



INDEX OF TEXAS ARCHAEOLOGY

Open Access Gray Literature from the Lone Star State

Volume 2019

Article 15


2019

Proposed Texas Pipeline LTD Star 12,000-Foot-Long Power Transmission Line on University of Texas Lands, Ward County, Texas

Michael Hogan

Jennifer Hatchett Kimbell

Follow this and additional works at: <https://scholarworks.sfasu.edu/ita>

 Part of the [American Material Culture Commons](#), [Archaeological Anthropology Commons](#), [Environmental Studies Commons](#), [Other American Studies Commons](#), [Other Arts and Humanities Commons](#), [Other History of Art, Architecture, and Archaeology Commons](#), and the [United States History Commons](#)

[Tell us how this article helped you.](#)

Cite this Record

Hogan, Michael and Kimbell, Jennifer Hatchett (2019) "Proposed Texas Pipeline LTD Star 12,000-Foot-Long Power Transmission Line on University of Texas Lands, Ward County, Texas," *Index of Texas Archaeology: Open Access Gray Literature from the Lone Star State*: Vol. 2019, Article 15. <https://doi.org/10.21112/ita.2019.1.15>

ISSN: 2475-9333

Available at: <https://scholarworks.sfasu.edu/ita/vol2019/iss1/15>

This Article is brought to you for free and open access by the Center for Regional Heritage Research at SFA ScholarWorks. It has been accepted for inclusion in Index of Texas Archaeology: Open Access Gray Literature from the Lone Star State by an authorized editor of SFA ScholarWorks. For more information, please contact cdsscholarworks@sfasu.edu.

Proposed Texas Pipeline LTD Star 12,000-Foot-Long Power Transmission Line on University of Texas Lands, Ward County, Texas

Creative Commons License



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

Cultural Resources Survey

PROPOSED TEXAS PIPELINE LTD STAR 12,000-FOOT-LONG POWER TRANSMISSION LINE ON UNIVERSITY OF TEXAS LANDS, WARD COUNTY, TEXAS

August 7, 2019; revised October 2, 2019

Terracon Project No. 92197406



Prepared for:

PNM Resources, Environmental Services
Albuquerque, New Mexico

Prepared by:

Michael Hogan, MA, and Jennifer Hatchett Kimbell, MA, RPA
Terracon Consultants, Inc.
Houston, Texas

Principal Investigator:

Jennifer Hatchett Kimbell, MA, RPA
TAC Permit No. 8996

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

ABSTRACT

Terracon Consultants, Inc. (Terracon) was contracted by PNM Resources to conduct a Phase I archeological survey on lands owned by The University of Texas System in Ward County, Texas, the location of a proposed 12,000-foot-long power transmission line. Since the proposed undertaking will occur on land owned by a public institution of higher education, this project required compliance under the jurisdiction of the Antiquities Code of Texas (Natural Resources Code, Chapter 191) and its implementing rules (Texas Administrative Code, Title 13, Chapter 26).

The proposed project area comprises an easement approximately 12,000 feet (2.27 miles) long and approximately 30 feet wide. The total area covered is approximately 8.26 acres. Terracon archeologists excavated a total of forty (40) shovel tests to a depth of 80 centimeters (cm) below surface (bs), or to sediments predating human occupation in the area. The removed sediment was passed through ¼" hardware mesh to recover artifacts. One prehistoric archeological site, 41WR139, was recorded during the survey. The portion of the site that is within the project area is not eligible for inclusion in the National Register of Historic Places (NRHP) or for designation as a State Antiquities Landmark (SAL). Jenni Hatchett Kimbell served as Principal Investigator under Texas Antiquities Permit No. 8996. Fieldwork was conducted between July 16 and July 17, 2019 by Michael Hogan (Staff Archeologist) and Edgar Vazquez (Staff Archeologist). The report was authored by Michael Hogan and Jenni Hatchett Kimbell. Project records will be curated at the Texas Archeological Research Laboratory (TARL) at the University of Texas at Austin.

Given the absence of NRHP-eligible archeological sites within the proposed project area, Terracon recommends that the installation of the power transmission line proceed as planned. In the event that human remains, historic properties, or buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area but can continue where no cultural materials are present. TNMP Environmental Services Department should be contacted.

TABLE OF CONTENTS

ABSTRACT	iii
1.0 INTRODUCTION AND MANAGEMENT SUMMARY	1
2.0 BACKGROUND	4
2.1 Environmental Setting	4
2.2 Culture History	4
3.0 RESEARCH AND SURVEY METHODS	7
3.1 Desktop Review	7
3.2 Cultural Resources Survey	8
4.0 RESULTS	8
4.1 Desktop Review	8
4.2 Cultural Resources Survey	9
5.0 CONCLUSIONS AND RECOMMENDATIONS	15
6.0 REFERENCES CITED	16
APPENDIX	18

List of Figures

Figure 1. Project area aerial.	2
Figure 2. Project area on the 2019 Soda Lake NE and Soda Lake SE USGS 7.5' quadrangles.	3
Figure 3. Project area soils.....	5
Figure 4. Results of desktop assessment.....	10
Figure 5. Results of the Cultural Resources Survey	11
Figure 6. Vegetation at the eastern end of the project area; view facing west.	12
Figure 7. Vegetation at the western end of the project area; view facing west.....	12
Figure 8. Overview of site 41WR139; view facing north.	13
Figure 9. Site 41WR139 lithic flake in situ.	13
Figure 10. 41WR139 surface finds, obverse and reverse	14
Figure 11. 41WR139 site shovel test 01 (IP29) lithic flake, obverse and reverse.....	15

List of Tables

Table 1. Generalized culture history for the Trans-Pecos region of Texas, with corresponding environmental periods.....	4
---	---

**CULTURAL RESOURCES SURVEY OF THE
PROPOSED TEXAS PIPELINE LTD STAR
12,000-FOOT-LONG POWER TRANSMISSION LINE
ON UNIVERSITY OF TEXAS LANDS,
WARD COUNTY, TEXAS**

