Volume 2020 Article 126

2020

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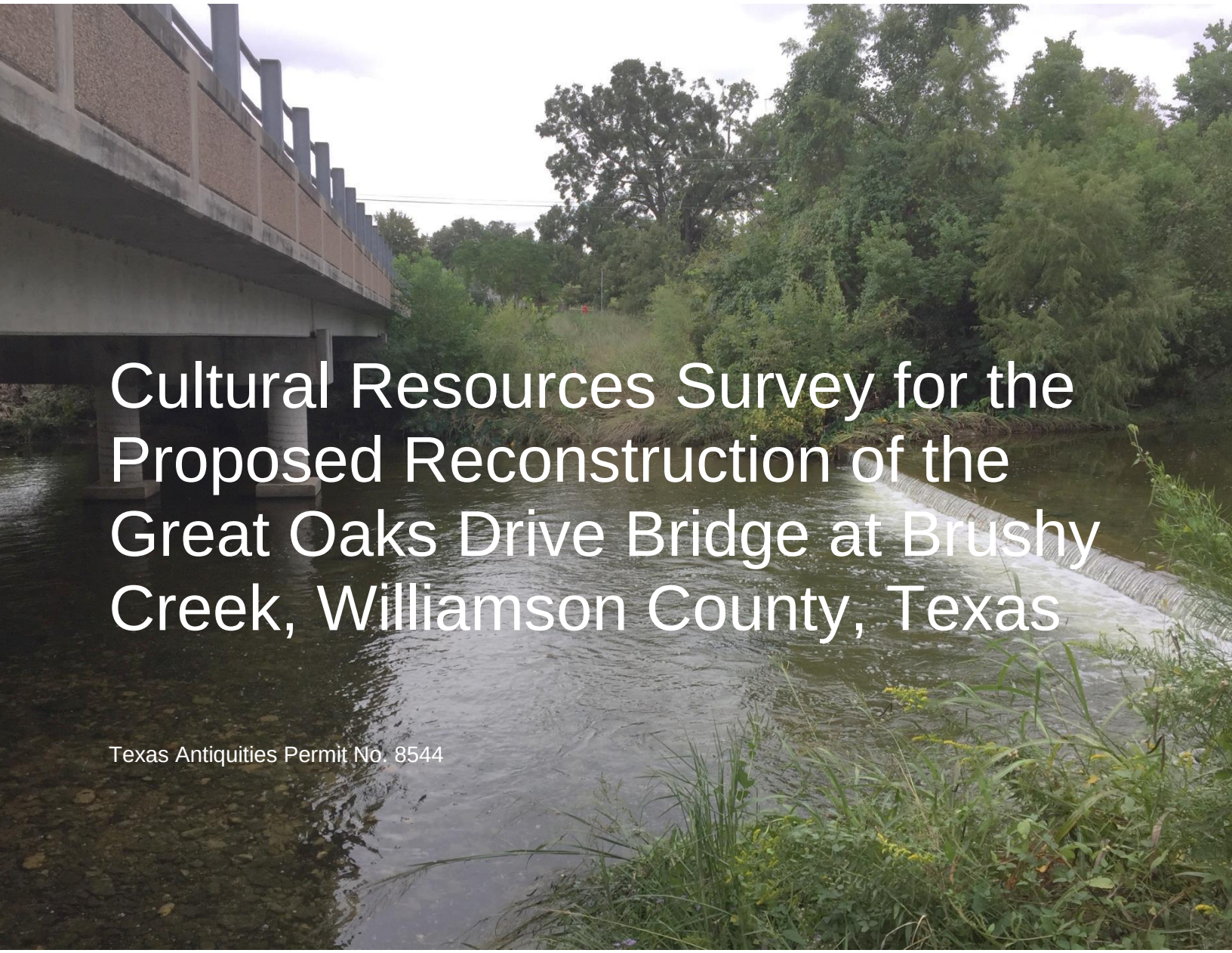

Cultural Resources Survey for the Proposed Reconstruction of the Great Oaks Drive Bridge at Brushy Creek, Williamson County, Texas

Texas Antiquities Permit No. 8544

Cultural Resources Survey for the Proposed Reconstruction of the Great Oaks Drive Bridge at Brushy Creek, Williamson County, Texas

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Texas Antiquities Permit No. 8544

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Management Summary

On behalf of Williamson County, AECOM was contracted by HNTB Corporation to conduct a cultural resources survey for the proposed reconstruction of the Great Oaks Drive Bridge at Brushy Creek, located in Williamson County, Texas. The purpose of this investigation was to survey and inventory archeological and historic resources and to evaluate the potential of any such resources for inclusion in the National Register of Historic Places (NRHP) and for designation as State Antiquities Landmarks (SALs). AECOM conducted the cultural resources survey on September 27, 2018, under Texas Antiquities Permit No. 8544. The archeological Area of Potential Effect (APE) consisted of a 13-acre environmental study area. The historic resources APE included the environmental study area plus a 150-foot buffer.

The archeological survey was completed using a combination of 100 percent pedestrian survey, augmented by the excavation of 26 shovel tests. No archeological materials were identified during the survey. Field observations included imbricated gravel layers within the narrow floodplain soils, reworked sediments, and bedrock scouring along the channel alignment that is indicative of a floodplain subjected to periodic high-energy flood discharge. Extensive disturbances such as buried utilities (natural gas line, water, electric) and mechanized impacts were also noted in the roadway right-of-way. Given these observations and the absence of sites identified during the survey, the project is not likely to contain deeply buried and intact cultural deposits, and no backhoe trenching was deemed necessary. During the historic resources reconnaissance survey, no historic resources (buildings, structures, objects, sites, or potential districts) were identified within the historic resources APE.

Based on the foregoing observations and survey results, the proposed project should have No Effect on historic properties or SALs, and no further cultural resources investigations are recommended. Should the dimensions of the project area change, additional archeological and/or historical investigations may be warranted.

In the event that any unmarked prehistoric or historic human remains or burials are encountered during construction, the area of the remains is considered a cemetery under current Texas law, and all construction activities must cease immediately so as to avoid impacting the remains. The THC must be notified immediately by contacting the History Programs Division at (512) 463-5853 and the Archeology Division at (512) 463-6096. All cemeteries are protected under State law and cannot be disturbed. Further protection is provided in Section 28.03(f) of the Texas Penal Code, which provides that intentional damage or destruction inflicted on a human burial site is a state jail felony.

1 Introduction

On behalf of Williamson County (County), Texas, AECOM was contracted by HNTB Corporation to conduct a cultural resources survey for the proposed reconstruction and realignment of the Great Oaks Drive Bridge at Brushy Creek, located in in Williamson County, Texas (**Figure 1**). The project involves modifications to sections of roadways intersecting Great Oaks Drive, including Brushy Creek Road/Hairy Man Road to the south of the bridge, and Oak Ridge Drive to the north. Our current understanding is that the existing bridge will be removed, and a new bridge constructed approximately 34 feet (ft) and widened from 32.5 ft to 76 ft to accommodate future traffic needs and mitigate flood risk (**Appendix A**). The realignment of the bridge to the east (downstream in Brushy Creek) will position the roadway to more closely align with a disconnected section of Great Oaks Drive to the north. This realignment would allow the two roadway sections to potentially be connected as part of a separate project in the future. The following additional improvements are proposed to take place within a 13-acre environmental study area:

- Add left and right turn lanes on northbound Great Oaks Drive to facilitate north to west and north to east traffic movements;
- Add left turn lane on Hairy Man Road (westbound) to facilitate west to south movements;
- Add left and right turn lanes on eastbound Brushy Creek Road to facilitate east to north and east to south movements

Under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and in accordance with Advisory Council on Historic Preservation regulations pertaining to the protection of historic properties (36 Code of Federal Regulations [CFR] 800), prior to permit issuance or funding, federal agencies are required to locate, evaluate, and assess the effects of their undertaking on historic properties. Historic properties are defined as those properties that are included in, or eligible for inclusion in the National Register of Historic Places (NRHP). It is anticipated that United States Army Corp of Engineers-Fort Worth District (USACE Fort Worth District) permitting would be required for this project. As such, the project would constitute a federal undertaking subject to review requirements under Section 106. This review process generally proceeds in four steps: 1) initiating early coordination with the State Historic Preservation Officer (formally known in Texas as the Texas Historical Commission [THC]) and other interested parties; 2) identification of historic properties; 3) assessment of the effects the project will have on historic properties; and 4) resolution of any adverse effects.

Because the project is being developed by the County, which is a political sub-entity of the State of Texas, it falls within the purview of the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191). The Antiquities Code requires the THC to review any actions that have the potential to disturb prehistoric or historic sites within the public domain of the State of Texas. Regulations pertaining to the code can be found within Title 13 Part 2, Chapter 26 of the Texas Administrative Code (TAC), Rules of Practice and Procedure. The THC may require archeological investigations to take place in all potentially affected areas in order to identify potential impacts to cultural resources. Such investigations are regulated through a permitting process, which establishes the terms under which work may proceed. Thus, prior to any such fieldwork, an Antiquities Permit from the THC is required.

The APE for archeological resources was defined by the spatial limits of potential ground disturbing activities and encompasses the limits of existing right-of-way (ROW), all newly-acquired ROW, as well as any permanent and temporary easements, staging areas, utility relocations, potential drill shaft locations, and project-specific locations that may be subsequently identified. During the initial coordination of this project with THC on October 24, 2017, current design data included an environmental study of approximately five acres. This area was subsequently enlarged to the current configuration, which encompasses a total of 13 acres (see **Figure 1**). Therefore, the archeological Area of Potential Effect (APE) was determined to consist of the 13-acre environmental study area. The depth of potential impacts is currently unknown, though the majority will likely be limited to near-surface cutting and filling near the existing grade. In addition, an indeterminate number of 36-inch drilled shafts for bridge support will also be excavated as much as 30 ft in depth. The APE established for historic resources extends for 150 ft beyond the boundary of the 13-acre environmental study area. In addition, a historic resources study area was also established for a distance of 1,300 ft beyond the environmental study area, and this area was used for developing the historic context of the broader area (see **Figure 1**).

AECOM conducted an intensive archeological survey of the project on September 27, 2018, under Texas Antiquities Permit No. 8544. Dr. Steve Ahr served as Principal Investigator/Project Archeologist. In addition, Beth Reed served as Project Architectural Historian and conducted the historic resources reconnaissance survey. Both individuals meet or exceed the Secretary of the Interior's Professional Qualification Standards.

