MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

FORT SUMNER BRIDGE: THE TESTING OF TWO SITES AND A DATA RECOVER PLAN FOR LA 111917, DE BACA COUNTY, NEW MEXICO

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ADMINISTRATIVE SUMMARY

Between September 30, 1996, and January 28, 1997, the Office of Archaeological Studies, Museum of New Mexico, conducted limited testing at two sites in Fort Sumner, De Baca County, New Mexico. Limited testing was conducted at LA 111917 and LA 111918 at the request of the New Mexico State Highway and Transportation Department (NMSHTD) to determine the extent and importance of cultural resources within the proposed project area of planned improvements to U.S. 60 in Fort Sumner.

The two sites are surface ceramic and lithic artifact scatters: peripheral portions of larger habitation sites. No intact cultural features or deposits were found at LA 111918. The resources have been adequately documented, and no additional investigations are recommended.

Two intact stratified midden deposits were found within the proposed project limits at LA 111917. We recommend that data recovery investigations be conducted at LA 111917.

A third site, LA 111919, was originally within the proposed project area. After changes in project limits, resurvey of this site during testing showed that it is completely outside of the project area.

Submitted in fulfillment of Joint Powers Agreement J00122 between the New Mexico State Highway and Transportation Department and the Office of Archaeological Studies, Museum of New Mexico.

CPRC Archaeological Survey Permit No. SP-96-027
NMSHTD Project BR-(US)-060-5(31)327, CN 1683
MNM Project 41.623 (Fort Sumner Bridge)

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INTRODUCTION

At the request of William L. Taylor, environmental program manager, New Mexico State Highway and Transportation Department (NMSHTD), a testing program was conducted at LA 111917 and LA 111918 within the area of proposed improvements to U.S. 60 in Fort Sumner, New Mexico (Fig. 1). Limited testing was conducted under CPRC Archaeological Survey Permit No. SP-96-027. Fieldwork, which took place between September 30 and October 6, 1996, was conducted by Peter Y. Bullock, assisted by Marcy Snow, Stephen A. Lakatos, Raul Troxler, and Phil Aldritt. Sherry Butler worked as a volunteer. Yvonne R. Oakes acted as principal investigator. Ceramic analysis was conducted by C. Dean Wilson. Faunal analysis was conducted by Nancy J. Akins. Maps were drafted by Ann Noble, and the report was edited by Tom Ireland. Photographs were printed by Nancy Warren.

Testing was conducted at LA 111917 and LA 111918 to determine the nature and extent of the portions of the sites within the proposed project area. LA 111917 and LA 111918 are on private land and NMSHTD highway right-of-way acquired from private sources. LA 111919, located completely outside the project area, was not tested. Testing was restricted to the area of proposed improvements to U.S. 60 in Fort Sumner, New Mexico. Site location information is in Appendix 1.

Prior to fieldwork, current listings of the *National Register of Historical Places,* the *State Register of Cultural Properties*, and the site files of the New Mexico Cultural Resource Information System were consulted. No properties listed on, nominated to, or approved for submission to either inventory are in the immediate vicinity of LA 111917 or LA 111918.

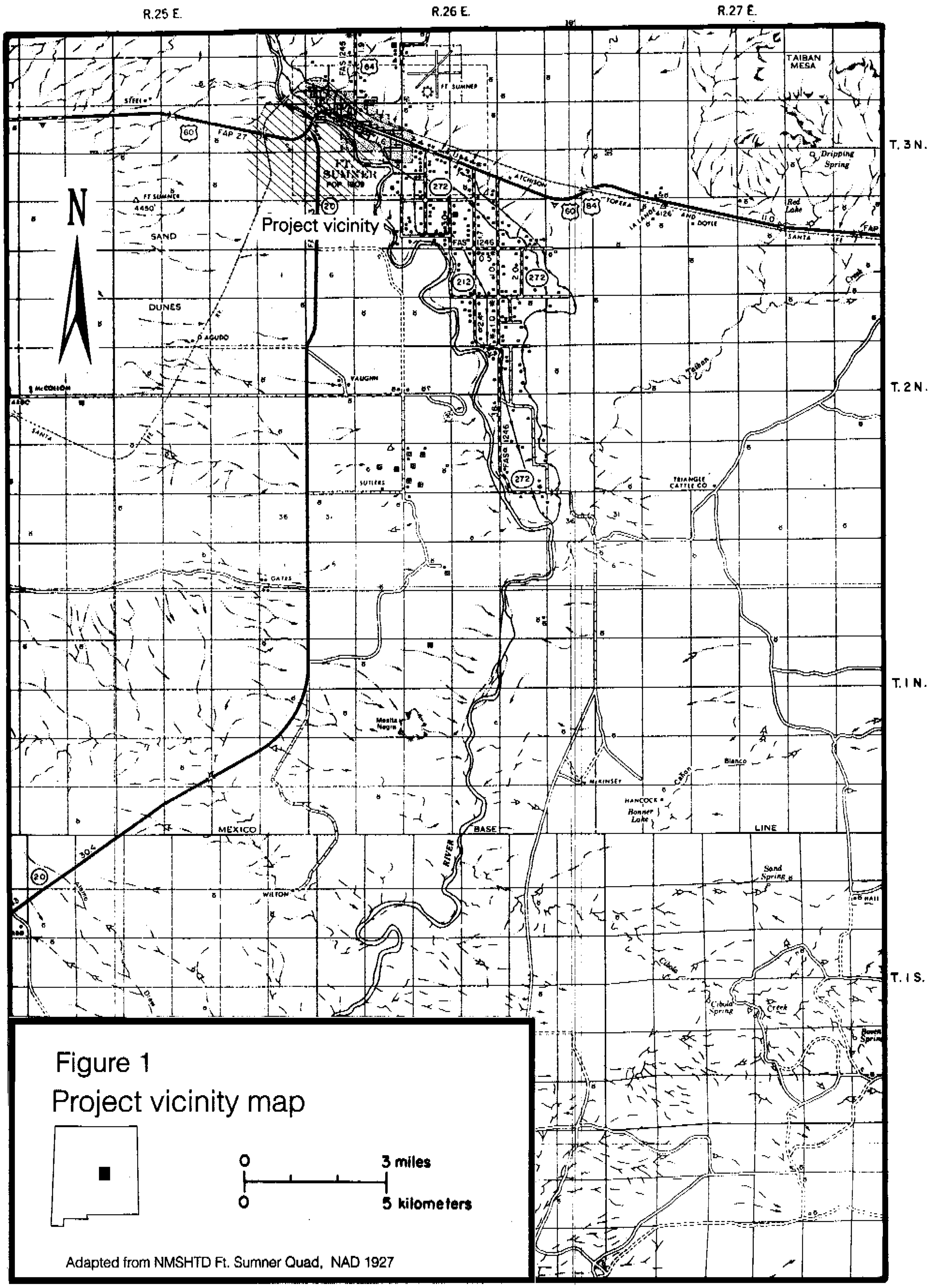

Figure 1
Project vicinity map

Adapted from NMSHTD Ft. Sumner Quad, NAD 1927

ENVIRONMENT

The project area is on both sides of the Pecos River in the middle Pecos Valley. The elevation within the project area ranges from 1,225.2 m (4,020 ft) to 1,234.4 m (4,050 ft). The countryside in the area of Fort Sumner is rolling mixed grassland (Castetter 1956: Fig. 1). Both sites are on the third terrace above the Pecos River. LA 111918 is also on the first terrace above Truchas Creek. Thus, both sites are in ecotones: areas of contact between the mixed grassland and riverine biotic communities. Overgrazing in the region has reduced the local grasses, allowing the spread of invasive species such as mesquite, sage, and yucca.

Geology

The Pecos River joins the Rio Grande near Comstock, Texas (Anonymous 1975:1). Part of the Great Plains province, the Pecos River Valley is a long trough between the High Plains (Llano Estacado) to the east, and the Basin and Range province to the west. This valley cuts through an alluvial-filled basin that represents the eroded extension of the High Plains to the Diamond A Plain to the west. The terrain of the valley is characterized at the local level by its underlying material. In the Fort Sumner area, the Pecos Valley has an uneven surface resulting from the degradation of the underlying deposits of limestone, sandstone, shales, and gypsum (Fenneman 1931:47-49).

The Fort Sumner area is pivotal in the major shift that occurred in the course of the Pecos River during the late Pleistocene Tahoka Subpluvial period (Reeves 1965:45). The Pecos River north of Fort Sumner originally formed part of the upper Brazos River system of central Texas, flowing through Blackwater Draw, the Portales Valley, and present-day Lubbock, Texas. Near Fort Sumner the Pecos River was diverted south and integrated into the lower Pecos River system during the late Pleistocene by a series of solution cavities, still visible as a series of river basins, that developed in the soluble subsurface rocks of the region (Jelinek 1967:5-7; Sebastian and Larralde 1989:7).

The project area is on the third river terrace on both sides of the Pecos River. These terraces date to the Holocene (Kues et al. 1985:68) and are primarily comprised of alluvium and glaciation-derived gravel and sand deposits (Jelinek 1967:10). Outcroppings of reddish-brown sandstone from the Santa Rosa formation are present within the project area at LA 111917.

The alluvial nature of these deposits is reflected in the soils of the area, which are primarily Camborthids and Calciorthids. Both soil types are derived from weathered sedimentary rocks, including shale, limestone, sandstone, and gypsum. These soils differ in depth of occurrence and depth of lime zone. Camborthids are generally deeper soils with a weak lime zone at 45.7 to 101.6 cm (18 to 40 inches), while Calciorthids are characterized by a heavy lime zone at a depth of 30.5 to 50.8 cm (12 to 20 inches). Both soil types are well suited for rangeland and when watered are successfully utilized for crops (Maker et al. 1974:70-71).

Climate

The climate of the project area is semiarid continental, with hot days and cool nights. Average precipitation for this section of the Pecos Valley is 35.6 cm (14 inches), and most moisture comes in the summer months (Gabin and Lesperance 1977:103; Jelinek 1967: Fig. 5; Maker et al. 1974:47-48; Tuan et al. 1973: Fig. 2). The average number of days without a killing frost is 200 (Anonymous 1975:9; Tuan et al. 1973: Fig. 48). The growing season averages an additional 80 days (Smith 1920:276-278).

The current pattern of summer rains and cool, relatively dry winters first appeared in the middle Holocene, when the amount of precipitation was much greater than at present. Although fluctuations have repeatedly occurred (wetter periods are suggested for 1000 B.C. to A.D. 1000), the overall trend has been toward a dryer climate through time (Davis 1989:21; Haynes 1993:232-233). The most obvious result of this drying trend has been a gradual change in biotic communities, with a shift from park woodland dominated by pine and spruce to mixed grassland (Brunswig 1992; Elias 1990; Sebastian and Larralde 1989:16, Fig. 1.9; Van Devender and Spaulding 1979).

Flora and Fauna

The range of environmental zones in the project area provides increased variety in available plant and animal resources. The two life zones in the project area are the Upper Sonoran (grasslands) and Lower Sonoran (the corridor of the Pecos River Valley (Anonymous 1975:5). While the resources of the plains ecosystem appear limited, they are complemented by the riverine ecosystem of the Pecos River floodplain. This serves as a distinct linear oasis, providing habitat for plant and animal communities not normally associated with the steppe landscape. This juxtaposition of plant and animal communities puts more species into closer proximity than in a single zone, although some species (such as migrating birds) utilize the area in a transitory manner.

The grazing of livestock has modified the vegetation of the general project area (Castetter 1956:261-262). The previously heavy grass cover of blue grama, hairy grama, Indian grass, and side-oats grama has been eliminated. Mesquite, yucca, prickly pear, cholla, and sagebrush now dominate the existing local vegetation (Castetter 1956:266-267; Jelinek 1967:37,40).

Animals are abundant along the river, and smaller numbers are present in the grasslands bordering the valley. Deer, wild turkeys, and cottontail rabbits live in the floodplain, and pronghorn and jackrabbits are common in the grassland areas (Anonymous 1975:6-7). Historically, bison were present in the Fort Sumner area. A variety of small rodents and birds are locally available. Various fish and shellfish live in the Pecos River (Jelinek 1967:40).

CULTURAL HISTORY

A complete cultural history of the project area is beyond the scope of this report. In-depth accounts are available in Sebastian and Larralde (1989) and Stuart and Gauthier (1988).

