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Cultural Resources Survey of the Lone Star Express II Pipeline – Loop 3, in Eastland, Comanche, Erath, and Bosque Counties, Texas

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Cultural Resources Survey of the Lone Star Express II Pipeline – Loop 3, in Eastland, Comanche, Erath, and Bosque Counties, Texas

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GRAY & PAPE

HERITAGE MANAGEMENT

*Cultural Resources Survey of the
Lone Star Express II Pipeline –
Loop 3, in Eastland, Comanche,
Erath, and Bosque Counties, Texas*

*Lead Agency:
The United States Army Corps of Engineers,
Fort Worth District*

SWF-2019-00091

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19-71601.001



GRAY & PAPE

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ABSTRACT

Gray & Pape, Inc., of Houston, Texas, on behalf of Lone Star NGL Pipeline, LP, conducted an intensive pedestrian cultural resources survey within permitted areas of the 142.27-kilometer (88.4-mile) long Lone Star Express II Pipeline Project – Loop 3, in Eastland, Comanche, Erath, and Bosque Counties, Texas. The lead agency for the project has been identified as the United States Army Corps of Engineers, Fort Worth District (Permit No. SWF-2019-00091). Thus, survey efforts concentrated on areas anticipated to be under the jurisdiction of the United States Army Corps of Engineers (permit areas). Within Loop 3, the total Area of Potential Effects within the permit areas measures approximately 209.9 hectares (518.6 acres). This area encapsulates approximately 52.8 kilometers (32.8 miles) of proposed project alignment. The procedures to be followed by the United States Army Corps of Engineers to fulfill the requirements set forth in the National Historic Preservation Act, other applicable historic preservation laws, and Presidential directives as they relate to the regulatory program of the United States Army Corps of Engineers (33 CFR Parts 320-334) are articulated in the Regulatory Program of the United States Army Corps of Engineers, Part 325 - Processing of Department of the Army Permits, Appendix C - Procedures for the Protection of Historic Properties.

All fieldwork and reporting activities were completed according to a scope of work submitted to the United States Army Corps of Engineers and the Texas Historical Commission and accepted standards set forth by the Texas Historical Commission and the Council of Texas Archeologists and in accordance with Section 106 of the National Historic Preservation Act.

A records and literature review of the project location prior to survey identified 13 previously recorded archaeological sites, four historic markers, five cemeteries, and five previously conducted surveys within a 0.8-kilometer (0.5-mile) radius of Loop 3. Of those, the mapped locations for one recorded archaeological site and three previous surveys intersect the project corridor. An additional three archaeological sites are located within 91 meters (300 feet) of the project's Areas of Potential Effects. Fieldwork on Loop 3 was conducted in the Spring of 2019 with supplemental survey in August, October, and November of 2019 and required approximately 3,680-person hours to complete. Survey involved archaeological reconnaissance and shovel testing throughout anticipated permit areas within the project corridor. In total, approximately 901 shovel tests were excavated within permit areas, of which four were positive for cultural material.

No portions of previously recorded resources: 41ER48, 41ER49, 41ER50, or 41ER56, were re-identified; however, two new previously unrecorded resources, 41BQ358 and 41BQ359, and one isolate, BQ-07-ISO-01, were discovered. The newly recorded resources consist of sparse Prehistoric lithic scatters, consisting mainly of debitage and lacking temporally or culturally diagnostic artifacts. The lone diagnostic artifact, Isolate BQ-07-ISO-01, consists of an Ellis or Godley type projectile point dating to the Late to Transitional Archaic. The resource areas within the pipeline corridor showed clear disturbance from the adjacent pipeline right-of-way. Indications of soil deflation, erosion, and past land modifications such as agriculture or terracing were also observed. Further, Resource 41BQ358 and Isolate BQ-07-ISO-01 are located on very spatially limited topographic settings surrounded by slopes of 30 degrees or greater. The workspace at the location of 41BQ359 has been revised to avoid the site thus removing it from permitting. The workspace where it passes the site will be marked by orange fencing.

Shovel test results at nearly all permit areas identified subsoils, cemented soils, or bedrock. Alarm Creek in Erath County, Permit Area Number 65, was targeted for deep testing based on

geomorphological data, and field results and discussions with the field archaeologist. Deep test results indicated a lack of deeply buried A horizon soils and showed no potential for deeply buried cultural material or paleosols. No cultural features or historic-age standing resources were encountered in the field. No artifacts were collected as a result of survey.

It is the opinion of Gray & Pape Inc. that none of the recorded resources retain the potential to provide significant research value and are thus recommended not eligible for the National Register, under Evaluation Criterion D. In addition, the resources are recommended not eligible for State Antiquities Landmark status. Gray & Pape, Inc. recommends no additional archaeological work for these resources or surveyed portions of the project. However, Gray & Pape, Inc. recommends that an unanticipated discoveries plan be put into place in the event that such discoveries take place during construction.

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1.0 INTRODUCTION

EDGE Engineering and Science, LLC (EDGE), of Houston, Texas, contracted with Gray & Pape, Inc. (Gray & Pape), of Houston, Texas, to perform an intensive pedestrian cultural resources survey within portions of the Area of Potential Effects (APE) of the Lone Star Express II Pipeline Project - Loop 3, located in Eastland, Comanche, Erath, and Bosque Counties, Texas.

The entire project is located on private property. The lead agency for permitting purposes has been determined to be the United States Army Corps of Engineers, Fort Worth District (Corps or USACE). Thus, survey efforts were conducted within portions of the APE anticipated to be within Corps permit areas. The procedures to be followed by the USACE to fulfill the requirements set forth in the National Historic Preservation Act (NHPA), other applicable historic preservation laws, and Presidential directives as they relate to the regulatory program of the USACE (33 CFR Parts 320-334) are articulated in the Regulatory Program of the USACE, Part 325 - Processing of Department of the Army Permits, Appendix C - Procedures for the Protection of Historic Properties. All fieldwork and reporting activities were completed with reference to state (the Antiquities Code of Texas) and federal (NHPA) guidelines.

The following report includes the results of the archaeological survey completed within jurisdictional permit areas along approximately 142.59 kilometers (88.60 miles) of centerline in Loop 3.

1.1 Project Overview

Lone Star NGL Pipeline, LP (Lone Star), proposes to construct a new pipeline loop in Eastland, Comanche, Bosque, and Erath Counties, Texas, referred to as the Lone Star Express II Pipeline Project – Loop 3 (LSXII –

Loop 3 or Project). The LSXII – Loop 3 Project will be approximately 142.59 kilometers (88.60) miles long and will be used to transport natural gas liquids (NGL). The purpose of the proposed Lone Star Express II Pipeline Project is to add approximately 400,000 barrels per day of NGL capacity to the existing Lone Star Express system which will help alleviate infrastructure constraints out of the Delaware and Permian basins in West Texas. The proposed Loop 3 portion of the Project will increase system capacity between the existing LSX3 Pump Station in Eastland County and the existing LSX4 Pump Station in Erath County, Texas. The proposed pipeline loop will generally be constructed within existing utility corridors and has been designed to parallel the existing Lone Star Express I Pipeline. New permanent facilities will be constructed alongside the existing Lone Star Express Pipeline facility locations where possible. Construction is currently scheduled to begin on September 1, 2019. The anticipated in-service date is January 2020.

Loop 3 intersects 15 USGS 7.5-minute topographic quadrangle maps (Figure 1-1, Table 1-1). Loop 3 begins in Eastland County approximately 13.7 kilometers (8.5 miles) southwest of Cisco at Interstate 20 and continues 108 kilometers (67 miles) southeast through Comanche and Erath Counties and into Bosque County before turning northeast for approximately 15.5 kilometers (9.6 miles) before turning west-southwest for 15 kilometers (9.3 miles) before terminating just south of Highway 174 approximately 6.9 kilometers (4 miles) west of Kopperl, Texas. Along that path the APE is largely collocated with an existing pipeline corridor and intersects several major and county roads, unimproved roads, agricultural fields and pastures. Loop 3 also crosses approximately 47 natural waterways (Table 1-2).

5/9/2019 Created in ArcGIS 10.4 for G&P Project 19-71601.001.

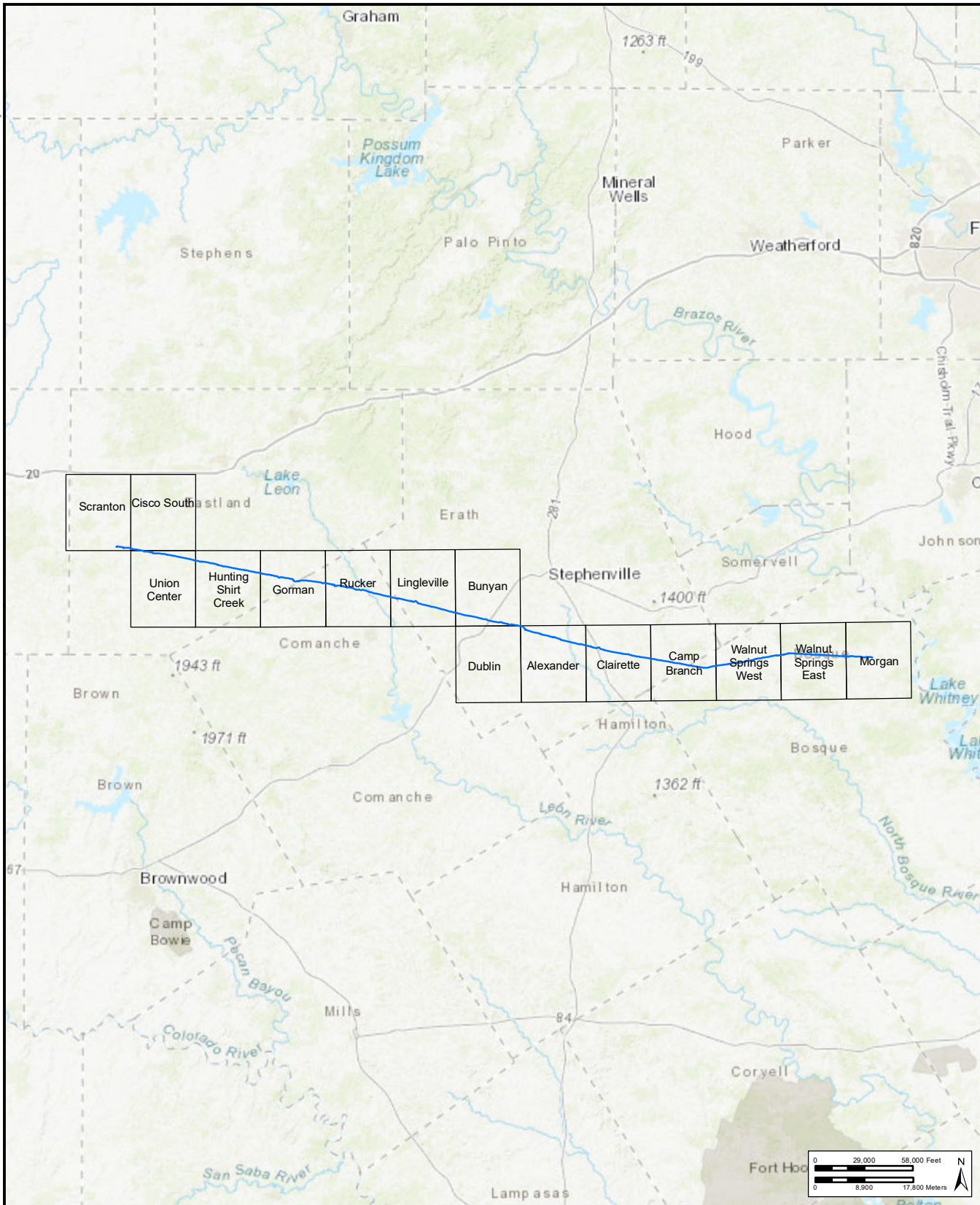


Figure 1-1
Project location in Eastland, Comanche, Erath,
and Bosque Counties, Texas.

- Project Location
- USGS Quadrangle Boundary

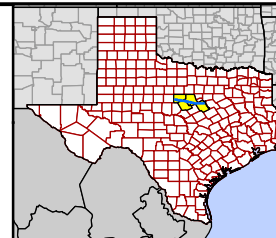


Table 1-1. USGS Quadrangles Intersecting Loop 3.

