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Intensive Cultural Resources Survey of the 380.6-Acre Stockdick School Road Tract, Katy, Harris County, Texas

By:

Jeffrey D. Owens, Charles E. Bludau, Jr., and Jesse O. Dalton

Texas Antiquities Permit No. 9409
Harris County Flood Control District No. U501-07-00-E001
BOA365-11589

Prepared for:

Berg-Oliver Associates, Inc.
Houston, Texas

Prepared by:

Horizon Environmental Services, Inc.
Austin, Texas

May 2020

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MANAGEMENT SUMMARY

Horizon Environmental Services, Inc. (Horizon) was selected by Berg-Oliver Associates, Inc. (BOA) on behalf of the Harris County Flood Control District (HCFCD) to conduct a cultural resources inventory and assessment for the proposed Stockdick School Road Project in Katy, Harris County, Texas (HCFCD Project No. U501-07-00-E001). The proposed undertaking would consist of constructing various storm water detention ponds and other drainage improvements within a non-contiguous 154.0-hectare (380.6-acre) tract located off either side of Grand Avenue Parkway (State Highway [SH] 99) in Katy, Harris County, Texas. The tract is bounded on the north by Stockdick School Road, on the west by Peek Road, on the south by Clay Road, and on the east by the Vineyard Meadow Tuscany residential subdivision. Mayde Creek flows southeastward through the tract. For purposes of the cultural resources survey, the project area is assumed to consist of the entire 154.0-hectare (380.6-acre) tract.

The proposed undertaking is being sponsored by HCFCD, a political subdivision of the state of Texas; as such, the project would fall under the jurisdiction of the Antiquities Code of Texas. In addition, the project would require the use of federal permits issued by the US Army Corps of Engineers (USACE), Galveston District, under Section 404 of the Clean Water Act (CWA). As such, those portions of the overall project area that fall within the federal permit area would also fall under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA). As the proposed project represents a publicly sponsored undertaking, the project sponsor is required to provide the applicable federal agencies, in this case the USACE, and the Texas Historical Commission (THC), which serves as the State Historic Preservation Office (SHPO) for the state of Texas, with an opportunity to review and comment on the project's potential to adversely affect historic properties listed on or considered eligible for listing on the National Register of Historic Places (NRHP) under the NHPA and/or for designation as State Antiquities Landmarks (SAL) under the Antiquities Code of Texas.

Between April 30 and May 5, 2020, Horizon archeologists Charles E. Bludau, Jr. and Luis Gonzalez conducted an intensive cultural resources survey of the project area. Jeffrey D. Owens acted as Principal Investigator, and the survey was conducted under Texas Antiquities Permit No. 9409. The purpose of the survey was to locate any significant cultural resources that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed the project area and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area consists of a vast tract that is roughly bisected by Mayde

Creek, which flows southeastward through the approximate middle of the tract. Areas adjacent to the creek were largely undeveloped and covered in dense hardwood forests with a thick understory of shrubs, grasses, forbs, brambles, vines, and various grasses. Vegetation in the more open areas consisted of dense pasture grasses with isolated copses of hardwood trees. Whereas most of the project area is undeveloped and appears to be largely intact, various disturbances were observed. An Enterprise Crude Pipeline, LLC pipeline corridor passes northeast to southwest through the north-central portion of the project area; a Kinder Morgan Texas Pipeline, LLC pipeline corridor passes northeast to southwest through the central portion of the project area; and a transmission line passes northwest to southeast through the center of the project area. In the northwestern corner of the project area, immediately south of Stockdick School Road and east of Clay Road, a large section of land has been cleared and a number of underground utility lines have been installed. In the southwestern corner of the project area, north of Clay Road and east of Peek Road, a wide, contoured drainage channel has been constructed. Finally, Grand Avenue Parkway (SH 99) passes between the two sections of the project area located on either side of the highway. Visibility of the modern ground surface ranged from poor (<20%) in more heavily vegetated areas to excellent (80 to 100%) in cleared areas.

In addition to pedestrian walkover, the Texas State Minimum Archeological Survey Standards (TSMASS) call for excavation of a minimum of two shovel tests per 0.4 hectare (1.0 acre) for projects measuring 10.1 hectares (25.0 acres) or less in size plus one additional shovel test per 2.0 hectares (5.0 acres) above 10.1 hectares (25.0 acres). As such, a minimum of 121 shovel tests would be required within the 154.0-hectare (380.6-acre) project area. Horizon excavated a total of 164 shovel tests, thereby exceeding the TSMASS for a project area of this size. Shovel tests typically revealed sandy clay loam to sandy loam sediments overlying sandy clay. Mottling and iron staining were ubiquitous in shovel tests, suggesting that large portions of the project area are likely saturated on a seasonal or perennial basis. It is Horizon's opinion that shovel testing was capable of fully penetrating sediments with the potential to contain subsurface archeological deposits.

No cultural resources of prehistoric or historic age were recorded within the project area during the survey. A modern church or some other type of large community center is present in the northern portion of the project area off the southern side of Stockdick School Road. This structure was built at some time between 1973 and 1981; as such, the structure is not of historic age.

Based on the results of the survey-level investigations documented in this report, no potentially significant cultural resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good-faith effort to identify historic properties within the project area. No cultural resources were identified within the project area that meet the criteria for designation as SALs according to 13 TAC 26 or for inclusion in the NRHP under 36 CFR 60.4. Horizon recommends a finding of "no historic properties affected," and no further archeological work is recommended in connection with the proposed undertaking. However, human burials, both prehistoric and historic, 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 in the project area, even in previously surveyed areas, all work should cease immediately in the vicinity of the inadvertent discovery, and the THC should be notified immediately. Following completion of the project, project records will be permanently curated at the Texas Archeological Research Laboratory (TARL).

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1.0 INTRODUCTION

Horizon Environmental Services, Inc. (Horizon) was selected by Berg-Oliver Associates, Inc. (BOA) on behalf of the Harris County Flood Control District (HCFCD) to conduct a cultural resources inventory and assessment for the proposed Stockdick School Road Project in Katy, Harris County, Texas (HCFCD Project No. U501-07-00-E001). The proposed undertaking would consist of constructing various storm water detention ponds and other drainage improvements within a non-contiguous 154.0-hectare (380.6-acre) tract located off either side of Grand Avenue Parkway (State Highway [SH] 99) in Katy, Harris County, Texas (Figures 1 to 3). The tract is bounded on the north by Stockdick School Road, on the west by Peek Road, on the south by Clay Road, and on the east by the Vineyard Meadow Tuscany residential subdivision. Mayde Creek flows southeastward through the tract. For purposes of the cultural resources survey, the project area is assumed to consist of the entire 154.0-hectare (380.6-acre) tract.

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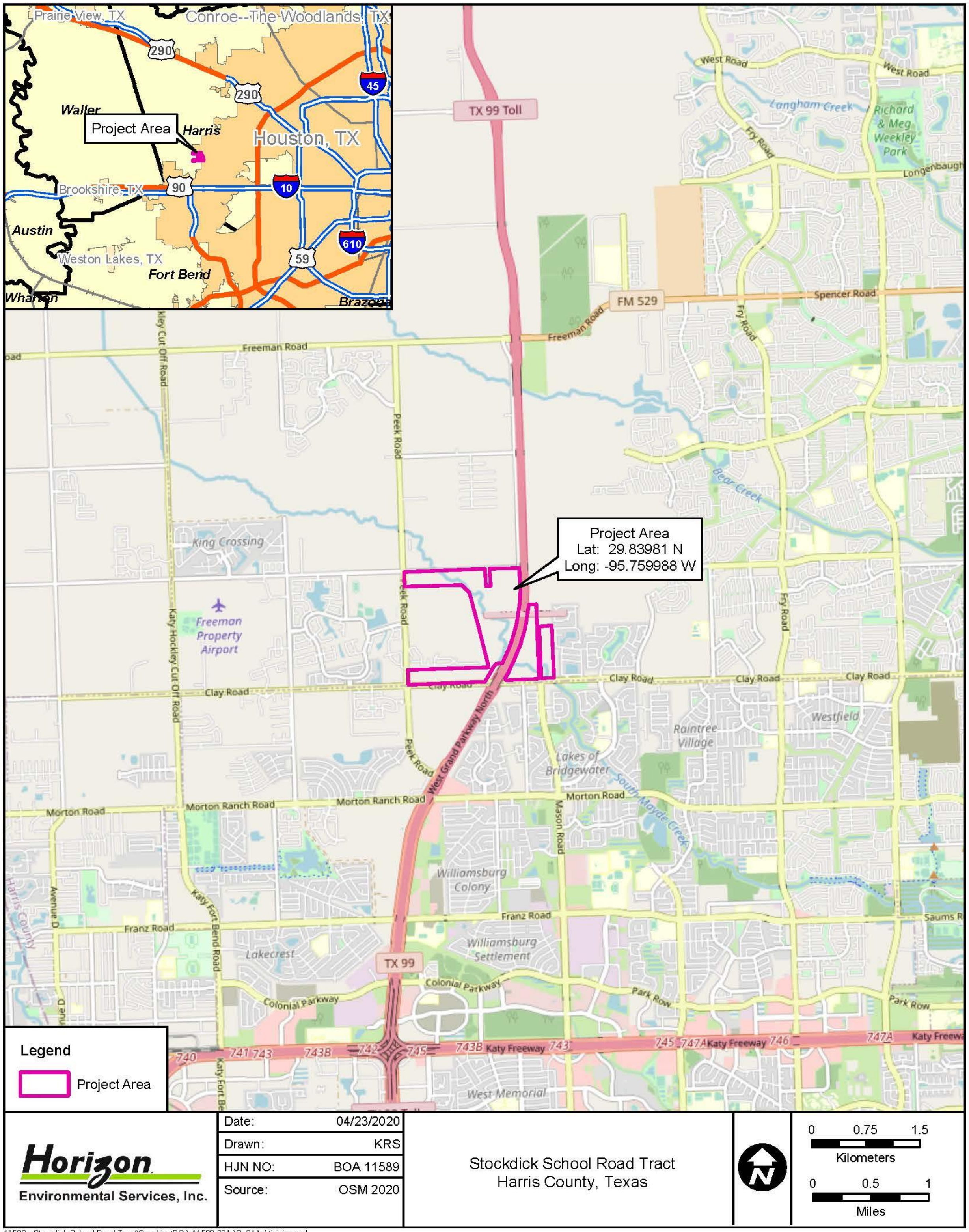