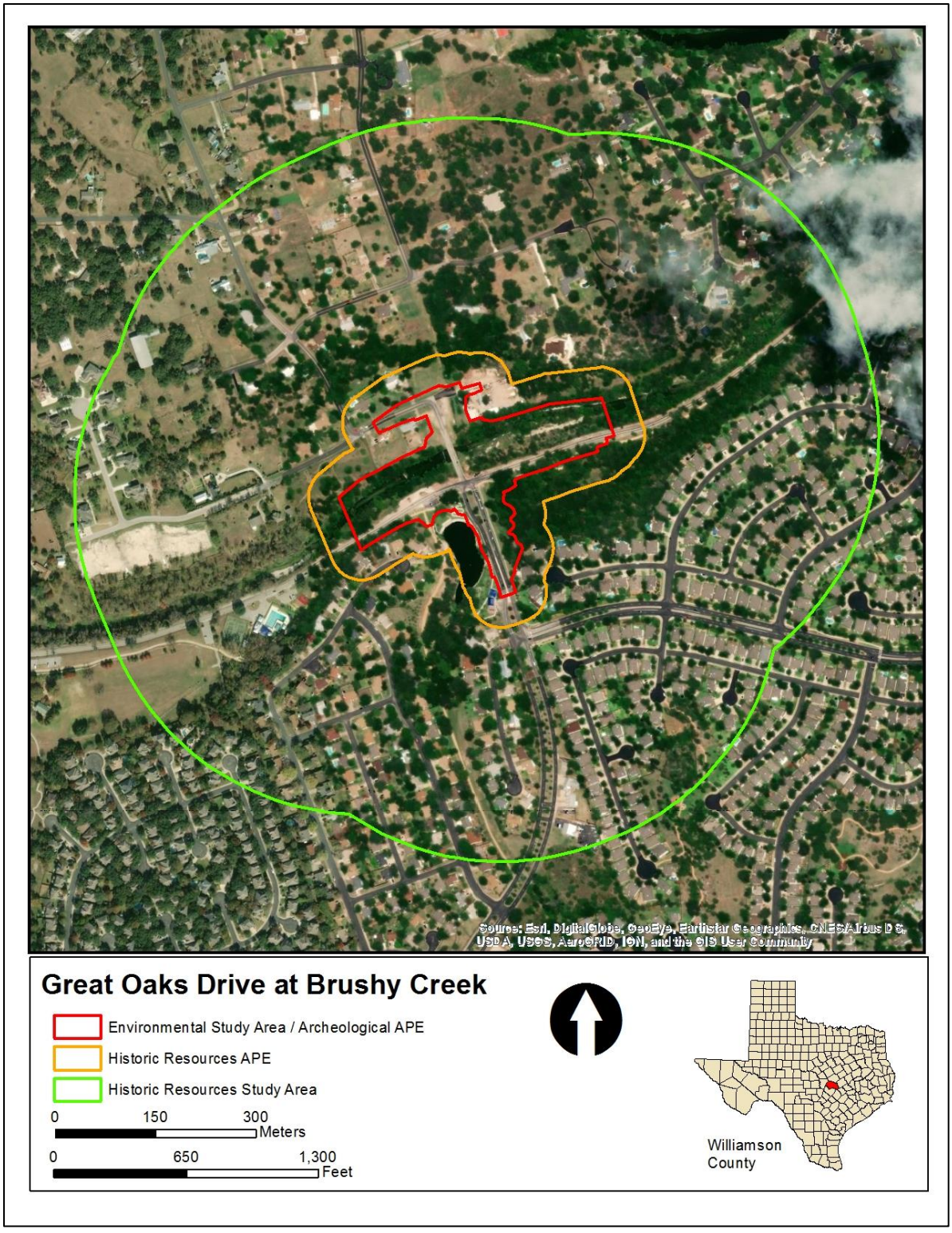

Figure 1. Project location in Williamson County, Texas.

2 Environmental Setting

2.1 Physiography

The project is located near the convergence of the Blackland Prairie and the Edwards Plateau physiographic regions. The Blackland Prairie, to the east, contain deep, black clay soils, while the Edwards Plateau has shallow soils covering limestone bedrock. The Balcones Escarpment allows stream erosion along the natural faults, forming the Hill Country of Central Texas (Fenneman 1938).

2.2 Topography

The project area is located within the United States Geological Survey (USGS) Round Rock topographic quadrangle in Williamson County, Texas. The center of the APE is traversed east to west by Brushy Creek, with a low-water flow elevation of approximately 740 ft above mean sea level (amsl). The flanking uplands to the north and south of Brushy Creek rise to an approximate elevation of 850 ft amsl. Outside the channel, alluvial floodplain and terrace landforms range from about 750 to 770 ft amsl.

2.3 Geology and Soils

An evaluation of the natural conditions affecting the integrity for archeological sites included an examination of the geologic and pedologic settings. The APE is underlain by Lower Cretaceous Edwards Limestone (Ked), which contains limestone, dolomite, and chert. The limestone is fine grained, massive to thin bedded, and medium gray to grayish brown. Chert nodules are common throughout this formation (Bureau of Economic Geology [BEG] 1974). Holocene-age alluvium (Qal) is mapped within the Brushy Creek channel and adjacent low terraces and consist of clay, silt, sand, and gravel (BEG 1974).

Soils in the APE are shown in **Figure 2** and summarized in **Table 1**. The Eckrant-Rock outcrop association, 1 to 10 percent slopes (ErE), makes up 27.5 percent of the APE and is found on the uplands on the south side of Brushy Creek. The Eckrant soils consist of well-drained, moderately slowly permeable soils that are very shallow (<30 centimeters [cm]) over limestone bedrock, exhibiting an A1-A2-R horizon sequence. These nearly level to very steep soils formed in residuum weathered from limestone, and as such, exhibit no potential to contain buried and intact cultural materials. These soils closely parallel the Brushy Creek channel and contain 15 to 20 percent limestone cobbles and gravels within the clayey matrix (Natural Resources Conservation Service [NRCS 2018]).

Oakalla soils, 0 to 1 percent slopes (OC), make up 57.4 percent of the APE and are described as channeled and frequently flooded. The Oakalla series consist of very deep well drained soils that formed in loamy alluvium. These soils are on nearly level to gently sloping floodplains and exhibit an Ap-Ak1-Ak2-Bk1-Bk2 horizon sequence (NRCS 2018). Based on these characteristics, these soils would tend to exhibit high integrity potential for buried and intact archeological materials.

Queeny clay loam soils, 1 to 5 percent slopes (QuC), comprise nearly four percent of the APE and are found on the north side of Brushy Creek. This series consist of very shallow (<30 cm) and well drained soils over a petrocalcic horizon. These soils are found on ancient terrace surfaces that formed in loamy sediments over sand and gravel deposits. They exhibit a generalized A-Bkkm-Ck-2C horizon sequence. Soil series data suggest the depths to the petrocalcic (indurated) horizon are as little as nine inches below the surface (NRCS 2018). Given the shallow and ancient nature of these soils, they exhibit low archeological potential.

Sunev silty clay loam, 1 to 3 percent slopes (SuB), comprises 11.2 percent of the APE and these soils are found on alluvial terraces located on the north side of Brushy Creek (NRCS 2018). These soils consist of very deep, well drained soils that formed in loamy alluvium, and exhibit a generalized Ap-A-Bk1-Bk2-Bk3 horizon sequence. Based on the topographic and geomorphic position of these soils, they likely exhibit low archeological potential.

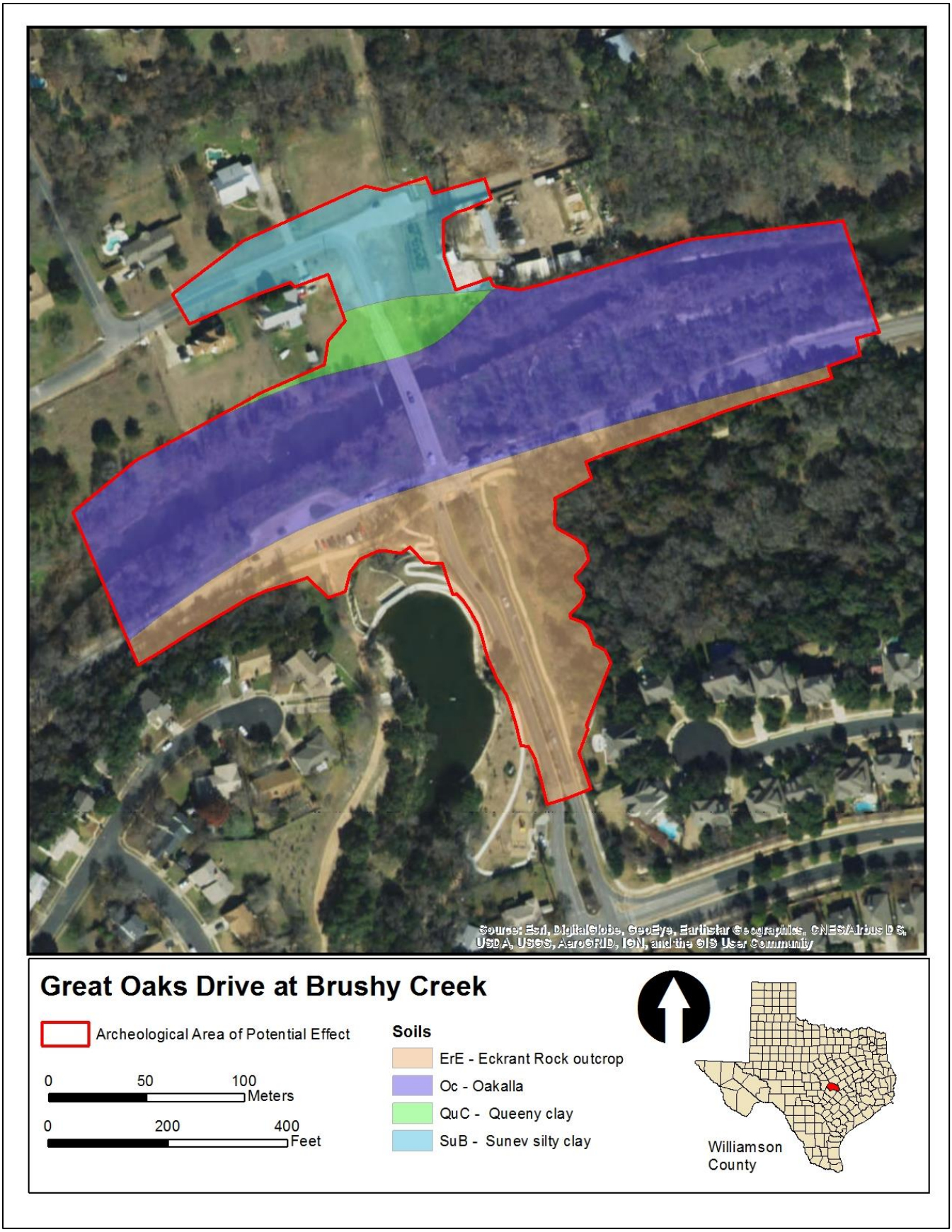

Figure 2. Soils within the APE.

Table 1. Soils and archeological integrity potential within the APE.

Map Unit Symbol	Map Unit Name	Acres	Percent of APE	Parent Material	Setting	Archeological Integrity Potential
ErE	Eckrant-Rock outcrop association, 1 to 10 percent slopes	3.6	27.5	Residuum weathered from limestone	Ridges, footslope, summit, shoulder	Low
Oc	Oakalla soils, 0 to 1 percent slopes, channeled, frequently flooded	7.6	57.4	Loamy alluvium	Floodplains	High
QuC	Queeny clay loam, 1 to 5 percent slopes	0.5	3.9	Gravelly alluvium	Paleoterraces	Low
SuB	Sunev silty clay loam, 1 to 3 percent slopes	1.5	11.2	Loamy alluvium	Terraces	Low

Source: NRCS (2018)

2.4 Potential Archeological Liability Mapping

Based on a review of Texas Department of Transportation's (TxDOT's) Austin District Hybrid Potential Archeological Liability Mapping (Austin-HPALM) model (Abbott and Pletka 2015), the APE exhibits 62 percent high integrity potential, and 20 percent moderate integrity potential, for intact sites at depths deeper than one meter (m). Approximately 25 percent of the APE exhibits moderate shallow potential, and 23 percent exhibits low shallow potential (**Table 2; Figure 3**). The integrity potential of the APE was further refined during the field survey.

Table 2. HPALM archeological integrity potential in APE.