USGS Quad ID	Name	State	Date Revised	Date Published	Date Photo Revised
32099-C1	Scranton	Texas	-	69	-
32098-C8	Cisco South	Texas	-	70	-
32098-B8	Union Center	Texas	-	72	-
32098-B7	Hunting Shirt Creek	Texas	-	72	-
32098-B6	Gorman	Texas	-	72	-
32098-B5	Rucker	Texas	-	72	-
32098-B4	Lingleville	Texas	76	79	-
32098-B3	Bunyan	Texas	-	68	76
32098-A3	Dublin	Texas	-	68	76
32098-A2	Alexander	Texas	76	79	-
32098-A1	Clairette	Texas	76	79	-
32097-A8	Camp Branch	Texas	-	68	76
32097-A7	Walnut Springs West	Texas	-	68	76
32097-A6	Walnut Springs East	Texas	77	79	-
32097-A5	Morgan	Texas	-	69	77

Table 1-2. Natural Waterways Crossed by Loop 3.

Waterway Name
Armstrong Creek
Greer Creek
Unnamed Tributary of Leon River
North Bosque River
Leon River
Currycomb Branch
Steele Creek
Cat Branch
Unnamed Tributary of Shirt Creek
Sand Branch
Duffau Creek
Unnamed Tributary of Long Branch
Round Hole Branch
Cat Branch
Unnamed Tributary of Cow Creek
Unnamed Tributary of Sand Branch
Cow Creek
Mustang Creek
Buck Branch
Unnamed Tributary of Greer Creek
Live Oak Creek
Unnamed Tributary of Long Branch / Sabana River
Unnamed Tributary of North Bosque River

Waterway Name
Green Creek
Unnamed Tributary of Green Creek
Unnamed Tributary of Sabana River
Rocky Creek
Unnamed Tributary of Round Hole Branch
Unnamed Tributary of Flat Creek
Unnamed Tributary of Steele Creek
Camp Branch
Turkey Branch
Farris Creek
Walker Branch
Cox Branch
Unnamed Tributary of Sabana River
Little Duffau Creek
Unnamed Tributary of Shinoak Branch
Unnamed Tributary of Sabana River
Flat Creek
Unnamed Tributary of Leon River
East Bosque River
Hunting Shirt Creek
Alarm Creek
Shinoak Branch
Unnamed Tributary of Long Branch
Unnamed Tributary of Round Hole Branch

The anticipated Corps Permit Area/APE for Loop 3 consists of approximately 124 locations subsuming 51.5 kilometers (32 miles) of centerline or approximately 203 hectares (502 acres) of Project survey corridor. The breakdown of area/length per county is provided in Table 1-3.

Table 1-3. Permit Areas by County.

County	Permit Area Count	Acres	Miles
Eastland	21	101.20	7.00
Comanche	16	58.80	3.50
Erath	52	211.00	12.00
Bosque	35	131.00	9.50
Total	124	502.00	32.00

1.2 Report Organization

This report is organized into seven numbered chapters and three lettered appendices. Chapter 1.0 provides an overview of the Project. Chapter 2.0 presents an overview of the environmental setting and geomorphology. Chapter 3.0 presents a discussion of the cultural context associated with the APE. Chapter 4.0 presents the research design and methods developed for this investigation. The results of this investigation are presented in Chapter 5.0. Chapter 6.0 presents the investigation summary and provides recommendations based on the results of field survey. A list of literary references cited in the body of the report is provided in Chapter 7.0.

Maps of the field survey results for Loop 3 are displayed in Appendices A and B. Appendix C contains a log of all excavated shovel tests.

1.3 Acknowledgements

Fieldwork on Loop 3 was conducted from March 26 to May 1, 2019 with supplemental survey activities conducted in August, October and November 2019. Fieldwork required approximately 3,680-person field hours to complete. The Project was managed by Senior Principal Investigator Tony Scott. Field activities were conducted by Field Leaders Chris Baltz, Matthew Kinsey, Monte Lawton, Kyle Mayer, Charlie Rose and Technicians Lindsay Gundler, William Leake, Marie Swartz, Kyle Potter, Jacob Seaton, Shelly White, Jonathan Cooper, Linsey Griffin, Petrina Kelly, Katrina Miller, Kaitlin Roberts, Steven Sykes, and Luis Gonzalez. The report was prepared by Tony Scott and Amanda Kleopfer. Graphics were produced by Tony Scott. Jessica Bludau edited and produced the report.

Gray & Pape extends a special thank you to Lone Star Construction Manager Mike Churchman, Assistant Construction Manager Clyde McDonald, Pipeline Inspectors Bill Laird, David Bostic, Mark Salmon, Shane Holdridge, and Environmental Inspector Patrick Hill whose assistance and knowledge was instrumental in the timely and safe completion of the survey effort.

2.0 ENVIRONMENTAL CONTEXT

2.1 Physiography and Geomorphology

Most of the Project is situated in the Interior Plains of the Central Lowland/Great Plains physiographic province. The Interior Plains are characterized by a nearly level to low rolling topography situated in the Edwards Plateau, Oakwoods and Prairies, and Blackland Prairies natural regions. Beginning in the rough hills of the Edwards Plateau, the surrounding topography quickly gives way to the rolling terrain of the Oakwood and Blackland Prairies, created by the effects of erosion from ancient streams, leaving a landscape that is also steeply sloped in areas of highly dissected riverine edges (Bureau of Economic Geology [BEG] 1996).

2.2 Surface Geology

Loop 3 crosses 14 geologic formations (Table 2-1). These formations largely consist of clay, mud, and shale surface horizons underlain by

limestone, sandstone, or shale. Where overlying sands have been eroded away, the underlying deposits of silt, gravel, shale, and limestone are exposed. These can be up to 11 meters (35 feet) thick (Barnes 1967, 1977, 1983; Ferring 2007). Deposits crossed by the Project loop largely date from the Pennsylvanian to the Early Cretaceous.

2.3 Soils

Loop 3 intersects approximately 90 soils (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture [SSS NRCS USDA] 2019) spread out across the four counties. Loop 3 is represented by Windthorst-Chaney-Duffau and Aledo-Sanger-Bolar soil associations (BEG 2008). Windthorst soils are characterized as fine sandy loam to loamy very fine sand surface layer overlying sandy clay. Duffau soils are very deep with a sandy clay loam to loamy fine sand surface layer that becomes yellowish red with depth.

Table 2-1. Geologic Groups/Formations Intersected by Loop 3.

Label	Formation/Group	Age	Rock Type 1	Rock Type 2
IPhc	Home Creek Limestone and Colony Creek Shale, undivided	Pennsylvanian; Missouri Series	shale	limestone
IPpb	pre-Brazos River rocks, undivided	Pennsylvanian; Des Moines Series	mudstone	sandstone
IPrp	Ranger Limestone and Placid Creek Shale, undivided	Pennsylvanian; Missouri Series	shale	limestone
IPw	Winchell Limestone	Pennsylvanian; Missouri Series	limestone	shale
IPwm	Wolf Mountain Shale	Pennsylvanian; Missouri Series	shale	sandstone
Ka	Antlers Sand	Early Cretaceous	sand	clay or mud
Kfu	undivided part Fredericksberg Group	Early Cretaceous	clay or mud	limestone
Kgr	Glen Rose Limestone	Early Cretaceous	limestone	clay or mud
Kpa	Paluxy Sand	Early Cretaceous	sand	sandstone
Ktm	Twin Mountains Formation	Early Cretaceous	sandstone	claystone
Kwa	Walnut Clay	Early Cretaceous	clay or mud	limestone
Kwu	undivided part of Washita Group	Early Cretaceous; Comanchean Series	clay or mud	limestone
PIPm	Magdalena Formation	Pennsylvanian to Permian?	limestone	shale
Qal	alluvium	Holocene	sand	silt

These soils are well drained and are found on nearly level or gently sloping uplands. The Chaney series are characterized as deep soils that are moderately well drained with a sandy surface layer overlying mottled sandy clay found on nearly level to sloping plains. The Bolar Series consists of deep, calcareous, loamy soils overlying layers with high amounts of lime (BEG 2008).

2.4 Natural Environment

The western portion of the Project area in Loop 3 is largely dominated by agricultural crops. As the Project moves east, the agricultural areas become more interspersed and, in some places, entirely replaced with Silver Bluestem-Texas Wintergrass Grassland and Oak-Mesquite-Juniper Parks/Woods (BEG 2000). Wildlife include the critically endangered lesser prairie chicken, as well as mammal species such as deer, fox, raccoon, skunk, opossum, badger, ringtail cat, bobcat, coyote, and peccary (Griffith et al. 2007). Other species inhabiting the area include waterfowl, rattlesnake, raptor, and jackrabbit (Lowther 1981).

2.4.1 Climate

The Project area in Loop 3 has a warm-temperate, sub-humid climate with hot summers. Annual rainfall averages 74.1 centimeters (29.17 inches), most of which falls during the warm season from April through October (Wagner et al. 1977; Stringer 1980). Summer temperatures can be intense, but relatively low humidity and frequent thundershowers help break the hot weather into short periods. Winters are highly variable, with cold fronts, and occasional light snows, which melt rapidly (Wagner et al. 1977; Stringer 1980).

2.5 Land Use

Land use in Loop 3 is largely farmland and/or pasture and scrub brush; however, it is more pasture than farmland. A small portion of Loop 3 crosses a residential area on the outskirts of Gorman. Much of the Project length is collocated and shows clear signs of disturbance from adjacent pipeline corridors and supporting infrastructure.

3.0 CULTURAL CONTEXT

3.1 Prehistoric Context

Prehistoric sites in the Southern High Plains and Central Plains regions are commonly found on the surface and in mixed context (Meltzer 1987). Sites are typically located along the remnants of draws, playas, and larger salina basins that have been filled in by eolian processes (Johnson and Holliday 2004). The majority of known prehistoric Clovis, Folsom, and Late Paleoindian archaeological sites in Texas are found in portions of the High Plains region near New Mexico and western Oklahoma. The general area was near the southernmost reach of now extinct megafauna in the United States and included mammoth and a large form of bison, which were frequently hunted by prehistoric groups.

Sites with historic components in the region date as far back to the 1700s as was recorded in Blanco Canyon. Most historic sites in the area represent materials left behind by Hispanic shepherders called *pastores*, European buffalo hunters, military outfits, and Anglo dumpsites (Perttula 2004).

Archaeological materials that have contributed to the development of a five-period cultural chronology, as developed by Kelley (1964) and Prikryl (1990), in the area based on excavations at a handful of intact sites. For the purpose of this report, an attempt is made to generalize these periods in the following paragraphs; however, it should be noted that cultural periods are not equally represented across the varying ecological and physiographic areas that the Project intersects.

3.2 Paleoindian Period

The Paleoindian period falls within the latter part of the Pleistocene and into the early Holocene. It is generally agreed to have begun as far back as 11,500 years before present (B.P.) and continued until 8,500 B.P. and is

marked by ubiquitous hunting and on-site butchering of megafauna in small nomadic groups.

The Paleoindian period is further subdivided into three more specific periods marked by projectile point technologies (Frison 1991; Holliday 1997; Wheat 1972; Wormington 1957). These include the well-known Clovis, Folsom, and Late Paleoindian periods. The Clovis period is thought to have endured at least 500 years during the latter part of the Pleistocene and its lithic technology is the oldest known in North America. Clovis points are lanceolate-shaped with short flutes (Turner and Hester 1993). Clovis points are large, heavy, and well-made tools that were used for puncturing the thick flesh of large game. The Folsom period, from 10,800-10,300 B.P., is also defined by a large fluted lanceolate-shaped point. Folsom points look similar to the Clovis point, but are thinner, more symmetrical, evenly chipped on the edges, and have a single classic flute all the way up the center of the point (Turner and Hester 1993). The Late Paleoindian period, from 10,000-8,500 B.P., is characterized by excellent craftsmanship of long, thin, narrow, lanceolate points without flutes. Instead, these points have parallel flakes and are ground with thinned bases typically accomplished with a few vertical flakes (Turner and Hester 1993). Paleoindian sites of note located in the Southern High Plains and Central Plains regions include the Lone Wolf Creek (41MH23), Midland (41MD1), and McClean (41TA29) sites.

3.3 Archaic Period

Following a transition to a warmer climate, the Archaic period is accepted to have lasted between 8,500-1,250 B.P. The Archaic period is marked by an adaptation to less abundant water resources and to more dependence on vegetation as a food source than compared to people living in the Paleoindian period

(Johnson and Holliday 2004). The Archaic period is further subdivided into two periods, known as the Early and Late Archaic periods, which the former is characterized by a lack of occupational sites in the area during a time called the Altithermal when the land was hot, dry, and dusty. The Late Archaic is defined by a sudden increase in the number of sites around 4,500 B.P., when a noticeably milder climate with less hostile conditions returned to the area (Antevs 1954; Hughes 1991). Archaic sites are commonly associated with fewer megafauna kill sites than earlier Paleoindian sites. Such sites are often associated with an array of stemmed and later barbed dart points, ground stones, and hearths lined with burned stone and caliche-cobbles (Hofman 1989).

