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Intensive Archaeological Survey of the Proposed Casa Bella Estates Land Development Project and Data Recovery at Site 41BX2131, San Antonio, Bexar County, Texas

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Abstract

At the request of Matiraan, Ltd., Pape-Dawson conducted an intensive archaeological survey with shovel testing and backhoe trenching of the proposed 37-acre (15-hectare [ha]) Casa Bella Estates residential development in compliance with the Historic Preservation and Design Section (Article 6 35-360 to 35-634) of the City of San Antonio (COSA) Unified Development Code (UDC). Based on the results of those investigations, the COSA Office of Historic Preservation (SA-OHP) requested further work to mitigate the effects of the proposed development on a potentially significant archaeological site (41BX2131). Subsequently, data recovery investigations were accomplished at site 41BX2131. This report documents all phases of fieldwork.

The Casa Bella Estates residential development is within the COSA city limits at the confluence of Mud and Elm Waterhole Creeks in northern Bexar County, about 1.40 miles (2.25 kilometers [km]) southwest of the intersection of Bulverde Road and Loop 1604. The irregularly shaped project area straddles an existing driveway that provides access to Jones Maltsberger Road. The development would be maximally about 1,739 feet (ft) (530 meters [m]) north to south, and 2,264 ft (690 m) east to west. The vertical impacts for the proposed development have not yet been determined.

Compliance with the Antiquities Code of Texas or Section 106 of the National Historic Preservation Act is not required because the project is on private property and does not involve federal funding or permitting. However, based on the Archaeological Report Guidelines of the SA-OHP, any observed cultural resources were to be evaluated according to the criteria in Title 36 Code of Federal Regulations Part 60.4 (36 CFR 60.4) and in Title 13 Texas Administrative Code Chapter 26.10 (13 TAC 26.10). The purpose of the investigations was to identify all historic or prehistoric cultural resources located within the project area and to evaluate the significance and eligibility of identified resources for inclusion to the National Register of Historic Places (NRHP) or for designation as a State Antiquities Landmark (SAL). All work was done in accordance with the archaeological survey standards and guidelines as developed by the Council of Texas Archaeologists (CTA) and adopted by the Texas Historical Commission (THC).

The investigations included a cultural resources background literature and records review and an intensive survey with mechanical trenching, followed by data recovery mitigation. Fieldwork for the initial survey took place between October 9, and November 12, 2015. The entirety of the project area was subject to visual inspection supplemented by systematically placed shovel tests in order to evaluate the impact of the proposed project on cultural resources. A second phase of survey with backhoe trenching followed on November 11 and 12, 2015. Archaeologists excavated a total of 28 shovel tests and 6 backhoe trenches, exceeding the minimum CTA/THC archaeological survey standards, which require a ratio of 1 shovel test per 2 acres for a 37-acre (15-ha) project area. Pape-Dawson archaeologists encountered cultural material in 23 shovel tests and 5 trenches throughout the project area as part of their survey efforts. Site 41BX2131 was evaluated according to the criteria in 36 CFR 60.4 and 13 TAC 26.10, and determined to be potentially eligible for inclusion to the NRHP and for designation as an SAL. Based on the results of the survey and subsequent coordination with COSA

Archaeologist Kay Hindes, Pape-Dawson conducted data recovery mitigation for 41BX2131 because it could not be avoided by development.

Data recovery took place on January 6 to 8, 2016, and involved the excavation of three additional backhoe trenches and two 1-by-1-meter, hand-excavated units. One diagnostic projectile point, a Frio, was encountered in an excavation unit, and radiocarbon dated to 903±37 B.P. (D-AMS 016005) (2-sigma calibrated age estimate of A.D. 1035 to 1211, with a median probability of A.D. 1119). The generally accepted time range for Frio points is within the Transitional Archaic period at 200 B.C. to A.D. 600 or later (Turner and Hester 1999:122); in this case, more than 500 years later.

One other radiocarbon date from the same unit, but 12 inches (30 centimeters [cm]) below the projectile point, was 1090±32 B.P. (D-AMS 016006) (2-sigma calibrated age estimate of A.D. 892 to 1015, with a median probability of A.D. 953), demonstrating that the preserved occupation at site 41BX2131 is limited to a 166- to 319-year interval during the transition between the Transitional Archaic and Late Prehistoric periods. No pottery or arrow points typical of the Late Prehistoric period were encountered at site 41BX2131; however, the radiocarbon results situate the site within the early portion of the Late Prehistoric period.

The many tested cobbles and large flakes present on the surface indicate that initial reduction took place here. Several preforms and bifaces noted on the surface, and the small size of many tertiary flakes from the data recovery also suggest more detailed work occurred. The actual borders of the site were not discovered, as they extend beyond the project area. The site has likely been destroyed by the surrounding urban development and associated infrastructure construction. Disturbances within the project area include vehicle trails, a sewage line, artifacts taken from the surface by prior owners, and erosion near the drainages.

Project records and photographs will be curated at the Center for Archaeological Studies (CAS) at Texas State University in San Marcos, while artifacts will be returned to the landowner. Based on the results of the investigations, intact archaeological deposits that maximally span than about 300 years of occupation were documented at the site, including faunal bone and charcoal in the assemblage. Pape-Dawson archaeologists recommend that site 41BX2131 is eligible for inclusion to the NRHP and for designation as an SAL. No further work is recommended, as site 41BX2131 was mitigated through detailed hand-excavations.

If human remains are encountered during construction, Pape-Dawson recommends that all work in the immediate area should cease and the appropriate agencies be contacted for guidance.

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I. Introduction

On behalf of the Matiraan, Ltd., Pape-Dawson Engineers (Pape-Dawson) conducted a cultural resources background literature and records review, an intensive survey with mechanical trenching, and data recovery mitigation for the proposed Casa Bella Estates residential development. The project area is within the city limits of San Antonio, Texas, and at the confluence of Mud and Elm Waterhole Creeks in northern Bexar County, about 1.40 miles (2.25 kilometers [km]) southwest of the intersection of Bulverde Road and Loop 1604 (Figure 1). The irregularly shaped, 37-acre (15 hectare [ha]) project area straddles an existing driveway that provides access to Jones Maltsberger Road. North of the driveway are 5.18 acres (2.1 ha), while 31.73 acres (12.8 ha) are south and east of it. The residential development would be maximally about 1,739 feet (ft) (530 meters [m]) north to south, and 2,264 ft (690 m) east to west. The vertical impacts for the proposed development have not yet been determined.

Compliance with Historic Preservation and Design Section (Article 6 35-360 to 35-634) of the City of San Antonio (COSA) Unified Development Code (UDC) was necessary. However, as the project is on private property and did not involve either federal funding or permitting, cultural resources work in compliance with the Antiquities Code of Texas or Section 106 of the National Historic Preservation Act was not required. However, based on the Archaeological Report Guidelines of the SA-OHP, any observed cultural resources were to be evaluated according to the criteria in Title 36 Code of Federal Regulations Part 60.4 (36 CFR 60.4) and in Title 13 Texas Administrative Code Chapter 26.10 (13 TAC 26.10).

The goal of Pape-Dawson's investigations was to locate and identify all prehistoric and historic archaeological sites in the project area, to establish vertical and horizontal site boundaries within the project area, and to evaluate the significance and eligibility of any sites recorded within the project area for inclusion to the National Register of Historic Places (NRHP) or for designation as a State Antiquities Landmark (SAL). All work was done in accordance with the standards and guidelines of the Texas Historical Commission (THC) and the Council of Texas Archeologists (CTA). Pape-Dawson archaeologists Dr. Nesta Anderson, Katie Hill, and Jacob I. Sullivan conducted the survey between October 9, and November 12, 2015, while Dr. Mary Jo Galindo, Katie Hill, and Joshua Hamilton conducted the data recovery field work on January 6 through 8, 2016.

II. Environmental Setting

Site 41BX2131 is situated in northern San Antonio on a portion of the Longhorn (2998-422) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map. It is at the confluence of two creeks and surrounded by existing residential developments and some large-acreage homes to the north and northeast, as well as a church on the opposite side of Jones Maltsberger Road (Figure 2). Historically, the project area has been unimproved ranch land. Historic aerial photographs from 1955 to 1973 and topographic maps from 1959 to 1981 depict the project area in a rural setting that is completely vegetated (Nationwide Environmental Title Research [NETR] 2015). According to a circa 1940s Stoner System map (Sheets 1041 and 1045), the portion of the project area on the east side of Mud Creek was then owned by John Eisenhauer, while the westernmost portion was previously owned by John G. Classen.

Redacted Site Information

Redacted Site Information

The same map depicts the southwestern corner of the project area as belonging to A. Rittiman; all three parcels are in a rural setting in the 1940s with no apparent improvements. Eisenhauer granted Bexar County an easement to extend Jones Maltsberger Road in 1931 (Bexar County Clerk Records [BCCR] 1239:431). Most of the residential developments presently surrounding the project area were constructed between 1981 and 1986 (NETR 2015).

As mentioned, the project area straddles an existing driveway that provides access to Jones Maltsberger Road. Additional prior disturbances noted during the investigations include two-track roads, sanitary sewer installation, several chain link fences, and a cleared field (Figure 3). The project area contains moderately dense to dense vegetation consisting of Live Oak, Ashe Juniper, Persimmon, and Hackberry trees with an undergrowth of Yaupon, scrub, and cacti. Located on the margins of the Blackland Prairies and the Interior Coastal Plains regions of central Texas (Wermund 1996), the site landscape is characterized by low stream terraces that emerge above Mud, Elm, and Elm Waterhole Creeks. The underlying geology is mapped as upper Cretaceous-era, undivided Buda Limestone and Del Rio Clay in the northern half and Holocene-era Fluvatile Terrace Deposits in the southern half (Bureau of Economic Geology [BEG] 1983). Buda Limestone consists of fine-grained, bioclastic, glauconitic, and pyritiferous limestone that is 60 to 100 feet thick (BEG 1983). Del Rio Clay is calcareous and gypsiferous, with pyrite and marine megafossils common, and from 60 to 120 feet thick (BEG 1983). Fluvatile Terrace Deposits are comprised of gravel, sand, silt, and clay on low terraces that are mostly above flood level along entrenched streams. Adjacent to the Edwards Plateau, these deposits are predominately gravel, limestone, dolomite, and chert (BEG 1983).

Figure 3: Sanitary sewer line along the project area's southeastern border, facing northeast.

Soils within the project area are mapped as 44 percent Eckrant cobbly clay with 1 to 5 percent slopes, 41 percent Tinn and Frio soils with 0 to 1 percent slopes that are frequently flooded, and 15 percent Crawford and Bexar stony soils (U.S. Department of Agriculture, Soil Conservation Service [USDA, SCS] 2015). Eckrant cobbly clay is mapped on the uplands between Elm and Mud Creek, while Tinn and Frio soils are within and adjacent to the creeks' floodplains. Crawford and Bexar stony soils are confined to a strip parallel to Jones Maltsberger Road. The Eckrant series consists of soils that are very shallow and shallow to indurated limestone bedrock that is interbedded with cryptocrystalline quartz, chert, marl, and chalk. These well-drained soils formed in residuum weathered from limestone of the Lower Cretaceous and other geologic periods. They are found on the summits, shoulders, and backslopes of ridges on dissected plateaus (USDA, SCS 2015).

The Tinn series consists of very deep, moderately well-drained, and very slowly permeable soils that formed in calcareous clayey alluvium (USDA, SCS 2015). Likewise, Frio soils are very deep, well-drained, and moderately slowly permeable, and formed in calcareous loamy and clayey alluvium (USDA, SCS 2015). Both of these soils occur on flood plains of the Blackland Prairies. Crawford soils are found on broad nearly level or gently sloping uplands, and are moderately deep, well-drained, and very slowly permeable. These soils formed in clayey sediments that are underlain by indurated limestone bedrock (USDA, SCS 2015). Finally, the Bexar series consists of moderately deep, well-drained, and slowly permeable soils on upland plains (USDA, SCS 2015). These soils are underlain by hard limestone at depths of 20 to 40 inches.

I. Cultural Chronology

Bexar County falls within the Central Texas archaeological region of the Central and Southern Planning Region as delineated by the THC (Mercado-Allinger et al, 1996). Cultural developments in this region are typically classified by archaeologists according to four primary chronological time periods: Paleoindian, Archaic, Late Prehistoric, and Historic. These classifications have been defined primarily by changes in material culture and subsistence strategies over time as evidenced through information and artifacts recovered from archaeological sites. This cultural chronology provides a brief summary of each major cultural period with reference to significant archaeological work that has occurred within the region.

Paleoindian (11,500 B.P. – 8,800 B.P.)

Although there is some debate about whether pre-Clovis Paleoindian peoples lived in Texas, there is evidence of Paleoindian occupation within Texas by 11,500 B.P. Collins (1995:376, 381) has proposed dividing this period into early and late phases, with Dalton, San Patrice, and Plainview possibly providing the transition between them. Research has shown Paleoindians were gathering wild plants and hunting large mammals (mammoth, bison, etc.) as well as smaller terrestrial and aquatic animals (Collins 1995: 381; Bousman et al. 2004: 75). Projectile points characteristic of the Paleoindian period in Central Texas are lanceolate-shaped and include Clovis, Plainview, and Folsom (Turner and Hester 1999). In Texas, most Paleoindian sites are classified as procurement or consumption sites (Bousman et al. 2004: 76-78), but a few, such as the Wilson-Leonard site in Williamson County (Collins 1995) and the Pavo Real site in Bexar County (Henderson 1980), have produced burials in context (Collins 1995: 383). Other Paleoindian

sites discovered within Bexar County include site 41BX47 on Leon Creek (Tennis 1996), the Richard Beene site (41BX831) (Thoms and Mandel 2007), and the St. Mary's Hall site (41BX229), which has provided insight into a more diverse diet for Paleoindian groups (Hester 1978).

