Volume 2015 Article 195

2015

Intensive Archeological Survey of the 14.3-Acre Doughtie West Tract and Proposed Farm-to-Market Road 2978 Storm Water Detention Pond No. 4, Montgomery County, Texas

Jeffrey D. Owens

Intensive Archeological Survey of the 14.3-Acre Doughtie West Tract and Proposed Farm-to-Market Road 2978 Storm Water Detention Pond No. 4, Montgomery County, Texas

Intensive Archeological Survey of the 14.3-Acre Doughtie West Tract and Proposed Farm-to-Market Road 2978 Storm Water Detention Pond No. 4, Montgomery County, Texas

By:

Jeffrey D. Owens

Texas Antiquities Permit No. 6973
TxDOT Houston District CSJ No. 3050-02-028
HJN 120138.11 AR

Prepared for:

Toll Brothers, Inc.
Houston, Texas

Prepared by:

Horizon Environmental Services, Inc.
Austin, Texas

March 2015

Intensive Archeological Survey of the 14.3-Acre Doughtie West Tract and Proposed Farm-to-Market Road 2978 Storm Water Detention Pond No. 4, Montgomery County, Texas

By:

Jeffrey D. Owens

Prepared for:

Toll Brothers, Inc.
10110 W. Sam Houston Parkway North
Houston, Texas 77064

Prepared by:

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

Jeffrey D. Owens, Principal Investigator
HJN 120138.11 AR

Texas Antiquities Permit No. 6973
TxDOT Houston District CSJ No. 3050-02-028

March 2015

MANAGEMENT SUMMARY

Horizon Environmental Services, Inc. (Horizon) was selected by Toll Brothers, Inc. (Toll Brothers) on behalf of Montgomery County Municipal Utility District No. 137 (MCMUD137) to conduct an intensive archeological inventory survey and assessment of the approximately 5.8-hectare (14.3-acre) Doughtie West tract. The Doughtie West tract is located in a forested area between Farm-to-Market Road (FM) 2978 on the west and Conroe Huffsmith Road on the east, approximately 4.8 kilometers (3.0 miles) southwest of the community of Oklahoma in southwestern Montgomery County, Texas. MCMUD137 is proposing to construct and own an approximately 3.2-hectare (8.0-acre) storm water detention pond within the southern portion of this tract. According to an agreement between MCMUD137 and the Texas Department of Transportation (TxDOT), TxDOT would maintain an easement on this proposed detention basin for a share of the detention capacity (TxDOT refers to this project as FM 2978 Storm Water Detention Pond No. 4 [CSJ No. 3050-02-028]). Thus, the Area of Potential Effect (APE) of the current proposed undertaking consists of the 3.2-hectare (8.0-acre) footprint of the proposed storm water detention pond. Although detailed construction plans are not yet available, the maximum depth of excavations within the proposed detention pond footprint is not anticipated to exceed 2.4 meters (8.0 feet) below surface. While the APE of the proposed undertaking consists only of the 2.4-hectare (8.0-acre) footprint of the proposed detention basin, at the request of Toll Brothers and MCMUD137 Horizon surveyed the entire 5.8-hectare (14.3-acre) Doughtie West tract to provide information pertinent to future permitting activities that may be identified within the tract. The proposed project would be located entirely on privately owned land. No existing or proposed new TxDOT rights-of-way (ROW) would be involved in the project, though TxDOT would maintain a permanent easement for a share of the yield of the proposed storm water detention pond.

The proposed undertaking is being sponsored by MCMUD137, a political subdivision of the State of Texas; as such, the project falls under the jurisdiction of the Antiquities Code of Texas. In addition, TxDOT would maintain a permanent easement for a share of the yield of the proposed detention basin. Via the involvement of TxDOT and its parent agency, the Federal Highway Administration (FHWA), the project also falls under the jurisdiction of the National Historic Preservation Act (NHPA) of 1966, as amended. As the project represents a public undertaking with the potential to impact significant archeological resources, MCMUD137 and TxDOT are required to provide for an archeological resources inventory of the project's APE to assess the project's possible impacts on any archeological resources within the APE.

On July 29 and 30, 2014, Horizon archeological technicians Michael Mudd and Jared Wiersema, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive archeological survey of the APE to locate any archeological resources that potentially would be impacted by the proposed undertaking. The archeological investigation consisted of an archival review, an intensive pedestrian survey, subsurface investigations involving shovel testing and backhoe trenching, and the production of a report suitable for review by the State Historic Preservation Office (SHPO) in accordance with the Texas Historical Commission's (THC) Rules of Practice and Procedure, Chapter 26, Section 27, and the Council of Texas Archeologists' (CTA) Guidelines for Cultural Resources Management Reports. Approximately 8 person-hours were expended during the process of scoping the project, coordinating with regulatory agencies, and obtaining a Texas Antiquities Permit; approximately 32 person-hours were expended during the archeological survey fieldwork; approximately 8 person-hours were expended by laboratory and mapping personnel processing field data after completion of fieldwork; and 32 person-hours were expended compiling this technical report summarizing the findings of the survey. The survey was conducted under Texas Antiquities Permit No. 6973.

Horizon's archeologists traversed 100% of the tract and thoroughly inspected the modern ground surface for aboriginal and historic-age archeological resources. The project tract was moderately densely wooded with interspersed open areas resulting from prior clearing episodes. Vegetation generally consisted of a dense understory of shrubs and vines in a mixed forest composed of oaks, Chinese tallows, and pines, and visibility ranged from poor to fair (<30% to 50%) across most of the tract. A large, non-jurisdictional wetland occupies the approximate center of the project tract, and unnamed tributaries of Spring Creek flow through the southwestern and eastern portions of the project tract. Several overgrown 2-track roads traverse the project tract.

In addition, the Texas State Minimum Archeological Survey Standards (TSMASS) require excavation of 1 shovel test per 2 acres for projects between 11 and 100 acres in size. Thus, a total of 7 subsurface probes would be required within the overall 5.8-hectare (14.3-acre) Doughtie West tract. Horizon excavated a total of 16 subsurface probes during the survey, including 13 shovel tests and 3 backhoe trenches. Eight of the subsurface probes, including 6 shovel tests and 2 backhoe trenches, were excavated within the proposed storm water detention pond footprint, and the remaining 7 shovel tests and 1 backhoe trench were excavated in the northern portion of the overall tract outside of the proposed detention pond footprint. Thus, Horizon exceeded the TSMASS requirements for the overall project tract. As there are no publicly owned lands located within the project tract, all subsurface probes were excavated on private land.

No archeological resources, historic or prehistoric, were observed on the modern ground surface or in any of the shovel tests or backhoe trenches excavated during the survey. Sediments typically consisted of a moderately deep mantle of light brown, gray, and reddish-brown sandy loam, sand, and silty loam extending to depths ranging from 20.0 to 100.0 centimeters (7.9 to 39.4 inches) below surface (with a typical thickness of 40.0 to 80.0 centimeters [15.7 to 31.5 inches]) overlying dense clayey sediments. Holocene-age sediments with the potential to contain subsurface archeological deposits were fully penetrated

in the majority of subsurface probes. A large, cleared area dotted with piles of construction debris is present in the northwestern corner of the project tract fronting onto FM 2978 to the west. This area represents the former site of 3 to 4 modern farm outbuildings and a gravel driveway. Examination of historic US Geological Survey (USGS) topographic quadrangles and Google Earth aerial photographs indicate that these structures were constructed between 1979 and 1989 and demolished between 2013 and 2014, and are thus not of historic age. No historic-age cultural materials (i.e., 45 years of age or older) were observed in the debris piles resulting from the demolition of these structures.

Based on the results of the survey-level investigations documented in this report, no potentially significant archeological resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good-faith effort to identify archeological historic properties within the APE. No archeological resources were identified within the 3.2-hectare (8.0-acre) footprint of the proposed storm water detention pond, which represents the current project's APE, or within the larger 5.8-hectare (14.3-acre) Doughtie West tract that meet the criteria for listing on the National Register of Historic Places (NRHP) according to 36 CFR 60.4 or for designation as State Antiquities Landmarks (SAL) according to 13 TAC 26, and no further archeological work is recommended in connection with the proposed undertaking. However, it should be noted that human burials, historic and prehistoric, are protected under the Texas Health and Safety Code. In the event that any human remains or burial objects are inadvertently discovered at any point during construction, use, or ongoing maintenance, even in previously surveyed areas, all work should cease immediately, and the THC should be notified of the discovery.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

1.0 INTRODUCTION

Horizon Environmental Services, Inc. (Horizon) was selected by Toll Brothers, Inc. (Toll Brothers) on behalf of Montgomery County Municipal Utility District No. 137 (MCMUD137) to conduct an intensive archeological inventory survey and assessment of the approximately 5.8-hectare (14.3-acre) Doughtie West tract. The Doughtie West tract is located in a forested area between Farm-to-Market Road (FM) 2978 on the west and Conroe Huffsmith Road on the east, approximately 4.8 kilometers (3.0 miles) southwest of the community of Oklahoma in southwestern Montgomery County, Texas (Figures 1 and 2). MCMUD137 is proposing to construct and own an approximately 3.2-hectare (8.0-acre) storm water detention pond within the southern portion of this tract (see Figures 1 and 2). According to an agreement between MCMUD137 and the Texas Department of Transportation (TxDOT), TxDOT would maintain an easement on this proposed detention basin for a share of the detention capacity (TxDOT refers to this project as FM 2978 Storm Water Detention Pond No. 4 [CSJ No. 3050-02-028]). Thus, the Area of Potential Effect (APE) of the current proposed undertaking consists of the 3.2-hectare (8.0-acre) footprint of the proposed storm water detention pond. Although detailed construction plans are not yet available, the maximum depth of excavations within the proposed detention pond footprint is not anticipated to exceed 2.4 meters (8.0 feet) below surface. While the APE of the proposed undertaking consists only of the 2.4-hectare (8.0-acre) footprint of the proposed detention basin, at the request of Toll Brothers and MCMUD137 Horizon surveyed the entire 5.8-hectare (14.3-acre) Doughtie West tract to provide information pertinent to future permitting activities that may be identified within the tract. The proposed project would be located entirely on privately owned land. No existing or proposed new TxDOT rights-of-way (ROW) would be involved in the project, though TxDOT would maintain a permanent easement on the yield of the proposed storm water detention pond.

