MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

RIVERSIDE: THE TESTING OF FOUR SITES AND A DATA RECOVERY PLAN FOR LA 110621, NEAR SANTA TERESA, DOÑA ANA COUNTY, NEW MEXICO

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ADMINISTRATIVE SUMMARY

Between April 15 and April 26, 1996, the Office of Archaeological Studies, Museum of New Mexico, conducted limited testing at four sites near Santa Teresa, Doña Ana County, New Mexico. Limited testing was conducted at LA 98732, LA 98734, LA 110621, and LA 110622 at the request of the New Mexico State Highway and Transportation Department (NMSHTD) to determine the nature and extent of cultural resources within an area of planned improvements to NM 273. All four sites are on state land administered by the NMSHTD.

The four sites are surface ceramic and lithic artifact scatters and represent peripheral portions of larger habitation sites. No intact cultural features or deposits were found at three of the sites (LA 98732, LA 98734, and LA 110622). The resources have been adequately documented at these three sites, and no additional investigations are recommended.

Three intact cultural features were found at LA 110621 within the proposed project limits: two pit structures and an intact midden deposit. We recommend data recovery investigations be conducted at LA 110621.

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.

NMSHTD Projects TPO-0273(3)04/CN2875 and TPO-0273(5)06/CN 3031
MNM Project 41.621 (Riverside)
CPRC Archaeological Survey Permit No. SP-146

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INTRODUCTION

At the request of William L. Taylor, environmental program manager, New Mexico State Highway and Transportation Department, a limited testing program was conducted at four sites (LA 98732, LA 98734, LA 110621, and LA 110622) within an area of proposed improvements to NM 273 near Santa Teresa, New Mexico (Fig. 1 and Appendix 1). Limited testing was conducted under CPRC Archaeological Survey Permit No. Sp-146. Fieldwork took place between April 15 and April 26, 1996, conducted by Peter Y. Bullock, assisted by Byron Hamilton and Tema Bennett. Martha and Roland Mace worked as volunteers at LA 110621. Yvonne Oakes acted as principal investigator. Ceramic analysis was carried out by C. Dean Wilson. Faunal analysis was conducted by Nancy J. Akins. Maps were drafted by Robert Turner, the report was edited by Tom Ireland, and the photographs were printed by Nancy Warren.

Limited testing was conducted at LA 98732, LA 98734, LA 110621, and LA 110622 to determine the nature and extent of the portions of the sites within the proposed project area. Testing was restricted to the project area for the planned improvements to NM 273 (Appendix 1).

Before the fieldwork, the *National Register of Historic Places,* the *State Register of Cultural Properties,* and the site files of the New Mexico Cultural Records Information System were consulted. No properties listed on, nominated to, or approved for submission to either inventory are located in the vicinity of LA 98732, LA 98734, LA 110621, or LA 110622.

This report complies with the provisions of the Historic Preservation Act of 1966 as amended.

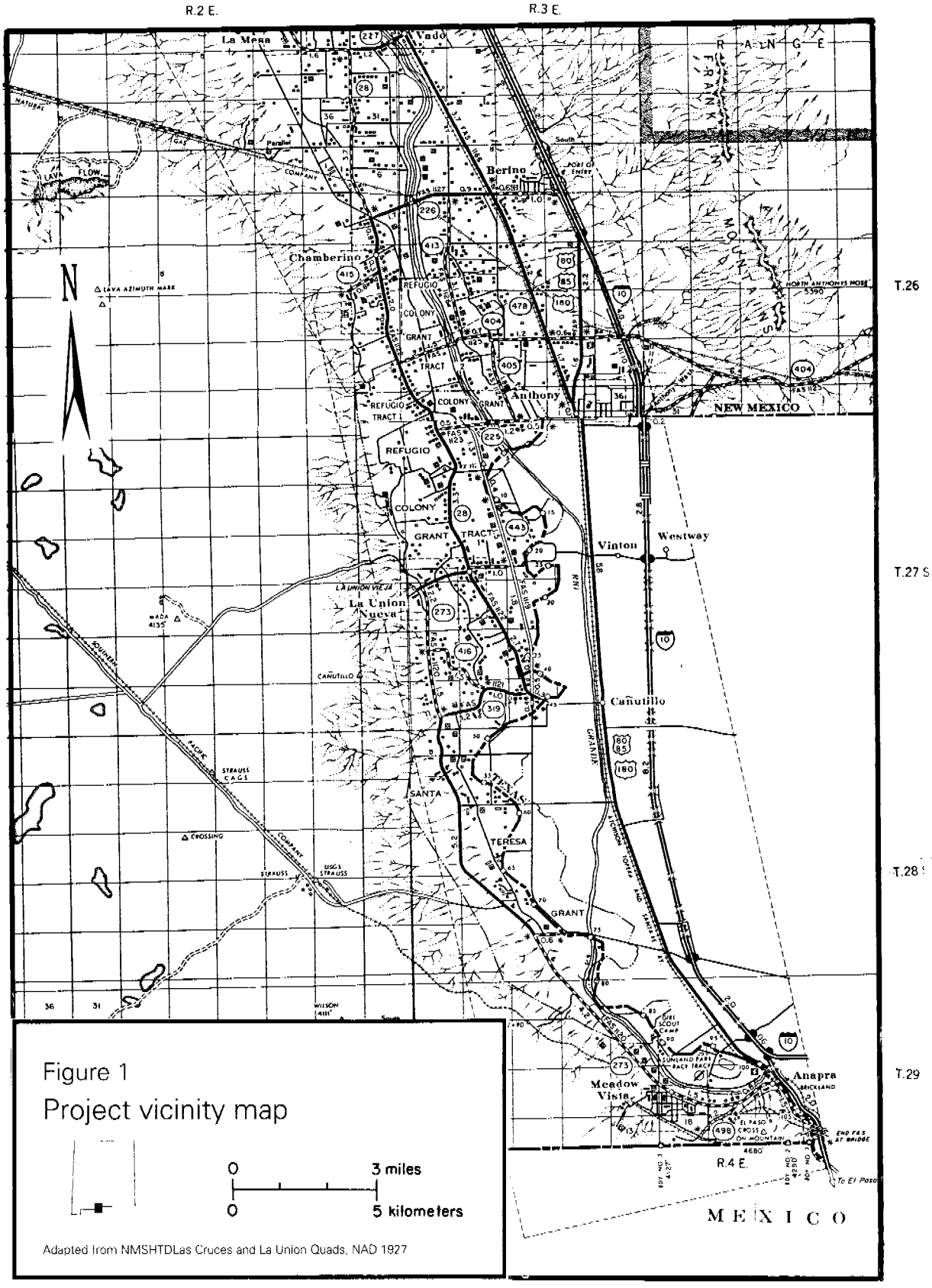


Figure 1
Project vicinity map

Adapted from NMSHTDLas Cruces and La Union Quads, NAD 1927

ENVIRONMENT

The project area is west of the Rio Grande near the center of the intermontain lowland known as the Mesilla Bolson. Elevation within the project area varies from 1,155.1 m (3,780 ft) to 1,158.2 m (3,800 ft).

The countryside, west of the Rio Grande Valley and north of Santa Teresa, is rolling desert grassland (Castetter 1956: Fig. 1). The site areas are in a region of active coppice dunes. Historically, these dunes have stabilized; however, overgrazing has reduced the local grasses, allowing an increase in erosional duning activity. Invasive species, including mesquite, creosotebush, and soap-tree yucca, dominate the local vegetation. An in-depth analysis of the environment of the project vicinity is available in O'Laughlin (1980).

Geology

The project area is within the Mexican Highland section of the Basin and Range physiographic province (Fenneman 1931:379-380). The area is characterized by north-south block-fault ranges uplifted in the Tertiary period. These ranges are separated by intermontain basins filled during the upland erosion of the Pleistocene (Kottlowski 1958; Strain 1966). The project area is within one of these basins, known as the Mesilla Bolson (Fenneman 1931:385). The Mesilla Bolson is bounded to the west by the Sierra de Las Uvas and the Potrillo Mountains, and to the east by the Organ and Franklin Mountains. The Franklin Mountains are approximately 11 km (7 miles) east of the project area (O'Laughlin 1980:6). They are a Tertiary uplift of Precambrian, Paleozoic, Cretaceous and Tertiary sedimentary rock, with rhyolite, granite, and andesite intrusions (McAnulty 1967).

The project area is on the first river terrace west of the Rio Grande, in an area known as the Leeward Slope zone. This zone includes both the alluvial fans and shallow drainages below the La Mesa deposits to the west, as well as an extensive strip of coppice dunes. The Leeward Slope zone is dominated by eolian deposits brought in by the prevailing westerly winds and has been heavily affected by erosion and duning. Sandy soils dominate this zone, although limited areas of gravelly soils do occur (O'Laughlin 1980:19).

West of the project area is an area of nearly level basin sediments. These once formed the bed of the Pleistocene Lake Cabeza de Vaca (Strain 1966) and are known as the La Mesa surface (Hawley and Kottlowski 1969). Eolian sands blowing off these deposits have been deposited in the Rio Grande Valley by westerly winds (Davis 1989:4), forming most of the soil comprising the coppice dunes in the project area (Strain 1966).

The soils of the project area reflect the redeposited erosional material from the La Mesa surface west of the Leeward Slope zone, incorporating the project area (O'Laughlin 1980:10). The soils in the project area are Typic Torripsamments, generally comprised of loose noncalcareous fine sand over thick deposits of fine sand, sometimes grading into sandy loam

or sandy clay. These soils are common in areas of duning (Maker et al. 1974:35).

Climate

The climate of the project area is semiarid mesothermal, with hot days and cool nights. Reflected heat from the north-south-oriented Franklin Mountains, west of the project area, contributes to higher temperatures for this section of the Rio Grande Valley (Tuan et al. 1973:68-69). Average annual precipitation for El Paso is 20.1 cm (O'Laughlin 1980:12; Tuan et al. 1973:18). Most rainfall occurs in July, August, and September (Gabin and Lesperance 1977:114; Maker et al. 1974:26; Tuan et al. 1973:20). The average number of frost-free days is 248 (O'Laughlin 1980:12; Tuan et al. 1973: Fig. 35), while the potential growing season for domesticated crops is closer to 348 days (Smith 1920:273; Fig. 79). O'Laughlin (1980:12) has noted that this combination of temperature and rainfall results in one long growing season, and variability of microclimates and localized conditions have the greatest effect on productivity and crop yield.

