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Intensive Archaeological Survey Of Portions Of The Plains Connection 1 And 2 Pipeline Project Within University Lands, Crane County, Texas

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Intensive Archaeological Survey Of Portions Of The Plains Connection 1 And 2 Pipeline Project Within University Lands, Crane County, Texas

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INTENSIVE ARCHAEOLOGICAL SURVEY OF
PORTIONS OF THE PLAINS CONNECTION 1
AND 2 PIPELINE PROJECT WITHIN
UNIVERSITY LANDS, CRANE COUNTY, TEXAS

MARCH 2018

PREPARED FOR
Medallion Pipeline Company, LLC

PREPARED BY
SWCA Environmental Consultants

Redacted

**INTENSIVE ARCHAEOLOGICAL SURVEY OF PORTIONS OF
THE PLAINS CONNECTION 1 AND 2 PIPELINE PROJECT
WITHIN UNIVERSITY LANDS, CRANE COUNTY, TEXAS**

Prepared for

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Texas Antiquities Permit No. 8262

SWCA Project No. 48269

SWCA Cultural Resources Report No. 18-41

March 22, 2018

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ABSTRACT

On behalf of Medallion Pipeline Company, LLC (Medallion), SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of portions of the Plains Connection 1 and 2 Pipeline Project that cross University of Texas Lands (University Lands) in Crane County, Texas. Medallion proposes to construct two parallel, 12-inch-diameter oil pipelines measuring approximately 0.6 mile (0.97 kilometer [km]) in length within an area marked by intensive oil and gas exploration. Both pipelines will occupy a single, 60-foot-wide (18.3-meter [m]-wide) workspace. Approximately 0.50 mile (0.8 km) of the proposed pipelines will be constructed within University Lands in Crane County, Texas. As a portion of the undertaking will be located on state-owned University Lands, cultural resources investigations were conducted to satisfy the requirements of the Antiquities Code of Texas (ACT) under Texas Antiquities Permit No. 8262. This report addresses only the 0.5-mile (0.8-km) segment of pipelines on Texas public lands.

Impacts associated with the construction of the pipelines will occur within a 60-foot-wide (18.3-m-wide) workspace. For the 0.5 mile (0.8 km) of cultural resources survey on public lands, SWCA investigated a 300-foot-wide (91.4-m-wide) corridor to give Medallion options for the ultimate centerline placements. The area of potential effects (APE) for the project is approximately 0.6 mile (0.97 km) long and 300 feet (91.4 m) wide, totaling 23.5 acres. The portion of the proposed project that crosses parcels owned by University Lands consists of a 0.5-mile-long (0.8-km-long) and 300-foot-wide (91.4-m-wide) segment in Crane County, Texas, totaling 18.8 acres.

Investigations included a cultural resources background review and literature search of the entire APE and an intensive pedestrian survey augmented with shovel testing of the portions of the APE within University Lands. The background review indicated that five previous cultural resources surveys have been conducted within a 1-mile (1.6-km) radius of the APE. Two of the five previously surveyed project areas intersect the APE or are adjacent to (within 300 feet [91.4 m] of) the APE; the remainder of the previous survey areas are within the 1-mile buffer, but due to their distance from the APE, will not be traversed by the planned construction. Two archaeological sites (41CR43 and 41CR44) were recorded during the previous investigations; however, neither is located within the current APE. No additional archaeological sites or cultural resources, such as, cemeteries, National Register of Historic Places properties, historic markers, or historic features are located within or adjacent to (within 300 feet [91.4 m] of) the current APE.

The majority of the APE has been disturbed by oil and gas development associated with petroleum exploration and expansion, which includes well pads, crude oil and holding tanks, and surface and buried pipelines. Other disturbances include overhead and buried utilities, fence lines, vegetation clearing, earth moving, gravel access roads, and two-track roads. These impacts have resulted in significant disturbances throughout the APE.

The Texas Historical Commission / Council of Texas Archeologists survey standards for this project necessitated the excavation of 24 shovel tests along the 0.5-mile-long (0.8-km-long) segment of APE within University Lands. SWCA excavated a total of 27 shovel tests, thereby exceeding the survey standards for projects of this size. No cultural materials were recovered from any of the 27 shovel tests or observed on the ground surface.

In accordance with the ACT, SWCA has made a reasonable and good faith effort to identify archaeological sites and historic properties within the investigated APE. Based on the negative shovel test results, the planned project will have no effect on cultural resources. SWCA recommends that because no cultural resources will be impacted by the project, no further archaeological investigations within the APE are warranted for the assessed portion of the Plains Connection 1 and 2 Pipeline Project on State of Texas public lands.

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INTRODUCTION

On behalf of Medallion Pipeline Company, LLC (Medallion), SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of portions of the Plains Connection 1 and 2 Pipeline Project that cross University of Texas Lands (University Lands) in Crane County, Texas (Figure 1). The area of potential effects (APE) for the project is approximately 0.6 mile (0.97 kilometer [km]) long and 300 feet (91.4 meters [m]) wide, totaling 23.5 acres. The portion of the proposed project area that crosses parcels owned by University Lands, and which is the subject of this report, consists of a 0.5-mile-long (0.8-km-long) and 300-foot-wide (91.4-m-wide) segment in Crane County, Texas, totaling 18.8 acres in extent. Since the proposed undertaking will be located on state-owned University Lands, work was conducted in compliance with the Antiquities Code of Texas (ACT) under Texas Antiquities Permit No. 8262. This report addresses only the 0.5-mile-long (0.8-km-long) segment of pipelines on Texas public lands.

The goal of the work was to locate all prehistoric and historic cultural resources within the proposed project area, establish vertical and horizontal site boundaries as appropriate, and evaluate the significance and eligibility of all recorded sites for designation as a State Antiquities Landmarks (SALs). All investigations adhered to guidelines provided in the Council of Texas Archeologists (CTA) Guidelines for Performance, Curation, and Reports. The overall approach ensured that all project-related impacts were investigated thoroughly for their potential to affect cultural resources and were documented accordingly.