Integrity Value	Description	Percent of Study Area
1	Low Potential	16
2	Low Shallow Potential, Moderate Potential at Depth (>1 m)	7
4	Moderate Shallow Potential, Low Potential at Depth	2
5	Moderate Potential	13
6	Moderate Shallow Potential, High Potential at Depth	12
9	High Potential	50

Source: TxDOT (2015)

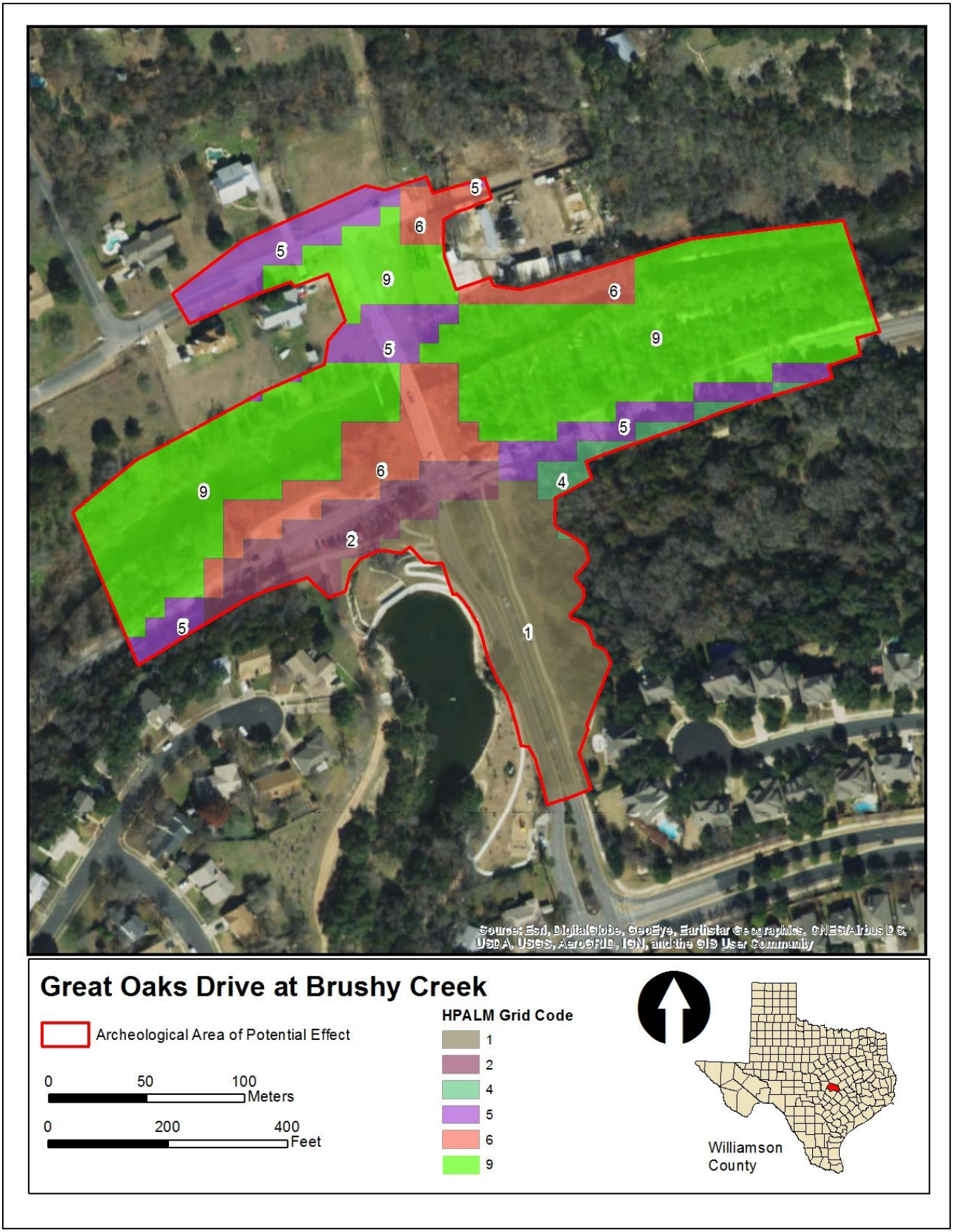

Figure 3. HPALM data within the APE.

3 Cultural Background and Previous Investigations

3.1 Cultural Background

The following sections provide a brief overview of the prehistoric cultural history of the area and are based largely on previous work conducted by Prewitt (1981), Johnson and Goode (1994), and Collins (1995).

3.1.1 Paleoindian Period (11,500 – 8800 Years Before Present [B.P.])

The conventional interpretation of the Paleoindian Period is that it ranges from approximately 11,500 to 8800 B.P. and represents the earliest known human occupation in North America. Two main Paleoindian periods have been extensively documented and include Early Paleoindian, represented largely by Clovis points, and Late Paleoindian, represented by Folsom points. Early Paleoindian Clovis cultures were characterized by highly-mobile big game hunters consisting of small bands. Notable cases of these occupations within the Central Texas region have been reported at the Gault Site (41BL323) in Bell County, the Buttermilk Creek Site in Williamson County, the Kincaid Rockshelter (41UV2) on the southern margin of the Edwards Plateau in Uvalde County, and the Pavo Real Site (41BX52) in Bexar County near San Antonio. The Late Paleoindian Period is represented by Folsom artifacts, which appear to have been more closely aligned to hunting bison and included a much more diverse subsistence base than the preceding period (Collins 1995). During this Late Pleistocene-Early Holocene transition, climate is thought to have been much cooler and wetter, though it was becoming increasingly dry and warm. Small, isolated occurrences of Late Paleoindian sites are common in upland settings in Central Texas, while larger, deeply-buried, and intact occupations are less well documented. Those sites that weren't eroded away during Late Pleistocene stream erosional events are likely buried deeply in alluvial deposits and still await detection. Those that have been found and fully-investigated include the Wilson-Leonard Site (41WM235) in Williamson County and suggest a much wider range of subsistence activities than previously thought (Collins 1998). Recent investigations at the Buttermilk Creek Site and the Gault Site in Central Texas are providing new insights into potential pre-Clovis occupations that date as far back as 15,500 B.P. (Collins and Brown 2000; Waters et al. 2011). These discoveries are challenging long-held notions about the timing of the entrance of humans into North America and Texas.

3.1.2 Archaic Period (8800 – 1300 B.P.)

The Archaic Period in Central Texas is subdivided into Early, Middle, and Late periods (Collins 1995).

3.1.2.1 Early Archaic (8800 - 6000 B.P.)

The Early Archaic Period is one of increasingly warmer and drier climate conditions than had existed previously, and one in which subsistence strategies were necessarily broadened to include a much more diverse array of plant and animal resources. Sites from this period tend to be small and contain diverse tool assemblages. Consequently, greater hunter-gatherer mobility and lower population densities are attributed to this period (Prewitt 1981). Increased reliance on floral remains and hot-rock cooking technology and more diverse lithic technology are also indicated, with sites tending to be concentrated along the eastern and southern Edwards Plateau margins (Black 1995; Johnson and Goode 1994). In South Texas, a greater emphasis on gathering and exploitation of riparian environments is observed (Black 1986), while in Central Texas, burned rock middens begin to emerge (Hester 1991; Prewitt 1981). Diagnostic projectile points from this time include Gower, Hoxie, Wells, Bell, Andice, Uvalde, and Martindale types (Hester 1980; Turner and Hester 1985).

3.1.2.2 Middle Archaic (6000 - 4000 B.P.)

The Middle Archaic Period is generally recognized as a period of population increase, with a concomitant increase in the number and diversity of archeological site types (Collins 1995; Hall et al. 1986; Turner and Hester 1985). Climate during this time in Central Texas is believed to have been significantly warmer and drier than today as a result of the mid-Holocene Altithermal. Climate conditions, coupled with a reduction in bison populations, resulted in greater exploitation of richer environments such as natural springs. The number and sizes of campsites and burned rock middens increased during this period, though there was still a strong reliance on game hunting (Prewitt 1981; Hall et al. 1986). Greater use of cemeteries also occurred across the region during this time (Bement 1994; Taylor and Highley 1995). Common diagnostic projectile points for this period include Carrollton and Nolan types (Collins 1995; Turner and Hester 1985).

3.1.2.3 Late Archaic (4000 - 1300 B.P.)

During the Late Archaic Period, climate is thought to have returned to cooler and moister conditions (Collins 1995). Bison returned in greater numbers than had been present during the Middle Archaic Period, and population densities are thought to have increased substantially (Prewitt 1981). Burned-rock middens are currently believed to have increased in number during the Late Archaic and are represented by abundant fire-cracked rock features, such as hearths and earth ovens. Use of cemeteries continued from the previous period, and defined territories and trade networks emerged (Collins 1995; Hall 1981; Hester 1995; Story 1985). Diagnostic projectile points for this period include Pedernales, Bulverde, and Marcos types, though the relatively low densities of such points in site assemblages may indicate that hunting was of lesser importance than gathering (Prewitt 1981).

3.1.3 Late Prehistoric Period (1300 – 300 B.P.)

The Late Prehistoric Period in Central Texas is marked by the introduction of small, stemmed projectile points for use with the bow and arrow. Two main periods are recognized in Central and South Texas and include the Austin and Toyah Phases (Collins 1995; Hester 1995).

3.1.3.1 Austin Phase (1300 - 650 B.P.)

The Austin Phase is marked by the introduction of the bow and arrow. This period is represented by diagnostic Scallorn arrow points and other side-notched points (Black 1989). Other common artifacts at Austin Phase sites include bifaces, gouges, scrapers, and grinding stones; cemeteries continued to be used as well. Subsistence was broad-based and included hunting deer, exploiting freshwater fish resources, and gathering (Collins 1995; Prewitt 1981; Hester 1995).

3.1.3.2 Toyah Phase (650 - 300 B.P.)

The Toyah Phase is perhaps the better known of the two Late Prehistoric Periods. It is distinct from the preceding Austin Phase and is marked by the introduction of contracting-stem Perdiz arrow points, bone-tempered pottery, beveled-edge bifacial knives, perforators, and end-scrapers (Black 1986, 1989; Creel 1991; Hester 1980; Johnson 1994; Kelley 1986; Prewitt 1981). The Toyah material cultural is arguably geared toward extensive bison exploitation and mobility, and extensive trade relationships likely existed that focused on the exchange of bison hides and other commodities (Creel 1991).

3.1.4 Historic Period (Post 300 B.P.)

Alonso De León was likely among the first Europeans to explore what would later become Williamson County, Texas. In the late seventeenth century, he traversed the area along Brushy Creek and the San Gabriel River while seeking a route (Camino de Arriba) from San Antonio to the Spanish missions in East Texas. In 1716, Louis Juchereau de St. Denis and Domingo Ramón led an expedition that passed through the area, and in the mid-1700s, the San Xavier missions were founded along the San Gabriel River near the present-day Williamson and Milam County border (Odintz 2018).

During the subsequent Mexican period, this area became part of Robertson's Colony, and land grants were awarded to several Mexican families, though no settlements took hold during this time. Just prior to and immediately following the Texas Revolution from Mexico, Anglos began to actively settle the area, which was still part of Milam County. A military outpost was built in 1835 near the head of Brushy Creek to protect the settlers against Indian attacks. In 1838, Dr. Thomas Kenney and a party of settlers established the first civilian settlement on Brushy Creek near the site of the present-day crossing of the Missouri-Kansas-Texas Railroad. Several nearby settlements followed, but constant predation by Native Americans resulted in the deaths of many early pioneers, including Kenney. Following annexation to the United States and a reduction of hostilities, there was an influx of Anglo immigrants to the area. By 1848, there were at least 250 settlers. Due to the need for a local seat of government, the Texas legislature established Williamson County on March 13, 1848, naming it for the prominent judge and soldier Robert M. Williamson. Georgetown was established as the county seat (Odintz 2018).

By 1850, Williamson County had a population of 1,379 whites and 155 slaves. Agriculture was the county's economic mainstay during the mid-1800s, and corn was the primary crop grown. The rich blackland soils in the region allowed cotton to be introduced, but it was not yet an important cash crop. During this period, however, cattle and sheep ranching were also important to the economy. Between 1850 and 1860, herds of cattle more than tripled from 11,973 to 38,114 head and the number of sheep grew from 2,937 to 16,952 (Odintz 2018).

During the Civil War, Union sympathy was strong, and Williamson County was one of 19 Texas counties to reject secession. In July 1863, eight Williamson County men were caught by Confederate troops while traveling to Mexico and were hanged near Bandera, Texas. Other Unionists were also persecuted during the war (Odintz 2018). Following the war, freed slaves began to form several new communities, and much of the post-war political and racial strife occurring in other Texas counties was absent. However, during the late nineteenth century, violent crime and horse and cattle theft were rampant (Odintz 2018).

Similar to other regions in Texas, Williamson County experienced an economic slump after the war, but a recovery was well underway by the 1870s as a result of growth in the cattle and sheep industries and expansion of cotton farming. Feeder routes linking to the Chisholm Trail crossed Williamson County, and many cattle drives passed through the area until the early 1880s when the railroad constructed a line through Taylor in the eastern part of the county. Cattle remained important to the local agricultural economy well into the twentieth century, and by 1869, ranchers owned 65,093 cattle. Sheep and goat raising followed a similar pattern. By 1900, Williamson County ginned more cotton than any county in Texas except Ellis County, following a 10-fold increase in the number of improved acres between 1870 and 1880. The construction of the International-Great Northern Railroad in 1876 and the Taylor, Bastrop, and Houston Railway in the 1880s, led to the founding of Taylor and Hutto and the relocation of Round Rock. Both lines were important for growing the local agricultural economy (Odintz 2018).

