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Intensive Archeological Survey: State Highway 34 at Kings Creek, Kaufman County, Texas

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Report for Archeological Survey

Intensive Archeological Survey: State Highway 34 at Kings Creek, Kaufman County, Texas

Dallas District

Jon Budd, Principal Investigator, Antiquities Permit No. 8225

CSJ: 0173-02-071
January 12, 2018

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated 12-16-14, and executed by FHWA and TxDOT.

Abstract

On behalf of the Texas Department of Transportation (TxDOT), SWCA Environmental Consultants (SWCA) conducted an intensive cultural resources survey on January 3, 2018, of 111.45 acres of existing right-of-way (ROW) along State Highway (SH) 34 at the Kings Creek in Kaufman County, Texas. As the project will receive funding from the Federal Highways Administration, it qualifies as an undertaking as defined in Title 36 Code of Federal Regulations (CFR) Part 800.16(y); therefore, the archeological survey was conducted in compliance with Section 106 of the National Historic Preservation Act (54 U.S. Code 306108). Furthermore, the project must also comply with the Antiquities Code of Texas (9 Natural Resources Code 191). Jon Budd served as Principal Investigator under Texas Antiquities Permit No. 8225.

The area of potential effects (APE) is defined as the existing SH 34 TxDOT ROW between 120 to 330 feet (36.6 to 100.6 meters [m]) wide beginning at County Road 4094 and extending 3.22 miles northeast to Farm-to-Market Road 1388. Depth of construction impacts are typically 4 feet (1.20 m), with a maximum of 30 feet (9.14 m). The APE consists of approximately 111.45 acres.

Background research identified three previous cultural resources surveys that cross the APE, but no archeological sites, recorded landmarks, cemeteries, National Register of Historic Places districts or properties, or historical markers were identified within or immediately adjacent to the project area. The nearest site, 41KF74, is a sparse prehistoric lithic scatter located approximately 0.4 mile south of the proposed project's southern terminus. Two potentially historic structures were identified just beyond the APE during the historic map review.

The existing ROW has been extensively modified by the construction of SH 34, numerous existing overhead and buried utilities, intersecting roadways, ditches, driveways, and major flood control structures, such as levees and channelized drainages. Since much of the area is a wide, low-lying alluvial setting, fill sections elevating the roadway above the floodplain are pervasive throughout the APE.

The field investigation consisted of a pedestrian survey of the entire APE augmented with nine shovel tests along adjacent terraces and seven backhoe trenches at drainage crossings. Fill sections and buried utilities, including fiber optic lines on both sides of the APE, precluded subsurface investigations in many areas. The pedestrian survey, along with shovel tests and backhoe trenches, identified no cultural materials or features within the project APE. The cumulative impacts from the roadway and existing utilities, as well as frequent inundation, indicate a negligible potential for intact archeological resources within the APE.

SWCA made a reasonable and good faith effort per 36 CFR Part 800.4(b)(1) to identify and locate prehistoric and historic archeological properties within the proposed project APE. The field investigation discovered no cultural resources; therefore, SWCA recommends that a finding of "no historic properties affected" be made for the current undertaking.

Project Identification

Date: January 12, 2018

Date(s) of Survey: January 3, 2018

Archeological Survey Type: Reconnaissance ☐ Intensive ☒

Report Version: Draft ☒ Final ☐

Jurisdiction: Federal ☒ State ☒

Texas Antiquities Permit Number: 8225

District: Dallas

County or Counties: Kaufman

USGS Quadrangle(s): Kaufman (3296-421)

Highway: State Highway (SH) 34 at Kings Creek

CSJ: 0173-02-071

Report Author(s): Mary Rodriguez, Chris Shelton, and Steve Carpenter

Principal Investigator: Jon Budd, Texas Department of Transportation (TxDOT)

Texas Historical Commission Approval

Signature Date

Project Description

Project Type: Bridge replacement with roadway improvements

Total Project Impact Acreage: 111.45 acres

New Right of Way (ROW) Acreage: 0.0 acres

Easement Acreage: 0 acres

Area of Pedestrian Survey: 111.45 acres

Project Description and Impacts: The proposed project consists of the expansion of State Highway (SH) 34 and Business SH 34 and replacement of four bridges located approximately 2.85 miles (4.59 kilometers [km]) southwest of Kaufman, Kaufman County, Texas (Figure 1). This undertaking would replace and widen four existing functionally obsolete bridges and roadway approaches along SH 34. The proposed horizontal alignment would be shifted 34.5 feet at the Kings Creek and relief bridges to allow for travel during construction. The proposed project will also include a new 360-foot-long by 3-to-4-foot deep drainage ditch that will be excavated on the southwestern quadrant of the existing ROW. No new ROW or temporary construction easements would be acquired for this proposed project.

Area of Potential Effects (APE): The APE is defined as the existing 120- to 330-foot-wide (36.58 to 100.58-m) SH 34 ROW beginning at County Road 4094 and extending 3.22 miles northeast to Farm-to-Market Road 1388 (Figure 2). Depth of construction impacts are typically 3 feet (0.91 m) with a maximum of 30 feet (9.14 m). The APE consists of approximately 111.45 acres.

Project Area Ownership: The entire ROW is currently owned and managed by TxDOT.

Project Setting

Topography: The APE runs roughly southwest to northeast across the floodplain of the Kings Creek and onto overlooking terraces on both the northeastern and southwestern ends. Elevation ranges from a maximum of 452 feet above mean sea level (amsl) at the northeastern end of the APE, to a low of approximately 378 feet amsl in the creek floodplain.

Geology: According to the Geologic Atlas of Texas, the underlying geology consists predominantly of Holocene alluvium in the wide King Creek floodplain covering the central portion of the project area (Figure 3). These Holocene-aged sediments, typically occurring along the terraces of streams, consist of sand, silt, clay and gravel in various portions (Barnes 1972). The project area also crosses areas of Cretaceous Nacatoch Sand (Kns) roughly within the eastern quarter and Cretaceous Neylandville Marl and Marlbrook Marl (Knm) at the southwestern terminus (Barnes 1972).