The current pattern of summer rains and cool, dry winters first appeared in the middle Holocene, when there was more precipitation than now. Despite a great deal of variability (wetter periods are suggested for 1000 B.C. and A.D. 1000), there has been an overall drying trend through time. One result of this drying trend has been a gradual change in biotic communities from piñon-juniper woodland, to juniper-oak, to savannah grassland with scattered juniper and oak in broken mountainous areas (Davis 1989:21; O'Laughlin 1980:12-14; Van Devender and Spaulding 1979).

Flora and Fauna

One by-product of the range of environmental zones in the project vicinity is an increased variety in available plant and animal resources. Plant communities generally vary with elevation in the Franklin Mountains (Castetter 1956). The riverine ecosystem of the Rio Grande floodplain serves as a distinct linear oasis, providing habitat for plant and animal communities not normally associated with the desert landscape. Some species, such as migrating birds, utilize this area in only a transitory manner. However, the increased variety in plant and animal communities puts more species in closer proximity.

The grazing of livestock has modified the vegetation of the project vicinity (Castetter 1956:261-262). The former heavy grass cover of dropseed and black grama has been eliminated. Mesquite, soap-tree yucca, four-wing saltbush, and creosotebush dominate the existing vegetation (O'Laughlin 1980:19).

Most of the general project area supports the Chihuahuan desert faunal complex of jackrabbits, pronghorn, mule deer, desert cottontail, and a variety of birds and small rodent species (O'Laughlin 1980:21).

CULTURE HISTORY

A complete culture history of the project area is beyond the scope of this report. In-depth history of the area is available in Lehmer (1948), Moore (1996), Stuart and Gauthier (1988), and Timmons (1990).

Paleoindian Period

The presence of Paleoindian peoples in the El Paso area is primarily known from surface finds of distinctive lancelate projectile points, scrapers, and gravers (Beckes 1977; Everitt and Davis 1974; Hard 1983; Russell 1968). These artifacts have been restricted to Folsom and later Plano occupations dating roughly between 8,000 and 6,000 B.C. (O'Laughlin 1980:23). Artifacts attributable to the earliest Paleoindian culture (Clovis) have not been found in the vicinity.

Although it was once believed that Paleoindian cultures depended mainly on large, now-extinct Pleistocene mammals for food, their subsistence is now believed be broader based. Although bison played an important role in Folsom and Plano subsistence (O'Laughlin 1980:23), small animals and wild plants also seem to have been important (Judge 1973).

The presence of surface artifacts indicates that small, highly mobile Paleoindian groups took advantage of the diverse ecology existing in the El Paso area during the late Pleistocene. During this period, large expanses of open woodland and savannah separated the then-forested mountain ranges. Small lakes and perennial streams were common. By the middle Holocene, climatic changes had established the ecological communities present today (O'Laughlin 1980:23).

Archaic Period

The Archaic period is characterized by a more diversified hunting and gathering form of subsistence than the Paleoindian period. Small family-based social groups may have traveled on a seasonal round structured by the availability of different species of wild plants. Lechuguilla and sotol may have been principal food plants in south-central New Mexico and west Texas (Hard 1983:9).

Although subsistence remained based on wild plants, maize began to be cultivated during the Archaic period (Hard 1983:8). Maize dating to 1,394 B.C. has been recovered from the Fresnal Shelter in south-central New Mexico (Tagg 1996:317), and to 1029 B.C. from the Organ Mountains near Las Cruces (Upham et al. 1987).

Archaic sites are identified on the basis of diagnostic projectile points, allowing Archaic sequences to be developed for specific areas. In northwestern New Mexico, a cultural

sequence known as the Oshara Tradition was developed by Irwin-Williams (1973). The Cochise Culture has been recognized in Arizona and southwestern New Mexico (Beckett 1973). Archaic sites are also characterized by flaked core tools, grinding implements, and clusters of roasting pits and hearths represented by burnt and fire-cracked rock. Perishable materials, including basketry, sandals, cordage, and matting have been recovered from caves and rockshelters (O'Laughlin 1980:24).

Archaic developments in the El Paso area reflect the Cochise Culture, with the addition of traits such as distinctive projectile points from the Big Bend aspect of the eastern Trans-Pecos area (Hard 1983:9; Lehmer 1958:127). This is particularly true of the Late Archaic Hueco phase (Hard 1983; Lehmer 1948). A number of Archaic sites have been recorded in the general project area (O'Laughlin 1977, 1979, 1980; Whalen 1977, 1980).

Pueblo Period

The Pueblo period in south central New Mexico is part of the Jornada Mogollon culture. Known as the Formative period, it is believed to be a direct offshoot of the Late Archaic Hueco phase (Hard 1983). Major cultural changes include an increased dependence on agriculture, the development of ceramics, and increased sedentism (Hard 1983:9). The Formative period is comprised of the three phases developed by Lehmer (1948), although slightly modified (Moore 1996).

Mesilla Phase

Beginning between A.D. 1 and A.D. 200 and extending to A.D. 1100, the Mesilla phase is characterized by the dominant use of El Paso Brown ceramics. Circular and rectangular pit structures were built during this phase. Also common at sites dating to this period are extramural storage cists and hearths, and sheet-trash deposits (Hard 1983:9; Lehmer 1948:77).

Regional trade is indicated by intrusive ceramics, suggesting contacts with the Mimbres Culture to the northwest and the Livermore horizon of the West Texas Big Bend area to the east; and by shell from the Gulf of California (Lehmer 1948:77).

Doña Ana Phase

The Doña Ana phase dates to between A.D. 1100 and 1200, a transitional phase between the earlier Mesilla phase and the later El Paso phase. The Doña Ana phase is characterized by El Paso Brown Ware and El Paso Polychrome in the same cultural deposits (Hard 1983:9-10; Lehmer 1948:78-80).

Small surface pueblos begin to appear during this phase (O'Laughlin 1980:26).

However, most of the cultural material of this phase shows little change from the preceding Mesilla phase (Moore 1996). Trough metates tend to become more common within the assemblages, suggesting a greater dependence on agriculture and the processing of maize. A greatly increased range of intrusive ceramic types, in greater numbers, occurs in the Doña Ana phase (Lehmer 1948:78-80).

El Paso Phase

The El Paso phase dates between A.D. 1200 and 1400. This phase is characterized by El Paso Polychrome ceramics and above-ground adobe structures. An increase in intrusive ceramics takes place during this phase, including material from over a wider area (Hard 1983:10; Lehmer 1948:80-82). The overall artifact assemblage is more complex, and a wider range of items and types of tools is represented than in either of the two earlier phases (Lehmer 1948:81).

Adobe surface structures are the dominant structural type during the El Paso phase. Such structures are grouped around a plaza or arranged in rows. Internal features are common (Lehmer 1948:8): usually postholes, pits, and hearths (Moore 1996). Villages are usually near the base of slopes, possibly to take advantage of seasonal water runoff for agricultural purposes (Hard 1983:10). Village size varies. Clusters of villages have been reported in the Alamogordo area (Lehmer 1948) and in the Hueco Bolson (Whalen 1977). Specialized sites such as hunting camps and plant gathering and processing camps are easily discernable (O'Laughlin 1980:26).

Ritual at the village level is suggested by specialized rooms at most El Paso phase villages. These rooms are larger than the other rooms in the village, and caches of material have been found beneath the floors (Moore 1996). El Paso phase villages were abandoned by about A.D. 1400 (Hard 1983:10).

Protohistoric Period

The El Paso area was inhabited by the Manso Indians, probable descendants of the Jornada Mogollon, at the time of Spanish contact. Although pit structures and adobe pueblos were in use in the La Junta area to the south, and pueblos were used in the Socorro area to the north, the Manso inhabited small huts covered with brush. Beans, squash, and maize were raised, and wild plant foods gathered in season. The Manso hunted game and fished in the Rio Grande. After Spanish contact, the Manso were gradually absorbed into the general population (Beckett and Corbett 1992; Moore 1996).

Historic Hispanic Period

Although a number of Spanish expeditions passed through the El Paso area during the conquest and colonization of New Mexico, no Spanish settlement occurred in the project

vicinity until December 8, 1659. On that day, the mission of Nuestra Señora de Guadalupe de los Mansos del Paso del Norte was founded. A presidio was also soon established, and the mission became the center of Spanish settlement in the El Paso area (Timmons 1990).

The small Spanish population of the area increased dramatically with the influx of refugees from the northern settlements of New Mexico with the Pueblo Revolt of 1680. Many Spanish and Indian refugees refused to return north after the Reconquest in 1692, settling in the El Paso area and becoming part of the local population (Timmons 1990). Early Spanish settlement in the El Paso area was concentrated along the Rio Grande Valley, south of the pass that gave the area its name. The threat of Apache raids effectively limited settlement to the north until the late 1700s (Timmons 1990).

The Spanish government made a number of land grants in the Mesilla Valley to encourage settlement, a policy that was continued by the Mexican government. The Santa Teresa grant was established by 1790 on the west bank of the Rio Grande. The El Brazito grant, further north on the east bank of the Rio Grande, was established in 1805 and reestablished in 1816 (Price 1995:2) and 1823 (Sayles and Williams 1986:105-107). The Canutillo grant, on the east bank of the Rio Grande, was established in 1823 (Timmons 1990). All of these grants were abandoned by 1833 due to Apache raids and remained vacant until the arrival of Euroamericans (Timmons 1990). One successful settlement was Doña Ana, settled in 1843 (Price 1995:2) on the Doña Ana Bend grant, which had been established in 1839 (Sayles and Williams 1986:105-107).

During the Mexican War, armed forces of the United States captured Santa Fe in April of 1846. Doña Ana and El Paso were captured in December of the same year. At the end of the Mexican War, the west bank of the Rio Grande from Doña Ana to El Paso remained the territory of Mexico. Mexican citizens from both areas who were unwilling, or unable, to remain in the territory captured by the United States moved into this portion of the Mesilla Valley with the encouragement of the Mexican government (Price 1995:14). The largest settlement in this area was Mesilla, founded in 1850 by Mexican refugees from Doña Ana (Price 1995; Stribling 1986; Timmons 1990).

