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Intensive Archeological Survey: Farm-to-Market 45 from Richland Creek to Near Mills County Line, San Saba and Mills Counties, Texas

Mary Rodriguez

Ken Lawrence

Christina Nielsen

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Intensive Archeological Survey: Farm-to-Market 45 from Richland Creek to Near Mills County Line, San Saba and Mills Counties, Texas

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Report for Archeological Survey

Intensive Archeological Survey:
Farm-to-Market 45 from Richland Creek to
Near Mills County Line, San Saba and
Mills Counties, Texas

Brownwood District

Kevin Hanselka, Principal Investigator, Antiquities Permit No. 8096

CSJ: 0480-08-024

August 25, 2017

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, SWCA Environmental Consultants (SWCA) conducted an intensive cultural resources survey with systematic shovel testing from July 10–14, 2017 of new and existing right-of-way (ROW) along Farm-to-Market (FM) 45 in San Saba and Mills Counties, Texas. Because the project will receive funding from the Federal Highways Administration, it qualifies as an undertaking as defined in Title 36 Code of Federal Regulations Part 800.16(y) and, therefore, 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). Kevin Hanselka served as Principal Investigator under Texas Antiquities Permit No. 8096.

The total area of potential effects (APE) is defined as a 12.5-mile-long stretch of FM 45 between the limits outlined above, and includes the existing 100- to 200-foot-wide ROW and an additional 84 acres of new ROW in discontinuous segments along both sides of existing ROW. The total project area is about 264.5 acres, of which about 178 acres is existing ROW, 84 acres is new ROW, and 2.5 acres is proposed easements. Typical depths of impact would range between 3 and 5 feet for pavement and vertical adjustments to the roadway profile. Maximum depths of impacts would reach up to 60 feet at bridge widening/replacement locations. Some areas would require significant (i.e., 5–15 foot) cuts in back slopes to accommodate the new roadway width.

Background research determined that two cultural resources surveys have been previously conducted within the APE. Fourteen previously recorded archeological sites and 166 potentially historic structures are located within a 0.6-mile (1-kilometer) radius of the current APE; of these, three archeological sites and three possible historic structures are located within the APE. The field investigations assessed all portions of the APE for which access was granted; however, right-of-entry was denied on 17.6 acres of new ROW. Consequently, the survey covered 246.9 acres of the total 264.5-acre APE. The investigations consisted of an intensive pedestrian survey supplemented with the excavation of 231 shovel tests and 15 backhoe trenches. The proposed ROW has been modified to varying degrees by modern land-use practices (e.g., farming and ranching) and infrastructure, but most areas are relatively intact. SWCA documented nine cultural resources, including five isolated finds, three prehistoric sites (41SS73, 41SS75, and 41MI2), and one historic archeological site (41SS197), within the FM 45 survey areas. Site 41SS197 is a historic residential site consisting of a standing chimney and artifact scatter. The artifacts included milk, clear, green and brown glass, whiteware, and miscellaneous metal. Based on information provided by the landowner, archival review, and temporally diagnostic artifact attributes, the site dates to the early through mid-twentieth century. Sites 41SS73, 41SS74, and 41MI2 are prehistoric lithic scatters with poor integrity and lacking substantial assemblages. Sites

41SS73, 41SS74, 41MI2, and 41SS197 are recommended as not eligible for the National Register of Historic Places or as State Antiquities Landmarks within the current APE. For the surveyed portion of the APE, SWCA recommends a finding of “no historic properties affected” and no further archeological investigations. Cultural resources survey is recommended on 12 currently inaccessible parcels, once right of entry is obtained.

Project Identification

- **Date:** 8/25/2017
- **Date(s) of Survey:** 7/10/2017 through 7/13/2017
- **Archeological Survey Type:** Reconnaissance Intensive
- **Report Version:** Draft Final
- **Jurisdiction:** Federal State
- **Texas Antiquities Permit Number:** 8096
- **District:** Brownwood
- **County or Counties:** San Saba and Mills
- **USGS Quadrangle(s):** Bowser (3198-233) and Richland Springs (3198-232)
- **Highway:** Farm-to-Market (FM) 45
- **CSJ:** 0480-08-024
- **Report Author(s):** Mary Rodriguez, Ken Lawrence, and Christina Nielsen
- **Principal Investigator:** Kevin Hanselka

Texas Historical Commission Approval

Signature

Date

Project Description

- **Project Type:** Roadway construction, rehabilitation and widening of existing roadway.
- **Total Project Impact Acreage:** 264.5 acres
- **New Right of Way (ROW) Acreage:** 84 acres
- **Easement Acreage:** 2.5 acres
- **Area of Pedestrian Survey:** 246.9 acres
- **Project Description and Impacts:** The proposed project would reconstruct the existing FM 45 roadway by improving the horizontal and vertical alignment, adding pavement width, and replacing and/or widening bridges and culverts (Figure 1). The resulting road would have 50-foot-wide clear paved surface with 5- to 8-foot-wide shoulders, two 12-foot-wide travel lanes, and a 16-foot center turn lane at intersections. Discontinuous segments of new, proposed ROW would be required along either side of existing ROW, and a 2.5-acre temporary easement would be required for drainage work.
- **Area of Potential Effects (APE):** The APE for the archeological resources is defined as a 12.5-mile stretch of FM 45 and includes the existing 100- to 200-foot-wide ROW and an additional new ROW in discontinuous segments along both sides of existing ROW (Figures 2a–2c). Total project area is about 264.5 acres, of which about 178 acres is existing ROW, 84 acres is new ROW, and 2.5 acres is proposed easements. Typical depths of impact would range between 3 and 5 feet for pavement and vertical adjustments to the roadway profile. Maximum depths of impacts would reach up to 60 feet at bridge widening/replacement locations. Some areas would require significant (i.e., 5–15 foot) cuts in back slopes to accommodate the new roadway width.
- **Project Area Ownership:** The existing ROW is currently owned and managed by TxDOT, which is acquiring the 84 acres of new ROW. Notably, SWCA did not have access to several parcels containing new ROW that totaled roughly 17.6 acres.

Project Setting

- **Topography:** The linear APE runs roughly south to north across low-rolling terrain of the Western Cross Timbers north of Richland Springs (Wermund 2017). The elevation ranges from a maximum of 732 feet above mean sea level (amsl) in the northeastern end of the APE to a low of 675 feet amsl near the southwestern terminus of the APE.

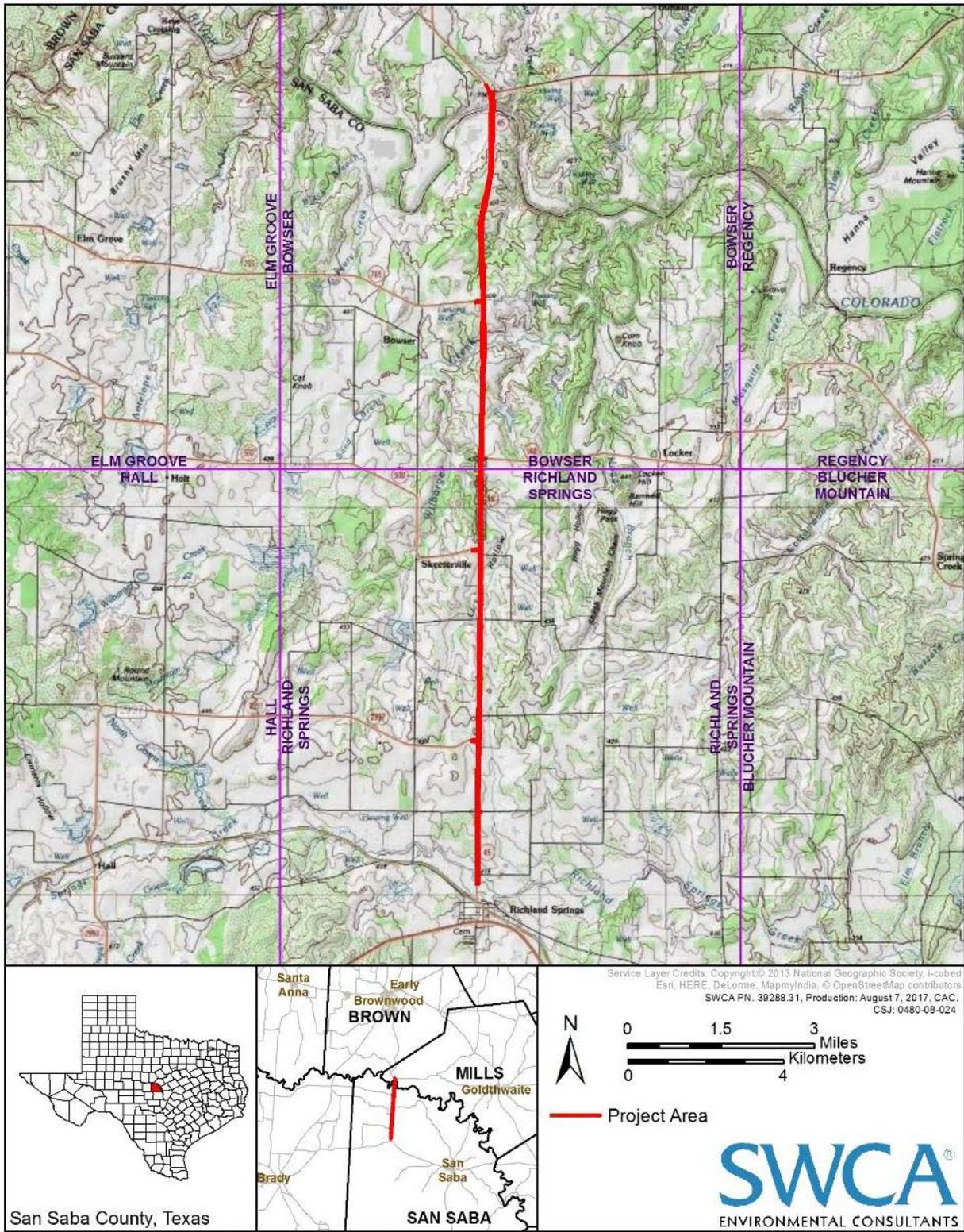


Figure 1. Project location.

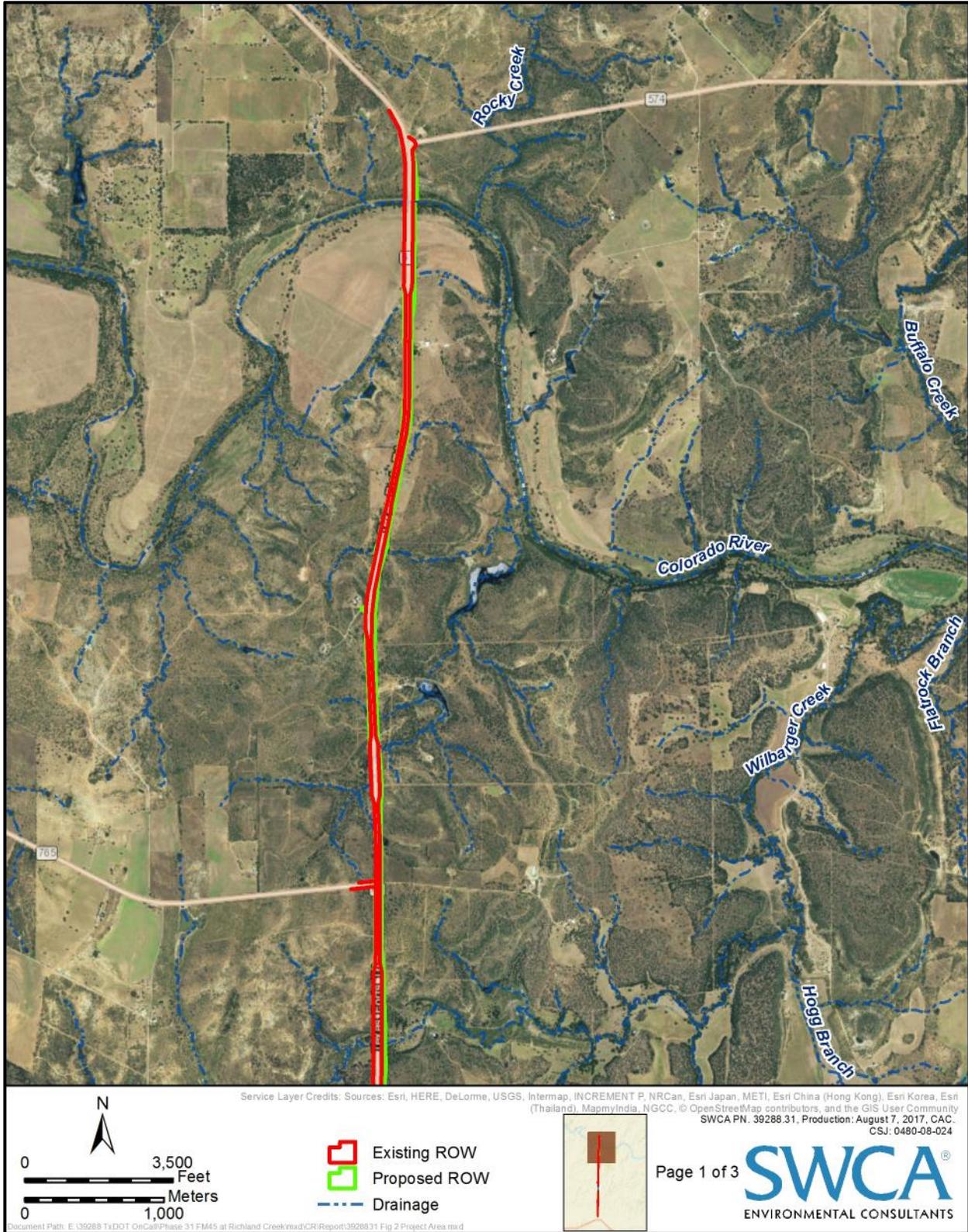


Figure 2a. Project location.