Project Description

Within Crane County, Medallion proposes to construct two parallel, 12-inch-diameter oil pipelines measuring approximately 0.6 mile (0.97 km) in length within an area marked by intensive oil and gas exploration. Both pipelines will occupy a single, 60-foot-wide (18.3-m-wide) workspace. The project area is approximately 2.65 miles (4.26 km) north of the town of Crane and located on the western side of U.S. Highway 385 (Figure 2). The proposed pipelines are an extension of a previous pipeline project Medallion constructed in 2015. This previous project was surveyed by SWCA under Texas Antiquities Permit No. 7481. Approximately 0.50 mile (0.8 km) of the proposed pipelines will be constructed within the southern half of Survey Sections 44 in Survey Block 30 of University Lands in Crane County, Texas. The pipelines will begin approximately 0.30 mile (0.48 km) west of the intersection of Foundry Road and Dump Ground Road. The pipelines travel north, entering University Lands, before curving west-southwest and terminating near the center of an existing facility on Foundry Road.

Project Personnel

Micah Chambers served as Project Manager and Ken Lawrence was the Principal Investigator. Miles Martin served as Crew Chief, while Michelle Poteet provided field support. Christina Nielsen prepared the report. Jayme Fontenot processed the geographic information system (GIS) data and expertly produced all field and report graphics. Lauri Logan conducted the technical edits and compiled the report.

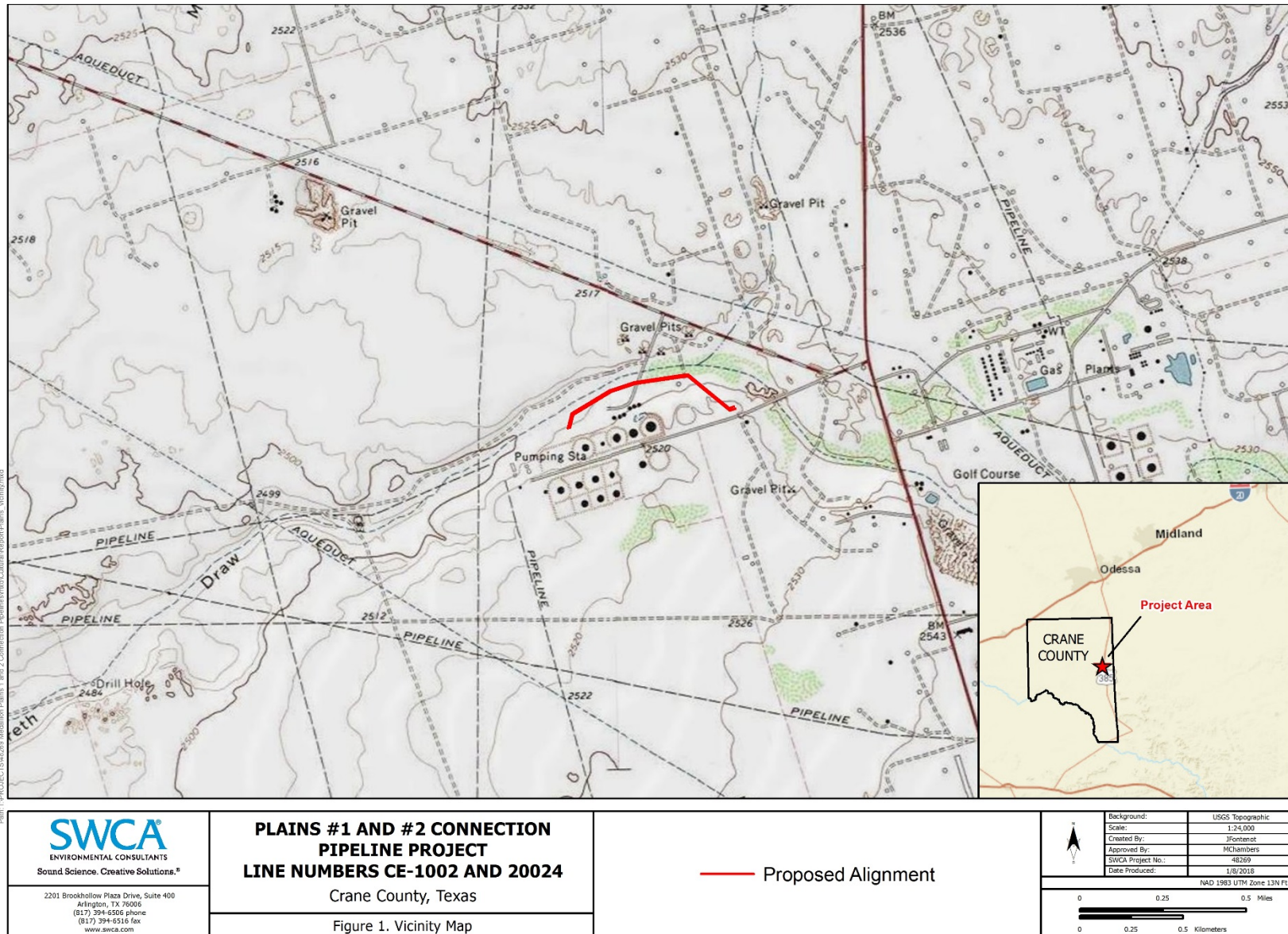


Figure 1. Project vicinity map.



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 <p>2201 Brookhollow Plaza Drive, Suite 400 Arlington, TX 76010 (817) 394-6506 phone (817) 394-6516 fax www.swca.com</p>	<p align="center">PLAINS #1 AND #2 CONNECTION PIPELINE PROJECT LINE NUMBERS CE-1002 AND 20024</p> <p align="center">Crane County, Texas</p> <p align="center">Figure 2. Project Area Map</p>	<ul style="list-style-type: none"> - - - Proposed Alignment Surveyed Area Project Area University Land 	<table border="1"> <tr><td>Background:</td><td>ESRI World Imagery</td></tr> <tr><td>Scale:</td><td>1:7,000</td></tr> <tr><td>Created By:</td><td>JFontenot</td></tr> <tr><td>Approved By:</td><td>MChambers</td></tr> <tr><td>SWCA Project No.:</td><td>48269</td></tr> <tr><td>Date Produced:</td><td>1/19/2018</td></tr> </table> <p align="center">NAD 1983 UTM Zone 13N FT</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>0 350 700 Feet</p>  </div> <div style="text-align: center;"> <p>0 100 200 Meters</p>  </div> </div>	Background:	ESRI World Imagery	Scale:	1:7,000	Created By:	JFontenot	Approved By:	MChambers	SWCA Project No.:	48269	Date Produced:	1/19/2018
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Figure 2. Project area map.