3.4 Late Prehistoric Period

The Archaic period was followed by the development of ceramic technology and the bow and arrow. These two inventions made way for significant sociocultural changes including a shift toward sedentism and decreased mobility. These developments are the hallmarks of the Late Prehistoric period, which lasted from A.D. 200-1450.

Because of more specific diagnostic traits associated with the Late Prehistoric, it is further subdivided into the Woodland period (A.D. 200-1450), the Palo Duro Complex (A.D. 500-1100), and the Antelope Creek Phase (A.D. 1200-1450). The Lake Creek Site in the Texas Panhandle represents the Woodland period in the High Plains, which is characterized by cordmarked ceramics, corner-notched Scallorn arrow points, and a large assemblage of lithic flake tools (Hughes 1962). Palo Duro Complex Sites are defined by the use of pit houses and evidence of plant food procurement and processing. The first evidence of such was gathered during excavations by Willey and Hughes (1978) of the Deadman's Terrace Site, more commonly called Deadman's Shelter.

Finally, the Antelope Creek Phase, sometimes called the Antelope Creek Focus is the most distinctive and well-known of the Late Prehistoric periods in the Panhandle. Hughes (1991:31) documents the highest density of Antelope Creek Sites occurring along the Canadian breaks. Antelope Creek sites are best known by their pueblo-like structures with numerous rooms. These sites are also commonly identified by the presence of bone tools, made from butchered bison, scrapers, grinding slabs for plant processing, and sometimes obsidian (Hughes 1991).

3.5 Protohistoric Period

The Protohistoric period dates from A.D. 1450 to AD 1600. It is defined by documented trade activities with neighboring Pueblos, increased ceramic production projectile points that seem to be confined to one of two subdivisions of the Protohistoric. The Tierra-Blanca Complex and the Garza Complex are contemporary. The Tierra-Blanca Sites are thought to have traded with the New Mexico Pueblos and are typically identified by the presence of larger villages (Hughes 1991). The Garza Complex is associated with the Garza point type which seems to only appear at Garza Complex sites. Other point types found at Garza Complex sites include the Washita, Harrell, Lott, and Fresno (Hughes 1991).

3.6 Historic Period

Several Native American tribes are known to have inhabited the area prior to Spanish contact in 1541; these include the Apache, Comanche, Kiowa, and Kiowa-Apache (Newcomb 1961). In the nineteenth century, the area was inhabited by the Kiowa and Comanche tribes, who preferred free range over Oklahoma's reservations (Whitlock 1970). By then, the Comanche had displaced the Apache. It is widely known that by the nineteenth century, aboriginal groups remaining in the High Plains had begun exploiting horses for use during hunting and raiding. During that time, the Comanche were

assigned by the Army to reservation life in Oklahoma (Newcomb 1961).

3.7 Historical Context of the Region

The earliest written descriptions of the north-central region of Texas come as a result of Spanish exploration of the areas to the north and west of the current Project. The cliff on the north facing of the Canadian River was seen by Francisco Vázquez de Coronado in 1541 on his way east from Cíbola, leading him to name the plateau the Llano Estacado, or *Palisaded Plain*. In addition to recording the initial explorations of the Llano Estacado, Coronado developed the region's orientation toward the Hispanic Southwest. Coronado's efforts were mimicked by Juan de Oñate during an early seventeenth century expedition

along the Canadian River. In 1872, the Llano Estacado was described by General Randolph Marcy as a "great North American desert" with "not a tree, bush or water" (Whitlock 1970).

Early on, white settlement in the region was sparse, with hostilities between settlers and Comanches a constant risk. In the 1870s, conflict between American buffalo hunters and regional Native-American tribes reached its apex in the Red River War. Military defeat and the slaughter of the buffalo herds forced the Comanches, Kiowa, Cheyenne, and Arapaho off the plains to reservations (Haley 2010). After removal of the Comanche, Anglo settlement of what is now Erath County and the surrounding areas increased sharply, with cotton farming becoming the main economic draw (Young 2017).

4.0 FIELD METHODOLOGY

This cultural resource investigation was designed to identify and assess new and previously recorded cultural resources that may be impacted by the proposed Project. Desktop assessment and modeling were performed prior to initiating field investigations to better understand cultural, environmental, and geological settings. Results of the desktop assessment were then used to develop the field methodology.

4.1 Site File and Literature Review

The background literature search included a review of previously conducted cultural resource surveys in the vicinity of the proposed Project area, and of any historic document pertaining to the history of the area. Site file research was performed to identify all previously recorded archaeological sites within a 0.8-kilometer (0.5-mile) study radius of the Project area and any recorded historic structures eligible for the National Register of Historic Places (NRHP) or State Antiquities Landmark (SAL) listing located adjacent to the Project area. Site file research was done by reviewing records maintained by the Texas Archeological Research Laboratory in Austin, Texas, and by consulting Texas Historical Commission (THC).

Historical topographic maps and aerial photographs when available were reviewed to identify any historic structures, residential, and other structures that might be located close to or within the Project area. Historical maps of Texas and Texas counties were also reviewed in order to better understand the history of the region and to identify any potential historic trails and important historic sites located or crossing the Project area.

4.2 Field Methods

4.2.1 Intensive Pedestrian Survey

The Project was subjected to pedestrian survey within permit areas. Permit areas were based on water features which were field delineated by biological field crews in conjunction with the cultural resource survey. The permit areas for each water feature were assessed on a case-by-case basis but in general comprised the first terrace to first terrace of large perennial creeks and rivers that intersect the APE. For smaller streams and water features without terraces, a minimum baseline buffer area placed to either side of the water feature was assessed. These buffer areas consist of 180 linear meters (600 linear feet) to either side of larger perennial and intermittent drainages and 100 linear meters (300 linear feet) to either side of some intermittent and ephemeral drainages, wetlands, and catch basins. Preliminary permit areas were further modified based on additional data such as geological units, soils, riparian areas, and previously identified resources. Based on the Project's typical corridor width of 39.6 meters (130 feet), two transects were investigated, with additional transects added as needed for wider temporary workspaces. Transects were spaced no more than 30 meters (100 feet) apart. Because most of the Project APE is collocated with an existing pipeline corridor which at times subsumes half or more of the total corridor width, one survey transect was often within an existing pipeline easement. Existing easements were routinely maintained and often displayed greater than 30 percent surface visibility. Survey transects overlapping existing easements, excessive slope, or standing water were at a minimum subjected to pedestrian surface inspection/walkover, and also judgmentally shovel tested where warranted to confirm/refute suspected subsurface disturbance. Digital photography aided

documentation of the existing conditions of the Project area and fieldwork methods, with photograph locations recorded on field maps and logged with a Global Positioning System (GPS) unit.

Shovel testing within permit areas was attempted along each transect at a number which met or exceeded Texas State Minimum Archaeological Survey Standards regardless of surface visibility. Shovel tests were generally spaced at intervals between 30 and 60 meters (100 and 200 feet). In areas of clear previous disturbance or areas of lower probability for cultural resources, shovel tests were not typically conducted at a distance greater than 100 meters (328 feet). Shovel tests were attempted to depths of 1 meter (3.3 feet) or until culturally sterile subsoil was reached, except where bedrock was present at shallow depths, or where potential existing pipelines were present.

All shovel tests measured approximately 30 centimeters by 30 centimeters (1 foot by 1 foot). When possible, all soil was screened through 0.64-centimeter (0.25-inch) wire mesh. Vertical control of each shovel test was maintained by excavating in arbitrary 10-centimeter (4-inch) levels with reference to the parent soil stratum. The profile of each shovel test was inspected for color and texture change potentially associated with the presence of cultural features. Descriptions of soil texture and color followed standard terminology and soil color charts (Munsell 2005). Additional information such as mottling, evidence of disturbance, and moisture level was also recorded. All shovel test data were recorded in one of two formats for analysis: GIS or standardized forms. All shovel tests were backfilled after excavation and documentation. The excavated shovel tests were placed on field maps and points were taken with a GPS unit.

At each permit area location, a summary of the results of activities along with recommendations was provided to the

Principal Investigator on a daily basis. These summaries were then submitted to the client. At regular intervals while survey was in progress shovel test forms were submitted to the Principal Investigator for review. Any need for additional work such as deep testing was based on the field results in coordination with the field archaeologist and arranged with the client.

4.2.2 Deep Testing

As documented in Chapter 5.2 below, shovel test results in nearly all permit areas indicated deflated soils with subsoil or bedrock near the surface. This is likely due to previous erosion and disturbance as a result of previous pipeline installations, the existing ROW of which subsumes the majority of the current APE. However, the location of Permit Number 65 at Alarm Creek in Erath County was identified as a candidate for deep testing. This determination was based on geomorphological data, and field results and discussions with the field archaeologists. The location is mapped for Holocene-age alluvial deposits which have the potential for a deep A horizon. Shovel test results at the location could not confirm that subsoils were reached and as a result, deep testing for the location was advised by the field archaeologist. The methodology was formulated in conjunction with agency coordination. Agency consultation concurred with the use of machine auguring at the location. Auger tests were placed at 50-meter (164-foot) intervals, conducted along a single transect placed outside of the existing pipeline right-of-way (ROW) for safety concerns. Mechanical auguring was conducted with reference to the most recent draft of the Council of Texas Archeologists (CTA) guidelines. Soil matrix removed during auguring was placed on plastic tarp to keep it separated from the surrounding vegetation. The removed material was monitored for texture and color changes and screened using ¼-inch mesh. Descriptions of soil texture and color followed standard terminology and the Munsell (2005) soil color charts. The locations

of all deep tests were recorded with a sub-meter accurate GPS data collector and recorded on field maps.

4.2.3 Site Definition

Surface visibility along the entire Project length was generally 70 percent or greater. Thus, all previously recorded sites that intersect the APE within permit areas were subjected to surface inspection supplemented by a sample of shovel tests placed at regular intervals within the previously established site boundary to check for deposition and density. A minimum of six radial shovel tests were typically attempted conducted in cardinal directions around the site boundary within the limits of the APE. Delineation tests were typically conducted in 10-meter (33-foot) intervals but increased or decreased at the field archaeologist's discretion based on contributing field factors such as surface expression, previously established site size, previous disturbance, landforms, amount of surface visibility, and perceived areas of surface density. Delineation tests were generally pursued until reaching two consecutive negative tests beyond the established site boundary.

Newly identified sites were delineated in the same manner. Positive shovel tests, artifacts visible on the surface, and site boundaries were recorded on Project maps and via sub-meter accurate GPS. Newly identified sites and revisited previously recorded sites were also documented on standardized archaeological site forms.

For each cultural resource identified, including structures or other resources within or immediately adjacent to the APE, photographs were taken of the general vicinity and of any visible features if present. A sketch map was prepared showing site limits, feature locations, permanent landmarks, topographic and vegetation variations, sources of disturbances, and total number of tests performed within and

near the site. Artifacts recovered from shovel tests were not to be collected. All discovered artifacts were photographed in the field and placed in the backfilled shovel test or left on the surface. Locations of all positive tests were recorded with the GPS.

Each identified resource was given a temporary field site number. Site forms were submitted for each cultural site identified. Revisit site forms were completed for previously recorded sites re-identified in the field. State-issued trinomial site numbers were requested for cultural sites but not for identified isolates.

If any architectural resources had been identified, these would have been recorded on corresponding field forms. Details of form, construction, material, style, condition, and alteration would be recorded both on the forms and photographically for each structure. All documentation would be reviewed by a qualified Architectural Historian who would decide if additional information or a personal field inspection was necessary at the survey level.

4.3 Laboratory Analysis

4.3.1 Artifact Analysis

Artifacts encountered in the field were not collected; thus, no lab analysis was conducted. Artifacts were instead described and classified in the field as best as possible and representative samples were photographed. Data recorded in the field for uncollected artifacts included general attributes such as form (if identifiable), material, functional classification (if identifiable), and counts.

4.4 Curation

No diagnostic or non-diagnostic artifacts were collected in the course of the current survey. Gray & Pape will maintain Project records in their curation facility in Houston.

5.0 RESULTS OF FIELD INVESTIGATION

5.1 Result of Site File and Literature Review

A search of the Texas Archeological Sites Atlas, maintained by the THC, determined that no National Register properties intersect the Project alignment within Loop 3. The same research identified that 13 previously recorded archaeological sites, five previously conducted archaeological surveys, four historical markers, and five cemeteries had been recorded within the 0.8-kilometer (0.5-mile) study radius of the Project area.