Paleoindian Period

The Paleoindian period (10,000-5,500 B.C.) was first recognized in 1926 at the Folsom site in northeastern New Mexico (Wormington 1947:20). A series of Paleoindian traditions have since been defined, beginning with Clovis and continuing through Plano (Stuart and Gauthier 1981:294-300). Originally defined on the plains of eastern New Mexico, the Paleoindian cultural area has since been expanded to include virtually all of North America. Although it was originally believed that Paleoindian people depended largely on big-game hunting, the importance of plant gathering and small-animal hunting to Paleoindian subsistence is now recognized (McGregor 1965:120; Willey 1966:38; Jennings 1968:78-79; Wilmsen 1974:115; Cordell 1979:19-21; Stuart and Gauthier 1981:31-33).

Paleoindian sites of any period are rare, but Paleoindian sites are recorded in the region, including the Clovis type site of Blackwater Draw, Locality No. 1, and Blackwater Draw, El Llano. Few sites have been recorded in the Pecos River area. Distinctly shaped Paleoindian projectile points have been found, but usually as isolated finds. One isolated Clovis projectile point base has been recorded for the Pecos River Valley, just to the southeast of Santa Rosa (Bullock 1995b). Late Paleoindian sites have been recorded in Guadalupe County to the north (Bullock 1994a). Other Paleoindian sites are probably present, buried under alluvial or eolian deposits (Cordell 1982).

Archaic Period

The Archaic occupation of the upper Pecos River Valley appears to have lasted quite late. Levine and Mobley (1975) define the Archaic occupation of northeastern New Mexico as lasting from 5000 B.C. until A.D. 1000, but a local chronology has not been developed for this area. Projectile points in eastern New Mexico have been identified under a number of different schemes, including those of the Oshara Tradition (Irwin-Williams 1973) and chronologies used in central and western Texas (Johnson 1967).

The Archaic period is best defined in northwestern New Mexico, where it is generally referred to as the Oshara Tradition (Irwin-Williams 1973). This period is distinguished by distinctive projectile points and lithic artifact scatters, including grinding implements and fire-cracked rock, and a lack of ceramics. Archaic subsistence adaptations are based on a highly mobile, broad-based economy characterized by a combination of seasonally scheduled hunting and gathering activities. The Oshara Tradition is divided into five phases: Jay (5500-4800 B.C.), Bajada (4800-3200 B.C.), San Jose (3200-1800 B.C.), Armijo (1800-800 B.C.), and

En Medio (800 B.C.-A.D. 400) (Irwin-Williams 1973). Although centered in the northwestern area of New Mexico, Oshara Tradition projectile points do occur as isolated occurrences as far east as the Pecos Valley.

A sequence of projectile points for central and western Texas was developed by Johnson (1967) based on stratified sites yielding radiocarbon dates. This sequence is divided into five overlapping periods: Period I (8350-4800 B.C.), characterized by Luna and Plainview projectile points; Period II (6810-1315 B.C.), characterized by Early Barbed, Pandale, Nolan, Travis, and Bulverde projectile points; Period III (4850 B.C.-A.D. 110), characterized by Shumla, Almagre, Langtry, Pedernales, and Montell projectile points; Period IV (350 B.C.-A.D. 1245), characterized by Ensor, Frio, Darl, Figuero, and Godley projectile points; and Period V (A.D. 50-1710), characterized by Scallorn, Livermore, Bonham, and Perdiz projectile points. In a number of cases, the same projectile point morphologies have been given different names based on location.A revised localized sequence for the lower Pecos River Valley has recently been developed by Shelley (1994).

Pueblo Period

Evidence of Puebloan use of the Santa Rosa area is abundant, although no Pueblo sites with residential architecture have been recorded. The recorded pueblos closest to the Fort Sumner area are at Pintada Canyon, approximately 72 km (45 miles) to the west. These Puebloan sites appear to date from A.D. 1200-1400. Ceramics assemblages are dominated by Chupadero Black-on-white and brown utilitarian wares (Stuart and Gauthier 1981). Pueblo ceramics are found in association with open-air sites, lithic artifact scatters, and rockshelters along the Pecos River, side canyons, and some main arroyos. The occasional occurrence of other ceramic types indicates regional trade and possible use of the area by Pueblo groups from Glorieta Mesa and Galisteo Basin. Sites associated with Puebloan use of the Pecos River Valley have been recorded for the western side of the Pecos River, south of Santa Rosa (Hannaford 1976), and the Los Esteros Lake area (Levine and Mobley 1975).

Jornada Mogollon ceramics also occur in the Fort Sumner area, and a number of possible Jornada Mogollon sites have been recorded in the Fort Sumner area to the north (Harlan et al. 1986; Levine and Mobley 1975). Jornada Mogollon sites with structures have been recorded in the area of Fort Sumner (Corley 1965; Jelinek 1967:119-124) and at Sumner Lake (Kemrer 1994).

A local pueblo traditional sequence is documented for the middle Pecos River Valley by Jelinek (1967). This tradition seems to develop in the late A.D. 800s out of the Jornada Mogollon. Anasazi or Anasazi-derived ceramics appear in the middle Pecos River Valley after A.D. 900 with the development of the Mesita Negra phase (Jelinek 1967:64-65). The presence of these structural sites suggests the gradual spread of sedentary subsistence based on maize agriculture east from the centers of both the Mogollon and Anasazi traditions. The eastern limits of this probably marginal area appear to have been the Pecos Valley (Jelinek 1967:145-147). These developmental sequences continue until the termination of the Crosby phase in the

lower middle Pecos Valley between A.D. 1250 and 1300, and the termination of the Late McKenzie phase in the upper middle Pecos Valley about A.D. 1300 (Jelinek 1967:65-67).

Plains Indian Period

Both Kiowa and southern Athapaskan groups appear to have moved into the eastern portion of New Mexico during the late protohistoric period. Apachean sites are scattered throughout southeastern New Mexico as well as the central plains and may date anywhere from the late 1400s to the late 1800s (Harlan et al. 1986:52).

Questions exist concerning Kiowa origins. These center on their language--a version of the Tanoan language, Towa, spoken by Puebloan peoples of both Jemez and Pecos pueblos (Jelinek 1967:162-163). The time of separation between these languages is estimated by Trager (1951) at approximately A.D. 1000. This suggests that the Kiowa may be descendants of the Puebloan colonizers of the Pecos Valley.

Shoshonean-speaking Comanches moved into the southern plains about 1700-1715. Most other Native American groups were driven from the area by these horse-mounted buffalo hunters, except for the closely politically allied Kiowas. Extermination of the buffalo herds combined with American military campaigns removed the Comanches, Kiowas, and other "Plains Indian" groups from the southern plains by 1875 (Schemer 1981). Sites identified as possibly Apache, Comanche, or other "Plains Indian" have been identified north of Santa Rosa at Los Esteros Lake (Levine and Mobley 1975).

Hispanic Period

The Hispanic presence on the eastern plains of New Mexico was minor prior to the American era in 1848. The presence of mobile and potentially hostile Apache, and later Comanche and Kiowa Indians prevented Hispanic settlement along the upper Pecos until after the assumption of American control in the 1850s. By 1860, 16 Hispanic settlements had been built on Pecos River land grants (Harlan et al. 1986:58), extending from the Anton Chico Land Grant to the north. The Agua Negra Land Grant was formalized in 1865 by Don Celso Baca, and the ranch settlement of Agua Negra Chiquita later became the settlement of Santa Rosa. By the 1880s, Hispanic settlements were well established at Pintada on Pintada Arroyo, and at Puerto de Luna on the Pecos River. Although the Fort Sumner area was visited by trading parties (*comancheros*), no permanent settlement took place prior to the establishment of Fort Sumner in 1862.

Anglo-American Period

The Anglo-American period began in the Fort Sumner area soon after the American victory in the Mexican war. The Fort Sumner area was licensed as a place to trade with Plains

Indian tribes in 1851 (Anonymous 1995:4) by James S. Calhoun, the first civilian territorial governor of New Mexico (Gonzales 1993). A permanent American presence became established in the eastern part of New Mexico with the construction of Fort Union, Fort Sumner, and Fort Stanton in the early 1860s (Levine and Mobley 1975:31). However, Anglo-American settlement in the eastern plains of New Mexico did not occur to any great extent until after the American Civil War.

Fort Sumner, named for Gen. Edmond Vose Sumner (Pearce 1965:59), was established in 1862 to guard a reservation for Navajos and Apaches at Bosque Redondo, on the east side of the Pecos, south of the present town of Fort Sumner. In 1862 an estimated 400 Mescalero Apaches were moved to the reservation from the Sacramento Mountains to the southwest. By 1864 the Navajos had been defeated in northwestern New Mexico, and approximately 9,000 were marched to Fort Sumner in the "Long Walk." The reservation was dissolved in 1868, and the Navajos were allowed to return to their homeland (the Mescaleros had simply left a year earlier) (Kues 1985:67-68). A garrison was maintained at Fort Sumner until August 1869, when the fort was closed. The land and buildings were sold in 1870 to Lucian Maxwell for $5,000.

Settlers from the Taos and Cimarron areas were encouraged by Maxwell to settle in the area of the old reservation, and a town soon grew up around the old fort. Known as Fort Sumner, the town was soon an important stop on the Goodnight–Loving Trail (Kues 1985:68). Texas cattle ranchers began moving into the area in the mid-1860s. Some of the first to arrive were Charles Goodnight and Oliver Loving, who brought a herd of cattle to Fort Sumner in 1866. The Goodnight–Loving Trail eventually ran from Cheyenne, Wyoming, south through eastern New Mexico to Belknap, Texas (Harlan et al. 1986:59). A second herd of cattle was brought to Fort Sumner from Paris, Texas, by John Chisum that same year (1866) (Broster 1983:13-14). Settlement of the area increased rapidly after 1875, with the final defeat of the Comanches and Kiowas and their removal to Oklahoma.

Drought and severe winters in 1887 and 1889, along with declining cattle prices, ultimately destroyed the great cattle empires of the plains (Harlan et al. 1986:57-58). Fort Sumner declined with the financial collapse of the cattle industry in the 1890s (Anonymous 1995:4).

In 1906 the Belen Cutoff, built by the Eastern Railway, a subsidiary of the Atchison, Topeka & Santa Fe Railroad, was constructed several miles north of the town. A community called Sunnyside developed along the railroad at a siding during construction (Myrick 1990). By 1910 the old town site had been abandoned, and Sunnyside had become "new" Fort Sumner (Julyan 1996:136).

The county seat of De Baca County, Fort Sumner serves as a commercial center for the ranching and farming industries of the area. Irrigation allows crops to be grown in large areas of the Pecos Valley, from Truchas Creek to the county line south of Fort Sumner (Anonymous 1975:9). The National Ground Balloon Launching Facility is operated by NASA at the Fort Sumner airport (Anonymous 1995:4).

TESTING PROGRAM

LA 111917 and LA 111918 were recorded as surface scatters of ceramic and lithic artifacts that formed peripheral areas of larger archaeological sites outside of the project area (Marshall 1996). Both sites were tested as part of the planned improvements to U.S. 60 in Fort Sumner, De Baca County, New Mexico. The purpose of the testing was to determine the nature and extent of the portions of the sites within the proposed project area.

Field Methods

Limited testing followed the procedures and practices outlined in the *Testing and Site Evaluation Proposal* (Historic Preservation Division, Log 43648) (Appendix 2). A main datum and baseline were established for each site. Surface artifacts were pinflagged to locate surface artifact clusters and assist in recording and mapping site limits. A map of each site was produced using a transit, a stadia rod, and a 50 m tape. The locations of all test units and cultural features were plotted. Surface artifacts were analyzed in the field and left in place except when inside a test unit or diagnostic.

Test units measuring 1 by 1 m were hand-excavated on each site in areas of surface artifact concentrations or other areas of possible prehistoric activity indicated by discolored soil. Test units were hand-excavated in 10 cm levels until culturally sterile soil or bedrock was reached. Test units that cut the walls of the arroyo in the northeastern part of LA 111917 were excavated from the modern ground surface to bedrock in a single "full cut" level. All excavated dirt was screened through 1/4 inch wire mesh and the artifacts collected. A stratigraphic profile was drawn for each test unit, and both test unit and site photographs were taken.

Auger holes were hand-excavated in or adjacent to areas of clustered surface artifacts. Each auger hole was dug to a depth of at least 30 cm or until cultural deposits or features were reached, and the depth recorded.

All excavated areas were backfilled when excavation was completed. Cultural material recovered through these excavations will be curated at the Archaeological Research Collection at the Laboratory of Anthropology, Museum of New Mexico. Field and analysis records will be on file at the Historic Preservation Division, Archaeological Records Management Section.

