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Phase I Archaeological Survey of the Spring Creek Greenway Trail Phase IIIc, Harris County, Texas

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USACE File No. SWG-2016-00013
Texas Antiquities Code Permit No. 7409

Prepared for

Harris County Public Infrastructure Department –Architecture and Engineering Division

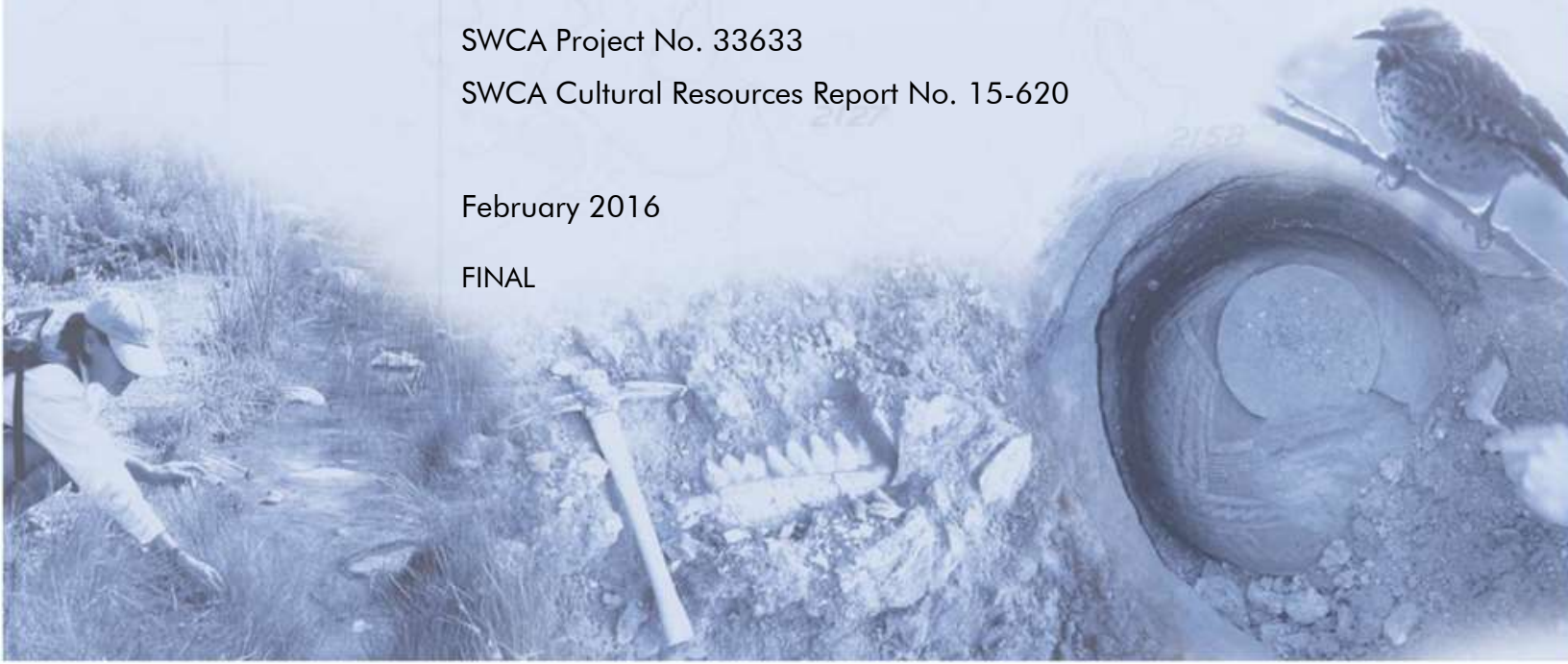
Prepared by

SWCA Environmental Consultants

SWCA Project No. 33633
SWCA Cultural Resources Report No. 15-620

February 2016

FINAL



PHASE I ARCHAEOLOGICAL SURVEY OF THE SPRING CREEK GREENWAY TRAIL PHASE IIIC, HARRIS COUNTY, TEXAS

USACE File No. SWG-2016-00013
Texas Antiquities Code Permit No. 7409

Prepared for

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ABSTRACT

On behalf of Harris County Public Infrastructure Department-Architecture and Engineering Division, SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey for the proposed Spring Creek Greenway Hike and Bike Trail Phase IIIc (project area). The project area covers a 100-foot-wide survey corridor approximately 2.29 miles in length (for a total surveyed area of 27.7 acres). The project area is located on either side of U.S. Interstate Highway 45 (I-45) along the south side of Spring Creek in Harris County, Texas. All work was conducted under Texas Antiquities Code permit number 7409 in compliance with the Antiquities Code of Texas, and in anticipation of Harris County Public Infrastructure Department-Architecture and Engineering Division's application for a U.S. Army Corps of Engineers (USACE) Section 404 permit (USACE File No. SWG-2016-00013) in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Document dated April 25, 2005) and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations.

The background literature and records review revealed that at least 16 cultural resources investigations have been conducted within 1 mile of the proposed project area. Approximately 24 percent of the current project area has been previously surveyed. Three archaeological sites and one historic cemetery have been previously identified within 1 mile of the proposed trail alignment.

The current investigation identified one new archaeological site (41HR1172) and one isolated find (IF-1). Site 41HR1172 is a multi-component (prehistoric and historic) site. The isolated find consisted of a single piece of prehistoric debitage within a disturbed context. Sites 41HR1172 and IF-1 are recommended NOT ELIGIBLE for the NRHP and no further work or avoidance is recommended. SWCA conducted a no collection survey, so artifact curation will not be necessary. Original survey documentation will be curated with the Texas Archeological Research Laboratory.

In accordance with 33 CFR Part 325, Appendix C, and Section 106 of the NHPA 36 CFR 800.4 (b)(1), SWCA has made a reasonable and good faith effort to identify historic properties within the anticipated project area. Based on the results of these investigations, SWCA recommends a finding of NO HISTORIC PROPERTIES AFFECTED (per 36 CFR 800.4[d] and 36 CFR 800.16[l]) on any properties listed or otherwise eligible for the NRHP.

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MANAGEMENT SUMMARY

Project Title: Phase I Archaeological Survey of the Spring Creek Greenway Trail Phase IIIc, Harris County, Texas

SWCA Project Number: 33633

Project Description: Harris County Public Infrastructure Department-Architecture and Engineering Division plans to construct a 2.29-mile-long hike and bike trail in Harris County, Texas. The proposed area of impact for the project area will be 25 feet in width and will impact a depth of approximately 1 to 2 feet.

Number of Acres Surveyed: Approximately 27.7 acres (investigations were conducted within a 100-foot-wide survey corridor along portions of the line totaling 2.29 miles).

Principal Investigator: C. Wesley Mattox

Dates of Work: November 4 and 9, 2015

Purpose of Work: All work was conducted under Texas Antiquities Code permit number 7409, in compliance with the Antiquities Code of Texas, and in anticipation of Harris County Public Infrastructure Department-Architecture and Engineering Division's application for a U.S. Army Corps of Engineers (USACE) Section 404 permit (USACE File No. SWG-2016-00013) in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Document dated April 25, 2005) and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations..

Number of Sites: The current investigation recorded one new site (41HR1172) and one isolated find (IF-1). Site 41HR1172 is a multicomponent site featuring a light scatter of prehistoric lithic debris and one solitary piece of historic ceramic. The isolated find consisted of a single piece of prehistoric lithic debitage in a disturbed context.

Recommendations: Site 41HR1172 and IF-1 are recommended NOT ELIGIBLE for the National Register of Historic Places (NRHP) and no further work or avoidance is recommended.

Curation: SWCA conducted a no collection survey. Original survey documentation will be curated with the Texas Archeological Research Laboratory

Comments: In accordance with 33 CFR Part 325, Appendix C, and Section 106 of the NHPA 36 CFR 800.4 (b)(1), SWCA has made a reasonable and good faith effort to identify historic properties within the anticipated permit review area. Based on the results of these investigations, SWCA recommends a finding of NO HISTORIC PROPERTIES AFFECTED (per 36 CFR 800.4[d] and 36 CFR 800.16[l]) on any properties listed or otherwise eligible for the NRHP.

INTRODUCTION

On behalf of Harris County Public Infrastructure Department-Architecture and Engineering Division, SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of the proposed Spring Creek Greenway Hike and Bike Trail Phase IIIc (project area). The project area covers a 100-foot-wide survey corridor approximately 2.29 miles in length (for a total surveyed area of 27.7 acres). The project area is located on either side of U.S. Interstate Highway 45 (I-45) along the south side of Spring Creek in Harris County, Texas.