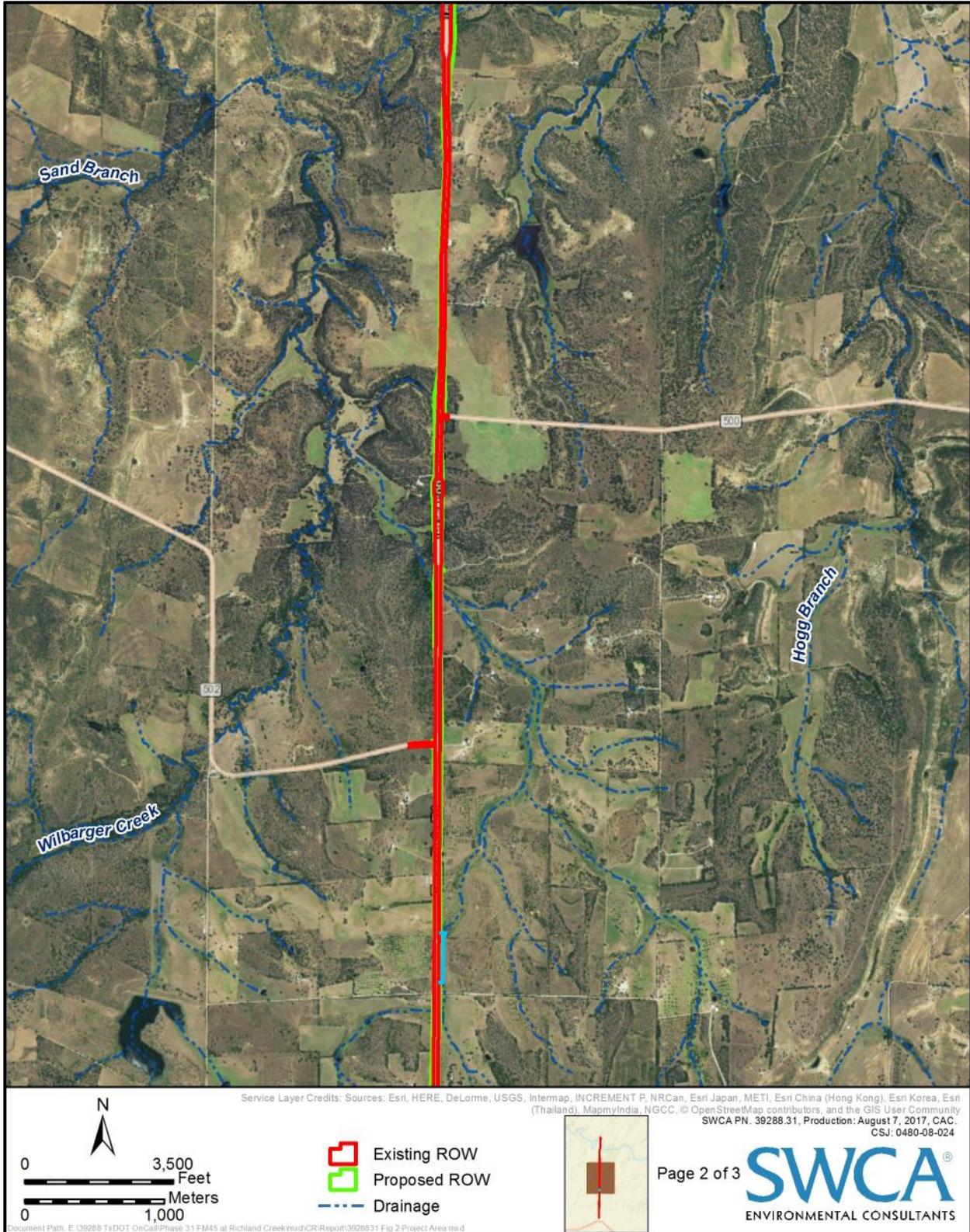


Figure 2b. Project location.

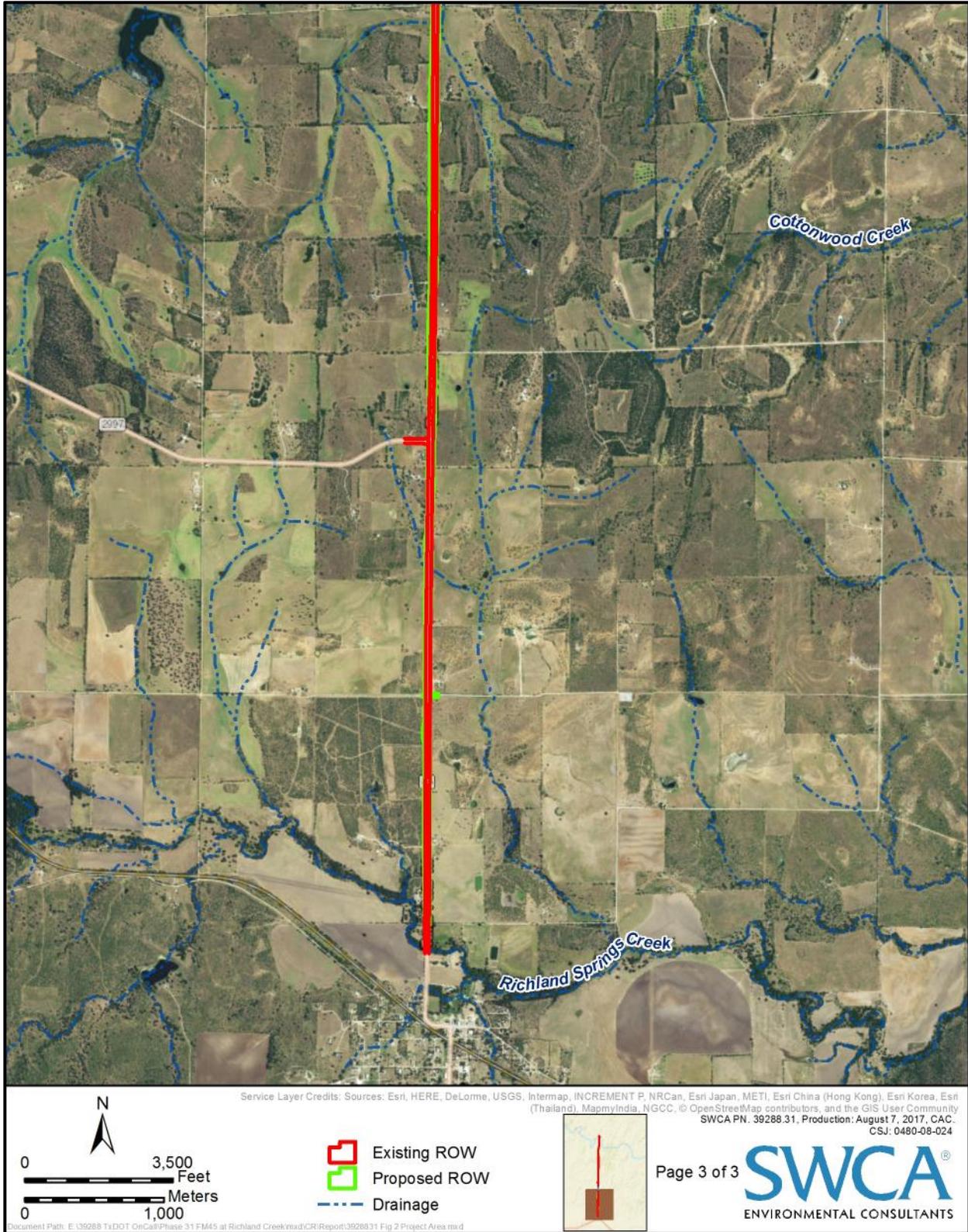


Figure 2c. Project location.

- **Geology:** The surface geology for most of the project area is mapped as the Carboniferous Pennsylvanian-Middle age Strawn Group, which is made up of alternating clays and shales and thin-bedded limestone overlaying Richland-Gordon sandstones (Figure 3). A small portion of the project area (0.40 mile) is mapped as Pleistocene-age Terrace deposits composed of sand, silt, clay and gravel with calcium carbonate in terraces along streams. Clast material along the Colorado River consists of limestones, chert, quartz and igneous and metamorphic rock from the Llano region and Edwards Plateau. The southern portion (0.18 mile) of the project area is composed of Holocene-age alluvium and low terrace deposits along streams consisting of sand, silt, clay and gravel (Barnes 1992).
- **Soils:** A total of 12 different soils from two general soil associations are traversed by the APE (Figures 4a–4c). The northern portion of the APE, near the Colorado River floodplain, is generally mapped as the Nocken-Callahan-Throck soil association. These soils are loamy and sandy soils on uplands formed from slope alluvium or residuum from claystone and siltstone (Natural Resources Conservation Service [NRCS] 2017). The southern portion of the APE is mapped as the Bronti fine sandy loam soil association. These soils are predominantly very stony fine sandy loam on uplands derived from sandstone and claystone residuum (NRCS 2017).
- **Land Use:** The APE is primarily surrounded by rolling, open, active and non-active agricultural and pastoral fields with sparsely scattered residences. The exception to this is the forested riparian margins along waterways traversed by the project alignment, including the Colorado River, Wilbarger Creek, Lick Hollow Creek, and Richland Springs Creek, as well as various smaller tributaries.
- **Vegetation:** Vegetation surrounding the project area is primarily open pastures with short, mixed grasses and scattered mesquite and juniper stands. The riparian areas along the drainages of the APE contain mixed hardwoods (oaks and elms), mesquite, juniper, shrubs, and short grasses.
- **Estimated Ground Surface Visibility:** Variable, ranging from 0 to 100 percent.

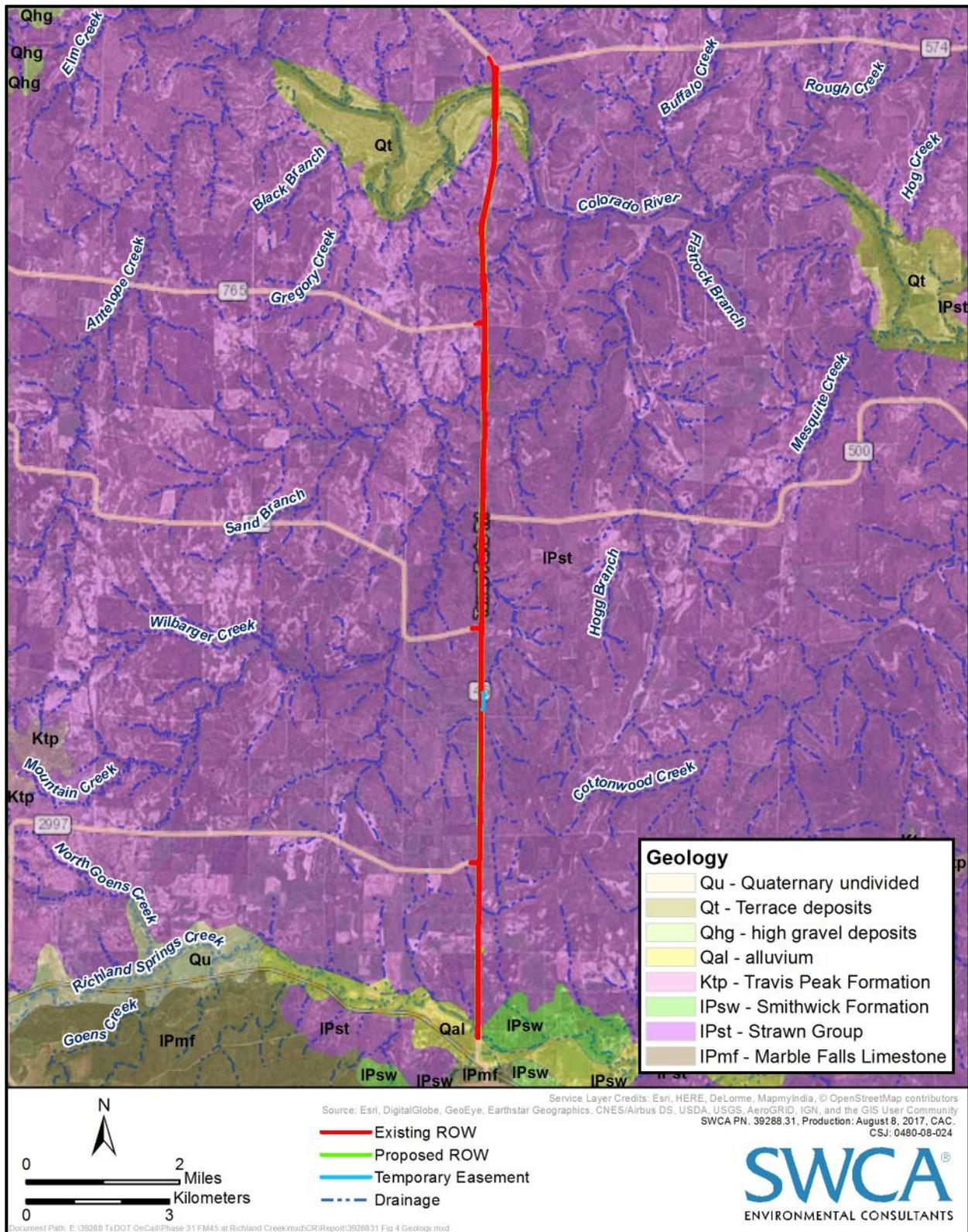


Figure 3. Project area geology.

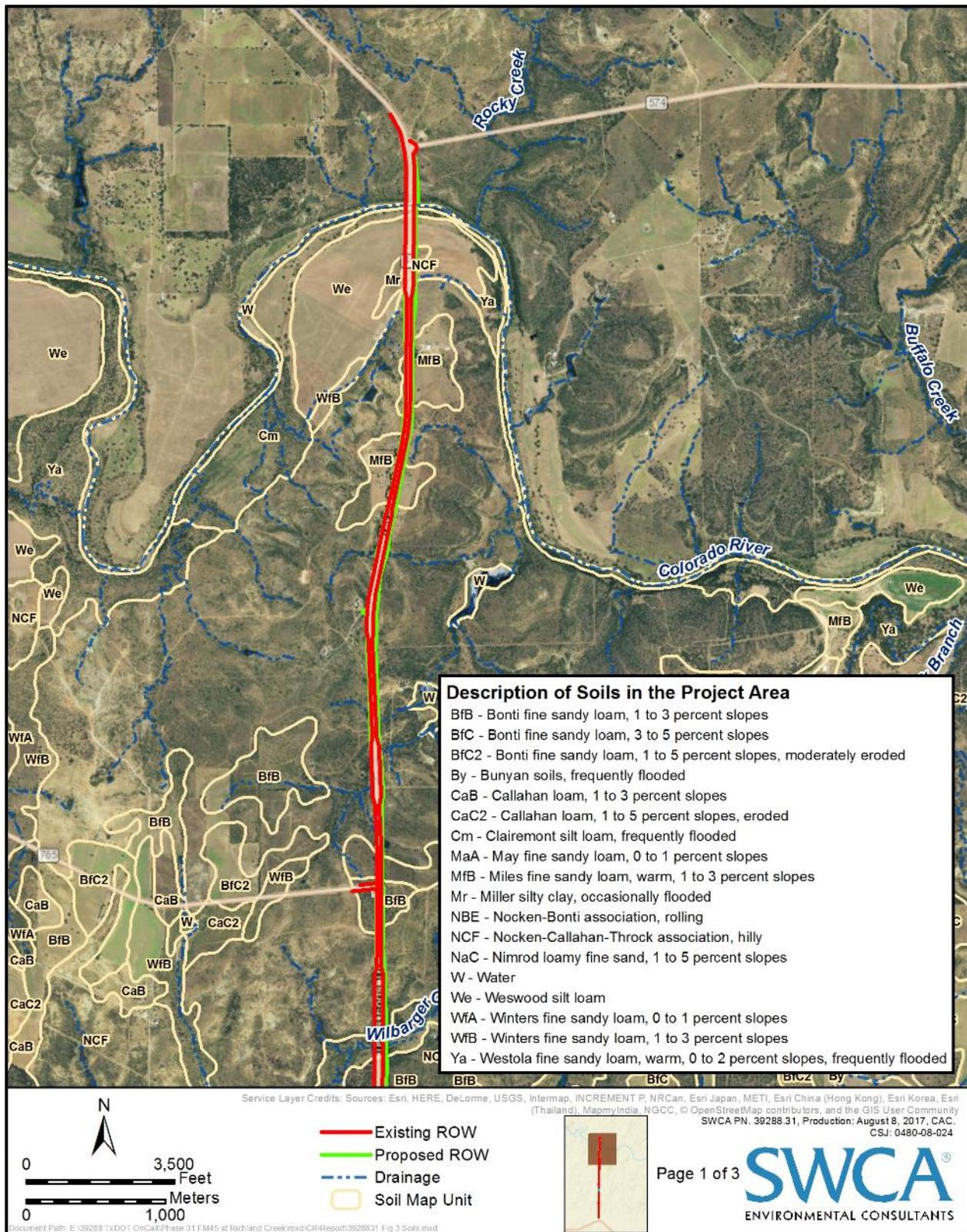


Figure 4a. Project area soils.