LA 111917

LA 111917 (Fig. 2) is a ceramic and lithic artifact scatter measuring 120 by 150 m. The site is on the west side of U.S. 60, on the south bank of the Pecos River. The main site area is in grassland on the top of the third river terrace (Figs. 3-4). This portion of the site has been partially modified and removed by gravel quarrying operations, although intact hearths

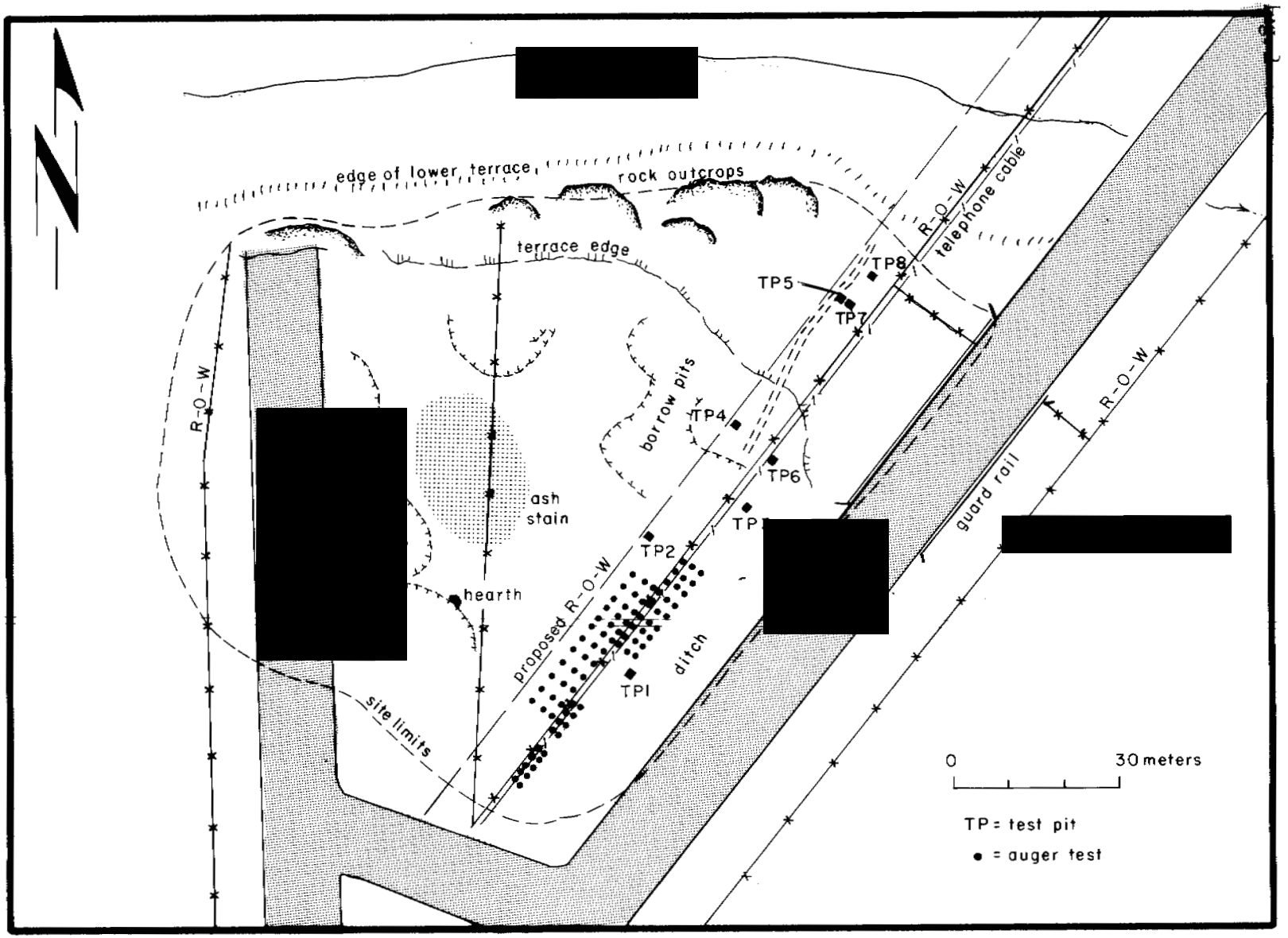

Figure 2. LA 111917 site map.

Figure 3. LA 111917, looking northeast.

Figure 4. LA 111917, looking west.

and ash stains are present outside of the project area. A second, earlier cultural component is located on the next terrace toward the river (Fig. 5). This surface of this area has been raised with the addition of construction fill associated with earlier bridge construction on U.S. 60. More recently, the site has been modified by construction of a buried telecommunications cable that parallels U.S. 60. A prepared dirt track also crosses a portion of the site outside of the present right-of-way. The site elevation is 1,235.4 m (4,050 ft).

Figure 5. LA 111917, northeastern portion of site. View is south.

A total of 316 artifacts were recorded at LA 111917. Of these, 164 (7 ceramic and 157 lithic) were piece-plotted on the surface of the site. A total of 151 artifacts (147 lithic artifacts, one piece of shell, and three pieces of animal bone) were collected from test units and auger tests. Eight test units and 82 auger tests were hand dug at LA 111917.

Test Unit 1

Test Unit 1 (1 by 1 m) was placed in the south-central portion of the site within a concentration of surface artifacts. No vegetation was present on this portion of the site prior to excavation.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a loose, silty soil containing some gravel. Stratum 2 was a fine, silty clay containing flecks of caliche. No artifacts were recovered from Test Unit 1.

Test Unit 2

Test Unit 2 was placed next to a concentration of surface artifacts in the south-central area of the site, outside of the existing right-of-way. No vegetation was present in the area of Test Unit 2 prior to excavation.

Excavation ended 50 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed in Test Unit 2. Stratum 1 was a yellowish brown, silty gravel that averaged 20 cm thick and contained artifacts. It was composed of redeposited material connected with gravel quarrying operations on a portion of the site. Stratum 2 was a yellowish brown, culturally sterile gravel deposit, also containing caliche. Three lithic artifacts were collected from Test Unit 2, all of them from the redeposited material of Stratum 1.

Test Unit 3

Test Unit 3 was placed in the east-central portion of the site area, within the existing right-of-way. This test unit was placed adjacent to a cluster of surface artifacts, within an area of the site that appeared intact. Grama grass covered 10 percent of the surface area of Test Unit 3 prior to excavation.

Excavation of Test Unit 3 ended 30 cm below the modern ground surface in culturally sterile soil. A single stratum of material was present in Test Unit 3: a fine, silty clay containing gravel and caliche. No artifacts were present within this stratum.

Test Unit 4

Test Unit 4 was excavated in a low silty area adjacent to a cluster of surface artifacts in the east-central portion of the site. This test unit was within the area of previous gravel quarry operations at the site. Prior to excavation, the area of Test Unit 4 contained a 5 percent coverage of mixed grasses.

Three strata of material were visible within Test Unit 4. Stratum 1 was a fine, silty soil. Stratum 2 was a fine, sandy alluvial soil. Rodent burrows containing small gravels were present within this stratum. Stratum 3 was a yellowish clay containing large gravel. No artifacts were recovered from any of the strata in Test Unit 4.

Test Unit 5

Test Unit 5 was excavated in the northeastern portion of the site area, on the next lower terrace toward the Pecos River, adjacent to a surface artifact concentration. No vegetation was present on this portion of the site prior to excavation.

Test Unit 5 was excavated to a depth of 84 cm below the modern ground surface to bedrock. A total of six strata were found in Test Unit 5 (Fig. 6). Stratum 1 was a surface duff layer of loose gravel and sandy silt, colluvial in origin. Stratum 2 was a sandy silt containing some gravel. Stratum 3 is a cultural ash layer containing artifacts, visible only in the south and western profiles of the test unit. This stratum varied in thickness between 1 and 10 cm. Stratum 4 was a fine alluvial silty sand. Stratum 5 was a second ash lense. This stratum, averaging 5 cm thick and containing artifacts, extended across the entire test unit. Stratum 6 was a thick deposit of fine silty sand containing angular broken pieces of rock and artifacts. Charcoal flecks were also present. This material ranged in thickness from 40 to 50 cm and ended at bedrock.

Recovered artifacts from Test Unit 5 totaled 88 (87 lithic artifacts and one piece of animal bone). Thirty-two lithic artifacts were recovered from Stratum 3. Stratum 5 contained 18 lithic artifacts. A total of 38 artifacts (37 lithic artifacts and one piece of animal bone) were recovered from Stratum 6.

Test Unit 6

Test Unit 6 was excavated in the east-central portion of the site, adjacent to an area of clustered surface artifacts. Outside of the existing right-of-way, this area of the site supported an 80 percent coverage of mixed grasses prior to the excavation of Test Unit 6.

Test Unit 6 was excavated to a depth of 20 cm below the modern ground surface in culturally sterile soil. A single strata of material was present within Test Unit 6. Stratum 1 was a silty clay containing large quantities of both gravel and caliche. No artifacts were found in Test Unit 6.

Test Unit 7

Test Unit 7 was placed in the northeastern portion of the site. Near Test Unit 5, this test unit was excavated as a "full cut" into the west side of a small arroyo. The exposed profile helped establish the extent of the cultural deposits within Test Unit 5.

Excavation of Test Unit 7 ended at 68 cm below the modern ground surface at bedrock. Five strata of material were visible within Test Unit 7. Stratum 1 was a duff layer of loose silty sandy soil containing gravel. Stratum 2 was a compacted yellowish-brown, alluvial, sandy soil. Stratum 3 was a gray ash layer. Containing artifacts, this material was restricted to the north

Figs. 6 and

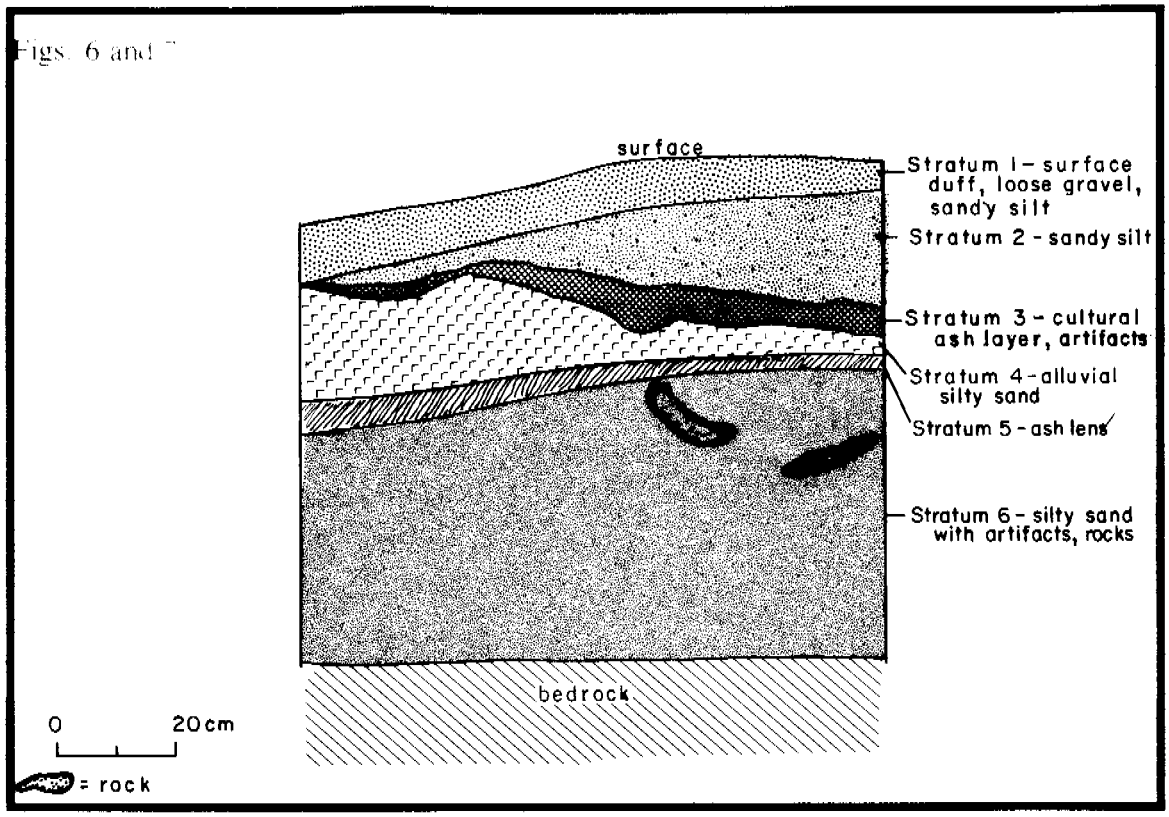

Figure 6. Profile of Test Unit 5, LA 111917.