The proposed hike and bike trail will be constructed on lands primarily owned by Harris County and managed by Harris County Public Infrastructure Department-Architecture and Engineering Division. Investigations were conducted in compliance with the Antiquities Code of Texas under Antiquities Permit Number 7409, and in anticipation of Harris County Public Infrastructure Department-Architecture and Engineering Division's application for a U.S. Army Corps of Engineers (USACE) Section 404 permit (USACE File No. SWG-2016-00013) in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Document dated April 25, 2005) and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations.

All investigations were conducted in accordance with the Texas Historical Commission (THC) and the Council of Texas Archaeologists (CTA) standards. C. Wesley Mattox served as Principal Investigator for the survey and Todd Butler served as Project Manager. Mr. Mattox and Ernesto Maycotte conducted the field investigations on November 4 and 9, 2015.

Project Area Description

The project area is located in northern Harris County at the Harris/Montgomery county line. It begins on the west side of I-45 and the north side of Springwoods Crossing Boulevard and proceeds north until it reaches Spring Creek. The line then turns east, crossing beneath I-45 and winding along the bank of Spring Creek until it crosses the Union Pacific railway line. The trail then turns south, following the railway line, until it reaches a channelized tributary of Spring Creek at the north end of East Hardy Road. The line follows the north bank of this tributary for approximately 0.2 mile before turning south and terminating at the north end of the Spring Creek Phase III alignment, approximately 0.25 miles northeast of the crossing of East Hardy Road and the Hardy Toll Road. The project is depicted on the U.S. Geological Survey (USGS) Spring 7.5-minute topographic quadrangle (Figure 1).

The finished width of the asphalt trail will be approximately 12 to 14 feet. Including land clearing activity within the construction area, the proposed area of effect will be 25 feet in width to depths ranging from 1 to 2 feet below surface. Project plans indicate that the vegetation will be cleared at the surface, minimizing subsurface impact.

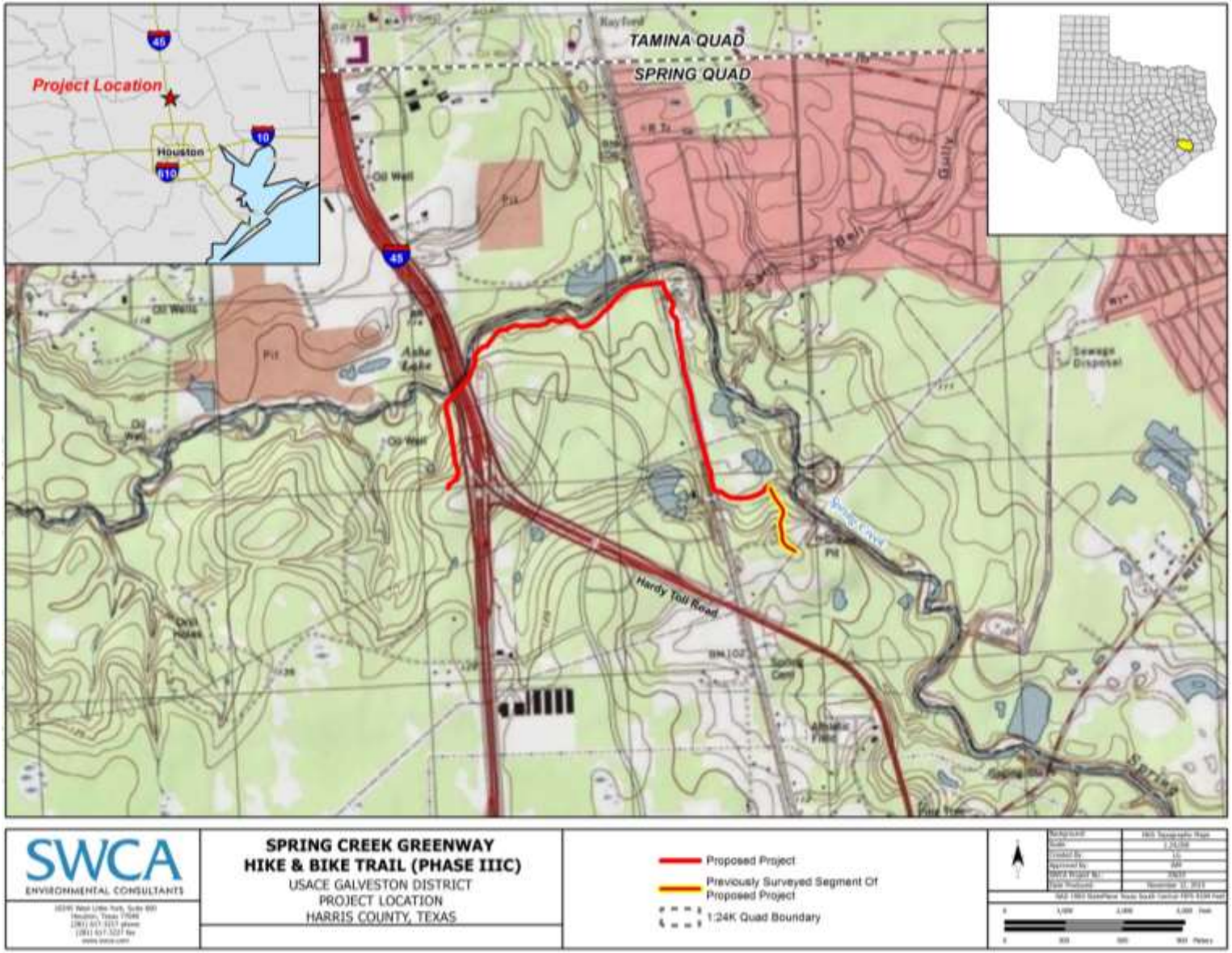

Figure 1. Project location map.

ENVIRONMENTAL SETTING

The project area is located in northern Harris County on the edge of two ecotones, the coastal plains of the Northern Humid Gulf Coastal Prairies to the south, and the Flatwoods ecotone to the north (Griffith et al. 2007). The Northern Humid Coastal Prairies are gently sloping and relatively flat. Soils are typically wet because of poor drainage that results from clay subsoils and low relief. The Flatwoods are acidic, clayey, and generally wet. The proposed hike and bike trail is within the San Jacinto River basin, just south of Spring Creek. Unnamed tributaries to Spring Creek traverse the project area at several locations.

Geology

According to the Geological Atlas of Texas (Barnes 1992), the project area traverses two geological formations, Holocene-age Quaternary Alluvium (Qal) and the Pleistocene-age Lissie Formation (Ql). Quaternary Alluvium consists of geologically recent deposits of clay, silt, and sand, with locally abundant organic matter. It includes point bar, natural levee, stream channel, and backswamp deposits (Barnes 1992). The Lissie formation contains clay, silt, sand, and a minor amount of small siliceous gravels. It is locally calcareous, with concretions of calcium carbonate, iron oxide, and iron-manganese oxides. The surface is fairly flat and featureless except for numerous rounded shallow depressions and pimple mounds (Barnes 1992).

Soils

According to the Natural Resources Conservation Service Web Soil Survey ([NRCS] 2015), soils in the area consist of Pleistocene age terrace deposits on upland segments, and sandy and loamy alluvium in areas adjacent to Spring Creek and its tributaries. Individual soil series within the proposed project area are presented in Table 1.

Table 1. Soils Crossed by the proposed project corridor

Soil Series	Texture	Location	Description	Potential for Deeply Buried Archaeological Materials (Abbott 2001: Table 2)
Segno	Fine sandy loam	Uplands	Deep, moderately well-drained, moderately slowly permeable soils form from unconsolidated loamy, fluviomarine sediments of Pleistocene or Pliocene age.	Low
Hatliff	Loam	Floodplain	Deep, moderately well-drained, moderately rapidly permeable soils that formed from deep, loamy and sandy alluvial sediments.	High
Pluck	Fine sandy loam	Floodplain	Deep, poorly drained soils formed in loamy Holocene-age alluvium along meandering creeks and streams.	-
Kian	Loam	Floodplain	Very deep, poorly drained soils formed in loamy Holocene-age alluvium along meandering creeks and streams.	-
Kenney	Loamy fine sand	Uplands	Deep, well-drained, moderately rapidly permeable terrace soils formed from thick beds of loamy and sandy sediments of Pleistocene age.	Low

Houston-PALM (Potential Archaeological Liability Map)

According to Abbott's (2001) Houston-PALM, a guide to archaeological potential related to geomorphology in the Harris County area, the project area is located in Map Unit 1. Briefly, Map Unit 1 recommends a surface survey with shovel testing and recommends deep testing if deep impacts are anticipated. Map Unit 1 is characteristic of areas underlain by deep Holocene deposits that exhibit low to moderate surficial disturbance (Abbott 2001).