Figure 1. Vicinity Map of Project Area

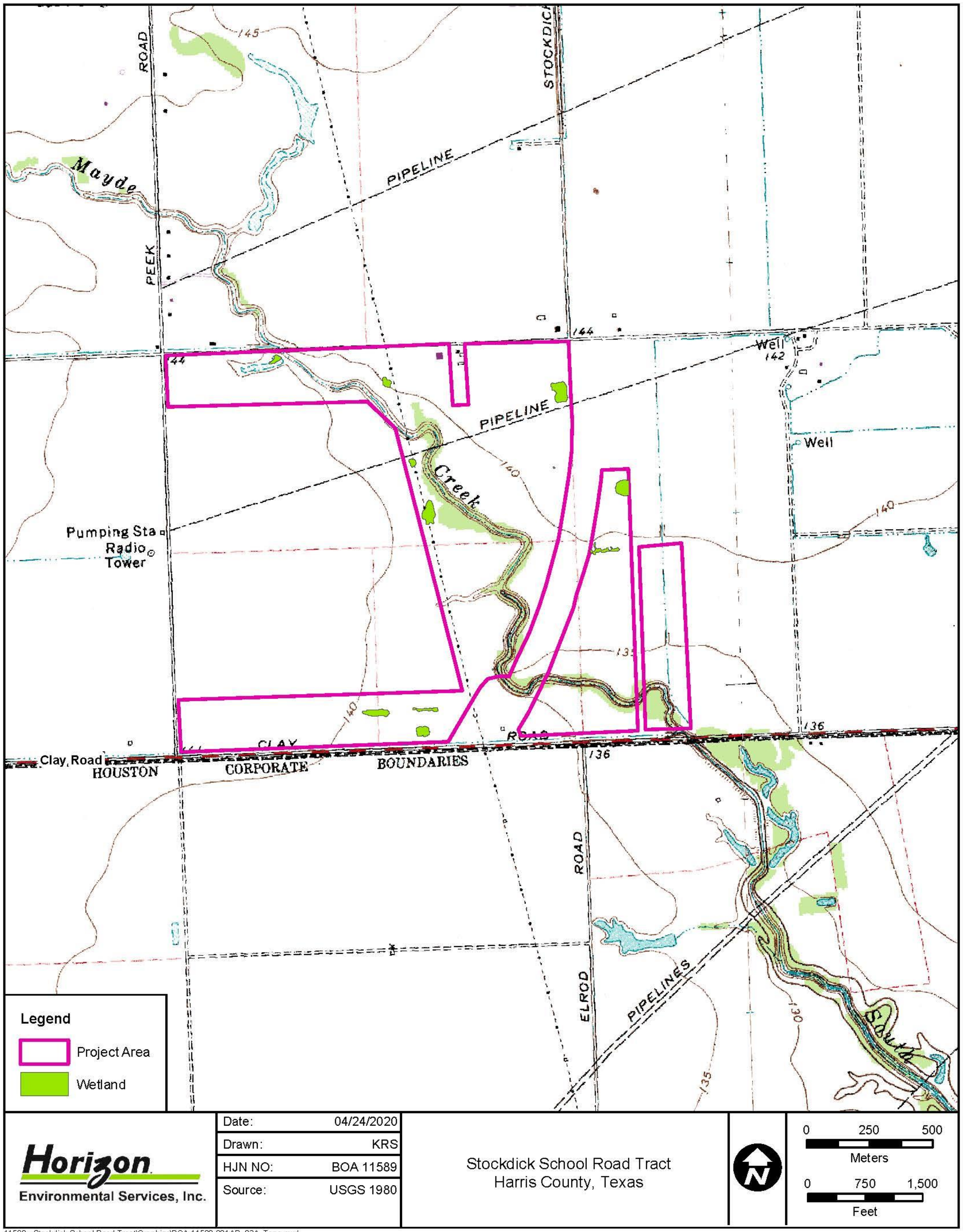


Figure 2. Location of Project Area on USGS Topographic Quadrangle

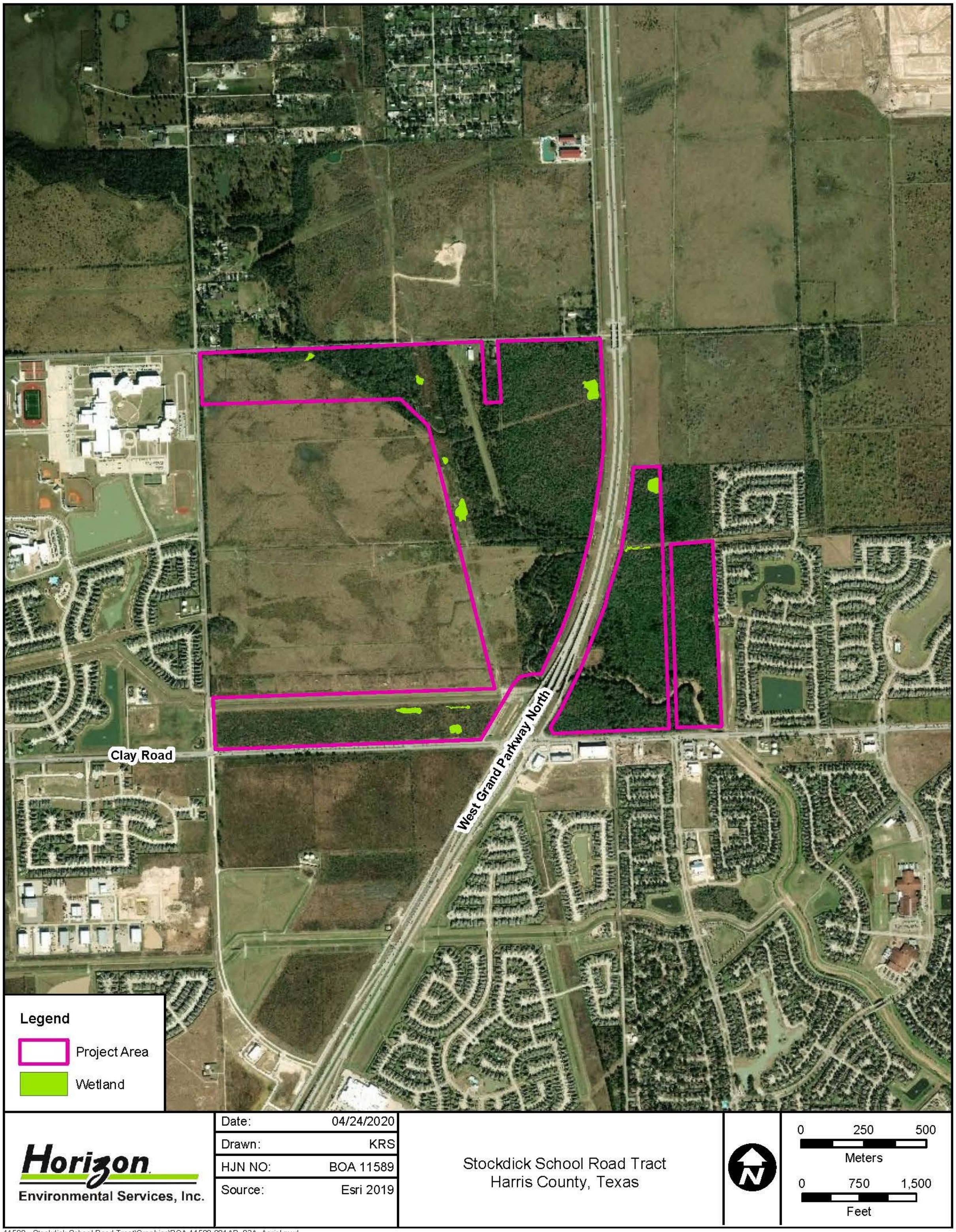


Figure 3. Location of Project Area on Aerial Photograph

Practice and Procedure, Chapter 26, Section 26, and the Council of Texas Archeologists (CTA) Guidelines for Cultural Resources Management Reports. Following completion of the project, project records will be prepared for permanent curation at the Texas Archeological Research Laboratory (TARL).

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

2.0 ENVIRONMENTAL SETTING

2.1 PHYSIOGRAPHY AND HYDROLOGY

The project area is located northeast of Katy in western Harris County, Texas. Harris County is situated on the Gulf Coastal Plain in southeastern Texas, and the project area is located about 104.6 kilometers (65.0 miles) northwest of the Gulf of Mexico. The Gulf of Mexico represents a structural basin formed by lithosphere deformation. The Texas Coastal Plain, which extends as far north as the Ouachita uplift in southern Oklahoma and westward to the Balcones Escarpment, consists of seaward-dipping bodies of sedimentary rock, most of which are of terrigenous clastic origin, that reflect the gradual infilling of the basin from its margins (Abbott 2001). The Houston area is underlain by rocks and unconsolidated sediments that are quite young in a geological sense, ranging from modern to Miocene in age. These consist predominantly of a series of fluviodeltaic bodies arranged in an offlapped sequence, with interdigitated and capping eolian, littoral, and estuarine facies making up a relatively minor component of the lithology. Major bounding disconformities between these formations are usually interpreted to represent depositional hiatuses that occurred during periods of sea level low stand. The oldest rocks in this fill are of Late Cretaceous age. As a result of the geometry of basin filling, successively younger rock units crop out in subparallel bands from the basin margin toward the modern coastline.

The project area is situated on a low-lying coastal flat within the Buffalo Bayou watershed. Mayde Creek meanders southeastward through the project area and continues eastward to discharge into South Mayde Creek within the body of Addicks Reservoir. South Mayde Creek joins with Bear Creek and Langham Creek within the reservoir, and a heavily modified drainage channel emerges from the southern margin of Addicks Reservoir and discharges into Buffalo Bayou a short distance south of Interstate Highway (IH) 10. Buffalo Bayou, in turn, flows generally eastward through Houston and empties into Burnet Bay along the coast of the Gulf of Mexico. Elevations within the project area as a whole are relatively flat, ranging from approximately 39.6 to 43.9 meters (130.0 to 144.0 feet) above mean sea level (amsl). The Mayde Creek channel is moderately deeply incised into local fluviomarine soils and provides the most topographic relief within the project area. Drainage within the project area is toward Mayde Creek, which flows roughly through the center of the project area and exits the project area at its southeastern corner.

2.2 GEOLOGY AND GEOMORPHOLOGY

The project area is underlain by the Lissie Formation (Ql), a Pleistocene-age fluviodeltaic formation composed of clay, silt, sand, and siliceous gravels of granule to pebble size and some petrified wood (Shelby et al. 1968; USGS 2020). While debate about the temporal affiliations of and correlations among the deposits that underlie the major coastline terraces remains active, they are of little direct geoarcheological relevance because virtually all investigators agree that these deposits considerably predate the earliest demonstrated dates of human occupation in North America.

Geomorphologically, the project area is situated on loamy fluviomarine deposits of Pleistocene age associated with the Cyfair and Katy soil units (Table 1; Figure 4). No alluvial sediments or soil units of Holocene age are mapped within the project area.

2.3 CLIMATE

Evidence for climatic change from the Pleistocene to the present is most often obtained through studies of pollen and faunal sequences (Bryant and Holloway 1985; Collins 1995). While the paleoclimatic history of the coastal region remains unclear, Bryant and Holloway (1985) present a sequence of climatic change for nearby east-central Texas that includes three 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

Table 1. Summary of Mapped Soils within Project Area

NRCS Soil Code	Soil Name	Parent Material	Typical Profile (inches)
Ar	Cyfair-Katy complex, 0 to 1% slopes	Loamy fluviomarine deposits on coastal flats	Cyfair: 0-8: Fine sandy loam (A1) 8-17: Fine sandy loam (A2) 17-55: Clay loam (Bt1) 55-80: Clay loam (Bt2) Katy: 0-8: Fine sandy loam (A) 8-17: Fine sandy loam (E) 17-37: Clay loam (Bt1) 37-80: Clay loam (Bt2)
Kf	Katy fine sandy loam, 0 to 1% slopes	Loamy fluviomarine deposits on coastal flats	0-6: Fine sandy loam (A) 6-19: Fine sandy loam (E) 19-29: Clay loam (Bt1) 29-80: Clay loam (Bt2)

Source: NRCS (2020)