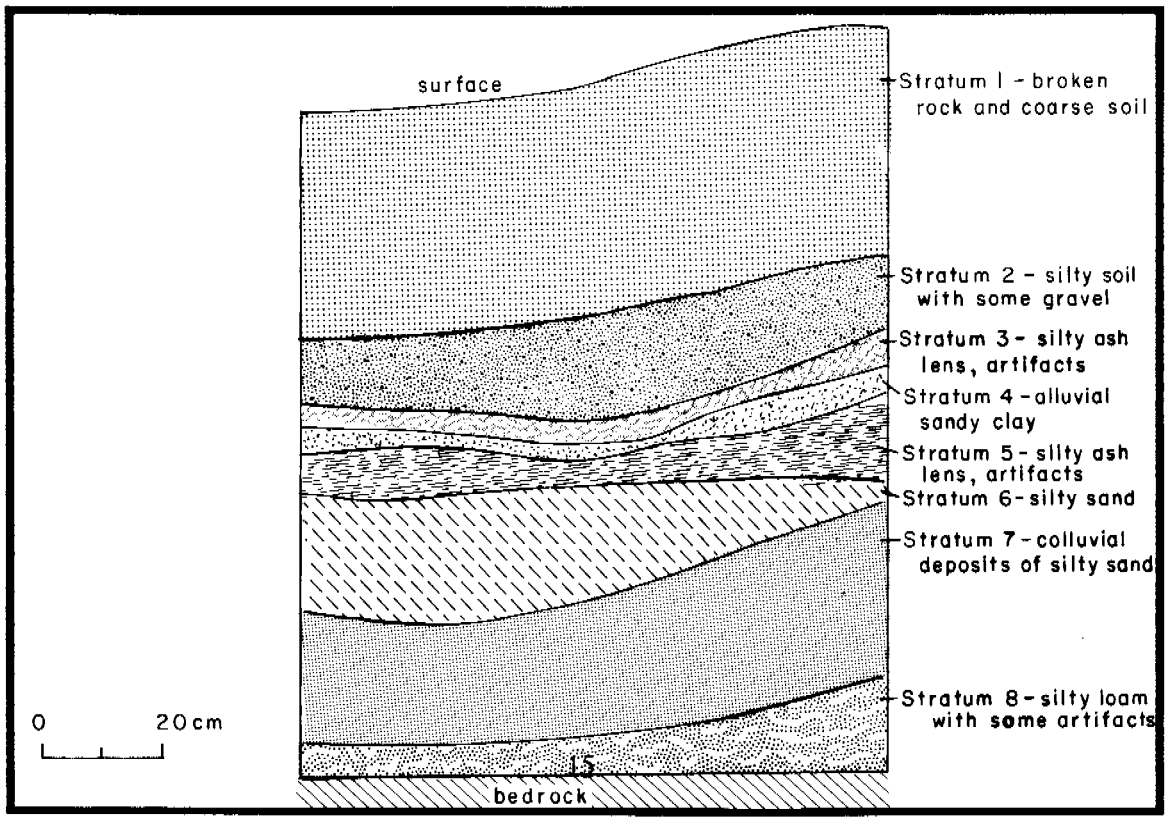

Figure 7. Profile of Test Unit 8, LA 111917.

and west sides of the test unit. Stratum 4 was a reddish-gray sandy soil containing mixed gravel. Stratum 5 was a brown, fine, sandy silty soil containing artifacts. Stratum 6 was a brown, silty sand containing artifacts. Nineteen artifacts were found in Test Unit 7. Nine lithic artifacts were recovered from Stratum 3. Five lithic artifacts were found in Stratum 5, and five lithic artifacts were recovered from Stratum 6.

Test Unit 8

Test Unit 8 was excavated into the east side of a small arroyo in the northeastern portion of the site. This test unit was designed to provide additional information on the extent of the cultural deposits found in Test Units 5 and 7.

Test Unit 8 was excavated as a "full cut" to a depth of 126 cm below the modern ground surface. Eight strata of material were present within this test unit (Fig. 7). Stratum 1, measuring 35-38 cm thick, was composed of broken rock and coarse soil used as fill in the construction of the current U.S. 60 bridge over the Pecos River. Stratum 2 was a silty soil containing some gravel. Stratum 3 was a silty ash lense measuring 4 to 6 cm thick and containing some gravel, artifacts, and charcoal flecks. Stratum 4 was a thin layer of alluvial sandy clay containing some small gravel and course sand. Stratum 5 was a second silty ash deposit, containing charcoal flecks and artifacts and measuring 6 to 14 cm thick. Stratum 6 was a silty sand, alluvial in origin, containing some gravel. Stratum 7 was a colluvial deposit of silty sand containing gravel and cobbles. Stratum 8 was a consolidated silty loam (possible old ground surface), directly on bedrock, and containing some gravel and artifacts.

A total of 38 artifacts were recovered from Test Unit 8. Nine lithic artifacts and two pieces of bone were recovered from Stratum 3. A total of 10 lithic artifacts were recovered from Stratum 5. Artifacts recovered from Stratum 8 totaled 17 (16 lithic artifacts and one piece of freshwater clam shell).

Auger Tests

A total of 80 auger tests were dug at LA 111917. Auger holes were dug in 2 or 3 m transects across the portion of the site that was apparently intact and had the greatest concentration of surface artifacts. Auger tests were dug to a depth of at least 30 cm, or until cultural material was reached. Five lithic artifacts were collected from three auger tests, all from the top 10 cm of redeposited material. No cultural features or deposits were found in any of the auger tests dug at LA 111917.

Cultural Features

No intact cultural deposits or features were found associated with LA 111917, the Jornada Mogollon site on the top of the third terrace.

Two stratified midden deposits were found in the northeastern portion of LA 111917, within the proposed project limits. Midden 1 begins 10 cm below the modern ground surface with a known area of approximately 16 sq m. Midden 1 extends for an unknown distance south into the face of the third terrace, 3 to 5 meters below the top of the terrace. Midden 2 begins 50 cm below the modern ground surface, extending for an unknown distance into the face of the third terrace (0.5 to possibly 8 m below the top of the terrace).

LA 111918

LA 111918 is a ceramic and lithic artifact scatter measuring 105 by 60 m (Figs. 8 and 9). The site is on the south side of U.S. 60 on the terrace just above Truchas Creek. This area is part of the third terrace above the Pecos River. Adjacent to the site, the roadbed of U.S. 60 has been raised with the addition of approximately 35 cm of fill. All of the site area within the existing right-of-way has been scraped to level the highway shoulder and improve drainage. One result of this activity is a low, 4 m wide berm along, or just outside of, the right-of-way fenceline. In this area of LA 111918, two underground telecommunications cables are within the existing right-of-way, running parallel to the highway. Outside of the existing right-of-way, the site has been mechanically graded. Part of the site has also been removed by a gravel quarry. The site elevation is 1,225.9 m (4,020 ft).

Seventy seven surface artifacts were piece-plotted at LA 111918. Of the artifact total, two were ground stone artifacts, and 75 were lithic artifacts. Two test units and 135 auger tests were hand excavated at LA 111918.

Test Unit 1

Test Unit 1 was placed adjacent to a surface artifact concentration, in the central portion of the site. It was excavated to a depth of 30 cm below the modern ground surface. Two strata of material were eexposed in this test unit. Stratum 1 was a sandy loam that measured 20 cm in depth. This stratum contained pieces of recent broken glass and plastic. Stratum 2 was a sandy loam containing caliche flecks. No artifacts were found within either stratum in Test Unit 1.

Test Unit 2

Test Unit 2 was dug adjacent ot a surface artifact cluster. This test unit was in the central portion of the site, near a dirt road that crossed the site. Test Unit 2 was excavated to a depth of 30 cm. Three strata of material were present. Stratum 1 was a fine, silty clay containing several cobbles. Stratum 2 was a sandy loam containing a large number of cobbles. This stratum also contained plastic, modern glass, and pieces of asphalt. Stratum 3 was a sandy loam containing caliche. No artifacts were recovered from any of the strata in Test Unit 2.

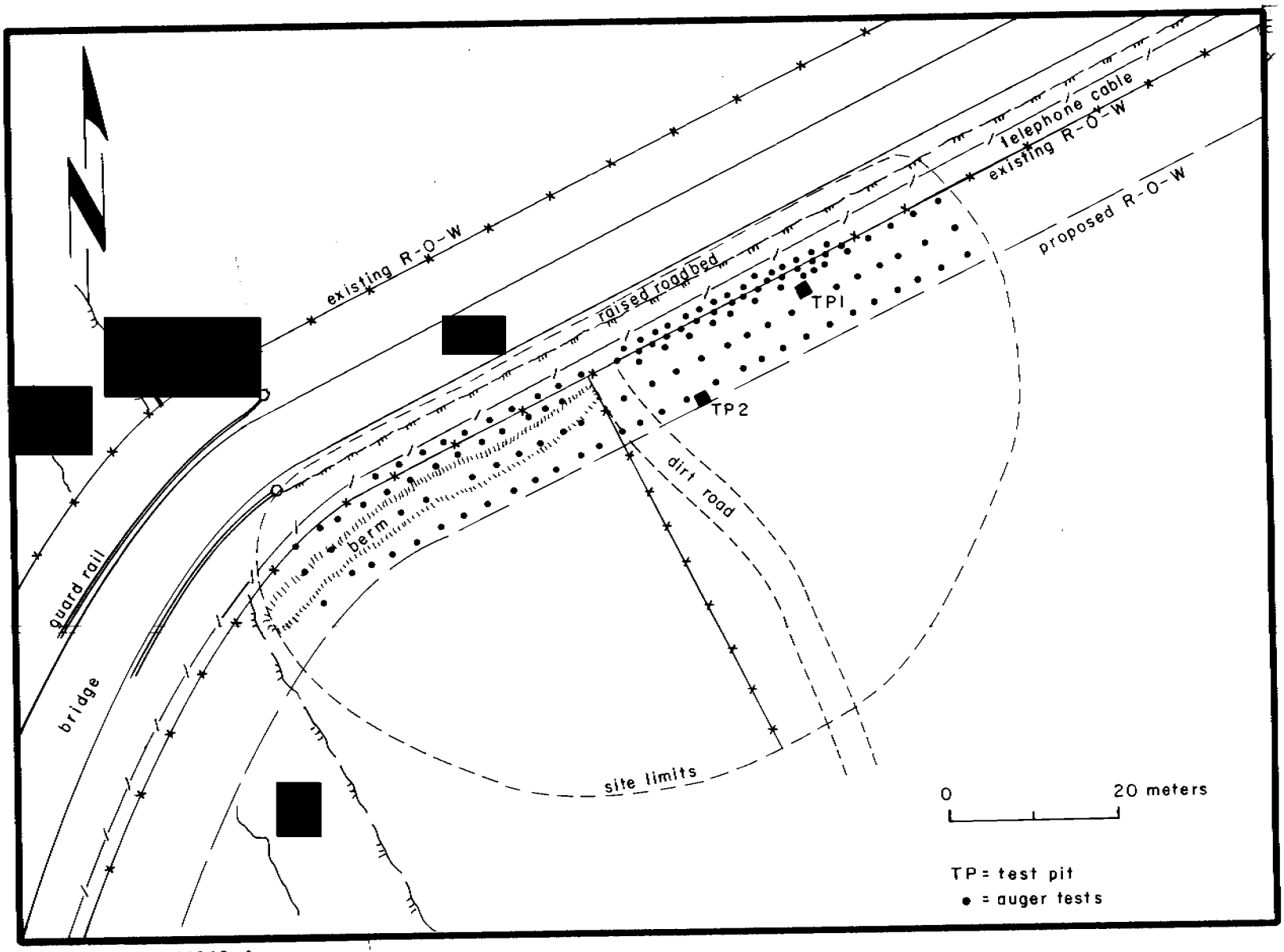

Figure 8. LA 111918 site map.

Figure 9. LA 111918, looking southwest.

Auger Tests

A total of 135 auger tests were dug at LA 111918. Auger tests were dug in both 1 and 3 m transects paralleling the right-of-way. Auger tests were dug to a depth of approximately 30 cm, or until cultural material was reached. No artifacts were found below the modern ground surface within any of the auger tests at LA 111918.