The proposed undertaking is being sponsored by MCMUD137, a political subdivision of the State of Texas; as such, the project falls under the jurisdiction of the Antiquities Code of Texas. In addition, TxDOT would maintain a permanent easement for a share of the yield of the proposed detention basin. Via the involvement of TxDOT and its parent agency, the Federal Highway Administration (FHWA), the project also falls under the jurisdiction of the National Historic Preservation Act (NHPA) of 1966, as amended. As the project represents a public undertaking with the potential to impact significant archeological resources, MCMUD137 and TxDOT are required to provide for an archeological resources inventory of the project's APE to assess the project's possible impacts on any archeological resources within the APE.

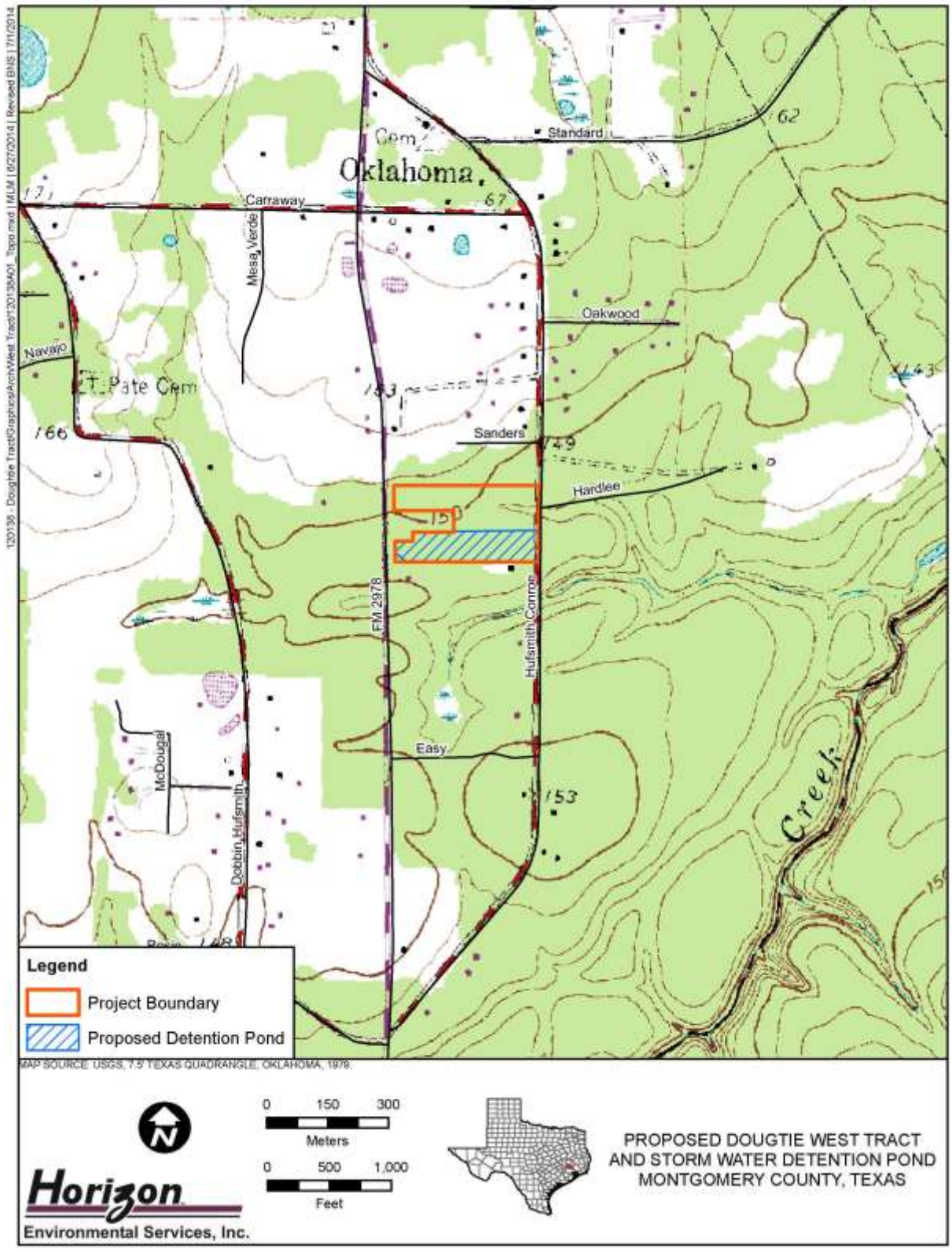

Figure 1. Location of Project Tract on USGS Topographic Quadrangle

Figure 2. Location of Project Tract on Aerial Photograph

On July 29 and 30, 2014, Horizon archeological technicians Michael Mudd and Jared Wiersema, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive archeological survey of the APE to locate any archeological resources that potentially would be impacted by the proposed undertaking. The archeological investigation consisted of an archival review, an intensive pedestrian survey, subsurface investigations involving shovel testing and backhoe trenching, and the production of a report suitable for review by the State Historic Preservation Office (SHPO) in accordance with the Texas Historical Commission's (THC) Rules of Practice and Procedure, Chapter 26, Section 27, and the Council of Texas Archeologists' (CTA) Guidelines for Cultural Resources Management Reports. Approximately 8 person-hours were expended during the process of scoping the project, coordinating with regulatory agencies, and obtaining a Texas Antiquities Permit; approximately 32 person-hours were expended during the archeological survey fieldwork; approximately 8 person-hours were expended by laboratory and mapping personnel processing field data after completion of fieldwork; and 32 person-hours were expended compiling this technical report summarizing the findings of the survey. The survey was conducted under Texas Antiquities Permit No. 6973.

Following this introductory chapter, Chapters 2.0 and 3.0 present the environmental and cultural backgrounds, respectively, of the project tract. Chapter 4.0 describes the results of background archival research, and Chapter 5.0 discusses archeological survey methods. Chapter 6.0 presents the results of the archeological survey, and Chapter 7.0 presents archeological management recommendations for the project. Chapter 8.0 lists the references cited in the report, Appendix A summarizes shovel test data, and Appendix B summarizes backhoe trenching data.

2.0 ENVIRONMENTAL SETTING

2.1 PHYSIOGRAPHY AND HYDROLOGY

The Doughtie West tract is located approximately 4.8 kilometers (3.0 miles) southwest of the community of Oklahoma in southwestern Montgomery County, Texas. Montgomery County is situated on the Gulf Coastal Plain in southeastern Texas, which is a structural basin formed by lithosphere deformation. The Texas Coastal Plain, which extends as far north as the Ouachita uplift in southern Oklahoma and westward to the Balcones Escarpment, consists of seaward-dipping bodies of sedimentary rock, most of which are of terrigenous clastic origin, that reflect the gradual infilling of the basin from its margins (Abbott 2001). The Houston area is underlain by rocks and unconsolidated sediments that are quite young in a geological sense, ranging from modern to Miocene in age. These consist predominantly of a series of fluviodeltaic bodies arranged in an offlapped sequence, with interdigitated and capping eolian, littoral, and estuarine facies making up a relatively minor component of the lithology. Major bounding disconformities between these formations are usually interpreted to represent depositional hiatuses that occurred during periods of sea level low stand. The oldest rocks in this fill are of Late Cretaceous age. As a result of the geometry of basin filling, successively younger rock units crop out in subparallel bands from the basin margin toward the modern coastline.

Physiographically, the Doughtie West tract is situated on an alluvial terrace located north of an unnamed, intermittent tributary of Spring Creek, which forms part of the West Fork of the San Jacinto River watershed. Two minor arms of this unnamed tributary flow generally southeastwards through the southwestern corner and the eastern portion of the tract. Elevations within the tract are relatively flat, ranging from approximately 44.2 to 45.7 meters (145.0 to 150.0 feet) above mean sea level.

