AN ARCHAEOLOGICAL SURVEY FOR THE CITY OF SONORA WATER IMPROVEMENT PROJECT IN SUTTON COUNTY TEXAS

Antiquities Permit 5202

By

William E. Moore and Charles D. Frederick

Brazos Valley Research Associates

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AN ARCHAEOLOGICAL SURVEY FOR THE CITY OF SONORA'S WATER IMPROVEMENT PROJECT IN SUTTON COUNTY, TEXAS

BVRA Project 09-09

Principal Investigator

William E. Moore, RPA

Prepared for

City of Sonora
201 East Main Street
Sonora, Texas 76950

Prepared by
Brazos Valley Research Associates
813 Beck Street
Bryan, Texas 77803

ABSTRACT

An archaeological survey and a geoarchaeological investigation of four segments of new water line in west-central Sutton County, Texas was performed on March 30, 2009 and April 2-5, 2009 by Brazos Valley Research Associates (BVRA) and Charles D. Frederick (consulting geoarchaeologist) for the City of Sonora under Antiquities Permit 5202. The archival research indicated that several prehistoric sites have been recorded in the vicinity. One of the three segments (Area 4) had been examined by a professional archaeologist in 1970 and 1971 prior to construction of Interstate Highway 10. Since the proposed route of the water line in Area 4 passes within seventy-five feet of the Sutton County Cemetery, this area was evaluated in order to determine if scraping for unmarked graves would be necessary. In the segment adjacent to the cemetery, the new line will replace an existing line and will occupy the same footprint. Following a consultation with the Texas Historical Commission (THC), it was decided that monitoring during the installation of the trench in this area would be required. At Area 2, a sparse scatter of one scraper, two flakes, two chert fragments, and fire-cracked rock was found on the surface. In addition, two pieces of burned limestone were observed within the A horizon of Backhoe Trench 2. Shovel tests were excavated in the vicinity of the backhoe trench, but no cultural materials were observed. Although the burned rock and the flake scatter may represent human activity in the project area, it was decided that the cultural materials were too few in number and too scattered to warrant assigning a site number. Previous disturbance by the landowner may have dispersed any concentration of cultural materials making it impossible to locate the locus of the site associated with these specimens. Copies of the final report have been submitted to the THC, the Texas Archeological Research Laboratory (TARL), Charles D. Frederick, the City of Sonora, and BVRA.

ACKNOWLEDGMENTS

The authors are appreciative of the assistance provided by others during this project. Our contacts at the City of Sonora were Dean Carrell (City Manager) and Patti Prather (City Secretary). The engineering firm responsible for this project is Enprotec/Hibbs & Todd, Inc. John D. Voller (Project Manager) and Mark McHan (Project Geologist) provided us with maps and other information. Bruce Kerbow, owner of the Kerbow Funeral Home, shared his knowledge of the history of Sutton County Cemetery. We are especially grateful to Jimmy Powers for allowing us to dig backhoe trenches on his property and conduct a pedestrian survey outside the Area of Potential Effect (APE) in Area 2. The site records at TARL were checked by Jean Hughes for previously recorded sites in the project area and vicinity. Lili G. Lyddon of LL Technical Services prepared the cover and figures that appear in this report. She also edited the report. William A. Dickens analyzed the lithics collected at Area 2.

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INTRODUCTION

The City of Sonora plans to install new water line in the city limits of Sonora, Texas (Figure 1). The project area consists of four segments of water line that will connect to existing line. The new line will be buried in trenches at Area 2 and Area 4. In Area 1 and Area 3, the new line will be installed through directional boring. The new line will be installed in trenches two feet wide and between four and five feet deep. The one exception is the line adjacent to the Sutton County Cemetery. Here, the line will replace an existing water line and will not be in previously undisturbed ground. Detailed information and line drawings of each segment are presented in the section entitled *Description of the Project Area* later in this report. This project is being funded by the Texas Water Development Board (TWDB). TWBD archaeologist, Chris Caran, requested that all areas where new water line is to be installed be investigated by a professional archaeologist and a geoarchaeologist. In addition, the report is to be reviewed by Ed Baker at the THC. In order to comply with these requirements, the City of Sonora retained BVRA of Bryan, Texas to conduct this investigation. The project area is depicted on the USGS 7.5' topographic quadrangle Sonora (3000-312) (Figure 2). This project is required in accordance with the State Antiquities Code since the proposed project includes ground disturbance to clear land for construction.

