

**AN ARCHAEOLOGICAL SURVEY FOR THE
TRINITY RURAL WATER SUPPLY CORPORATION
IN TRINITY COUNTY TEXAS**

Antiquities Permit 3977



***By
William E. Moore and Edward P. Baxter***

***Brazos Valley Research Associates
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AN ARCHAEOLOGICAL SURVEY FOR THE TRINITY RURAL
WATER SUPPLY CORPORATION IN TRINITY COUNTY, TEXAS

BVRA Project 05-18

Principal Investigator

William E. Moore

Prepared for

Trinity Rural Water Supply Corporation
Post Office Box 709
Trinity, Texas 75862

by

Brazos Valley Research Associates
813 Beck Street
Bryan, Texas 77803

ABSTRACT

An archaeological survey of a water treatment plant site (2 acres) and 5810 feet of proposed water line in southern Trinity County, Texas was performed on December 21, 2005 by Brazos Valley Research Associates (BVRA) under Texas Antiquities Permit 3977. The Principal Investigator was William E. Moore, and Edward P. Baxter was the Project Archaeologist. In all, four acres were examined. No archaeological sites (prehistoric or historic) were found, and no artifacts were collected. It is recommended that the project be allowed to proceed without further consultation with the Texas Historical Commission. Copies of the report are on file at the Texas Historical Commission (THC), Archeology Division; the Texas Archeological Research Laboratory (TARL); the Trinity Rural Water Supply Corporation (WSC); and BVRA.

ACKNOWLEDGMENTS

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INTRODUCTION

The Trinity Rural WSC plans to install water transmission lines along city streets in Trinity, Texas and in rural areas of the county (Figure 1). In addition, one water treatment plant (2 acres) and one elevated storage tank (100' x 150') are proposed. The proposed water line totals 12.14 miles in length and consists of 6", 12", 16", and 18" diameter pipe. Trenches will be 1.5 feet wide, and the pipe will be buried beneath 36" of cover. Topographic coverage of the entire project area is provided by three 7.5' USGS topographic quadrangles, Chita, Trinity East, and Trinity West. The areas surveyed for this project are depicted on the Trinity West (Figure 2) and Chita (Figure 3) quadrangles.

Trinity County is in an area that contains numerous prehistoric and historic archaeological sites. Because of the potential for significant sites in the project area, a survey by a professional archaeologist prior to construction was requested by the Texas Water Development Board (TWDB). In order to fulfill this requirement, the Trinity Rural WSC contracted with BVRA to perform this assessment. Texas Antiquities Permit number 3977 was issued to BVRA with William E. Moore the Principal Investigator.

A field assessment by the Principal Investigator prior to preparing the Research Design identified three areas in need of archaeological survey, the water treatment plant site (Area A), creek crossing at Magnolia Creek (Area B), and an upland ridge south of Fountain Creek (Area B). This created a project area of two acres for the water treatment plant and 5810 feet of water line.