Terracon Project No. 92197406
August 7, 2019; revised October 2, 2019

1.0 INTRODUCTION AND MANAGEMENT SUMMARY

On behalf of PNM Resources (Client), archeologists from Terracon Consultants, Inc. (Terracon) conducted an intensive archeological survey of a 12,000-foot-long by 30-foot-wide proposed transmission line easement on lands owned by The University of Texas System in Ward County, Texas (Figures 1 and 2). This investigation assisted the Client in complying with requirements of the Antiquities Code of Texas (Natural Resources Code, Chapter 191) and its implementing rules (Texas Administrative Code, Title 13, Chapter 26); this compliance was required due to the location of the project area on land belonging to the University of Texas System, a political subdivision of the State of Texas. Proposed impacts consist of the embedding of 14-inch-diameter transmission line poles to an approximate depth of seven feet below the surface. Vegetation may be cleared in an area up to 20 feet around each pole, but no grading is planned. No concrete foundations will be constructed.

The project area for the proposed power transmission line consists of an easement approximately 12,000 feet long (2.27 miles) and 30 feet wide. Investigation of the project area consisted of pedestrian survey and sampling by means of the excavation of 40 shovel tests. Fieldwork was undertaken between July 16 and July 17, 2019 and was conducted by Michael Hogan (Staff Archeologist) and Edgar Vazquez (Staff Archeologist), under the supervision of Principal Investigator Jennifer Hatchett Kimbell. One archeological site, a prehistoric lithic scatter consisting of seven chert flakes, was recorded. The portion of the site within the project area was considered to be not eligible for inclusion on the National Register of Historic Places (NRHP) or for designation as a State Antiquities Landmark (SAL). Project records will be curated at the Texas Archeological Research Laboratory (TARL).

Given the absence of NRHP-eligible archeological sites within the project area, Terracon recommends that the installation of the proposed transmission line be allowed to proceed as planned. In the event that human remains, historic properties, or buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area but can continue where no cultural materials are present. TNMP Environmental Services Department should be contacted.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
 August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406

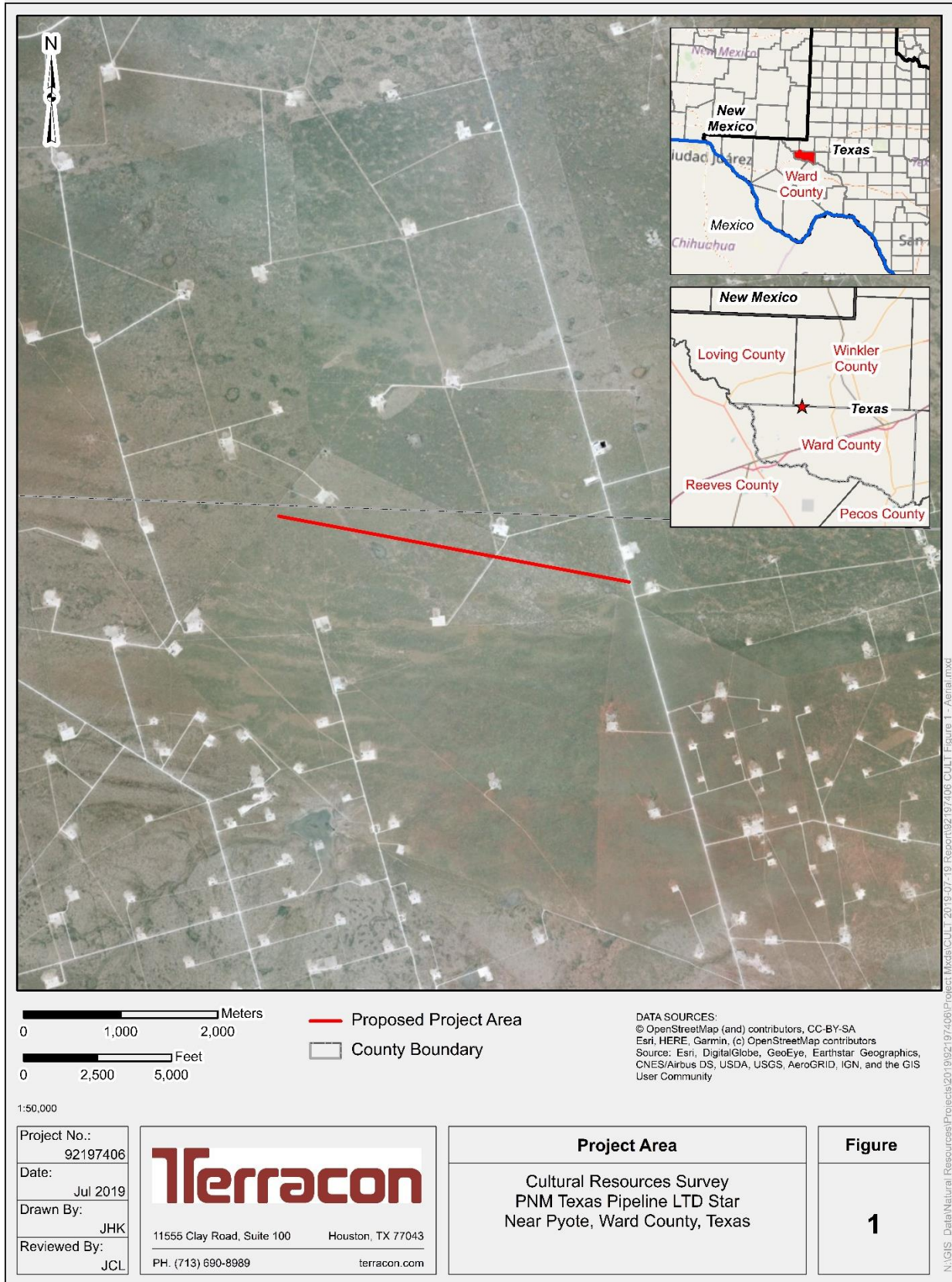


Figure 1. Project area aerial.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
 August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406