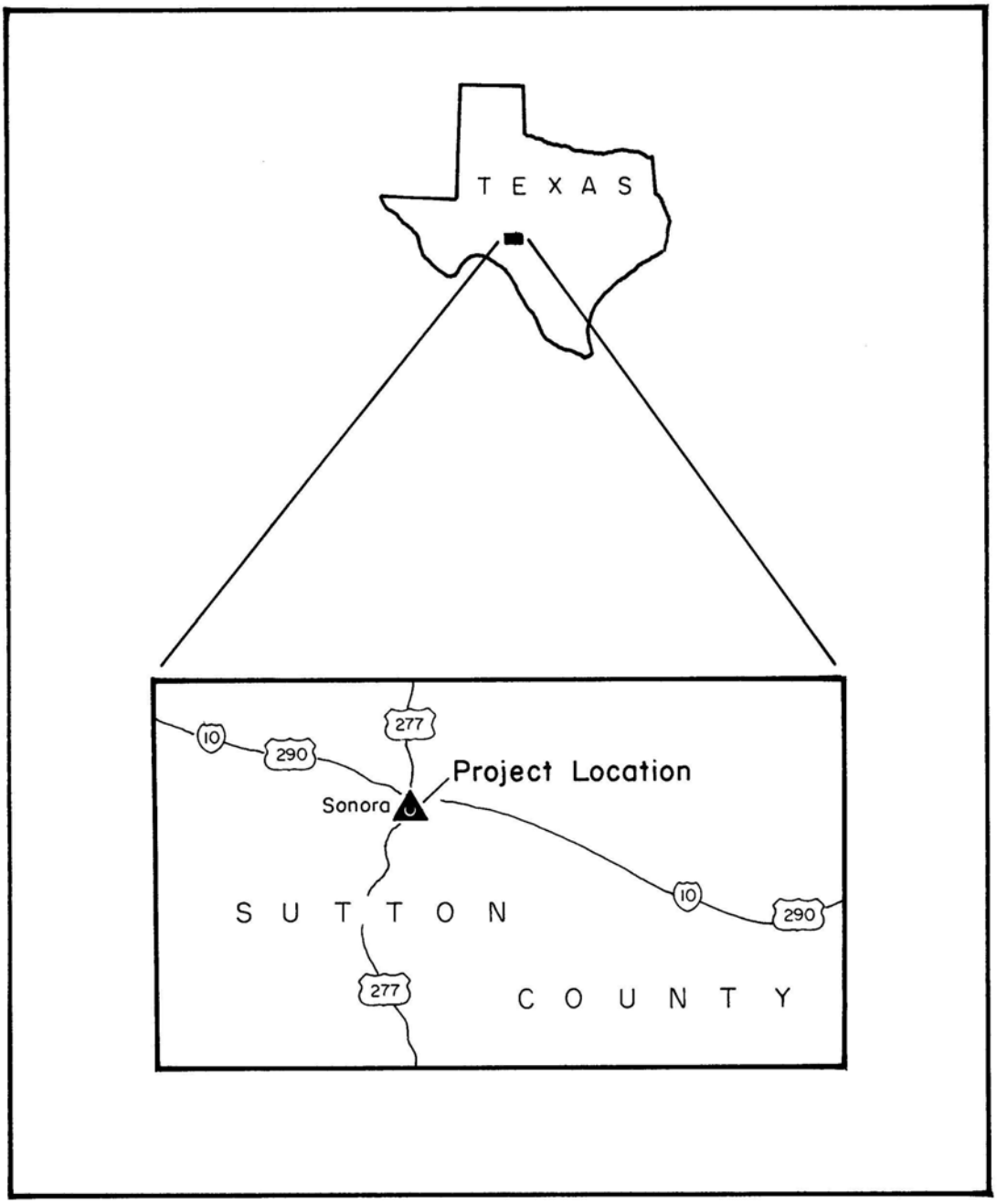

Figure 1. General Location of Project Area

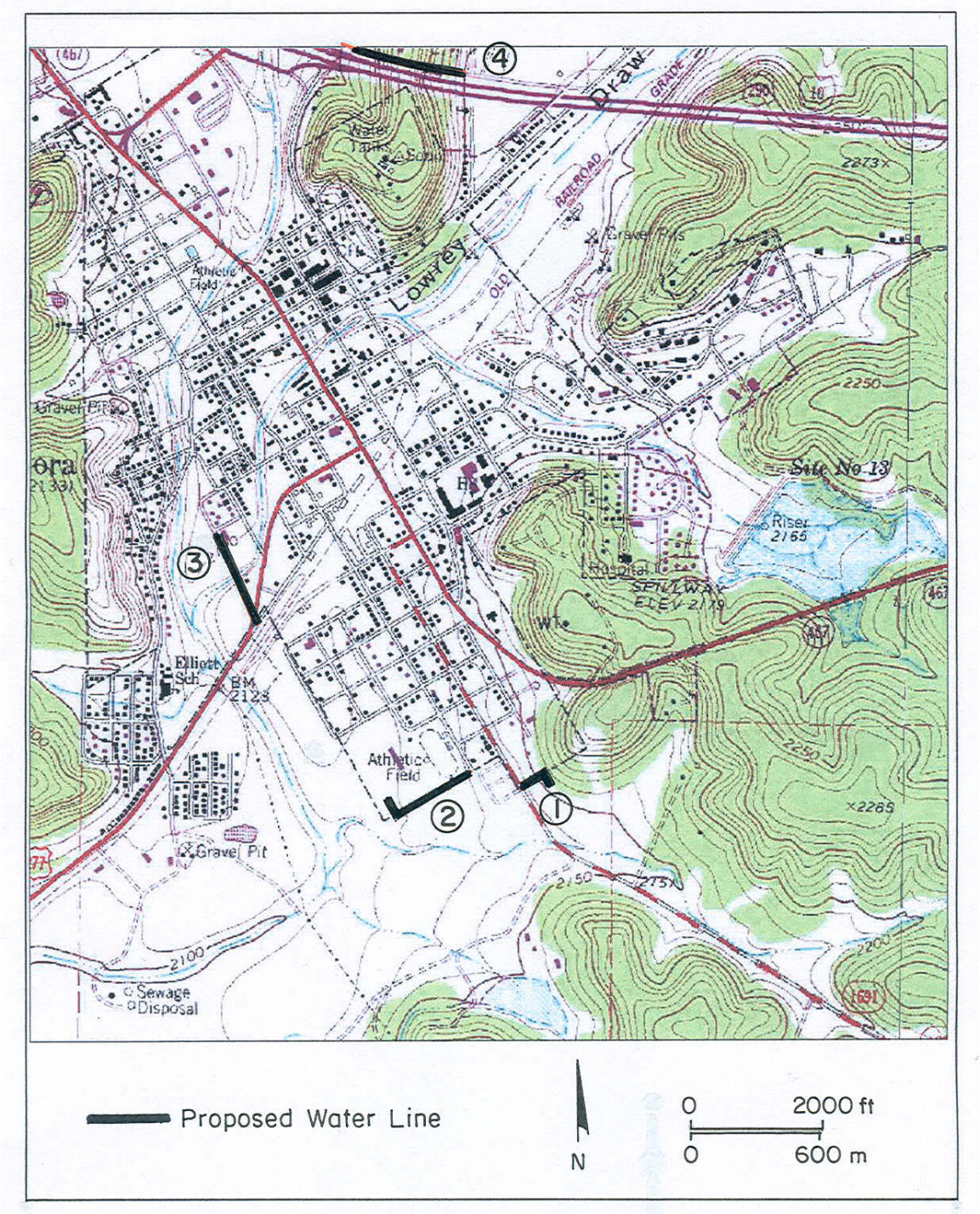

Figure 2. Project Area on Topographic Map Sonora

ENVIRONMENTAL SETTING

Sutton County is located within the Edwards Plateau of Central Texas. To the west is the Stockton Plateau, and the two plateaus are bounded on the south and east by the Balcones Escarpment. To the north is the Llano Estacado, and to the west are the mountains of the Big Bend. The major drainages in the area are the Pecos River to the west and the Devils River that flows through Sutton County. The project area is drained mainly by the Dry Devil's River and some of its tributaries that flow through the town of Sonora. The uplands of the Edwards Plateau are relatively level, and they contain karstic features such as playas and sinkholes that fill with water during the rainy season. The area is also characterized by deep canyons, valleys, and divides that contain steep bluffs and overhangs or rock shelters. Terraces and floodplains are present along the major streams. Limestone outcrops dominate the surface geology, and the local soils have developed from the weathering of limestone and marls. Most of the soils are shallow to very shallow and stony on moderate to steep slopes. Deeper soils are found in floodplain settings along major streams and the tops of plateaus (Anonymous 1958). Soils in Sutton County are only about 10 inches deep in 70 percent of the county and 20 inches deep in about 15 percent of the county. About 77 percent of the soils are clayey, and about 71 percent are stony. Only about 11 percent of the soils formed in alluvium in the valleys (Wiedenfeld and McAndrew 1968:1). Soils found in the project area are discussed in the *Description of the Project Area* section below. The climate of the plateau country is characterized by a decrease in rainfall from east to west. The project area is located in a region defined as dry humid mesothermal (Blair 1950:113). Pollen data from a number of localities in Southwest Texas indicate that a gradual increase in aridity prevailed in this region from post-glacial times to the present (Bryant 1969:124).

ARCHAEOLOGICAL BACKGROUND

Sutton County is located in the Central Texas Cultural-Geographical Region of Texas as defined by Biesaart et al. (1985) in a planning document published by the THC. The counties in this region correspond roughly with the Edwards Plateau region (Figure 3). This region has been delineated for management purposes, and it may not coincide exactly with regions defined by other researchers. There were 3507 recorded sites in the region in 1985, and Sutton County was eleventh in the region that consists of thirty-four counties. Of the twenty-two recorded sites in Sutton County in 1985, two are Middle Archaic, one is Late Archaic, and two are General Archaic. Disturbance to sites in the county is listed by Biesaart et al. (1985:187) as erosion (n=16), construction (n=6), dispersed (n=4), and vandalized (n=3). Investigation at sites in the county in 1985 consisted of excavated (n=4), tested by hand (n=7), and surface collected (n=13). At the time of this survey, there were 80 recorded prehistoric and historic sites in the county. At the time of this survey, two sites are listed in the in the National Register of Historic Places (NRHP) and one site has been designated as a State Archeological Landmark (SAL). The NRHP sites are the Old Mercantile Building and the Sutton County Courthouse, both in the town of Sonora. The SAL site is also the courthouse.

When the archeological bibliography for the Central Texas region was published by the THC (Simons and Moore 1997), there were only twenty references to field work in Sutton County. Most of these projects (n=12) were a result of construction associated with construction of Interstate Highway 10 (Crawford 1973; Jarvis and Crawford 1974; Doran 1976; Luke 1981). The remaining projects consisted of archaeological reconnaissance for the City of Sonora (Whitsett 1976, 1978) and survey for the All American Pipeline (Mueller-Wille 1986, Labadie 1987).

The first professional survey in the county was an investigation of the route of the proposed Interstate Highway 10 in 1970 and 1971 (Crawford 1973). This study was conducted in Crockett, Kimble, Pecos, and Sutton counties. In Sutton County, seventeen prehistoric archaeological sites (41SU1 – 41SU17) were recorded. These sites are described in Crawford's (1973:10-14) report as a lithic scatter, ring middens, and burned rock middens. Site 41SU10 is very close to Area 4 in the current project area. This site was found to be on an eroded surface with shallow soils. Artifacts were observed scattered over a wide area and consisted of flakes, a scraper, and a biface. Not one of the seventeen sites found during this survey was recommended for further investigations. As a result of this survey, Crawford (1973:31) hypothesizes that the "region was intermittently inhabited by aboriginal peoples solely dependent upon a hunting and gathering way of life."

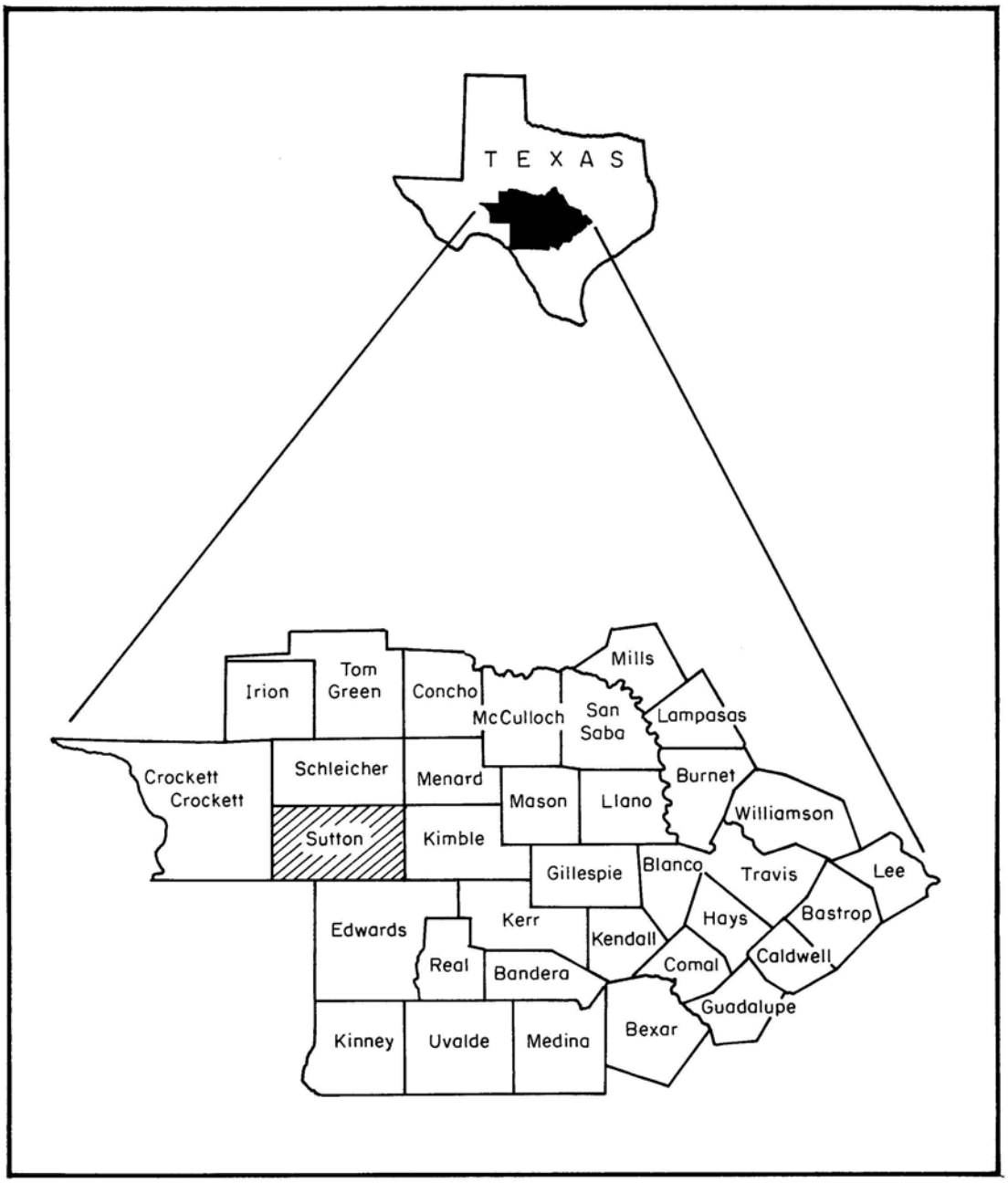

Figure 3. Central Region of Texas

He states that large amounts of chipped stone artifacts were found at the earlier sites, while the later sites were almost void of artifacts except for the burned rock middens. He believes the ubiquitous ring middens represent a greater emphasis on the utilization of local plants such as *agave.* This site type is believed by most archaeologists to be associated with the preparation of food. An in-depth study of ring middens in the area is presented in a Masters thesis by William E. Moore (1980).

The next professional study was conducted in the city limits of Sonora by W. Hayden Whitsett in 1976. Whitsett (1976) conducted a reconnaissance for the Texas Department of Water Resources for the improvement of wastewater treatment facilities. Whitsett recorded one site (41SU26) as a surface scatter containing lithic debitage and burned rock on a terrace overlooking the Dry Devils River. Artifacts observed include one large end scraper and one large biface. The size of the site was estimated at 40 meters by 75 meters. The size of the area surveyed is not stated in the abstract, and a copy of his letter report was not available. Whitsett recommended eligibility testing for 41SU26. In 1978, Whitsett (1978) conducted a second reconnaissance in the city limits of Sonora for the improvement of wastewater treatment facilities. According to his abstract, survey and testing were conducted. Whitsett surveyed 50 acres and presumably tested 41SU26. According to his abstract, the site was largely restricted to the surface with only five centimeters of soil above limestone bedrock. Whitsett's letter report was not available at the time of this study.

The final archaeological investigation in the immediate area was in the city limits of Sonora and was performed by archaeologists from Espey, Huston & Associates, Inc. in 1979 (report not available). This study recorded six prehistoric lithic scatters (41SU22 – 41SU27). Five of the sites are described as being located on a terrace overlooking the Dry Devils River and Lowery Draw, but no information is available for the geographic position of the remaining site. Soils at four of the sites are shallow, being between five and ten centimeters over bedrock. Depth of the soil at the two remaining sites is not stated on the site forms. The size of these sites varies (based on field estimates) from 10 meters in diameter to 100 meters in diameter. The size was not determined for one site. Artifacts observed and collected include bifaces and biface fragments, unifaces tools, a dart point fragment, a scraper, and debitage. No mention is made of burned rock. The only site that can be assigned to a temporal period is 41SU22. Based on the recovery of a dart point, this site is believed to date to the Archaic period. No statement regarding the eligibility of these sites for listing in the National Register of Historic Places or for designation as a State Archeological Landmark appears on the site forms. A controlled surface collection and subsurface testing was recommended for sites 41SU22 and 41SU27.

Additional information regarding the prehistory of Sutton County can be found in the statistical overview by Biesaart et al. (1985), the bibliography for the Central Region of Texas (Simons and Moore 1997), and a planning document prepared by the THC entitled *Archeology in the Central and Southern Planning Region, Texas: A Planning Document* (Mercado-Allinger, et al. 1996).