As the climate warmed, the Paleoindian people began to shift away from hunting large animals. The changing environment, which led to extinction of the megafauna, likely influenced their decision to focus more on hunting small game animals, including deer and rabbit, as well as gathering edible roots, nuts, and fruits (Black 1989). This change in food supply, as well as a different set of stone tools, marks the transition into the Archaic Period.

Archaic (8,800 B.P. – 1,200 B.P.)

Usually divided into early, middle, late, and sometimes transitional sub-periods, the Archaic marks a gradual shift from hunting Megafauna and some smaller animals supplemented with wild plants to a focus on hunting and gathering medium and small animals and wild plants, and an eventual transition to agriculture. Beginning with Clear Fork gouges and Guadalupe bifaces in the Early Archaic (8500 B.P. – 6000 B.P.) (Turner and Hester 1999; Collins 1995), Early Archaic people produced a variety of point types. The variety of points and their scattered distribution over a large area in the Early Archaic may indicate smaller groups of people moving over larger territories (Prewitt 1981). Point types transition to Bell-Andice-Calf Creek, Taylor, and Nolan-Travis points in the Middle Archaic (6000 B.P. – 4000 B.P.) (Turner and Hester 1999; Collins 1995), and burned rock middens become an important characteristic. The Middle Archaic focus on constructing burned rock ovens to cook a diverse array of plant food (Black 1989) suggests a slightly more sedentary focus. The Bulverde, Pedernales, Ensor, Frio, and Marcos points in the Late Archaic (4000 B.P. – 1300 B.P.) (Turner and Hester 1999; Collins 1995) mirror the diversity of point types found in the Early Archaic. During the Late Archaic, cemeteries, especially associated with rock shelters, become common in central Texas (Dockall et al. 2006). In Bexar County, sites with Early Archaic components include the Housman Road site (41BX47), the Richard Beene site (41BX831) (Thoms and Mandel 2007), the Higgins site (41BX184) (Black et al. 1998), and the Panther Springs site (41BX228) (Black and McGraw 1985). While the Elm Waterhole site (41BX300) is representative of a Middle Archaic site within Bexar County (McNatt et al. 2000), the Granberg site (41BX17\41BX271) in San Antonio is a multi-component site with occupations from both the Middle and Late Archaic sub-periods.

Late Prehistoric (1,200 B.P. – 250 B.P.)

As the Archaic transitioned into the Late Prehistoric period, several technological changes become apparent. The most notable change is the use of the bow and arrow rather than the spear and atlatl, as evidenced by smaller dart points. Another significant innovation is the creation and use of ceramic vessels. Some groups began to practice consistent agriculture during this time as well; there is some evidence that peoples in Central Texas may have incorporated agriculture into their lives, but primarily remained hunter gatherers (Collins 1995). Also during this period, there are possible indications of major population movements, changes in settlement patterns and perhaps lower population densities (Black 1989). Archaeologists divide the Late Prehistoric into two phases: the Austin phase, followed by the Toyah.

Historic (A.D. 1600s – A.D. 1950)

While there is an overlap between the prehistoric and historic periods (sometimes called the protohistoric), Europeans did not explore the area until the seventeenth century. Alonso de León's 1689 and 1690 expeditions and Domingo Terán de los Ríos' 1691 expedition were likely the some of the first interactions between Europeans and Native groups (de la Teja 1995:6). These explorations helped the Spanish choose locations to establish five missions in and around what would later become San Antonio. Don Martín de Alarcón established the first mission, San Antonio de Valero, in 1718, on the west bank of the San Pedro Creek, followed by the Presidio San Antonio de Béxar and the Villa de Béxar (de la Teja 1995). However, by 1722 the Marqués de San Miguel de Aguayo had moved the presidio and villa to the west side of the San Antonio River (Clark et al. 1975). Other missions, including Mission San José y San Miguel de Aguayo, Nuestra Señora de la Purísma Concepción, San Juan Capistrano, and San Francisco de la Espada were established in the area from 1718 to 1731 (Clark et al. 1975). Most of the Native American people recruited to live at these missions comprised many different groups (Campbell 1977), but it is difficult to know all the groups that were present due to the variations in spelling and phonetic complexity. The missions used this Native labor force to construct acequias, or irrigation ditches, which helped them to develop self-sustaining communities bordered by farmland. (Long 2010).

In 1731, Spain sent 16 families from the Canary Islands to the villa de Béxar to establish the secular village. With the arrival of these families, surveyors set out the city's main plaza, or Plaza de las Islas, next to the church, designated a spot for the Casas Reales, and began to establish residential lots (Spell 1962). In 1773, San Antonio de Béxar Presidio was named the capital of Spanish Texas, and the settlement including mission Indians had a population of about 2,000 by 1778 (Fehrenbach 2010). During this period of early settlement, water was an essential component for successful settlement and survival. The acequia system, begun with the arrival of the missionaries, continued to expand to serve irrigation and drinking water needs. The acequia system influenced the street layout in the city (Cox 2005:20) and played an integral part in contact between the Spanish, who brought the engineering concepts for the system, and the indigenous groups forced to provide the construction labor.

During the 1820s and early 1830s, American settlers began moving to San Antonio in increasing numbers, though the population remained predominately Mexican. In 1824, Texas and Coahuila were united into a single state with its capital at Saltillo. San Antonio fought for Mexican Independence in 1813, then for its own sovereignty during the Texas Revolution. The Siege of Bexar and the Battle of the Alamo, in 1835 and 1836, were both located within San Antonio, showing its importance in the region. After Texas gained its independence from Mexico in 1836, Bexar County was created and San Antonio was chartered as its seat (Long 2010). However, this was not the end of conflict in the city; a dispute with Comanche Indians resulted in the Council House Fight in 1840, and Woll's invasion in 1842 precipitated Texas' entrance into the United States as the 28th state.

On March 2, 1861, Texas seceded from the Union and soon after the Civil War began. San Antonio became a Confederate storage area as well as a location where military units could be organized; however, the city kept its distance from most of the actual fighting (Fehrenbach 2010). After the Civil War, San Antonio continued to grow larger, spurred on by the arrival of the railroad in 1877

(Fehrenbach 2010). Industries such as cattle, distribution, ranching, mercantile, gas, oil, and military centers in San Antonio prospered. The city served as the distribution point for the Mexico-United States border as well as the rest of the southwest. At the turn of the twentieth century, San Antonio was the largest city in Texas with a population of more than 53,000. Much of the city's growth after the Civil War was a result of an influx of southerners fleeing the decimated, reconstruction-era south. An additional population increase came after 1910, when large numbers of Mexicans began moving into Texas to escape the Mexican Revolution (Fehrenbach 2010).

Modernization increased dramatically between the 1880s and the 1890s, compared to the rest of the United States. Civic government, utilities, electric lights and street railways, street paving and maintenance, water supply, telephones, hospitals, and a city power plant were all built or planned around this time (Fehrenbach 2010). The First United States Volunteer Cavalry was organized in San Antonio during the Spanish-American War, and San Antonio was an important military center for the army and air forces during both world wars. Its five military bases provided an important economic base and contributed to the evolution of the city's medical research industry.

In 1921, a disastrous flood engulfed downtown San Antonio with up to 12 ft (3.7 m) of water. The Olmos Dam was built in response to this event to prevent further flooding. Sections of the San Antonio River were straightened and widened in areas to control the water flow. Another recommendation was to construct an underground channel in downtown San Antonio and to cover portions of the river with concrete. This last idea was controversial, but a compromise was eventually agreed upon to create a Riverwalk with shops and restaurants along the water channel, which was completed in 1941 (Fisher 2010).

I. Research Design

Research Questions

The primary goals of the investigation were to (1) to assess the age and horizontal and vertical extent of cultural deposits at the site; (2) to document buried and intact prehistoric features (e.g. hearth or earth ovens); and (3) to evaluate whether organic material (e.g. faunal remains or charcoal) is preserved.

Examples of the type of data that would constitute site significance and therefore a recommendation for site 41BX2131 as eligible for inclusion to the NRHP or for SAL designation include the discovery of in situ features such as hearths or earth ovens, human burials, cultural deposits with well-preserved organic material, definable and intact activity areas where tool manufacturing, plant processing or animal butchering took place, or stratigraphically isolable archaeological components representing a living surface or occupational layer.

Field Methods

Records Review

Prior to fieldwork, Pape-Dawson archaeologists conducted a thorough background literature and records search of the proposed project area. This research included reviewing the Longhorn (2998-422) USGS 7.5-minute topographic quadrangle map at the Texas Archeological Research Laboratory (TARL) and searching the Texas Historical Commission's Texas Archeological Sites Atlas (Atlas) online database for any previously recorded surveys and historic or prehistoric archaeological sites located within a 0.62-mile (1-km) radius of the project area. In addition, the review included information on the following types of cultural resources: National Register of Historic Places (NRHP)-listed properties and sites, NRHP districts, State Antiquities Landmarks (SAL), Official Texas Historical Markers (OTHM), Registered Texas Historic Landmarks (RTHL), and cemeteries. Archaeologists also consulted the National Park Service's (NPS) National Historic Trails Map Viewer online to learn whether any National Historic Trails (NHTs) are located within the 1 km radius. In addition, Pape-Dawson reviewed data from the City of San Antonio's Historic Landmark and Historic Districts GeoDatabase, the U.S. Department of Agriculture Soil Survey of Bexar County (Taylor et al. 1966), Natural Resources Conservation Service Web Soil Survey (USDA-SCS 2015), the Geologic Atlas of Texas-San Antonio Sheet (BEG 1983), and historic maps and aerials that depict the project area (NETR 2015), including the circa 1940s Stoner System maps.

Fieldwork

Survey

Pape-Dawson archaeologists conducted an intensive cultural resources survey of the proposed 37-acre (15 ha) project area that included a 100-percent pedestrian survey augmented with shovel testing and mechanical trenching. Pedestrian transects were spaced at intervals of no more than 98 ft (30 m) across the project area. Shovel tests were roughly 11.8 inches (30 centimeter [cm]) in diameter and were excavated in 3.9-inch (10-cm) levels to pre-Holocene clay. All soils were screened through ¼-inch (0.64-cm) mesh unless clay concentrations were high enough to require hand sorting. All shovel tests were recorded, visually described, plotted by sub-meter accurate Global Positioning System (GPS) device, and backfilled upon completion.

Archaeologists excavated six trenches during survey that were approximately 1.8 to 3.3 ft (0.55 to 1 m) deep, 2.5 to 8 ft (0.75 to 2.45 m) long, 3.3 ft (1.0 m) wide, and were excavated in 4-inch (10.2-cm) levels. Prior to these investigations, a One-Call (Texas 811) was requested to verify there are no existing utilities within the proposed excavation area. The One-Call notification required a 48-hour period prior to any survey excavations to allow for proper marking and noting of any existing utilities. All trenching work was performed in accordance with Occupational Safety and Health Administration (OSHA) (29 CFR Part 1926). Appropriate measures would have been taken had any trenches exceeded 4 feet in depth, following OSHA safety protocols for safe ingress and egress. All trenches were backfilled and leveled upon completion of excavation and recording.

Pape-Dawson archaeologists thoroughly photographed and recorded representative trench profiles, and mapped the trenches and any archaeological deposits with a sub-meter accurate, handheld Trimble GPS

unit. Site 41BX2131 was recorded on TexSite forms in the field, and the form was submitted to the Texas Archeological Research Laboratory (TARL) to obtain a trinomial. Diagnostic artifacts were collected and brought to Pape-Dawson's Archaeological Laboratory in Austin for cleaning, analysis, and curation. A representative sample of non-diagnostic artifacts observed during the survey was photographed and documented in the field, but not collected.

Based on the Archaeological Report Guidelines of the SA-OHP, any observed cultural resources were evaluated according to the NRHP criteria in 36 CFR 60.4, which states:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

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

Archaeological sites were also evaluated according to the criteria in 13 TAC 26.10, which includes:

1. the site has the potential to contribute to a better understanding of the prehistory and/or history of Texas by the addition of new and important information;
2. the site's archeological deposits and the artifacts within the site are preserved and intact, thereby supporting the research potential or preservation interests of the site;
3. the site possesses unique or rare attributes concerning Texas prehistory and/or history
4. the study of the site offers the opportunity to test theories and methods of preservation, thereby contributing to new scientific knowledge; and
5. there is a high likelihood that vandalism and relic collecting has occurred or could occur, and official landmark designation is needed to ensure maximum legal protection, or alternatively, further investigations are needed to mitigate the effects of vandalism and relic collecting when the site cannot be protected.