Cultural Features

No cultural features or deposits were found within the portion of LA 111918 within the proposed project area.

Twenty lithic artifacts were piece-plotted at LA 111918. A total of 42 auger tests were dug at LA 111918. Auger tests were dug in transects paralleling the right-of-way in areas with concentrations of surface artifacts to a depth of 30 cm, or until cultural material was reached. No artifacts were found below the modern ground surface within any of the auger tests.

LITHIC ARTIFACT ANALYSIS

A total of 325 lithic artifacts was analyzed from the portions of LA 111917 and LA 111918 within the project area.

Attributes for lithic analysis were chosen for the greatest return of useful information within the available time. The guidelines and format of the Office of Archaeological Studies' *Standardized Lithic Artifact Analysis: Attributes and Variable Code Lists* (OAS 1994) were followed.

The following attributes were recorded during analysis:

Material Type. Codes for material types are for general material groups unless the material is from a recognizable source. For example, although a wide range of chert occurs at these sites, all were classified as "chert." If a specimen was of a specifically named chert (such as Washington Pass chert), it was coded by the specific name.

Morphology (Artifact Type). The characterization of artifacts by form.

Portion. The part of the artifact present. Flakes and tools may be whole or fragmentary. Angular debris and cores are whole by definition.

Dorsal Cortex. Cortex is estimated to the nearest 10 percent increment. For flakes this is the cortex on the dorsal surface. Cortex on the platform was not included. For other morphological types, the cortex on all surface is estimated and added together.

Flake Platform. Flake platform is recorded for the whole and proximal flakes. Some lateral flakes also have their platforms recorded, if the platform is still present. Either the morphology of the impact area prior to flake removal or extreme modifications of the impact area caused by the actual flake removal is coded.

Size. Artifact size is given in millimeters.

Edge Number. Artifacts can have one or more utilized edges. Each utilized edge on an artifact is given an edge number. Consecutive numbers are used for artifacts with more than one utilized edge. Each edge was analyzed separately for function and wear patterns.

Function. Characterization of artifact by function.

Wear Patterns. Artifact modification caused by human use is coded as wear.

A total of 326 artifacts from the portions of the two sites in the project area were analyzed. The lithic artifact assemblage from LA 111917 is divided into three parts, corresponding to the three cultural areas of the site: the Jornada Mogollon portion of the site, Midden Deposit 1, and Midden Deposit 2.

Material Selection

Material use serves as an indication of human decision-making processes with regard to the suitability of materials (Young and Bonnichsen 1985:128). The presence within a site assemblage of tested material or substantial numbers of core flakes exhibiting dorsal cortex can thus be presumed to illustrate the manner in which this material suitability is determined.

All of the lithic material utilized at LA 111917 and LA 111918 is locally available as nodules within the Holocene alluvial deposits of the area. The one exception to this may be the material designated "Alibates," which may be from the Alibates source area along the Canadian River north of Amarillo, Texas. This material, although apparently identical to varieties of Alibates, should be accepted as such with some reservation (Banks 1990). Similar, visually identical material is present in gravel deposits along the Upper Pecos River (Bullock 1994a).

Chert is the main lithic material of choice at both LA 111917 and LA 111918, dominating two of the three lithic artifact assemblages at LA 111917 and the assemblage at LA 111918 (Tables 1-4). Chert comprises 66.6 percent of the Jornada Mogollon assemblage and 61.0 percent of the Midden 1 assemblage at LA 111917. At LA 111918, chert makes up 75.0 percent of the total lithic assemblage. In contrast, chert forms only 18.8 percent of the Midden 2 assemblage at LA 111917.

Metamorphic sandstone (graywacke) is the most common lithic material (68.8 percent) at LA 111917, Midden 2. Metamorphic sandstone is the second most common lithic material in the three other deposits. The LA 111917 Jornada Mogollon component is 17.4 percent metamorphic sandstone, while it comprises 21.2 percent of the Midden 1 assemblage. Sixteen percent of the LA 111918 assemblage is metamorphic sandstone.

Other materials are present in all four assemblages in smaller quantities. Silicified wood is present in all four assemblages. The Jornada Mogollon and Midden 1 assemblages from LA 111917 also contain quartzitic sandstone, siltstone, and Alibates chert. Quartzite artifacts are also present in the LA 111917 Midden 1 assemblage. Small amounts of siltstone aned quartzitic sandstone are present in the LA 111918 assemblage.

Artifact Morphology

Core flakes make up the largest morphological group of lithic artifacts in all four assemblages. Of 144 lithic artifacts in the LA 111917 Jornada Mogollon assemblage, 118 (81.9 percent) are core flakes. Core flakes comprise 89.0 percent of the assemblage at LA 111917 Midden 1, and 81.3 percent at LA 111917 Midden 2. At LA 111918, core flakes comprise 95.0 percent of the small sample. Other morphological types include biface thinning flakes, resharpening flakes, and hammerstone flakes. Also present are bifaces and multidirectional and bidirectional cores.

Cortical and single-flake platforms are the most common within all four assemblages (Tables 5-8). At LA 111917, flake platforms are 63.7 percent single-faceted and 23.6 percent cortical in the Jornada Mogollon assemblage, and 66.7 percent single-faceted and 23.7 percent cortical in the Midden 1 assemblage. This contrasts with the Midden 2 assemblage, where cortical and single-faceted platforms each comprise 46.1 percent of the total. Single-faceted platforms are the most common at LA 111918 (69.1 percent), the rest cortical.

Based on the range of cortex within material types in these assemblages (Tables 9-12), large-scale lithic reduction took place at LA 111917 in the Jornada Mogollon assemblage, which included metamorphic sandstone, chert, siltstone, quartzitic sandstone, and silicified wood. The large-scale reduction of metamorphic sandstone, chert, and silicified wood also took place in the Midden 1 assemblage at LA 111917. Lithic reduction in the Midden 2 assemblage, however, was limited to metamorphic sandstone. The reduction of chert and metamorphic sandstone took place at LA 111918.

Utilization by Material

Lithic material utilized as both formal and informal tools is present within all assemblages (Tables 13-16). Utilized lithic material reflects the range of materials present within each assemblage. Chert and metamorphic sandstone are the two most utilized materials.

The occurrence of expedient and formal tools is extremely high in all four assemblages. Midden 1 at LA 111917 has the largest range of tool forms. The lowest range of tool forms was at LA 111918. Tools exhibiting a second function were present at all four sites, comprising 5.5 percent of the total Jornada Mogollon assemblage at LA 111917, 8.9 percent of the Midden 1 assemblage, 12.5 percent of the Midden 2 assemblage, and 5.3 percent of the assemblage at LA 111918. Utilized debitage was present in all four assemblages. Among formal tools, knives and various types of scrapers were present in all four assemblages. Gravers were present in all three of the assemblages from LA 111917.

One of the artifact assemblages from LA 111917 is from a Jornada Mogollon site, based on the ceramics present. The higher than expected occurrence of tools (both formal and expedient) in the assemblage may indicate site specialization. It is also possible that this surface artifact assemblage is biased toward larger, more easily observed artifacts.

Differences are also present between the assemblages from the two midden deposits at LA 111917, neither of which is associated with the site's Jornada Mogollon component. Tools comprise a lower proportion of the Midden 1 assemblage than in Midden 2. A majority of the tools from Midden 1 are expedient (utilized debitage), rather than formal, tools. The Midden 2 assemblage contains a majority of formal tools. A higher rate of secondary tool function, as well as the occurrence of tertiary tool function, is present in the Midden 2 assemblage. These assemblage differences may be reflected in the stratigraphy of the two midden deposits: Midden 1 may represent long-term site occupation, and Midden 2 may represent repeated short-term use.

The lithic artifact assemblage from LA 111918 is similar to that from Midden 1, LA 111917, in the range of materials and tools represented. This assemblage is dated to the Middle Archaic period, based on an Ellis-style projectile point (Shelley 1994) found at the site (Fig. 10). This suggests that Midden 2, LA 111917, may also represent a Middle Archaic period activity area.

It should be possible to determine, however roughly, the types of activities pursued at each of these areas (Christenson 1987:77). The heavy use of utilized debitage suggests the production of expedient tools in three of the four assemblages (Midden 2 at LA 111917 is the exception). The low numbers of biface thinning flakes and tool resharpening flakes indicates a low level of formal tool production (Akins and Bullock 1992). Game processing is suggested by the presence of artiodactyl bone in both midden deposits at LA 111917. Differences between these lithic artifact assemblages can thus be related to differences in the cultures they represent, or to differences in site activities.

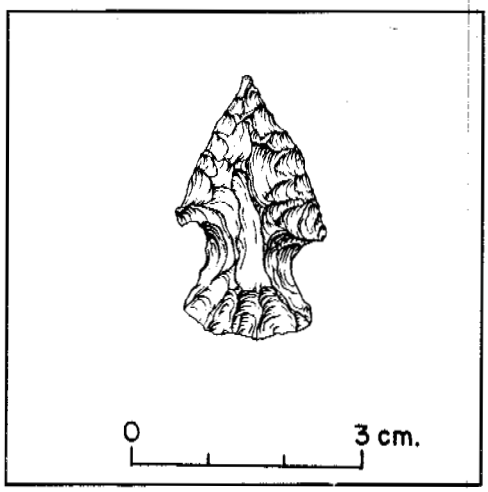

Figure 10. Projectile point, LA 111918.

Table 1. Artifact morphology by material type, LA 111917 (Jornada Mogollon component)

Artifact Type	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	16	64.0	84	88.3	2	100.0	3	75.0	5	71.4	8	80.0	118	81.9
Biface thinning flake			1	1.0									1	0.7
Hammerstone flake	1	4.0	5	4.8			1	25.0	1	14.3			8	5.6
Biface (1st phase)			2	2.0									2	1.4
Biface (2nd phase)			1	1.0							1	10.0	2	1.4
Bidirectional core	3	12.0							1	14.3	1	10.0	5	3.5
Multidirectional core	5	20.0	3	2.9									8	5.6
Total	25	100.0	96	100.0	2	100.0	4	100.0	7	100.0	10	100.0	144	100.0

Table 2. Artifact morphology by material type, LA 111917 (Midden 1)

Artifact Type	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	28	90.0	82	92.1			1	100.0	3	100.0	5	100.0	11	68.8	130	89.0
Biface thinning flake			1	1.1									1	6.3	2	1.4
Hammerstone flake			1	1.1									1	6.3	2	1.4
Resharpening flake					1	100.0									1	0.7
Uniface	1	3.2		2.2											1	0.7
Biface (1st phase)			2												2	1.4

Artifact Type	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		Total	
Biface (2nd phase)													1	6.3	1	0.7
Bidirectional core			1	1.1											1	0.7
Multidirecrtional core	2	6.5	2	2.2									2	12.5	6	4.1
Total	31	100.0	89	100.0	1	100.0	1	100.0	3	100.0	5	100.0	16	100.0	146	100.0

Table 3. Artifact morphology by material type, LA 111917 (Midden 2)

Artifact Type	Metamorphic Sandstone		Chert		Silicified Wood		Total	
	N	%	N	%	N	%	N	%
Core flake	9	81.8	3	100.0	1	50.0	13	81.1
Biface (1st phase)	1	9.1					1	6.3
Bidirectional core	1	9.1					1	6.3
Multidirectional core					1	50.0	1	6.3
Total	11	100.0	3	100.0	2	100.0	16	100.0

Table 4. Artifact morphology by material type, LA 111918

Artifact Type	Metamorphic Sandstone		Chert		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	9	66.7	54	94.7	1	50.0	2	100.0	1	100.0	67	89.3
Hammerstone flake			1	1.8							2	2.7
Multidirectional core	3	25.0	1	1.8	50.0						5	6.7
Biface (1st phase)	1	8.3	1	1.8							1	1.3
Total	13	100.0	58	100.0	2	100.0	2	100.0	1	100.0	75	100.0

Table 5. Flake by platform, LA 111917 (Jornada Mogollon component)

Flake Type	Absent		Cortical		Single		Multiple		Crushed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	6	100.0	28	93.3	75	92.6	3	75.0	6	100.0	118	92.9
Biface thinning flake							1	25.0			1	0.8
Hammerstone flake			2	6.7	6	7.4					8	6.3
Total	6	100.0	30	100.0	81	100.0	4	100.0	6	100.0	127	100.0

