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## Phase I Cultural Resource Survey Of The Texstar Epic NGL Phase 2-Ramsey Terminal To Benedum Plant- Pipeline Project, Texas General Land Office Properties And Three Upland Sites, Reeves And Upton Counties, Texas

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**Phase I Cultural Resource Survey Of The Texstar Epic NGL Phase 2-Ramsey Terminal To Benedum Plant- Pipeline Project, Texas General Land Office Properties And Three Upland Sites, Reeves And Upton Counties, Texas**

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**FINAL REPORT**

**PHASE I CULTURAL RESOURCE SURVEY OF THE TEXSTAR EPIC NGL  
PHASE 2—RAMSEY TERMINAL TO BENEDUM PLANT—PIPELINE  
PROJECT, TEXAS GENERAL LAND OFFICE PROPERTIES AND  
THREE UPLAND SITES, REEVES AND UPTON COUNTIES, TEXAS**

**TEXAS ANTIQUITIES PERMIT #8268**

**MAY 2018**



**CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE**





# FINAL REPORT

## PHASE I CULTURAL RESOURCE SURVEY OF THE TEXSTAR EPIC NGL PHASE 2—RAMSEY TERMINAL TO BENEDUM PLANT— PIPELINE PROJECT, TEXAS GENERAL LAND OFFICE PROPERTIES AND THREE UPLAND SITES, REEVES AND UPTON COUNTIES, TEXAS

PREPARED FOR



**FLATROCK ENGINEERING  
AND ENVIRONMENTAL**

ON BEHALF OF  
TEXSTAR MIDSTREAM LOGISTICS

REPORT AUTHORED BY  
CHARLOTTE DONALD PEVNY, BARRY BLEICHNER,  
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MAY 2018

TEXAS ANTIQUITIES PERMIT #8268

SEARCH PROJECT #180002



## ABSTRACT

From January 8 through January 15, 2018, SEARCH completed a Phase I cultural resource survey of Texas General Land Office (GLO) properties in Reeves County, as part of the proposed Epic NGL Phase 2 Pipeline Project (Project). The Project is a joint venture between affiliates of TexStar Midstream Logistics, Ironwood Midstream Energy Partners, and Castleton Commodities International. Phase 2 of the Project consists of the installation of approximately 286.8 kilometers (178.2 miles) of 12-inch outside diameter (O.D.) pipeline that will be used to transport natural gas liquids from the Ramsey Terminal in Reeves County, Texas, to the Benedum Plant in Upton County, Texas. The work was conducted for Flatrock Engineering and Environmental, LLC (Flatrock), environmental contractor to TexStar, and this document reports the survey results of sections of the Project Area of Potential Effect (APE) traversing lands owned by the Texas GLO in Reeves County, Texas, to satisfy the requirements of the Antiquities Code of Texas under Texas Antiquities Permit #8268. As a matter of due diligence, three previously recorded upland archaeological sites (41RV30, 41RV40, and 41UT127) with an “undetermined” National Register of Historic Places (NRHP) eligibility also were surveyed within the APE in Reeves and Upton Counties.

The proposed pipeline route crosses four Texas GLO properties (SEARCH Survey Areas STL001-STL004). Area STL001 is located in northwestern Reeves County near the start of the Phase 2 pipeline route, approximately 3.65 kilometers (2.27 miles) west of State Highway 285 and 0.52 kilometers (0.32 miles) south of the Ramsey Terminal, the Ford Geraldine Oil Field, and China Draw. The city of Orla, Texas, is roughly 13.85 kilometers (8.6 miles) to the south of Area STL001. Area STL002 is located 34.52 kilometers (21.45 miles) to the south of Area STL001 and 22.14 kilometers (13.76 miles) south of Orla. It is roughly 1.83 kilometers (1.14 miles) west of State Highway 232 and is situated between Narrow Bow and WT Draws. Areas STL003 and STL004 are adjacent to each other. STL003 is 1.59 kilometers (0.99 miles) south of STL002. WT and John D Draws cross portions of Areas STL003 and STL004, and State Highway 232 parallels much of the proposed pipeline route on Area STL004.

The Project APE is 61.0 meters (200 feet) wide, and the pipeline trench is anticipated to be no more than 1.5 to 1.8 meters (5 to 6 feet) deep. On Texas GLO lands, the combined length of the APE in Areas STL001-STL004 is 2.98 kilometers (1.85 miles) in length and 23.4 hectares (57.7 acres) in size. The upland archaeological sites APE totals 5.1 hectares (12.6 acres) and measures 843.2 meters (2,766.4 feet) in length. Staging areas, pipe yards, access roads, and other ancillary facilities eventually will be sited along the Project corridor, but their locations have yet to be determined.

SEARCH performed a Phase I survey to identify and evaluate cultural resources that may be adversely affected within the proposed Project APE, using intensive pedestrian survey and shovel test excavation, as outlined in the Texas Historical Commission’s (THC) *Archaeological Survey Standards for Texas and Archeology and Historic Preservation and Rules of Practice and Procedure for the Antiquities Code of Texas*. Pedestrian survey was conducted along four

transects spaced 15 meters (49 feet) apart across the width of the APE where surface visibility was greater than 30 percent. Twenty-two shovel tests were excavated along the Project APE centerline on Texas GLO properties, and 28 shovel tests were excavated at the upland archaeological sites. Shovel test profiles varied only slightly across the Project areas and generally corresponded to data mapped by the US Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) for Reeves and Upton Counties. Based on USDA Soil Survey data, topography, elevation, vegetation, and the results of shovel test excavation, much of the surveyed portion of Project APE on Texas GLO lands can be distinguished by well-drained, level, open mesquite-grass scrubland. Shovel testing in the Project APE generally revealed two strata; on average, shovel test excavation was terminated at 65 centimeters (26 inches) below surface. Caliche was encountered in all 50 shovel tests, and no cultural material was identified during shovel test excavation.

Three newly identified archaeological sites, 41RV131, 41RV132, and 41RV133, characterized as low- to medium-density prehistoric lithic surface scatters, were recorded and surveyed within the Project APE on Texas GLO property. The length of the Project centerline across the newly recorded sites totals 901.4 meters (2,957.2 feet) or 4.99 hectares (12.35 acres). No temporally diagnostic artifacts were recovered from the three sites, and no artifacts were recovered during shovel test excavation at these three sites.

Upland site 41RV30, a low-density, late nineteenth- to twentieth-century surface scatter associated with Old X Ranch, has been impacted by pipeline construction within the APE. Site 41RV40, a small, burned caliche feature, was not relocated, and this feature likely has been destroyed by pipeline construction and road maintenance. Site 41UT127 served as a practice bombing range during World War II, and while several practice targets are visible on recent aerial photographs, none of the targets are located within the Project APE. No artifacts were identified during pedestrian survey at sites 41RV40 and 41UT127, and no artifacts were recovered during shovel test excavation at the three upland sites.

It is SEARCH's opinion that the proposed Project will result in NO ADVERSE EFFECT to the portions of these six sites located within the Project APE, and these sites are not eligible for inclusion in the NRHP. No further work is recommended at these sites or within other portions of the Project APE located on Texas GLO lands.

## ACKNOWLEDGMENTS

SEARCH would like to thank the individuals who facilitated archaeological survey of the Epic NGL Phase 2 Pipeline Project on State Lands. Kevin Roberts, Ecology Program Director with Flatrock, supported the overall planning and development of this project. Also with Flatrock, Kevin Burkes, Senior Project Manager, facilitated logistical planning during the course of the Project. Shaun Seale, Manager of Inventory and Sovereign Dispositions at the Texas GLO, was instrumental in acquiring access to the survey areas.

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## TABLE OF CONTENTS

Abstract.....	iii
Acknowledgments.....	v
SEARCH Project Team .....	vi
Table of Contents.....	vii
List of Figures .....	ix
List of Tables .....	xii
Management Summary .....	xiii
Chapter 1: Introduction .....	1
Project Description .....	2
The Area of Potential Effects .....	11
Summary .....	11
Chapter 2: Environmental Overview.....	13
Geology and Physiography .....	13
Soils .....	14
Paleoenvironment .....	20
Modern Environment .....	20
Chapter 3: Historical Overview and Background Research .....	21
Native American Overview .....	21
Pre-Contact Paleoindian Period.....	21
Pre-Contact Archaic Period.....	22
Pre-Contact Ceramic Period.....	23
Protohistoric/Late Prehistoric II Period .....	23
Contact/Historic Period .....	24
Literature and Records Review.....	25
Land Use at the Texas GLO Property and Upland Sites .....	28
Area STL001 .....	28
Area STL002 .....	35
Areas STL003 and STL004 .....	35
Site 41RV30.....	35
Site 41RV40.....	48
Site 41UT127.....	48
Chapter 4: Research Design and Methods.....	60
Research Design.....	60
NRHP Criteria .....	60
Methods.....	61
Archaeological Fieldwork.....	61
Architectural Field Methods .....	62
Laboratory Methods .....	62
Curation .....	62
Chapter 5: Results .....	63

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Texas GLO Property .....	63
Area STL001 .....	63
Area STL002 .....	66
Areas STL003 and STL004 .....	72
Previously Recorded Upland Sites .....	78
Site 41RV30 .....	78
Site 41RV40 .....	80
Site 41UT127 .....	82
Chapter 6: Summary and Recommendations .....	84
References Cited .....	85

Appendix A: Shovel Test Log



## LIST OF FIGURES

Figure 1.1.	General vicinity map showing the locations of the Epic NGL Phase 2 Pipeline route, Texas GLO properties, and upland archaeological sites. ....	2
Figure 1.2.	USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 1 of 4).....	3
Figure 1.3.	USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 2 of 4).....	4
Figure 1.4.	USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 3 of 4).....	5
Figure 1.5.	USGS topographic map showing upland archaeological sites surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 4 of 4). ....	6
Figure 1.6.	2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 1 of 4).....	7
Figure 1.7.	2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 2 of 4).....	8
Figure 1.8.	2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 3 of 4).....	9
Figure 1.9.	2017 aerial photograph showing upland archaeological sites surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 4 of 4). ....	10
Figure 2.1.	Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Area STL001. ....	15
Figure 2.2.	Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Area STL002. ....	16
Figure 2.3.	Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Areas STL003 and STL004. ....	17
Figure 2.4.	Map showing soil types in the Epic NGL Phase 2 APE at upland archaeological sites. ....	18
Figure 3.1.	Previously conducted cultural resource surveys and previously identified archaeological sites within 1.6 kilometers (one mile) of Texas GLO property and upland archaeological sites.....	26
Figure 3.2.	1953 aerial photograph showing Area STL001. ....	29
Figure 3.3.	1967 aerial photograph showing Area STL001. ....	30
Figure 3.4.	1972 aerial photograph showing Area STL001. ....	31
Figure 3.5.	1985/1986 USGS topographic map showing Area STL001. ....	32
Figure 3.6.	1993 USGS topographic map showing Area STL001.....	33
Figure 3.7.	2003 aerial photograph showing Area STL001. ....	34
Figure 3.8.	1954 aerial photograph showing Area STL002. ....	36
Figure 3.9.	1967 aerial photograph showing Area STL002. ....	37
Figure 3.10.	1976 aerial photograph showing Area STL002. ....	38
Figure 3.11.	1986 USGS topographic map showing Area STL002.....	39

Figure 3.12.	1993 USGS topographic map showing Area STL002.....	40
Figure 3.13.	2003 aerial photograph showing Area STL002. ....	41
Figure 3.14.	1954 aerial photograph showing Areas STL003 and STL004.....	42
Figure 3.15.	1967 aerial photograph showing Areas STL003 and STL004.....	43
Figure 3.16.	1976 aerial photograph showing Areas STL003 and STL004.....	44
Figure 3.17.	1986 USGS topographic map showing Areas STL003 and STL004.....	45
Figure 3.18.	1993 USGS topographic map showing Areas STL003 and STL004.....	46
Figure 3.19.	2003 aerial photograph showing Areas STL003 and STL004.....	47
Figure 3.20.	1954 aerial photograph showing 41RV30. ....	49
Figure 3.21.	1965 USGS topographic map showing 41RV30. ....	50
Figure 3.22.	1976 aerial photograph showing 41RV30. ....	51
Figure 3.23.	1981 USGS topographic map showing 41RV30. ....	52
Figure 3.24.	1954 aerial photograph showing 41RV40. ....	53
Figure 3.25.	1965 USGS topographic map showing 41RV40. ....	54
Figure 3.26.	1976 aerial photograph showing 41RV40. ....	55
Figure 3.27.	1981 USGS topographic map showing 41RV40. ....	56
Figure 3.28.	1954 aerial photograph showing 41UT127. ....	57
Figure 3.29.	1970 USGS topographic map showing 41UT127.....	58
Figure 3.30.	1995 aerial photograph showing 41UT127. ....	59
Figure 5.1.	Location of shovel tests excavated at Area STL001.....	64
Figure 5.3.	Typical soil stratigraphy at Area STL001, Shovel Test 7.....	65
Figure 5.2.	Overview of Area STL001, looking west, showing vegetation and oil facilities in the background. ....	65
Figure 5.4.	Excavated shovel test locations at Area STL002 and extent of 41RV131 within the Project APE. ....	67
Figure 5.5.	Overview of Area STL002, facing west, showing general desert shrub vegetation. Note the white fenceposts in the background that parallel a road bordering the western edge of the APE. ....	68
Figure 5.6.	Typical soil stratigraphy at Area STL002. ....	68
Figure 5.7.	Select artifacts recovered from 41RV131.....	69
Figure 5.8.	Select artifacts recovered from 41RV131.....	70
Figure 5.9.	Select artifacts recovered from 41RV131 that fluoresced orange when exposed to ultraviolet light.....	71
Figure 5.10.	Typical environment at Area STL003, looking north. ....	73
Figure 5.11.	Typical environment at Area STL004, looking west.....	73
Figure 5.12.	Excavated shovel test location at Area STL004 and extent of 41RV132 and 41RV133 within the Project APE.....	74
Figure 5.13.	Shovel test profile at site 41RV133.....	75
Figure 5.14.	Biface recovered from 41RV132. Bottom photograph shows the artifact under ultraviolet light. ....	76
Figure 5.15.	Select artifacts recovered from 41RV133.....	77
Figure 5.16.	Typical environment of 41RV30, showing disturbance during the installation powerlines, road grading, and pipeline construction.....	78

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Figure 5.17.	Excavated shovel test locations at upland sites 41RV30, 41RV40, and 41UT127. ....	79
Figure 5.18.	Metal object, likely a barrel clamp, found on the surface at 41RV30. The diameter of this object is approximately 45 centimeters (18 inches). ....	80
Figure 5.19.	Typical soil stratigraphy at 41RV30. ....	80
Figure 5.21.	Typical soil stratigraphy at site 41RV40. ....	81
Figure 5.20.	Typical environment at 41RV40, which has been disturbed by powerlines installation, road maintenance, and pipeline construction. ....	81
Figure 5.22.	Typical environment at 41UT127, looking east. ....	82
Figure 5.23.	Typical soil stratigraphy at 41UT127. ....	83

## LIST OF TABLES

Table 2.1.	Soil Series Classifications along the Proposed Phase 2 Epic NGL Pipeline Route on Texas GLO Property and Upland Archaeological Sites. ....	14
Table 3.1.	Native American Cultural History of the Epic NGL Phase 2 Texas GLO APE. ....	21
Table 3.2.	Previously Conducted Cultural Resource Surveys within 1.6 Kilometers (One Mile) of Texas GLO Property. ....	25
Table 3.3.	Previously Recorded Archaeological Sites within 1.6 Kilometers (One Mile) of the Texas GLO Property. ....	25
Table 5.1.	Artifacts Recovered from the Surface at 41RV131. ....	66
Table 5.2.	Artifacts Recovered from the Surface of 41RV133. ....	75

## MANAGEMENT SUMMARY

**Project Title.** Phase I Cultural Resource Survey of the TexStar Epic NGL Phase 2—Ramsey Terminal to Benedum Plant—Pipeline Project, Texas General Land Office Properties and Three Upland Sites, Reeves and Upton Counties, Texas.

**Project Description.** The Project is a joint venture between affiliates of TexStar Midstream Logistics, Ironwood Midstream Energy Partners, and Castleton Commodities International. Phase 2 of the Project consists of the installation of approximately 286.8 kilometers (178.2 miles) of 12-inch outside diameter (O.D.) pipeline that will be used to transport natural gas liquids from the Ramsey Terminal, which is located approximately 1.1 kilometers (0.69 miles) south of the city of Orla in Reeves County, Texas. The pipeline will continue east through Reeves, Pecos, Ward, and Crane Counties and terminate in Upton County at the Benedum Plant. This document reports survey results of 2.98 kilometers (1.85 miles) of the Project traversing Texas General Land Office (GLO) properties in Reeves County. The Project Area of Potential Effect (APE) is the length of the pipeline route across Texas GLO properties; the APE is 61.0 meters (200 feet) wide, and the pipeline trench is anticipated to be no more than 1.5 to 1.8 meters (5 to 6 feet) deep. Three upland archaeological sites (41RV30, 41RV40, and 41UT127) with an “undetermined” National Register of Historic Places (NRHP) eligibility also were surveyed within the APE in Reeves and Upton Counties. Staging areas, pipe yards, access roads, and other ancillary facilities will eventually be sited along the Project corridor, but their locations have yet to be determined.

**Location.** The proposed pipeline route crosses four Texas GLO properties (SEARCH Survey Areas STL001-STL004). Area STL001 is located in northwestern Reeves County near the start of the Phase 2 pipeline route, approximately 3.65 kilometers (2.27 miles) west of State Highway 285 and 0.52 kilometers (0.32 miles) south of the Ramsey Terminal, the Ford Geraldine Oil Field, and China Draw. The city of Orla, Texas, is roughly 13.85 kilometers (8.6 miles) to the south of Area STL001. Area STL002 is located 34.52 kilometers (21.45 miles) to the south of Area STL001 and 22.14 kilometers (13.76 miles) south of Orla. It is roughly 1.83 kilometers (1.14 miles) west of State Highway 232 and is situated between Narrow Bow and WT Draws. Areas STL003 and STL004 are adjacent to each other. STL003 is 1.59 kilometers (0.99 miles) south of STL002. WT and John D Draws cross portions of Areas STL003 and STL004, and State Highway 232 parallels much of the proposed pipeline route on Area STL004.

**Number of Acres Surveyed.** Approximately 79.5 hectares (196.04 acres), the area of the Project APE on Texas GLO property, were surveyed. This total includes 4.99 hectares (12.35 acres) surveyed within the APE at three newly recorded archaeological sites. Additionally, 5.1 hectares (12.6 acres) were surveyed within three previously recorded archaeological sites.

**Principal Investigator.** Charlotte Donald Pevny.

**Purpose of Work.** The 1969 Antiquities Code of Texas protects historic properties located on non-federal public lands and requires a review of proposed energy projects on these lands. The Project route crosses tracts managed by the Texas GLO; therefore, an Antiquities Permit (#8268) was obtained from the Texas Historical Commission (THC) prior to survey.

**Number of Sites.** Six sites were identified or revisited. Phase I cultural resource survey identified three new prehistoric lithic surface scatters (41RV131, 41RV132, and 41RV133) within the Project APE on Texas GLO property. Previously recorded sites 41RV30, 41RV40, and 41UT127 were revisited. Site 41RV30 is a late nineteenth- to twentieth-century surface scatter associated with Old X Ranch. Site 41RV40 is a small, burned caliche feature. Site 41UT127 is a World War II practice bombing range.

**Eligibility.** It is SEARCH's opinion that the proposed Project will result in NO ADVERSE EFFECT to the portions of these six sites located within the Project APE, and within the APE, these sites are not eligible for inclusion in the NRHP. No further work is recommended at these sites or within other portions of the Project APE located on Texas GLO lands.

**Curation.** Artifacts, paperwork, and photographs will be curated at Texas State University.

**Comments.** SEARCH performed a Phase I survey to identify and evaluate cultural resources that may be adversely affected within the proposed Project APE using intensive pedestrian survey and shovel test excavation, as outlined in the THC's *Archaeological Survey Standards for Texas and Archeology and Historic Preservation and Rules of Practice and Procedure for the Antiquities Code of Texas*.

## CHAPTER 1: INTRODUCTION

From January 8 through January 15, 2018, SEARCH completed a Phase I cultural resource survey of Texas General Land Office (GLO) properties in Reeves County, as part of the proposed Epic NGL Phase 2 Pipeline Project (Project) (**Figure 1.1**). The Project is a joint venture between affiliates of TexStar Midstream Logistics, Ironwood Midstream Energy Partners, and Castleton Commodities International. Phase 2 of the Project consists of the installation of approximately 286.8 kilometers (178.2 miles) of 12-inch outside diameter (O.D.) pipeline that will be used to transport natural gas liquids from the Ramsey Terminal in Reeves County, Texas, to the Benedum Plant in Upton County, Texas (see **Figure 1.1**). The work was conducted for Flatrock Engineering and Environmental, LLC (Flatrock), environmental contractor to TexStar, and this document reports the survey results of sections of the Project Area of Potential Effect (APE) traversing lands owned by the Texas GLO in Reeves County, Texas (**Figures 1.2-1.4**), to satisfy the requirements of the Antiquities Code of Texas under Texas Antiquities Permit #8268. As a matter of due diligence, three previously recorded upland archaeological sites (41RV30, 41RV40, and 41UT127) with an “undetermined” National Register of Historic Places (NRHP) eligibility also were surveyed within the APE in Reeves and Upton Counties (**Figure 1.5**). **Figures 1.6 to 1.9** show the Project APE on aerial maps.

The 1969 Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191) protects historic properties located on non-federal public lands and requires a review of proposed energy projects on these lands. The Project route crosses tracts managed by the Texas GLO; therefore, an Antiquities Permit (#8268) was obtained from the Texas Historical Commission (THC) prior to survey. A Work Plan outlining the methods proposed to identify prehistoric and historic archaeological resources was developed in conjunction with the THC (meeting on June 6, 2017).

SEARCH performed a Phase I survey to identify and evaluate all cultural resources (e.g., archaeological sites, historic roads, and cemeteries) that may be adversely affected by the proposed Project. These areas were surveyed using surface and subsurface methods, as outlined in the THC’s *Archaeological Survey Standards for Texas and Archeology and Historic Preservation and Rules of Practice and Procedure for the Antiquities Code of Texas*, and in conformance with the Advisory Council on Historic Preservation (ACHP) guidelines (36 CFR, Part 800, as amended); the National Historic Preservation Act (NHPA) of 1966, as amended; and the Native American Graves Protection and Repatriation Act (NAGPRA). The Project Manager and Principal Investigator for the Project exceed the professional qualifications presented in Secretary of the Interior’s *Standards and Guidelines for Archeology and Historic Preservation* (Federal Register V.48 N. 190 Part IV p. 44738-44739, September 30, 1983); the requirements for Principal Investigator as defined in Title 13, Part II of the Texas Administrative Code, Chapter 26; and are listed on the Register of Professional Archeologists (RPA).

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**Figure 1.1. General vicinity map showing the locations of the Epic NGL Phase 2 Pipeline route, Texas GLO properties, and upland archaeological sites.**



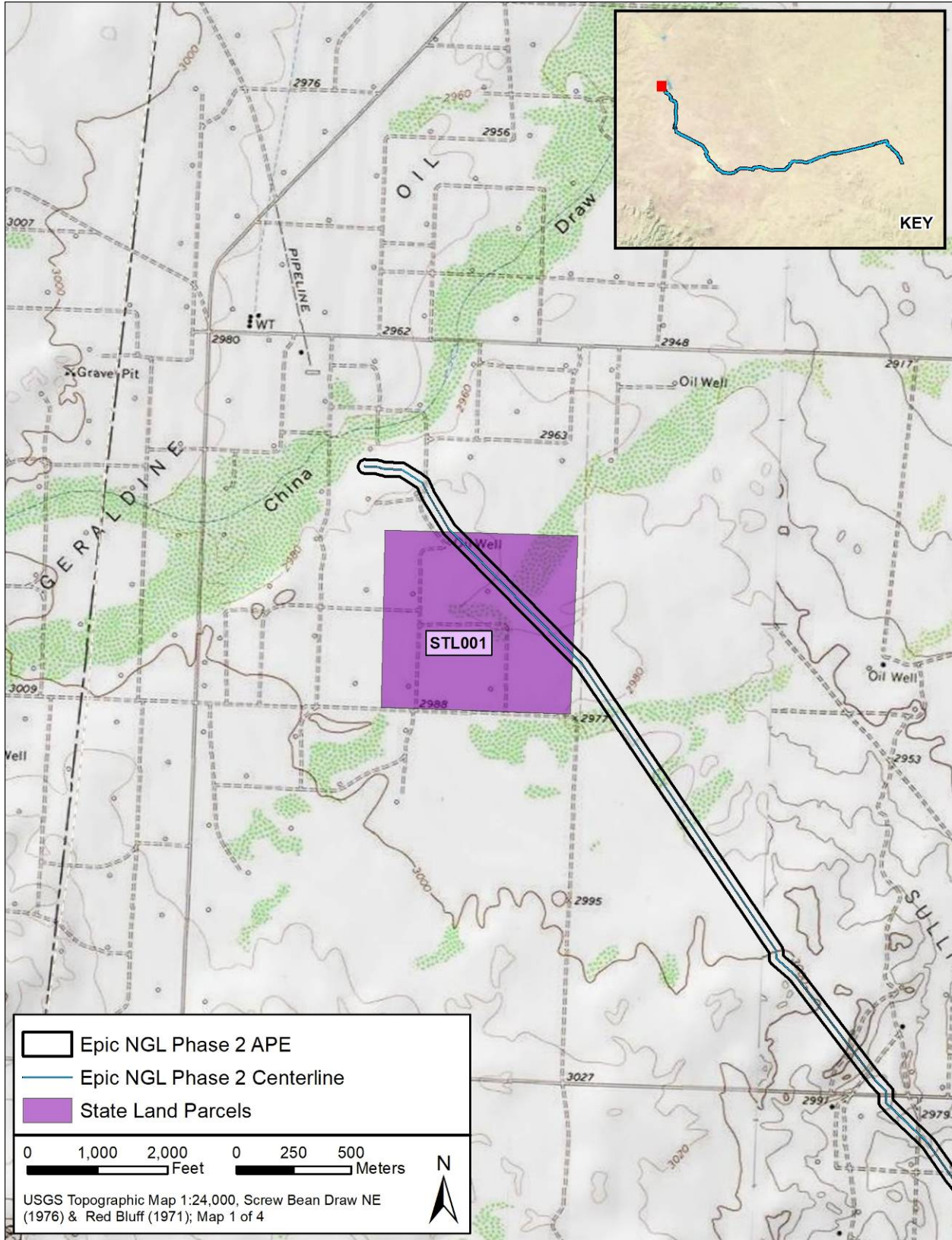


Figure 1.2. USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 1 of 4).