Data Recovery

Pape-Dawson archaeologists excavated three additional backhoe trenches and two 1-by-1-m hand excavation units within the boundary of 41BX2131 to explore the extent of the deposits and to confirm whether the deposits were intact. Trenches were approximately 1.8 to 3.3 ft (0.55 to 1 m) deep, 9.8 to 16.4 ft (3 to 5 m) long, 4.9 ft (1.5 m) wide, and were excavated in 4-inch levels. Archaeologists recorded representative trench profiles and mapped the trenches and excavation units with a sub-meter accurate, handheld Trimble GPS unit. Representative samples of the trenches' backdirt were screened and diagnostic artifacts were collected. A representative sample of non-diagnostic artifacts observed were photographed and documented in the field but not collected.

The hand excavation units were excavated in 10-cm levels, and a small sample of soil was to be collected from each 10-cm level of the unit placed within a feature. These samples would have been separated for subsequent water screening and the remaining dirt was screened through ¼-inch (0.64-cm) hardware mesh unless the matrix was dominated by clay. Clay matrices were finely divided by hand and visually inspected for cultural material. Units were to be excavated until at least two levels of sterile soil or gravels/bedrock was reached unless archaeological deposits extended greater than 4 ft (1.2 m) deep. Excavation below this depth would have required compliance with OSHA regulations and archaeologists would have coordinated with COSA-OHP if it had been necessary to proceed below this depth. All artifacts and samples were collected by unit and level provenience.

Throughout the field effort, matrix resulting from the hand excavations was screened through ¼-inch (0.64-cm) hardware mesh for full artifact recovery. All diagnostic artifacts and pertinent faunal remains were collected for analysis, bagged, and labeled accordingly. Burned rocks were quantified (by size category), counted and weighed in the field, but not collected. Had a discrete feature been encountered, it would have been fully exposed horizontally, thoroughly documented, cross-sectioned, sampled, and recovered. The soil matrix (minus any burned rock) from the features would have been bagged separately and returned to the lab for water screening, if applicable, and fine screen analysis. Detailed coarse (burned rock) and fine matrix analyses were conducted, describing the types, counts, and characteristics of the matrices. If an extensive midden had been encountered, the methodology would have been the same except the midden would not have been fully exposed horizontally. Instead, it would have been thoroughly documented, cross-sectioned, and strategically sampled.

A series of column samples and radiocarbon samples were planned across the site from intact features or occupation layers, if present. Flotation samples were not planned as the soil at the site is not conducive to the preservation of botanical remains. Profiles were drawn for multiple units and excavated trenches on the same axis in order to record stratigraphic detail across the bulk of the excavation area. The excavation unit was photographed and drawn in plan view between levels and in profile view upon termination.

Laboratory Analysis

Artifacts recovered from these investigations were brought back to Pape-Dawson's Cultural Resources Laboratory in Austin for cleaning, analysis, and curation. Most artifacts were washed in distilled water, air-dried on drying racks prior to analysis, and catalogued by provenience. However, some artifacts (e.g. bone) were dry-brushed only. Archaeologists analyzed the artifacts according to class and material type, and a written summary is included in this report. If collected, up to two radiocarbon samples were to be sent for analysis following field work. The cultural material recovered from the site was exclusively prehistoric and was the focus of laboratory sorting and analysis. Prehistoric material type observed and recovered during the survey and data recovery phases include lithic flakes, modified lithic flakes (flake tools), cores, scrapers, bifaces, preforms, fire-cracked rock (FCR), debitage, tested chert cobbles, biface

fragments, ochre, ground stone, faunal bone fragments, shell fragments, charcoal samples, and two Frio projectile points.

Ecofacts

Ecofacts are the organic remains of plants and animals that are indicative of human occupation. Examples of ecofacts encountered at site 41BX2131 include faunal bone, charcoal, and marine shell. Besides providing an indication of the prehistoric diet, ecofacts such as charcoal can be used to date the occupation of the site.

Artifacts

Lithic Artifacts

All prehistoric lithic artifacts recovered from site 41BX2131 were initially classified as either tools or non-tools and were then sorted by raw material type and presence of thermal alteration. Tools were divided into five subcategories: biface, dart point, ground stone, blade, and flake tool. Non-tools were categorized as debitage, core, or FCR. The assemblage of lithic debitage as well as the collection of flake tools was further subdivided according to flake reduction stage (e.g. primary, secondary, and tertiary).

Tools

Bifaces exhibit negative flake scarring extending over a portion or the entirety of both faces of the tool, with both sides converging on a single edge that circumnavigates the entire artifact. There are several possible functions for bifaces including sources for usable flakes, chopping and cutting apparatuses, or as projectile points.

Dart points represent bifacial projectile points featuring wide bases, moderate thinning and a hafting groove that permits the point to be fixed to a spear. These tools are identified based on the general shapes of the point and stem as well as the notching style of the stem when evident. Often a dart point exhibits evidence of re-working, which can be indicative of re-use occurring across multiple occupation periods. The two individual dart point fragments collected were classified by comparable point typology as depicted and described by Turner and Hester (1999).

Ground stones are stone tools shaped through abrasion by grinding or polishing one stone against another. Ground stones are typically cobble-size and made of a course-grained stone. These tools were utilized for a variety of functions including the processing of plants for food or medicine as well as the shaping and polishing of formalized stone tools such as adzes, celts, and some types of projectile points. Ground stone cobbles often exhibit a ground or polished surface upon which scored striations may also be observed.

Blades are flakes produced from a unidirectional core and have parallel lateral margins and uniform width and thickness values along the longitudinal axis (Andrefsky 1998:159). Blades are detached from a

single striking platform or flat surface and in a single direction following core preparation. Blade technology produced relatively less waste and enabled knappers to extract a larger ration of cutting edges from a given piece of chert than flake core technology.

Flake tools are identified as pieces of lithic debitage that exhibit some manner of deliberate edge modification by humans. Human modification may be the result of intentional retouching along one or more edges in order to shape an edge for use. Human modification may also be the direct result of tool use such as cutting or scraping that has occurred along an edge that has not been retouched prior to use. However, in some cases, indications of both retouch and usewear are present on flake tools. No attempt was made during the current analysis to distinguish intentional retouch from usewear. Any piece of lithic debitage with recognizable edge modification was simply identified as a flake tool regardless of how the modification was produced.

Non-tools

Analysis of the nontool categories mainly focused on unmodified lithic debitage. However, cores and fire-cracked rock were also recovered from site 41BX2131. Characteristics of each non-tool category observed during analysis are summarized below.

Lithic Debitage includes all unmodified materials detached from an objective piece during core reduction or during the production of chipped tools. Lithic debitage was classified under the following categories: primary flakes, secondary flakes, tertiary flakes and shatter. The criteria utilized to categorize these materials define primary flakes as initial reduction stage flakes retaining at least 50 percent of dorsal cortex, with a platform observed on the ventral side. Secondary flakes denoted any flake exhibiting dorsal cortex ranging between 1 and 49 percent. Tertiary flakes were defined as non-cortical interior flakes. Lithic debitage lacking an observable striking platform as well as other morphologically discernable flake characteristics were categorized as shatter.

A *core* represents any relatively large, homogenous lithic material exhibiting negative flake scarring on its surface owing to flake reduction activities. Andrefsky (1998) additionally categorizes cores as either unidirectional or multidirectional with respect to the directional mode of reduction. Unidirectional cores demonstrate flake reduction in one direction from a single striking platform, whereas multidirectional cores display flake reduction in variable directions and from different striking platforms.

Fire-cracked rocks (FCR) are lithics that have been thermally altered from intentional heat exposure during the use of hot rocks for cooking and heating purposes. Characteristics associated with thermal alteration of lithic material include color change, increased luster, and heat fracturing. FCR is identified as a lithic specimen that exhibits all three forms of thermal alterations. Lithic specimens exhibiting a color change and/or an increase in luster but no fracturing due to heat are typically identified as burned rock, not FCR. However, no burned rock was collected during the data recovery at site 41BX2131.

Results

Record Review

The results of the cultural resources background review identified no previously recorded NRHP-listed properties or districts, cemeteries, OTHMs, RTHLs, SALs, or archaeological sites within the project area. There are 13 archaeological sites within 0.62 mile (1 km) of the project area (Figure 4; Table 1). All but one of these sites were prehistoric. The single historic site was a log house, made of cedar, caliche plaster and square cut nails. The majority of prehistoric sites was documented as unknown prehistoric, or broadly as Archaic to Late Prehistoric. Site types included open occupations sites, quarries, lithic scatters, and two rock shelter sites. Artifacts typically consisted of lithics, such as flakes, and bifaces. Few identifiable point types were reported, though one site described several large hand axes (41BX354). Features were few, and those documented were predominantly burned rock middens. Depth of deposits varied when reported. Most were surficial to shallowly buried, though a few sites described deeper deposits. The greatest of these was 0.3 m below surface. None of these sites have been evaluated for NRHP eligibility by the SHPO. The consultants recommended further investigation on several to determine eligibility, but for many others recommended no further work based on a site's poor or largely destroyed condition. Disturbances included looting, bulldozing, plowing, and road construction.

According to the THC's on-line Restricted Archeological Sites Atlas, the APE was included in a 1977 survey for a wastewater treatment project (Fox 1977), but the report does not detail the methodology used and no sites were recorded within the APE. However, three sites—41BX354, 41BX355, and 41BX356—were recorded just south of the APE during the same survey (Fox 1977). Standards for survey methods have since become more rigorous. Nine other archaeological surveys have been conducted with a 0.62-mile (1-km) radius of the project area, including one under ACT Permit Number 5339 that was along Jones Maltsberger Road and adjacent to the APE (Lowe 2010). The survey recorded site 41BX1813 about 0.25 km north of the APE (Lowe 2010). Two surveys and follow up investigations at 41BX452 were conducted in 1974 and 1978 on behalf of the Soil Conservation Service (SCS) about 0.56 mile (0.9 km) northwest of the APE by The University of Texas at San Antonio's Center for Archeological Research (UTSA-CAR) (Hester et al. 1974; McGraw and Valdez 1978). Two other surveys revisited rock shelter sites 41BX452 and 41BX570 on behalf of the THC (Patterson 1982) and the SCS (Cole 1982).

UTSA-CAR also surveyed prior to a residential development about 0.16 mile (0.25 km) south of the APE, revisiting site 41BX356 and recording site 41BX630 (Kelly 1984). Site 41BX901, an extensive prehistoric quarry, was investigated by UTSA-CAR during a survey about 0.5 km north of the APE on behalf of Northeast Independent School District and under ACT Permit Number 950 (Potter et al. 1992). More recently, a commercial development about 0.62 mile (1 km) northeast of the APE was surveyed and two prehistoric sites (41BX1786 and 41BX1787) were recorded, but the actual site locations are beyond the study area limits (Galindo 2010). Finally, a survey was conducted by Prewitt and Associates under ACT Permit Number 6535 about 0.62 mile (1 km) south for Mud Creek drainage improvements (Burden 2013).

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Table 1. Archaeological sites recorded within 0.62 mile (1 km) of the project area.

Archeological Site	Site Type	Depths of Deposits From Surface	Distance & Direction	Additional Information
41BX354	Prehistoric Occupation (open)	unknown	0.40 km (0.24 mi) S	Consultant recommended further investigation and test pitting to determine eligibility.
41BX355	Prehistoric Occupation (open)	unknown, but exposed by plowing	0.15 km (0.09 mi) S	Consultant recommended no further investigations, unless coupled with work at a possibly related site to the south.
41BX356	Prehistoric Occupation (open)	unknown	0.75 km (0.47 mi) SSE	Consultant recommended testing to determine depth of deposits and significance.
41BX452	Prehistoric Rock shelter	Surface to 25 cm	0.90 km (0.56 mi) NNW	Consultant made no recommendation.
41BX570	Prehistoric Rock shelter	15 to 35 cm	0.85 km (0.52 mi) NNW	Consultant noted that much of the site had been destroyed by bulldozing work.
41BX630/ Eden Site	Prehistoric Lithic scatter	unknown	0.45 km (0.28 mi) S	Consultant recommended backhoe trenching.
41BX901	Archaic-Late Prehistoric Quarry	40 cm	0.70 km (0.43 mi) N	Consultant recommended that 20+ acre site is eligible for NRHP listing and SAL designation; good potential for research.
41BX905	Archaic-Late Prehistoric Quarry	50 to 67 cm	0.95 km (0.59 mi) NNW	Consultant made no recommendation.
41BX907/ Pecan Gap	Archaic Quarry	unknown	0.80 km (0.50 mi) NW	Consultant made no recommendation.
41BX909	Archaic Lithic Scatter	30 to 50 cm	0.90 km (0.56 mi) NW	Potholed; site condition is poor.
41BX914	Historic Log house	unknown	0.95 km (0.59 mi) W	Consultant reported cabin was measured, drawn, and documented
41BX1625	Unknown prehistoric Lithic procurement area	Surface	0.85 km (0.53 mi) N	Consultant recommended that site was not eligible for SAL designation.
41BX1813	Unknown Prehistoric Lithic reduction scatter	5 to 20 cm	0.35 km (0.22 mi) N	Consultant recommended no further investigations.