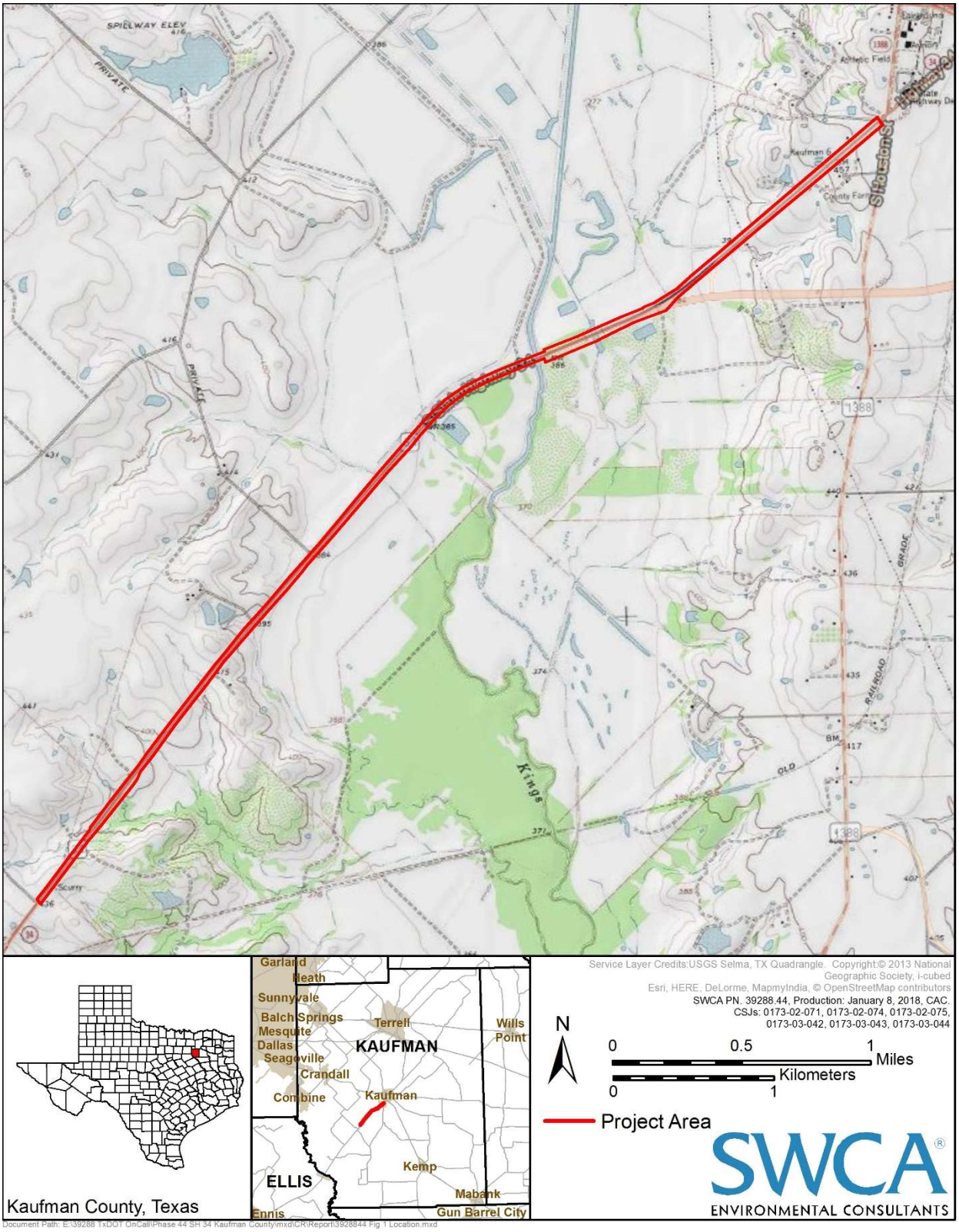

Figure 1. Project location map.