2.2 GEOLOGY AND GEOMORPHOLOGY

Geologically, the Doughtie West tract is situated on the mid-Pleistocene-age Lissie Formation (Ql) (Barnes 1992). The Lissie Formation consists of gently rolling, fluviatile deposits of clay, silt, and sand, with a minor component of siliceous gravels. Specifically, the project tract is situated on Boy loamy fine sand, 1 to 5% slopes (Bo), which consists of deep deposits of loamy alluvium on stream terraces (Figure 3; Table 1) (NRCS 2014). A typical profile of this soil

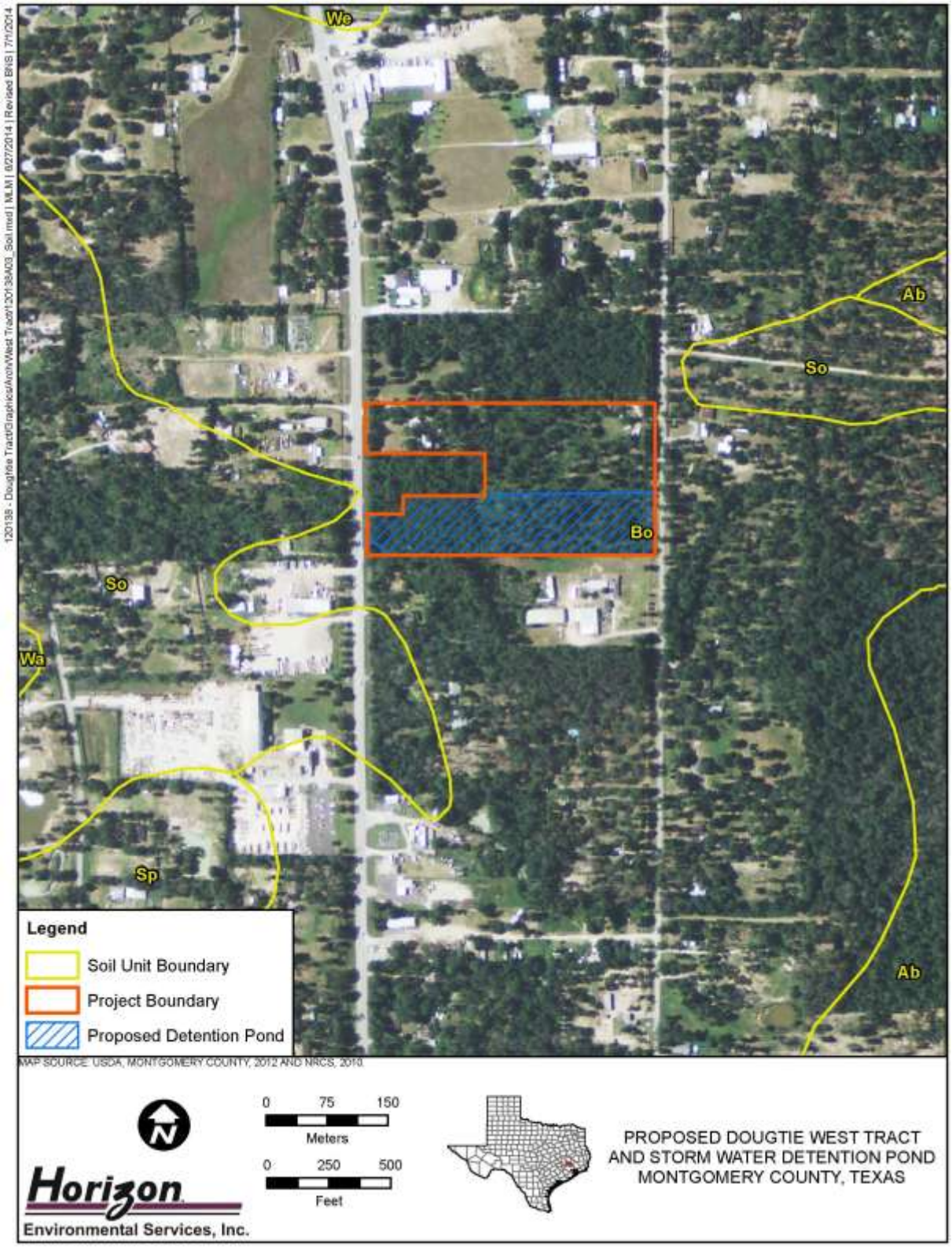

Figure 3. Distribution of Mapped Soils within Project Tract

Table 1. Summary of Mapped Soils in Area of Project Tract

NRCS Soil Code	Soil Name	Parent Material	Typical Profile	Location within Tract
Bo	Boy loamy fine sand, 1 to 5% slopes	Loamy alluvium	0-7 in: Fine sand 7-31 in: Fine sand 31-49 in: Fine sand 49-73 in: Fine sandy loam 73-80 in: Fine sandy loam	Entirety of tract

Source: NRCS 2014

APE = Area of Potential Effect

in = Inches

NRCS = Natural Resources Conservation Service

unit consists of approximately 78.7 centimeters (31.0 inches) of fine sand underlain by fine sandy loam extending to a depth of at least 203.2 centimeters (80.0 inches) below surface.

In Southeast Texas, aboriginal archeological resources are commonly found in upland settings and on alluvial terraces adjacent to prominent streams and springs. Based on the physiographic setting of the current project tract on alluvial terraces adjacent to a tributary of Spring Creek and the proximity to Spring Creek proper, the project tract was considered to possess moderate to high potential to contain aboriginal archeological resources. Historic-age archeological resources may occur in virtually any physiographic setting. The location of the project tract in a rural setting near the community of Oklahoma and FM 2978, which bridges Spring Creek approximately 1.4 kilometers (0.9 miles) south of the project tract, suggested at least some potential for historic-age archeological resources.

According to TxDOT's Potential Archeological Liability Map (PALM) for the Houston District, the project tract is located in Map Unit 2 (Abbott 2001). Map Unit 2 is described as follows:

> Map Unit 2: Surface Survey Recommended, No Deep Reconnaissance Recommended.
>
> This map unit is characteristic of Holocene-age, alluvial, eolian, or colluvial veneer deposits that exhibit low to moderate evidence of disturbance and rest on Pleistocene landforms….[T]he phrase "surface survey" includes shovel testing (Abbott 2001:156)

2.3 CLIMATE

Evidence for climatic change from the Pleistocene to the present is most often obtained through studies of pollen and faunal sequences (Bryant and Holloway 1985; Collins 1995). While the paleoclimatic history of the coastal region remains unclear, Bryant and Holloway (1985) present a sequence of climatic change for nearby east-central Texas that includes 3 separate climatic periods—the Wisconsin Full Glacial Period (22,500 to 14,000 B.P.), the Late Glacial Period (14,000 to 10,000 B.P.), and the Post-Glacial Period (10,000 B.P. to present).

Evidence from the Wisconsin Full Glacial Period suggests that the climate in east-central Texas was considerably cooler and more humid than at present. Pollen data indicate that the region was more heavily forested in deciduous woodlands than during later periods (Bryant and Holloway 1985). The Late Glacial Period was characterized by slow climatic deterioration and a slow warming and/or drying trend (Collins 1995). In east-central Texas, the deciduous woodlands were gradually replaced by grasslands and post oak savannas (Bryant and Holloway 1985). During the Post-Glacial Period, the east-central Texas environment appears to have been more stable. The deciduous forests had long since been replaced by prairies and post oak savannas. The drying and/or warming trend that began in the Late Glacial Period continued into the mid-Holocene, at which point there appears to have been a brief amelioration to more mesic conditions lasting from roughly 6000 to 5000 B.P. Recent studies by Bryant and Holloway (1985) indicate that modern environmental conditions in east-central Texas were probably achieved by 1,500 years ago.

The modern climate of the upper Texas coast, including the region surrounding Houston, is classified as subtropical humid (Abbott 2001; Larkin and Bomar 1983), forming a transitional zone between the humid southeastern US and the semiarid to arid west. The climate reflects the influences of latitude, low elevation, and proximity to the Gulf of Mexico, which combine with the urban heat island formed by the tremendous concentration of asphalt and concrete to give the Houston area a notorious modern climate that is oppressively warm and moist throughout much of the year. As a result of proximity to the Gulf and the abundance of surface water, humidity in the early morning can approach 100% even on cloudless summer days, and it often exceeds 50% even on the warmest afternoons. Largely as a consequence of the relatively high humidity characteristic of the region, temperature patterns exhibit a moderate annual range and a modest diurnal range that increases slightly with distance from the coast. Average monthly high temperature ranges from a low of 17 to 19°Celcius (°C) (59 to 63°Fahrenheit [°F]) in January to a high of 38 to 40°C (89 to 96°F) in August. Average monthly lows range from 4 to 9°C (38 to 47°F) in January to 25 to 29°C (72 to 79°F) in July and August. Annually, average low temperatures range from 15 to 21°C (56 to 65°F), and average high temperatures range from 27 to 29°C (75 to 79°F) (Abbott 2001; Larkin and Bomar 1983).

The Houston region experiences 2 precipitation peaks throughout the year (Abbott 2001). The first occurs in the late spring (i.e., May to June) due to the passage of infrequent cold fronts that spawn chains of powerful frontal thunderstorms. The second occurs in the late summer to early autumn (i.e., August to September) due to the incidence of tropical storms and hurricanes from the Atlantic and, occasionally, Pacific oceans. In contrast, winter and early spring are relatively dry, and high summer rainfall is dominated by convectional thunderstorms that are relatively brief and localized, albeit frequently intense. Average annual precipitation varies from a low of approximately 100.0 centimeters [cm] (40.0 inches) to a high of more than 132.0 cm (52.0 inches). Average monthly precipitation varies from less than 5.0 to 8.0 cm (2.0 to 3.0 inches) in March to more than 19.0 cm (7.5 inches) occurring locally on the coast during September. Almost all of the measurable precipitation falls as rain—snowfall is extremely rare, occurring in measurable amounts in only 1 in 10 years.