The Mexican government legitimized this settlement with a series of land grants. The J. M. S. Baca grant, on the west side of the Rio Grande, was established in 1849. The Refugio Colony #1 grant and the Refugio Colony #2 grant were both established in 1852 (Sayles and Williams 1986:105-107) or 1850 (Price 1995). The Mesilla Civil Colony grant and the Santo Tomas de Iturbide Colony grant were both established in 1853 (Sayles and Williams 1986:105-107) or 1852 (Price 1995).

Euroamerican Period

The west side of the Mesilla Valley became part of the United States in the Gadsen Purchase of 1854--the purchase by the United States, from Mexico, of the territory south of the Gila River between the Rio Grande and the Colorado River for $15 million (Stribling 1986;

Timmons 1990). The small population of this territory was clustered in Mesilla Valley and the mission settlements of southern Arizona (centered on Tucson).

In 1859 the Euroamerican residents of the Mesilla Valley and Tucson areas petitioned the United States Congress for the establishment of a new, proslavery territory--Arizona--consisting of the southern half of New Mexico (Price 1995:12). This petition was not adopted, but with the advent of the Civil War, many Euroamerican residents of the area supported a Confederate victory. Mesilla was captured by Confederate forces on July 1, 1861, and the territory of Arizona was proclaimed part of the Confederacy (Price 1995:26; Stribling 1986:19; Timmons 1990).

Although not originally concerned with the issues leading up to the Civil War, the invasion of New Mexico by Texas Confederate forces rallied the Mexican-American population of southern New Mexico to support the Union. The final defeat of Confederate forces in New Mexico, and the subsequent capture of El Paso by Union forces in 1862, ended Confederate control of the Mesilla Valley (Stribling 1986; Timmons 1990).

The southern area of the Mesilla Valley remained a sparsely settled agricultural area, with farming and some ranching along the Rio Grande. The economics of the area altered after the 1880s with the arrival of the railroads. The Southern Pacific Railroad Company completed its track, just west of the project area, from Deming to El Paso on May 19, 1881 (Myrick 1990:60). The El Paso and Southwestern Railroad completed its track between Hermanas, New Mexico, and El Paso, Texas, in November 1902 (Myrick 1990:95). This line, south of the project area, was abandoned in 1961 (Myrick 1990:70).

A number of communities are in this portion of New Mexico. Near the site area are La Union and Santa Teresa. La Union, the oldest community in the area, was created by the union of two earlier settlements in 1856 (Julyan 1996:192; Pearce 1965:86; Price 1995:9). Santa Teresa, named for the Santa Teresa Land Grant, is a recently established residential community (Julyan 1996:327). Anapra, south of the project area, was founded as a railroad town. This community is now part of Sunland Park (Julyan 1996:15; Pearce 1965:7), incorporated as a town in 1960 and named after the local race track (Julyan 1996:393; Pearce 1965:161).

Economic activity in this part of New Mexico is now centered on the growing El Paso–Juarez area to the east, and to a lesser extent, on Las Cruces, to the north.

FIELD METHODS

Limited testing followed the procedures and practices outlined in *Testing and Site Evaluation Proposal* (New Mexico Historic Preservation Division, Log 43648), Appendix 4. A main datum and baseline were established for each site. Surface artifacts were pinflagged to define 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 location of all test units and cultural features were plotted. All surface artifacts were plotted with a 50 m tape and then collected.

Test units measuring 1 by 1 m were hand-excavated at each site in areas of surface artifact concentrations or areas of possible prehistoric activity indicated by discolored soil. Test units were hand-excavated in 10 cm levels until culturally sterile soil was reached. All of the excavated dirt was screened through 1/4 inch wire mesh, and the artifacts were 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 went down to culturally sterile soil, and the depth to sterile soil was 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, Archeological Records Management Section.

LA 98732, also known as the Sandy Bone site, is a ceramic and lithic artifact scatter measuring 35 m by 55 m (Figs. 2 and 3). The site is in an area of active dunes on the north side of NM 273. The roadbed of NM 273 is built up nearly 1 m in the area of LA 98732, and the built-up area extends 9 m (29.5 ft) beyond the edge of the highway pavement. The portion of LA 98732 within the existing highway right-of-way was excavated by a University of Texas at El Paso (UTEP) field school in 1975 (O'Laughlin and Gerald 1977). The site has more recently been modified by construction of an underground gas pipeline which parallels NM 273. A dirt track also crosses the site between the underground pipeline and the built-up roadbed of the existing highway. The elevation of the site is 1,158.2 m (3,800 ft).

Figure 2. Overview of LA 98732, looking south.

A total of 196 artifacts was recorded at LA 98732. Of this total, 32 artifacts (7 ceramics and 16 lithic artifacts) were piece-plotted on the surface of LA 98732. All of these artifacts are redeposited from highway fill from the built-up roadbed.

One hundred and sixty seven artifacts (26 ceramics, 133 lithic artifacts, and 8 pieces of bone) were recovered from test units hand-excavated into the fill of the built-up roadbed.

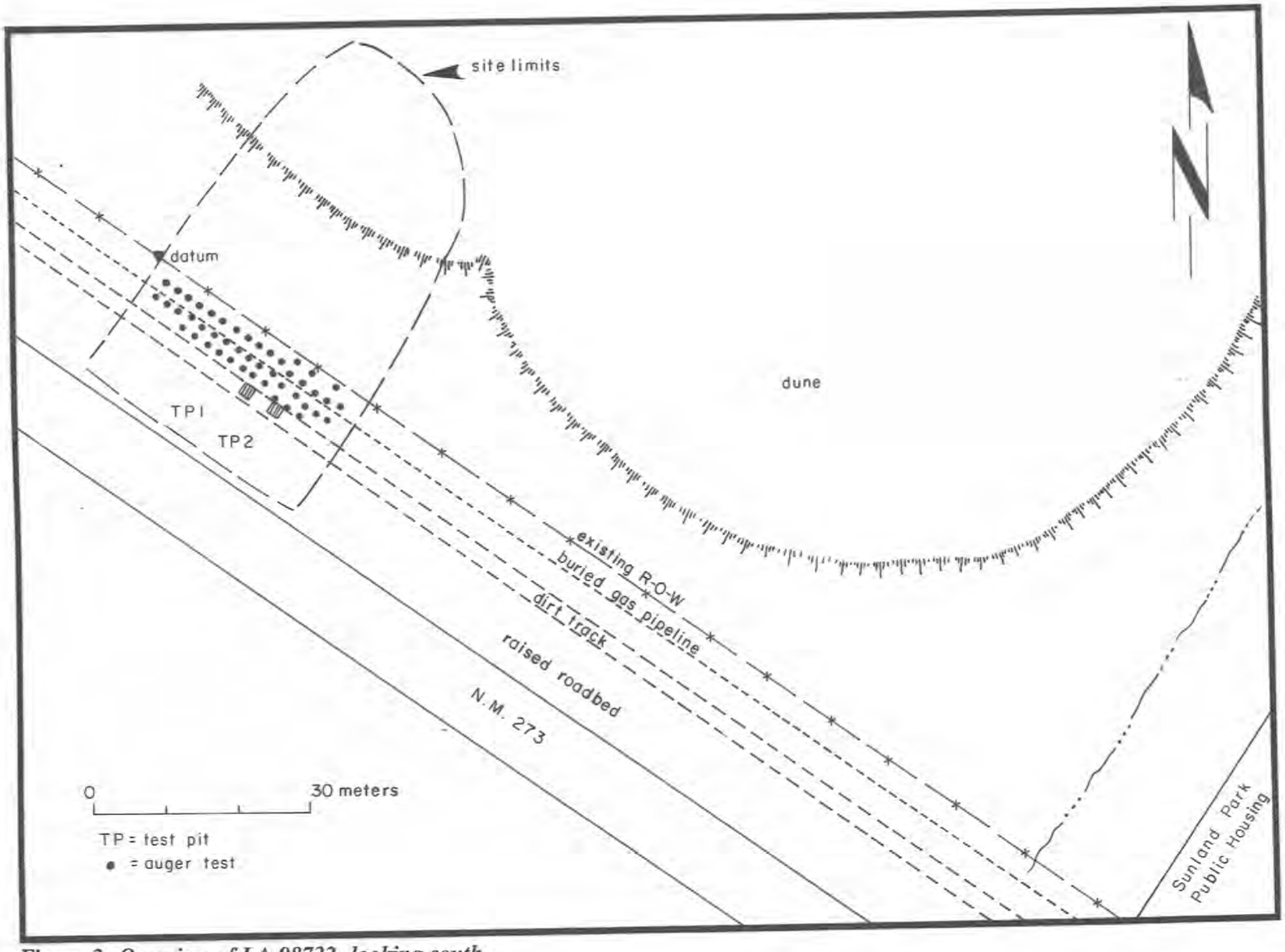


Figure 2. Overview of LA 98732, looking south.

Two test units and 48 auger holes were hand dug at LA 98732.

Test Unit 1

Test Unit 1 (1 by 1 m) is in the southern portion of the site. This test unit was dug in an area of exposed charcoal-stained soil within the dirt track at the edge of the built-up roadbed. No surface vegetation was present in this area of the site.

Excavation ended 50 cm below the modern ground surface in culturally sterile soil. Testing revealed four strata of material. Stratum 1 was a light yellowish-brown silty sand containing some charcoal-staining, modern glass, and a few lithic artifacts. Stratum 2 was a charcoal-stained, silty sand containing artifacts and pieces of modern plastic and glass. Stratum 3 was a tan, silty sand containing artifacts and bits of metal and plastic. Rodent burrows were also present within this stratum; however, there was no charcoal-staining within this material. Stratum 4 was a brown, silty sand containing bits of caliche. This stratum was culturally sterile, although rodent burrows were present. Eighty-five artifacts were recovered from Test Unit 1 (16 ceramics, 63 lithic artifacts, and 3 pieces of bone), all of them from the top three strata of mixed deposits of highway fill forming part of the built-up roadbed.