During the 1880s and 1890s, significant numbers of Scandinavians, Germans, Czechs, Wends, and Austrians moved to the county, with the proportion of foreign born at about 10 percent. Mexican immigration began to rise significantly at the turn of the century, with 294 present in 1900, 732 in 1910, and 4,967 in 1930. By 1980, 9,693 residents, or 11 percent, were of Hispanic origin. By 1930, Williamson County had a culturally diverse population of 44,146 inhabitants and an economy that was still largely agricultural (Odintz 2018).

During the Great Depression, the cotton industry suffered as a result of soil depletion, overproduction, and the boll weevil. Consequently, the number of acres used for growing cotton was cut in half. However, cropland acreage used for corn production increased over the same period, and wool and mohair production more than doubled. Farmers began to turn to crops such as sorghum and wheat. During the 1950s, poultry farming gained a significant foothold in the economy, and the county ranked fifth in the state in egg and chicken production. In 1980, Williamson County was tenth in the state in the production of turkeys (Odintz 2018).

Although Williamson County experienced a dramatic increase in population, growing from 37,305 inhabitants in 1970 to an estimated 85,700 inhabitants in 1982, the African American population steadily declined, a trend that began in the 1940s. Much of the overall growth in population was related to “suburbanization” and housing development in the areas bordering Austin. Politically, the county has remained solidly Democratic for a century after Reconstruction (Odintz 2018).

3.2 Archeological Resources

A review of the Texas Archeological Sites Atlas (TASA) was conducted in order to identify previous archeological investigations and recorded archeological sites within 1,000 m of the archeological APE. Six previous archeological surveys were identified (**Table 3**). Three of the previous surveys intersect the archeological APE (**Figure 4**). However, the intensity of the previous investigations could not be determined from the TASA review.

Table 3. Previous archeological investigations within 1,000 m of the archeological APE.

Type	Date	Antiquities Permit No.	Agency/Firm	Description	Distance from APE
Survey	1987	N/A	USACE Fort Worth District	Survey for the Brushy Lake Creek Interceptor	0
Survey	1998	N/A	City of Cedar Park	Linear survey	820 m west
Survey	2000	2490	Brushy Creek PUD / Hicks and Company, Inc.	Survey for proposed hike and bike trail and 26-acre park in Round Rock. Project cleared to proceed.	0
Survey	2000	2508	Texas Parks and Wildlife Department (TPWD)	Survey of section of Fern Bluff Municipal Utility District in Williamson County. One site found. Project cleared to proceed.	550 m east
Survey	2002	2723	TPWD / Fern Bluff Municipal Utility District (MUD) ACS Group	Survey of Glen Canyon and Montana Falls Parks Improvement project. No sites found. Project cleared to proceed.	200 m southeast
Survey	2002	2768	USACE Fort Worth District / Brushy Creek MUD / Paul Price Associates, Inc.	152-acre survey of proposed Brushy Creek Surface Water Supply System, Williamson County. Project cleared to proceed.	0

Source: TASA (2018)

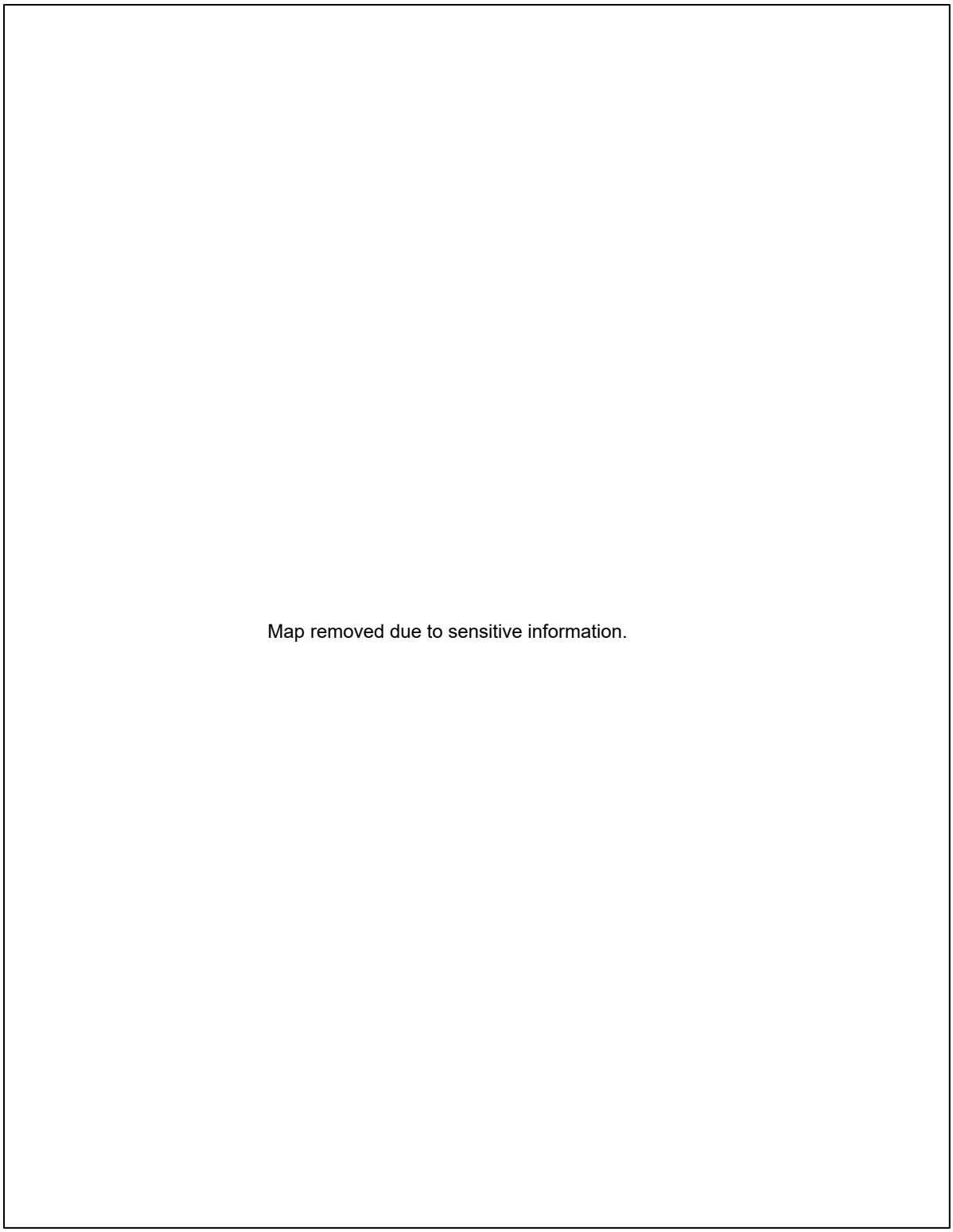

Figure 4. Previously recorded archeological sites and surveys within 1,000 m of the archeological APE.

Three previously recorded archeological sites were identified within 1,000 m of the archeological APE (**Table 4**). Two sites (41WM166 and 41WM167) contain historic ranch components. Site 41WM1062 lacks site data and therefore has an unknown cultural affiliation. The eligibility of all three sites is currently undetermined. None of the previously recorded sites are located within the archeological APE (TASA 2018).

Table 4. Previously recorded archeological sites within 1,000 m of the archeological APE.

Site	Cultural Period(s)	Site Description	Recommendation	Distance (m) from APE
41WM166	Historic (Phinney) Ranch	1.5 story rock structure consisting of either milk house or spring house	Eligibility undetermined. Testing was recommended	550 m southwest
41WM167	Historic (Phinney) Ranch	Old house site with possible fireplace foundation and stone fences	Eligibility undetermined	260 m east
41WM1062	No data	No data	No data	670 m west

Source: TASA (2018)

3.3 Historic Resources

For this study, historic resources refers to any buildings, structures, objects, sites, and potential historic districts that are, or will be, 45 years of age or older at the time of the anticipated project letting date for construction. At present, the let date for the proposed project is Spring 2019. Therefore, it is recommended any buildings, structures, objects, or potential historic districts dating to 1974 or earlier be considered historic resources. This date is based on the year 2019 minus 45 years to provide a 5-year buffer that allows for unexpected delays in project planning. The APE established for historic resources extends for 150 ft beyond the boundary of the 13-acre environmental study area. In addition, a historic resources study area was also established for a distance of 1,300 ft beyond the environmental study area, and this area was used for developing the historic context of the broader area (see **Figure 1**).

A review of the Texas Historic Sites Atlas (2018), the NRHP database, TxDOT's Historic District and Properties GIS layer, and TxDOT's Historic Bridges of Texas GIS layer, was conducted in order to identify previously recorded and/or designated historic resources within the historic resources APE. This review included a search for properties listed in the NRHP, as well as those listed as National Historic Landmarks, Recorded Texas Historic Landmarks, non-archeological SALs, and Official Texas Historical Markers. None of the above resources were identified.

Prior to fieldwork, background research was also conducted in order to assess the potential for the presence of previously unrecorded historic resources in the historic resources APE, as well as to obtain information for the development of a historic context for evaluation of historic resources for NRHP eligibility within the larger historic resources study area. Sources reviewed include USGS aerial photographs (1954-2014), USGS historic topographic maps (1928-2016), Texas General Land Office (GLO) online records, Williamson County Appraisal District (Williamson CAD) online records, Williamson County Clerk online deed records, TxDOT's Bridge Inventory**,** Inspection and Appraisal Program (BRINSAP) bridge inspection report for the Great Oaks Bridge, historic newspaper archives, the Handbook of Texas Online, and various secondary literary sources.

Background research revealed that local historic land use within the historic resources study area includes agricultural activities, specifically ranching. A review of Texas GLO records show that this area is within two land surveys, which include the J. H. Dillard survey (Abstract #179 [Texas GLO 2018A]) on the west and the W. Dugan survey (Abstract #190 [Texas GLO 2018B]) on the east. Based on a review of aerial photographs and topographic maps from 1925 through 1974, the area was sparsely settled until the late twentieth century, and included a small number of widely scattered structures (USGS 2018A; USGS 2018B). These structures likely comprised farmsteads, accessed by dirt roads.

Modern residential development in the area surrounding the search area began in the 1970s and has continued to the present (Odintz 2018). The 1982 topographic map shows residential subdivision construction northwest of the bridge location. According to Williamson CAD (2018), the historic resources study area is situated in portions of the 'Great Oaks Section 2' subdivision', 'Stone Canyon Section 8C' subdivision', and the 'Brushy Creek Section 1 South' subdivision. Williamson CAD records for buildings within the historic resources APE indicate that they were constructed between 1977 and 2002.

The historic resources APE contains the Great Oaks Bridge over Brushy Creek, which is owned by the County (National Bridge Inventory # 4260AA0859001 [TxDOT 2012]). The BRINSAP inspection report identifies the structure as a 2-lane bridge with a multiple concrete box-beam design. Although records suggest the bridge was constructed in 1988, the structure is visible on a 1985 aerial photograph (TxDOT 2012; USGS 2018B). This discrepancy may be due to the bridge being under construction in 1985, but not completed until 1988 as stated in the report (TxDOT 2012). In either case, the bridge is less than forty-five years of age and does not meet the 1974 historic-age cutoff date for this project.

4 Survey Methods

4.1 Archeological Survey

4.1.1 Antiquities Permit

Since the project falls within the purview of the Antiquities Code of Texas, a Texas Antiquities Permit application and research design were prepared and submitted to the THC prior to fieldwork. The THC approved the application and issued Antiquities Permit No. 8544 on September 11, 2018. Steven Ahr served as Principal Investigator. The objectives of the survey were to identify and inventory any cultural resources sites within the archeological APE, assess the potential of any resources for NRHP eligibility and/or SAL designation, assess the potential for the presence of significant cultural resources relative to previous disturbances and anticipated future impacts, and determine whether any additional archeological studies were warranted. All work was supervised by AECOM cultural resources professionals meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (36 CFR Part 61).