2.4 FLORA AND FAUNA

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

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

The coastal prairie category consists primarily of grasses with minor amounts of forbs and woody plants in areas that are not saturated on a seasonal basis (Abbott 2001:24-26). This community is characteristic of upland areas and grades into the pine-hardwood forest to the north and east and into the coastal marsh/barrier island to the south. A wide variety of grasses are found in the prairie environments, but the principal taxa include big bluestem, little bluestem, indiangrass, eastern grama, switchgrass, brownseed paspalum, sideoats grama, silver bluestem, buffalograss, threeawn, and Texas wintergrass. Common forbs include Maximilian sunflower, Engelmann daisy, blacksalmon, penstemon, dotted gayfeather, bundleflower, yellow neptunia, snoutbean, prairie clover, tick clover, wild bean, western indigo, paintbrush, bluebonnet, ragweed, croton, milkweed, vetch, verbena, and winecup. Woody plants occurring in the coastal prairie include mesquite, honey locust, huisache, eastern baccharis, sesbania, live oak, elm, hackberry, bumelia, and coralberry. The frequency of trees increases dramatically as the coastal prairie grades into the pine-hardwood forest, forming an open woodland environment with common stands of hardwood trees and occasional pines. The coastal prairie is home to a diverse fauna, including coyote, white-tailed deer, skunks, cottontail rabbit, many small rodents, amphibians and reptiles, and a variety of permanent and migratory birds. Bison and pronghorn were also present at various times in the past.

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

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

3.0 CULTURAL BACKGROUND

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The earliest European explorer of what became Montgomery County was probably the Frenchman René Robert Cavelier, Sieur de La Salle, who evidently passed through the area in 1687[1]. When news of French incursions reached Spanish authorities, they sent several expeditions to the region to reclaim it for Spain. During the mid-19th century the Spanish made several attempts to establish settlements in the area and eventually set up 3 missions on the

[1] The following history of Montgomery County, Texas, is adapted from TSHA (2014).

banks of Spring Creek within the current boundaries of Montgomery County, but the missions were abandoned in 1756 and no permanent Spanish settlements were established. The future Montgomery County area was included in the colonization contracts issued by Spanish and later Mexican authorities to *empresario* Stephen F. Austin, and, during the early 1820s, Anglo-American settlers began moving into the region. Forty-two families of Austin's colony obtained land titles from the Mexican government and settled in western Montgomery County. Among the earliest settlers was Andrew Montgomery, who established a trading post at the crossroads of the Loma del Toro and lower Coushatta traces. He was soon joined by relatives and others, and the settlement eventually grew into the town of Montgomery. During the early 1830s, the population of the region increased rapidly, and, in December 1837, the Republic of Texas Congress established Montgomery County, which was named for its largest settlement. The new county was carved from Washington County, and its borders originally extended from the Brazos River on the west to the Trinity on the east, and from the Old San Antonio Road on the north to the San Jacinto River on the south, an area that included future Grimes, Walker, San Jacinto, Madison, and Waller counties. The county's present boundaries were established after the establishment of Waller County in 1870.

On the eve of the Civil War, Montgomery County was in most ways typical of the counties of the region, decidedly Southern in character and outlook, with a rapidly developing plantation economy. Montgomery remained the largest town, but several other trading centers had emerged, including Danville, Bay's Chapel, Cincinnati, and Waverly. Methodist minister I.L.G. Strickland began preaching in Montgomery in the early 1840s, and, in the early 1850s, Baptists had organized the first church there. Several private schools also began operating during the 1850s, including the Montgomery Academy, which earned a reputation as one of the preeminent schools of the region. The Civil War and its aftermath brought profound changes to the county. Not surprisingly, given its large number of slaveholders, Montgomery County's citizens overwhelmingly supported the Southern cause, and nearly 80% (318 of 416) of those who went to the polls cast their votes in favor of secession. The county's men volunteered for the Confederate army in large numbers, a sizeable number of them serving in the Fourth Texas Regiment of Hood's Texas Brigade; others joined Terry's Texas Rangers (Eighth Texas Cavalry). Many of the early volunteers saw considerable action during the war, and as many as 3/4 of them were killed or injured before war's end. For those who remained at home, there were other problems to deal with, including lack of markets for goods, shortages, and wild fluctuations in Confederate currency. The end of the war brought wrenching changes to the county's economy. For many of Montgomery County's white inhabitants, the abolition of slavery meant devastating economic loss. Prior to the Civil War, slaves had constituted nearly half of all taxable property in the county, and their loss, coupled with a decline in property values, caused a profound disruption for most planters. The African-American population of Montgomery County fared even worse. Most blacks left the farms owned by their former masters to seek better working and living conditions; however, for the vast majority, the change brought only marginal improvement. Most ended up working as agricultural laborers or as sharecroppers, receiving 1/3 or 1/2 of the crop for their labors.

Montgomery County escaped much of the strife that many other Texas counties experienced during Reconstruction. No permanent federal garrison was stationed in the county,

and there was no Freedmen's Bureau. Citizens nevertheless chafed under local Republican rule, and there were isolated acts of violence and intimidation directed at African-American officials. By the early 1870s, the local white elite had once more gained control of the county's affairs, and, through the use of the White Primary, literacy tests, and threats, managed to effectively disenfranchise the black population until the 1960s. Like most of the counties in the state, Montgomery County experienced a prolonged post-war agricultural depression. During the Civil War, prices for cotton had skyrocketed, and landowners had planted ever-increasing amounts of land in cotton to reap the benefits. After the war, falling prices and the loss of cheap slave labor combined to severely depress the local economy. To make ends meet, many landowners opted to grow even more cotton, badly depleting the soil in the process. By the 1880s, the soil in many areas of the county was so poor that cotton yields were as low as 1/3 to three-quarters of a bale per acre. Some farmers turned to livestock-raising or other small grains, such as corn and wheat, but cotton nevertheless remained the county's leading cash crop until the end of the century.

The county's economy began to recover in the 1870s and early 1880s with the construction of several railroads. In 1871, the International-Great Northern Railroad was built across the county; in 1879, a narrow-gauge line known as the Houston, East, and West Texas was constructed; and, in 1880, the Houston and Texas Central built a branch line from Navasota to Montgomery and extended eastward to Conroe. The construction of the railroads touched off an intense controversy concerning the location of the county seat. The first railroad missed the town of Montgomery. Willis, a new town on the railroad, was voted county seat in 1874, but the county seat was moved back to Montgomery in 1880, after the Houston and Texas Central was built. In 1889, however, the county seat was moved to the fledgling community of Conroe, which was situated at the junction of the International-Great Northern and the newly built Gulf, Colorado, and Santa Fe Railway. The construction of the railroads also sparked a major period of expansion in the county. Numerous new towns grew up, and the population, which had risen only slightly since the Civil War, saw a marked increase. Despite the loss of considerable territory due to the splitting off of several new counties, the number of residents grew from 6,483 to 10,154 between 1870 and 1880, and population increased to more than 17,000 over the next 2 decades.

The construction of the railroads also marked the beginnings of the county's great lumbering boom. Commercial lumbering had begun in the county prior to the Civil War, but the lack of easy access to river or rail transportation severely hampered efforts to exploit the area's rich timber resources. With the arrival of the railroads, however, lumbering quickly developed into a major industry. By 1882, 45 steam sawmills were in operation, and lumbering emerged as the county's largest source of income within a short time. The lumber boom gave rise to numerous new communities, including Bobville, Cowl Spur, Dobbin, Egypt, Fostoria, Honea, Karen, Keenan, Mostyn, Leonides, and Security, all of which developed as lumber shipping points or mill sites. The boom also helped to transform the county in other ways. As late as the early 1870s, 80% of the county was still covered by thick pine forests. Over the next 4 decades, much of the county was deforested, permanently altering the landscape and opening the way for a steady increase in livestock-raising and farming.

The agricultural economy, which had been on the wane since the Civil War, began to recover in the 1880s. Spurring its growth was the introduction of tobacco, which began to be planted in large quantities in the 1890s. Much of the tobacco was a fine-grade variety known as *Vuelta Abajo*, grown from seeds imported each year from Cuba. The center of the industry was Willis, which had 7 cigar factories by 1895. High railroad shipping costs and the high initial investment and labor involved in curing and sweating the tobacco, however, discouraged many farmers; between 1898 and 1901, the amount of land given over to tobacco production fell dramatically from more than 1,000 acres to only 70. The subsequent lifting of a US tariff on Cuban tobacco, which had kept prices artificially high, finally ended the experiment, and no tobacco was being grown in the county within a few years. The agricultural economy stagnated at the turn of the century; however, by 1910, it began to show slow but steady growth.

The county, however, experienced a dramatic reversal of fortune in 1932, when oil was discovered southeast of Conroe. Evidence of oil had been found in the county as early as 1901, when Santa Fe Railroad engineers drilled a water well and noted traces of oil. Natural gas was found southwest of Conroe in 1924, and several major oil companies acquired leases in the area. The initial tests, however, were unsuccessful, and the companies lost interest. In August 1931, however, wildcatter George William Strake began drilling a test well southeast of Conroe and, on 13 December of the same year, hit oil; by June 1932, Strake had brought in a second, even larger well, which was spewing out more than 900 barrels daily. The discovery immediately triggered a tremendous oil boom. Within days, thousands of fortune-seekers, wildcatters, financiers, roughnecks, and hangers-on flooded the area. The population of Conroe, estimated at 2,500 in December 1931, blossomed to more than 10,000 within a few months. At the beginning of 1933, more than 100 wells had been drilled, and more that 25,000 barrels per day were being produced; by the end of the year, the number of producing wells had grown to 679, and the daily output was more than 52,000 barrels. Oil was subsequently discovered in several other areas of the county, and the combined oilfields of Montgomery County made it one of the richest oil-producing areas in the nation. Although the vast majority of Montgomery County residents did not benefit directly from the oil discovery, oil money contributed to a general prosperity that helped offset the worst effects of the depression. Proceeds from the oil also helped to remake the face of the county. Roads were graded and paved, new schools were built, and public buildings and monuments were erected. Conroe experienced a construction boom as numerous new buildings, including banks, offices, and homes, were erected with oil money. The population of the county swelled during the boom, growing by nearly 10,000 between 1930 and 1940, increasing from 14,588 to 23,055. The prosperity continued during the years of World War II. Oil refineries and a carbon black manufacturing plant were built, and efforts were intensified to produce as much oil as possible for the war effort. After the war, oil production declined somewhat, but it has remained one of the county's leading sources of income; in 1990 alone, more than 2.7 million barrels of oil were produced.