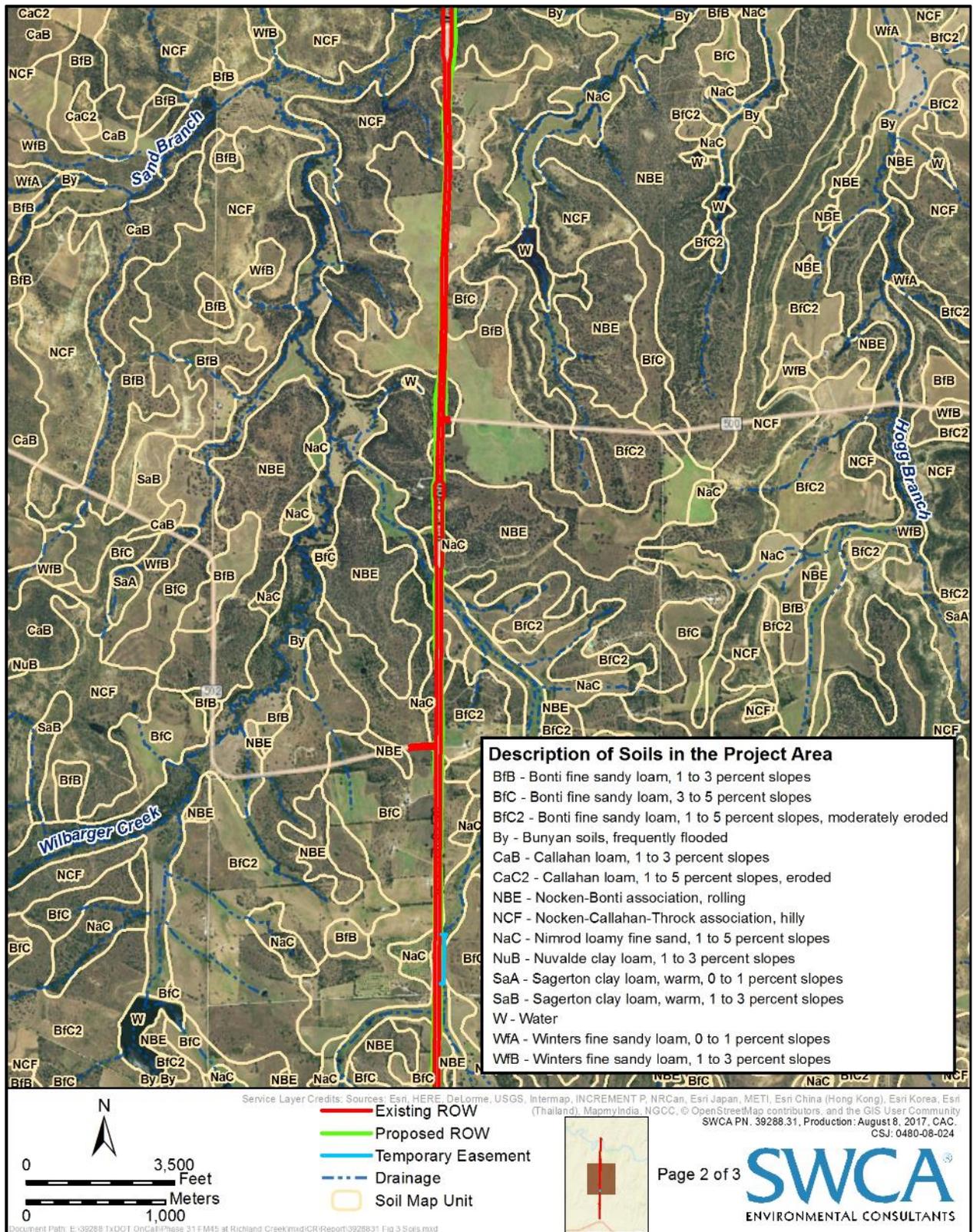


Figure 4b. Project area soils.

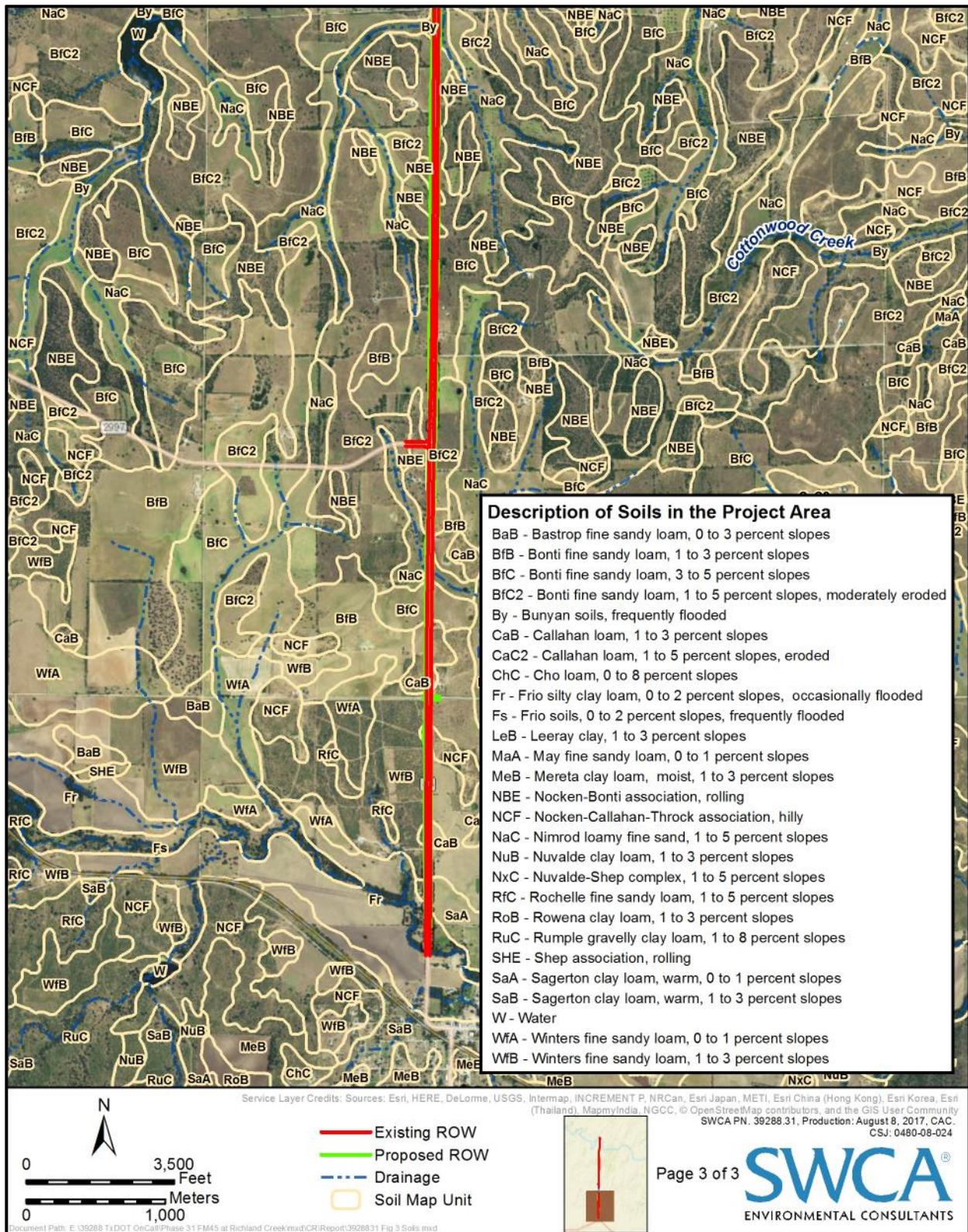


Figure 4c. Project area soils.

- **Previous Investigations and Known Archeological Sites:** A background literature review determined that portions of the APE were previously surveyed for cultural resources and three archeological sites are recorded within the APE and an additional 11 are within a 0.6 mile (1 kilometer [km]) (Table 1)(Texas Historical Commission [THC] 2017). Two cultural resources surveys have been conducted within 0.6 mile (1 kilometer [km]) of the APE, and one historical marker is located within 0.6 mile (1 km) of the APE. A review the TxDOT Historic Overlay Maps identified 166 historic-age structures within 0.6 mile (1 km) of the APE during a review of Foster et al. (2006).

In June 1991, a survey was carried out for the proposed FM 45 reconstruction within the existing FM 45 ROW. This effort resulted in the recording of two archeological sites (41SS73 and 41SS74). In addition, one previously recorded archeological site (41MI2), which was recorded in 1971 by Robert Mallouf, exists within the ROW. Eleven previously recorded archeological sites (41MI13, 41MI14, 41MI15, 41MI16, 41MI18, 41MI120, 41MI121, 41MI124, 41MI125, 41SS19, and 41SS20) are located within a 0.6-mile (1-km) radius of the current APE (THC 2017).

One historic marker is located within 0.6 mile (1 km) of the APE. John Duncan’s Fort is located at the intersection of US 190 and FM 45 in Richland Springs, Texas, approximately 0.5 mile south of the project terminus. The settler’s fort was built in 1858 and consists of the remains of cabins forming a stockade for defense against Indians (THC 2017).

SWCA examined 32 historic topographic maps dating from 1881 to 1964 within the Texas Historic Overlay (Foster et al. 2006) for evidence of potential historic-age resources that may exist within 0.6 mile (1 km) of the APE. The background review identified a total of 166 potential historic-aged structures. Of these structures, only three were identified within the currently proposed project work area. One of these potential historic structures, 41SS197, is a historic farmstead and is discussed below.

- **Comments on Project Setting:** None.

Table 1. Archeological Sites Within a 1-Km Radius of the APE

Site Trinomial	Site Type	NRHP and/or SAL Eligibility Status
41MI2	Prehistoric Lithic Procurement Site	Undetermined
41SS73	Prehistoric campsite and Historic River crossing	Undetermined
41SS74	Prehistoric campsite	Undetermined
41MI121	Prehistoric Lithic Procurement Site	Undetermined
41MI124	Historic Cattle Feeder	Not Eligible within ROW
41MI120	Prehistoric Lithic Procurement Site	Undetermined

Site Trinomial	Site Type	NRHP and/or SAL Eligibility Status
41MI18	Prehistoric Lithic Scatter	Not Eligible within ROW
41MI125	Historic Farmstead	Undetermined
41MI16	Prehistoric Lithic Scatter	Undetermined
41MI15	Prehistoric Campsite	Undetermined
41MI14	Prehistoric Lithic Scatter	Undetermined
41MI13	Prehistoric Campsite	Undetermined
41SS19	Prehistoric Campsite	Undetermined
41SS20	Prehistoric Toyah Campsite	Undetermined

Survey Methods

- **Surveyors:** Ken Lawrence, Mary Rodriguez, Jessica Ulmer, and Sophia Salgado
- **Methodological Description:** SWCA conducted a pedestrian inspection across the entire APE within existing ROW as well as new proposed ROW for which right of entry was granted, including approximately 68.9 acres of proposed new ROW and the entirety of the 178 acres of existing TxDOT ROW (Appendix A). No land access was available for roughly 17.6 acres of the new proposed ROW, accounting for approximately 20 percent of new ROW. Fifteen mechanical trenches were also excavated within the floodplain of the Colorado River and Richland Springs Creek within the APE.

SWCA archeologists excavated a total of 231 shovel tests across the surveyed areas of the APE (Appendix B; Table 2). Shovel tests were approximately 30 centimeters (cm) in diameter and excavated in arbitrary 20-cm levels to 100+ cm below ground surface (cmbs), unless soil conditions or bedrock precluded obtaining such depth. Archeologists screened the matrix from each shovel test through ¼-inch mesh and plotted the location of each excavation using a hand-held global positioning system (GPS) unit. Each shovel test was recorded on a standardized form to document the excavations.

Table 2. 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	0	231	0	0.94
Auger Test Units	0	0	0	0
Mechanical Trenching	0	15	0	0.06

A total of 15 backhoe trenches (BHTs) were excavated within the Colorado River and Richland Springs Creek floodplains. Chosen at the discretion of the project archeologist, the trench locations were placed in accessible areas with the least disturbance within the APE, as well as areas with possible alluvial deposits and the potential for deeply buried cultural materials. Specifically, trenching focused on areas where Potential Archeological Liability Map data showed a high probability for deeply buried deposits, notably along the Colorado River and Richland Springs Creek. Of note, the floodplains of Wilbarger and Lick Hollow Creek were not tested for deeply buried cultural deposits because of logistical restraints due to landowner access (Lick Hollow) or extremely dense vegetation (Wilbarger Creek). Archeologists thoroughly documented and photographed the entire excavation process. Upon completion of the individual trench, the BHT was backfilled, levelled, and returned as much as possible to its original state. In the case of cultural or potentially cultural materials identified within the trench, SWCA placed two stacked shovel tests vertically along the edge of the trench wall at the location of the identified material to further test for additional cultural materials.

- **Other Methods:** The outermost edge of the project APE was sufficiently assessed to account for a 50-foot buffer beyond the horizontal project limits to accommodate any potential future project design changes.
- **Collection and Curation:** NO YES If yes, specify facility.
- **Comments on Methods:** Investigations exceeded the recommended THC/Council of Texas Archeologists survey standards for a project of this size (i.e., approximately 246.9 acres out of the total 264.5 acres). Standards require one shovel test per 3 acres, or a minimum of 82 shovel tests for a project of this size. The 231 tests, therefore, exceed the survey standards. Additionally, various modern disturbances from buried utilities (e.g., water pipeline, fiber optic lines, and gas lines), as well as previous road construction (e.g., cut below grade and fill sections), made shovel testing in some areas unnecessary.

Survey Results

- **Project Area Description:** The project area crosses predominantly upland prairies occasionally intersected by waterways of varying size and magnitude (Figures 5 and 6). The surveyed portions of the APE contain the floodplains of the Colorado River, Wilbarger Creek, Lick Hollow Creek, and Richland Springs Creek. The floodplains of the Colorado River and Richland Spring Creeks were tested for deeply buried cultural deposits. However, the floodplains of Wilbarger and Lick Hollow Creek were not tested for deeply buried cultural deposits because of logistical constraints or lack of access.



Figure 5. Overview of upland prairies, facing south.



Figure 6. Colorado River and FM 45 bridge with road fill and added drainage features, facing south.

Other existing impacts within the project corridor include those associated with transportation infrastructure, including rural roads, as well as electrical transmission line, fiber optic line, and utility easements.

SWCA archeologists conducted a pedestrian inspection across the entire APE within the proposed ROW for which right of entry was granted (Appendices A and D). Investigations revealed the APE consisted largely of undeveloped rural terrain with limited development. Large portions of the APE consist of upland terrain with exposed bedrock outcrops. Existing impacts along the corridor are mostly associated with modern agricultural and other practices, such as clearing and plowing (Figures 7 and 8). Transportation infrastructure, such as rural roads and existing ROW modifications, has also impacted portions of the APE (see Figures 7 and 8).

Surveyors excavated a total of 231 shovel tests within the survey areas (Appendix B). The shovel test excavations throughout the APE encountered fine sandy loams and compact clay loams, as well as bedrock exposures in higher elevation settings (Figure 9).



Figure 7. Section of existing ROW that is cut below grade, exposing shallow bedrock, facing north.



Figure 8. Fiber optic line on east side of FM 45 and typical rural gravel road within ROW.



