Volume 2020 Article 151

2020

Intensive Cultural Resources Survey of the 11.4-acre Northwest Drive at Green Hill Road Tract, San Angelo, Tom Green County, Texas

Jesse O. Dalton

Jeffery D. Owens

Intensive Cultural Resources Survey of the 11.4-acre Northwest Drive at Green Hill Road Tract, San Angelo, Tom Green County, Texas

Intensive Cultural Resources Survey of the 11.4-acre Northwest Drive at Green Hill Road Tract, San Angelo, Tom Green County, Texas

By:

Jesse O. Dalton and Jeffrey D. Owens

H090-200141

Prepared for:

Mason Joseph Company, Inc.
San Antonio, Texas

Prepared by:

Horizon Environmental Services, Inc.
Austin, Texas

July 2020

Intensive Cultural Resources Survey of the 11.4-acre Northwest Drive at Green Hill Road Tract, San Angelo, Tom Green County, Texas

By:

Jesse O. Dalton and Jeffrey D. Owens

Prepared for:

Mason Joseph Company, Inc.
21102 Market Ridge
San Antonio, Texas 78258

Prepared by:

Horizon™
Environmental Services, Inc.

Horizon Environmental Services, Inc.
1507 S. Interstate 35
Austin, Texas 78741

Jeffrey D. Owens, Principal Investigator
H090-200141

July 2020

MANAGEMENT SUMMARY

Horizon Environmental Services, Inc. (Horizon) was selected by Mason Joseph Company, Inc. (Mason Joseph) to conduct a cultural resources survey and assessment for a proposed apartment complex development located on an approximately 4.6-hectare (11.4-acre) tract in San Angelo, Tom Green County, Texas. The proposed apartment complex would be located on undeveloped land in western San Angelo just northwest of the intersection of Northwest Drive and Green Hill Road. For the purposes of the cultural resources survey, the project area was assumed to consist of the entire 4.6-hectare (11.4-acre) tract.

The proposed undertaking would be sponsored by Mason Joseph, a private real estate developer, on privately owned land. However, the project would utilize funding provided by the US Department of Housing and Urban Development (HUD). As HUD is a federal agency, the project would fall under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. As the project represents a publicly sponsored undertaking with the potential to impact potentially significant cultural resources, the project sponsor was required to perform a cultural resources inventory and assessment of the project area. The purpose of the survey was to determine if any archeological sites are located within the boundaries of the project area and, if any exist, to determine if the project has the potential to have any adverse impacts on sites listed on or considered eligible for inclusion on the National Register of Historic Places (NRHP).

On July 14, 2020, Horizon archeologist Jesse O. Dalton, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the 4.6-hectare (11.4-acre) project area. Horizon's archeologist traversed the survey area on foot and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area is situated in an open field on a gently sloping upland landform just northeast of Red Arroyo, a tributary of the South Concho River. Vegetation at the time of the survey consisted of short tobosa, buffalo, and mesquite grasses as well as sparse patches of dry forbs. The modern ground surface was covered in medium-sized gravels and rocks. Visibility of the modern ground surface was generally excellent (80 to 100%).

Examination of historical imagery dating from 1928 to the present indicates that the project area has remained undeveloped throughout its history. Around 2004, the project area as well as a large tract of land extending to the north and west was devegetated and possibly graded. In

2014, Green Hill Road, the road that bounds the project area on the southern side, and a multifamily apartment complex, the Vistas at Red Creek, were constructed south of the project area. Portions of the project area adjacent to Green Hill Road appear to have been used as equipment stating areas during construction of the adjacent subdivision. Large portions of the southern half of the project area are extensively disturbed, including a large drainage channel and an associated artificial berm that follows the alignment of Green Hill Road for approximately 0.2 kilometer (0.1 mile) and a slightly raised rectangular pad that measures approximately 60.0 meters (196.9feet) long by 25.0 meters (82.0 feet) wide. This rectangular pad was likely a leveled temporary staging area for the equipment and associated materials used in the construction of the road and/or residential subdivision to the south. These disturbed areas are present on historical aerial photographs from 2014 through the present and were observed during the current cultural resources survey. Near the eastern border of the rectangular pad is a 2.0-by-2.0-meter (6.6-feet-by-6.6-foot) asphalt surface. Several push piles containing modern trash and large limestone rocks are also present within the disturbed rectangular pad area.

In addition to pedestrian walkover, the Texas State Minimum Archeological Survey Standards (TSMASS) require a minimum of two shovel tests per 0.4-hectare (1.0-acre) for projects areas less than 10.1-hectares (25.0-acres) in size. As such, a minimum of 23 shovel tests would be required within the 4.6-hectare (11.4-acre) project area. Horizon excavated a total of 23 shovel tests within the project area, thereby meeting the TSMASS for a project area of this size. Shovel testing revealed that sediments in the project area consist of a typical A-B sequence of dry reddish-brown loam or clay loam overlying weak, blocky dark reddish-brown or pinkish-brown clay with common calcium carbonate ($CaCO_3$) inclusions. The B-horizon subsoil (Bss1, Bw, Btk1) or limestone bedrock were observed underlying the A horizon at average depths of 15.0 to 40.0 centimeters (5.9 to 15.7 inches) below surface. Horizon is confident that shovel testing were capable of penetrating Holocene-era sediments with the potential to contain subsurface archeological deposits.

No cultural resources of historic or prehistoric age were observed on the modern ground surface or within any of the shovel tests excavated during the survey, and no standing structures of historic age are present within the project area or on adjacent parcels.

Based on the results of the survey-level investigations documented in this report, no significant cultural resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good faith effort to identify historic properties within the project area. No cultural resources were identified that meet the criteria for listing on the NRHP according to 36 CFR 60.4. Horizon recommends a finding of “no historic properties affected,” and no further work is recommended in connection with the proposed undertaking. However, in the event that any human remains or burial objects are inadvertently discovered at any point during construction, use, or ongoing maintenance in the project area, even in previously surveyed areas, all work should cease immediately and the Texas Historical Commission (THC) should be notified of the discovery.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

1.0 INTRODUCTION

Horizon Environmental Services, Inc. (Horizon) was selected by Mason Joseph Company, Inc. (Mason Joseph) to conduct a cultural resources survey and assessment for a proposed apartment complex development located on an approximately 4.6-hectare (11.4-acre) tract in San Angelo, Tom Green County, Texas. The proposed apartment complex would be located on undeveloped land in western San Angelo just northwest of the intersection of Northwest Drive and Green Hill Road. For the purposes of the cultural resources survey, the project area was assumed to consist of the entire 4.6-hectare (11.4-acre) tract (Figures 1 to 3).

The proposed undertaking would be sponsored by Mason Joseph, a private real estate developer, on privately owned land. However, the project would utilize funding provided by the US Department of Housing and Urban Development (HUD). As HUD is a federal agency, the project would fall under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. As the project represents a publicly sponsored undertaking with the potential to impact potentially significant cultural resources, the project sponsor was required to perform a cultural resources inventory and assessment of the project area. The purpose of the survey was to determine if any archeological sites are located within the boundaries of the project area and, if any exist, to determine if the project has the potential to have any adverse impacts on sites listed on or considered eligible for inclusion on the National Register of Historic Places (NRHP).

On July 14, 2020, Horizon archeologist Jesse O. Dalton, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the 4.6-hectare (11.4-acre) project area. The cultural resources investigation consists of an archival review, an intensive pedestrian survey with shovel testing, and the production of a report suitable for review by the State Historic Preservation Officer (SHPO) in accordance with the Texas Historical Commission's (THC) Rules of Practice and Procedure, Chapter 26, Section 26, and the Council of Texas Archeologists (CTA) Guidelines for Cultural Resources Management Reports.

Following this introductory chapter, Chapters 2.0 and 3.0 present the environmental and cultural backgrounds, respectively, of the project area. Chapter 4.0 describes the results of background archival research, and Chapter 5.0 discusses cultural resources survey methods. Chapter 6.0 presents the results of the cultural resources survey, and Chapter 7.0 presents

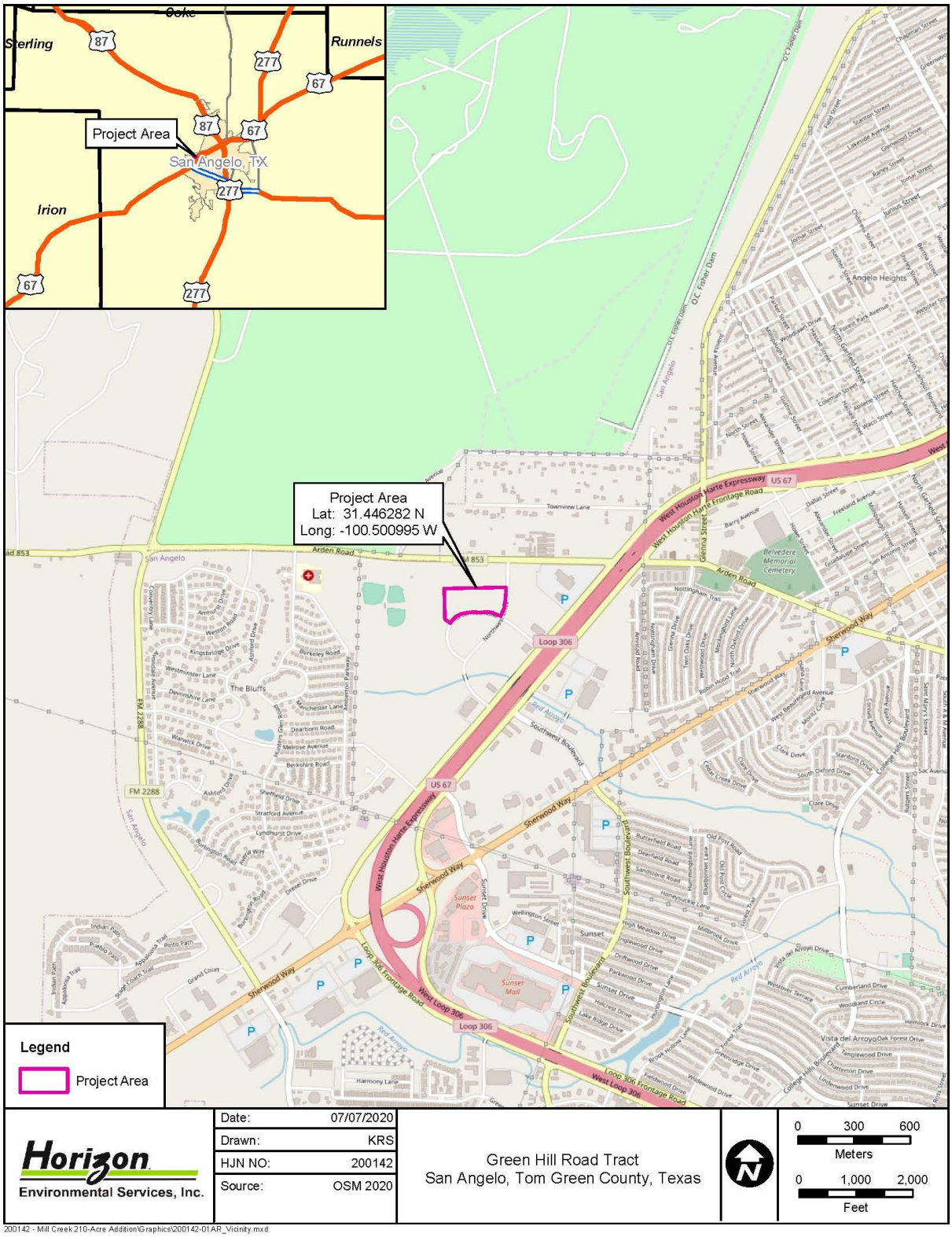

Figure 1. Vicinity Map of Project Area

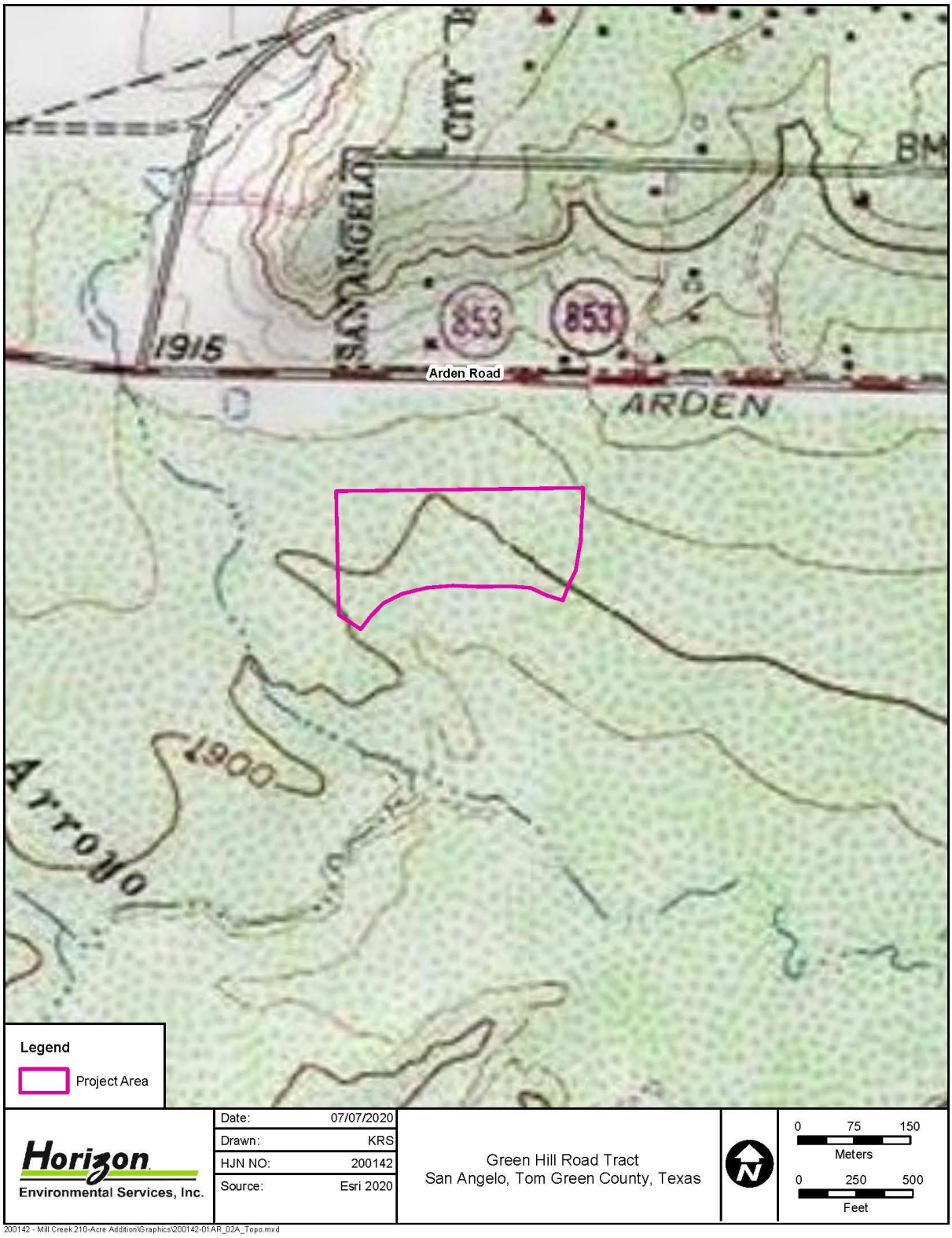

Figure 2. Location of Project Area on USGS Topographic Map

Figure 3. Location of the Project Area on Aerial Photograph

cultural resources management recommendations for the project. Chapter 8.0 lists the references cited in the report. Appendix A summarizes shovel test data.