ENVIRONMENTAL SETTING

The project area within Crane County is situated at the southern end of the High Plains within the Shinnery Sands ecoregion. The area is commonly characterized as a flat sandy recharge zone subjected to wind erosion and is composed of sandy hills and dunes, stabilized by Harvard oak brush. The formation of the area is most likely attributed to the buildup of sands from Pecos River Basin blown against the western face of the Llano Estacado (Griffin and Omernik 2017).

Geology

Given the nature of the formation of the area, the underlying geological formation of the project area is composed of Holocene-age sand sheet deposits. These deposits consist of areas of large dunes from windblown sands comprising predominately sand intermixed with silt. Typical depths of the deposits are undetermined and are characterized as having a shallow water table with soils that are moderate to very high permeability and have a low to moderate water holding capacity (Barnes 1992).

Soils

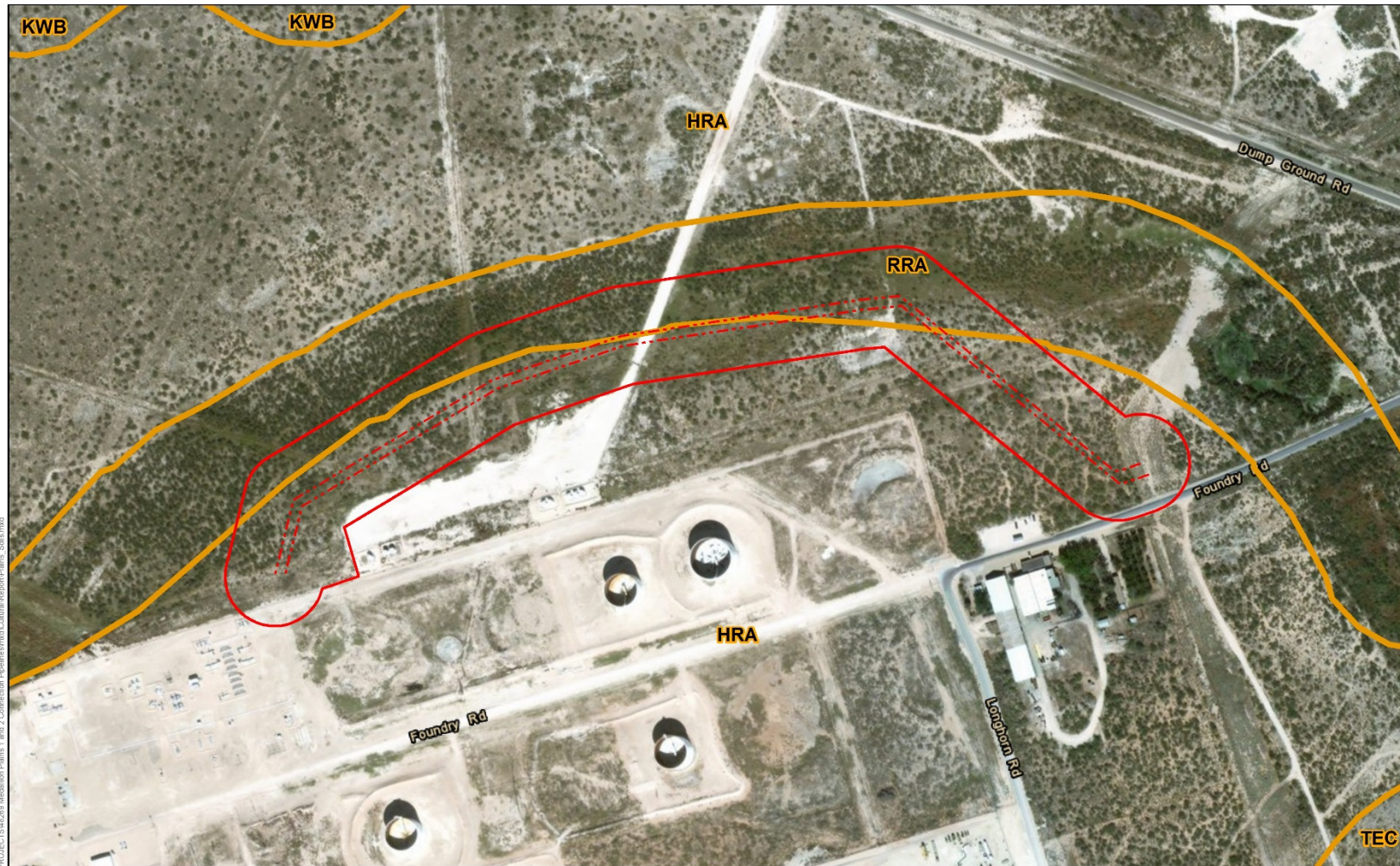
Soils of the project area are composed of the Reakor (RRA) and Holloman-Reeves (HRA) associations (Figure 3). The Reakor series soils consist of loamy alluvium that is well drained, deep, and slowly permeable. Reakor soils form from mixed sources and are typically found on broad level plains and alluvial fans (Natural Resources Conservation Service [NRCS] 2017). These soils become weakly cemented with accumulations of gypsum, gravel, or cobbles commonly occurring below 100 centimeters below surface (cmbs).

The Holloman-Reeves associations are composed of the Holloman series and Reeves series soils. Holloman series soils are characterized as well-drained, moderately permeable soils that are typically found adjacent to terraces, basins, or valley floors. These soils are derived from loamy, gypsiferous, and calcareous sediments and are considered shallow to very shallow (NRCS 2017). Reeves series are characterized as fine-loamy soils formed in calcareous and gypsiferous alluvium that are well drained and very deep. These soils are typically encountered along basin floors, plateaus, or on hillslopes (NRCS 2017). Depths of the Holloman-Reeves association vary from 152 to 200 cmbs and are often intermixed or underlain by gypsum.