Table 6. Flake by platform, LA 111917 (Midden 1)

Flake Type	Absent		Cortical		Single		Multiple		Crushed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	3	100.0	31	96.9	88	97.8			8	100.0	130	96.3
Biface thinning flake							2	100.0			2	1.5
Hammerstone flake					1	1.1					1	0.7
Resharpening flake			1	3.1	1	1.1					2	1.5
Total	3	100.0	32	100.0	90	100.0	2	100.0	8	100.0	135	100.0

Table 7. Flake by platform, LA 111917 (Midden 2)

FlakeType	Absent		Cortical		Single		Total	
	N	%	N	%	N	%	N	%
Core flake	1	100.0	6	100.0	6	100.0	13	100.0
Total	1	100.0	6	100.0	6	100.0	13	100.0

Table 8. Flake by platform, LA 111918

Flake Type	Absent		Cortical		Single		Total	
	N	%	N	%	N	%	N	%
Core flake	2	100.0	19	100.0	46	97.9	67	98.5
Hammerstone flake					1	2.1	1	1.5
Total	2	100.0	19	100.0	47	100.0	68	100.0

Table 9. Percent of cortex by material type, LA 111917 (Jornada Mogollon component)

Dorsal Cortex	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	3	12.0	18	49.5	2	100.0	1	25.0	2	28.6	3	30.0	59	41.0
10	3	12.0	8	8.4			1	25.0	1	14.3			13	9.0
20	6	24.0	7	7.4					1	14.3			14	9.7
30	2	8.0	5	5.3			1	25.0			2	20.0	10	6.9
40	2	8.0	4	4.2			1	25.0					7	4.9
50	1	4.0											2	1.4
60	2	8.0	2	2.1									4	2.8
70	2	8.0	7	7.4					1	14.3			9	6.3
80	2	8.0	7	7.4							1	20.0	12	8.3
90	2	8.0	4	4.2					1	14.3	1	20.0	8	5.6
100			4	4.2					1	14.3	2	20.0	6	4.2
Total	25	100.0	96	100.0	2	10.0	4	100.0	7	100.0	10	100.0	144	100.0

Table 10. Percent of cortex by material type, LA 111917 (Midden 1)

Dorsal Cortex	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	12	38.7	67	75.3	1	100.0			3	100.0	3	60.0	9	56.3	95	65.1
10			4	4.5							1	20.0			5	3.4
20	2	6.5	4	4.5											6	4.1
30	1	3.2	1	1.1									2	12.6	4	2.7
40	5	16.1	1	1.1									1	6.3	7	4.8
50	1	3.2	1	1.1											2	1.4
60	2	6.5	1	1.1							1	20.0			4	2.7
70	1	3.2											1	6.3	2	1.4
80	1	3.2	4	4.5									2	12.6	7	4.8
90			1	1.1											1	0.7
100	6	19.4	5	5.6			1	100.0					1	6.3	13	8.9
Total	31	100.0	89	100.0	1	100.0	1	100.0	3	100.0	5	100.0	16	100.0	146	100.0

Table 11. Percent of cortex by material type, LA 111917 (Midden 2)

Dorsal Cortex	Metamorphic Sandstone		Chert		Silicified Wood		Total	
	N	%	N	%	N	%	N	%
0	1	9.1	3	100.0	1	50.0	5	31.3
10	2	18.2					2	12.5
20	1	9.1					1	6.3
30	1	9.1			1	50.0	2	12.5
40								
50	2	18.2					2	12.5
60								
70	2	18.2					2	12.5
80	2	18.2					2	12.5
90								
100								
Total	11	100.0	3	100.0	2	100.0	16	100.0

Table 12. Percent of cortex by material type, LA 111918

Dorsal Cortex	Metamorphic Sandstone		Chert		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
0	3	25.0	34	57.9			2	100.0	1	100.0	40	53.3
10			3	5.3							3	4.0
20	1	8.3	3	5.3							4	4.0
30			2	3.5							2	2.7
40	1	8.3	1	1.8							2	2.7
50	1	8.3	4	7.0							5	6.7
60	2	16.7	1	1.8							3	4.0
70	2	16.7	3	5.3	1	50.0					6	8.0
80	1	8.3	3	5.3	1	50.0					5	6.7
90			3	5.3							3	4.0
100	1	8.3	1	1.8							2	2.7
Total	12	100.0	58	100.0	2	100.0	2	100.0	1	100.0	75	100.0

Table 13. Artifact function by material type, LA 111917 (Jornada Mogollon component)

Artifact Function	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Function 1														
Utilized debitage	20	100.0	79	94.0	2	100.0	4	100.0	6	85.7	7	77.8	118	93.7
Hammerstone			2	2.4									2	1.6
Graver											1	11.1	1	0.8
Spokeshave											1	11.1	1	0.8
Scraper (side)			2	2.4					1	14.3			3	2.4
Knife			1	1.2									1	0.8
Total	20	100.0	84	100.0	2	100.0	4	100.0	7	100.0	9	100.0	126	100.0
Function 2														
Utilized debitage	1	100.0	5	100.0							2	100.0	8	100.0
Total	1	100.0	5	100.0							2	100.0	8	100.0

Table 14. Artifact function by material type, LA 111917 (Midden 1)

	Metamorphic Sandstone		Chert		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%
Function 1										
Utilized debitage	9	69.2	10	50.0	1	100.0	3	50.0	23	57.5
Hammerstone	1	7.7	1	5.0					2	5.0
Graver			1	5.0					1	2.5

	Metamorphic Sandstone		Chert		Quartzitic Sandstone		Silicified Wood		Total	
Spokeshave			1	5.0					1	2.5
End scraper			2	10.0					2	5.0
Side scraper	1	7.7	2	10.0			1	16.7	4	10.0
Knife	2	15.4	3	15.0			2	33.3	7	17.5
Total	13	100.0	20	100.0	1	100.0	6	100.0	40	100.0
Function 2										
Utilized debitage	4	100.0	6	100.0			3	100.0	13	100.0
Total	4	100.0	6	100.0			3	100.0	13	100.0

Table 15. Artifact function by material type, Midden 2, LA 111917

	Metamorphic Sandstone		Chert		Total	
	N	%	N	%	N	%
Function 1						
Utilized debitage	3	50.0			3	42.9
Graver			1	100.0	1	14.3
End scraper	1	16.7			1	14.3
Side scraper	1	16.7			1	14.3
Knife	1	16.7			1	14.3
Total	6	100.0	1	100.0	7	100.0
Function 2						
Spokeshave			1	100.0	1	50.0

	Metamorphic Sandstone		Chert		Total	
Side scraper	1	100.0			1	50.0
Total	1	100.0	1	100.0	2	100.0
Function 3						
Side scraper	1	100.0			1	100.0
Total	1	100.0			1	100.0

Table 16. Artifact function by material type, LA 111918

	Metamorphic Sandstone		Chert		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Function 1												
Utilized debitage	2	33.3	13	50.0	1	50.0	1	100.0			17	47.2
Retouched debitage			1	3.8							1	2.7
Utilized and retouched debitage	1	16.7	5	19.2	1	50.0					7	19.4
Hammerstone	1	16.7	1	3.8							2	5.4
Side scraper	1	16.7	3	11.5					1	100.0	5	13.9
End scraper			1	3.8							1	2.7
Chopper	1	16.7	1	3.8							2	5.4
Knife			1	3.8							1	2.7
Total	6	100.0	26	100.0	2	100.0	1	100.0	1	100.0	36	100.0
Function 2												

	Metamorphic Sandstone		Chert		Siltstone		Quartzitic Sandstone		Silicified Wood		Total	
Utilized debitage			1	50.0	1	100.0					2	100.0
Side scraper			1	50.0			1	100.0			2	100.0
Total			2	100.0	1	100.0	1	100.0			4	100.0

ANALYSIS OF OTHER ARTIFACTS

Ground Stone Artifacts

Two ground stone artifacts were recovered from the portion of LA 111918 in the project area. They were analyzed following the procedures outlined in *Standardized Ground Stone Artifact Analysis: A Manual for the Office of Archaeological Studies* (OAS 1994). Both pieces of ground stone are comprised of fine-grained sandstone. One artifact is an interior metate fragment. The use surface of this fragment is a steeply concave grinding surface. The surface shows no evidence of having been resharpened by pitting. The small size of this interior metate fragment makes it impossible to determine the form of the complete artifact. The other artifact is a whole, one-hand mano. Also of fine-grained sandstone, it is heavily shaped by pitting. However, there is no evidence that it was ever utilized for grinding. The portions of the rock surface not shaped by pitting still consist of weathered cortex.

The presence of ground stone artifacts on this site is consistent with the Middle Archaic period date of the site. It is also indicative of food processing at the site level.

Ceramic Artifacts

Eight ceramic artifacts were recovered from LA 111917, all from the modern ground surface: one Jornada Brown (unpolished exterior), one Jornada Brown (polished on both sides), one South Pecos Brown, two Middle Pecos Micaceous, one red-slipped brown ware, and one white ware. Based on Jelinek's Middle Pecos Valley ceramic sequence (1967:65), the Jornada Mogollon component at LA 111917 has been assigned to the Early Mesita Negra phase. Also present on the site was a small middle glaze sherd, possibly from the Galisteo Basin near Santa Fe. This sherd is intrusive, dating several hundred years later then the rest of the ceramics, or about A.D. 1400.

Bone

Three pieces of bone were recovered at LA 111917, all from Midden 1. One bone fragment, a premolar fragment, is from an artiodactyl. A second bone is the pitted end fragment of a long bone. This bone fragment is from a large mammal, probably also an artiodactyl. The third bone fragment is part of a long-bone shaft from an immature small to medium-sized mammal.

One piece of shell was also found at LA 111917. Recovered from Midden 2, it is a fragment of a freshwater clam shell. A number of species of clams inhabit the Pecos River, suggesting that this is a local species.

DISCUSSION

The two sites in the Fort Sumner Bridge Project have been assigned dates based on the artifacts found. The Jornada Mogollon component at LA 111917 has been assigned to the Early Mesita Negra phase of the Jornada Mogollon, based on the pottery present (Jelinek 1967:65). Since no ceramics were recovered at LA 111918, the site has also been assigned to the Middle Archaic period, based on the presence of an Ellis style projectile point (Shelley 1994).

The Jornada Mogollon component of LA 111917 is probably a residential site. The intense occupational nature of the site suggests that it is the result of long-term, rather than short-term use. At LA 111917, both residential and short-term activity Archaic occupations may be represented by the two midden deposits.

The intensely modified nature of LA 111918 makes it impossible to determine the site's original form. However, the presence of ground stone artifacts suggests that a degree of food processing did take place at this site. Ground stone artifacts indicate domesticated maize or wild seed collection.

Limited-activity sites are defined by Adams (1978), as "sites containing a limited range of actions present within that specific culture, and are generally involved in the exploitation of resources located at a distance from residential area." Short-term limited-activity sites usually involve the procurement of seasonally available plant or animal resources (Adams 1978:105). They may also involve the procurement of other materials in short supply, such as clay or specific types of stone (Adams 1978:106). In most areas of the Southwest, short-term limited-activity sites are present as small structureless ceramic and lithic artifact scatters. Long-tern occupational sites are therefore defined as sites containing residential structures and a range of features resulting from long-term use of the area. These may include hearth areas, storage pits, specialized activity areas, and deep homogeneous midden deposits.

While short-term limited-activity areas have been documented along the Pecos River that can be assigned to the Jornada Mogollon, few habitation sites have been excavated (Kemrer 1994; Jelinek 1967). Although features are not present at either LA 111917 (associated with the Jornada Mogollon component) or LA 111918 within the project limits, site size and artifact densities outside of the project area suggest that features may be present.

The importance of wild plant and animal resources to the Jornada Mogollon has become increasingly better understood. Use was made of a wide range of wild plants, despite the cultivation of maize and other domesticated crops (Whalen 1994:116). This combination of farming and the collection of wild plants has been shown to be especially well adapted to hot, dry desert conditions (Whalen 1994:116-117). Fluctuating crop yields are a common phenomenon in the difficult farming environment of the Southwest, where crop failure is common. The maintenance of a hunting and gathering component within a farming-based subsistence system is an effective coping mechanism in this type of environment.

Ethnographically, this mixture of farming and hunting and gathering has been recorded by Bohrer (1970) among the Pima Indians of southern Arizona. The Pima collected wild plants in inverse proportion to their harvest, although some wild plants were always collected. Hunting, as opposed to plant collecting, is less dependent on farming results.