Historic Maps and Aerial Photographs

In addition to the review of previously documented cultural resources, Pape-Dawson archaeologists researched a series of topographic maps and aerial photographs of the project area dating between 1955 and 2012, as well as circa 1940s Stoner System Maps. As previously mentioned, most of the project area was owned by John G. Classen according to Stoner System Map Sheets 1041 and 1045 (Figure 5), while the southern portion of the project area on the east side of Mud Creek was owned by John Eisenhauer in the 1940s. The same maps depict the southwestern corner of the project area as belonging to A. Rittiman; all three properties are in a rural setting. Classen's property is depicted with a

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well, a structure, and a cemetery to the east of the current project area. Eisenhauer's 350 acres is depicted with a well and four structures along Bulverde Road and south of the project area. Likewise, the Rittiman property is depicted with seven structures and a well, but all are south of the project area. No improvements are depicted within the project area. Eisenhauer granted Bexar County an easement to extend Jones Maltsberger Road in 1931 (BCCR 1239:431). Historic aerial photographs from 1955 to 1973 and topographic maps from 1959 to 1981 continue to depict the project area in a rural setting that is completely vegetated (NETR 2015).

This review of historic maps and aerials identified no structures within the project area, though some are directly adjacent. Historically, the project area has been unimproved ranch land. Structures do not appear on the topographic maps or historic aerials until the 1980s; thus, they are not yet of historic-age. In general, the project area had less vegetation in the earlier aerial images. Rows of vegetation in certain areas may indicate fences. Plowing is not evident from the historic imagery, but fencing and sparse vegetation is suggestive of cattle grazing. Most of the residential developments presently surrounding the project area were constructed between 1981 and 1986 (NETR 2015). The vegetation that was sparse in 1955 continued to thicken over the decades, and remains largely undisturbed today with the exception of a few cleared areas. These include the strip of land adjacent to Jones-Meltzberger Road, and an oval-shaped clearing in the southwest section of the project area (NETR 2015).

Fieldwork

Introduction

Investigations at site 41BX2131 were initiated with an intensive survey with shovel testing. The initial survey took place between October 9, and November 12, 2015. The entirety of the project area was subject to visual inspection supplemented by systematically placed shovel tests in order to evaluate the impact of the proposed project on cultural resources. After encountering buried cultural material in 23 of 28 shovel tests, and in consultation with COSA Archaeologist Kay Hindes, a second phase of survey with the mechanical excavation of six trenches followed (Figures 6 and 7; Appendices A and B). No definitive features were encountered during the initial trenching phase, but fire-cracked rock (FCR) was encountered along with lithic artifacts in five of the six trenches. Based on the potential for encountering buried, intact cultural features as revealed during trenching, mitigation through data recovery was required for site 41BX2131, in compliance with the Historic Preservation and Design Section (Article 6 35-360 to 35-634) of the COSA UDC.

Archaeologists excavated a total of 28 shovel tests and 6 backhoe trenches, exceeding the minimum CTA/THC archaeological survey standards, which require a ratio of 1 shovel test per 2 acres for a 37-acre (15-ha) project area. Pape-Dawson archaeologists encountered cultural material in 23 shovel tests and 5 trenches throughout the project area as part of their survey efforts (see Figures 6 and 7). The shovel tests ranged in depth from 0.8 to 23.6 inches (2 to 60 cm) below surface, averaging 13.9 inches (35.3 cm) deep. The trenches excavated during the survey ranged from 21.7 to 59.1 inches (55 to 150 cm) below surface, averaging 37.4 inches (95 cm) deep. Site 41BX2131 was evaluated according to the criteria in 36 CFR 60.4 and 13 TAC 26.10, and determined to be potentially eligible for inclusion to the NRHP and for designation as an SAL.

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Based on the results of the survey and through subsequent consultation with COSA Archaeologist Kay Hindes, Pape-Dawson conducted data recovery mitigation for 41BX2131. Data recovery field work took place on January 6 to 8, 2016, and involved 108 person-hours, the excavation of three additional backhoe trenches, and two hand-excavated units measuring 1-by-1-meter (Figure 8). The trenches excavated during the data recovery phase ranged from 20.5 to 39.4 inches (52 to 100 cm), averaging 27.2 inches (69 cm) deep. Excavation Unit 1 (EU 1) terminated at 35.4 inches (90 cm) below surface, while EU 2 was excavated to 30 cm below surface.

Site 41BX2131

Site 41BX2131 was recorded during the survey phase of the investigations on the basis of encountering a dense and widespread lithic scatter (surface and subsurface) containing flakes (some very large), modified flakes (flake tools), cores, scrapers, bifaces, preforms, FCR, debitage, a tested chert cobble, biface fragments, ochre, ground stone, and a Frio projectile point in an area with abundant, naturally occurring chert cobbles (Table 2). The main area of the site is an upland toe slope at the confluence of Mud, Elm, and Elm Waterhole Creeks, although cultural material was also encountered along the western bank of Mud Creek, where a natural seam of limestone and chert cobbles is evident along the 800-ft contour line (see Figure 1). During data recovery, the same types of artifacts were encountered along with more faunal bone fragments, a shell fragment, and charcoal samples (Table 3; Figure 9). Two diagnostic artifacts (Frio projectile points) were documented during the investigations. One projectile point was found during survey on the surface in the northeastern portion of the project area (near Excavation Unit 2); the other was in Excavation Unit 1 at about 11.8 inches (30 cm) below surface.

Table 2. Artifacts encountered during shovel testing and column sampling

Artifact Class	Quantity from Shovel Tests	Quantity from Column Sample
Flake	362	
Shatter	53	
FCR	50	322
Tested cobble	6	
Biface fragment	5	
Ochre	2	
Frio Projectile Point fragment	1	
Shotgun shell	1	
Debitage		242
Faunal Bone fragment		1
Charcoal		1
Shell		1

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Table 3. Artifacts encountered during data recovery investigations

Artifact Class	Quantity	Weight (g)
Tertiary Flake	1,900	1,939.30
Secondary Flake	504	2,456.65
Shatter	420	2,426.51
FCR	874	57,590.00
Primary Flake	114	323.70
Bone fragment	101	203.33
Charcoal Sample	85	11.56
Biface (and fragment)	15	267.64
Blade	10	32.17
Flake Tool	9	676.95
Core	2	1,063.47
Marine Shell	1	0.20
Frio Projectile Point	1	6.69
Ground stone fragment	1	30.82

Figure 9: Plan view documentation at EU 2 during data recovery phase, facing south.

The site was discovered during survey when flakes were noticed on the surface in an upland setting, and on the ridges sloping down to Mud, Elm, and Elm Waterhole Creeks. The area is densely wooded, and vegetation included Ashe Juniper, Live Oak (many very old specimens), and Hackberry trees with an underbrush of scrub and cacti. Also present, particularly along the 800-ft contour line, were many natural chert cobbles. Shovel tests excavated on and below this contour line encountered many large cobbles, but those excavated above the contour line contained few cobbles. Surface visibility was low—15 to 45 percent—as the ground was covered with leaves and duff; however, the abundance of artifacts helped make the surface scatter visible.

When the site was first discovered on the surface and confirmed to be subsurface with the first shovel test, a cruciform pattern of shovel tests were excavated within the project area. Numerous artifacts were visible on the surface, including flakes, many of which were very large, and while not diagnostic, showed evidence of having been utilized. Scrapers, bifaces, preforms and other non-diagnostic tools were also noted on the surface. When it became clear that the scatter continued, shovel tests were judgmentally placed to determine if the surface scatter continued to have depth. Within the shovel tests, artifacts were encountered to a maximum depth of 18.9 inches (48 cm) below surface. The presence of large, dense cobbles often led to a shovel test being terminated before two sterile layers were reached. For this reason, shovel testing was not able to determine whether artifacts were present below 18.9 inches (48 cm) below surface. Chiefly, artifacts found in the shovel tests included a number of small- to large-sized flakes, though a biface and the distal tip of a biface were also encountered subsurface. The number of artifacts in each shovel test ranged from less than five to more than 100. The majority of the shovel tests encountered more than ten artifacts. On the surface, artifact density was greatest in the uplands, above the creeks, and between the 790- to 810-ft contour lines.

Within the project area, 28 shovel tests were excavated (Appendix A). Typically shovel tests revealed a dark brown, dark yellowish brown, dark grayish brown, or black clay, or clay loam. In several areas of the site, however, soils were of a markedly different, dark to light reddish brown hue. The common component to all of these soils was the presence of natural chert cobbles, which ranged from small- to very large-sized (some more than 19.7 inches (50 cm) in diameter). Most of these were medium- to very large-sized, and often so densely packed that they were impenetrable. Twenty-three shovel tests were positive for cultural material. One negative shovel test (KH7) was in a cleared field and contained no cobbles. The presence of a Farmall tractor with a sapling growing through it suggested the field had not only been cleared, but plowed in the past. A large area in the western portion of the field contained a concentration of cobbles that may have been the result of removing them from the field. Another negative shovel test (JS8) was placed in the vicinity of surficial lithic artifacts, but bedrock was encountered at 0.8 inch (2 cm) below surface. Finally, three shovel tests in the central southern area of the site were negative for cultural resources (KH27, KH28, and NA5).

Six backhoe trenches were excavated during survey and three more were excavated during data recovery to try and locate intact features (Appendix B). Backhoe Trench 3 (BHT 3) was the only one during survey that did not contain cultural material. During data recovery, BHT 7 was also negative. BHTs 8 and 9 did not reveal features, so based on the density of cultural material as revealed in a column sample of BHT 6 during survey, the decision was made to excavate a 1-by-1-m unit nearby (EU 1). A

second unit was placed in the northeastern portion of the project area that was inaccessible by the backhoe (EU 2).

Excavation Unit 1

EU 1 was situated 43.3 ft (13.2 m) northeast of BHT 6, where a column sample had been excavated along the east wall of the trench during the survey phase (Figure 10; Appendix C). The column sample was placed and excavated to 23.6 inches (60 cm) below surface in 3.9-inch (10-cm) levels. A total of 242 pieces of debitage, 305 FCR, a bone fragment, and a marine shell fragment was documented throughout the column sample, with the greatest quantity encountered in Level 3, which was from 7.9 to 11.8 inches (20 to 30 cm) below surface. The artifact distribution was similar to that revealed in EU 1 (Appendix D).

EU 1 was a 1-by-1-m unit that was excavated in 3.9-inch (10-cm) levels, except for Level 9, which was only 2 inches (5 cm) thick. The amount of artifacts in the first three levels triggered some changes in field strategy. Instead of field sorting the lithic artifacts, all were bagged together in the field and then washed and sorted in the Pape-Dawson Cultural Resources Laboratory. The other adjustment made was to only excavate the southern half of Levels 7, 8, and 9 in EU 1, meaning an area 1.6 by 3.3 ft (50 by 100 cm) was excavated. This change was based on the limited amount of remaining field time and the desire to reach bedrock or sterile strata. Using this strategy, EU 1 was terminated at bedrock 2.8 ft (85 cm) below surface.

A total of 3,797 ecofacts and artifacts were recovered from EU 1 (see Appendices E and F). Four charcoal samples were collected from Levels 3 through 6, and two were radiocarbon dated. Faunal bone was also encountered in Levels 3 through 6, and one marine shell specimen was in Level 2. Secondary flakes were the most common form of debitage by weight, and FCR was noted throughout the unit. All tools were limited to Levels 3 through 6, except two bifaces that were in Level 2. Notably, nine blades were encountered in Level 3, and one fragment of ground stone was in Level 4.

Excavation Unit 2

EU 2 was situated 13.5 ft (4.12 m) northeast of the projectile point that was collected during the survey from the surface, and 23.4 ft (7.13 m) northwest of ST 27. The artifact density was much lower than that encountered in EU 1, and no faunal bone, charcoal, or shell was in EU 2 (see Appendices E and F). A total of 219 artifacts were recovered from EU 2, which was a 1-by-1-m unit that was excavated in 3.9-inch (10-cm) levels. Within Level 2, a number of larger limestone and chert cobbles were encountered, pedestalled, and mapped. The cobbles were mainly oriented in a southwest to northeast manner, but there was another cluster in the northwestern corner of the unit. Some of the stones in the southeastern corner overlapped each other and appeared to form a feature; however, when bisected in Level 3, most of the rocks had not been modified, only a few were FCR, and since there was not another layer of cobbles beneath, the cluster of stones was not designated a feature. EU2 was terminated at 11.8 inches (30 cm) below surface when field time expired. Consequently, the depth of deposits is not known, but based on the increasingly reddish brown color of the sediment in Level 3 of EU2, bedrock was thought to be within about 7.9 inches (20 cm).

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The amount of FCR and debitage from the top three levels of EU 1 can be used to compare with the results at EU 2. In an attempt to be equitable, the assemblage from Level 3 of EU 1 was halved, which assumes there was an even distribution of artifacts throughout Level 3. In this manner, total of 183 FCR weighing 9,375 g was in Levels 1 through 3 in EU 1. In comparison, only 28 FCR weighing 2,840 g was in EU 2.

Debitage weight, however, was inversely related between the units. A total of 1,509.23 g of debitage was recovered in Levels 1 through 3 in EU 1, while 1,749.49 g was in EU 2. To be fair, the weight of 7 pieces of debitage from Level 1 in EU 1 was not recorded before the artifacts were inadvertently discarded, but they probably represent less than 20 g. The varying distribution of FCR and debitage may indicate a less intensive occupation on the east side of Elm Creek. It may also be interpreted as indicating a preference for conducting flintknapping activities to the east of the creek. Additionally, the site formation processes—which were not investigated during the data recovery—may have affected the locations of the excavation units differently based on where they are situated in relation to the confluence of the creeks, resulting in varying degrees of sediment deposition and site preservation.