General Flora and Fauna of the Area

Vegetation consists of principally fourwing-saltbrush-creosotebush scrub, as defined by McMahan et al. (1984), which features principally mesquite (*Prosopis glandulosa*), salt-cedar (*Tamarix spp.*), creosotebush (*Larrea tridentata*), tarbush (*Flourensia cernua*), prickly pear (*Opuntia spp.*), tasajillo (*Opuntia leptocaulis*), sacaton (*Sporobolus sporobolus*), blue grama grass (*Bouteloua gracilis*), broom snakeweed (*Gutierrezia sarothrae*), James' rushpea (*Pomaria jamesii*), tabosagrass (*Pleuraphis mutica*), mesa dropseed (*Sporobolus flexuosus*), purple threeawn (*Aristida purpurea*), and jimmyweed (*Isocoma wrightii*).

Common fauna in this region include Black-tailed jackrabbit (*Lepus californicus*), desert cotton tail (*Sylvilagus audubonii*), Merriam's pocket mouse (*Perognathus merriami*), collared peccary (*Tayassu tajacu*), Mexican ground squirrel (*Spermophilus mexicanus*), white-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginiana*), tarantula (*Aphonopelma chalcodes*), and western diamondback rattlesnake (*Crotalus atrox*).



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<p>SWCA ENVIRONMENTAL CONSULTANTS Sound Science. Creative Solutions.®</p> <p>2201 Brookhollow Plaza Drive, Suite 400 Arlington, TX 76006 (817) 394-6506 phone (817) 394-6516 fax www.swca.com</p>	<p>PLAINS #1 AND #2 CONNECTION PIPELINE PROJECT LINE NUMBERS CE-1002 AND 20024</p> <p>Crane County, Texas</p>	<p>--- Proposed Alignment</p> <p>Project Area</p> <p>Soil Unit</p>	<table border="1"> <tr> <td>Background:</td> <td>ESRI World Imagery</td> </tr> <tr> <td>Scale:</td> <td>1:5,000</td> </tr> <tr> <td>Created By:</td> <td>JFontenot</td> </tr> <tr> <td>Approved By:</td> <td>MChambers</td> </tr> <tr> <td>SWCA Project No.:</td> <td>48269</td> </tr> <tr> <td>Date Produced:</td> <td>1/18/2018</td> </tr> </table> <p>NAD 1983 UTM Zone 13N Ft</p> <p>0 250 500 Feet</p> <p>0 100 200 Meters</p>	Background:	ESRI World Imagery	Scale:	1:5,000	Created By:	JFontenot	Approved By:	MChambers	SWCA Project No.:	48269	Date Produced:	1/18/2018
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<p>Figure 3. Soils Map</p>															

Figure 3. Soil units in the project area.

CULTURAL SETTING

The project area is located in the Permian Basin of the Southern High Plains (Llano Estacado) archaeological region, which lies immediately to the east of the Pecos River, a physiographic dividing line of the Trans-Pecos and the Southern High plains archaeological regions (Perttula 2004; Turner and Hester 1999). Both archaeological regions have been extensively researched and comprehensive chronological sequences have been established for these regions (Turner and Hester 1999). According to research conducted at archaeological sites in both regions, evidence of human occupation in the regions roughly spans 12,000 years before present (B.P.) (Miller and Kenmotsu 2004; Johnson and Holliday 2004). These 12,000 years of occupation are typically divided into four main periods based on technological and cultural changes seen throughout the archaeological record. These four main periods are the Paleoindian (12,000/11,500–8500/8000 B.P.), the Archaic (8500/8000–2000 B.P.), the Late Prehistoric (2000/1500 B.P. to A.D. 1650), and the Historic (A.D. 1650–1950s) (Miller and Kenmotsu 2004; Johnson and Holliday 2004). The following is a general overview of trends seen during each period, followed by a discussion of what occurred in the Southern High Plains and the Tran-Pecos regions.

Paleoindian Period

The Paleoindian Period was commonly characterized throughout Texas as being populated by nomadic big-game hunters who heavily relied on megafauna of the Pleistocene (e.g., mammoth, mastodon, bison, camel, and horse) for subsistence (sensu Willey 1966). However, a more accurate description of this stage is presented by Bousman et al. (1990:22), who state that “this period may have seen use by small, mobile bands of nonspecialized hunters and gathers occasionally utilizing megafauna perhaps only as the opportunity arose.” Thus, according to Bousman et al. (1990), Paleoindians used a wider variety of resources than previously thought. Evidence of this broader resource subsistence is based on the works of Johnson (1977), Collins (1998: 1505–1506), and Collins and Brown (2000). Johnson (1977) reviewed reports on numerous Paleoindian sites that indicated a range of small and medium fauna were harvested in addition to big game. Investigations at the Wilson-Leonard site (41WM235), the Gault site (41BL323), and Lubbock Lake (41LU1) provide evidence of small- and medium-sized faunal remains (i.e., turtle, rabbit, squirrel, snakes, gopher, and deer) associated with megafaunal remains (i.e., bison and mammoth) (Collins 1998:1505–1506). Clovis and Folsom points are the primary diagnostic artifacts associated with this period (Turner and Hester 1999; Collins 1995).

Archaic Period

The Archaic period is characterized by a shift from big-game hunting subsistence strategies to a less mobile, more generalized subsistence strategy. This change in subsistence strategies shows a greater exploitation of local environments with the exploitation of plants and animals located in the immediate vicinity. Along with the change in subsistence practices, a change is also seen in lithic technology. Evidence of this is apparent in the archaeological record where lanceolate-shaped points are replaced by dart points that are stemmed and barbed, and in the creation of groundstone tools typically thought to indicate an increase in the use of plant materials (Black 1989; Collins 2004). Although Archaic peoples were still nomadic in nature, traveling became seasonal, utilizing food resources specific to certain localities.

Late Prehistoric Period

The Late Prehistoric is marked by the replacement of the atlatl with the bow and arrow and by the production of small arrow points (Hester 1981:122). With this technological advancement, an apparent increase in warfare is reported (Black 1989; Story 1985). During this stage, new technological adaptations came about. As previously mentioned, Late Prehistoric peoples began to use the bow and arrow; however, this is not the only technological innovation of this time period. Ceramics and agriculture became an important technological advancement in the lifeways of the Late Prehistoric peoples.