NRCS = Natural Resources Conservation Service

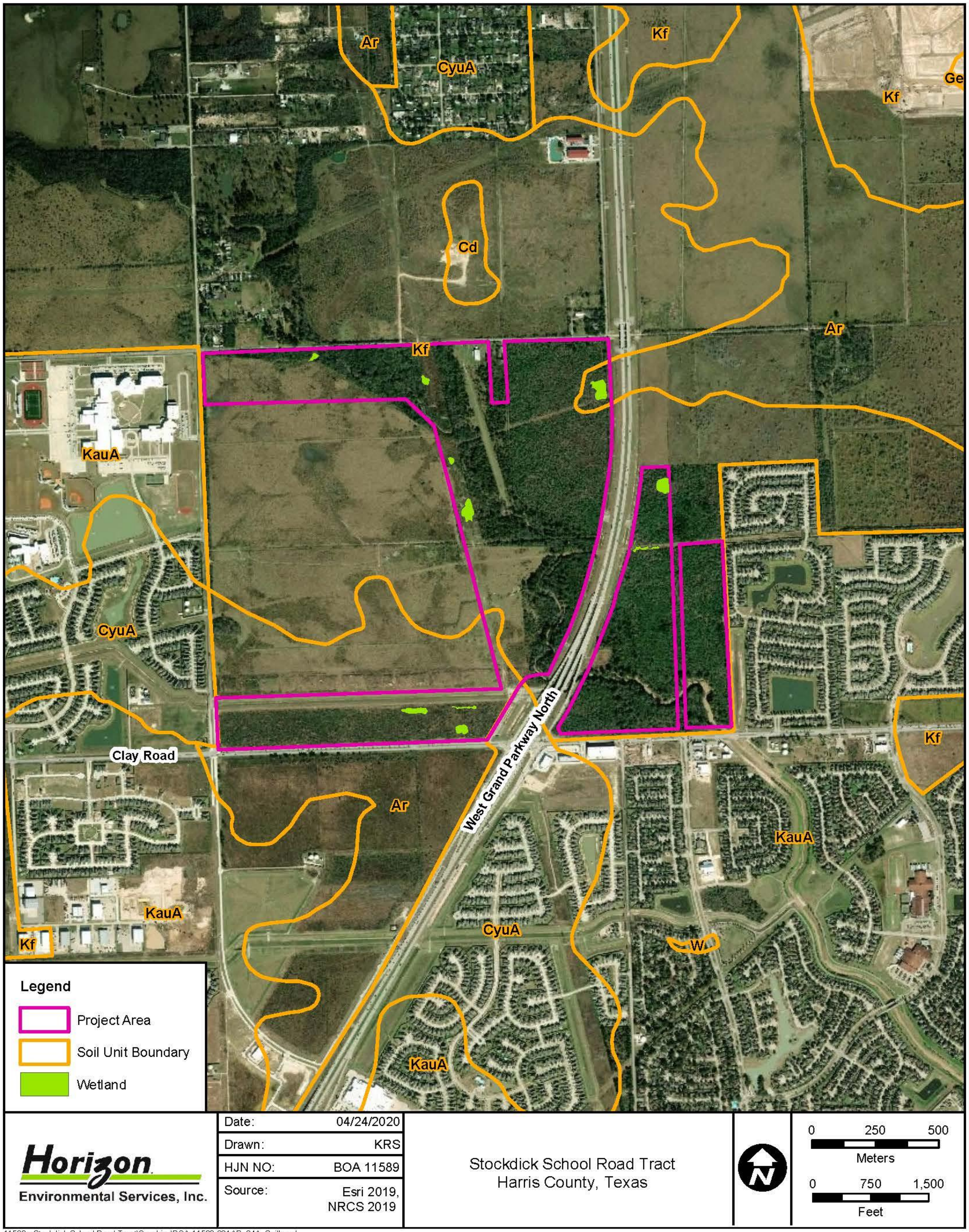


Figure 4. Soils Mapped within Project Area

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 two precipitation peaks throughout the year (Abbott 2001; Wheeler 1976). 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 101.6 centimeters (40.0 inches) to a high of more than 132.1 centimeters (52.0 inches). Average monthly precipitation varies from less than 5.1 to 7.6 centimeters (2.0 to 3.0 inches) in March to more than 19.1 centimeters (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 one in 10 years.

2.4 FLORA AND FAUNA

Harris 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. McMahon et al. (1984) further define four 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-oxey, and glasswort. A variety of fauna are characteristic of the shore zone. Important larger taxa include raccoon, nutria, alligators, turtles, swamp rabbit, and many birds, including ducks, geese, herons, and many smaller species. Aquatic taxa, including a wealth of fish and shellfish adapted to brackish to hypersaline conditions, are also important in the coastal zone.

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

The coastal gallery forest consists of diverse, principally deciduous trees and associated understory in floodplains and streams that traverse the outer coastal plain (Abbott 2001:26). Important taxa include water oak, pecan, poplar, American elm, cedar elm, sugarberry, ash, loblolly pine, post oak, cherrybark oak, mulberry, swamp chestnut oak, willow oak, sweetgum, hawthorn, dogwood, hickory, bois d'arc, sassafras cypress, willow, cottonwood, and sumac. Shrubs and vines such as mustang grape, greenbriar, 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 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, greenbriar, Virginia creeper, blackberry, dewberry, trumpet vine, gourd, and poison ivy. A variety of fauna is also present, including white-tailed deer, opossum, raccoon, squirrel, rabbit, mink, skunk, various small rodents, turtles, reptiles, and many different birds. Black bear was also present at times in the past, and bison and pronghorn were occasionally present in the transition zone to the coastal prairie environment.

3.0 CULTURAL BACKGROUND

The project area is located within the Southeast Texas Archeological Region, a 21-county area extending from the Colorado River on the west to the Sabine River on the east and measuring about 199.5 kilometers (124.0 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 two 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 25.7 kilometers (16.0 miles) inland from the coast that covers the area influenced by Gulf tidal flows on the salinity of streams, lakes, and bays. Considerable ecological variability characterizes this subregion, including woodlands, coastal prairie, lakes, wetlands, marine coastline, and barrier islands. The inland subregion also encompasses considerable ecological diversity, including mixed woodlands, coastal prairies, and dense piney woods.

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

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

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

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 have historically discounted claims of much earlier human occupation during the Pleistocene glacial period. However, recent investigations of the Buttermilk Creek Complex in Bell County, Texas, have raised the possibility that a pre-Clovis culture may have been present in North America as early as 15,500 years ago (Waters et al. 2011).

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 two 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 (CA. 5000 B.P. TO A.D. 100)

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

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

In the western part of inland Southeast Texas, a Late Archaic mortuary tradition developed in the lower Brazos and Colorado river valleys and in the intervening area (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 (ca. 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 128.7 kilometers (80.0 miles) to the west until several hundred years later. With the principal exception of a few Tchefuncte ceramic types, other southern Louisiana ceramics are not found on the Gulf coast west of the Sabine Lake area.

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

3.4 LATE PREHISTORIC PERIOD (CA. 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 (CA. A.D. 1500 TO 1700)

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

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

3.6 Historic Period (ca. A.D. 1700 to Present)

The first European incursion into what is now known as Texas was in 1519, when Álvarez de Pineda explored the northern shores of the Gulf of Mexico. In 1528, Álvar Núñez Cabeza de Vaca crossed South Texas after being shipwrecked along the Texas Coast near Galveston Bay; however, European settlement did not seriously disrupt native ways of life until after 1700. The first half of the 18th century was the period in which the fur trade and mission system, as well as the first effects of epidemic diseases, began to seriously disrupt the native culture and social systems. This process is clearly discernable at the Mitchell Ridge site on Galveston Island, 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).

By 1519, Spain had claimed much of the Texas coast, extending across the southeastern Texas coastal and interior landscape and including present-day Galveston and Harris counties. Between the Neches and Trinity rivers there was a small tribe of Native Americans called the Orcoquisac by the Spaniards, who may have been akin to the Atakapan speakers who occupied western Louisiana and the inner-coastal Texas woodlands (Newcomb 1961; Swanton 1911). Little is known about the Texas sect of Atakapans, whose name is a Choctaw word for “man-eaters” (Newcomb 1961). Their language was likely of Tunican stock, but scant data are available about their linguistic origins (Swanton 1911). According to Newcomb, the Akokisas, settled on the lower Trinity and San Jacinto rivers as well as the eastern shores of Galveston Bay; to the north lived a lesser known group, the Patiris, and, to their north, the Bidais (Newcomb 1961; Swanton 1911). Altogether, their population estimates are around 3,500 people (Newcomb 1961). The Galveston Bay focus likely practiced a hunter-gatherer subsistence strategy, for the salt water flooding in the region would be cumbersome to any agricultural practices (Newcomb 1961).

It is possible that Cabeza de Vaca and/or members of the Narvaez expedition encountered the Atakapan communities as early as 1528, and it is also possible that La Salle's excursions in 1684 would have encountered these groups. However, the first documented European account of the Atakapans was left by French naval officer Simars de Bellisle in 1719 (Newcomb 1961). During his expedition, de Bellisle was stranded on the shore of Galveston Bay after a mishap on a supply run for fresh water, and he was taken captive and forcibly inducted into a tribe of Akokisas (Newcomb 1961). After taking a widowed wife, escaping to live with the Caddo tribe to the north, and living with a Hasinai woman, Angelica, the Frenchman eventually escaped native captivity and returned to Galveston Bay to work as a guide for Bernard de la Harpe, who led the first French expedition into present-day Oklahoma (Newcomb 1961). The Atakapans in southeastern Texas continued to trade deer and bison skins with the encroaching French settlers in Louisiana throughout the 1730s and 1740s until the Spanish Crown sent Captain Joaquin de Orobio Bazterra to investigate alleged French settlements in 1745 or 1746 (Henson 2010; Newcomb 1961). During this incursion, Bazterra visited several Orcoquisac villages along Spring Creek, a tributary of the San Jacinto River. He found no identifiable roads, maps, or any indications of French presence (Henson 2010; Newcomb 1961).

Around 1756, the Spanish erected an outpost near the mouth of the Trinity River in what is now Chambers County to combat the French presence in the region. This settlement consisted of a presidio named San Augustin de Ahumada and a mission named Nuestra Senora de la Luz (Ladd 2010). Atakapans were intermixed with 50 families of Tlascalan Indians brought in from central Mexico to help "pacify [them] more successfully" (Newcomb 1961). Collectively, this short-lived outpost was known as El Orcoquisac, named after the tribe. After a series of unfortunate events that included mutinous internal fighting and ravaging by hurricanes, the fort outpost was abandoned by the Spanish in 1771 (Ladd 2010). The Bidais to the north were subjected to Spanish violence after trading firearms with the Lipan Apaches, who were enemies of the Spanish Crown (Newcomb 1961). A group of Atakapans settled somewhere along the Colorado River to the west of present-day Harris County in the mid-19th century, but they virtually disappeared from any records (Newcomb 1961). It is speculated that the remainder of the Atakapans who were not decimated by European epidemics or warfare either married into neighboring tribes, such as the displaced Alabama-Coushatta or the Caddo, or returned to Louisiana to join their linguistic and cultural kin, the eastern band of Atakapans (Newcomb 1961). Either way, all Atakapan speakers were gone from Texas by 1859.

During the height of the War of Mexican Independence, numerous Anglo-American filibusters explored what is now Harris County looking for land in exchange for helping to drive away the Spanish colonial government and their authoritarian rule over the Mexican Republicans and revolutionaries. Launching from New Orleans, many expeditions used Galveston Island and the Bolivar Peninsula on Galveston Bay as a base of operations, and the expeditions of the last of the "terrestrial buccaneers" included a failed filibustering expedition led by Dr. James Long and Jean Lafitte (Hester 1977). Mexican revolutionary figure Francisco Xavier Mina and French privateer Jean Lafitte also landed their filibustering crews in the Galveston region during this time, but no settlements resulted from their efforts.

When Stephen F. Austin received his *empresario* grant in 1824 to allow 300 settlers move to an allotment of 67,000 acres granted by the Mexican government, many Anglo-American families mistakenly assumed the lands surrounding the San Jacinto estuary were a part of the contract (Baker 2010). The *empresario* contract specifically forbade Galveston Island and the Gulf shore to colonial settlement, so Austin's colonizers turned northward to the land that is now Harris County, which borders the northern end of the forbidden lands (Henson 2010). During this time, there were no indications of Native American habitation in the former Atakapan lands (Henson 2010). In July of the same year, land commissioner and intermediary to the Mexican government, Baron de Bastrop, issued 29 titles to colonist families, which included early Anglo settlers Nathaniel Lynch, William Scott, and John Harris. Harris and Scott built a house and established a store and warehouse on Buffalo Bayou (Beazley 2010). Later, John Harris, along with his brother, David Harris, established the first steam sawmill-gristmill in Harrisburg as well as an important trading post at Bell's Landing on the Brazos River that serviced vessels traveling to and from New Orleans and other Gulf ports (Beazley 2010). Between 1828 and 1833, an additional 23 *empresario* titles were granted to families that settled along waterways such as the San Jacinto River and tributaries (Henson 2010).