4.0 ARCHIVAL RESEARCH

Prior to initiating fieldwork, Horizon performed background archival research on the Texas Historical Commission's (THC) online *Texas Archeological Site Atlas* (Atlas) for information on previously recorded cultural resources sites and historic properties in and near the proposed project tract as well as previous cultural resources investigations conducted in the vicinity of the proposed project tract. Based on this archival research, 5 known archeological sites and 2 cemeteries are located within a 1.6-kilometer (1.0-mile) radius of the proposed project tract (Figure 4; Table 2) (NPS 2014; THC 2014). No historic properties listed on the National Register of Historic Places (NRHP) or designated as State Antiquities Landmarks (SAL) were identified within the archival review area.

Three of the 5 previously recorded archeological sites (41HR626, 41HR627, and 41HR981) consist of aboriginal lithic artifact scatters of undetermined prehistoric age. Two of these 3 prehistoric sites (41HR626 and 41HR627) were recommended as potentially eligible for inclusion in the NRHP and for designation as SALs based on their research potential, though final determinations of eligibility have not been made for these sites. The third prehistoric site (41HR981) was recommended as ineligible for inclusion in the NRHP and for designation as an SAL. Aboriginal cultural resources on these 3 sites were encountered at depths ranging from 40.0 centimeters (15.7 inches) to at least 100.0 centimeters (39.4 inches) below surface (possibly extending deeper than 100 centimeters [39.4 inches] below surface on site 41HR981). The remaining 2 of the 5 previously recorded archeological sites (41MQ301 and 41MQ302) actually were determined to represent 2 portions of a single early 20th-century historic-age farmstead of undetermined eligibility for inclusion in the NRHP and for designation as an SAL. All of these previously recorded archeological sites are located well beyond the boundaries of the current project tract and would have no potential to be disturbed as a result of the proposed undertaking. No known cultural resources sites are located within or adjacent to the current project tract.

Of the 2 cemeteries identified within the archival research area (the Oklahoma and Pape cemeteries), the Oklahoma Cemetery is a Historic Texas Cemetery. Both cemeteries are located at distances ranging from 0.8 to 1.0 kilometers (0.5 to 0.6 miles) away from the proposed project tract and would have no potential to be adversely affected by the proposed undertaking.

SENSITIVE SITE LOCATION DATA OMITTED

Figure 4. Known Archeological Sites and Cemeteries within 1 Mile of Project Tract

Table 2. Previously Recorded Archeological Sites within 1 Mile of Project Tract

Site No./Name	Site Type	NRHP/SAL Eligibility Status	Distance/Direction from APE	Potential to be Impacted by Project?
Archeological Sites				
41HR626	Aboriginal lithic scatter (undetermined prehistoric)	Recommended eligible	0.9 miles east	No
41HR627	Aboriginal lithic scatter (undetermined prehistoric)	Recommended eligible	1.0 miles south-southeast	No
41HR981	Aboriginal lithic scatter (undetermined prehistoric)	Ineligible	1.0 miles south	No
41MQ301	Historic-age farmstead (early 20th-century)	Undetermined	0.4 miles north-northeast	No
41MQ302	Historic-age farmstead (early 20th-century)	Undetermined	0.3 miles east	No
Cemeteries				
Oklahoma Cemetery (MQ-C002)	Historic Texas Cemetery	Undetermined	0.6 miles north	No
Pate Cemetery (MQ-C032)	Cemetery	Undetermined	0.5 miles west-northwest	No

APE = Area of Potential Effect
NRHP National Register of Historic Places
SAL = State Antiquities Landmark

According to the THC's Atlas, no portion of the proposed 5.8-hectare (14.3-acre) Doughtie West tract or the 3.2-hectare (8.0-acre) footprint of the proposed storm water detention pond, as currently designed, has been previously surveyed for cultural resources. In 2012 and 2014, HRA Gray & Pape, LLC (HRA Gray & Pape) conducted 2 cultural resources surveys associated with the proposed expansion of FM 2978 that included areas adjacent to the current project tract (Figure 5). The 2012 survey was conducted under Texas Antiquities Permit No. 6053 (Bludau and Valenti 2012), and the 2014 survey was conducted under Texas Antiquities Permit No. 6625 (Bludau and Valenti 2014). Apparently, the 2014 survey covered much of the same territory as the earlier 2012 survey and was occasioned by some design changes that expanded the overall scope of the project. During these 2 surveys, 3 areas located adjacent to the current project tract were surveyed—(1) the existing FM 2978 ROW, (2) a narrow segment of proposed new ROW measuring approximately 7.6 meters (25.0 feet) in width located along the eastern side of FM 2978, and (3) an approximately 0.8 hectare (2.0-acre) block located off the eastern side of FM 2978 that is surrounded by the Doughtie West tract, as currently defined. The latter block-area survey was conducted within an earlier proposed location for a TxDOT storm water detention pond that was not constructed (i.e., TxDOT elected not to construct that pond in lieu of sharing an easement with MCMUD137 on

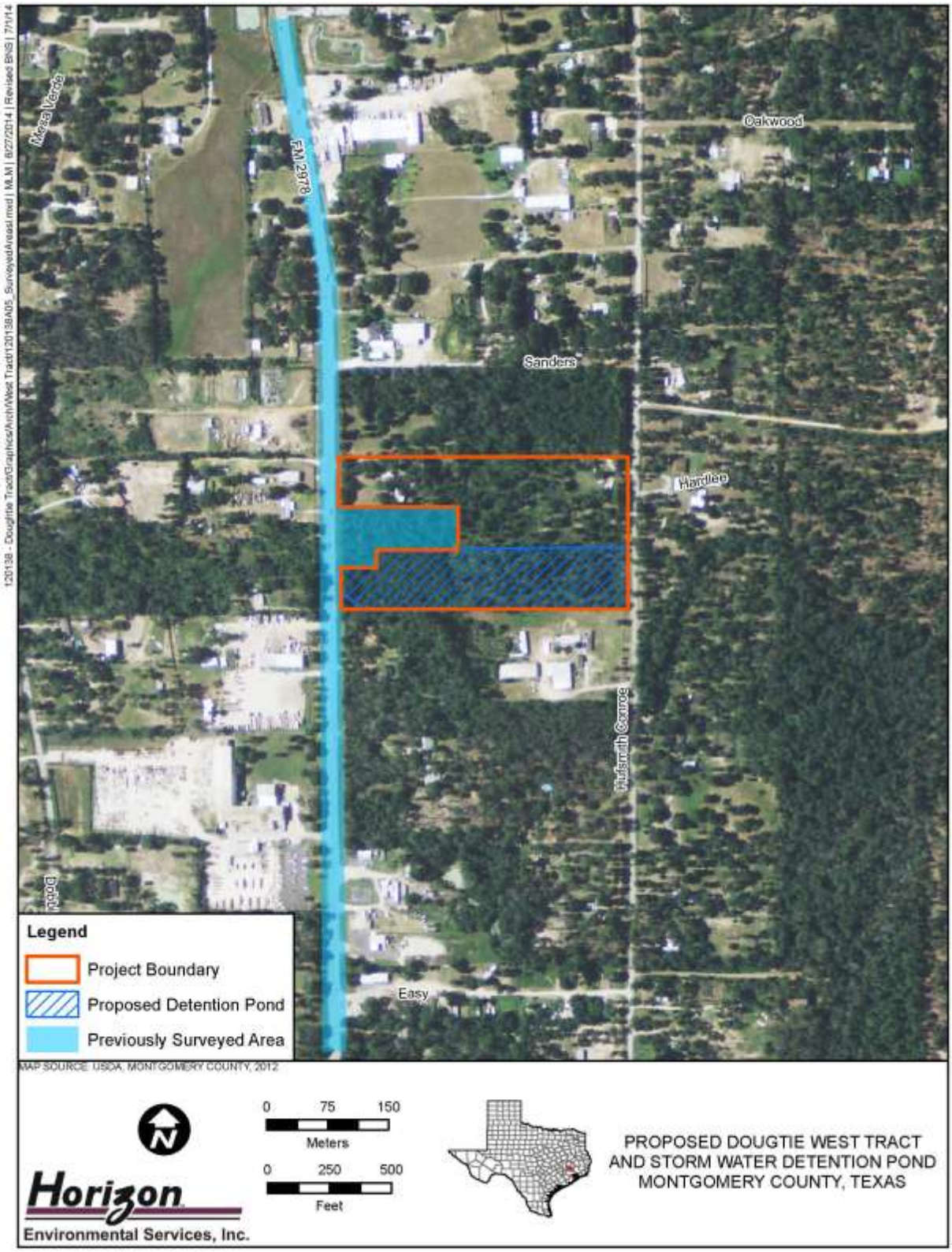

Figure 5. Previous Cultural Resources Surveys Conducted Adjacent to Project Tract

the current proposed detention basin). No cultural resources were discovered within or in the vicinity of the current project tract during these prior surveys.