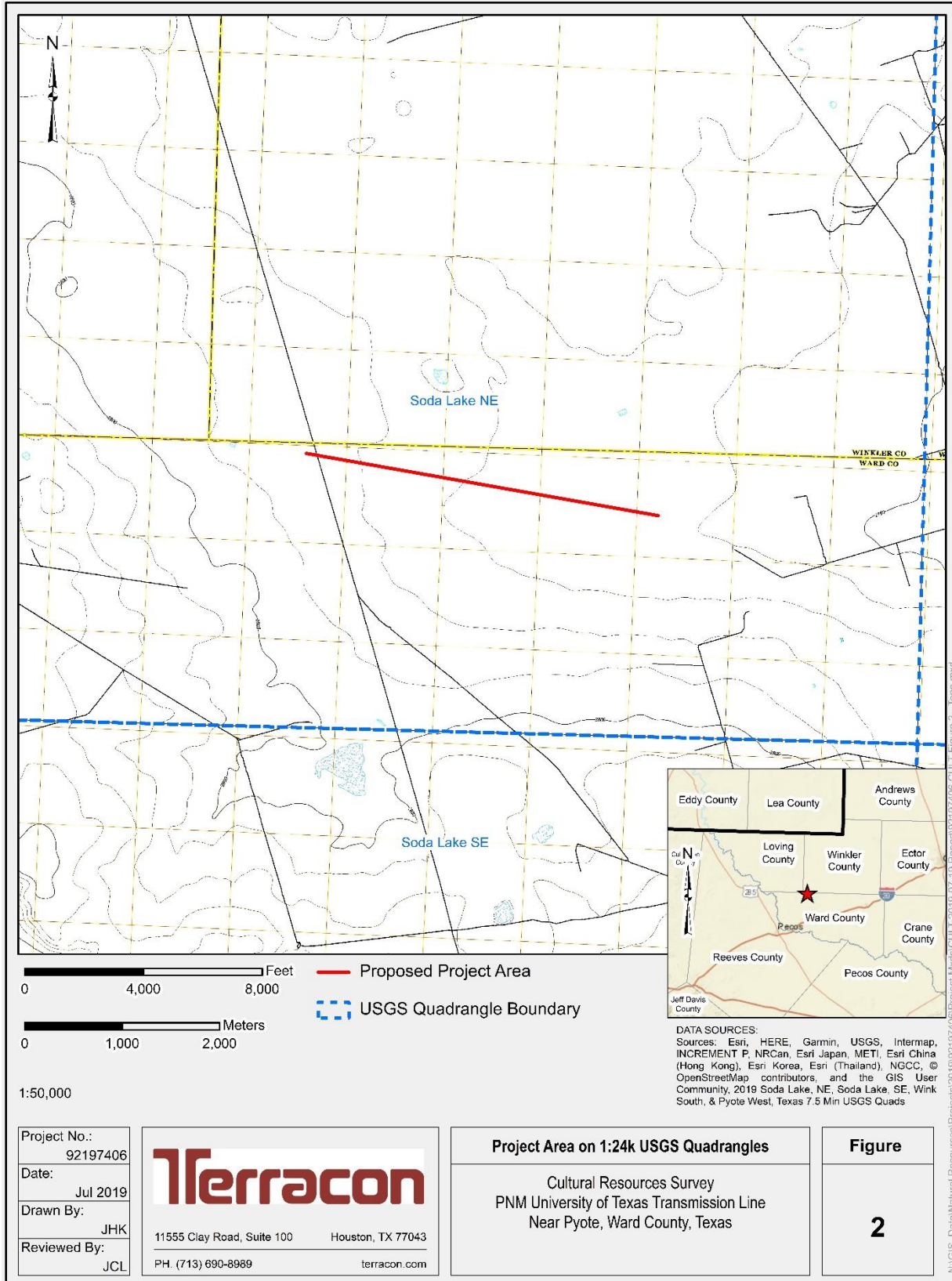


Figure 2. Project area on the 2019 Soda Lake NE and Soda Lake SE USGS 7.5' quadrangles.

2.0 BACKGROUND

2.1 Environmental Setting

The project area, located within Ward County, Texas, is in the Chihuahuan Basins and Playas Ecoregion (Griffith et al. 2007), which is characterized by its alluvial fans, internally drained basins, and low elevation (less than 3500 feet) river valleys. Bedrock geology of the project area is mapped as the Sharvana Series (NRCS 2019), which is made up of well drained, moderately permeable very shallow and shallow soils above a permeable petrocalcic horizon formed from the calcareous, loamy eolian deposits from the Pleistocene age Blackwater Draw Formation (Figure 3).

Ward County is characterized by long, hot summers with short, cool winters. Temperatures range between an average low of 29°F in January and an average high of 98°F in July (Justice and Leffler 2010). Overall, the climate is arid with an average annual rainfall of twelve inches. The majority of the annual precipitation occurs between May and October when high intensity thunderstorms come through and often cause soil erosion (NRCS 2019).

The local biotic community is dominated by mostly barren, large windblown sand dunes with sparse desert brush and grasses. The elevation of the project area is approximately 2800 feet above mean sea level (NRCS 2019).

2.2 Culture History

The project area straddles the border of the Southern High Plains archeological region, which stretches from the Texas Panhandle to the Pecos River and the Trans-Pecos region, which includes the majority of Texas west of the Pecos River, and thus this culture history will be a synthesis of the two regions (Pertulla 2004). Following Miller and Kenmotsu (2004) the Trans-Pecos regional prehistory is typically divided into three general periods: Paleoindian (12,000 B.P. to 8000 B.P.), Archaic (8000 B.P. to 1800 B.P.), and Late Prehistoric (1800 B.P. to 500 B.P.). Hypothesized shifts are related to climatic and environmental changes (Table 1) although these, like cultural transformations, are difficult to precisely date in the study area.

Table 1. Generalized culture history for the Trans-Pecos region of Texas, with corresponding environmental periods.