Test Unit 2

Test Unit 2 was in the southern portion of the site, 2 m west of Test Unit 1. This test unit was dug in an area of exposed charcoal-stained soil within the dirt track at the edge of the built-up roadbed. No surface vegetation was present in this area of the site.

Excavation of Test Unit 2 ended at 50 cm below the modern ground surface in culturally sterile soil. Four strata of material were found in Test Unit 2. Stratum 1 was a yellowish-brown silty sand containing some charcoal staining, artifacts, and modern plastic and paper. Stratum 2 was a tan silty sand containing charcoal-staining, artifacts, and modern glass, plastic, and metal. Stratum 3 was a tan silty sand containing artifacts and modern metal. Stratum 4 was a brown, culturally sterile, silty sand containing flecks of caliche. Eighty-five artifacts (10 ceramics, 70 lithic artifacts, and 5 pieces of bone) were recovered from Test Unit 2. All of the recovered artifacts were from the top three strata of mixed deposits of highway fill forming part of the built-up roadbed.

Auger Holes

A total of 48 auger holes were dug at LA 98732. Auger holes were dug in 2 m intervals in a series of transits across the most intact portion of the site away from the highway. Auger tests were dug until cultural material, culturally sterile soil, or a depth of 80 cm was reached. No cultural features or deposits were found in any of the auger holes dug at LA 98732.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 112260 located within the proposed project area.

LA 98734

LA 98734 is a ceramic and lithic artifact scatter measuring 100 by 90 m (Figs. 4 and 5). The site is in an area of stabilized coppice dunes and has been bisected by NM 273. The east side of NM 273 has a raised roadbed 30 cm high at the pavement and extending 7 m beyond the edge of the pavement. Within the project area, east of this raised roadbed, a buried gas pipeline, a large storm drain system (including manholes), and a dirt track parallel the highway. West of NM 273, the site area has been modified by a buried telephone cable and a dirt track. Large areas west of NM 273 have been mechanically scraped, probably during the original highway construction, and then filled with construction debris (broken brick, masonry, ceramic tile, and concrete). The elevation of the site is 1,152.1 m (3,780 ft).

Figure 4. Overview of LA 98734, looking north.

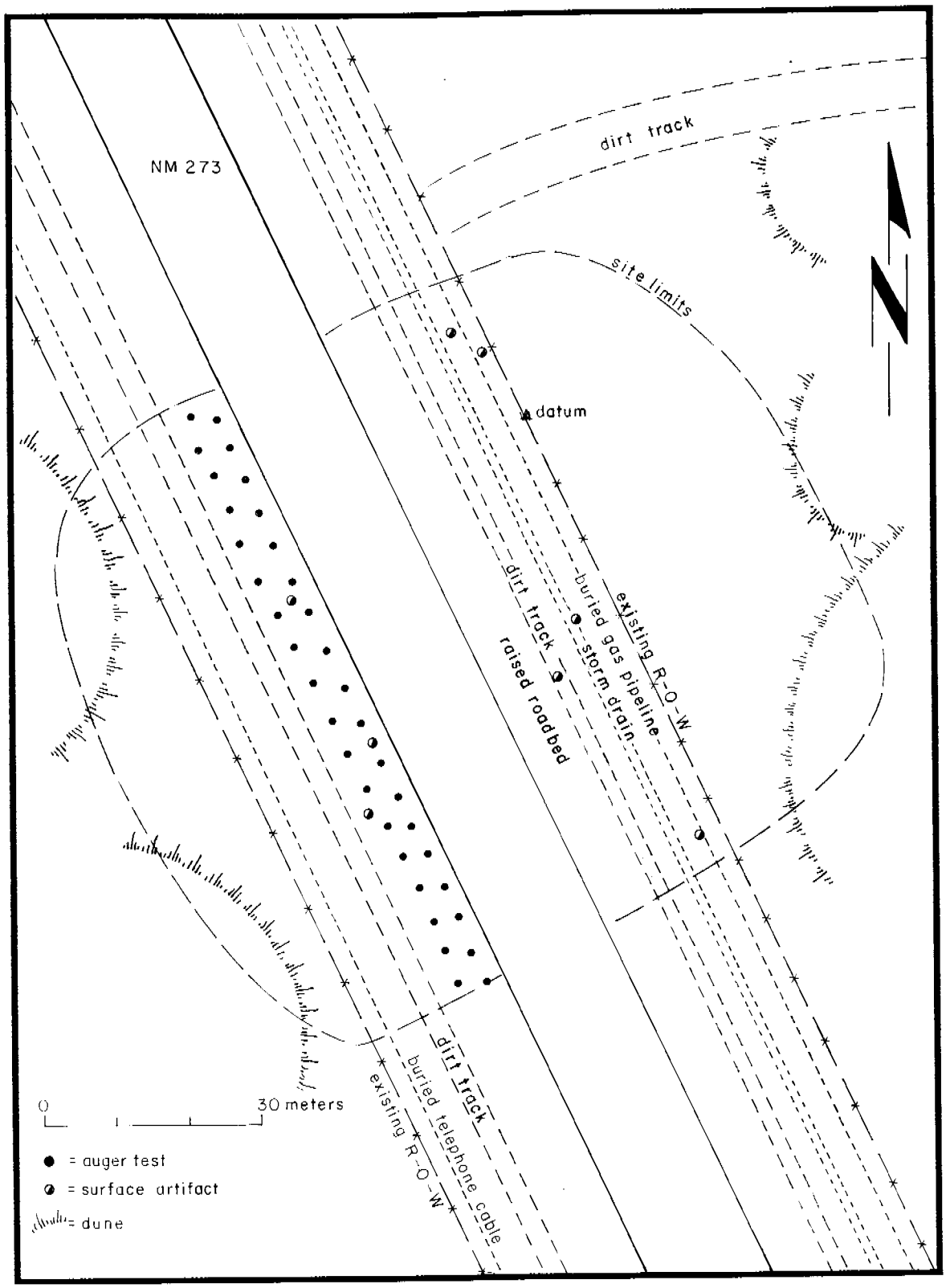


Figure 5. LA 98734 site map.

Nine lithic artifacts were piece-plotted at LA 98734. Six artifacts were piece-plotted east of NM 273, and three artifacts to the west. No artifacts were recovered at LA 98734 from test units or auger holes.

Test Units

No test units were excavated at LA 98734.

Auger Holes

Thirty-six auger holes were hand dug in two transects at staggered 3 m intervals (north to south) along the west side of NM 273 in the largest intact portion of the site within the project area. Auger holes were dug until cultural material or culturally sterile soil was reached. No intact cultural features or deposits were found in any of the auger holes.

Cultural Features

No cultural features or deposits were found in the portion of LA 98734 within the proposed project area.

LA 110621

LA 110621 is a ceramic and lithic artifact scatter measuring 230 m by 60 m (Figs. 6-8). The site is in an area of active coppice dunes east of NM 273. The site extends 8 m into the existing right-of-way. Its western boundary is the edge of the area scraped prior to construction of the original raised highway roadbed. A dirt track separates the site from the raised roadbed. An El Paso phase pueblo (LA 110620), removed by industrial development (Vernon 1984), was approximately 300 m northeast of LA 110621. The elevation of the site is 1,152.1 m (3,780 ft).

A total of 113 surface artifacts (40 ceramics, 68 lithic artifacts, and one ground stone artifact) were piece-plotted at LA 110621. Surface artifacts were present in three distinct concentrations within the site area. An additional 211 artifacts (82 ceramic, 128 lithic artifacts, and 1 ground stone artifact), were recovered from test units and auger holes. Five test units and 117 auger holes were dug at LA 110621.

Test Unit 1

Test Unit 1 (1 by 1 m) was excavated in the southern area of the site, adjacent to a possible hearth and within a surface artifact concentration. No surface vegetation was present