Two intact stratified midden deposits are present at LA 111917, associated with the site's second component. Each of these deposits has been tenitively assigned to a general Archaic cultural affiliation because of the lack of ceramics and the lack of diagnostic artifacts. The two midden deposits differ in that one has the deep deposition of a long-term habitation site, and the other has a series of thin deposits suggesting repeated short-term use.

No diagnostic artifacts were recovered from either of the two midden deposits at LA 111917. But it may be possible to determine their relative age based on a model of lithic artifact use developed by Schelberg and Akins (1987). This model is based on the concept that different cultures utilize lithic material in different ways. In this model, both the percentage of flakes and the ratio of debitage to tools (both expedient and formal) should increase through the Paleoindian to the Protohistoric period. At the same time, a decrease should take place in the percentages of bifaces and cores within the assemblages (Akins and Bullock 1992). Relative dates based on this data (indicate that Midden No. 1 is a considerably younger deposit than Midden No. 2 (Table 17). Any finer dating is limited by the small size of the assemblages, particularly that from Midden No. 2.

Of particular importance is the position of these sites within the ecological edge area (ecotone) of the plains grassland and riverine ecological zones (Jelinek 1967). Habitation sites generally occur in ecological edge areas, the areas of contact between different biotic communities. These sites are generally where physical changes are present in the landscape. Ecological edge areas are "the most convenient locations for proximity to the widest variety and stability of resources" (Epp 1984:332). Correlations have been demonstrated between site location and ecological edge areas for sites dating from the Paleoindian (Thurmond 1990), the Archaic (Reher and Winter 1977), and the Protohistoric periods (Epp 1988). Settlement patterns based on the correlation between environmental zone and site location for the Jornada Mogollon in the El Paso area have been developed by O'Laughlin (1980:27-31).

Although it has been argued that the constraints imposed by the unpredictability of the wild plant crops are incompatible with a sedentary lifestyle, Thurmond (1990:17) suggests that these biotic borderlands maximize both density and diversity of both available faunal and floral resources. This increased availability of resources should result in a larger range of short-term activities occurring in increased frequency in these ecological edge areas. The types of faunal and flora resources procured should thus reflect the range of availability within the ecotone. The repeated use of an area should occur as different plant (and possibly animal) resources become available throughout the year, allowing the degree of exploitation needed to support a sedentary population.

As an increasing number of sites are recorded in this general area, a more complete picture of site frequency, location of occurrence, and site structure will enable us to make more refined interpretations of these site data.

Table 17. Comparison of the two midden assemblages at LA 111917

Artifact Type	Midden 1	Midden 2
Percent flakes	92.5	81.3
Tools: debitage	1:2.1	1:1.3
Percent cores	4.8	12.5
Percent bifaces	2.7	6.4

ASSESSMENTS AND RECOMMENDATIONS

LA 111917

Based on ceramics, the main portion of this site has been assigned to the Early Mesita Negra phase of the Jornada Mogollon culture. Two earlier, nonceramic (probably Archaic), intact stratified midden deposits are also present at LA 111917. The stratified nature of both deposits is indicative of extensive repeated site use through time. Confirmation of site reuse during the Archaic period would be a major contribution to archaeology in eastern New Mexico.

Archaeological testing within the proposed project limits has revealed intact cultural deposits likely to yield important information on the prehistory of LA 111917 and the region. We recommend that a data recovery program be undertaken at LA 111917.

LA 111918

Originally recorded as a ceramic and lithic artifact scatter, LA 111918 proved to be a lithic artifact scatter. No ceramic artifacts were present. This site has been assigned to the Middle Archaic period based on the absence of ceramics and the presence of an Ellis style projectile point. LA 111918 has been heavily modified by earlier highway construction and drainage improvements. The presence of two underground telecommunications cables has further modified the site area. Large portions of the site have been mechanically graded, and a portion of the site has been removed by a gravel pit. No intact cultural features or deposits were found.

Archaeological testing within the proposed project limits at LA 111918 did not reveal any cultural features or deposits likely to yield important information on the prehistory of LA 111918 or the region. No further investigations are needed.

LA 111919

LA 111919 was originally included within the proposed project area. Resurvey of this site during testing showed the site to be located completely outside of the project area. No testing was conducted at LA 111919.

A DATA RECOVERY PLAN FOR LA 111917

The portion of LA 111917 within the proposed project area of planned improvements to U.S. 60 has the potential to yield important information about the prehistory of central De Baca County. Determination of the site's data potential is based on the archaeological testing results.

The OAS data recovery plan will focus on research questions that can be dealt with using site-specific data. Intersite comparisons and interpretations on a regional level will be offered as is appropriate, given the data that are recovered.

Little archaeology has been done in the immediate area of Fort Sumner. However, previous research in the general Fort Sumner area has focused on site-specific and regional problems. Jelinek's (1967) work was directed toward understanding the prehistoric cultural sequence of the Middle Pecos Valley. In the Sunshine Mesa (1994a), Sunshine Breaks (1994b), and Sunshine Valley (1995a) studies, Bullock focused on temporal differences between chipped stone assemblages some distance from the river. An analysis of prehistoric site variability was a main research goal of the Sumner Lake study (Kemrer 1994). Analysis of an isolated Clovis point found north of Fort Sumner was limited to its physical description and environmental setting (Bullock 1995b).

Data recovery at LA 111917 can be used to address problems focused on chronology, occupation history, and subsistence and mobility. Faunal and lithic raw material procurement strategies will be integrated into the study. LA 111917 will be one of the few sites to have been excavated on the terrace of the Pecos River in the Fort Sumner area. Chronology and occupation history will be addressed on the intrasite level. Subsistence and mobility will be addressed at both the intrasite and intersite level for the Fort Sumner area.

Chronology

When was the site occupied, and what form of occupation is indicated? LA 111917 has two nonceramic stratified midden deposits. Two distinct, yet similar, occupational sequences are thus indicated.

Excavation at LA 111917 will focus on collecting chronometric samples and temporally diagnostic artifacts. When combined with artifact assemblage analysis data, the information can be used to address site structural variability and duration of occupation.

To address the question of chronology, the most exact date range would be preferred. Samples that can be used for dendrochronological, C-14, and archaeomagnetic dating will be collected. The contextual and methodological limitations and advantages of these dating techniques are addressed elsewhere (Blinman 1990; Smiley 1985).

Changes in projectile point styles through time provides a coarse indication of occupation length. The similarity of projectile points recovered from a site suggests that a relatively small interval occurred between occupations. If noncontemporaneous diagnostic styles are present within discreet depositional episodes, a long interval between occupations is indicated. Conversely, the presence of contemporaneous diagnostic styles within a range of depositional episodes suggests a short interval between occupations. The recovered lithic artifact assemblage will be compared to other site assemblages that are associated with absolute dates in an attempt to refine the time frame of site occupation.

Occupational History

What is the occupational history of the site, and how many occupations are represented? Determining the number of occupations is critical to chronological and functional studies at the intrasite level. The occupational sequence of LA 111917 is represented by the stratigraphy of the midden deposit, enabling a determination of the occupational sequence. In addition, spacial patterns of activity and discard areas may reflect differences in length of occupation, site function, and group size and composition.

Residential sites that were occupied for long periods of time, either year round or during a season, should have a combination of artifact assemblage diversity, formal feature construction, and accumulated discard areas. Testing data indicates that at least two (artifact assemblage diversity and accumulated discard areas) of these factors are present at one of the midden deposits at LA 111917.

In contrast, short-term use areas should have less artifact diversity, thin cultural deposition, and few or no formal features. Testing data reveals that three deposits of this type, separated by culturally sterile material, are present within the second midden deposit at LA 111917.

The study of occupation history at LA 111917 will use the sequence of stratified deposits to determine the number and length of occupational episodes, as well as activities represented within each occupation. Excavation will also focus on possible surface areas; the piece-plotting of artifacts encountered will aid in identifying activity and discard areas. Analysis of the lithic artifacts associated with each occupational episode will aid in reconstructing the site's occupational history and differences represented by the two midden deposits.

Subsistence

What activities were conducted at LA 111917? Are there differences in the activities through time, within the occupational sequence? Do the subsistence data reflect sedentary or seasonal site use? What subsistence differences are reflected by the two midden deposits? Subsistence can be directly inferred from dietary evidence and indirectly investigated through

the technology represented in the procuring and processing of food. Dietary evidence includes flora and faunal remains. Technological evidence includes the tools used in the procurement and processing of food. While dietary evidence may be collected, technological evidence will be the most abundant, particularly in the form of chipped or ground stone.

Subsistence should be reflected in the ecological zones associated with site location. The location of LA 111917 on the third river terrace above the Pecos River puts it near the border of two hunting and foraging strategy areas (plains grassland and riverine). This should serve to maximize the quantity of available plant and animal resources.

Differences in hunting and gathering strategies may be reflected in the artifact assemblage (Kelly 1988; Parry and Christenson 1987), even when they occur within a single culture. Abundant plant resources result in tool production and use focused on gathering and processing, with an emphasis on expedient and generalized tools. One result of plant gathering would be an emphasis on processing. A lithic artifact assemblage focused on formalized and specialized tools would be more likely if hunting, rather than plant gathering, was the main thrust of subsistence activity.

A model for the cultural and temporal differentiation of lithic artifact assemblages in the absence of diagnostic artifacts has been developed by Schelberg and Akins (1987). This model combines hunter-gather subsistence (Binford 1980) and Early and Late Archaic subsistence (Irwin-Williams 1984) with observations of prehistoric and historic Pueblo subsistence patterns (Akins and Bullock 1992:32). Based on the concept that different cultures will utilize the same lithic resource in different ways, this model tracks four "marker" attributes within lithic artifact assemblages. The ratio of debitage to tools (including utilized debitage) and the percentages of flakes, cores, and bifaces within an assemblage will be monitored.

Two trends are found to occur through time. Both the ratio of debitage to tools, and the percentage of flakes within lithic assemblages, should increase through time. Conversely, the percentages of both cores and bifaces within assemblages decrease. Thus, through a comparison of these four attributes, cultural affiliation can be determined when diagnostic artifacts are not present. This is accomplished by plotting each assemblage position within a progression between well-dated sites (Bullock 1994a, 1994b, 1995a).

Subsistence and changes in subsistence strategy can be addressed through the use of floral and fauna remains, features, the artifact assemblage, and the spatial relationships of the data. Although floral remains are not likely to be abundant at the site, faunal remains could be present in large quantities.

Contexts likely to yield floral and fauna remains are hearths, storage pits, use surfaces, and midden deposits. Two stratified midden deposits are present at LA 111917. Since processing the entire midden deposit may not be practical, samples will be collected from it during excavation, processed, and analyzed for macrobotanical remains. If storage pits are present, pollen samples will be collected from the pit floors. Hearths are the features with the

most potential to yield macrobotanical remains. Fill from hearths will also be sampled, processed, and analyzed for macrobotanical remains. Both hearths and middens may contain fragmentary faunal remains.

Chipped stone can be an indicator of subsistence activities based on the technological levels of lithic material reduction, tool production, and use. The level of tool technology within a culture varies according to the form of site utilization (Akins and Bullock 1992). Kelly (1988) has suggested that the level of tool technology results from the distance from residential sites and the source of suitable raw materials for tool production. The chipped stone assemblage will be examined in terms of reduction strategy, assemblage diversity, and tool use.

The processing of food can be inferred by the presence of ground stone artifacts, such as manos and metates. The presence of manos and metates would indicate LA 111917 was a residential site. The form of a metate may be indicative of the product to be processed. Lancaster (1984) has suggested that basin metates are more commonly associated with the processing of wild grass seeds, while trough metates are evidence for the grinding of maize. This functional differentiation will be used in the analysis of manos and metates from LA 111917.

Features such as hearths, use surfaces, and storage pits will provide more direct evidence of site function. The existence of extramural hearths and storage pits would provide additional evidence of possible site function and activities.

The presence of features and their association with artifacts will determine our ability to determine site function. These associations are the basis for site structure analysis. Site structural analysis methods are used to address questions of site formation, activity areas, and group size. For LA 111917, artifact associations and distribution in relation to features will be used to address site formation as well as length and sequence of occupation.

Field Methods

1. LA 111917 will be reexamined, and surface artifacts, feature locations, and site limits will be pinflagged.

2. A 1 by 1 m grid system will be superimposed across the site with a transit, stadia rod, and 50 m tape. The west and south limits of the grid will be staked at 2 m intervals. All grid designations will be based on the southwest corner of this superimposed grid. Each collection unit will have a south and west designation, based on its southwest corner.