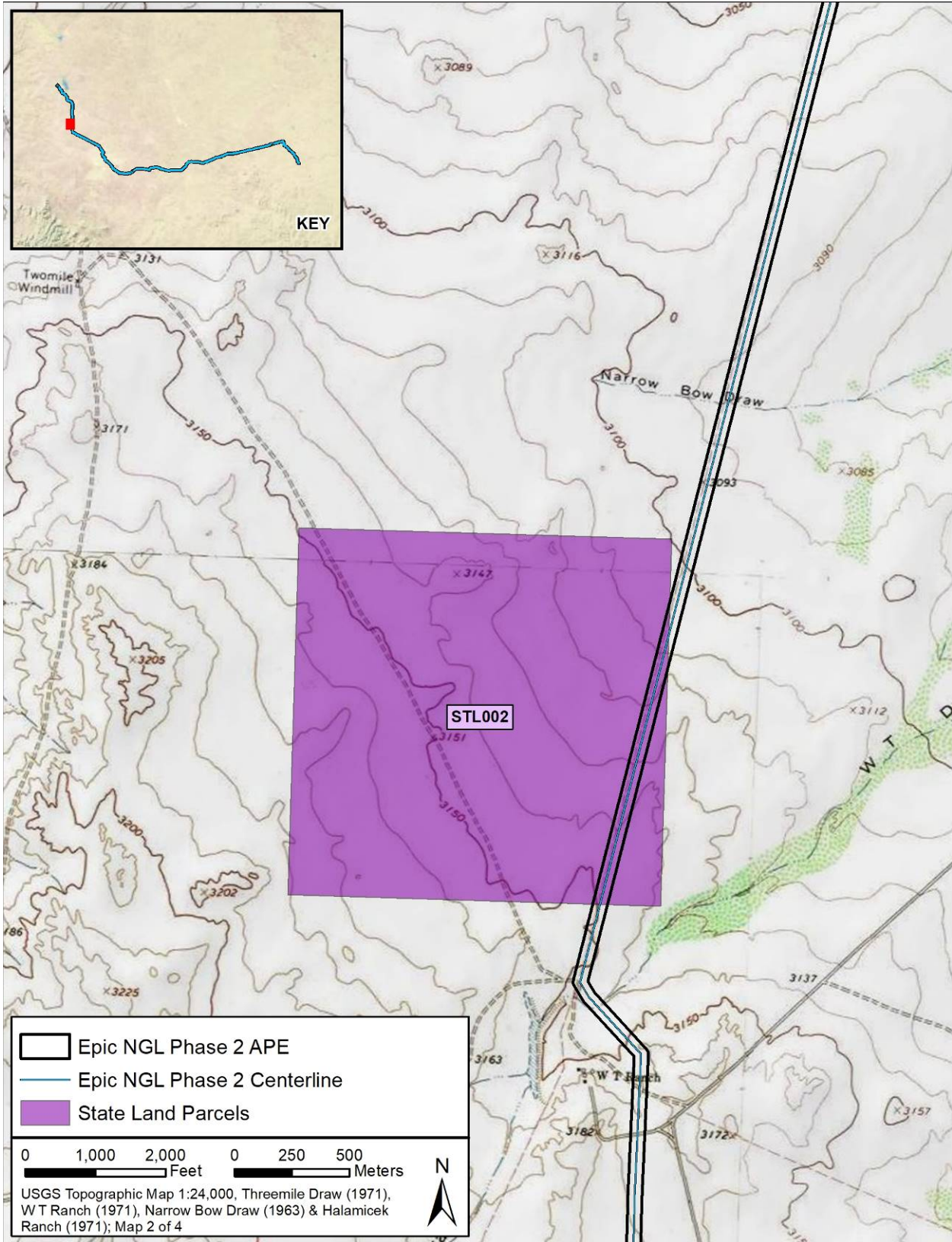


Figure 1.3. USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 2 of 4).



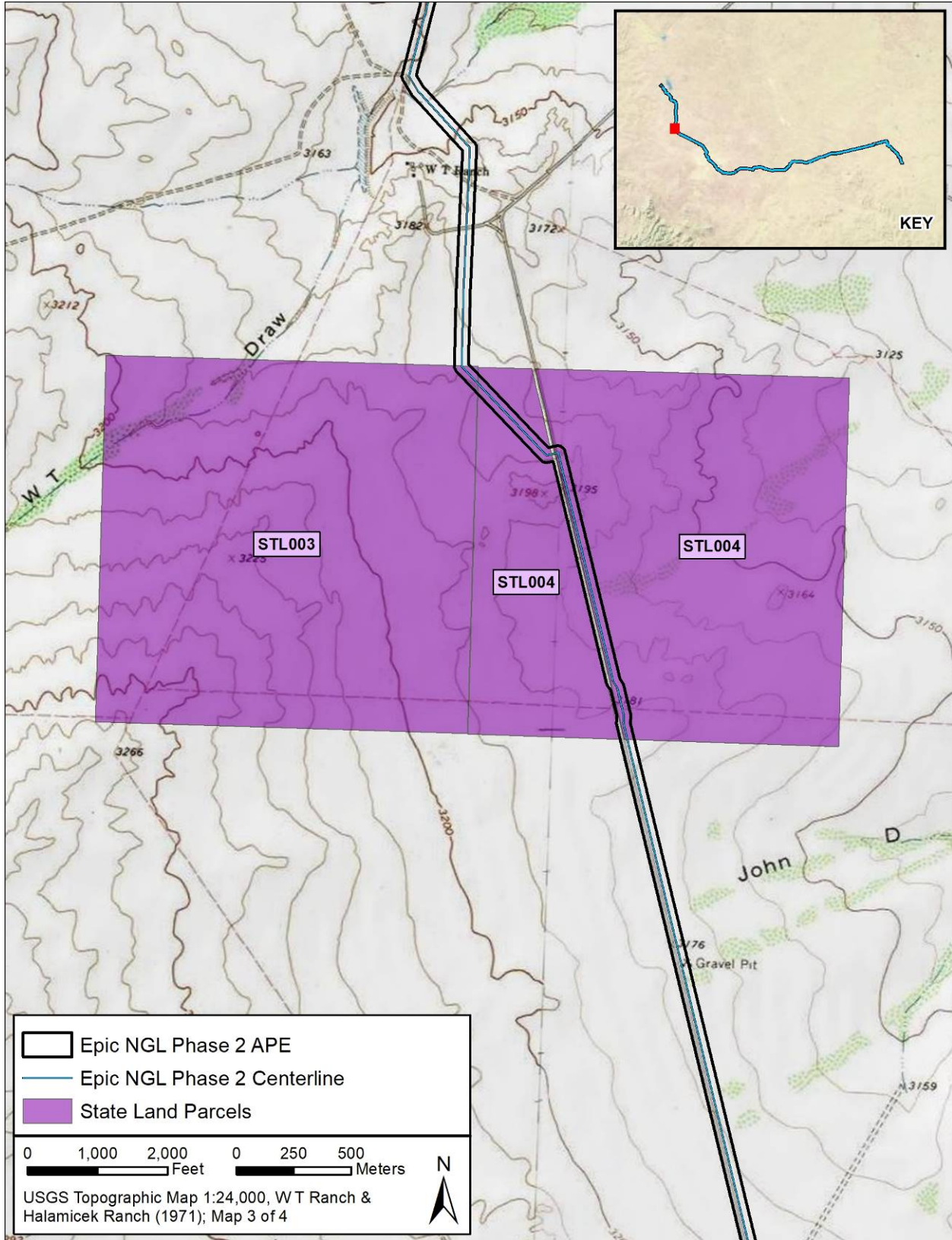


Figure 1.4. USGS topographic map showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 3 of 4).

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**Figure 1.5. USGS topographic map showing upland archaeological sites surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 4 of 4).**



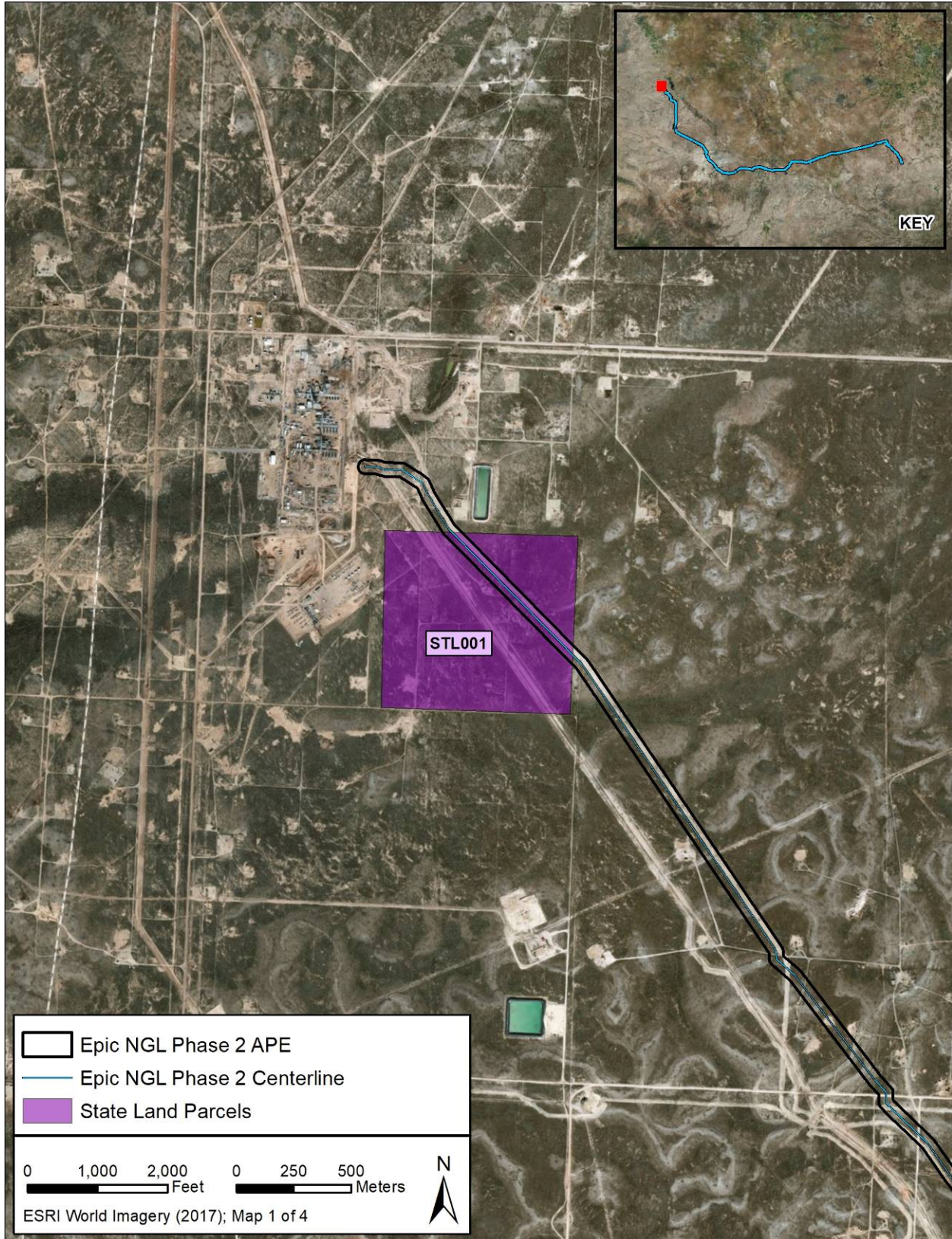


Figure 1.6. 2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 1 of 4).



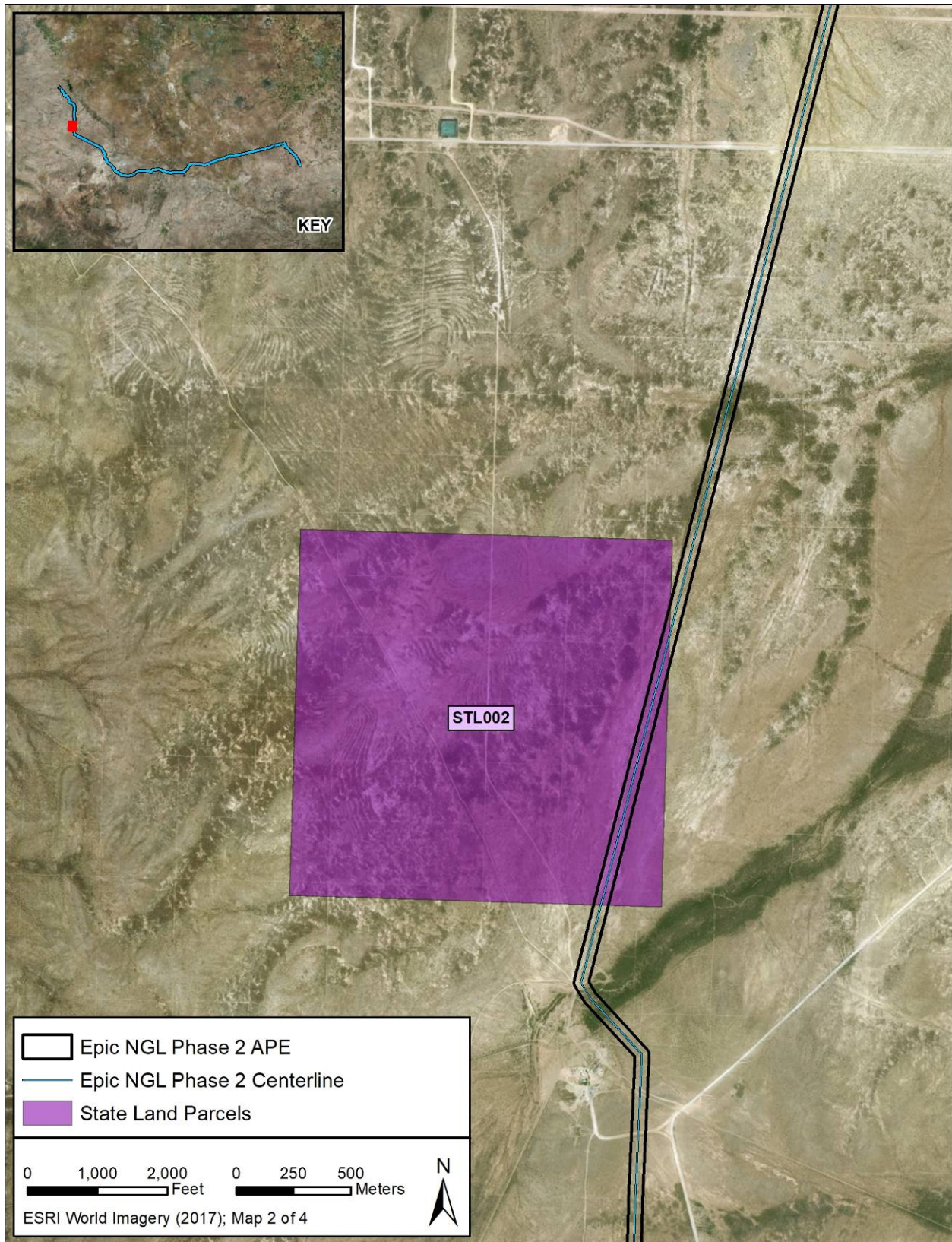


Figure 1.7. 2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 2 of 4).



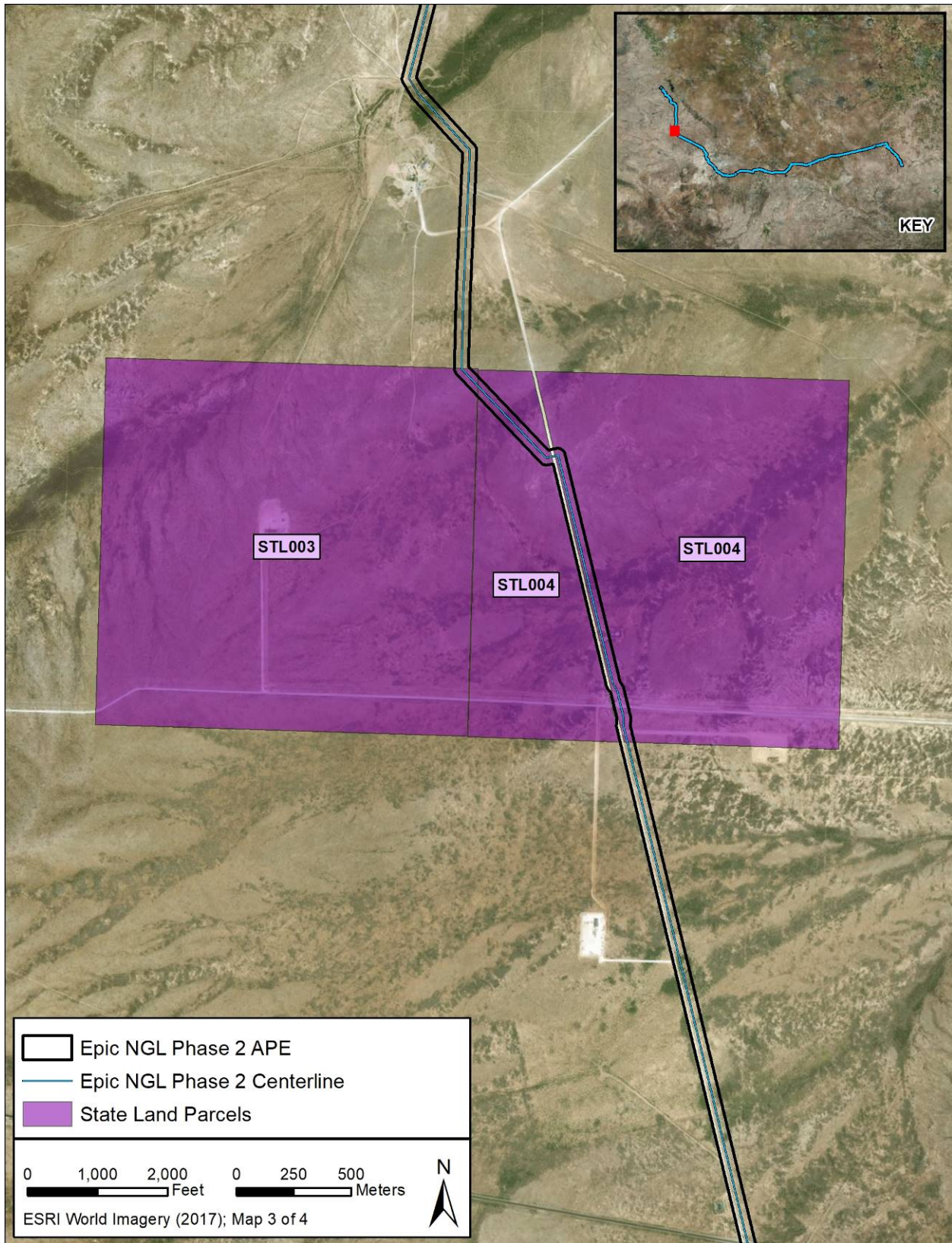


Figure 1.8. 2017 aerial photograph showing Texas GLO property surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 3 of 4).

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**Figure 1.9. 2017 aerial photograph showing upland archaeological sites surveyed as part of the Epic NGL Phase 2 Pipeline Project (map 4 of 4).**



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## PROJECT DESCRIPTION

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This work is part of the second phase of the proposed Project in Texas. Phase 2 will originate at an existing facility—the Ramsey Terminal—located approximately 1.1 kilometers (0.69 miles) south of the city of Orla in Reeves County, Texas. The pipeline will continue east through Reeves, Pecos, Ward, and Crane Counties and terminate in Upton County at the Benedum Plant (see **Figure 1.1**). The Phase 2 right-of-way (ROW) is approximately 286.8 kilometers (178.2 miles) long and 61.0 meters (200 feet) wide. The pipeline trench is anticipated to be no more than 1.5 to 1.8 meters (5 to 6 feet) deep. The Project route traverses Texas GLO tracts measuring approximately 2.98 kilometers (1.85 miles) in length and 23.4 hectares (57.8 acres) in size. As a matter of due diligence, three previously recorded upland archaeological sites (41RV30, 41RV40, and 41UT127) with an “undetermined” NRHP eligibility also were surveyed within the APE in Reeves and Upton Counties. In total, the upland sites are 5.1 hectares (12.6 acres). Staging areas, pipe yards, access roads, and other ancillary facilities will eventually be sited along the Project ROW, but their locations have yet to be determined.

### The Area of Potential Effects

The APE is a geographic area within which a project may directly or indirectly cause alterations in the character or use of historic properties, such as archaeological sites, historic standing structures, and NRHP-listed and -eligible properties (36 CFR 800.16[d]). For this Project, the term “Direct APE” designates the specific areas where cultural resources could be directly affected by trench excavation and other activities related to pipeline construction. The Direct APE on Texas GLO property is constrained to the width of the Project ROW (61.0 meters [200 feet]), the length of the proposed pipeline (2.95 kilometers [1.83 miles]), and the depth of the pipeline trench (maximum depth of 1.5 to 1.8 meters [5 to 6 feet]).

Potential direct, indirect, and cumulative effects to historic properties and aspects of integrity are considered. Historic properties located above ground could be indirectly affected by visual, auditory, and vibration impacts. While the Indirect APE for aboveground properties usually encompasses an entire viewshed—areas where a project may visually affect aboveground structures—once the Project is completed, no aboveground evidence of pipeline construction will be evident. The location, design, and construction parameters for aboveground infrastructure, such as valves and meter stations, have not been decided; once these factors are defined, SEARCH will consult with the THC to define the Indirect APE and the viewshed.

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## SUMMARY

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Field investigations included systematic pedestrian survey and shovel test excavation of the proposed pipeline corridor, with a total survey area of approximately 23.4 hectares (57.7 acres) on Texas GLO property and 5.1 hectares (12.6 acres) on upland sites. Pedestrian survey was supplemented with shovel test excavation at 100-meter (328-foot) intervals (even in areas with

greater than 30 percent surface visibility). Twenty-two shovel tests were excavated along the Project APE centerline on Texas GLO properties, and 28 shovel tests were excavated at the upland archaeological sites.

On Texas GLO properties, three newly identified prehistoric lithic surface scatters—41RV131, 41RV132, and 41RV133—were recorded. All three sites were low- to medium-density prehistoric artifact scatters. No temporally diagnostic artifacts were noted, and no artifacts were recovered during shovel test excavation. Of the uplands sites, 41RV40—a small, burned caliche feature—could not be relocated and is likely destroyed; 41RV30, a historic artifact scatter associated with a nearby ranch, also has been disturbed within the APE. No artifacts or practice bombing targets were identified within the APE at 41UT127. The portions of these six sites located within the APE are not recommended eligible for NRHP inclusion. It is SEARCH's opinion that the Project will have NO ADVERSE EFFECT on these six sites within the Project APE.

## CHAPTER 2: ENVIRONMENTAL OVERVIEW

This chapter presents information concerning the natural environment of the Project APE and the region. It includes discussion of the geology and physiography, soils, climate, flora and fauna, and present-day land use. The purpose of this information was to support the development of an appropriate research design for the Phase I cultural resource survey and to facilitate the interpretation of the survey results. This chapter focuses on data most relevant to the location of Texas GLO property in Reeves County.

### GEOLOGY AND PHYSIOGRAPHY

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The Project areas—Texas GLO property and sites 41RV30, 41RV40, and 41UT127—lie on Pleistocene-age other Quaternary Deposits (Qao), windblown cover sand (Qcs), and Holocene-age alluvium deposits (Qal) (Bureau of Economic Geology 1992). Silt, silty sand, and sand are the primary component of these deposits and often overlay limestone bedrock. The characteristic depths of the deposits are undetermined, but in general, the water table is shallow, soils are moderate to highly permeable, and soils have a low to moderate holding capacity (Barnes 1992).

The proposed pipeline route traverses three physiographic zones: it originates in the Trans-Pecos Mountains and Basins, crosses the Southern High Plains, and terminates on the Edwards Plateau (Bureau of Economic Geology 1996). The Pecos River divides the Trans-Pecos and Southern High Plains. The Trans-Pecos Mountains and Basins comprise the southwestern portion of the state from the New Mexico/Texas border south to the Texas/Mexico border. On the Southern High Plains, the pipeline route passes through the Shinnery Sands and Arid Llano Estacado ecoregions. The Shinnery Sands environment is comprised of sand hills, dunes, and flat sandy recharge areas, and the Arid Llano Estacado is considered a transitional region between the Llano Estacado to the north and the Trans-Pecos to the southwest (Griffith et al. 2004). Finally, the easternmost portions of the Project lie within the Edwards Plateau, an uplifted nearly level semi-arid prairie.

The Texas GLO properties and upland archaeological sites 41RV30 and 41RV40 are situated in the Chihuahuan Desert ecoregion, in the Chihuahaun Basins and Playas, which generally can be described as desert characterized by arid shrubland and semi-desert grasses. The playas and basin floors have saline or alkaline soils and areas of salt flats, dunes, and windblown sand. The typical desert shrubs and grasses growing in these environments, such as creosote bush, tarbush, fourwing saltbush, blackbrush, and grama, withstand large diurnal ranges in temperature, low available moisture, and extremely high evapotranspiration rates. Invasive species, such as saltcedar and common reed, have overrun riparian areas. Land use, particularly grazing, is limited in desert areas due to sparse vegetation and lack of water

(Griffith et al. 2004). Historic grazing practices have expanded the extent or boundary of this ecoregion.

Site 41UT127 is located in the Arid Llano Estacado ecoregion, a transitional region located between the mesas of the Llano Estacado to the north and the Trans-Pecos to the southwest (Griffith et al. 2007). The Arid Llano Estacado is drier than the Llano Estacado, and local vegetation includes shortgrass prairie species, buffalo grasses, mesquite, and lotebush. Land use includes livestock grazing and irrigated farming of cotton, sorghum, wheat, and pecans. The oil industry is supported by several large oil fields located throughout the region.

## SOILS

Soil drainage is a significant indicator for identifying archaeological probability zones. For example, prehistoric archaeological sites are regularly associated with soil types ranging from somewhat poorly drained to excessively drained; whereas, they less frequently occur in areas of poorly drained soil (unless areas of better-drained soil are not nearby) and are even less common in areas that are very poorly drained. Areas classified as swamp or water are unlikely to contain intact cultural resources.

Soils in Reeves County (Jaco 1980) are generally formed on valley fill and are loamy and well drained, whereas soils in Upton County (Wiedenfeld 2003) cover large areas of deep to very deep, nearly level, well-drained soils that form in warm temperate, sub-humid to arid areas. Soils in both counties are severely affected by wind erosion when adequate vegetation is not maintained. **Table 2.1** lists the soil series or associations found within the APE, the drainage class, and corresponding acreage as mapped by the US Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS 2016). Soil series within the APE are presented in **Figures 2.1-2.4**.