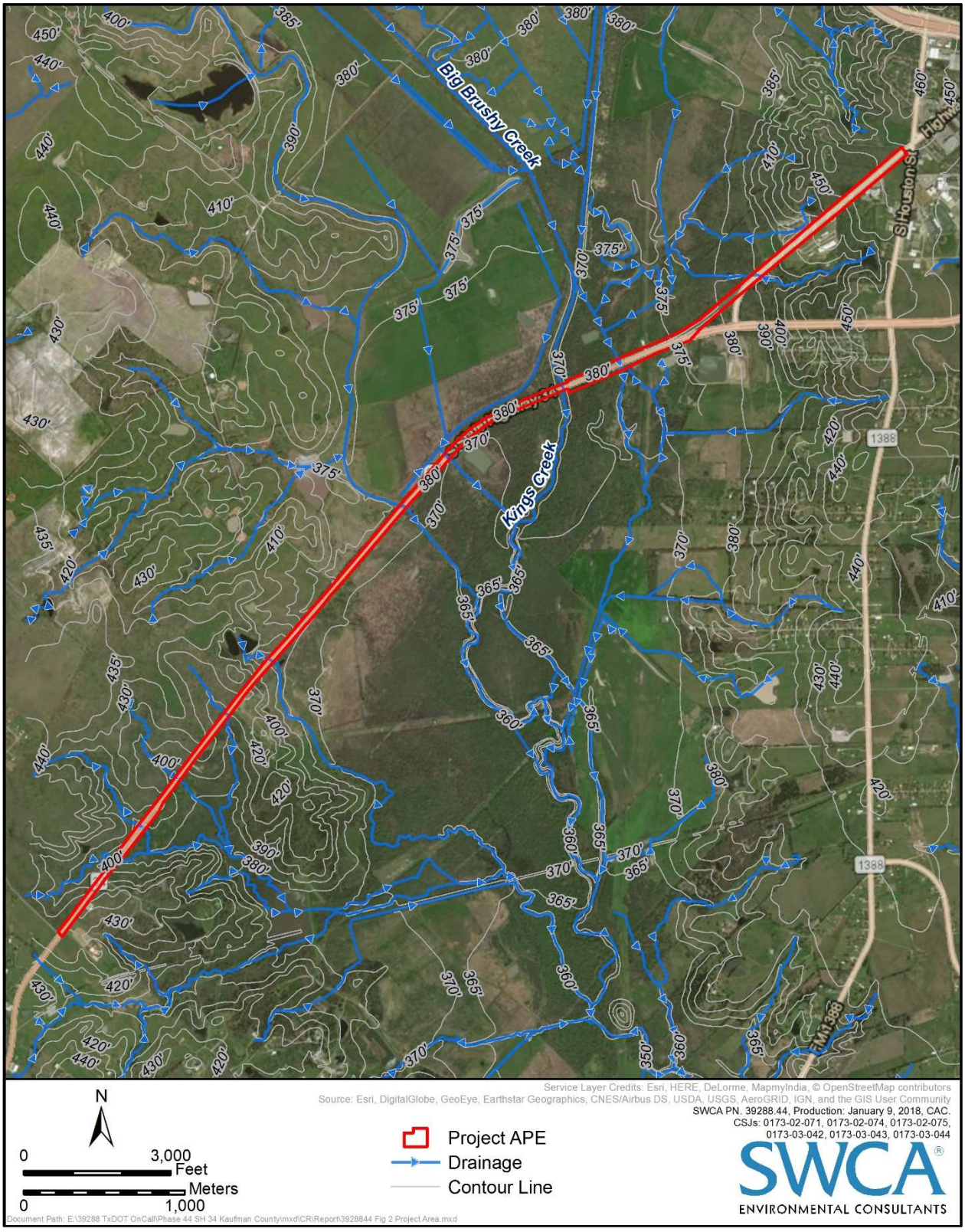

Figure 2. Project area.

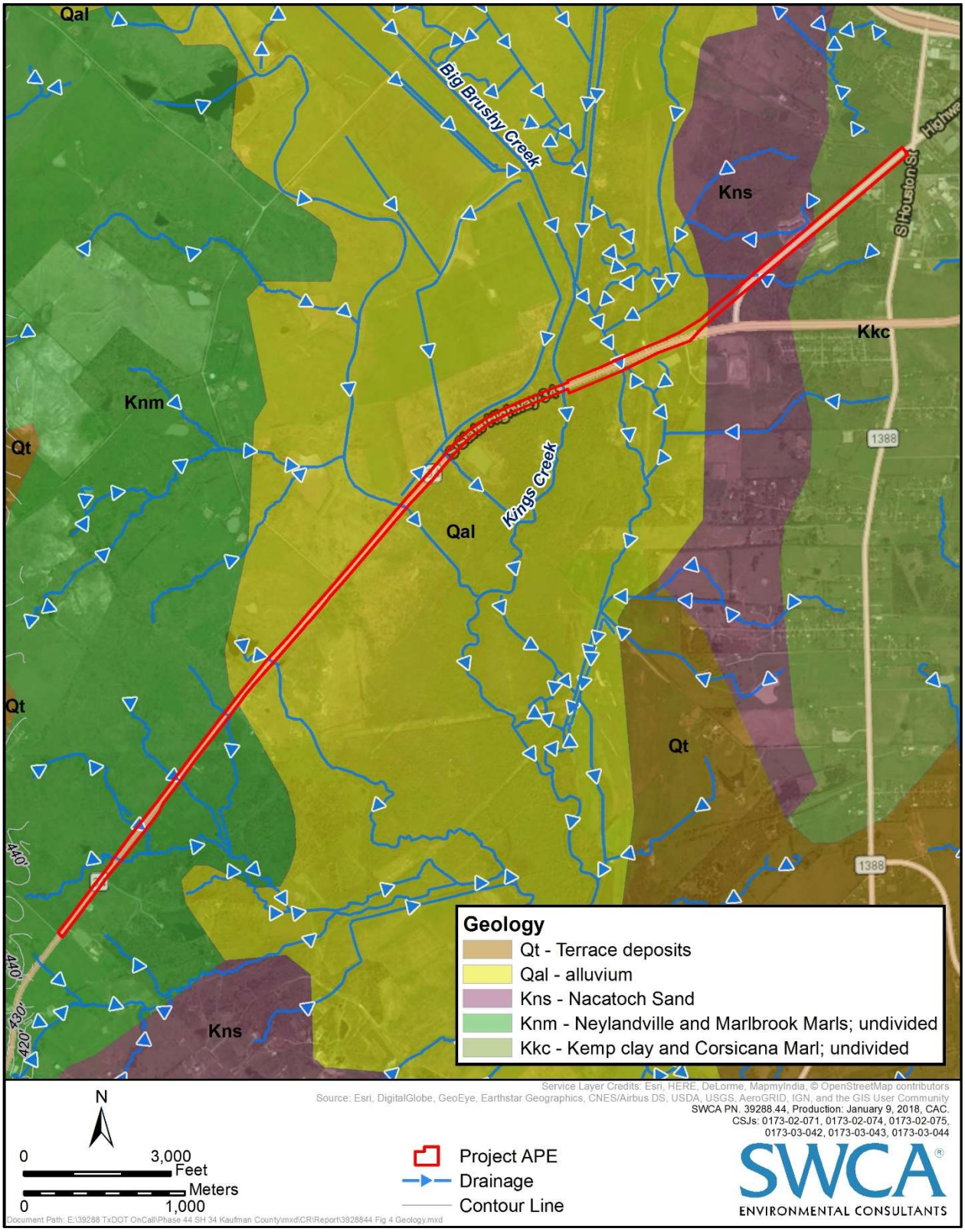

Figure 3. Geology mapped within the APE.

Soils: The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) Web Soil Survey, indicates that the APE is mapped within the Wilson silty loam, 1 to 5 percent slopes; Chickasha loam, 5 to 12 slopes; Kaufman clay, frequently flooded, 0 to 1 percent slopes; Kemp loam, frequently flooded; Burleson, clay 1 to 3 percent slope; Heiden clay 5 to 8 percent slopes; Ferris clay, 2 to 5 percent slopes; and the Gowen clay loam, frequently flooded (Figure 4). The only sediments with high potential for the presence of deeply buried, intact archeological deposits are the Kemp, Kaufman, and Gowen soil series. The Kemp series consists of an Aquic Udifluvent with a mottled, stratified, or buried horizons of varying loamy textures (NRCS 2018). The Kaufman series consists of very deep soils that formed in clayey alluvium derived from mudstone. These soils occur on floodplains on river stream valleys and dissected plains (NRCS 2018). The Gowen soil series consists of a very deep, well-drained soil that formed in loamy Holocene alluvium. These soils are found on nearly level floodplains (NRCS 2018).