Figure 9. Typical bedrock exposure in upland settings.

Backhoe Trenching

SWCA excavated a total of 15 BHTs within the proposed project APE. Fourteen trenches (BHT01–BHT14) were placed at the Colorado River crossing and one trench (BHT15) was placed at the Richland Springs Creek crossing (Appendix C). Mechanical excavations were planned at two other crossings (Wilbarger Creek and Lick Hollow) along FM 45, but various factors were encountered that either prohibited (i.e., land access) or precluded the need for (i.e., narrow floodplain) trenching.

The BHTs across the project area were excavated to varying depths, ranging from a minimum of 18 cm (7 inches) to a maximum of 3.35 m (11 feet) to encounter strata that predated human occupation in the area (Figure 10). The trench dimensions were typically 90 cm (2.95 feet) wide, 7 m (23 feet) long, and excavated to a minimum of 1.52 m (5 feet) deep, however, on the left bank (east side) of the drainage, the trenches were 120 cm (4 feet) wide, 11 m (36 feet) long, and minimally excavated to 3.19 m (10.4 feet) deep. When cultural materials were observed in or near the backhoe trench, a column sample (30 cm²) was excavated down one side of the backhoe trench (Figure 11).



Figure 10. Deep profile view of BHT 13, facing northwest.



Figure 11. BHT 03 profile with column sample, facing west.

Colorado River: At this crossing of the Colorado River, the drainage has a paired, stair-stepped terrace system consisting of a series of alluvial terraces that bracket the drainage, created by various episodes of overbank deposition (Waters 1992:149–151). From youngest to oldest, the Colorado River crossing appears to contain T_0 (recent deposits), T_1 , T_2 , and T_3 landforms (Figure 12). The drainage has a narrow (4.5-m [16-foot] wide) T_0 landform with a surface (tread) that is gently sloping and roughly 2 m (6.6 feet) above the drainage surface. The T_0 tread dramatically rises to the adjacent T_1 landform, situated about 3 m (10 feet) above the T_0 surface and 4.5 m (15 feet) above the river surface (see Figure 12). The tread of the T_1 surface is slightly sloping and has a variable width on both the south and north banks. The T_1 landform is roughly 25 m (80 feet) wide on the south bank and about 39 m (130 feet) wide on the north bank. The T_1 landform gradually rises to the T_2 landform, which has a surface situated about 3 m (10 feet) above the T_1 surface and approximately 7.5 m (25 feet) above the river surface. The T_2 landform is roughly 96 m (315 feet) wide on the south bank and about 30 m (100 feet) wide on the north bank. On the south bank, the T_2 landform very gradually rises to the T_3 landform, but dramatically rises into the upland valley margins on the north bank. As a consequence, the left bank does not contain a T_3 landform. On the south bank, the T_3 landform is broad, 335 m (1,100 feet), and gradually rises about 2.4 m (8 feet) above the T_1 landform. The T_3 landform extends southward, gradually rising to the drainage valley margins about 610 m (2,000 feet) south

of the Colorado River. Notably, the T₃ landform has at least one remnant channel that crosses the landform.

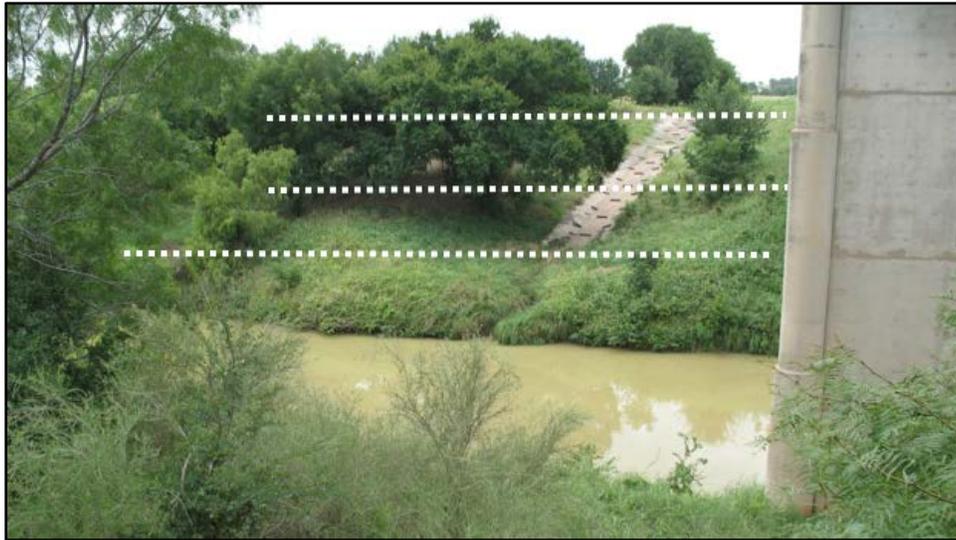


Figure 12. Overview of Colorado River (south side) terraces. Dotted lines indicate surfaces of the T₀, T₁, and T₂ landforms, facing south.

The project area crossing at the Colorado River is located along a section of the drainage that has a sinuosity ratio of 2.3 (Charlton 2008). This high sinuosity suggests a dynamic depositional history where the channel in this area has moved laterally. In this type of setting, the lateral movement can significantly erode the deposits of outside meander bends and, in contrast, deposit significant amounts of sediment upon interior meanders (Charlton 2008). Not surprisingly, the north bank containing very narrow alluvial terraces abruptly rising to uplands is on the outside meander, whereas the south bank contains a broad floodplain. All 14 trenches were placed on the south bank with no backhoe trenches excavated on the north bank at this crossing. A total of four trenches (BHTs 01, 02, 13, and 14) were placed in the T₂ landform (Appendix C). Eight trenches (BHTs 03–7 and 10–12) were excavated on the T₃ landform, while the remaining two trenches (BHTs 08–09) were excavated on the margins of the T₃ landform near the base of the upland slope.

The observed deposits within the backhoe trenches on the floodplain varied slightly across the T₂ and T₃ landforms and were distinctly different on the valley margins. The surface horizon ranged from 17–36 cmbs across the trenches and exhibited some varying levels of disturbance from agricultural plowing. The trenches (BHTs 01, 02, 13, and 14) on the T₂ landform all contained strata of brown (7.5YR 4/3) to yellowish brown (7.5YR 5/4–5/6) deep sand and sandy loams overlying a horizon of strong brown (7.5YR 5/6) sandy clay loam (Appendix C). The deposits in the T₃ landform were similar to the T₂ deposits, but noticeably more compact with some clay content. The observed T₃ strata in BHTs 03–07 and 10–12

typically consisted of brown (7.5YR 5/3) to yellowish brown (7.5YR 5/4–5/6) deep sandy loams overlying a horizon of strong brown (7.5YR 5/8) sandy clay loam (Appendix C). The two trenches (BHTs 08 and 09) near the base of the upland slope were very shallow, encountering large boulders and bedrock at or near the surface.

Archeologists observed cultural materials in several of the Colorado River floodplain backhoe trenches, and these are discussed more fully in the following site descriptions. These trenches (BHTs 02, 03, and 12) were centered on previously recorded site 41SS73 and contained sparse lithic debitage (Appendix C). The artifacts (n=4) in these trenches included chert tertiary flakes and shatter, almost exclusively located at or near the ground surface. The artifacts ranged from the surface to 70 cmbs, with one deeper artifact recovered at 134 cmbs in BHT 12. Column samples were excavated at three of the trenches (BHTs 02, 03, and 12), but no artifacts were recovered. No burned rock or staining was observed within any of the backhoe trenches. Very small fragments of mussel shell were observed in three trenches (BHTs 02, 07, and 12), but it was indeterminate if these were naturally deposited by mammals or associated with cultural activities. Overall, no intact, distinct cultural zones were observed within any of the backhoe trenches at 41SS73.

Two trenches (BHTs 08 and 09) were excavated on previously recorded site 41SS74, which is located on the edge of the Colorado River floodplain. One trench (BHT 08) encountered bedrock at 18 cmbs, while the other (BHT 09) encountered bedrock at 76 cmbs. Neither trench contained any cultural materials.

Richland Springs Creek: At this crossing, the proposed project alignment crosses a small section of the north bank of the floodplain. Specifically, the apparent alluvial terraces intersect about 1,000 feet of the proposed alignment. Mechanical excavation was attempted at this location, but a large 6-inch diameter waterline was encountered at 55 cmbs. The buried utility parallels FM 45 and bisects the proposed new TxDOT ROW in this area. Due to the presence of the buried waterline, only one trench (BHT 15) was excavated at this crossing (Appendix C).

- **Archeological Materials Identified:** During the current investigation, SWCA encountered nine cultural resources within the survey areas. These nine cultural resources consisted of a historic farmstead (site 41SS197), three previously recorded prehistoric sites (41MI2, 41SS73, and 41SS74), and five isolated finds (IF) (MR01–MR04 and KL01) that included four prehistoric lithic artifacts and one possible historic rock wall.

41SS197

Site 41SS197 is a newly recorded historic farmstead consisting of a chimney with no associated foundations or standing walls (Figure 13). The site is located on parcel 34, which is currently used as a short grass cow pasture with large oak trees surrounding the site area. Soils at the site consisted of a reddish brown (7.5YR 5/6) sandy loam to a

depth of 30 to 50 cmbs overtop loosely consolidated sandstone bedrock. SWCA excavated six shovel tests to assess the site for subsurface deposits, none of which were positive for cultural materials; artifact recoveries were limited to the surface.



Figure 13. Overview of chimney at 41SS197, facing northeast.

In addition to the structural components, the site also contains an artifact scatter consisting of milk, clear, green, and brown glass, whiteware, stoneware, and miscellaneous metal. One piece of brown glass has an Owens Illinois Duraglass maker's mark that dates from 1940 to 1963 (Figure 14). No other diagnostic artifacts were observed. The site is located west of FM 45 and has been impacted by road construction and clearing for cattle grazing. A modern corral is located to the north of the site. The site is located 87 m (285) feet south of an unnamed tributary of Wilbarger Creek.

A review of historical maps revealed a structure on the historic 1925 U.S. Geological Survey (USGS) topographic map in the location of 41SS197 (USGS 2017; Foster et al. 2006). The earlier 1896 map does not depict a structure, suggesting that the residence was constructed between 1896 and 1925.

To gather additional information on the site and its association with previous owners (addressing National Register of Historic Places [NRHP] Criterion B), SWCA interviewed the current landowner Dean Taylor on August 16, 2017. Mr. Taylor said he thought the

structure was built around the turn of the century and belonged to two prior landowners, the Bowington's and Benner's. Mr. Bowington was born in the 1890s and died 25 years ago. Mr. Taylor recollected that the structure was of pier and beam construction, with the piers being made of native sandstone. A review of the county and state histories do not indicate that members of the Bowington or Benner families were significant local or regional historical figures.

Summary. Site 41SS197 is a historic farmstead dating to the early to mid-twentieth century (Figure 15). The site consists of a standing chimney and a surface artifact scatter made up of milk, clear, green, and brown glass, whiteware, stoneware, and miscellaneous metal. In addition to natural erosion, the land has been cleared for cattle grazing, and the nearby construction of FM 45 has disturbed the site. Given the light scatter of surface cultural materials, the degree of site disturbance, and lack of any diagnostic artifacts or cultural features, SWCA recommends site 41SS197 as not eligible for the NRHP or as a State Antiquities Landmark (SAL). The site may continue to the northeast, outside of the current APE, and that portion of the site has not been fully evaluated. Should future impacts be anticipated to the east, further work is recommended.



Figure 14. Overview of artifacts at 41SS197.

REMOVED BECAUSE OF RESTRICTED INFORMATION

Texas Natural Resource Code Title 9, Section 191.004

Texas Antiquities Code Title 13, Part 2, Chapter 24.13

41MI2

Site 41MI2 is a previously recorded prehistoric lithic procurement site consisting of tested cobbles, cores, flakes, bifaces, and mussel shell (Figure 16). Site 41MI2 was originally recorded in 1971 by Robert Mallouf. The site is located on parcel 92, which is in the floodplain of the Colorado River. The vegetation at the site consists of short bunch grasses, mesquite and juniper stands, and scrub brush (Figure 17). The Colorado River is located 73 m (239 feet) south of the site boundary. The site is disturbed by the construction of FM 45, as well as a gravel two-track road that parallels the site boundary. Much of the originally recorded site was likely bladed away during this prior construction. Soils consisted of a light brown (10YR 6/3) silty loam and silty clay loam over shallow bedrock at 10 to 70 cmbs on the Colorado River floodplain. Site 41MI2 is on a terraced slope, ranging from 15 to 30 degrees facing south-southeast on the northern river floodplain. The existing ROW to the west is disturbed from artificial fill during the construction of FM 45.

SWCA excavated six shovel tests within and around the site boundary, all of which were negative for cultural materials. Artifacts observed at 41MI2 are surficial and included cores, flakes, bifaces, lithic shatter, and mussel shell; however, no diagnostic artifacts were noted. Artifacts were clustered within the previously defined site boundary. Chert consisted of several different types based on hue and grain structure, but are all likely locally available materials eroding from the slope north of the Colorado River. The site remains similar to its originally recording in 1971, although the site boundaries were extended slightly to the east, based on the observed distribution of cultural materials.

Summary. Site 41MI2 is a prehistoric lithic procurement site of unknown age (Figure 18). The site consists of cores, flakes, bifaces, lithic shatter, and mussel shell eroding from the sloped surface north of the Colorado River. In addition to natural erosion, the land has been cleared for a cattle pasture and the nearby construction of FM 45 has also contributed to disturbance at the site. Given the degree of site disturbance, and lack of any diagnostic artifacts or cultural features, SWCA recommends site 41MI2 as not eligible for the NRHP or as an SAL. The site may continue to the east, outside of the current APE, and that portion of the site has not been fully evaluated. Should future impacts be anticipated to the east, further work is recommended.



Figure 16. Sample of artifacts observed at 41MI2.



Figure 17. Overview of 41MI2 with FM 45 bridge at the Colorado River, facing south.

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41SS73

Site 41SS73 is a previously recorded multicomponent site consisting of secondary and tertiary flakes, two fragments of fire cracked rock, two biface fragments, one projectile point, mussel shell, one ground stone fragment, one fragment of a plow blade, and one metal buckle fragment (Figures 19 and 20). The site was originally recorded in April 1991 by Daymond Crawford for the State Department of Highways and Public Transportation. The site was not recommended for further investigations in 1991.

The site is located on parcel 91, which is currently used as an agricultural field on the floodplain of the Colorado River (Figure 21). The site has been disturbed by agricultural practices and the construction of FM 45 bridge at the Colorado River, which bisects the site (Figure 22). Soils in the area consisted of a brown sandy loam overtopping a very compact sandy clay loam.

SWCA excavated nine backhoe trenches (BHTs 02–06, BHTs 10–12, and BHT14) within the site boundaries to assess the potential for buried deposits. Three of the backhoe trenches were positive (BHT02, BHT03, and BHT12) for cultural materials and column samples were excavated in the positive trenches. BHT02 contained one tertiary flake at 70 cmbs and one mussel shell fragment at 72 cmbs. BHT03 contained two fragments of debitage from 0 to 10 cmbs, one tertiary flake at 32 cmbs, and one fragment of debitage at 51 cmbs. BHT 12 contained one fragment of debitage at 134 cmbs. Although artifacts ranged from 0 to 134 cmbs, no features were observed either at the surface or subsurface. The difference in artifact depths are likely attributed to colluvial depositional processes. Chert observed at 41SS73 varied in color, although the majority was gray.