4.1.2 Field Methods

AECOM conducted an intensive archeological survey in accordance with THC's Archeological Survey Standards for Texas. Components of the survey included 100 percent pedestrian reconnaissance, stream cutbank inspection, and shovel testing. Exposed ground surfaces were visually inspected for evidence of archeological resources. Shovel tests were 30 cm in diameter and were excavated to the bottom of Holocene deposits. Shovel tests were dug in 10-cm levels and excavated soils were screened through ¼-inch hardware cloth, except where clayey soil conditions required troweling. Location, depth, soil strata, and presence/absence of cultural materials were recorded for each shovel test. All shovel tests were backfilled upon completion. The survey employed a non-collection strategy.

The geomorphology of the project was examined closely in order to determine the need for deep mechanical prospection (e.g., backhoe trenching) to locate deeply buried cultural materials. This assessment was based on local soil-geomorphic conditions, natural stream cutbank examinations, and the anticipated extent of project impacts. Based on the degree of prior disturbances that have compromised the integrity potential for buried and intact cultural deposits, and given the paucity of deep, artifact-bearing soils, no backhoe trenches were deemed necessary.

If any archeological sites were to be identified, the site boundaries would have been delineated by the surficial extent of artifacts, and by the excavation of shovel tests to assess site depth and to provide information on potential integrity of any cultural deposits. A temporary field designation would be assigned to each site, and trinomial site numbers would be obtained from the Texas Archeological Research Laboratory.

4.1.3 Site Assessment

Any newly discovered sites are assessed to determine if they could be eligible for the NRHP (and thus designated as a historic property) and whether they meet the criteria to merit official designation as a SAL. For an archeological or historic resource to be considered eligible for listing in the NRHP, the resource must be evaluated by applying the NRHP criteria of eligibility presented in 36 CFR Part 60.4 (a-d), which states:

"…the quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

a. that are associated with events that have made a significant contribution to the broad patterns of our history; or
b. that are associated with the lives of persons significant in our past; or
c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
d. that have yielded or may be likely to yield, information important in prehistory or history."

To be considered eligible for the NRHP, a resource must satisfy at least one of the four criteria listed above (a through d), and it must retain one or more aspects of integrity, including location, design, setting, materials, workmanship, feeling, or association. The integrity that a resource must retain for NRHP eligibility is different for different kinds of resources. For

example, for archeological sites, integrity generally means that components of a site must be in their original depositional context, such that the stratigraphic relationships of site components are maintained.

The Antiquities Code of Texas allows for certain cultural resources to be designated and protected as a SAL. For a historic building to be eligible for designation as a SAL, it must be listed in the NRHP prior to being designated. The same prerequisite does not apply to archeological sites. At the state level, under Title 13, Part 2, Chapter 26, Subchapter C, Rule 26.10 of the TAC, an archeological site under the ownership or control of the State of Texas may merit official designation as a SAL if one of the following criteria applies:

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

4.1.4 Curation

No artifacts were collected during the survey. Pursuant to 13 TAC 26.17, field records and photographs generated during field investigations will be prepared for permanent curation at the Texas Archeological Research Laboratory in Austin, Texas.

4.2 Historic Resources Reconnaissance Survey

A historic resources reconnaissance survey was conducted on September 27, 2018 by a Secretary of the Interior-qualified architectural historian. The purpose of the survey was to document the condition, materials, alterations, and other features of any identified historic resources, and evaluate potential significance and integrity. Any identified historic resources were documented with digital photography, and evaluated for NRHP eligibility.

5 Results

5.1 Archeological Resources

A pedestrian walkover was conducted within the archeological APE, which was supplemented by the excavation of 26 shovel tests (**Figure 5**; **Appendix B**). During the survey, no cultural materials or archeological sites were found.

Numerous past disturbances were noted during the survey, including erosion and flood scouring, mechanical and roadway and bridge construction disturbances, and impacts from numerous buried utilities (e.g., sewer lines and buried gas lines). In addition, bedrock outcrops were commonly seen throughout various areas of the archeological APE.

The southernmost portion of the archeological APE encompasses extensive outcrops of Edwards Limestone. To the west of Great Oaks Drive, the Brushy Creek valley is narrowly constricted by the high bluffs consisting of Lower Cretaceous deposits rise vertically, as much as 40 ft above a wedge of ancient and modern alluvial deposits below (**Figures 6-7**). A city park occupies this location, and includes a moderately sized impoundment for runoff from a small tributary that flows from south to north into Brushy Creek.

On the east side of Great Oaks Drive, the valley widens considerably, and the Cretaceous uplands extend south of Brushy Creek at a significantly reduced gradient. Bedrock outcrops can be observed in some places where soils are eroded or non-existent. In areas where shallow soils have been de-vegetated, erosional gullies have formed, exposing the shallow bedrock below (**Figures 8-9**). In this location, south of Hairy Man Road, five shovel tests (STs 1-5) were excavated, which revealed shallow (typically less than 15 cm), very dark gray (10YR 3/1), black cobbly clay over bedrock, consistent with the series description for the Eckrant-Rock outcrop association (NRCS 2018). No cultural materials were identified.

On the east side of Great Oaks Drive, between Hairy Man Road and Brushy Creek, 11 shovel tests (STs 6-16) were excavated. This area is mapped as Holocene alluvium containing Oakalla soils. Pedestrian inspection within this area revealed mechanical disturbances within and immediately adjacent to the Hairy Man Road ROW (**Figure 10**). In addition, extensive scouring from flooding was noted within the entire valley bottom between the roadway and Brushy Creek, along with extensive erosion in the southeast corner of the Hairy Man Road and Great Oaks Drive intersection (**Figures 11-12**). Extensive lag deposits of fluvial channel gravels lined the valley floor, and were observable resting on limestone bedrock. The 11 shovel tests in this area were limited to minor pockets containing soils, which revealed shallow, mixed, gravelly loams over bedrock. No cultural materials were found.

On the west side of Great Oaks Drive, between Hairy Man Road and Brushy Creek, five shovel tests (STs 17-21) were excavated within the narrow wedge of terrace deposits situated between the bedrock escarpment to the south and the creek to the north (see **Figure 5**). Soils consisted of shallow, dark grayish brown (10YR 4/2) gravelly loam over a well-developed and compact brown (10YR 5/3) Bk horizon, and contained abundant limestone cobbles. Inspection of cutbank exposures within erosional gullies revealed rubified soils with common, well-developed calcium carbonate nodules, and imbricated gravel zones indicative of ancient terrace construction during high energy flow regimes (**Figure 13**).

Similar shallow (<20 cm) gravelly and cobbly soils were also revealed in five shovel tests on the north side of Brushy Creek. Each of these shovel tests revealed shallow to eroded, very dark grayish brown (10YR 3/2) gravelly loam. Surface expressions included common pebbles and limestone cobbles, and a strongly cemented caliche zone (Bkm horizons) (**Figure 14**).

Significant disturbances were noted north of Brushy Creek within the APE, including numerous buried utilities (sewer, water, gas) within the ROW on both sides of the bridge (**Figures 15-17**). Gravel and bedrock outcrops were plainly visible on the surface (**Figure 18**), indicating that soils in this area were thin to non-existent, possibly removed during bridge construction and/or maintenance, and possibly as a result of scouring during large magnitude floods. The majority of the north bank of Brushy Creek on the west side of the Great Oaks Drive Bridge could not be accessed due to a lack of right-of-entry (see **Figure 5**). However, based on visual observations from across the creek and from public roads, and from aerial photographs and topographic maps, it appears to exhibit similar geomorphology as the south side of the creek, and as such, likely exhibits the same low potential for containing deeply buried and preserved cultural materials.

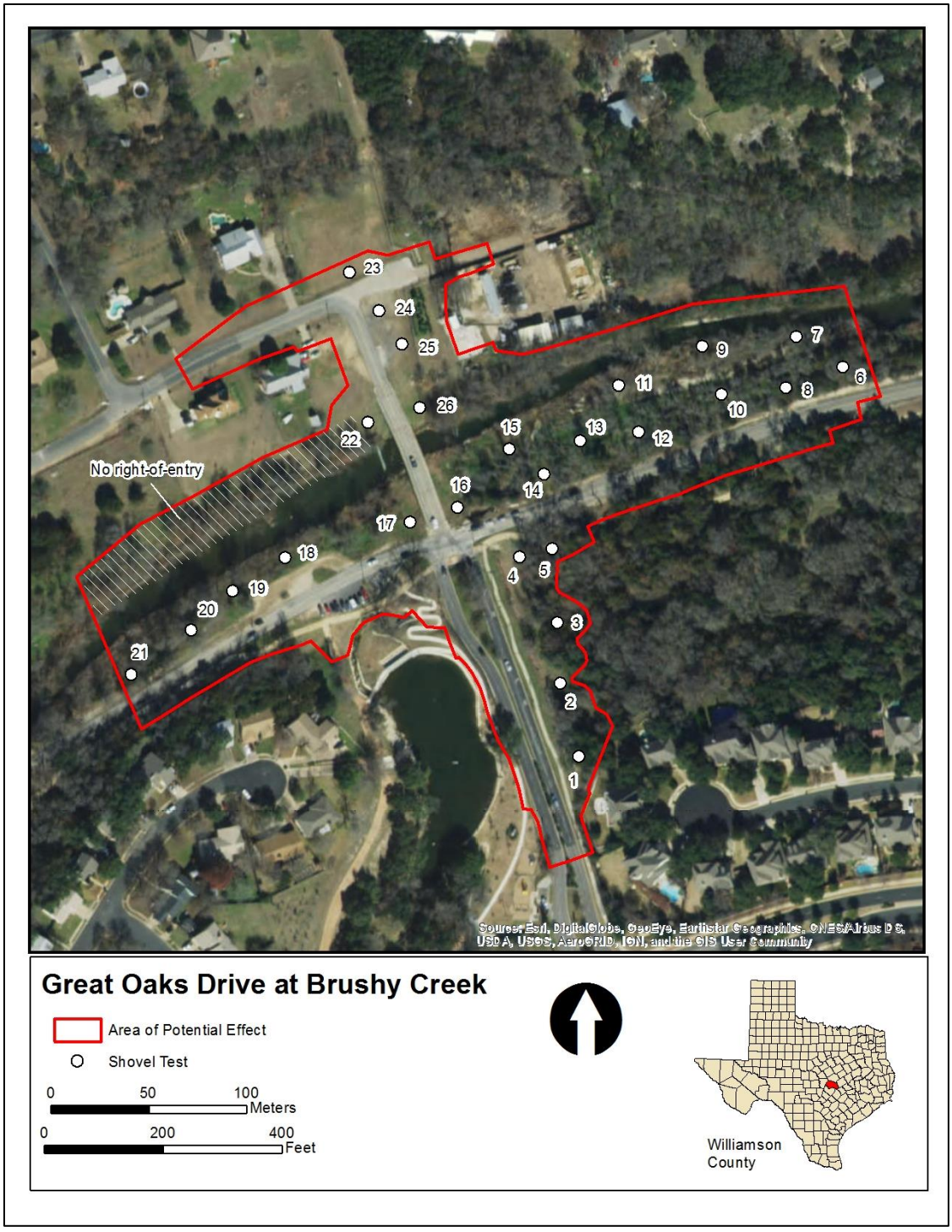

Figure 5. Shovel tests within the APE.

Figure 6. Narrow terrace between limestone bluff to the south (right) and brushy creek to the north (left).

Figure 7. Small city park near southwest corner of project.

Figure 8. Erosion in Great Oaks Drive ROW, showing exposed bedrock.

Figure 9. Erosional gully on east side of Great Oaks Drive.

Figure 10. Mechanized disturbance in ROW on north side of Hairy Man Road.

Figure 11. Flood scour and lag gravel deposit in Brushy Creek floodplain.

Figure 12. Erosion below culvert beneath Hairy Man Road at Great Oaks Bridge.

Figure 13. Eroded gully between Hairy Man Road and Brushy Creek, illustrating rubified, calcareous gravelly terrace soils.

Figure 14. Eroded gravelly terrace soils on north side of Brushy Creek.

Figure 15. Buried gas pipeline in ROW, parallel to east side of Great Oaks Drive.