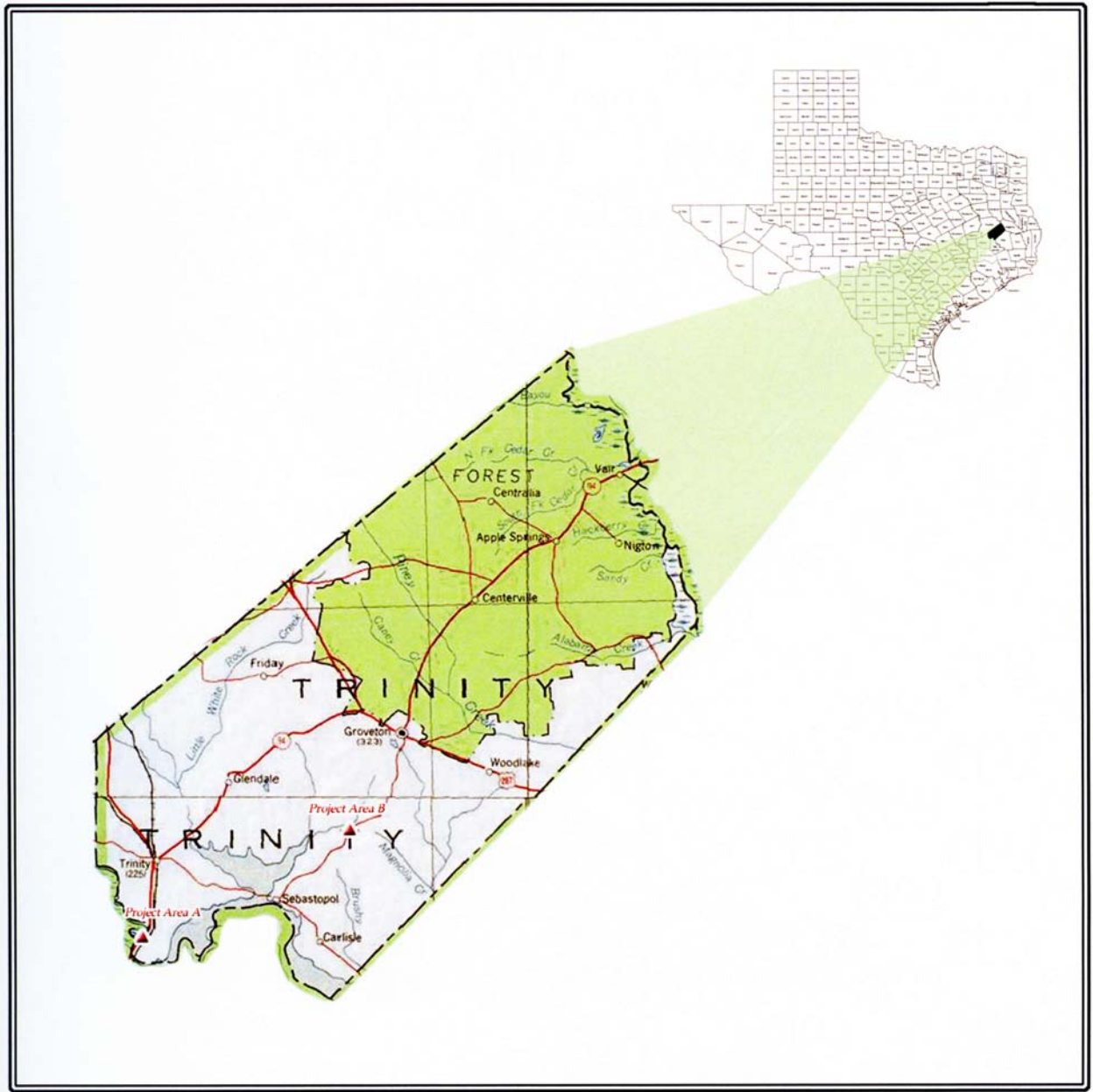
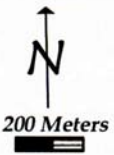
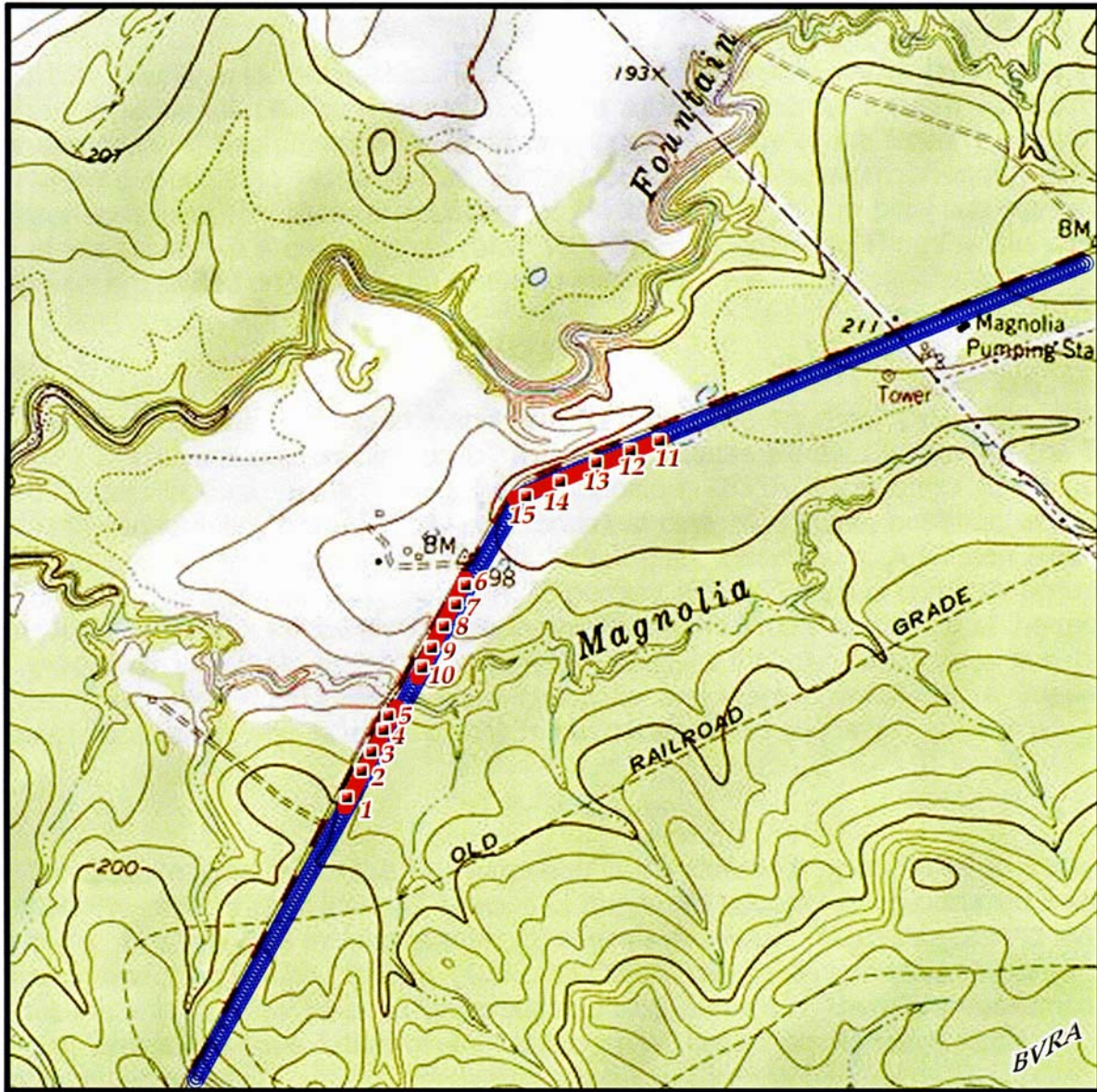


Figure 1. General Location



Figure 2. Project Area A



USGS Chita, Texas
 Quadrangle 3095-443

- Shovel Test
- Proposed Waterline
- Project Area

Figure 3. Project Area B

ENVIRONMENTAL SETTING

General

Trinity County is located within the Austroriparian biotic province as defined by Blair (1950) and includes the Gulf coastal plain from the Atlantic Ocean to eastern Texas. The western boundary of this province in Texas is approximated by a line running north from western Harris County to western Red River County. The western boundary of the Austroriparian is also the western boundary of the main body of the pine and hardwood forests of the eastern Gulf coastal plain (Blair 1950:99). According to Thornthwaite (1948), these forests are limited on the west by available moisture.