2.0 ENVIRONMENTAL SETTING

2.1 PHYSIOGRAPHY AND HYDROLOGY

Physiographically, the project area is situated on a gently undulating upland located in west-central Tom Green County where the southern edge of the Rolling Plains overlaps with the Northern Edwards Plateau physiographic zone (Fenneman 1931). Named by the Spanish after the abundant mussel shells found the numinous rivers in the region, the Concho River valley lays between the Northern Edwards Plateau and the farthest northeastern extent of the Chihuahuan desert. To the north are the Rolling Plains, also referred to as the Osage Plains, a region characterized by undulating plains with occasional canyons deeply incised from erosional processes (Fenneman 1931). The Edwards Plateau and Balcones Escarpment are associated with a great fault system that arcs across Texas to form a distinct boundary between uplands composed primarily of limestone bedrock and lower plains composed mostly of softer rocks. In places, this boundary is marked by an abrupt scarp (the Balcones Escarpment) and in others by a more gradational ramp, but the entire length of this transition zone is a major ecotone in terms of topography, bedrock, hydrology, soil, vegetation, and animal life. The Edwards Limestone formation is composed of hard, micritic limestone beds, some of which are chert-bearing. Other beds are extensively burrowed and weathered into “honeycombed” porous rock. Caverns and sinkholes are known to occur throughout central and southwestern Texas in the Edwards Formation and Austin Chalk limestones, but they are not especially common. The Edwards Limestone constitutes one of the largest chert resources on the Great Plains (Frederick and Ringstaff 1994), and expansive outcrops of Edwards Group chert are often accompanied by extensive aboriginal lithic scatters created during raw material procurement (or “quarrying”) activities. In the absence of aggrading depositional environments, such lithic procurement sites are typically restricted to the deflated modern ground surface, on which the native limestone bedrock is typically exposed over large areas.

Hydrologically, the project area is situated within the Colorado River Basin. Drainage within the project area is to the southeast toward Red Arroyo, primarily via overland sheet flow. Red Arroyo, an ephemeral draw situated approximately 0.2 kilometer (0.1 mile) southwest of the project area, flows generally eastward, discharging into the South Concho River in southeastern San Angelo. The South Concho River, in turn, flows northeastward a short distance before joining with the Middle and North Concho rivers to form the Concho River proper. The Concho River flows northeastward, draining into the Colorado River at O.H. Ivie Reservoir. The Colorado River,

in turn, flows generally southeastward across the Blackland Prairie and Gulf Coastal Plain and discharges into the Gulf of Mexico in Matagorda County. Elevations across the project area range from approximately 577.6 to 583.7 meters (1,895.0 to 1,915.0 feet) above mean sea level (amsl), sloping down to the southeast toward Red Arroyo.

2.2 GEOLOGY AND GEOMORPHOLOGY

The project area is situated on the Permian Period-age San Angelo Formation (Psa) (USGS 2020). Generally, this geological formation is characterized by sandstone, shale, fine-grained quartz, and conglomerates of dolomite and siliceous pebbles (USGS 2020). Silty clay loams and calcareous clays overlying Permian-age sandstone and limestone beds are typical within this region. The San Angelo Formation has yielded a unique vertebrate fossil assemblage that includes the xenacanth shark (*Xenacanthus*), *Angelosaurus*, and Middle Permian tetrapods (Lucas 2004). The Red Arroyo floodplain southwest of the project area is situated on Holocene-age Alluvium (Qal), which is characterized by low terrace and floodplain alluvial deposits of gravel, sand, silt, and organic matter (USGS 2020); however, this formation does not extend into the project area.

Soils within the project area consist of a mixture of loam and clay loam sediments from parent material of ancient alluvium (Table 1; Figure 4) (NRCS 2020). The central portion of the project area is characterized by Angelo clay loam, which formed in calcareous loamy and clayey

Table 1. Summary of Mapped Soils within Project Area

NRCS Soil Code	Soil Name	Parent Material	Typical Profile (inches)
AnA	Angelo clay loam, 0 to 1% slopes	Calcareous loamy alluvium on plains	0-6: Clay loam (Ap) 6-12: Clay loam (A) 12-28: Clay (Bw) 28-58: Clay (Bk1) 58-92: Clay (Bk2)
KmC	Cho gravelly loam, dry, 1 to 8% slopes	Calcareous loamy alluvium on stream terraces	0-10: Loam (A) 10-14: Indurated caliche (Bkkm) 14-60: Loam (Bkk)
ToA	Tobosa clay, 0 to 1% slopes	Calcareous clayey alluvium on swales	0-12: Clay (Ap) 12-16: Clay (A) 16-44: Clay (Bss1) 44-60: Clay (Bss2) 60-80: Clay (BCk)
TuB	Tulia loam, 1 to 3% slopes	Mixed loamy alluvium on hillslopes	0-6: Loam (A) 6-14: Loam (Btk1) 14-30: Clay loam (Btk2) 30-45: Clay loam (Bkt3) 45-85: Sandy clay loam (Bt)

Source: NRCS (2020)

NRCS = Natural Resources Conservation Service

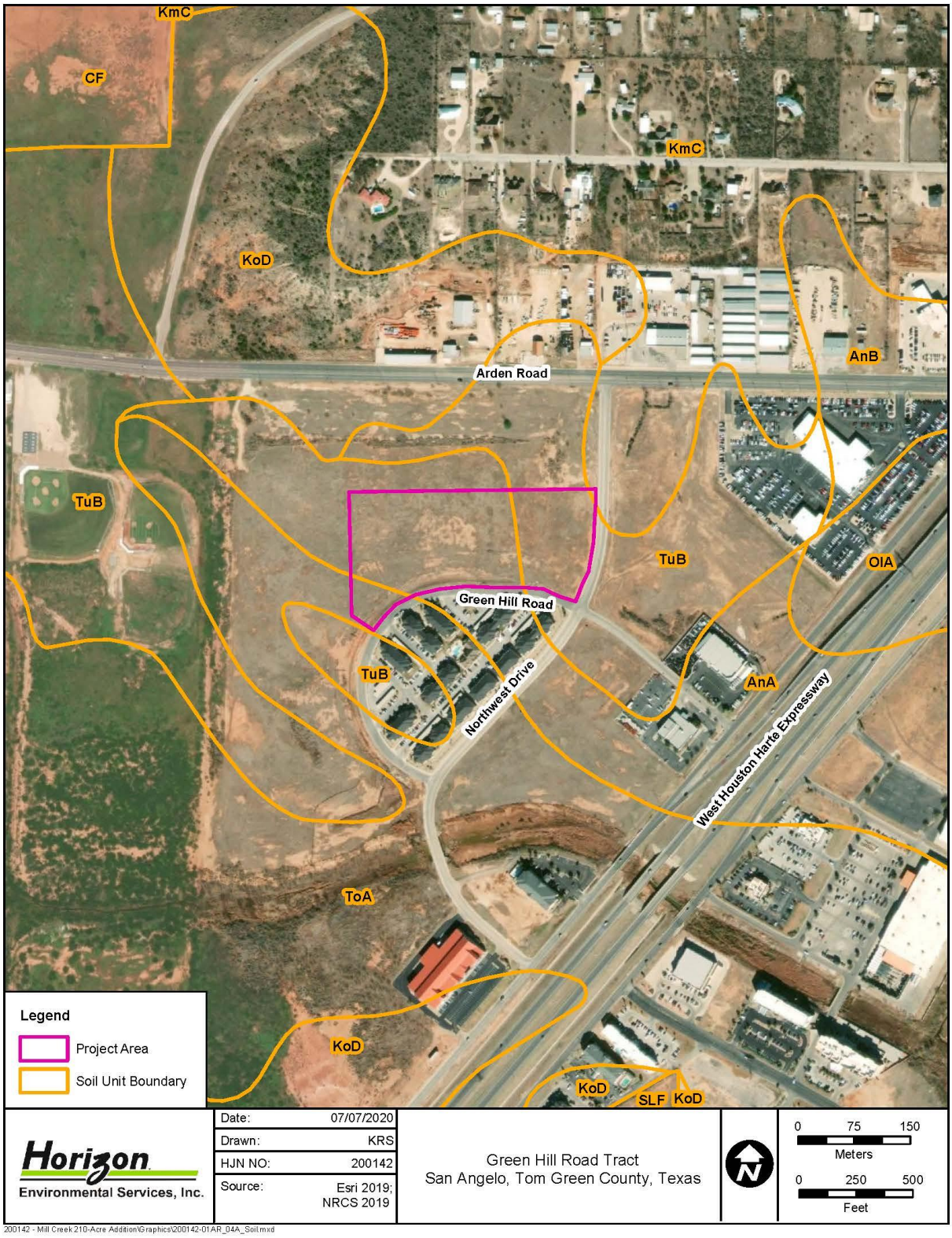

Figure 4. Soils Mapped within Project Area

alluvium. The eastern third of the project area is composed of Tulia loam derived from Pleistocene-age eolian deposits. A small sliver of Cho gravelly loam overlying bedrock is present in the northeastern corner of the project area. In the southwest corner is the well drained Tobosa clay, which consists of calcareous alluvium. No Holocene-age alluvial sediments are mapped within the boundaries of the project area.

2.3 CLIMATE

Evidence for climatic change from the Pleistocene to the present is most often obtained through studies of pollen and faunal sequences (Bryant and Holloway 1985; Collins 1995). Bryant and Holloway (1985) present a sequence of climatic change for nearby east-central Texas from the Wisconsin Full Glacial period (22,500 to 14,000 B.P.) through the Late Glacial period (14,000 to 10,000 B.P.) to the Post-Glacial period (10,000 B.P. to present). Evidence from the Wisconsin Full Glacial period suggests that the climate in east-central Texas was considerably cooler and more humid than at present. Pollen data indicate that the region was more heavily forested in deciduous woodlands than during later periods (Bryant and Holloway 1985). The Late Glacial period was characterized by slow climatic deterioration and a slow warming and/or drying trend (Collins 1995). In east-central Texas, the deciduous woodlands were gradually replaced by grasslands and post oak savannas (Bryant and Holloway 1985). During the Post-Glacial period, the east-central Texas environment appears to have been more stable. The deciduous forests had long since been replaced by prairies and post oak savannas. The drying and/or warming trend that began in the Late Glacial period continued into the mid-Holocene, at which point there appears to have been a brief amelioration to more mesic conditions lasting from roughly 6000 to 5000 B.P. Recent studies by Bryant and Holloway (1985) indicate that modern environmental conditions in east-central Texas were probably achieved by 1,500 years ago.

Tom Green County is located within the south-central climatic division. The modern climate is typically dry to subhumid with long, hot summers and short, mild winters. The climate is influenced primarily by tropical Maritime air masses from the Gulf of Mexico, but it is modified by polar air masses. Tropical Maritime air masses predominate throughout spring, summer, and fall. Modified polar air masses are dominant in winter and provide a continental climate characterized by considerable variations in temperature.

On average throughout the past century, precipitation and temperature in Texas manifest regional clines with mean annual precipitation totals declining fairly regularly from east to west and mean annual temperature declining equally evenly from northwest to southeast (Larkin and Bomar 1983). In north-central Texas, climate has fluctuated from subtropical humid to subtropical subhumid. Average annual precipitation totals 76.2 centimeters (30.0 inches) (Carr 1967). During this time, however, drier periods lasting from three to seven years may be followed by abnormally wet years. Two annual precipitation peaks, which typically occur in April to May and September to October, are associated with frontal storms that form when southward-moving cool air masses collide with warm, moist air masses moving inland from the Gulf of Mexico (Bomar 1983; Carr 1967). The topographic discontinuity along the Balcones Escarpment to the south and east lies directly in the path of the Gulf storm trace and increases the lift in convective storms to produce extreme amounts of rainfall (Baker 1975). Lower rainfall amounts are characteristic

of winter and late summer. In winter, frontal storms pass so frequently that there is little time for moisture to increase, and prevailing upper-level winds from west to east often dominate over meridional flow, meaning that much of the available moisture is derived from the Pacific rather than from the Gulf of Mexico. In summer, cool fronts rarely penetrate into the region, and rainfall occurs primarily as localized, thermal convective storms.