Figure 16. Sewage line in ROW on east side of Great Oaks Drive Bridge.

Figure 17. Buried water lines in ROW on east side of Great Oaks Drive Bridge.

Figure 18. Shallow, exposed bedrock on ROW, east of Great Oaks Drive Bridge.

5.2 Historic Resources

The historic resources survey resulted in the identification of no historic buildings, structures, objects, sites or potential districts meeting the cut-off date of 1974 within the historic resources APE.

6 Summary and Recommendations

AECOM conducted a cultural resources survey for the proposed reconstruction of the Great Oaks Drive Bridge at Brushy Creek in Williamson County, Texas, on September 27, 2018, under Texas Antiquities Permit No. 8544. The purpose of this investigation was to survey and inventory archeological and historic resources and to evaluate the potential of any such resources for inclusion in the NRHP and for designation as a SAL.

The archeological survey was completed using a combination of 100 percent pedestrian survey, augmented by the excavation of 26 shovel tests. No archeological sites were identified. Based on the survey results, prior disturbances, and an assessment of the geomorphic setting of the project, the potential for the presence of buried and intact cultural materials is considered low. No backhoe trenching was deemed necessary. During the historic resources reconnaissance survey, no historic resources (buildings, structures, objects, sites, or potential districts) were identified. Based on these findings, no further cultural resources investigations are recommended.

Based on the result of the survey, the proposed project should have No Effect on historic properties or SALs. It is recommended that construction can proceed without further archeological investigations. However, should the dimensions of the project area change, additional archeological and/or historic resources investigations may be warranted.

In the event that any unmarked prehistoric or historic human remains or burials are encountered during construction, the area of the remains is considered a cemetery under current Texas law and all construction activities must cease immediately so as to avoid impacting the remains. The THC must be notified immediately by contacting the History Programs Division at (512) 463-5853 and the Archeology Division at (512) 463-6096. All cemeteries are protected under State law and cannot be disturbed. Further protection is provided in Section 28.03(f) of the Texas Penal Code, which provides that intentional damage or destruction inflicted on a human burial site is a state jail felony.

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APPENDIX A

SCHEMATICS

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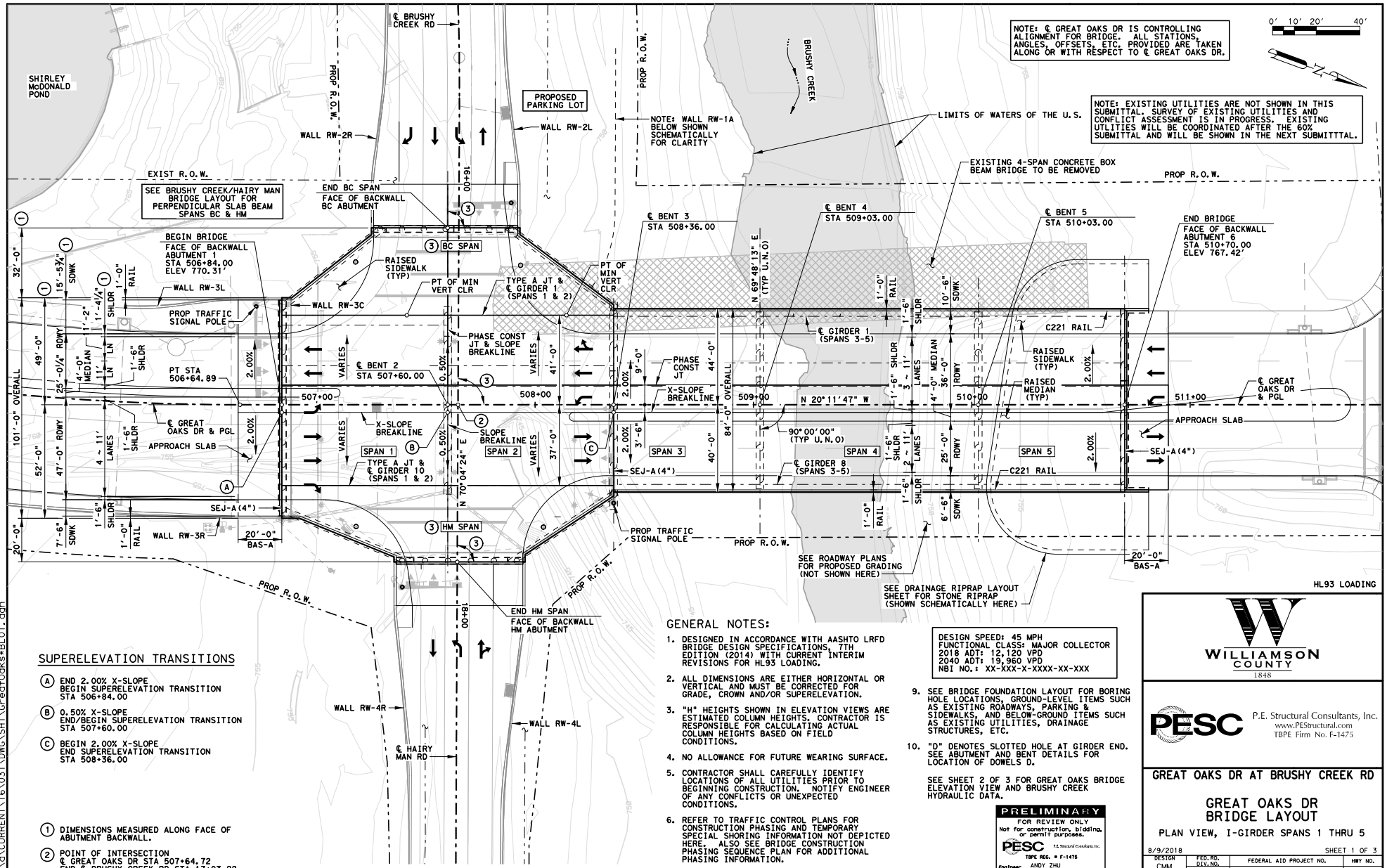

SUPERELEVATION TRANSITIONS

(A) END 2.00% X-SLOPE
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STA 506+84.00

(B) 0.50% X-SLOPE
END/BEGIN SUPERELEVATION TRANSITION
STA 507+60.00

(C) BEGIN 2.00% X-SLOPE
END SUPERELEVATION TRANSITION
STA 508+36.00

(1) DIMENSIONS MEASURED ALONG FACE OF ABUTMENT BACKWALL.

(2) POINT OF INTERSECTION
℄ GREAT OAKS DR STA 507+64.72
END ℄ BRUSHY CREEK RD STA 17+03.22
BEGIN ℄ HAIRY MAN RD STA 17+03.22

(3) 89° 43' 49" SKEW

GREAT OAKS BRIDGE PLAN

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH CURRENT INTERIM REVISIONS FOR HL93 LOADING.
2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATION.
3. "H" HEIGHTS SHOWN IN ELEVATION VIEWS ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE FOR CALCULATING ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
4. NO ALLOWANCE FOR FUTURE WEARING SURFACE.
5. CONTRACTOR SHALL CAREFULLY IDENTIFY LOCATIONS OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. NOTIFY ENGINEER OF ANY CONFLICTS OR UNEXPECTED CONDITIONS.
6. REFER TO TRAFFIC CONTROL PLANS FOR CONSTRUCTION PHASING AND TEMPORARY SPECIAL SHORING INFORMATION NOT DEPICTED HERE. ALSO SEE BRIDGE CONSTRUCTION PHASING SEQUENCE PLAN FOR ADDITIONAL PHASING INFORMATION.
7. SEE TRAFFIC SIGNAL AND ILLUMINATION PLANS FOR BRIDGE-MOUNTED SIGNAL POLES AND UNDERDECK LIGHTING.
8. SEE BRIDGE TYPICAL SECTION SHEETS FOR ADDITIONAL INFORMATION.
9. SEE BRIDGE FOUNDATION LAYOUT FOR BORING HOLE LOCATIONS, GROUND-LEVEL ITEMS SUCH AS EXISTING ROADWAYS, PARKING & SIDEWALKS, AND BELOW-GROUND ITEMS SUCH AS EXISTING UTILITIES, DRAINAGE STRUCTURES, ETC.
10. "D" DENOTES SLOTTED HOLE AT GIRDER END. SEE ABUTMENT AND BENT DETAILS FOR LOCATION OF DOWELS D.

SEE SHEET 2 OF 3 FOR GREAT OAKS BRIDGE ELEVATION VIEW AND BRUSHY CREEK HYDRAULIC DATA.

DESIGN SPEED: 45 MPH
FUNCTIONAL CLASS: MAJOR COLLECTOR
2018 ADT: 12,120 VPD
2040 ADT: 19,960 VPD
NBI NO.: XX-XXX-X-XXXX-XX-XXX

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding, or permit purposes.
PESC TBPE REG. # F-1475
Engineer ANDY ZHU
P.E. No. 88707 Date 8/9/2018

WILLIAMSON COUNTY 1848

PESC P.E. Structural Consultants, Inc.
www.PEStructural.com
TBPE Firm No. F-1475

GREAT OAKS DR AT BRUSHY CREEK RD

GREAT OAKS DR
BRIDGE LAYOUT

PLAN VIEW, I-GIRDER SPANS 1 THRU 5

8/9/2018 SHEET 1 OF 3

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HWY NO.
CMM	6			
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
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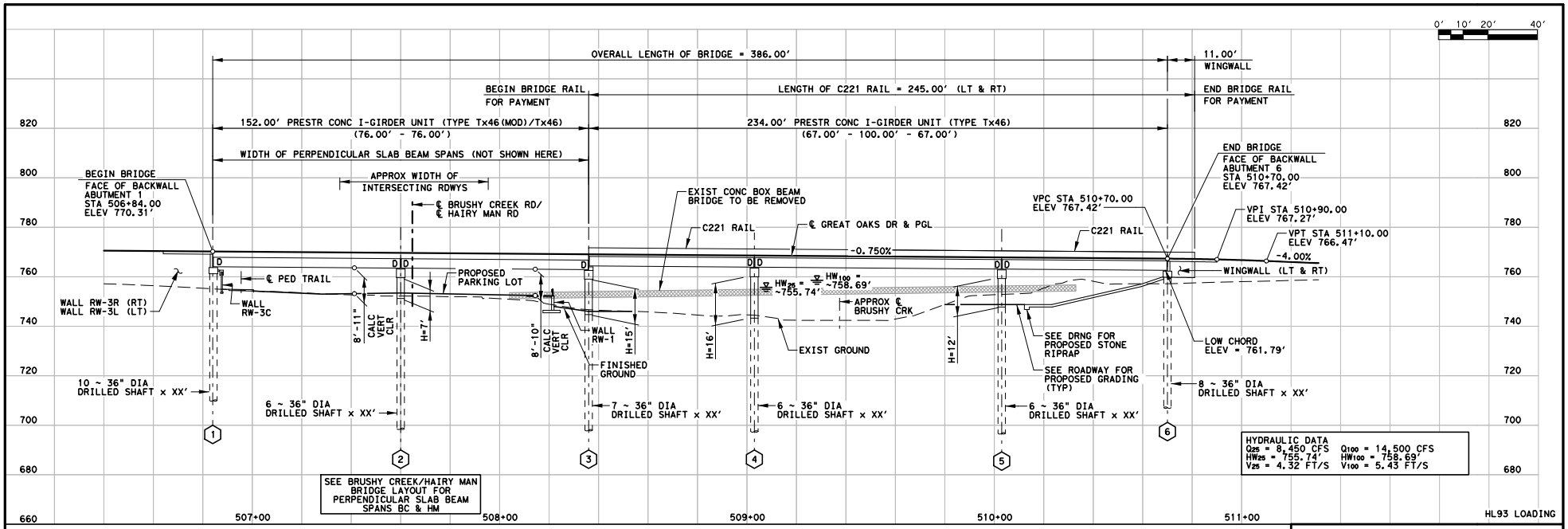

GREAT OAKS BRIDGE ELEVATION

NOTE: PERPENDICULAR SLAB BEAM SPANS AND BRUSHY CREEK / HAIRY MAN INTERSECTING ROADWAYS NOT SHOWN HERE FOR CLARITY. SEE BRIDGE PLAN AND TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.