DESCRIPTION OF THE PROJECT AREA

Area 1

Area 1 is a 325-foot segment that will be disturbed by the installation of a new two-inch water line (Figure 4). This line will connect an existing two-inch water line to the west with an existing six-inch water line to the east. Because the majority of this area is beneath a concrete parking lot and driveway, the line will be installed by directional boring or tunneling. The boring machine will set up several feet away from the proposed tie-in connection to the existing water line and will punch a six-inch hole at the surface. The six-inch auger bit will be controlled by the machine's computer to drill to a pre-determined depth and then follow the proposed path for the new water line until it reaches the tie-in location at the end of the proposed route. The new water line will be attached to the drill stem and pulled back through the borehole. The tie-in locations on the existing water lines will be excavated, and the tie-ins will be made and backfilled.

According to the soil survey (Wiedenfeld and McAndrew 1968), the soils in this area belong to the Tarrant-rock outcrop complex (Tr). This complex is close to streams and is chiefly in the southern and western parts of the county. About 75 percent of this complex is stony clay about seven inches thick that is underlain by fractured limestone. In other areas, these soils vary in depth from two inches near rock outcrops to twelve inches between ledges or in cracks. In general, soils of the Tarrant Series are shallow stony and clayey soils on hills. These soils have a rapid runoff, a moderate water intake rate, and a low capacity to store water. Because of the shallow nature of the soils beneath the concrete, the fact that the ground surface was disturbed during paving for the parking lot and driveway (Figure 5), BVRA believes this is a very low probability area for an intact prehistoric site.

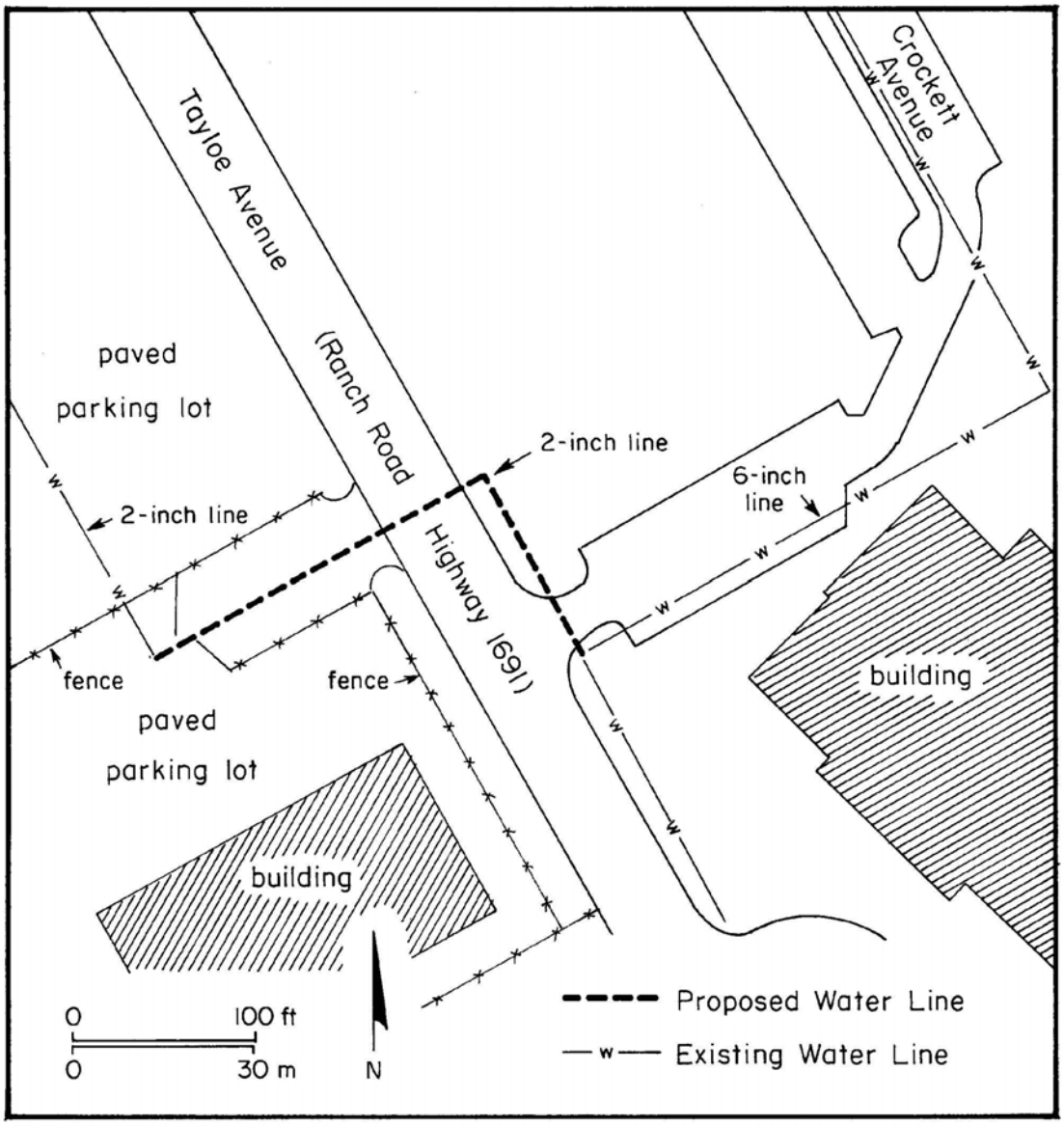

Figure 4. Plan View of Area 1

Figure 5. Photograph of Area 1 (looking north)

Area 2

Area 2 is a 1500-foot segment that will be disturbed by the installation of a new two-inch water line (Figure 6). This line will connect an existing two-inch water line to the west with an existing two-inch water line to the east. The line will be placed in a trench four to five feet deep and two feet wide. It will be placed within a fifteen-foot easement, and the cover will be thirty-six inches. The terrain at Area 2 is flat and featureless (Figure 7).

According to the soil survey (Wiedenfeld and McAndrew 1968), the soils in this area belong to the Knippa series, specifically Knippa silty clay (Ky). This soil type occurs as narrow strips along streams, and it is the most extensive soil in the valleys. Soils of the Knippa series have a surface layer of calcareous silty clay or clay. The top eight inches consists of a moderate, very fine and fine, subangular blocky or granular structure. The lower ten inches has moderate, fine, and medium subangular blocky structure. The subsurface layer, to a depth of fifty inches, has moderate, fine, and medium subangular or irregular blocky structure. The underlying material is made up of gravel and boulders mixed with clayey outwash. The depth to this material ranges from thirty-three to sixty-five inches or more. Knippa soils are well drained, permeability is moderate to slow, and the capacity to store water is high. The field inspection by Charles Frederick revealed the surface in the northeastern segment to consist of Pleistocene soils, while the southwestern segment contains Holocene soils that have the potential to contain buried cultural materials.

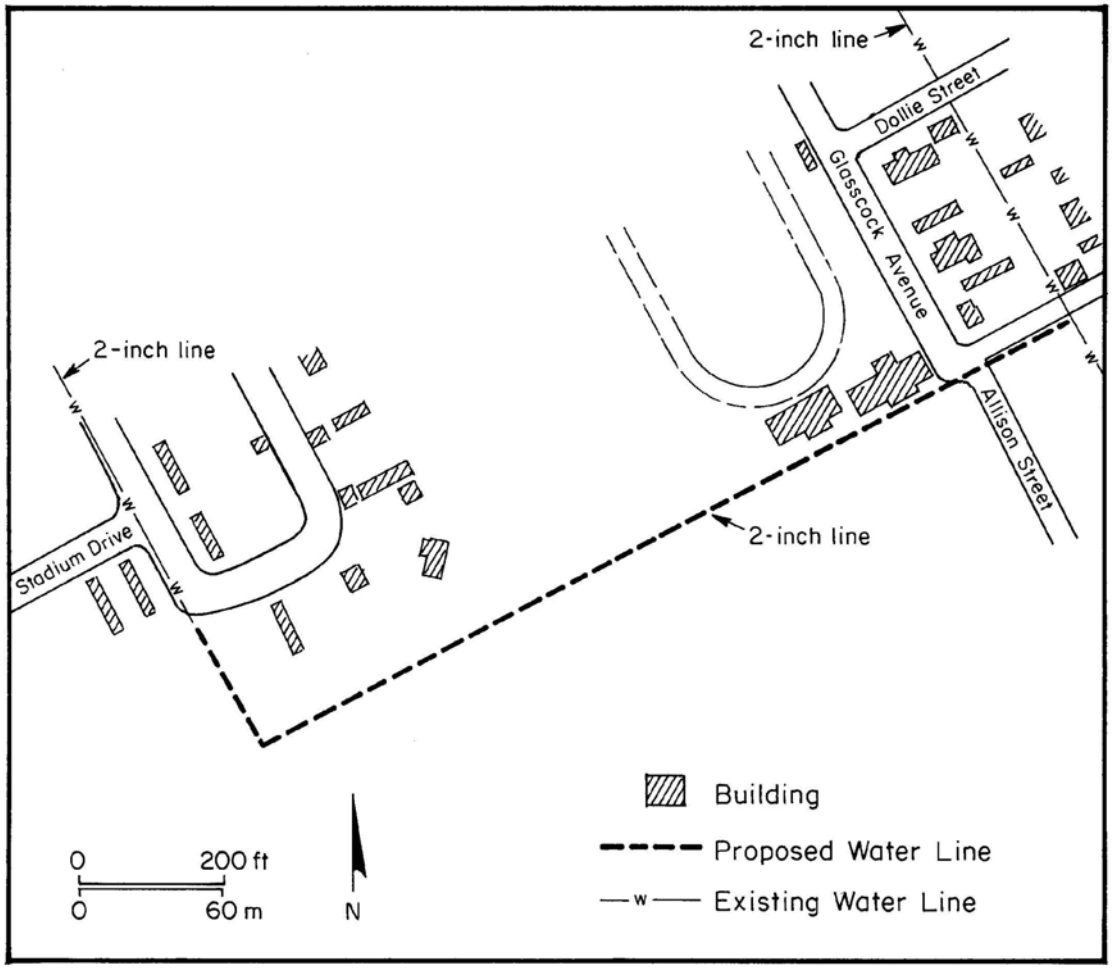

Figure 6. Plan View of Area 2

Figure 7. Photograph of Area 2 (looking north).

Area 3

Area 3 is a 670-foot segment that will be disturbed by the installation of a new two-inch water line (Figure 8). This line will connect an existing two-inch water line to the north with an existing two-inch water line to the south. The line in this area will be installed within a fifteen-foot easement by directional boring at a depth of at least four feet. The depth of the line at the slopes of the draw may be as deep as eight to nine feet to transition the pipe smoothly from the bottom of the draw to the areas beyond the draw. The line will also be deeper as it crosses State Highway 277 in order to maintain a cover of thirty-six inches over the pipe below the existing ditch flow line. The north side of this area is covered with pens for chickens and a horse (Figure 9).