**Table 2.1. Soil Series Classifications along the Proposed Phase 2 Epic NGL Pipeline Route on Texas GLO Property and Upland Archaeological Sites.**

Soil Name or Association	Soil Type	Drainage	Setting	Acres	Hectares
Delnorte-Chilicotal association	Gravelly loam, 5-12% slopes	Well drained	Fan piedmonts	34.86	14.11
Hoban-Reeves-Holloman association	Silty clay loam, 0-2% slopes	Well drained	Basin floors	0.99	0.40
Reagan loam	Clay loam, 0-1% slopes	Well drained	Plains	8.77	3.55
Reakor association	Silty clay loam, 0-3% slopes	Well drained	Alluvial flats	11.24	4.55
Reakor-Lozier association	Clay and gravelly loam, 1-8% slopes	Well drained	Plains	4.11	1.66
Upton-Delnorte association	Gravelly loam, 0-2% slopes	Well drained	Pediments	3.12	1.26



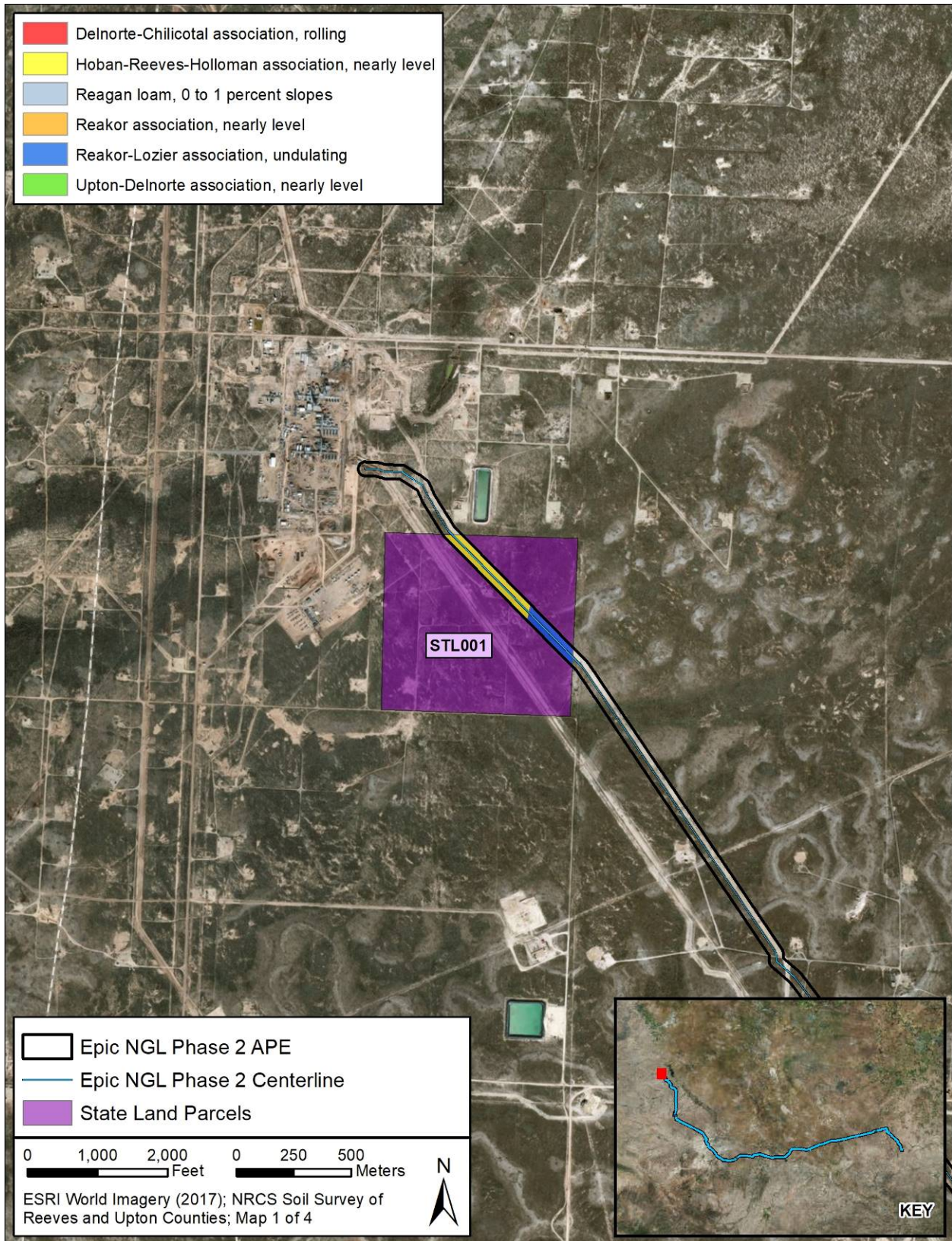


Figure 2.1. Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Area STL001.



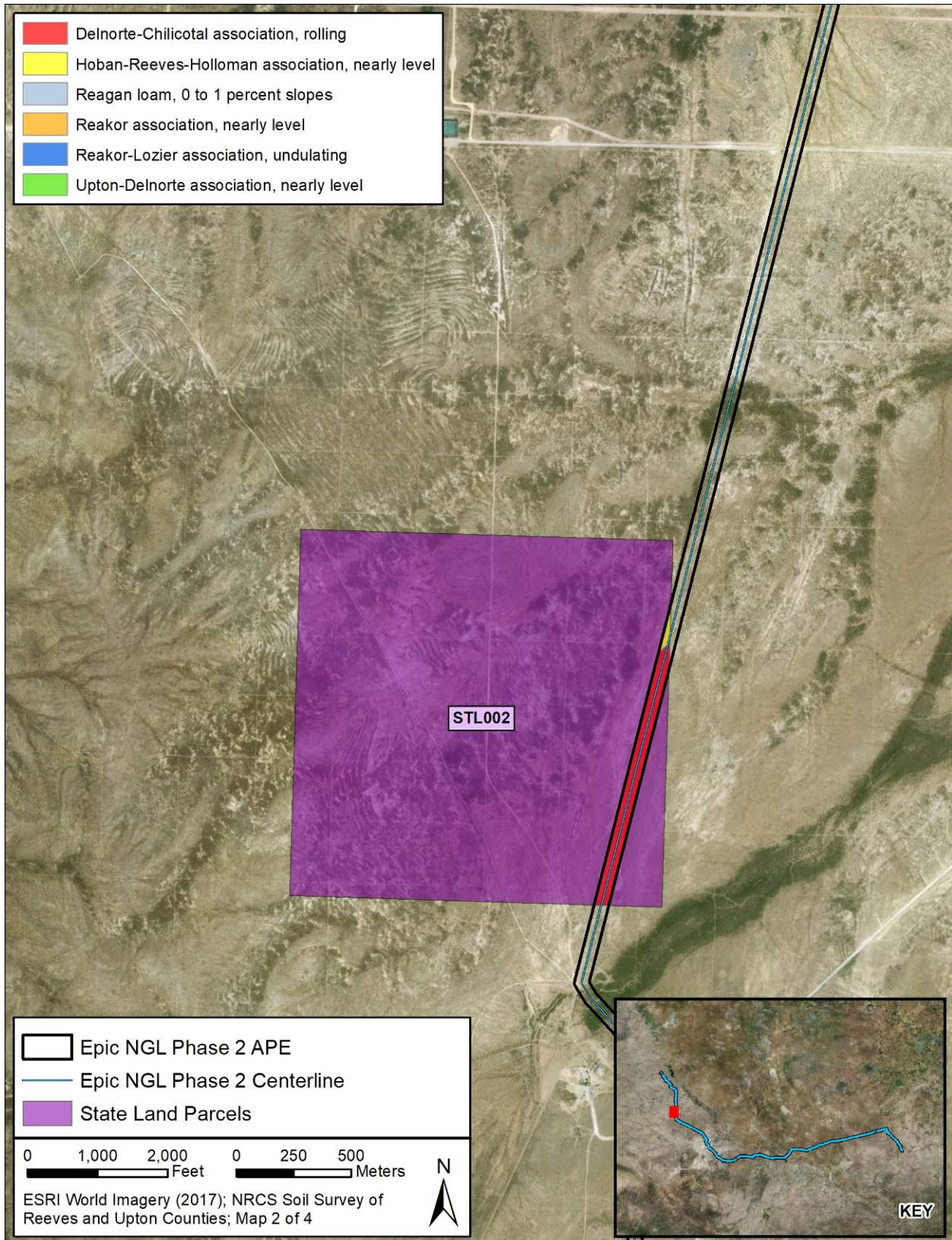


Figure 2.2. Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Area STL002.



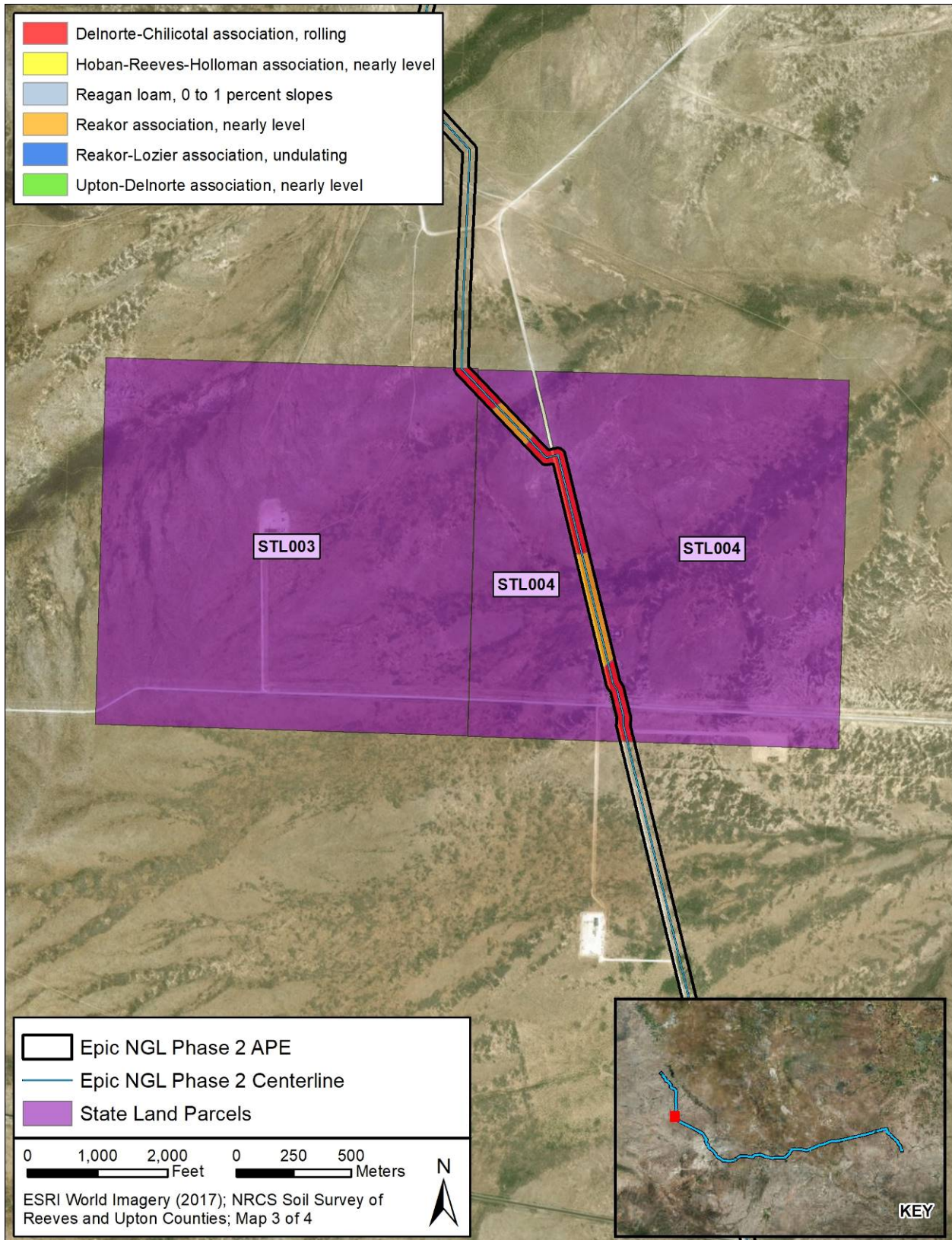


Figure 2.3. Map showing soil types in the Epic NGL Phase 2 APE on Texas GLO property, Areas STL003 and STL004.

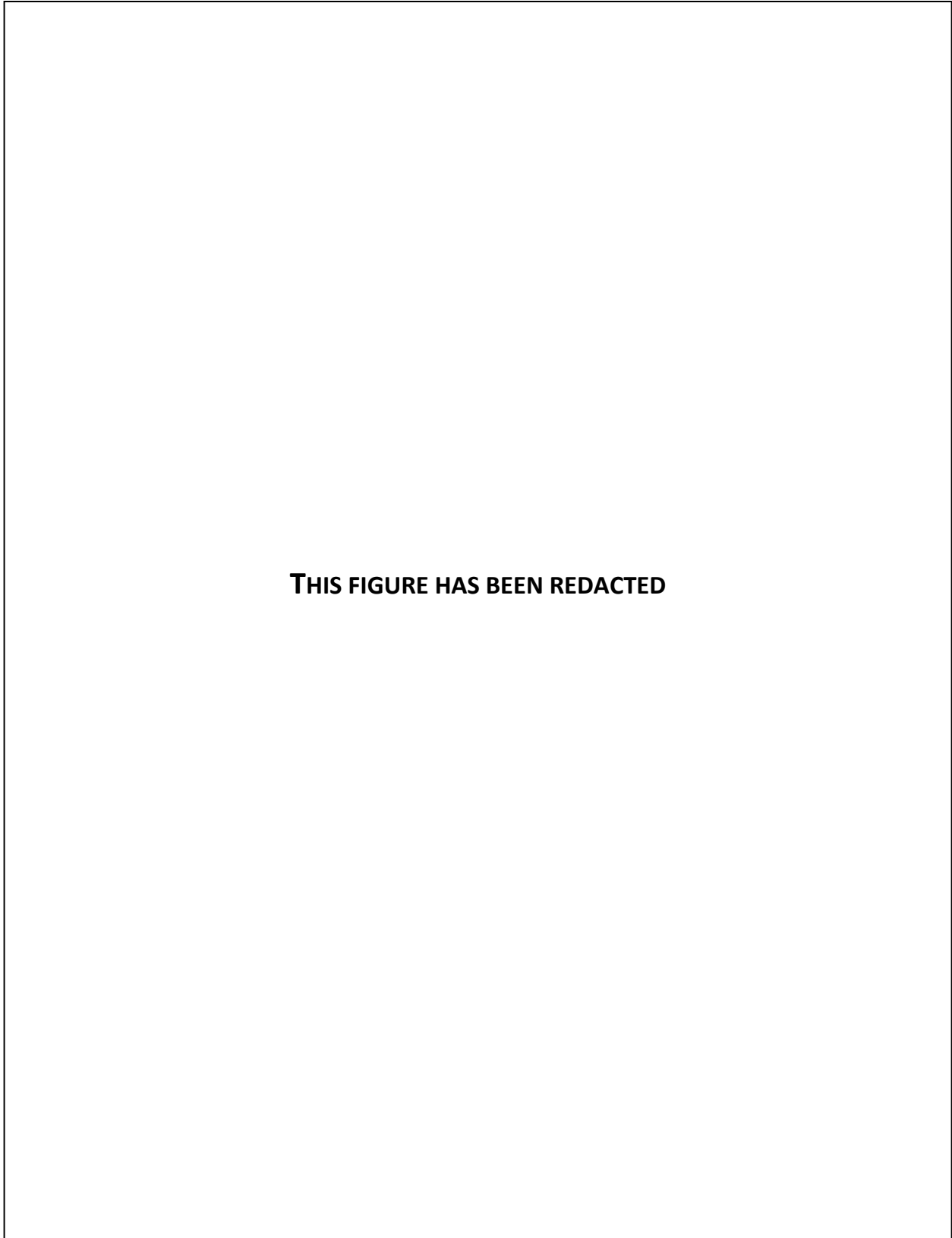


Figure 2.4. Map showing soil types in the Epic NGL Phase 2 APE at upland archaeological sites.



The Delnorte-Chilicotal association, about 55 percent of the total APE on Texas GLO property and upland sites, is comprised of well-drained soils generally found on fan piedmonts and often used for rangeland. The Delnorte series consist of shallow to very shallow, very gravelly, loamy soils (0 to 12 percent slopes). A typical Delnorte pedon includes pale brown calcareous gravelly loam (0 to 5 inches). Below the surface layer, very pale brown very gravelly loam (5 to 12 inches) is followed by a very pale brown strongly cemented caliche to 32 inches. Light gray gravelly loam concludes this pedon (32-80 inches) (Jaco 1980). Chilicotal series consist of well-drained soil found on gently undulating to strongly rolling fan remnants and alluvial fans (0 to 50 percent slopes). A typical pedon consists of brown very gravelly fine sandy loam (0 to 2 inches), followed by brown, very gravelly loam (2 to 28 inches). Light brown, extremely gravelly loam (28-40 inches) is followed by pink, extremely gravelly sandy loam (40 to 80 inches). Both soil series are calcareous and moderately alkaline (USDA 2014).

The Hoban-Reeves-Holloman association, about 2 percent of the total APE on Texas GLO property and upland sites, ranges from deep to very deep, nearly level soils on uplands (0 to 3 percent slopes). The main difference between soils in this association is the depth at which the gypsiferous layer is encountered, which can range from deep to very shallow and changes over short distances. A typical Hoban pedon consists of gray pinkish clay loam (0 to 8 inches). Subsequently, pinkish gray clay loam with 5 percent calcium carbonate (8 to 36 inches) and very pale brown clay loam containing 15 percent calcium carbonate (36 to 45 inches) follow. This is the start of a brownish gypsiferous layer that continues to 60 inches. For Reeves soils, the typical pedon consists of a surface layer of 6 inches, followed by a light brown clay loam (6 to 36 inches), which terminates at the pink calcareous and gypsiferous earth extending to 60 inches. A typical Holloman soil consists of light brown loam (0 to 15 inches) that sits on top of pinkish white calcareous, gypsiferous earth (15 to 60 inches). Soils are calcareous and all are well drained. Typical use of these soils is for rangeland, although cultivation as cropland is possible if irrigation is available (Jaco 1980).

Reagan series, about 14 percent of the total APE on Texas GLO property and upland sites, is a very deep and nearly level soil and found on smooth, broad plains and broad valley floors (0 to 1 percent). The soil is formed in calcareous loamy materials and is mixture of alluvial and eolian deposits. A typical pedon is comprised of brown loam (0 to 8 inches), followed by light brown clay loam with visible calcium carbonate (8 to 30 inches), and it terminates at reddish yellow clay loam with calcium carbonate (30 to 80 inches). The soils are often used for cropland, although the soils are threatened by runoff and erosion if vegetation cover is inadequate (Wiedenfeld 2003).

Well drained with moderate permeability, Reakor soils are located in nearly level to slightly depressed upland areas (0 to 3 percent slopes) for about 18 percent of the total APE on Texas GLO property and upland sites. The surface layer consists of light brown calcareous loam (0 to 8 inches), above light brown calcareous clay loam (8 to 24 inches). This layer is followed by pink calcareous clay loam with visible concretions (24 to 36 inches) that supersedes pink calcareous clay loam without concretions (36 to 60 inches) (Jaco 1980).

Reakor-Lozier association, about 7 percent of the total APE on Texas GLO property and upland sites, consists of deep to very shallow, undulating soils located on outwash plains and uplands (1 to 8 percent slopes). Both soils are well drained, with slopes ranging from 1 to 8 percent. Reakor soils are generally located in lower areas (less than 2 percent slopes), whereas Lozier soils are located on slopes (2 to 8 percent slopes). A typical Reakor soil is comprised of a surface layer of light brownish gray loam (0 to 4 inches). The next layer is light yellowish-brown clay loam (4 to 29 inches), followed by very pale brown clay loam with 50 percent calcium carbonate (29 to 60 inches). Lozier soils have a surface layer of moderately alkaline, calcareous stony loam (0 to 8 inches) over limestone bedrock. Soils in this association are generally used as rangeland (Jaco 1980).

The Upton-Delnorte association, about 5 percent of the total APE on Texas GLO property and upland sites, range from shallow to very shallow and are nearly level (0 to 2 percent slopes). A typical pedon for Upton comprises of light brownish gray loam (0 to 4 inches), followed by pale brown gravelly loam (4 to 12 inches) with a substratum of indurated caliche. Delnorte soils consist of light brownish gray calcareous and very gravelly loam (0 to 6 inches) on top of indurated caliche. These soils are generally used primarily for grazing land (Jaco 1980).

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## PALEOENVIRONMENT

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Miller and Kenmotsu (2004:214) describe the Trans-Pecos environment during the Paleoindian period as “characterized by moist woodlands and continual stream flow in mountain zones, with standing lakes and marshes throughout interior basins.” The region became gradually drier from 12,000 to 8000 BP, resulting in an ecological shift where woodland environments were transformed into plant communities similar to those of the Chihuahuan Desert (Miller and Kenmotsu 2004). Changing environmental conditions may have caused the extinction of large mammals on which Paleoindians are thought to have relied upon. By around 9000 BP, climate and vegetation communities similar to modern conditions were becoming established (Miller and Kenmotsu 2004:208).

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## MODERN ENVIRONMENT

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The Trans-Pecos is sparsely populated due to its rugged nature. The region boasts more than one million acres of public land that include multiple state parks and observatories. Much of the land within the region is actively used for cattle ranching. The economy of the survey area is based on ranching and the petroleum industry.

## CHAPTER 3: HISTORICAL OVERVIEW AND BACKGROUND RESEARCH

This chapter presents a cultural context for the APE, including a pre-contact and contact/historic period Native American cultural history, and a post-contact review of the area using historic maps and aerial photographs. A summary of previously recorded sites on file with the Texas Archeological Site (TAS) Atlas and Texas Historic Sites Atlas (THSA) also is provided, as well as a section discussing land use history of the APE.

### NATIVE AMERICAN OVERVIEW

The Texas GLO APE is located in the eastern Trans-Pecos archaeological region (Miller and Kenmotsu 2004:208; Perttula 2004).<sup>1</sup> While Miller and Kenmotsu admit the division between the eastern and western portions of the Trans-Pecos is arbitrary, it is based in part on the limited data available for the region east of El Paso, Texas. Much of the understanding of the prehistory of the area is extrapolated from other regions. In general, the cultural chronology is divided into five broad stages (**Table 3.1**) and shares more similarities with the Llano Estacado and Edwards Plateau than with cultures further west near El Paso, Texas.

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**Table 3.1. Native American Cultural History of the Epic NGL Phase 2 Texas GLO APE.**

Cultural Stage	Sub Stage	High Plains Archaeological Region
Pre-contact Paleoinidian	Clovis	11,500–11,000 BP
	Folsom	10,000–10,300 BP
	Late	10,300–8500 BP
Pre-contact Archaic	Early	8500–6000 BP
	Middle	6000–3600 BP
	Late	3600–2000 BP
Pre-contact Ceramic/ Late Prehistoric		2000 BP–AD 1000
	Antelope Creek	AD 1000–1500
Protohistoric/Late Prehistoric II		AD 1450–1725
Contact/Historic		AD 1725–1950

### Pre-Contact Paleoindian Period

The earliest identified populations in Texas, as with other regions of North America, are known as Paleoindians. Paleoindian peoples are believed to have been highly mobile hunter-gatherers that exploited large game, including extinct megafauna, as part of their survival strategy. Paleoindians may have arrived as early as 12,000 years ago in Texas, but were clearly present 9,000 years ago (Perttula 2004:10). In accordance with recent overviews of Texas prehistory, “Pleistocene peoples within the period of ca. 12,000–10,000 BP” are identified as Early

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<sup>1</sup> Site 41UT127 falls within the Southern High Plains archeological region, but since it is a historic site (with no prehistoric component) it is discussed further below in the Land Use History section.

Paleoindian, while “Late Paleoindian refers to those societies making lanceolate projectile points during the Early Holocene period of ca. 10,000–8,000 BP” (Bousman et al. 2004:16). Paleoindian activity is readily recognized by the presence of the uniquely-shaped lanceolate projectile points that were crafted during the period. Sites from this time period are primarily found in upland tributary and spring settings or deeply buried in floodplain alluvium.

The Paleoindian period was commonly characterized throughout Texas by nomadic big-game hunters who relied heavily on megafauna of the Pleistocene (e.g., mammoth, mastodon, bison, camel, and horse) for subsistence (Willey 1966). However, Paleoindians used a wider variety of resources than previously thought. Evidence of this broader resource subsistence is based on the works of Collins (1998:1505-1506), Collins and Brown (2000), and Johnson (1977). 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 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 the early (pre-10,300 BP) part of this period (Collins 1995; Turner and Hester 1999).

A date range of 10,300–8500 BP is identified for the Late Paleoindian period (Perttula 2004), which is marked by a drier and warmer environment with an increase in eolian sediments in draws and a number of dunes in the uplands (Johnson and Holliday 2004). Despite the change in environmental conditions, many of the Late Paleoindian sites in the region are still associated with bison kills (Johnson and Holliday 2004). Plainview, Golondrina, Scottsbluff, Meserve, Eden, and Angostura points are characteristic later in the period.

### **Pre-Contact Archaic Period**

The Archaic period in the eastern Trans Pecos is poorly known, primarily due to the lack of sites with intact Archaic deposits and even fewer excavations investigating such sites (Collins 1971). The Archaic period is generally understood to correspond to the post-Paleoindian Early Holocene and to continue to the Late Holocene stabilization of environmental conditions (Johnson and Holliday 2004). This period is characterized by a distinct change in projectile point style, the addition of new tool types, and a diversification in subsistence patterns with an increased reliance upon the hunting of modern species of game, including deer and rabbit. An increased reliance on the collecting of wild plants also occurs (Gregg et al. 1996). Changes in material culture during the Archaic period are believed to reflect somewhat larger and more-localized populations, as well as changes in the methods of food procurement and food processing.

Although Early Archaic populations made their living in much the same way as their Paleoindian ancestors, the Archaic period as a whole can be characterized as having more specialized resource procurement activities and technology (Miller et al. 2000; Smith et al. 1983; Watkins 2006). The use of fluted and lanceolate points disappeared, and projectiles with side and

corner notches became more common. Dart points are also identified as an important diagnostic of the Archaic period (Collins 1971). Other lithic changes included the emphasis on bifacial tools, whereas Paleoindian culture focused more on unifacial tools (Miller et al. 2000; Smith et al. 1983). Early Archaic sites usually are identified on terraces along tributary watercourses or deeply buried in floodplain alluvium.