Land Use: The existing SH 34 ROW contains the roadway, extensive fill sections, current concrete span bridges, existing overhead and buried utilities, intersecting roadways, ditches, and driveways. The ROW serves as a utility corridor between Scurry and Kaufman, with numerous communication lines, such as fiber optic and other phone lines, common on both sides of the roadway. Beyond the APE adjacent to Big Brushy and Kings Creeks (and their associated tributaries), land use patterns consist of floodplain and flood control water impoundment areas.

Vegetation: The existing ROW consists of sparse short grasses with mixed hardwoods bordering the roadway, and more densely forested vegetation within the floodplain.

Estimated Ground Surface Visibility: 0 to 10 percent, not including the existing roadway.

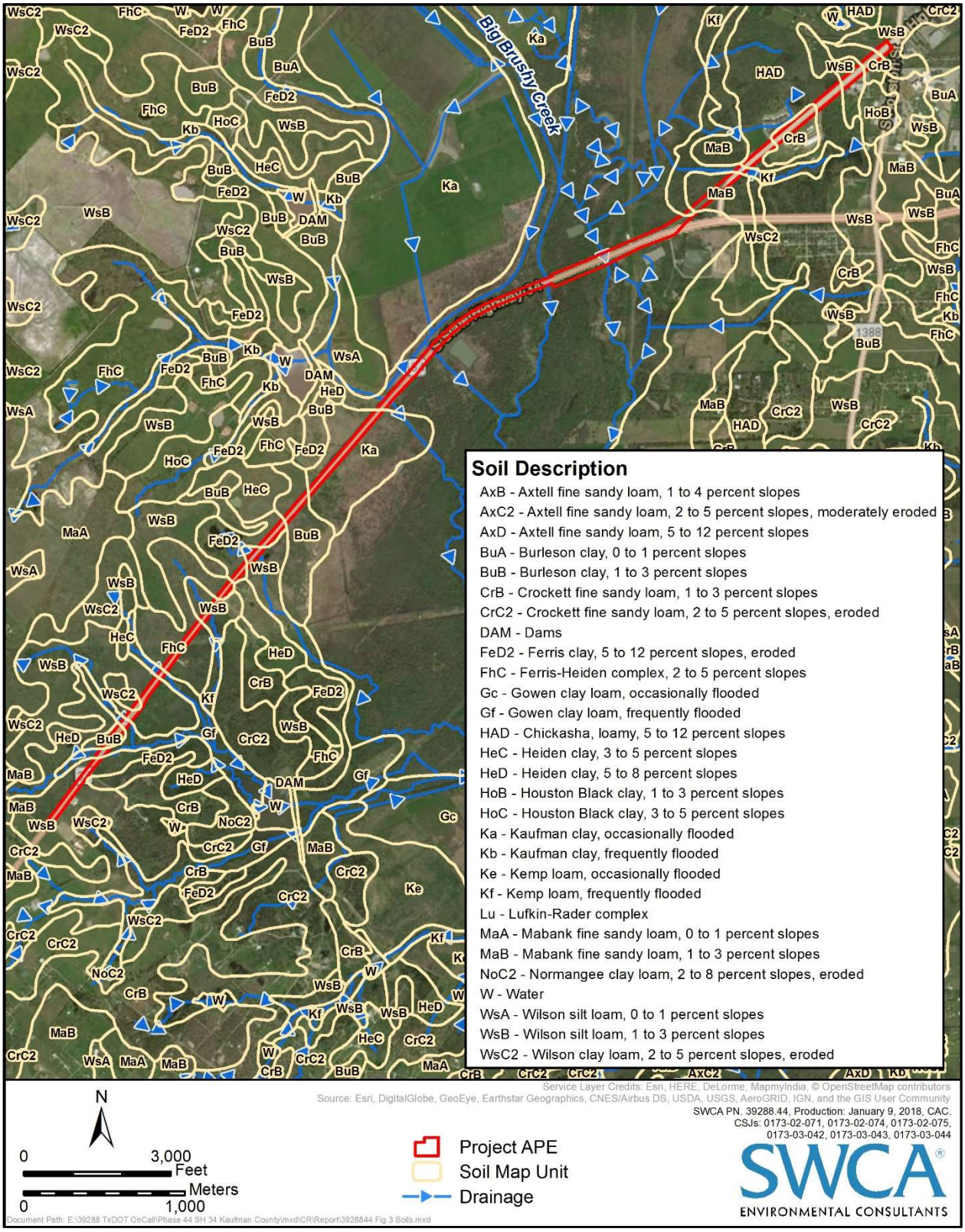

Figure 4. Soils mapped within the APE.

Previous Investigations and Known Archeological Sites: SWCA conducted a cultural resources background and historic map review of the project area in December 2017 and January 2018. To conduct the background review, an SWCA archeologist reviewed the Bellville (2996-434) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map and records pertaining to the project area on the Texas Historical Commission's (THC's) Archeological Sites Atlas online database (Atlas) (THC 2018a). Additionally, SWCA reviewed maps contained in the TxDOT Historic Overlay, a mapping/geographic information system (GIS) database with historic maps and resource information covering most portions of the state (Foster et al. 2006). SWCA also reviewed historical USGS topographic maps available on USGS TopoView (USGS 2018) and the 1936 Montague County Texas State Highway Department map. These sources contain information on the nature and location of previously conducted cultural resources investigations, previously recorded prehistoric and/or historic archeological sites, National Register of Historic Places districts and properties, State Antiquities Landmarks, Official Texas Historical Markers, Registered Texas Historic Landmarks, and local neighborhood surveys in, or within 0.6 mile (1 km) of, the proposed project APE. The review identified one archeological site, one cemetery, and several previously conducted surveys within 0.6 mile (1 km) of the proposed project APE (THC 2018a).