Because of its strategic position at the confluence of the San Jacinto River and Buffalo Bayou, John Harris' Harrisburg was designated a head of navigation and an important port of entry for both immigrants and freight by 1833 (Henson 2010). Goods were often shipped northwest up the Brazos River to the newly colonized communities of San Felipe and Washington-on-the-Brazos. Harrisburg was also a hub for a dendritic road system that forked out in every direction—eastward, travelers could make their way to Anahuac, Liberty, or Nacogdoches; northward, travelers could head towards Spring Creek and the Brazos settlements; southward, travelers could follow Brays Bayou to a community on Oyster Creek (Henson 2010). This region was known as the San Jacinto District until 1833, when it was formally renamed the Harrisburg District (Kleiner 2010). An original member of Stephen Austin's Old Three Hundred, Humphrey Jackson was deemed *alcade* of the San Jacinto District in 1824, 1825, and 1827 until 1828 when the *empresarios* were relieved and *comisarios* replaced their positions. Jackson also served as the ex officio militia captain of the San Jacinto region (Kleiner 2010). The Harrisburg Municipality boundaries were defined by the nascent Texas Congress in October of 1835, and the Texas provisional government officially recognized the municipality in 1836 (Henson 2010). During this time, David G. Burnet, the first President of the Texas Republic, purchased 6.5 hectares (16.0 acres) in Lynchburg, a smaller village within the scope of the Harrisburg Municipality. Burnet and his wife sailed from New Jersey to Texas in 1831, where they purchased a 15-horsepower steam sawmill and eventually settled on the San Jacinto River on the property purchased from Nathaniel Lynch (Henson 2010). Lorenzo de Zavala, who had served as the first minister of plenipotentiary of the Mexican legation in Paris under Antonio Lopez de Santa Anna, moved to the north side of Buffalo Bayou below Harrisburg with his wife from New York and their two children (Estep 2010). Because of his experience with legislative, executive, ministerial, and diplomatic measures, along with his education, Zavala was instrumental in the early formation of the Republic of Texas, helped draft the Constitution, and served in the Permanent Council (Estep 2010).

At midnight on March 16, interim President Burnet and Vice President Lorenzo de Zavala were elected by the delegates of the Convention of 1836 at Washington-on-the-Brazos, drafted the new Texas Constitution, and adopted the Texas Declaration of Independence. On the next morning, the two left for Harrisburg in a strategic move in case the Mexican army should press northeastward (Henson 2010). The group reached their home in Harrisburg by March 25, and by April 12 the President and his cohorts evacuated by steamboat to Lynchburg when the news arrived that Santa Anna's army had crossed the Brazos River to pursue Zavala and other cabinet members (Henson 2010). From Lynchburg, the Republic officials and their families escaped in the steamboat *Cayuga*, to Galveston Island, where they disembarked and awaited the fate of the newly formed Republic (Henson 2010). On midnight of April 14, Santa Anna's army of approximately 700 men marched into Harrisburg in pursuit of the Texas government, where they looted and burned most of the freshly evacuated settlement (Henson 2010; Kemp 2010). the Battle of San Jacinto took place on April 21 on Peggy McCormick's farm adjacent to Zavala's property near the confluence of Buffalo Bayou and the San Jacinto River (Kemp 2010). The battle was short lived (only 18 minutes long). The Mexican army suffered 630 casualties and 730 soldiers were taken prisoner (Kemp 2010). The result of the battle was a transference of almost a million square miles of territory—Texas was annexed from Mexico and the territories known today as New Mexico, Arizona, Nevada, California, Utah, and parts of Colorado, Wyoming, Kansas, and Oklahoma changed sovereign hands (Kemp 2010).

In December 1836, the First Texas Congress passed several measures, including the official delineation of Harrisburg County, the naming of Andrew Briscoe as the chief justice, and the designation of the city of Houston as both county seat and capitol of the Republic of Texas (Henson 2010). At first, Harrisburg County encompassed Galveston Island, but an addendum was made in May 1838—Galveston became its own county and Harrisburg maintained its current boundaries (Henson 2010). In December 1839, the Texas Congress changed the name of Harrisburg County to Harris County in honor of John R. Harris, one its first successful residents (Henson 2010). The first courthouse, a two-story framed building, and a log-jail were constructed in 1837 on the courthouse square by Dr. Morris L. Birdsall, the county contractor, and the first county court convened the same year overseen by district judge Benjamin C. Franklin and first judge of probate, Andrew Briscoe (Henson 2010).

After the Mexican Revolution, economic recovery in Harrisburg hit a slow pace, but by 1850, General Sidney Sherman, a Battle of Jacinto war hero, along with a group of Boston capitalists, drew up the plans and gathered funding for the construction of the Buffalo Bayou, Brazos, and Colorado Railway, thereby pilot-lighting the railroad age in the state of Texas (Werner 2010). Sherman's rail commission began construction in 1851 and 32.2 kilometers (20.0 miles) of track were laid from Stafford's Point terminating at Buffalo Bayou (Werner 2010). By 1860, the Buffalo Bayou, Brazos and Colorado Railway, otherwise commonly known as the Harrisburg Line, stretched all the way to Alleyton, 128.7 kilometers (80.0 miles) to the east, and five other independent railways were constructed by the onset of the Civil War (Werner 2010). Mainly, these lines, such as the Galveston, Houston and Henderson, the Texas and New Orleans, the Houston and Texas Central, and the Houston Tap and Brazoria, served the prosperous southern economy by shipping staple slave labor-dependent goods like sugar and cotton (Werner 2010).

A large proportion of residents in Harris County were African-American slaves brought in by farmers and ranchers who immigrated in from the deep South. These slaves provided the backbone of labor for the early economy in southeast Texas by picking cotton, cultivating fields, and harvesting and processing sugar cane. Additionally, cattle ranching was an important agricultural focus in the area south of Buffalo Bayou. Many of these cattle ranches continued in operation well into the 20th century (Henson 2010). Many other immigrants of various nationalities flocked to Harris County by the 1840s in search for promising social, economic, and political pursuits. These included both Germans and French, who brought their cultural influences as well as respected religious denominations rooted in varying sects of Catholicism and Protestantism (Henson 2010). On April 21, 1837, President Sam Houston, ordered all Mexican prisoners of war to be released, and the US census of 1850 documented no Mexican-born males living in Harris County or its surrounding counties (Henson 2010). However, by the 1880s a few Mexican families were documented as living in Houston, and with the construction and opportunities presented by the advent of the Houston Ship Channel and railroads, many Mexicans migrated to the Houston area by the turn of the century (Henson 2010). These waves of migration were prompted in part by the unfavorable social conditions and political unrest in Mexico that followed the Mexican Revolution.

By the 1890s, large parcels of land along the newly laid North Galveston, Houston, and Kansas City Railroad were purchased by land developers from the Midwest with the intention of attracting Midwesterners to migrate south to escape the harsh winters (Henson 2010). This rail line ran along the southern boundaries of Buffalo Bayou towards Morgan’s Point and south to the mouth of Clear Creek, upon which the townships of Pasadena, Deer Park, and La Porte were settled in 1892. Similarly, the towns of South Houston, Genoa, and Webster were established along the Galveston, Houston, and Henderson Railroad in the 1880s (Henson 2010). Due to the favorable conditions for growing rice, a Japanese consular official, Sadatsuchi Uchida, worked with local officials and businesses to bring in Japanese immigrants to help grow a burgeoning rice-dependent economy (Rhoads 2010). In 1903, Seito Saibara founded Webster, a successful rice farm near the town of Webster in Harris County, and subsequently, the Japanese population in Texas began to accumulate numbers; however, the rice market crashed after World War I, and many rice farmers focused on other crops such as citrus fruit (Rhoads 2010).

During the Reconstruction period following the Civil War, several rail lines entered northern Harris County that economically tied the region to various terminal ports in Houston. These lines included the Houston and Great Northern, the Trinity and Brazos Valley, the Houston East and West Texas, and the Burlington-Rock Island railroads (Henson 2010). Similar to the history of progress in southern Harris County, several towns were established along these rail lines that saw rapid growth and economic prosperity, such as Humble, whose population rocketed after the Moonshine Hill oil boom of 1905 (Henson 2010). The towns of Spring and Tomball grew rapidly to meet the demands of the lumbering and farming interests of the early 20th century (Henson 2010). During the late 19th century in eastern Harris County along the San Jacinto River, the only commercial structures of note were two small ports and boatyards in Lynchburg and Goose Creek and a brick factory on Cedar Bayou (Henson 2010). However, when crude oil was discovered on the banks of the San Jacinto estuary at Goose Creek and Tabbs Bay in 1903, an economic boom occurred, drawing in migrant families that build a shantytown between 1915 and 1917 (Henson 2010). This tent city was replaced by the town of Pelly in 1917, and then in 1919, the predecessor of ExxonMobil, the Humble Oil and Refining Company, built its first refinery in the area right along the San Jacinto River just north of the mouth of Goose Creek (Henson 2010). Soon, several small towns bordered the refinery site—the company town, Humble; the workers' residence, Baytown; and the executive middle-class district, Goose Creek (Henson 2010). In the mid-1920s, these three towns were incorporated into one larger town named "Tri-Cities" which was then finally renamed "Baytown" in 1948 (Henson 2010). The Houston-North Shore Railway developed an electric interurban train in 1925 for the burgeoning oil business workforce that connected the region and ran along the northern side of Buffalo Bayou to downtown Houston (Henson 2010).

In 1911, the US Congress authorized the formation of the Harris County Ship Channel Navigation District, whose goal is was to improve the water ways around the confluences of the San Jacinto River and Buffalo Bayou to make the port accessible to ocean-going vessels (Henson 2010). The US Army Corps of Engineers oversaw the completion of the district by widening and deepening the channel and creating a thoroughfare from the Gulf of Mexico to inner Harris County. After its completion, several independent oil refineries moved to the area, and numerous wharves, warehouses, and docks, including the Long Reach docks, were constructed and maintained by the profitable Harris County Navigation District (Henson 2010). This influx of infrastructure bolstered population growth—in 1920, the population of Harris Country was 70,974; in 1930, that number rose to 172,661. Main exports from the ports included wheat, grain, sorghum, cotton, rice, cement, and petroleum products, and main imports included crude oil, iron ore, molasses, coffee, and foreign-made automobiles (Henson 2010).

During the 1960s at the height of the Cold War with Russia, the US, under the direction of Vice President Lyndon B. Johnson, purchased a 404.7-hectare (1,000.0-acre) site from Rice University just east of Webster at the edge of Clear Lake (Alexander and Kleiner 2010). Upon this land, the epicenter of the newly founded National Aeronautics and Space Administration (NASA) was constructed and named the Manned Spacecraft Center, later renamed the Lyndon B. Johnson Space Center in 1973 (Alexander and Kleiner 2010). By 1966, the Manned Spacecraft Center employed a staff of more than 5,000 people in more than a dozen functional structures (Alexander and Kleiner 2010). To meet the growing infrastructure demands of the Space Center, several towns were established around the area, including Clear Lake City, the largest town along Clear Lake's northern shore (Alexander and Kleiner 2010). Post-World War II population increased from 169,633 in 1940 to 277,740 in 1950 and then to 436,457 in 1960.

The first fully air-conditioned and enclosed sports stadium in the world was built in 1965 and named the Harris County Domed Stadium. Known today as the Astrodome, this stadium has been home to numerous events, including major-league baseball, major-league soccer, Portuguese-style bullfighting, rodeos, college basketball, concerts, religious events, and housing for Hurricane Katrina refugees. In 2009, the Astrodome was permanently closed due to several code violations issued by the Houston Fire Marshall's Office. In 2017, the THC designated the Astrodome as a State Antiquities Landmark (SAL) (Chandler 2010). Harris County also contains two public hospitals and maintains several major transportation systems, such as a passenger Amtrak line, interstate and intrastate highways, and high-rise bridges over the San Jacinto Ship

Channel and the Houston Ship Channel. Today, there are more than 4,690,000 people living in Harris County, although the growth rate has slowed considerably since 2010.