According to the soil survey (Wiedenfeld and McAndrew 1968), the soils in this area belong to the Frio series, specifically the Frio-Dev association (Fd). Soils in the Frio series consist of deep, dark-colored soils on flood plains. They are nearly level, but there are scattered, deeply sloping areas along old sediment filled channels. Gravel and cobblestones occur on the surface and in the profile in some places. The surface layer is about twenty inches thick and consists of dark grayish-brown silty clay loam or clay loam that has been darkened by organic material. It is calcareous and friable. Limestone pebbles make up as much as thirty percent of this layer. The subsurface layer, to a depth of fifty inches, consists of grayish-brown silty clay loam to silty clay. It is gravelly in most places, and the amount of gravel increases with depth. The underlying material consists of limestone gravel or cobblestones mixed with soil material. The depth to the limestone bedrock ranges from three feet along the smaller streams to more than fifteen feet along the large streams. Frio soils are well drained and have a moderate water intake rate, and they are subject to flooding at regular intervals.

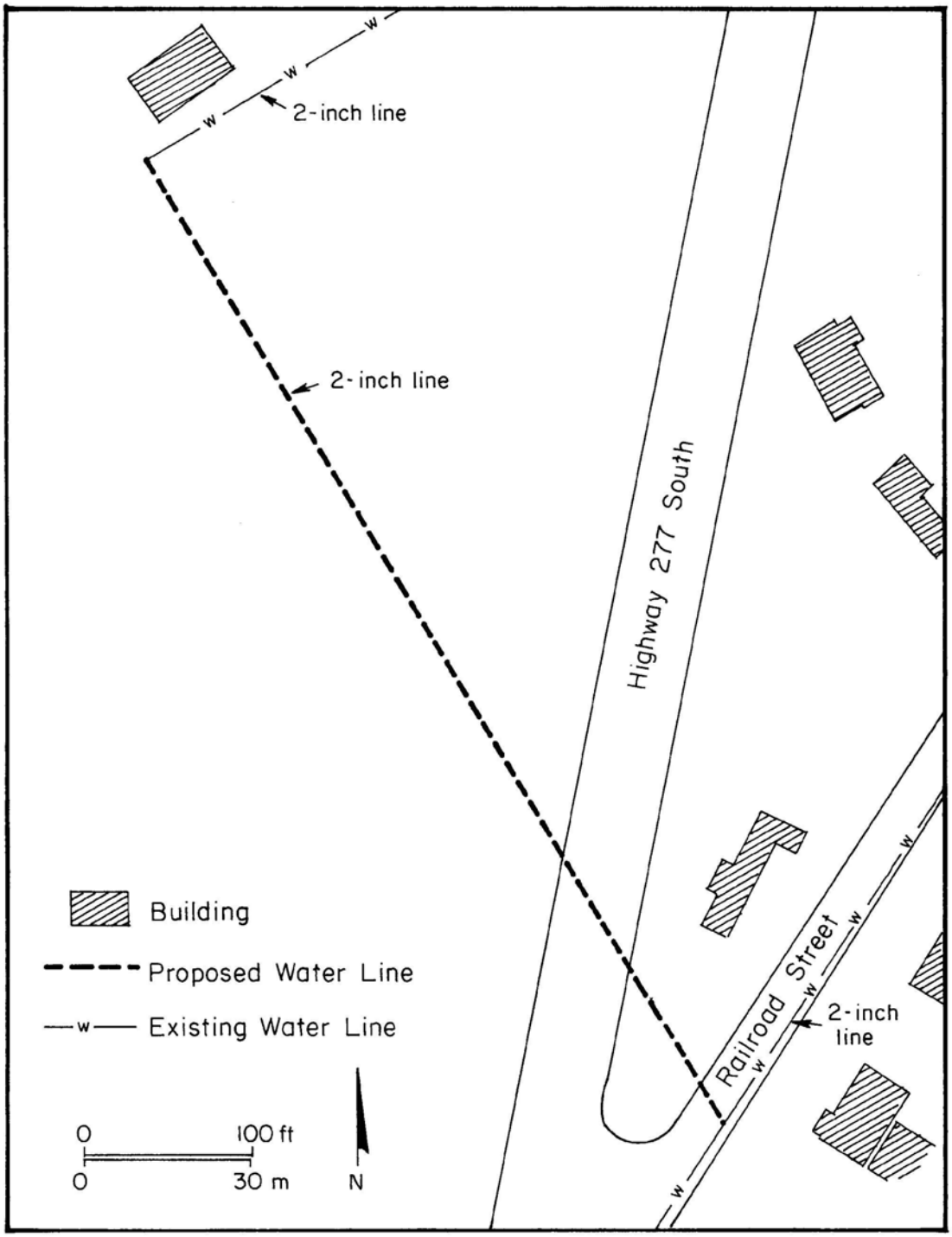

Figure 8. Plan View of Area 3

Figure 9. Photograph of Area 3.

Area 4

Area 4 is a 2340-foot segment that will be disturbed by the installation of a new six-inch water line (Figure 10). This line will connect an existing six-inch water line to the east with an existing six-inch water line to the west. There will not be an easement for that portion of the line that is installed within the TxDOT right-of-way from State Highway 277 to the Sutton County Cemetery. The new line will be located and installed in accordance with the permit from TxDOT. Based on previous experience with TxDOT projects, this agency will want the line to be installed as close to the right-of-way as possible and as existing utilities within the right-of-way will allow. The pipe in this area will be buried at least four feet deep in a two-foot wide trench, except for that short segment (160 feet) in front of the Sutton County Cemetery (Figure 11). In this area, the new line will replace the existing line and will occupy the same footprint. In the rest of this area (when possible), the easement will be fifteen feet. The rest of the new line will be placed in the access road within the right-of-way next to Interstate Highway 10. Most of this segment passes beneath a high hill that has been cut into during highway construction (Figure 11). When the line leaves the road cut, it proceeds down a 2.5% to 3% slope until it connects with the existing line at a Shell gasoline station (Figure 12). State Highway 277, which crosses the APE at a right angle, will be crossed by directional boring.

According to the soil survey (Wiedenfeld and McAndrew 1968), the soils in this area belong to the Tarrant series, specifically the Tarrant-rock outcrop complex (Tr) and the Tarrant soils (Ts). This complex is close to streams and is chiefly in the southern and western parts of the county. About 75 percent of this complex is stony clay about seven inches thick that is underlain by fractured limestone. In other areas, these soils vary in depth from two inches near rock outcrops to twelve inches between ledges or in cracks. In general, soils of the Tarrant Series are shallow stony and clayey soils on hills. These soils have a rapid runoff, a moderate water intake rate, and a low capacity to store water.

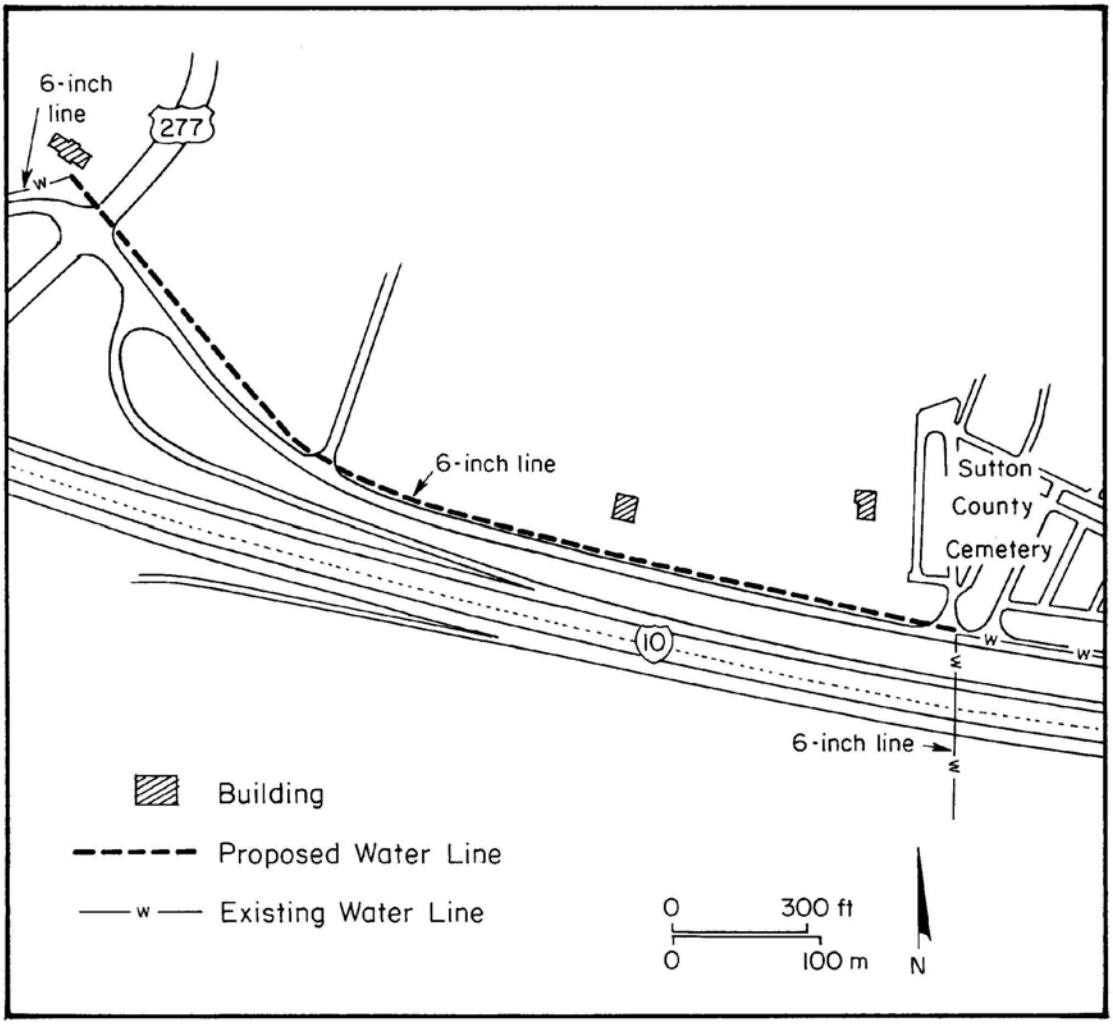

Figure 10. Plan View of Area 4

Figure 11. Photograph of Area 4 (looking west)

Figure 12. View of Project Area Leaving Road Cut (looking west)

METHODS

Prior to entering the field, the Archeological Site Atlas and the site records at TARL were checked for previously recorded sites and past surveys in the project area and vicinity. Archaeological reports relevant to the project area were reviewed in order to ascertain the kinds of prehistoric sites known to occur in the region and to become familiar with the prehistory of the area.

The majority of Area 1 is covered with concrete associated with a parking lot and a driveway. Therefore, no subsurface investigation in this area was conducted.

Area 2 was investigated by the Pedestrian Survey method, backhoe trenching, and shovel testing. The surface of the entire APE was examined. The landowner gave permission for the Principal Investigator to conduct a surface inspection of his land outside the APE. Therefore, a wider area was inspected for evidence of an archaeological site. The northern end of this area was found to consist of Pleistocene age soils. Since the only possibility of an archaeological site would be within the shallow mantle of surface soils and the fact that this mantle had been greatly disturbed by agricultural activities, no shovel tests or backhoe trenches were excavated. The southern end of this area consists of Holocene age soils that have the potential to contain cultural materials. In this area, two backhoe trenches were excavated, and the profiles were examined by the geoarchaeologist. The results of the geoarchaeological investigation are discussed in the section entitled *Geoarchaeological Investigations* below. At the eastern end of Backhoe Trench 2, two pieces of burned limestone rock and a bone fragment were encountered in the A horizon. Based on this find, five shovel tests were excavated along the route of the water line in an attempt to locate additional evidence of a site (Appendix I). These tests were dug at close intervals in order to test the immediate area where the burned rock and bone fragment were found, and they were dug through the A horizon, the same level as the burned rock and bone fragment. The debitage found on the surface was collected and analyzed in the laboratory (Appendix II). They were discarded following the completion of this project. Photographs of each of the four areas, the backhoe trenches, and the area near the Sutton County Cemetery were taken with a digital camera.