Flora

The Project Area is located within the loblolly pine, shortleaf pine, and upland hardwood plant community as defined by the United States Forest Service for the four National Forests in East Texas. According to Ippolito (1983:6-7), the major forest cover types in this community include loblolly pine, shortleaf pine, slash pine, post oak, southern red oak, white oak, black oak, blackjack oak, black gum, sweet gum, American elm, red maple, hickories, and beech. Approximately 70 percent of East Texas is currently occupied by the Piney Woods with Post Oak Savannah and Blackland Prairie in the rest of the region (Boyd and Howard 1988:4). Keller (1974:139-156) believes that deciduous trees may have been more numerous during most of the Holocene and were probably more important resources to prehistoric populations than the modern flora would suggest.

Fauna

The vertebrate fauna of the Austroriparian is considered typical of that to the east. Blair (1950:99) states that at least 47 species of mammals occur or have occurred there in recent times. Known types include at least 29 species of snakes, 10 lizards, 2 land turtles, 17 anurans, and 18 urodeles. Ippolito (1983:11) states that there is an inadequate sample of faunal material for the area in an archaeological context. Therefore, assumptions concerning prehistoric exploitation of animals must be based on historical accounts and current populations.

A study by Keller (1974:78-81) of the paleoecology of the middle Neches region lists those mammals most likely to have been hunted in the area. They are Whitetail deer, Cottontail rabbit, Swamp rabbit, Grey squirrel, Fox squirrel, Flying squirrel, Raccoon, Opossum, Red fox, Grey fox, Woodchuck, Bobcat, Spotted skunk, Striped skunk, Mink, Otter, Long-tailed weasel, and Muskrat. According to Ippolito (1983:11), this list excludes many species of birds, especially migratory fowl, and fish that can still be found in the area.

Species not found in the area today include Black bear, beaver, and wild turkey. These were once numerous but were eradicated by uncontrolled hunting and timber harvesting that irreparably altered their habitats.

Climate

The following climatic data were taken from Steptoe (2004). The weather in Trinity County consists of hot summers and cool winters. An occasional cold front may cause temperatures to drop below freezing, sometimes quite suddenly. The average winter temperature is 50 degrees Fahrenheit with an average daily minimum of 38 degrees. In summer, the average is 81 degrees with an average daily maximum of 93 degrees. Prevailing winds are from the south. Rainfall falls mainly between May and September, and snowfall is rare.

ARCHAEOLOGICAL BACKGROUND

A search of the site files at TARL revealed no major archaeological investigations have been conducted in Trinity County. Most of the site data from this area are based on small area surveys by private archaeological firms, the United States Forest Service, and the Texas Department of Transportation (TxDOT) with little or no subsurface testing. As a result, much of the information for Trinity County is taken from projects in surrounding areas such as Lake Livingston in Polk and San Jacinto counties (McClurkan 1968); Lake Conroe in Montgomery County (McNatt 1978; Shafer 1968; Shafer and Stearns 1975); Davy Crockett, Sam Houston, Angelina, and Sabine National Forests (Fields 1979); Davy Crockett National Forest (Bond and Moore 1980); Lake Creek Reservoir (Bement et al. 1987); and the Gibbons Creek Mine in Grimes County (Rogers 1993, 1994). Several overviews have been published which provide valuable data for Trinity County and vicinity. These are *Indians of the Upper Texas Coast* by Aten (1983), *Comments on Woodland Cultures of East Texas* by Shafer (1975), and *An Overview of the Archaeology of East Texas* by Story (1981).

Other publications worthy of mention are *Archeology in the Eastern Planning Region, Texas: A Planning Document* compiled by the Department of Antiquities Protection (Kenmotsu and Perttula (1993); a dissertation by Roger G. Moore (1995) entitled *The Mossy Grove Model of Long-Term Forager-Collector Adaptations in Inland Southeast Texas*; and Volume 66 of the *Bulletin of the Texas Archeological Society* which reviews the current state of Archeology in Texas and contains a chapter devoted to Southeast Texas (Patterson 1995).

The nearest large area survey was an investigation of 345 acres of land owned by Sam Houston State University just across the river in Walker County. This project was conducted by BVRA in 2004 (Moore 2004). The project area is in an upland setting overlooking Harmon Creek at its confluence with the Trinity River. This survey visited previously recorded site 41WA2 that has been designated as a State Archeological Landmark. Although this site was found to be severely disturbed through rock quarrying activities, its eastern and western boundaries were enlarged through shovel testing. In addition, nine previously unrecorded prehistoric sites (41WA273 - 41WA281) were documented. Site 41WA278 is located to the east of 41WA2 and is on the same landform. Although separated from 41WA2 by a gully, it is possible that this site is an extension of 41WA2 or was occupied at the same time. Both sites date to the Late Prehistoric Period based on the presence of ceramics observed by previous researchers at 41WA2 and collected during this survey at 41WA278.

The majority of the newly recorded sites is small and may represent hunting camps or short-term activity areas where the reworking of tools was a major lithic activity. At seven of these sites no diagnostic artifacts were collected, and no features were observed at any of the sites in the project area including 41WA2. One site (41WA275), however, appears to be significant and was recommended for avoidance. It dates to the Archaic period of Texas prehistory based on the presence of a *Yarbrough* dart point, a Waco sinker, and an apparent absence of ceramics. Since Archaic sites in this part of Southeast Texas are not well documented, it was recommended that this site be tested for significance if avoidance is not possible.

Historic artifacts consisting of undecorated crockery fragments, nails, and bottle glass were found at sites 41WA274 and 41WA275. No evidence of a structure was found through archival research or during the field survey. These components were not viewed by BVRA as significant.

The ten archaeological sites located within the boundaries of the project area confirm the hypothesis that upland margins along major streams in Southeast Texas are high probability areas for the presence of prehistoric sites.