One diagnostic projectile point was found on the surface at 41SS73 (Figure 23). This projectile point is a Marcos point that dates from the Late to Transitional Archaic (Turner et al. 2011).

Summary. Site 41SS73 is a multicomponent site on the floodplain of the Colorado River with one diagnostic Marcos projectile point dating from the Late to Transitional Archaic (see Figure 23). The site consists of secondary and tertiary flakes, two fragments of fire cracked rock, two biface fragments, one projectile point, mussel shell, and one metal buckle fragment. In addition to erosion, the land has been disturbed by agricultural practices, as well as the construction of the FM 45 bridge at the Colorado River. Given the light scatter of subsurface cultural material, the degree of site disturbance, and lack of any cultural features, SWCA recommends site 41SS73 as not eligible for the NRHP or as an SAL. The site may extend outside the current APE, and that portion of the site has not been fully evaluated. Should further impacts be anticipated outside the APE, further work is recommended.



Figure 19. Sample of artifacts found on the surface of 41SS73.



Figure 20. Ground stone fragment found on the surface of 41SS73.

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Figure 22. Overview of 41SS73.



Figure 23. Marcos projectile point found on surface of 41SS73.

41SS74

Site 41SS74 is a previously recorded site consisting of diffuse scatter of lithic debitage (Figure 24). The site was originally recorded in April 1991 by Daymond Crawford for the State Department of Highways and Public Transportation. The site was not recommended for further investigations in 1991. Of note, the site location indicated on the Texas Archeological Sites Atlas (Atlas; THC 2017) is situated on top of a broad upland (see Figure 21); however, the site description and the field investigations place site 41SS74 roughly 198 m (650 feet) north of the Atlas data. Figure 21 illustrates the initial site location indicated by Atlas and the current site location observed during the current investigations.

The site is located on parcel 91 on a small rise between two remnant channels, which is currently used as an agricultural field on the floodplain of the Colorado River (see Figure 21). The site has been disturbed by agricultural practices and the construction of FM 45, which bisects the site. Soils in the area consisted of a brown sandy clay loam overtopping bedrock. In areas, exposed bedrock was observed at the site.

SWCA excavated two backhoe trenches (BHT08 and BHT09) within the site boundary to assess for the potential for buried deposits (see Figure 21). No cultural material was found subsurface. The backhoe trenches were shallow and excavated to a depth of 18 cmbs and 107 cmbs, respectively.

Surface artifacts observed at the site consist of secondary and tertiary flakes and lithic shatter, but no formal tools were observed within the APE. The description on the original site form mentioned cut banks within the site boundary, which leads SWCA to believe that the site is located north of the original site boundary (see Figure 21). No artifacts, cut banks or remnant channels were observed within the original site boundary.

Summary. Site 41SS74 is a prehistoric lithic scatter of unknown age. The site consists of a diffuse scatter of secondary and tertiary flakes and lithic shatter. The site is located on an upland rise between two remnant channels of the Colorado River. In addition to natural erosion, the land has been disturbed by agricultural practices, as well as the construction of FM 45, which bisects the site. Given the light surface scatter of cultural material, the degree of ground disturbance, and the lack of any diagnostic artifacts or cultural features, SWCA recommends that site 41SS74 as not eligible for the NRHP or as an SAL. The site may extend outside of the current APE; should future impacts be anticipated, further work is recommended.



Figure 24. Overview of site 41SS74.

Isolated Find MR01

IF MR01 consists of a dry-stacked stone wall made up of locally available sandstone boulders with young trees growing within stacked stones on parcel 45 (Figure 25). The wall, oriented east to west, is perpendicular to the ROW. It does not correlate with current property boundaries, and its age and function was undetermined. Similar features have been used for erosion control or field clearing. The feature measured approximately 50 cm high and 50 cm wide. It extended an unknown distance beyond the survey areas. SWCA excavated four shovel tests to delineate the IF, all of which were negative for additional cultural materials.



Figure 25. Overview of rock wall at IF MR01.

Isolated Find MR02

IF MR02 consists of a Langtry projectile point (Figure 26), which dates to the Middle to Late Archaic. SWCA excavated two additional shovel tests (SS19 and MR17) at this location, neither of which was positive for cultural materials. IF MR02 was located on the surface of the slope of an upland ridge north of the floodplain of Wilbarger Creek on parcel 85.



Figure 26. Langtry projectile point at IF MR02.

Isolated Find MR03

IF MR03 consists of the non-diagnostic distal tip of a projectile point. SWCA excavated four additional shovel tests (MR75, JU19, KL30, and, MR68) at this location, none of which were positive for cultural materials. IF MR03 is located on the surface of the slope of an upland ridge on parcel 90 (Figures 27 and 28).



Figure 27. Overview of IF MR03.



Figure 28. Distal tip of projectile point found on the surface of IF MR03.

Isolated Find MR04

IF MR04 consists a Zephyr projectile point, which dates from A.D. 200 to 700 (Figures 29 and 30). To augment the nearly 100 percent visibility and assess the potential for buried deposits, SWCA excavated three additional shovel tests (KL35, JU25, and MR74) at this location; however, no additional cultural materials were identified. IF MR04 is located on the surface of the slope of an upland ridge on parcel 53.



Figure 29. Zephyr projectile point (IF MR04) found on the surface.



Figure 30. Overview of IF MR04 area.

Isolated Find KL01

IF KL01 consists of a historic square bottle base with an Owens Illinois makers mark dating to the early twentieth century (Figure 31). SWCA excavated one additional shovel test (JU15) at this location; no further cultural materials were recovered. IF KL01 is located in a cleared pasture on parcel 48.



Figure 31. Bottle base fragment (IF KL01) encountered on surface along east side of FM 45.

APE Integrity: The survey area within the new TxDOT easement has variable integrity, but appears predominantly intact. Most of the surveyed areas are, or have been, agricultural fields or hunting tracts. Plowing has modified the upper portion of the pedogenic profile, as well as timber clearing. Recently, modern developments have increasingly encroached upon the area, and utilities associated with these are found in some areas.

Recommendations

- **Archeological Site Evaluations:** SWCA recommends that sites 41SS73, 41SS74, 41SS197, and 41MI2 within the proposed TxDOT ROW are not eligible for the NRHP or for designation as an SAL.
- **Comments on Evaluations:** None.
- **Further Work:** No further cultural resources investigations are recommended within the 246.9-acre surveyed portion of the proposed ROW for which right of entry has been obtained. Access was denied on 19 parcels, comprising 17.6 acres (Appendix D). However, seven of these parcels have negligible or very narrow new ROW and consequently, no further work is recommended on these seven parcels (i.e., parcels 10, 26, 42, 50, 51, 52, and 80). On the remaining 12 parcels (i.e., parcels 3, 13, 19, 29, 32, 33, 36, 60, 61, 62, 81, and 89), further work is recommended within the currently

inaccessible portions of the proposed ROW, once additional right of entry has been negotiated. One of the inaccessible areas was Lick Hollow, where backhoe trenching is recommended to assess the potential for deeply buried deposits; however, except for this location, no further backhoe trenching is recommended for the remainder of the APE. Additionally, if changes to the project design require additional APE adjacent to sites 41SS73, 41SS74, 41SS197, or 41MI2, further work is recommended to delineate and evaluate the possible extension of the site boundaries beyond the current APE.

- **Justification:** The available exposures, disturbances, and excavations (backhoe trenching and shovel tests) afforded sufficient archeological data to adequately assess the survey areas. The background review revealed three recorded sites within the proposed ROW. The single archeological site identified during the survey is a historic farmstead with a sparse historic scatter. As per 36 CFR 800 and 13 Texas Administrative Code 26, SWCA has made a good faith effort to identify archeological resources within the APE.

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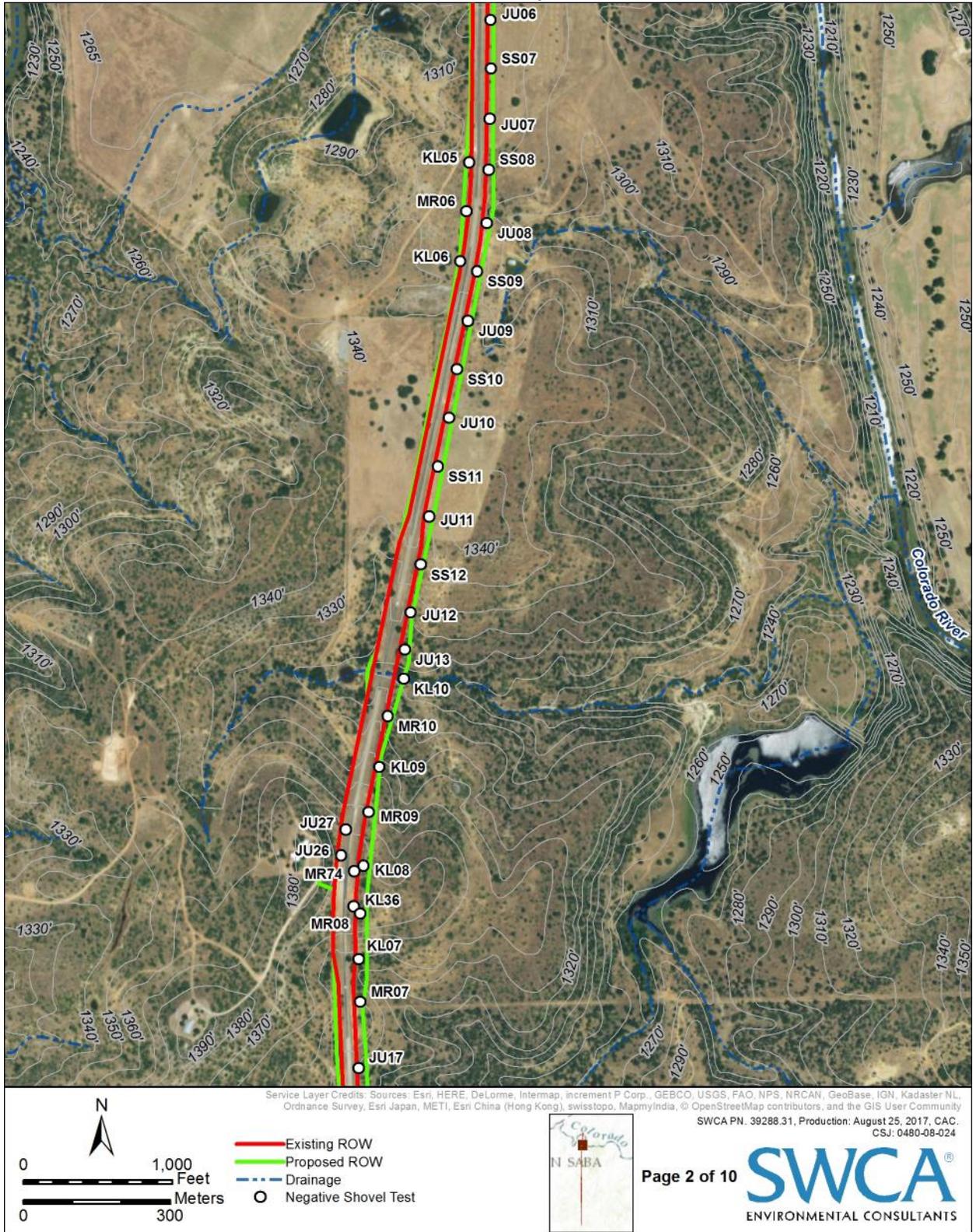
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Appendix A - Survey Results



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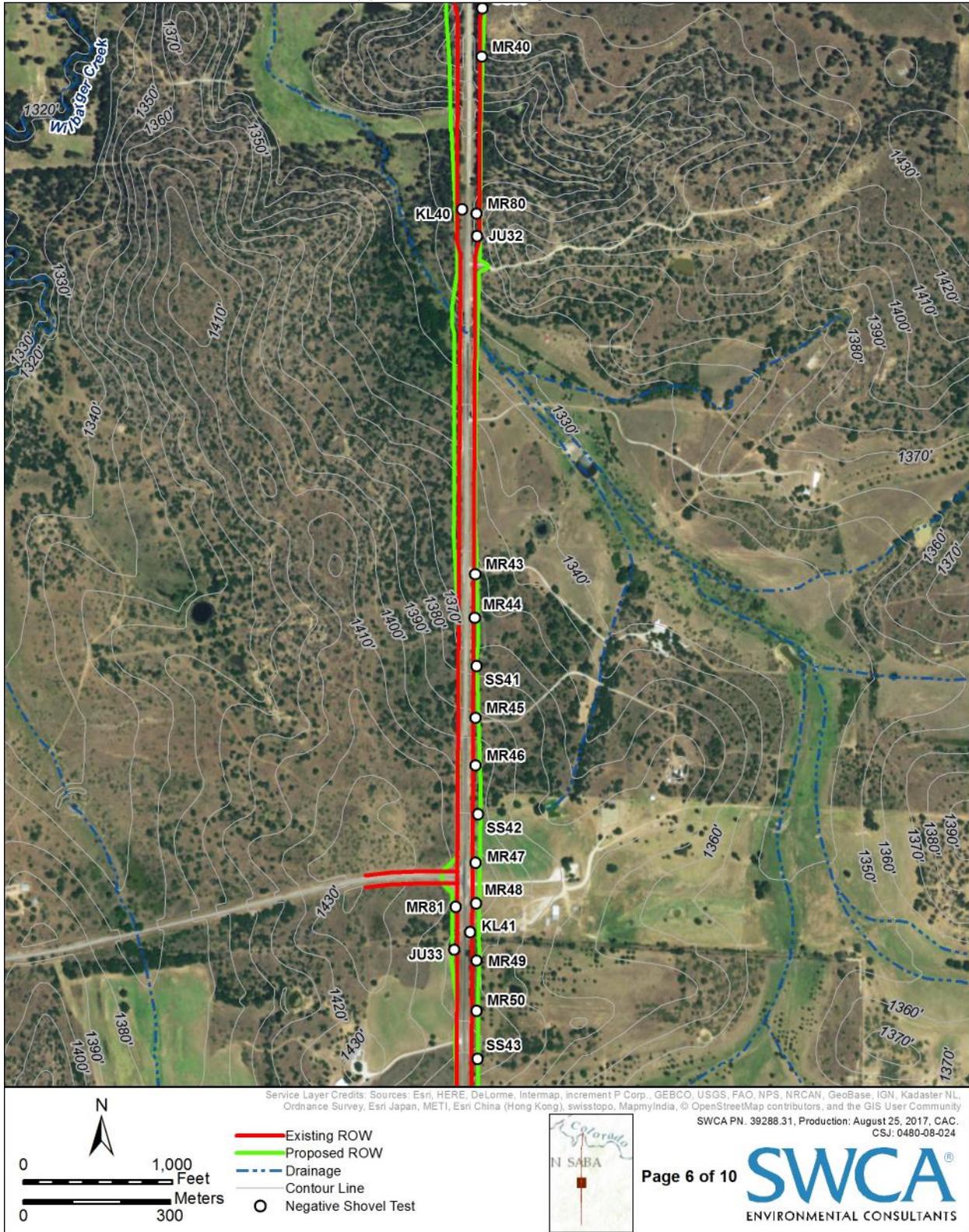
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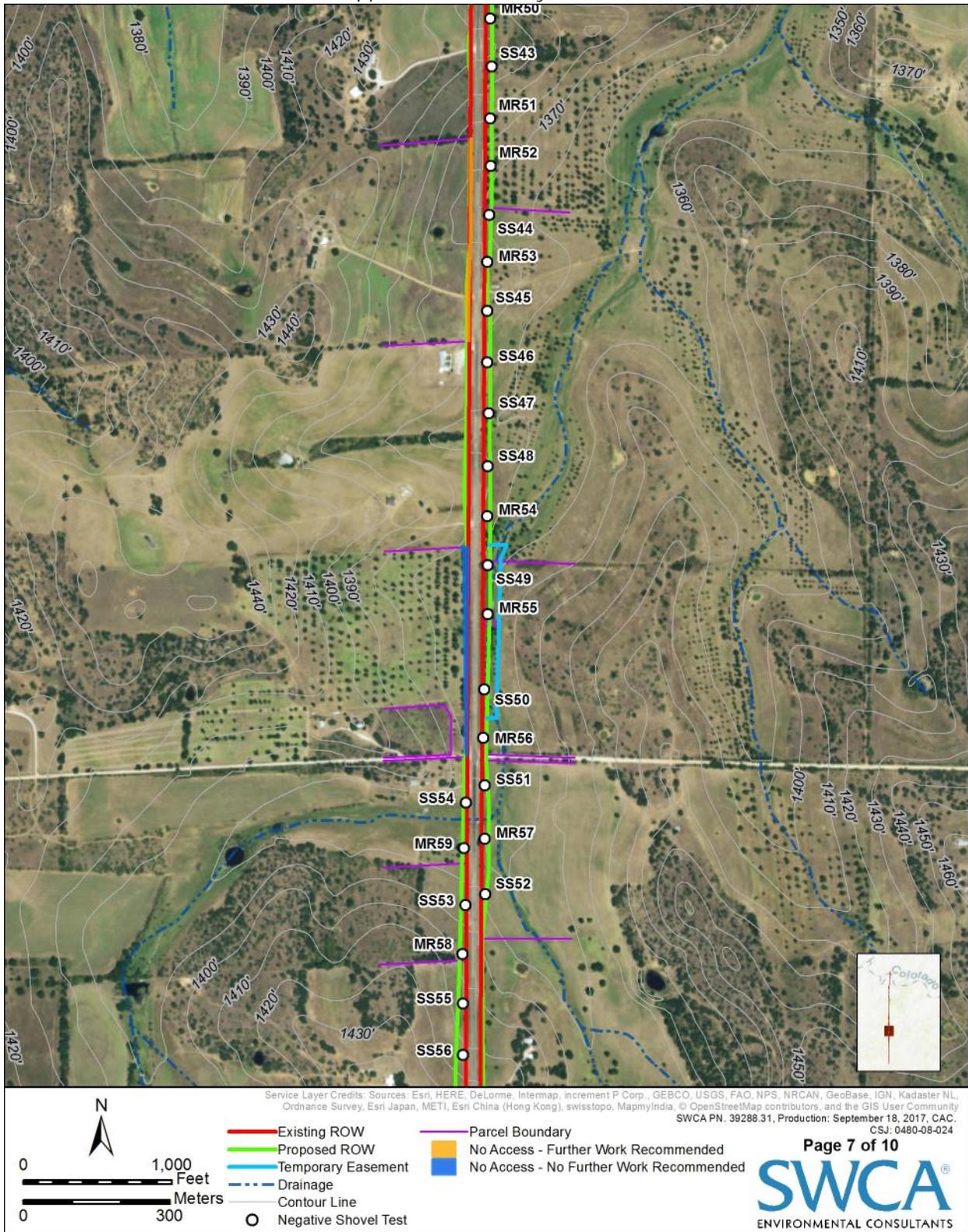
Texas Natural Resource Code Title 9, Section 191.004

