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An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas

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An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas

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An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas

By:

Jennifer L. Cochran



HJN 140262 AR Texas Antiquities Permit No. 7144

Prepared for:



City of Round Rock Round Rock, Texas Prepared by:

Environmental Services, Inc.

Horizon Environmental Services, Inc. Austin, Texas

March 2015

An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas

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Texas Antiquities Permit No. 7144

March 2015

MANAGEMENT SUMMARY

On 15 January 2015, Horizon Environmental Services, Inc. (Horizon) conducted an intensive cultural resources survey of the City of Round Rock's Frontier Park Improvement Project in Round Rock, Williamson County, Texas (Project Area). The Project Area is located approximately 150.0 feet (ft) (45.8 meters [m]) south of the intersection of Chisholm Valley Drive and Frontier Trail in Round Rock, Texas. The proposed project entails conducting general improvements within the existing Frontier Park location, including minor modifications to the existing Frontier Park trail right-of-way (ROW) within the Project Area. The Area of Potential Effect (APE) for the Project Area totals 7.0 acres.

The proposed undertaking is currently owned and operated by the City of Round Rock, a political subdivision of the State of Texas; as such, the project falls under the jurisdiction of the Antiquities Code of Texas (ACT). Additionally, proposed improvements to the Project Area are being funded by Community Development Block Grant (CDBG) funds provided by the U.S Department of Housing and Urban Development (HUD). As such, the proposed undertaking also falls under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA), as amended. As the proposed project is a publicly sponsored undertaking, the City of Round Rock is required to provide for a cultural resources inventory of the Project Area to assess the project's possible impacts on any cultural resources survey of the Project Area in compliance with the ACT and Section 106 of the NHPA. The purpose of the survey was to determine if the development of the Project Area would have the potential to adversely affect any significant cultural resources designated as or considered eligible for formal designation as State Antiquities Landmarks (SAL) or eligible for listing on the National Register of Historic Places (NRHP). The cultural resources survey was performed under Texas Antiquities Permit No. 7144.

The cultural resources survey resulted in the reassessment of 1 previously recorded site, 41WM442. Site 41WM442 was originally documented as a low-density aboriginal lithic scatter near the central portion of the Project Area. However, only a single chert flake was observed during the site reassessment, and the flake was restricted to surface contexts on the site. Six shovel tests were excavated in the vicinity of the originally documented site centroid for site 41WM442, all of which produced negative results. The originally delineated site boundaries could not be reevaluated based upon the paucity of cultural materials along the modern ground surface and within shovel tests. Given the low density of cultural materials, and the lack of temporally

diagnostic artifacts, cultural features, preserved floral/faunal remains, or intact archeological deposits on the site, it is Horizon's opinion that site 41WM442 is ineligible for formal designation as an SAL or inclusion on the NRHP. As such, no additional investigations are recommended for site 41WM442 in connection with the currently proposed undertaking.

Based on the survey-level results, it is Horizon's opinion that the proposed improvements to the City of Round Rock's Frontier Park Project will have no adverse effect on significant cultural resources designated as or considered eligible for formal designation as SALs or eligible for listing on the NRHP. Horizon therefore recommends that the City of Round Rock be allowed to proceed with the proposed improvements to Frontier Park relative to the jurisdiction of the ACT and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the Texas Historical Commission (THC) should be notified of the discovery.

TABLE OF CONTENTS

Chapter		Page			
	MANAGEMENT SUMMARY	v			
1.0		1			
2.0	ENVIRONMENTAL SETTING 2.1 General Description				
	 2.2 Physiography and Hydrology 2.3 Geology and Geomorphology 2.4 Climate 2.5 Flora and Fauna 				
3.0	CULTURAL BACKGROUND3.1PaleoIndian Period (9200 to 6000 B.C.)3.2Archaic Period (6000 B.C. to A.D. 800)3.3Late Prehistoric Period (A.D. 800 to 1600)3.4Historic Period (A.D. 1600 to Present)				
4.0	ARCHIVAL RESEARCH	21 21 21			
5.0	SURVEY METHODOLOGY				
6.0	RESULTS OF INVESTIGATIONS 6.1 Site 41WM442 Revisit				
7.0	SUMMARY AND RECOMMENDATIONS7.1Summary7.2Management Recommendations				
8.0	REFERENCES CITED				

LIST OF FIGURES

Page

2
3
6
6
7
7
9
23
26
28
28
29

LIST OF TABLES

	Page
Table 2-1. Soil types mapped within Project	t Area10
Table 4-1. Previously recorded sites within	1.0 mi (1.6 km) of Project Area22

1.0 INTRODUCTION

Horizon Environmental Services, Inc. (Horizon) was contracted by the City of Round Rock to conduct an intensive cultural resources survey for the Frontier Park Improvement Project in Round Rock, Williamson County, Texas (Project Area; Figures 1-1 and 1-2). The Project Area is located approximately 150.0 feet (ft) (45.8 meters [m]) south of the intersection of Chisholm Valley Drive and Frontier Trail in Round Rock, Texas. The proposed project entails conducting general improvements within the existing Frontier Park location, including minor modifications to the existing Frontier Park trail right-of-way (ROW) within the Project Area. The Area of Potential Effect (APE) for the Project Area totals 7.0 acres.

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The cultural resources investigations consisted of an archival review, an intensive cultural resources survey of the Project Area, 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 27, and the Council of Texas Archeologists (CTA) Guidelines for Cultural Resources Management Reports. Jennifer L.



Figure 1-1. Location of Project Area on USGS topographic quadrangle



Figure 1-2. Location of Project Area on aerial photograph

Cochran served as the Principal Investigator for the project and conducted the field investigations with the assistance of Jared Wiersema (Horizon staff archeologist).