Assemblage

A total of 3,850 artifacts and 203 ecofacts (including 85 pieces of charcoal) was recovered from site 41BX2131 during data recovery investigations. The assemblage consists of faunal bone, shell, debitage, FCR, bifaces, blades, flake tools, cores, ground stone, and a projectile point. Bone, charcoal, and lithic tools were only encountered in Levels 3 through 6 of EU 1, but debitage and FCR were throughout both excavation units. Although only the southern half of Levels 7 through 9 in EU1 were excavated, the amount of debitage and FCR was proportionally equal to or exceeded what was recorded in the upper levels. The greatest quantities of debitage were in Levels 2 and 3 of EU 1, at 1,133.84 grams (g) and 1,136.69 g, respectively; however, the debitage in the southern half of Level 9 (which was only 5 cm thick) was 874.28 g.

Ecofacts

Marine Shell

A burned fragment of a marine shell was recovered in Level 2 of EU 1, and it is the only specimen from site 41BX2131 (Appendix E).

Charcoal

Charcoal fragments were recovered in EU 1 from Levels 3 through 6 (7.9 to 23.6 inches [20 to 60 cm] below surface) (see Appendix E). Level 6 (19.7 to 23.6 inches [50 to 60 cm] below surface) contained the most charcoal by weight with 6.91 grams (see Appendix D). Many of the 21 pieces of charcoal from Level 6 are large enough that identifying the type of tree used for fuel may be possible. Two charcoal samples (one each from Levels 3 and 6) were submitted for radiocarbon dating. The sample from Level 3 was radiocarbon dated to 903±37 B.P. (D-AMS 016005) (2-sigma calibrated age estimate of A.D. 1035 to 1211,

with a median probability of A.D. 1119). The other radiocarbon date from the same unit, but 12 inches (30 centimeters [cm]) below, was 1090±32 B.P. (D-AMS 016006) (2-sigma calibrated age estimate of A.D. 892 to 1015, with a median probability of A.D. 953), demonstrating that the preserved occupation at site 41BX2131 is limited to a 166- to 319-year interval during the transition between the Archaic and Late Prehistoric periods.

Faunal Bone

Faunal bone fragments were recovered exclusively in EU 1 and only from Levels 3 through 6 (7.9 to 23.6 inches [20 to 60 cm] below surface) (see Appendix E and Appendix F). Level 3 (7.9 to 11.8 inches [20 to 30 cm] below surface) contained the most bone by quantity and by weight with 63 fragments weighing 127.99 grams (see Appendices D and F). Of the 101 pieces of bone collected from EU 1, 82 fragments of bone were not diagnostic, with 7 of these having been burned.

Two conjoining fragments of an ungulate cheek tooth were recovered in Level 3 that are probably from a bison, based on the radiocarbon date associated with this level that predates the introduction of cattle to the New World from Spain (Figure 11). Another tooth fragment from Level 4 conjoins with the two from Level 3 (Figure 11c). An incisor from a medium- to large-sized mammal was also recovered in Level 3.

Ankle bone, long bone, and rib fragments from large mammals such as deer were also in Level 3 (Figure 12). Large-mammal long bones were also encountered in Levels 4 and 6 (Figure 13). Level 5 contained a most proximal phalanx and Level 6 had a right metacarpal from a cloven-hooved mammal (see Appendix F).

Figure 11: Bovidae cheek tooth fragments from 41BX2131: a and b) EU 1, Level 3; c and d) EU 1, Level 4. Specimens a, b, and c can be refit.

Figure 12: Large mammal rib fragments from 41BX2131: a-d) EU 1, Level 3.

Figure 13: Large mammal long bone fragments from 41BX2131:
a and b) EU 1, Level 3; c through e) EU 1, Level 4; f) EU 1, Level 6.

Artifacts

Biface

Nineteen bifaces and fragments were encountered during both phases of investigation at site 41BX2131, with 15 of these from data recovery (Figure 14; see Appendix E). Thirteen bifaces were in Levels 2 through 6 in EU 1, while one each was in Levels 1 and 2 in EU 2. Many of these were complete, or nearly complete and fragmented, representing both manufacturing errors (see Figure 13 a, b, and e), and breakage during use. For example, Figure 13 (f and g) depicts the proximal ends of bifaces that likely snapped while hafted. Some biface examples were thicker than most, and may have been manufacturing failures that resisted being thinned further (see Figure 13 c), or may be preforms (Figure 15).

Figure 14: Bifaces from 41BX2131: a) EU 1, Level 2; b) EU 1, Level 5; c) Surface near ST 6 (JS2); d) ST 6 (JS2), Level 3; e) EU 1, Level 3; f) EU 1, Level 4; g) EU 1, Level 2.

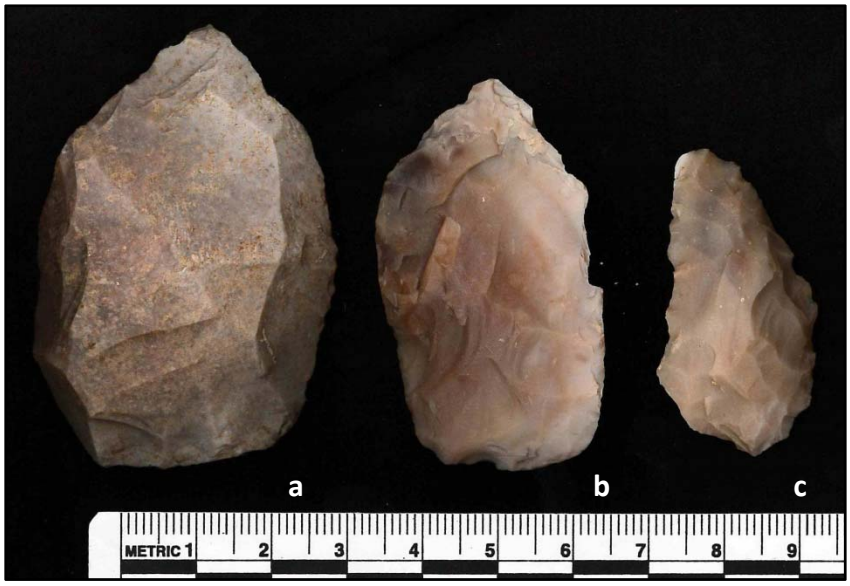

Figure 15: Biface preforms from 41BX2131: a) EU 1, Level 4; b) and c) EU 1, Level 6.

Dart Point

As mentioned, a fragmented Frio projectile point was found during survey on the surface in the northeastern portion of the project area (Figure 16:b). The distal tip has been snapped, probably from an impact, and both lateral edges are serrated. One barb has also been broken. The projectile point also resembles an Ensor, another Transitional Archaic dart point, because the notches are oriented more to the side than aligned with the corner, but this variation is also within the parameters of the Frio type description (Turner and Hester 1999). The concave base and the prominence of the barb, however, push the projectile toward the Frio end of the Frio-Ensor spectrum. It does not appear to have been reused after it was discarded.

A second Frio projectile point was encountered in EU 1 at about 11.8 inches (30 cm) below surface, and radiocarbon dated to 903±37 B.P. (D-AMS 016005) (2-sigma calibrated age estimate of A.D. 1035 to 1211, with a median probability of A.D. 1119) (Figure 16:a; Appendix G; see Appendix D). The generally accepted time range for Frio points is within the Transitional Archaic period at 200 B.C. to A.D. 600 or later (Turner and Hester 1999:122); in this case, up to 500 years later. One possibility is that the Frio point from EU 1 was encountered by occupants during the Late Prehistoric, collected, resharpened, and discarded at the site, but was not originally manufactured there. The aesthetic quality of the chert would have probably drawn attention to the discarded artifact (see Figure 16:a).

One other radiocarbon date from EU 1, but 12 inches (30 centimeters [cm]) below the projectile point, was 1090±32 B.P. (D-AMS 016006) (2-sigma calibrated age estimate of A.D. 892 to 1015, with a median probability of A.D. 953), demonstrating that the preserved occupation at site 41BX2131 may be limited to a 166- to 319-year interval during the Transitional Archaic and Late Prehistoric periods. Despite the presence of bison remains and two radiocarbon assays results falling within the generally accepted

Figure 16: Both sides of Frio Projectile Points from Level 3 in EU 1 (a), and from the surface near EU 2 (b).

range of the Late Prehistoric period (1,200 B.P. to 250 B.P.), no pottery or Perdiz projectile points—which would be indicative of a Toyah-Phase occupation—were encountered at the site 41BX2131.

Ground Stone

One piece of ground stone was encountered at the site 41BX2131 in EU 1, Level 4 (Figure 17; see Appendix E). The fragment from the unit was very small, but retained the characteristic smooth surface along one edge.

Figure 17: Ground stone fragment from EU 1, Level 4.

Blade

A total of 10 blades were documented during data recovery excavations at the site 41BX2131 (see Appendix E). One specimen was in EU 2 at Level 2, and the remainder was from Level 3 in EU 1 (Figure 18). The blades were manufactured from a variety of differently colored chert.

Figure 18: Blades from 41BX2131; all were recovered from EU 1, Level 3, except c), which was from EU 2, Level 2.

Flake Tool

Nine flake tools were documented during mitigation at the site 41BX2131 (see Appendix E). Three specimens each were in EU 1 at Levels 3 and 4, while one other was from Level 1 in EU 2, and two more were in Level 2 in EU 2. All three of the specimens from Level 3 of EU 1 retain some cortex. The largest flake tool appears to have been manufactured as a hand axe (Figure 19:a). Similarly, the flake tools from

Figure 19: Hand Axes from 41BX2131; a) EU 1, Level 3; b) EU 1, Level 4.

Level 4 in EU 1 and Level 2 in EU 2 each retain a small amount of cortex. One specimen from Level 4 in EU 1 also appears to have been manufactured as a hand axe (Figure 19:b).

Debitage

Debitage was encountered throughout the two excavation units during data recovery (see Table 3 and Appendix E). Tertiary flakes were the most abundant sub-group at 1,900, suggesting that finished tools were being manufactured or resharpened at the site. By weight, however, secondary flakes and shatter were equally more common than tertiary flakes. Secondary flakes were documented in every level except Level 1 in EU 1, totaled 504, and weighed 2,456.65 g. Conversely, shatter was documented in every level except Level 9 in EU 1, totaled 409, and weighed 2,426.51 g. Finally, 114 primary flakes weighing 323.7 g were distributed throughout all but three levels: Levels 1 in EU 1, and Levels 2 and 3 in EU 2. Based on these distributions, less initial-stage flint knapping was occurring at site 41BX2131, and more final-stage tool making or retouching was common.

Cores

Two cores were documented during mitigation at the site 41BX2131, and both are from Level 2 in EU 2 (see Appendix E). They are multi-directional flake cores. Despite the presence of blades in the assemblage, no unidirectional cores were encountered.

Fire-Cracked Rock

FCR was recovered from all levels of both excavation units (Appendix H). In EU 1, the highest concentration by weight of FCR was in Level 4. FCR with a diameter less than 2 inches (5 cm) was the most common with 696 pieces. However, the FCR with a diameter between 2 and 3.9 inches (5 and 10 cm) weighed more than double (23.35 kilograms [kg] versus 10.64 kg). FCR is one of the major artifact classes in central Texas archaeology because they were commonly used as thermal elements in earth ovens. Large slabs or cobbles were preferred when available, but as the rocks were used repeatedly, they fractured from prolonged exposure to heat. Thus, over time the size of the burned rock diminished until they were no longer efficient at holding heat.

Summary and Recommendations

At the request of Matiraan, Ltd., Pape-Dawson conducted an intensive archaeological survey and data recovery investigations using 28 shovel tests, 9 backhoe trenches, and 2 excavation units within the proposed 37-acre (15-hectare [ha]) Casa Bella Estates residential development in compliance with the Historic Preservation and Design Section (Article 6 35-360 to 35-634) of the City of San Antonio (COSA) Unified Development Code (UDC).

The project area is at the confluence of Mud, Elm, and Elm Waterhole Creeks in northern Bexar County, about 1.40 miles (2.25 kilometers [km]) southwest of the intersection of Bulverde Road and Loop 1604. The irregularly shaped project area straddles an existing driveway that provides access to Jones Maltsberger Road. The investigations included a cultural resources background literature and records review and an intensive survey with mechanical trenching, followed by data recovery mitigation. Archaeologists exceeded the minimum CTA/THC archaeological survey standards, which require a ratio

of 1 shovel test per 2 acres for a 37-acre (15-ha) project area. Data recovery involved the excavation of three additional backhoe trenches and two 1-by-1-meter, hand-excavated units.

Based on the Archaeological Report Guidelines of the SA-OHP, cultural resources were evaluated according to the criteria in 36 CFR 60.4 and in 13 TAC 26.10. The purpose of the investigations was to identify all historic or prehistoric cultural resources located within the project area and to evaluate the significance and eligibility of identified resources for inclusion to the NRHP or for designation as an SAL. All work was done in accordance with the archaeological survey standards and guidelines as developed by the CTA and adopted by the THC.

One diagnostic projectile point, a Frio, was encountered in an excavation unit, and radiocarbon dated to 903±37 B.P. (D-AMS 016005) (2-sigma calibrated age estimate of A.D. 1035 to 1211, with a median probability of A.D. 1119). The generally accepted time range for Frio points is within the Transitional Archaic period at 200 B.C. to A.D. 600 or later (Turner and Hester 1999:122); in this case, more than 500 years later. One other radiocarbon date from the same unit, but 12 inches (30 centimeters [cm]) below the projectile point, was 1090±32 B.P. (D-AMS 016006) (2-sigma calibrated age estimate of A.D. 892 to 1015, with a median probability of A.D. 953), demonstrating that the preserved occupation at site 41BX2131 is limited to a 166- to 319-year interval during the transition between the Transitional Archaic and Late Prehistoric periods. No pottery or arrow points typical of the Late Prehistoric period were encountered at site 41BX2131; however, the radiocarbon results situate the site within the early portion of the Late Prehistoric period.