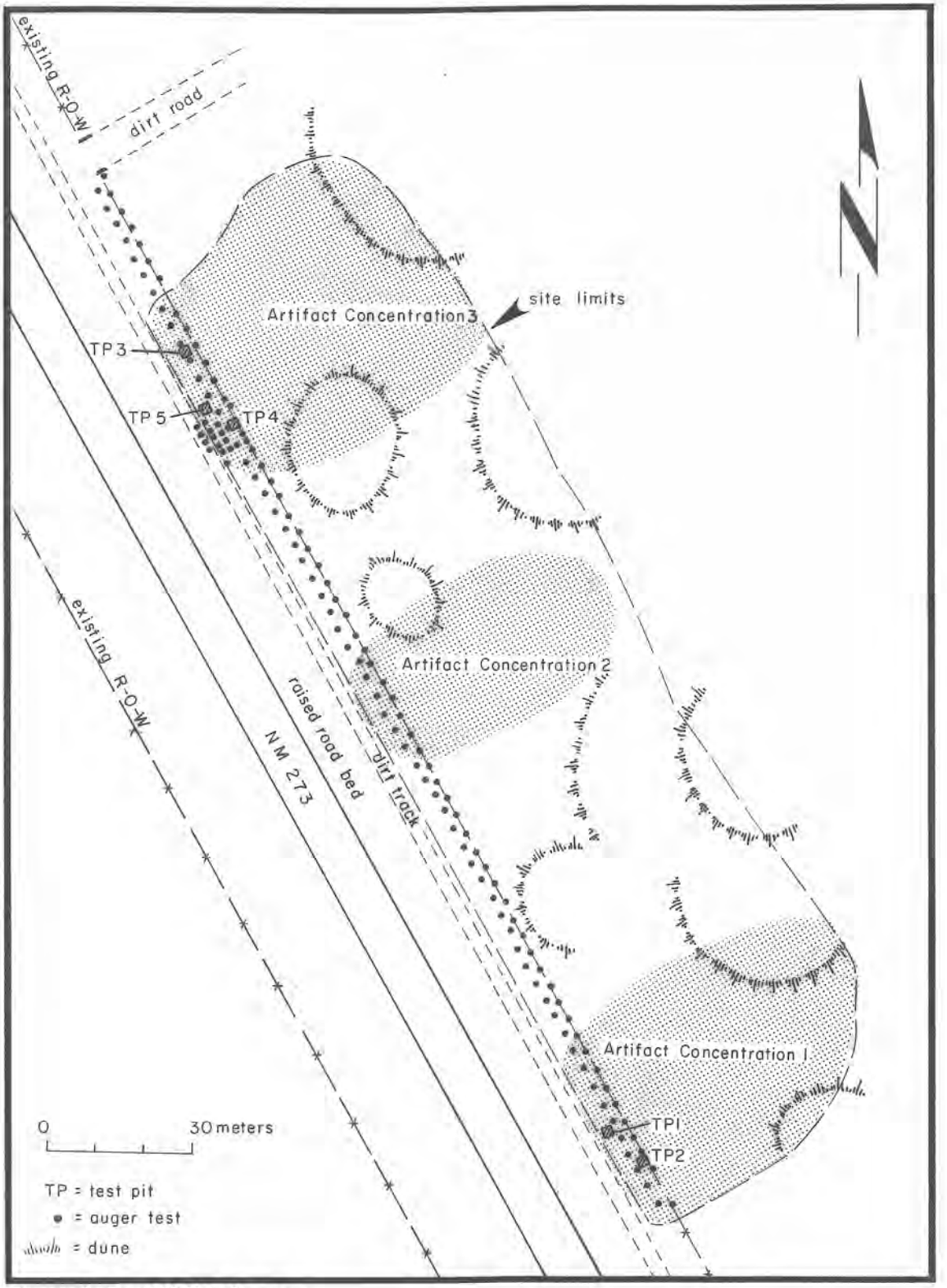


Figure 8. LA 110621 site map.

on this portion of the site. A single lithic artifact was collected from this test unit prior to excavation.

Excavation ended 40 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material within this test unit. Stratum 1 was a silty sandy eolian soil, containing flecks of charcoal, artifacts, and a large number of rodent burrows. This stratum was 10 cm thick. Two ceramics and 19 lithic artifacts were recovered from Stratum 1. Stratum 2 was a reddish brown sandy clay containing flecks of caliche, extending from the bottom of Stratum 1 to the bottom of the test unit. An auger hole was dug and extended an additional 54 cm in the bottom of Test Unit 1. No artifacts or cultural material were found.

Test Unit 2

Test Unit 2 (1 by 1 m) was placed in the southern portion of the site adjacent to a possible hearth. No surface vegetation was present in this area.

Excavation ended 60 cm below the modern ground surface in culturally sterile soil. Excavation revealed three strata of material in this test unit. Stratum 1 was a fine, tan, silty sand, approximately 34 cm deep. Twenty-one lithic artifacts were recovered from this stratum. Stratum 2 was a brown silty sand containing flecks of caliche. Two lithic artifacts were collected from Stratum 2. Stratum 3 was a reddish brown sandy clay containing flecks of caliche.

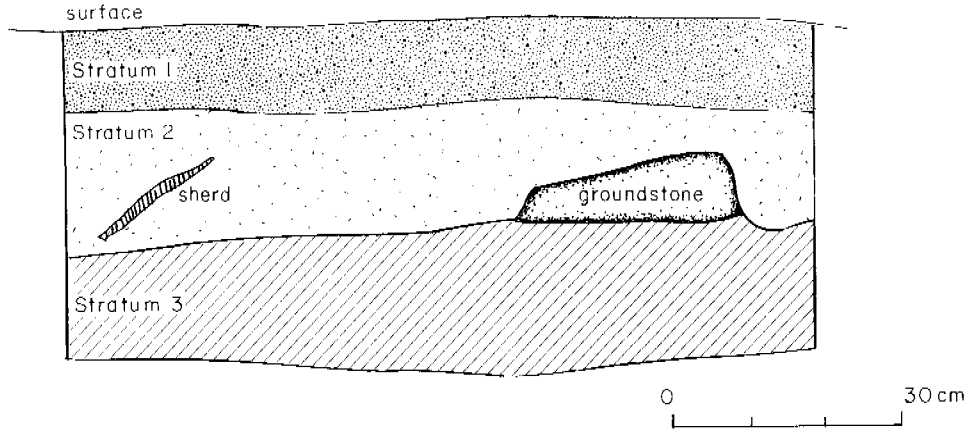
Test Unit 3

Test Unit 3 (1 by 1 m) was excavated in an area of charcoal-stained soil in the northern portion of the site, within a large surface artifact concentration. No vegetation was present in this area of the site.

Excavation of Test Unit 3 ended 40 cm below the modern ground surface in culturally sterile soil. Test Unit 3 revealed three strata of material (Fig. 9). Stratum 1 was a fine yellowish brown, silty sand, 10 cm in depth, containing flecks of charcoal and artifacts (13 ceramics and 16 lithic artifacts). Stratum 2 was a dark gray charcoal-stained silty sand cultural deposit 20 cm deep, containing a large number of artifacts. The artifacts recovered from Stratum 2 included 30 ceramics (most from a single pot), 32 lithic artifacts, and one ground stone artifact (half of a basin metate). Stratum 3 was a fine silty sand containing flecks of caliche.

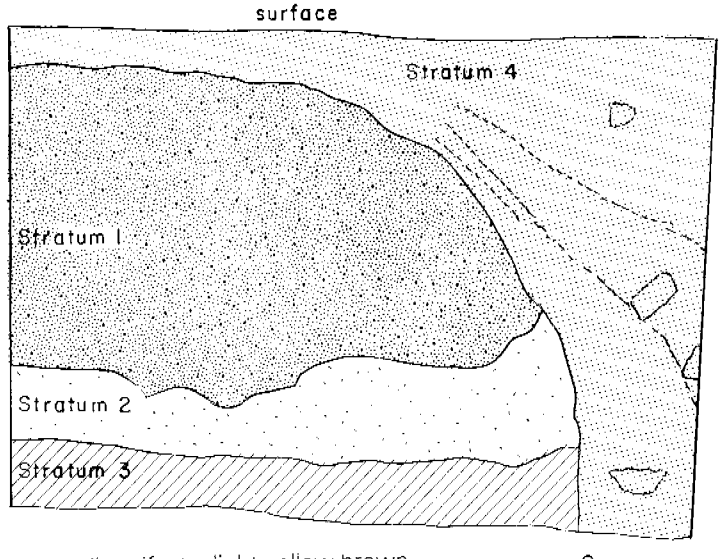
Test Unit 4

Test Unit 4 (1 by 1 m) was dug in the northern portion of the site in an area of stained soil near Test Unit 3. No vegetation was present within this test unit.



Stratum 1 - fine silty soil, artifacts, light yellow brown
Stratum 2 - ashy silty soil, artifacts and charcoal, dark gray brown
Stratum 3 - fine silty sandy soil with caliche, pale brown

Figure 9. Profile of Test Unit 3, LA 110621.



Stratum 1 - fine silty soil, artifacts, light yellow brown
Stratum 2 - ashy silty soil, artifacts and charcoal, dark gray brown
Stratum 3 - fine silty sandy soil with caliche, pale brown
Stratum 4 - sandy loam with striations and clay, brown

Figure 10. Profile of Test Unit 4, LA 110621.

Excavation of Test Unit 4 ended 65 cm below the modern ground surface in culturally sterile soil. Test Unit 4 (Fig. 10) revealed the stratified fill of a subterranean cultural feature (a possible pit structure). This in turn had been cut by a second, later, and deeper cultural feature (possibly a second pit structure). Recovered artifacts from Test Unit 4 totaled 45 (14 ceramic and 28 lithic artifacts).

Test Unit 5

Test Unit 5 (1 by 1 m) was placed in the northern portion of the project area near Test Units 3 and 4, also in an area of charcoal-stained soil. This test unit had a 30-percent coverage of mixed grasses prior to excavation.

Excavation of Test Unit 5 ended 30 cm below the modern ground in culturally sterile soil. Three strata of material were exposed in Test Unit 5. Stratum 1 was a fine silty sand containing flecks of charcoal and 20 artifacts (5 ceramics and 15 lithic artifacts). Stratum 2 was a brown mottled silty sand containing flecks of charcoal and artifacts (5 ceramics and 2 lithic artifacts). Stratum 3 was a compact silty sand containing flecks of caliche.

Auger Holes

A total of 117 auger holes were hand dug at LA 110621 to locate subsurface cultural deposits and features. The majority of the auger holes (106) at LA 110621 were dug at 2 m intervals, in two staggered transects parallel to the highway (north to south). Subsurface charcoal staining was found in auger holes at both 38S and 44S. Another area of subsurface charcoal was found between 58S and 62S. These occurrences of charcoal motivated the placement of Test Units 3, 4, and 5 in this area of the site.

An additional 11 auger holes were dug west and south of the features found in the resulting test units to define the extent of this area of intact cultural features and deposits. One lithic artifact was recovered from Auger Hole 116 in this portion of the site.

Cultural Features

Two intact cultural features (probable pit structures) and an intact midden deposit were found within the northern portion of LA 110621, within the proposed project limits.

LA 110622

LA 110622 is a ceramic and lithic artifact scatter measuring 110 by 46 m. The site is on the east side of NM 273 (Figs. 11 and 12). A portion of the site extends into the proposed project area (existing right-of-way) on the top of a deep roadcut. This portion of the site varies

from .45 to 4 m in width. A lens of charcoal-stained soil was visible within the road cut, 35 cm below the modern ground surface. However, no artifacts were present within this deposit. Any site area that may have existed to the west was removed by the roadcut associated with the original construction of NM 273. The elevation of the site is 1,158.2 m (3,800 ft).

Piece-plotted surface artifacts at LA 110622 totaled 82 (7 ceramics and 75 lithic artifacts). An additional 14 artifacts (13 lithic artifacts and 1 ground stone artifact) were recovered from test units. Four test units and 71 auger holes were hand dug.

Figure 11. Overview of LA 110622, looking south.

Test Unit 1

Test Unit 1 was in the southeastern portion of the site, on the top of the roadcut, above the area containing the exposed charcoal lens. No vegetation was present in this area of the site.