The nearest recorded site to the current project area is in Area A. Site 41TN11 is a prehistoric campsite located on an upland ridge overlooking the Trinity River about 900 meters north of the proposed water treatment plant (Appendix I). William E. Moore recorded this site in 1971 based on a surface collection of projectile points, ceramics, and miscellaneous tools found on the surface. Based on the large number of artifacts found at this site by Moore and others, 41TN11 is assumed to be a major site in the area. Exotic artifacts include an arrow point and flakes of Manning Fused Glass, a volcanic glass from the Manning Formation that crops out in Walker County to the northwest at TARL Rock Sample Locality M41 WA1. An excellent article by Ken M. Brown (1976) discusses the use of fused glass in prehistoric times throughout Southeast Texas and illustrates the arrow point from 41TN11. The location of this site is depicted in Appendix I.

In 1991, archaeologists from TxDOT shovel tested within the right-of-way of State Highway 19 next to the location of 41TN19 as plotted on the TARL maps (letter report on file at TxDOT and TARL). No evidence of this site was found within the highway right-of-way.

There is a historic gravesite depicted on the topographic map about ¼ mile south of 41TN11 on the west side of the highway outside the current project area. This isolated grave was moved prior to widening of the highway.

METHODS

Prior to entering the field, the Principal Investigator checked the site records at the Texas Archeological Research Laboratory (TARL) on the campus of The University of Texas at Austin for the presence of previously recorded sites in the project area and vicinity and examined the topographic maps submitted by the engineers. The Principal Investigator also drove the entire project area in order to identify high probability areas and areas to be eliminated because of disturbance and other factors. Four areas planned for construction are depicted on the topographic maps by the engineers. These areas were referred to in the Research Design (Appendix II) as areas A-D. Based on disturbance and lack of stream crossings, the project area was reduced to two areas. These are the proposed wastewater treatment plant (Area A) and the crossing of Magnolia Creek and the high ground overlooking the floodplain of Fountain Creek (Area B). In addition, a review of relevant literature was conducted in order to be familiar with the kinds of sites expected to occur in the area.

Area A

Area A is situated on a slight rise above the surrounding featureless floodplain overlooking the Trinity River. Only a portion of the site of the proposed water treatment plant was found to be undisturbed. The remainder was fenced and covered with construction equipment, and the ground surface had been scraped in some places. Since ground surface visibility was poor, the 100% Pedestrian Survey was conducted in the undisturbed area in an attempt to locate surface indications of a historic site. There were no rodent burrows or disturbed earth that might contain prehistoric cultural materials brought to the surface by artificial means.

The undisturbed portion was examined by a single backhoe trench, and shovel testing. Since the treatment plant will be constructed above ground with little subsurface disturbance, the backhoe trench was excavated in the area of the proposed sludge pond where the subsurface will be disturbed to a depth of approximately 10 feet. The backhoe trench was excavated to a depth of 12 feet, and it was 30 feet long, and 3 feet wide. A profile of a portion of the wall was drawn in the field and documented through digital photography (Appendix III). The approximate location of the backhoe trench and shovel tests is depicted in Figure 4.

Ten shovel tests were dug in the undisturbed portions of the two-acre tract. Each shovel test was dug by hand, and the excavated dirt was screened using ¼" hardware cloth. The project was documented by a shovel test log (Appendix IV), field notes, and digital photographs. All shovel tests were terminated when firm clay was reached between 10 and 30 cm. Two tests were excavated outside the boundaries of the treatment plant site. This was done because BVRA had permission from the landowner to dig in this area and because the excavators wanted to make sure that they did not miss a site by stopping at the northern boundary.