Horizon conducted the survey of the Project Area on 15 January 2015. This entailed intensive surface inspection and subsurface shovel testing efforts. The Texas State Minimum Archeological Survey Standards (TSMASS) require a minimum of 2 shovel tests per acre on projects between 11.0 to 100.0 acres in size. As such, a total of 14 shovel tests were necessary on the 7.0-acre Project Area in order to comply with the TSMASS. Horizon exceeded the minimum survey standards by excavating 19 shovel tests within the boundaries of the Project Area.

The cultural resources survey resulted in the reassessment of 1 previously recorded site, 41WM442. Site 41WM442 was originally documented as a low-density aboriginal lithic scatter near the central portion of the Project Area. However, only a single chert flake was observed during the site reassessment, and the flake was restricted to surface contexts on the site. Six shovel tests were excavated in the vicinity of the originally documented site centroid for site 41WM442, all of which produced negative results. The originally delineated site boundaries could not be reevaluated based upon the paucity of cultural materials along the modern ground surface and within shovel tests. Given the low density of cultural materials and the lack of temporally diagnostic artifacts, cultural features, preserved floral/faunal remains, or intact archeological deposits on the site, it is Horizon's opinion that site 41WM442 is ineligible for formal designation as an SAL or inclusion on the NRHP. As such, no additional investigations are recommended for site 41WM442 in connection with the currently proposed undertaking.

Based on the survey-level results, it is Horizon's opinion that the proposed improvements to the City of Round Rock's Frontier Park Project will have no adverse effect on significant cultural resources designated as or considered eligible for formal designation as SALs or eligible for listing on the NRHP. Horizon therefore recommends that the City of Round Rock be allowed to proceed with the proposed improvements to Frontier Park relative to the jurisdiction of the ACT and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the Texas Historical Commission (THC) should be notified of the discovery.

2.0 ENVIRONMENTAL SETTING

2.1 GENERAL DESCRIPTION

The cultural resources survey reported herein assessed approximately 7.0 acres within an existing public park in southern Williamson County, Texas. The Project Area is located approximately 150.0 ft (45.8 m) south of the intersection of Chisholm Valley Drive and Frontier Trail in Round Rock, Texas and can be found on the US Geological Survey (USGS) 7.5-minute Pflugerville West, Texas, topographic quadrangle (see Figure 1-1). The proposed project entails conducting general improvements within an existing public park, including minor modifications to the existing Frontier Park trail ROW within the Project Area. The vegetation within the Project Area consists of short-to-medium grasses and oak trees. Photographs of the Project Area are provided in Figures 2-1 to 2-4.

2.2 PHYSIOGRAPHY AND HYDROLOGY

The Project Area is located in southern Williamson County, Texas. Williamson County is situated near the southern end of the Lampasas Cut Plain (Hill 1901; Hill and Vaughn 1900; Johnson 1931:125) in Central Texas and close to the common junction of 3 significant physiographic provinces—the Lampasas Cut Plain, the Edwards Plateau, and the Blackland Prairie. The Blackland Prairie, the narrow physiographic zone situated between the Edwards Plateau to the west and the Gulf Coastal Plain to the east, is a low, rolling land that extends in a narrow band along the eastern edge of the Balcones Fault Zone from the Red River Valley in northeastern Texas to the southern edge of the Edwards Plateau. This is an area of low topographic relief and poor drainage in which water often ponds after rainstorms, and streams flow at very gentle gradients. 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 Lampasas Cut Plain is a roughly triangular area of rolling hill country in central and north-central Texas situated between the Brazos and Colorado rivers, ranging in elevation from



Figure 2-1. View of Project Area (facing southwest)



Figure 2-2. Another view of Project Area (facing south)

An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas



Figure 2-3. View of tributary to Lake Creek that bisects Project Area (facing west)



Figure 2-4. Another view of Lake Creek tributary within Project Area (facing west)

754.0 to 1312.0 ft (230.0 to 400.0 m) above mean sea level (amsl). The Lampasas Cut Plain forms a limestone upland that has been dissected by the Brazos River and its tributaries, resulting in landforms characterized by generally rounded uplands cut by moderately broad, shallow valleys. Soil is thin to absent on the bedrock and supports a mixed savanna flora, whereas soil is moderately deep in valley floors, where it supports mixed riparian woodlands and forests. Karst features include sinks, caves, and rockshelters, but such are neither common nor extensive. Edwards chert is locally abundant, but not widespread across the Lampasas Cut Plain, and is of high quality in some places.

Hydrologically, the Project Area is situated within the Brazos River Basin. A tributary to Lake Creek bisects the Project Area from east to west. This tributary feeder flows northeast and joins the main branch of Lake Creek approximately 1.2 miles (mi) (1.9 kilometers [km]) northeast of the Project Area. Lake Creek flows northeast and converges with Brushy Creek approximately 2.6 mi (4.2 km) northeast of the Project Area. Brushy Creek flows generally northeastward to its confluence with the Little River in Milam County, which in turn flows a short distance eastward and empties into the Brazos River. The Brazos River flows southeastward across the Blackland Prairie and Gulf Coastal Plain, ultimately discharging into the Gulf of Mexico a short distance northeast of East Matagorda Bay.

2.3 GEOLOGY AND GEOMORPHOLOGY

Geologically, the Project Area overlies Del Rio Clay and the Georgetown Formation (Barnes 1974). Del Rio Clay consists of calcareous and gypsiferous sediments and ranges in thickness from 40.0 to 70.0 ft (12.2 to 21.3 m), while the Georgetown Formation consists of mostly limestone sediments with some marl and ranges in thickness from 30.0 to 80.0 ft (9.1 to 24.4 m).