It was not possible to dig backhoe trenches at Area 3 due to the presence of chicken houses and a horse pen. Since the water line will be installed through the process of directional boring beneath the creek, the northern and southern ends of this area were examined by the geoarchaeologist in order to evaluate the impact of this procedure to the landscape where Holocene age soils are present. At the northern end, it was determined that the impact of the boring would have no significant effect. Therefore, no subsurface investigation was conducted. At the southern end, there was a gully that offered a natural profile. This profile was scraped to look for evidence of cultural materials.

Most of Area 4 is within the access road along Interstate Highway 10. Part of this area had been surveyed in 1970 and 1971 by archaeologists from the Texas Highway Department (Crawford 1973). A short segment of the proposed water line passes very close to the Sutton County Cemetery, and it is not known if this portion was part of the survey area by the Texas Highway Department. There is an existing six-inch water line in front of the cemetery, and the new line will be placed within the trench for the existing line. At the time of this survey, the exact location of buried utilities was not known. Therefore, no subsurface excavations were conducted. The Principal Investigator discussed that part of the APE near the cemetery with Bruce Kerbow, owner of the Kerbow Funeral Home and was told that the fence was erected over 50 years ago as a boundary for the cemetery. He stated that there have been no graves placed outside this fence since that time. Mr. Kerbow also stated that all graves since the 1950s within the cemetery had headstones. Most of the remainder of the line passes through a massive road cut. Should a site be present in this area it would be on top of the hill that is outside the APE. Therefore, this area was not examined by BVRA. After leaving the road cut, the proposed water line will connect with an existing line across State Highway 277 at a Shell gasoline station, approximately 950 feet from this point. The line proceeds down a slope that is a 25 – 30 foot drop (2.5% - 3%) in elevation. The nearest water to the end point of the new line is the Dry Devils River, which is approximately 600 feet to 700 feet to the west.

GEOARCHAEOLOGICAL INVESTIGATIONS

Field Methods

Two backhoe trenches (BT 1 and BT 2) were excavated, and two exposed areas (one borrow pit and one gully) were examined. Trenches were excavated to about 1.2 meters deep with a ramp at one end and three vertical walls (less than 4 feet tall). Trench walls were cleaned with a pick, knife, and trowel to search for cultural material, and the end wall was used for a formal description. These deposits were described in general accordance with Schoeneberger et al. (2002), with the exception that the fundamental unit of field observation was a "zone," which was used to represent any physically distinct deposit. All zones were subsequently assigned soil horizon designations. Trench descriptions are provided in Appendix III and discussed in the text below. The approximate age of the deposits examined in the field was inferred on the basis of the degree of soil development in accordance with general principles outlined by Birkeland (1999) and correlation with alluvial stratigraphic work elsewhere in Central Texas.

Geomorphic Setting

The City of Sonora is situated in an alluvial valley at the confluence of Lowrey Draw and the Dry Devils River. Both streams have their headwaters along the southern margin of the Edwards Plateau to the north of Sonora. The Dry Devils River originates in Schleicher county about 20 miles north of Sonora, to the west and south of the town of Eldorado. The river enters Sonora from the north and immediately south of town it makes a prominent bend to the southwest. Lowrey Draw originates about 12 miles northeast of Sonora near the county line between Schleicher and Sutton counties. The courthouse and historic core of Sonora are built on the interfluvial ridge between the two streams, and the town is surrounded by dissected mesas that are underlain by the Segovia Formation of the Edwards Group Limestone as defined by the Bureau of Economic Geology (1981).

Above Sonora, the Bureau of Economic Geology (1981) does not map any Holocene alluvium (Qal) in either valley. Instead, it maps the valley floor as Quaternary undivided (Qu), which is a composite unit consisting of Holocene and Pleistocene age deposits that are described as "alluvial fan deposits, colluvium, caliche and alluvium." These alluvial fan deposits merge with colluvium and alluvium, caliche-cemented, poorly sorted angular-to-rounded rock fragments of locally derived material. Caliche also forms partly alluviated flats, mostly soil covered. Although it is likely that discrete mappable deposits of Holocene and Pleistocene alluvium are present in this area, they are not mappable at the scale of the Bureau of Economic Geology map.

Areas 2 and 3 were examined during this phase of work. Two backhoe trenches were excavated within Area 2, which is located to the south of Sonora and adjacent to the athletic field on land owned by Jimmy Powers. Area 3 is the point where a new pipeline is proposed to cross Lowrey Draw immediately north of State Highway 277. A single gully exposure was documented on the south side of the creek at this area.

Area 2

The proposed pipeline route in Area 2 traverses a gently westward sloping surface that originates at the toe of the limestone upland to the east of Ranch Road 1691 and is partially underlain by a low-order, unnamed stream floodplain which drains a small canyon formed in the limestone uplands southeast of Sonora. Ranch Road 1691 traverses the floor of this drainage on its way out of Sonora to the southeast. This small canyon and the westward sloping surface are all mapped as Quaternary undivided by the Bureau of Economic Geology (1981), and the soil in the area trenched is mapped by Wiedenfeld and McAndrew (1968) as the Angelo Silty Clay Loam (classified as an Aridic Calciustoll). This soil series is described as “deep or very deep, well drained, moderately slowly permeable soils formed in calcareous loamy and clayey alluvium” and is primarily mapped on ancient stream terraces (Wiedenfeld and McAndrew 1968).

The geology in the vicinity of Area 2 appears to consist of an ancient stream deposit as well as one or more deposits of Holocene alluvium. Immediately south-southwest of the athletic field, there is a borrow pit that has been excavated to a depth of about two meters. This borrow pit provides a view of the near surface geology. The eastern side of the borrow pit exposes a gravelly Pleistocene alluvial deposit within which a petrocalcic horizon has formed (Figure 13). Based on the degree of soil development, this deposit is probably in excess of 50,000 years old, and it has no potential for buried cultural material in any horizon other than the thin (<20 cm) A horizon. The western side of the borrow pit appears to be underlain by a younger, Holocene alluvial deposit, but sculpting and dumping of gravel along the pit margin precluded a clear view of this deposit within the borrow pit. The modern tributary channel is situated south of the borrow pit and immediately north and more or less parallel to a caliche oil-field road that crosses this portion of the area in an east-west direction. A short undetermined distance to the west, this small stream enters the Dry Devils River, but that is outside of Area 2. The proposed pipeline follows the fence line where it borders a housing development that is situated west of the athletic stadium. A narrow ditch runs around this development and at the eastern (upslope) margin the surface the houses have been built on lies almost three meters below the former natural ground surface and the ditch that circumscribes the development intersects the course of the small stream immediately west of Area 2. Area 2 is depicted in Figure 14.

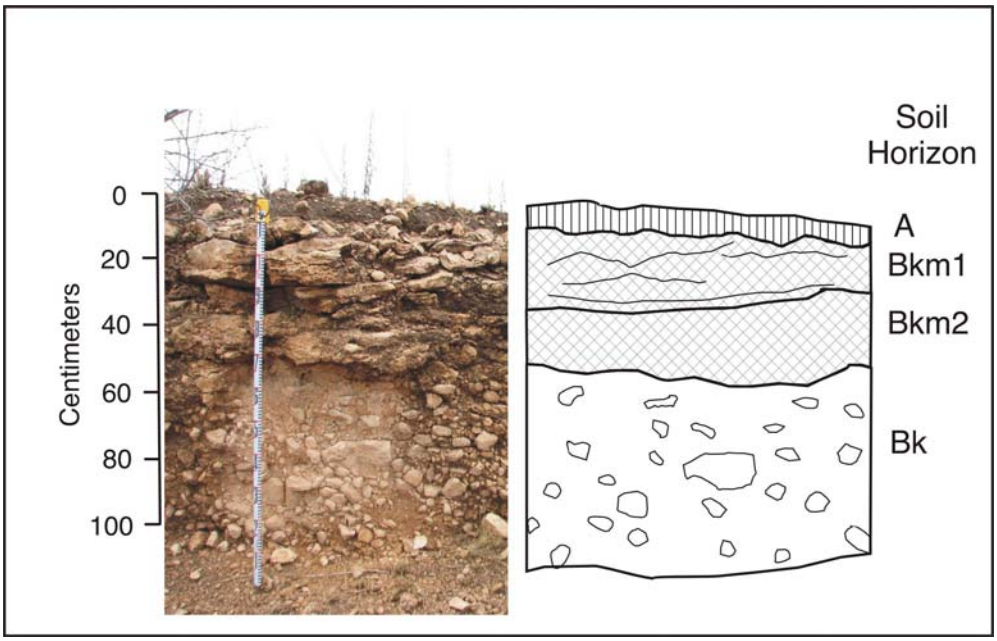

Figure 13. Borrow Pit Exposure

In Area 3, the newly proposed pipeline crosses Lowrey Creek near its confluence with the Dry Devils River. This area is close to the point that the Bureau of Economic Geology starts mapping Qal (Holocene alluvium) in the Devils River valley, and the soils in this area have been mapped by Wiedenfeld and McAndrew (1968) as the Frio-Dev association (map unit Fd). The Frio-Dev association consists of five soil phases (four of the Frio Series and one of the Dev Series (both series are classified as cumulic haplustolls) that occur as long narrow strips adjacent to larger streams in this area. The Dev series soils exhibit A-C profiles and consist of “deep, dark-colored, well-drained, very gravelly soils on the flood plains of streams that drain limestone areas,” whereas the Frio Series soils exhibit A-AC-C profiles and are described as “grayish-brown to very dark grayish-brown, moderately fine textured, well-drained soils on the flood plains of streams that drain limestone areas” (Wiedenfeld and McAndrew 1968:32-34).