4.0 ARCHIVAL RESEARCH

Prior to initiating fieldwork, Horizon personnel reviewed the THC's online *Texas Archeological Sites Atlas* (TASA) and *Texas Historic Sites Atlas* (THSA), the National Park Service's (NPS) online *National Register Information System* (NRIS), and the Texas State Historical Association's (TSHA) *The Handbook of Texas Online* for information on previously recorded archeological sites and previous archeological investigations conducted within a 1.6-kilometer (1.0-mile) radius of the project area (THC 2020). Based on this archival research, no previously recorded archeological sites, cemeteries, or historic properties listed on the NRHP or designated as SALs are present within approximately 1.6 kilometers (1.0 mile) of the project area (THC 2020).

Examination of historical US Geological Survey (USGS) topographic maps dating from 1915 to the present and aerial photographs dating from 1953 to the present indicate that no standing structures of potentially historic age (i.e., 50 years of age or older) are located within the boundaries of the project area (NETR 2020). One structure, a large building that may be a church or other community gathering facility, is located off the southern side of Stockdick School Road along the northern margin of the project area. The structure was built at some time between 1973 and 1981; as such, the structure is not of historic age. Land use within the project area throughout the 20th century appears to have been predominantly agricultural, and the majority of the project area was under active cultivation until sometime between 1995 and 2000. Currently, most of the project area is densely overgrown with recent-growth coastal forest.

Based on the TASA database, two prior cultural resources surveys have been conducted within the limits of the project area. In 2009, the proposed right-of-way (ROW) of Grand Parkway was surveyed by PBS&J, Inc. for the Texas Department of Transportation (TxDOT) (Schubert et al. 2009). This survey covered a slender margin of those portions of the project area located immediately adjacent to the highway. Another linear survey was conducted that ran north-to-south through the project area. No information is available on the THC's TASA about this survey, but the surveyed area roughly correlates with the ROW of an existing electrical transmission line that traverses the tract, so the prior survey may have been conducted in association with the construction of this transmission line. The majority of the project area has not been previously surveyed.

In southeast Texas, aboriginal cultural resources are common adjacent to rivers, creeks, and bayous as well as in coastal settings. Based on the physiographic setting, the terraces of Mayde Creek within the project area have moderate to high potential for aboriginal archeological resources, though the potential decreases to low away from the creek. Based on the absence of historic-age structures within the project area on historical imagery, the project area as a whole has low potential to contain historic-age archeological and architectural resources.

5.0 SURVEY METHODOLOGY

Between April 30 and May 5, 2020, Horizon archeologists Charles E. Bludau, Jr. and Luis Gonzalez conducted an intensive cultural resources survey of the project area. Jeffrey D. Owens acted as Principal Investigator, and the survey was conducted under Texas Antiquities Permit No. 9409. The purpose of the survey was to locate any significant cultural resources that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed the project area and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area consists of a vast tract that is roughly bisected by Mayde Creek, which flows southeastward through the approximate middle of the tract. Areas adjacent to the creek were largely undeveloped and covered in dense hardwood forests with a thick understory of shrubs, grasses, forbs, brambles, vines, and various grasses. Vegetation in the more open areas consisted of dense pasture grasses with isolated copses of hardwood trees. Whereas most of the project area is undeveloped and appears to be largely intact, various disturbances were observed. An Enterprise Crude Pipeline, LLC pipeline corridor passes northeast to southwest through the north-central portion of the project area; a Kinder Morgan Texas Pipeline, LLC pipeline corridor passes northeast to southwest through the central portion of the project area; and a transmission line passes northwest to southeast through the center of the project area. In the northwestern corner of the project area, immediately south of Stockdick School Road and east of Clay Road, a large section of land has been cleared and a number of underground utility lines have been installed. In the southwestern corner of the project area, north of Clay Road and east of Peek Road, a wide, contoured drainage channel has been constructed. Finally, Grand Avenue Parkway (SH 99) passes between the two sections of the project area located on either side of the highway. Visibility of the modern ground surface ranged from poor (<20%) in more heavily vegetated areas to excellent (80 to 100%) in cleared areas. Representative photographs of the project area are presented in Figures 5 to 9.

In addition to pedestrian walkover, the Texas State Minimum Archeological Survey Standards (TSMASS) call for excavation of a minimum of two shovel tests per 0.4 hectare (1.0 acre) for projects measuring 10.1 hectares (25.0 acres) or less in size plus one additional shovel test per 2.0 hectares (5.0 acres) above 10.1 hectares (25.0 acres). As such, a minimum of 121 shovel tests would be required within the 154.0-hectare (380.6-acre) project area. Horizon excavated a total of 164 shovel tests, thereby exceeding the TSMASS for a project area of this size (Figures 10 to 13). In general, shovel tests measured approximately 11.8 inches (30.0 centimeters) in diameter, and all sediments were screened through 0.25-inch (6.35-

Figure 5. Typical View of Mayde Creek within Project Area (Facing Northwest)

Figure 6. Typical View of Mayde Creek within Project Area (Facing Northeast)

Figure 7. Typical View of Forested Eastern Portion of Project Area (Facing North)

Figure 8. Artificial Channel in Southwestern Portion of Project Area (Facing East)

Figure 9. Typical View of Mayde Creek Terraces (Facing Northwest)

millimeter) hardware cloth. The Universal Transverse Mercator (UTM) coordinates of all shovel tests were determined using Collector for ArcGIS data collection software based on the North American Datum of 1983 (NAD 83). Shovel tests typically revealed sandy clay loam to sandy loam sediments overlying sandy clay. Mottling and iron staining were ubiquitous in shovel tests, suggesting that large portions of the project area are likely saturated on a seasonal or perennial basis. It is Horizon's opinion that shovel testing was capable of fully penetrating sediments with the potential to contain subsurface archeological deposits. Summary data for all 164 shovel tests are presented in Appendix A.

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

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

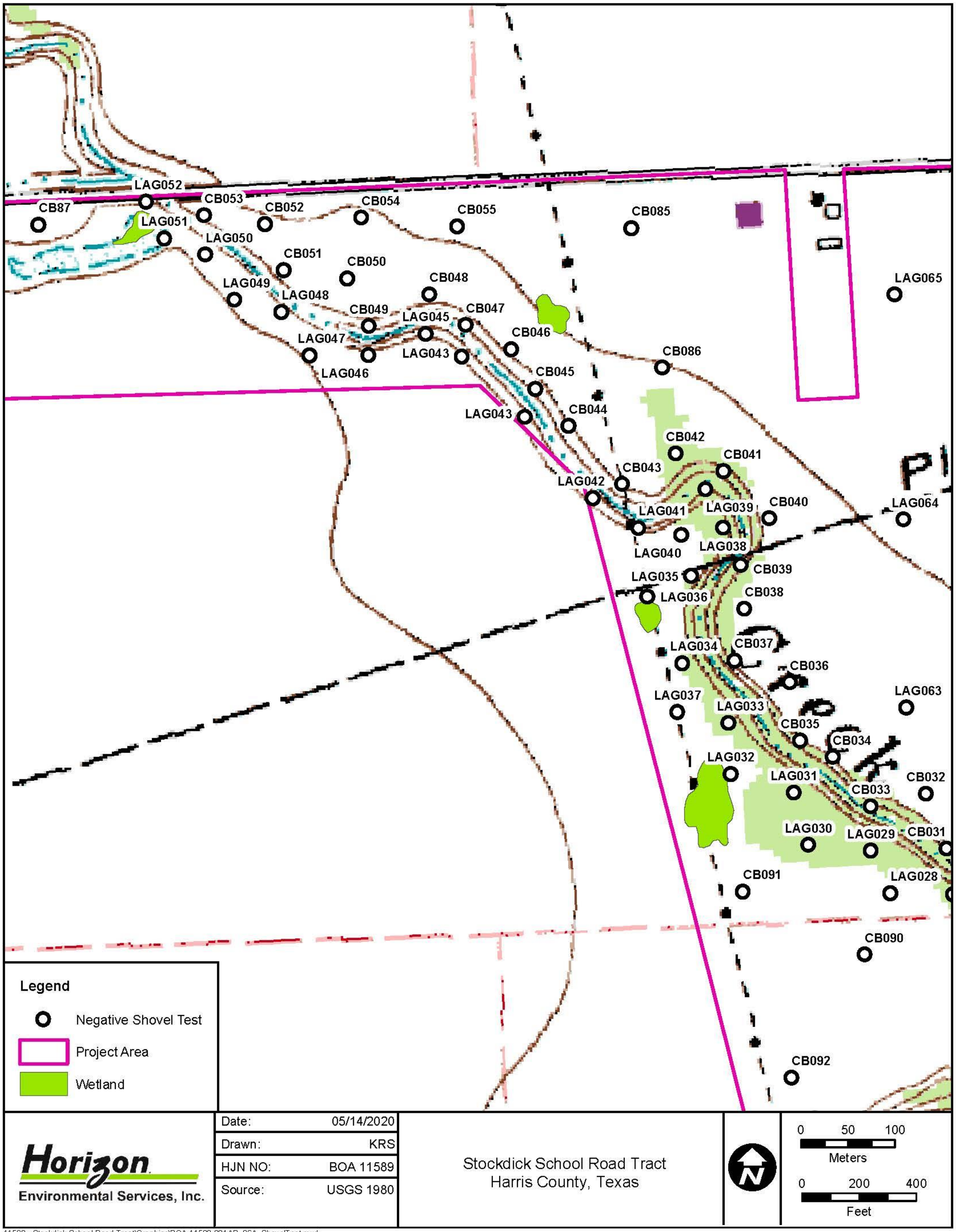
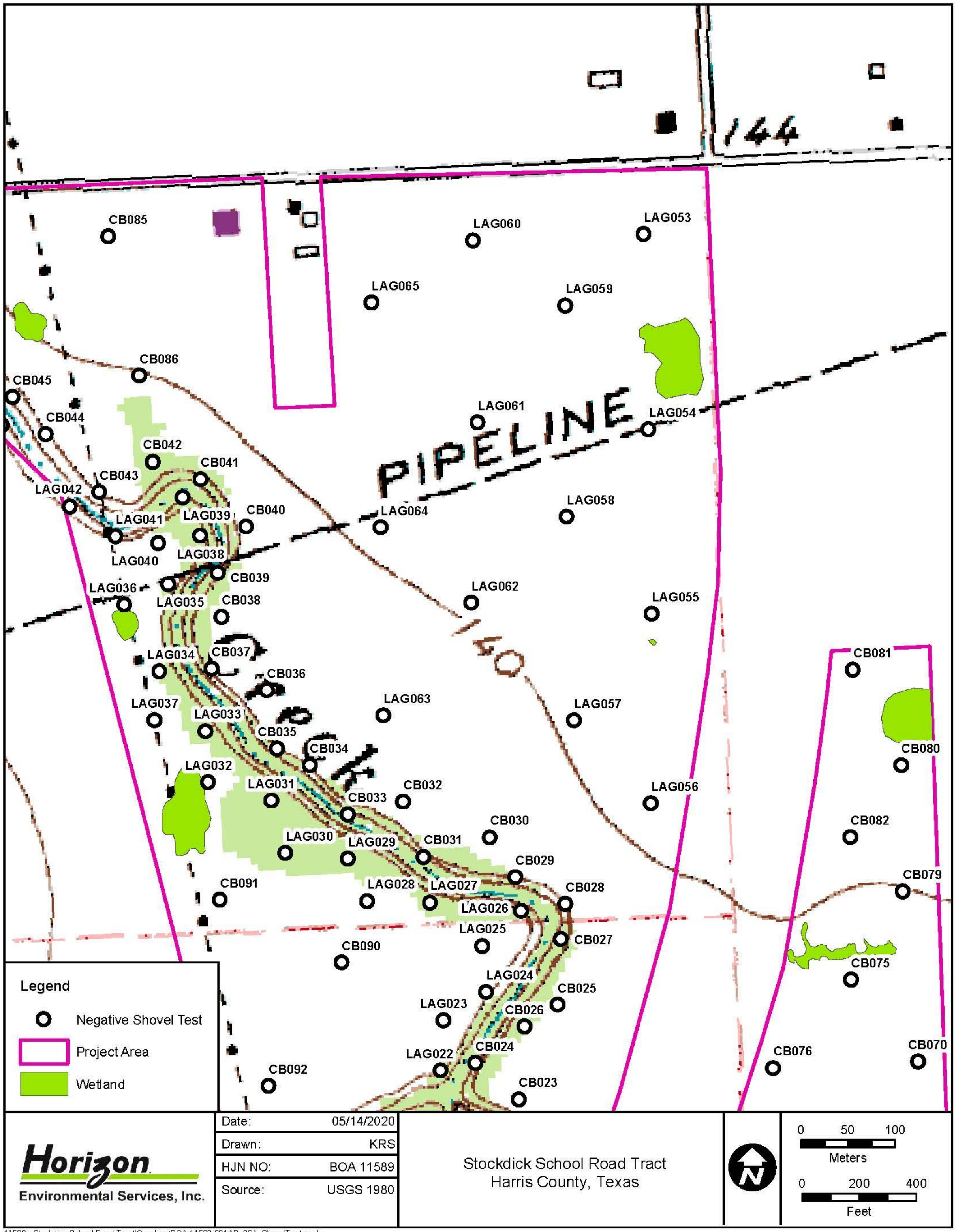