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Appendix A - Survey Results

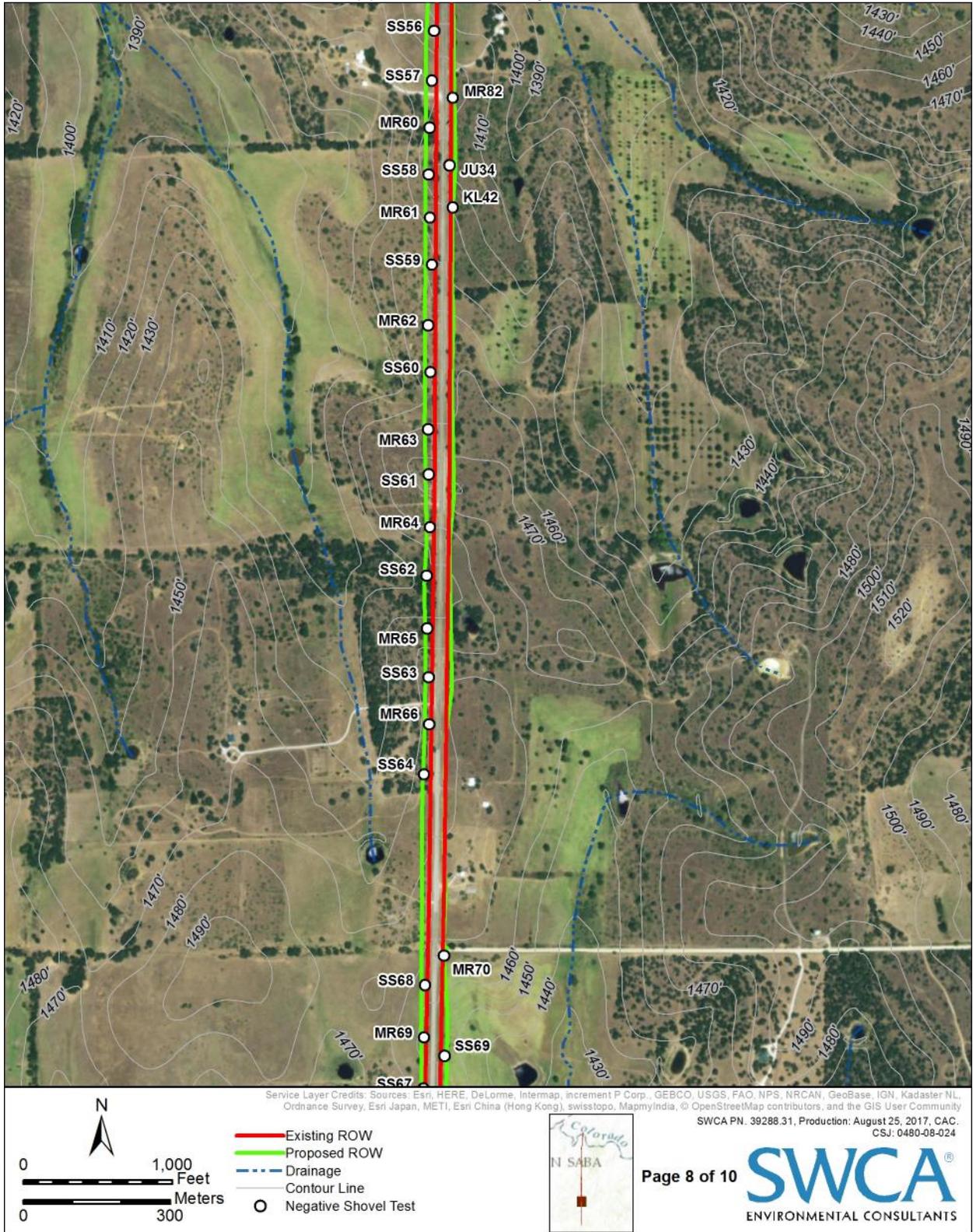


Appendix A - Survey Results



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Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
41MI2	JU01	0-10	7.5YR 5/4	brown	Sandy Loam	10-20%	Gravels	N	Bedrock
41MI2	JU02	0-20	10YR 4/4	dark yellowish brown	Clay Loam			N	Bedrock
		20-60	10YR 6/4	light yellowish brown	Silt Loam			N	Compact Soil
NA	JU03	0-10	7.5YR 4/3	brown	Clay Loam	>20%	Gravels, Pebbles	N	Bedrock
NA	JU04	0-20	10YR 4/3	brown	Sandy Loam	1-5%	Gravels	N	Bedrock
NA	JU05	0-30	10YR 4/4	dark yellowish brown	Sandy Clay Loam	5-10%	Gravels	N	Dense Gravels
NA	JU06	0-20	7.5YR 4/4	brown	Sandy Loam			N	Compact Soil
		20-35	7.5YR 5/6	strong brown	Sandy Clay Loam			N	Compact Soil
NA	JU07	0-30	7.5YR 4/3	brown	Sandy Clay Loam			N	Basal Clay
		30-45	5YR 4/6	yellowish red	Sandy Clay			N	Basal Clay
NA	JU08	0-15	7.5YR 4/4	brown	Sandy Clay	10-20%	Gravels	N	Bedrock
NA	JU09	0-15	10YR 4/4	dark yellowish brown	Sandy Clay Loam	5-10%	Gravels	N	Bedrock
NA	JU10	0-15	10YR 4/3	brown	Sandy Clay Loam			N	Compact Soil
		15-30	10YR 5/3	brown	Clay Loam			N	Compact Soil
NA	JU11	0-10	10YR 4/3	brown	Sandy Clay Loam			N	Compact Soil
		10-20	10YR 5/3	brown	Clay Loam			N	Compact Soil
NA	JU12	0-15	7.5YR 4/3	brown	Sandy Clay Loam	5-10%	Gravels	N	Bedrock
NA	JU13	0-20	7.5YR 4/3	brown	Sandy Clay Loam	1-5%	Gravels	N	Bedrock
		20-30	5YR 4/6	yellowish red	Sandy Clay			N	Bedrock
NA	JU14	0-10	7.5YR 5/4	brown	Sandy Loam	5-10%	Gravels	N	Compact Soil
NA	JU15	0-10	7.5YR 5/4	brown	Sandy Loam	5-10%	Gravels	N	Compact Soil
NA	JU16	0-10	10YR 4/3	brown	Clay Loam	10-20%	Gravels	N	Dense Gravels
NA	JU17	0-15	7.5YR 4/3	brown	Clay Loam	10-20%	Gravels	N	Bedrock
NA	JU18	0-10	7.5YR 5/6	strong brown	Sandy Loam	10-20%	Gravels	N	Bedrock
NA	JU19	0-25	7.5YR 5/6	strong brown	Sandy Loam	10-20%	Gravels	N	Bedrock
NA	JU20	0-15	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	JU21	0-25	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	JU22	0-15	7.5YR 4/6	strong brown	Sandy Loam	>20%	Gravels	N	Dense Gravels
NA	JU23	0-100	7.5YR 4/4	brown	Loamy Sand			N	Depth
NA	JU24	0-30	7.5YR 5/4	brown	Clay Loam			N	Compact Soil
NA	JU25	0-15	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	JU26	0-20	7.5YR 5/3	brown	Sandy Loam	10-20%	Gravels	N	Dense Gravels
NA	JU27	0-30	7.5YR 4/3	brown	Clay Loam			N	Compact Soil

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	JU28	0-15	7.5YR 5/4	brown	Sandy Loam			N	Bedrock
NA	JU30	0-20	7.5YR 4/3	brown	Clay Loam	1-5%	Gravels	N	Bedrock
NA	JU31	0-15	7.5YR 4/6	strong brown	Sandy Loam	1-5%	Gravels	N	Bedrock
NA	JU32								No dig due to bedrock on surface
NA	JU33	0-100	7.5YR 5/6	strong brown	Loamy Sand			N	Depth
NA	JU34	0-15	7.5YR 4/4	brown	Sandy Loam	1-5%	Gravels, Degrading bedrock	N	Bedrock
41MI2	KL01	0-47	7.5YR 4/3	brown	Silt Loam			N	Compact Soil
		47-65	7.5YR 5/6	strong brown	Silty Clay Loam	5-10%	White filaments	N	Compact Soil
NA	KL02	0-6	7.5YR 4/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Bedrock
NA	KL03	0-6	7.5YR 4/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Bedrock
NA	KL04	0-13	7.5YR 4/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Bedrock
NA	KL05	0-17	7.5YR 4/3	brown	Sandy Loam	5-10%	Gravels, Pebbles	N	Compact Soil
		17-22	7.5YR 6/3	light brown	Sandy Clay Loam	1-5%	Pebbles	N	Compact Soil
NA	KL06	0-14	7.5YR 4/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Bedrock
NA	KL07	0-17	7.5YR 5/3	brown	Sandy Loam	5-10%	Cobbles, Gravels, Pebbles	N	Bedrock
NA	KL08	0-7	7.5YR 5/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Compact Soil
		7-21	7.5YR 4/3	brown	Sandy Clay Loam	5-10%	Gravels, Pebbles	N	Compact Soil
NA	KL09	0-6	7.5YR 4/3	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Bedrock
NA	KL20	0-3	7.5YR 5/6	strong brown	Sandy Loam	5-10%	Gravels, Pebbles	N	Bedrock
NA	KL21	0-3	7.5YR 5/6	strong brown	Sandy Loam	5-10%	Gravels, Pebbles	N	Bedrock
NA	KL22	0-4	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL23	0-4	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL24	0-4	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL25	0-4	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL26	0-4	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL27	0-6	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL28	0-8	7.5YR 5/4	brown	Sandy Clay Loam	1-5%	Gravels, Pebbles	N	Compact Soil
		8-17	7.5YR 6/6	reddish yellow	Sandy Clay Loam	5-10%	Gravels, Pebbles	N	Compact Soil
NA	KL29	0-33	7.5YR 4/3	brown	Sandy Loam	5-10%	Cobbles, Gravels, Pebbles	N	Bedrock
NA	KL30	0-27	7.5YR 4/3	brown	Sandy Loam	10-20%	Gravels, Pebbles	N	Dense Gravels
NA	KL31	0-22	7.5YR 5/6	strong brown	Sandy Clay Loam	5-10%	Gravels, Pebbles	N	Dense Gravels
NA	KL32	0-22	7.5YR 5/6	strong brown	Sandy Clay Loam	5-10%	Gravels, Pebbles	N	Dense Gravels
NA	KL33	0-47	7.5YR 4/3	brown	Sandy Loam	10-20%	Roots	N	Large Root
NA	KL34	0-64	7.5YR 4/3	brown	Sandy Loam	1-5%	Roots	N	Depth
		64-93	7.5YR 5/3	brown	Sandy Loam			N	Depth