2.4 FLORA AND FAUNA

The project area is situated in the northwestern portion of the Balconian biotic province (Blair 1950). This is an intermediate zone between the forests of the Austroriparian and Carolinian provinces to the east and the grasslands of the Kansan and Tamaulipan provinces to the north and south, respectively (Dice 1943). The Balconian province is roughly coextensive with the Edwards Plateau and the Central Texas (or "Llano") Uplift. Rainfall in the Balconian province decreases from east to west. The eastern half of the province is classified as C_1B_4 (dry, subhumid, mesothermal), and the western half is classified as DB_3 (semiarid, mesothermal) by Thornthwaite (1948).

Three vegetational regions are recognized by Tharp (1939) within the limits of the Balconian province—the oak-hickory-mesquite region corresponds to the Llano Uplift region, the oak-cedar region corresponds to the dissected southern and eastern parts of the Edwards Plateau, and the live oak-mesquite savannah region in the central and northwestern part of the province. The most characteristic plant association of the Balconian province is a scrub forest of Mexican cedar (*Juniperus mexicana*), Texas oak (*Quercus texana*), stunted live oak (*Quercus virginiana*), and various less numerous species. This association occupies the more dissected parts of the province. Mesquite is distributed throughout the province, and mesquite and live oak are the most conspicuous woody vegetation in the western portion of the province. Floodplains of major streams are occupied by mesic forests composed of large live oaks, elms, hackberries, and pecans. Along the Medina River, in the southeastern part of the province, large cypress trees (*Taxodium distichum*) fringe the stream course. Several plants characteristic of the Chihuahuan province to the south extend eastward sparingly into the Balconian, including beargrass (*Nolina texana*), lecheguilla (*Agave lecheguilla*), and pinyon (*Pinus edulis*).

The fauna associated with this region are represented by a mixture of species from the Austroriparian, Tamaulipan, Chihuahuan, Kansan, and Texan biotic provinces. Fifty-seven species of mammals are native to the Balconian province, but no species is restricted to this province. Mammals with Chihuahuan affinities include pallid bat (*Antrozous pallidus*), ring-tailed cat (*Bassariscus astutus*), western hog-nosed skunk (*Conepatus leuconotus*), rock squirrel (*Spermophilus variegatus*), brush mouse (*Peromyscus boylii*), white-ankled mouse (*Peromyscus pectoralis*), Botta's pocket gopher (*Thomomys bottae*), white-throated woodrat (*Neotoma albigula*), and North American porcupine (*Erethizon dorsatum*). Mammals with Austroriparian affinities include Virginia opossum (*Didelphis virginiana*), tri-colored bat (*Pipistrellus subflavus*), fox squirrel (*Sciurus niger*), eastern cottontail (*Silvilagus floridanus*), evening bat (*Nycticeius humeralis*), Baird's pocket gopher (*Geomys breviceps*), eastern woodrat (*Neotoma floridana*), and woodland vole (*Pitymys pinetorum*). Mammals with Tamaulipan affinities include peccary (*Tayassu angulatum*), plains harvest mouse (*Reithrodontomys montanus*), and Mexican ground

squirrel (*Ictidomys mexicanus*). Mammals with Kansan affinities include badger (*Taxidea taxus*) and black-tailed prairie dog (*Cynomys ludovicianus*). Other characteristic mammals of the Balconian include hispid pocket mouse (*Chaetodipus hispidus*), Merriam's pocket mouse (*Perognathus merriami*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), and black-tailed jackrabbit (*Lepus californicus*).

The only land turtle known in the Balconian is the western box turtle (*Terrapene ornata*). Sixteen species of lizards include Texas banded gecko (*Celeonyx brevis*), greater earless lizard (*Cophosaurus texana*), lesser earless lizard (*Holbrookia maculate*), crevice spiny lizard (*Sceloporus poinsettia*), ornate tree lizard (*Urosaurus ornatus*), Texas alligator lizard (*Gerrhonotus liocephalus*), common collared lizard (*Crotaphytus collaris*), Texas horned lizard (*Phrynosoma cornutum*), shortnose skink (*Plestiodon brevirostris*), Great Plains skink (*Plestiodon obsoletus*), Texas spotted whiptail (*Aspidocelis gularis*), Texas spiny lizard (*Sceloporus olivaceus*), little brown skink (*Scincella lateralis*), six-lined racerunner (*Cnemidophorus sexlineatus*), and eastern glass lizard (*Ophisarus ventralis*).

Thirty-six species of snakes are known from the Balconian province, the majority of which are widely districted western species that range over western and southwestern North America, including Mexican hooknose snake (*Gyalopion cana*), Mexican gatersnake (*Thamnophis eques*), black-tailed rattlesnake (*Crotalus molossus*), rough green snake (*Opheodrys aestivus*), ring-necked snake (*Diadophis punctatus*), eastern hognose snake (*Heterodon contortrix*), eastern racer (*Coluber constrictor*), brown snake (*Storeria dekayi*), rough earth snake (*Haldea striatula*), smooth earth snake (*Haldea valeriae*), eastern coral snake (*Micrurus fulvius*), copperhead (*Agkistrodon mokasen*), cottonmouth (*Agkistrodon piscivorus*), Texas blind snake (*Leptotyphlops dulcis*), coachwhip (*Masticophis flagellum*), striped whipsnake (*Masticophis taeniatus*), western rat snake (*Pantherophis obsoleta*), Texas patch-nose snake (*Salvadora grahamiae*), glossy snake (*Arizona elegans*), western ground snake (*Sonora episcopa*), checkered garter snake (*Thamnophis marcianus*), eastern ribbon snake (*Thamnophis sauritus*), California nightsnake (*Hypsiglena ochrorhyncha*), plain-bellied water snake (*Nerodia erythrogaster*), diamondback water snake (*Natrix rhombifera*), and western diamondback rattlesnake (*Crotalus atrox*).

Fifteen species of anuran fauna are known from the Balconian province, including barking frog (*Craugastor augusti*), cliff chirping frog (*Eleutherodactylus marnockii*), Gulf Coast toad (*Bufo valliceps*), southern cricket frog (*Acris gryllus*), gray treefrog (*Hyla versicolor*), North American bullfrog (*Rana catesbeiana*), Couch's spadefoot toad (*Scaphiopus couchii*), plateau toad (*Anaxyrus compactilis*), North American green toad (*Anaxyrus debilis*), red-spotted toad (*Bufo punctatus*), Great Plains narrow-mouthed toad (*Gastrophryne olivacea*), Woodhouse's toad (*Bufo woodhousii*), northern leopard frog (*Rana pipiens*), Strecker's chorus frog (*Pseudacris streckeri*), and spotted chorus frog (*Pseudacris clarkia*).

Urodele species include tiger salamander (*Ambystoma tigrinum*), northern slimy salamander (*Plethodon glutinosus*), Texas blind salamander (*Typhlomolge rathbuni*), San Marcos salamander (*Eurycea nana*), Texas salamander (*Eurycea neotenes*), Cascade Caverns salamander (*Eurycea latitans*), and Blanco River Springs salamander (*Eurycea pterophila*).

Small herds of bison and antelope were common during the late prehistoric and early historic periods, but these species are no longer native to this region (Jurney et al. 1989:13-14).

3.0 CULTURAL BACKGROUND

The project area is located within Prewitt's (1981, 1985) Central Texas Archeological Region. The indigenous human inhabitants of central Texas practiced a generally nomadic hunting and gathering lifestyle throughout all of prehistory, and, in contrast to much of the rest of North America, mobility and settlement patterns do not appear to have changed markedly through time in this region.

3.1 PALEOINDIAN PERIOD (CA. 12,000 TO 8500 B.P.)

The initial human occupations in the New World can now be confidently extended back before 12,000 B.P. (Dincauze 1984; Haynes et al. 1984; Kelly and Todd 1988; Lynch 1990; Meltzer 1989). Evidence from Meadowcroft Rockshelter in Pennsylvania suggests that humans were present in Eastern North America as early as 14,000 to 16,000 years ago (Adovasio et al. 1990), while more recent discoveries at Monte Verde in Chile provide unequivocal evidence for human occupation in South America by at least 12,500 years ago (Dillehay 1989, 1997; Meltzer et al. 1997). Most archeologists have historically discounted claims of much earlier human occupation during the Pleistocene glacial period. However, scholars recently identified a pre-Clovis projectile point technology that was previously unknown and unrelated to Clovis at the Gault Site in central Texas, pushing the estimates of human occupation in the region to 16,000 years before present (Williams et al. 2018).

The earliest generalized evidence for human activities in central Texas is represented by the PaleoIndian period (12,000 to 8500 B.P.) (Collins 1995). This stage coincided with ameliorating climatic conditions following the close of the Pleistocene epoch that witnessed the extinction of herds of mammoth, horse, camel, and bison. Cultures representing various periods within this stage are characterized by series of distinctive, relatively large, often fluted, lanceolate projectile points. These points are frequently associated with spurred end scrapers, gravers, and bone foreshafts. PaleoIndian groups are often inferred to have been organized into egalitarian bands consisting of a few dozen individuals that practiced a fully nomadic subsistence and settlement pattern. Due to poor preservation of floral materials, subsistence patterns in central Texas are known primarily through the study of faunal remains. Subsistence focused on the exploitation of plants, small animals, fish, and shellfish, even during the PaleoIndian period. There is little evidence in this region for hunting of extinct megafauna, as has been documented elsewhere in North America. Rather, a broad-based subsistence pattern appears to have been practiced throughout all prehistoric time periods. In central Texas, the PaleoIndian stage is

divided into two periods based on recognizable differences in projectile point styles. These include the Early PaleoIndian period, which is recognized based on large, fluted projectile points (i.e., Clovis, Folsom, Dalton, San Patrice, and Big Sandy), and the Late PaleoIndian period, which is characterized by unfluted lanceolate points (i.e., Plainview, Scottsbluff, Meserve, and Angostura).

Overall, there is a dearth of PaleoIndian sites in the Rolling Plains, which has been labeled by scholars as an archeologically sterile corridor (Hurt 1980; Meltzer and Bever 1995). Within Tom Green County, only two Clovis Points and a handful of Folsom Points have been found (Maudlin and Nickels 2001; Meltzer and Bever 1995). Most known sites are buried under deep sediments deposited by eolian and fluvial formation processes (Meltzer and Bever 1995). Furthermore, there exists only a marginal amount of potable water in the region since most of the rivers have a high saline content derived from exposed and leaching Permian halite beds (Meltzer and Bever 1995). The inhospitable terrain of the Rolling Plains likely discouraged both human settlement and fauna/megafauna movement during PaleoIndian times; however, due to the small sample size from archeological investigations and the potential for deeply buried archeological deposits in the region, there exists a possibility of undiscovered Clovis occupations in the Rolling Plains. Discovered in 1998, site 41TG378 is a PaleoIndian site near the Twin Buttes Reservoir in southwestern Tom Green County. The site yielded a Clovis point base, six hearths, and formal lithic tools; however, due to colluvial slumping of sediments from the adjacent hillslope and bioturbation, PaleoIndian materials were all observed in secondary contexts (Maudlin and Nickels 2001).

3.2 ARCHAIC PERIOD (CA. 8500 TO 1200 B.P.)

As originally defined, the Archaic period spans many thousands of years, from 8800 to 1500 B.P. Compared with the preceding PaleoIndian period, Archaic life was significantly different, reflecting a long period of relative cultural stability (Collins 1995:383). Subsistence patterns appear to have been more diverse, with evidence for greater exploitation of local environments (Hofman et al. 1989:45). There is evidence for an increase in the dietary importance of smaller game animals, fish, and wild plant foods (Cliff et al. 1991:15). A hunting and gathering lifestyle prevailed, with seasonal traveling to use different food resources in various localities but a marked decrease in group mobility (Hofman et al. 1989:58; Weir 1976).

The Rolling Plains Archaic often has been divided into Early, Middle, and Late subperiods (e.g., Etchieson et al. 1979; Kelley 1947; Prewitt 1981, 1985; Story 1985; Suhm et al. 1954; Weir 1976). Distinctions between these periods are based in large part on changes in projectile point styles, but the transitions between periods may well coincide with climatic shifts (Boyd 1997:226-231; Collins 1995:Tabs. 1 and 2). Collins (1995:383) notes for central Texas that there were distinctive cultural changes within the broad Archaic tradition but that the nature and timing of those shifts are poorly understood. It is clear, however, that the appearance and proliferation of burned rock middens in Archaic times (Collins 1995:384) is one of the most significant prehistoric cultural events in this part of Texas.

The Early Archaic period (8800 to 6000 B.P.) is not well represented in the Rolling Plains, and most of the finds come from mixed contexts. Some archeologists have suggested a

transitional stage between the PaleoIndian and Archaic cultures that exhibits similarities to both periods (Hofman et al. 1989; McKinney 1981; Sollberger and Hester 1972). The transition from late PaleoIndian to Early Archaic was a time of considerable environmental change, with a cooler, wetter climate giving way to much warmer, dryer conditions (Collins 1995). In fact, most paleoenvironmental evidence suggests that a major period of aridity, originally called the Altithermal (or Hypsithermal) by Antevs (1955), occurred over central Texas in early to middle Holocene times from about 8000 to 4000 B.P. (Collins 1995:Tab. 2, 378-380). In the Central Rolling Plains, the Early Archaic is seen as a period of increasing aridity that led to full-blown drought conditions during the Middle Archaic. Over much of Texas, these climatic conditions had profound effects on human populations and on the cultural remains that survive, or failed to survive, in the archeological record.

In the Central Rolling Plains region, representative Early Archaic dart points include stemmed, corner-notched with expanding stems, triangular, and heavily barbed forms, including Angostura, Gower, Martindale, Uvalde, and Wells (Collins 1995:Tab. 2; Turner and Hester 1999). In addition, Clear Fork gouges, burins, and grinding implements are also present. Only a small number of sites dating to the Early Archaic have been reported for the Central Rolling Plains region, and no major excavations associated with this period have been reported. The relative paucity of sites from this time period appears to be a result of a severe erosional episode (or episodes) in the Southern Plains during Middle Archaic times. Widespread erosional scouring is thought to have removed significant amounts of early Holocene deposits and Early Archaic archeological remains (Story 1985:39). It may be the case that the overall hunter and gatherer population density was low during this period, but the differential preservation of archeological sites makes it difficult to demonstrate this point.