Time Period	Years Before Present (calibrated years cal B.P.)	Environmental Period
Historic	500 cal B.P. to 50 B.P.	Modern Era, sometimes referred to as Anthropocene
Late Prehistoric	1800 to 500 cal. B.P.	Late Holocene
Archaic	8000 to 1800 cal. B.P.	Early and Middle Holocene
Paleoindian	12,000 to 8000 cal B.P.	Terminal Pleistocene

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
 August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406

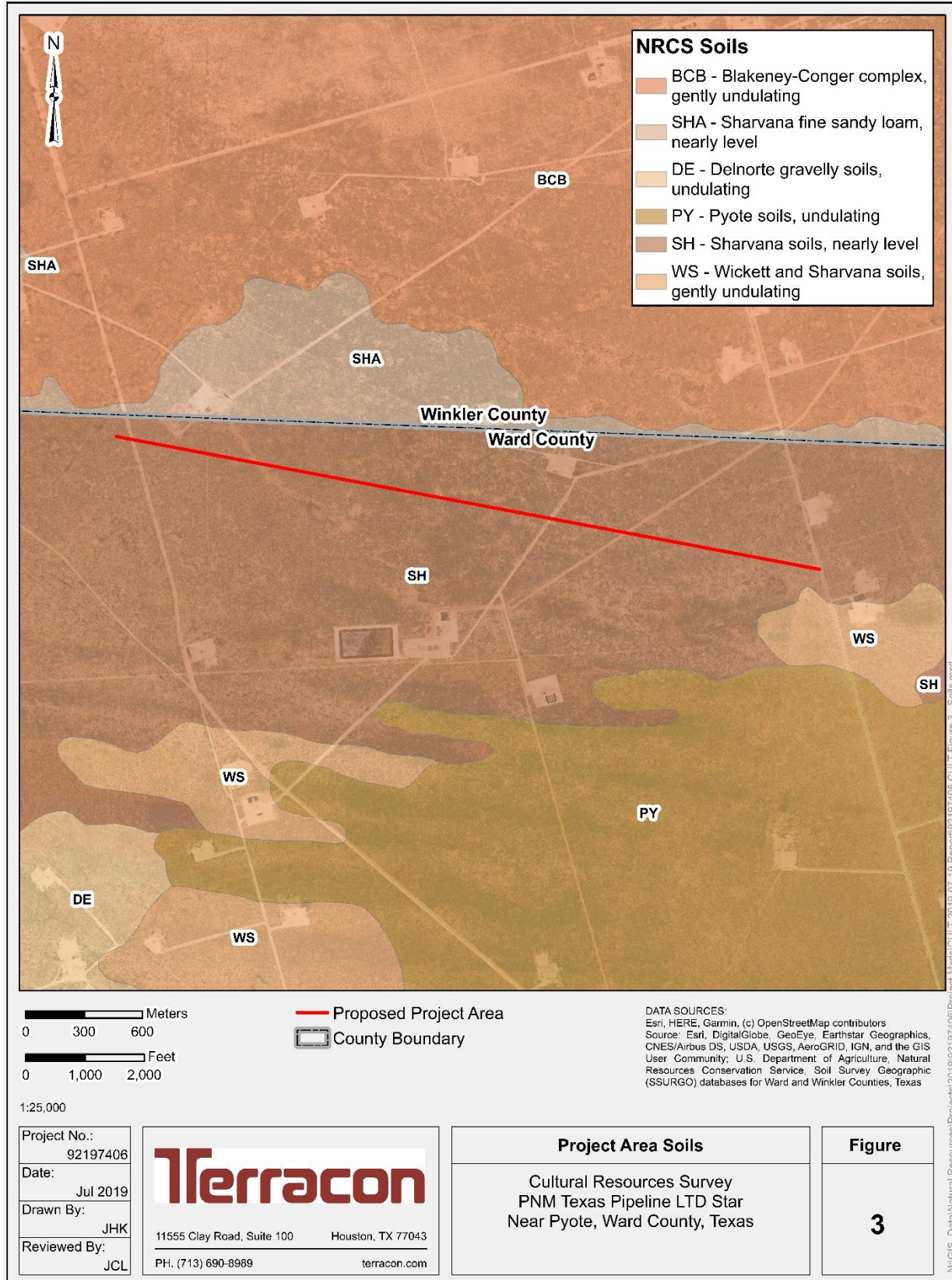


Figure 3. Project area soils.

The Paleoindian period begins with the earliest evidence of human presence and occupation in the study area, as well as in the New World. Archeologists have argued that during this time, human bands were highly nomadic, relied heavily on hunting strategies for food and other important resources, and maintained cultural territories covering large expanses of terrain. Exploitation of now extinct Pleistocene fauna (including antique bison, mammoth, mastodon, and other taxa) was common. Environmental evidence suggests that the region was cooler and moister than the current climate patterns, and the region was characterized by pinyon-juniper parkland with more water sources than those present today (Simmons et al. 1989). Diagnostic tool types for the early part of this period include Clovis and Folsom points, both of which are defined by sophisticated fluting techniques. Fluted points eventually gave way to other forms including San Patrice, St. Mary's Hall, Plainview, Midland, Golondrina, and others (Bousman et al. 2004; Hofman et al. 1989).

By sometime around 10,200 years ago, Pleistocene climates underwent rapid warming; this marks the beginning of the Holocene and of many of the so-called Archaic adaptations that followed. Megafauna became extinct, either from over-predation or climate change or a combination of the two, and the species hunted during the Archaic period represent modern species (Simmons et al. 1989). Environmental habitats changed as rainfall regimes increased. The predominating cultural patterns associated with this transition are the demonstrable increase in reliance on plant resources, both for tools and for subsistence, and gradual increase in population. With the loss of most large-bodied prey species from the landscape, socially defined food-gathering and economic strategies became refocused on smaller prey and a wider variety of caloric resources. An important archeological indication of this shift is the appearance of plant cooking technology that used thermally heated rocks as a source of heat to transform carbohydrates into ingestible sugars (i.e., caloric energy) (Thoms 2009). This technique immediately made available several geophytes, root-based plant resources, as reliable sources of food. The Archaic period (ca. 8000-1000 years ago) of Texas was the longest period in prehistory and is often subdivided into the Early (ca. 8000-5500/5000 B.P.), Middle (ca. 5500/5000-3200 B.P.), and Late Archaic (ca. 3200-1800 B.P.) based primarily on projectile point forms (Miller and Kenmotsu 2004). A significant amount of information of the prehistory of West Texas can be drawn from the various rock shelters in the region. For example, excavations at Hinds Cave in Val Verde County recovered human coprolites from that identify a diet that consisted primarily of plant materials, although animal protein still provided a significant part of the subsistence system (Simmons et al. 1989).