The Middle Archaic is associated with a period of marked warmer and drier environmental conditions of the mid-Holocene Altithermal (Johnson and Holliday 1986:46). The Altithermal is dated between 6500 and 4500 BP and includes a massive increase in eolian sedimentation and decrease in vegetative cover, which would have affected the Project APE. Excavation of wells is noted within adjacent environmental regions (e.g., Southern High Plains) as a Middle Archaic adaptation to the dry conditions. Bottomland exploitation increases and fewer sites are found on minor tributaries.

More modern climatic conditions, beginning around 4500 BP, led to a change in human adaptation. Subsistence is focused on hunting and gathering within the bottomlands of major creeks and rivers. Johnson and Holliday (1986) note that the Late Archaic “occurs during a return to moister and somewhat cooler conditions, perhaps similar to those of today” (Johnson and Holliday 1986:46-47). The stabilization of climatic conditions also led to less sedimentation within the APE, greatly decreasing the chances of burying archaeological deposits (Johnson and Holliday 2004). Thus, Late Archaic sites with intact stratigraphic contexts are rare.

### **Pre-Contact Ceramic Period**

In the eastern Trans Pecos, the Ceramic period begins around 2000 BP; the first thousand years of the Ceramic period is viewed as a time of transition (Johnson and Holliday 2004:292), which includes a Late Archaic toolkit with the introduction and use of pottery and the bow and arrow. The early part of the Late Archaic is “characterized by corner-notched Scallorn arrow points and coarse-tempered cordmarked pottery” (Johnson and Holliday 2004:292). The climate is described as relatively mild, marked by intervals of moderate to severe drought conditions.

Johnson and Holliday (2004:293) note that the “later Ceramic period (ca. 1000–500 BP) is characterized by a mixed assemblage of Puebloan trade pottery and Plains lithic tool types” and dominated by Mogollon ceramics (Johnson and Holliday 2004:293). This includes Mogollon brownware pottery. Boyd (2004) suggests that a decrease bison population, perhaps related to a wetter climate, may have been in part responsible for the change in cultural adaptation, including the adoption of both eastern Woodland cultural traits, as well as those from the Southwestern Puebloan Jornada Mogollon peoples.

### **Protohistoric/Late Prehistoric II Period**

Perttula (2004) defines the general date range of this period as 1450–1725. Although Europeans were present in the region at this time, their influence is not readily evident in the

archaeological record (Johnson and Holliday 2004:284). A number of sites have been identified for the Southern High Plains region that contains protohistoric occupations; however, many of the identified components lack stratigraphic integrity. Sites of note include a number of previously discussed sites, including Lubbock Lake, Country Club, Montgomery, and Garza (Baugh 1986).

The Spanish expedition, led by Francisco Vasquez de Coronado, explored the Texas panhandle region in 1541. Coronado was in search of the fabled Seven Cities of Cibola. Archaeological evidence has indicated that Coronado and his expeditionary camped in Blanco Canyon south of Floydada (Floyd County) (Brock 2004). The region continued to be occupied by ancestors of the Apaches at that time, and no European settlements were established for nearly three centuries.

The lower Texas panhandle is populated by sites of the Garza complex, along the upper forks and tributaries of the Brazos River (Habicht-Mauche 1992). Some researchers see this culture as related to, and an outgrowth of, the Wheeler complex of southwest Oklahoma (Baugh 1986). The tool assemblage includes stone triangular arrow points and a variety of stone tools used for hide prepping. Ceramics consist of slightly more locally produced Southwestern-style wares, as well as glazed wares imported from the southwest. The percent of individual ceramic types within site assemblages includes Glaze E and F wares, as well as minor amounts of Plains Village wares, such as Little Deer Plain, Edwards Plain, and Perdido Plain (Baugh 1986; Habicht-Mauche 1992). The Garza complex sites focused along forks of the Brazos River are likely related to the Teya, which are culturally related to the Plains Caddoans (Habicht-Mauche 1992). These groups were driven out of the region by the Comanches in the eighteenth century.

## **Contact/Historic Period**

The Comanches first appeared on the Llano Estacado in the 1710s and, during the ensuing decades, gradually displaced the various Apaches and related groups that had settled in the region. The Comanches had adapted to nomadic, equestrian lifeways. They hunted bison and raided regional settlements in order to furnish hides, meat, livestock, and manufactured commodities for trade throughout the vast frontier between the United States and Mexico.

There were no serious challengers to Comanche dominance of the Llano Estacado from the mid-eighteenth century until the Red River War of 1874–1875 when, upon the conclusion of the Civil War, the US Army campaigned to expel the Comanches from the region in order to foster Anglo-American settlement (Collins 1971). The war was instigated by the overhunting of buffalo by white hunters, which threatened the Comanche way of life. The Comanche also had suffered from a decrease in rations from the federal government.

Along with Kiowa, Cheyenne, and Arapaho allies, the Comanches attacked white hunting camps and frontier settlements. Their action brought out the US Army in force. Led by Civil War veterans Generals William Tecumseh Sherman and Philip Sheridan, the federal forces battled the Indians at Palo Duro Canyon and skirmished through the panhandle of Texas and into Oklahoma. On June 2, 1875, the Comanches surrendered at Fort Sill (Tinsley et al. 2013:12).



## LITERATURE AND RECORDS REVIEW

SEARCH reviewed electronic data currently on file with the Texas Archeological Sites Atlas (TAS Atlas) and identified five previously completed cultural resource surveys and nine previously recorded archaeological sites within 1.6 kilometers (one mile) of the Project APE (**Tables 3.2 and 3.3; Figure 3.1**).

**Table 3.2. Previously Conducted Cultural Resource Surveys within 1.6 Kilometers (One Mile) of Texas GLO Property.**

TAS Atlas Number	Survey Firm	Author(s)	Date	Report Title
8500025460	Goshawk Environmental Consulting, Inc.	Jon Dowling and Scott Justen	2013	Cultural Resources Survey of the Proposed ±43,504-Foot Zena to Phillips Pipeline, Reeves County, Texas (Abstract No. 8100016980)
8500060502	SWCA Environmental Consultants	Christopher Carlson and Jennifer Walborn	2014	Ramsey Gas Plant Expansion (report and abstract unavailable)
8500073326	SWCA Environmental Consultants	Cherie K. Walth, Kimberly Parker, Meaghan Trowbridge, and Adrian Martinez	2015	A Cultural Resources Investigation for the Ramsey North Residue Line Project, Reeves and Culberson Counties, Texas (Abstract No. 8100018756)
8500079883	Goshawk Environmental Consulting, Inc.	Phil Schoch and Reign Clark	2015	Cultural Resources Survey of the Proposed +32,740-Foot Zena 10" Water Transfer Line, Reeves County, Texas (report and abstract unavailable)
Not listed	Horizon Environmental Services, Inc.	Russell K. Brownlow	2016	An Intensive Cultural Resources Survey of a Segment of Anadarko Petroleum Corporation's Proposed Red Bluff Booster to Ramsey NGL 8" Pipeline ROW Located on GLO Property in Reeves County, Texas (Abstract No. 8100019277)

**Table 3.3. Previously Recorded Archaeological Sites within 1.6 Kilometers (One Mile) of the Texas GLO Property.**

Site	Site type	Temporal Affiliation	NRHP- Eligibility Status
41RV28	Unknown Prehistoric; well pad	Unknown Prehistoric; early twentieth century	Potentially eligible
41RV29	Prehistoric camp	Prehistoric	Not eligible
41RV30	Historic ranch	1880s–1920s	Undetermined*
41RV31	Prehistoric camp	Unknown Prehistoric	Not evaluated
41RV37	Prehistoric camp	Prehistoric	Potentially eligible
41RV40	Prehistoric camp	Prehistoric	Not evaluated
41RV41	Prehistoric camp	Prehistoric	Not evaluated
41RV49	Hearthfield	Late Archaic	Not evaluated
41UT127	Battlefield	World War II bombing range	Undetermined

\*THC Determination

Source: TAS Atlas database query on January 29, 2018.

**THIS FIGURE HAS BEEN REDACTED**

**Figure 3.1. Previously conducted cultural resource surveys and previously identified archaeological sites within 1.6 kilometers (one mile) of Texas GLO property and upland archaeological sites.**



Four surveys were conducted for energy projects (TAS Atlas Nos. 8500025460, 8500060502, 8500073326, and Abstract No. 8100019277) and one project was conducted for a water transfer line (Atlas No. 8500079883) (see **Figure 3.1**; see **Table 3.2**). Reports or abstracts are not available for TAS Atlas Nos. 8500060502 (Carlson and Walborn 2014) and 8500079883 (Schoch and Clark 2015).

TAS Atlas No. 8500025460 involved pedestrian survey and shovel test excavation along a 23-meter (75-foot) wide and 13.26-kilometer (8.23-mile) long pipeline ROW. Six artifacts were observed within a 75-meter (246-foot) radius of each other, but this locus was not recorded as an archaeological site due to the “paucity of cultural materials” (Dowling and Justen 2013:ii). No other artifacts were recovered during survey.

Pedestrian survey of 14.39 kilometers (8.94 miles) of pipeline in Texas and New Mexico, 9.56 kilometers (5.94 miles) of which was located in Texas, was conducted for TAS Atlas No. 8500073326. The survey corridor was 45.7 meters (150 feet) wide. One new archaeological site, an abandoned railroad bed (41CU804) possibly dating between AD 1865–1900, was recorded with associated artifacts, such as iron spikes and wooden railroad tie fragments (Walth et al. 2015:17). The railroad spur may be associated with the Pecos Valley Railroad, located about 1.6 kilometers (one mile) to the east, and additional survey was recommended to assess the eligibility of the site.

Finally, TAS Atlas No. 8100019277 included pedestrian survey and shovel test excavation of a 6.3-kilometer (3.9-mile) long and 9.1-meter (30-foot) wide pipeline corridor (Brownlow 2016). No cultural resources were identified during survey.

Nine previously recorded archaeological sites are located within a 1.6-kilometer (one-mile) radius of the Texas GLO property and upland archaeological sites (see **Figure 3.1**; see **Table 3.3**). Three of the previously recorded archaeological sites (41RV30, 41RV40, and 41UT127) were investigated during the current survey.

Site 41RV28 is a large prehistoric village with at least 40 burned caliche hearth features, lithic debitage, tools, and ground stone. A modern well pad was noted at the northern end of the site, which is not eligible for inclusion in the NRHP. Caliche hearths, but no tools or debitage, also were observed at site 41RV29. The site has been disturbed, and the THC found it ineligible for inclusion in the NRHP. Site 41RV30, also known as Old X Ranch, consists of three artifact concentrations of glass (clear, purple, and aqua), whiteware, and metal cans. No ranch structure was present, but a windmill and stock tank were identified. The site likely was occupied between 1890 and 1920 and possibly abandoned during the 1916 drought. The NRHP eligibility of the site has not been determined. Two burned caliche features, but no other artifacts, were observed at site 41RV31. The site lacks temporally diagnostic artifacts, combined, and is ineligible for inclusion in the NRHP.

Site 41RV37 consists of one burned caliche hearth feature and one chert scraper. The site’s NRHP eligibility has not been determined. Similarly, 41RV40 and 41RV41 have one burned

caliche feature, but no artifacts were identified at these sites and neither site is eligible for inclusion in the NRHP. Site 41RV49 is a Late Archaic hearthfield. The site has been affected by erosion, and the artifact assemblage included burned rock, sandstone, metates, manos, debitage, seven cornertang knives, and temporally diagnostic artifacts, including Toyah, Frio, Langtry, Paisano, Ensor, possible Bullverde Guadalupe, and Carlsbad projectile points.

Finally, 41UT127 consists of four World War II bombing ranges recorded in the region. The bombing range located along the current Project APE includes replica outlines of a ship, dock, bullseye, and other practice targets constructed by the US Army Corps of Engineers (USACE) for the San Angelo Air Force Base (AFB) bombardier training. The NRHP eligibility of 41UT127 has not been evaluated.

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## LAND USE AT THE TEXAS GLO PROPERTY AND UPLAND SITES

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SEARCH conducted a preliminary review of historic maps and aerial photographs for evidence of environmental change, past land use, and man-made alterations to the landscape within and surrounding the Project areas. These data informed an assessment of the potential for identifying archaeological sites, the formulation of an appropriate research design, and the interpretation of any resources encountered during field survey.

### Area STL001

A 1953 aerial photograph of Area STL001 depicts unimproved roads or trails in the vicinity and the main branch of China Draw, which is located to the north of the proposed Project (**Figure 3.2**). No buildings or other infrastructure are present at this time. By 1967, a grid of roads, water reservoirs, and well pads, associated with the Ford Geraldine Oil Field, dominate the landscape (**Figure 3.3**). China Draw is still identifiable, but the construction of energy-related infrastructure has altered much of the landscape. Northwest of STL001, structures are visible in the area where the Ramsey Terminal eventually will be established. The 1972 aerial photograph shows the continued expansion of the oil field, and more roads and well pads have been built (**Figure 3.4**). The concentration of structures to the northwest of STL001 also expanded. The 1985/1986 and 1993 US Geological Survey (USGS) topographic maps do not show the level of detail that can be seen on the aerial photographs, and only the oil field and the draws are labeled with place names (**Figures 3.5** and **3.6**). By 2003, an aerial photograph depicts a further intensification of landscape alteration, including an extension of the facilities to the north and additional roads and pipelines (**Figure 3.7**). Few additional oil rigs are noted compared to the older imagery. Overall, Area STL001 and its vicinity underwent significant change due to the growth of the oil and gas industry between 1953 and 1967. Thereafter, industrial development continued, but few residential structures were built and no towns were established. China Draw is the one constant through time and remains a functional drainage, regardless of industrialization in the region.



Figure 3.2. 1953 aerial photograph showing Area STL001.





Figure 3.3. 1967 aerial photograph showing Area STL001.



Figure 3.4. 1972 aerial photograph showing Area STL001.



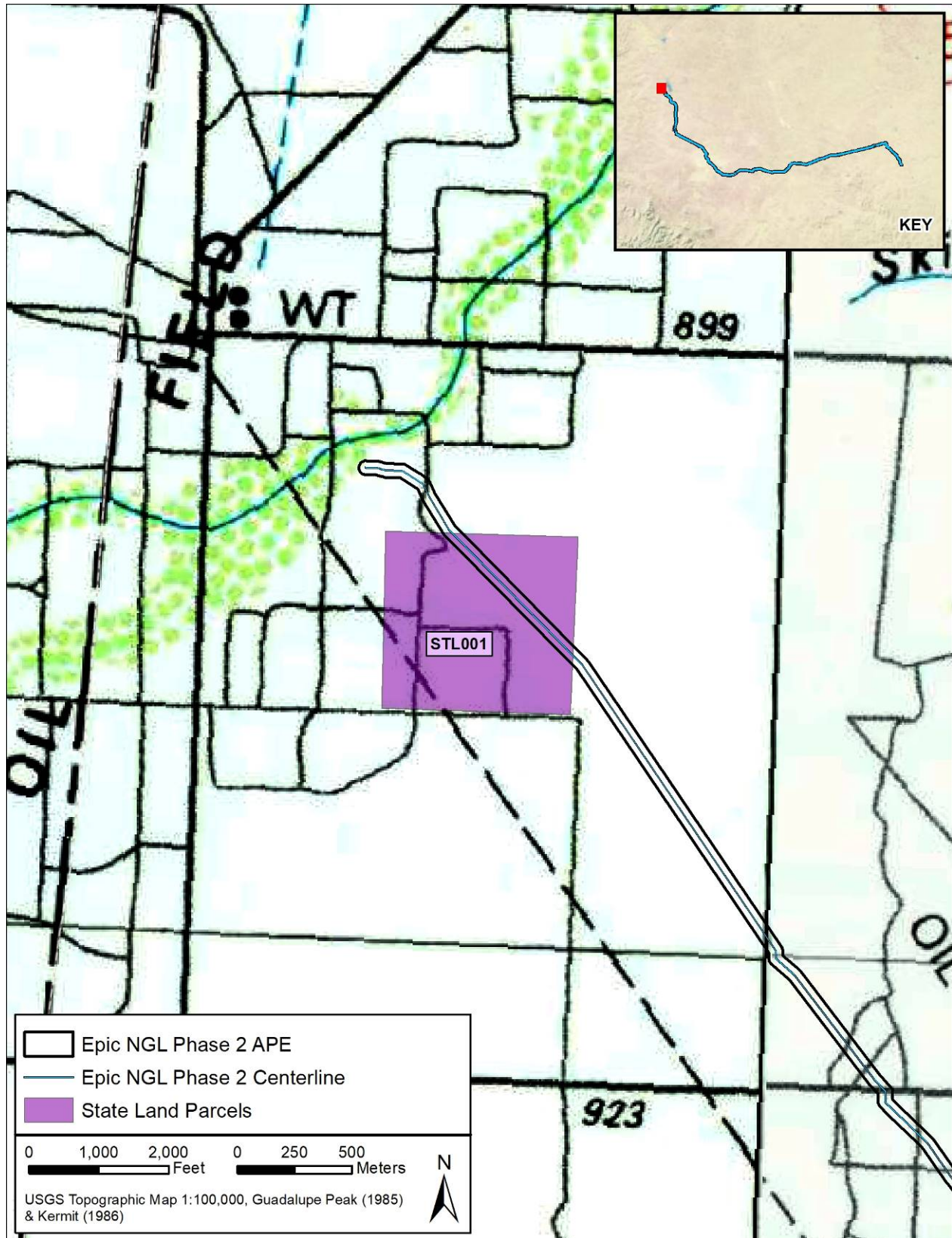


Figure 3.5. 1985/1986 USGS topographic map showing Area STL001.

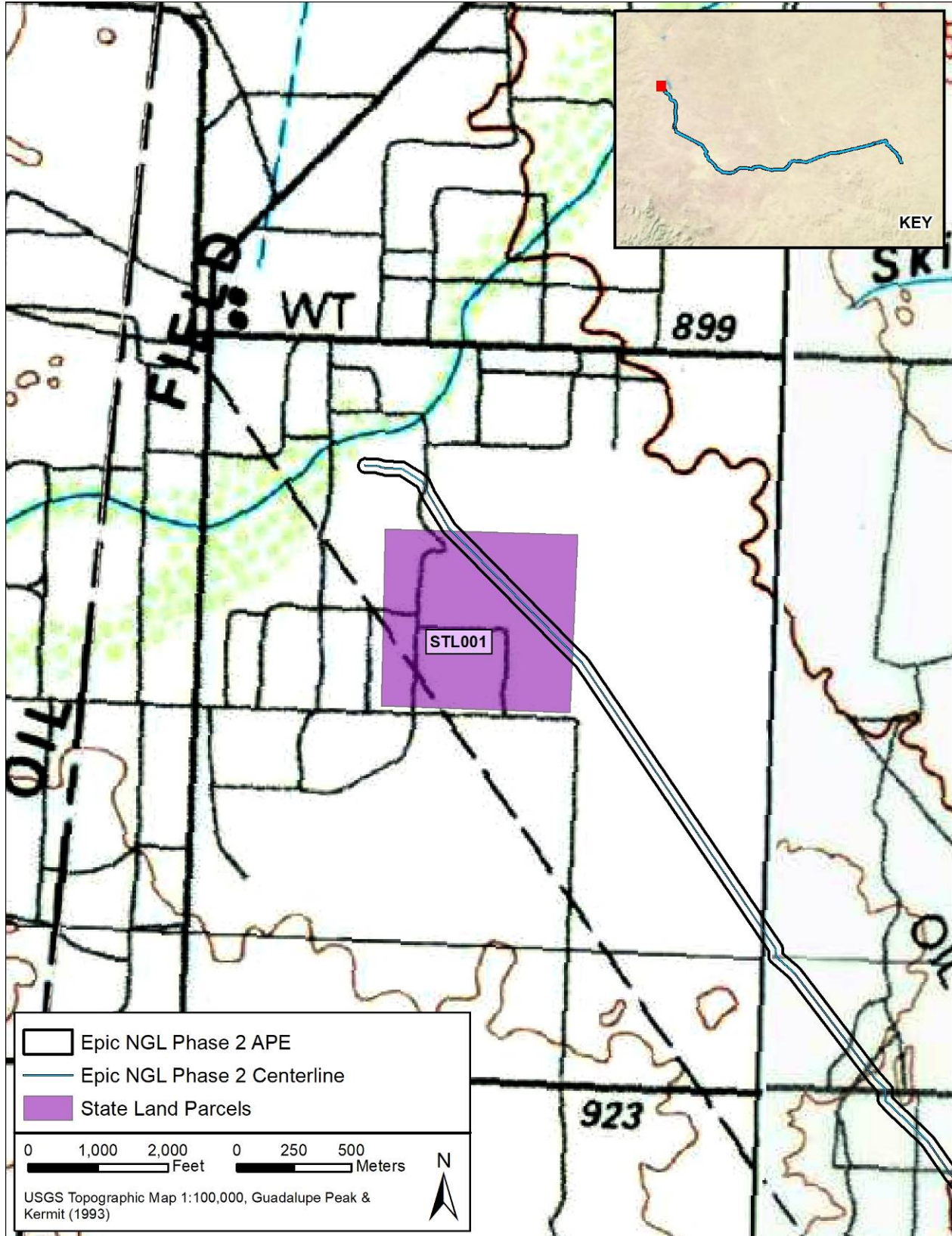


Figure 3.6. 1993 USGS topographic map showing Area STL001.



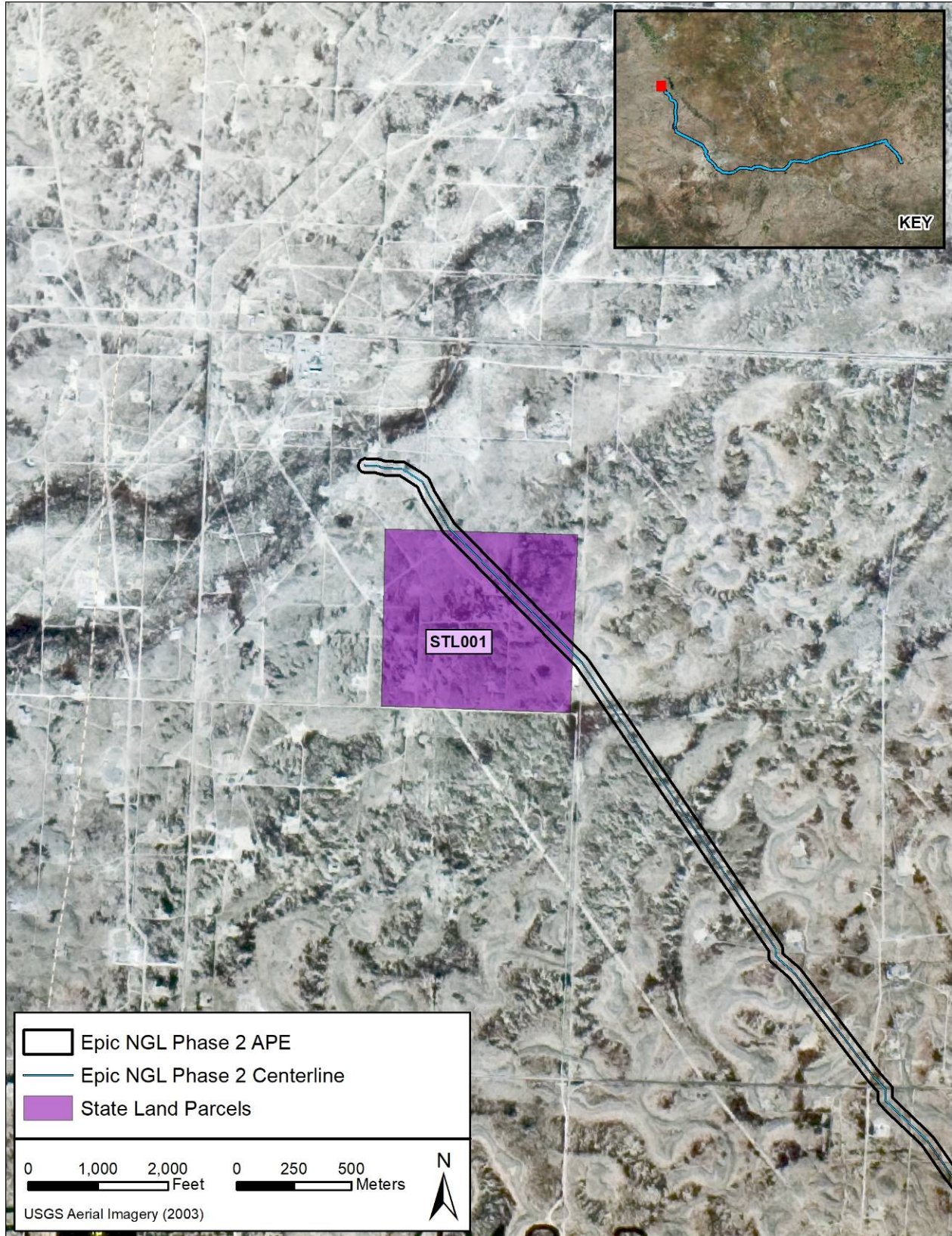


Figure 3.7. 2003 aerial photograph showing Area STL001.



## Area STL002

With one exception, the WT Ranch located 0.74 kilometers (0.46 miles) southeast of STL002, there has been little development in this area for more than 60 years (**Figures 3.8-3.13**). A 1954 aerial photograph shows a largely undisturbed desert landscape with one structure, probably a ranch house (see **Figure 3.8**). Two roads connect to the ranch: County Road (CR) 232, extending from the northeast and continuing southward, and an unnamed road oriented to the northwest and that originates at the ranch. WT Draw also is visible on the aerial images. Subsequent aerial imagery (1967, 1976, and 2003) and topographic maps (1985 and 1993) show that no major developments occurred in the last six decades (see **Figures 3.9-3.13**).

## Areas STL003 and STL004

The land use pattern in the vicinity of Areas STL003 and STL004 is similar to Area STL002. A 1954 aerial photograph shows almost no development in the region, except for the aforementioned ranch and associated CR 232 (**Figure 3.14**) and WT and John D Draws. By 1967, Farm to Market (FM) Road 2119 is depicted to the south of both areas (**Figure 3.15**). With the exception of unimproved roads, trails, fence lines, and a few pipeline corridors, later aerial imagery (1976 and 2003) and topographic maps (1986 and 1993) do not show new settlements, infrastructure, or additional changes to the landscape (**Figures 3.16-3.19**).