The Middle Archaic, from 6000 to 4000 B.P., is poorly represented in the region but may include Ray's (1945) Clear Fork complex originally assigned to the PaleoIndian-Archaic transition (Cliff et al. 1991:15). In the central Texas archeological record, there appears to have been a population increase during the Middle Archaic and development of regionally distinct cultural patterns along with changes in settlement patterns, economic and social systems, and technology (Collins 1995:384). If these changes occurred in the Rolling Plains, evidence is extremely limited because of geomorphic reasons. A considerable body of paleoclimatic evidence suggests that extremely xeric conditions (i.e., the latter half of the Hypsithermal) and erosional scouring were prevalent in the Southern Plains from ca. 6500 to 4600 B.P. (Boyd 1997:226-228; Hughes 1991:19-20). With a combination of low human population density because of droughts and concurrent erosional scouring, it is not surprising that Middle Archaic archeological sites are rare.

Although human populations may have been increasing in central Texas during the Middle Archaic, there appears to have been minimal human activity on the Llano Estacado and Rolling Plains (Boyd 1997:52; Hughes 1991:20). In the Central Rolling Plains, Middle Archaic sites are usually represented by surface scatters, and no substantive investigations of buried components have been made. Collins (1995:Tab. 2) lists Andice, Bell, Taylor, Nolan, and Travis points as definitive Middle Archaic points in central Texas, but these types are rare in the Central Rolling Plains. Prewitt (1985) shows only a few Nolan points occurring within the region.

In central Texas, burned rock middens became common during the Middle and Late Archaic periods (Black et al. 1997:273-280; Collins 1995:384). The ages of many of the burned rock middens known in Callahan, Jones, Mitchell, Shackelford, and Taylor counties are unknown (Creel 1986; Mauldin and Nickels 2003), but some of them may well be Middle to Late Archaic in age.

The Late Archaic saw the development of an array of new cultural patterns and a proliferation of new projectile point styles (Collins 1995:Tab. 1; Story 1985:45). Subsistence patterns in the Central Rolling Plains changed as people became more reliant on bison hunting, with herds becoming more common after long periods of bison absence or scarcity during part of the Early Archaic and all of the Middle Archaic (Dillehay 1974). The Late Archaic period in the region is most commonly represented by open campsites and isolated burials, but bison kill and processing sites are common farther north in the Rolling Plains (Boyd 1997:Tab. 59, Fig. 78).

Sites in the region contain a variety of Late Archaic dart point styles—Castroville, Darl, Edgewood, Elam, Ensor, Fairland, Frio, Marcos, Marshall, Nolan—that are often associated with central Texas (Boyd 1997:Tab. 60; Collins 1995:Fig. 1), along with some styles common in north-central Texas such as Eliasvile, Ellis, and Godley (Cliff et al. 1991:16). Late Archaic components investigated at Lake Alan Henry in Kent and Garza counties produced Castroville, Marcos, and Marshall dart points (Boyd 1997:249-250). Mack (1994) reports on an intensive surface collection of the Van York site (41BD8) in Borden County that yielded Edgewood and Ellis points. In the 1980s, the Texas Department of Highways and Public Transportation conducted a limited testing project at 41KT32 on the floodplain of the Brazos River in Kent County. Small expanding-stem dart points indicated Late Archaic occupations (Denton 1983).

Late Archaic burials from Kent (Holden 1929) and Mitchell (Ray 1936) counties contain unusual lunate stones made of exotic rocks as grave offerings. The Mitchell County find was a cremated burial that had Fairland, Marcos, and Shumla points associated with it. The cultural significance of lunate stones and cremation as mortuary traits are not fully understood (Boyd 1997:253-257).

According to data accumulated by Hurt (1980), the Late Archaic populations occupying the Twin Buttes area in Tom Green County reached a zenith during the Terminal Archaic. Based on artifact assemblages, their origins reflect a central Texas migration as opposed to previous occupations that reflected Trans-Pecos cultures (Hurt 1980). Transitional-era projectile points for the region include Ensor, Frio, and Matamoras, and there existed an overall decrease in bison populations concomitant with lowered water table levels (Dillehay 1974; Hurt 1980; Maudlin and Nickels 2001).

3.3 LATE PREHISTORIC PERIOD (CA. 1200 TO 350 B.P.)

The Late Prehistoric period (1200 to 450 B.P.) was a time of rapid and significant changes among prehistoric cultures. Technological changes, including emergence of the bow and arrow, use of ceramics, and adoption of horticulture, occurred at different times in different locations and should be viewed as a process rather than an event. People in some regions adopted the bow and arrow later than others, and some people never adopted agriculture while others did. In the

Central Plains region, some Late Prehistoric sites and assemblages continue to show similarities to central Texas, but there were distinctive cultural influences in the Rolling Plains that are not evident in central Texas. Across much of central Texas, there is evidence of increasing relationships with Caddo peoples to the east, but the Rolling Plains region also has stronger evidence of influences from Plains Woodland and Plains Village peoples to the north and Puebloan peoples to the west as well as limited Caddo influence (Boyd 1997:491-496; Cliff et al. 1991:16).

In Late Prehistoric I times, which lasted from about A.D. 500 to 1100 or 1200, two cultural complexes are recognized in the region. There were probably more than two groups within the Central Rolling Plains at this time, but only the Palo Duro and Blow Out Mountain complexes are recognized as definable archeological entities.

The core area of the Palo Duro complex is situated along the Caprock Escarpment and mainly to the north of the region (Boyd 1997:Fig 84), but the southern end of the culture area extends into the Rolling Plains. At least two sites in the region—the Big Spring site in Howard County and the South Sage Creek site in Kent County—are attributable to the Palo Duro complex (Boyd 1997:Figs. 66 and 85). One of the most significant sites of the Palo Duro complex is the Sam Wahl site (41GR292) in Garza County. The discovery of a circular pithouse, large subterranean storage pits, and baking pits there led to a comparative study and redefinition of the Palo Duro complex (Boyd 1995, 1997). The complex is considered to represent foraging peoples who primarily occupied the canyonlands along the Caprock Escarpment but also ventured onto the High Plains and Rolling Plains, probably seasonally. Deadman's arrow points are the distinctive style for the complex, but Scallorn and stemmed Alba or Alba-like arrow points also are found. These people do not appear to have made any pottery, but they imported plain brownware pots from the Jornada Mogollon region to the west. Bison were of little importance, presumably because they were so scarce from around A.D. 500 to 1000, but hunting deer and smaller animals was important. Paleoclimatic evidence suggests cooler and wetter conditions during this time, and Palo Duro peoples harvested a range of wild plant foods, including mesquite beans and shin oak acorns. They used a variety of grinding tools and baking pits to process these and other plants. Although no cultigen remains have been found at any Palo Duro complex sites, the possibility that the people practiced limited horticulture cannot be ruled out.

The recent finding of corn at the Bear Branch site (41CA13) in Callahan County sheds new light on agriculture in the Callahan Divide area. A charred corn kernel (*Zea mays*) was recovered from a cooking pit associated with a burned rock midden (Katz and Katz 2001), and a bulk sediment radiocarbon date of A.D. 1150 to 1290 (calibrated, 2-sigma) is associated. This may be the only documented occurrence of prehistoric corn in the Rolling Plains region and the westernmost reported occurrence in northern Texas, excluding the Panhandle (see Henrietta complex below). The cultural affiliation of this site is not certain. Katz and Katz (2001) suggest the Bear Branch site belongs to the Blow Out Mountain complex (see below), but the cultural affiliation is complicated by a fairly long span of occupation (estimated to be from A.D. 600 to 1600) and a variety of diagnostic points. Along with a few dart points, the Bear Branch assemblage includes early arrow point styles, such as Scallorn and Alba, and late arrow point styles, such as Fresno, Perdiz, and Washita. The site definitely has multiple use episodes, and

it could represent occupations by different groups over time or perhaps contemporaneous use by multiple groups. Some of the occupations could be associated with the Henrietta or Palo Duro complexes. The Scallorn and Alba points in particular suggest an affiliation with the late Palo Duro complex despite the absence of imported Mogollon brownware pottery. Regardless of whom the occupants were around A.D. 1200, the corn likely indicates that people were farming at or close to the Bear Branch site during the transition time from Late Prehistoric I to II.

Creel (1990:15-18) defined the Blow Out Mountain complex based on his work at the East Levee site in Tom Green County (41TG91), and this culture area encompasses much of the Central Rolling Plains (see Boyd 1997:280-281). The complex is transitional between Late Prehistoric I and II and presumably dates from about A.D. 800 to 1300. As it is currently defined, the Blow Out Mountain complex subsumes Cyrus Ray's (1929) Sand Dune Culture and Sayles and Ray's Brazos River Culture (Ray and Sayles 1941; Sayles 1935). Blow Out Mountain also includes many cairn burial sites and "rock-covered mounds" excavated in the region during the 1930s and 1940s. Evidence in many of these graves suggests that intercultural violence was prevalent in the Rolling Plains during Late Prehistoric times (see Boyd 1997:280-281, 491-496; Brooks 1994).

The Blow Out Mountain strata at the East Levee site, in contrast to the Late Archaic strata below and the Toyah phase strata above, contained no bison remains. The stone-lined hearths, faunal remains, and stone tool assemblage all indicate generalized hunter-gatherers. No ceramics are associated with the complex. Typical arrow points fall into one of four categories—stemmed points often typed as Alba or Bonham; Chadbourne points (Turner and Hester 1999:207) that appear to be smaller versions of Darl or Zephyr dart points; contracting-stem Cliffton-like points; and side-notched Washita points. Of particular note, many of the Alba-like points are longer and have serrated blades, and this form is most commonly associated with human burials. These were named Moran points by Forrester (1987), and many specimens found in burials appear to be arrow tips that caused death (Boyd 1997:280-281).

There are some interpretive problems with the Blow Out Mountain complex because of the limited sample of excavated components and the lack of chronological control. It may be that Blow Out Mountain represents a single culture undergoing rapid changes during a critical time from A.D. 800 to 1300, or it may be that the complex needs to be split into two or more cultural groups as more data come to light.

The transition from the Late Prehistoric I to Late Prehistoric II periods, occurring sometime around A.D. 1100 to 1200, was a time of significant cultural changes across the American Southwest and Southern Plains. In the Southern Plains, it is generally linked with a shift from cooler, wetter conditions to a warmer, dryer climate. These dryer conditions are presumed to have been more favorable for grasslands and bison. At about this time, bison populations seem to have exploded in the Southern Plains and most cultures shifted subsistence strategies to intensify bison-hunting pursuits (Dillehay 1974). Many cultures also intensified their agricultural pursuits at this time, apparently shifting from simple horticultural practices to more substantial farming primarily involving corn (Brooks 1989; Hofman et al. 1989). The extent to which this Plains Woodland to Plains Village transition occurred, or did not occur, in the Central Rolling Plains is uncertain because of the lack of substantive archeological excavations.

During the Late Prehistoric II period, local cultures may have modified their subsistence base to incorporate or intensify bison hunting while other groups moved into the Southern Plains from surrounding areas to exploit the expanded bison range. However, some climatic fluctuations within the Late Prehistoric II period may have been significant, and there is evidence of two major drought periods in the Southern Plains that were extremely long and severe—one around A.D. 1275 to 1300 and another around A.D. 1550 to 1600. These periods certainly would have affected animal and human populations and may have served as catalysts for cultural changes.

At least three different cultural groups are thought to have inhabited part or all of the region during the Late Prehistoric II period and into Protohistoric times. These groups were associated with the Garza complex, Henrietta complex, and Toyah phase. All three cultures seem to be present in the region (see Boyd 1997:Fig. 96), and the Central Rolling Plains is within a "shared area" identified by Johnson (1994:Fig. 105) as a place where several cultural groups lived and interacted. Because of the dynamic cultural nature of this shared area during Late Prehistoric II times, the archeological remains are diverse, intriguing, and confusing.

The Garza complex (Boyd 1997:495) is represented by bison kill and processing sites, short-term hunting camps, rockshelters, and residential base camps with evidence of tipi-like dwellings. Isolated burials also are associated. Material culture includes a triad of bison hunting and skinning tools—the distinctive Garza and Lott points, Plains-style end scrapers, and beveled knives. Stone tool assemblages are strictly functional at most Garza sites, particularly those related to bison hunting and processing, and striated pottery sherds from plainware pots are often associated. In contrast, at residential bases where more intensive occupations occurred, a range of imported Puebloan items is usually found. Obsidian, turquoise, and *Olivella* shell beads are sometimes present, and decorated Puebloan pottery is abundant at some sites. Further evidence of Puebloan trade is found at 17th-century sites in the form of historic-age materials (e.g., majolica pottery, gunflints and lead, cow and horse bones) that were obtained from Spanish colonial settlement or mission pueblos like Pecos.

The Garza complex extends into the northwestern counties of the region, and the Longhorn and Headstream sites in Kent County (41KT53 and 41KT51) are two Garza complex sites that have been intensively investigated (Boyd 1997:380-381). Garza peoples were major players in the Southern Plains-Pueblo interaction during the middle to late 1600s and appear to have processed large numbers of bison hides for the Pueblo trade. The intensity of Plains-Puebloan trading increased through time, and it is notable that prehistoric Garza sites (i.e., those before A.D. 1541) may look very different from protohistoric Garza sites dating after about A.D. 1650.