Three surveys cross portions of the APE, all located near the northeastern end of the project. In 2002, Gene Davis surveyed a water line that mainly parallels, but slightly intersects, the APE. Conducted for the Texas Water Development Board under Antiquities Permit No. 2773, the effort identified no resources near the SH 34 project area. In 2005, Steven Ahr, with Parsons Brinkerhoff, surveyed a roadway on behalf of TxDOT. More recently, SWCA surveyed the Seaway Loop Pipeline in 2013. None of these surveys documented cultural resources near the APE.

In 1983, J.L. Ingraham recorded site 41KF74 within the Kaufman Scurry Transmission Line corridor. Located about 0.4 mile south of the southwestern terminus of the SH 34 APE, the site is, or was, a lithic scatter with worked cobbles, large flakes, and a possible scraper. Although no eligibility recommendations were provided on the form, the record states the research potential was low and the site area was probably disturbed from railroad construction and farming activities.

The historic map review did not reveal any potentially historic structures within the APE, but two residences were located adjacent to the roadway at each end of the project area; these are particularly notable on the 1936 county roadway map. A review of the 1963 USGS 7.5-minute Kaufman topographic map indicates the the structure in the southwestern portion of the project area was removed prior to the 1960s, but the northeastern structure persisted and may be currently standing approximately 0.1 mile south of the APE. The 1963 map also shows the extensive flood control features, such as levees and canals that are still common in the area (Figure 5).

Comments on Project Setting: None

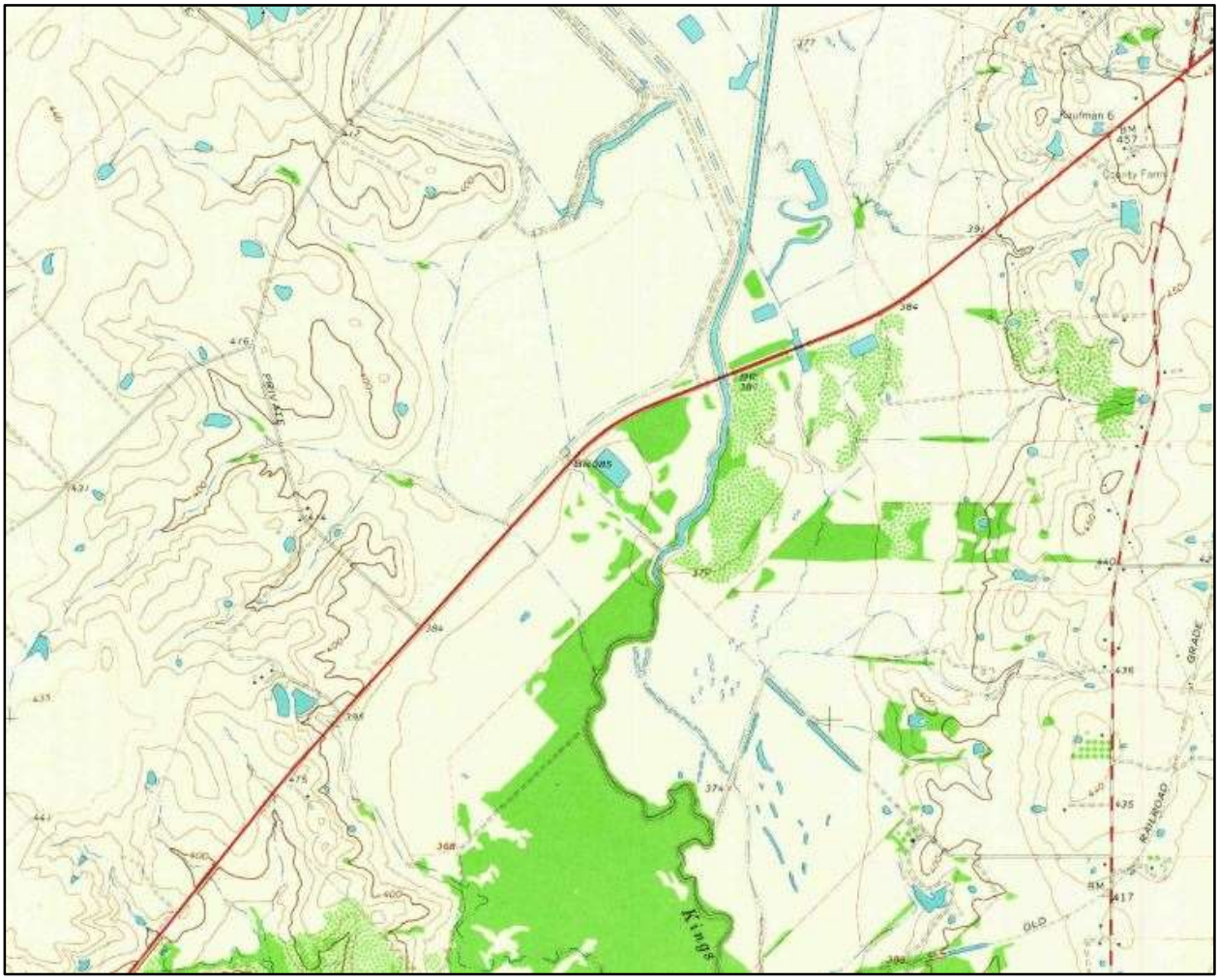

Figure 5. 1963 USGS Kaufman 7.5-minute topographic map showing the numerous flood control features (channelized canals and levees) in the vicinity of SH 34, a highly flood-prone area.

Survey Methods

Surveyors: Dan Rodriguez and Robert Brush

Methodological Description: The field investigations complied with the THC Archeological Field Survey Standards (THC 2018b). The investigations entailed an intensive pedestrian survey of 111.45 acres, augmented with shovel testing and backhoe trenching in locations that appeared most favorable to contain intact cultural resources (e.g., areas with less visible disturbance, fewer buried utilities, and/or not inundated). Trench locations were chosen at the discretion of the project archeologist and focused on areas with the least disturbance within the APE, as well as areas with alluvial deposits and the potential for deeply buried cultural materials. Survey efforts resulted in the excavation of nine shovel tests (STs) and seven backhoe trenches (BHTs) (Table 1).