Figure 10. Locations of Shovel Tests Excavated within Project Area (Northwestern Area)



11589 - Stockdick School Road Tract\Graphics\BOA-11589-001AR_06A_ShovelTest.mxd

Figure 11. Locations of Shovel Tests Excavated within Project Area (Northeastern Area)

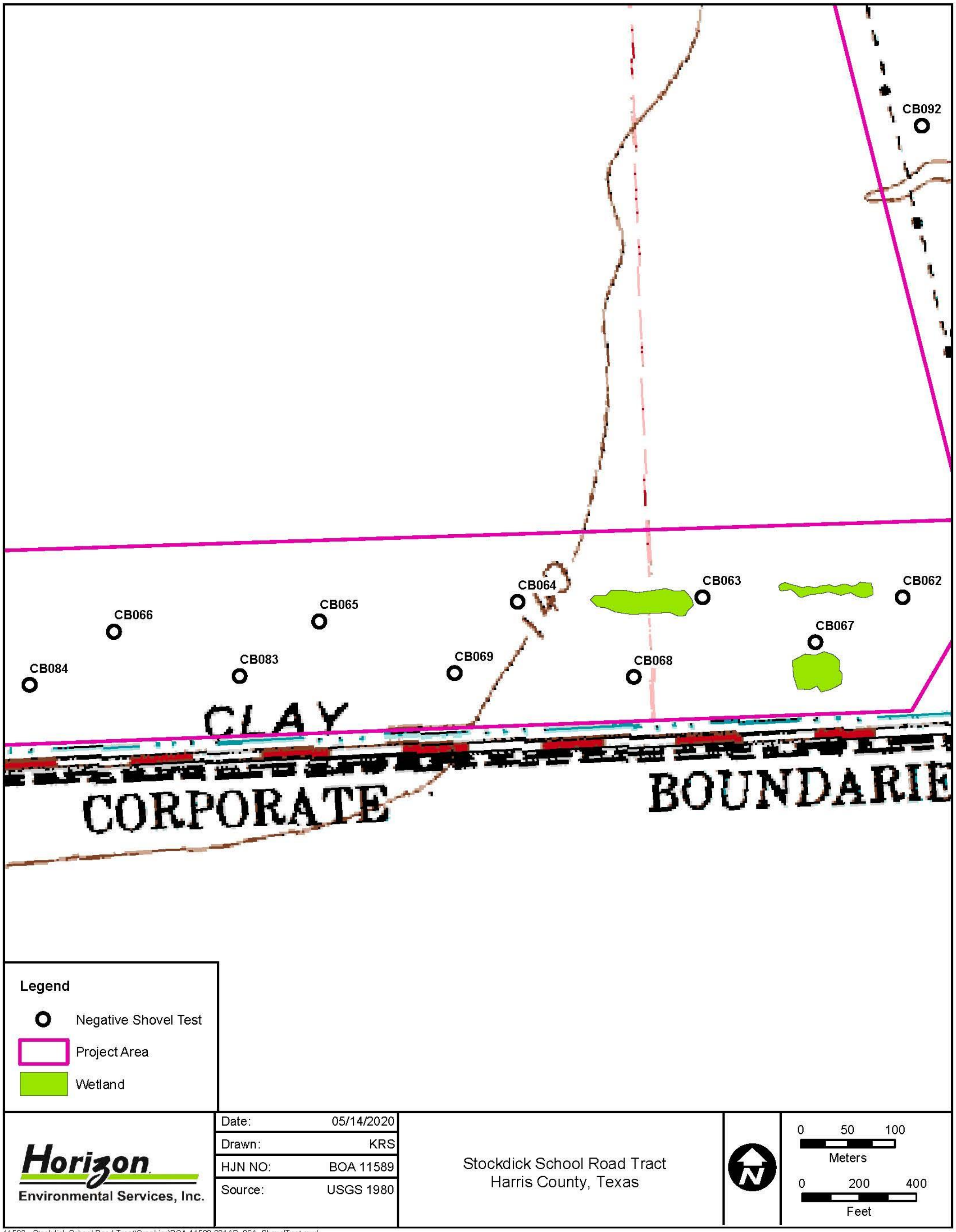
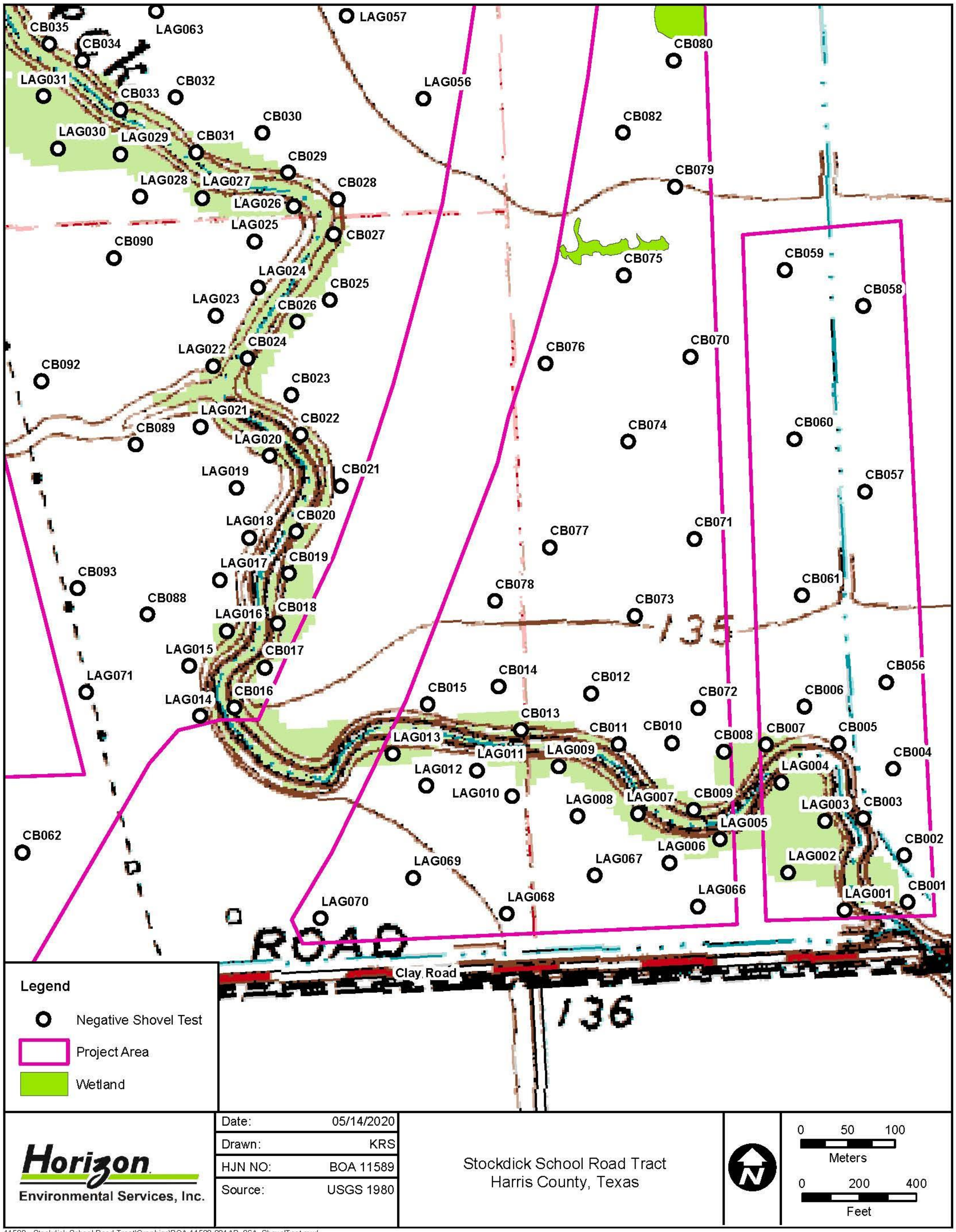


Figure 12. Locations of Shovel Tests Excavated within Project Area (Southwestern Area)



11589 - Stockdick School Road Tract\Graphics\BOA-11589-001AR_06A_ShovelTest.mxd

Figure 13. Locations of Shovel Tests Excavated within Project Area (Southeastern Area)

6.0 RESULTS OF INVESTIGATIONS

Between April 30 and May 5, 2020, Horizon archeologists Charles E. Bludau, Jr. and Luis Gonzalez conducted an intensive cultural resources survey of the project area. Jeffrey D. Owens acted as Principal Investigator, and the survey was conducted under Texas Antiquities Permit No. 9409. The purpose of the survey was to locate any significant cultural resources that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed the project area and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area consists of a vast tract that is roughly bisected by Mayde Creek, which flows southeastward through the approximate middle of the tract. Areas adjacent to the creek were largely undeveloped and covered in dense hardwood forests with a thick understory of shrubs, grasses, forbs, brambles, vines, and various grasses. Vegetation in the more open areas consisted of dense pasture grasses with isolated copses of hardwood trees. Whereas most of the project area is undeveloped and appears to be largely intact, various disturbances were observed. An Enterprise Crude Pipeline, LLC pipeline corridor passes northeast to southwest through the north-central portion of the project area; a Kinder Morgan Texas Pipeline, LLC pipeline corridor passes northeast to southwest through the central portion of the project area; and a transmission line passes northwest to southeast through the center of the project area. In the northwestern corner of the project area, immediately south of Stockdick School Road and east of Clay Road, a large section of land has been cleared and a number of underground utility lines have been installed. In the southwestern corner of the project area, north of Clay Road and east of Peek Road, a wide, contoured drainage channel has been constructed. Finally, Grand Avenue Parkway (SH 99) passes between the two sections of the project area located on either side of the highway. Visibility of the modern ground surface ranged from poor (<20%) in more heavily vegetated areas to excellent (80 to 100%) in cleared areas.

In addition to pedestrian walkover, the TSMASS call for excavation of a minimum of two shovel tests per 0.4 hectare (1.0 acre) for projects measuring 10.1 hectares (25.0 acres) or less in size plus one additional shovel test per 2.0 hectares (5.0 acres) above 10.1 hectares (25.0 acres). As such, a minimum of 121 shovel tests would be required within the 154.0-hectare (380.6-acre) project area. Horizon excavated a total of 164 shovel tests, thereby exceeding the TSMASS for a project area of this size. Shovel tests typically revealed sandy clay loam to sandy loam sediments overlying sandy clay. Mottling and iron staining were ubiquitous in shovel tests, suggesting that large portions of the project area are likely saturated on a seasonal or perennial basis. It is Horizon's opinion that shovel testing was capable of fully penetrating sediments with the potential to contain subsurface archeological deposits.