The many tested cobbles and large flakes present on the surface indicate that initial reduction took place here. Several preforms and bifaces noted on the surface, and the small size of many tertiary flakes from the data recovery also suggest more detailed work occurred. The actual borders of the site were not discovered, as they extend beyond the project area. The site has likely been destroyed by the surrounding urban development and associated infrastructure construction. Disturbances within the project area include vehicle trails, a sewage line, artifacts taken from the surface by prior owners, and erosion near the drainages.

Project records and photographs will be curated at the Center for Archaeological Studies (CAS) at Texas State University in San Marcos, while artifacts will be returned to the landowner. Based on the results of the investigations, intact archaeological deposits that maximally span than about 300 years of occupation were documented at the site, including faunal bone and charcoal in the assemblage. Pape-Dawson archaeologists recommend that site 41BX2131 is eligible for inclusion to the NRHP and for designation as an SAL. No further work is recommended, as site 41BX2131 was mitigated through detailed hand-excavations.

If human remains are encountered during construction, Pape-Dawson recommends that all work in the immediate area should cease and the appropriate agencies be contacted for guidance.

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Appendix A

Shovel Test Table

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
NA1	1	41BX2131	1	0–10	**P**	10YR4/3	brown	clay loam	**4 flakes**	many roots, large cobbles	On rise adjacent to small drainage.
			2	10–20	**P**	10YR4/3	brown	clay loam	**2 flakes, 2 pieces of shatter**	many roots, large cobbles	–
			3	20–30	**P**	7.5YR2.5/2	very dark brown	clay	**3 flakes**	many roots, large cobbles	–
			4	30–40	N	7.5YR2.5/2	very dark brown	clay	–	many roots, large cobbles	Terminated at impassable cobbles.
KH3	2	41BX2131	1	0–10	**P**	10YR2/2	very dark brown	clay	**3 tertiary flakes, 3 secondary flakes**	many roots; many small and large limestone and chert cobbles	30 m from KH1 overlooking drainage; live oaks, persimmons, and juniper.
			2	10–20	**P**	10YR2/2	very dark brown	clay	**1 large flake, 2 large pieces of shatter**	many roots; many small and large limestone and chert cobbles	–
			3	20–30	N	10YR2/2	very dark brown	clay	–	many roots; many small and large limestone and chert cobbles	–
			4	30–40	N	10YR2/2	very dark brown	clay	–	many roots; many small and large limestone and chert cobbles	Terminated after two sterile levels.
KH2	3	41BX2131	1	0–10	**P**	10YR4/3	brown	clay	**5 tertiary flakes, 1 secondary flake**	few rootlets	10 m east of road; 30 m west of KH1; juniper and oaks with thick understory.
			2	10–20	**P**	10YR4/4	dark yellowish brown	clay	**3 tertiary flakes, 1 secondary flake**	roots	–
			3	20–30	**P**	10YR4/4	dark yellowish brown	clay	**3 tertiary flakes, 1 piece of shatter**	few rootlets	–
			4	30–40	**P**	10YR4/4	dark yellowish brown	clay	**1 tertiary flake**	few rootlets	–
			5	40–50	**P**	10YR4/4	dark yellowish brown	clay	**1 biface fragment**	few rootlets; small limestone pebbles	Dart point fragment recovered from 48 cmbs.
			6	50–60	N	10YR4/4	dark yellowish brown	clay	–	few rootlets; small limestone pebbles	–
			7	60–70	N	10YR4/4	dark yellowish brown	clay	–	few rootlets; small limestone pebbles	Terminated after two sterile levels.
KH1	4	41BX2131	1	0–10	N	10YR4/3	brown	clay	–	few roots; limestone and chert cobbles	East on road; juniper and oaks with thick understory.
			2	10–20	**P**	10YR4/3	brown	clay	**3 tertiary chert flakes**	common roots; limestone and chert cobbles	–
			3	20–30	**P**	10YR4/3	brown	clay	**2 tertiary flakes, 1 piece of shatter, 1 biface fragment**	common roots; limestone and chert cobbles	–
			4	30–40	**P**	10YR5/4	yellowish brown	clay	**2 primary flakes, 4 tertiary flakes, 1 piece of shatter**	large limestone cobbles; degraded limestone bedrock	Terminated due to bedrock.

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
JS1	5	41BX2131	1	0–10	**P**	10YR2/1	black	clay	**11 flakes, 2 FCR, 1 piece of shatter**	common subrounded limestone pebbles and gravels; common roots and organics; common $CaCO_3$ flecking	Gentle slope with mature cedars, oaks, and grasses; ASV 40%.
			2	10–20	**P**	10YR2/1	black	clay	**8 flakes, 1 FCR, 1 piece of shatter**	common subrounded limestone pebbles and gravels; common roots and organics; common $CaCO_3$ flecking	–
			3	20–30	**P**	10YR4/3	brown	clay	**7 flakes, 2 pieces of shatter**	common to many subrounded limestone pebbles and gravels; common to many $CaCO_3$ flecks	–
			4	30–40	N	10YR4/3	brown	clay	–	common to many subrounded limestone pebbles and gravels; common to many $CaCO_3$ flecks	–
			5	40–45	N	10YR4/3	brown	clay	–	many subrounded limestone pebbles and gravels; many $CaCO_3$ flecks	Terminated at impassable gravels.
JS2	6	41BX2131	1	0–10	**P**	10YR2/1	black	clay	**4 flakes, 1 piece of shatter**	ommon organics; common roots; few $CaCO_3$ flecks; few subrounded limestone pebbles and gravels	Upland ridge 30 m south of KH1; mature cedars, cedar scrub, oaks, and grasses; ASV 60%.
			2	10–20	**P**	10YR2/1	black	clay	**9 flakes, 2 pieces of shatter, 4 FRC (1 chert and 3 limestone), 1 possible mano**	common organics; common roots; few $CaCO_3$ flecks; few subrounded limestone pebbles and gravels	–
			3	20–30	**P**	10YR2/1	black	clay	**1 biface fragment, 6 flakes, 1 piece of shatter**	few roots; common $CaCO_3$ flecks; common limestone pebbles and gravels; few limestone cobbles	–
			4	30–40	N	10YR3/2	very dark grayish brown	clay	–	many limestone pebbles, gravels, and cobbles	Terminated at limestone bedrock.
JS3	7	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**1 biface fragment, 5 flakes, 1 piece of shatter, 2 FCR (limestone)**	common roots and organics; few $CaCO_3$ flecks; common limestone pebbles and gravels	Upland shoulder ridge 60 m south of KH1; mature cedars, hackberry, scrub brush, and grasses. ASV 40%.
			2	10–20	**P**	10YR3/2	very dark grayish brown	clay	**4 flakes**	common roots and organics; few $CaCO_3$ flecks; common limestone pebbles and gravels	–
			3	20–30	**P**	10YR3/2	very dark grayish brown	clay	**8 flakes, 2 red ocre fragments**	common roots and organics; few $CaCO_3$ flecks; common limestone pebbles and gravels	–
			4	30–40	**P**	10YR3/2	very dark grayish brown	clay	**2 flakes**	common roots; common $CaCO_3$ flecks; common subrounded limestone pebbles, gravels, and cobbles	–
			5	40–45	N	10YR3/2	very dark grayish brown	clay	–	many limestone pebbles, gravels, and cobbles	Terminated at limestone bedrock.

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
NA3	8	41BX2131	1	0–10	**P**	10YR4/4	dark yellowish brown	clay loam	**1 piece of shatter, 1 shotgun shell**	few rabdotus shells	Southwest of bridge on bank of creek.
			2	10–20	**P**	10YR4/4	dark yellowish brown	clay loam	**1 flake**	few large cobbles, few rabdotus shells	–
			3	20–30	**P**	10YR4/4	dark yellowish brown	clay loam	**1 piece of shatter**	few large cobbles, few rabdotus shells	–
			4	30–40	**P**	10YR4/4	dark yellowish brown	clay loam	**1 flake**	many cobbles	–
			5	40–50	N	10YR4/4	dark yellowish brown	clay loam	–	many cobbles	–
			6	50–60	N	10YR4/4	dark yellowish brown	clay loam	–	many cobbles	Terminated at impassable cobbles.
NA2	9	41BX2131	1	0–10	**P**	10YR4/4	dark yellowish brown	clay loam	**16 flakes**	–	On rise between road and drainage.
			2	10–20	**P**	10YR4/4	dark yellowish brown	clay loam	**12 flakes**	–	–
			3	20–30	**P**	10YR4/4	dark yellowish brown	clay loam	**6 flakes**	roots	–
			4	30–40	**P**	10YR4/4	dark yellowish brown	clay loam	**3 flakes, 1 piece of debitage**	many cobbles	–
			5	40–50	**P**	10YR4/4	dark yellowish brown	clay loam	**2 flakes**	many cobbles	Terminated at impassable cobbles.
KH7	10	-	1	0–40	N	10YR2/2	very dark brown	clay	–	few large cobbles	Cleared field with short grasses and onion bulbs; terminated at impassable cobbles.
NA4	11	41BX2131	1	0–10	N	10YR4/4	dark yellowish brown	clay	–	many cobbles	Thick vegetation consisting of persimmons and oaks.
			2	10–20	**P**	10YR4/4	dark yellowish brown	clay	**2 tertiary flakes**	many cobbles	–
			3	20–30	**P**	10YR4/4	dark yellowish brown	clay	**5 tertiary flakes**	many cobbles	–
			4	30–35	N	10YR4/4	dark yellowish brown	clay	–	many cobbles	Terminated at impassable cobbles.
KH8	12	41BX2131	1	0–10	N	10YR2/2	very dark brown	clay	–	many roots; many large cobbles	East of creek and southeast of bridge; live oaks with juniper underbrush.
			2	10–20	**P**	10YR2/2	very dark brown	clay	**4 pieces of debitage**	many large cobbles	Terminated at impassable cobbles.
KH15	13	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**36 flakes, 8 FCR**	common roots and rootlets, common limestone gravels and cobbles	Upland setting with cedars and oaks.
			2	10–20	**P**	10YR3/2	very dark grayish brown	clay	**1 biface fragment, 33 flakes, 21 FCR**	common roots and rootlets, common limestone gravels and cobbles	–
			3	20–30	**P**	10YR3/2	very dark grayish brown	clay	**10 flakes, 2 FCR**	common roots and rootlets, many limestone cobbles	Terminated at impassable limestone cobbles.

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
JS5	14	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**2 flakes, 3 pieces of shatter**	many subrounded limestone gravels and cobbles; common rootlets; few roots	Clearing with tall grasses and prickly pear cacti; ASV 10%.
			2	10–20	N	10YR3/2	very dark grayish brown	clay	–	many subrounded limestone gravels and cobbles; common rootlets; few roots	–
			3	20–25	N	10YR3/2	very dark grayish brown	clay	–	many subrounded limestone gravels and cobbles; common rootlets; few roots	Terminated at impassable limestone cobbles.
KH27	15	41BX2131	1-3	0-25	N	10YR2/2	very dark brown	clay	none	many cobbles, from small to very large	Large Live Oak trees and underbrush near cleared path
NA5	16	41BX2131	1-3	0-25	N	10YR2/1	black	clay	none	many cobbles	Terminated at impassable cobbles.
KH28	17	41BX2131	1-3	0-25	N	10YR2/1	black	clay	none	impenetrable large cobbles at 25 cmbs	Large Live Oak trees and underbrush near cleared path
KH9	18	41BX2131	1	0–10	N	10YR2/2	very dark brown	loamy clay	–	many roots; many small to medium size cobbles	Terrace above drainage; live oaks and hackberry.
			2	10–20	**P**	10YR2/2	very dark brown	loamy clay	**3 tertiary flakes**	many small to medium size cobbles	–
			3	20–30	**P**	10YR2/2	very dark brown	loamy clay	**2 tertiary flakes**	many small to medium size cobbles	–
			4	30–40	**P**	10YR2/2	very dark brown	loamy clay	**1 tertiary flake**	many small to medium size cobbles	–
			5	40–50	N	10YR2/2	very dark brown	loamy clay	–	many small to medium size cobbles	Terminated at impassable cobbles.
JS4	19	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**15 flakes, 1 FCR (chert), 2 pieces of shatter**	common roots and rootlets; many angular limestone gravels and cobbles	Upland ridge with dense oak scrub, cacti, and grasses; 12 m west of fence; ASV 10%.
			2	10–20	**P**	10YR3/2	very dark grayish brown	clay	**4 flakes, 3 FCR (chert), 2 pieces of shatter**	common roots and rootlets; many angular limestone gravels and cobbles	–
			3	20–30	**P**	10YR2/1	black	clay	**4 flakes, 1 FCR (chert), 4 pieces of shatter**	few to common roots; few to common angular limestone gravels	–
			4	30–40	**P**	10YR2/1	black	clay	**3 flakes, 1 FCR (chert)**	few to common roots; few to common angular limestone gravels; many limestone cobbles	Terminated at impassable limestone cobbles.
KH10	20	41BX2131	1	0–10	**P**	10YR2/2	very dark brown	loamy clay	**2 tertiary flakes, 3 secondary flakes**	many cobbles and gravels	Oaks and hackberry with prickly pear underbrush.
			2	10–20	**P**	10YR2/2	very dark brown	loamy clay	**4 tertiary flakes, 2 secondary flakes, 1 piece of shatter**	many cobbles and gravels	–
			3	20–30	**P**	10YR2/2	very dark brown	loamy clay	**4 tertiary flakes, 3 secondary flakes**	many cobbles and gravels	Terminated at compact, gravelly soils.