Appendix B - Shovel Test Results

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NA	KL35	0-6	7.5YR 6/3	light brown	Sandy Loam	5-10%	Gravels, Pebbles	N	Compact Soil
		6-12	7.5YR 5/8	strong brown	Sandy Clay Loam	1-5%	Gravels, Pebbles	N	Compact Soil
NA	KL36	0-13	7.5YR 5/8	strong brown	Sandy Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	KL37	0-3	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Large Rock Frags, Pebbles	N	Compact Soil
NA	KL38	0-11	7.5YR 5/6	strong brown	Sandy Clay Loam	10-20%	Gravels, Large Rock Frags, Pebbles	N	Compact Soil
NA	KL40	0-13	7.5YR 6/3	light brown	Sandy Loam	5-10%	Gravels, Large Rock Frags	N	Bedrock
NA	KL41	0-22	7.5YR 5/4	brown	Sandy Loam	5-10%	Gravels, Pebbles, Asphalt	N	Compact Soil
NA	KL42	0-62	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Compact Soil
41MI2	MR01	0-30	10YR 5/3	brown	Sandy Clay			N	Bedrock
NA	MR02	0-20	5YR 5/3	reddish brown	Sandy Loam			N	Bedrock
NA	MR03	0-10	10YR 3/2	very dark grayish brown	Sandy Loam	1-5%	Large Rock Frags	N	Bedrock
NA	MR04	0-10	10YR 3/2	very dark grayish brown	Sandy Loam	1-5%	Large Rock Frags	N	Bedrock
NA	MR05	0-10	10YR 3/2	very dark grayish brown	Sandy Loam	1-5%	Large Rock Frags	N	Bedrock
NA	MR06	0-25	10YR 4/6	dark yellowish brown	Sandy Clay			N	Bedrock
NA	MR07	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR08	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR09	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR10	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR11	0-30	7.5YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR12	0-30	7.5YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR13	0-50	10YR 5/6	yellowish brown	Silt Loam			N	Bedrock
NA	MR14	0-25	7.5YR 5/6	strong brown	Sandy Loam			N	Bedrock
		25-35	10YR 4/6	dark yellowish brown	Sandy Clay			N	Bedrock
NA	MR15	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR16	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR17								Bedrock
NA	MR18	0-70	10YR 5/3	brown	Loamy Sand			N	Compact Soil
NA	MR20	0-70	10YR 5/3	brown	Loamy Sand			N	Compact Soil
NA	MR21	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR22	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	MR23	0-30	7.5YR 5/3	brown	Sandy Clay			N	Basal Clay
NA	MR24	0-30	7.5YR 5/3	brown	Sandy Clay			N	Basal Clay
NA	MR25								Bedrock
NA	MR26	0-40	10YR 5/3	brown	Loamy Sand			N	Bedrock
NA	MR27	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR28	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR29	0-35	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR30	0-35	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR31								No dig due to bedrock on surface
NA	MR32								No dig due to bedrock on surface
FSMR01	MR33								No dig due to bedrock on surface
FSMR01	MR36	0-35	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR39	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR40								No dig due to bedrock on surface
NA	MR41	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR42								No dig due to bedrock on surface
NA	MR43	0-50	10YR 5/2	grayish brown	Sandy Loam			N	Bedrock
NA	MR44	0-50	10YR 5/2	grayish brown	Sandy Loam			N	Bedrock
NA	MR45	0-50	10YR 5/2	grayish brown	Sandy Loam			N	Bedrock
NA	MR46	0-50	10YR 5/2	grayish brown	Sandy Loam			N	Bedrock
NA	MR47	0-60	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR48	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR49	0-40	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR50	0-40	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR51	0-70	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR52	0-40	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR53	0-40	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR54	0-40	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR55	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR57	0-100	7.5YR 5/3	brown	Loamy Sand			N	Depth
NA	MR58	0-100	7.5YR 5/3	brown	Loamy Sand			N	Depth
NA	MR59	0-100	7.5YR 5/3	brown	Loamy Sand			N	Depth

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	MR60	0-40	7.5YR 4/6	strong brown	Loamy Sand			N	Bedrock
NA	MR61	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR62	0-40	7.5YR 4/6	strong brown	Loamy Sand			N	Bedrock
NA	MR63	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR64	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR65	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR66	0-30	10YR 5/3	brown	Loamy Sand			N	Bedrock
NA	MR67								No dig due to bedrock on surface
NA	MR68	0-25	10YR 5/3	brown	Loamy Sand			N	Bedrock
NA	MR69	0-50	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR71	0-5	10YR 5/3	brown	Loamy Sand			N	Bedrock
NA	MR72	0-30	10YR 5/3	brown	Loamy Sand			N	Bedrock
NA	MR73								Bedrock
NA	MR74	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR75	0-10	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR76	0-10	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR77	0-10	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR78	0-30	7.5YR 5/4	brown	Sandy Clay			N	Bedrock
NA	MR79	0-30	10YR 5/3	brown	Sandy Loam			N	Bedrock
NA	MR80								No dig due to bedrock on surface
NA	MR81	0-10	10YR 5/3	brown	Sandy Loam			N	Bedrock
41MI2	SS01	0-10	10YR 4/3	brown	Sandy Loam	>20%	Cobbles, Gravels, Large Rock Frags, Sandstone	N	Bedrock
41MI2	SS02	0-40	10YR 5/3	brown	Silty Clay Loam	5-10%	Gravels	N	Bedrock
		40-50	10YR 6/3	pale brown	Sandy Clay Loam	10-20%	Calcium Carbonate, Gravels	N	Bedrock
NA	SS03	0-25	10YR 4/3	brown	Sandy Clay Loam	>20%	Gravels, Pebbles	N	Bedrock
NA	SS04	0-10	10YR 4/3	brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	SS05	0-25	10YR 3/4	dark yellowish brown	Sandy Clay Loam	1-5%	Gravels	N	Bedrock
NA	SS06	0-25	10YR 3/4	dark yellowish brown	Sandy Clay Loam	1-5%	Gravels	N	Bedrock
NA	SS07	0-25	7.5YR 3/3	dark brown	Sandy Clay Loam	1-5%	Gravels	N	Compact Soil
		25-40	2.5YR 4/6	red	Sandy Clay Loam	>20%	Gravels, Mottles, Pebbles	N	Compact Soil

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	SS08	0-10	7.5YR 4/4	brown	Sandy Clay Loam	10-20%	Gravels, Large Rock Frags, Pebbles	N	Bedrock
NA	SS09	0-15	10YR 5/6	yellowish brown	Sandy Clay Loam	10-20%	Cobbles, Gravels, Large Rock Frags	N	Compact Soil
NA	SS10	0-25	7.5YR 3/4	dark brown	Silty Clay Loam	1-5%	Pebbles	N	Compact Soil
NA	SS11	0-25	7.5YR 3/4	dark brown	Silty Clay Loam	1-5%	Pebbles	N	Compact Soil
NA	SS12	0-20	7.5YR 3/4	dark brown	Sandy Clay Loam	1-5%		N	Compact Soil
		20-25	7.5YR 3/4	dark brown	Silty Clay Loam	1-5%	Mottles	N	Compact Soil
NA	SS13	0-10	7.5YR 3/3	dark brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
		10-20	10YR 4/3	brown	Sandy Clay Loam	1-5%	None	N	Compact Soil
NA	SS14	0-15	7.5YR 4/3	brown	Sandy Clay Loam	1-5%	Sandstone	N	Compact Soil
NA	SS15	0-25	7.5YR 4/3	brown	Sandy Clay Loam	1-5%	Sandstone	N	Compact Soil
NA	SS16	0-20	7.5YR 3/3	dark brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
		20-30	10YR 4/3	brown	Sandy Clay Loam	1-5%	None	N	Compact Soil
NA	SS17	0-40	10YR 3/4	dark yellowish brown	Sandy Clay	1-5%	Sandstone	N	Compact Soil
		40-50	10YR 3/4	dark yellowish brown	Sandy Clay	1-5%	Sandstone	N	Compact Soil
NA	SS18	0-15	10YR 4/4	dark yellowish brown	Sandy Loam	>20%	Large Rock Frags, Sandstone	N	Bedrock
NA	SS19	0-15	10YR 4/4	dark yellowish brown	Sandy Loam	>20%	Large Rock Frags, Sandstone	N	Bedrock
NA	SS20	0-35	10YR 4/3	brown	Sandy Loam	1-5%	None	N	Compact Soil
NA	SS21	0-10	10YR 4/3	brown	Sandy Clay Loam	>20%	Large Rock Frags	N	Bedrock
NA	SS22	0-35	7.5YR 3/4	dark brown	Sandy Loam	>20%	Gravels, Pebbles	N	Compact Soil
NA	SS23	0-20	10YR 3/4	dark yellowish brown	Sandy Loam	>20%	Gravels, Pebbles	N	Compact Soil
NA	SS24	0-10	10YR 3/4	dark yellowish brown	Sandy Loam	>20%	Gravels, Pebbles	N	Compact Soil
NA	SS25	0-15	10YR 3/4	dark yellowish brown	Sandy Clay Loam	10-20%	Gravels	N	Bedrock
NA	SS26	0-50	7.5YR 4/6	strong brown	Sandy Clay	1-5%	Gravels	N	Compact Soil
NA	SS27	0-30	10YR 3/4	dark yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS28	0-30	10YR 3/4	dark yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS29	0-30	10YR 3/4	dark yellowish brown	Sandy Loam	10-20%	Gravels, Pebbles	N	Compact Soil

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	SS30	0-30	10YR 3/4	dark yellowish brown	Sandy Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	SS31	0-25	10YR 3/4	dark yellowish brown	Sandy Loam	10-20%	Gravels, Pebbles	N	Compact Soil
NA	SS32	0-20	7.5YR 4/4	brown	Sandy Loam	1-5%	None	N	Compact Soil
NA	SS33	0-5	10YR 4/3	brown	Sandy Loam	5-10%	Gravels, Large Rock Frags	N	Bedrock
NA	SS34								No dig due to bedrock on surface
FSMR01	SS35	0-30	10YR 5/4	yellowish brown	Sand	1-5%	Pebbles	N	Bedrock
FSMR01	SS36	0-20	10YR 4/4	dark yellowish brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	SS37	0-35	10YR 5/4	yellowish brown	Sandy Loam	1-5%	None	N	Bedrock
NA	SS38	0-25	10YR 4/3	brown	Sandy Loam	1-5%	None	N	Compact Soil
		25-50	10YR 6/4	light yellowish brown	Sand	1-5%	None	N	Compact Soil
NA	SS39	0-30	10YR 5/4	yellowish brown	Sandy Loam	10-20%	Gravels	N	Bedrock
NA	SS40	0-15	10YR 4/4	dark yellowish brown	Sandy Loam	1-5%	Gravels	N	Bedrock
NA	SS41	0-60	10YR 5/4	yellowish brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
NA	SS42	0-70	10YR 5/4	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
		70-75	10YR 7/3	very pale brown	Sand	1-5%	None	N	Compact Soil
NA	SS43	0-85	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Depth
		85-100	7.5YR 5/6	strong brown	Sandy Loam	1-5%	None	N	Depth
NA	SS44	0-60	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS45	0-40	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS46	0-60	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS47	0-75	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS48	0-60	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS49	0-50	10YR 4/4	dark yellowish brown	Silt Loam	1-5%	Gravels, Mottles, Roots	N	Compact Soil
NA	SS50	0-10	10YR 4/3	brown	Sandy Loam	1-5%	Pebbles	N	Depth
		10-100	10YR 6/6	brownish yellow	Sand	1-5%	None	N	Depth
NA	SS51	0-10	10YR 4/3	brown	Sandy Loam	1-5%	Pebbles	N	Depth
		10-100	10YR 6/6	brownish yellow	Sand	1-5%	None	N	Depth
NA	SS52	0-60	10YR 4/6	dark yellowish brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS53	P-40	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Large Rock Frags	N	Compact Soil
NA	SS54	0-20	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Large Rock Frags	N	Bedrock

Appendix B - Shovel Test Results

Site Trinomial	ST ID	Depth (cmts)	Munsell	Soil Color	Soil Texture	Inclusion %	Inclusion	P=Positive N=Negative	Reason for Termination
NA	SS55	0-50	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Large Rock Frags	N	Compact Soil
NA	SS56	0-100	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Gravels, Large Rock Frags	N	Depth
NA	SS57	0-50	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Large Rock Frags	N	Compact Soil
NA	SS58	0-70	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Gravels	N	Compact Soil
		70-80	10YR 7/4	very pale brown	Sandy Loam	1-5%	None	N	Compact Soil
NA	SS59	0-20	7.5YR 5/6	strong brown	Sandy Loam	5-10%	Gravels	N	Bedrock
NA	SS60	0-15	7.5YR 5/6	strong brown	Sandy Loam	5-10%	Gravels	N	Bedrock
NA	SS61	0-20	7.5YR 5/6	strong brown	Sandy Loam	5-10%	Gravels	N	Bedrock
NA	SS62	0-30	10YR 4/3	brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS63	0-10	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Gravels	N	Bedrock
NA	SS64	0-30	10YR 4/3	brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS65	0-5	7.5YR 5/6	strong brown	Sandy Loam	1-5%	Large Rock Frags	N	Bedrock
NA	SS66	0-30	7.5YR 4/6	strong brown	Sandy Loam	1-5%	Pebbles	N	Compact Soil
NA	SS67	0-40	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Compact Soil
NA	SS68	0-100	7.5YR 5/6	strong brown	Sand	1-5%	Pebbles	N	Depth
NA	SS69	0-60	10YR 5/6	yellowish brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Compact Soil
NA	SS70	0-30	7.5YR 5/4	brown	Sandy Loam	1-5%	Gravels, Pebbles	N	Compact Soil
NA	SS71	0-25	7.5YR 5/4	brown	Sandy Loam	10-20%	Gravels, Large Rock Frags	N	Compact Soil
NA	SS72	0-20	7.5YR 5/4	brown	Sandy Loam	5-10%	Cobbles, Gravels	N	Bedrock
NA	SS73	0-20	7.5YR 5/4	brown	Sandy Loam	5-10%	Cobbles, Gravels	N	Bedrock
NA	SS74	0-20	7.5YR 5/4	brown	Sandy Loam	5-10%	Cobbles, Gravels	N	Bedrock

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT01	451SS73	1	0-17	7.5YR 4/3	Brown	Sandy Loam	Crumb-subangular, fine-medium, moderate, roots/rootlets 5-10%, worm burrows 3%, pinhole 5%	Clear, Slightly wavy	Plow zone, NCM
		2	17-41	7.5YR 5/4	Brown	Sandy Loam	Friable, subangular, fine-medium, moderate, rootlets - 5%, pinhole, snail shell fragments - <1%	Gradual, smooth	NCM
		3	41-109	7.5YR 5/4-5/6	Brown to strong brown	Sandy Loam	Friable, subangular, medium, moderate, rootlets - 5%, pinhole - 10%, worm - 3%	Clear, smooth	NCM
		4	109-220	7.5YR 6/4	Light brown	Fine Sandy Loam	Loose to friable, crumb to subangular, fine, weak, rootlets - 5%	Unobserved	NCM
		5	220-263	10YR 5/4-5/6	Yellowish brown	Sandy Loam	Friable to firm, subangular, medium, moderate, rootlets - 3-5%, pinhole - 5%, worm - 3%, white filaments <1%	Clear, Smooth	NCM
		6	263-335+	7.5YR 5/4-5/6	Brown to strong brown	Sandy Clay Loam	Friable to firm, subangular, medium to coarse, moderate, Pinhole - 10%, Rootlets - 10%, white filaments - 3%	Unobserved	Observed from above, NCM
BHT02 (column sampled)	41SS73	1	0-11	7.5YR 4/3	Brown	Sandy Loam	Friable, subangular, fine to medium, weak to moderate, rootlets - 5-10%, insect pinhole - 5%	Clear, Slightly wavy	NCM, contains positive column sample
		2	11-67	7.5YR 5/4-5/6	Brown to strong brown	Sandy Loam	Friable to firm, subangular, medium, moderate, rootlets - 10-15%, pinhole - 5%, worm - 5-10%	Clear, smooth	NCM
		3	67-218	7.5YR 5/4-5/6	Brown to strong brown	Sandy Clay Loam	Friable to Firm, subangular, medium, moderate, rootlets - 3-5%, pinhole - 5%, worm - 5-10%, white filaments (dendritic fungi) - 15%	Unobserved	~72 cmbs mussel shell fragment, ~70 cmbs 1 tertiary flake
		4	218-317	7.5YR 5/6-5/8	Strong brown	Sandy Clay Loam	Firm to Friable, subangular, medium to coarse, moderate, pinhole - 10%, worm - 2%, white filament - 0.5 mm >1% could be CaCo3, rootlets 3%	Unobserved	NCM