No cultural resources of prehistoric or historic age were recorded within the project area during the survey. A modern church or some other type of large community center is present in the northern portion of the project area off the southern side of Stockdick School Road (Figure 14). Examination of historical USGS topographic maps and aerial photographs indicates this structure was built at some time between 1973 and 1981; as such, the structure is not of historic age.

Figure 14. Modern Church in Northern Portion of Project Area (Facing Southwest)

7.0 SUMMARY AND RECOMMENDATIONS

7.1 CONCEPTUAL FRAMEWORK

The archeological investigations documented in this report were undertaken with three 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 project 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 36 CFR §60.4(a-d). The four 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 three requirements: (1) properties must possess significance, (2) the significance must satisfy at least one of the four 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 four 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 building, structure, cultural landscape, or non-archeological site, object, or district as an SAL if it meets at least one of following criteria:

A. [T]he property is associated with events that have made a significant contribution to the broad patterns of our history, including importance to a particular cultural or ethnic group;

B. [T]he property is associated with the lives of persons significant in our past;

C. [T]he property embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction;

D. [T]he property has yielded, or may be likely to yield, information important in Texas culture or history.

Furthermore, the THC may designate an archeological site as an SAL if the site meets one or more of the following criteria:

1. [T]he site has the potential to contribute to a better understanding of the prehistory and/or history of Texas by the addition of new and important information;
2. [T]he site's archeological deposits and the artifacts within the site are preserved and intact, thereby supporting the research potential or preservation interests of the site;
3. [T]he site possesses unique or rare attributes concerning Texas prehistory and/or history;
4. [T]he study of the site offers the opportunity to test theories and methods of preservation, thereby contributing to new scientific knowledge; or,
5. [T]he high likelihood that vandalism and relic collecting has occurred or could occur, and official landmark designation is needed to ensure maximum legal protection, or alternatively further investigations are needed to mitigate the effects of vandalism and relic collecting when the site cannot be protected.

7.4 SUMMARY OF INVENTORY RESULTS

Between April 30 and May 5, 2020, Horizon archeologists Charles E. Bludau, Jr. and Luis Gonzalez conducted an intensive cultural resources survey of the project area. Jeffrey D. Owens acted as Principal Investigator, and the survey was conducted under Texas Antiquities Permit No. 9409. The purpose of the survey was to locate any significant cultural resources that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed the project area and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area consists of a vast tract that is roughly bisected by Mayde Creek, which flows southeastward through the approximate middle of the tract. Areas adjacent to the creek were largely undeveloped and covered in dense hardwood forests with a thick understory of shrubs, grasses, forbs, brambles, vines, and various grasses. Vegetation in the more open areas consisted of dense pasture grasses with isolated copses of hardwood trees. Whereas most of the project area is undeveloped and appears to be largely intact, various disturbances were observed. An Enterprise Crude Pipeline, LLC pipeline corridor passes northeast to southwest through the north-central portion of the project area; a Kinder Morgan Texas Pipeline, LLC pipeline corridor passes northeast to southwest through the central portion of the project area; and a transmission line passes northwest to southeast through the center of the project area. In the northwestern corner of the project area, immediately south of Stockdick School Road and east of Clay Road, a large section of land has been cleared and a number of underground utility lines have been installed. In the southwestern corner of the project area, north of Clay Road and east of Peek Road, a wide, contoured drainage channel has been constructed. Finally, Grand Avenue Parkway (SH 99) passes between the two sections of the project area located on either side of the highway. Visibility of the modern ground surface ranged from poor (<20%) in more heavily vegetated areas to excellent (80 to 100%) in cleared areas.

In addition to pedestrian walkover, the TSMASS call for excavation of a minimum of two shovel tests per 0.4 hectare (1.0 acre) for projects measuring 10.1 hectares (25.0 acres) or less in size plus one additional shovel test per 2.0 hectares (5.0 acres) above 10.1 hectares (25.0 acres). As such, a minimum of 121 shovel tests would be required within the 154.0-hectare (380.6-acre) project area. Horizon excavated a total of 164 shovel tests, thereby exceeding the TSMASS for a project area of this size. Shovel tests typically revealed sandy clay loam to sandy loam sediments overlying sandy clay. Mottling and iron staining were ubiquitous in shovel tests, suggesting that large portions of the project area are likely saturated on a seasonal or perennial basis. It is Horizon's opinion that shovel testing was capable of fully penetrating sediments with the potential to contain subsurface archeological deposits.

No cultural resources of prehistoric or historic age were recorded within the project area during the survey. A modern church or some other type of large community center is present in the northern portion of the project area off the southern side of Stockdick School Road. This structure was built at some time between 1973 and 1981; as such, the structure is not of historic age.

7.5 Management Recommendations

Based on the results of the survey-level investigations documented in this report, no potentially significant cultural resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good-faith effort to identify historic properties within the project area. No cultural resources were identified within the project area that meet the criteria for designation as SALs according to 13 TAC 26 or for inclusion in the NRHP under 36 CFR 60.4. Horizon recommends a finding of "no historic properties affected," and no further archeological work is recommended in connection with the proposed undertaking. However, human burials, both prehistoric and historic, 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 in the project area, even in previously surveyed areas, all work should cease immediately in the vicinity of the inadvertent discovery, and the THC should be notified immediately. Following completion of the project, project records will be permanently curated at TARL.

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APPENDIX A:

Shovel Test Data

Table A-1. Shovel Test Summary Data

ST No.	UTM Coordinates[1] Easting	UTM Coordinates[1] Northing	Depth (cmbs)	Soils	Artifacts
CB001	234016	3303367	0-15	Light brown sandy loam	None
			15-30+	Gray and orange mottled sandy clay	None
CB002	234015	3303417	0-45	Light brown sandy loam	None
			45-60+	Light brown sandy clay with iron staining	None
CB003	233973	3303459	0-45	Light brown sandy loam	None
			45-60+	Light brown sandy clay with iron staining	None
CB004	234008	3303510	0-80	Light brown sandy loam	None
			80-100+	Light grayish-brown sandy loam with iron staining	None
CB005	233951	3303540	0-45+	Gray, pale brown, black, and red mottled sandy clay	None
CB006	233917	3303581	0-30+	Dark gray sandy clay with iron staining	None
CB007	233874	3303543	0-35	Brown sandy loam	None
			35-50+	Brown sandy clay with iron staining	None
CB008	233828	3303537	0-35+	Dark gray sandy clay with iron staining	None
CB009	233793	3303477	0-25	Pale brown sand	None
			25-40+	Dark grayish-brown clay with iron staining	None
CB010	233774	3303550	0-20+	Dark gray clay loam with iron staining	None
CB011	233716	3303551	0-15	Light brown compact sandy loam	None
			15-30+	Dark gray compact clay (water table at 20 cmbs)	None
CB012	233690	3303607	0-35+	Dark gray clay with iron staining	None
CB013	233613	3303572	0-40+	Dark gray compact clay	None
CB014	233592	3303619	0-40+	Dark gray clay with iron staining	None
CB015	233515	3303605	0-35	Dark brown sandy loam	None
			36-60+	Dark brown and gray sandy clay with iron staining	None
CB016	233309	3303612	0-45+	Brown and gray clay with iron staining	None
CB017	233344	3303653	0-45+	Brown and gray clay with iron staining	None
CB018	233360	3303699	0-45+	Brown and gray clay with iron staining	None
CB019	233375	3303751	0-55	Whitish-gray sandy loam	None
			55-70+	Pale gray sandy clay with iron inclusions	None

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

ST No.	UTM Coordinates[1] Easting	UTM Coordinates[1] Northing	Depth (cmbs)	Soils	Artifacts
CB20	233385	3303796	0-30+	Reddish-brown and gray mottled clay with iron staining	None
CB21	233435	3303842	0-60	Pale gray sandy loam	None
			60-75+	Pale gray sandy clay with iron inclusions	None
CB022	233395	3303899	0-30+	Reddish-brown and gray sandy clay with iron staining	None
CB023	233387	3303942	0-40+	Dark gray sandy clay with iron staining	None
CB024	233343	3303983	0-30+	Reddish-brown and gray sandy clay	None
CB025	233434	3304041	0-60	Pale grayish-brown sandy loam	None
			60-70+	Grayish-brown sandy clay with iron staining	None
CB026	233397	3304019	0-30+	Reddish-brown and gray clay	None
CB027	233441	3304111	0-30+	Reddish-brown and gray clay	None
CB028	233447	3304148	0-30+	Reddish-brown and gray clay	None
CB029	233396	3304179	0-30+	Reddish-brown and gray clay	None
CB030	233371	3304223	0-40	Pale grayish-brown sandy loam	None
			40-60+	Grayish-brown sandy clay with iron staining	None
CB031	233299	3304206	0-30+	Reddish-brown and gray clay	None
CB032	233280	3304266	0-40+	Gray sandy clay with iron staining	None
CB033	233221	3304255	0-30+	Reddish-brown and gray sandy clay	None
CB034	233183	3304310	0-25	Pale brown sandy loam	None
			25-40+	Pale brown sandy clay with iron staining	None
CB035	233149	3304329	0-25	Pale brown sandy loam	None
			25-40+	Pale brown sandy clay with iron staining	None
CB036	233141	3304392	0-25	Pale brown sandy loam	None
			25-40+	Pale brown sandy clay with iron staining	None
CB037	233084	3304418	0-25	Pale brown sandy loam	None
			25-40+	Pale brown sandy clay with iron staining	None
CB038	233097	3304473	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None