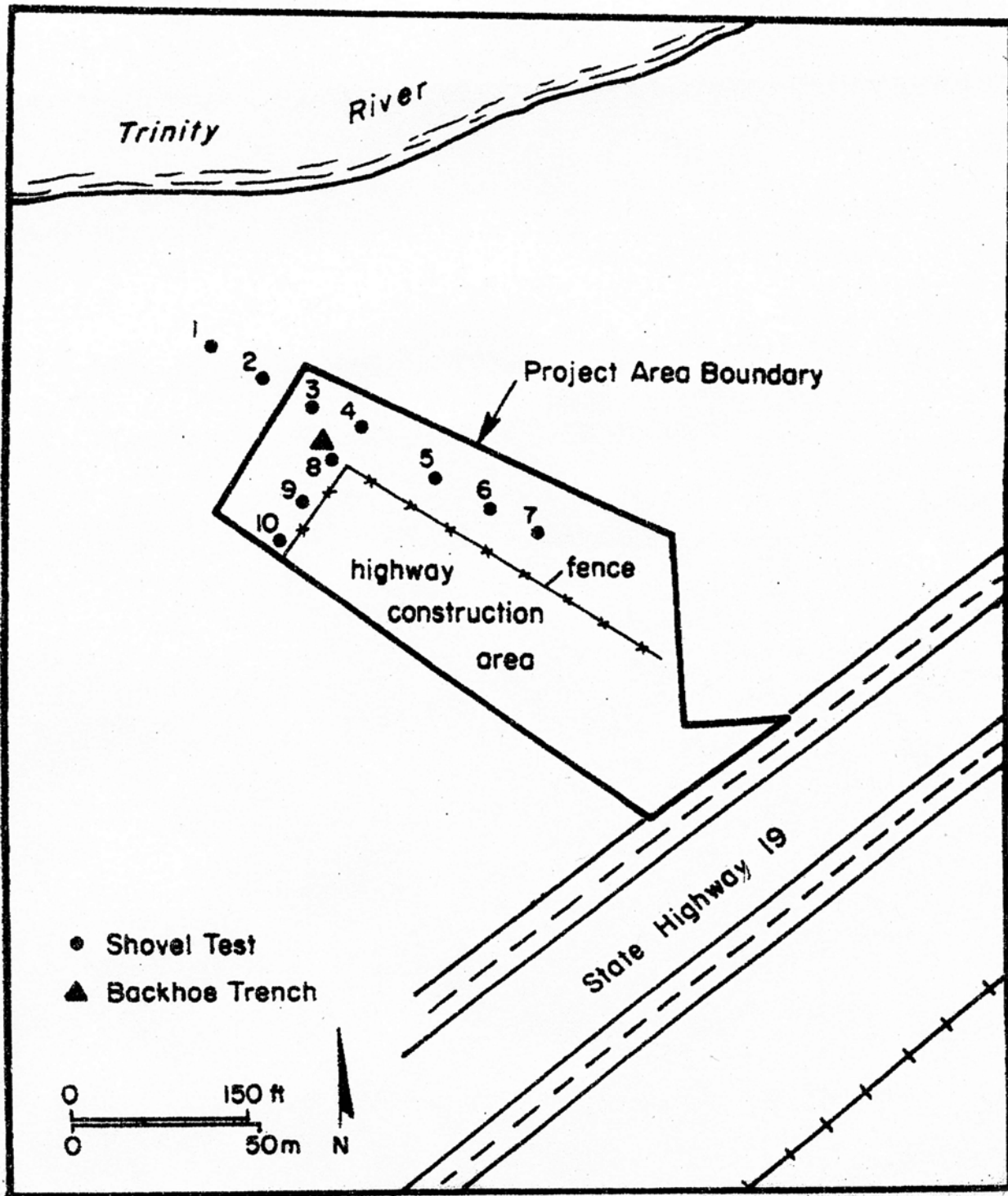


Figure 4. Location of Backhoe Trench and Shovel Tests

The original map depicting the location of the proposed treatment plant was submitted to BVRA superimposed on the Trinity West topographic quadrangle. In the field, however, the Project Archaeologist was given another map with the plant site in a slightly different location. The area examined in the field is the location shown on the maps in this report and is not the same as the one submitted with the Research Design to the THC.

Area B

Both banks of the crossing of County Road 355 at Magnolia Creek and the high ground above the flood plain of Fountain Creek were shovel tested, and the shovel test methods are identical to those employed at Area A. Fifteen shovel tests were excavated (Appendix V). The general area was photographed. On a segment of high ground overlooking the floodplain of Fountain Creek, five shovel tests were excavated.

The original map depicting the location of the water line was submitted to BVRA superimposed on the Trinity East, Trinity West, and Chita topographic quadrangles. On these maps the proposed water line is at least 260 feet from the highway right-of-way. According to the engineer for this project, the line is to be placed on private property just inside the fence. The area examined in the field is the location shown on the maps in this report and is different from what was submitted with the Research Design to the THC.

Areas A and B were documented with digital photography and field notes. Figure 5 is a view of Area A, and Figure 6 is a view of Area B.



Figure 5. View of Area A



Figure 6. View of Area B

RESULTS AND CONCLUSIONS

The archival research indicated no previously recorded archaeological sites in the project area. No large scale surveys have been conducted in Trinity County. Most of the recorded sites were found by archaeologists from the United States Forest Service and as a result of small area surveys by contract archaeological firms. Individuals recorded the rest of the sites on their personal time.

No archaeological sites (prehistoric or historic) were found as a result of this survey. One potentially significant prehistoric site (41TN11) is near the project area, but it will not be affected by the construction as currently proposed (see *Archaeological Background* above). A single historic grave was present on the west side of State Highway 19, but it was moved during a highway improvement project by the Texas Highway Department in 1991 (see *Archaeological Background* above).

The site of the wastewater treatment plant was probably not selected by the prehistoric groups in the area as a campsite because of the shallow sandy soils over clay. This seems logical since there is a major site (41TN11) nearby on a sandy upland ridge. Sandy hills and upland areas have been demonstrated to be the preferred location for prehistoric sites in Southeast Texas. The same argument may be made for the absence of sites on Magnolia Creek. There are other larger (possibly more permanent) streams in the area such as Fountain Creek, and the sandy hills along this drainage may have been a more suitable location for a prehistoric camp. At the area overlooking the floodplain of Fountain Creek, no site was found. Across the fence and closer to the creek there are a number of small rises which might be site locations. They are, however, outside the Area of Potential Effect (APE).

At least 50% of the two-acre area where the water treatment plant is to be constructed has been disturbed through activities related to construction associated with State Highway 19. The area had been scraped and pushed, and gravel has been spread over a large portion of the area. In addition, a containment levee around an above ground gas storage facility has been constructed per OSHA requirements. Overall, these activities have greatly disturbed the shallow sandy mantle.

Part of the water line passes through the city limits of Trinity, Texas. This is a residential area consisting largely of mobile homes and frame houses. Only a small segment passes through an area with commercial buildings. The Principal Investigator did not observe any potentially significant buildings along this route, and the water line will not affect any standing structures.

The survey was performed in accordance with the Minimum Survey Standards as published by the Texas Historical Commission, Archeology Division.

RECOMMENDATIONS

Since no archaeological sites were found in the project area, it is recommended that construction be allowed to proceed in this area as planned without further consultation with the Texas Historical Commission. Should significant cultural deposits be found in the project area, all construction must stop until the situation can be evaluated by the Archeology Division, Texas Historical Commission in consultation with the Trinity Rural WSC and BVRA. Also, if the route of the water line or the location of the water treatment plant or elevated storage tank is changed, the Texas Historical Commission must be notified as this may require additional survey.