## Site 41RV30

Site 41RV30, a historic surface scatter of late nineteenth- and twentieth-century artifacts associated with Old X Ranch, is located in rural Reeves County, which was created from Pecos County in 1884 and named for local leader George R. Reeves. The 4,184-square-kilometer (2,600-square-mile) county had a population of 1,847 in 1900. A decade later, the population had more than doubled to 4,392. The county seat of Pecos was the population center. Smaller towns in the region included Toyah, Balmorhea, and Saragosa. The Texas and Pacific Railroad, the Pecos River Railroad, and the Pecos Valley Railroads served the county. Many residents were involved in farming. The primarily crops were alfalfa, grains, corn, vegetables, and melons. Fruits such as grapes, peaches, and pears were grown on a smaller scale. In the early twentieth century, irrigation farming spread across the landscape, and near Toyah, oil was produced (“Reeves County” 1912:343).

Historically, a large area of Reeves County, including 41RV30, was owned by the Texas and Pacific Railroad Company. The Company was chartered in 1871 with the intention to build a railroad from Marshall, Texas, to San Diego, California. The state of Texas granted the Company 20 sections of land per mile. Through the 1870s, the Company, beset with financial difficulties, was able to extend rails to Fort Worth. Between 1880 and 1891, the rails were built from Fort Worth to Sierra Blanca (Hudspeth County). The line passed through the northern portion of Reeves County. The railroad land encompassing 41RV30 apparently was part of the acreage the state granted to the Company in 1871. This land was apparently never developed by the railroad, although they continued to own the land until at least 1915 (Texas GLO 1892, 1915).

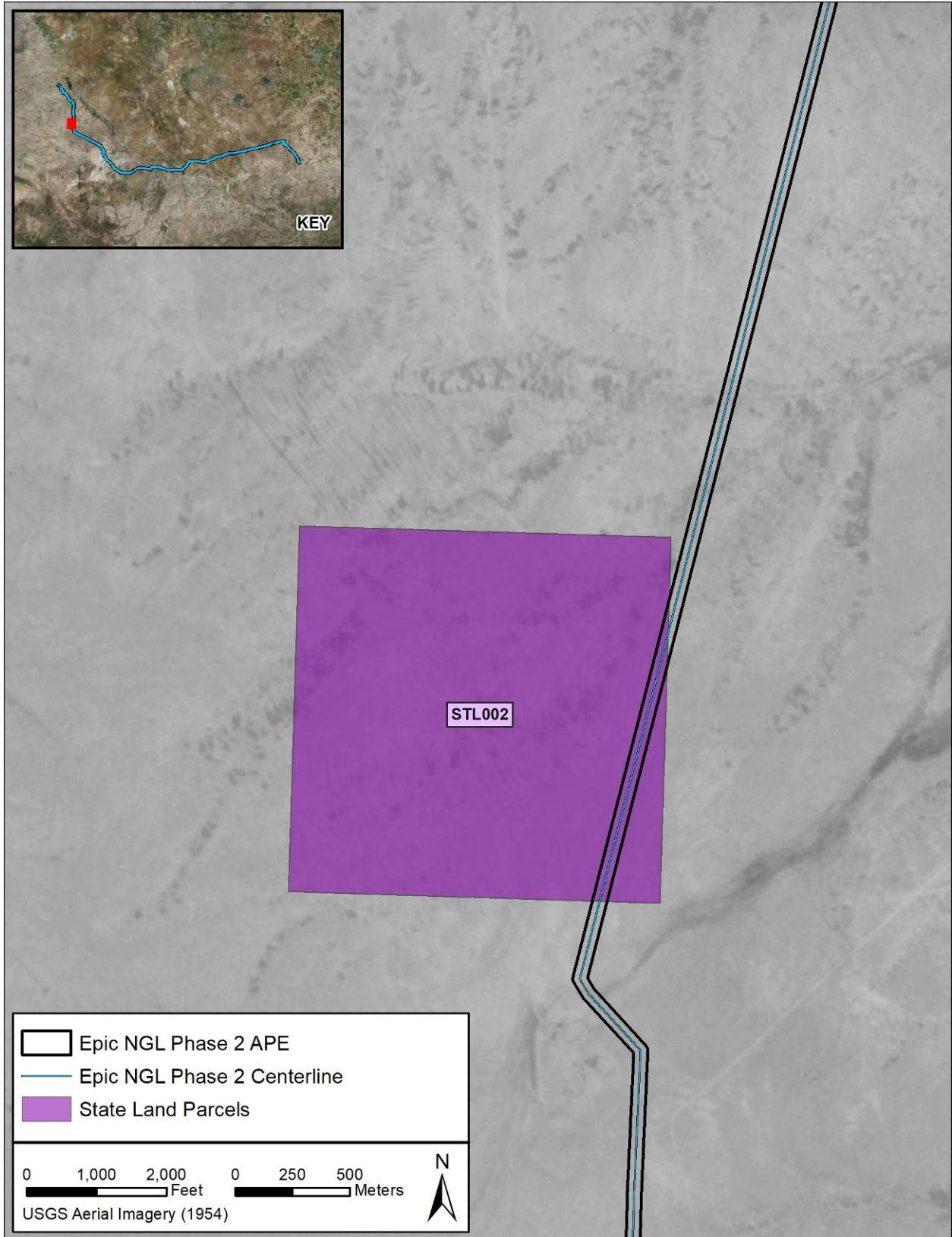


Figure 3.8. 1954 aerial photograph showing Area STL002.



Figure 3.9. 1967 aerial photograph showing Area STL002.



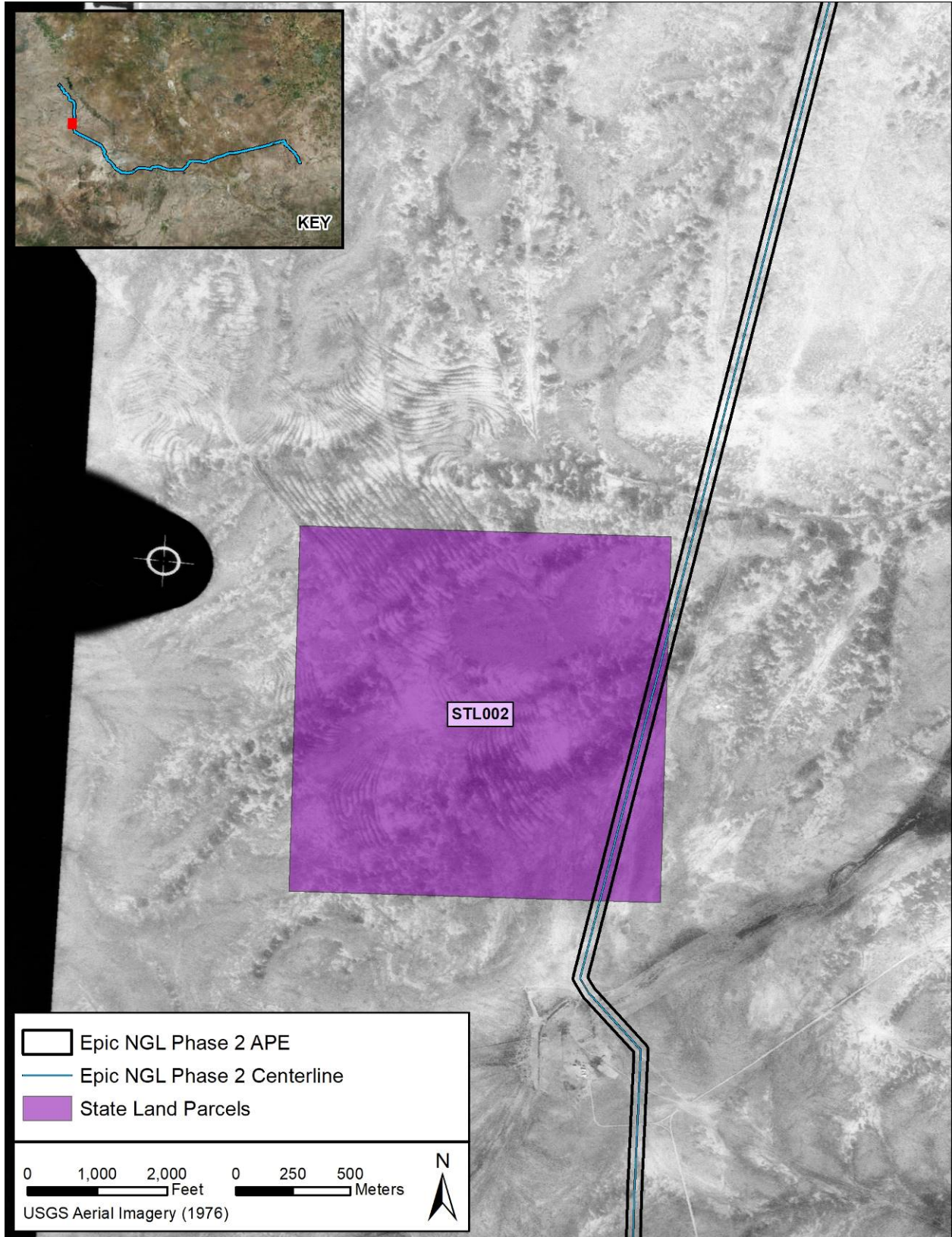


Figure 3.10. 1976 aerial photograph showing Area STL002.

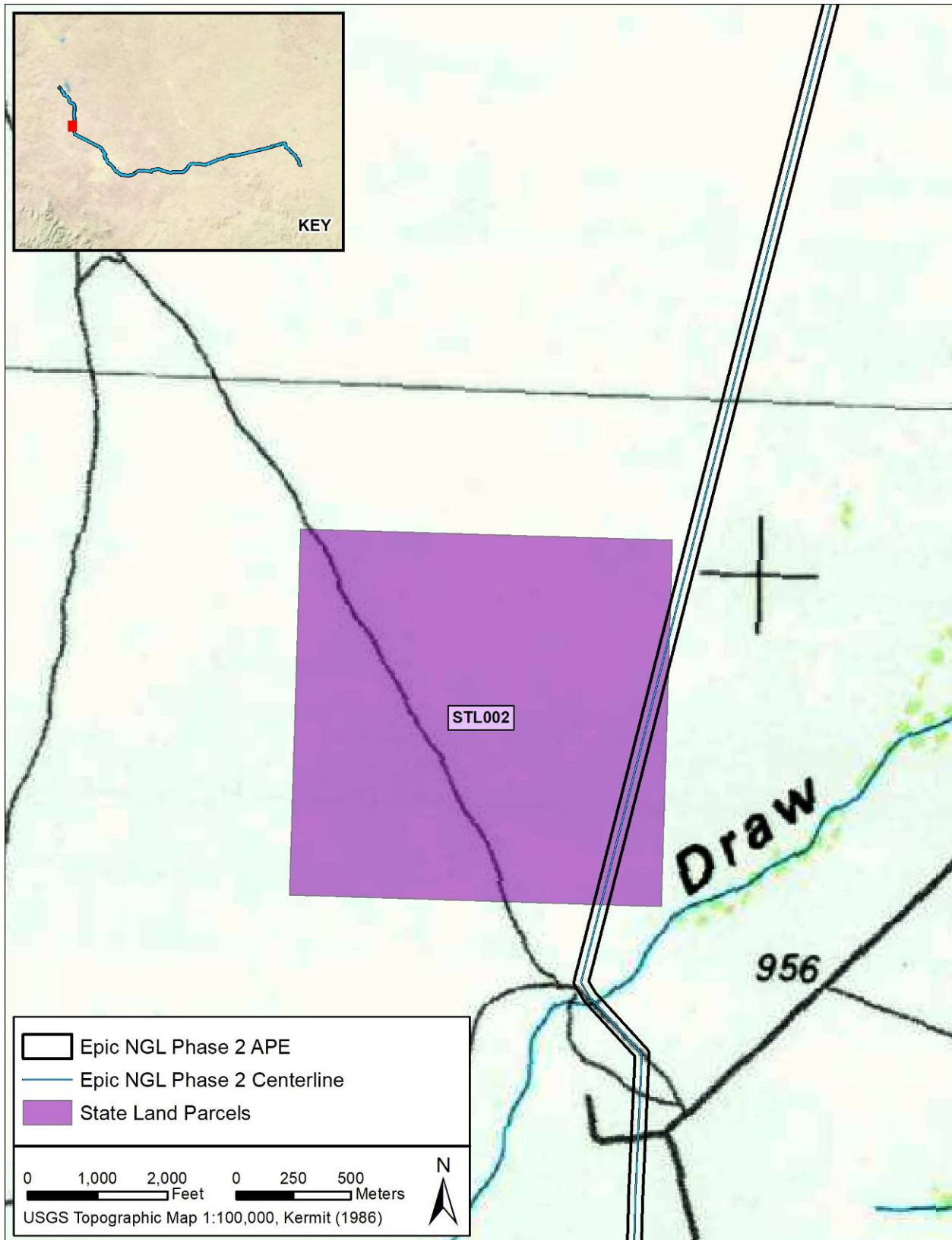


Figure 3.11. 1986 USGS topographic map showing Area STL002.



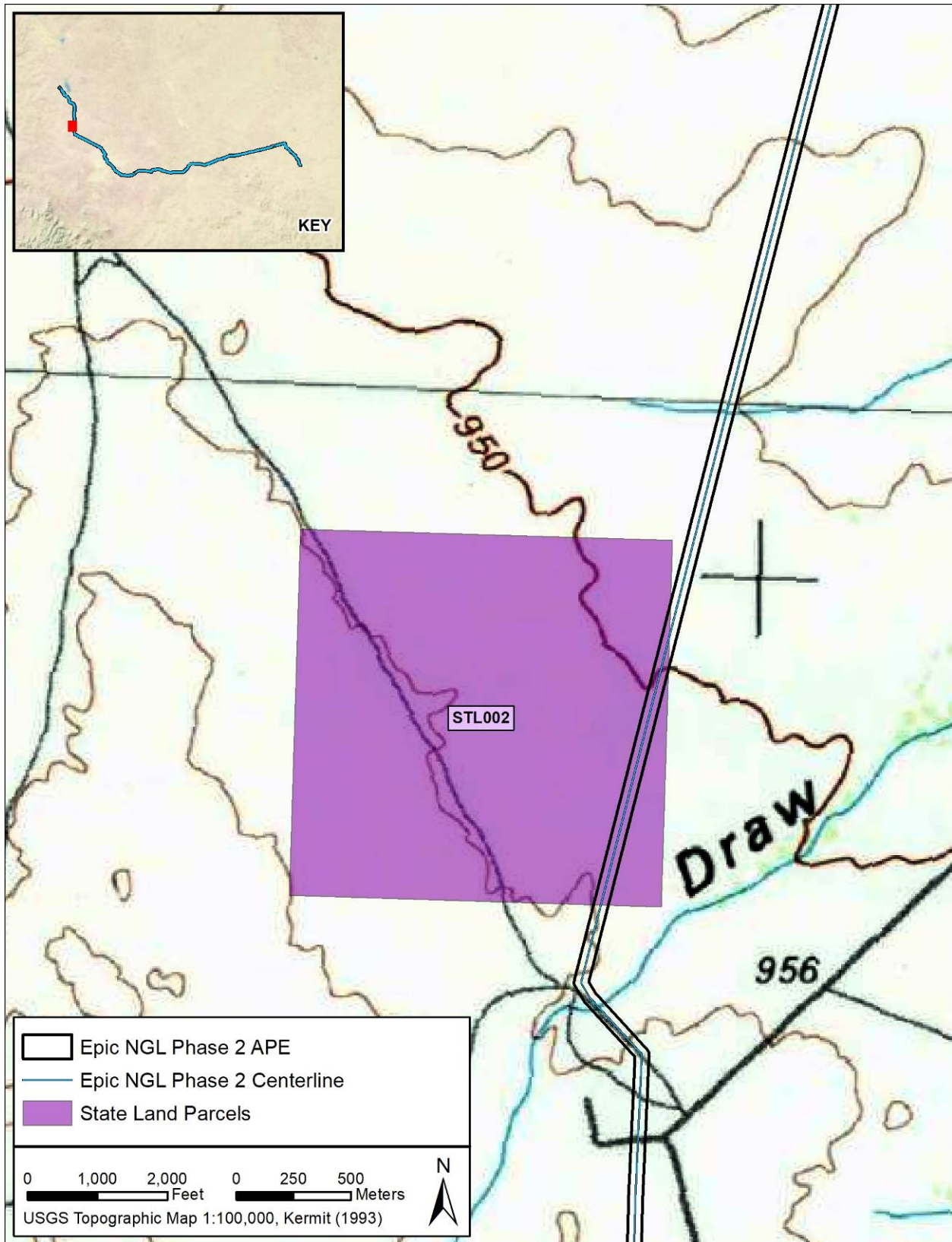


Figure 3.12. 1993 USGS topographic map showing Area STL002.



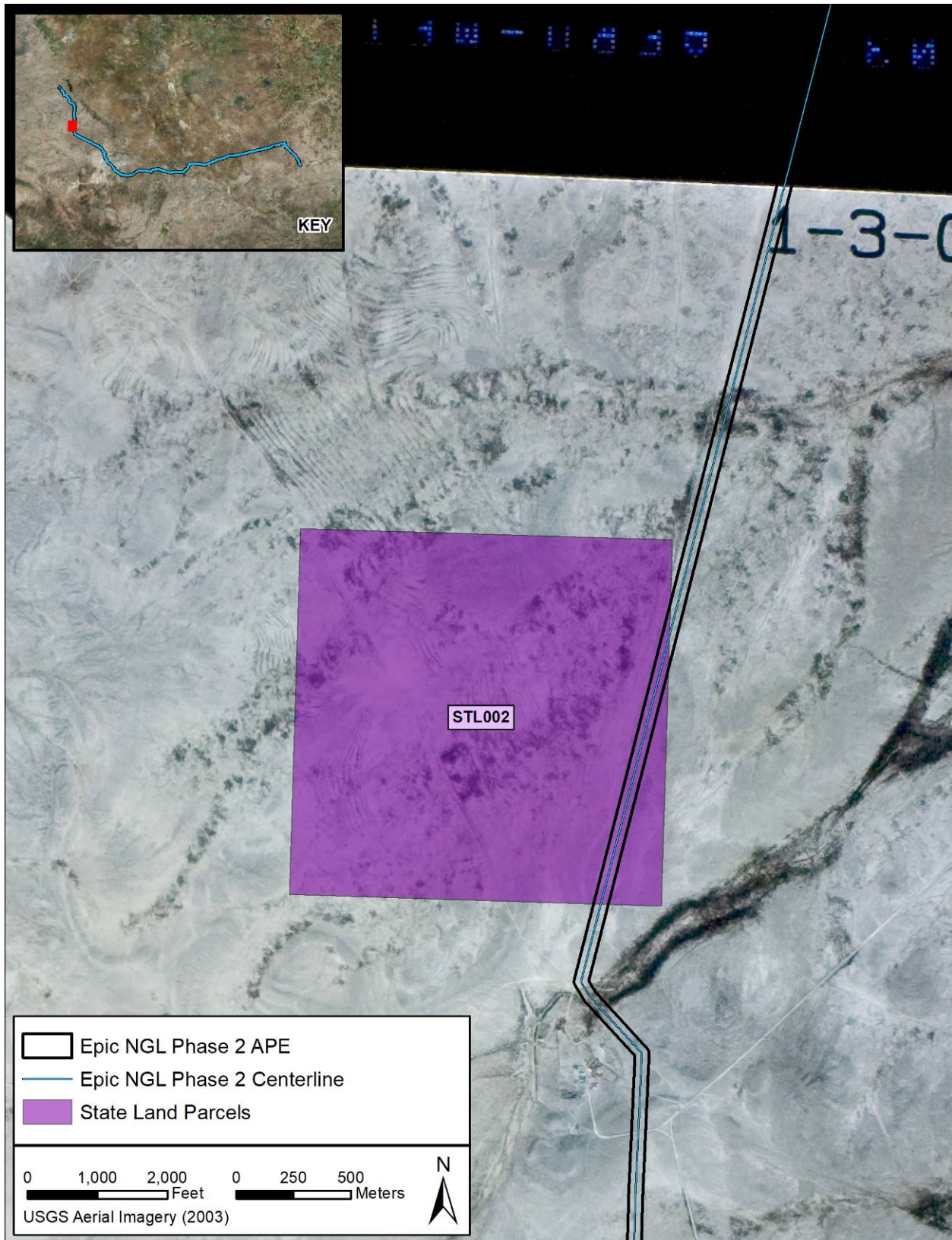


Figure 3.13. 2003 aerial photograph showing Area STL002.

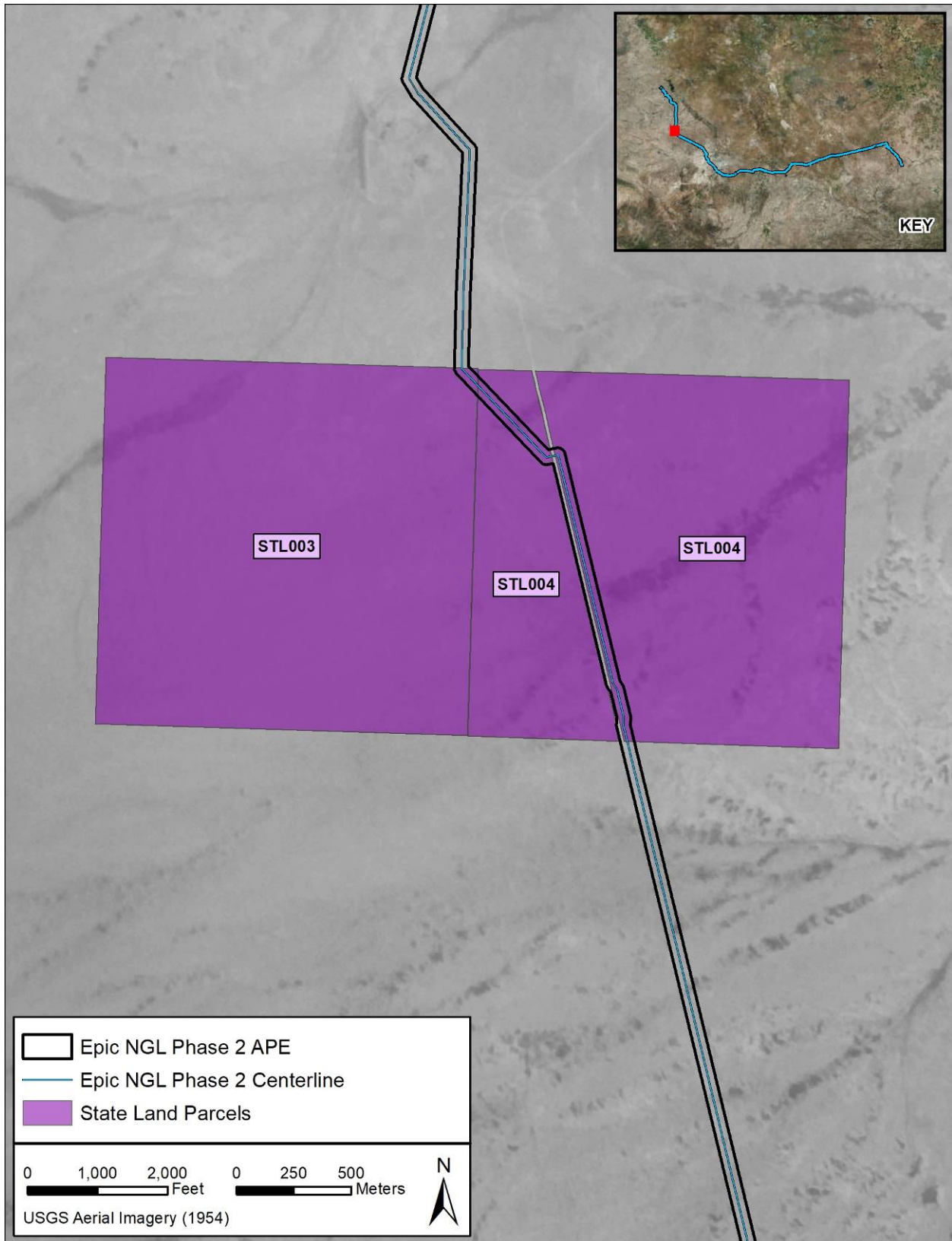


Figure 3.14. 1954 aerial photograph showing Areas STL003 and STL004.



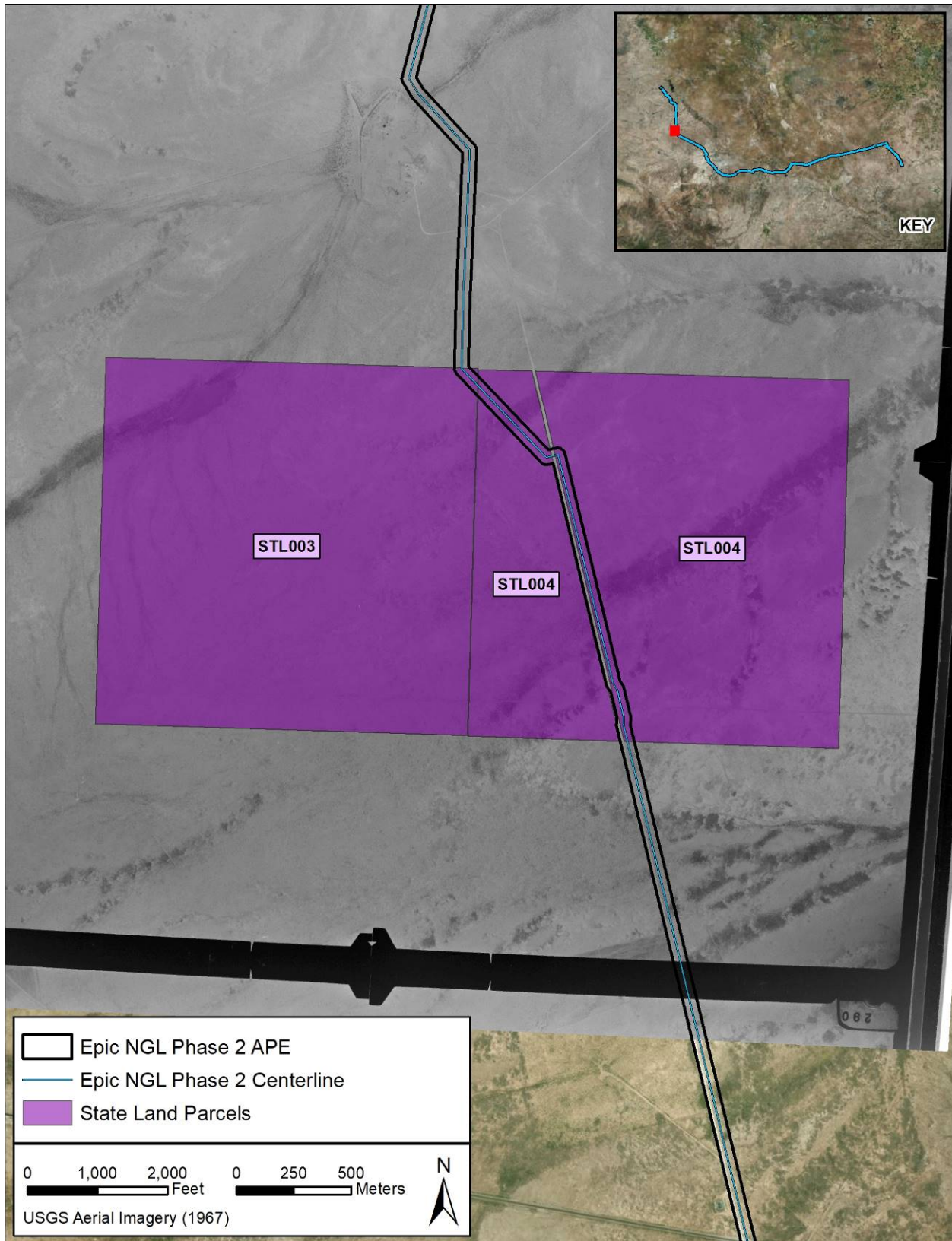


Figure 3.15. 1967 aerial photograph showing Areas STL003 and STL004.