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

ST No.	UTM Coordinates[1] Easting	UTM Coordinates[1] Northing	Depth (cmbs)	Soils	Artifacts
CB39	233095	3304520	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB40	233129	3304568	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB041	233083	3304621	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB042	233033	3304642	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB043	232974	3304613	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB044	232920	3304678	0-30	Pale brown sandy loam	None
			30-40+	Pale brown sandy clay with iron staining	None
CB045	232887	3304719	0-25	Grayish-brown sandy clay	None
			25-40+	Grayish-brown and orange clay	None
CB046	232863	3304763	0-30	Brown sandy loam	None
			30-50+	Brown and orange clay	None
CB047	232816	3304791	0-30	Brown sandy loam	None
			30-50+	Brown and orange clay	None
CB048	232779	3304826	0-30	Brown sandy loam	None
			30-50+	Brown and orange clay	None
CB049	232713	3304795	0-30+	Brownish-gray and orange sandy clay	None
CB050	232692	3304847	0-30+	Brownish-gray and orange sandy clay	None
CB051	232625	3304859	0-15	Grayish-brown sandy loam	None
			15-30+	Brown and orange clay	None
CB052	232608	3304910	0-15	Grayish-brown sandy loam	None
			15-30+	Brown and orange clay	None
CB053	232543	3304922	0-15	Grayish-brown sandy loam	None
			15-30+	Brown and orange clay	None
CB054	232711	3304911	0-45	Dark brown sandy loam	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
			45-60+	Brown, orange and red sandy clay	None
CB055	232812	3304896	0-45	Dark brown sandy loam	None
			45-60+	Brown, orange and red sandy clay	None
CB056	234005	3303602	0-40	Grayish-brown sandy loam	None
			40-60+	Grayish-brown and red sandy clay	None
CB057	233993	3303807	0-40	Grayish-brown sandy loam	None
			40-60+	Grayish-brown and red sandy clay	None
CB058	234002	3304005	0-40	Grayish-brown sandy loam	None
			40-60+	Grayish-brown and red sandy clay	None
CB059	233920	3304048	0-40	Grayish-brown sandy loam	None
			40-60+	Grayish-brown and red sandy clay	None
CB060	233921	3303867	0-25+	Grayish-brown sandy loam (water table at 25 cmbs)	None
CB061	233920	3303700	0-35	Grayish-brown sandy loam	None
			35-50+	Grayish-brown and red sandy clay	None
CB062	233075	3303469	0-55	Grayish-brown sandy loam	None
			55-70+	Grayish-brown sandy clay with iron staining	None
CB063	232862	3303480	0-55	Grayish-brown sandy loam	None
			55-70+	Grayish-brown sandy clay with iron staining	None
CB064	232665	3303486	0-55	Grayish-brown sandy loam	None
			55-70+	Grayish-brown sandy clay with iron staining	None
CB065	232452	3303476	0-55	Grayish-brown sandy loam	None
			55-70+	Grayish-brown sandy clay with iron staining	None
CB066	232233	3303476	0-55	Grayish-brown sandy loam	None
			55-70+	Grayish-brown sandy clay with iron staining	None
CB067	232980	3303426	0-35+	Grayish-brown sandy loam (water table at 35 cmbs)	None
CB068	232784	3303399	0-50	Grayish-brown sandy loam	None
			50-60+	Grayish-brown sandy clay with iron staining	None
CB069	232593	3303413	0-50	Grayish-brown sandy loam	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
			50-60+	Grayish-brown sandy clay with iron staining	None
CB070	233815	3303960	0-60+	Grayish-brown and red wet sandy clay	None
CB071	233809	3303766	0-60+	Grayish-brown and red wet sandy clay	None
CB072	233803	3303586	0-60+	Grayish-brown and red wet sandy clay	None
CB073	233741	3303687	0-60+	Grayish-brown and red wet sandy clay	None
CB074	233744	3303873	0-60+	Grayish-brown and red wet sandy clay	None
CB075	233748	3304051	0-60+	Grayish-brown and red wet sandy clay	None
CB076	233660	3303961	0-30	Gray and brown sandy loam	None
			30-50+	Gray, brown and red sandy clay	None
CB077	233654	3303765	0-30	Gray and brown sandy loam	None
			30-50+	Gray, brown, and red sandy clay	None
CB078	233593	3303711	0-30	Gray and brown sandy loam	None
			30-50+	Gray, brown, and red sandy clay	None
CB079	233808	3304143	0-35+	Grayish-brown sandy clay with iron staining	None
CB080	233813	3304277	0-35+	Grayish-brown sandy clay with iron staining	None
CB081	233767	3304381	0-35+	Grayish-brown sandy clay with iron staining	None
CB082	233755	3304203	0-35+	Grayish-brown sandy clay with iron staining	None
CB083	232365	3303422	0-30+	Grayish-brown sandy clay with iron staining	None
CB084	232140	3303424	0-30+	Grayish-brown sandy clay with iron staining	None
CB085	232998	3304885	0-35	Pale brown sandy loam	None
			35-40+	Pale brown sandy clay with iron staining	None
CB086	233023	3304735	0-35	Pale brown sandy loam	None
			35-40+	Pale brown sandy clay with iron staining	None
CB087	232366	3304922	0-35	Pale brown sandy loam	None
			35-40+	Pale brown sandy clay with iron staining	None
CB088	233222	3303716	0-30+	Gray, brown, and yellow sandy clay	None
CB089	233219	3303898	0-30+	Gray, brown, and yellow sandy clay	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
CB090	233206	3304098	0-30+	Gray, brown, and yellow sandy clay	None
CB091	233080	3304172	0-30+	Gray, brown, and yellow sandy clay	None
CB092	233122	3303971	0-30+	Gray, brown, and yellow sandy clay	None
CB093	233148	3303748	0-30+	Gray, brown, and yellow sandy clay	None
LAG001	233948	3303361	0-15	Grayish-brown sandy loam	None
			15+	Light gray and orange mottled sandy clay	None
LAG002	233890	3303405	0-20	Grayish-brown sandy loam	None
			20-70	Brown fine sandy loam	None
			70-80+	Light yellowish-brown sandy clay loam	None
LAG003	233933	3303458	0-20	Grayish-brown sandy loam	None
			20-40+	Light gray and orange mottled sandy clay	None
LAG004	233888	3303501	0-35	Grayish-brown sandy loam	None
			35-45+	Light gray and orange mottled sandy clay	None
LAG005	233819	3303444	0-25	Grayish-brown sandy loam	None
			25-60	Brown fine sandy loam	None
			60-70+	Light yellowish-brown sandy clay loam	None
LAG006	233764	3303422	0-35	Grayish-brown sandy loam	None
			35-55	Brown fine sandy loam	None
			55-70+	Light yellowish-brown sandy clay	None
LAG007	233734	3303476	0-35	Dark brown sandy loam	None
			35-50+	Light gray sandy clay	None
LAG008	233669	3303477	0-40	Grayish-brown sandy loam	None
			40-70	Light brown sandy loam	None
			70-80+	Light grayish-yellow clay	None
LAG009	233651	3303531	0-40	Dark brown sandy loam	None
			40-60+	Light gray sandy clay	None
LAG010	233600	3303502	0-35	Dark brown sandy loam	None
			35-50+	Light grayish-brown sandy clay	None
LAG011	233564	3303531	0-45	Dark brown sandy loam	None
			45-60+	Light grayish-brown sandy clay	None
LAG012	233509	3303518	0-45	Grayish-brown sandy loam	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
			45-70	Light brown loam	None
			70-85+	Light gray sandy clay	None
LAG013	233475	3303553	0-40	Dark gray sandy loam	None
			40-60+	Light gray sandy clay	None
LAG014	233272	3303605	0-40	Grayish-brown fine sandy loam	None
			40-50+	Light gray black mottled sandy clay	None
LAG015	233263	3303659	0-35	Grayish-brown fine sandy loam	None
			35-45+	Light gray sandy clay	None
LAG016	233305	3303694	0-35	Grayish-brown sandy loam	None
			35-70	Light brown sandy loam	None
			70-80+	Light gray sandy clay loam	None
LAG017	233301	3303749	0-25	Dark brown sandy loam	None
			25-40+	Yellowish-brown sandy clay	None
LAG018	233334	3303792	0-35	Dark brown sandy loam	None
			35-45+	Yellowish-brown sandy clay	None
LAG019	233324	3303846	0-30	Dark brown sandy loam	None
			30-40+	Yellowish-brown sandy clay	None
LAG020	233361	3303878	0-40+	Yellowish-brown sandy clay	None
LAG021	233289	3303913	0-40+	Yellowish-brown sandy clay	None
LAG022	233306	3303977	0-40+	Yellowish-brown sandy clay	None
LAG023	233311	3304030	0-25	Dark grayish-brown sandy loam	None
			25-35+	Reddish-brown sandy clay	None
LAG024	233358	3304058	0-30	Dark grayish-brown sandy clay	None
			30-40+	Reddish-brown sandy clay	None
LAG025	233357	3304108	0-30+	Reddish-brown sandy clay	None
LAG026	233400	3304143	0-15	Dark grayish-brown sandy loam	None
			15-35+	Yellowish-brown sandy clay	None
LAG027	233303	3304157	0-30+	Yellowish-brown sandy clay	None
LAG028	233237	3304162	0-30+	Yellowish-brown sandy clay	None
LAG029	233218	3304208	0-30+	Yellowish-brown sandy clay	None
LAG030	233152	3304218	0-20	Dark grayish-brown sandy loam	None
			20-40+	Yellowish-brown sandy clay	None
LAG031	233140	3304274	0-30+	Orangish-yellow sandy clay	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
LAG032	233074	3304298	0-40+	Dark gray sandy clay with iron staining	None
LAG033	233074	3304352	0-30+	Dark gray sandy clay with iron staining	None
LAG034	233028	3304418	0-30	Dark grayish-brown sandy loam	None
			30-45+	Reddish-brown sandy clay	None
LAG035	233042	3304511	0-30+	Reddish-brown sandy clay	None
LAG036	232994	3304491	0-40+	Reddish-brown sandy clay	None
LAG037	233020	3304366	0-40+	Reddish-brown sandy clay	None
LAG038	233079	3304561	0-25	Dark grayish-brown sandy loam	None
			25-40+	Reddish-brown sandy clay	None
LAG039	233062	3304603	0-30	Dark grayish-brown sandy loam	None
			30-45+	Reddish-brown sandy clay	None
LAG040	233034	3304555	0-30	Dark grayish-brown sandy loam	None
			30-40+	Reddish-brown sandy clay	None
LAG041	232989	3304565	0-40+	Dark grayish-brown sandy clay	None
LAG042	232942	3304599	0-25	Dark grayish-brown sandy loam	None
			25-40+	Reddish-brown sandy clay	None
LAG043	232874	3304690	0-15	Dark grayish-brown sandy loam	None
			15-30+	Light yellowish-brown sandy clay	None
LAG044	232810	3304758	0-20	Dark grayish-brown sandy clay	None
			20-40+	Yellowish-brown sandy clay	None
LAG045	232773	3304784	0-35	Dark grayish-brown sandy loam	None
			35-50+	Reddish-brown sandy clay	None
LAG046	232711	3304764	0-15	Dark grayish-brown sandy loam	None
			15-30+	Yellowish-brown sandy clay	None
LAG047	232648	3304767	0-30+	Orangish-brown sandy clay	None
LAG048	232620	3304815	0-30+	Orangish-brown sandy clay	None
LAG049	232571	3304831	0-30+	Orangish-brown sandy clay	None
LAG050	232542	3304880	0-20	Dark grayish-brown sandy loam	None
			20-30+	Yellowish-brown sandy clay	None
LAG051	232500	3304900	0-30+	Dark grayish-brown and orange mottled sandy clay	None
LAG052	232482	3304940	0-30	Dark grayish-brown sandy loam	None
			30-40+	Reddish-brown sandy clay	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
LAG053	233568	3304857	0-40	Dark grayish-brown sandy loam	None
			40-60+	Grayish-brown sandy clay	None
LAG054	233563	3304649	0-45	Dark grayish-brown sandy clay	None
			45-55+	Grayish-brown sandy clay	None
LAG055	233556	3304452	0-40	Dark grayish-brown sandy loam	None
			40-50+	Grayish-brown sandy clay	None
LAG056	233545	3304250	0-45	Light grayish-brown sandy loam	None
			45-60+	Dark grayish-brown sandy clay	None
LAG057	233467	3304343	0-40	Light grayish-brown sandy loam	None
			40-50+	Dark grayish-brown sandy clay	None
LAG058	233471	3304561	0-50	Grayish-brown sandy loam	None
			50-60+	Dark grayish-brown sandy clay	None
LAG059	233481	3304786	0-40	Grayish-brown sandy loam	None
			40-50+	Dark gray sandy clay loam	None
LAG060	233386	3304860	0-50	Light brown sandy loam	None
			50-60+	Dark gray sandy clay	None
LAG061	233381	3304666	0-15	Dark brown sandy loam	None
			15-30+	Reddish-brown sandy clay	None
LAG062	233364	3304474	0-25	Dark grayish-brown sandy clay	None
			25-35+	Reddish-brown sandy clay	None
LAG063	233264	3304359	0-30	Dark grayish-brown sandy loam	None
			30-40+	Reddish-brown sandy clay	None
LAG064	233272	3304559	0-35	Light brownish-gray sandy loam	None
			35-45+	Dark gray sandy clay	None
LAG065	233274	3304800	0-45	Light brownish-gray sandy loam	None
			45-55+	Dark gray and orange mottled sandy clay	None
LAG066	233792	3303374	0-65	Dark grayish-brown sandy loam	None
			65-70+	Light grayish-yellow sandy clay	None
LAG067	233588	3303377	0-55	Dark grayish-brown sandy loam	None
			55-65+	Light grayish-yellow sandy clay	None
LAG068	233684	3303413	0-35	Dark grayish-brown sandy loam	None

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

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
			35-50+	Light yellowish-brown clay	None
LAG069	233490	3303420	0-65	Dark grayish-brown sandy loam	None
			65-75+	Light grayish-yellow sandy clay	None
LAG070	233389	3303382	0-30+	Dark gray and orange mottled sandy clay	None
LAG071	233152	3303636	0-30+	Dark gray and orange mottled sandy clay	None

[1] All UTM coordinates are located in Zone 15 and utilize the North American Datum of 1983 (NAD 83). None

cmbs = Centimeters below surface None

ST = Shovel test

UTM = Universal Transverse Mercator