Krieger (1946) defined the Henrietta complex based primarily on late 1930s excavations at the Harrell site (Hughes 1942) to the east of the region in Young County. Most of the sites attributed to this complex are east of the Central Rolling Plains region, but the westernmost extent of this culture appears to include Callahan, Eastland, Shackelford, and Stephens counties. The Henrietta complex represents the southernmost Plains Village manifestation in Texas (Boyd 1997:360-361). It is characterized by small, circular to oval houses (with walls lined with posts and having three or four interior posts), storage pits, a variety of arrow points (Fresno, Harrell, Scallorn, and Washita being most common; Alba, Bonham, Eddy, and Perdiz being less

common), and Nocona Plain pottery tempered with limestone or shell. Henrietta peoples did some farming. Charred corn has been recovered from sites in Young and Cooke counties, and bison scapula hoes were used as gardening tools. Henrietta peoples were tied into interregional exchange networks, with trade to the west and northwest as indicated by obsidian, Alibates flint, and Puebloan pottery, and trade to the east as indicated by celts and Caddo pottery.

The Henrietta complex is somewhat confusing because of the low number of investigated sites and the lack of chronological control. It shows similarities to the Blow Out Mountain complex to the west and to the Sanders and Wylie phases to the east (Boyd 1997:361; Brooks 1989:85-86). One thing that is clear, however, is that there is a high frequency of violence in burials, and warfare seems to have been prevalent in this culture (Boyd 1997:360-361).

The Toyah phase was first proposed by Kelley and later revised by Jelks (1962). More recently, Toyah culture was redefined by Johnson (1994) based on his work at the Buckhollow site in Kimbell County. He defined what he called a Classic Toyah culture area that extends northward up into the Rolling Plains region and to the southern edge of the region. He also defines a shared culture area that encompasses the Central Rolling Plains region (Johnson 1994:Fig. 105). Classic Toyah culture is identified by Perdiz arrow points, Plains-style end scrapers, beveled knives, and bone-tempered plainware pottery (often called Leon Plain).

Toyah phase artifacts are found outside the Classic Toyah area, particularly to the north and northwest, but they seem to be mixed with traits and materials from other cultures. Evidence indicates that Toyah people ventured into the Rolling Plains sites to the south (e.g., the Elm Creek site in Concho County and the Rush site in Tom Green County), but Perdiz arrow points are found as far north as the southern Llano Estacado (Boyd 1997:82). One particularly interesting find in the region is the Weaver-Ramage cache in Kent County (Tunnell 1978), containing more than 800 items of high-quality Edwards chert, including a Perdiz point. It is thought to be a cache made by Toyah people. Within the shared area of the Rolling Plains, Perdiz points are found alongside other distinctive arrow points styles (such as Cliffton, Garza, Harrell, Lott, and Washita) and with a wide range of ceramic types. As noted with the Henrietta complex above, violence in Toyah phase burials indicates that the groups in the shared area were not always friendly toward each other (Boyd 1997:364; Prewitt 1981:83).

3.4 PROTOHISTORIC PERIOD (CA. A.D. 1541 TO 1750)

The Protohistoric period begins with Francisco Vázquez de Coronado's entrada in A.D. 1541. The Central Rolling Plains region was undoubtedly occupied at various times by Apaches, Jumanos, Comanches, and other Native American groups, but recognizing the archeological remains of these historic cultures is difficult at best.

When Coronado entered the northern part of Texas in 1541, he met two different groups—Querechos and Teyas—and they were enemies (Boyd 2001). Most researchers agree that the Querechos were Apache peoples, and an Apache presence in the Southern Plains seems certain in the latter 1500s and 1600s. There is less certainty as to the identity of the Teyas, but the most prominent theory is that they represent Jumano peoples described in Spanish accounts from the 17th and 18th centuries (Boyd 2001; Kenmotsu 2001; Kenmotsu and Boyd 2012). The Jumano

culture area probably extended up into the Rolling Plains, but its precise boundaries are not well documented (Hickerson 1994:Map 6; Kenmotsu 2001:Fig. 1; Kenmotsu and Boyd 2012).

3.5 HISTORIC PERIOD (CA. A.D 1632. TO PRESENT)

The beginning of the historic period in Tom Green County is marked by written Spanish accounts of their interactions with the various indigenous nomadic hunter-gatherer subgroups living in the region. The earliest historical narrative from the area comes from the chronicles of Friar Juan de Salas and Diego López, who were dispatched by the Spanish government to visit a Jumano aggregate located on a river called the Rio Nueces (hereafter referred to as the Concho River near San Angelo) on the high plains of Texas in 1632 (Wade 2003). The Jumanos occupied a vast territory that stretched from the Rio Grande to the Balcones Escarpment based on seasonal cycles. They were described as a cohesion of different tribes and bands unified by language and cultural customs; they practiced lifeways as both semi-sedentary maize growers and nomadic bison hunters who traded well beyond the limits of their homeland (Hickerson 1994). During de Salas' 1632 visit, drought conditions in western Texas and southeastern New Mexico had caused the Jumanos to follow the movement of the buffalo to the Concho River, which was a considerable distance from their known sedentary villages of Toyah Creek and La Junta (Chipman 1992; Hickerson 1994; Wade 2003). During the course of a visit to Jumano lands in 1650 by Hernan Martin and Diego de Castillo, fine freshwater pearls were collected from the Concho River and sent to the Viceroy Alva de Liste (Wade 2003).

Four years later, in 1654, an expedition to the Concho River was led by Sergeant Diego de Guadalajara, who oversaw command of 30 soldiers and approximately 200 Christianized Native Americans (Wade 2003). Pearls were harvested and collected by the entrada, and at the end of the trip, Captain Andrés López and 12 soldiers were engaged in battle with the Cuitoa, a neighboring tribe (Wade 2003). Two additional indigenous groups—the Excanxaque and the Ayjad, who were separate from the Jumano and allies of the Cuitoa—were supposedly in the area of the Concho River drainages at the time of the battle; however, by 1684, no trace of their existence was mentioned or listed in any Spanish documents (Wade 2003). Between the Guadalajara expedition and 1683, the Spanish actively traded iron tools and horses with the Jumano in exchange for pelts and bison meat.

Indications of cultural change during the 17th century are evident based on the documents produced by the expedition of 1683-1684 led by Juan Domínguez de Mendoza, Friar Nicolás López, and Friar Juan Sabaleta. By then, Jumano seasonal settlement patterns were disrupted by both Spanish presence and the adoption of the horse by the Apaches and Comanches. Due to the menacing attacks by the Apaches, the more friendly Jumanos joined an alliance with the Spaniards against their common enemy. The Spanish, who were interested in proselytizing the Jumano Nation, took this as an opportunity to advance their conversion goals, which pleased both the Viceroy and Governor Cruzate. In 1684, Mendoza, after leaving El Arcángel San Miguel, traveled to a place located on the Middle Concho River that was covered in groves of pecan and oak trees where nuts, mussel shells, and buffalo were plentiful. There, his party waited for four days while detached spies scouted the area northwest of present-day San Angelo (Wade 2003). Upon their return, the scouts reported an abandoned Apache *rancheria* nearby, who by then had

been pushed down into central Texas from pressures by their Plains rivals, the Comanches (Wade 2003).

In addition to the Jumanos, several other Native Americans who resided in the region had joined the expedition, including members of the Orasos, Isuchos, Caucos, Chinchis, Llames, Cunchucos, Quitacas, and Cuicuchubes (Wade 2003). Other nations that lived on the Edwards Plateau that did not join were the Huicaciques, Ayelis, Aguidas, Amichienes, Tujujos, Amomas, Manaques, Durjaquitas, Chuncotes, Anchimos, Colabrotes, Unojitas, Chinsas, Quaysabas, Payubunas, and the Pahuachianes (Wade 2003). From March to May 1684, Mendoza and his entrada camped at a spot where the Rio de San Clemente "flows eastward," (likely the San Saba River near present-day Menard), and there he commissioned a bastion and a church to be built for protection and baptism (Wade 2003). Additionally, Mendoza documented a bison hunt that killed more than 4,030 buffalo by the Spanish soldiers and indigenous peoples in order to feed the expedition party (Foster 2008). Due to raids by both Apaches and the Salinero Indians, the latter having been identified as originating from southeastern Chihuahua, Mendoza returned to New Mexico to report to the governor after a quick tenure in the hill country (Foster 2008; Hickerson 1994). By 1716, the Jumanos became allies with their previous nemeses, the Apaches, in order to create an effective barrier against the powerful Comanches (Allen 1941). This alliance is further evidenced by the use of the term Apaches-Jumanes, describing a subgroup living near the Rio Grande in 1747 (Bolton 1911). After 1750, no mention of Jumanos occurs within any documentation from the Spanish, suggesting that the group was likely defeated by enemies, disease, or completely absorbed by groups such as the Wichita, Caddo, or Apache (Allen 1941; Bolton 1911; Hickerson 1994). By the turn of the century, most Apaches had been pushed westward by the Comanches, who by then had political control over the Concho River drainages.

When the nascent Republic of Texas was annexed by the US in 1845, Anglo pioneers began to settle the area of present-day Tom Green County. In efforts to thwart Native attacks on Anglo expansion, a series of federal forts were constructed in the region, such as Camp J.E. Johnston in 1852 and Fort Chadbourne in 1852 in present-day Coke County. A semi-weekly mail and passenger stagecoach trail was chartered in 1858, the Butterfield Overland Mail, which linked San Francisco to St. Louis via the headwaters of the Middle Concho River as well as Fort Chadbourne (Richardson 2010). The San Antonio-San Diego trail also traversed the Concho Country in the early 1870s. Both the Butterfield Overland stagecoach trail and Fort Chadbourne were abandoned following the onset of the Civil War. The first Anglo settlers in the area of the Concho Rivers were cattle baron R.F. Tankersley, G.W. Delong, and ranchman Eugene G. McCrohan, along with a plethora of temporary Anglo bison hunters who exploited the winter and spring populations and created a viable industry (Henderson 2010). In the winter of early 1865, Texas Rangers and Confederate soldiers were engaged in a skirmish with displaced Kickapoo Indians who were en route to Mexico from Kansas (Allen 1941). Defeated, the remaining Kickapoo sought refuge in the Santa Rosa Mountains and continued to conduct raids in the Concho Country throughout the 1870s (Allen 1941). To safeguard the expanding frontier, the US established a series of forts strategically aligned from the hill country to the TransPecos region, including Fort Davis, Fort Stockton, Fort Griffin, Fort McKavett, and Fort Concho; the latter two were located in the heart of the Concho Country region (Allen 1941).

Many of the first immigrant families to settle what is now known as San Angelo were of German descent contracted through the German Immigration Company. By the 1880s, a telegraph line was built from San Antonio to Fort Concho, which was the first communication line chartered by the US government for the region (Allen 1941). Mr. Bartholomew DeWitt, a wealthy man from San Antonio, moved to the region in 1868 and purchased a tract of land located on the North Concho River (Allen 1941). After establishing a small community with saloons, gambling halls, and huts, he named the new provincial town San Angelo after his Mexican-born wife Santa Angela (Allen 1941). The county's boundaries were carved from the existing Bexar land in 1874 and named after Confederate Brig. General Thomas Green. Originally, the county's borders encompassed a large area, which was later divvied up to create Coke, Crane, Ector, Glasscock, Irion, Loving, Midland, Reagan, Sterling, Upton, and Ward counties. Ben Ficklin was chosen as the county seat until the town was destroyed by a catastrophic flood in 1882 and subsequently moved to San Angelo in 1884 (Allen 1941). The Goodnight-Loving Trail passed through Concho Country as early as 1866 until the advent of the railroads replaced cattle drives with technological efficacy.

The county was marked in the 1880s with the chartering of several newspapers, including *The Concho Times* and the *San Angelo Standard*; the construction of a fire department; and the establishment of several Catholic, Methodist, Episcopal, Baptist, Presbyterian, and Church of Christ churches (Henderson 2010). In 1888, the agricultural industry hit its stride with the laying of the first rail connection to Tom Green County, the Santa Fe Railroad, which linked the region to markets in New Mexico and east Texas. By 1900, the county's population had reached 6,804, and San Angelo had risen to become one of the chief markets for cattle exports in the entire US. Additional agricultural and ranching exports were mohair, goat, sheep, and wool. The year 1890 bore witness to the county's first electrical plant, and the first sewer line was constructed in 1895. By the 1920s, mohair and cotton production dominated the industry, along with pecan and grain sorghum. The 1940s saw a population expansion as Goodfellow Field opened its doors to Air Force pilot training. After the chartering of San Angelo State University in 1928, several other institutions of higher education followed, including the Texas A&M Research and Extension Center, Howard College–San Angelo Campus, American Commercial College, and the Chenier Business School. By 1980, the population of Tom Green County had expanded to 98,458 citizens. Economically, the county is dominated by agribusiness, ranching, farming, as well of recreational tourism, education, and retail. The county proudly boasts its diversified cultural heritage, and the San Angelo Museum of Fine Arts, the San Angelo Symphony, the San Angelo Civic Ballet, and the San Angelo State University Planetarium all attest to its expanding horizons.

4.0 ARCHIVAL RESEARCH

Prior to initiating fieldwork, Horizon personnel reviewed the THC's online *Texas Archeological Sites Atlas* (TASA) and *Texas Historic Sites Atlas* (THSA), the National Park Service's (NPS) online *National Register Information System* (NRIS), and the Texas State Historical Association's (TSHA) *The Handbook of Texas Online* for information on previously recorded archeological sites and previous archeological investigations conducted within a 1.6-kilometer (1.0-mile) radius of the project area. Based on this archival research, ten previously recorded archeological sites and two cemeteries are located within a 1.6-kilometer (1.0-mile) radius of the project area (Table 2; Figure 5) (THC 2020). All ten known archeological sites and the two cemeteries are located well outside of the project area and would not be impacted by the proposed undertaking. Based on the TASA database, no previous cultural resources investigations have occurred within the boundaries of the proposed project area.

A review of historical aerial photographs dating from 1954 to the present and US Geological Survey (USGS) topographic maps dating from 1924 to the present indicates that no historic-age structures have stood within the project area since at least the early 20th century (NETR 2020; UT 2020). Examination of historical imagery dating from 1928 to the present indicates that the project area has remained undeveloped throughout its history. Around 2004, the project area as well as a large tract of land extending to the north and west was devegetated and possibly graded. In 2014, Green Hill Road, the road that bounds the project area on the southern side, and a multifamily apartment complex, the Vistas at Red Creek, were constructed south of the project area.