The Southern High Plains Region in Relation to the Cultural Chronology

Although a complete chronological sequence is well represented in the Southern High Plains region, it is limited to the northern half of the Southern High Plains. Representation of archaeological sites in the southern half of the Southern High Plains is generally scarce, and knowledge of prehistoric lifeways in this area is incomplete. This is in part due to a lack of resources within the area. This lack of resources kept populations low, therefore keeping sites to a minimum. A review of archaeological sites found in the region revealed that the majority of sites are open campsites consisting of scatters of lithic debris on the surface, or are shallowly buried and burned rock features. Although these types of sites are commonly found throughout Texas, they are easily disturbed by erosion and modern intrusion (Turner and Hester 1999). Although the southern half of the Southern Plains region is lacking in long-term occupation sites and quarries, the region does contain an important site possibly dating to the Folsom period (12,610–12,170 B.P.). This particular site, unearthed at Scharbauer Ranch in 1953, is known as the Scharbauer or Midland Site (41MD1). This site is one of the earliest sites known within this region. Investigation of the site revealed a partial human female cranium, faunal remains from extinct megafauna, and projectile points dating to the early Paleoindian period (Leffler 2018a).

As the Southern High Plains moved into the Archaic Period, the southern half of the Southern High Plains entered a long altithermal phase that lasted around 4,000 years (7000–3000 B.P.). The altithermal was a period with a warmer and drier climate that ultimately led to severe xeric conditions. According to researchers, the altithermal phase resulted in the “decreased use, if not complete abandonment” of the region (Johnson and Holliday 2004; Stafford 1981). Most sites recorded in the Southern Panhandle Plains region date to the Middle Archaic through Late Prehistoric periods.

The Trans-Pecos Region in Relation to the Cultural Chronology

The Trans-Pecos region, much like the Southern High Plains contains well-established chronological sequence, however it encompasses a considerably more dynamic cultural environment than the southern half of the Southern Plains around Midland/Odessa. The Trans-Pecos Region is characterized by its numerous natural rock shelters that formed in limestone cliffs, abundant lithic material, and isolated micro-environments formed in mountain ranges or at springs. Limitations of accessibility between various environments contributed to distinctive prehistoric site types (Turpin 1995). Prehistoric sites are often found within natural rock shelters located in many of the limestone cliffs, which create ideal conditions for the preservation of burned rock middens, organic materials, burials, and various types of rock art. Native peoples utilized these rockshelters throughout all periods of prehistory and well into the historic period.

Paleoindian sites in the Trans-Pecos occur rather infrequently. However, those that are known are primarily kill sites found in or near rock shelters where ancient peoples processed megafauna such as bison, camel, and bear (Turpin 1995). Other evidence of the existence of Paleoindian inhabitants comes

from Paleoindian tools or points found in isolated occurrences or points found within multicomponent scatters (Seebach 2001).

During the Archaic, habitation sites within rock shelters became more prevalent, along with rock art. The Late Archaic (4000–1500 B.P.) is the best known period of the three. This period is characterized by expansion into all available ecological niches, and the use of specialized food processing earth ovens (Miller and Kenmotsu 2004). In the Late Archaic the more common site types in the Trans-Pecos are massive burned rock middens, used for large-scale food processing. These middens are typically found exposed on mesa tops overlooking the surrounding canyons and waterways.

During the Late Prehistoric, sites found in the Trans-Pecos region consisted of tipi rings, cairn burial sites, rock shelter sites with pictographs and petroglyphs, and pit houses built on river and stream terraces. It was during this time that the lifeways of the Late Prehistoric peoples changed, with the development of proto-agriculture, use of the bow and arrow, and the manufacture of ceramics. Material culture associated with this social organizational change includes Perdiz arrow points, flake drills, end and side scrapers, beveled knife fragments, ground stone items, end-notched sinker stones, small bone and stone beads, tiny turquoise beads, and a few *Olivella* shell beads.

Historic Context

The Historic Period in Texas can be divided into two sub-periods: the Protohistoric and Historic. The Protohistoric (ca. A.D. 1528–1700) is ushered by the venture into south and southeast Texas by Spanish explorer Cabeza de Vaca in 1528. Archaeological sites dated to this sub-period contain a mix of both European (e.g., metal and glass arrow points, trade beads, and wheel-made or glazed ceramics) and traditional Native American artifacts (e.g., manufactured stone tools). The effect the Spanish presence in Mexico had on Native Americans in Texas prior to about 1700 is not well understood. What is known is that the initial arrival of Spanish missionaries and explorers spread disease that killed, displaced, and fragmented a huge percentage of the population. As colonization spread from Mexico, many of the Coahuiltecan groups moved northward to avoid the Spanish. At the same time, invading Indian groups from the north put pressure on Native American groups in north Texas (Nickels et al. 1997). Historians believe that these pressures led to intense territorial disputes, further destabilizing Native American populations. The establishment of the first Spanish missions and the expansion of the Spanish Colonial Empire mark the Historic period (ca. 1700–present). Most of our knowledge of this subperiod is through the written records of early Spanish missionaries and by records kept by local land officials.

Spanish exploration, however, had little direct impact on Crane County. The area was too remote, and, except for the area around the Pecos River, remained largely unexplored by Europeans until the end of the nineteenth century. The first European settlers were ranchers who came in the late nineteenth and early twentieth centuries, although lack of water and other resources hindered significant population growth. These areas remained sparsely populated until oil was discovered in 1923. Crane County still relies on petroleum and ranching as the primary industries today (Leffler 2018b).

Crane County

The area that is now Crane County was within the territory of the Lipan Apaches, who were among the originators of the plains culture common to Apaches, Comanches, Kiowas, and other Native Americans. This part of the Pecos country may have been crossed by Spanish explorer Felipe de Rábago y Terán in 1761, and some of the early California-bound American travelers passed through Castle Gap and Horsehead Crossing (Leffler 2018b).

Crane County was formed in 1887 from land previously assigned to Tom Green County the same year, but for many years the area's scant rainfall deterred settlement. In 1890 only 15 people lived in Crane County; as late as 1900, the United States census enumerated only 51 people and 12 ranches in the county. Almost 17,650 cattle and 3,750 sheep were counted that year (Leffler 2018b).