The end of the Archaic in West Texas conventionally corresponds with the appearance of ceramics, primarily El Paso brownware in the Trans-Pecos (Miller and Kenmotsu 2004) and coarse-tempered cordmarked pottery in the Southern High Plains (Johnson and Holliday 2004), and the bow and arrow (Hofman et al. 1989). The use of bow and arrow is identified by the presence of smaller projectile points, including Perdiz, Toyah, Scallorn, and Garza points. Hunting and gathering continued to be the primary form of subsistence in the region during the Late Prehistoric period, and ceramics are not as prevalent in the region as they are in the more agriculturally reliant Puebloan or Caddoan societies to the west and east respectively (Simmons et al. 1989). However, evidence of Caddoan ware ceramics, El Paso polychrome, and Puebloan

trade pottery indicates active trade routes with nearby peoples. Hot rock cooking continued to be an important part of subsistence in the region, and large accumulations of burned rock are often found in association with Late Prehistoric sites.

Beginning in the early 1500's, European expeditions and incursions into Southwest Texas became increasingly frequent, including the Rodriguez-Chamascudo, Espejo, and Oñate expeditions. They encountered Native groups including the Manso, Comanche, and Apache. The earliest recorded European presence in the area was the expedition led by Antonio de Espejo in 1582, who followed the Pecos River from its origins near Santa Fe to the area near modern day Pecos, Texas (Blake 2010). Various Presidios and Missions were established along the Rio Grande, but the Spanish never managed to create a permanent settlement in the northern Trans-Pecos region.

Much later, the Chihuahuan Trail was established on a trade route pioneered by the Hays-Highsmith expedition and continued to be an important trade route until the arrival of the railroad in 1882 (Simmons et al. 1989). Andrew Gray surveyed the region for the Texas Western Railroad Company in 1854 and Fort Davis was established the same year. Fort Davis was abandoned during the American Civil War and deprivations from the Apache and Comanche increased during that period (Simmons et al. 1989). Ward County was created in 1887, and in 1890 the county had a population of 75 (Justice and Leffler 2010). The economy was primarily agricultural until the discovery of oil in the region at the Hendrick oilfield in 1926 and the county quickly began to rely on oil and gas (Justice and Leffler 2010).

3.0 RESEARCH AND SURVEY METHODS

A combination of desktop review and archeological fieldwork was employed to identify cultural resources present within both the project area and a half-mile study area. Desktop review focused on identifying previously known historic properties and archeological sites, while a cultural resources survey was used to locate previously unknown archeological resources.

3.1 Desktop Review

The desktop review was conducted by consulting United States Department of Agriculture(USDA) Natural Resources Conservation Service (NRCS) soils data; the Texas Historical Commission's online database, the Texas Archeological Sites Atlas (Atlas), which is restricted to qualified archeologists; historic-period USGS topographic maps and other historic maps; the National Register of Historic Places (NRHP) website; the Texas Freedom Colonies Atlas; TxDOT electronic resources for historic sites and bridges; and historic aerial photographs. These sources provide information on factors that affect the likelihood of intact archeological deposits being present, previous archeological investigations, known prehistoric or historic-period sites, and historic properties listed in or eligible for listing in the NRHP within and near the project area. It should be noted that, while the Atlas includes polygons and lines representing many of the archeological investigations undertaken over the last five decades or so in Texas, this aspect of

the Atlas is lacking much information. Additionally, the information available varies widely in quality, detail, and accuracy; this is particularly true for investigations conducted more than 20 years ago.

3.2 Cultural Resources Survey

Terracon archeologists investigated the project area by means of a systematic survey to identify and delineate cultural resources. The investigation was conducted in accordance with standards proposed by the Council of Texas Archeologists (CTA) and accepted by the Texas Historical Commission (THC). According to current CTA standards, linear project areas with corridors not exceeding 30 m (98.4 ft) in width should be evaluated with a shovel test density of one probe every 100 meters (328 ft), or 16 shovel tests per mile. While the actual project area easement measured only 30 feet wide, the Client requested survey of a 100-foot-wide corridor. The survey was conducted in two transects, one on each side of the centerline, and shovel tests were evenly spaced across the project alignment except where delineation shovel tests are clustered around a positive test marking the location of the one archeological site documented during this effort. In accordance with CTA guidelines, shovel tests measured approximately 30 cm in diameter and were excavated in 20-cm arbitrary levels to sediments predating human occupation in the area, in all cases no more than 40 cmbs. Sediments removed from shovel tests were passed through ¼" hardware mesh to recover artifacts that were present. The one site that was located was delineated in the form of additional shovel testing in order to define site area boundaries. Shovel test locations were mapped using a handheld Trimble GPS unit with sub-meter accuracy, and shovel tests were documented on purpose-designed forms and through digital photography. The locations of surface finds were marked with flagging tape so that artifacts could be returned to their original locations following documentation.

4.0 RESULTS

4.1 Desktop Review

The Texas Archeological Sites Atlas (Atlas) records search identified no previously recorded archeological sites within the direct project area, but two sites were located within one half mile of the project area (Figure 4). One archeological investigation by Lone Mountain Archeological Services in 2017 covered portions of a large area that includes the proposed project alignment. This investigation was conducted in advance of a 3-D seismic exploration for petrochemical resources and consisted of surface survey only. The two archeological sites within the half-mile buffer area, 41WK99 and 41WK102, were recorded during the 2017 Lone Mountain survey. The Atlas also indicates the presence of a linear survey conducted in 1978 that reached to within one half mile of the project alignment, but additional information on this survey was not available.