In central and north-central Texas, aboriginal resources are commonly encountered adjacent to streams, rivers, and creeks, as well as in upland settings. Based on the proximity of the project area to Red Arroyo to the south and the South Concho River to the east, the project area is considered to possess moderate potential for aboriginal cultural resources. Historic-age resources may occur in virtually any physiographic setting but are most common in urban settings and in rural areas suitable for agriculture. Based on the absence of historic-age structures on historical USGS topographic maps and aerial photographs throughout the 20th century, the project area is considered to possess low potential to contain historic-era architectural or archeological resources. Due to the antiquity of the geological and soil units that characterize the project area, any archeological resources present within the project area would be expected to

Table 2. Previously Documented Cultural Resources within 1.0 Mile of Project Area

Site No./Name	Site Type	NRHP Eligibility Status[1]	Distance/Direction from Project Area	Potential to be Impacted by Project?
Archeological Sites				
41TG54	Aboriginal petroglyph (undetermined prehistoric)	Undetermined	0.9 mile northwest	No
41TG85	Aboriginal lithic scatter (undetermined prehistoric)	Determined ineligible	0.3 mile north	No
41TG158	Aboriginal campsite (undetermined prehistoric)	Determined ineligible	0.8 mile northwest	No
41TG183	Aboriginal burned rock midden (undetermined prehistoric)	Undetermined	0.2 mile west	No
41TG579	Aboriginal campsite (undetermined prehistoric); Historic-age artifact (button) (undetermined historic)	Undetermined	0.9 mile northwest	No
41TG583	Aboriginal lithic scatter/quarry (undetermined prehistoric)	Determined ineligible	1.0 mile north	No
41TG584	Aboriginal lithic scatter/quarry (undetermined prehistoric)	Determined ineligible	0.9 mile northwest	No
41TG585	Aboriginal lithic scatter (undetermined prehistoric)	Determined ineligible	0.7 mile northwest	No
41TG586	Aboriginal lithic scatter (undetermined prehistoric)	Determined ineligible	0.9 mile north-northwest	No
41TG662	No site form available	Undetermined	1.0 mile northwest	No
Cemeteries				
Belvedere Memorial Park (TG-C007)	Cemetery	Historic Texas Cemetery	0.7 mile east	No
Delta Memorial Park Cemetery (TG-C015)	Cemetery	Historic Texas Cemetery	0.7 mile east	No

[1] *Determined eligible/ineligible* = Site determined eligible/ineligible by SHPO
Recommended eligible/eligible = Site recommended as eligible/ineligible by site recorder and/or sponsoring agency but eligibility has not been determined by SHPO
Undetermined = Eligibility not assessed or no information available

NRHP National Register of Historic Places

SHPO State Historic Preservation Office

be constrained to the modern surface or to shallowly buried contexts lacking integrity due to erosion and recent vegetation-clearing and landscaping.

SENSITIVE ARCHEOLOGICAL SITE LOCATION INFORMATION OMITTED

Figure 5. Locations of Documented Cultural Resources within 1.0 Mile of Project Area

5.0 SURVEY METHODOLOGY

On July 14, 2020, Horizon archeologist Jesse O. Dalton, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the 4.6-hectare (11.4-acre) project area. Horizon's archeologist traversed the survey area on foot and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area is situated in an open field on a gently sloping upland landform just northeast of Red Arroyo, a tributary of the South Concho River. Vegetation at the time of the survey consisted of short tobosa, buffalo, and mesquite grasses as well as sparse patches of dry forbs. The modern ground surface was covered in medium-sized gravels and rocks. Visibility of the modern ground surface was generally excellent (80 to 100%).

Examination of historical imagery dating from 1928 to the present indicates that the project area has remained undeveloped throughout its history. Around 2004, the project area as well as a large tract of land extending to the north and west was devegetated and possibly graded. In 2014, Green Hill Road, the road that bounds the project area on the southern side, and a multifamily apartment complex, the Vistas at Red Creek, were constructed south of the project area. Portions of the project area adjacent to Green Hill Road appear to have been used as equipment stating areas during construction of the adjacent subdivision. Large portions of the southern half of the project area are extensively disturbed, including a large drainage channel and an associated artificial berm that follows the alignment of Green Hill Road for approximately 0.2 kilometer (0.1 mile) and a slightly raised rectangular pad that measures approximately 60.0 meters (196.9feet) long by 25.0 meters (82.0 feet) wide. This rectangular pad was likely a leveled temporary staging area for the equipment and associated materials used in the construction of the road and/or residential subdivision to the south. These disturbed areas are present on historical aerial photographs from 2014 through the present and were observed during the current cultural resources survey. Near the eastern border of the rectangular pad is a 2.0-by-2.0-meter (6.6-feet-by-6.6-foot) asphalt surface. Several push piles containing modern trash and large limestone rocks are also present within the disturbed rectangular pad area. Representative photographs of the project area are presented in Figures 6 to 11.

In addition to pedestrian walkover, the Texas State Minimum Archeological Survey Standards (TSMASS) require a minimum of two shovel tests per 0.4-hectare (1.0-acre) for projects areas less than 10.1-hectares (25.0-acres) in size. As such, a minimum of 23 shovel tests would be required within the 4.6-hectare (11.4-acre) project area. Horizon excavated a total of 23 shovel tests within the project area, thereby meeting the TSMASS for a project area of this

Figure 6. Overview of Central Portion of Project Area (Facing West)

Figure 7. Drainage Channel along Southern Margin of Project Area (Facing West)

Figure 8. Disturbed Elevated Pad in Southern Portion of Project Area (Facing South)

Figure 9. Asphalt and Gravels within Disturbed Portion of Project Area

Figure 10. Asphalt near Disturbed Portion of Project Area (Facing West)

Figure 11. Push Pile on within Disturbed Portion of Project Area (Facing South)

size (Figures 12 to 14). In general, shovel tests measured approximately 30.0 centimeters (11.8 inches) in diameter, and all sediments were screened through 6.35-millimeter (0.25-inch) hardware cloth. The Universal Transverse Mercator (UTM) coordinates of all shovel tests were determined using Collector for ArcGIS data collection software based on the North American Datum of 1983 (NAD 83). Shovel testing revealed that sediments in the project area consist of a typical A-B sequence of dry reddish-brown loam or clay loam overlying weak, blocky dark reddish-brown or pinkish-brown clay with common calcium carbonate ($CaCO_3$) inclusions. The B-horizon subsoil (Bss1, Bw, Btk1) or limestone bedrock were observed underlying the A horizon at average depths of 15.0 to 40.0 centimeters (5.9 to 15.7 inches) below surface. Horizon is confident that shovel testing were capable of penetrating Holocene-era sediments with the potential to contain subsurface archeological deposits. Specific shovel test data are presented in Appendix A.

During the survey, field notes were maintained on terrain, vegetation, soils, landforms, survey methods, and shovel test results. Digital photographs were taken, and a photographic log was maintained. Horizon employed a non-collection policy for cultural resources. Diagnostic artifacts (e.g., projectile points, ceramics, historic materials with maker's marks) and non-diagnostic artifacts (e.g., lithic debitage, burned rock, historic glass, and metal scrap) were to be described, sketched, and/or photo-documented in the field and replaced in the same location in which they were found. As no cultural resources of historic or prehistoric age were observed during the survey, the collection policy was not enacted.

The survey methods employed during the survey represented a "reasonable and good-faith effort" to locate significant archeological sites within the project area as defined in 36 CFR 800.3.

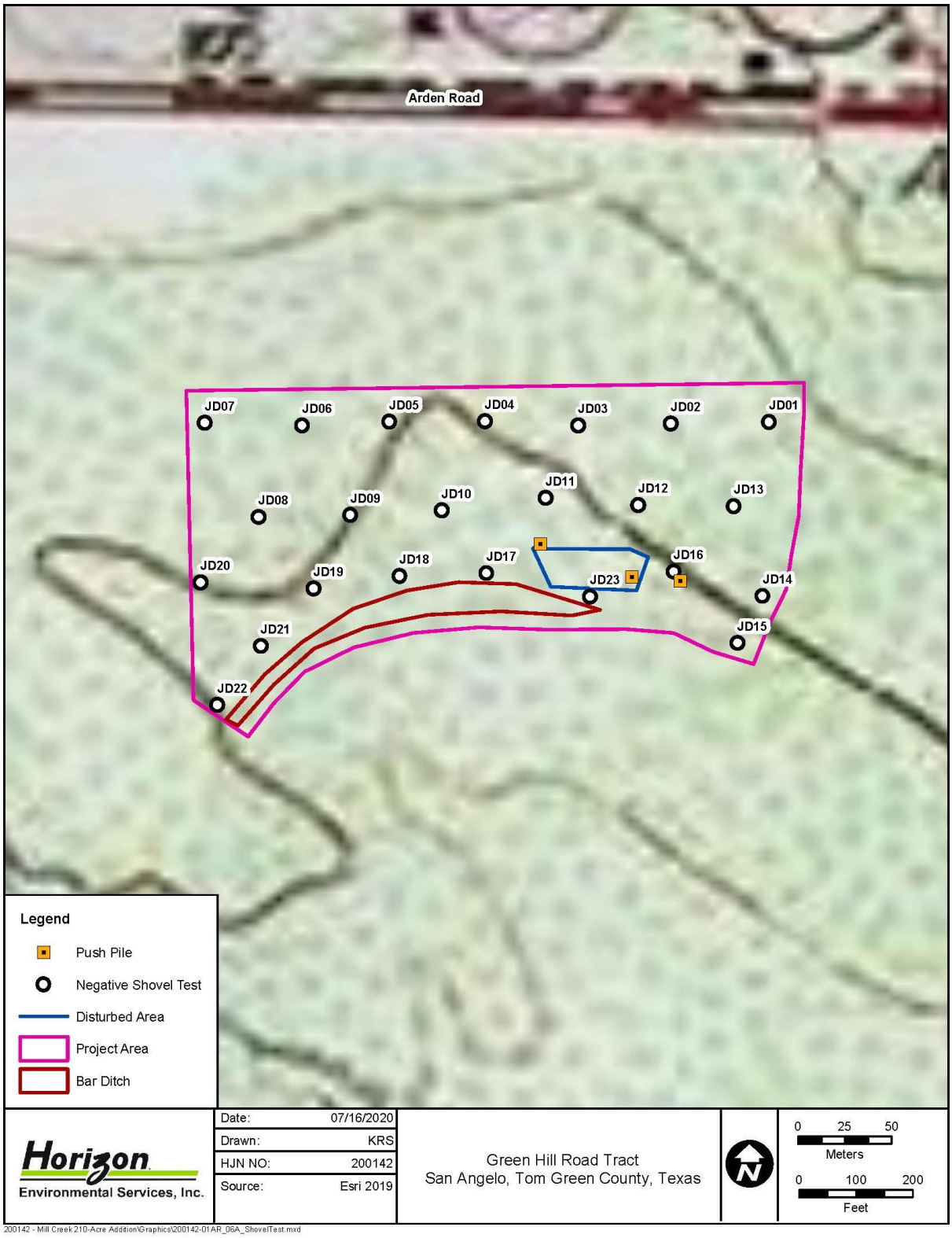

Figure 12. Locations of Shovel Tests and Disturbed Areas in Project Area

Figure 13. View of Typical Shovel Test

Figure 14. Typical Reddish-Brown Clay Loam Observed in Shovel Tests

6.0 RESULTS OF INVESTIGATIONS

On July 14, 2020, Horizon archeologist Jesse O. Dalton, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the 4.6-hectare (11.4-acre) project area. Horizon's archeologist traversed the survey area on foot and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area is situated in an open field on a gently sloping upland landform just northeast of Red Arroyo, a tributary of the South Concho River. Vegetation at the time of the survey consisted of short tobosa, buffalo, and mesquite grasses as well as sparse patches of dry forbs. The modern ground surface was covered in medium-sized gravels and rocks. Visibility of the modern ground surface was generally excellent (80 to 100%).

Examination of historical imagery dating from 1928 to the present indicates that the project area has remained undeveloped throughout its history. Around 2004, the project area as well as a large tract of land extending to the north and west was devegetated and possibly graded. In 2014, Green Hill Road, the road that bounds the project area on the southern side, and a multifamily apartment complex, the Vistas at Red Creek, were constructed south of the project area. Portions of the project area adjacent to Green Hill Road appear to have been used as equipment stating areas during construction of the adjacent subdivision. Large portions of the southern half of the project area are extensively disturbed, including a large drainage channel and an associated artificial berm that follows the alignment of Green Hill Road for approximately 0.2 kilometer (0.1 mile) and a slightly raised rectangular pad that measures approximately 60.0 meters (196.9feet) long by 25.0 meters (82.0 feet) wide. This rectangular pad was likely a leveled temporary staging area for the equipment and associated materials used in the construction of the road and/or residential subdivision to the south. These disturbed areas are present on historical aerial photographs from 2014 through the present and were observed during the current cultural resources survey. Near the eastern border of the rectangular pad is a 2.0-by-2.0-meter (6.6-feet-by-6.6-foot) asphalt surface. Several push piles containing modern trash and large limestone rocks are also present within the disturbed rectangular pad area.

In addition to pedestrian walkover, the TSMASS require a minimum of two shovel tests per 0.4-hectare (1.0-acre) for projects areas less than 10.1-hectares (25.0-acres) in size. As such, a minimum of 23 shovel tests would be required within the 4.6-hectare (11.4-acre) project area. Horizon excavated a total of 23 shovel tests within the project area, thereby meeting the TSMASS for a project area of this size. Shovel testing revealed that sediments in the project area consist of a typical A-B sequence of dry reddish-brown loam or clay loam overlying weak, blocky

dark reddish-brown or pinkish-brown clay with common calcium carbonate ($CaCO_3$) inclusions. The B-horizon subsoil (Bss1, Bw, Btk1) or limestone bedrock were observed underlying the A horizon at average depths of 15.0 to 40.0 centimeters (5.9 to 15.7 inches) below surface. Horizon is confident that shovel testing were capable of penetrating Holocene-era sediments with the potential to contain subsurface archeological deposits.