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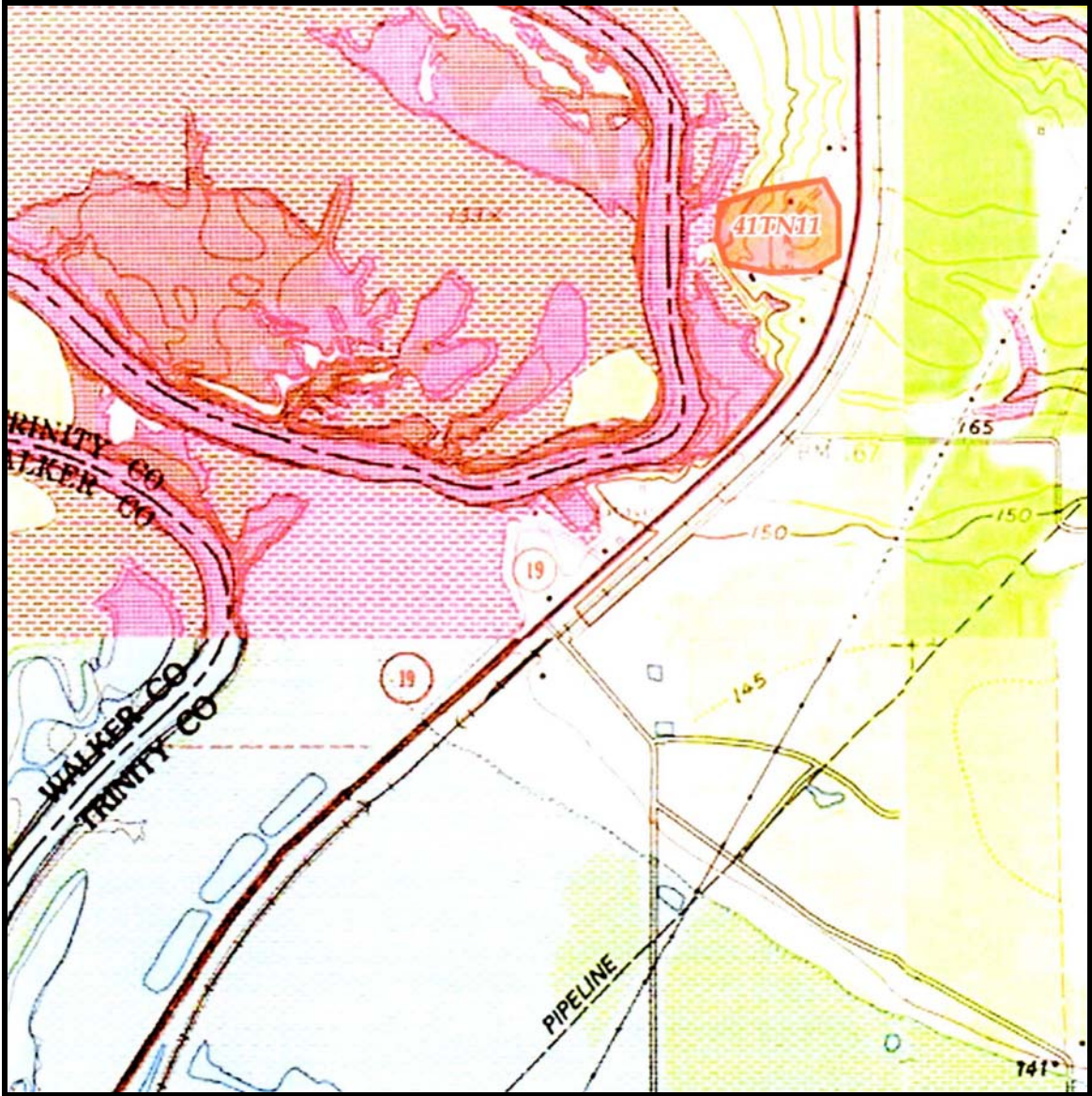
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APPENDIX I
LOCATION OF SITE 41TN11



Trinity West Topographic Quadrangle

APPENDIX II

RESEARCH DESIGN

TRINITY RURAL WATER SUPPLY CORPORATION

Records Check

Brazos Valley Research Associates (BVRA) will contact the Texas Archeological Research Laboratory (TARL), the state repository for site records, to determine if previously recorded sites are present in the project area. In addition, a review of relevant archaeological reports will be conducted. This task will reveal if there are previously recorded sites in the project area and what areas, if any, have been examined by professional archaeologists. A field assessment by the Principal Investigator has already been conducted to better prepare this Research Design.

Project Description

The Trinity Rural Water Supply Corporation (WSC) proposes to construct a wastewater treatment plant, an elevated storage tank, and install 64,100 feet (12.14 miles) of new water line throughout portions of Trinity County. Most of the line will be in rural areas; however, one segment will follow existing streets within the city limits of Trinity, Texas. The size of the line will vary from 6 inches in diameter to 16 inches in diameter. Much of the line will be placed on private property just outside the highway right-of-way, while the rest will be placed in existing road rights-of-way. The trench will be approximately 1.5 feet wide and the pipe will be installed below 36 inches of cover.

The wastewater treatment plant will be two acres in size and will be constructed on the high bank of the Trinity River overlooking the floodplain. Although the plant will be built on a slab and will be an above ground structure, the subsurface within this tract will be disturbed to a depth of 10 feet by construction of a sludge holding pond.

The elevated storage tank will be 100' x 150' in size and will be constructed adjacent to an existing standpipe.

The areas of new construction are depicted on the topographic maps in red. Other areas depicting line and related facilities shown in black are existing and not part of this project.

RESEARCH DESIGN (PAGE TWO)

Areas to Survey

The project area is divided into four segments (Areas A – D). The areas recommended for survey are discussed below. The recommendations are based on a review of the topographic maps, assessment of the project area by the Principal Investigator, and extensive experience in the area by the Principal Investigator.

Area A

This area consists of 20,300 feet of 6-inch line from East Tatum Street in the city limits of Trinity to an existing ground storage and pump station.. This route follows city streets before turning onto County Road 19. There are no major creek crossings, and the portion within the city of Trinity passes through a residential area with no historic buildings present. The line will be placed in the rights-of-way of East Tatum Street and County Road 19. This is a very low probability area for significant prehistoric or historic sites, and no survey is recommended. It is depicted on the Trinity East (3095-434) and Trinity West (3095-433) topographic maps.