5.1.1 Previously Recorded Surveys

According to a search of the Texas Archeological Sites Atlas, at least five previous surveys have been conducted within a 0.8-kilometer (0.5-mile) study radius of Loop 3 (Table 5-1, Appendix A). Three of those surveys intersect the Project alignment; however, these consist of narrow survey corridors and none significantly overlap the current Project. The most recent of these surveys were conducted by Horizon Environmental Services, Inc. (Horizon). Projects included the Lonestar Transmission Pipeline. A review of reports associated with these and other surveys in the vicinity indicated a mix between 100 percent survey coverage and survey of USACE jurisdictional water crossings. Survey findings suggests that while archaeological sites are not uncommon in the general vicinity, they do not typically contain the information that would result in a recommendation for eligibility. Some of these resources are discussed further in-depth below.

5.1.2 Previously Recorded Archaeological Sites

Per a search of the Texas Archeological Sites Atlas (2019), 13 previously recorded archaeological resources occur within the 0.8-kilometer (0.5-mile) study radius of the Project

area. Of those, four are located within 91 meters (300 feet) of the APE, with only one resource, 41ER48, mapped as intersecting the APE (Table 5-2). Site 41ER48 is a historic-era farmstead originally recorded in 2011 for the Lone Star Competitive Renewable Energy Zone (CREZ) Transmission Line project by Horizon (Cochran et al. 2012). The site is located in the eastern portion of Erath County approximately 1.9 kilometers (1.2 miles) northwest of the intersection of Farm-to-Market (FM) 1824 and County Road (CR) 229. Cultural features observed at the site include the remnants of several historic structures: a house, a barn, two side-by-side corn-crib structures, a possible collapsed cellar, a limestone wall structure, a collapsed windmill, and a fenced-in corral area with a corrugated metal door. Ten canine graves were also discovered near the corn-crib structures. Artifacts present at Site 41ER48 include: whiteware fragments, clear, blue, brown and milk glass fragments, clear, brown and blue glass bottles, clear glass jars, metal fragments, metal stoves, wooden planks, red cherry bricks and brick fragments, window/door hinges, and pieces of metal piping and farm equipment (Texas Archeological Sites Atlas 2019).

5.1.3 Historical Markers

Four historical markers are recorded within 0.8 kilometers (0.5 miles) of the Project (Table 5-3; Figures A8, A24, and A25). The closest of these, the Duffau Cemetery (Marker No. 1293), is located 173 meters (569 feet) from the survey corridor at its nearest.

5.1.4 Cemeteries

Five cemeteries are located within the 0.8-kilometers (0.5-miles) radius of the Loop 3 Project area (Table 5-4; Figures A11, A18, and A25). The closest of these, Jewel Cemetery (No. EA-C008), is located 275 meters (902 feet) from the survey corridor at its nearest point.

Table 5-1. Previously Recorded Area and Linear Surveys within 0.8 Kilometers (0.5 Miles) of the Proposed Loop 3 Project Area.

Project Type	Date	TAC Permit No.	Sponsor/Agency	Investigating Firm	Report Author	THC Review Date
*Area Survey	8/1/2012	-	USACE, US Fish and Wildlife	Horizon	Cochran, Jennifer, et al.	1/4/2013
*Area Survey	2/1/1996	-	Federal Highway Administration, TXDOT	-	-	-
Linear Survey	5/1987	-	TXDOT	-	-	-
*Linear Survey	8/1993	-	REA	-	-	-
Linear Survey	1/2001	-	USDA-RD	-	-	-

*Indicates an intersection with the current Project.

Table 5-2. Previously Recorded Archaeological Resources within 91 Meters (300 Feet) of the Loop 3 Project Area.

Trinomial	Site Type	Cultural Affiliation	Materials observed	Record Date	NRHP Status	NRHP Review Date
*41ER48	Farmstead	Historic	Structures, whiteware, clear, blue, brown, and milk glass, metal, brick, wood, farming equipment.	2011	Ineligible	2012
41ER49	Artifact Scatter	Historic	Whiteware, brown glass bottle base, spun yarn, blue-green glass.	2011	Ineligible within ROW	2012
41ER50	Artifact scatter	Prehistoric/ Historic	Worked chert flake, metal, whiteware, brown glass bottle base.	2011	Ineligible within ROW	2012
41ER56	Artifact Scatter	Prehistoric and Historic	Chert flake, chert tool fragment, whiteware	2012	Ineligible within ROW	2012

*Indicates an intersection with the APE.

Table 5-3. Historical Markers Located within 0.8 Kilometers (0.5 Miles) of the Proposed Loop 3 Project Area.

Marker Number	Name	Marker Year	Description
1292	Duffau Baptist Church	1979	Dedicated to the early establishment of the Baptist church in the local community.
1293	Duffau Cemetery	1997	Dedicated to the early settlement of the area, the cemetery contains more than 950 marked graves, the earliest dating to 1865.
3810	Old Shinoak Springs	1966	Dedicated to the natural water resources in the area and their use and impact on the communities that arose around them.
4253	Hurley, Rev. Henry	1983	Dedicated to the early establishment of the Baptist church and religious leaders in the local community.

Table 5-4. Previously Recorded Cemeteries Located within 0.8 Kilometers (0.5 Miles) of the Proposed Loop 3 Project Area.

Cemetery Number	Name	County
CJ-C043	Unknown (Oliver Springs Ch)	Comanche
EA-C008	Jewel	Eastland
EA-C023	Romney	Eastland
ER-C006	Duffau	Erath
ER-C035	Lower Green's Creek	Erath

5.2 Results of Field Investigations

Fieldwork included archaeological reconnaissance throughout USACE permit areas within the APE. During the survey of Loop 3, permit areas surrounding 235 water features were investigated, consisting of streams, rivers, wetlands, and ponds/catch basins. These areas were encapsulated by 124 permit areas. In total, 901 shovel tests were excavated within the permit areas. Of those, four were positive for cultural materials resulting in the discovery of two new resources and one isolate find (Tables 5-5 to 5-8). Resource and artifact descriptions are provided in more detail in Section 5.2.3 below.

Table 5-5. Newly Recorded Cultural Resources Identified as a Result of Survey.

Field ID	Trinomial	Description
BQ-07-01	41BQ358	Prehistoric lithic scatter
BQ-38-01	41BQ359	Prehistoric lithic scatter
BQ-07-ISO-01	-	Projectile Point

5.2.1 Loop 3 General Characteristics

The loop's setting largely consisted of grassland pastures (Figure 5-1) and woods (Figure 5-2). Vegetation observed within the APE includes mesquite trees, sycamore trees, greenbrier, short annual grasses, Post Oak and Black Jack Oak trees. Surface visibility generally ranged from 20 to 100 percent. At least half of the survey corridor has been previously impacted by the adjacent pipeline installations, maintenance, or subsequent erosion (Figure 5-3). In many places, subsoil or bedrock is exposed at the surface (Figure 5-4). Within Loop 3, 901 shovel tests were excavated (see maps in Appendix B and Shovel

Test Log in Appendix C). While the project intersects areas mapped for at least 90 soils series, permit areas most often intersected areas mapped for Windthorst, Purves, Cheney, Pedernales, and Maloterre soils. These soils

The typical shovel test profile for most of the loop consisted of brown or dark yellowish brown (10YR 4/3 or 4/4) silt loam or silty clay loam followed by a subsurface layer of deflated silt loam. However, some portions consisted of light yellowish brown (10YR 6/4) sand or loamy sand followed by brownish yellow (10YR 6/6) hydric sand or clay. The depth of the surface and subsurface layers was typically shallow (5 to 50 centimeters [2 to 20 inches]), indicating past impact by erosion or land modification. In most tests, these layers were underlain by a layer of cemented caliche or limestone bedrock. Because of this, very few tests approached 100 centimeters (33 inches). Approximately 148 shovel tests showed evidence of disturbance displayed as mottled soils containing larger quantities of calcium carbonate or gravels throughout. These tests typically were located within or very near the existing pipeline corridor limits.



Figure 5-1. Overview of typical field conditions observed within pastured areas of Loop 3. View is to the east.

Table 5-6. Survey Results within Permit Areas of the Loop 3 Project Area.

Permit Area No.	Parcels	Miles	Acres	UTM E	UTM N	Shovel Test Count	Resources Identified	Appendix A Figure	Appendix B Figure
1	LSX-EA-023.000, LSX-EA-024.000	0.17	3.17	499078.19	3568655.90	1		A1	B1
2	LSX-EA-029.000	0.12	1.97	503559.27	3567882.67	5		A2	B2
3	LSX-EA-034.000 - LSX-EA-036.000	0.23	3.73	504230.10	3567668.63	9		A2	B3
4	LSX-EA-040.000, LSX-EA-041.000, LSX-EA-041.100	0.27	4.36	505738.90	3567541.18	13		A3	B4
5	LSX-EA-054.000	0.36	6.08	511855.87	3566329.60	13		A4	B5
6	LSX-EA-056.000, LSX-EA-057.000	0.25	3.98	513156.04	3566168.81	4		A4	B6
7	LSX-EA-057.000, LSX-EA-058.000	0.13	1.41	513525.04	3566101.53	2		A5	B7
8	LSX-EA-058.000	0.23	4.06	514393.36	3565940.52	3		A5	B8
9	LSX-EA-058.000, LSX-EA-062.000 / LSX-EA-063.000	0.15	2.96	515094.30	3565791.06	2		A5	B9
10	LSX-EA-068.000, LSX-EA-069.000, LSX-EA-070.000	1.22	19.86	518316.96	3565039.19	51		A6	B10
11	LSX-EA-074.000	0.51	8.42	521966.01	3564369.96	13		A7	B11
12	LSX-EA-076.000 - LSX-EA-077.000	0.26	4.66	522653.42	3564238.54	10		A7	B12
13	LSX-EA-077.000, LSX-EA-078.000	0.33	5.12	523331.98	3564116.72	15		A7	B13
14	LSX-EA-080.200, LSX-EA-080.300, LSX-EA-080.400, LSX-EA-081.000	0.52	3.57	525347.78	3563735.18	6		A8	B14
15	LSX-EA-081.100, LSX-EA-081.200, LSX-EA-082.000, LSX-EA-083.000	0.52	4.68	525799.17	3563650.83	10		A8	B15
16	LSX-EA-084.000, LSX-EA-085.000	0.27	4.80	526603.19	3563458.92	16		A8	B16
17	LSX-EA-086.000, LSX-EA-088.000	0.26	4.46	527279.43	3563335.31	8		A8	B17
18	LSX-EA-088.000, LSX-EA-089.000	0.11	2.26	527977.74	3563240.11	3		A8	B18
19	LSX-EA-090.000, LSX-EA-091.000	0.50	4.10	529283.40	3562984.55	2		A8	B19
20	LSX-EA-091.000	0.50	5.52	529510.34	3562701.16	3		A9	B20
21	LSX-EA-092.000, LSX-EA-093.000	0.12	1.98	529995.46	3562555.86	4		A9	B21
22	LSX-CO-002.000, LSX-CO-003.000	0.12	2.06	531490.88	3562728.14	4		A9	B22
23	LSX-CO-006.000, LSX-CO-007.000	0.14	2.30	533276.51	3562554.69	4		A9	B23
24	LSX-CO-008.000	0.15	2.85	534048.32	3562435.61	3		A10	B24
25	LSX-CO-009.000	0.21	3.33	534820.79	3562273.71	6		A10	B25
26	LSX-CO-009.000, LSX-CO-010.000	0.12	1.98	535339.35	3562244.44	2		A10	B26
27	LSX-CO-010.000, LSX-CO-011.000	0.23	3.62	536158.24	3562122.74	2		A10	B27
28	LSX-CO-016.000	0.18	2.76	538091.22	3561806.18	5		A11	B28