Table 1. Excavations in Project APE

Method	Quantity in Existing ROW	Quantity in Proposed New ROW	Quantity in Temporary Easements	Total Number per Acre
Shovel Test Units	9	0	0	0.08
Auger Test Units	0	0	0	0
Mechanical Trenching	7	0	0	0.06

SWCA archeologists excavated STs in arbitrary 4-inch (10-centimeter [cm]) levels and sifted all materials through ¼-inch mesh. Shovel tests measured 12 inches (30 cm) in diameter and were excavated to sterile soil strata, or in disturbed areas, into impenetrable layers. Archeologists recorded STs on data forms, and included information on texture, consistency, color, and cultural materials collected. Soil colors were described as per Munsell soil color charts. Furthermore, archeologists photographed all STs and recorded ST locations on a handheld Global Positioning System (GPS) device with sub-meter accuracy.

The SWCA archeologists excavated BHTs in areas with a potential for deeply buried deposits, although extensive fill sections and buried utilities limited the locations where trenching could be conducted. The archeologists thoroughly documented and photographed the entire excavation process. Additionally, the archeologists recorded ST and BHT locations with a handheld GPS device. Upon completion of the individual tests and trenches, all STs and BHTs were backfilled, levelled, and returned as much as possible to their original state. SWCA performed all work in accordance with Occupational Safety and Health Administration regulations (29 Code of Federal Regulations [CFR] 1926).

Other Methods: None

Collection and Curation: NO ☒ YES ☐ If yes, specify facility.

Comments on Methods: THC survey standards for a project of this size (i.e., >101–200 acres) require a minimum of one shovel test per every 3 acres, or 37 tests for a project of this size. THC archeological survey standards do not specify a density of BHTs per unit area (THC 2018b). Due to the existing artificially raised roadway, existing buried utilities, and heavy disturbance within the APE, the seven BHTs and nine STs are considered to meet the required standards (see Table 1).

Survey Results

Project Area Description:

The project area setting is predominantly within the Kings Creek floodplain, but extending onto upland margins on both the northeastern and southwestern termini. Except for flood control features and buried utilities, the area is largely rural terrain with limited development. The APE is entirely within existing TxDOT ROW with no new easements or new ROW. The southwestern extent of the APE is surrounded by open pastoral fields and sparsely scattered hardwood trees. The northeastern terminus is surrounded by riparian forest along Kings Creek and its associated tributaries and bottomlands. Development in the area includes SH 34, various above and below ground utilities, and a small housing community near the northeastern terminus.

SWCA archeologists conducted an intensive pedestrian survey supplemented with the excavation of STs and BHTs, which focused on accessible areas near Kings Creek where the horizontal alignment will be shifted during construction (Figure 6). The existing ROW has been heavily modified by the construction of SH 34 and the current concrete span bridge, existing overhead and buried utilities, and intersecting roadways and driveways. Additionally, most of the APE is located within the Kings Creek floodplain; therefore, disturbance is quite substantial, due to the need for the road to be raised with fill within the existing ROW (Figure 7). The cumulative impacts from the roadway, flood control modifications, and existing utilities not only limited the archeological potential, but also where shovel testing and trenching could be conducted (Figures 8–10).

Vegetation within the existing ROW consists mainly of short, mixed grasses with sparse hardwood trees. Tree growth is more prevalent within the areas adjacent to tributaries and flood control drainages. The portion of the existing ROW directly surrounding Kings Creek contains dense vegetation and hardwood tree growth; however, the existing ROW is maintained by mowing and contains mixed grasses.

Surveyors excavated nine STs (i.e., RB01–RB09) within the southern side of the APE in areas that warranted shovel testing and did not exhibit obvious signs of disturbance on the ground surface (Table 2). The STs were all negative for cultural materials and contained gray to grayish brown clay loam with indications of soil disturbance, including mixed soil mottling, non-local construction gravel, and buried trash.