Geomorphologically, the Project Area is situated on the Denton-Eckrant-Doss Association, which consists of moderately deep to very shallow, calcareous, clayey, stony, and cobbly soils found in upland settings that formed in indurated fractured limestone and limy earths (Werchan and Coker 1983). The soils of this association are deep, clayey sediments that usually have minimal potential to contain intact, subsurface archeological resources at any substantial depth. Two defined soil types are mapped within the boundaries of the Project Area. These soil types are described in Table 2-1 (NRCS 2015), and their distribution is mapped in Figure 2-5.

While aboriginal cultural resources are commonly encountered in deep alluvial sediments adjacent to major streams in Central Texas, the relative antiquity of the pre-Holocene-age uplands in the Project Area suggests that any cultural resources would be constrained to the modern ground surface, rather than in buried contexts, in erosional settings lacking integrity. Intact, buried archeological deposits may occur within alluvial sediments near major streams, though no Holocene-age alluvial sediments are mapped within the current Project Area. Other things being equal, any cultural resources associated with the soils mapped in the Project Area would be expected to occur on the modern ground surface in deflated, eroded contexts that would lack stratigraphic integrity. Historic-era resources may be found in virtually any physiographic environment.



Figure 2-5. Distribution of mapped soils in Project Area

Soil Name	Soil Type	Soil Depth (inches)	Setting
Eckrant extremely stony clay, 0 to 3 % slopes (EeB)	Cobbly clay	0 to 30: Cobbly clay 30 to 76+: Bedrock	Uplands
Fairline clay, 1 to 2 % slopes (Fa)	Silty clay	0 to 5: Silty clay loam 5 to 35: Silty clay 35-54: Clay 54-60+: Chalk bedrock	Uplands

Table 2-1. Soil types mapped within Project Area

2.4 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 1500 years ago.

Williamson 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 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 1983:18, 50). Climate has fluctuated from subtropical humid to subtropical subhumid in western Williamson County. Average annual precipitation totals 32.0 inches (in) (81.0 centimeters [cm]) and temperature averages 19.0 degrees Celsius (°C) (67.0 degrees Fahrenheit [°F]) annually, ranging from 36.0°C (96.0°F) in August (the warmest month) to 15.0°C (59.0°F) in January (the coldest month). During this time, however, drier periods lasting from 3 to 7 years, when total

annual rainfall ranged from 12.0 to 25.0 in (30.0 to 64.0 cm) were followed by abnormally wet years with 45.0 to 50.0 in (114.0 to 127.0 cm) of rainfall.

Two annual precipitation peaks, which typically occur in May and September, 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 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). Two extreme examples are the excess of 91.0 cm (36.0 in) of rain that fell within an 18-hour period in the vicinity of Thrall, Texas, in September 1921, and the 56.0-cm (22.0-in) deluge that fell in less than 3 hours near O'Harris, Texas, in May 1935 (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.

2.5 FLORA AND FAUNA

The Project Area is in the southwestern portion of the Texan biotic province (Blair 1950), an intermediate zone between the forests of the Austroriparian and Carolinian provinces and the grasslands of the Kansan, Balconian, and Tamaulipan provinces. Some species reach the limits of their ecological range within the Texan province. The boundary, characterized as "approximate," between Blair's (1950) Texan and Balconian provinces passes through western Williamson County in the vicinity of the Project Area.

The fauna associated with this region are represented by a mixture of species from the Austroriparian, Tamaulipan, Chihuahuan, Kansan, Balconian, and Texan biotic provinces. Common mammalian species include white-tailed deer, opossum, eastern cottontail rabbit, raccoon, striped skunk, hispid cotton rat, white-footed mouse, nine-banded armadillo, and fox squirrel. Common bird species include northern bobwhite, eastern meadowlark, mourning dove, killdeer, field sparrow, red-tailed hawk, turkey vulture, belted kingfisher, and mockingbird. Reptile and amphibian species common to this biotic zone include six-lined racerunner, rat snake, eastern hognose snake, Gulf Coast toad, Texas spiny lizard, rough green snake, copperhead, western diamondback rattlesnake, green treefrog, Blanchard's cricket frog, diamondback water snake, Houston toad, and green anole. Although small herds of bison and antelope were common during the late prehistoric and early historic periods, 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 the 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 (9200 TO 6000 B.C.)

The initial human occupations in the New World can now confidently be extended back before 10,000 B.C. (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 presently discount claims of much earlier human occupation during the Pleistocene glacial period (cf. Butzer 1988).

The earliest generalized evidence for human activities in Central Texas is represented by the PaleoIndian period (9200 to 6000 B.C.) (Black 1989). 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 of the 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 2 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).

3.2 ARCHAIC PERIOD (6000 B.C. TO A.D. 800)

The onset of the Hypsithermal drying trend marks the beginning of the Archaic stage (6000 B.C. to A.D. 800). This climatic trend marked the beginning of a significant reorientation of lifestyle throughout most of North America, but this change was far less pronounced in Central Texas. Elsewhere, the changing climatic conditions and corresponding decrease in the big game populations forced people to rely more heavily upon a diversified resource base composed of smaller game and wild plants. In Central Texas, however, this hunting and gathering pattern is characteristic of most of prehistory. The appearance of a more diversified tool kit, the development of an expanded groundstone assemblage, and a general decrease in the size of projectile points are hallmarks of this cultural stage. Material culture shows greater diversity during this broad cultural period, especially in the application of groundstone technology.