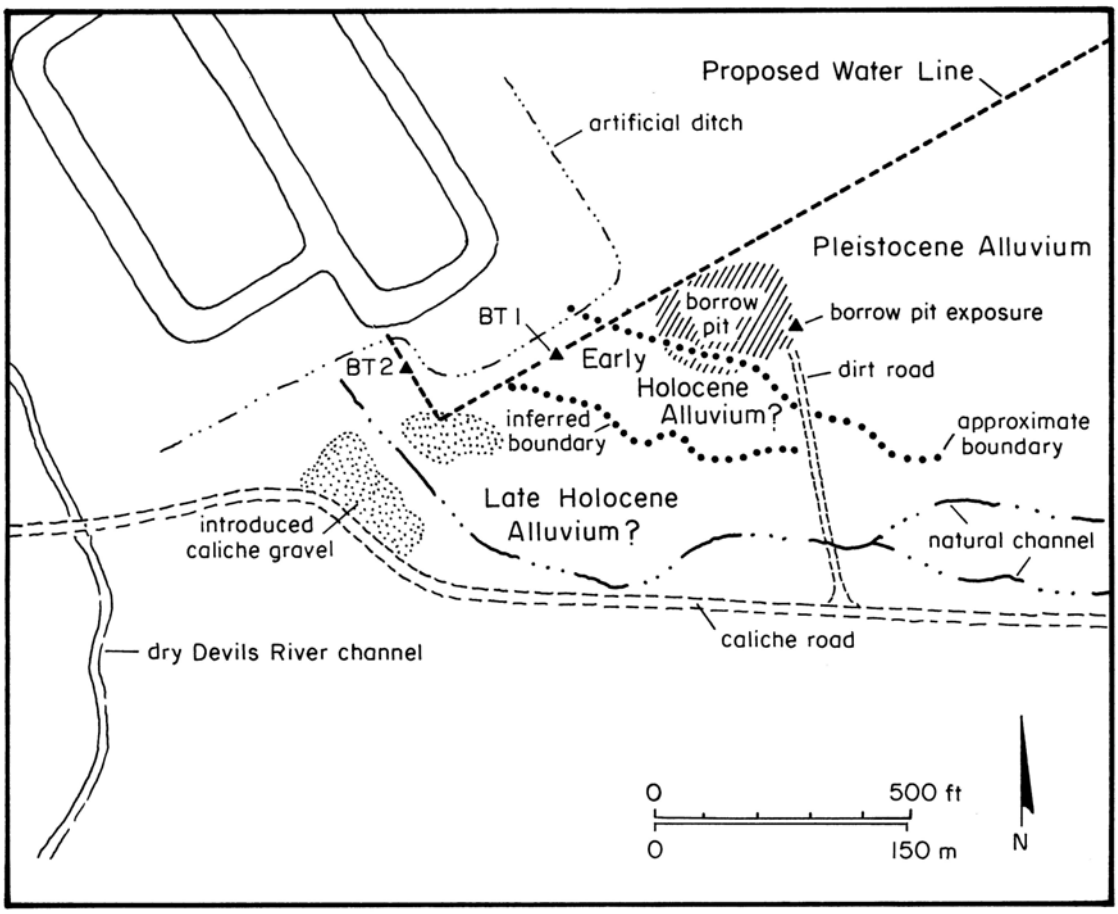

Figure 14. Area 2

The landforms present at this stream crossing imply that several different age deposits are locally present. On the north side of Lowery Draw, two constructive alluvial surfaces are present. Fay Street, where the proposed water line bore hole will be placed north of Lowrey Draw, is built upon a broad alluvial surface that appears to be the floodplain of the Dry Devils River. Inset into this surface immediately adjacent to Lowrey Draw is a slightly lower surface that lies about two meters above the Lowery Draw channel, and this surface appears to be the active or late Holocene floodplain of Lowrey Draw. Although no exposures of either of these surfaces were observed, the landscape position of the landforms suggest that these are Holocene deposits, and a Late Holocene age is presumed.

The south side of the Area 3 crossing is a constructional alluvial surface that lies about four meters above the Lowry Creek channel. A gully that has cut southward into this surface adjacent to a gasoline station provides a good view of the deposits (Figure 15). The location of this cut is fortuitous, given that nearly the entire path of the pipeline on the south side of Lowrey Draw is now covered in pavement associated with the filling station.

Results

Observations from Trenching in Area 2

Two trenches and five shovel tests were excavated within the area of the presumed Holocene alluvial deposits west of the borrow pit (Figure 16). Backhoe Trench 1 (see Appendix III for description) was closest to the borrow pit, and this trench revealed an alluvial deposit within which an A-AB-Bk soil profile had formed (Figure 17). The presence of a nodular morphology to the calcic B horizon (Zone 3, Bk horizon) suggests that this deposit is of late Pleistocene to Early or Middle Holocene age and has the potential to contain buried cultural resources. No cultural material was observed within this trench exposure.

The second trench was placed into a slightly lower surface (no clear scarp separated the two trench localities) and revealed what appear to be two different age alluvial deposits separated by an unconformity (Figure 18). The top meter consisted of a deposit that is interpreted as a Late Holocene alluvium within which an A-AC soil profile had formed. This deposit fined upward, and the basal part (Zone 2) appeared to be poorly sorted channel sediment. Two pieces of burned limestone were found near the base of the A horizon (Zone 1) at depths of 25 and 31cm below the existing ground surface and, despite examining the entire trench wall with a trowel, no other cultural material was found. To evaluate the potential for buried cultural material five shovel tests were excavated adjacent to Backhoe Trench 2 within the proposed pipeline route (three to the north and two to the south), and no additional cultural material was observed. The basal 30 cm of Backhoe Trench 2 (95-125 cm) consisted of slightly redder, well-structured clay that was interpreted as older alluvial deposits, possibly the same deposit as exposed by Backhoe Trench 1.