Area B

This area consists of 8800 feet of 12-inch line along Doug Bell Road and a wastewater treatment plant (2 acres). This line will be placed on private property just outside the road right-of-way. It passes previously recorded prehistoric site 41TN11, which is on the opposite side of County Road 19. The Principal Investigator recorded this site in 1971. The significant portion of this site is on the upland area closest to the Trinity River. Later, the Texas Department of Transportation conducted shovel testing along the road and found no evidence that the site extended to the east. Therefore, the proposed water line will not impact this site. The remainder of the line does not cross any streams. This is a very low probability area for significant prehistoric or historic sites, and no survey is recommended. It is depicted on the Trinity West topographic map (3095-433).

The water treatment plant will be 2 acres in size and will be constructed on the high ground overlooking the Trinity River to the north. According to the published soil survey for Trinity County, this facility may contain both clay soils at or near the surface and sandy soils and loams to 17 inches before encountering clay. Because of its topographic setting in the uplands overlooking the Trinity River and close proximity to a known site (41TN11), it is recommended that this site be examined through shovel testing and probing and/or backhoe trenching. It is depicted on the Trinity West topographic map (3095-433).

RESEARCH DESIGN (PAGE THREE)

Area C

Area C is the elevated storage tank. It will be constructed on a tract of land 100' x 150' feet in size. The subsurface will be disturbed to a depth of 8-9 feet for foundations. This area is not near any streams; therefore, it is viewed as a very low probability area for significant prehistoric or historic sites. No survey is recommended. It is depicted on the Trinity East topographic map (3095-434).

Area D

This area consists of 2500 feet of 16-inch line from Chita Standpipes to Farm-to-Market Road 355 and 32,500 feet of 8-inch line along Farm-to Market Road 355. It will be placed on private property just outside the road right-of-way. This 2500-foot segment does not cross any major streams. It is viewed as a very low probability area for significant prehistoric or historic sites, and no survey is recommended. It is depicted on the Chita topographic map (2897-342).

The 32,500-foot segment along Farm-to-Market Road 355 only crosses one major stream, Magnolia Creek. Although the new line will parallel an existing 4-inch line, the line will be placed in a new trench. Since this area appears to be a suitable location for a prehistoric site, shovel testing is recommended on the north and south banks. There is a segment of line where it traverses a hill overlooking the floodplain of Fountain Creek to the north. It is recommended that this area be shovel tested as well. The remaining stream crossings are the upper reaches of tributaries. These areas are not viewed by BVRA as likely settings for prehistoric sites. Therefore, no survey is recommended in these areas. It is depicted on the Chita topographic map (2897-342).

Site Types

Based on previous work in the area, prehistoric archaeological sites are most likely to be found on sandy hills in close proximity to a dependable water source. Since the gravels used to make stone tools were obtained mainly from lag deposits in rivers and large streams, lithic procurement sites are not likely to be present. The only known prehistoric quarry is an outcrop of Manning Fused (volcanic) Glass. This quarry is located in northern Walker County not far from Trinity County, and artifacts made from this material have been found in nearby sites, most notably 41TN11 just across the road from Area B.

RESEARCH DESIGN (PAGE FOUR)

Survey Methods

The Principal Investigator for this project is William E. Moore, and the Project Archaeologist is Edward P. Baxter. No fieldwork will commence until an Antiquities Permit has been issued for this project. The entire project area was assessed by the Principal Investigator. The following methods are based on this “windshield survey” and a review of previous work in the area.

The water treatment plant will be examined through shovel testing and probing. If shallow clay soils are present (as indicated in the soil survey for Trinity County), no additional work will be performed at this site. If sandy soils are present and the Area of Potential Effect (APE) cannot be evaluated through shovel testing, a backhoe will be utilized.

Shovel tests along the route of the water line will be excavated at the discretion of the Project Archaeologist and will be dug in arbitrary 10 cm levels. All excavated earth will be passed through ¼ inch hardware cloth. Artifacts found in shovel tests will be collected and analyzed in the laboratory prior to curation. When possible, shovel tests will be dug to the underlying clay and to depths of about 100 cm when clay is not reached. A shovel test log will be maintained and will appear as an appendix to the report. Shovel tests will be plotted on a project area map that will appear in the report.

Backhoe trenches will be approximately 36 inches wide, several meters long, and dug to (or beyond) the APE. Non-diagnostic artifacts observed in the back dirt of the backhoe trench or trenches will not be collected. Selected shovels full of earth will be screened at each backhoe trench location. Since only a small portion of the wastewater treatment facility will contain subsurface disturbance it is estimated that no more than two trenches will be adequate to evaluate the APE in this area. The backhoe trenches will be profiled, and these profiles will appear as an appendix to the report. Backhoe trenches will be plotted on a project area map that will appear in the report.

. When a site is found, an attempt to determine its boundaries through shovel testing and surface inspection will be made.

All archaeological sites will be located on the landscape using a hand-held GPS, and each site will be plotted on the proper USGS topographic quadrangle. Field numbers will be assigned to all sites until an official trinomial can be obtained TARL. Site locations will appear in the report; however, this information will be deleted from those reports made available to the general public.