NOTE: SCOUR ANALYSIS IS CURRENTLY IN PROGRESS. BRIDGE COLUMN SCOUR DEPTH CURRENTLY UNAVAILABLE. FINISHED GRADING IN THE CHANNEL AND LIMITS OF RIPRAP AND/OR PROTECTIVE VEGETATION ARE PRELIMINARY AND SUBJECT TO CHANGE.

SEE SHEET 1 OF 3 FOR GENERAL NOTES AND OTHER TYPICAL INFORMATION.

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding, or permit purposes.
PESC P.E. Structural Consultants, Inc.
TBPE REG. # F-1475
Engineer ANDY ZHU
P.E. No. 88707 Date 8/9/2018

WILLIAMSON COUNTY
1848

PESC P.E. Structural Consultants, Inc.
www.PEStructural.com
TBPE Firm No. F-1475

GREAT OAKS DR AT BRUSHY CREEK RD

GREAT OAKS DR
BRIDGE LAYOUT

ELEVATION VIEW, I-GIRDER SPANS 1 THRU 5

8/9/2018 SHEET 2 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HWY NO.
CMM	6			
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
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DRN CHECK				
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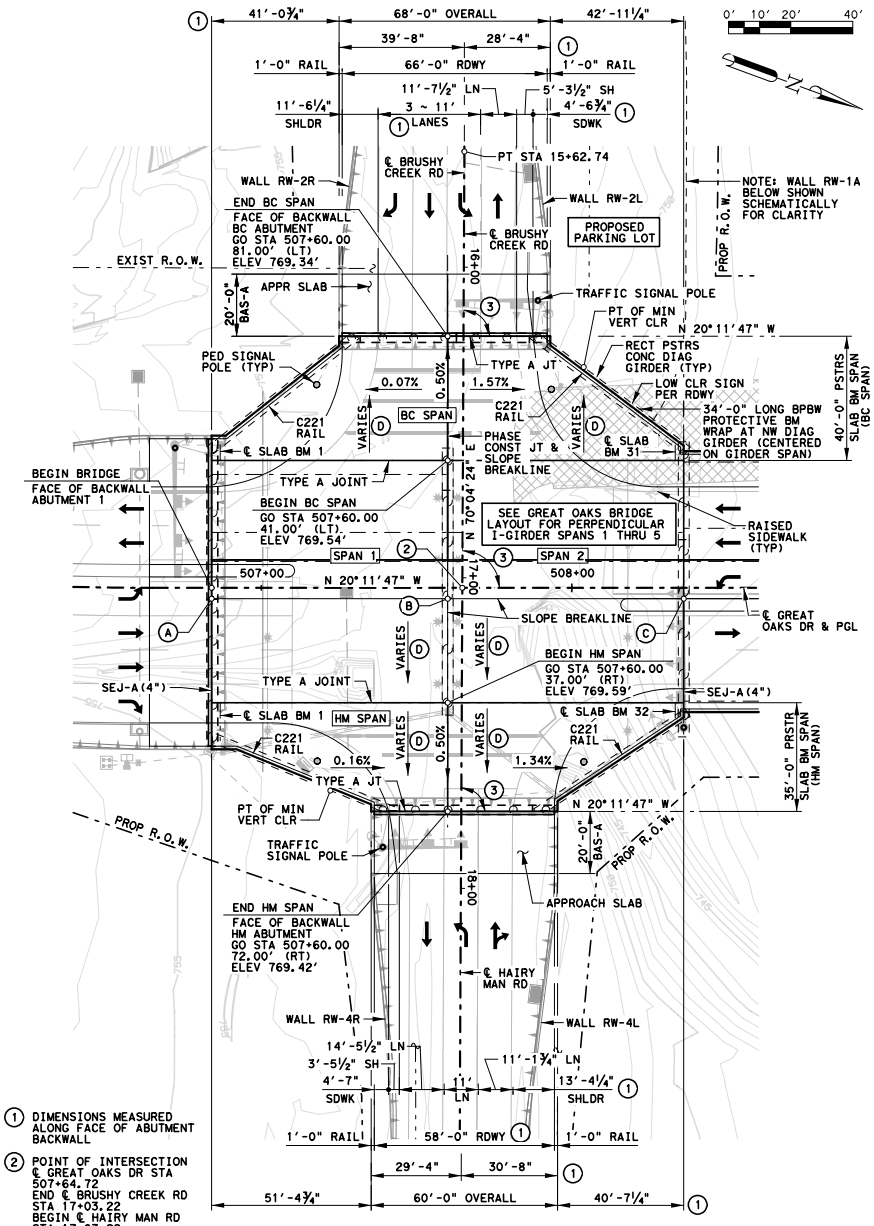
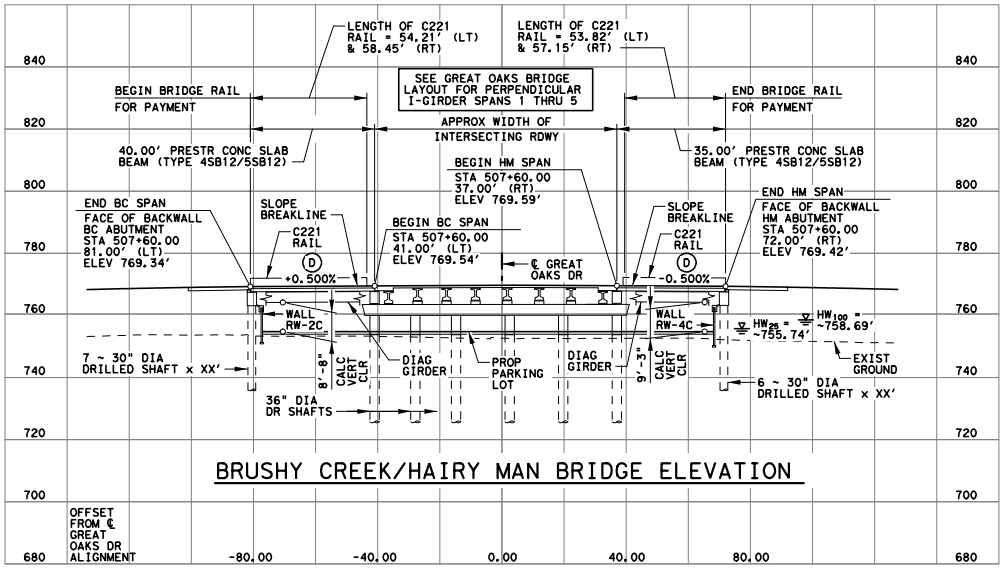


BRUSHY CREEK/HAIRY MAN BRIDGE PLAN



BRUSHY CREEK/HAIRY MAN BRIDGE ELEVATION

NOTE: ELEVATION DRAWN ALONG SLOPE BREAKLINE AT ℄ BENT 2, STA 507+60.00

HL93 LOADING

NOTE: ℄ GREAT OAKS DR IS CONTROLLING ALIGNMENT FOR BRIDGE. ALL STATIONS, ANGLES, OFFSETS, ETC. PROVIDED ARE TAKEN ALONG OR WITH RESPECT TO ℄ GREAT OAKS DR.

SEE SHEET 1 OF 3 FOR GENERAL NOTES AND OTHER TYPICAL INFORMATION NOT REPEATED HERE.

SEE SHEET 2 OF 3 FOR HYDRAULIC DATA AND OTHER INFORMATION NOT REPEATED HERE.

DECK CROSS SLOPES & SUPERELEVATION TRANSITIONS

(A) SEE GREAT OAKS BRIDGE LAYOUT
(B) SEE GREAT OAKS BRIDGE LAYOUT
(C) SEE GREAT OAKS BRIDGE LAYOUT
(D) VERTICAL GRADE FOR BC & HM SPANS VARIES ACROSS DECK WIDTH TO MATCH SUPERELEVATION TRANSITION CROSS-SLOPES AT PERPENDICULAR SPANS 1 & 2

(1) DIMENSIONS MEASURED ALONG FACE OF ABUTMENT BACKWALL
(2) POINT OF INTERSECTION ℄ GREAT OAKS DR STA 507+64.72
END ℄ BRUSHY CREEK RD STA 17+03.22
BEGIN ℄ HAIRY MAN RD STA 17+03.22
(3) 89°43'49" SKEW

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding, or permit purposes.
PESC P.E. Structural Consultants, Inc. TBPE REG. # F-1475
Engineer ANDY ZHU
P.E. No. 88707 Date 8/9/2018

WILLIAMSON COUNTY 1848

PESC P.E. Structural Consultants, Inc. www.PEStructural.com TBPE Firm No. F-1475

GREAT OAKS DR AT BRUSHY CREEK RD

BRUSHY CREE/HAIRY MAN RD BRIDGE LAYOUT

SLAB BEAM SPANS BC & HM

8/9/2018 SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HWY NO.
CMM	6			
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JR	TEXAS	AUS	WILLIAMSON	
DES CHECK	CONTROL	SECTION	JOB	
ADZ				
DRN CHECK				
ADZ				

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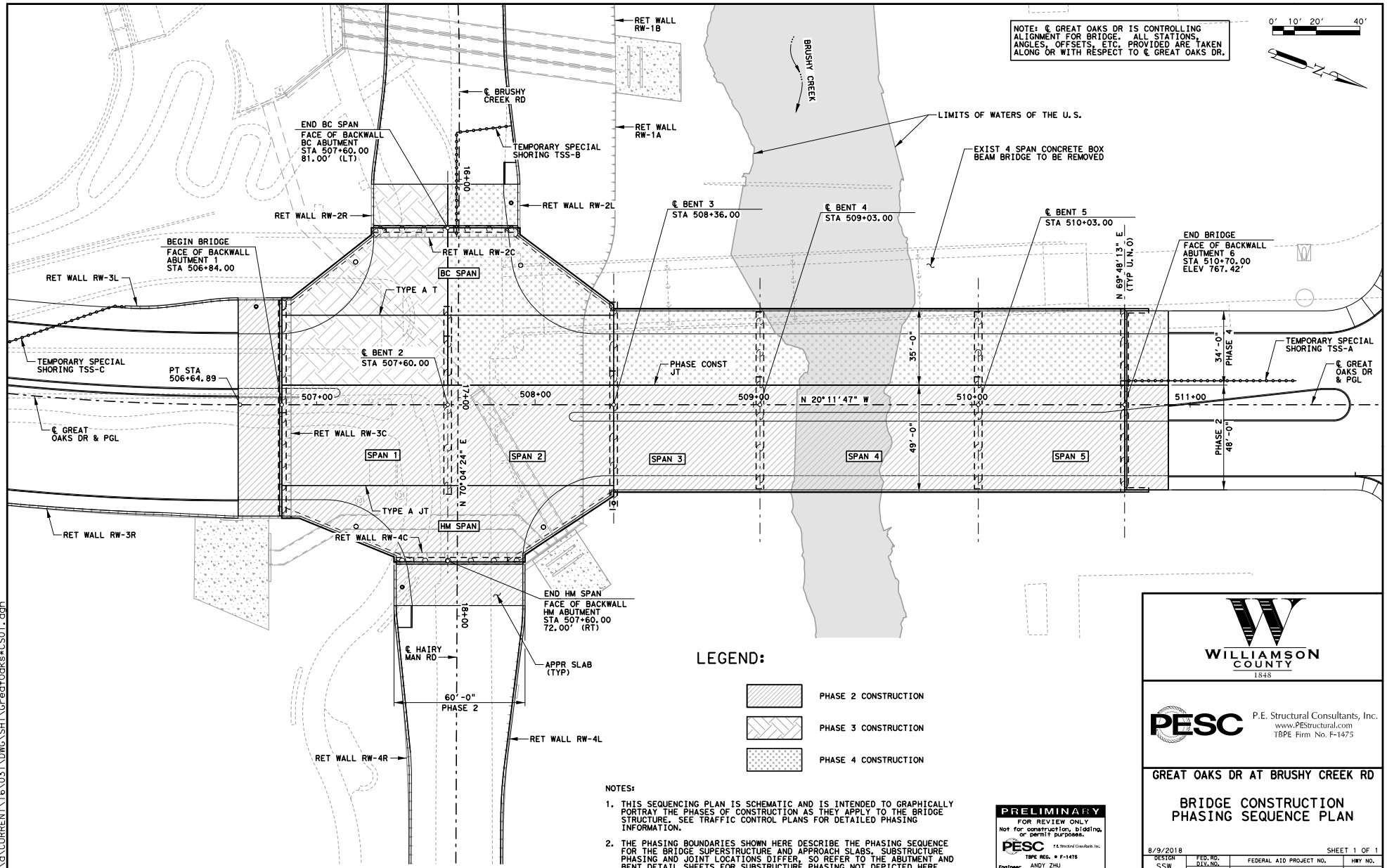

PLAN

LEGEND:

- PHASE 2 CONSTRUCTION
- PHASE 3 CONSTRUCTION
- PHASE 4 CONSTRUCTION

NOTES:

1. THIS SEQUENCING PLAN IS SCHEMATIC AND IS INTENDED TO GRAPHICALLY PORTRAY THE PHASES OF CONSTRUCTION AS THEY APPLY TO THE BRIDGE STRUCTURE. SEE TRAFFIC CONTROL PLANS FOR DETAILED PHASING INFORMATION.
2. THE PHASING BOUNDARIES SHOWN HERE DESCRIBE THE PHASING SEQUENCE FOR THE BRIDGE SUPERSTRUCTURE AND APPROACH SLABS. SUBSTRUCTURE PHASING AND JOINT LOCATIONS DIFFER, SO REFER TO THE ABUTMENT AND BENT DETAIL SHEETS FOR SUBSTRUCTURE PHASING NOT DEPICTED HERE.
3. SEE BRIDGE TYPICAL SECTION SHEETS FOR ADDITIONAL PHASING NOTES, DIMENSIONS AND TRAFFIC CONTROL INFORMATION.