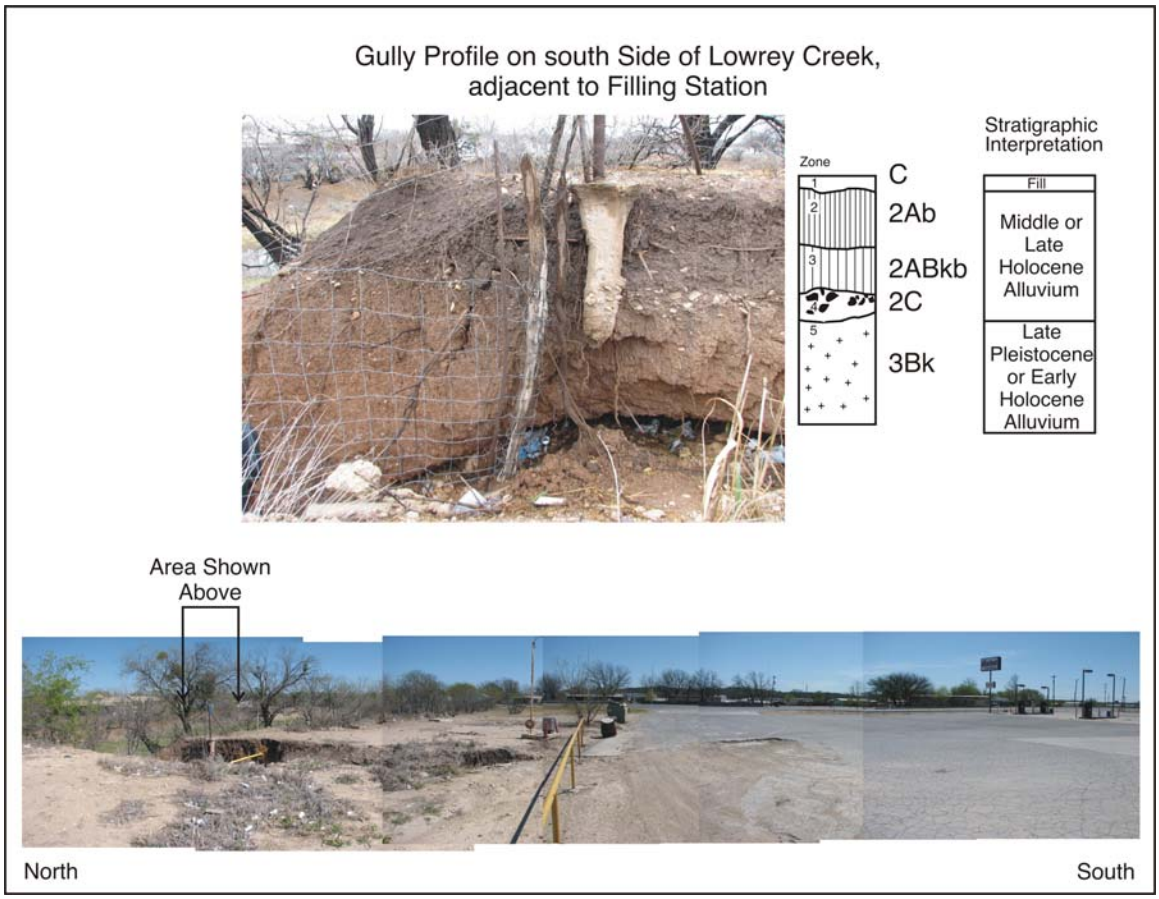

Figure 15. Gully Profile

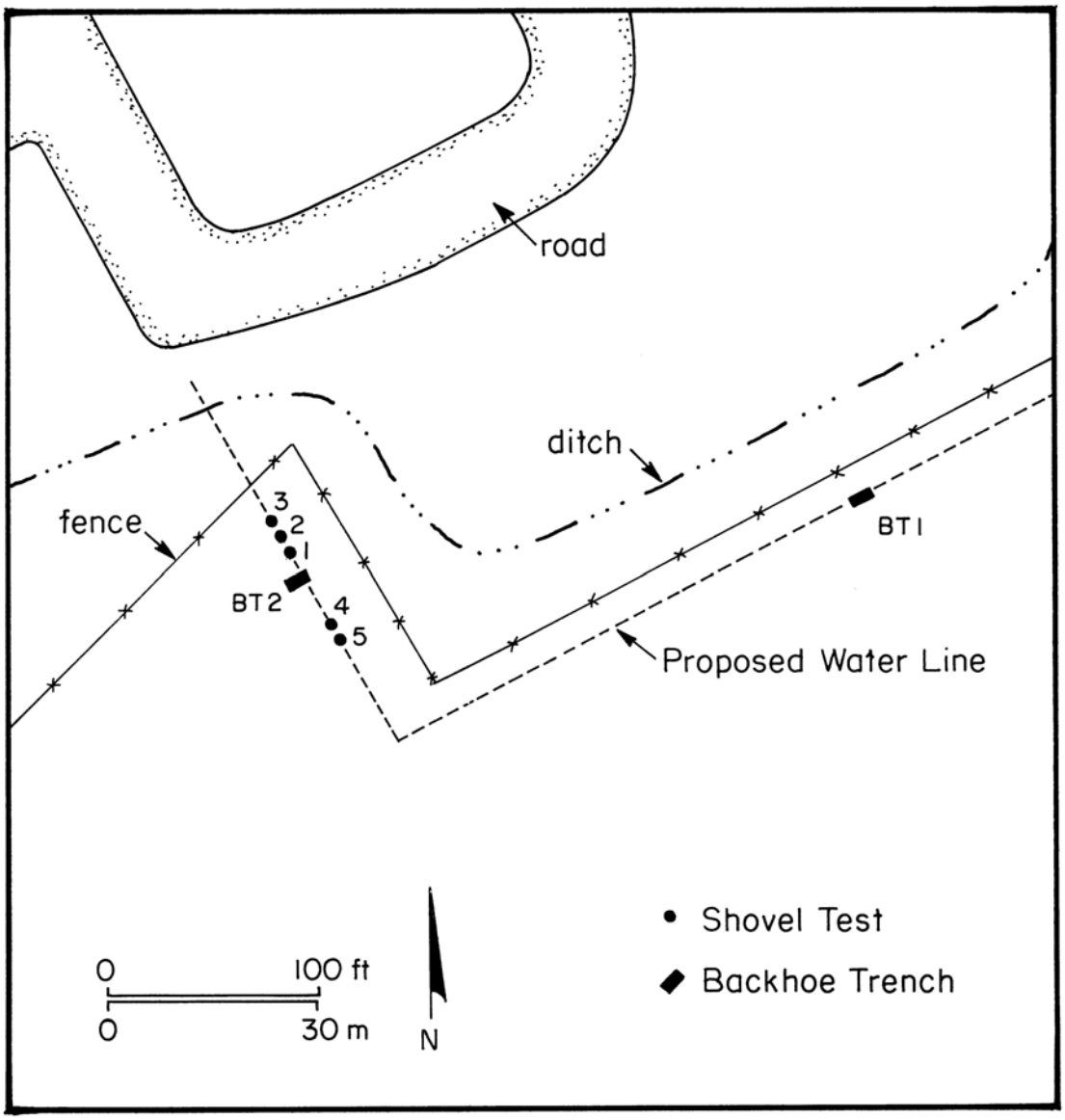

Figure 16. Location of Backhoe Trenches and Shovel Tests

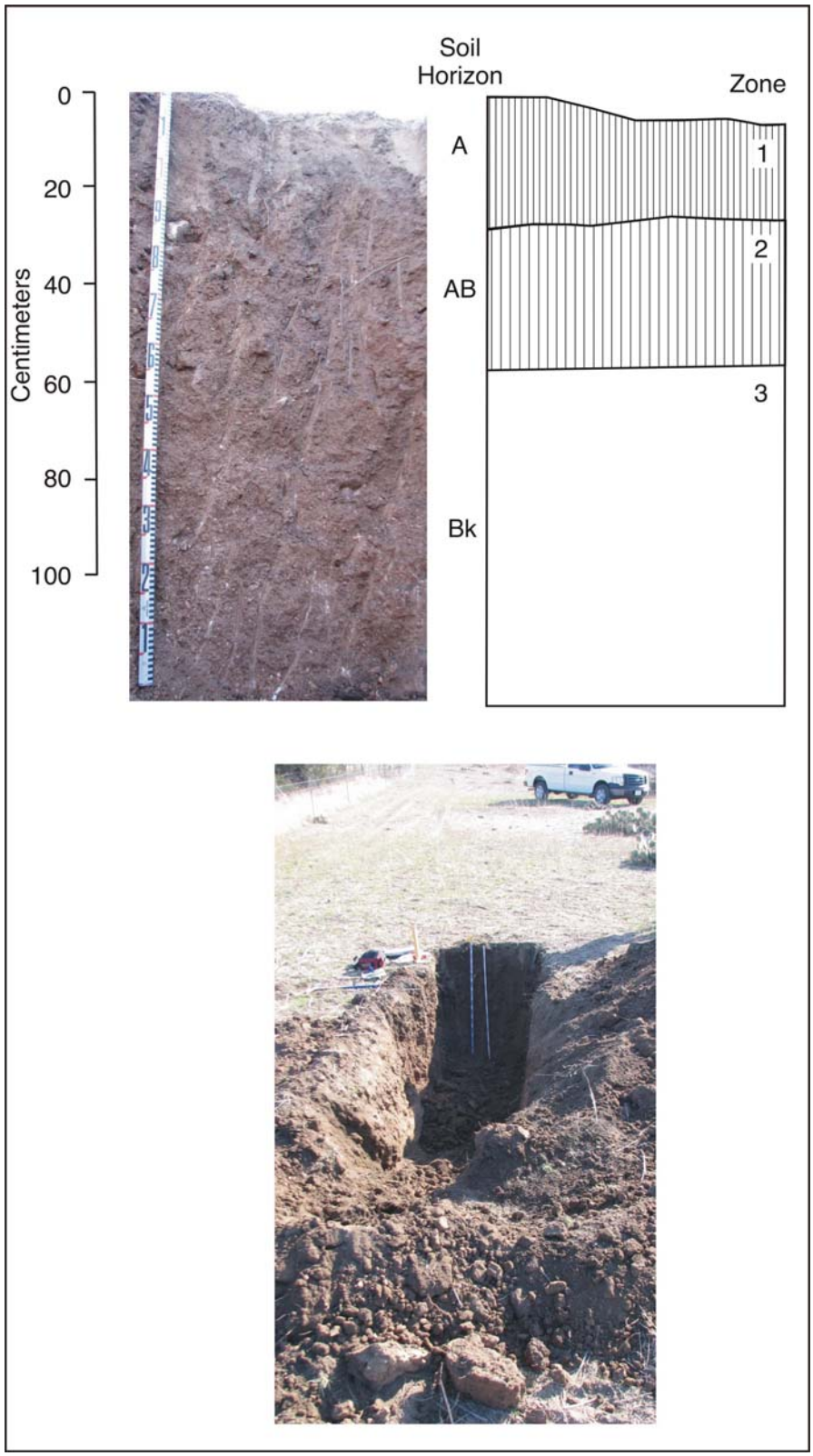

Figure 17. Backhoe Trench 1

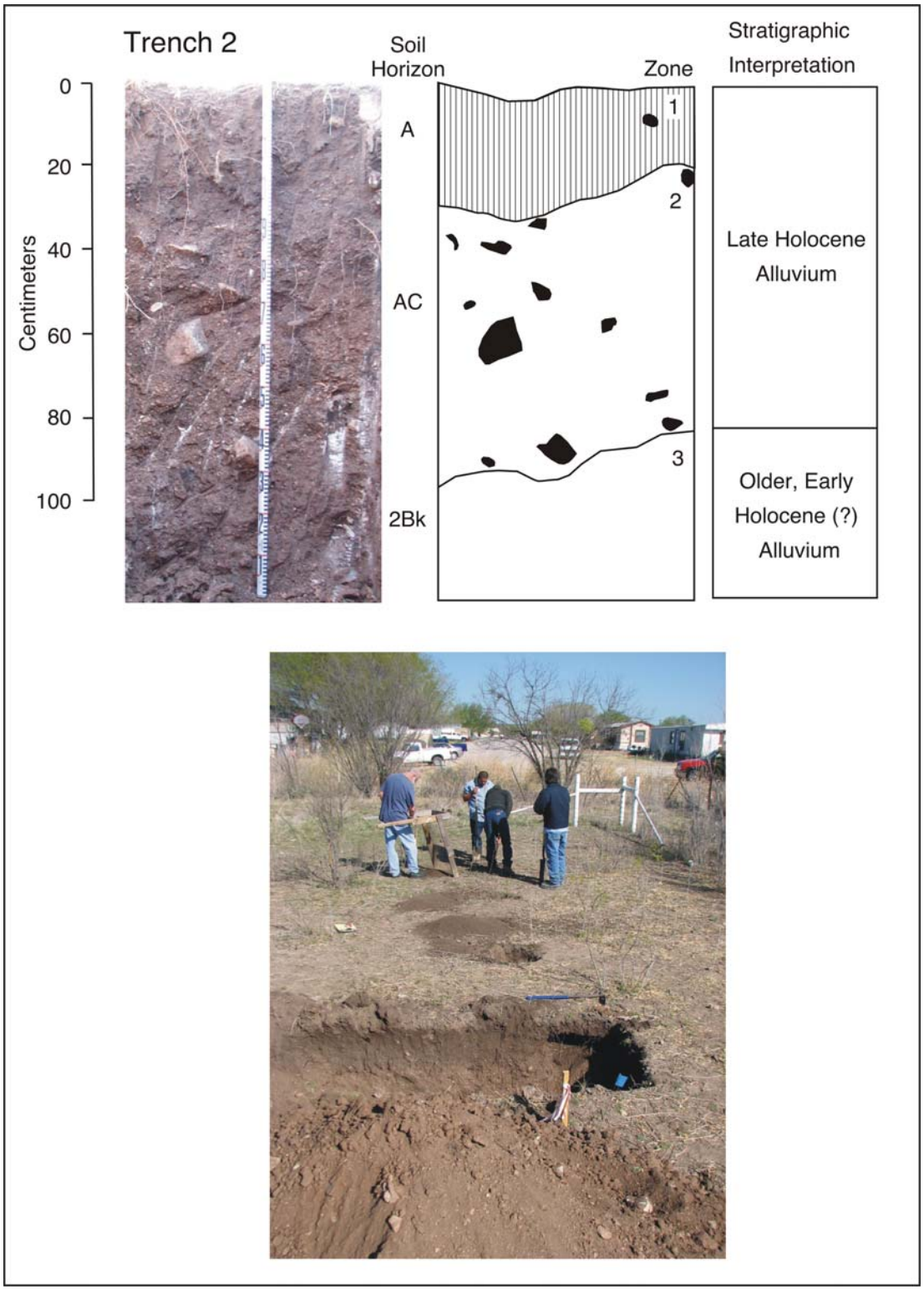

Figure 18. Backhoe Trench 2

Stratigraphic Observations in Area 3

The only visible exposures in this area are the deposits revealed by the gully adjacent to the filling station. Examination of this cutbank revealed the presence of a Late Pleistocene or Early Holocene alluvial deposit at depth (below 70 cm), which is unconformably draped by a younger, presumably middle or Late Holocene alluvium (5-70 cm). The top five centimeters in this exposure is an introduced gravelly fill. The upper alluvial deposit exhibits an A-ABk-C soil profile and the ABk horizon consists of weak stage II (nodular) calcic horizon, which contained 5% small (<2 mm) calcium carbonate nodules. The older alluvial fill consisted of a Bk horizon that also exhibited a Stage II nodular calcic horizon but with considerably more secondary (or pedogenic) calcium carbonate (common (15%) coarse (0.5 to 1.5 cm) calcium carbonate nodules). This deposit was also demonstrably rubified and exhibited 7.5YR hues, whereas the overlying younger alluvial deposit was predominantly 10YR hues. A six-meter long section of the gully face was picked and examined for cultural material, but no prehistoric items were observed.

Conclusions

Both Area 2 and Area 3 contain significant amounts of Holocene alluvium that have the potential to contain buried cultural material. Two backhoe trenches were excavated in Area 2, and no cultural material was observed in context in Backhoe Trench 1. Two pieces of burned limestone were observed within the A horizon at Backhoe Trench 2. Five shovel tests excavated adjacent to Backhoe Trench 2 failed to recover additional burned rock or prehistoric artifacts.

Although no trenches were excavated in Area 3, examination of a gully exposure on the south side of Lowrey Draw provided an image of the age of the deposits in this area, and no buried cultural material was observed.

RESULTS AND CONCLUSIONS

The records check revealed that three of the areas (1-3) had not been visited by a professional archaeologist, and no prehistoric or historic sites are known to be present in either of these areas. Part of Area 4 was examined in 1970 and 1971 as part of the survey for the proposed Interstate Highway 10. This investigation recorded one site (41SU1) in close proximity to Area 4 (see *Archaeological Background* above). Previous surveys in the county have documented prehistoric sites dating to the Archaic and Late Prehistoric periods of Texas prehistory in the general area. The majority of these sites are burned rock middens and lithic scatters. Carin burials, rock art, and sites in rock shelters have been recorded in the region, but the landscape in the current project area is not suitable for these kinds of sites.

Area 1 was found to be a low probability area for a prehistoric site due to the fact that the soils in this area are shallow and rocky. Also, at the time of this visit the majority of the area was beneath a concrete parking lot and driveway. Any site present would be restricted to the very disturbed surface.

At Area 2, a very sparse scatter of debitage and some burned rock was observed on the surface. According to Jimmy Powers (personal communication, April 6, 2009), this entire area has been disturbed through root plowing, pushing of mesquite, and grass burning. According to Powers, root plowing and mesquite pushing disturbs the surface to a depth of three feet. If this is true, any site in this area to this depth would be greatly disturbed and have no research potential. The geoarchaeological investigation, however, did not confirm disturbance to this depth. The fires associated with grass burning could account for some of the burned limestone rock present. It is also possible that there is more debitage and perhaps some diagnostic artifacts present beneath the surface as they were moved about during the root plowing and mesquite pushing. The soils in this area are Pleistocene and Holocene in age. One interior flake was found on the surface at the northern end of this area where Pleistocene age soils are present, and one scraper, one flake, and two large chert fragments were found at the southern end in the area where Holocene soils are present.