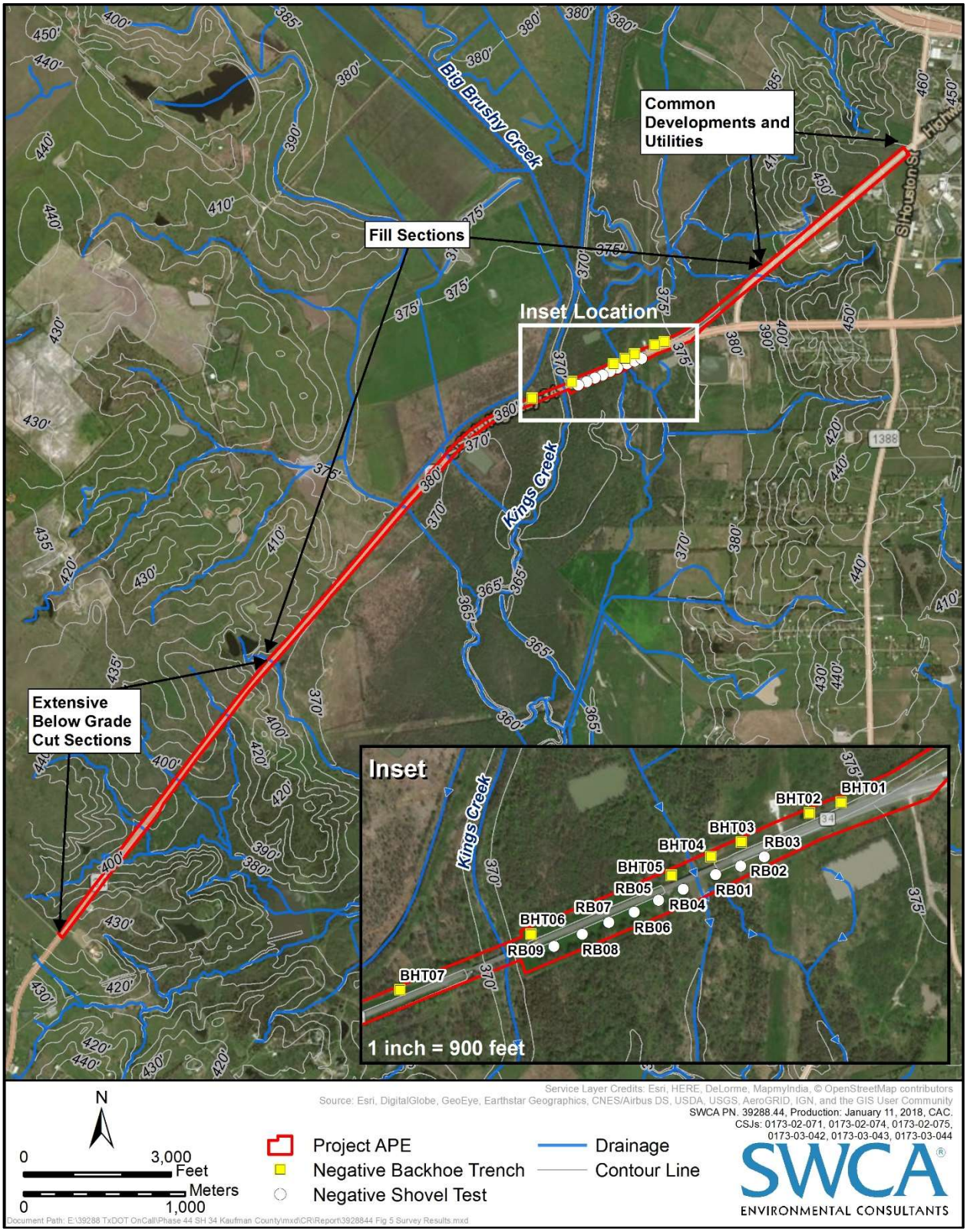

Figure 6. Survey results map.

Figure 7. Overview of APE within existing ROW showing large fill section to elevate roadway above floodplain; fiber optic and other buried utilities along ROW margins precluded excavations in most of APE, facing southwest.

Figure 8. Overview of APE showing common disturbances within the APE; including multiple parallel buried utilities, pipelines, driveways, and road fill, facing southeast.

Figure 9. Location of BHT 5 after backfilling near artificially channelized King Creek Relief Canal. Landscape has been substantially modified by flood control measures, facing northwest.

Figure 10. Extensive cut sections at southern portion of APE that have removed archeological potential. Existing buried utilities are located along both ROW margins, facing northwest.

Table 2. Shovel Test Data

Shovel Test No.	Level	Depth (cmbs)	Munsell	Color	Texture	Inclusions	Comments / Reason for Termination
RB01	1	0-10	10YR 5/2	grayish brown	Clay Loam	>20% Cobbles, Gravels, Pebbles, Rootlets	No cultural material encountered. Terminated at disturbance: area disturbed by existing highway and utilities in the area.
RB02	1	0-20	7.5YR 4/4	brown	Clay Loam	10-20% Calcium Carbonate, Cobbles, Gravels, Mottles, and rootlets	No cultural material encountered. Terminated at disturbance; soil is heavily disturbed by existing highway and utilities in the area.
RB03	1	0-15	7.5YR 6/1	gray	Sandy Clay Loam	>20% Calcium Carbonate, Cobbles, Gravels, Large Rock Frags, Mottles	No cultural material encountered. Terminated at disturbance: disturbed by existing highway and utilities in the area.
RB04	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.
RB05	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.
RB06	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.
RB07	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.
RB08	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.
RB09	1	0-50	10YR 5/1	gray	Clay Loam	None	No cultural material encountered. Terminated at compact soil.

Backhoe Trenching

The areas of the APE slated for mechanical excavations were the four locations for bridge replacement located within the floodplain of Kings Creek (see Figure 5). As the APE is entirely within the existing SH 34 ROW, the vegetation in the designated backhoe trenching sites was composed of mowed, mixed grasses with dense riparian forest growth lining the ROW boundary. SWCA excavated seven BHTs (BHTs 1–7) within the project APE (Appendix A). Backhoe trenching locations were selected as areas with the least amount of visible indications of disturbance; care was taken to avoid buried utilities.

Of the seven BHTs excavated within the project APE, three trenches (i.e., BHTs 3, 4, and 5) were excavated on the northern side of the APE at the Kings Creek crossing. BHTs 3 and 4 had similar profiles: very dark brown (10YR 2/2) sandy clay loams overlying a light brownish gray (10YR 6/2) to pale brown (10YR 6/3) sandy clay (Appendix A). BHTs 3 and 4 contained buried modern trash to a depth of approximately 3 feet (90 cm) below the surface, and contained mottling of different soils in the upper most level. Additionally, BHT 4 appeared to contain a mixing of the first and second stratigraphic levels to a depth of approximately 6 feet (200 cm). The buried modern trash, mottled soil, and stratigraphic level mixing are all indications of heavy disturbance due to previous construction. BHT 5, the easternmost BHT at the Kings Creek crossing, contained a slightly different profile with very dark brown (10YR 2/2) sandy clay loam overlying gray (10YR 5/1) to brown (10YR 5/3) clay loam to sandy clay loam. As with BHTs 3 and 4, BHT 5 exhibited characteristics of deep soil disturbances with buried modern trash located approximately 1 foot (40 cm) below the surface and mixed soils as deep as 8 feet (250 cm).

The area on the northern side of Kings Creek Relief No. 1 drainage afforded one spot for a backhoe trench (BHT 7) between the fill section of the bridge and the edge of the ROW. BHT 7 contained an upper level of gray (10YR 5/1) clay loam overlying a very dark brown (10YR 2/1) clay loam, with a lowermost observed level consisting of a light brownish gray (10YR 6/2) to pale brown (10YR 6/3) sandy clay. BHT 7 exhibited soil mottling indicative of disturbance to a depth of approximately 4 feet (110 cm).

BHT 6 was excavated on the northern side of the APE at the Kings Creek Relief No. 2 drainage crossing. This trench contained soils of approximately the same color (very dark brown [10YR 2/2]) sandy clay loam with varying clay content to a depth of approximately 10 feet (320 cm). Once again, modern concrete rubble was observed to a depth of approximately 4 feet (110 cm).

BHTs 1 and 2 were excavated on the northern side of the APE at the Kings Creek Relief No. 3 drainage crossing. Both trenches contained a similar profile with a very dark brown (10YR 2/2) sandy clay loam overlying a light brownish gray (10YR 6/2) to a pale brown (10 YR 6/3) sandy clay. BHTs 1 and 2 both contained mottled soil to the base of the excavated trench (10 feet [300 cm]), which could indicate deep soil disturbance.