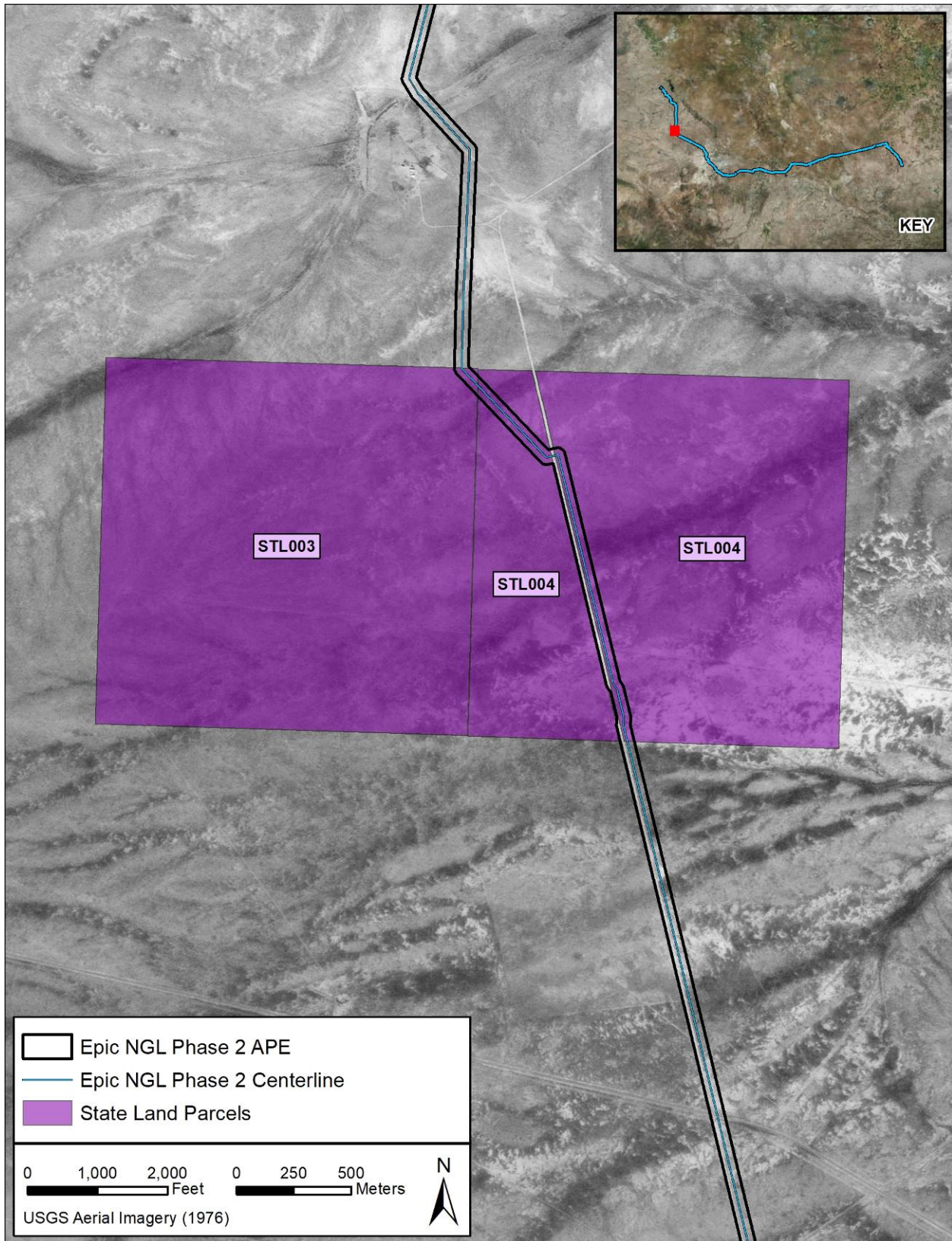


Figure 3.16. 1976 aerial photograph showing Areas STL003 and STL004.



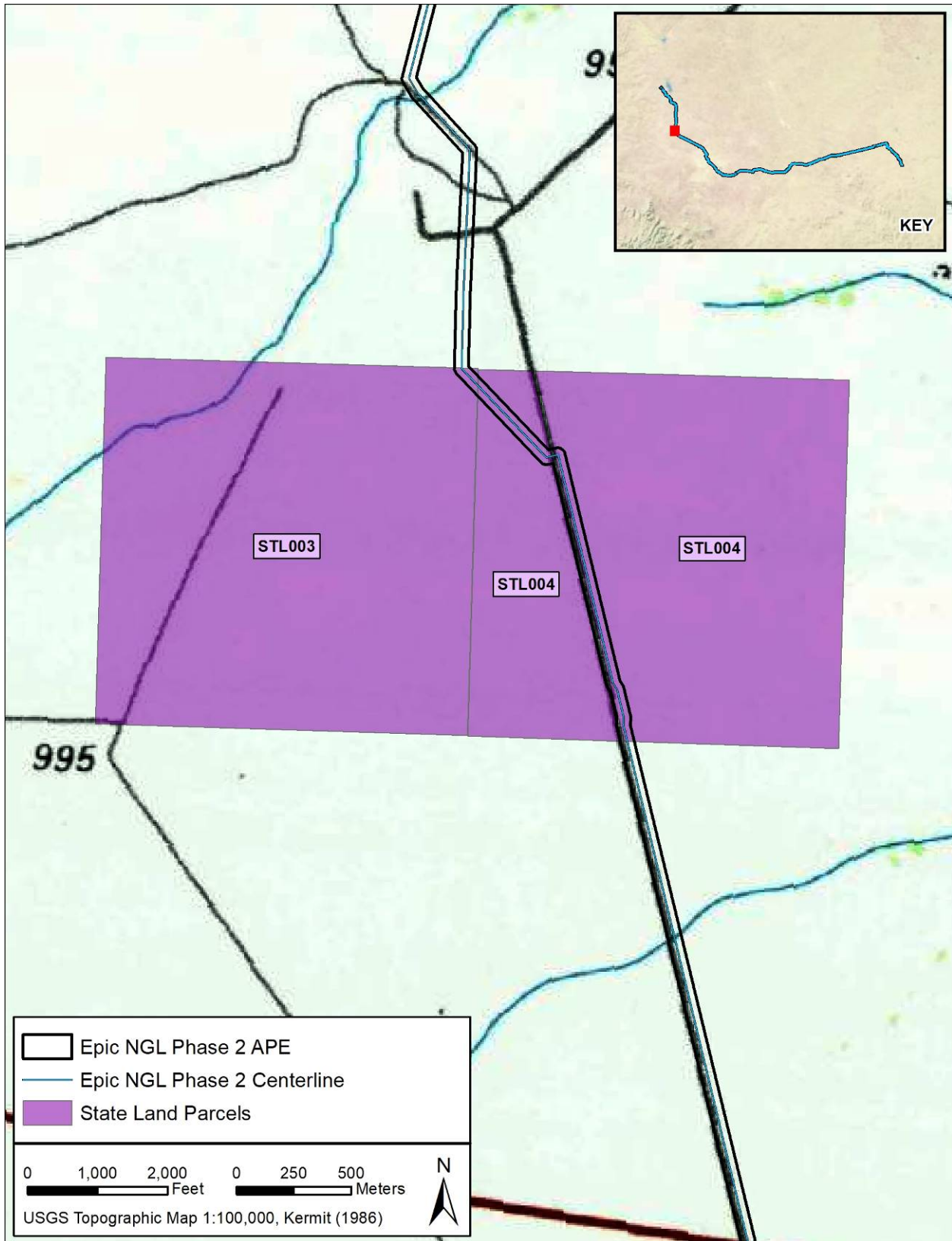


Figure 3.17. 1986 USGS topographic map showing Areas STL003 and STL004.



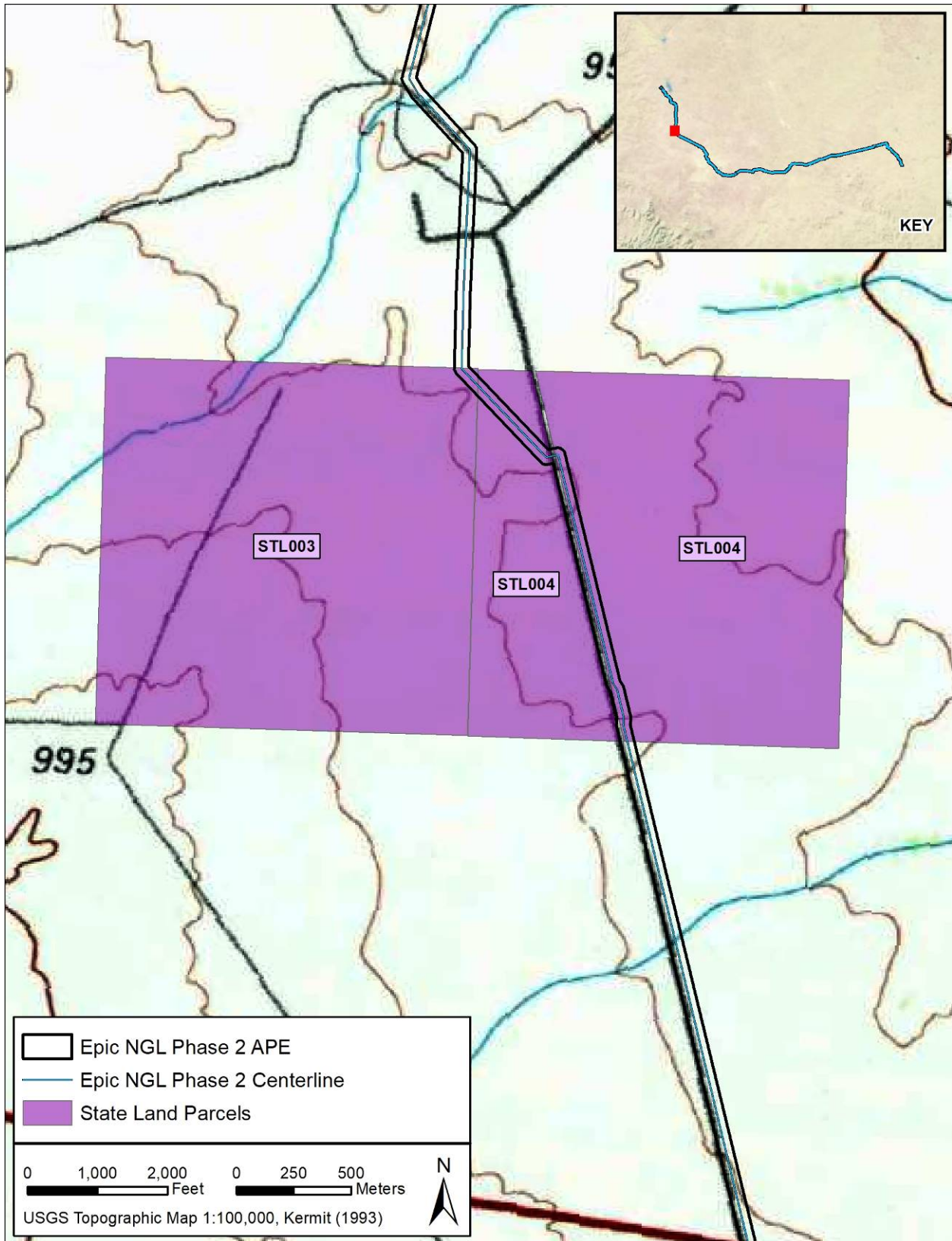


Figure 3.18. 1993 USGS topographic map showing Areas STL003 and STL004.

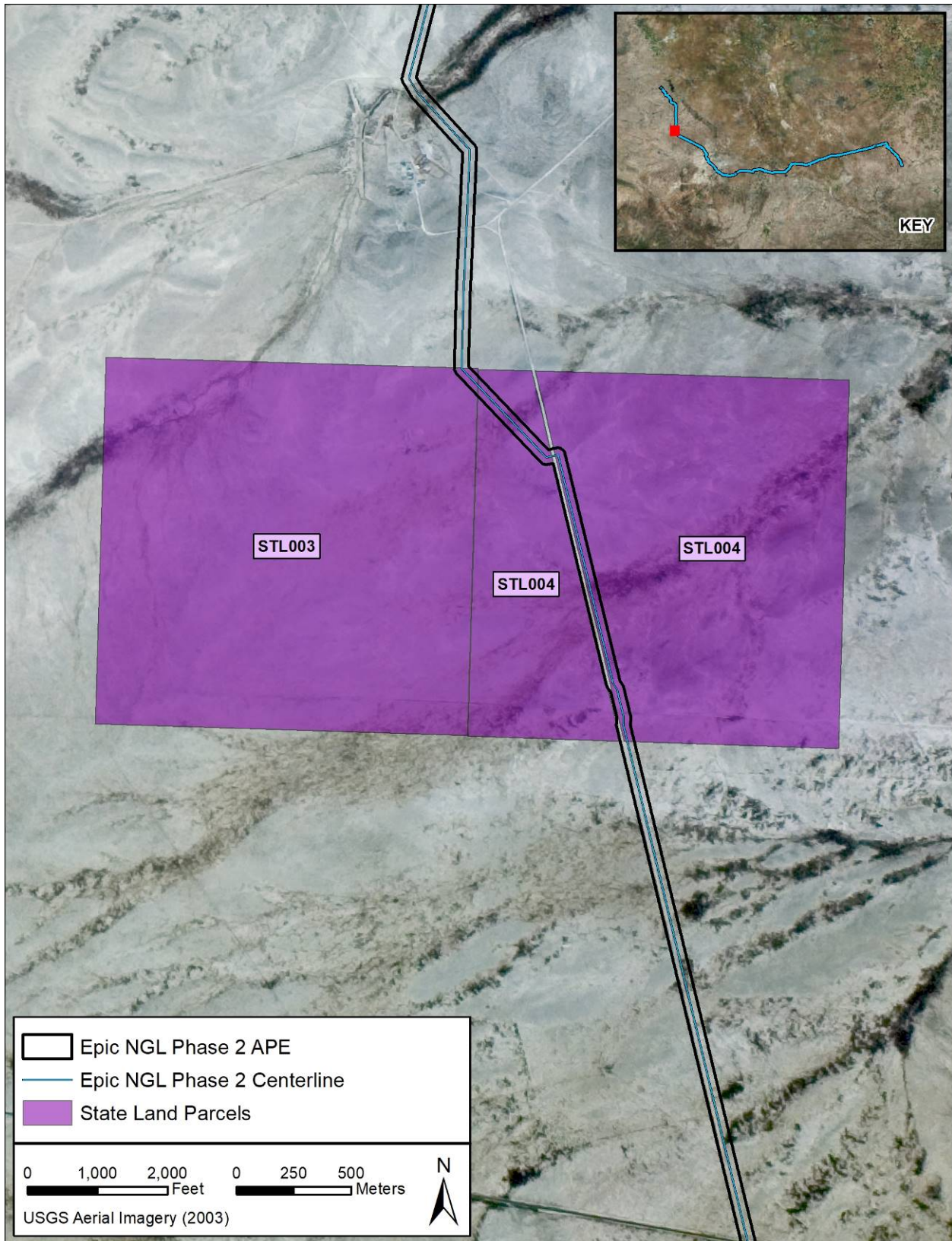


Figure 3.19. 2003 aerial photograph showing Areas STL003 and STL004.



Site 41RV30 is considerably removed from the historically populated parts of the county. However, there appears to have been a community somewhere in the area that was known as Panama, as the 1931 topographic map indicates a landmark called “Panama School” to the east of 41RV30. Panama reportedly received a post office in 1904 (Smith 2010), and thus it is likely that by the time Panama School appeared in the topographic map, the community had existed for more than two decades. Supporting the assumption that a community existed in the general vicinity of 41RV30 is the presence of several unnamed roads shown on a 1931 topographic map and a 1954 aerial image (**Figure 3.20**).

By the 1950s and early 1960s, 41RV30 was at the intersection of six unimproved roads, as indicated on maps. East of the site, an automotive proving ground had been developed, and numerous drill holes, oil wells, and windmills had been established throughout the area. The area likely is associated with Old X Ranch, as this is the name of the 1965 topographic map (**Figure 3.21**). In any case, the specific association of 41RV30 with these historical activities is unknown, and the area has not changed much over the years (**Figures 3.22-3.23**).

### **Site 41RV40**

Site 41RV40 is located 2.27 kilometers (1.41 miles) west of site 41RV30. Aerial images and topographic maps for site 41RV40 are all similar (**Figures 3.24-3.27**); a largely undeveloped area with one unnamed and unimproved road is situated to the south of the site. An unnamed drainage parallels the south side of the road. After 1965, a short road or driveway was cleared to the west of the site, but it is not possible to discern from the 1976 aerial if the road leads to a structure (see **Figure 3.26**), and neither are shown on the 1981 topographic map (see **Figure 3.27**). The oil and gas industry did not affect the area until after the millennium.

### **Site 41UT127**

Site 41UT127 was recorded as one of four World War II-era bombing ranges in Upton County, Texas, that were developed for aerial bombardment training. The four locations consist of variously sized and shaped targets, including squares, circles, and rectangles, as well as mock ships, bullseyes, docks, railroads, oil depots, and crosshair-shaped targets (**Figures 3.28-3.30**). The USACE constructed the bombing ranges. US Army Air Force cadets from the flying school at San Angelo Army Airfield conducted the bombing missions against the targets, which were abandoned at the end of World War II. Target remnants are still identifiable on modern aerial photographs (see **Figure 3.30**). In the southwest corner of the site is a bullseye target with the number “3” above it. Also, an off-center, cross-shaped feature appears to represent a mock runway.

Following World War II, historical maps provide no evidence of cultural activity at the site. Windmills and unimproved roads appear in post-war maps from the 1950s and 1970s; however, none of these features were located at the site within the current APE. In the last 10 years, features such as roads and oil pumping stations have been constructed within the site boundary.

**THIS FIGURE HAS BEEN REDACTED**

**Figure 3.20. 1954 aerial photograph showing 41RV30.**

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**Figure 3.21. 1965 USGS topographic map showing 41RV30.**



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**Figure 3.22. 1976 aerial photograph showing 41RV30.**

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**Figure 3.23. 1981 USGS topographic map showing 41RV30.**

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**Figure 3.24. 1954 aerial photograph showing 41RV40.**



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**Figure 3.25. 1965 USGS topographic map showing 41RV40.**

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**Figure 3.26. 1976 aerial photograph showing 41RV40.**

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**Figure 3.27. 1981 USGS topographic map showing 41RV40.**

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**Figure 3.28. 1954 aerial photograph showing 41UT127.**



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**Figure 3.29. 1970 USGS topographic map showing 41UT127.**

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**Figure 3.30. 1995 aerial photograph showing 41UT127.**

## CHAPTER 4: RESEARCH DESIGN AND METHODS

This chapter presents the research design adopted for the Phase I archaeological survey of the APE for the proposed Epic NGL Phase 2 Project on Texas GLO property and at the upland sites.

### RESEARCH DESIGN

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A research design is a plan to coordinate the cultural resource investigation from inception to the completion of the project. This plan should minimally account for three things: (1) it should make explicit the goals and intentions of the research; (2) it should define the sequence of events to be undertaken in pursuit of the research goals; and (3) it should provide a basis for evaluating the findings and conclusions drawn from the investigation.

The goal of this cultural resource undertaking is to locate and document evidence of cultural occupation or land use within the project area (archaeological or historic sites, historic structures, or archaeological occurrences [isolated artifact finds]), and to evaluate these findings for their potential eligibility for listing in the NRHP.

### NRHP Criteria

Cultural resources identified within the Project APE will be evaluated according to the criteria for listing in the NRHP. As defined by the National Park Service (NPS), the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

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

NRHP-eligible districts must possess a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. NRHP-eligible districts and buildings must also possess historic significance, historic integrity, and historical context.

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## METHODS

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### Archaeological Fieldwork

Following THC guidelines for Phase I cultural resource investigations, pedestrian survey was conducted within the APE where ground visibility was greater than 30 percent. Pedestrian survey was supplemented by shovel test excavation to document soil stratigraphy. All SEARCH field teams were equipped with an iPad connected to an EOS Arrow 100 external antenna with sub-foot accuracy. Running ArcGIS Collector, these iPads provided digital maps showing the APE, Texas GLO property boundaries, and previously identified archaeological sites. Field observations were digitally recorded using the iPads, including site boundaries and shovel test information.

Pedestrian survey was conducted using four transects spaced 15 meters (49 feet) apart along the Project APE, which provided coverage of the 61-meter (200-foot) wide corridor. During pedestrian survey, anthropogenic and natural modifications to the land surface, current land use, and geomorphic setting were identified. Further, disturbances and structures within the APE, including facilities built in the twentieth century, were photographed and documented.

If artifacts were identified during survey, the APE was more intensely surveyed by the field team. Representative artifact types were primarily photographed and analyzed in the field. A Field Sample log was maintained with a detailed description of the artifacts, including counts, classification, and parent material. A sketch map was drawn, showing the location of all shovel tests, site limits, surface scatters, feature locations, permanent landmarks, variations in topography and vegetation, and sources of disturbance. In addition, shovel test excavation locations and other natural and cultural features were digitized in ArcGIS Collector on the iPad. A temporary field designation was assigned to each site, and a Texas site form has been submitted to the THC for assignment of a permanent trinomial designation.

Shovel tests measured 30 centimeters (11.8 inches) in diameter. Soil strata, texture, Munsell color, and environmental settings were recorded for each excavated shovel test. Excavated sediments were screened through 0.6-centimeter (1/4-inch) mesh hardware cloth. Shovel tests were excavated in arbitrary 20-centimeter (7.9-inch) levels within natural strata to the bottom of Holocene deposits or a depth of one meter (3.3 feet). Soil profiles were recorded and shovel tests were backfilled.

All shovel test locations were recorded utilizing iPads. A photograph log, including relevant information necessary to accurately document the location and condition of the item being photographed, was kept. Minimally, information recorded in the photograph log included the shovel test number, date, photograph orientation, recorder, description of the item being photographed, frame/exposure number, and an accurate location from which the photograph was taken. Environmental attributes of different areas were documented, including fauna and flora (if present), land use (e.g., agricultural, pasture, commercial), and other notable features (e.g., canals). The field crew kept daily field notes, recording survey activities and observations.



As part of this Phase I cultural resource survey, previously recorded archaeological sites within the APE with an “undetermined” or “unknown” NRHP eligibility were evaluated. For these sites, State of Texas Archaeological Site Revisit Forms were prepared and submitted to the THC. In addition to the site revisit forms, ArcGIS shapefile of the site locations also will be provided to Texas Archeological Research Laboratory (TARL).

### **Site Definition**

Archaeological sites are defined by the presence of two or more cultural artifacts located within a 30-meter (98-foot) radius that are at least 50 years in age and maintain a reasonable amount of surface or subsurface provenience. Prehistoric archaeological sites consisted of lithic debitage and/or tools. Historic sites were defined by historic glass and metal objects. Determination of site boundaries of prehistoric and historic sites were based on surface artifact density. No surface or subsurface documentation of sites occurred beyond the APE boundaries.

### **Architectural Field Methods**

No standing structures were identified during the Phase I survey of the proposed Project APE on Texas GLO property.

### **Laboratory Methods**

Collected artifacts, which included stone tools and debitage, were returned to the SEARCH laboratory in Gainesville, Florida. Artifacts were washed and air dried and subsequently catalogued according to provenience; relevant attributes were recorded during analysis and described using well-established descriptive and typological criteria. The analysis was grounded in an approach linking attributes of form and function to particular stages in stone tool reduction and use strategies, using Andrefsky (1998, 2001) and Collins (1975) as guides.

### **Curation**

The collection was prepared for curation following standards set forth by the THC, the Council for Texas Archeologists’ *Guidelines and Standards for Curation*, and the Center for Archaeological Studies at Texas State University-San Marcos Curatorial Standards, where artifacts, field notes, maps, forms, and photographs will be curated.

## CHAPTER 5: RESULTS

This chapter presents the results of SEARCH's Phase I cultural resource investigation of Texas GLO property and upland archaeological sites in Reeves and Upton Counties, Texas, as part of the Epic NGL Phase 2 Pipeline Project. The proposed pipeline route crosses four Texas GLO properties (Survey Areas STL001-STL004) with a combined length of 2.98 kilometers (1.85 miles) or 23.4 hectares (57.7 acres) within the 61.0-meter (200-foot) wide APE. Fieldwork included intensive pedestrian survey and shovel test excavation of the APE on each Texas GLO parcel. Survey also was conducted at three previously recorded upland archaeological sites: 41RV30 and 41RV40 in Reeves County and 41UT127 in Upton County. The APE at the upland archaeological sites totals 5.1 hectares (12.6 acres) and measures 843.2 meters (2,766.4 feet) in length. Three newly identified archaeological sites (41RV131, 41RV132, and 41RV133), characterized as low- to medium-density prehistoric surface lithic scatters, were recorded and surveyed within the Project APE on Texas GLO property. The length of the Project centerline across the newly recorded sites totals 901.4 meters (2,957.2 feet) or 4.99 hectares (12.35 acres). No temporally diagnostic artifacts were recovered from the six sites, and no cultural material was found during shovel test excavation. In total, 22 shovel tests were excavated on Texas GLO property, and 28 shovel tests were excavated at the previously recorded upland sites.

### TEXAS GLO PROPERTY

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#### Area STL001

Area STL001 is located in northwestern Reeves County near the start of the proposed Phase 2 pipeline route, approximately 3.65 kilometers (2.27 miles) west of State Highway 285 and 0.52 kilometers (0.32 miles) south of the Ramsey Terminal, the Ford Geraldine Oil Field, and China Draw (**Figure 5.1**). The city of Orla, Texas, is roughly 13.85 kilometers (8.6 miles) to the south of Area STL001. The Area STL001 APE is 747 meters (2,451 feet) long and 45.5 hectares (11.4 acres) in size and has been impacted by previous pipeline construction and drilling. A gravel road extends down the east side of the APE. Vegetation is typical of the Trans-Pecos region west of the Pecos River (**Figure 5.2**).