Traditionally, the Archaic period is subdivided into Early, Middle, and Late subperiods. In Central Texas, the Early Archaic subperiod extends from 6000 to 3000 B.C., the Middle Archaic subperiod extends from 3000 to 1000 B.C., and the Late Archaic subperiod covers the 1000 B.C. to A.D. 800 timeframe. Changes in projectile point morphology are often used as markers differentiating these 3 subperiods, though other changes in material culture occurred as well. Perhaps most markedly, burned rock middens appear during the Middle Archaic subperiod, continuing into the Late Archaic subperiod, and large cemeteries appear during the Late Archaic subperiod. In addition, the increasing density of prehistoric sites through time is often considered to constitute evidence of population growth, though differential preservation probably at least partially accounts for the lower numbers of older sites.

3.3 LATE PREHISTORIC PERIOD (A.D. 800 TO 1600)

The onset of the Late Prehistoric period (A.D. 800 to 1600) (Black 1989) is defined by the appearance of the bow and arrow. In Central Texas, pottery also appears during the Late Prehistoric period (though ceramics appear earlier in Southeast Texas). Use of the atlatl (i.e., spearthrower) and spear was generally discontinued during the Late Prehistoric period, though they continued to be used in the inland subregion of Southeast Texas along with the bow and arrow through the Late Prehistoric period (Patterson 1980, 1995; Wheat 1953). In Texas, unifacial arrow points appear to be associated with a small prismatic blade technology. The Late Prehistoric period is generally divided into 2 phases, the Austin and Toyah phases. Austin phase sites occur earliest to the north, which has led some researchers (e.g., Prewitt 1985) to suggest that the Austin phase populations of Central Texas were migrants from the north who lacked the ceramic industry of the later Toyah phase.

3.4 HISTORIC PERIOD (A.D. 1600 TO PRESENT)

The first European incursion into what is now known as Texas was in 1519, when Álvarez de Pineda explored the northern shores of the Gulf of Mexico. In 1528, Cabeza de Vaca crossed South Texas after being shipwrecked along the Texas Coast near Galveston Bay. However, European settlement did not seriously disrupt native ways of life until after 1700. The first half of the 18th century was the period in which the fur trade and mission system, as well as the first effects of epidemic diseases, began to seriously disrupt the native culture and social systems.

This process is clearly discernible at the Mitchell Ridge site, where burial data suggest population declines and group mergers (Ricklis 1994), as well as increased participation on the part of the Native American population in the fur trade. By the time that heavy settlement of Texas began in the early 1800s by Anglo-Americans, the indigenous Indian population was greatly diminished.

The earliest known historical occupants of Williamson County were the Tonkawa Indians.¹ The Tonkawa traditionally followed buffalo herds on foot and periodically set fire to the prairie to aid them in their hunts. During the 18th century, however, they made the transition to a horse-based culture and used firearms to a limited extent. Decimated by European diseases and by warfare with the Cherokee and Comanche, the Tonkawa were generally friendly toward the early settlers of Williamson County, but were nevertheless removed from Central Texas by the 1850s. Lipan Apaches and Comanches were also associated with the area that would become Williamson County. Before the arrival of Europeans in the area, the Lipan Apaches ranged through the western part of present-day Williamson County, and, after Spanish missions were established on the San Gabriel River in the 18th century, the Indians frequently raided the missions for horses. Their enemies, the Comanches, arrived in the area in the 18th century and lived in parts of the territory of Williamson County until as late as 1838. After they were crowded out by Anglo settlers, the Comanches continued to raid settlements in the county until the 1860s. There also appear to have been small numbers of Kiowa, Yojuane, Tawakoni, and Mayeye Indians living in the county at the time of the earliest Anglo settlements.

While Álvar Núñez Cabeza de Vaca may have traveled through the area in the 16th century, it was probably first explored by Europeans in the late 17th century, when Capt. Alonso De León sought a route between San Antonio and the Spanish missions in East Texas that would serve as a drier alternative to the more southerly Camino Real. The new route passed through the area of Williamson County along Brushy Creek and the San Gabriel River and was called Camino de Arriba. In 1716, 2 explorers in the Spanish service, Louis Juchereau de St. Denis and Domingo Ramón, led an expedition that passed through the area and camped on Brushy Creek and the San Gabriel River, naming them respectively Arroyo de las Bendítas Ánimas and Rio de San Xavier. The San Xavier missions, which were founded in the mid-18th century and occupied a series of sites along the San Gabriel River, were just across the eastern border of Williamson County in present-day Milam County, and the area was extensively explored by the Spanish. During the Mexican period, parts of the county were awarded as land grants, first to several Mexican families, then as part of Robertson's colony, but no settlement resulted from these grants.

Anglo settlement began during the Texas Revolution and the early days of the Republic of Texas, when the area was part of Milam County. In 1835, in an attempt to strengthen the frontier against Indian attack, a military post was built near the headwaters of Brushy Creek in what would become southwestern Williamson County and was named for Capt. John J. Tumlinson, Jr., the commander of the company of Texas Rangers who garrisoned the post. The

¹ Much of the following discussion of Williamson County history derives from Makemson (1904), Scarbrough (1973), and the Texas State Historical Association (TSHA 2015).

post was abandoned in February of 1836, when its garrison was withdrawn to deal with the Mexican invasion. In 1838, the first civilian settlement was established by Dr. Thomas Kenney and a party of settlers who built a fort, named Kenney's Fort, on Brushy Creek near the site of the present-day crossing of the Missouri-Kansas-Texas Railroad. Several other sites on Brushy Creek were settled soon after, but Indian raids kept Anglo settlement in check, and a number of the early pioneers, including Kenney, were killed by Indians over the next few years.