Excavation of Test Unit 1 ended 50 cm below the modern ground surface in culturally sterile soil. Four strata of material were exposed in Test Unit 1. Stratum 1 was a fine loose silty sand averaging 5 cm thick. It contained five lithic artifacts. Stratum 2 was a pale brown, fine silty sand containing flecks of caliche. Stratum 3 was a fine, charcoal-stained, silty sand averaging 5 cm thick. Some gravel was present in Stratum 3, but no artifacts. Stratum 4 was a compact, fine, yellowish brown sand. No artifacts were recovered from Strata 2, 3, and 4.

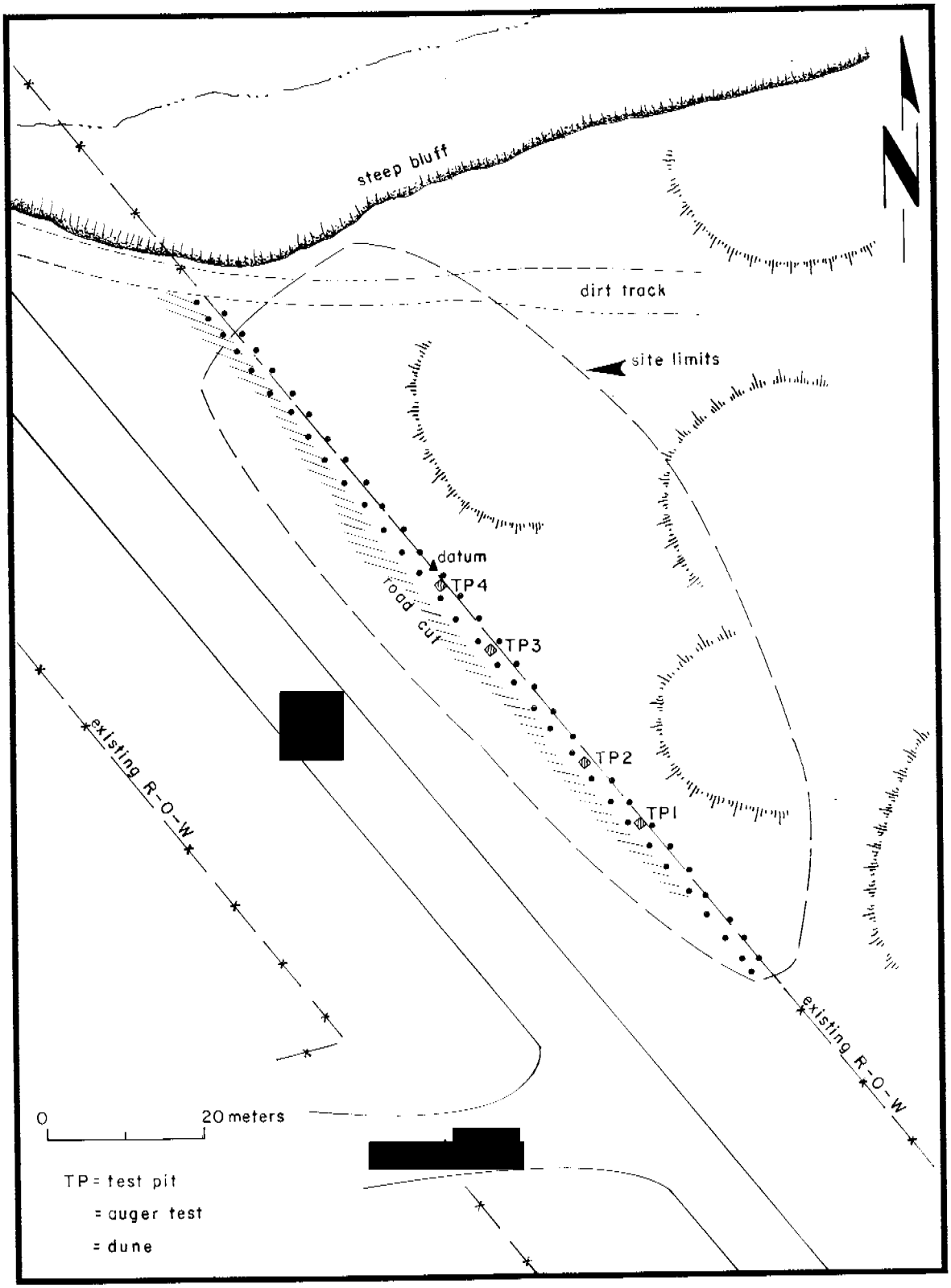


Figure 12. LA 110622 site map.

Test Unit 2

Test Unit 2 was excavated in the southwestern portion of the site. This test unit was adjacent to a surface artifact concentration. No vegetation was present in this portion of the site.

Excavation of Test Unit 2 ended 40 cm below the modern ground surface in culturally sterile soil. One stratum of soil was present in Test Unit 2: a fine, pale brown, silty sand. No artifacts were recovered from this test unit.

Test Unit 3

Test Unit 3 was in the west part of the site. This area was picked for a test unit based on the presence of charcoal-stained soil found in an adjacent auger hole (Auger Hole 46). Mixed grasses covered 5 percent of the site surface in this area prior to excavation of the test unit. A large number of rodent burrows were also present in this area.

Excavation of Test Unit 3 ended 50 cm below the modern ground surface in culturally sterile soil. Three strata of material were visible in Test Unit 3. Stratum 1 was a fine, loose, silty sand. One lithic artifact was recovered from this stratum. Rodent burrows were also present. Stratum 2 was a gray, charcoal-stained, silty soil. A large number of rodent burrows were present within this stratum. Artifacts were recovered from Stratum 2 (five lithic artifacts and one ground stone artifact), but all came from the fill of rodent burrows. Stratum 3 was a pale brown, fine sand containing flecks of caliche. No artifacts were found in Stratum 3 or 4.

Test Unit 4

Test Unit 4 was in the west portion of LA 110622. This test unit was placed in an area of the site where charcoal-stained soil was present in an adjacent auger hole (Auger Hole 52). Prior to excavation, this part of the site had a 5 percent coverage of mixed grasses.

Excavation of Test Unit 4 ended 40 cm below the modern ground surface in culturally sterile soil. Three strata of soil were present in Test Unit 4. Rodent burrows were also present in this portion of the site in large numbers. Stratum 1 was a pale, fine, silty sand. One lithic artifact was found in this stratum. Stratum 2 was a fine, charcoal-stained, silty sand averaging 25 cm thick. Stratum 3 was a pale brown, course sand containing some gravel and flecks of caliche. No artifacts were found in Stratum 2 or 3.

Auger Holes

Seventy-one auger holes were hand dug at LA 110622 to locate subsurface cultural deposits and features. The auger holes were dug in two staggered transects at 2 m intervals

parallel to the highway (south to north). Auger holes were dug until cultural material or culturally sterile soil was reached.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 110622 within the proposed project limits.

LITHIC ARTIFACT ANALYSIS

A total of 449 lithic artifacts were collected from LA 98732, LA 98734, LA 110621, and LA 110622 in the project area.

Analytic Methods

Attributes chosen for lithic analysis reflected the desire to achieve 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 1994a) were followed.

The following attributes were included in analysis:

Material Type

Codes for material types are for general material groups unless the material is from a recognizable source. For example, a wide range of chert occurs on these sites were classified as "chert," but 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

Portion is 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 was 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 surfaces was estimated and added together.

Flake Platform

Flake platform was recorded for whole and proximal flakes. Some lateral flakes also had their platforms recorded if the platform was still present. The morphology of the impact area prior to flake removal or extreme modifications of the impact area caused by the actual flake removal were coded.

Size

Artifact size in millimeters.

Edge Number

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

Function

Describes and characterizes artifact function.

Wear Patterns

Artifact modification caused by human use is coded as *wear*.

Analytic Results

Lithic artifacts analyzed from the portions of the four sites within the project area totaled 442.

Material Selection

Analysis of material use addresses the human decision-making processes regarding the suitability of materials (Young and Bonnichsen 1985:128). The presence in a site assemblage of tested material or substantial numbers of core flakes exhibiting dorsal cortex can thus illustrate the manner in which this material suitability is determined.

All of the lithic material utilized at LA 98732, LA 98734, LA 110621, or LA 110622 is locally available as nodules within the Pleistocene alluvial deposits of the area or from

erosional deposits in the Franklin Mountains. Thunderbird rhyolite is a specific form of reddish brown rhyolite containing biotite inclusions found locally in the Franklin Mountains.

Rhyolite was the main material of choice at all four of these sites (Tables 1-4). Rhyolite, or a combination of rhyolite and Thunderbird rhyolite, dominates all four lithic artifact assemblages. Rhyolite comprises 37.6 percent of the assemblage at LA 98732, 55.5 percent at LA 98734, 62.2 percent at LA 110621, and 65.9 percent at LA 110622. Thunderbird rhyolite comprises 31.5 percent of the LA 98732 assemblage and 18.8 percent at LA 110621 and is the second most common material at both sites. Chert is the second most common material at LA 110622 (15.9 percent). Siltstone is the second most common material at LA 98734, comprising 22.2 percent of the small assemblage.

Other materials are present at all four sites in smaller quantities. Chert, limestone, and quartzitic sandstone are present at LA 98732, LA 110621, and LA 110622. Obsidian, represented by a total of three artifacts, is present at LA 110621 and LA 110622. Very small numbers of basalt, silicified wood, and siltstone artifacts also appear at some of the sites.

Artifact Morphology

Core flakes make up the largest morphological group of lithic artifacts at all four sites. Of 149 lithic artifacts recorded at LA 98732, 144 are core flakes (96.6 percent). Core flakes comprise 88.9 percent of the assemblage at LA 98734, 88.8 percent of the assemblage at LA 110621, and 81.8 percent at LA 110622. Other types of lithic artifacts at the sites include hammerstone flakes, biface thinning flakes, resharpening flakes, cores, and bifaces.

Flake platforms at LA 98732 are 44.9 percent cortical and 44.2 percent single-faceted for all flake types (Table 5). This contrasts with LA 98734 (Table 6), where single platforms comprise 88.8 percent of the platforms present and cortical platforms are not even present. At LA 110621 (Table 7), single platforms are also the most common: 54.8 percent of the total versus 35.1 percent for cortical platforms. Cortical platforms and single platforms are the most common at LA 110622, as well (Table 8). Both comprise roughly 39 percent of the total. The overwhelming majority of flakes at all four sites are whole.