No cultural resources of historic or prehistoric age were observed on the modern ground surface or within any of the shovel tests excavated during the survey, and no standing structures of historic age are present within the project area or on adjacent parcels.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 CONCEPTUAL FRAMEWORK

The archeological investigations documented in this report were undertaken with three primary management goals in mind:

- Locate all historic and prehistoric archeological resources that occur within the designated survey area.
- Evaluate the significance of these resources regarding their potential for inclusion in the NRHP.
- Formulate recommendations for the treatment of these resources based on their NRHP evaluations.

At the survey level of investigation, the principal research objective is to inventory the cultural resources within the project area and to make preliminary determinations of whether or not the resources meet one or more of the pre-defined eligibility criteria set forth in the state and/or federal codes, as appropriate. Usually, management decisions regarding archeological properties are a function of the potential importance of the sites in addressing defined research needs, though historic-age sites may also be evaluated in terms of their association with important historic events and/or personages. Under the NHPA, archeological resources are evaluated according to criteria established to determine the significance of archeological resources for inclusion in the NRHP.

Analyses of the limited data obtained at the survey level are rarely sufficient to contribute in a meaningful manner to defined research issues. The objective is rather to determine which archeological sites could be most profitably investigated further in pursuance of regional, methodological, or theoretical research questions. Therefore, adequate information on site function, context, and chronological placement from archeological and, if appropriate, historical perspectives is essential for archeological evaluations. Because research questions vary as a function of geography and temporal period, determination of the site context and chronological placement of cultural properties is a particularly important objective during the inventory process.

7.2 ELIGIBILITY CRITERIA FOR INCLUSION IN THE NATIONAL REGISTER OF HISTORIC PLACES

Determinations of eligibility for inclusion in the NRHP are based on the criteria presented in 36 CFR §60.4(a-d). The four criteria of eligibility are applied following the identification of relevant historical themes and related research questions:

> The quality of significance in American history, architecture, archeology, 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. [T]hat are associated with events that have made a significant contribution to the broad patterns of our history; or,
>
> b. [T]hat are associated with the lives of persons significant in our past; or,
>
> c. [T]hat embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
>
> d. [T]hat have yielded, or may be likely to yield, information important in prehistory or history.

The first step in the evaluation process is to define the significance of the property by identifying the particular aspect of history or prehistory to be addressed and the reasons why information on that topic is important. The second step is to define the kinds of evidence or the data requirements that the property must exhibit to provide significant information. These data requirements in turn indicate the kind of integrity that the site must possess to be significant. This concept of integrity relates both to the contextual integrity of such entities as structures, districts, or archeological deposits and to the applicability of the potential database to pertinent research questions. Without such integrity, the significance of a resource is very limited.

For an archeological resource to be eligible for inclusion in the NRHP, it must meet legal standards of eligibility that are determined by three requirements: (1) properties must possess significance, (2) the significance must satisfy at least one of the four criteria for eligibility listed above, and (3) significance should be derived from an understanding of historic context. As discussed here, historic context refers to the organization of information concerning prehistory and history according to various periods of development in various times and at various places. Thus, the significance of a property can best be understood through knowledge of historic development and the relationship of the resource to other, similar properties within a particular period of development. Most prehistoric sites are usually only eligible for inclusion in the NRHP under Criterion D, which considers their potential to contribute data important to an understanding of prehistory. All four criteria employed for determining NRHP eligibility potentially can be brought to bear for historic sites.

7.3 SUMMARY OF INVENTORY RESULTS

On July 14, 2020, Horizon archeologist Jesse O. Dalton, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the

4.6-hectare (11.4-acre) project area. Horizon's archeologist traversed the survey area on foot and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. The project area is situated in an open field on a gently sloping upland landform just northeast of Red Arroyo, a tributary of the South Concho River. Vegetation at the time of the survey consisted of short tobosa, buffalo, and mesquite grasses as well as sparse patches of dry forbs. The modern ground surface was covered in medium-sized gravels and rocks. Visibility of the modern ground surface was generally excellent (80 to 100%).

Examination of historical imagery dating from 1928 to the present indicates that the project area has remained undeveloped throughout its history. Around 2004, the project area as well as a large tract of land extending to the north and west was devegetated and possibly graded. In 2014, Green Hill Road, the road that bounds the project area on the southern side, and a multifamily apartment complex, the Vistas at Red Creek, were constructed south of the project area. Portions of the project area adjacent to Green Hill Road appear to have been used as equipment stating areas during construction of the adjacent subdivision. Large portions of the southern half of the project area are extensively disturbed, including a large drainage channel and an associated artificial berm that follows the alignment of Green Hill Road for approximately 0.2 kilometer (0.1 mile) and a slightly raised rectangular pad that measures approximately 60.0 meters (196.9feet) long by 25.0 meters (82.0 feet) wide. This rectangular pad was likely a leveled temporary staging area for the equipment and associated materials used in the construction of the road and/or residential subdivision to the south. These disturbed areas are present on historical aerial photographs from 2014 through the present and were observed during the current cultural resources survey. Near the eastern border of the rectangular pad is a 2.0-by-2.0-meter (6.6-feet-by-6.6-foot) asphalt surface. Several push piles containing modern trash and large limestone rocks are also present within the disturbed rectangular pad area.

In addition to pedestrian walkover, the TSMASS require a minimum of two shovel tests per 0.4-hectare (1.0-acre) for projects areas less than 10.1-hectares (25.0-acres) in size. As such, a minimum of 23 shovel tests would be required within the 4.6-hectare (11.4-acre) project area. Horizon excavated a total of 23 shovel tests within the project area, thereby meeting the TSMASS for a project area of this size. Shovel testing revealed that sediments in the project area consist of a typical A-B sequence of dry reddish-brown loam or clay loam overlying weak, blocky dark reddish-brown or pinkish-brown clay with common calcium carbonate ($CaCO_3$) inclusions. The B-horizon subsoil (Bss1, Bw, Btk1) or limestone bedrock were observed underlying the A horizon at average depths of 15.0 to 40.0 centimeters (5.9 to 15.7 inches) below surface. Horizon is confident that shovel testing were capable of penetrating Holocene-era sediments with the potential to contain subsurface archeological deposits.

No cultural resources of historic or prehistoric age were observed on the modern ground surface or within any of the shovel tests excavated during the survey, and no standing structures of historic age are present within the project area or on adjacent parcels.

7.4 MANAGEMENT RECOMMENDATIONS

Based on the results of the survey-level investigations documented in this report, no significant cultural resources would be affected by the proposed undertaking. In accordance with

36 CFR 800.4, Horizon has made a reasonable and good faith effort to identify historic properties within the project area. No cultural resources were identified that meet the criteria for listing on the NRHP according to 36 CFR 60.4. Horizon recommends a finding of "no historic properties affected," and no further work is recommended in connection with the proposed undertaking. However, in the event that any human remains or burial objects are inadvertently discovered at any point during construction, use, or ongoing maintenance in the project area, even in previously surveyed areas, all work should cease immediately and the Texas Historical Commission (THC) should be notified of the discovery.

8.0 REFERENCES CITED

Adovasio, J.M., J. Donahue, and R. Stuckenrath

1990 The Meadowcroft Rockshelter Chronology 1975-1990. *American Antiquity* 55:348-354.

Allen, S.T.

1941 *Early Settlement of the Concho Country*. Master's Thesis of the North Texas Teachers College, San Angelo.

Antevs, E.

1955 Geologic-Climatic Dating in the West. *American Antiquity* 20:317-335.

Baker, V.R.

1975 *Flood Hazards Along the Balcones Escarpment in Central Texas—Alternative Approaches to the Recognition, Mapping, and Management*. Geological Circular No. 75-5. Bureau of Economic Geology, The University of Texas at Austin.

Black, S.L., L.W. Ellis, D.G. Creel, and G.T. Goode

1997 *Hot Rock Cooking on the Grater Edwards Plateau: Four Burned Rock Midden Sites in West Central Texas*, Volumes 1 and 2. Studies in Archeology 22. Texas Archeological Research Laboratory, The University of Texas at Austin. Archeology Studies Program, Report No. 2. Archeology Studies Program, Environmental Affairs Department, Texas Department of Transportation, Austin.

Blair, W. F.

1950 The Biotic Provinces of Texas. *Texas Journal of Science* 2:93-117.

Bolton, H.E.

1911 The Jumano Indians in Texas, 1650-1771. *The Quarterly of the Texas State Historical Association*, Vol. XV, No. 1.

Bomar, G.W.

1983 *Texas Weather*. University of Texas Press, Austin.

Boyd, D.K.

1995 The Palo Duro Complex: Redefining the Early Ceramic Period in the Caprock Canyonlands. *Bulletin of the Texas Archeological Society* 66:461-518.

1997 *Caprock Canyonlands Archeology: A Synthesis of the Late Prehistory and History of Lake Henry and The Texas Panhandle Plains, Volumes I-II*. Report of Investigations No. 10. Prewitt and Associates, Inc., Austin.

2001 Querechos and Teyas: Protohistoric Hunters and Gatherers in the Texas Panhandle Plains, A.D. 1540-1700. *Bulletin of the Texas Archeological Society* 72:5-22.

Brooks, R.L.

1989 Village Farming Societies. In *From Clovis to Comanchero: Archeological Overview of the Southern Great Plains*, by J.L. Hoffman, R.L. Brooks, J.S. Hays, D.W. Owsley, R.L. Jantz, M.K. Marks, and M.H. Manhein, pp. 71-90. Research Series No. 35. Arkansas Archeological Society, Fayetteville.

1994 Warfare on the Southern Plains. In *Skeletal Biology in the Great Plains: Migration, Warfare, Health, and Subsistence*, edited by D.W. Owsley and R.L. Jantz, pp. 317-323. Smithsonian Institution Press, Washington, D.C.

Bryant, V. M., Jr., and R.G. Holloway

1985 A Late-Quaternary Paleoenvironmental Record of Texas: An Overview of the Pollen Evidence. In *Pollen Records of Late-Quaternary North American Sediments*, edited by V.M. Bryant, Jr., and R.G. Holloway, pp. 39-70. American Association of Stratigraphic Palynologists Foundation, Dallas, Texas.

Carr, J.T.

1967 *Climate and Physiography of Texas*. Texas Water Development Board, Report No. 53, Austin.

Chipman, D.E.

1992 *Spanish Texas: 1519-1821*. The University of Texas Press, Austin.

Cliff, M.B., R. Martynec, S.N. Allday, and D.E. Peter

1991 *Cultural Resources Sample of the Elm Creek Detention and Channelization Area, Abilene, Taylor County, Texas*. Miscellaneous Report of Investigations No. 21. Geo-Marine, Inc., Plano, Texas.

Collins, M.B.

1995 Forty Years of Archeology in Central Texas. *Bulletin of the Texas Archeological Society* 66: 361-400.

Creel, D.

1986 *A Study of Prehistoric Burned Rock Middens in West Central Texas*. Unpublished Ph.D. dissertation, The University of Arizona, Tucson.

1990 *Excavations at 41TG91, Tom Green County, Texas*. Publications in Archaeology Report No. 38. Texas State Department of Highways and Public Transportation, Highway Design Division, Austin.

Denton, J.T.

1983 *Test Excavations at Site 41KT32, Kent County, Texas*. Texas Department of Highways and Public Transportation, Austin.

Dice, L.R.

1943 *The Biotic Provinces of North America*. University of Michigan Press, Ann Arbor.

Dillehay, T.D.

1974 Late Quaternary Bison Population Changes on the Southern Plains. *Plains Anthropologist* 19:180-196.

1989 *Monte Verde: A Late Pleistocene Settlement in Chile—Paleoenvironment and Site Context*, Vol. 1. Smithsonian Institution Press: Washington D.C.

1997 *Monte Verde: A Late Pleistocene Settlement in Chile—The Archaeological Context*, Vol. 2. Smithsonian Institution Press: Washington D.C.

Dincauze, D.F.

1984 An Archaeo-Logical Evaluation of the Case for Pre-Clovis Occupations. *Advances in World Archaeology* 3:275-323. Academic Press, New York.

Environmental Systems Research Institute (Esri)

2019 Digital orthographic photography sourced by Esri for ArcGIS Online. <arcgis.com>. Accessed September 3, 20190.

2020 USA topographic maps sourced by ESRI for ArcGIS Online. <arcgis.com>. Accessed July 16, 2020.

Etchieson, G.M., R.D. Speer, and J.T. Hughes

1979 *Archeological Investigations in the Crowell Reservoir Area, King and Knox Counties, Texas*. Archeological Research Laboratory, Killgore Research Center, West Texas State University, Canyon.

Fenneman, N.

1931 *Physiography of the Western United States*. McGraw Hill, New York.

Forrester, R.E.

1987 The Moran Point from North-Central Texas. *Bulletin of the Oklahoma Anthropological Society* 36:131-136.

Foster, W.C

2008 *Historic Native Peoples of Texas*. The University of Texas Press, Austin.

Frederick, C.D., and C. Ringstaff

1994 Lithic Resources at Fort Hood: Further Investigation. In *Archeological Investigation on 571 Prehistoric Sites at Fort Hood, Bell and Coryell Counties, Texas*. Management Series, Research Report No. 31. US Army, Fort Hood.

Haynes, C.V., Jr., D.J. Donahue, A.J. T. Hull, and T.H. Zabel

1984 Application of Accelerator Dating to Fluted Point Paleoindian Sites. *Archaeology of Eastern North America* 12:184-191.

Henderson, J.C.

2010 Tom Green County. *The Handbook of Texas Online*. <https://tshaonline.org/handbook/online/articles/hct07>. Uploaded June 12, 2010. Accessed July 2, 2020.