In 1842, many of the early farms were abandoned when Governor Sam Houston advised settlers to pull back from the frontier. The Indian threat eased after 1846, and part of the influx of settlers who came to Texas after its annexation traveled to the frontier along Brushy Creek and the San Gabriel River. By 1848, there were at least 250 settlers in what was then western Milam County, and in the early months of that year, 107 of them signed a petition to organize a new county. Recognizing that the petitioners needed a seat of local government that was considerably closer to them than Milam County, the Texas legislature established Williamson County on 13 March 1848, naming it for prominent judge and soldier Robert M. Williamson. Georgetown, the county seat, was laid out during the summer of that year, and the district court was in session by October. According to the census of 1850, Williamson County had a population of 1379 Anglos and 155 slaves living in agricultural communities on Brushy Creek and the San Gabriel. As was common in other frontier counties, most of the improved acreage was used to grow corn. Three families owned 15 or more slaves in 1850, but family farms and subsistence agriculture remained the norm prior to the Civil War. While most of the settlers had moved to Texas from other southern states, particularly Tennessee, a substantial contingent came from Vermilion County, Illinois; and this latter group remained pro-Union and Republican in its political orientation during the secession crisis.

On the eve of the Civil War, Williamson County had moved beyond the frontier stage and was a populous, agriculturally diverse county. The Anglo population tripled between 1850 and 1860 to 3638, while the slave population grew even more dramatically to 891, six times the number of slaves in 1850. Agricultural pursuits were quite varied and reflected the county's geographical diversity. Farmers used the rich blackland soils in the eastern half of the county to grow wheat and corn. Cotton was introduced in the 1850s, but only 271 bales were grown in 1860, and it was not an important cash crop for most farmers. The early settlers had found large herds of wild cattle in the 1840s, and cattle ranching for both home consumption and the market was widespread throughout the county by 1860. The number of cattle on county ranches had more than tripled from 11,973 head in 1850 to 38,114 head in 1860. Similarly, the number of sheep grew from 2937 producing 3499 pounds of wool in 1850 to 16,952 sheep and 32,994 pounds of wool in 1860.

Williamson County was marked by political divisions during the secession crisis, divisions that were carried over into the Civil War and Reconstruction. Unionist sentiment was strong in the county, and a resolution denouncing secession was adopted by a Texas Constitutional Union party meeting in Round Rock in 1860. One of the county's delegates to the secession convention, Thomas Proctor Hughes, was among the 8 who voted against the ordinance of secession. When the ordinance was referred to a statewide election, Williamson County was one of 19 counties to oppose it, rejecting secession by 480 to 349 votes. When the war came, most of the citizens of

Williamson County supported the Confederate cause, and at least 5 companies were raised in the county: an independent "spy" company under James O. Rice, a company of Texas Rangers for border defense under William C. Dalrymple, and companies in the Fourth, Seventh, and Sixteenth Texas Cavalry regiments. While some of those who had opposed secession became active Confederate supporters, others remained loyal to the Union and fled to Mexico or the North, and a number enlisted in the Union army. In July 1863, 8 Williamson County men were caught by Confederate troops while traveling to Mexico and were hanged near Bandera, Texas, and other Unionists were persecuted during the war. The pattern of violence within the community continued into the summer following the end of the war, when several men were arrested for "flagrant crimes" and "illegal persecution of Union men." In September 1865, a mass meeting of the citizens of Williamson County was held on the San Gabriel River near Georgetown, and the gathering set a general tone of reconciliation, which seems to have characterized the Reconstruction period in Williamson County, a period that ended with the return of county government to conservative Democratic control in 1869. Freed slaves formed several new communities, and the county seems to have been free of much of the political and racial strife that occurred in other Texas counties during Reconstruction. On the other hand, there was a great deal of crime, much of it violent, in the latter 19th century. Horse and cattle thieves and some of the more famous outlaws of the day, such as Sam Bass and John Wesley Hardin, preved on the property of citizens, and long-term family feuds and drunken brawls at the various saloons in the towns added to the toll of homicides.

Though the Civil War had caused little material damage in the area, the county was a much poorer place in 1870 than it had been in 1860. The total value of farms had fallen from \$833,418 to \$389,239 and the value of livestock from \$823,653 to \$341,794. The economic recovery in the 1870s was aided by the growth of the cattle and sheep industries and a dramatic expansion of cotton farming. Various feeder routes to the Chisholm Trail passed through Williamson County, and many cattle drives passed through or originated in the county from the 1860s through the early 1880s. With the coming of the railroads to the county in the 1870s, Taylor, in the eastern part of the county, became an important rail center for the cattle trade. Cattle-raising, after declining somewhat in importance in the early 20th century, was again a major part of the agricultural economy by 1950, and in 1969 ranchers owned a record 65,093 cattle. Sheep- and goat-raising followed a similar pattern. Sheep ranching recovered its pre-war level by 1880 and peaked at 39,961 sheep and 171,752 pounds of wool in 1890, then declined in the late 19th and early 20th centuries to 13,397 sheep and 39,458 pounds in 1920. The industry revived in the 1930s and reached a new high of 59,919 sheep and 336,494 pounds of wool in 1959. Mohair became a significant agricultural product by 1930 and reached a peak in 1959, when 44,668 goats produced 209,098 pounds of mohair. Cotton, the second boom industry in Williamson County, developed at about the same time as the cattle industry. As early as 1869. the editor of the Georgetown Watchman was advising farmers to "make cotton, but do not, by any means, neglect the grain crop-diversity." Cotton production, which had been insignificant before the war, rose to successive heights of 4,217 bales in 1880; 33,945 bales in 1890; and 80,514 bales in 1900. From 1900 to 1901, Williamson County ginned more cotton than any county in Texas except Ellis County. The number of improved acres increased almost tenfold from 1870 to 1880 and doubled again to 306,881 acres by 1890. The proportion of cropland used for cotton

production moved from about one-third of the total in 1880 to a high of 77% in 1910, and cotton was grown on 73% of the cropland as late as 1930. Dramatic changes in land tenure attended the shift to cotton production. As late as 1880, 1183 of the 1538 farms, or 77%, were still worked by owners. By 1890, only 43% of the farms were operated by owners, and the percentage of owner-operators remained at 40% until the 1920s, when it dropped still further to 29% in 1930. Farm tenancy rates began to decline during the Great Depression with the shift away from cotton and other staple crops and by 1959 had dropped to 36% of the county's farmers.