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT03 (column sampled)	41SS73	1	0-21	7.5YR 4/3-5/3	Brown	Sandy Loam	Friable, subangular, medium, moderate to strong, rootlets - 5-10%, pinholes - 15%, worm - 10%, white filaments dendritic - 5%	Clear, smooth	NCM, contains positive column sample
		2	12-183	7.5YR 5/3-5/4	Brown	Sandy Loam	Friable to Firm, angular parting to prismatic, medium, moderate, rootlets 10%, worm burrows 5-10%, pinhole - 15%, raddotus moreanus snail at 67 cmbs, white filaments dendritic 10-15%	Clear, smooth	1 flake at 51 cmbs, 1 flake at 32 cmbs? (translocated), NCM below 51 cmbs
		3	183-317+	7.5YR 5/6-5/8	Strong brown	Sandy Clay Loam	Friable to Firm, subangular, medium to coarse, moderate, pinholes - 10%, worm 2%, white filament 0.5 mm >1% could be CaCo3, rootlets 3%	Unobserved	NCM
BHT04	41SS73	1	0-35	7.5YR 4/3-5/3	Brown	Sandy Loam	Friable, subangular, medium, moderate to strong, rootlets - 5-10%, pinholes - 15%, worm - 10%, white filaments dendritic - 5%	Clear, smooth	NCM
		2	35-155	7.5YR 5/3-5/4	Brown	Sandy Loam	Friable to Firm, angular parting to prismatic, medium, moderate, rootlets 10%, worm burrows 5-10%, pinhole - 15%, raddotus moreanus snail at 67 cmbs, white filaments dendritic 10-15%	Clear, smooth	NCM
		3	155-180+	7.5YR 5/6-5/8	Strong brown	Sandy Clay Loam	Friable to Firm, subangular, medium to coarse, moderate, pinholes - 10%, worm 2%, white filament 0.5 mm >1% could be CaCo3, rootlets 3%	Unobserved	NCM

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT05	41SS73	1	0-36	7.5YR 6/4-6/6	Light brown to reddish yellow	Sandy Loam	Friable to firm, angular to subangular, fine to medium, moderate, roots to rootlets 15%, pinhole 20%, worm 10%, white filaments 1% (fungi?)	Abrupt, smooth	Root zone 0-9 cmbs, Disturbed fill?, Localized platy structure 11-16 cmbs
		2	36-61	7.5YR 4/2-4/3	Brown	Sandy Clay Loam	Firm, angular blocky, medium, moderate to strong, rootlets 20%, pinhole 20%, worm 5-10%, white filaments 2% (fungi?)	Clear, smooth	NCM
		3	61-146	7.5YR 4/3-4/4	Brown	Clay Loam	Firm, angular blocky, medium, moderate to strong, rootlets 5%, pinhole 15-20%, worm 5%, white filaments 2% (fungi?)	Clear, smooth	NCM
		4	146-158+	7.5YR 4/6-4/4	Brown	Clay Loam	Firm, angular blocky, medium, moderate, pinhole 10%, worm 3%, white filaments 1% (fungi?), rootlets 3%	Unobserved	NCM
BHT06	41SS73	1	0-36	7.5YR 5/6	Strong brown	Sandy Loam	Friable to firm, subangular, fine to medium, weak to moderate, roots and rootlets 20-30%, pinhole 10%, worm 10%, white filaments 3% (fungi?)	Abrupt, slightly wavy	0-21 cmbs: compressed platy strat, edge of corn field
		2	36-170	7.5YR 3/2-3/3	Brown	Clay Loam	Firm, angular blocky, medium to coarse, moderate to strong, pinhole 20%, worm 5%, rootlets 10%, white filaments 3% primarily near surface (fungi?), subtle SS 2-3 cmbs 5%	Unobserved	NCM
		3	170-190	7.5YR 4/3-4/4	Brown	Clay Loam	Firm to extra firm, angular, medium to coarse, moderate, pinhole 5%, possible snail fragments <1%, rootlets 3%	Unobserved	NCM
		4	190-263+	7.5YR 5/4	Brown	Sandy Clay Loam	Firm to Extra Firm, angular, medium to coarse, moderate, rootlets 3-5%, pinhole 3%	Unobserved	NCM
BHT07	41SS73	1	0-18	7.5YR 4/3	Brown	Clay Loam	Firm to Friable, angular, fine to medium, moderate, roots and rootlets 15-20%, pinhole 5-10%, worm 5%	Clear, Slightly wavy	Root zone 0-9 cmbs, NCM
		2	18-88	7.5YR 3/3	Dark Brown	Clay Loam	Firm to Extra firm, angular blocky, medium, moderate, rootlets 10%, pinhole 5%, worm 3%, white filaments 10-15% (fungi?)	Abrupt, smooth	Mussel shell at 75-80 cmbs, bedrock at base (88 cmbs).

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT08	41SS74	1	0-18	7.5YR 3/2-3/3	Dark Brown	Sandy Clay Loam	Loose to friable, crumb to subangular, fine, weak, roots and rootlets 10-15%, sandstone pebbles 3%, pinhole 15%, worm 5%	Abrupt, smooth	18-19 cmbs bedrock
BHT09	41SS74	1	0-8	7.5YR 4/4	Brown	Sandy Loam	Friable, crumb to subangular, fine, weak, roots and rootlets 20%, pinhole 15%, worm 5%, snail shell fragment 1%	Clear, smooth	NCM
		2	8-37	7.5YR 4/2-4/3	Brown	Sandy Clay Loam	Friable to slightly firm, subangular, fine to medium, moderate, rootlets 15-20%, pinhole 15%, worm 5%, white filaments 3% (fungi?), subrounded sandstone pebbles 1%	Clear, smooth	NCM
		3	37-76	7.5YR 5/4-5/6	Strong brown	Sandy Loam	Friable, subangular, medium, moderate, rootlets 10%, pinhole 15%, worm 5%, subrounded sandstone pebbles 1%	Abrupt, irregular	NCM
		4	76-107+	7.5YR 6/4-6/6	Reddish Yellow	Sandy Loam	Friable to firm, rootlets 5%, crumb to subangular, fine to medium, weak, pinholes 5-10%	Unobserved	NCM, bedrock 80%, sandstone matrix discussion is from cracks, matrix is degrading sandstone
BHT10	41SS73	1	0-11	7.5YR 6/4-6/6	Reddish Yellow	Sandy Loam	rootlets 15%, pinhole 15-20%, worm 3%, pebbles 1% (subrounded quartz river gravels)	Clear, smooth	Primarily root zone slightly compressed
		2	11-119	7.5YR 5/4	Brown	Sandy Clay Loam	Friable to firm, angular to prismatic, medium, moderate to strong, insect galleries 5%, pinhole 10%, rootlets 10%, worm 5%, white filaments 0.1-0.3 mm 15%	Gradual to clear, smooth	NCM
		3	119-207	7.5YR 5/6-6/6	Strong brown	Sandy Loam	Friable to firm, angular, fine to medium, moderate, rootlets 5%, pinhole 5%, white filaments 10% (dendritic fungi?), worm 3%	Gradual, smooth	NCM
		4	207-294+	7.5YR 6/6	Reddish Yellow	Clay Loam	Firm, angular blocky, medium to coarse, moderate, rootlets 3%, pinhole 15%, worm 3%	Unobserved	NCM

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT11	41SS73	1	0-44	7.5YR 4/2-4/3	Dark Brown	Fine Sandy Loam	Loose to friable, crumb to subangular, fine, weak, rootlets 25%, pinholes 20%, worm 15%	Gradual, smooth	root zone: 0-11 cmbs, NCM
		2	44-89	7.5YR 4/3-5/3	Brown	Sandy Loam	Friable to firm, crumb to subangular, fine to medium, weak to moderate, rootlets 10-15%, pinhole 10%, worm 5%, white filaments <1% (fungi?)	Gradual to clear, smooth	NCM
		3	89-149+	7.5YR 5/4-5/6	Brown to strong brown	Sandy Clay Loam	Friable to firm, angular, fine to medium, moderate, rootlets 5%, pinhole 5%, white filaments 3% (dendritic fungi?)	Unobserved	NCM
BHT12 (column sampled)	41SS173	1	0-17	7.5YR 4/3	Brown	Sandy Loam	Loose to friable, crumb to subangular, fine, weak, rootlets 25%, pinholes 20%, worm 15%, road gravels	Clear, smooth	Amber glass fragment, Column sample excavated in west wall, NCM
		2	17-128	7.5YR 5/4	Brown	Sandy Clay Loam	Firm, angular, medium to coarse, moderate, rootlets 15%, pinhole 20%, worm 5-10%, white filaments 20% (fungi?)	Gradual to clear, smooth	Mussel shell at 70 cmbs
		3	128-200	7.5YR 5/4	Brown	Sandy Clay Loam	Friable to firm, subangular, fine to medium, weak to moderate, rootlets 3%, pinhole 10%, white filaments 15% (fungi?)	Gradual, smooth	Flake at 134 cmbs
		4	200-303+	5YR 5/8	Yellowish red	Sandy Clay Loam	Firm, subangular, coarse, moderate, rootlets 3%, pinholes 15%, worm 1-2%, white filaments 1% (fungi) 0.1 mm	Unobserved	NCM
BHT13	41SS73	1	0-19	7.5YR 4/3-5/3	Brown	Sandy Loam	Loose to friable, subangular, fine to medium, weak to moderate, roots and rootlets 20%, pinhole 10%, worm 5%	Abrupt, irregular	NCM
		2	19-82	7.5YR 5/4	Brown	Sandy Loam	Loose to friable, crumb to subangular, fine to medium, weak, rootlets 15%, pinhole 10%, white filaments 3% (fungi?)	Clear, smooth	NCM
		3	82-133	7.5YR 6/4	Light Brown	Sandy Loam	Friable to firm, subangular to angular, medium, moderate, rootlets 5%, pinhole 5%, white filaments 1% (fungi?)	Clear, smooth	NCM
		4	133-152+	7.5YR 6/4-6/6	Light Brown	Sandy Clay Loam	Extra firm, angular, medium, moderate, rootlets 5%, pinhole 5%, white filaments (CaCo3?) 3-5%	Unobserved	NCM

Appendix C – BHT Results

BHT	Trinomial	Strat	Depth (cmbs)	Munsell	Soil Color	Soil Texture	Horizon Discussion	Lower boundary	Comments*
BHT14	41SS73	1	0-56	7.5YR 4/2-4/3	Brown	Clay Loam	Friable, crumb to subangular, fine, weak, roots and rootlets 20%, pinhole 10%, worm 5%, rare subangular gravel 1%	Abrupt, slightly wavy	Root zone 0-11, NCM
		2	56-138	7.5YR 4/3-4/4	Brown	Sandy Loam	Friable, crumb to subangular, fine to medium, weak to moderate, rootlets and roots 10%, pinhole 10-15%, worm 5%	Abrupt, smooth	NCM
		3	138-142	7.5YR 4/4-4/6	Brown	Sandy Clay Loam	Friable, angular, fine to medium, weak, rootlets 3%, pinhole 10%, white filament <1% (fungi?)	Abrupt, slightly irregular	Flood event? Heavily mottled with strat 4 matrix in insect burrows
		4	142-307+	7.5YR 5/3-5/4	Brown	Sandy Clay Loam	Friable, subangular to angular, fine to medium, moderate, rootlets 5%, pinhole 5-10%	Unobserved	
BHT15	N/A	1	0-21	10YR 5/3	Brown	Sandy Loam	Friable to firm, crumb to subangular, fine to medium, weak to moderate, rootlets 5%, worm 3%	Clear, smooth	NCM
		2	21-36	10YR 4/3	Brown	Clay Loam	Firm, subangular, medium, moderate, rootlets 5%, pinhole 3%, pebbles subrounded 1%	Abrupt, irregular	NCM
		3	36-55+	10YR 4/3	Brown	Clay Loam	Firm, subangular, medium, moderate, CaCo3 disturbance 7.5YR 5/4 clay loam: Firm, angular, medium, moderate, Rootlets 5%, pinhole 3%, CaCo3 nodules, 5 mm-1 cm 10%, rootlets 5%, pinhole 3%, pebbles subrounded 1%	Abrupt, irregular	NCM, encountered water line at 55 cmbs - no damage

* NCM indicates no cultural materials

Appendix D - Survey Status

Parcel #(s)	Survey Status	Recommendation
2	Survey Complete	No further work
3	No Access	Survey recommended
4	Survey Complete	No further work
5	Survey Complete	No further work
6	Survey Complete	No further work
7	Survey Complete	No further work
8	Survey Complete	No further work
9	Survey Complete	No further work
10	No Access	No further work
11	Survey Complete	No further work
12	Survey Complete	No further work
13	No Access	Survey recommended
14	Survey Complete	No further work
14	Survey Complete	No further work
15	Survey Complete	No further work
16	Survey Complete	No further work
18	Survey Complete	No further work
19	Survey Complete	No further work
19	No Access	Survey recommended
20	Survey Complete	No further work
21	Survey Complete	No further work
22	Survey Complete	No further work
23	Survey Complete	No further work
24	Survey Complete	No further work
25	Survey Complete	No further work
26	No Access	No further work
27	Survey Complete	No further work
28	Survey Complete	No further work
29	No Access	Survey recommended
30	Survey Complete	No further work
31	Survey Complete	No further work
32	No Access	Survey recommended
33	No Access	Survey recommended
34	Survey Complete	No further work
35	Survey Complete	No further work
36	No Access	Survey recommended
37	Survey Complete	No further work
38	Survey Complete	No further work
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40	Survey Complete	No further work
41	Survey Complete	No further work
42	No Access	No further work
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45	Survey Complete	No further work
46	Survey Complete	No further work
47	Survey Complete	No further work
48	Survey Complete	No further work
49	Survey Complete	No further work
50	No Access	No further work
51	No Access	No further work
52	No Access	No further work
53	Survey Complete	No further work
54	Survey Complete	No further work

Appendix D - Survey Status

Parcel #(s)	Survey Status	Recommendation
55	Survey Complete	No further work
56	Survey Complete	No further work
57	Survey Complete	No further work
59	Survey Complete	No further work
60	No Access	Survey recommended
61	no access	Survey recommended
62	No Access	Survey recommended
63	Survey Complete	No further work
64	Survey Complete	No further work
65	Survey Complete	No further work
66	Survey Complete	No further work
67	Survey Complete	No further work
68	Survey Complete	No further work
69	Survey Complete	No further work
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72	Survey Complete	No further work
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74	Survey Complete	No further work
75	Survey Complete	No further work
76	Survey Complete	No further work
77	Survey Complete	No further work
80	No Access	No further work
81	No Access	Survey recommended
82	Survey Complete	No further work
84	Survey Complete	No further work
85	Survey Complete	No further work
86	Survey Complete	No further work
87	Survey Complete	No further work
88	Survey Complete	No further work
89	No Access	Survey recommended
90	Survey Complete	No further work
91	Survey Complete	No further work
92	Survey Complete	No further work

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



SWCA Environmental Consultants
4407 Monterey Oaks Boulevard
Building 1, Suite 110
Austin, Texas 78749
www.swca.com