Vegetation

Historical vegetation in the project area was likely a mixture of coastal prairie communities of tall grass with a few clusters of oaks, and a more closed forest community dominated by pine. Dominant vegetative species in the prairies included little bluestem (*Schizachyrium scoparium*), yellow Indiangrass (*Sorghastrum nutans*), brownseed paspalum (*Paspalum plicatulum*), gulf muhly (*Muhlenbergia capillaries*), and switchgrass (*Panicum virgatum*). The piney community was composed of longleaf pine (*Pinus palustris*) with an understory of sweetbay (*Magnolia virginiana*), wax myrtle (*Morella* spp.), and holly (*Ilex* spp.) (Griffith et al. 2007). The project area is presently dominated by wetland and various upland plant communities that include woodrush flatsedge (*Cyperus entrerianus*), lamp rush (*Juncus effusus*), white grass (*Leersia virginica*), torpedo grass (*Panicum repens*), and swamp smartweed (*Persicaria hydropiperoides*). Sweetgum *(Liquidambar styraciflua),* American sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), American elm (*Ulmus americana),* and cedar elm (*Ulmus crassifolia*) form the tree canopy (Vicenik 2015).

CULTURAL SETTING

The project area is located within the Southeast Texas archaeological region (Perttula 2004a). Southeast Texas is identified to include the upper Texas coast, from the Sabine River southwestward to the Brazos River delta, and including the adjacent inland coastal plain (Ricklis 2004).

Prehistoric Cultural Setting

The prehistoric cultural setting is divided into three primary periods: Paleoindian, Archaic, and Ceramic. The Protohistoric period bridges the gap to the historic period, with the arrival of Europeans to Southeast Texas. The following general summary draws heavily from regional sources found in *The Prehistory of Texas* (Perttula 2004b) and a comprehensive regional summary provided by Story in *The Archaeology and Bioarchaeology of the Gulf Coastal Plain* (Story 1990).

Paleoindian Period

In Southeast Texas, the Paleoindian period (ca. 11,500-8000 years before present [B.P.]) is divided into Early (ca. 11,500-10,000 B.P.) and Late (10,000-8500 B.P.) subperiods (Perttula 2004a:9). Fluted points are the most commonly known markers of the Paleoindian period. Early types include Clovis and Folsom points. Late Paleoindian occupation is generally represented by Dalton, San Patrice, and Scottsbluff, in addition to Plainview and Angostura points (Bousman et al. 2004; Ricklis 2004; Turner et al. 2011).

Few Paleoindian sites have been identified, and of those, none have been systematically excavated in Southeast Texas. Paleoindian projectile points have been primarily identified by surface collections in the region, and only about two dozen Paleoindian sites have been recorded in Harris County (Bousman et al. 2004: 64) Paleoindian points have been found in excavated contexts, although these have generally been mixed with materials from later periods. Most have been identified along major stream drainages (Ricklis 2004). It is thought that one factor in the lack of intact Paleoindian sites is due to the submersion of coastal occupations by an increase in sea level and the lack of preservation across older upland areas (Aiuvalasit 2007; Aten 1983). Sea levels did not stabilize until the end of the Middle Archaic period, approximately 5000 B.P. (Aten 1983: 157).

One of the largest local collections of Paleoindian artifacts comes from the McFaddin Beach site, located southeast of the project area in Jefferson County, Texas. Numerous Paleoindian points have been recovered, along with a significant amount of materials from later time periods. Research at the site, however, indicates that artifacts have been re-deposited inland from an unknown location offshore (Brown 2009). As no excavation has been conducted at the site proper, little is known about the lifeways of individuals who utilized these projectile points.

Because no discrete Paleoindian components have been found or investigated in Southeast Texas, there is no direct evidence for Paleoindian subsistence practices. In other parts of Texas and the Southeastern United States, early discoveries of Paleoindian artifacts in conjunction with now-extinct Pleistocene megafauna, such as mastodon and *Bison antiquus,* strongly biased early descriptions of Paleoindian subsistence towards exploitation of big game animals (Bousman et al. 2004: 15; Williams and Stoltman 1965). Continued evidence from excavated Paleoindian components outside Southeast Texas suggests that Paleoindian subsistence was more widely varied, though exploitation of big game was certainly a part (Bousman et al. 2004: 75, Dunbar and Webb 1996).

One significant line of evidence for understanding Paleoindian lifeways comes from their diagnostic projectile points, themselves; across North America, archaeologists have documented consistent Paleoindian use of nonlocal raw materials for stone tool manufacture (Bousman et al. 2004). Most of the recovered points in southeast Texas are of a high grade lithic material that is scarce or absent in the region, suggesting a widespread movement of peoples and materials over long distances in a highly mobile lifestyle that likely depended on a diverse range of food resources (Ricklis 2004). Due to this high-mobility lifestyle, population densities were likely low and social structure is hypothesized as relatively simple (Ricklis 2004).

Archaic Period

The Archaic period generally dates to the end of the Wisconsin glaciation and the concomitant extinction of Pleistocene megafauna. The period is often distinguished by the development of a broad subsistence base and evidence of a more intensive exploitation of regionally specific plant and animal resources. This change in subsistence is marked by an adaptation in tool production to conform to new hunting techniques, food preparation, and related activities.

The Archaic period in Texas is generally defined by pre- or non-horticultural adaptations and pre-ceramic and pre-bow-and-arrow hunting technologies (Story 1990). In Southeast Texas, the Archaic sequence is separate for inland groups (ca. 8000–1500 B.P.) and coastal groups (ca. 5000–2200 B.P.), due to the fact that the coastline was not stabilized until the middle of the Archaic period (Ricklis 2004). Numerous Archaic sites have been found along inland stream courses in Southeast Texas. The Archaic components at these sites are represented by various types of flaked stone dart points and other lithic tools. For coastal groups, the Archaic also includes stratified shell midden sites (Ricklis 2004).

For inland groups, a typological cluster of expanded-stem types dominates the Early Archaic (before ca. 6000 B.P.). Included in this group are early side-notched and early stemmed forms and corner-notched points of the Keithville, Neches River, and Trinity types. These are followed by massively barbed points of the Bell/Calf Creek series, as well as non-stemmed Tortugas points and stemmed Wells points (Ricklis 2004).

A variety of Middle Archaic tool types is reported from Southeast Texas, including Yarbrough, Bulverde, Travis, and Pedernales in the western sector. The predominant Late Archaic types are Kent and Gary, with Ensor and Godley points common in the western reaches of Southeast Texas (Ricklis 2004). A shift to the use of poorer quality and more local lithic resources in Late Archaic times suggests reduced group mobility and more tightly defined group territories (Story 1990). Several Middle to Late Archaic cemeteries have been reported from the coastal prairies of the western part of southeast Texas. By the Late Archaic, cemeteries were an integral part of cultural behavior along the inland margins of the coastal prairies zone, further tying groups to specific locations of shared mortuary practice (Ricklis 2004).

Ceramic Period

The Ceramic period in Southeast Texas begins ca. 2200 B.P., with the introduction of ceramics on the Texas Coast (Rickliss 2004; Aten 1983). Ceramics would not be found in inland southeast Texas for several centuries (Rickliss 2004). A later, important, technological innovation was the introduction of the bow and arrow (marked by the appearance of small, light straight and expanded-stem stone point types), around 1300 B.P. (Ricklis 2004; Story 1990). The Ceramic period of southeast Texas is further divided into Early and Late subperiods.

The Early Ceramic subperiod shows a continuation of Archaic period subsistence and settlement patterns (Ricklis 2004). Gary contracting stem points began to replace earlier Kent points. Tchefuncte and Mandeville ceramics began to be present in small amounts as one moves east towards the Louisiana border, but sandy Goose Creek ceramics spread throughout an area bounded by the Brazos River to the west and extend to the upper reaches of the Neches and Angelina Basins (Ricklis 2004; Story 1990: 257). This area has been called the Mossy Grove culture area, and appears to have been a distinct regional development that persisted through time until the Protohistoric period (Rickliss 2004: 190).