Based on the range of cortex within material types (Tables 9-12), only limited lithic reduction of rhyolite took place at LA 98734 and LA 110622. This is in contrast to the large-scale reduction of lithic material at LA 98732, where it included chert, rhyolite, limestone, quartzitic sandstone, and thunderbird rhyolite; and LA 110621, where it included chert, rhyolite, quartzitic sandstone, and thunderbird rhyolite.

Utilization by Material

Lithic material was utilized as formal and expedient tools at LA 98732, LA 110621, and LA 110622 (Tables 13-16). LA 98734 may be a false exception, however, considering the

small size of the artifact assemblage within the project area, in contrast to that outside of the proposed project limits. Similarities in utilized lithic material reflect similarities in the total assemblages.

The occurrence of expedient and formal tools is extremely low at all sites. LA 110621 has the largest range of tool forms. No formal tools were present at LA 98734. The intensity of use was highest at LA 110621 and LA 110622, where tools exhibiting a second function were present. Utilized debitage is present at all four sites. End scrapers were present at LA 110621 and LA 110622.

The small numbers of tools within these assemblages and the wide range of lithic materials involved are common occurrences at prehistoric Puebloan sites and indicate that these sites did not function as short-term procurement areas, but as habitation settlements (Akins and Bullock 1992). This view is supported by site size, combined with the known use of LA 98732 as an intensely utilized Mesilla phase hunting site and the presence of structures at LA 110622. The small artifact assemblage from LA 98734 reflects site modification within the project area more than site dynamics.

It should be possible to determine, however roughly, the types of activities pursued at each of these sites (Christenson 1987:77). However, all of the assemblages are too small for this to be practical at the site level. The use of utilized debitage suggests the production of expedient tools. The low number of biface thinning flakes, uniface thinning flakes, and tool resharpening flakes also indicates a lack of formal tool production, while the large nonutilized debitage to tool ratio suggests long-term site use (Akins and Bullock 1992:27).

Table 1. Artifact morphology by material type, LA 98732

	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Silicified Wood		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	12	92.3	53	94.6	2	100.0	14	100.0	16	100.0	1	100.0	46	97.9	144	96.6
Biface thinning flake			1	1.8											1	0.7
Multifaceted core			1	1.8											1	0.7
Hammerstone flake	1	7.7											1		2	1.3
Graver			1	1.8									2.1		1	0.7
Total	13	100.0	56	100.0	2	100.0	14	100.0	16	100.0	1	100.0	47	100.0	149	100.0

Table 2. Artifact morphology by material type, LA 98734

	Chert		Rhyolite		Siltstone		Quartzitic sandstone		Total	
	N	%	N	%	N	%	N	%	N	%
Core flake			5	100.0	2	100.0	1	100.0	8	88.9
Resharpening flake	1	100.0							1	11.1
Total	1	100.0	5	100.0	2	100.0	1	100.0	9	100.0

Table 3. Artifact morphology by material type, LA 110621

	Chert		Rhyolite		Siltstone		Limestone		Quartzite		Obsidian		Thunderbird Rhyolite		Basalt		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	19	90.5	110	90.2	3	100.0	10	83.3	6	85.7			21	91.3	5	71.6	174	88.8
Biface thinning flake			4	3.3			1	8.3			1	100.0			1	14.2	7	3.6
Reshaped flake			1	0.8													1	0.5
Biface (1st)			1	0.8													1	0.5
Biface (2nd)	1	4.8															1	0.5
Bifacial core			1	0.8													1	0.5
Multifaceted core			3	2.5											1	14.2	4	2.0
Hammerstone													1	4.3			1	0.5
Hammerstone flake	1	4.8	2	1.6			1	8.3	1	14.3			1	4.3			6	3.1
Total	21	100.0	122	100.0	3	100.0	12	100.0	7	100.0	1	100.0	23	100.0	7	100.0	196	100.0

Table 4. Artifact morphology by material type, LA 110622

	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	12	85.7	46	79.3	2	66.7	6	100.0	2	66.7	2	100.0	2	100.0	72	81.8
Biface thinning flake	1	7.1	3	5.2					1	33.3					5	5.7
Resharpening flake			1	1.7											1	1.1
Multifaceted core	1	7.1	1	1.7											2	2.3
Hammerstone flake			7	12.1	1	33.3									8	9.1

	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	14	100.0	58	100.0	3	100.0	6	100.0	3	100.0	2	100.0	2	100.0	88	100.0

Table 5. Flake types by platform and portion, LA 98732

Platform														
	Absent		Cortical		Single		Multifaceted		Collapsed		Crushed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	7	100.0	64	97.0	65	100.0			1	100.0	7	100.0	144	98.0
Biface thinning flake							1	100.0					1	0.7
Hammerstone flake			2	3.0									2	1.4
Total	7	100.0	66	100.0	65	100.0	1	100.0	1	100.0	7	100.0	147	100.0

Portion												
	Whole		Proximal		Medial		Distal		Lateral		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	131	97.8	4	100.0	2	100.0	5	100.0	2	100.0	144	98.0
Biface thinning flake	1	0.7									1	0.7
Hammerstone flake	2	1.5									2	1.4
Total	134	100.0	4	100.0	2	100.0	5	100.0	2	100.0	147	100.0

Table 6. Flake types by platform and portion, LA 98734

Platform						
	Single		Multifaceted		Total	
	N	%	N	%	N	%
Core flake	8	100.0			8	88.9
Resharpening flake			1	100.0	1	11.1
Total	8	100.0	1	100.0	9	100.0

Portion				
	Whole		Total	
	N	%	N	%
Core flake	8	88.9	8	88.9
Resharpening flake	1	11.1	1	11.1
Total	9	100.0	9	100.0

Table 7. Flake types by platform and portion, LA 110621

Platform												
	Absent		Cortical		Single		Multifaceted		Crushed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	5	62.5	63	95.5	100	97.1					174	92.6
Biface thinning flake	3	37.5					4	80.0	6	100.0	7	3.7
Resharpening flake							1	20.0			1	0.5
Hammerstone flake			3	4.5	3	2.9					6	3.2
Total	8	100.0	66	100.0	103	100.0	5	100.0	6	100.0	188	100.0

	Portion									
	Whole		Proximal		Distal		Lateral		Total	
	N	%	N	%	N	%	N	%	N	%
Core flake	158	92.9	9	90.0	5	83.3	2	100.0	174	92.6
Biface thinning flake	5	2.9	1	10.0	1	16.7			7	3.7
Resharpening flake	1	0.6							1	0.5
Hammerstone flake	6	3.5							6	3.2
Total	170	100.0	10	100.0	6	100.0	2	100.0	188	100.0

Table 8. Flake types by platform and portion, LA 110622

	Platform											
	Absent		Cortical		Single		Multifaceted		Crushed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	7	100.0	32	94.1	30	90.9	2	18.2			72	83.7
Biface thinning flake							5	45.5	1	100.0	5	5.8
Uniface thinning flake							1	9.1			1	1.2
Hammerstone flake			2	5.9	3	9.1	3	27.3			8	9.3
Total	7	100.0	34	100.0	33	100.0	11	100.0	1	100.0	86	100.0

	Portion											
	Whole		Proximal		Medial		Distal		Lateral		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	58	80.6	6	100.0	2	100.0	5	100.0	1	100.0	72	83.7
Biface thinning flake	5	6.9									5	5.8

Uniface thinning flake	1	1.4									1	1.2
Hammerstone flake	8	11.1									8	9.3
Total	72	100.0	6	100.0	2	100.0	5	100.0	1	100.0	86	100.0

Table 9. Percentage of cortex by material type, LA 98732

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Silicified Wood		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	2	15.4	19	33.9	1	50.0	7	50.0	8	50.0			19	40.4	56	37.6
10	2	15.4	4	7.1	1	50.0	1	7.1			1	100.0	4	8.5	13	8.7
20	2	15.4	3	5.4									6	12.8	11	7.4
30	1	7.7	4	7.1			1	7.1	1	6.3			1	2.1	8	5.4
40	2	15.4	1	1.8									2	4.3	5	3.4
50			3	5.4									1	2.1	4	2.7
60			3	5.4			1	7.1	2	12.5			2	4.3	8	5.4
70	1	7.7	5	8.9									2	4.3	8	5.4
80	1	7.7					1	7.1	2	12.5			2	4.3	6	4.0
90			7	12.5											7	4.7
100	2	15.4	7	12.5			3	21.4	3	18.8			8		23	15.4
Total	13	100.0	56	100.0	2	100.0	14	100.0	16	100.0	1	100.0	47	100.0	149	100.0

Table 10. Percentage of cortex by material type, LA 98734

%	Chert		Rhyolite		Siltstone		Quartzitic Sandstone		Total	
	N	%	N	%	N	%	N	%	N	%
0	1	100.0	1	20.0					2	22.2
10										
20					1	50.0			1	11.1
30			1	20.0					1	11.1
40			1	20.0					1	11.1
50										
60										
70										
80										
90			1	20.0	1	50.0	1	100.0	3	33.3
100			1	20.0					1	11.1
Total	1	100.0	5	100.0	2	100.0	1	100.0	9	100.0

Table 11. Percentage of cortex by material type, LA 110621

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Basalt		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	8	38.1	51	41.8	1	33.3	8	66.7	2	28.6			7	30.4	3	42.6	80	40.8
10	2	9.5	13	10.7					1	14.3							16	8.2
20	3	14.3	8	6.6			4	33.3					1	4.3	1	14.2	17	8.7

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Basalt		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
30	3	14.3	6	4.9							1	100.0					10	5.1
40			6	4.9					1	14.3			1	4.3			8	4.1
50			3	2.5									1	4.3	1	14.2	5	2.6
60			5	4.1					1	14.3			4	17.4			10	5.1
70	2	9.5	4	3.3									1	4.3			7	3.6
80			8	6.6	2	66.7			1	14.3			2	8.7			13	6.6
90	1	4.2	6	4.9									2	8.7			9	4.6
100	2	9.5	12	9.8					1	14.3			4	17.4	2	28.4	21	10.7
Total	21	100.0	122	100.0	3	100.0	12	100.0	7	100.0	1	100.0	23	100.0	7	100.0	196	100.0