Site 41WK99 appears to represent a prehistoric campsite of unknown age. The site was characterized by five concentrations of burned rock measuring between 1.5 and 5 meters (m) in diameter. No other artifacts were observed, and no shovel tests were excavated. Trowel testing

within one feature revealed buried staining to at least 10 cm below the surface. The site was assessed as being eligible for inclusion in the NRHP (McCormack and Boggess 2017).

Site 41WK102 is a much larger prehistoric probable campsite of unknown age. Nineteen fire-cracked rock features were identified on the low slopes surrounding a small playa. In addition to burned rock, several flaked-stone artifacts, including two tools, and three groundstone artifacts were identified. Several pieces of modern trash were also observed at the site. No shovel tests were excavated at the site, but trowel testing indicated the presence of buried cultural material up to at least 10 cm below the surface (McCormack and Boggess 2017).

No recorded cemeteries, properties or districts listed on the National Register of Historic Places (NRHP), or State Antiquities Landmarks (SALs) are located near the proposed project area. Historic topographic maps dating as early as 1955 and historic aerial photographs dating back to 1996 show early and continuous use of the larger area surrounding the project area for oil and gas production. The historic maps and aerial photographs examined did not indicate the presence of structures within or near the project area.

4.2 Cultural Resources Survey

The cultural resources survey consisted of 100-percent pedestrian survey and the excavation of 40 shovel test units (Figure 5; see Appendix for shovel test details). The project area was characterized as a primarily flat landscape with sparse, low desert grasses and mesquite (Figures 6 and 7). Surface visibility averaged between 40 and 60 percent. Shovel tests were shallow, reaching to between 8 and 43 cmbs due to the shallowly buried caliche that was present throughout the project area. One prehistoric archeological site, 41WR139, was identified based on the presence of artifacts on the ground surface. One shovel test, within the boundaries of the site, was positive for cultural material at approximately 10 cmbs.

Site 41WR139 is a prehistoric lithic scatter that covers an area of approximately 10 x 10 meters within the project area (Figures 8 and 9). The archeologists investigated and documented the portion of the site within the project area and within the 100-foot corridor requested by the Client. The site appears to extend outside the 100-foot corridor to the south for an unknown distance. On the surface, archeologists observed six tertiary chert flakes (Figures 10 and 11). Five shovel tests were excavated in order to delineate the subsurface deposits associated with the site. One site shovel test (IP29/SST1) yielded one small (approximately 2-cm-diameter) tertiary chert flake from between 0 and 10 cmbs (Figures 12 and 13). Site shovel tests reached a caliche-rich stratum between 8 and 33 cmbs. The portion of the site within the project area does not meet any of the four criteria for inclusion on the NRHP, and the potential research value of this portion of the site is minimal. Terracon recommends that the installation of the power transmission line proceed as planned.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Figure Redacted for Site Protection

Figure 4. Results of desktop assessment

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Figure Redacted for Site Protection

Figure 5. Results of the Cultural Resources Survey

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Figure 6. Vegetation at the eastern end of the project area; view facing west.



Figure 7. Vegetation at the western end of the project area; view facing west.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Figure 8. Overview of site 41WR139; view facing north.



Figure 9. Site 41WR139 lithic flake in situ.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Figure 10. 41WR139 surface finds, obverse and reverse



Figure 11. 41WR139 site shovel test 01 (IP29) lithic flake, obverse and reverse

5.0 CONCLUSIONS AND RECOMMENDATIONS

Terracon archeologists conducted a desktop review of known cultural resources and a cultural resources survey of an approximately 12,000-foot-long (2.27 miles) by 30-foot-wide project area in Ward County, Texas. The project area was sampled archeologically through the excavation 40 shovel tests. One prehistoric archeological site, 41WR139, was recorded during the survey. The portion of the site that is within the project area was determined to be not eligible for inclusion in the National Register of Historic Places (NRHP) or for designation as a State Antiquities Landmark (SAL).

Based on the results of the current investigation, it is Terracon's assessment that no known historic properties eligible for inclusion on the NRHP will be affected by the proposed project. Therefore, Terracon recommends that the installation of the power transmission line proceed as planned. In the event that human remains, historic properties, or buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area but can continue where no cultural materials are present. TNMP Environmental Services Department should be contacted.

6.0 REFERENCES CITED

Blake, Robert.

2010 Antonio de Espejo. *Handbook of Texas Online*. Electronic resource, <https://tshaonline.org/handbook/online/articles/fes03>, accessed July 1, 2019.

Bousman, Britt C., Barry W. Baker, and Anne C. Kerr

2004 Paleoindian Archeology in Texas. In *The Prehistory of Texas*, edited by Timothy K. Pertulla, pp 5-14. Texas A&M University Press, College Station.

Griffith, G.E., S.A. Bryce, J.M. Omernik, J.A. Comstock, A.C. Rogers, B. Harrison, S.L. Hatch, and D. Benzason

2007 *Ecoregions of Texas*. U.S. Environmental Protection Agency, Corvallis.

Hofman, Jack L., Robert L. Brooks, Joe S. Hays, Douglas W. Owsley, Richard L. Jantz, Murray K. Marks, and Mary H. Mannhein.

1989 *From Clovis to Comanchero: Archeological Overview of the Southern Great Plains*. University of Arkansas Copy Services, Fayetteville.

Johnson, Eileen and Vance T. Holliday

2004 Archeology and Late Quaternary Environments of the Southern High Plains. In *The Prehistory of Texas*, edited by Timothy K. Pertulla, pp 5-14. Texas A&M University Press, College Station.

Justice, Glenn and John Leffler

2010 Ward County. *Handbook of Texas Online*. Electronic resource, <https://tshaonline.org/handbook/online/articles/hcw03>, accessed July 1, 2019.

McCormack, Beth and Douglas Boggess

2017 *Cultural Resource Survey for the West Kermit Phase 2 3D Seismic, Loving, Ward, and Winkler Counties, Texas*. Lone Mountain Archaeological Services, Inc., Albuquerque.