On the central Texas coast, The Late Ceramic/Late Prehistoric subperiod saw an apparent division of Toyah phase groups in inland areas and the Rockport phase groups on the central Texas coast (Ricklis 2004). Small, light arrow point types, such as Scallorn, Alba, and Catahoula appear during this time (Ricklis 2004). Goose Creek ceramics continue along with the introduction of grog-tempered and some bone-tempered ceramics, and decoration becomes more elaborate, although grog-tempered ceramics are more common and decorations are less elaborate inland (Ricklis 2004; Story 1990). Additional characteristics of the Late subperiod include the appearance of bison bone along with a lithic technocomplex of Perdiz arrow points, unifacial end scrapers, blade-core lithic technology, thin bifacial knifes (often alternately beveled), and expanded base drills/perforators made from flakes and prismatic blades (Ricklis 2004). The use of cemeteries continued through the Ceramic period, with the Harris County Boys School Site, including 29 burials on the western edge of Galveston Bay, and the Mitchell Ridge Site on Galveston Island, presenting notable examples (Story 1990: 242; Ricklis 1994)

Protohistoric Period

While not necessarily a formal period, the Protohistoric is generally recognized as the period when contact with Europeans occurred, but not in sufficient amounts to significantly affect the economy or lifestyles of the prehistoric groups. Native groups in the Houston area, due to their proximity to the Gulf of Mexico, had some of the earliest contact with European explorers and colonists. In 1528, Spanish explorer, Alvar Nuñez Cabeza de Vaca shipwrecked near Galveston Bay and began a nine-year odyssey through Texas and Mexico, documenting various native cultures at the initial point-of-contact with Europeans (Kleiner 2010). However, though documentation of Native American lifeways began with this contact, sustained interaction between Native Americans and Europeans did not begin until later in the period. During this period, European goods sometimes appear at sites, but there was essentially little change in subsistence and settlement from the Ceramic period. The Perdiz point continues with the addition of Bulbar Stemmed, and non-stemmed round-based and lozenge-shaped arrow points (Ricklis 2004). In the Galveston Bay area, native ceramics persist at sites until approximately 1700 a.d., but then disappear almost completely except for Goose Creek Plain sherds (Story 1990: 260).

Historic Cultural Setting

Earliest Contact/Colonial Era (1500-1836)

The Spanish Colonial period (1630–1821) can be characterized as the initial period of Aboriginal/European contact and European settlement in Texas. During this time, the region was inhabited by several aboriginal groups including the Coapite, Copane, Karankawa, and Orcoquizas (Kleiner 2010). Apart from the Cabeza de Vaca expedition, other European explorers passed through the region; remnants of the Hernando de Soto expedition, led by Luis de Moscoso Alvarado, crossed through central Texas in 1542, but found the country "uninviting" (Hudson 1997). In February 1685, the French La Salle expedition entered Matagorda Bay and established Fort St. Louis along Garcitas Creek. Throughout the mid-1700s, the upper Texas coast continued to be an area of contention between France and Spain, until the 1763 Treaty of Paris clearly placed Louisiana within the Spanish realm. French trader Joseph Blancpain traveled through the lower Trinity River and Galveston Bay area in 1754. In response, the Spanish established Nuestra Senora de la Luz Mission in 1756, near the present day site of Wallisville. In the same year, a military presidio, Agustin de Ahumada Presidio, was established on the east bank of the Trinity River near the Liberty-Chambers County line. Most Spanish settlement in the area was abandoned by the early 1770s (Kleiner 2010).

By 1803, when the United States acquired Louisiana, the region was under Spanish control as a part of the Atascosito District (Kleiner 2010). Shortly thereafter, Mexico gained independence and assumed Spain's former territories in 1821. Anglo-American settlement began in earnest after 1824 when Stephen F. Austin received the first official colonization grant from the Mexican Government to bring 300 Anglo settlers into the area. Colonization proceeded rapidly and Harrisburg, Velasco, Brazoria, Columbia, Washington, and San Felipe became the principal settlements. However, the Mexican government's later efforts to curtail American immigration resulted in several disturbances, all leading up to the Texas Revolution and the final battle at San Jacinto, in which Texas won independence from Mexico.

Republic of Texas/Pre-Civil War (1836–1860)

During the Republic of Texas era, from 1836–1845, Harris (then Harrisburg) County was formed and organized in 1836 (Henson 2010). Houston was founded the same year. At the time, the Brazos River, Oyster Creek, and Buffalo Bayou played an integral role in the economic life of the region. Plantations dotted their banks, growing rice, cotton, sugarcane, and other crops, while steamboats transported goods and people to and from the port at Galveston. The cattle industry was introduced at this time, as well, serving as another boost to a growing economy (Henson 2010; Kleiner 2010). With the region's dependence on slave labor, residents voted heavily in favor of secession and many citizens participated as Confederate soldiers (Kleiner 2010).

The Post–Civil War/Reconstruction Period (1865–1880)

Following the Civil War, recovery from the war was slow, with principal agricultural exports dropping to a fraction of their pre-war totals. After the war, many freedmen worked for their former masters or started small farms. By the late 1870s, the livestock, lumber, and shipping industries had recovered significantly, owing in part to railroad expansion and improvements, and utilization of the Houston Ship Channel (Henson 2010). However, significant agriculture did not develop again until after 1890 (Henson 2010; Kleiner 2010).

Late-Nineteenth/Early-Twentieth Century (1880–1940s)

After 1880, rail transportation in the region increased significantly, principally following the introduction of the Texas and New Orleans Railroad (now the Southern Pacific Transportation Company) in 1860, which linked Houston to Orange. This railroad was later linked to the Louisiana and Western Railroad with through service to the City of New Orleans in 1881 (Kleiner 2010). By 1890, Midwestern developers had purchased land along the new North Galveston, Houston, and Kansas City Railroad, which headed east from Houston along the southern side of Buffalo Bayou towards Morgan's Point. This was done to attract other out-of-state farmers to raise fruit, berries, and vegetables, or just to seek more a temperate climate (Henson 2010).

Oil exploration in the early-twentieth century generated a population explosion in the region, particularly in Humble with the oil boom at Moonshine Hill in 1905. Oil was also discovered at Goose Creek and Tabbs Bay, which led to the establishment of a temporary boomtown from 1915 to 1917. In 1919, Ross Sterling and the Humble Oil and Refining Company (now Exxon) built a refinery near the oilfield on the San Jacinto above the mouth of Goose Creek. The development of the area as an industrial hub really began in 1911, when the formation of the Houston Ship Channel Navigation District was approved. The 50-mile-long channel was deepened and eventually widened to allow oceangoing vessels. Petroleum and other refineries popped up all along Buffalo Bayou and the San Jacinto River (Henson 2010; Kleiner 2010). In modern times, the region's economy continues to center around the shipping, agricultural, and petroleum industries. Many residents of the region find employment in the Houston metropolitan area.

BACKGROUND REVIEW

The background review consisted of a cultural resource and environmental literature review of the entire 2.29-mile-long project area. An SWCA archaeologist reviewed the corresponding USGS 7.5-minute topographic quadrangle map on the Texas Archeological Sites Atlas (TASA), a restricted online database, for any previously recorded surveys and historic or prehistoric sites located in or near the project area. Site files, relevant maps, National Register of Historic Places (NRHP) properties and State Antiquities Landmark (SAL) listings, Registered Texas Historic Landmarks, cemeteries, and local neighborhood surveys were also examined. Listings on TASA are limited to projects under purview of the Antiquities Code of Texas or the National Historic Preservation Act (NHPA) of 1966. Therefore, all work conducted in the area may not be available. The Texas Historic Sites Overlay, aerial photographs, Bureau of Economic Geology Maps, and the NRCS Web Soil Survey were also examined for historical and environmental information related to the project area.

Previous Investigations

At least 16 cultural resources investigations have been previously conducted within 1 mile of the project area (Table 2). The majority of surveys were conducted for transportation development projects, including a number associated with the Grand Parkway/ SH 99 construction. Surveys that are adjacent or intersected by the project area are shown on the project area alignment sheets, and provided a map label (Appendix A). The background literature and records review revealed that a portion of the project alignment, totaling approximately 24 percent of the entire project area, has been previously surveyed by two earlier surveys: the Spring Creek Greenway Trail Phase III survey (Jeremiah et al. 2012), and a survey of the tract that now surrounds the Exxon Mobile Campus on the west end of the project alignment (Nash and Spalding 2012). These surveys are described in detail below

The current Spring Creek Greenway Trail Phase IIIc follows a portion of the alignment of the Spring Creek Greenway Trail Phase III, which was surveyed by SWCA in 2012 (Jeremiah et al. 2012). The current proposed alignment overlaps a 0.25-mile-long portion of the original survey beginning at the unnamed tributary of Spring Creek, on the eastern end of the current project alignment (Appendix A: Sheet 5). In the vicinity of the current project area, the original Spring Creek Greenway Trail Phase III survey encountered landforms that appeared compact and graded, or were so heavily disturbed that shovel test excavations were unnecessary (Jeremiah et al. 2012). The Spring Creek Greenway Trail Phase III survey encountered no cultural resources near the current project.