Permit Area No.	Parcels	Miles	Acres	UTM E	UTM N	Shovel Test Count	Resources Identified	Appendix A Figure	Appendix B Figure
29	LSX-CO-018.000	0.12	1.98	538864.66	3561579.61	3		A11	B29
30	LSX-CO-024.000	0.14	2.30	541590.03	3561039.37	5		A12	B30
31	LSX-CO-024.000 - LSX-CO-026.000	0.61	9.58	542253.27	3561001.68	13		A12	B31
32	LSX-CO-027.000, LSX-CO-028.000	0.27	4.84	543279.07	3560649.46	6		A12	B32
33	LSX-CO-028.000	0.30	6.06	543842.15	3560524.13	4		A12	B33
34	LSX-CO-030.000, LSX-CO-031.000	0.28	5.23	544941.40	3560259.53	9		A12	B34
35	LSX-CO-031.000, LSX-CO-032.000	0.37	5.65	545819.45	3560060.83	14		A13	B35
36	LSX-CO-033.000	0.15	2.35	547073.90	3559769.69	2		A13	B36
37	LSX-CO-034.000	0.11	1.91	547376.99	3559695.86	5		A13	B37
38	LSX-ER-0005.000, LSX-ER-0007.000	0.26	5.08	551584.12	3558985.34	8		A14	B38
39	LSX-ER-0008.000, LSX-ER-0009.000	0.14	2.63	553047.97	3558354.78	8		A14	B39
40	LSX-ER-0010.000	0.17	3.02	553913.64	3558166.68	3		A15	B40
41	LSX-ER-0010.000, LSX-ER-0011.000	0.24	4.10	554598.23	3558003.16	6		A15	B41
42	LSX-ER-0011.000, LSX-ER-0012.000	0.33	5.65	555212.48	3557847.40	3		A15	B42
43	LSX-ER-0013.000 - LSX-ER-0015.000	0.37	6.28	557276.29	3557320.74	9		A16	B43
44	LSX-ER-0016.000	0.00	3.07	558180.76	3557090.10	3		A16	B44
45	LSX-ER-0016.000, LSX-ER-0017.000	0.35	5.77	558768.25	3556944.10	7		A16	B45
46	LSX-ER-0017.000	0.16	2.51	559994.83	3556636.74	4		A16	B46
47	LSX-ER-0018.000	0.13	2.13	561010.99	3556370.80	7		A16	B47
48	LSX-ER-0018.000	0.14	3.48	561292.41	3556289.10	4		A17	B48
49	LSX-ER-0018.000 - LSX-ER-0020.000	0.13	2.71	561568.11	3556354.84	11		A17	B49
50	LSX-ER-0025.000	0.41	7.01	564110.06	3555738.67	27		A17	B50
51	LSX-ER-0027.000	0.27	4.64	564792.11	3555561.60	15		A17	B51
52	LSX-ER-0030.000 - LSX-ER-0032.000	0.37	5.99	566310.30	3555245.76	18		A18	B52
53	LSX-ER-0032.000 - LSX-ER-0034.000	0.76	12.46	567503.00	3555091.61	22		A18	B53
54	LSX-ER-0036.000	0.18	3.48	568646.86	3554740.48	9		A18	B54
55	LSX-ER-0037.000	0.13	2.07	568946.82	3554735.77	8		A18	B55
56	LSX-ER-041.000	0.40	6.40	570446.41	3554539.13	34		A19	B56
57	LSX-ER-0043.000 - LSX-ER-0045.000	0.33	6.17	571691.32	3553796.82	10		A19	B57

Permit Area No.	Parcels	Miles	Acres	UTM E	UTM N	Shovel Test Count	Resources Identified	Appendix A Figure	Appendix B Figure
58	LSX-ER-0045.000, LSX-ER-0046.000	0.14	2.80	572637.34	3553479.42	3		A19	B58
59	LSX-ER-0048.000	0.12	2.32	573914.54	3553216.66	4		A20	B59
60	LSX-ER-0049.000	0.19	3.25	574411.66	3553029.14	2		A20	B60
61	LSX-ER-0049.000, LSX-ER-0050.000	0.39	6.00	575074.34	3552836.88	7		A20	B61
62	LSX-ER-0049.000	0.31	4.92	575956.85	3552618.89	7		A20	B62
63	LSX-ER-0053.000, LSX-ER-0054.000	0.35	5.86	577475.78	3552242.82	5		A21	B63
64	LSX-ER-0054.000 - LSX-ER-0056.000	0.28	6.53	578000.05	3552019.45	9		A21	B64
65	LSX-ER-0058.000	0.23	4.60	579264.19	3551696.41	4		A21	B65
66	LSX-ER-0063.000	0.13	2.07	582070.32	3551096.08	5		A22	B66
67	LSX-ER-0063.000 - LSX-ER-0065.000	0.11	2.42	582443.91	3551010.97	6		A22	B67
68	LSX-ER-0064.000	0.23	3.64	583749.51	3550680.39	4		A22	B68
69	LSX-ER-0064.000	0.17	2.65	584341.55	3550532.69	4		A22	B69
70	LSX-ER-0067.000	0.23	3.64	585111.90	3550480.64	7		A23	B70
71	LSX-ER-0069.000	0.21	3.32	586081.62	3550098.63	6		A23	B71
72	LSX-ER-0069.000	0.11	1.81	586653.85	3549957.27	2		A23	B72
73	LSX-ER-0069.000	0.23	4.00	587114.88	3549845.75	6		A23	B73
74	LSX-ER-0071.000, LSX-ER-0072.000	0.39	6.67	588472.35	3549600.23	7		A23-A24	B74
75	LSX-ER-0073.000	0.15	2.32	589033.52	3549560.65	4		A24	B75
76	LSX-ER-0075.000, LSX-ER-0076.000	0.12	2.24	589869.57	3549380.97	3		A24	B76
77	LSX-ER-0076.000, LSX-ER-0077.000	0.26	4.67	590284.61	3549369.66	11		A24	B77
78	LSX-ER-0078.000	0.12	2.13	590626.57	3549259.09	4		A24	B78
79	LSX-ER-0079.000	0.11	1.83	591797.90	3548990.96	4		A24	B79
80	LSX-ER-0080.000 - LSX-ER-0082.000	0.27	5.06	592457.65	3548872.00	12		A24	B80
81	LSX-ER-0082.000, LSX-ER-0083.000	0.31	5.30	593045.34	3548778.42	12		A25	B81
82	LSX-ER-0083.000 - LSX-ER-0085.000	0.14	2.24	593977.65	3548623.70	2		A25	B82
83	LSX-ER-0085.000 - LSX-ER-0087.000	0.34	5.70	595321.02	3548395.02	8		A25	B83
84	LSX-ER-0089.000	0.24	4.26	596461.62	3548198.64	8		A25	B84
85	LSX-ER-0089.000	0.13	2.03	596999.79	3548113.64	2		A25	B85
86	LSX-ER-0091.000, LSX-ER-0092.000	0.13	2.06	597832.78	3547971.71	3		A25	B86

Permit Area No.	Parcels	Miles	Acres	UTM E	UTM N	Shovel Test Count	Resources Identified	Appendix A Figure	Appendix B Figure
87	LSX-ER-0092.000	0.26	4.02	598503.11	3547861.07	8		A25	B87
88	LSX-ER-0093.000	0.19	3.39	599051.43	3547764.09	7		A25	B88
89	LSX-ER-0093.000, LSX-ER-0094.000	0.13	2.53	600156.49	3547575.45	7		A25	B89
90	LSX-ER-0094.000	0.13	2.08	601083.98	3547417.38	3		A27	B90
91	LSX-BQ-0002.000	0.15	2.42	602177.53	3547219.05	6		A27	B91
92	LSX-BQ-0002.000	0.16	2.57	602601.43	3547138.77	5		A27	B92
93	LSX-BQ-0003.000, LSX-BQ-0004.000	0.24	3.77	603613.42	3546970.84	5		A27	B93
94	LSX-BQ-0005.000	0.20	3.51	604858.68	3546976.80	4		A28	B94
95	LSX-BQ-0006.000, LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.26	4.12	605629.12	3547145.14	7		A28	B95
96	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.13	2.08	606181.08	3547269.16	2		A28	B96
97	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.37	5.82	607047.25	3547376.77	5		A28	B97
98	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.43	3.20	608407.70	3547582.89	3		A28	B98
99	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.43	3.97	608737.32	3547633.52	7		A29	B99
100	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.14	2.14	609371.48	3547738.16	3		A29	B100
101	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.25	4.32	610140.54	3547800.88	9		A29	B101
102	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.15	2.40	610710.05	3547830.71	3		A29	B102
103	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.29	5.00	UTM redacted	UTM redacted	36	41BQ358, BQ-07-ISO-01	A29	B103
104	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.77	8.23	612026.37	3548189.40	27		A29	B104
105	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.77	3.75	612594.66	3548282.51	4		A30	B105
106	LSX-BQ-0007.000 thru LSX-BQ-0018.000	0.35	6.13	613540.50	3548563.82	9		A30	B106
107	LSX-BQ-0020.000, LSX-BQ-0021.000	0.15	2.44	616086.31	3548988.86	7		A30	B107
108	LSX-BQ-0024.000	0.16	2.54	617648.37	3549174.27	3		A31	B108
109	LSX-BQ-0031.000 - LSX-BQ-0036.000	0.59	12.48	619668.57	3549580.80	11		A31	B109
110	LSX-BQ-0038.000	0.25	4.33	621909.66	3549406.23	4		A32	B110
111	LSX-BQ-0038.000	0.24	4.20	622495.77	3549368.06	3		A32	B111
112	LSX-BQ-0038.000	0.18	3.20	622949.58	3549347.30	4		A32	B112
113	LSX-BQ-0038.000	0.28	4.76	UTM redacted	UTM redacted	12	41BQ359	A32	B113
114	LSX-BQ-0038.000, LSX-BQ-0042.000 / LSX-BQ-0043.000	0.25	4.59	625107.20	3549244.58	6		A33	B114

Permit Area No.	Parcels	Miles	Acres	UTM E	UTM N	Shovel Test Count	Resources Identified	Appendix A Figure	Appendix B Figure
115	LSX-BQ-0042.000 / LSX-BQ-0043.000	0.13	2.01	625856.85	3549203.56	1		A33	B115
116	LSX-BQ-0042.000 / LSX-BQ-0043.000	0.55	5.29	626684.01	3549152.32	7		A33	B116
117	LSX-BQ-0042.000 / LSX-BQ-0043.000	0.55	3.66	627044.43	3549137.75	3		A33	B117
118	LSX-BQ-0042.000 / LSX-BQ-0043.000	0.24	3.71	627615.59	3549111.83	3		A33	B118
119	LSX-BQ-0044.000 thru LSX-BQ-0047.000	0.24	3.82	629083.34	3549045.69	3		A34	B119
120	LSX-BQ-0044.000 thru LSX-BQ-0047.000	0.15	2.28	629896.31	3548991.35	2		A34	B120
121	LSX-BQ-0044.000 thru LSX-BQ-0047.000	0.31	6.22	630346.17	3548953.76	3		A34	B121
122	LSX-BQ-0048.000 / LSX-BQ-0049.000	0.12	1.93	631362.71	3548993.90	2		A34	B122
123	LSX-BQ-0050.000, LSX-BQ-0051.000	0.34	8.39	633104.74	3548815.84	5		A35	B123
124	LSX-BQ-0053.000	0.29	6.33	634262.27	3548860.72	5		A35	B124
Total		32.81	518.60			901			

Table 5-7. Newly Identified Resources within the Loop 3 Permit Areas.

Trinomial	MP Begin	MP End	Site Type	Cultural Affiliation	Record Date	Current Materials Observed	Current Eligibility Recommendations	Appendix A Figure	Appendix B Figure	Report Figure
41BQ358	255.00	255.07	Prehistoric lithic scatter	Unknown Prehistoric	5/29/2019	6 pieces of chert debitage.	Ineligible	A32	B113	5-6
BQ-07-ISO-01	255.10		Isolate	Late to Transitional Archaic / Prehistoric	5/29/2019	Ellis or Godley type projectile point.	Ineligible	A29	B103	5-6

Table 5-8. Newly Identified Resources outside of Loop 3 Permit Areas.

Trinomial	MP Begin	MP End	Site Type	Cultural Affiliation	Record Date	Current Materials Observed	Current Eligibility Recommendations	Appendix A Figure	Appendix B Figure	Report Figure
41BQ359	263.52		Prehistoric lithic scatter	Unknown Prehistoric	5/29/2019	1 chert biface and 5 flakes.	Ineligible	A29	B103	5-13



Figure 5-2. Overview of typical field conditions observed within wooded areas of Loop 3. View is to the south.



Figure 5-3. Overview of typical field conditions observed within disturbed areas of Loop 3 where subsoil was visible on the surface. View is to the northeast.



Figure 5-4. Exposed bedrock as seen within the survey corridor. View is to the northwest.

5.2.2 Newly Identified Resources within Permit Areas

Three new resources were identified as a result of survey within the jurisdictional permit areas of Loop 3. These are described below.

5.2.2.1 Resource 41BQ358

Resource 41BQ358 was identified by Gray & Pape on April 3, 2019. The resource is located in Bosque County, Permit Area Number 103, approximately 170 meters (558 feet) south of the Bosque River, to the west of a tributary drainage leading to the river. The APE at the location measures between 40 and 55 meters (131 and 180 feet) wide, with approximately 30 to 45 meters (100 to 148 feet) of that width within an existing pipeline ROW. Resource 41BQ358 occupies a nearly level terrace or bench at the bottom of a steeply sloped hillside. The hillside is largely composed of exposed fossil rich limestone. At the base of the hill, the APE is covered in short grasses bordered by low-lying juniper and cypress trees, yielding good surface visibility (Figure 5-5). Resource 41BQ358 consists of a sparse surface and subsurface lithic scatter, dispersed along the edge of the west-facing side slope between the base of the existing pipeline corridor and the edge of the adjacent waterway to the south (Figure 5-6).