Ground visibility at the Area STL001 APE exceeded 30 percent, and pedestrian survey was conducted along four transects spaced 15 meters (49 feet) apart across the 61-meter (200-foot) wide APE. Eight shovel tests, excavated at 100-meter (328-foot) intervals along the APE centerline (see **Figure 5.1**), extended to a maximum depth of 60 centimeters (24 inches) below the surface. Shovel test profiles varied only slightly across the APE and generally corresponded to data mapped by the USDA-NRCS for this section of Reeves County (Jaco 1980) (see **Figures 2.1-2.4**; see **Table 2.1**).

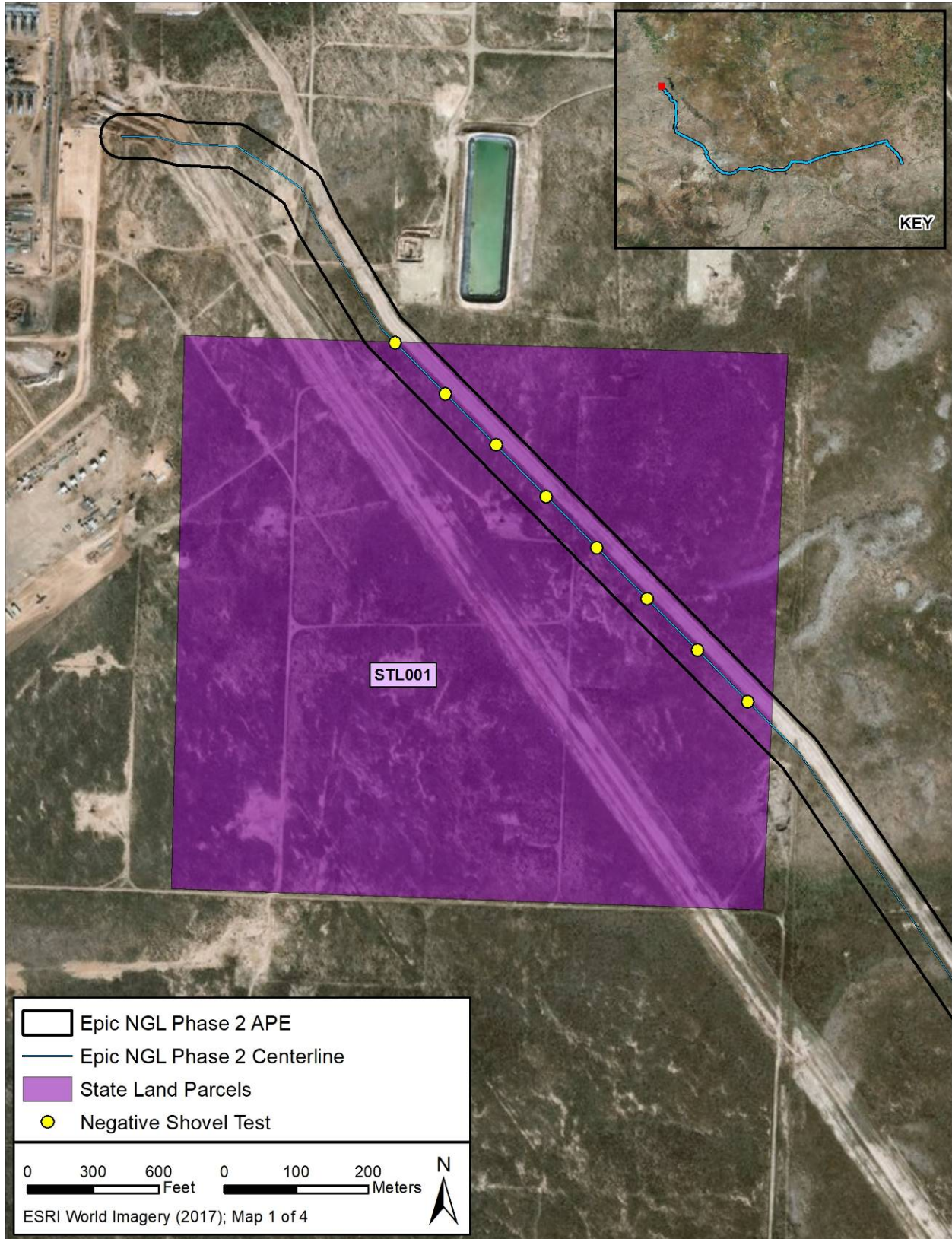


Figure 5.1. Location of shovel tests excavated at Area STL001.





Figure 5.2. Overview of Area STL001, looking west, showing vegetation and oil facilities in the background.

Based on USDA Soil Survey data, topography, elevation, vegetation, and the results of shovel test excavation, much of the Area STL001 APE can be distinguished by well-drained, level, open mesquite-grass scrubland (see **Figure 5.1**) and soils characteristics of the Hoban-Reeves-Holloman association (see **Figure 2.1**; see **Table 2.1**). Shovel test excavation was terminated when a hard, impenetrable layer of caliche was encountered. A typical shovel test included two strata (**Figure 5.3**):



Figure 5.3. Typical soil stratigraphy at Area STL001, Shovel Test 7.

- Stratum I (A horizon, 0 to 10 centimeters below surface [cmbs] [0 to 4 inches]): Light brown (7.5YR 6/4) silty loam with 10 percent gravel inclusions and a gradual, leached boundary.
- Stratum II (Bk horizon, 10 to 40 cmbs [4 to 16 inches]): Light brown very compact (7.5YR 6/4) silty loam with 20 percent caliche inclusions and 3 percent films and threads of calcium carbonate.

No cultural material was identified during pedestrian survey or shovel test excavation at Area STL001, and no further work is recommended.



## Area STL002

Area STL002 is located 34.52 kilometers (21.45 miles) south of Area STL001 and 22.14 kilometers (13.76 miles) south of Orla, Texas. Area STL002 is roughly 1.83 kilometers (1.14 miles) west of State Highway 232 and is situated between Narrow Bow and WT Draws (**Figure 5.4**). The Area STL002 APE is 1,207.8 meters (3,962.6 feet) long and 7.4 hectares (18.3 acres) in size, located in a minimally disturbed area surrounded by multiple access roads related to the oil industry (i.e., oil extraction and transport).

The environment and vegetation at Area STL002 is similar to Area STL001. An ephemeral stream with an associated alluvial fan was noted within the APE. Ground visibility exceeded 30 percent, and pedestrian survey was conducted along four transects spaced 15 meters (49 feet) apart across the 61-meter (200-foot) wide APE (**Figure 5.5**). A prehistoric lithic scatter, STL002-Site001, was recorded during pedestrian survey. Twelve shovel tests were excavated at 100-meter (328-foot) intervals along the APE centerline to a maximum depth of 55 cmbs (22 inches). Shovel test profiles varied only slightly across the APE and generally corresponded to data mapped by the USDA-NRCS for this section of Reeves County (Jaco 1980) (see **Figure 2.2**; see **Table 2.1**). A typical shovel test included two strata (**Figure 5.6**):

- Stratum I (A horizon, 0 to 30 cmbs [0 to 12 inches]): Brown (7.5YR 5/4) silty loam with 10 percent gravel inclusions and a gradual, leached boundary.
- Stratum II (Bk horizon, 30 to 55 cmbs [12 to 22 inches]): Brown compact (7.5YR 5/4) silty loam; 40 percent gravel inclusions; 3 percent films and threads of calcium carbonate.

### Site 41RV131

Site 41RV131 is a low-density surface scatter of lithic tools and debitage. The site measures approximately 427.1 meters (1,401.2 feet) in length and totals 2.8 hectares (6.9 acres) within the Project APE. Artifacts were noted throughout the APE except for a 150-meter (492-foot) section near the center of the site and the eastern APE boundary (see **Figure 5.4**). Surface artifact density increased slightly in the southern portion of the site, and most artifacts were identified near the road and fenceline located along the western edge of the APE (see **Figure 5.5**).

**Table 5.1. Artifacts Recovered from the Surface at 41RV131.**

Artifact Type	Count	Weight (g)
Biface, early stage	1	30.61
Core, tested cobble	5	469.21
Core, multidirectional	4	290.23
Core, bifacial	2	84.49
Edge-modified flake tool	3	84.6
Flake, bipolar	1	30.03
Flake, biface thinning	1	1.51
Flake	1	3.96
Flake fragments	4	8.82
<b>Total</b>	<b>22</b>	<b>1003.46</b>

Artifacts were photographed in the field and a representative sample (n=22) was collected for analysis (**Table 5.1**; **Figures 5.7-5.8**). Nearly all artifacts were made from Edwards chert, which fluoresced an orange color when exposed to ultraviolet light (**Figure 5.9**), as noted by other researchers (Frederick et al. 1994; Hofman et al. 1991; Newlander and Speth 2009).

**THIS FIGURE HAS BEEN REDACTED**

**Figure 5.4. Excavated shovel test locations at Area STL002 and extent of 41RV131 within the Project APE.**



**Figure 5.5. Overview of Area STL002, facing west, showing general desert shrub vegetation. Note the white fenceposts in the background that parallel a road bordering the western edge of the APE.**



**Figure 5.6. Typical soil stratigraphy at Area STL002.**



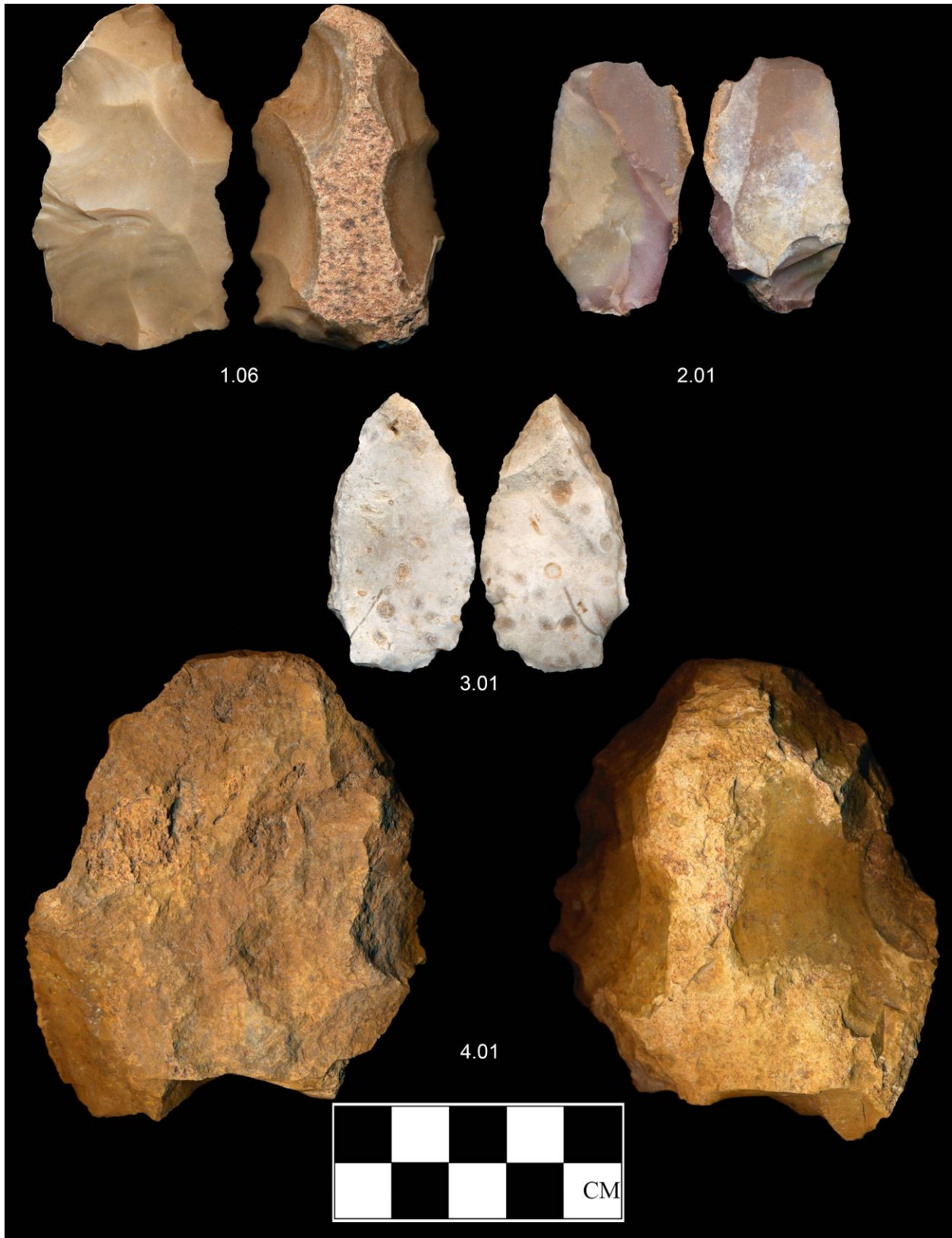


Figure 5.7. Select artifacts recovered from 41RV131.



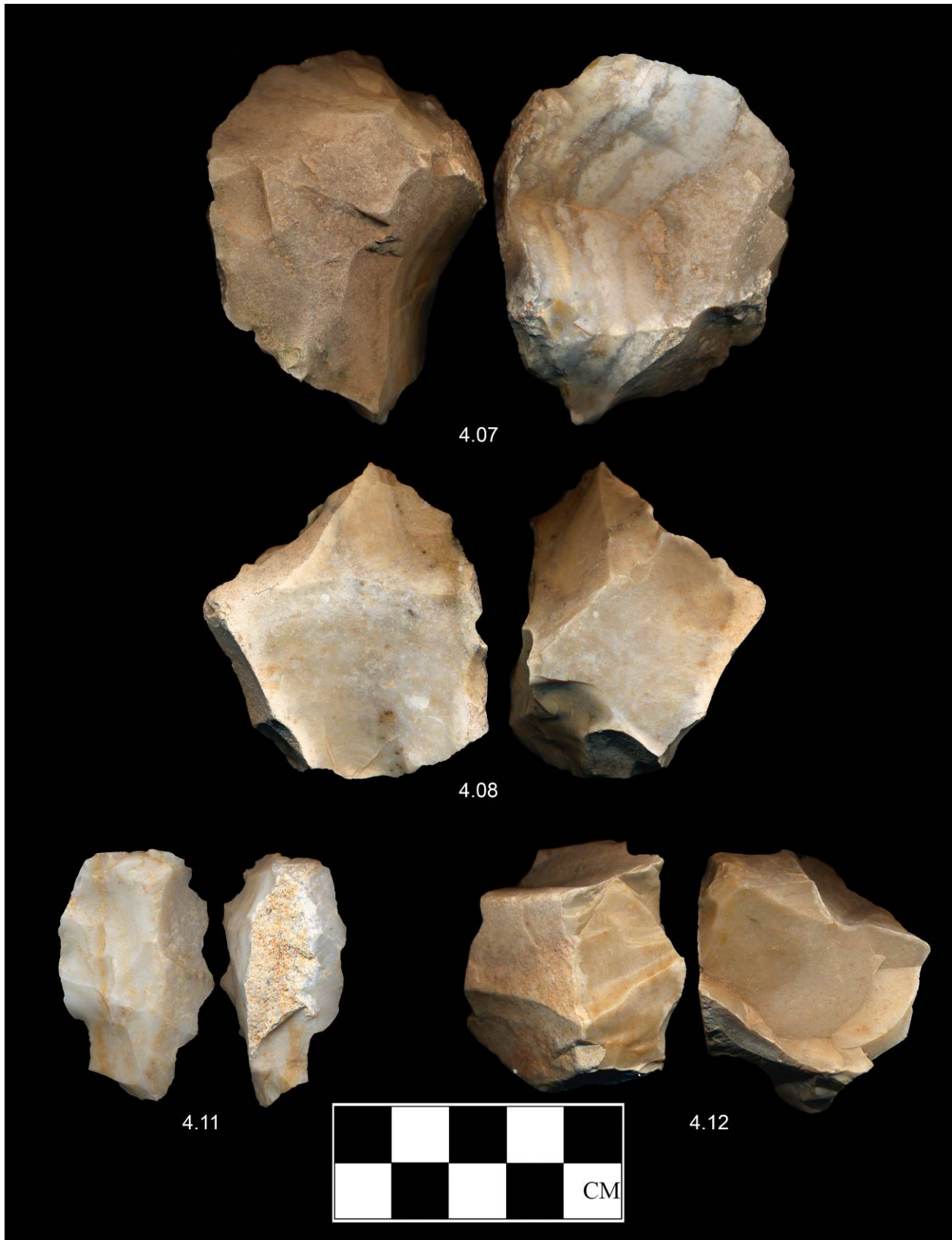


Figure 5.8. Select artifacts recovered from 41RV131.

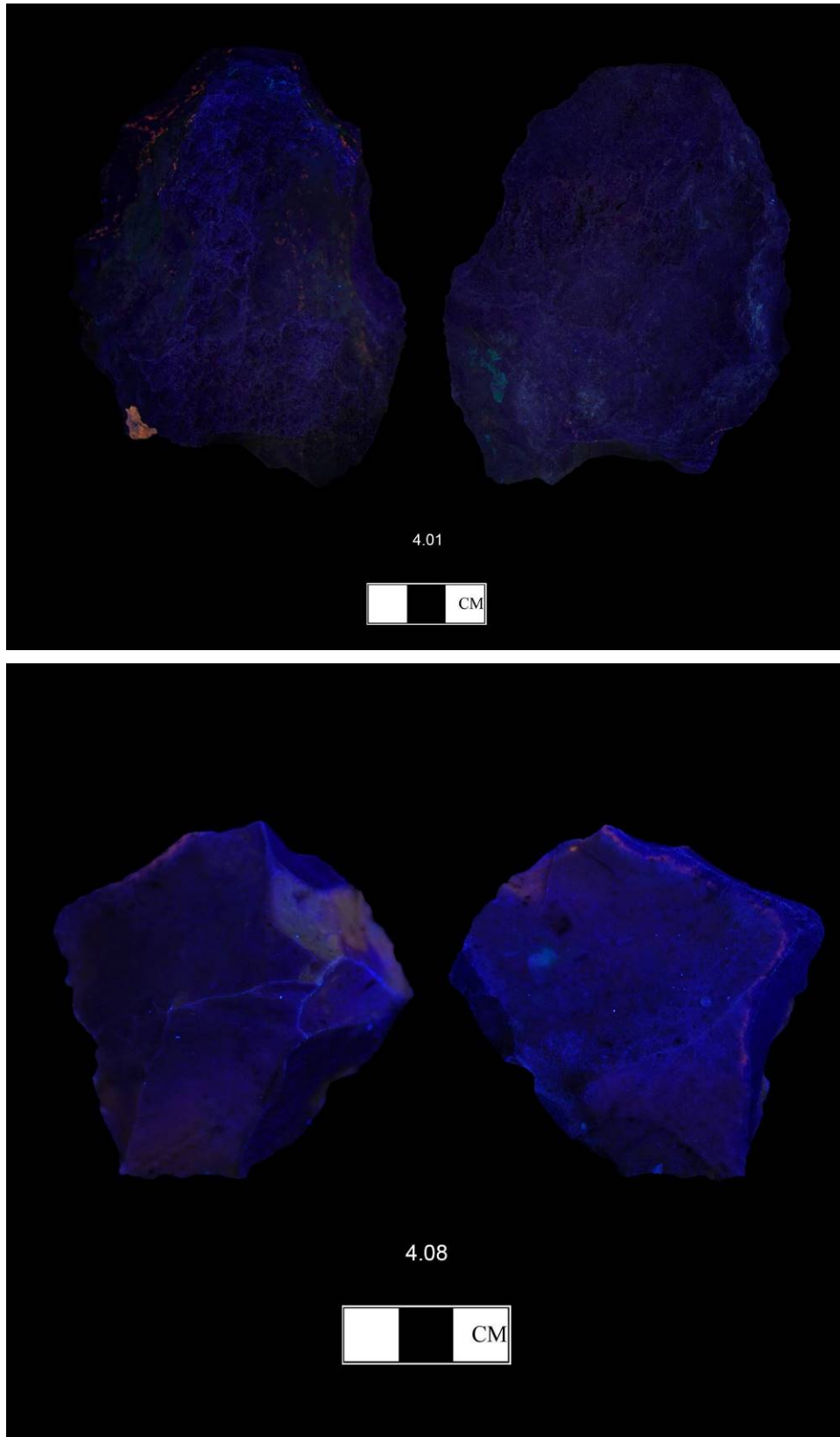


Figure 5.9. Select artifacts recovered from 41RV131 that fluoresced orange when exposed to ultraviolet light.

Patination and wind varnish on the surface of several artifacts hindered material type identification using ultraviolet light. Raw material quality varied from fine- to coarse-grained and, more often than not, had cracks and other flaws. When present, cortex was weathered limestone. No temporarily diagnostic artifacts were observed at the site. One primary or early stage biface (Cat No. 1.06) was collected; no secondary trimming was noted along the bifacial edge and cortex remained on one face (see **Figure 5.7**). Eleven cores were recovered from the site's surface: five tested cobbles, four multidirectional, and two bifacial cores. Three minimally modified flakes also were collected in addition to three unmodified flakes and four unmodified flake fragments.

Considering the artifacts identified at 41RV131, which included bifaces, cores, cortical and noncortical flakes, the site functioned as a briefly or intermittently used camp where nearby gravels from WT Draw were tested and, depending on the lithic material quality, made into tools. Artifacts and features generally associated with domestic activities, such as ground stone, pottery, and hearths, were not identified at the site. No temporally diagnostic artifacts were identified at the site, and no artifacts were recovered from shovel test excavation. Recent road and fence construction probably moved artifacts after they were discarded. The lack of site integrity, diagnostic tools, and intact anthropogenic features provides little potential for future work to yield more information. For this reason, the site is recommended ineligible inside the APE, and no additional work is recommended.

### **Areas STL003 and STL004**

Areas STL003 and STL004 are adjacent to each other. Area STL003 is 1.59 kilometers (0.99 miles) south of Area STL002. The WT and John D Draws cross portions of Areas STL003 and STL004, and State Highway 232 parallels much of the proposed pipeline route on Area STL004. The centerline extends across STL003 for 16.2 meters (348.4 feet) for a total ROW surface area of 0.6 hectares (1.5 acres), and the centerline extends across STL004 for 1,770.5 meters (5,808.7 feet) for a total ROW surface area of 10.8 hectares (26.9 acres). Vegetation observed in the areas included sagebrush and yucca (**Figures 5.10-5.11**). The areas are minimally disturbed except for an access road running north-south within the APE at Area STL003.

Ground visibility at both areas was greater than 90 percent, and pedestrian survey was conducted along four transects measuring 15-meters (49-feet) apart. No cultural materials were identified at Area STL003, and no further work is recommended. Two prehistoric low-density lithic surface scatters, 41RV132 and 41RV133, were identified at Area STL004 (**Figure 5.12**). One shovel test was excavated at 41RV133; no cultural materials were recovered. The shovel test profile consisted of two strata (**Figure 5.13**):

- Stratum I (A horizon, 0 to 30 cmbs [0-12 inches]): Light brown (7.5YR 6/4) silty loam with 10 percent gravel inclusions; gradual, leached boundary.
- Stratum II (Bk horizon, 30 to 40 cmbs [0 to 16 inches]): Light brown (7.5YR 6/4) silty loam with 20 percent gravel inclusions and caliche at 40 cmbs (16 inches).





**Figure 5.10. Typical environment at Area STL003, looking north.**



**Figure 5.11. Typical environment at Area STL004, looking west.**



**THIS FIGURE HAS BEEN REDACTED**

**Figure 5.12. Excavated shovel test location at Area STL004 and extent of 41RV132 and 41RV133 within the Project APE.**

### Site 41RV132

Three chert artifacts, an early stage biface (**Figure 5.14**) and two flakes manufactured from Edwards chert, were identified within a 10-meter (33-foot) radius of each other at 41RV132. Within the Project APE, the site is 35.9 meters (117.7 feet) long and measures 0.2 hectares (0.5 acres) in size. No temporally diagnostic artifacts or other cultural materials were located in the vicinity. This site is located near the intersection of two graded roads and the entrance to a well pad. The lack of site integrity, temporally diagnostic tools, and anthropogenic features provides little potential for future work. Within the Project APE, the site is not considered eligible for inclusion in the NRHP, and no additional work is recommended.



Figure 5.13. Shovel test profile at site 41RV133.

### Site 41RV133

Site 41RV133 is 438.4 meters (1,438.3 feet) long, spans the width of the proposed APE, and has a surface area of 2.6 hectares (6.5 acres). Artifacts were photographed in the field, and a representative sample (n=14) was collected for analysis, including six cores, four minimally modified flakes, three unmodified cortical flakes, and one flake fragment (**Figure 5.15; Table 5.2**). Artifacts were made from Edwards chert, which fluoresced an orange color when exposed to ultraviolet light (see **Figure 5.9**), as noted by other researchers (Frederick et al. 1994; Hofman et al. 1991; Newlander and Speth 2009). Raw material quality varied from fine- to coarse-grained and, more often than not, had cracks and other flaws. When present, cortex was weathered limestone. No temporarily diagnostic artifacts were observed at the site. Many artifacts were heavily patinated, wind varnished, and thermally damaged.

Table 5.2. Artifacts Recovered from the Surface of 41RV133.