On the west end of the project area, a 1600-foot segment of the current project alignment passes through a tract that now houses the Exxon Mobile Campus (Appendix A: Sheet 1). This property was surveyed in 2010 and 2011 by HRA Gray and Pape, who conducted intensive subsurface testing on a 50-m-interval grid (Nash and Spalding 2012). The survey encountered several isolated prehistoric and historic artifacts, including one concrete slab associated with a mid-twentieth-century oilfield, and one large prehistoric site containing concentrations of prehistoric lithic debris and ceramics (41HR1086) (Nash and Spalding 2012). No Isolated Finds or archaeological sites were located on the eastern end of the survey area where the projected Spring Creek Phase IIIc alignment is situated.

Table 2. Previously conducted cultural investigations within 1 mile of the project area.

Map Label	Year	Distance (feet)	Sponsoring Agency	Survey Type	Report Author/ Principal Investigator	Investigating Agency	Additional Information
Original Spring Creek Phase III alignment	2012	Partially Overlaps	Harris County/ USACE	Linear	Jeremiah, K., M. Marek, & T. Butler/ Butler, T.	SWCA	Project Planner: Harris County Precinct 4 Parks; TAC# 6322; (Jeremiah et al. 2012)
4	2014	370	USACE	Area	Bludau, C./ Hughey, J.	HRA Gray & Pape	(Bludau 2014)
3	2010	Intersects	USACE	Area	Nash, S. & Spalding E.	HRA Gray & Pape	Project Planner: Berg-Oliver Associates (Nash and Spalding 2012)
2	2009	Intersects	USACE	Linear	Nash, S.	HRA Gray & Pape	Project Planner: Coventry Development Company; (Nash 2009)
1	2011	160	USACE	Area	Spalding, E. & S. Nash/ Nash, S.	HRA Gray & Pape	Project Planner: Berg-Oliver Associates; (Spalding and Nash 2011)
-	2011	4275	San Jacinto River Authority	Linear	Dowling, J./ Feit, R.	ECCOM	Project Planner: Halff Associates; TAC# 6000; (Dowling et al. 2011)
-	1985	5120	FHWA	Linear	-	-	No information provided
-	2004	5015	TxDOT	Linear	Douglas, M./ Moore, R.G.	MAC	Project Planner: Carter and Burgess; TAC #3518; (Mangum and Moore 2004)
-	1979	4700	HUD	Area	-	-	No information provided
-	2009	3380	TxDOT	Linear	Schubert, D. & Bishop, P./ Cordova, K.	PBS&J	TAC# 5311; SH 99; (Schubert and Bishop 2009)
-	2009	4800	TxDOT	Linear	Shubert, D.& K. Cordova/ Cordova, K.	PBS&J	TAC#5302; SH 99; (Schubert 2009)
-	2004	3640	TxDOT	Linear	Porter, N., Bishop, P., & Jameson, S./ Fulmer, J.	PBS&J	Project Planner: Grand Parkway Association; TAC# 2769; (Porter et al. 2005)
-	2012	4225	TxDOT	Area	Darnell, B./ Feit, R.	AmaTerra	TAC#6102; (Darnell, 2012a)
-	2012	2800	TxDOT	Area	Bludau, C. et al/ Hughey, J.	HRA Gray & Pape	Project Planner: Zachry-Odebrect Parkway Builders; TAC# 6536; (Bludau et al 2014.)
-	2012	4065	TxDOT	Testing	Padilla, A., R. Feit, M. Bonine/ Feit, R.	AmaTerra	Project Planner: Michael Baker Jr. Inc; TAC# 6162; (Padilla et al. 2013)
-	2012	3535	TxDOT	Area	Darnell, B/ Feit R.	AmaTerra	TAC# 6101; (Darnell 2012b)

Previously Recorded Cultural Resources

A review of TASA (2015) identified four previously recorded cultural resources situated within 1 mile of the proposed project area (Table 3). This includes three archaeological sites and one historic cemetery, all of which are outside the proposed workspace and survey corridor and will not be affected by the proposed project. No NRHP, SAL, or Registered Texas Historic Landmarks are located near the project area. The two closest cultural resources, the Highland Cemetery and Site 41MQ310, are briefly described below.

Table 3. Previously recorded cultural resources within 1 mile of the project area.

Site No.	Distance (feet)	Type	Time Period	Site Type	NRHP Recommendation
Highland Cemetery (HR-C137)	1425	Cemetery	Historic	Cemetery	N/A
41MQ310	2535	Prehistoric Site	Unknown Prehistoric	Lithic scatter	Not Eligible
41MQ197	2955	Prehistoric	Transitional Archaic – Late Prehistoric	Open campsite	Not Eligible
41HR1086	4435	Prehistoric	Archaic – Late Prehistoric	Open campsite	No further work recommended by consultant

Highland Cemetery is labeled as Spring Cemetery on the 1960 USGS Spring 7.5-minute quadrangle map and as Spring Peaceful Rest Cemetery on Google Earth (2015). The cemetery is identified on Findagrave.com as Spring Peaceful Rest Cemetery, and is recorded as having 124 interments, dating mostly to the second half of the twentieth century, but including a small number of graves dating to the first half of the twentieth century.

Site 41MQ310 was identified during an undefined Grace Community Church Project, and consisted of a small, light scatter of lithic artifacts. The site was determined to be ineligible for inclusion in the NRHP by THC in September 2013 (TASA 2015).

FIELD INVESTIGATIONS

Field Methods

The archaeological investigations were designed to be of sufficient intensity to determine the nature, extent, and if possible, significance of any cultural resources located within the project area. An intensive pedestrian survey with systematic shovel testing was conducted throughout the entire survey corridor, measuring 100 feet in width (Appendix A).

During the intensive survey, a team of archaeologists walked the proposed project alignment while inspecting the ground surface for artifacts and anomalies that may indicate subsurface cultural deposits. Subsurface explorations consisted of shovel tests placed systematically throughout the project area at 100-m intervals, and at any landforms suspected of having archaeological potential. The intensity of the subsurface investigations complied with THC survey standards and was commensurate with the proposed depth of ground disturbance.

Individual 30-cm-diameter shovel tests were excavated until culturally sterile clay, water table, or 100 centimeters below surface (cmbs) was reached. The excavated matrix was screened through ¼-inch hardware mesh to retrieve any cultural materials that were present. The data from each shovel test was recorded on standardized shovel test forms and the location of each test was plotted with a handheld global positioning system (GPS) unit. Current project plans anticipate that the depth of impact for this project will be between 1 and 2 feet below surface; therefore, no deep testing was conducted.

Results of Field Investigations

The intensive survey was conducted along a single transect following the proposed trail. In compliance with THC standards, a total of 37 shovel tests were excavated (Appendix B). Three of the shovel tests were positive for cultural materials. An additional 14 shovel tests were attempted, but not excavated due to previous disturbances, including the I-45 corridor and a graded gravel road paralleling the Union Pacific railway line.

During the current investigation, SWCA identified one new archaeological site (41HR1172) and one isolated find. Both loci contained prehistoric artifacts, and 41HR1172 contained an isolated historic component. Discussion of the investigations at these locations follows.

Site 41HR1172 (Field Site 110415A-TS-1)

Site 41HR1172 is multicomponent site located approximately 0.25 mile northeast of the intersection of Northgate Crossing Boulevard and Spring Crossing Boulevard in northern Harris County, Texas (Appendix A: Sheet 2). SWCA identified the site on November 4, 2015.

Site 41HR1172 is located on the back slope of a large levee on the bank of Spring Creek (Figure 2). A small tributary of Spring Creek lies 40 feet west of the site boundary, and Spring Creek is 290 feet to the northeast of the site. Immature pine with an open understory covers the site area. To the south of the site area, the land slopes into a wide wetland. West of the small tributary, a large, 2-m-tall, constructed embankment covered in concrete riprap runs north, terminating approximately 50 m south of Spring Creek.

Figure 2. General overview of site 41HR1172, view southwest.

Site 41HR1172 was initially identified from a single positive shovel test during transect shovel testing along the project centerline. Archaeological investigations of the site included systematic surface survey and subsurface shovel testing. Ground surface visibility was approximately 0 to 5 percent due to dense pine straw and leaf litter.

An additional nine shovel tests were excavated to delineate the site; one additional shovel test was positive for cultural materials during site delineation (Figure 5). Soils in Site 41HR1172 are mapped as Kenney fine sandy loam (NRCS 2015). Shovel tests typically exhibited two to three strata in profile. Stratum I contained brown (10YR 4/3) fine sandy loam to depths of approximately 50 cmbs. Stratum II consisted of a very pale brown (10YR 7/4) fine sandy loam at depths of 50 to 100 cmbs. Several tests also exhibited a strata of gray (10YR 6/1) sandy loam with copious charcoal fragments at depths of between 30 and 70 cmbs. Excavations were terminated at depth (approximately 100 cmbs), compact soil, or the water table. Both delineation tests south of the site center encountered layers of reddish yellow (5YR 6/6) clay at depths between 30 and 50 cmbs. These clay strata overlaid strata of light yellowish brown (10YR 6/4) coarse sand with inclusions of rounded gravels.