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PESC P.E. Structural Consultants, Inc.
TBPE REG. # F-1475
Engineer ANDY ZHU
P.E. No. 88707 Date 8/9/2018

HL93 LOADING

WILLIAMSON COUNTY
1848

PESC P.E. Structural Consultants, Inc.
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GREAT OAKS DR AT BRUSHY CREEK RD

BRIDGE CONSTRUCTION PHASING SEQUENCE PLAN

8/9/2018 SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HWY NO.
SSW	6			
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
TLS	TEXAS	AUS	WILLIAMSON	
DES CHECK	CONTROL	SECTION	JOB	
ADZ				
DRN CHECK				
ADZ				

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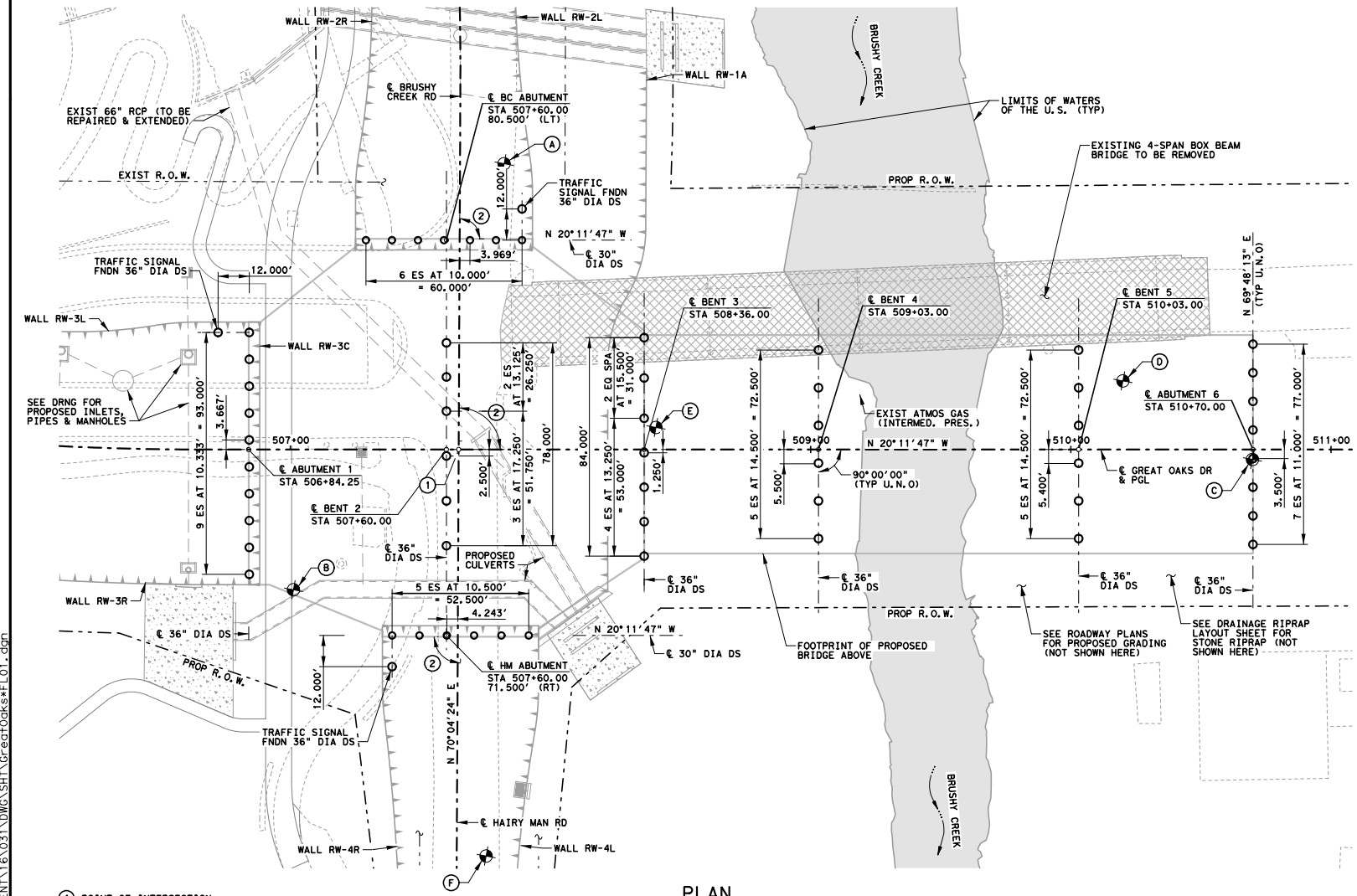

PLAN

(1) POINT OF INTERSECTION
℄ GREAT OAKS DR STA 507+64.72
END ℄ BRUSHY CREEK RD STA 17+03.22
BEGIN ℄ HAIRY MAN RD STA 17+03.22

(2) 89°43'49"

(A) BORE HOLE CR-1 STA 507+82.17 109.87' LT

(B) BORE HOLE CR-2 STA 507+.01.22 53.93' RT

(C) BORE HOLE B-1 STA 510+69.81 3.85' RT

(D) BORE HOLE B-2 STA 510+20.03 26.37' LT

(E) BORE HOLE B-3 STA 508+40.54 8.46' LT

(F) BORE HOLE RW-2 STA 507+75.26 156.33' RT

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION (2014) WITH CURRENT INTERIM REVISIONS FOR HL93 LOADING.
2. SEE ROADWAY PLANS FOR PARKING AND PEDESTRIAN TRAIL INFORMATION.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATION.
4. ALL DIMENSIONS ARE PARALLEL OR PERPENDICULAR TO ALIGNMENT UNLESS NOTED OTHERRWISE (TANGENT OR RADIAL AT CURVING ELEMENT).
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
6. SEE ILLUMINATION AND SIGNAL PLANS FOR LOCATION OF EXISTING AND PROPOSED ELEMENTS NOT SHOWN HERE.
7. SEE DRAINAGE PLANS FOR EXISTING AND PROPOSED DRAINAGE.
8. REFER TO BRIDGE LAYOUT FOR OVERHEAD UTILITIES NOT SHOWN HERE.

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P.E. No. 88707 Date 8/9/2018

WILLIAMSON COUNTY 1848

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GREAT OAKS DR AT BRUSHY CREEK RD

BRIDGE FOUNDATION LAYOUT

8/9/2018

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HWY NO.
JSR	6			
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
TLS	TEXAS	AUS	WILLIAMSON	
DES CHECK	CONTROL	SECTION	JOB	
ADZ				
DRN CHECK				
JSR				

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APPENDIX B

SHOVEL TEST DATA

Shovel Test	Depth (cm)	Setting	Soil Description	Cultural Materials
1	0-10	Shoulderslope on uplands south of Brushy Creek	Very dark gray (10YR 3/1) very cobbly clay; numerous limestone casts	None observed
2	0-10	Backslope on uplands south of Brushy Creek	Very dark gray (10YR 3/1) very cobbly clay; numerous limestone casts	None observed
3	0-15	Backslope on uplands south of Brushy Creek	Very dark gray (10YR 3/1) very cobbly clay; numerous limestone casts and pebbles	None observed
4	0-5	Toeslope on uplands south of Brushy Creek	Eroded/shallow dark gray (10YR 3/1) soil over bedrock/cobbles	None observed
5	0-10	Toeslope on uplands south of Brushy Creek	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
6	0-30	Toeslope on uplands south of Brushy Creek, east end of APE	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
7	0-10	Channeled portion of floodplain; common lag gravels on bedrock	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed
8	0-25	Toeslope on uplands south of Brushy Creek, slightly elevated above channeled floodplain and gravel layers	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
9	0-5	Channeled portion of floodplain; common lag gravels on bedrock; scoured bedrock surface	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed
10	0-20	Toeslope on uplands south of Brushy Creek, slightly elevated above channeled floodplain and gravel layers	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
11	0-5	Channeled portion of floodplain; common lag gravels on bedrock; scoured bedrock surface	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed
12	0-15	Toeslope on uplands south of Brushy Creek, slightly elevated above channeled floodplain and gravel layers	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
13	0-10	Toeslope on uplands south of Brushy Creek, slightly elevated above channeled floodplain and gravel layers	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
14	0-15	Toeslope on uplands south of Brushy Creek, slightly elevated above channeled floodplain and gravel layers	Shallow very dark gray (10YR 3/1); impenetrable due to cobbles and pebbles	None observed
15	0-5	Channeled portion of floodplain; common lag	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed

Shovel Test	Depth (cm)	Setting	Soil Description	Cultural Materials
		gravels on bedrock; scoured bedrock surface		
16	0-10	Disturbed, eroded and gullied right-of-way	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed
17	0-10	Disturbed, eroded and gullied right-of-way	Dark grayish brown (10YR 4/2) silty clay loam; over gravel deposits	None observed
18	0-15	Narrow terrace surface south of Brushy Creek	Very dark gray (10YR 3/1) gravelly clay; limestone casts and pebbles	None observed
19	0-15	Narrow terrace surface south of Brushy Creek	Very dark gray (10YR 3/1) gravelly clay; limestone casts and pebbles	None observed
20	0-20	Narrow terrace surface south of Brushy Creek	Very dark gray (10YR 3/1) gravelly clay; limestone casts and pebbles	None observed
21	0-15	Narrow terrace surface south of Brushy Creek	Very dark gray (10YR 3/1) gravelly clay; limestone casts and pebbles	None observed
22	0-15	Gravelly terrace within right-of-way east of Great Oaks Drive, north of Brushy Creek	Very dark grayish brown (10YR 3/2) gravelly loam over indurated/caliche horizon; disturbed	None observed
23	0-10	Gravelly terrace within right-of-way east of Great Oaks Drive, north of Brushy Creek	Very dark grayish brown (10YR 3/2) gravelly loam over indurated/caliche horizon; disturbed	None observed
24	0-5	Gravelly terrace within right-of-way east of Great Oaks Drive, north of Brushy Creek	Very dark grayish brown (10YR 3/2) gravelly loam over indurated/caliche horizon; disturbed	None observed
25	0-5	Gravelly terrace within right-of-way east of Great Oaks Drive, north of Brushy Creek	Very dark grayish brown (10YR 3/2) gravelly loam over indurated/caliche horizon; disturbed	None observed
26	0-10	Gravelly terrace within right-of-way east of Great Oaks Drive, north of Brushy Creek	Very dark grayish brown (10YR 3/2) gravelly loam over indurated/caliche horizon; disturbed	None observed