In summary, the trenches excavated at the Kings Creek and relief drainage crossings within the APE all exhibited some form of soil disturbance, most likely due to the previous road and bridge constructions. The trenches encountered friable sandy clay loams overlying thick, massive to blocky angular/subangular, sandy clays. As indicated by the presence of calcium carbonate development, the bottom pale brown layer is likely a pre-Holocene unit, but even the lowest layers in some of the BHTs contained evidence of intrusive soil disturbance.

Archeological Materials Identified: The pedestrian survey along with the STs and BHTs identified no cultural materials or features within the project APE. The documented cumulative impacts from modern and historical development indicate a negligible potential for intact archeological resources within the APE.

APE Integrity: The existing SH 34 APE exhibits extensive prior disturbance from road and bridge construction and the installation of overhead and buried utilities, thereby compromising the integrity of the survey area.

Recommendations

Further Work: No further work is recommended within the APE.

Justification: Investigators did not encounter any historic or prehistoric cultural materials during intensive investigations of the APE. Modern cultural materials were observed on the ground surface within the APE, but all were recent in age. The backhoe trenching across the APE encountered common disturbances at depths ranging from 1 feet (40 cm) to 10 feet (300 cm). Soil disturbances were likely caused by road and bridge construction, road fill, and buried and overhead utilities. The extensive disturbances throughout the existing ROW has greatly decreased the potential for encountering intact cultural deposits. No further investigations are recommended to assess deep impacts from project construction within the 111.45 acres of existing ROW.

Investigations were conducted in compliance with the Antiquities Code of Texas and Section 106 of the National Historic Preservation Act. As per the federal and state implementing regulations at 36 CFR 800.4(b)(1) and 13 Texas Administrative Code 26, SWCA has made a reasonable and good faith effort to identify all cultural resources within the APE and recommends no further cultural resources investigation prior to construction.

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Appendix A. BHT Excavations in Project APE.

Trench	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower Boundary	Comments
BHT01	0-110	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade; rootlets (15%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 7/2, 40%)	Diffuse and horizontal	–
	110-300+	10YR 6/2 to 10YR 6/3	Light brownish gray to pale brown	Sandy clay	Extremely firm, massive, and strong grade; rootlets (<1%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 6/8, 30%)	Unobserved	Observed from above after 140 cmbs.
BHT02	0-90	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade; rootlets (15%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 7/2, 40%)	Diffuse and horizontal	–
	90-300+	10YR 6/2 to 10YR 6/3	Light brownish gray to pale brown	Sandy clay	Extremely firm, massive, and strong grade; rootlets (<1%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 6/8, 30%)	Unobserved	Observed from above after 150 cmbs.

Trench	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower Boundary	Comments
BHT03	0-20	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade; rootlets (15%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 7/2, 40%)	Irregular	–
	20-260+	10YR 6/2 to 10YR 6/3	Light brownish gray to pale brown	Sandy clay	Extremely firm, massive, and strong grade; rootlets (<1%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 6/8, 30%)	Unobserved	Observed from above after 190 cmbs. Modern colorless glass observed at 90 cmbs.
BHT04	0-110	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade; rootlets (15%-20%), calcium carbonate concretions (2%, 1-5 cm), mottles (10YR 7/2, 40%)	Irregular	Moist to wet soil. A modern glass bottle and Styrofoam pieces were observed around 90 cmbs.
	110-340+	10YR 6/2 to 10YR 6/3	Light brownish gray to pale brown	Sandy clay	Extremely firm, massive, and strong grade; rootlets (<1%), calcium carbonate concretions (2%, 1-5 cm), mixed with upper level	Unobserved	Observed from above after 170 cmbs. Level appears to be mixed with the upper level until a depth of 200 cm. Water collecting at bottom of trench.

Trench	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower Boundary	Comments
BHT05	0-77	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade; roots (5%), rootlets (15%)	Diffuse and horizontal	Pieces of concrete and pebbles observed around 40 cmbs.
	77-130	10YR 5/1 to 10YR 4/1	Gray to dark gray	Clay loam	Firm, blocky, nearly massive, and moderate to strong grade; roots (1%)		–
	130-250	10YR 5/1	Gray	Sandy clay loam	Firm, blocky, moderate to weak grade; mottles with 10YR 5/5 (40%)		Observed from above after 170 cmbs. Sand grains are heterogeneous in size. Level appears to have been disturbed.
	250-270+	10YR 5/3	Brown	Sandy clay loam	Crumbly to loose, moderate to weak grade.	Unobserved	Moist soil.
BHT06	0-75	10YR 2/2	Very dark brown	Sandy clay loam	Loose to firm, subangular, and weak to moderate grade; worm burrows (2%), rootlets (15%)	Diffuse	Lenses of sandy loam (10YR 7/2) are present at 36 cmbs (1 to 2 cm thick), and 50 cmbs (3 cm thick)
	75-170	10YR 2/2	Very dark brown	Sandy clay loam	Loose to firm, subangular, and weak to moderate grade; worm burrows (2%), rootlets (15%)	Diffuse	More clay content than layer above. Lenses of sandy loam (10YR 7/2) are present at 90 cmbs (3 cm thick), and 147 cmbs (3 cm thick). Concrete rubble observed at 110 cmbs.
	170-320+	10YR 2/2	Very dark brown	Sandy clay loam	Friable, coarse, and moderate grade;	Unobserved	Observed from above after 185 cmbs.

Trench	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower Boundary	Comments
BHT07	0-110	10YR 5/1	Gray	Clay loam	Friable, coarse, and moderate grade; roots (10%), with 10YR 7/3 sandy clay loam inclusions	Gradual and very irregular	–
	110-240	10YR 2/1	Very dark brown	Clay loam	Angular to blocky, fine size, and strong grade; rootlets (5%), calcium carbonate concretions (1%-2%, ~5 mm)		Observed from above after 140 cmbs.
	240-270+	10YR 6/2 to 10YR 6/3	Light brownish gray to pale brown	Sandy clay	Extremely firm, massive, and strong grade; rootlets (<1%), calcium carbonate concretions (2%, 1-5 cm)	Unobserved	–

This report was written on behalf of the Texas Department of Transportation by

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