Figure 5-5. Overview of the location of Resource 41BQ358 within the APE. View is to the northeast.

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Plan view of Resources 41BQ358 and BQ-07-ISO-01.

Investigation of the resource began with the identification of single flake in Shovel Test T7 during survey of the Permit Area (Figure 5-6). Delineation consisted of an additional 20 shovel tests excavated at 10-meter (33-foot) intervals within the APE. Shovel test delineation of the site did not continue to the north as this portion of the APE consists of slope of approximately 30 degrees and contains potentially shallowly buried pipelines. However, this area was surface inspected as part of delineation efforts and during survey of the APE in general. Subsoil and bedrock were observed on the surface of the northern portion of the APE. Likewise, the area of APE to the south of the site boundary within a distance of approximately 3 meters (10 feet) or less of the southern-most conducted tests drops off into a wide natural drainage and no shovel testing could be performed there. These areas were surface inspected however as part of delineation efforts. Shovel testing resulted in 3 positive shovel tests total. These tests contained four pieces of chert debitage (Figure 5-7; Tables 5-9 and 5-10).



Figure 5-7. Representative materials identified within Resource 41BQ358.

Pedestrian walkover of the location resulted in the identification of six additional pieces of chert debitage on the surface having eroded from the bank of the drainage to the south of the landform.

Table 5-9. Provenience of Subsurface Materials Identified within Resource 41BQ358.

Test Number	Material	Depth
T7	1 chert flake	28 cm
T7b	2 chert flakes	20 cm
T7d	1 chert flake	28 cm

Table 5-10. Artifact Assemblage Observed at 41BQ358.

Depth	Flakes	FCR
Surface	7	25
0-10	-	-
10-20	2	-
20-30	2	-
30-40	-	-
40-50	-	-

All materials were composed of gray/white fine-grained Edwards chert. The debitage were indicative of late stage reduction. No diagnostic artifacts or more developed tools were identified to the west of the water way; however, a nearby artifact recorded as an isolate, BQ-07-ISO-01, is potentially associated with the site and is discussed separately below.

The site was revisited by Gray & Pape and representatives of the USACE on October 29, 2019. During a walk over of the site, the USACE representative observed 25 FCR of limestone scattered inside the western portion of the site boundary in two small loose clusters. The location of the FCR is at the bottom of the slope. This suggests the current location of the FCR is the result of colluvial action and is thus out of context. Three flakes were observed on the surface including one large blade or blade-like flake of likely heat-treated white chert. The waterway below the site was observed to be flowing during the site visit with a series of deep clear pools with a limestone stream bottom. The deep stream pools might be seep/spring perennial pools.

The resultant resource boundary within the corridor measures approximately 130 meters (429 feet) east-west by 40 meters (131.23 feet) north-south at its widest point. Soil mapped for most of the area consists of Brackett-Eckrant association, while soil in the western portion of the resource consists of Purves-Malotterre association (NRCS 2019). Purves, Malotterre, and Eckrant are all very shallow soils which encounter coarsely fractured indurated limestone bedrock at roughly 30 to 36 centimeters (12 to 14 inches) deep. Only the Brackett series extends deeper, with a C horizon of weakly cemented, fractured and weathered limestone bedrock that extends to 152 centimeters (60 inches). Many shovel tests indicated disturbed soils particularly along the north of the APE due to existing pipelines, as well as from prior terracing activities and erosion. Many radial tests were either visibly disturbed from recent pipeline activities (to the north) or on steep slope of 30 degrees or more (to the south). Soils at the site were found to be shallow, with a typical shovel test profile within the resource/APE consisting of a surface layer of brown or dark yellowish brown (10YR 4/3 to 5/3 or 4/6) loamy sand to a depth of 28 centimeters (11.02 inches) followed by yellowish red (5YR 4/6) loamy sand to a depth of between 25 and 40 centimeters (10 and 16 inches) overlying limestone bedrock (Appendix C). Fragments of limestone and other non-culturally modified rock were present throughout the profile. This profile most closely represents the Ak, Bk, and R horizons of the Purves series.

Shovel tests at the resource produced shallow soil profiles that appeared deflated. Due to previous pipeline work in the APE and sloping landscape, it is possible that the observed soils and artifacts have eroded downslope to their current location. The surface finds within the site were out of context and had no discernable provenience. Within the APE, the resource areas appear to have experienced moderate erosion and deflation due to previous impacts. The location is spatially limited by the surrounding topography and

previous disturbance. This observation combined with the sparsity of artifacts and shallow soils recorded during the current effort suggests the resource within the ROW is not significant. The resource does not retain the potential to provide significant research value and is thus recommended not eligible for the National Register, under Evaluation Criterion D.

5.2.2.2 Resource BQ-07-ISO-01

Isolate BQ-07-ISO-01 is located approximately 50 meters (164.04 feet) east of Resource 41BQ358, on the opposite side of the drainage that forms the eastern border of 41BQ358 (Figure 5-6). The isolate is located within a small area that represents the highest point on the surrounding landscape, overlooking waterways to the west, south, and east. From this point the landscape slopes downward in all directions. The undisturbed portion of this landform is limited due to the adjacent pipelines. The find is considered an isolate due to the lack of additional materials in the immediate surroundings however the proximity to 41BQ358 suggests the resources may be associated. The find is located in a recently cleared portion of the pipeline corridor with clumps of short grasses offering excellent surface visibility (Figure 5-8). The APE at the location measures between 40 and 55 meters (131 and 180 feet) wide, with approximately 30 to 45 meters (100 to 148 feet) of that width within an existing pipeline ROW.

The isolate consists of a projectile point identified in a shovel test at a depth of 28 centimeters (11.02 inches), just 2 centimeters (0.8 inches) above bedrock. The object consists of a triangular blade with a serrated straight left edge and slightly excurvate right edge, with prominent shoulders, straight base, expanding stem and random flaking pattern (Figure 5-9). The maximum length of the object is 40 millimeters (1.57 inches) with a width of 23 millimeters (0.9 inches) at the shoulders. The length of the stem is 11

millimeters (0.4 inches) and the width of the stem is 15 millimeters (0.6 inches).



Figure 5-8. Overview of the location of Isolate BQ-01-ISO-01. View is to southwest



Figure 5-9. Projectile point which comprises Isolate BQ-01-ISO-01.

While there are several dart points in Texas that share many of these attributes, the overall characteristic of the find places it most similar to an Ellis or Godley type, both of which date from the Late to Transitional Archaic, although some Godley points have been found in Late Prehistoric contexts as well. The Ellis point has a distribution primarily in northcentral to northeast Texas, but it has also been reported in south and central Texas, the Panhandle, and Trans-Pecos. The Godley point has a distribution in the Brazos River drainage with occurrences in East Texas and Louisiana (Turner et al. 2011).

Investigation of the isolate consisted of pedestrian walkover and six delineation shovel tests placed around the find at 10-meter (33-foot) intervals within the APE (Figure 5-6). No shovel tests were conducted in the northern portion of the APE where the ground slopes sharply (30 degrees or more) down and is occupied by potentially shallowly buried pipelines, however this area was surface inspected as part of delineation efforts and during survey of the APE in general. Subsoil and bedrock were observed on the surface of the area. Likewise, the southern portion of the APE sloped sharply (30 degrees or more) downward into the banks of the adjacent waterway. No additional shovel tests were positive for cultural materials. Soils mapped for the location consist of the Brackett-Eckrant association, hilly. Eckrant soils are very shallow and encounter coarsely fractured indurated limestone bedrock at roughly 30 centimeters (12 inches) deep. The Brackett series extends deeper, with a C horizon of weakly cemented, fractured and weathered limestone bedrock that extends to 152 centimeters (60 inches). The soils at the location, just as at 41BQ358, are quite shallow. Many shovel tests displayed previous disturbance exhibited as shallow soils (Appendix C). A typical shovel test profile at the location consists of brown to yellowish brown (10YR 4/3 to 5/6) silt loam depth of between 10 and 40 centimeters (4 and 16 inches) overlying cemented limestone / bedrock.

The isolate is located within a small area that is spatially limited by the surrounding topography and previous disturbances. Further, the soils are quite shallow, showing signs of deflation and bedrock near the surface. The resource is not recommended for further work. The isolate does not contain additional materials with the potential to provide significant research value and is thus recommended not eligible for the National Register, under Evaluation Criterion D.

5.2.2.3 Resource 41BQ359

Site 41BQ359 was identified by Gray & Pape on April 17, 2019. The resource is located in Bosque County approximately 0.06 kilometers (0.03 miles) west of Cox Branch. The resource was initially identified within the APE, but the workspace has been revised to avoid the resource by 5.5 meters (18 feet), thus removing it from the permitted area. At the time of survey, the location was a recently plowed field covered by short grasses with excellent surface visibility (Figure 5-10). The resource was identified by a surface scatter of prehistoric lithics. Observed surface material includes one biface, one tested cobble, one core, two primary or secondary flakes, and five late stage reduction flakes, one of them edge-damaged (Figures 5-11 and 5-12, Table 5-11). Nearly all materials were composed of brown to gray/white chert of most likely an Edwards or Georgetown variety with one or two objects composed of an undetermined material potentially derived from river gravels. No diagnostic artifacts were identified.



Figure 5-10. Overview of the location of Resource 41BQ359. View is to the northeast.

Investigation of the resource consisted of a systematic surface inspection and shovel testing. Due to the small size and relative concentration of the artifacts, only one shovel test was placed within the center of the scatter and five delineation shovel tests were placed around the visible limits of the surface scatter

at 10-meter (33-foot) intervals to confirm the site limits (Figure 5-13).



Figure 5-11. Representative lithics identified within Resource 41BQ359.



Figure 5-12. Biface observed on the surface at Site 41BQ359.

Table 5-11. Artifact Assemblage Observed at 41BQ359.

Depth	Flakes	Bifaces	Cores	Tested Cobble
Surface	7	1	1	1
0-10	-	-	-	-
10-20	-	-	-	-
20-30	-	-	-	-
30-40	-	-	-	-
40-50	-	-	-	-

Of six shovel tests conducted within and around the scatter, none were positive for buried cultural materials.

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Plan view of Resource 41BQ359.

No additional testing was performed within the field due to the plowed conditions, excellent surface visibility, and shallow soils observed by the conducted shovel tests. The resultant resource boundary within the corridor measures approximately 17 meters (55.77 feet) north-south by 9.5 meters (31.17 feet) east-west. The resource was not pursued to the north where a number of existing pipelines area present, however this area was surface inspected as part of delineation efforts and during survey of the APE in general. Subsoil was observed at the surface within the existing ROW. Soils mapped for the location consist of Slidell clay (NRCS 2019). Being located within a heavily plowed agricultural field, soil profiles appeared extremely deflated and represented the Bss and Bkss1 horizons of the Slidell soil series. A typical shovel profile within the resource/APE consists of a shallow surface layer of 10YR 3/1 silt loam to a depth of 10 centimeters (4 inches) followed by a 10YR 4/3 silt clay loam to a depth of 40 centimeters (16 inches) (Appendix C). Besides the deflated nature of the soils and surface expression of the artifacts, the site's location in the corner of the ag field where machinery will make turns and soils often get pushed adds more doubt to the materials context.

The resource will be avoided by the project workspace. The resource is characterized by a sparsity of surface artifacts, lack of diagnostic artifacts, lack of subsurface materials, and deflated soils. The resource is not likely to add to the knowledge of prehistoric occupation of the area and is not recommended for further work. The site does not retain the potential to provide significant research value and is thus recommended not eligible for the National Register, under Evaluation Criterion D.

5.2.3 Previously Recorded Resources Not Re-Identified

Of the four previously recorded resources within 91 meters (300 feet) of the APE (41ER48, 41ER49, 41ER50, and 41ER56), none were re-identified by the current field

effort (Table 5-12). One of these, 41ER48, is within the APE within a jurisdictional area. The remaining three are outside of the Project APE.