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
KH11	21	41BX2131	1	0–10	**P**	10YR2/2	very dark brown	loamy clay	**2 tertiary flakes**	50% cobbles	15–20 m south of building; oaks, juniper, hackberry, and prickly pear cacti.
			2	10–20	**P**	10YR2/2	very dark brown	loamy clay	**2 tertiary flakes, 2 pieces of shatter, 1 large tested cobble**	50% cobbles	One large tested cobble recovered between levels 1 and 2.
			3	20–30	**P**	10YR2/2	very dark brown	loamy clay	**2 tertiary flakes**	50% cobbles	Terminated at impassable cobbles.
JS6	22	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**5 flakes**	many subangular chert gravels and cobbles; common rootlets; common organics	Oaks and cedars with scrub brush and cacti; ASV 70%.
			2	10–20	N	5YR3/4	dark reddish brown	clay	–	common rootlets; common subangular chert gravels	–
			3	20–30	N	5YR3/4	dark reddish brown	clay	–	common rootlets; common subangular chert gravels	–
			4	30–35	N	5YR3/4	dark reddish brown	clay	–	common rootlets; common subangular chert gravels	Terminated at basal clay.
KH12	23	41BX2131	1	0–10	**P**	2.5YR2.5/4	dark reddish brown	loamy clay	**4 tertiary flakes, 1 secondary flake**	many gravels and cobbles	Persimmons, hackberry, oaks, juniper, cacti, and abundant tall grasses.
			2	10–20	**P**	2.5YR2.5/4	dark reddish brown	loamy clay	**3 tertiary flakes**	many gravels and cobbles	Terminated at impassable cobbles.
JS7	24	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**5 tertiary flakes**	common roots; common limestone cobbles	Cedars, hackberry, scrub brush, grasses, and cacti; ASV 50%.
			2	10–20	**P**	10YR3/2	very dark grayish brown	clay	**5 tertiary flakes, 1 piece of shatter**	common roots; common limestone cobbles	–
			3	20–30	**P**	10YR3/2	very dark grayish brown	clay	**2 secondary flakes, 1 tertiary flake**	common roots; common limestone cobbles	–
			4	30–40	N	5YR3/4	dark reddish brown	clay	–	common roots and rootlets	Clay becomes very dense.
			5	40–50	N	5YR3/4	dark reddish brown	clay	–	common roots and rootlets	Terminated at impassable limestone cobbles.
KH13	25	41BX2131	1	0–10	**P**	10YR2/2	very dark brown	loamy clay	**3 tertiary flakes, 1 tested cobble**	many red gravels, few chert gravels	Near drainage with junipers and oaks.
			2	10–20	**P**	10YR2/2	very dark brown	loamy clay	**4 tertiary flakes, 1 tested cobble**	many red gravels, few chert gravels	Terminated at impassable gravels.
JS8	26	41BX2131	1	0–2	N	10YR3/2	very dark grayish brown	clay	–	few rootlets	Cedar woods 20 m south of fence line; ASV 70%; tested cobbles, flakes, and bifaces on surface; terminated at limestone bedrock.

Table A-1. Shovel Test Results of Survey at 41BX2131

Field Test #	Site ST #	Site	Level	Depth (cmbs)	Pos (P) Neg (N)	Munsell	Soil Color	Soil Texture	Artifacts	Inclusions	Comments/Reason for Termination
JS9	27	41BX2131	1	0–10	**P**	10YR3/2	very dark grayish brown	clay	**15 flakes, 3 FCR (chert), 7 pieces of shatter**	common limestone gravels and cobbles; common roots and rootlets	Cedar and oak woods with scrub brush and grasses; 13 m east of fence; ASV 30%.
			2	10–20	**P**	10YR3/2	very dark grayish brown	clay	**11 flakes, 1 FCR (chert), 4 pieces of shatter**	common limestone gravels and cobbles; common roots and rootlets	–
			3	20–25	**P**	10YR3/2	very dark grayish brown	clay	**2 flakes**	many limestone gravels and cobbles; common roots and rootlets	Terminated at impassable limestone cobbles.
KH14	28	41BX2131	1	0–10	**P**	10YR2/2	very dark brown	clay	**2 tertiary flakes, 1 piece of shatter**	common roots, many cobbles	Upland setting with juniper, oaks, and hackberry.
			2	10–20	**P**	10YR2/2	very dark brown	clay	**5 tertiary flakes, 1 piece of shatter**	common roots, many cobbles	–
			3	20–30	**P**	10YR2/2	very dark brown	clay	**2 tertiary flakes, 1 secondary flake, 1 primary flake, 2 pieces of shatter**	common roots, many cobbles	Terminated at impassable cobbles.

Appendix B

Backhoe Trench Table

Table B-1. Backhoe Trench Table

Trench	Depth (cmbs)	Neg (N) Pos (P)	Munsell	Soil Color	Soil Texture Description	Structure	Inclusions	Lower Boundary	Comments
1	0-30	**P**	10YR2/1	Black	silty clay loam	Medium	roots and rootlets; **shatter and fire cracked rock (FCR)** throughout north wall profile and **lithic flake tool** in south wall profile at interface with Zone II	Diffuse	oriented east to west; 0.75 m long; 1 m wide;
	30-60	**P**	10YR3/4	Dark Yellowish Brown	silty clay loam	Medium	**lithic flake tool** in south wall profile at interface with Zone III	Diffuse	none
	60-90	N	10YR3/6	Dark Yellowish Brown	sandy clay loam	Medium	10YR4/6 sandy clay loam mottles	Unknown	terminated at degrading bedrock marl
2	0-40	**P**	10YR2/1	Black	silty clay loam	Thick	roots and rootlets; **biface**	Diffuse	oriented east to west;2.1 m long; 1 m wide; upslope from BHT 1
	40-75	N	10YR3/4	Dark Yellowish Brown	silty clay loam	Thick	none	Clear	none
	75-150	N	10YR3/6	Dark Yellowish Brown	sandy clay loam	Thick	10YR4/6 sandy clay loam mottles	Unknown	terminated at degrading bedrock marl
3	0-20	N	10YR2/2	Very Dark Brown	silty clay loam	Medium	roots and rootlets	Diffuse	oriented east to west; 2.3 m long; 1 m wide; north of BHT 2
	20-75	N	10YR3/4	Dark Yellowish Brown	sand	Thick	none	Diffuse	none
	75-100	N	10YR3/6	Dark Yellowish Brown	clay	Medium	10YR4/6 sandy clay loam mottles	Unknown	terminated at degrading bedrock marl
4	0-30	**P**	10YR2/1	Black	clay	Medium	roots and rootlets; **FCR and debitage**	Abrupt	oriented east to west; 2.45 m long; 1 m wide
	30-55	**P**	10YR8/3	Very Pale Brown	sandy clay loam	Medium	mottled with 10YR7/4; natural cobbles; **FCR and debitage**	Unknown	terminated at degrading bedrock marl
5	0-75	**P**	10YR2/1	Black	clay loam	Thick	roots and rootlets; **FCR and debitage**	Abrupt	oriented east to west; 2 m long; 1 m wide
	75-95	**P**	10YR3/4	Dark Yellowish Brown	silty clay loam	Medium	**FCR and debitage**	Unknown	terminated at depth
6	0-50	**P**	10YR2/1	Black	silty clay loam	Thick	roots and rootlets; limestone cobbles and gravel; **FCR and debitage**	Abrupt	oriented north to south; 2.1 m long; 1 m wide
	50-80	**P**	10YR3/4	Dark Yellowish Brown	silty clay loam	Medium	**FCR and debitage**	Unknown	terminated at depth
7	0-40	N	5YR3/3	Dark Reddish Brown	clay loam	Thick	roots and rootlets; 50% 10-15-cm diameter limestone cobbles and 0-5-cm diameter gravel	Abrupt	oriented north to south 3 m long; 1.5 m wide
	40-100	N	5YR6/4	Light Reddish Brown	clay	Thick	75% unsorted limestone cobbles (from boulders to 0-5-cm diameter)	Unknown	terminated at depth

Table B-1. Backhoe Trench Table

Trench	Depth (cmbs)	Neg (N) Pos (P)	Munsell	Soil Color	Soil Texture Description	Structure	Inclusions	Lower Boundary	Comments
8	0-30	**P**	10YR2/1	Black	clay loam	Medium	roots and rootlets; 20% 0-5-cm diameter limestone cobbles; **FCR and debitage**	Abrupt	oriented north-northwest to south southeast 3.5 m long; 1.5 m wide
	30-52	**P**	5YR6/4	Light Reddish Brown	clay	Medium	75% unsorted limestone cobbles (from boulders to 0-5-cm diameter); **FCR and debitage**	Unknown	terminated at degrading bedrock marl
9	0-35	**P**	10YR2/1	Black	clay loam	Thick	roots and rootlets; 20% 0-5-cm diameter limestone cobbles; **FCR and debitage**	Abrupt	oriented north-northwest to south southeast; 5 m long; 1.5 m wide
	35-55	**P**	5YR6/4	Light Reddish Brown	clay	Medium	75% unsorted limestone cobbles (from boulders to 0-5-cm diameter); **FCR and debitage**	Unknown	terminated at degrading bedrock marl

Appendix C

Column Sample Table

Table F-1. Trench 6 Column Sample Table

Level	Depth (cmbs)	Neg (N) Pos (P)	Munsell	Soil Color	Soil Texture Description	Inclusions
1	0-10	**P**	10YR2/1	Black	silty clay loam	roots and rootlets; **18 pieces of debitage; 9 fire-cracked rock (FCR)**
2	10-20	**P**	10YR2/1	Black	silty clay loam	**78 pieces of debitage; 59 FCR; 1 bone fragment**
3	20-30	**P**	10YR2/1	Black	silty clay loam	**116 pieces of debitage; 157 FCR; 1 marine shell fragment; charcoal**
4	30-40	**P**	10YR2/1	Black	silty clay loam	**10 pieces of debitage; 44 FCR**
5	40-50	**P**	10YR2/1	Black	silty clay loam	**9 pieces of debitage; 44 FCR**
6	50-60	**P**	10YR3/4	Dark Yellowish Brown	silty clay loam	**11 pieces of debitage; 9 FCR**

Appendix D

Artifact Distribution by Unit and Level

Table D-1. Artifact Distribution by Unit and Level from Data Recovery

Unit	Level	Depth (cmbs)	Primary Flakes		Secondary Flakes		Tertiary Flakes		Shatter		Projectile Point		Bifaces		Blades		Flake Tools		Cores		Ground Stone		FCR		Bone		Shell		Charcoal	
			Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (kg)	Qty	Wt (g)	Qty	Wt (g)	Qty	Wt (g)
EU 1	1	0-10					2		5														14	0.35						
	2	10-20	15	70.29	63	225.94	200	236.66	62	217.88			2	49.20									95	5.60			1	0.20		
	3	20-30	14	15.89	90	491.53	312	345.55	44	280.87	1	6.69	2	20.48	9	27.97	3	393.01					148	6.85	63	127.99			22	2.49
	4	30-40	10	28.64	79	573.67	302	276.07	85	258.31			3	74.79			3	239.81			1	30.82	149	15.80	18	35.42			17	1.94
	5	40-50	17	26.48	63	287.85	235	169.55	30	136.93			2	63.72									100	7.30	14	13.90			25	0.22
	6	50-60	23	48.56	72	230.21	339	326.61	52	93.24			4	34.79									179	6.60	6	26.02			21	6.91
	7*	60-70	17	19.92	63	47.67	235	120.07	30	123.00													92	7.10						
	8*	70-80	8	80.01	33	98.57	147	95.92	31	316.41													54	4.23						
	9*	80-90	7	3.51	8	14.55	51	38.67	11	97.67													15	0.92						
EU 2	1	0-10	3	30.40	23	203.73	57	94.96	57	545.19			1	14.87			1	17.58					6	0.03						
	2	10-20			7	163.47	18	84.99	11	189.03			1	9.79	1	4.20	2	26.55	2	1063.47			18	1.40						
	3**	20-30			3	119.46	2	150.25	2	167.98													4	1.41						