Artifacts recovered from the site include four pieces of lithic debitage, one piece of historic porcelain and a piece of concrete rubble (Figure 3). All artifacts were recovered at depths below 40 cmbs, with the fragment of historic porcelain and concrete rubble recovered at depths greater than prehistoric artifacts within the same shovel tests (Table 4). No cultural features were observed on the surface or subsurface. No diagnostic artifacts were available to date the prehistoric component; the small porcelain fragment can only be dated generally to the Historic period, while the concrete rubble dates to the late 19th to 20th centuries.

Figure 3. Artifacts recovered from site 41HR1172; Top Row, Shovel Test N500/E500; Bottom Row, Shovel Test N500/E490.

Table 4. Artifact totals by depth observed at site 41HR1172.

Depth (cmbs)	Prehistoric Lithics	Historic Ceramics	Historic Rubble	Total
0-40	0	0	0	0
40-50	1	0	0	1
50-60	3	0	0	3
60-70	0	1	1	2
70-100	0	0	0	0
Total	**4**	**1**	**1**	**6**

Site 41HR1172 is oval in form and measures approximately 20 m east-west by 10 m north-south. The scarcity of artifacts recovered from the site prevents any measurement of intra-site patterning.

The site area appears to have been heavily disturbed through time. The reversed stratigraphic association of prehistoric and historic artifacts within both positive shovel tests, in which historic/modern artifacts appear below prehistoric artifacts, speaks to significant artifact displacement. The presence of what appeared to be Pleistocene-age, B-horizon clays over well-sorted, coarse, sandy alluvial deposits in shovel tests south of the site suggest substantial levels of earth moving. This disturbance may relate to the construction of the large riprap embankment west of the site. A review of aerial photographs and topographic maps of the project area show that the site location once sat on the north edge of an isolated terrace in the Spring Creek floodplain (USGS 1916). Between 1960 and 1978, the area was utilized in natural gas or oil mining (USGS 1960; Google Earth 2015). At some point between 1977 and 1989, the area was extensively graded, creating a deep channel south of the site, and installing the large concrete covered embankment (Figure 4) (Google Earth 2015). Although the aerial photographs are not completely clear, it appears that the area around 41HR1172 was graded to form the levee on which the site now sits. This may account for the presence of B-horizon clays above floodplain deposits, and land clearance and burn piles may account for the charcoal and evidence of burning seen within some shovel tests.

Site 41HR1172 is a multicomponent site consisting of a prehistoric lithic scatter of unknown age or cultural affiliation and an extremely light historic artifact scatter. Although the artifacts were somewhat deeply buried, it appears that the site has been extensively disturbed, based on evidence from artifact distribution, soils, historic topographic maps, and aerial photographs. Additionally, no cultural features or diagnostic artifacts were identified. As the assemblage is limited in quantity and range of types and the site area lacks contextual integrity, the site is unlikely to contain deposits that might contribute to the understanding of local and/or regional prehistory or history. As such, site 41HR1172 is recommended NOT ELIGIBLE for the NRHP and no further work is recommended.

[FIGURE REDACTED]

Figure 4. General vicinity of 41HR1172 showing extensive land clearance and disturbance prior to 1989 (Google Earth 2015).

[FIGURE REDACTED]

Figure 5. Plan map of site 41HR1172.

Isolated Find 1 (Field Site 110415A-TS-2)

IF-1 consists of one prehistoric chert early reduction flake of unknown age or cultural affiliation located approximately 0.16 mile northwest of the intersection of Northgate Crossing Boulevard and Morley Park Lane in northern Harris County, Texas (Appendix A: Sheet 1). SWCA identified the isolate on November 4, 2015. IF-1 is located on a dissected slope approximately 90 feet east of Spring Creek. The single flake was observed at a depth between 80 and 90 cmbs within a shovel test. Nearby shovel tests were negative and no other artifacts and no cultural features were identified. Copious modern debris was identified within shovel tests, including concrete rubble, modern brick fragments, plastic, and modern glass at depths of up to 60 cmbs. The site area had been substantially disturbed by the construction of a large earthen berm 15 m south of the single positive shovel test, and several large drainage ditches cut across the site area running north-south. These had been partially filled with riprap of concrete rubble and brick fragments. To the west, the terrain sloped down quickly to Spring Creek, and to the southwest, the area had been significantly disturbed by the construction of I-45, which lies 55 m west-southwest of IF-1. Due to the limited amount of cultural material identified and the extensive disturbance to surrounding terrain, the area was found insufficient to be considered as a site and a trinomial will not be requested. As such, IF-1 is recommended NOT ELIGIBLE for the NRHP and no further work is recommended.

SUMMARY AND RECOMMENDATIONS

On behalf of Harris County Public Infrastructure Department-Architecture and Engineering Division, SWCA conducted an intensive archaeological survey for the proposed Spring Creek Greenway Hike and Bike Trail Phase IIIc (project area). The project area totals approximately 2.29 miles in length and is located on either side of U.S. I-45 along the south side of Spring Creek in Harris County, Texas. All work was conducted under Texas Antiquities Code permit number 7409, in compliance with the Antiquities Code of Texas, and in anticipation of Harris County Public Infrastructure Department-Architecture and Engineering Division's application for a USACE Section 404 permit (USACE File No. SWG-2016-00013) in accordance with 33 CFR Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Document dated April 25, 2005) and Section 106 of the NHPA (16 USC 470) and its implementing regulations.

The background literature and records review revealed that at least 16 cultural resources investigations have been conducted within 1 mile of the proposed project area. Approximately 24 percent of the current project area has been previously surveyed. Three archaeological sites and one historic cemetery have been previously identified within 1 mile of the proposed trail alignment.

The current investigation identified one new archaeological site (41HR1172) and one isolated find (IF-1). Site 41HR1172 is a multi-component (prehistoric and historic) site. The isolated find consisted of a single piece of prehistoric debitage within a disturbed context. Sites 41HR1172 and IF-1 are recommended NOT ELIGIBLE for the NRHP and no further work or avoidance is recommended.

In accordance with 33 CFR Part 325, Appendix C, and Section 106 of the NHPA 36 CFR 800.4 (b)(1), SWCA has made a reasonable and good faith effort to identify historic properties within the anticipated project area. Based on the results of these investigations, SWCA recommends a finding of NO HISTORIC PROPERTIES AFFECTED (per 36 CFR 800.5[b] and 36 CFR 800.16[l]) on any properties listed or otherwise eligible for the NRHP.

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APPENDIX A

Project Alignment Sheets

[REDACTED]

APPENDIX B

Shovel Test Data

Final Site Number	Temp Site #	Shovel Test	Level	Depth (cmbs)	Pos/ Neg	Munsell	Soil Texture Description	Inclusions	Comments	Reason for Termi-nation	Artifacts (depth, count, type)	Excavator	Date
		110415A-01	1	0-20	N	10YR 4/4	sand		disturbed soil; ~30m from concrete overflow of creek; on two track; numerous push piles; 30% ground visibility	compact soil	NCM	EM	11/4/2015
		110415A-01	2	20-45	N	10YR 4/1	compacted sandy loam		disturbed soil; ~30m from concrete overflow of creek; on two track; numerous push piles; 30% ground visibility	compact soil	NCM	EM	11/4/2015
		110415A-03	1	0-100	N	10YR 4/1	sandy loam		disturbed soil; high moisture; on creek embankment; push pile and wire fence 3m North; 0% ground visibility; green briars and bushes; 1 piece of modern clear glass at 50cm	depth	NCM	EM	11/4/2015
		110415A-15	1	0-100	N	10YR 6/4	sand		soft sand; wooded area; pine forest; leaf and pine needle litter; 0% ground visibility; 1 modern clear glass at 50cm; 1 modern green glass at 60cm; one modern bullet at 70cm	depth	NCM	EM	11/4/2015
		110415A-17	1	0-80	N	10YR 4/4	sand		soft sand; 10m from small creek flowing into Spring Creek; wetland area 50m East of shovel test; 0% ground visibility; brush and briars; 1 modern bullet case at 50cm; one shell at 70cm	depth	NCM	EM	11/4/2015
		110415A-17	2	80-100	N	10YR 4/2	sand		soft sand; 10m from small creek flowing into Spring Creek; wetland area 50m East of shovel test; 0% ground visibility; brush and briars; 1 modern bullet case at 50cm; one shell at 70cm	depth	NCM	EM	11/4/2015
		110415A-19	1	0-40	N	10YR 4/4	sand		pine forest; 0% ground visibility; leaf and pine needle litter; on slope (<3%); located on Spring Creek levee	compact soil	NCM	EM	11/4/2015
		110415A-19	2	40-55	N	10YR 4/1	clay		pine forest; 0% ground visibility; leaf and pine needle litter; on slope (<3%); located on Spring Creek levee	compact soil	NCM	EM	11/4/2015
		110415A-22	1	0-70	N	10YR 4/4	sand		pine forest; 0% ground visibility; thin understory; on trail	compact soil	NCM	EM	11/4/2015
		110415A-22	2	70-80	N	10YR 6/1	compact sandy loam		pine forest; 0% ground visibility; thin understory; on trail	compact soil	NCM	EM	11/4/2015
		110415A-24	1	0-100	N	10YR 4/4	sand		pine and hardwood forest; briars and shrubs; 10% ground visibility; on raised platform 3m from dry creek bed	depth	NCM	EM	11/4/2015
		110415A-26	1	0-100	N	10YR 4/4	sand	30% gravel	1m from path cut through pine forest; HWY 45 is ~60m West. 80% ground visibility	depth	NCM	EM	11/4/2015
		110415A-28	1	0	NE				beneath I-45 overpass on concrete embankment			EM	11/4/2015