The county seems to have experienced a brief burst of settlement during the first years of the twentieth century; Crane, the future county seat, became a post office in 1908, while census figures show that in 1910 there were 71 farms or ranches in the county, and that the population by that year had risen to 331. Almost no crop production was reported for the county in 1910, however, and in any case most of the new settlers had moved away by 1920, when only eight ranches, 37 people, and about 4,700 cattle were reported. As late as 1918, the county had no roads, although the Texas and Pacific Railway crossed the northwest corner and the Panhandle and Santa Fe crossed the southern tip (Leffler 2018b).

The area only began to develop after oil was discovered in the county in 1926, after which an oil boom attracted thousands to the county. O. C. Kinnison opened a realty office and platted a town site for Crane, where he named the streets for his daughters and sons. He also invited a preacher to hold services in the area; according to county tradition, local gamblers resented the gesture and gave Kinnison a beating for it (Leffler 2018b).

Crane County was attached to Ector County for administrative purposes until 1927, but with (according to one estimate) 6,000 oil boomers in the area by that time, the county was ready for organization. The town of Crane, bustling with as many as 4,500 fortune-seekers, was designated as the county seat, and citizens organized to build a courthouse. Water was a scarce commodity. People paid a dollar a barrel for water brought from a well 7 miles east of town, or, if prosperous, paid \$2.25 a barrel for better water from Alpine. Water was too precious then for any use but cooking or homemade whiskey; women sent their laundry to El Paso. According to the census, 2,221 people were living in Crane County in 1930 (Leffler 2018b).

The county became one of the most productive oil counties in the state. In 1938, more than 5,494,600 barrels of oil were produced in the area. In 1944, more than 9,557,500 barrels were pumped, and in 1948 production was 16,851,698 barrels. Almost 27,377,800 barrels were produced in 1956, almost 30,731,500 in 1960, almost 34,092,000 in 1978, and about 26,866,000 in 1982. In 1990, the county produced almost 19,026,000 barrels of oil. By the beginning of 1991, almost 1,552,324,000 barrels of oil had been produced in the county since 1926 (Leffler 2018b).

Thanks almost exclusively to the oil industry, Crane County's population rose to 2,841 in 1940, 3,956 in 1950, 4,699 in 1960, and 4,172 in 1970. In 1980, 4,600 people lived in the county, and in 2014 the area had a population of 4,950. Highways in the county include U.S. Highway 385 and Farm-to-Market Road 1053 (north to south); U.S. Highway 67/385, which crosses the southeast corner; and State Highway 329, FM 11, and FM 1223 (west to east). The town of Crane (population 3,756) is the county's only community and its seat of government. In 2000 business establishments in the town included a foundry and a surfboard manufacturer. Tourist attractions included historic pioneer trails and Horsehead Crossing on the Pecos River (Leffler 2018b).

BACKGROUND REVIEW AND SURVEY METHODS

Background Review

SWCA conducted a background review to determine if the project area has been previously surveyed for cultural resources or if any archaeological sites have been recorded within a 1-mile (1.6-km) radius of the

project area. To conduct this review, an SWCA archaeologist reviewed the Crane and Crane NW, Texas U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps on the Texas Historical Commission's (THC) Texas Archeological Sites Atlas (Atlas; THC 2017). These sources provided information on the nature and location of previously conducted archaeological surveys, previously recorded cultural resources, locations of National Register of Historic Places (NRHP) properties, sites designated as SALs, Official Texas Historical Markers, Recorded Texas Historic Landmarks, cemeteries, and local neighborhood surveys. As a part of the review, an SWCA archaeologist reviewed the Texas Department of Transportation's Historic Overlay, a mapping/GIS database with historic maps and resource information covering most portions of the state (Foster 2006).

The background literature review revealed that five previously conducted cultural surveys are within a 1-mile (1.6-km) radius of the proposed project area (THC 2017). Only two of the previous surveys intersect or are immediately adjacent to (within 300 feet [91.4 m] of) the project area (Figure 4). The first survey, conducted in 1998, is adjacent to the western end of the project area and consisted of an area survey. No further information is available on the THC's Atlas about the survey. The second survey was conducted in 2015 by SWCA under Texas Antiquities Permit No. 7481. The 2015 survey was an investigation of another proposed Medallion project, into which this current project will connect. During the 2015 investigation, SWCA newly recorded two archaeological sites (41CR43 and 41CR44; see Figure 4).

Site 41CR43 is a large early- to late-twentieth-century historic trash dump located within a heavily eroded wash. The site is located approximately 492 feet (150 m) northeast of the project area's easternmost terminus. Site 41CR44 is an approximately 131×49-foot (40×15-m) historic scatter located within an active oilfield. The site is located 1 mile east-northeast from the easternmost terminus of the current project area. Due to the poor condition of sites 41CR43 and 41CR44 and the unremarkable character of the features and artifact assemblages, there is little potential to provide additional information that may contribute to the understanding of local and/or regional history (THC 2017). As such, sites 41CR43 and 41CR44 were recommended NOT ELIGIBLE for nomination as SALs.

No additional archaeological sites or cultural resources, such as, cemeteries, NRHP properties, historic markers, or historic features are located within or adjacent to (within 300 feet [91.4 m] of) the project area (THC 2017).

Cultural Resources Survey Methods

SWCA's investigations consisted of an intensive pedestrian survey with subsurface investigations of the 0.5-mile-long (0.8-km), 300-foot-wide (91.4-m) APE located on public lands. Archaeologists examined the ground surface and erosion profiles and exposures for cultural resources. Subsurface investigations consisted of systematic shovel test excavations. For a linear corridor survey, THC survey standards minimally require that for every 100 feet (30 m) of survey corridor width, 16 shovel tests need to be excavated every mile. For a project of this size (i.e., total of 1.5 mile [2,400 m] along three transects), the shovel test investigations required a minimum of 24 shovel tests. The survey was of sufficient intensity to determine the nature, extent, and, if possible, significance of cultural resources discovered within the APE.

Restricted Information
Not for Public Disclosure

Figure 4. Cultural resources within 1 mile of project area.