Recent aerial imagery shows the remnants of a small cluster of structures, apparently outbuildings associated with a nearby farmstead, in the northwestern corner of the overall 5.8-hectare (14.3-acre) Doughtie West tract but outside the boundaries of the proposed 3.2-hectare (8.0-acre) APE associated with the proposed detention pond (see Figure 2). These structures do not appear on the 1962 or 1979 versions of the USGS's Oklahoma, Texas, 7.5-minute topographic quadrangle, though they are visible on a Google Earth aerial photograph from 1989. As such, these structures appear to have been constructed between 1979 and 1989 and, therefore, are not of historic age. Google Earth aerial imagery shows that these structures were demolished between 2013 and 2014 and are no longer standing. No other standing structures are visible within the 5.8-hectare (14.3-acre) Doughtie West tract or within the 3.2-hectare (8.0-acre) APE associated with the proposed detention pond on historic aerial photographs or topographic maps. As such, the proposed project tract is considered to possess low potential for historic-age archeological or architectural resources.

Historic aerial photographs show that the area immediately surrounding the cluster of structures in the northwestern corner of the Doughtie West tract has been cleared of vegetation since at least 1989, and some degree of disturbance associated with construction and use of the modern farmstead in this area is expected. The rest of the tract is relatively densely wooded, and historic aerial photographs suggest that the wooded areas have remained largely unmodified since at least 1944, the date of the earliest aerial image available on Google Earth. As such, while some degree of disturbance is expected in the northwestern corner of the overall 5.8-hectare (14.3-acre) project tract, the rest of the project tract, including the 3.2-hectare (8.0-acre) proposed detention pond footprint, appears to be largely intact.

5.0 SURVEY METHODOLOGY

On July 29 and 30, 2014, Horizon archeological technicians Michael Mudd and Jared Wiersema, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive archeological survey of the project tract to locate any archeological resources that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed 100% of the tract and thoroughly inspected the modern ground surface for aboriginal and historic-age archeological resources. The majority of the project tract was moderately densely wooded (Figure 6) with interspersed open areas resulting from prior clearing episodes (Figures 7 and 8). Vegetation generally consisted of a dense understory of shrubs and vines in a mixed forest composed of oaks, Chinese tallows, and pines, and visibility ranged from poor to fair (<30% to 50%) across most of the tract. A large, non-jurisdictional wetland occupies the approximate center of the project tract, and unnamed tributaries of Spring Creek flow through the southwestern and eastern portions of the project tract (Figure 9). Several overgrown 2-track roads traverse the project tract.

In addition, the Texas State Minimum Archeological Survey Standards (TSMASS) require excavation of 1 shovel test per 2 acres for projects between 11 and 100 acres in size. Thus, a total of 7 subsurface probes would be required within the overall 5.8-hectare (14.3-acre) Doughtie West tract. Horizon excavated a total of 16 subsurface probes during the survey, including 13 shovel tests and 3 backhoe trenches (Figure 10). Eight of the subsurface probes, including 6 shovel tests and 2 backhoe trenches, were excavated within the proposed storm water detention pond footprint, and the remaining 7 shovel tests and 1 backhoe trench were excavated in the northern portion of the overall tract outside of the proposed detention pond footprint. Thus, Horizon exceeded the TSMASS requirements for the overall project tract. As there are no publicly owned lands located within the project tract, all subsurface probes were excavated on private land.

Shovel tests generally measured 30.0 centimeters (11.8 inches) in diameter and were excavated to a target depth of 1.0 meters (3.3 feet) below surface, to the top of pre-Holocene deposits, or to the maximum depth practicable. In practice, most shovel tests were terminated at depths ranging from 50.0 to 80.0 centimeters (19.7 to 31.5 inches) below surface due to the presence of dense, pre-Holocene clay sediments, though a few shovel tests achieved the target depth of 1.0 meters (3.3 feet) below surface. All sediments were screened through 6.35-millimeter (mm) (0.25-inch) hardware cloth. Standard shovel test logs were completed for each shovel test describing the location, strata, soil texture and color, archeological materials, and

Figure 6. Typical View of Heavily Wooded Portions of Project Tract (Facing SE)

Figure 7. Typical View of Previously Cleared Portions of Project Tract (Facing NE)

Figure 8. Push Piles from Previous Clearing Activities in Project Tract (Facing N)

Figure 9. Unnamed Tributary in Southwestern Corner of Project Tract (Facing NW)

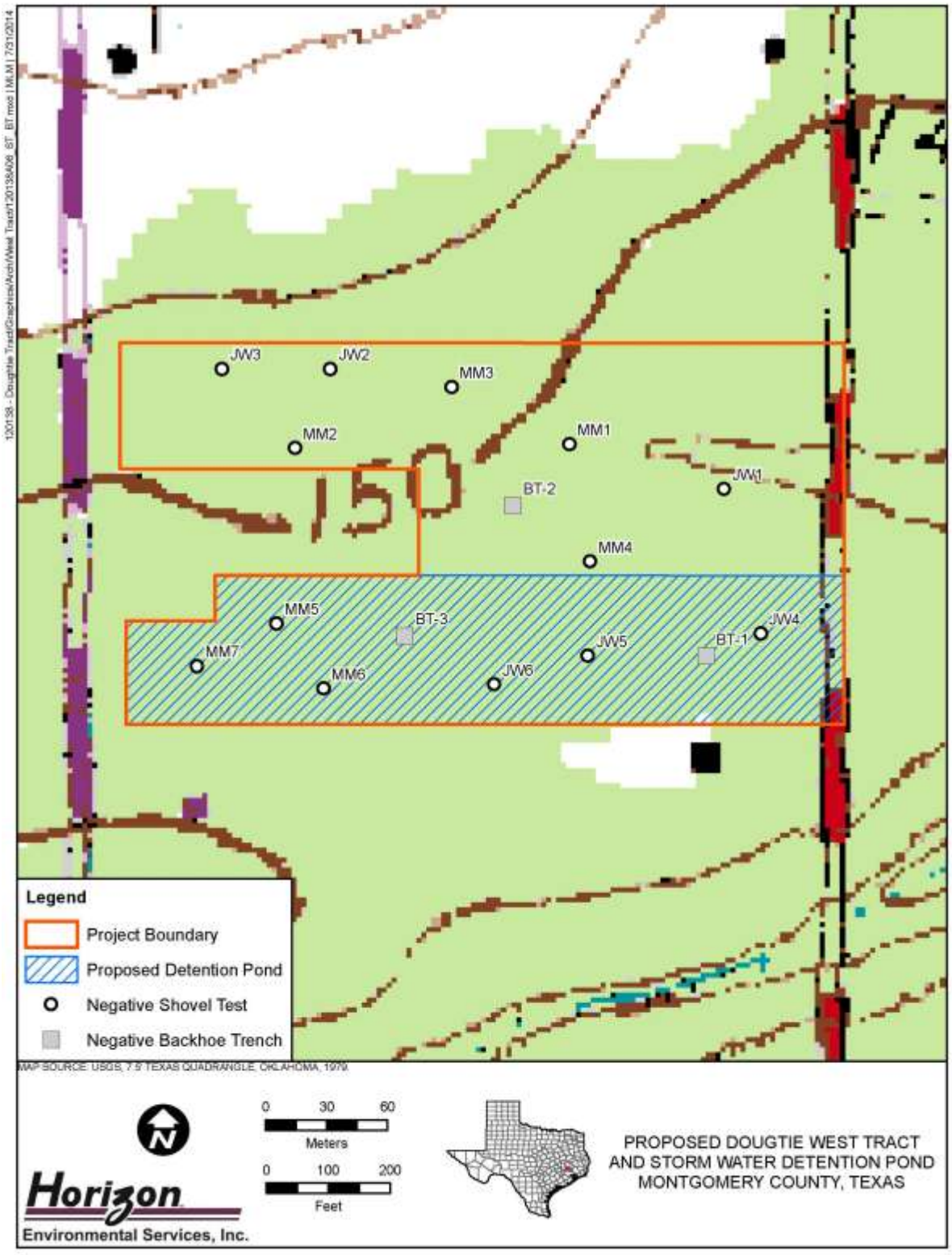

Figure 10. Locations of Shovel Tests and Backhoe Trenches Excavated during Survey

any unusual characteristics of the surrounding landscape. All sediments excavated from shovel tests were replaced in the shovel test hole upon completion of recording. The Universal Transverse Mercator (UTM) coordinates of each shovel test were determined using hand-held, Garmin Foretrex 201 Global Positioning System (GPS) devices, which are typically accurate to within 3.0 meters (9.8 feet) on open landscapes with open forest canopies, using the North American Datum of 1983 (NAD 83). Specific shovel test data are summarized in Appendix A.

The TSMASS also require backhoe trenching in stream terraces and other areas with the potential to contain buried archeological materials at depths below those that shovel tests are capable of reaching (approximately 40.0 to 60.0 centimeters [15.7 to 23.6 inches] below surface in clay sediments or 1.0 meters [3.3 feet] or more below surface in loose loam and sand sediments). Examination of the Natural Resource Conservation Service's soil maps and the relevant USGS 7.5-minute topographic quadrangle suggested that the project tract is situated on alluvial sediments with the potential to contain subsurface archeological deposits, an observation that was confirmed based on the results of shovel testing. While TxDOT's PALM for the Houston District indicates that the current project is situated on a map unit that does not typically require backhoe trenching, the alluvial soils in the project tract appeared to have the potential for archeological deposits at depths that may exceed the reach of shovel tests. In addition, anticipated impacts associated with construction of the proposed storm water detention pond may extend to as deep as 2.4 meters (8.0 feet) below surface. As such, to ensure that all sediments with the potential for subsurface archeological deposits are fully evaluated during the survey, particularly within the proposed detention pond footprint, limited backhoe trenching was conducted to determine the presence or absence of deeply buried archeological deposits.