RESEARCH DESIGN (PAGE FIVE)

Artifact Analysis and Curation

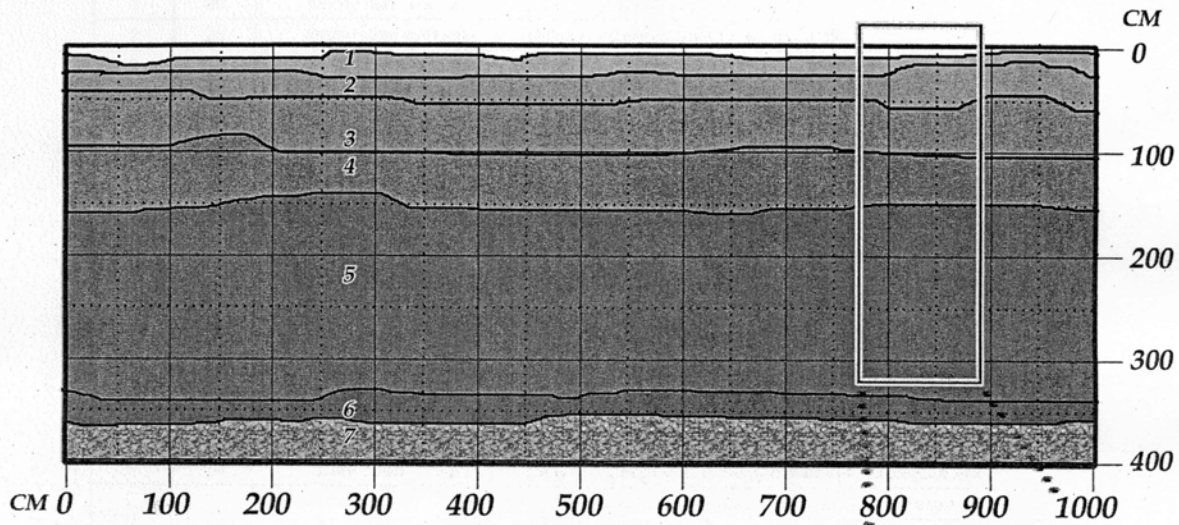
All significant artifacts will be collected for analysis in the laboratory. They will be described and measured. Those specimens deemed worthy of permanent curation will be processed and turned over to TARL. All artifacts not viewed as containing research potential for future researchers will be discarded following a written document authorizing this action from the Texas Historical Commission (THC), Archeology Division. Artifacts found on private property will be offered to the landowner.

Report Preparation

A report documenting the findings of this project will be written by the Principal Investigator and Project Archaeologist. This report will follow the guidelines established by the Council of Texas Archeologists and THC. Two draft copies will be submitted to the THC for review. Upon acceptance of this report, 20 copies will be submitted to the THC for distribution to regional libraries.

APPENDIX III
BACKHOE TRENCH PROFILE

**TRINITY WSC
BACKHOE TRENCH 1
SURVEY AREA A
EAST WALL PROFILE**



Zone 1: Fine brown sandy loam, 10YR5/4.

Zone 2: Hard red clay, 10YR4/2, mottled with gray clay, 10YR6/2.

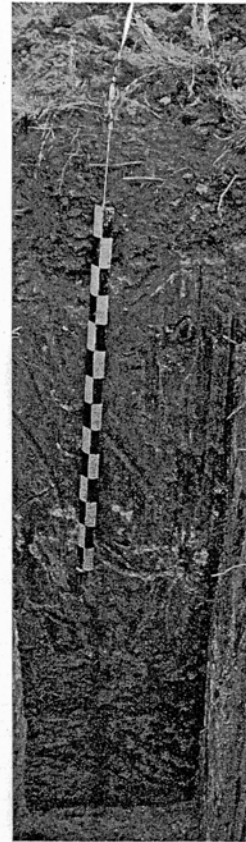
Zone 3: Hard dark gray clay, 2.5Yr4/2.

Zone 4: Hard yellowish-brown clay, 2.5Y 5/4, with some white specks.

Zone 5. Hard yellowish-brown clay, 2.5Y 5/4, mixed with white clay.

Zone 6. Fine grained light tan sand, 2.5Y 8/2.

Zone 7. Unexcavated.



Appendix IV: Shovel Test Log for Area A

| Test | Depth | Soils | Comments |
|------|-------|----------------------|--------------------------------|
| 01 | 30 cm | loamy clay over clay | cleared pasture on top of hill |
| 02 | 25 cm | loamy clay over clay | cleared pasture on top of hill |
| 03 | 30 cm | loamy clay over clay | cleared pasture on top of hill |
| 04 | 20 cm | loamy clay over clay | cleared pasture on top of hill |
| 05 | 25 cm | loamy clay over clay | cleared pasture on top of hill |
| 06 | 30 cm | loamy clay over clay | cleared pasture on top of hill |
| 07 | 10 cm | clay at surface | down slope from top of hill |
| 08 | 20 cm | loamy clay over clay | cleared pasture on top of hill |
| 09 | 30 cm | loamy clay over clay | cleared pasture on top of hill |
| 10 | 20 cm | loamy clay over clay | cleared pasture on top of hill |

Appendix V: Shovel Test Log for Area B

| Test | Depth | Soils | Comments |
|------|-------|-------------------------|-------------------------|
| 01 | 50 cm | sand and clay over clay | clear cut area |
| 02 | 50 cm | sand and clay over clay | clear cut area |
| 03 | 40 cm | sand and clay over clay | clear cut area |
| 04 | 40 cm | sand and clay over clay | clear cut area |
| 05 | 30 cm | clay loam over clay | clear cut area |
| 06 | 90 cm | sand over clay | hay pasture |
| 07 | 80 cm | clay at surface | hay pasture |
| 08 | 90 cm | sand over clay | hay pasture |
| 09 | 90 cm | sand over clay | hay pasture |
| 10 | 70 cm | sand over clay | hay pasture |
| 11 | 90 cm | sand over clay | south of Fountain Creek |
| 12 | 50 cm | sand and clay over clay | south of Fountain Creek |
| 13 | 50 cm | sand and clay over clay | south of Fountain Creek |
| 14 | 50 cm | sand and clay over clay | south of Fountain Creek |
| 15 | 40 cm | sand and clay over clay | south of Fountain Creek |