Area 3 also contains Holocene soils, but the water line will be placed beneath the creek and through the area by directional boring. Based on a study of the area by Charles Frederick, it is believed that minimal impact will result from this method of installing the water line.

At Area 4, the water line will be placed along the access road of Interstate Highway 10 and within 75 feet of the Sutton County Cemetery. A field inspection of this area failed to identify any evidence of a prehistoric or historic site. The access road has been totally disturbed during the construction associated with Interstate Highway 10. Therefore, if a site was not located during the previous survey by the Highway Department, it would have been destroyed during the above-mentioned construction. The Sutton County Cemetery contains graves dating to the 19th century, and it is still in use. According to Bruce Kerbow, the area was fenced approximately 50 years ago to enclose the original cemetery and to mark the boundary for future burials. This fence has been in place for at least 50 years, and no burials since that time have been placed outside the fence. The old portion of the cemetery is hundreds of feet from the fence and the APE. Therefore, it is unlikely that there are unmarked graves that far from the original cemetery.

RECOMMENDATIONS

Since no prehistoric site was identified as a result of this survey, it is recommended that construction in areas 1-3 be allowed to proceed as planned. It is also recommended that monitoring by a professional archaeologist be conducted in that portion of the proposed water line that will be placed within 75 feet of the Sutton County Cemetery. Should construction plans change to include new areas or a change in any of these areas, the THC and the TWDB must be notified in case additional survey by a professional archaeologist is warranted. Also, if prehistoric or historic cultural materials are unearthed during construction, all work in the area of the find must stop until the THC and the TWDB can evaluate the situation. This study was performed in accordance with the Minimum Survey Standards as defined by the Archaeology Division of the THC.

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Appendix I: Shovel Test Log

Shovel Test	Depth*	Area	Results
1	35 cm	2	Holocene soil with small limestone gravels; no cultural materials
2	35 cm	2	Holocene soil with small limestone gravels; no cultural materials
3	38 cm	2	Holocene soil with small limestone gravels; no cultural materials
4	40 cm	2	Holocene soil with small limestone gravels; no cultural materials
5	35 cm	2	Holocene soil with small limestone gravels; no cultural materials

* depth below the ground surface

Appendix II

Lithic Analysis

(by William A. Dickens)

Discussion

Six lithic specimens were submitted for analysis. They consist of one scraper, two flakes, two large chert fragments, and one limestone cobble. These specimens were collected from the surface over a wide area. They are described below.

Scraper

This specimen is made on a large flake that falls within the size grade 3 category (greater than 3/4 inch and less than 1 inch). The material is a light to dark brown mottled chert with a few whitish blotches. It is a complete interior flake that appears to be an "overshot flake," or one that has been removed from the entire width of some portion of a chert cobble. The dorsal surface exhibits an earlier removal scar that covers most of its surface, forming a slight depression. The platform is crushed, and there is a large "erailleur" scar present on the ventral surface. The entire distal edge, on the side of the parent cobble, has been retouched from the ventral surface, and this has resulted in a slight concave shape. This edge still is still sharp and exhibits little wear.

Flake 1

This flake falls within the size grade 5 category (greater than 3/8 inch and less than ½ inch). It is a complete interior flake made from a light brown chert. It has a plain platform, is "un-lipped," and contains a slight bulb.

Flake 2

This flake also falls within the size grade 5 category. Only the distal portion of the flake is present. It has a triangular cross-section that suggests it is part of a blade with the distal end retaining some cortical material. This indicates it was an overshot type flake removal. The interior of the flake is a yellowish-brown chert, and the color gradually changes to white towards the cortical area.

Chert Fragment 1

This chert fragment measures 70.6 mm in length, 57.6 mm in width, and 22.5 mm in thickness. The interior of this cobble is light gray in color with a darker gray band near the outer surface. Portions of the surface are heavily patinated, and some cortex is present. The dorsal surface contains a number of "pits" or potlids, indicating contact with fire sometime in the past. This fragment was removed from a larger cobble, and one of its sides ha been flaked. The specimen appears to have been either a flake core or an early attempt at making a larger tool or biface.

Chert Fragment 2

This chert fragment measures 59.7 mm in length, 34.3 mm in width, and 24.7 mm in thickness. It is essentially an unaltered chert fragment. Some pitting is present on the ventral surface, and a small sliver has been detached from one corner. The interior within the resulting scar is bright or shiny, indicating that the material has been heated (probably through natural causes). Its color is a dark grayish-brown with some brown cortex along one edge.

Limestone Cobble

This specimen is a typical limestone cobble that has been weathered on the surface for an extended period of time. It measures 69.2 mm in length, 51.0 mm in width, and 34.7 mm in thickness. Weathering has created a rounded shape to all but one edge, which has been broken. No apparent heating or thermal fracturing is evident on the fractured edge or on any of the other surfaces.

Summary

Although several of the collected specimens contain some evidence of cultural modification, the scattered nature of the finds suggests that the ground surface has been altered by ranching activities or that these specimens represent scattered isolated finds.

APPENDIX III

DESCRIPTION OF BORROW PIT AND BACKHOE TRENCHES

By

Charles D. Frederick

Borrow Pit (East End Exposure)

Location: Zone 14R 3 42 618 Easting 33 81 548 Northing

Geologic Units: Bureau of Economic Geology map unit Quaternary Undivided (Qu) and Holocene alluvium

Cultural material: Light scatter of fire-cracked rock and debitage in the A horizon

Comments: This borrow pit was excavated along the western edge of the Quaternary undivided outcrop, and it exposes an ancient alluvial deposit in the east wall and a deposit that was presumed to be Holocene along the west wall. Sculpting of the quarry margin did not leave a good exposure of the younger deposit along the western wall, but the eastern wall retained a 1 to 2 meter tall-standing face that revealed a gravelly alluvial deposit within which an A-Bkm-Bk soil profile had formed (Figure 13). On the basis of the degree of soil development, this deposit is inferred to be in excess of 50,000 years old. The presence of an advanced stage calcic B horizon (specifically the Bkm soil horizon or K horizon, as it is sometimes called) (e.g., Birkeland 1999:356-357) requires a very long period of time to form. A formal description was not made of this exposure as the deposit is clearly Pleistocene in age and has no potential for a significant buried archeological site.

Backhoe Trench 1

Location: Zone 14R 3 42 500 Easting 33 81 532 Northing

Geologic Units: Holocene alluvium (estimated to be of terminal Pleistocene to Middle Holocene age)

Cultural material: A very light scatter of burned rock and debitage was observed across the surface around the trench. No portion of this scatter was observed in context within the trench.

Comments: No comments for this trench.

Zone	Horizon	Depth	Description
1	A	0-32 cm	Dark brown (7.5YR 3/2, moist) silty clay to clay, very friable, moderate medium to fine subangular blocky structure, gradual smooth boundary, violently effervescent, few (3%) coarse fragments, most of which were fine subrounded limestone gravel.
2	AB	32-60 cm	Brown (7.5YR 4/2, moist) clay, friable, strong medium to fine angular blocky structure, gradual smooth boundary, violently effervescent, few to common (3-5%) coarse fragments, similar to Zone 1.
3	Bk	60-125 cm or more	Reddish brown (5YR 4/4, moist) silty clay, slightly hard, moderate medium prismatic structure parting to strong fine to very fine subangular blocky structure, violently effervescent, common (5-7%) calcium carbonate filaments, common (5%) medium (2-5 mm) prominent white (10YR 8/1) irregular shaped friable masses of calcium carbonate, 7-15% coarse fragments consisting of matrix supported fine subrounded limestone gravel.

Backhoe Trench 2

Location: Zone 14R 3 42 422 Easting 33 81 524 Northing

Geologic Units: Holocene alluvium (zones 1 and 2 appear to be a Late Holocene alluvial fill that rests unconformably upon an older alluvial deposit (presumably the same deposit revealed by Backhoe Trench 1, which is estimated to be of Late Pleistocene to Early Holocene age).

Cultural material*:* No cultural material was observed on the ground surface but two burned rocks were observed in the A horizon (25 and 31 cm below the existing ground surface).

Comments: Zones 1 and 2 are inferred to be of Middle to Late Holocene age, whereas Zone 3 is inferred to be of Early Holocene to Late Pleistocene age. The entire trench was picked and examined with a trowel to search for buried cultural material, and only two pieces (burned limestone) were observed. A series of five closely spaced shovel tests situated along the proposed pipeline north and south of the trench recovered no additional cultural material.

Zone	Horizon	Depth	Description
1	A	0-31 cm	Black (10YR 2/1, moist) silty clay, very friable, weak to moderate coarse subangular blocky structure parting to strong very fine crumb structure, abrupt smooth boundary, violently effervescent, 5-7% coarse fragments throughout (matrix supported), two pieces of burned limestone were observed within this deposit between 25 and 31 cm.
2	AC	28-95 cm	Very dark gray (10YR 3/1, moist) very gravelly clay to silty clay, friable, weak medium subangular blocky structure parting moderate very fine subangular blocky structure, abrupt wavy boundary, violently effervescent, 40 to 60% coarse fragments, most of which are < 2 cm subrounded limestone gravels, but a few larger clasts are present.
3	2Bk	95-125 cm	Dark brown (10YR 3/3, moist) to brown (7.5YR 4/3**,** moist) clay, very firm, strong medium angular blocky structure, violently effervescent, common (3-5%) calcium carbonate filaments, 5-10% coarse fragments, the majority of which are matrix supported < 2 cm diameter subrounded limestone gravel.

Gully Exposure, adjacent to South Side of Lowrey Draw

Location: Zone 14R 3 41 998 Easting 33 82 295 Northing

Geologic Units: Middle or Late Holocene alluvium resting unconformably upon Early Holocene or Late Pleistocene alluvium.

Cultural material: None observed.

Comments: Zone 1 is introduced fill, zones 2-4 are inferred to be a middle-to-late Holocene alluvial fill, and Zone 5 is inferred to be of Early Holocene or Late Pleistocene age.

Zone	Horizon	Depth	Description
1	C	0-5 cm	Grayish-brown (10YR 5/2, dry) slightly gravelly silt loam, loose, single grain, abrupt smooth boundary, violently effervescent, 20% coarse fragments (rounded gravel).
2	2Ab	5-30 cm	Dark gray-dark grayish-brown (10YR 41/5, dry) clay to silty clay, hard, strong medium to fine subangular blocky structure, gradual smooth boundary, violently effervescent, <3% coarse fragments.
3	2ABkb	30-55 cm	Grayish-brown (10YR 5/2, dry) silty clay, hard, strong medium subangular blocky structure, abrupt wavy boundary, violently effervescent, common fine distinct white spherical masses and crystals of calcium carbonate.
4	2C	55-70 cm	Grayish-brown (10YR 5/2, dry) extremely gravelly loam, loose, single grain, abrupt wavy boundary, violently effervescent, ~75% coarse fragments.
5	3Bk	70-170 cm	Light brown (7.5YR 6/4, dry) silty clay, hard, strong medium prismatic structure parting to strong fine angular blocky structure, violently effervescent, few to common (3-5%) calcium carbonate filaments, common (15%) coarse (0.5-1.5 mm) prominent white irregular to spherical calcium carbonate nodules, 3-5% coarse fragments.