The intensive pedestrian field survey consisted of SWCA archaeologists walking the proposed ROW utilizing transects spaced no more than 100 feet (30 m) apart, which equals three parallel transects across the 300-foot-wide (91.4-m-wide) survey corridor. Shovel tests measured roughly 30×30 centimeters (cm) in size and were excavated in 20-cm arbitrary levels to 100 cm in depth or to culturally sterile deposits, whichever came first. The matrix was screened through ¼-inch mesh. The location of each shovel test was plotted using a hand-held sub-meter accurate Global Positioning System (GPS) receiver and was recorded on appropriate project forms in SWCA's field tablets. SWCA conducted a non-collection survey. Artifacts, had any been encountered, would have been tabulated, analyzed, and documented in the field, but not collected. Following the review and acceptance of the final cultural resources report, all records and photographs will be curated with the Center for Archaeological Research at the University of Texas at San Antonio, per requirements of the ACT.

CULTURAL RESOURCES SURVEY RESULTS

On January 5, 2018, two SWCA archaeologists conducted an intensive cultural resources survey of two parallel pipeline segments in Crane County that cross University of Texas Lands approximately 2.65 miles (4.3 km) north of the town of Crane and located on the western side of U.S. Highway 385 (Figure 5). Investigations within the University Lands APE involved surface and subsurface examinations of approximately 0.5 mile (0.8 km) of proposed pipeline alignment. The intensive cultural resources investigations were conducted within a 300-foot-wide (91.4-m-wide) survey corridor and examined a total of 18.8 acres within the survey corridor.

The general setting of the APE is rural and isolated with no residential areas and extensive industrial development within the surrounding oil and gas fields on public lands. Vegetation throughout the project area consists of tall grasses, mesquite trees, and creosote with patches of eroded surface (Figure 6). Ground surface visibility typically ranged from 50–75 percent. Disturbances across the APE vary in extent and severity. The most prominent disturbance is the oil and gas development associated with petroleum exploration and expansion, which includes well pads, crude oil and holding tanks, and surface and buried pipelines. Other disturbances include overhead and buried utilities, fence lines, vegetation clearing, earth moving, gravel access roads, and two-track roads (Figures 7–10).

Surface examinations of the APE observed no cultural materials or features within the 300-foot-wide (91.4-m-wide) survey corridor. Subsurface investigations involved the excavation of shovel tests along three transects within the University Lands APE. A total of 27 negative shovel tests (MM001–MM015 and MP001–MP012) were excavated to test for buried cultural materials (see Figure 5; Appendix A). The THC/CTA survey standards for this project necessitated the excavation of at least 24 shovel tests along the 0.5-mile-long (0.8-km-long) segment of APE within University Lands. SWCA excavated a total of 27 shovel tests, thereby exceeding the survey standards for projects of this size.

Excavated shovel tests in the western portion of the APE consisted of moderately compact to compact, brown (7.5YR 5/3) dry loamy sand atop a dense layer of caliche or light brown (7.5YR 6/4) loamy sand with a high amount of caliche gravels (Appendix A). Shovel tests were typically terminated around 65 cmbs due to compacted caliche, although a few tests along the southern edge of the APE (e.g., MP006 and MP007) were terminated at depth. Shovel tests within the eastern portion of the APE encountered less caliche, but shovel tests had an increased clay content (Appendix A). Typical shovel tests in the eastern area consisted of brown (7.5YR 5/3) sandy loam atop dense sandy clay loam to sandy clay. Shovel tests were terminated due to compact clay at around 65 cmbs. No cultural materials were observed in any of the excavated shovel tests or on the ground surface within the University Lands APE.



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<p>SWCA ENVIRONMENTAL CONSULTANTS Sound Science. Creative Solutions.®</p> <p>2201 Brookhollow Plaza Drive, Suite 400 Arlington, TX 76006 (817) 394-6506 phone (817) 394-6516 fax www.swca.com</p>	<p>PLAINS #1 AND #2 CONNECTION PIPELINE PROJECT LINE NUMBERS CE-1002 AND 20024</p> <p>Crane County, Texas</p>	<p>○ Negative Shovel Test</p> <p>⊗ Not Excavated</p> <p>■ Existing Pipeline</p>	<p>- - - Proposed Alignment</p> <p>▭ Surveyed Area</p> <p>▭ Project Area</p> <p>▭ University Land</p>	<p>Background: ESRI World Imagery</p> <p>Scale: 1:5,000</p> <p>Created By: JFontenot</p> <p>Approved By: MChambers</p> <p>SWCA Project No.: #8269</p> <p>Date Produced: 1/19/2018</p> <p>NAD 1983 UTM Zone 13N Ft</p> <p>0 250 500 Feet</p> <p>0 70 140 Meters</p>
	<p>Figure 5. Cultural Resources Results Map</p>			

Figure 5. Cultural resources survey results map.



Figure 6. Overview of typical project area vegetation from shovel test MM001, facing east.



Figure 7. Example of oil-related disturbances and access roads from shovel test MM008, facing south.



Figure 8. Example of oil-related disturbances from shovel test MP008, facing east.



Figure 9. Example of earth-moving disturbances and oil-related disturbances from shovel test MP012, facing west.



Figure 10. Example of two-track road within project area from shovel test MP004, facing north.

Based on the negative results of the survey and previous disturbances within the APE, it is SWCA's opinion that the proposed project will have no effect on cultural resources within University Lands. SWCA therefore recommends that the proposed project be allowed to proceed with no further archaeological investigations of the proposed project area on University Lands. No artifacts were collected; therefore, only project paperwork and photographs will be curated as per the requirements of Texas Antiquities Code Permit No. 8262.

SUMMARY AND RECOMMENDATIONS

On behalf of Medallion, SWCA conducted an intensive archaeological survey of portions of the Plains Connection 1 and 2 Pipeline Project that cross University Lands in Crane County, Texas. Within Crane County, Medallion proposes to construct two parallel, 12-inch-diameter oil pipelines measuring approximately 0.6 mile (0.97 km) in length within an area marked by intensive oil and gas exploration. Both pipelines will occupy a single, 60-foot-wide (18.3-m-wide) workspace. Approximately 0.50 mile (0.8 km) of the proposed pipeline route will be constructed within University Lands in Crane County, Texas. As the undertaking will be located on University Lands property, investigations were conducted in accordance with the requirements of the ACT under Texas Antiquities Permit No. 8262. This report addresses only the 0.5-mile (0.8-km) segment of pipeline corridor on Texas public lands.