Both the cattle and the cotton booms were aided by the improved communications available in the county in the later 19th century. The International-Great Northern Railroad, which later was consolidated with the Missouri Pacific, was built across the eastern part of the county in 1876 and led to the founding of Taylor (now Williamson County's third largest city) and Hutto and to the relocation of Round Rock. It also opened up large areas in eastern Williamson County to commercial farming. The Taylor, Bastrop, and Houston Railway, which was eventually consolidated with the Missouri, Kansas, and Texas Railway, was built in the 1880s and aided in the development of Taylor, Granger, and Bartlett. Roads were generally poor throughout the county in the early 20th century. There were 11,882 automobiles in the county by 1930, and extensive improvements, including blacktopping, of all major roads took place in the 1930s.

The county also became more ethnically diverse in the later 19th and early 20th centuries. While there were only 111 inhabitants of foreign birth out of a population of 6368 in Williamson County in 1870, significant numbers of Scandinavians, Germans, Czechs, Wends, and Austrians moved to the county in the 1880s and 1890s. The proportion of foreign-born in the county population remained at about 10% from 1890 to the 1930s. Mexican immigration reached a significant level by about 1910, just as Europeans stopped arriving in the county. There were 294 Hispanics in 1900, 732 in 1910, and 4967, or 11% of the population, in 1930. In 1980, 9693 residents, or again 11%, were of Hispanic origin. The immigrants added their distinctive customs and architectural styles to the mix of county life and introduced new religious denominations. By the time of the Civil War, Williamson County had a number of Baptist and Methodist churches and several different factions of the Presbyterian Church. Churches of other denominations were built after the war, and the new emigrants established Lutheran, Catholic, and Czech Moravian congregations. By 1930, Williamson County had a culturally diverse population of 44,146 inhabitants. The economy was still overwhelmingly agricultural; only 29 manufacturing establishments employed 347 workers that year. While cotton production was near its peak in terms of percentage of cropland, the cotton industry was already undergoing a rapid transformation.

The combined effects of soil depletion, overproduction, and the influx of the boll weevil had already injured the profitability of the industry by the late 1920s, and the situation of cotton growers was further worsened by the depression. The black population seems to have been particularly hard hit by the depression. Of the 944 county families on relief in 1933, 442, almost half, were black, though blacks constituted only 16% of the population. Various federal relief programs benefited farmers with farm loans and subsidies, and in 1936 a total of \$204,000 in subsidy checks was issued. The Depression encouraged diversification among farmers and a shift away from staple crops to livestock. Between 1930 and 1940, the number of acres used for

cotton-growing fell by almost half, and cotton production went from 68,266 to 36,890 bales. Cropland acreage used for corn production increased over the same period by about half, and wool and mohair production more than doubled to 342,983 and 102,517 pounds, respectively. While cotton continued to be an important crop in eastern Williamson County, farmers increasingly turned to other crops like sorghum and wheat and to livestock-raising in the latter 20th century. Along with such traditional livestock as sheep and cattle, poultry farming played a significant role in the economy by 1950, when the county was fifth in the state in the production of eggs and chickens. In 1980, it was 10th in the state in the production of turkeys.

The agricultural diversification of the middle decades of the 20th century was followed by significant social and economic changes in the 1960s, 1970s, and 1980s. The black population, which had remained at between 15 and 18% of the total in the early and mid-20th century, began to decline, both proportionately and in real numbers, from the 1940s on and had fallen to 4111, or about 5%, by 1980. As in other areas of Texas, blacks were relegated to segregated and inferior housing and educational facilities until the 1960s, when some improvements were brought about by federal desegregation policies. Along with changes in racial composition, Williamson County experienced a dramatic increase in population during this period, growing from 37,305 inhabitants in 1970 to an estimated 85,700 inhabitants in 1982, making it 34th in population growth among counties in the US in the 1970s.

4.0 ARCHIVAL RESEARCH

4.1 DATABASE REVIEW

Archival research conducted via the Internet at the THC's *Texas Archeological Sites Atlas* (Atlas) website indicated the presence of 7 previously recorded archeological sites and 1 cemetery within a 1.0-mile (1.6-km) radius of the Project Area (THC 2015), while a review of the National Park Service's (NPS) NRHP Google Earth map layer indicated the presence of no historic properties listed on the NRHP within the review radius (NPS 2015). These documented cultural resources are summarized in Table 4-1, while their locations relative to the Project Area are presented in Figure 4-1. One previously recorded site, 41WM442, is located within the central portion of the Project Area. Site 41WM442 was originally recorded as a low-density prehistoric lithic scatter. According to the Atlas, portions of the Project Area have been previously surveyed for cultural resources. Two surveys, conducted in 1980 and 1999, documented the presence of site 41WM442. Both surveys describe the low density of cultural materials associated with the site and recommend the site as ineligible for formal designation as an SAL or for listing on the NRHP.

4.2 PROBABILITY ASSESSMENT

Prehistoric archeological sites are commonly found in upland areas and on alluvial terraces near stream/river channels or drainages. Based on the location of the Project Area on an upland formation adjacent to a tributary feeder to Lake Creek, in conjunction with the presence of numerous previously recorded prehistoric sites within the review radius and within the boundaries of the Project Area, it was Horizon's original opinion that there existed a high potential for additional undocumented prehistoric cultural deposits within the boundaries of the Project Area.