5.2.3.1 Resource 41ER48

Resource 41ER48 was identified by Horizon in 2011 as part of the CREZ Lone Star Transmission Line Project (Cochran et al. 2012). The site consisted of a historic farmstead located approximately 1.9 kilometers (1.28 miles) northwest of the intersection of FM 1824 and CR 229. The site occupies a hill/ridgetop adjacent to Turkey Branch Creek. The resource was investigated by pedestrian survey and shovel testing. According to the site record, the site consists of a moderate to high-density of historic-era artifact scatter and the remnants of several historic-era structures including: one standing chimney composed of cut limestone and mortar, a dilapidated barn; two side-by-side corn-crib log structures, one possible collapsed-in cellar; one limestone wall structure along the terrace just north of the house structure; one collapsed windmill; and one fenced-in corral area with a corrugated metal door. The survey also recorded 10 pet (likely dog) graves, with four limestone markers and one informal headstone. Recorded artifacts consisted of 30+ pieces of whiteware, 50+ clear, blue, brown and milk glass fragments, 20+ clear, brown, and blue glass bottles of various sized, 5+ clear glass jars, 15+ metal fragments, 2 metal stoves, 30+ wooden planks, 10+ red cherry bricks and brick fragments, 3+ window or door hinges, and 5+ pieces of metal piping and farm equipment. The resource was considered by Horizon to possess little research value and no further work was recommended. The resource was determined ineligible for the NRHP in 2012 (THC 2019).

A small northern corner portion of Site 41ER48 is mapped within Permit Area 74 of the current APE. This location was investigated Gray & Pape on April 8, 2019 by pedestrian survey and shovel testing. At least five existing

Table 5-12. Previously Recorded Resources Not Re-Identified within the APE.

Trinomial	MP	JD*	Site Type	Cultural Affiliation	Previous Materials Observed	Record Date	Previous NRHP Status	NRHP Review Date	Current Materials Observed	Current Eligibility Recommendations	Appendix A Figure	Report Figure
41ER48	240.66	Yes	Historic-era Farmstead	Early to Mid-20th century	Historic artifact scatter, several structures, and farm equipment, 5 graves of pets	11/29/2011	Ineligible	4/16/2012	N/A	Not Located within the APE. No Further Work	A23-A24	5-13
41ER49	Offline	No	Historic scatter	Early to Mid-20th century	6+ pieces of whiteware, 1 brown glass bottle base, 1 fragment of spun yarn, 1 blue-green glass shard	11/28/2011	Ineligible within ROW	5/2/2012	N/A	Not Located within the APE. No Further Work	A24	5-16
41ER50	Offline	No	Prehistoric lithic scatter and historic-era surface scatter	Early to Mid-20th century, Unknown Prehistoric	1 oxidized metal hinge, 1 oxidized metal saw blade, 1 piece of whiteware, 1 thick brown glass bottle base, 1 worked chert flake.	11/30/2011	Ineligible within ROW	4/16/2012	N/A	Not Located within the APE. No Further Work	A24	5-18
41ER56	Offline	No	Prehistoric lithic scatter and historic-era surface scatter	Early to Mid-20th century, Unknown Prehistoric	1 chert tertiary flake, 1 chert tool fragment, 4+ pieces of whiteware belonging to the same object.	1/17/2012	Ineligible within ROW	5/3/2012	N/A	Not Located within the APE. No Further Work	A17	5-19

*JD = Jurisdictional

pipelines cross the mapped resource boundary in this area. The vicinity of the site was found to be largely inundated with standing water (Figure 5-14). No cultural materials were identified on surface at the location. Two shovel tests (bb4 and bb5) spaced 30 meters (100 feet) apart placed within and adjacent to the mapped boundary contained disturbed soils (Figure 5-15; Appendix C). No cultural materials were identified in the shovel tests. Soils mapped for the location consist of Windthorst fine sandy loam, 1 to 5 percent slopes, eroded. These soils are characterized by a shallow A horizon of grayish brown (10YR 5/2) very fine sandy loam to a depth of 10 centimeters (4 inches). This is followed an E horizon of light yellowish brown (10YR 6/4) very fine sandy loam. Below that are several B horizons of red (2.5YR 4/6), yellowish red (5YR 5/6), and mottled brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) sandy clay down to 1 meter (39 inches) below surface (NRCS 2019). Shovel tests at the location contained of subsoil of mottled dark grayish brown (10YR 4/3) and reddish brown (2.5YR 4/3) silty clay.



Figure 5-14. Mapped location of Resource 41ER48 within the Loop 3 corridor. View is to the west.

The site was revisited by Gray & Pape and representatives of the USACE on October 29, 2019. During a walk over of the site, the USACE representative observed a modern T-post and hog panel pen was observed along the edge of the proposed ROW but no features

recorded as part of 41ER48 appear to be in close proximity to the proposed ROW. A review of the site map recorded by Horizon (Cochran et al. 2012) confirms that all features associated with the resource are located south of the existing pipeline ROW and will not be impacted by the current project (Figure 5-15). No further work needs were identified by USACE at site 41ER48.

5.2.3.2 Resource 41ER49

Resource 41ER49 was identified by Horizon in 2011 as part of the CREZ Lone Star Transmission Line Project (Cochran et al. 2012). The site was recorded as a historic scatter and low limestone wall located partly in a cultivated field approximately 50 meters (164 feet) west of FM 1824 and approximately 100 meters (328 feet) south of the historic Duffau schoolhouse in Erath County. The location is adjacent to a small unnamed tributary of Duffau Creek which passes approximately 50 meters (164 feet) to the south. According to the site record, the site consists of a low density of both surface and subsurface historic-era artifacts. Within the ROW, surface artifacts were reported to include: 6+ pieces of whiteware, one brown glass bottle base, one fragment of spun yarn, and one blue-green glass shard. Subsurface artifacts were encountered within the plow zone. Cultural material can be found along the surface to the north and northwest leading to the historic Duffau schoolhouse. A small red brick storage shed, and evidence of other bulldozed structures were also observed in the nearby vicinity of the site. Due to the disturbance of the site from agriculture, the resource was considered by Horizon to possess little research value and no further work was recommended. In 2012, the resource was determined ineligible for the NRHP within the ROW (THC 2019).

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Plan view of Resource 41ER48.

The portion of APE, Permit Area Number 80, that passes the previously recorded location of Resource 41ER49 was surveyed by Gray & Pape on April 5, 2019. The APE at the location measures approximately 40 meters (131 feet) wide, of which about 20 meters (66 feet) is within an existing pipeline ROW. The ROW is covered by short grass allowing good surface visibility. The remainder of the APE to the south contains scattered trees and grass but still offers good surface visibility (Figure 5-16). The site is located approximately 45 meters (148 feet) north of the current APE at Permit Area 80 (Figure 5-17). At least five existing pipelines and a transmission corridor are located between the previously recorded site and the current APE.



Figure 5-16. Overview of the APE where it passes near the previously recorded location of Resource 41ER49. View is to the west.

The APE at the location was investigated by pedestrian survey and shovel testing with tests spaced 20 to 30 meters (66 to 100 feet) apart. Of five shovel tests placed within the APE, none were positive for cultural materials. Soils mapped for the location consist of Windthorst fine sandy loam, 1 to 5 percent slopes, eroded. These soils are characterized by a shallow A horizon of grayish brown (10YR 5/2) very fine sandy loam to a depth of 10 centimeters (4 inches). This is followed an E horizon of light yellowish brown (10YR 6/4) very fine sandy loam. Below that are several B horizons of red (2.5YR 4/6), yellowish red (5YR

5/6), and mottled brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) sandy clay down to 1 meter (39 inches) below surface (NRCS 2019). Shovel tests at the location contained mottled dark grayish brown (10YR 4/2) and reddish brown 2.5YR 4/3 silty clay (Appendix C).

No portion of the previously recorded resource appears to be located within the current APE and no further work is recommended for the location.

5.2.3.3 Resource 41ER50

Resource 41ER50 was identified by Horizon in 2011 as part of the CREZ Lone Star Transmission Line Project (Cochran et al. 2012). The site was recorded as a multi-component scatter of prehistoric and historic materials. The site is located approximately 1 kilometer (0.6 miles) southwest of the intersection of FM 2481 and FM 1824 in Duffau, Texas. The site is located on a gentle east and southeast trending slope about 110 meters (361 feet) north of an unnamed tributary of Duffau Creek. According to the site record, the site consists of a low density of surface historic-era and prehistoric artifacts. Observed surface materials consist of one oxidized metal hinge, one oxidized metal saw blade, one piece of whiteware, one thick brown glass bottle base, and one worked chert flake. No subsurface artifacts were encountered at the site. Due to the previous disturbance of the site from pipelines and erosion and lack of subsurface artifacts, the resource was considered by Horizon to possess little research value and no further work was recommended. In 2012, the resource was determined ineligible for the NRHP within the ROW (THC 2019).

The portion of APE, Permit Area Number 79, that passes the previously recorded location of Resource 41ER50 was surveyed by Gray & Pape on April 5, 2019. The APE at the location measures approximately 40 meters (131 feet) wide, of which about 20 meters (66

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Plan view of Resource 41ER49.

feet) is within an existing pipeline ROW. The ROW is covered by short grass allowing good surface visibility. The remainder of the APE to the south contains scattered trees and grass but still offers good surface visibility (Figure 5-18). The site is located approximately 45 meters (148 feet) north of the current APE at Permit Area 79. At least five existing pipelines and a transmission corridor are located between the previously recorded site and the current APE.



Figure 5-18. Overview of the APE where it passes near the previously recorded location of Resource 41ER50. View is to the east.

The APE at the location was investigated by pedestrian survey and shovel testing with tests spaced between 30 and 40 meters (66 to 100 feet) apart (Figure 5-19). No artifacts were observed on the surface at the location. Of six shovel tests placed within the APE, none were positive for cultural materials. Soils mapped for the location consists of Purves-Maloterre association (NRCS 2019). Purves and Maloterre soils are all very shallow and encounter coarsely fractured indurated limestone bedrock at roughly 30 to 36 centimeters (12 to 14 inches) deep. Shovel tests at the location contained mottled dark grayish brown (10YR 4/2) and reddish brown 2.5YR 4/3 silty clay.

No portion of the previously recorded resource appears to be located within the current APE and no further work is recommended for the location.

5.2.3.4 Resource 41ER56

Resource 41ER56 was identified by Horizon in 2011 as part of the CREZ Lone Star Transmission Line Project (Cochran et al. 2012). The site was recorded as a multi-component scatter of prehistoric and historic materials. The site is located approximately 650 meters (0.4 miles) south of the intersection of CR 242 and CR 376 in Erath County. The site is located in gently rolling pastureland on a south and southeast trending slope towards Cat Branch, which lies approximately 700 meters (0.4 miles) to the south. According to the site record, observed surface materials consist of one chert tertiary flake, one chert tool fragment, and four plus pieces of whiteware belonging to the same object. No subsurface artifacts were encountered at the site. Due to the previous disturbance of the site from pipelines and erosion and lack of subsurface artifacts, the resource was considered by Horizon to possess little research value and no further work was recommended. In 2012 the resource was determined ineligible for the NRHP within the ROW (THC 2019).

The portion of APE, Permit Area Numbers 48 and 49, where it passes the previously recorded location of Resource 41ER56 was surveyed by Gray & Pape on May 1, 2019. The APE at the location measures between 45 meters (148 feet) at the narrowest and 100 meters (328 feet) at the widest. Practically all of that area is within previously disturbed ROW or ROW workspace. A portion of the APE is also a fallow ag field/pasture covered by grasses, offering poor surface visibility (Figure 5-20). The remainder of the APE is covered by grass and shrubs offering low surface visibility. The site is located approximately 45 meters (148 feet) north of the current APE. At least six existing pipelines are located between the previously recorded site and the current APE.

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Plan view of Resource 41ER50.



Figure 5-20. Overview of the APE where it passes near the previously recorded location of Resource 41ER56. View is to the west.

The APE was investigated by pedestrian survey and shovel testing with tests spaced between 40 and 45 meters (131 and 148 feet) apart (Figure 5-21). No artifacts were observed on the surface within the APE. Of seven shovel closest tests placed within the APE at the location, none were positive for cultural materials. Soils mapped for the location consist of Windthorst fine sandy loam, 1 to 8 percent slopes, severely eroded (NRCS 2019). These soils are characterized by a shallow A horizon of grayish brown (10YR 5/2) very fine sandy loam to a depth of 10 centimeters (4 inches). This is followed an E horizon of light yellowish brown (10YR 6/4) very fine sandy loam. Below that are several B horizons of red (2.5YR 4/6), yellowish red (5YR 5/6), and mottled brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) sandy clay down to 1 meter (39 inches) below surface (NRCS 2019).

Shovel tests at the location typically contained mottled dark grayish brown (10YR 3/3) silty loam followed by strong brown (7.5YR 4/6) silty clay loam (Appendix C). The APE at the location consists almost entirely of previous workspace and/or plowed agricultural field. No portion of the previously recorded resource appears to be located within the current APE and no further work is recommended for the location.