Impacts associated with the construction of the pipelines will occur within a 60-foot-wide (18.3-m-wide) workspace. For the 0.5 mile (0.8 km) of cultural resources survey on public lands, SWCA investigated a 300-foot-wide (91.4-m-wide) corridor to give Medallion options for the ultimate centerline placements. The APE for the project is approximately 0.6 mile (0.97 km) long and 300 feet (91.4 m) wide, totaling 23.5 acres. The portion of the proposed project that crosses parcels owned by University Lands consists of a 0.5-mile-long (0.8-km-long) and 300-foot-wide (91.4-m-wide) segment in Crane County, Texas, totaling 18.8 acres.

Investigations included a cultural resources background review and literature search and an intensive pedestrian survey augmented with shovel testing of the portions of the APE within University Lands. The background review indicated that five previous cultural resources surveys have been conducted within a 1-mile (1.6-km) radius of the APE. Two of the five previously surveyed project areas intersect the APE or are adjacent to (within 300 feet [91.4 m] of) the APE; the remainder of the previous survey areas are within the 1-mile (1.6-km) buffer, but due to their distance from the APE, will not be traversed by the planned construction. Two archaeological sites (i.e., 41CR43 and 41CR44) were recorded during these previous investigations; however, neither is located within the current APE. No additional archaeological sites or cultural resources, such as, cemeteries, NRHP properties, historic markers, or historic features are located within or adjacent to (within 300 feet [91.4 m] of) the current APE.

Most of the APE has been disturbed by oil and gas development associated with petroleum exploration and expansion, including well pads, crude oil and holding tanks, and surface and buried pipelines. Other disturbances include overhead and buried utilities, fence lines, vegetation clearing, earth moving, and gravel access roads. These impacts have resulted in significant disturbances throughout the APE. The THC/CTA survey standards for this project necessitated the excavation of 24 shovel tests along the 0.5-mile-long (0.8-km-long) segment of APE within University Lands. SWCA excavated a total of 27 shovel tests, thereby exceeding the survey standards for projects of this size. No cultural materials were recovered from any of the 27 shovel tests or observed on the ground surface during the pedestrian survey.

In accordance with the ACT, SWCA has made a reasonable and good faith effort to identify archaeological sites and historic properties within the investigated APE. Based on the negative shovel test results, the planned project will have no effect on cultural resources. SWCA recommends that because no cultural resources would be impacted by the project, no further archaeological investigations within the APE are warranted for the assessed portion of the Plains Connection 1 and 2 Pipeline Project on State of Texas public lands.

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Appendix A
Shovel Test Data

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*Intensive Archaeological Survey of
Portions of the Plains Connection 1 and 2 Pipeline Project within University Lands*

Shovel Test Number	Level	Depth	Munsell	Munsell Color	Texture	Inclusion %	Inclusion Type	Comments
MM001	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM002	1	0-50	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	50-60	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM003	1	0-55	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	55-65	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM004	1	0-30	7.5YR 6/4	light brown	Loamy Sand	–	–	No cultural material encountered. Terminated at compact soil.
MM005	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM006	1	0-100	10YR 6/4	light yellowish brown	Loamy Sand	>20%	Caliche Gravels	No cultural material encountered. Terminated at depth.
MM007	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM008	1	0	n/a	n/a	n/a	–	–	Not excavated, within existing pipeline
MM009	1	0-30	7.5YR 4/4	brown	Sandy Clay Loam	1-5%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM010	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM011	1	0-30	7.5YR 3/3	dark brown	Sandy Loam	–	–	No cultural material encountered. Terminated at compact soil.
MM012	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM013	1	0-30	7.5YR 3/3	dark brown	Sandy Loam	–	–	No cultural material encountered. Terminated at compact soil.

*Intensive Archaeological Survey of
Portions of the Plains Connection 1 and 2 Pipeline Project within University Lands*

Shovel Test Number	Level	Depth	Munsell	Munsell Color	Texture	Inclusion %	Inclusion Type	Comments
MM014	1	0-45	7.5YR 5/3	brown	Loamy Sand	–	–	No cultural material encountered.
	2	45-55	7.5YR 6/3	light brown	Loamy Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MM015	1	0-30	7.5YR 4/4	brown	Loamy Sand	>20%	Caliche Gravels	No cultural material encountered. Terminated at disturbed soil.
MP001	1	0-100	10YR 6/4	light yellowish brown	Sand	–	–	No cultural material encountered. Terminated at depth.
MP002	1	0-30	10YR 5/3	brown	Sand	–	–	No cultural material encountered.
	2	30-65	10YR 6/4	light yellowish brown	Sand	10-20%	Caliche Gravels	No cultural material encountered. Terminated at compact soil.
MP003	1	0-35	10YR 3/4	dark yellowish brown	Loamy Sand	1-5%	Caliche	No cultural material encountered. Terminated at compact soil.
MP004	1	0-30	10YR 4/4	dark yellowish brown	Loamy Sand	–	–	No cultural material encountered. Terminated at compact soil.
MP005	1	0-60	10YR 6/4	light yellowish brown	Sand	5-10%	Caliche	No cultural material encountered. Terminated at bedrock.
MP006	1	0-60	10YR 6/4	light yellowish brown	Sand	5-10%	Caliche	No cultural material encountered. Terminated at compact soil.
MP007	1	0-100	10YR 6/4	light yellowish brown	Sand	1-5%	Caliche	No cultural material encountered. Terminated at depth.
MP008	1	0-50	10YR 6/4	light yellowish brown	Sand	5-10%	Caliche	No cultural material encountered. Terminated at compact soil.
MP009	1	0-65	10YR 6/4	light yellowish brown	Sand	–	–	No cultural material encountered.
	2	65-75	10YR 8/4	very pale brown	Sand	1-5%	Caliche	No cultural material encountered. Terminated at compact soil.
MP010	1	0-35	10YR 6/4	light yellowish brown	Loamy Sand	1-5%	Caliche	No cultural material encountered. Terminated at compact soil.
MP011	1	0-60	10YR 6/4	light yellowish brown	Sand	–	–	No cultural material encountered.
	2	60-70	10YR 8/4	very pale brown	Sand	10-20%	Caliche	No cultural material encountered. Terminated at compact soil.
MP012	1	0-30	10YR 5/4	yellowish brown	Sand	>20%	Gravel, tarred paper, glass fragments, wood, and bone.	No cultural material encountered. Terminated at disturbed.