Miller, Myles R. and Nancy A. Kenmotsu

2004 Prehistory of the Jornada Mogollon and eastern Trans-Pecos Regions of West Texas. In *The Prehistory of Texas*, edited by Timothy K. Pertulla, pp 5-14. Texas A&M University Press, College Station.

Natural Resources Conservation Service (NRCS), USDA, Soil Survey Staff

2019 Web Soil Survey, Electronic resource, <http://websoilsurvey.nrcs.usda.gov/>, accessed July 2, 2019.

Pertulla, Timothy K.

2004 An Introduction to Texas Prehistoric Archeology. In *The Prehistory of Texas*, edited by Timothy K. Pertulla, pp 5-14. Texas A&M University Press, College Station.

Simmons, Alan H., Ann Lucy Wiener Stodder, Douglas D. Dykeman, and Patricia A. Hicks

1989 *Human Adaptations and Cultural Change in the Greater Southwest: An Overview of Archeological Resources in the Basin and Range Province*. Academic Press of Orlando.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



Thoms, Alston V.

2009 Rocks of Ages: Propagation of Hot-Rock Cookery in Western North America. *Journal of Archeological Science* 36:573-591.

Cultural Resources Survey

PNM Resources, 12,000-Foot-Long Power Transmission Line ■ Ward County, Texas
August 7, 2019; revised October 2, 2019 ■ Terracon Project No. 92197406



APPENDIX

Investigation Point Log

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
1	EV01	-	0-30	10YR6/3 Pale Brown	Dry Silt	60%	Grassy area adjacent to round mesquite shrubs	No cultural materials. Hit fractured bedrock layer at 15cmbs. Lots of gravels >8cm.
2	MNH01	-	0-30	10YR5/3 Brown	Compacted Silt, Dry	50%	Desert grass and mesquite. Flat plain.	Eroded/fractured caliche starting at 7 cmbs. Large amount of gravel/caliche throughout. No cultural materials. Terminated due to bedrock.
3	EV02	-	0-20	10YR6/3 Pale Brown	Dry Silt	40%	Flat grassy area. Several Mesquite shrubs	No cultural materials. Hit dense fractured bedrock/caliche at surface. Lots of gravels <10cm.
4	MNH02	-	0-24	10YR5/3 Brown	Compacted Silt, Dry	40%	Desert grass and mesquite. Flat plain. Barbed wire fence ~10m to the south	Eroded/fractured caliche starting at 3 cmbs. Large amount of gravel/caliche throughout. No cultural materials. Terminated due to bedrock.
5	EV03	-	0-22	10YR6/3 Pale Brown	Dry Silt	50%	Flat grassy area. Mesquite shrubs; ~40m from fence	No cultural materials. Gravel bedrock layer. Gravels <10cm. Limestone @ surface
6	MNH03	-	0-18	10YR5/3 Brown	Compacted Silt, Dry	40%	Desert grass and mesquite. Barbed wire fence ~50m north.	Eroded/fractured caliche starting at 3 cmbs. Large amount of gravel/caliche throughout. No cultural materials. Terminated due to bedrock.

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
7	EV04	-	0-36	10YR6/3 Pale Brown	Dry fine sand	90%	Edge of existing RoW. Grassy flat area. Mesquite.	No cultural materials. Hit bedrock. Lots of gravels <8 cm. Limestone at surface. Disturbed RoW soil.
8	MNH04	-	0-27	10YR5/3 Brown	Compacted Silt, Dry	50%	Desert grass and mesquite. Barbed wire fence ~15m N	Eroded/fractured caliche starting at 3 cmbs. Large amount of gravel/caliche throughout. No cultural materials. Terminated due to bedrock.
9	EV05	-	0-22	10YR6/3 Pale Brown	Dry Silt	40%	Flat, grassy area. Mesquite shrubs. 30m from fence.	No cultural materials. Fractured bedrock. Lots of gravels <8 cm. Compact gravels
10	MNH05	-	0-30	10YR5/3 Brown	Compacted Silt, Dry	55%	Desert grass and mesquite. Flat plain.	Eroded/fractured caliche at ~10 cmbs. Large amount of gravel/broken caliche throughout. No cultural materials. Terminated due to bedrock/caliche.
11	EV06	-	0-40	10YR6/3 Pale Brown	Dry fine sand	60%	Flat, grassy area. Mesquite.	No cultural materials. Slight CaCO ₃ ; few gravels <5 cm. Hit bedrock at 40 cmbs.
12	MNH06	-	0-26	10YR5/3 Brown	Compacted Silt, Dry	55%	Desert grass and mesquite. Flat plain.	Eroded/fractured caliche at ~10 cmbs. Large amount of gravel/broken caliche throughout. No cultural materials. Terminated due to bedrock/caliche.

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
13	EV07	-	0-43	10YR6/3 Pale Brown	Dry Sand	60%	Flat, grassy area. Mesquite.	No cultural materials. Fractured bedrock at 10 cmbs. Lots of gravels <8 cm. Compact gravels
14	MNH07	-	0-13	10YR5/3 Brown	Compacted Silt, Dry	30%	Desert grass and mesquite. Gravel road 5m to the east. IP placed 10m W due to road.	Hit caliche at surface. Large amount of gravel/eroded caliche. No cultural materials. Terminated due to bedrock/caliche.
15	EV08	-	0-20	10YR6/3 Pale Brown	Dry Silt	40%	Flat, grassy area. Mesquite.	No cultural materials. Fractured bedrock at 10 cmbs. Lots of gravels <8 cm. Compact gravels. Bedrock at surface.
16	MNH08	-	0-12	10YR5/3 Brown	Compacted Silt, Dry	40%	Desert grass and Mesquite.	Hit caliche at surface. Large amount of gravel/eroded caliche. No cultural materials. Terminated due to bedrock/caliche.
17	EV09	-	0-15	10YR6/3 Pale Brown	Dry Silt	40%	Flat, grassy area. Mesquite	No cultural materials. Lots of gravels <8 cm. CaCO ₃ , Fractured bedrock
18	MNH09	-	0-31	10YR5/3 Brown	Compacted Silt, Dry	40%	Desert grass and mesquite.	Eroded/fractured caliche at 17cmbs. Large amount of gravel/caliche. No cultural materials. Terminated due to bedrock/caliche.
19	EV10	-	0-16	10YR6/3 Pale Brown	Dry Silt	40%	Flat, grassy area. Mesquite.	No cultural materials. Lots of gravels <8 cm. CaCO ₃ , Fractured bedrock