Hickerson, N.P.

1994 *The Jumanos: Hunters and Traders of the South Plains*. The University of Texas Press, Austin.

Hofman, J.L., R.L. Brooks, J.S. Hays, D.W. Owsley, R.L. Jantz, M.K. Marks, and M.H. Manhein

1989 *From Clovis to Comanchero: Archeological Overview of the Southern Great Plains.* Research Series No. 35. Arkansas Archeological Survey, Fayetteville.

Holden, W.C.

1929 Some Recent Explorations and Excavations in Northwest Texas. *Bulletin of the Texas Archeological and Paleontological Society* 1:23-35.

Hughes, J.T.

1991 Prehistoric Cultural Developments on the Texas High Plains. *Bulletin of the Texas Archeological Society* 60:1-55.

Hurt, R.D.

1980 *Archeological Investigations of Portions of the Middle Concho Valley*. Unpublished M.A. Thesis, Texas Tech University, Lubbock.

Jelks, E.B.

1962 *The Kyle Site: A Stratified Central Texas Aspect Site in Hill County, Texas*. Archeology Series No. 5. Department of Anthropology, The University of Texas at Austin.

Johnson, L., Jr.

1994 *The Life and Times of Toyah-Culture Folk as Seen from the Buckhollow Encampment, Site 31KM16, of Kimble County, Texas*. Office of the State Archeologist Report No. 38. Texas Department of Transportation and Texas Historical Commission, Austin.

Jurney, D.H., F. Winchell, and R.W. Moir

1989 *Cultural Resources Overview of the National Grasslands in North Texas: Studies in Predictive Archaeological Modeling for the Caddo and LBJ Grasslands*. Archaeology Research Program, Institute for the Study of Earth and Man, Southern Methodist University, Dallas. Submitted to the US Forest Service, Lufkin, Texas.

Katz, P., and S.R. Katz

2001 *Data Recovery at the Bear Branch Site (41CA13), Callahan County, Texas*. PRIAM, Panhandle, Texas.

Kelley, J.C.

1947 The Cultural Affiliations and Chronological Position of the Clear Fork Focus. *American Antiquity* 13(2):97-109.

Kelly, R.L., and L.C. Todd

1988 Coming into the Country: Early Paleo-Indian Hunting and Mobility. *American Antiquity* 53:231-244.

Kenmotsu, N.A.

2001 Seeking Friends, Avoiding Enemies: The Jumano Response to Spanish Colonization, A.D. 1580-1750. *Bulletin of the Texas Archeological Society* 72:23-43.

Kenmotsu, N.A., and D.K. Boyd (editors)

2012 *The Toyah Phase of Central Texas: Late Prehistoric Economic and Social Progress*. Texas A&M University Press, College Station.

Krieger, A.D.

1946 *Culture Complexes and Chronology in Northern Texas with Extension of Puebloan Dating to the Mississippi Valley*. University of Texas Publication No. 4640. Austin.

Larkin, T.J., and G.W. Bomar

1983 *Climatic Atlas of Texas*. Publication LP-192. Texas Department of Water Resources, Austin.

Lucas, S.G.

2004 A Global Hiatus in the Middle Permian Tetrapod Fossil Record. Micropaleontology Press. <http://www.micropress.org/stratigraphy/pdfs/Stratigraphy_1.1.47.pdf>. Uploaded 2004. Accessed July 15, 2020.

Lynch, T.F.

1990 Glacial-Age Man in South America?: A Critical Review. *American Antiquity* 55(1):12-36.

Mack, S.R.

1994 *Archaeological Investigations at the Van York Site (41BD8): A Late Archaic Lithic Scatter in the Western Rolling Plains of Texas*. Unpublished M.A. thesis, Department of Anthropology, University of Tulsa.

Maudin, R.P. and D.L. Nickels

2001 *An Archaeological Survey of Twin Buttes Reservoir, Tom Green County, Texas, Volume I*. Center for Archaeological Research, The University of Texas at San Antonio Archaeological Survey Report No. 300.

2003 Burned Rock Middens in Texas. In *Archaeological Testing to Determine the National Register Eligibility Status of 18 Prehistoric Sites on Camp Bowie, Brown County, Texas*, by R.P. Mauldin, D.L. Nickels, and C.J. Broehm, pp. 217-231. Archaeological Survey Report No. 334, Center for Archaeological Research, The University of Texas at San Antonio.

McKinney, W.W.

1981 Early Holocene Adaptations in Central and Southwestern Texas: The Problem of the Paleoindian-Archaic Transition. *Bulletin of the Texas Archeology Society* 52:91-120.

Meltzer, D.J.

1989 Why Don't We Know When the First People Came to America? *American Antiquity* 54(3):471-490.

Meltzer, D.J. and M.R. Bever

1995 Paleoindians of Texas: An Update on the Texas Clovis Fluted Point Survey. *In Bulletin of the Texas Archeological Society* 66:47-81.

Meltzer, D.J., D.K. Grayson, G. Ardila, A.W. Barker, D.F. Dincauze, C.V. Haynes, F. Mena, L. Nuñez, and D.J. Stanford

1997 On the Pleistocene Antiquity of Monte Verde, Southern Chile. *American Antiquity* 62(4):659-663.

Natural Resources Conservation Service (NRCS)

2019 Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed July 16, 2020.

National Environmental Title Research (NETR)

2020 Historic Aerials by NETR Online. <http://www.historicaerials.com>. Accessed July 16, 2020.

Open Street Map (OSM)

2020 OpenStreetMap. <http://www.openstreetmap .org>. Available under the Open Database License: <www.opendatacommons.org/licenses/odbl>. Accessed July 9, 2020.

Prewitt, E.R.

1981 Cultural Chronology in Central Texas. *Bulletin of the Texas Archeological Society* 52:65-89.

1985 From Circleville to Toyah: Comments on Central Texas Chronology. *Bulletin of the Texas Archeological Society* 54:201-238.

Ray, C.N.

1929 A Differentiation of the Prehistoric Cultures of the Abilene Region. *Bulletin of the Texas Archeological and Paleontological Society* 1:7-22.

1936 Some Unusual Cremated Burials Found near Colorado, Texas. *Bulletin of the Texas Archeological and Paleontological Society* 8:9-16.

1945 Stream Bank Silts of the Abilene Region. *Bulletin of the Texas Archeological and Paleontological Society* 16:117-147.

Ray, C.N., and E.B. Sayles

1941 An Agreement on Abilene Region Terminology. *Bulletin of the Texas Archeological and Paleontological Society* 13:175-176.

Richardson, R.N.

2010 Butterfield Overland Mail. *The Handbook of Texas Online*. <https://tshaonline.org/handbook/online/articles/egb01>. Uploaded June 12, 2010. Accessed July 2, 2020.

Sayles, E.B.

1935 An Archeological Survey of Texas. *Medallion Papers* No. 17. Gila Pueblo, Globe, Arizona.

Sollberger, J.B., and T.R. Hester

1972 The Stonehacker Site: A Review of Pre-Archaic Manifestations in Texas. *Plains Anthropologist* 17(58, part 1):326-344.

Story, D.A.

1985 Adaptive Strategies of Archaic Cultures of the West Gulf Coastal Plain. In *Prehistoric Food Production in North America*, edited by R.I. Ford, pp. 19-56. Anthropological Papers No. 75. Museum of Anthropology, University of Michigan, Ann Arbor.

Suhm, D.A., A.D. Krieger, and E.B. Jelks

1954 An Introductory Handbook of Texas Archeology. *Bulletin of the Texas Archeological Society* 25.

Texas Historical Commission (THC)

2020 *Texas Archeological Sites Atlas*. Access-restricted online database. Texas Historical Commission. <https://atlas.thc.state.tx.gov/>. Accessed July 16, 2020.

Tharp, B.C.

1939 *The Vegetation of Texas*. The Texas Academy of Science. The Anson Jones Press, Houston.

Thornwaite, C.W.

1948 An Approach Toward a Rational Classification of Climate. *Geographical Review* 38:55-94.

Tunnell, C.

1978 *The Gibson Lithic Cache from West Texas*. Office of the State Archeologist Report No. 30. Texas Historical Commission, Austin.

Turner, E.S., and T.R. Hester

1999 *A Field Guide to Stone Artifacts of Texas Indians*. Third Edition. Lanham: Gulf Publishing.

University of Texas at Austin (UT)

2020 *Perry-Castañeda Library Map Collection*. <http://www.lib.utexas.edu/maps/>. The University of Texas at Austin, University of Texas Libraries. Accessed July 16, 2020.

US Geological Survey (USGS)

2020 *Texas Geology Web Map Viewer*. <https://txpub.usgs.gov/txgeology/>. Accessed July 16, 2020.

Wade, M.F.

2003 *The Native Americans of the Texas Edwards Plateau: 1582-1799*. The University of Texas Press, Austin.

Waters, M.R., J.L. Keene, S.L. Forman, E.R. Prewitt, D.L. Carlson, and J.E. Widerhold

2018 Pre-Clovis Projectile Points at the Debra L. Friedkin Site, Texas—Implications for the Late Pleistocene Peopling of the Americas. *Science Advances* 4(10).

Weir, F.A.

1976 *The Central Texas Archaic*. Ph.D. dissertation, Department of Anthropology, Washington State University, Pullman.

Williams, T.J., M.B. Collins, K. Rodrigues, W.J. Rink, N. Velchoff, A. Keen-Zebert, A. Gilmer, C.D. Frederick, S.J. Ayala, and E.R. Prewitt

2018 Evidence of an Early Projectile Point Technology in North America at the Gault Site, Texas, USA. In *Science Advances*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6040843/pdf/aar5954.pdf>. Accessed September 10, 2019.

APPENDIX A:

Shovel Test Data

Table A-1. Shovel Test Summary Data

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
JD01	357508	3480085	0-15	Light reddish-brown fine loam with gravels	None
			15-20+	Limestone bedrock	None
JD02	357455	3480084	0-20	Blocky reddish-brown loam	None
			20-35+	Blocky, weak light reddish-brown clay loam with $CaCO_3$ inclusions	None
JD03	357406	3480083	0-30	Blocky reddish-brown clay loam	None
			30-40+	Blocky, weak dark reddish-brown clay loam with $CaCO_3$ inclusions	None
JD04	357356	3480086	0-25	Blocky reddish-brown clay loam	None
			25-35	Blocky, weak reddish-brown clay with $CaCO_3$ inclusions	None
			35-40+	Blocky, weak pinkish-brown clay with $CaCO_3$ inclusions	None
JD05	357305	3480085	0-30	Blocky reddish-brown clay loam	None
			30-35+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD06	357258	3480083	0-30	Blocky reddish-brown clay loam	None
			30-47+	Blocky, weak dark pinkish-brown clay with $CaCO_3$ inclusions	None
JD07	357206	3480085	0-30	Blocky reddish-brown clay loam	None
			30-35+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD08	357235	3480034	0-30	Light grayish-brown fine clay loam	None
			30-40+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD09	357284	3480035	0-35	Very gravelly reddish-brown fine loam	None
			35-40+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions and gravels	None
JD10	357333	3480038	0-25	Very gravelly light reddish-brown fine loam	None
			25-30+	Blocky, weak, very gravelly dark reddish-brown clay with $CaCO_3$ inclusions	None
JD11	357388	3480045	0-20	Blocky reddish-brown clay loam	None
			20-35	Blocky, weak dark reddish-brown clay	None
			35-40+	Blocky, weak pinkish-brown clay with $CaCO_3$ inclusions	None

Table A-1. Shovel Test Summary Data (cont.)

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
JD12	357438	3480041	0-20	Compact, blocky, gravelly reddish-brown loam	None
			20-30+	Compact, blocky, weak brown clay loam	None
JD13	357489	3480040	0-35	Blocky reddish-brown loam	None
			35-45+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD14	357505	3479992	0-20	Blocky reddish-brown loam	None
			20-25+	Blocky, weak pinkish-brown clay with $CaCO_3$ inclusions	None
JD15	357491	3479967	0-20	Blocky reddish-brown loam	None
			20-30+	Blocky, weak dark pinkish-brown clay with $CaCO_3$ inclusions	None
JD16	357457	3480005	0-15	Compact, gravelly reddish-brown loam	None
			15-30+	Compact, blocky, weak dark reddish-brown clay loam with $CaCO_3$ inclusions	None
JD17	357357	348004	0-25	Calcareous, gravelly light reddish-brown fine loam	None
			25-35+	Blocky, weak dark pinkish-brown clay loam with $CaCO_3$ inclusions	None
JD18	357310	3480003	0-20	Calcareous, gravelly light grayish-brown fine loam	None
			20-30+	Calcareous, blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD19	357264	3479996	0-50	Calcareous, gravelly reddish-brown fine loam	None
			50-60+	Calcareous, blocky, weak pinkish-brown clay loam with $CaCO_3$ inclusions	None
JD20	357203	3479999	0-30	Calcareous, blocky, gravelly reddish-brown clay loam	None
			30-45+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD21	357236	3479965	0-35	Calcareous, blocky, weak reddish-brown clay with $CaCO_3$ inclusions	None
			35-40+	Calcareous, blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None

Table A-1. Shovel Test Summary Data (cont.)

ST No.	UTM Coordinates[1]		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
JD22	357213	3479934	0-35	Calcareous pinkish-brown fine loam with many small limestone gravels	None
			35-40+	Blocky, weak dark reddish-brown clay with $CaCO_3$ inclusions	None
JD23	357412	3479992	0-20	Compact, calcareous, blocky, gravelly reddish-brown clay loam	None
			20-30+	Blocky, weak, gravelly dark reddish-brown clay with $CaCO_3$ inclusions	None

[1] All UTM coordinates are located in Zone 14 and utilize the North American Datum of 1983 (NAD 14).

$CaCO_3$ = Calcium carbonate

cmbs = Centimeters below surface

ST = Shovel test

UTM = Universal Transverse Mercator