Final Site Number	Temp Site #	Shovel Test	Level	Depth (cmbs)	Pos/ Neg	Munsell	Soil Texture Description	Inclusions	Comments	Reason for Termi-nation	Artifacts (depth, count, type)	Excavator	Date
		110415A-29	1	0	NE				beneath I-45 overpass on concrete embankment			EM	11/4/2015
		110415A-30	1	0-25	N	10YR 4/5	clay		compacted disturbed soil; ~35m from HWY 45; open grassy area; 0% ground visibility	compact soil	NCM	EM	11/4/2015
		110415A-02	1	0-35	N	10YR 6/2	sandy loam	2% rounded gravel	upland stream bank; North of man-made levee; offset 5m East from existing PL; area to North is inundated; grasses and scattered hardwoods	depth	NCM	WM	11/4/2015
		110415A-02	2	35-61	N	10YR 5/2, 10YR 3/3 redox (10%)	sandy clay	3% rounded gravel	upland stream bank; North of man-made levee; offset 5m East from existing PL; area to North is inundated; grasses and scattered hardwoods	depth	NCM	WM	11/4/2015
		110415A-02	3	61-100	N	10YR 7/4, 10YR 6/1 and 2.5YR 4/4 large clay nodules at 5%	sand	10% rounded gravel	upland stream bank; North of man-made levee; offset 5m East from existing PL; area to North is inundated; grasses and scattered hardwoods	depth	NCM	WM	11/4/2015
		110415A-04	1	-	NE				Not Excavated: at corner by bridge and road; push piles; inundation			WM	11/4/2015
		110415A-05	1	-	NE				Not Excavated: gravel road; ditch to West then railroad; large berm to East with wetland beyond			WM	11/4/2015
		110415A-06	1	-	NE				Not Excavated: gravel road; ditch to West then railroad; large berm to East with wetland beyond			WM	11/4/2015
		110415A-07	1	-	NE				Not Excavated: gravel road; ditch to West then railroad; large berm to East with wetland beyond			WM	11/4/2015
		110415A-08	1	-	NE				Not Excavated: gravel road on berm with large drop and ditch to East; railroad to the West; PL crossing 15m South			WM	11/4/2015
		110415A-09	1	-	NE				Not Excavated: gravel road on berm with drop to East; berm ends 12m East of center line			WM	11/4/2015
		110415A-10	1	-	NE				Not Excavated: gravel road and turn-around			WM	11/4/2015
		110415A-11	1	-	NE				Not Excavated: macadam road with push piles on either side			WM	11/4/2015
		110415A-12	1	-	NE				Not Excavated: macadam road with berms on either side			WM	11/4/2015

Final Site Number	Temp Site #	Shovel Test	Level	Depth (cmbs)	Pos/ Neg	Munsell	Soil Texture Description	Inclusions	Comments	Reason for Termi-nation	Artifacts (depth, count, type)	Excavator	Date
		110415A-13	1	-	NE				Not Excavated: gravel road with push piles on either side			WM	11/4/2015
		110415A-14	1	0-30	N	10YR 5/2	sandy loam		disturbed upland; borrow pit; 5m East of shovel test; pine forest	depth	NCM	WM	11/4/2015
		110415A-14	2	30-49	N	10YR 6/2, 10YR 5/1 clay nodules at 5%	sandy loam		disturbed upland; borrow pit; 5m East of shovel test; pine forest	depth	NCM	WM	11/4/2015
		110415A-14	3	49-100	N	10YR 8/1	sand		disturbed upland; borrow pit; 5m East of shovel test; pine forest	depth	NCM	WM	11/4/2015
		110415A-16	1	0-40	N	10YR 7/3	sand	3% granite road gravel	on slightly flat area West of railroad and North of small back channel; impasse due to large piece of concrete	other	NCM	WM	11/4/2015
		110415A-18	1	0-23	N	10YR 4/2	sandy clay loam		mixed hardwoods and pine and grass; land slopes up to North to levee	compact soil	NCM	WM	11/4/2015
		110415A-18	2	23-55	N	10YR 7/3, 10YR 6/8 at 5%	sandy loam		mixed hardwoods and pine and grass; land slopes up to North to levee	compact soil	NCM	WM	11/4/2015
		110415A-18	3	55-70	N	10YR 6/2, 10YR 6/8 at 40%	sandy clay loam		mixed hardwoods and pine and grass; land slopes up to North to levee	compact soil	NCM	WM	11/4/2015
		110415A-21	1	0-29	N	10YR 4/3	sandy loam		mixed hardwoods and pine; adjacent to two track	compact soil	NCM	WM	11/4/2015
		110415A-21	2	29-33	N	7.5YR 5/6	sandy clay		mixed hardwoods and pine; adjacent to two track	compact soil	NCM	WM	11/4/2015
		110415A-23	1	0-32	N	10YR 5/3	loam		mixed hardwoods and pine; adjacent to two track	compact soil	NCM	WM	11/4/2015
		110415A-23	2	32-45	N	10YR 6/3, 10YR4/4 at 10%	sandy loam		mixed hardwoods and pine; adjacent to two track	compact soil	NCM	WM	11/4/2015
		110415A-25	1	0-110	N	10YR 7/3	sand		mixed hardwoods and pine; adjacent to two track; on levee deposits	depth	NCM	WM	11/4/2015
		110915A-02	1	0-16	N	10YR 5/2	sandy loam		upland slope; privet and pine; I-45 service road ~30m East	clay	NCM	WM	11/9/2015
		110915A-02	2	16-23	N	10YR 7/3	sandy loam		upland slope; privet and pine; I-45 service road ~30m East	clay	NCM	WM	11/9/2015
		110915A-02	3	23-35	N	10YR 6/8	sandy clay		upland slope; privet and pine; I-45 service road ~30m East	clay	NCM	WM	11/9/2015

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		110915A-04	1	0-24	N	10YR 5/2	sandy loam		upland; privet, pine, oak; 30m West of I-45 access and 30m North of Spring Woods Parkway; area 5m South has been recently landscaped; scatter of modern trash on surface	clay	NCM	WM	11/9/2015
		110915A-04	2	24-65	N	10YR 7/3	sandy loam		upland; privet, pine, oak; 30m West of I-45 access and 30m North of Spring Woods Parkway; area 5m South has been recently landscaped; scatter of modern trash on surface	clay	NCM	WM	11/9/2015
		110915A-04	3	65-75	N	10YR 6/8	sandy clay		upland; privet, pine, oak; 30m West of I-45 access and 30m North of Spring Woods Parkway; area 5m South has been recently landscaped; scatter of modern trash on surface	clay	NCM	WM	11/9/2015
		110915A-01	1	0-55	N	10YR 5/3	loamy sand		wooded area; pine forest; 0% ground visibility; leaf and pine needle litter; root disturbance; root impasse at 55cmbs	other	NCM	EM	11/9/2015
		110915A-03	1	0-40	N	10YR 5/3	sandy loam		wooded area; pine forest; 0% ground visibility; leaf and pine needle litter; ~40m from I-45 feeder road	compact soil	NCM	EM	11/9/2015
		110915A-03	2	40-85	N	10YR 5/3, 5YR 5/8	silty clay		wooded area; pine forest; 0% ground visibility; leaf and pine needle litter; ~40m from I-45 feeder road	compact soil	NCM	EM	11/9/2015
IF-1	TS2	N500-E500	1	0-25	N	10YR 7/1	sandy loam		dense secondary growth; drainage swale 75cm West; copious modern debris at surface; modern glass at 0 to 20cm	depth	NCM	WM	11/4/2015
IF-1	TS2	N500-E501	2	25-100	P	10YR 8/1	sand		dense secondary growth; drainage swale 75cm West; copious modern debris at surface; modern glass at 0 to 20cm	depth	80-90cm: one chert early reduction flake	WM	11/4/2015
IF-1	TS2	N520-E500	1	0-70	N	10YR 3/3	loamy sand		wooded area; pine and oak; next to dry stream bed; ~25m from Spring Creek; area seems to have been used as dumping ground for modern construction material; disturbed; concrete and brick impasse	other	NCM	EM	11/9/2015
IF-1	TS2	N510-E500	1	0-50	N	10YR 3/3	loamy sand		wooded area; pine and oak; next to dry stream bed; ~25m from Spring Creek; area seems to have been used as dumping ground for modern construction material; disturbed; hit large piece of concrete rubble at 50cmbs	other	NCM	EM	11/9/2015