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
20	MNH10	-	0-30	10YR5/3 Brown	Compacted Silt, Dry	40%	Desert grass and mesquite.	Eroded/fractured caliche at 17cmbs. Large amount of gravel/caliche. No cultural materials. Terminated due to bedrock/caliche.
21	EV11	-	0-30	10YR6/3 Pale Brown	Dry, fine sand	40%	Flat, grassy area. Several mesquite shrubs.	No cultural materials <5cm. Hit bedrock @30 cmbs.
22	EV12	-	0-35	10YR6/3 Pale Brown	Dry, fine sand	40%	Flat, grassy area. Several mesquite shrubs.	No cultural materials <5cm. Hit bedrock @30 cmbs.
23	MNH11	-	0-13	10YR5/3 Brown	Compacted Silt, Dry	35%	Flat plain. Desert grass and mesquite.	Eroded/fractured caliche @ surface. No cultural materials. Large amount of gravels/broken caliche. Terminated due to caliche/bedrock.
24	EV13	-	0-15	10YR6/3 Pale Brown	Dry, fine sand	60%	Flat, grassy area. Mesquite shrubs; pad 120m away.	No cultural materials. Fracture bedrock at 5 cmbs. Lots of gravels <5cm.
25	MNH12	-	0-16	10YR5/3 Brown	Compact sand, dry	70%	Flat desert grass and mesquite. Oil pad ~70m north.	Eroded/fractured caliche @ surface. No cultural materials. Large amount of gravels/broken caliche. Terminated due to caliche/bedrock.
26	EV14	-	0-18	10YR6/3 Pale Brown	Dry, fine sand	60%	Flat, grassy area. Mesquite shrubs; pad 120m away.	No cultural materials. Fractured bedrock @ 10cmbs; Fewer gravels @ 5cmbs

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
27	MNH13	-	0-25	10YR5/3 Brown	Compact sand, dry	60%	Flat. Desert grass and mesquite.	Eroded/fractured caliche @ 12cmbs. No cultural materials. Large amount of gravels/broken caliche. Terminated due to bedrock/caliche.
28	EV15	-	0-15	10YR6/3 Pale Brown	Dry, fine sand	40%	Slight rise in topo, grassy area, mesquite, limestone at surface.	No cultural materials. Fractured bedrock, Lots of gravels <10cm.
29	SST01	+	0-33	10YR6/3 Pale Brown	Dry, fine sand	40%	Flat, grassy area. Several mesquite shrubs. Some limestone at surface.	TS1. 1 Lithic flake at 10 cmbs. Terminated due to bedrock. Lots of gravels <8cm.
30	SST02	-	0-22	10YR6/3 Pale Brown	Dry, fine sand	40%	Flat, grassy area. Several mesquite shrubs. Some limestone at surface.	No cultural materials. Several gravels <5cm. Fractured bedrock @ 20cmbs.
31	SST03	-	0-8	10YR6/3 Pale Brown	Dry, fine sand	50%	Flat, grassy area. Several mesquite shrubs. Lots of limestone at surface.	No cultural materials. Several gravels <8cm. Terminated at bedrock
32	SST04	-	0-8	10YR6/3 Pale Brown	Dry, fine sand	50%	Flat, grassy area. Several mesquite shrubs. Lots of limestone at surface.	No cultural materials. Several gravels <8cm. Terminated at bedrock
33	SST05	-	0-12	10YR6/3 Pale Brown	Dry, fine sand	50%	Flat, grassy area. Several mesquite shrubs. Lots of limestone at surface.	No cultural materials. Several gravels <8cm. Terminated at bedrock
34	MNH14	-	0-10	10YR5/3 Brown	Compact sand, dry	60%	Flat, desert grass and mesquite.	Eroded/fractured caliche @ 2cmbs. No cultural materials. Large amount of gravels/caliche. Terminated due to bedrock/caliche.

IP#	ST #/ SST #	+/-	Depth (cmbs)	Munsell & Color	Soil Texture	Surface Visibility	Setting Description	Shovel Test Comments
35	EV16	-	0-30	10YR6/2 light brownish gray	Dry, fine sand	50%	Slight rise in topo; lots of mesquite shrubs & grasses. Lots of limestone @ surface.	No cultural materials. Several gravels <5cm. Terminated @ bedrock.
36	MNH15	-	0-12	10YR5/3 Brown	Compact sand, dry	60%	Flat, desert grass and mesquite.	Eroded/fractured caliche @ 2cmbs. No cultural materials. Large amount of gravels/caliche. Terminated due to bedrock/caliche.
37	EV17	-	0-21	10YR6/3 Pale Brown	Dry, fine sand	50%	Slight rise in topo; lots of mesquite shrubs & grasses. Lots of limestone @ surface	No cultural materials. Several gravels <5cm. Terminated @ bedrock.
38	MNH16	-	0-20	10YR5/3 Brown	Compact sand, dry	60%	Flat, desert grass and mesquite.	Eroded/fractured caliche @ 2cmbs. No cultural materials. Large amount of gravels/caliche. Terminated due to bedrock/caliche.
39	EV18	-	0-34	10YR6/2 light brownish gray	Dry fine sand	50%	Slight rise in topo. Grass and mesquite shrubs.	No cultural materials. Several gravels <8cm. Terminated at bedrock
40	MNH17	-	0-40	10YR5/3 Brown	Compact sand, dry	85%	Flat, desert grass and mesquite. Well pad 60m N.	Eroded/fractured caliche at 30 cmbs. No cultural materials. Large amount of gravels and broken caliche 30cmbs and below. Terminated due to caliche/bedrock.
41	No Dig	-					Middle of gravel road	