In regard to historic-era resources, the lack of visible structures in proximity to the Project Area on the relevant topographic quadrangle map and on Google Earth suggested a decreased potential for historic-era standing structures or associated cultural deposits within the limits of the Project Area.

Site Trinomial, Cemetery, or Historic Property	Site Type	NRHP/SAL Eligibility Status	Distance/Direction from Project Area	Potential to be Impacted?
41WM1	Prehistoric open campsite	Undetermined	0.6 mi (1.0 km) west	No
41WM16	Unknown prehistoric	Undetermined	1.0 mi (1.6 km) northwest	No
41WM442	Prehistoric lithic scatter	Ineligible	Within Project Area	Yes
41WM506	Prehistoric burned rock midden	Undetermined	1.0 mi (1.6 km) northwest	No
41WM936	Unknown prehistoric	Undetermined	0.8 mi (1.3 km) west	No
41WM951	Historic-age trash scatter	Undetermined	0.6 mi (1.0 km) southwest	No
41WM980	Historic-age farmstead	Ineligible	0.5 mi (0.9 km) southwest	No
WM-C011	Bratton Cemetery	N/A	0.8 mi (1.3 km) southeast	No

Table 4-1. Previously recorded sites within 1.0 mi (1.6 km) of Project Area

Sensitive site data omitted

Figure 4-1. Documented cultural resources within 1.0 mi (1.6 km) of Project Area

5.0 SURVEY METHODOLOGY

A 2-person Horizon archeological field crew completed the intensive pedestrian survey of the Project Area on 15 January 2015. This entailed intensive surface inspection and subsurface shovel testing efforts. The TSMASS require a minimum of 2 shovel tests per 1.0 acres on projects 11.0 to 100.0 acres in size. As such, a total of 14 shovel tests were necessary on the 7.0-acre Project Area in order to comply with the TSMASS. Horizon exceeded the minimum survey standards by excavating 19 shovel tests within the boundaries of the Project Area. All excavated matrices were screened through 0.25-inch (6.0-millimeter [mm]) hardware mesh or were trowel-sorted if the dense clay soils prohibited successful screening.

In general, shovel tests measured approximately 12.0 in (30.0 cm) in diameter and were excavated to a target depth of 3.3 ft (1.0 m) below ground surface, to the top of pre-Holocene deposits, or to the maximum depth practicable. In practice, shovel tests were terminated at depths of 3.9 to 11.8 in (10.0 to 30.0 cm) below surface due to the presence of pre-Holocene sediments generally composed of clay loam, clay, and limestone gravels derived from decomposing limestone. The locations of all shovel tests were recorded via handheld global positioning system (GPS) units utilizing the Universal Transverse Mercator (UTM) coordinate system and the North American Datum of 1983 (NAD 83). Shovel test locations are presented in Figure 5-1, and shovel test data are presented in Appendix A.

The TSMASS also require backhoe trenching in stream terraces and other areas with the potential to contain buried archeological materials at depths below those that shovel tests are capable of reaching (approximately 3.3 ft [1.0 m] below surface). The Project Area is located in an upland setting well away from alluvial terrace deposits, and the near-surface sediments in the Project Area are composed of clay. While one intermittent stream crosses the Project Area, the stream lacked an alluvial package; rather, it represented an erosional channel being cut into the surrounding upland clays. Shovel testing revealed shallow clay sediments overlying limestone gravels, indicating that shovel testing was capable of penetrating to the bottom of sediments containing archeological deposits. As such, shovel testing is considered to constitute an adequate and effective survey technique for identifying archeological resources within the Project Area, and mechanical trenching was consequently not employed as a site-prospecting technique.





6.0 RESULTS OF INVESTIGATIONS

The cultural resources survey resulted in the reassessment of previously documented site 41WM442 within the Project Area. A detailed description of the site observed within the Project Area is presented below.

6.1 SITE 41WM442 REVISIT

General Site Description

Site 41WM442 was originally recorded as a low-density, prehistoric lithic scatter during a 1980 survey of Southwest Park (now Frontier Park). In 1999, the site was revisited during a survey conducted by the Lower Colorado River Authority (LCRA). Based on the lack of diagnostic artifacts and limited subsurface cultural deposits, the site was assessed by its original recorders as ineligible for formal designation as an SAL and ineligible for inclusion on the NRHP. No further investigations were recommended for the site.

Site 41WM442 is located approximately 150.0 ft (45.8 m) south of the intersection of Chisholm Valley Drive and Frontier Trail in Round Rock, Texas (See Figure 4-1). The site is situated adjacent to the banks of a small tributary feeder to Lake Creek at an elevation of approximately 750.0 ft (228.6 m) amsl. Vegetation surrounding site 41WM442 consist of short annual grasses with scattered oak and pine trees (Figures 6-1 and 6-2).

A total of 6 shovel tests were excavated within the vicinity of the originally recorded centroid for the site. These shovel tests revealed shallow gravelly clay loam overlying clay and yielded no subsurface cultural materials.

Observed Cultural Materials

Observed cultural materials on site 41WM442 consist a single tertiary flake (Figure 6-3). The chert flake was manufactured from dark grayish-brown, medium- to fine-grained chert. No temporally diagnostic tool fragments, thermally altered rocks, or preserved floral or faunal remains were observed on site 41WM442. Five to 10 pieces of lithic debitage were observed on site 41WM442 during the 1980 and 1999 assessments of the site; however, these materials were not observed during the current assessment of the site.