Backhoe trenches were excavated using a 0.6-meter- (2.0-foot-) wide bucket, and trenches generally measured 3.0 to 4.0 meters (9.8 to 13.0 feet) in length. Trenches were excavated by removing thin layers from across the entire trench before proceeding downwards. Horizon personnel monitored all backhoe trench excavations. Trench walls, floors, and spoil piles were inspected during and after excavation for evidence of archeological materials, distinctive stratigraphic anomalies, and/or soil discolorations that may be indicative of past cultural activities. Horizon personnel recorded notes on the stratigraphic character of soil deposits observed in trench walls, though at no time did any personnel enter a backhoe trench that is more than 1.2 meters (4.0 feet) deep per current Occupational Safety and Health Administration (OSHA) guidelines. Specific backhoe trench data are summarized in Appendix B.

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

The survey methods employed during the survey represented a “reasonable and good-faith effort” to locate significant archeological sites within the project tract as defined in 36 CFR 800.3.

6.0 RESULTS OF INVESTIGATIONS

No archeological resources, historic or prehistoric, were observed on the modern ground surface or in any of the shovel tests or backhoe trenches excavated during the survey. Horizon's archeologists traversed 100% of the tract and thoroughly inspected the modern ground surface for aboriginal and historic-age archeological resources. The project tract was moderately densely wooded with interspersed open areas resulting from prior clearing episodes. Vegetation generally consisted of a dense understory of shrubs and vines in a mixed forest composed of oaks, Chinese tallows, and pines, and visibility ranged from poor to fair (<30% to 50%) across most of the tract. A large, non-jurisdictional wetland occupies the approximate center of the project tract, and unnamed tributaries of Spring Creek flow through the southwestern and eastern portions of the project tract. Several overgrown 2-track roads traverse the project tract.

Horizon excavated 16 subsurface probes during the survey, including 13 shovel tests and 3 backhoe trenches. Eight of the subsurface probes, including 6 shovel tests and 2 backhoe trenches, were excavated within the proposed storm water detention pond footprint, and the remaining 7 shovel tests and 1 backhoe trench were excavated in the northern portion of the overall tract outside of the proposed detention pond footprint. Sediments typically consisted of a moderately deep mantle of light brown, gray, and reddish-brown sandy loam, sand, and silty loam extending to depths ranging from 20.0 to 100.0 centimeters (7.9 to 39.4 inches) below surface (with a typical thickness of 40.0 to 80.0 centimeters [15.7 to 31.5 inches]) overlying dense clayey sediments. Holocene-age sediments with the potential to contain archeological deposits were fully penetrated in the majority of subsurface probes.

A large, cleared area dotted with piles of construction debris is present in the northwestern corner of the project tract fronting onto FM 2978 to the west (Figures 14 and 15). Recent aerial imagery shows the remnants of a small cluster of 3 to 4 structures, apparently outbuildings associated with a nearby farmstead, in the northwestern corner of the overall 5.8-hectare (14.3-acre) Doughtie West tract but outside the boundaries of the proposed 3.2-hectare (8.0-acre) APE associated with the proposed detention pond (Figure 16). These structures do not appear on the 1962 or 1979 versions of the USGS's Oklahoma, Texas, 7.5-minute topographic quadrangle, though they are visible on a Google Earth aerial photograph from 1989. As such, these structures appear to have been constructed between 1979 and 1989 and therefore are not of historic age. Google Earth aerial imagery shows that these structures were demolished between 2013 and 2014 and are no longer standing (Figure 17). No other standing

Figure 11. Profile of BT-1

Figure 12. Profile of BT-3

Figure 13. Profile of BT-2

Figure 14. View of Former Structure Location in NW Corner of Project Tract (Facing SE)

Figure 15. View of Debris Piles Surrounding Former Structure Location

Figure 16. Google Earth Screen Capture of NW Corner of Project Tract Showing Former Locations of Modern Farm Structures (2006)

Figure 17. Google Earth Screen Capture of NW Corner of Project Tract Following Demolition of Modern Farm Structures (2014)

structures are visible within the 5.8-hectare (14.3-acre) Doughtie West tract or within the 3.2-hectare (8.0-acre) APE associated with the proposed detention pond on historic aerial photographs or topographic maps. No historic-age cultural materials (i.e., 45 years of age or older) were observed in the debris piles resulting from the demolition of these structures.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 CONCEPTUAL FRAMEWORK

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

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

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

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

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

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

> The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> a. [T]hat are associated with events that have made a significant contribution to the broad patterns of our history; or,
>
> b. [T]hat are associated with the lives of persons significant in our past; or,
>
> c. [T]hat embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
>
> d. [T]hat have yielded, or may be likely to yield, information important in prehistory or history.

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

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

7.3 ELIGIBILITY CRITERIA FOR LISTING AS A STATE ANTIQUITIES LANDMARK

The criteria for determining the eligibility of a prehistoric or historic cultural property for designation as an SAL are presented in Chapter 191, Subchapter D, Section 191.092 of the Antiquities Code of Texas, which states that SALs include:

> Sites, objects, buildings, artifacts, implements, and locations of historical, archeological, scientific, or educational interest including those pertaining to prehistoric and historical American Indians or aboriginal campsites, dwellings, and habitation sites, their artifacts and implements of culture, as well as archeological sites of every character that are located in, on, or under the surface of any land belonging to the State of Texas or to any county, city, or political subdivision of the state are state antiquities landmarks and are eligible for designation.

For the purposes of assessing the eligibility of a historic property for designation as an SAL, a historic site, structure, or building has historical interest if the site, structure, or building:

1. [W]as the site of an event that has significance in the history of the United States or the State of Texas;
2. [W]as significantly associated with the life of a famous person;
3. [W]as significantly associated with an event that symbolizes an important principle or ideal;
4. [R]epresents a distinctive architectural type and has value as an example of a period, style, or construction technique; or,
5. [I]s important as part of the heritage of a religious organization, ethic group, or local society.

The Antiquities Code of Texas establishes the THC as the legal custodian of all cultural resources, historic and prehistoric, within the public domain of the State of Texas. Under Part II of Title 13 of the Texas Administrative Code (13 TAC 26), the THC may designate a historic structure as an SAL if it (1) is publicly or privately owned and listed on the NRHP and (2) meets one of the following 6 eligibility criteria:

A. Is associated with events that have made a significant contribution to the broad patterns of our history;
B. Is associated with the lives of persons significant in our past;
C. Is important to a particular cultural or ethnic group;
D. Is the work of a significant architect, master builder, or craftsman;
E. Embodies the distinctive characteristics of a type, period, or method of construction, possesses high aesthetic value, or represents a significant and distinguishable entity whose components may lack individual distinctions; or
F. Has yielded or may be likely to yield information important to the understanding of Texas culture or history.

7.4 SUMMARY OF INVENTORY RESULTS

No archeological resources, historic or prehistoric, were observed on the modern ground surface or in any of the shovel tests or backhoe trenches excavated during the survey.

A large, cleared area dotted with piles of construction debris is present in the northwestern corner of the project tract fronting onto FM 2978 to the west. This area represents the former site of 3 to 4 modern farm outbuildings and a gravel driveway. Examination of historic USGS topographic quadrangles and Google Earth aerial photographs indicate that these structures were constructed between 1979 and 1989 and demolished between 2013 and 2014 and are thus not of historic age. No historic-age cultural materials (i.e., 45 years of age or older) were observed in the debris piles resulting from the demolition of these structures.

7.5 MANAGEMENT RECOMMENDATIONS

Based on the results of the survey-level investigations documented in this report, no potentially significant archeological resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good-faith effort to identify archeological historic properties within the APE. No archeological resources were identified within the 3.2-hectare (8.0-acre) footprint of the proposed storm water detention pond, which represents the current project's APE, or within the larger 5.8-hectare (14.3-acre) Doughtie West tract that meet the criteria for listing on the National Register of Historic Places (NRHP) according to 36 CFR 60.4 or for designation as State Antiquities Landmarks (SAL) according to 13 TAC 26, and no further archeological work is recommended in connection with the proposed undertaking. However, it should be noted that human burials, historic and prehistoric, are protected under the Texas Health and Safety Code. In the event that any human remains or burial objects are inadvertently discovered at any point during construction, use, or ongoing maintenance, even in previously surveyed areas, all work should cease immediately, and the THC should be notified of the discovery.

8.0 REFERENCES CITED

Abbott, J.T.

2001 *Houston Area Geoarcheology—A Framework for Archeological Investigation, Interpretation, and Cultural Resource Management in the Houston Highway District*. Archeological Studies Program, Report No. 27, Environmental Affairs Division, Texas Department of Transportation, Austin.

Adovasio, J.M., J. Donahue, and R. Stuckenrath

1990 The Meadowcroft Rockshelter Chronology 1975-1990. *American Antiquity* 55:348-354.

Aten, L.E.

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

1984 Woodland Cultures of the Texas Coast. In *Perspectives on Gulf Coast Prehistory*, pp. 72-93. Ripley P. Bullen Monographs in Anthropology and History, No. 5, The Florida State Museum, Gainesville.

Barnes, V.E.

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

Blair, W.F.

1950 The Biotic Provinces of Texas. *Texas Journal of Science* 2:93-117.

Bludau, J., and V. Valenti

2012 *Archaeological Intensive Pedestrian and Visual Reconnaissance Survey for the FM 2978 Expansion Project between Conroe-Huffsmith and FM 1488 in Montgomery County, Texas*. HRA Gray & Pape, LLC, Houston, Texas.