* southern half only

** northern half only

Appendix E

Specimen Inventory

Table E-1. Specimen Inventory of Data Recovery at 41BX2131

Unit No.	Level (10cm)	Depth (cmbs)		Artifact			Ecofact		Comments
				Lithic	FCR	Weight (g)	Qty	Weight (g)	
EU 1	1	0	10		14	350.00			FCR
EU 1	1	0	10	5		not recorded			Shatter
EU 1	1	0	10	2		not recorded			Tertiary Flake
EU 1	2	10	20				1	0.20	Shell
EU 1	2	10	20		95	5,600.00			FCR
EU 1	2	10	20	1		43.38			Biface
EU 1	2	10	20	1		5.82			Biface
EU 1	2	10	20	62		217.88			Shatter
EU 1	2	10	20	15		70.29			Primary Flake
EU 1	2	10	20	63		225.94			Secondary Flake
EU 1	2	10	20	200		236.66			Tertiary Flake
EU 1	3	20	30				63	127.99	Bone
EU 1	3	20	30				22	2.49	Charcoal
EU 1	3	20	30		148	6,850.00			FCR
EU 1	3	20	30	1		6.69			Projectile Point
EU 1	3	20	30	1		15.79			Biface
EU 1	3	20	30	1		4.99			Biface
EU 1	3	20	30	1		278.62			Flake Tool
EU 1	3	20	30	1		74.78			Flake Tool
EU 1	3	20	30	1		39.61			Flake Tool
EU 1	3	20	30	1		8.98			Blade
EU 1	3	20	30	1		7.78			Blade
EU 1	3	20	30	1		3.26			Blade
EU 1	3	20	30	1		2.09			Blade
EU 1	3	20	30	1		1.95			Blade
EU 1	3	20	30	1		1.55			Blade
EU 1	3	20	30	1		1.10			Blade
EU 1	3	20	30	1		0.96			Blade
EU 1	3	20	30	1		0.30			Blade
EU 1	3	20	30	44		280.87			Shatter
EU 1	3	20	30	14		15.89			Primary Flake
EU 1	3	20	30	90		491.53			Secondary Flake
EU 1	3	20	30	312		345.55			Tertiary Flake
EU 1	4	30	40				18	35.42	Bone
EU 1	4	30	40				17	1.94	Charcoal
EU 1	4	30	40		149	15,800.00			FCR
EU 1	4	30	40	1		45.02			Biface
EU 1	4	30	40	1		13.00			Biface
EU 1	4	30	40	1		16.77			Biface
EU 1	4	30	40	1		143.12			Flake Tool

Table E-1. Specimen Inventory of Data Recovery at 41BX2131

Unit No.	Level (10cm)	Depth (cmbs)		Artifact			Ecofact		Comments
				Lithic	FCR	Weight (g)	Qty	Weight (g)	
EU 1	4	30	40	1		95.97			Flake Tool
EU 1	4	30	40	1		0.72			Flake Tool
EU 1	4	30	40	85		258.31			Shatter
EU 1	4	30	40	10		28.64			Primary Flake
EU 1	4	30	40	79		573.67			Secondary Flake
EU 1	4	30	40	302		276.07			Tertiary Flake
EU 1	4	30	40	1		30.82			Ground Stone
EU 1	5	40	50				14	13.90	Bone
EU 1	5	40	50				25	0.22	Charcoal
EU 1	5	40	50				1	0.43	Shell
EU 1	5	40	50		100	7,300.00			FCR
EU 1	5	40	50	1		42.74			Biface
EU 1	5	40	50	1		20.98			Biface
EU 1	5	40	50	30		136.93			Shatter
EU 1	5	40	50	17		26.48			Primary Flake
EU 1	5	40	50	63		287.85			Secondary Flake
EU 1	5	40	50	235		169.55			Tertiary Flake
EU 1	6	50	60				6	26.02	Bone
EU 1	6	50	60				21	6.91	Charcoal
EU 1	6	50	60		179	6,600.00			FCR
EU 1	6	50	60	1		17.53			Biface
EU 1	6	50	60	1		7.94			Biface
EU 1	6	50	60	1		5.29			Biface
EU 1	6	50	60	1		4.03			Biface
EU 1	6	50	60	52		93.24			Shatter
EU 1	6	50	60	23		48.56			Primary Flake
EU 1	6	50	60	72		230.21			Secondary Flake
EU 1	6	50	60	339		326.61			Tertiary Flake
EU 1	7	60	70				15	0.47	Charcoal
EU 1	7	60	70		92	7,100.00			FCR
EU 1	7	60	70	30		123.00			Shatter
EU 1	7	60	70	17		19.92			Primary Flake
EU 1	7	60	70	63		47.67			Secondary Flake
EU 1	7	60	70	235		120.07			Tertiary Flake
EU 1	8	70	80		54	4,230.00			FCR
EU 1	8	70	80	31		316.41			Shatter
EU 1	8	70	80	8		80.01			Primary Flake
EU 1	8	70	80	33		98.57			Secondary Flake
EU 1	8	70	80	147		95.92			Tertiary Flake

Table E-1. Specimen Inventory of Data Recovery at 41BX2131

Unit No.	Level (10cm)	Depth (cmbs)		Artifact			Ecofact		Comments
				Lithic	FCR	Weight (g)	Qty	Weight (g)	
EU 1	9	80	85		15	920.00			FCR
EU 1	9	80	85	11		97.67			Shatter
EU 1	9	80	85	7		3.51			Primary Flake
EU 1	9	80	85	8		14.55			Secondary Flake
EU 1	9	80	85	51		38.67			Tertiary Flake
EU 2	1	0	10		6	30.00			FCR
EU 2	1	0	10	1		14.87			Biface
EU 2	1	0	10	1		17.58			Flake Tool
EU 2	1	0	10	57		545.19			Shatter
EU 2	1	0	10	3		30.40			Primary Flake
EU 2	1	0	10	23		203.73			Secondary Flake
EU 2	1	0	10	57		94.96			Tertiary Flake
EU 2	2	10	20		18	1,400.00			FCR
EU 2	2	10	20	1		934.40			Core
EU 2	2	10	20	1		129.07			Core
EU 2	2	10	20	1		9.79			Biface
EU 2	2	10	20	1		16.68			Flake Tool
EU 2	2	10	20	1		9.87			Flake Tool
EU 2	2	10	20	1		4.20			Blade
EU 2	2	10	20	11		189.03			Shatter
EU 2	2	10	20	7		163.47			Secondary Flake
EU 2	2	10	20	18		84.99			Tertiary Flake
EU 2	3	20	30		4	1,410.00			FCR
EU 2	3	20	30	2		167.98			Shatter
EU 2	3	20	30	3		119.49			Secondary Flake
EU 2	3	20	30	2		150.25			Tertiary Flake

Appendix F

Faunal Remains

Table G-1. Faunal Remains at 41BX2131

Unit	Level	Depth		Bone				
No.	(10cm)	(cmbs)		Qty	Weight (g)	Element	Classification	Comment
EU 1	3	20	30	1	7.55	Rib	Large Mammal	Fragment
EU 1	3	20	30	1	5.77	Rib	Large Mammal	Fragment
EU 1	3	20	30	1	2.82	Rib	Large Mammal	Fragment
EU 1	3	20	30	1	1.82	Rib	Large Mammal	Fragment
EU 1	3	20	30	1	13.43	Cheek Tooth	Bovidae	Fragment
EU 1	3	20	30	1	1.21	Cheek Tooth	Bovidae	Fragment
EU 1	3	20	30	1	0.62	Incisor	Med.-Lrg. Mammal	Fragment
EU 1	3	20	30	1	4.64	Long Bone	Large Mammal	Fragment
EU 1	3	20	30	1	4.48	Long Bone	Large Mammal	Fragment
EU 1	3	20	30	1	6.97	Astragalus	Large Mammal	Fragment
EU 1	3	20	30	1	0.79	Undetermined	Undetermined	Burned fragment
EU 1	3	20	30	1	0.54	Undetermined	Undetermined	Burned fragment
EU 1	3	20	30	1	0.50	Undetermined	Undetermined	Burned fragment
EU 1	3	20	30	1	0.49	Undetermined	Undetermined	Burned fragment
EU 1	3	20	30	49	76.36	Undetermined	Undetermined	Fragments
Total Level 3				**63**	**127.99**			
EU 1	4	30	40	1	1.05	Cheek Tooth	Bovidae	Fragment
EU 1	4	30	40	1	0.53	Cheek Tooth	Bovidae	Fragment
EU 1	4	30	40	1	9.08	Long Bone	Large Mammal	Fragment
EU 1	4	30	40	1	8.64	Long Bone	Large Mammal	Fragment
EU 1	4	30	40	1	3.88	Long Bone	Large Mammal	Fragment
EU 1	4	30	40	1	0.21	Undetermined	Undetermined	Burned fragment
EU 1	4	30	40	12	12.03	Undetermined	Undetermined	Fragments
Total Level 4				**18**	**35.42**			
EU 1	5	40	50	1	1.25	Most proximal phalanx	Artiodactyla	Fragment
EU 1	5	40	50	1	0.08	Undetermined	Undetermined	Burned fragment
EU 1	5	40	50	11	12.57	Undetermined	Undetermined	Fragments
Total Level 5				**14**	**13.90**			
EU 1	6	50	60	1	6.28	Metacarpal	Artiodactyla	Right / Fragment
EU 1	6	50	60	1	16.10	Long Bone	Large Mammal	Fragment
EU 1	6	50	60	1	0.20	Undetermined	Undetermined	Burned fragment
EU 2	6	50	60	3	3.44	Undetermined	Undetermined	Fragments
Total Level 6				**6**	**26.02**			
Grand Total				**101**	**203.33**			

Appendix G

Radiocarbon Results

DirectAMS
RADIOCARBON DATING SERVICE
measure more. learn more.

Report/Invoice: **PDE-02** 11 April 2016

Customer: 1573
Mary Jo Galindo
Pape-Dawson Engineers
7800 Shoal Creek Blvd.
Ste. 220 West
Austin, TX 78757

Your samples submitted for radiocarbon dating have been processed and measured by AMS. The following results were obtained:

DirectAMS code	Submitter ID	$\delta(^{13}C)$	Fraction of modern		Radiocarbon age	
		per mil	pMC	1σ error	BP	1σ error
D-AMS 016005	FS 2	-18.9	89.37	0.41	903	37
D-AMS 016006	FS 6	-19.2	87.31	0.35	1090	32

All results have been corrected for isotopic fractionation with $\delta^{13}C$ values measured on the prepared graphite using the accelerator mass spectrometer. These $\delta^{13}C$ values provide the most accurate radiocarbon ages, but cannot be used to investigate environmental conditions, or for trophic and nutritional interpretations.

RADIOCARBON CALIBRATION PROGRAM*
CALIB REV7.1.0

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

Sample ID
Lab Code
D-AMS 016005
Radiocarbon Age BP 903 +/- 37
Calibration data set: intcal13.14c # Reimer et al. 2013

% area enclosed	cal AD age ranges	relative area under probability distribution
68.3 (1 sigma)	cal AD 1044- 1098	0.513
	1119- 1143	0.204
	1146- 1170	0.225
	1174- 1182	0.057
95.4 (2 sigma)	cal AD 1035- 1211	1.000

Median Probability: 1119

Sample ID
Lab Code
D-AMS 016006
Radiocarbon Age BP 1090 +/- 32
Calibration data set: intcal13.14c # Reimer et al. 2013

% area enclosed	cal AD age ranges	relative area under probability distribution
68.3 (1 sigma)	cal AD 898- 924	0.359
	945- 990	0.641
95.4 (2 sigma)	cal AD 892- 1015	1.000

Median Probability: 953

References for calibration datasets:
Reimer PJ, Bard E, Bayliss A, Beck JW, Blackwell PG, Bronk Ramsey C, Buck CE Cheng H, Edwards RL, Friedrich M, Grootes PM, Guilderson TP, Haflidason H, Hajdas I, HattÃ© C, Heaton TJ, Hogg AG, Hughen KA, Kaiser KF, Kromer B, Manning SW, Niu M, Reimer RW, Richards DA, Scott EM, Southon JR, Turney CSM, van der Plicht J.
IntCal13 and MARINE13 radiocarbon age calibration curves 0-50000 years calBP
Radiocarbon 55(4). DOI: 10.2458/azu_js_rc.55.16947

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

Appendix H

Fire-Cracked Rock Table

Table H-1. Fire Cracked Rock from Excavation Units

Unit No.	Level (10 cm)	Depth (cmbs)	0- to 5-cm diameter		5- to 10-cm diameter		10- to 15-cm diameter		< 15-cm diameter		Total FCR by Level	
			Count	Weight (kg)	Count	Weight (kg)	Count	Weight (kg)	Count	Weight (kg)	Count	Weight (kg)
EU 1	1	0-10	13	0.30	1	0.05	-	-	-	-	14	0.35
	2	10-20	83	1.70	8	1.80	4	2.10	-	-	95	5.60
	3	20-30	128	1.85	16	2.20	4	2.80	-	-	148	6.85
	4	30-40	113	1.60	27	3.60	5	5.00	4	5.60	149	15.80
	5	40-50	75	0.90	21	3.20	4	3.20	-	-	100	7.30
	6	50-60	154	1.50	24	4.80	1	0.30	-	-	179	6.60
	7 (southern half)	60-70	59	0.70	30	4.70	3	1.70	-	-	92	7.10
	8 (southern half)	70-80	35	0.73	17	2.50	1	0.20	1	0.80	54	4.23
	9 (southern half)	80-85	15	0.92	-	-	-	-	-	-	15	0.92
EU 2	1	0-10	6	0.03	-	-	-	-	-	-	6	0.03
	2	10-20	14	0.40	3	0.40	1	0.60	-	-	18	1.40
	3 (northern half)	20-30	1	0.01	1	0.10	2	1.30	-	-	4	1.41
Total FCR by Size			**696**	**10.64**	**148**	**23.35**	**25**	**17.2**	**5**	**6.4**		
Total FCR at site 41BX2131											**874**	**57.59**