Figure 6-1. General view of 41WM442 (facing northeast)



Figure 6-2. Another view of site 41WM442 (facing southwest)

An Intensive Cultural Resources Survey of the 7.0-Acre Frontier Park Improvement Project in Round Rock, Williamson County, Texas



Figure 6-3. Chert flake observed on site 41WM442 within Project Area

Cultural Features

No evidence of any cultural features (e.g., hearths or burned rock middens) was observed on the surface of the site or within any of the 6 shovel tests excavated on the site.

Horizontal and Vertical Extents of the Cultural Materials

During the 1999 survey assessment of site 41WM442, the recorders observed the site boundaries to measure approximately 328.0 ft (100.0 m) east to west by 131.2 ft (40.0 m) north to south. However, during the current assessment of site 41WM442, the originally recorded boundaries could not be identified due to the paucity of cultural materials along the modern ground surface and within excavated shovel tests

A total of 6 shovel tests were excavated during the revisit of site 41WM442. Shovel tests revealed up to 11.8 inches (30.0 cm) of dark grayish-brown and reddish-brown clay loam overlying dark reddish-brown and grayish-brown clay or limestone gravels. No cultural materials were observed in subsurface contexts.

Site Summary

Site 41WM442 was originally recorded as a prehistoric lithic scatter located immediately to the north of a tributary feeder to Lake Creek. The site originally consisted of a low-density scatter of prehistoric lithic artifacts. However, only a single, tertiary flake was observed in surface contexts during the current reassessment of site 41WM442. The originally delineated site

boundaries could not be reevaluated based upon the paucity of cultural materials along the modern ground surface and within shovel tests. Given the low density of cultural materials and the lack of temporally diagnostic artifacts, cultural features, preserved floral/faunal remains, or intact archeological deposits on the site, it is Horizon's opinion that site 41WM442 is ineligible for formal designation as an SAL or inclusion on the NRHP. As such, no additional investigations are recommended for site 41WM442 in connection with the currently proposed undertaking.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 SUMMARY

The cultural resources survey resulted in the reassessment of 1 previously recorded site, 41WM442. Site 41WM442 was originally documented as a low-density aboriginal lithic scatter near the central portion of the Project Area. However, only a single chert flake was observed during the site reassessment, and the flake was restricted to surface contexts on the site. Six shovel tests were excavated in the vicinity of the originally documented site centroid for site 41WM442, all of which produced negative results. The originally delineated site boundaries could not be reevaluated based upon the paucity of cultural materials along the modern ground surface and within shovel tests. Given the low density of cultural materials and the lack of temporally diagnostic artifacts, cultural features, preserved floral/faunal remains, or intact archeological deposits on the site, it is Horizon's opinion that site 41WM442 is ineligible for formal designation as an SAL or inclusion on the NRHP. As such, no additional investigations are recommended for site 41WM442 in connection with the currently proposed undertaking.

7.2 MANAGEMENT RECOMMENDATIONS

Based on the survey-level results, it is Horizon's opinion that the proposed improvements to the City of Round Rock's Frontier Park Project will have no adverse effect on significant cultural resources designated as or considered eligible for formal designation as SALs or eligible for listing on the NRHP. Horizon therefore recommends that the City of Round Rock be allowed to proceed with the proposed improvements to Frontier Park relative to the jurisdiction of the ACT and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the Texas Historical Commission (THC) should be notified of the discovery

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APPENDIX A:

Shovel Test Data

	UTM Coordinates ¹		Depth		
ST No.	Easting	Northing	(cmbs)	Soils	Artifacts
JC1	626030	3374068	0-30	Dark-grayish brown silty clay	None
			30+	Dark brown gravelly clay	None
JC2	625984	3374040	0-10	Dark brown clay loam	None
			10+	Limestone gravels	None
JC3	625940	3374016	0-20	Dark gray-brown clay loam	None
			20-35+	Dark reddish-brown gravelly clay	None
JC4	625908	3373974	0-15	Dark reddish-brown clay	None
			15-25+	Dark reddish-brown clay	None
JC5	625852	3373949	0-10	Dark grayish-brown clay loam	None
			10-30+	Dark reddish-brown silty clay	None
JC6	625771	3373891	0-15+	Reddish-brown gravelly clay	None
JC7	625952	3374021	0-10+	Dark gray-brown clay loam	None
			10-15+	Reddish-brown gravelly clay	None
JC8	625961	3374027	0-10	Dark gray-brown clay loam	None
			10-15+	Reddish-brown gravelly clay	None
JC9	626012	3374101	0-10	Dark grayish-brown clay loam	None
			10-15+	Yellowish-brown clay	None
JW1	626043	3374020	0-5	Mottled red and brown clay loam	None
			5+	Limestone bedrock	None
JW2	625996	3373999	0-10	Reddish-brown sandy clay	None
			10-15+	Dark gray clay	None
JW3	625957	3373975	0-5+	Dark gray gravelly clay	None
JW4	625914	3373950	0-20	Brown gravelly clay	None
			20+	Limestone bedrock	None
JW5	625873	3373910	0-10+	Brown gravelly clay	None
JW6	625836	3373876	0-5+	Brown gravelly clay	None
JW7	625793	3373795	0-10	Brown loam	None
			10-20	Brown loam with marl inclusions	None
			20+	Limestone bedrock	None
JW8	625804	3373877	0-30	Dark brown loam	None
			30+	Very dark brown clay loam	None
JW9	625926	3374018	0-30	Reddish-brown loam	None
			30+	Reddish-brown gravelly clay	None
JW10	625947	3374047	0-10	Reddish-brown clay loam	None
			10+	Limestone bedrock	None

Table A-1. Shovel Test Summary Data

¹ All UTM coordinates are located in Zone 14 and utilize the North American Datum of 1983 (NAD 83)

cmbs = Centimeters below surface

ST = Shovel test

UTM = Universal Transverse Mercator