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IF-1	TS2	N500-E480	1	0-100	N	10YR 6/4	sand		wooded area; pine forest; 0% ground visibility; leaf and pine needle litter; significant root disturbance; ~7m from Spring Creek	depth	NCM	EM	11/9/2015
IF-1	TS2	N500-E520	1	0-47	N	10YR 5/4	sandy loam	5% charcoal	dissected upland slope with pine; 10m North of large earthen berm; 1m West of stabilized gully with rip rap; piece of plastic at 40-50cm; encountered concrete rip rap at 47cmbs	other	NCM	WM	11/9/2015
IF-1	TS2	N500-E510	1	0-49	N	10YR 8/2	sand		slight slope, pine and hardwoods; bricks; 10m North of large berm; heavy disturbance, concrete, brick, and 1 piece of plastic at 40-50 cm	other	NCM	WM	11/9/2015
IF-1	TS2	N500-E510	2	49-70	N	10YR 4/3	sandy loam		slight slope, pine and hardwoods; bricks; 10m North of large berm; heavy disturbance; modern concrete; 1 piece of dry press brick at 50-60 cm	other	NCM	WM	11/9/2015
IF-1	TS2	N500-E510	3	70-90	N	10YR 5/4, 7.5YR 6/6 at 50%	sandy clay	1% gravel	slight slope, pine and hardwoods; bricks; 10m North of large berm; heavy disturbance	other	NCM	WM	11/9/2015
IF-1	TS2	N500-E490	1	-	NE				Not Excavated: steep slope down to 1st terrace			WM	11/9/2015
IF-1	TS2	N480-E500	1	-	NE				Not Excavated: slope and man-made berm with rip rap			WM	11/9/2015
IF-1	TS2	N490-E500	1	0-19	N	10YR 5/2	sand		pine and oak forest; 0% ground visibility; scattered concrete rubble on the surface	depth	NCM	WM	11/9/2015
IF-1	TS2	N490-E500	2	19-103	N	10YR 7/3	sand		pine and oak forest; 0% ground visibility; scattered concrete rubble on the surface	depth	NCM	WM	11/9/2015
41HR1172	TS1	N500-E480	1	0-50	N	10YR 4/4	sand		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~15m from small creek	depth	NCM	EM	11/4/2015
41HR1172	TS1	N500-E480	2	50-80	N	10YR 8/1	clay		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~15m from small creek	depth	NCM	EM	11/4/2015
41HR1172	TS1	N500-E480	3	80-100	N	10YR 7/6	sandy loam		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~15m from small creek	depth	NCM	EM	11/4/2015
41HR1172	TS1	N500-E490	1	0-80	P	10YR 4/4	sand		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~15m from small creek	depth	1 tertiary flake at 40-50cm; 1 porcelain at 60-70cm	EM	11/4/2015

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41HR1172	TS1	N500-E490	2	80-100	N	10YR 8/1	clay		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~15m from small creek	depth	NCM	EM	11/4/2015
41HR1172	TS1	N500-E470	1	0-5	N	5YR 4/4	sand		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~3m from small creek	clay	NCM	EM	11/4/2015
41HR1172	TS1	N500-E470	2	5-45	N	10YR 8/1	clay		pine forest; 0% ground visibility; leaf and pine needle litter; thin understory; ~3m from small creek	clay	NCM	EM	11/4/2015
41HR1172	TS1	N500-E500	1	0-35	N	10YR 8/2	loamy sand		on back slope of levee; pine	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N500-E500	2	35-69	P	10YR 6/2	sandy loam	1% charcoal; 1% rounded gravel	on back slope of levee; pine; 20% charcoal staining	compact soil	40-60cm: 2 early reduced chert flakes; 1 finished flake fragment	WM	11/4/2015
41HR1172	TS1	N500-E500	3	69-80	N	10YR 7/4, 10YR 7/6 at 10%	sandy clay loam	1% rounded gravel	on back slope of levee; pine	compact soil	60-70cm: 1 tested cobble	WM	11/4/2015
41HR1172	TS1	N500-E520	1	0-31	N	10YR 7/2	sandy loam	1% rounded gravel	on back slope of levee; pine; 20% charcoal staining	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N500-E520	2	31-39	N	10YR 6/1	sandy loam	1% rounded gravel; 5% charcoal chunks	on back slope of levee; pine; 20% charcoal staining	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N500-E520	3	39-52	N	10YR 7/4	sandy clay loam	1% rounded gravel	on back slope of levee; pine; 20% charcoal staining	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N500-E510	1	0-43	N	10YR 7/2	sandy loam		on back slope of levee; pine; 20% charcoal staining	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N500-E510	2	43-56	N	10YR 7/4	sandy loam	1% charcoal flecks	on back slope of levee; pine; 20% charcoal staining	compact soil	NCM	WM	11/4/2015
41HR1172	TS1	N520-E500	1	0-100	N	10YR 7/4	sand		pine and oak forest; 0% ground visibility; leaf and pine needle litter; on top of levee ~ 15m from Spring Creek; root disturbance	depth	NCM	EM	11/9/2015

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41HR1172	TS1	N510-E500	1	0-50	N	10YR 6/4	sand	20% charcoal starting at 30cmbs	pine forest; 0% ground visibility; pine needle litter; on South side of Spring Creek levee; < 5% slope; root disturbance	depth	NCM	EM	11/9/2015
41HR1172	TS1	N510-E500	2	50-90	N	10YR 7/3	sandy loam	20% charcoal starting at 30cmbs	pine forest; 0% ground visibility; pine needle litter; on South side of Spring Creek levee; < 5% slope; root disturbance	depth	NCM	EM	11/9/2015
41HR1172	TS1	N510-E500	3	90-105	N	10YR 4/6	clay	20% charcoal starting at 30cmbs	pine forest; 0% ground visibility; pine needle litter; on South side of Spring Creek levee; < 5% slope; root disturbance	depth	NCM	EM	11/9/2015
41HR1172	TS1	N480-E495	1	0-20	N	10YR 6/3	sandy loam		floodplain; ~30m North of wetland area and 15m South of levee; pine; 0% ground visibility; hit water table at 65cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N480-E495	2	20-39	N	10YR 5/2	sandy loam		floodplain; ~30m North of wetland area and 15m South of levee; pine; 0% ground visibility; hit water table at 65cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N480-E495	3	39-44	N	10YR 6/6	clay		floodplain; ~30m North of wetland area and 15m South of levee; pine; 0% ground visibility; hit water table at 65cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N480-E495	4	44-76	N	10YR 6/4, 10YR 8/1 at 10%	coarse sand	3% rounded gravel	floodplain; ~30m North of wetland area and 15m South of levee; pine; 0% ground visibility; hit water table at 65cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N490-E495	1	0-17	N	10YR 6/3	sandy loam		floodplain; 5m South of levee; pine; 0% ground visibility; hit water table at 70cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N490-E495	2	17-28	N	10YR 5/2	sandy loam		floodplain; 5m South of levee; pine; 0% ground visibility; hit water table at 70cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N490-E495	3	28-32	N	10YR 6/6	clay		floodplain; 5m South of levee; pine; 0% ground visibility; hit water table at 70cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N490-E495	4	32-50	N	10YR 7/6	sand, with 5% clay nodules		floodplain; 5m South of levee; pine; 0% ground visibility; hit water table at 70cmbs	water table	NCM	WM	11/9/2015
41HR1172	TS1	N490-E495	5	50-79	N	10YR 7/2	sand	1% small rounded gravel	floodplain; 5m South of levee; pine; 0% ground visibility; hit water table at 70cmbs	water table	NCM	WM	11/9/2015