Artifact Type	Count	Weight (g)
Core, multidirectional	5	312.91
Core, bifacial	1	81.28
Edge-modified flake tool	4	99.83
Flakes, cortical	3	61.13
Flake, proximal fragment	1	8.26
<b>Total</b>	<b>14</b>	<b>565.41</b>

Considering the artifacts identified at 41RV133, which included bifaces, cores, cortical and noncortical flakes, the site functioned as a briefly or intermittently used camp where nearby gravels from WT Draw were tested and, depending on the lithic material quality, made into tools. Artifacts and features generally associated with domestic activities, such as ground stone, pottery, and hearths, were not identified at the site. No temporally diagnostic artifacts were identified at the site, and no artifacts were recovered from shovel tests. Recent road and fence construction probably moved artifacts after they were discarded. The lack of site

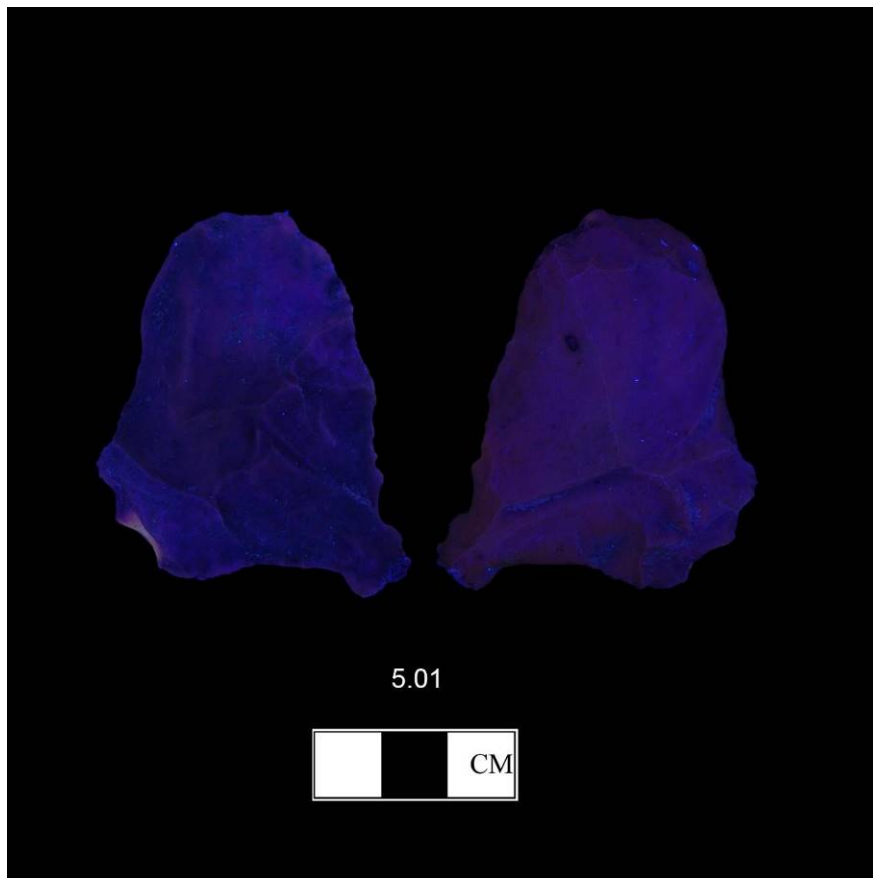


Figure 5.14. Biface recovered from 41RV132. Bottom photograph shows the artifact under ultraviolet light.

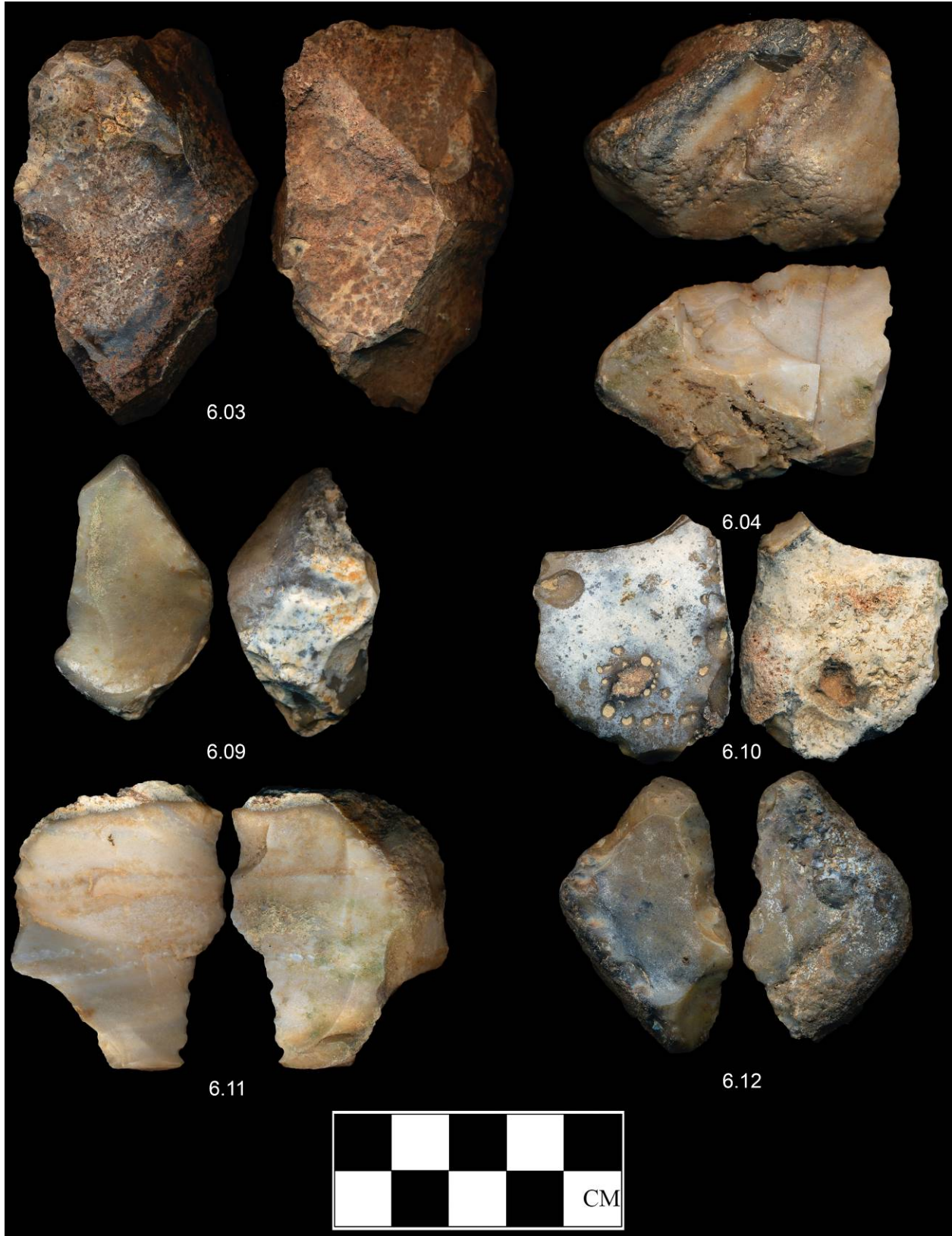


Figure 5.15. Select artifacts recovered from 41RV133.



integrity, diagnostic tools, and intact anthropogenic features provides little potential for future work to yield more information. For this reason, the site is recommended ineligible inside the APE, and no additional work is recommended.

## PREVIOUSLY RECORDED UPLAND SITES

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### Site 41RV30

Site 41RV30, a surface scatter of late nineteenth- and twentieth-century artifacts associated with nearby Old X Ranch, is located approximately 25 kilometers (15.5 miles) southeast of Pecos, Texas, and 6.9 kilometers (4.3 miles) east of Highway 285. The site measures 5.0 hectares (12.4 acres) in size; 1.4 hectares (3.5 acres) are located within the APE, and the centerline extends across the site for 226.5 meters (743.1 feet). Within the APE, the site has been disturbed by road grading, pipeline construction, and powerline installation corridors that cross the site (**Figure 5.16**).

No artifacts were recovered during the excavation of eight shovel tests within the APE (**Figure 5.17**). Late nineteenth- and twentieth-century artifacts were noted on the site's surface,



**Figure 5.16.** Typical environment of 41RV30, showing disturbance during the installation powerlines, road grading, and pipeline construction.

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**Figure 5.17. Excavated shovel test locations at upland sites 41RV30, 41RV40, and 41UT127.**

including amethyst glass and various metal objects (**Figure 5.18**). During the current survey, shovel tests were excavated to approximately 50 cmbs (20 inches); an impenetrable caliche layer was encountered at 20 cmbs (8 inches). Caliche was identified in all shovel tests.

A typical shovel test was comprised of (**Figure 5.19**):

- Stratum I (A horizon, 0 to 20 cmbs [0 to 8 inches]): Light brown (7.5YR 6/4) silty loam; 5 percent gravel inclusions; gradual, leached boundary.
- Stratum II (Bk horizon, 20 to 40 cmbs [8 to 16 inches]): Brown (7.5YR 4/4) silty loam; 10 percent gravel inclusions with caliche present at 40 cmbs (16 inches).
- Stratum III (Bk<sub>2</sub> horizon, 40 to 50 cmbs [16 to 20 inches]): Brown (7.5YR 5/3) silty loam; 20 percent gravel inclusions with caliche.

Artifacts identified during pedestrian survey (glass and metal objects) did not provide data to counter the original interpretation of the site's use as a ranch. No structures were observed within the APE or in the vicinity and artifact density is very low; it is likely that this area was located away from the main ranch buildings. The amount of recent site disturbance and the lack of intact features or archaeological deposits suggest that this portion of the site has been destroyed. Within the APE, 41RV30 is not eligible for inclusion in the NRHP, and no additional work is recommended.

## Site 41RV40

Site 41RV40 is located 24.6 kilometers (15.3 miles) southeast of Pecos, Texas, and 3.98 kilometers (2.17 miles) east of Highway 285. The site measures 0.3 hectares (0.7 acres) in



**Figure 5.18.** Metal object, likely a barrel clamp, found on the surface at 41RV30. The diameter of this object is approximately 45 centimeters (18 inches).



**Figure 5.19.** Typical soil stratigraphy at 41RV30.

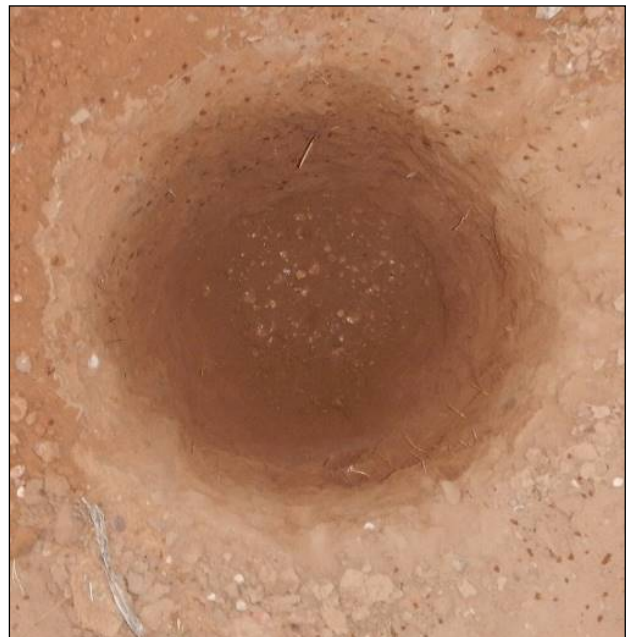




**Figure 5.20. Typical environment at 41RV40, which has been disturbed by powerlines installation, road maintenance, and pipeline construction.**

size, of which 0.2 hectares (0.5 acres) fall within the APE; the centerline extends 34.6 meters (113.5 feet) across the site. Vegetation is typical of the region (**Figure 5.20**).

Originally recorded as a small campsite with a single burned caliche thermal feature, intensive pedestrian survey along transects spaced at 5-meter (16-foot) intervals failed to relocate the feature, and no artifacts were observed. One shovel test was excavated to 50 cmbs (20 inches); no artifacts were recovered. A hard layer of caliche was identified at 35 cmbs (14 inches), and there is little potential for buried deposits within the site. The shovel test consisted of (**Figure 5.21**):



**Figure 5.21. Typical soil stratigraphy at site 41RV40.**



- Stratum I (A horizon, 0 to 35 cmbs [0 to 14 inches]): Brown (7.5YR 5/4) silty loam; 30 percent gravel inclusions; gradual, leached boundary.
- Stratum II (Bk horizon, 35 to 50 cmbs [14 to 20 inches]): Brown (7.5YR 4/3) silty loam; 30 percent gravel and caliche.

It is likely that road, pipeline, and powerline construction destroyed the hearth feature. Since the feature could not be re-identified and no additional artifacts were observed at the site, 41RV40 is not eligible for inclusion in the NRHP, and no additional work is recommended.

### Site 41UT127

Site 41UT127 is situated 23.6 kilometers (14.7 miles) east of the city of Crane in Upton County, Texas, and 7.6 kilometers (4.7 miles) west of Highway 349. The site measures 150.6 hectares (372.1 acres) in size, of which 3.5 hectares (8.6 acres) are located within the APE; the Project centerline extends across the site for 582.1 meters (1,909.8 feet). Vegetation observed in the area is typical for the region (**Figure 5.22**).

The site was originally recorded as a World War II practice bombing range. No artifacts, including potential bombing practice targets, were relocated during pedestrian survey of the



Figure 5.22. Typical environment at 41UT127, looking east.

APE along transects spaced at 15-meter (49-foot) intervals. In general, the area has been impacted by energy related projects.

In total, 19 shovel tests were excavated within the APE along the Project centerline. Shovel tests extended to approximately 45 cmbs (18 inches); no artifacts were identified. Caliche typically was identified at 15 cmbs (6 inches), and there is little potential for buried deposits within the APE.

The shovel test consisted of (**Figure 5.23**):

- Stratum I (A horizon, 0 to 15 cmbs [0 to 6 inches]): Dark yellowish brown (10YR 4/4) sandy silt.
- Stratum II (Bk horizon, 15 to 35 cmbs [6 to 14 inches]): Dark yellowish brown (10YR 4/4) sandy silt; 10 percent caliche gravel.



**Figure 5.23. Typical soil stratigraphy at 41UT127.**

The proposed APE crosses through the northeast portion of 41UT127 and is located roughly 90 meters (295.4 feet) north of a target shaped like a runway. As discussed in Chapter 3, historical maps provide little evidence of cultural activity at the site after World War II. However, in the last 10 years, numerous roads and oil pumping stations have been constructed with the site boundary. No targets or buildings associated with the practice range are situated within the APE, and no artifacts were identified within the APE during pedestrian survey and shovel test excavation. This portion of site 41UT127 is not eligible for inclusion in the NRHP, and no additional work is recommended.

## CHAPTER 6: SUMMARY AND RECOMMENDATIONS

From January 8-15, 2018, SEARCH completed a Phase I cultural resource survey of Texas GLO properties and three previously recorded upland archaeological sites (41RV30, 41RV40, and 41UT127) in Reeves and Upton Counties, Texas, as part of the proposed Epic NGL Phase 2 Pipeline Project. Site 41RV30 is a late nineteenth- and twentieth-century surface artifact scatter associated with Old X Ranch. Site 41RV40 is a small, burned caliche feature. Both of these sites have been impacted by previous pipeline construction; 41RV40 could not be relocated. Site 41UT127 is a World War II bombing range. While several practice targets still exist within the site, the targets do not fall within the Project APE. Three new prehistoric lithic surface scatters (41RV131, 41RV132, and 41RV133) also were identified during pedestrian survey. No temporally diagnostic artifacts were observed at these three sites. No artifacts were recovered during shovel test excavation at the previously recorded or newly identified sites.

It is SEARCH's opinion that the proposed Project will result in NO ADVERSE EFFECT to any resources located within the APE, and no further work is recommended on Texas GLO property.

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**APPENDIX A:**  
**SHOVEL TEST LOG**



County	Site	ST #	Stratum	Depth (cmbs)	Positive/Negative	Munsell	Texture	Inclusions	Comments	Reason for Termination
Reeves	-	STL001-001	I	0-60	N	10YR6/4	Silt	-	Increasing moisture w/ depth; low shrub; numerous pipelines	Caliche
Reeves	-	STL001-002	I	0-55	N	7.5YR6/4	Silt fine sand	5% gravel	Deflated; sage; numerous pipelines	-
Reeves	-	STL001-002	II	55-65	N	7.5YR6/4	Silt fine sand	20% gravel	-	Caliche
Reeves	-	STL001-003	I	0-40	N	10YR6/4	Silt	-	Increasing moisture w/ depth; very compact at bottom; low shrub, desert/prairie vegetation; numerous pipelines	Caliche
Reeves	-	STL001-004	I	0-45	N	7.5YR6/4	Silt fine sand	5% gravel	Deflated; sage; numerous pipelines	-
Reeves	-	STL001-004	II	45-55	N	7.5YR6/4	Silt fine sand	20% gravel	-	Caliche
Reeves	-	STL001-005	I	0-70	N	10YR6/4	Silt	-	-	Caliche
Reeves	-	STL001-006	I	0-40	N	7.5YR6/4	Silt fine sand	5% gravel	Deflated; sage; numerous pipelines	-
Reeves	-	STL001-006	II	40-50	N	7.5YR6/4	Silt fine sand	20% gravel	-	Caliche
Reeves	-	STL001-007	I	0-45	N	10YR6/4	Silt	-	Very compact at bottom; creosote	Caliche
Reeves	-	STL001-008	I	0-43	N	10YR6/4	Silt	-	Increasing moisture w/ depth; creosote; disturbed from pervious pipelines	Caliche
Reeves	-	STL002-002	I	0-55	N	10YR6/4	Silt	30% gravel	Good ground visibility; low shrubs	Caliche
Reeves	-	STL002-003	I	0-40	N	10YR6/4	Silt	-	Some moisture w/depth; very compact soil	Caliche
Reeves	-	STL002-004	I	0-30	N	10YR6/4	Silt	30% pebble	Very compact; low shrub	Caliche
Reeves	-	STL002-005	I	0-40	N	10YR6/4	Silt	30% gravel	Very compact at bottom	Caliche
Reeves	-	STL002-006	I	0-50	N	10YR6/4	Silt	30% pebble	-	Caliche
Reeves	-	STL002-007	I	0-50	N	10YR6/4	Silt	30% pebble	-	Caliche
Reeves	-	STL002-008	I	0-30	N	7.5YR6/4	Silt fine sand	10% gravel	Flat area w/ natural rock surrounding, possible tested cobble; sage; access road to west	-



County	Site	ST #	Stratum	Depth (cmbs)	Positive/Negative	Munsell	Texture	Inclusions	Comments	Reason for Termination
Reeves	-	STL002-008	II	30-40	N	7.5YR6/4	Silt fine sand	20% gravel	-	Caliche
Reeves	-	STL002-009	I	0-30	N	7.5YR6/4	Silt fine sand	10% gravel	Increase in gravel content; old drainage; sage	-
Reeves	-	STL002-009	II	30-40	N	7.5YR6/4	Silt fine sand	40% gravel	-	Caliche
Reeves	-	STL002-010	I	0-35	N	7.5YR6/4	Silty loam sand	10% gravel	Increase in gravel content, more moisture in Strat II; sage	-
Reeves	-	STL002-010	II	35-45	N	7.5YR6/4	Silty loam sand	40% gravel	-	Caliche
Reeves	-	STL002-011	I	0-20	N	7.5YR6/4	Silt sand	10% gravel	No artifacts in ST but lithics found at surface; sage; deflated ground surface	-
Reeves	-	STL002-011	II	20-30	N	7.5YR6/4	Silt sand	20% gravel	-	Caliche
Reeves	-	STL002-012	I	0-15	N	7.5YR6/4	Silt fine sand	10% river pebbles	Within old ephemeral drainage, lithic scatter 100m N; sage	-
Reeves	-	STL002-012	II	15-25	N	7.5YR6/4	Silt fine sand	20% river pebbles	-	Caliche
Reeves	-	STL002-013	I	0-15	N	7.5YR6/4	Silt fine sand	10% river pebbles	Lithic scatter 200m N; sage	-
Reeves	-	STL002-013	II	15-25	N	7.5YR6/4	Silt fine sand	20% river pebbles	-	Caliche
Reeves	-	STL004-001	I	0-30	N	7.5YR6/4	Silt loam	10% gravel	~15m E of access road, deflated w/ little rock at surface, elevation to N; sage, yucca	-
Reeves	-	STL004-001	II	30-40	N	7.5YR6/4	Silt loam	20% gravel	-	Caliche
Reeves	41RV30	41	I	0-25	N	7.5YR5/3	Silt	25% pebble	Very compact at bottom, no historic artifact identified around STP; creosote, desert shrub; close to road, numerous oil rigs in area, appears very disturbed by construction	Caliche
Reeves	41RV30	44	I	0-20	N	7.5YR5/3	Silt	-	Very compact at bottom; desert shrub; road to S and oil rigs in area	Caliche

County	Site	ST #	Stratum	Depth (cmbs)	Positive/Negative	Munsell	Texture	Inclusions	Comments	Reason for Termination
Reeves	41RV30	47	I	0-30	N	7.5YR5/3	Silt	-	Very compact at bottom; desert shrub; road to S and oil rigs in area	Caliche
Reeves	41RV30	50	I	0-10	N	7.5YR5/3	Silt	90% gravel	Unidentified metal next to STP; desert shrub; road to S and oil rigs in area	Rock impasse
Reeves	41RV30	53	I	0-20	N	7.5YR6/4	Silt loam	20% angular rock	Extremely rocky compact surface w/ little sediment; desert shrub, sage; access roads surrounding	Caliche
Reeves	41RV30	56	I	0-20	N	7.5YR6/4	Silt loam	20% angular rock	Extremely rocky compact surface w/ little sediment; desert shrub, sage; access roads surrounding	Caliche
Reeves	41RV30	59	I	0-15	N	7.5YR6/4	Silt loam	75% angular rock	Extremely rocky compact surface w/ little sediment; desert shrub, sage; access roads surrounding	Caliche
Reeves	41RV30	62	I	0-20	N	7.5YR6/4	Silt loam	5% gravel	Deflated area; desert shrub, sage; access roads surrounding	-
Reeves	41RV30	62	II	20-40	N	7.5YR4/4	Silt loam	10% gravel	-	-
Reeves	41RV30	62	III	40-50	N	7.5YR5/3	Silt loam	20% gravel	-	Caliche
Reeves	41RV40	8	I	0-35	N	7.5YR5/4	Silt	10% rounded pebble	90% visibility, caliche at surface; desert shrub; two pipelines	-
Reeves	41RV40	8	II	35-50	N	7.5YR4/6	Silt	30% pebble	-	Caliche
Upton	41UT127	101	I	0-35	N	10YR4/3	Sandy silt	30% gravel	80% ground visibility, no artifacts visible, deflated surface, extremely compact soil; desert shrub, mesquite	Caliche
Upton	41UT127	104	I	0-20	N	7.5YR4/4	Silt loam	20% gravel	Deflated area; low desert scrub; area appears to be artificially altered	-
Upton	41UT127	104	II	20-30	N	7.5YR4/4	Silt loam	5% gravel	-	Caliche
Upton	41UT127	107	I	0-35	N	10YR4/3	Sandy silt	10% gravel	90% ground visibility, no artifacts visible, deflated surface, extremely compact soil; desert shrub, mesquite	Caliche
Upton	41UT127	110	I	0-35	N	7.5YR4/4	Silt loam	20% gravel	Deflated area; low desert scrub; area appears to be artificially altered	-
Upton	41UT127	110	II	35-45	N	7.5YR4/4	Silt loam	5% gravel	-	Caliche

County	Site	ST #	Stratum	Depth (cmbs)	Positive/Negative	Munsell	Texture	Inclusions	Comments	Reason for Termination
Upton	41UT127	113	I	0-40	N	10YR4/4	Sandy silt	30% gravel	Rocks on bottom, 95% ground visibility, no artifacts visible on surface, extremely compact soil; desert shrub	Caliche
Upton	41UT127	116	I	0-25	N	7.5YR4/4	Silt loam	20% gravel	Deflated area; low desert scrub; area appears to be artificially altered	-
Upton	41UT127	116	II	25-35	N	7.5YR4/4	Silt loam	5% gravel	-	Caliche
Upton	41UT127	119	I	0-40	N	10YR4/4	Sandy silt	10% gravel	Compact, no artifacts on surface; desert shrub	Caliche
Upton	41UT127	122	I	0-30	N	7.5YR4/4	Silt loam	20% gravel	Deflated area; low desert scrub; area appears to be artificially altered	-
Upton	41UT127	122	II	30-40	N	7.5YR4/4	Silt loam	5% gravel	-	Caliche
Upton	41UT127	125	I	0-40	N	10YR4/4	Sandy silt	30% gravel	Very compact, no artifacts on surface; desert shrub	Caliche
Upton	41UT127	128	I	0-15	N	7.5YR4/4	Silt loam	2% gravel	Deflated area; low desert scrub; area appears to be artificially altered	-
Upton	41UT127	128	II	15-30	N	7.5YR4/4	Silt loam	5% gravel	-	Caliche
Upton	41UT127	131	I	0-35	N	10YR4/4	Sandy silt	10% gravel	Very compact, no artifacts on surface; desert shrub	
Upton	41UT127	134	I	0-20	N	7.5YR4/4	Silty sand	2% gravel	Deflated area; low desert scrub and honey mesquite; area appears to be artificially altered	-
Upton	41UT127	134	II	20-30	N	7.5YR4/4	Silty sand	10% gravel	-	Caliche
Upton	41UT127	137	I	0-15	N	10YR4/4	Sandy silt	10% gravel	Less compact than previous STs, no artifacts on surface; desert shrub	-
Upton	41UT127	137	II	15-35	N	10YR4/4	Silty sand	40% gravel	-	Caliche
Upton	41UT127	140	I	0-20	N	7.5YR4/4	Silty sand	2% gravel	Deflated area; low desert scrub and honey mesquite; area appears to be artificially altered	-
Upton	41UT127	140	II	20-30	N	7.5YR4/4	Silty sand	10% gravel	-	Caliche
Upton	41UT127	143	I	0-15	N	10YR4/4	Sandy silt	10% gravel	More compact than previous ST, no artifacts on surface; desert shrub	-

County	Site	ST #	Stratum	Depth (cmbs)	Positive/Negative	Munsell	Texture	Inclusions	Comments	Reason for Termination
Upton	41UT127	143	II	15-35	N	10YR4/4	Sandy silt	30% gravel	-	Caliche
Upton	41UT127	146	I	0-20	N	7.5YR4/4	Silty sand	2% gravel	Deflated area; low desert scrub and honey mesquite; area appears to be artificially altered	-
Upton	41UT127	146	II	20-35	N	7.5YR4/4	Silty sand	10% gravel	-	Caliche
Upton	41UT127	149	I	0-15	N	10YR4/4	Sandy silt	10% gravel	Very compact, no artifacts on surface; desert shrub	-
Upton	41UT127	149	II	15-25	N	10YR4/4	Sandy silt	20% gravel	-	Caliche
Upton	41UT127	152	I	0-25	N	7.5YR4/4	Silty sand	2% gravel	Deflated area; low desert scrub and honey mesquite	-
Upton	41UT127	152	II	25-35	N	7.5YR4/4	Silty sand	10% gravel	-	Caliche
Upton	41UT127	155	I	0-25	N	7.5YR4/4	Silty sand	2% gravel	Deflated area; low desert scrub and honey mesquite	-
Upton	41UT127	155	II	25-35	N	7.5YR4/4	Silty sand	10% gravel	-	Caliche



**PHASE I CULTURAL RESOURCE SURVEY OF THE TEXSTAR EPIC NGL  
PHASE 2—RAMSEY TERMINAL TO BENEDUM PLANT—PIPELINE  
PROJECT, TEXAS GENERAL LAND OFFICE PROPERTIES AND  
THREE UPLAND SITES, REEVES AND UPTON COUNTIES, TEXAS**

**TEXAS ANTIQUITIES PERMIT #8268**



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