5.2.4 Deep Test Results

Fieldwork at Alarm Creek was conducted on August 7, 2019. The location was originally surveyed as Permit Area 65; however, the location is slated for horizontal directional drill, and thus may eventually be removed from permitting. The permit area as currently identified subsumes approximately 1.9 hectares (4.6 acres) and is located right off of CR 246 approximately 12.9 kilometers (8 miles) south-southeast of Stephenville, Texas. The location is only 1.21 kilometers (0.75 miles) north of the confluence of Alarm Creek with the Bosque River. The APE at the location measures between 40 and 55 meters (131 and 180 feet) wide. Most of that width is within an existing pipeline ROW. The location consists of two separate field conditions. To the east/south of Alarm Creek and CR 246 is an agricultural field that at the time of the deep testing had been recently harvested (Figure 5-22). To the west/north of Alarm Creek was a grass and shrub covered pasture (Figure 5-23).

Soils mapped in this area consist of Wise clay loam, 3 to 5 percent slopes, moderately eroded (BcC2), Frio clay loam, occasionally flooded (Fr), and Bosque loam, occasionally flooded (Bo) (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (NRCS 2019). All three are soil series are deep and well drained soils that could contain A horizons beyond the reach of shovel testing.

Wise series soils are very deep, well drained, moderately permeable inceptisols. They are located on uplands and on low hills and formed in loamy and shaley marine sediments of lower Cretaceous Age. A typical soil profile consists of four strata (A-Bw-Bk-C) to a depth of 152.4 centimeters (60 inches). Soil profiles generally consist of a surface (A horizon) of brown (10YR 5/3) clay loam to a depth of 18 centimeters (7 inches).

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Plan view of Resource 41ER56.



Figure 5-22. Overview of a harvested ag field south of Alarm Creek and CR 246. View is to the southeast.



Figure 5-23. Overview of deep test locations to the west/north of Alarm Creek. View is to the northwest.



Figure 5-24. Bobcat equipped with an auger bit for deep testing. View is to the northwest.

That is followed by a successive subsoil layers (Bw-Bk horizons) of light brownish gray (2.5Y 6/2) clay loam to a depth of 69 centimeters (27 inches). Below that is a substratum (C horizon) of stratified light gray (2.5Y 7/2) silt loam and light gray (5Y 7/2) shaley silty clay loam (NRCS 2019).

Frio series soils are very deep, well drained, moderately slowly permeable mollisols. They are located on nearly level flood plains and formed in calcareous loamy and clayey alluvium. A typical soil profile consists of five strata (A1-A2-A3-A4-Bk) that extend to 203 centimeters (80 inches) below the surface. Soil profiles generally consist of a surface (A1 horizon) of dark grayish brown (10YR 4/2) silty clay to a depth of 20 centimeters (8 inches). That is followed by successive subsurface (A2-A4 horizons) layers of dark grayish brown (10YR 4/2) clay loam and silty clay loam to a depth of 102 centimeters (40 inches). A subsoil layer (Bk horizon) of grayish brown (10YR 5/2) silty clay to a depth of 203 centimeters (80 inches) finishes out the profile (NRCS 2019).

Bosque series soils consist of very deep to loamy alluvium, well drained mollisols. These nearly level soils are located on treads of flood plains and formed in loamy, calcareous alluvium of Pleistocene age derived from limestone and shale. A typical soil profile consists of five strata (Ap-A1-A2-Bw-Akb) to a depth of 152 centimeters (60 inches). Soil profiles generally consist of a plowed surface (Ap horizon) of dark grayish brown (10YR 4/2) loam to a depth of 13 centimeters (5 inches). That is followed by a subsurface (A1-A2 horizons) of dark grayish brown (10YR 4/2) loam / clay loam to a depth of 97 centimeters (38 inches). Below that is a subsoil (Bw horizon) of brown (10YR 5/3) clay loam to 127 centimeters (50 inches) depth. A buried surface (Akb horizon) of dark grayish brown (10YR 4/2) clay finishes out the profile to a depth of 152 centimeters (60 inches) (NRCS 2019).

At least one shovel test at the location contained soils that could represent deep alluvial material (Appendix C). Shovel Test dd2, contained a layer of light yellowish brown (10YR 6/4) sandy loam that continued to the limits of the shovel test at 1 meter (39 inches). The location was recommended for deep testing by the Field Archaeologist. This recommendation in tandem with the geomorphological data mapped for the location resulted in the area being deep tested.

Field investigations consisted of mechanical deep testing by means of an auger bit attached to a Bobcat (Figure 5-24). Investigation consisted of 8 auger tests measuring 38.1 centimeters (15 inches) in diameter (Figure 5-25 and 5-26). Because the proposed centerline is located between existing pipelines within the existing ROW, the tests were performed near the southern edge of the APE away from the existing ROW out of safety concerns.

A typical deep test profile (Table 5-13) within the permit area consists of a surface layer of pale brown (10YR 6/3) fine sandy loam to an average depth of 55 centimeters (21.65 inches) followed by light brownish gray (10YR 6/2) to light yellowish brown (10YR 6/4) sandy clay or sandy clay loam extending to an average depth of 115 centimeters (45.28 inches) underlain by dark gray (10YR 4/1) to brown (10YR 4/3) clay loam or silty clay loam to an average depth of 170 centimeters (66.93 inches) (Figure 5-26). Finally, in some areas there is a fourth stratum of grayish brown (10YR 5/2) fine sandy clay or silty clay to the base of excavation at 180 centimeters (70.87 inches) below surface.

The lighter Munsell colors identified in the deep tests do not appear to represent either the Bosque or Frio series. They are within the range of the Bw horizon of the Bosque series however this would suggest the soils have been severely truncated. Some erosion would not be unusual for an area that has been impacted by

agriculture and previous pipelines, but the amount of material that would need to have been removed would approximate 1 meter (39 inches) in depth. More likely, the soils represent the B horizons of the Wise series, which entail a similar color clay loam. In general, the soils became blockier beyond 50 centimeters (20 inches) depth, at which point they could no longer be screened but were hand sorted.

A review of historical aerial imagery of the location indicates the land west of the creek had been contoured prior to 1961 and the land east of the creek has been plowed since at least the same date. Darker soils are eventually observed in Stratum III in most tests, but this change is more likely the result of an increase in moisture as they displayed no indication of a buried A horizon but retained the same blocky structure as the soils above.

None of the deep tests were positive for cultural materials. The location is planned for instalment by Horizontal Directional Drilling (HDD), which removes the chances of surface or near surface impacts at the location. Further, the proposed centerline is to be installed within the existing ROW between two existing pipelines. These facts together suggest it is highly unlikely that the Project will impact intact buried cultural resources at Alarm Creek.



Figure 5-25. Representative soil profile as observed in Deep Test 1 at Alarm Creek.

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Deep test locations within Permit Area 65 at Alarm Creek.

Table 5-13. Deep Test Profiles from the Project Area at Alarm Creek.

Number	Creek	Survey Result	Strat I Depth	Strat I Munsell	Strat I Texture	Strat II Depth	Strat II Munsell	Strat II Texture	Strat III Depth	Strat III Munsell	Strat III Texture	Strat IV Depth	Strat IV Munsell	Strat IV Texture	Comment
DT1	Alarm	Negative	45	10YR 6/3	Fine SaLo	120	7.5YR 5/2	SaClLo	160	7.5YR 4/1	ClLo	180	10YR 5/2	Fine SaCl	-
DT2	Alarm	Negative	43	10YR 4/3	SaLo	110	10YR 6/3	SaCl	180	10YR 4/1	ClLo	-	-	-	-
DT3	Alarm	Negative	60	10YR 7/3	Fine SaLo	110	10YR 6/4	SaClLo	160	10YR 4/1	ClLo	180	7.5YR 5/2	SiCl	Caliche in Stratum III
DT4	Alarm	Negative	40	10YR 4/3	Fine SaLo	105	10YR 6/4	SaClLo	170	10YR 5/3	SaCl	-	-	-	-
DT5	Alarm	Negative	70	10YR 6/3	Fine SaLo	115	10YR 6/2	Fine SaClLo	180	10YR 4/3	SiCl	-	-	-	-
DT6	Alarm	Negative	60	10YR 6/3	Fine SaLo	120	10YR 6/2	Fine SaClLo	180	7.5YR 4/1	SiCl	-	-	-	-
DT7	Alarm	Negative	60	10YR 6/3	SaClLo	115	7.5YR 4/3	Fine SaLo	180	7.5YR 3/3	SiCl	-	-	-	Caliche and chert gravels in Strata II and III
DT8	Alarm	Negative	60	10YR 6/3	SaClLo	115	7.5YR 4/3	Fine SaLo	180	7.5YR 3/3	SiCl	-	-	-	Caliche and chert gravels in Strata II and III

6.0 CONCLUSIONS AND RECOMMENDATIONS

This report details the results of pedestrian cultural resources survey of permit areas within 142.27 kilometers (88.4 miles) of the Lone Star Express II Pipeline Project - Loop 3 in Eastland, Comanche, Erath, and Bosque Counties, Texas. The lead agency for the Project is the USACE, Fort Worth District. Nearly all of the Project will be installed by open trench; however, the location at Alarm Creek is currently planned for HDD.

A records and literature review initiated prior to survey identified one previously recorded archaeological resource potentially intersecting USACE permit areas within Loop 3. Fieldwork on Loop 3 was conducted by Gray & Pape in the Spring 2019 and required approximately 3,680-person hours to complete and involved archaeological reconnaissance and shovel testing throughout anticipated permit areas within the Project corridor.

A total of 124 permit areas were surveyed, encapsulating a total of 52.8 kilometers (32.8 miles) of centerline and 209.9 hectares (518.6 acres) of APE. In total, approximately 871 shovel tests were excavated within permit areas, four of which were positive for cultural materials. No evidence was identified within the APE of four previously recorded resources located within 91 meters (300 feet) of the APE. Two new previously unrecorded resources, 41BQ358 and 41BQ359, and one isolate find were identified. No evidence was identified for previously recorded Resource

41ER48 within the APE. Likewise, no evidence was identified for resources 41ER49, 41ER50, or 41ER56 within portions of APE that were located within 91 meters (300 feet).

Both identified sites consist of small lithic scatters and are considered ineligible (Table 6-1). The resource areas showed clear disturbance from previous impacts associated with the pipeline ROW, impacts from agriculture in the case of 41BQ359, and soil deflation. Resource 41BQ358 and Isolate BQ-07-ISO-01 are also spatially limited by the natural topography of the area. Neither of the lithic scatters contained temporally or culturally diagnostic prehistoric artifacts and no artifacts were collected. These largely were represented by surface scatters of lithics which are typical for the area and were consistent with the resources identified within jurisdictional permit areas. Observance of these resources within the APE indicated no features or diagnostic artifacts and suggests research potential is low. Revisions to the workspace at Resource 41BQ359 will avoid the site, removing it from permitting, and the section of workspace that passes the resource will be marked by orange fencing. None of these resources are recommended as eligible within the APE and no further work is recommended regarding them (Table 6-1). The lone diagnostic artifact, Isolate BQ-07-ISO-01, consists of an Ellis or Godley type projectile point dating to the Late to Transitional Archaic.

Table 6-1. Summary of Resources Identified within the APE.

Trinomial	Jurisdictional?	Site Type	Temporal Affiliation	Research Value	NRHP Recommendation
41BQ358	Yes	Prehistoric Lithic Scatter	Unspecified Prehistoric	Low	Not eligible
BQ-07-ISO-001	Yes	Prehistoric Isolate	Late to Transitional Archaic	Low	Not eligible
41BQ359	No	Prehistoric Lithic Scatter	Unspecified Prehistoric	Low	Not eligible

One location, Alarm Creek, was investigated by mechanical auguring to determine if the location contained soils with A horizons deeper than can be reached by shovel or deeply buried cultural materials or paleosols. However, deep testing within the APE at the location displayed a surface and subsurface that likely represents the B horizon of the Wise series and produced no evidence for deeply buried resources or buried paleosols at the location. Further, the location is planned for Project installation by means of HDD.

While the identification of the observed resources adds to the overall knowledge base

of the region, the paucity of artifacts, lack of diagnostic materials within context, fragmentary nature of the artifacts, and lack of integrity, suggests that these resources do not have the potential to add further insight on prehistoric or historic occupation in the region. Based on current data, the resources are recommended not eligible for listing in the NRHP according to Criteria A through D. Gray & Pape currently recommends no additional archaeological work for any portions of Project corridor surveyed. However, Gray & Pape recommends that an unanticipated discoveries plan be put into place in the event that such discoveries take place during construction.

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APPENDIX A: PERMIT AREAS WITHIN THE LOOP 3 ALIGNMENT.

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**APPENDIX B: FIELD RESULTS WITHIN PERMIT AREAS ALONG
THE PROPOSED LOOP 3 PROJECT ALIGNMENT.**

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APPENDIX C: SHOVEL TEST LOG.

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