3. Surface artifacts will be collected in 1 by 1 m units. All artifacts within collection units will be placed in bags with the appropriate grid designation.

4. Excavation will emphasize finding use surfaces and associated features. The excavation

methods will include the mechanical removal of overburden, surface stripping, and feature excavation. Previously excavated test units will also be relocated.

Testing determined that midden deposits extend into the face of the terrace under several meters of overburden. The existing overburden will be mechanically removed to within 10 cm of the top of the midden deposits. The remaining overburden will be surface-stripped by hand in 1 by 1 m units. All excavated dirt will be screened in 1/4 inch wire mesh and the artifacts collected and placed in bags with the appropriate grid designation. Vertical control will be maintained with a site datum tied into the grid system. Subdatums tied to the site datum will be used as appropriate.

Cultural deposits are present at LA 111917. Since cultural deposits are considered an indicator of an occupational level, once surface-stripping has been completed, any cultural deposits or features present will be defined and possible activity areas associated with them carefully uncovered by hand. Excavation will proceed in 10 cm or 20 cm arbitrary levels as applicable until cultural strata are encountered. If a cultural stratum is encountered it will become the excavation unit. Where deposits of overburden exist, this will be removed with mechanical equipment prior to surface-stripping by hand.

As excavation proceeds, structural components of features will be mapped using the closest set point. The mapping of features will aid in the identification of occupational levels or surfaces. Once occupational levels or surfaces are defined, they will be carefully excavated by hand, and any artifacts present will be left in place. These will be piece-plotted and drawn on a map, prior to their removal. Excavation will continue until culturally sterile soils or bedrock is reached.

Excavation documentation will consist of field notes and grid forms compiled by the excavator. The forms will contain locational, dimensional, stratigraphic, and contextual information. General notes outlining excavation strategy and rationale, field interpretations, and decisions will be kept by the project director and site assistants.

5. Feature excavation will begin by exposing the top of the feature and the immediate surrounding area. The exposed stain or soil change will be mapped and photographed (if appropriate). Once defined, each feature will be excavated as a discreet unit, regardless of its location on the grid system. The feature will be bisected, and half will be excavated in natural levels, if possible, exposing the natural stratigraphy of the feature fill. The exposed cross section will be photographed and profiled, and the stratigraphy described using a Munsell Color Chart and standard geomorphological terms. The second half of the feature will be excavated in natural layers. Soil samples, archaeomagnetic samples, and Carbon-14 samples will be collected as appropriate. All dirt removed during excavation will be screened in 1/4 inch wire mesh and the artifacts bagged and labeled by excavation unit. Dirt from areas of the site where small artifacts are present will be screened through 1/8 inch wire mesh.

Once each feature is completely excavated, feature maps and profiles will be drawn and tied into the grid system and site elevations. Drawings will include a scale, north arrow, and

a key to abbreviations and symbols. Written description will be on standard forms that will include provenience, dimensions, soil matrix, artifact, construction, time frame, excavation techniques, and other data. Photographs will record each excavated feature. All photographs will be recorded on a photo data sheet.

Any structures encountered will be approached in the same manner as features. A portion of any pit structure will be excavated in natural levels, if possible, until culturally sterile soil has been reached. The resulting profile will be drawn and photographed. The second portion of the pit structure will then be excavated in natural stratigraphic layers. Artifacts on the pit structure floor will be piece-plotted and drawn onto a scale map of the pit structure, as will any floor features encountered. All dirt from the pit structure will be screened through 1/4 wire mesh and the artifacts recovered, bagged, and recorded by provenience. The pit structure will then be tied into the grid and mapped.

Artifacts from each provenience will be bagged and labeled by excavation unit. A field specimen number will be assigned to all bags by provenience and a field artifacts catalogue maintained for the site. Materials necessary for immediate preservation of fragmentary and unstable faunal or macrobotanical remains will be used.

6. Human remains that may occur will be treated according to the procedures outlined by the laws and regulations of the State of New Mexico and the Museum of New Mexico's "Policy on Collection, Display, and Repatriation of Culturally Sensitive Materials" (SRC Rule 11, adopted January 17, 1991, and modified February 5, 1991; see Appendix 3).

7. Carbon-14 samples will be collected from features and other possible cultural contexts as appropriate. Samples will be ranked according to their context and data potential. Preferred samples should lack sources of potential contamination such as rodent burrows and nests, prolonged exposure during excavation, and proximity to modern surfaces or disturbance. Archaeomagnetic samples and dendrochronological samples will be collected according to the processing laboratory's standards.

8. After deposits, hearths, and features are cross-sectioned, the sample potential for macrobotanical and palynological samples will be assessed. Samples will be collected when deemed appropriate (when the assessed possibility of preservation is high and the potential for contamination is low). All samples will be collected with a dry, clean trowel and placed immediately into a bag or tin foil. Samples will only be collected from contexts with a high potential for success.

Sample locations will be plotted on plan and profile drawings of features and proveniences. The sample bags will be labeled with the provenience designation, feature number, location within the feature, and stratigraphic position. The samples will also be recorded on specimen forms with labeling information, environmental data, contextual information, and any other comments that may be useful to the laboratory analysis.

9. An updated map of the site will be made with a transit, stadia rod, and 50 m tape. The map

Laboratory Methods

Before artifact analysis, all artifacts will be cleaned, and any material requiring conservation will be treated. Collected samples of charcoal and macrobotanical remains will be processed and prepared for shipment to the appropriate laboratory. The specialists involved will be consulted for special preparations required before shipment. Working copies of filed maps and feature drawings will be prepared and made available to the special analysts.

The lithic artifact analysis will follow the guidelines of OAS (1994). Morphological and functional attributes will emphasize material reduction, manufacture and maintenance, and tool use.

Faunal remains will be analyzed in the OAS laboratory. Specimens will be analyzed for species, sex, age, portion, condition, evidence of butchering, and evidence of taphonomic processes. Faunal remains are important indicators of subsistence strategy and site formation and use. The detail of the analysis will be dependent on the abundance and condition of the recovered faunal remains.

Macrobotanical remains from collected samples will be analyzed at OAS. The analysis will identify plant resources used prehistorically and aid in the study of subsistence and site function. Analysis of pollen samples will be integrated with other flora-derived data to study seasonality of site use.

Specialized dating studies will be conducted by contracted specialists. Archaeomagnetic analysis will be conducted at the OAS archaeomagnetic laboratory.

Research Results

A report will be published in the Office of Archaeological Studies' Archaeology Notes series. The report will present all important excavation, analysis, and interpretive results. Included will be photographs, maps, and tables. Raw data such as field notes, maps, photographs, and artifact categories will be stored at the Archaeological Records Management Section, Historic Preservation Division. The artifact collection will be curated at the Museum of New Mexico's Archaeological Research Collection.

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APPENDIX 2: TESTING AND SITE EVALUATION PROPOSAL

TESTING AND SITE EVALUATION PROPOSAL

Purpose of Testing

The purpose of testing sites is to determine the nature and extent of surface and subsurface archaeological materials. Further, these materials need to be assessed for their potential contribution for increasing the knowledge of the prehistory or history of a region. The following components will be included in each testing project with the exception of auger testing or the use of mechanical equipment. The augering and mechanical earthmoving equipment components may or may not be used as necessary.

Definition of Site Limits and Artifact Distributions

To determine site limits, archaeologists will traverse the site using parallel transects across the portion of the site within the area of proposed project limits. If landowner permission has been received, the entire site will be examined. Artifacts observed during these transects will be marked with pinflags. Site limits will be considered to be the boundary between the presence and absence of artifacts and features. The pinflags will also reveal areas of relatively higher artifact density and provide an indication of artifact distribution in general. If artifact density across the site is so high that marking individual artifacts with pinflags is impractical, only site limits and artifact concentrations will be marked with pinflags.

Selection of Site Areas to be Tested

Areas to be tested include those of higher artifact density in relation to the site as a whole and are indicated by clusters of pinflags. Obvious features such as hearths and rock alignments may be tested to determine if they have potential to contribute important data. Unidentifiable, but visible surface manifestations of possible subsurface features will also be selected for testing in order to determine their nature and extent. These manifestations include, but will not be limited to, soil discolorations, charcoal/ash deposits, or rock alignments/concentrations.

Collection and Recording

Depending upon the density of artifacts present on the site surface, the entire assemblage, or a sample of the assemblage, may be recorded in the field. Artifacts that provide data on temporal placement or cultural affiliation will be collected. Surface artifacts that occur within areas selected for test excavations will be collected before testing proceeds. Locations of artifacts will be recorded using either a transit, tape, and stadia or by grid designations based on Cartesian coordinates. Feature locations and general characteristics will be recorded using some combination of Brunton, transit, tape, and stadia. Photographs of the site and features will also be taken.

Test Excavation Procedures

In general, test excavations will be performed entirely with hand tools. Exceptions regarding the use of mechanical earthmoving equipment are discussed below. Test pits will not exceed 1 by 2 m and excavation will proceed in arbitrary 10 cm levels. As natural strata are determined, test pits may be excavated using those strata as the vertical excavation unit. All soil and sediment deposits will be

screened through ¼ inch mesh. Samples for flotation, pollen, or radiocarbon analysis may be taken from test excavation areas, as appropriate. Recovered artifacts will be bagged by horizontal and vertical provenience unit. All test pits will be backfilled at the completion of the testing program.

Augering

Depressions suggestive of possible subsurface features, such as pit structures, may be tested with hand soil augers. These auger tests will be used to search for charcoal, wood, artifacts, or other evidence usually associated with semisubterranean living spaces. Auger tests may also be used to determine the subsurface extent of cultural lenses or strata that are identified during test excavations. All soil removed by auger testing will be screened through ¼ inch mesh. Additional auger tests may also be used to determine if other buried features, having no surface manifestations, are present.

Limits of Testing

The combined horizontal extent of tested areas will not exceed 2 percent of the total site area, excluding the testing of possible features and any auger tests. If intact features are found during test excavations, digging will cease, the nature of the feature will be recorded, and the test pit will be backfilled.

Use of Mechanical Earthmoving Equipment

Geomorphological data may be of value in assessing the nature of the site. Therefore, limited use of mechanical earthmoving equipment may be necessary. Such equipment may also be useful for finding subsurface features in alluvial or eolian deposits. If so, all surface artifacts within corridors where mechanical earthmoving equipment will be used, an adjacent buffering strip, and the expected position(s) for the mechanical equipment will be collected before use of the equipment begins. Examination of the excavated area will occur after the removal of each extracted unit of soil or sediment. The resulting backdirt will also be examined for the presence of artifacts.

Expansion of Testing

If testing results are inconclusive within the constraints outlined above, for example, the 2 percent maximum is reached and there are equivocal results regarding the nature and extent of subsurface materials, then appropriate authorities will be contacted with a revised proposal. The additional testing will proceed after the revised proposal has been approved.

Human Remains

If human remains are encountered, they will be protected and left in place. If conditions are such that the remains cannot be protected, field treatment will follow procedures outlined by the laws and regulations of the State of New Mexico (Sec. 16-6-11.2 NMSA 1978; HPD Rule 89-1) and the Museum of New Mexico policy adopted January 17, 1991 and modified February 5, 1991, "Policy on Collection, Display, and Repatriation of Culturally Sensitive Materials" (SRC Rule 11).

Laboratory Analyses

All collected artifacts will be cleaned, sorted, and examined in the laboratories of the Office of Archaeological Studies. Analyses within each artifact material class will be conducted by standards established by the Office of Archaeological Studies.

Disposition of Recovered Artifacts

Unless otherwise stipulated by landowners or land managers, all recovered artifacts will be curated in the Archaeological Research Collections at the Museum of New Mexico, Laboratory of Anthropology. As a division of the Museum of New Mexico, the Office of Archaeological Studies maintains a curation agreement with the Archaeological Research Collections unit.

Site Mapping

Site boundaries, physical and cultural features, test excavation locations, auger tests, mechanical equipment tests, and areas of proposed project limits will be recorded with a transit, stadia, and tape. A scaled map will be produced showing these data.

Published Report

A report, containing a summary of the test excavations, laboratory analyses, and recommendations for site management, will be produced upon completion of fieldwork and laboratory study and published in the Museum of New Mexico, Office of Archaeological Studies, *Archaeology Notes* series. Attached to the report will be updated site record forms for the New Mexico Cultural Resource Management Information System managed by the Historic Preservation Division, Archeological Records Management Section.