2014 *Archaeological Intensive Pedestrian and Visual Reconnaissance Survey for the FM 2978 Expansion Project between Conroe-Huffsmith and FM 1488 in Montgomery County, Texas*. HRA Gray & Pape, LLC, Houston, Texas.

Bryant, V.M., Jr., and R.G. Holloway

1985 A Late-Quaternary Paleoenvironmental Record of Texas: An Overview of the Pollen Evidence. In *Pollen Records of Late-Quaternary North American Sediments*, edited

by V.M. Bryant, Jr., and R.G. Holloway, pp. 39-70. American Association of Stratigraphic Palynologists Foundation, Dallas, Texas.

Collins, M.B.

1995 Forty Years of Archeology in Central Texas. *Bulletin of the Texas Archeological Society* 66:361-400.

Dillehay, T.D.

1989 *Monte Verde: A Late Pleistocene Settlement in Chile—Paleoenvironment and Site Context*, Vol. 1. Smithsonian Institution Press: Washington, D.C.

1997 *Monte Verde: A Late Pleistocene Settlement in Chile—The Archaeological Context*, Vol. 2. Smithsonian Institution Press: Washington, D.C.

Dincauze, D.F.

1984 An Archaeo-Logical Evaluation of the Case for Pre-Clovis Occupations. *Advances in World Archaeology* 3:275-323. Academic Press, New York.

Ensor, H.B., and D.L. Carlson (editors)

1991 *Alabonson Road: Early Ceramic Period Adaptations to the Inland Coastal Prairie Zone, Harris County, Southeast Texas*. Reports of Investigations, No. 8, Archeological Research Laboratory, Texas A&M University, College Station.

Hall, G.D.

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

Haynes, C.V., Jr., D.J. Donahue, A.J. T. Hull, and T.H. Zabel

1984 Application of Accelerator Dating to Fluted Point Paleoindian Sites. *Archaeology of Eastern North America* 12:184-191.

Hudgins, J.D.

1986 A Historic Indian Site in Wharton County, Texas. *Bulletin of the Texas Archeological Society* 55:29-51.

Keller, J.E., and F.A. Weir

1979 *The Strawberry Hill Site*. Publications in Archeology, Report No. 13. Texas State Department of Highways, Austin.

Kelly, R.L., and L.C. Todd

1988 Coming into the Country: Early Paleo-Indian Hunting and Mobility. *American Antiquity* 53:231-244.

Larkin, T.J., and G.W. Bomar

1983 *Climatic Atlas of Texas*. Publication LP-192. Texas Department of Water Resources, Austin.

Lynch, T.F.

1990 Glacial-Age Man in South America?: A Critical Review. *American Antiquity* 55(1):12-36.

Meltzer, D.J.

1989 Why Don't We Know When the First People Came to America? *American Antiquity* 54(3):471-490.

Meltzer, D.J., D.K. Grayson, G. Ardila, A.W. Barker, D.F. Dincauze, C.V. Haynes, F. Mena, L. Nuñez, and D.J. Stanford

1997 On the Pleistocene Antiquity of Monte Verde, Southern Chile. *American Antiquity* 62(4):659-663.

National Park Service (NPS)

2014 National Register of Historic Places online database. <http://nrhp.focus.nps.gov>. Accessed July 25, 2014.

Natural Resources Conservation Service (NRCS)

2010 SSURGO Database for Montgomery County, Texas. Natural Resources Conservation Service, US Department of Agriculture.

2014 Web Soil Survey, <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed July 25, 2014. US Department of Agriculture.

Newcomb, W.W.

1961 *The Indians of Texas from Prehistoric to Modern Times*. University of Texas Press, Austin.

1993 Historic Indians of Central Texas. *Bulletin of the Texas Archeological Society* 64:1-63.

Patterson, L.W.

1980 *The Owen Site, 41HR315: A Long Occupation Sequence in Harris County, Texas*. Houston Archeological Society, Report No. 3.

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

Patterson, L.W., J.D. Lockwood, R.L. Gregg, and S.M. Kindall

1993 Prehistoric Site 41HR354, 730, 731, 732, Harris County, Texas. *Houston Archeological Society Journal* 104:25-30.

Perttula, T.K., M.R. Miller, R.A. Ricklis, D.J. Prikryl, and C. Lintz

1995 Prehistoric and Historic Aboriginal Ceramics in Texas. *Bulletin of the Texas Archeological Society* 66:175-235.

Prewitt, E.

1981 Cultural Chronology in Central Texas. *Bulletin of the Texas Archeological Society* 52:65-90.

Ricklis, R.A.

1994 *Aboriginal Life and Culture on the Upper Texas Coast: Archaeology at the Mitchell Ridge Site, 41GB66, Galveston Island*. Coastal Archaeological Research, Inc., Corpus Christi, Texas.

1995 Prehistoric Occupation of the Central and Lower Texas Coast: A Regional Overview. *Bulletin of the Texas Archeological Society* 66:265-330.

Story, D.A.

1990 Cultural History of the Native Americans. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D.A. Story, J.A. Guy, B.A. Burnett, M.D. Freeman, J.C. Rose, D.G. Steele, B.W. Olive, and K.J. Reinhard, pp. 163-366. Two Volumes. Research Series No. 38, Arkansas Archeological Survey, Fayetteville.

Texas Historical Commission (THC)

2014 *Texas Archeological Sites Atlas Restricted Database*. <http://www.nueces.thc.state.tx.us/>. Accessed July 25, 2014.

Texas State Historical Association (TSHA)

2014 Montgomery County. *The Handbook of Texas Online*. <http://www.tshaonline.org/handbook/online/articles/hcm17>. Accessed July 25, 2014.

US Department of Agriculture (USDA)

2012 Digital orthophoto quarter-quadrangle, Montgomery County, Texas. National Agriculture Imagery Program, Farm Service Agency, Aerial Photography Field Office.

US Geological Survey (USGS)

1979 Oklahoma, Texas, 7.5-minute topographic quadrangle.

1979 Tomball, Texas, 7.5-minute topographic quadrangle.

Wheat, J.B.

1953 *The Addicks Dam Site*. Bulletin 154:143-252. Bureau of American Ethnology, US Government Printing Office, Washington, D.C.

APPENDIX A:

Shovel Test Summary Data

Table A-1. Shovel Test Summary Data

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
MM1	250072	3338135	0-40	Very light brown sandy loam	None
			40-60	Light gray and light brown sandy clay loam	None
			60-70	Reddish-yellow clay with pale gray silty compact clay mottles	None
MM2	249937	3338133	0-30	Gray sandy loam	None
			30-80	Light reddish-brown sand	None
			80+	Reddish-yellow clay	None
MM3	250014	3338163	0-20	Very light gray sandy loam	None
			20-70	Pale reddish-brown sand	None
			70+	Reddish-yellow clay	None
MM4	250082	3338077	0-70	Light brown sandy loam	None
			70+	Reddish-yellow clay with pale gray silty compact clay mottles	None
MM5	249928	3338047	0-10	Dark gray sandy loam	None
			10-40	Gray sandy loam	None
			40-80	Light gray sand	None
			80+	Reddish-yellow clay with pale gray silty compact clay mottles	None
MM6	249951	3338015	0-10	Light gray sandy loam	None
			10-50	Gray silty sandy loam	None
			50+	Dark gray clay	None
MM7	249889	3338026	0-15	Light gray sandy loam	None
			15-40	Gray sandy loam	None
			40-50	Dark gray compact clay loam	None
JW1	250148	3338113	0-30	Brown loamy sand	None
			30-100	Pale brown sand	None
JW2	249954	3338172	0-30	Brown loamy sand	None
			30-100	Pale brown sand	None
JW3	249901	3338172	0-30	Very compact disturbed silty loam	None
JW4	250166	3338042	0-70	Pale brown silty loam	None
JW5	250081	3338031	0-30	Brown loamy sand	None
			30-100	Pale brown sand	None
JW6	250035	3338017	0-20	Brown loamy sand	None
			20-80	Pale brown sand	None
			80+	Reddish-yellow clay with pale gray silty compact clay mottles	None

[1] All UTM coordinates are located in Zone 15 and utilize the North American Datum of 1983 (NAD 83)

cmbs = Centimeters below surface ST = Shovel test UTM = Universal Transverse Mercator

APPENDIX B:

Backhoe Trench Summary Data

Table B-1. Backhoe Summary Data

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
BT-1	250139	3338031	0-20	Very light brown silty loam with high organic content	None
			20-130	Light brown and light gray silty compact clay	None
			130-180	Light gray and light brown silty clay with reddish-brown iron inclusions	None
			180-200	Very compact pale grayish-brown clay	None
BT-2	250044	3338105	0-25	Very light brown sandy loam with high organic content	None
			25-70	Light brown sandy clay loam	None
			70-80	Light brown, yellowish-brown, and light gray clay sand	None
			80-100	Mottled reddish-brown, brown, and light gray clay	None
BT-3	249991	3338041	0-15	Light brown sandy loam with high organic content	None
			15-40	Light brown sandy loam	None
			40-100	Light brown sandy loam with light reddish-brown sandy clay mottles	None
			100-135	Mottled reddish-brown, brown, and light gray clay	None

[1] All UTM coordinates are located in Zone 15 and utilize the North American Datum of 1983 (NAD 83)

cmbs = Centimeters below surface ST = Shovel test UTM = Universal Transverse Mercator