Table 12. Percentage of cortex by material type, LA 110622

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	6	42.9	24	41.4	2	66.7	2	33.3	2	66.7			2	100.0	38	43.2
10	1	7.1	9	15.5			2	33.3			2	100.0			14	15.9
20	1	7.1	2	3.4	1	33.3	1	16.7							5	5.7
30			4	6.9											4	4.5
40			3	5.2											3	3.4
50			1	1.7											1	1.1
60	1	7.1	4	6.9											5	5.7

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Basalt		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
30	3	14.3	6	4.9							1	100.0					10	5.1
40			6	4.9					1	14.3			1	4.3			8	4.1
50			3	2.5									1	4.3	1	14.2	5	2.6
60			5	4.1					1	14.3			4	17.4			10	5.1
70	2	9.5	4	3.3									1	4.3			7	3.6
80			8	6.6	2	66.7			1	14.3			2	8.7			13	6.6
90	1	4.2	6	4.9									2	8.7			9	4.6
100	2	9.5	12	9.8					1	14.3			4	17.4	2	28.4	21	10.7
Total	21	100.0	122	100.0	3	100.0	12	100.0	7	100.0	1	100.0	23	100.0	7	100.0	196	100.0

Table 12. Percentage of cortex by material type, LA 110622

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	6	42.9	24	41.4	2	66.7	2	33.3	2	66.7			2	100.0	38	43.2
10	1	7.1	9	15.5			2	33.3			2	100.0			14	15.9
20	1	7.1	2	3.4	1	33.3	1	16.7							5	5.7
30			4	6.9											4	4.5
40			3	5.2											3	3.4
50			1	1.7											1	1.1
60	1	7.1	4	6.9											5	5.7

%	Chert		Rhyolite		Siltstone		Limestone		Quartzitic Sandstone		Obsidian		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
70			3	5.2					1	33.3					4	4.5
80	3	21.4	2	3.4											5	5.7
90	1	7.1	2	3.4											3	3.4
100	1	7.1	4	6.9			1	16.7							6	6.8
Total	14	100.0	58	100.0	3	100.0	6	100.0	3	100.0	2	100.0	2	100.0	88	100.0

Table 13. Artifact function by material type, LA 98732

Function 1	Chert		Rhyolite		Thunderbird Rhyolite		Total	
	N	%	N	%	N	%	N	%
Utilized debitage	1	100.0	1	50.0	2	100.0	4	80.0
Graver			1	50.0			1	20.0
Total	1	100.0	2	100.0	2	100.0	5	100.0

Table 14. Artifact function by material type, LA 98734

Function 1	Chert		Rhyolite		Total	
	N	%	N	%	N	%
Utilized debitage	1	100.0			1	50.0
Utilized/retouched debitage			1	100.0	1	50.0
Total	1	100.0	1	100.0	2	100.0

Table 15. Artifact function by material type, LA 110621

	Chert		Rhyolite		Limestone		Quartzitic Sandstone		Thunderbird Rhyolite		Basalt		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Function 1														
Utilized debitage	4	57.1	8	47.1	1	100.0	1	100.0	1	50.0	1	100.0	16	55.2
Utilized/retouched debitage	1	14.3	2	11.8									3	10.3
Hammerstone			3	17.6					1	50.0			4	13.8
Notch			1	5.9									1	3.4
Scraper (end)	1	14.3	1	5.9									2	6.9
Knife	1	14.3	1	5.9									2	6.9
Projectile point			1	5.9									1	3.4
Total	7	100.0	17	100.0	1	100.0	1	100.0	2	100.0	1	100.0	29	100.0
Function 2														
Utilized debitage	2	100.0	1	100.0									3	100.0
Total	2	100.0	1	100.0									3	100.0

Table 16. Artifact function by material type, LA 110622

	Chert		Rhyolite		Siltstone		Limestone		Total	
	N	%	N	%	N	%	N	%	N	%
Function 1										
Utilized debitage	1	33.3	1	50.0			1	100.0	3	42.9
Utilized/retouched debitage	1	33.3							1	14.3
Chopper			1	50.0					1	14.3
Scraper (end)	1	33.3			1	100.0			2	28.6
Total	3	100.0	2	100.0	1	100.0	1	100.0	7	100.0
Function 2										
Utilized debitage	1	50.0							1	50.0
Utilized/retouched debitage	1	50.0							1	50.0
Total	2	100.0							2	100.0

GROUND STONE ARTIFACT ANALYSIS

Two ground stone artifacts were recovered from LA 110621, and one from LA 110622.

Attributes chosen for ground stone analysis reflected the desire to achieve the greatest return of useful information within the available time. The guidelines and format followed *Standardized Ground Stone Artifact Analysis: A Manual for the Office of Archaeological Studies* (OAS 1994b).

LA 110621

The end fragment of a small metate was found on the modern ground surface at LA 110621. Made of fine-grained sandstone, this metate was made from a cobble that had been partially shaped by pecking. The metate has a single utilized side, deeply concave. It is impossible to determine the complete form of the metate from the remaining fragment. The intended use-surface was made slightly concave by pecking. Wear on this pecked area indicates that tool use did take place before the metate was broken. The complete metate (approximately 10 cm by 6 cm) would have been small for processing plant material. It may have been used for specialized activities such as grinding pigments or shaping ornaments or bone tools.

A large end fragment of a basin metate was recovered from the original ground surface, beneath the midden deposit, in Test Pit 3. Constructed from a slab of medium-grained rhyolite, this metate was shaped by flaking the edges of the original slab and then pecking a slightly concave surface. It shows evidence of use. Pecking of the use-surface indicates that at least one resharpening episode (by pecking the use-surface to make it rough) took place.

The presence of ground stone artifacts at LA 110621 is consistent with the presence of cultural features (probable pit structures) and deposits. Although only two ground stone artifacts were found at LA 110621, they indicate a range of activities consistent with a habitation site. Thus, food processing is indicated by the presence of the basin metate, and unknown specialized activities are suggested by the small metate.

LA 110622

The one ground stone artifact recovered from LA 110622 is a small side fragment from a basin metate, recovered from the fill of a rodent burrow in Test Unit 3. The metate was constructed from a modified slab of fine-grained rhyolite, shaped by flaking and pecking. The single use-surface of this metate is a smooth, deep, concave surface. This implies that the metate was heavily used prior to being broken or discarded. Although the lack of pecking suggests that the metate was not resharpened, any evidence of this may have been ground away (as suggested by the extremely smooth use surface). It is impossible to determine the original,

complete shape of the metate based on this single side fragment.

The presence of ground stone artifacts indicates food processing, making the presence of a basin metate fragment consistent with the occurrence of ceramics at LA 110622. The large site area, combined with the high number of surface artifacts, suggests that this is a habitation site. Although no intact cultural features or deposits were found at LA 110622 within the proposed project area, structures may be present within the main site area, east of the proposed project area.

CERAMIC ANALYSIS

C. Dean Wilson

This chapter discusses data resulting from the analysis of 147 sherds recovered during the project: 32 sherds from LA 98732, 108 from LA 110621, and 7 from LA 110622. Despite the small number of sherds examined, the resulting data allow for the further examination of ceramic trends associated with the Jornada Mogollon component at this site compared to those from other sites in the area, including several small sites recently examined by OAS (Wilson in prep. a, in prep. b). Therefore, the same analysis approaches and categories employed during these projects were utilized during the present study. In this analysis, descriptive attributes and typological categories employed in previous studies of Jornada Mogollon ceramics were documented (Seaman and Mills 1988; Whalen 1994).

Descriptive Attributes

The recording of descriptive attributes reflecting resource use, technology, manufacture, decoration, vessel form, and postfiring modifications of vessels reveal a variety of patterns. Attributes recorded during sherd analysis include temper, pigment, surface manipulation, wall thickness, paste profile, rim shape, vessel form, and modification.

Temper

Temper categories were identified by examining freshly broken sherd surfaces through a binocular microscope. Most of the sherds examined during this study exhibited similar temper consisting of relatively large white angular fragments of quartz and feldspar. This material is a crushed granite, the nearest source of which is the Franklin Mountains to the east (Hill 1996).

A few sherds contain fine volcanic particles, probably reflecting the use of self-tempered clays derived from volcanic tuff deposits in the Mogollon Highlands (Wilson 1994; Ratte and Finnel 1978; Rhodes and Smith 1976) and were assigned to a tuff category. The presence of fine volcanic temper in pottery produced in this region may reflect inclusions commonly occurring in local pedogenic clays or the addition of fine volcanic rock as temper. Temper reflecting these sources generally contains a combination of reflective light-colored igneous rocks; dull, light-color tuff; and sandstone particles derived from volcanic clastic formations. This temper usually consists of numerous, relatively small, shiny, angular particles of varying colors, although most tend to be white to light gray. These particles, usually associated with less numerous dull white tuff and darker basalt and rhyolite fragments, were assigned to the tuff category.

A single white ware sherd, possibly from the Anasazi region, was tempered with sand.

Sand refers to rounded or subrounded, white to translucent, white to clear grains. Small angular fragments were also present and may indicate the use of sands weathered from local sandstone sources.

Surface Manipulation

Surface manipulation refers to the presence and type of surface textures, and polishing was noted for interior and exterior sherd surfaces. *Plain smoothed surfaces* are unpolished surfaces on which coil junctures have been completely smoothed. *Plain polished surfaces* are those which have been intentionally polished after smoothing. *Polishing* implies intentional smoothing with a polishing stone to produce a compact and lustrous surface. *Smoothed and somewhat lustrous* refers to intermediate treatments that are either highly smoothed or lightly polished.

Wall Thickness

Previous studies indicate possible changes in the average wall thickness of Jornada Brown Ware vessels from the Mesilla to the El Paso phase. Sherd thickness was recorded to 0.1 mm. In the present study, this measurement was made at an area of the sherd that appeared to be fairly typical of the overall thickness.

Paste Profile

The color combinations of sherd cross section reflects clay iron content and the firing conditions to which a vessel was exposed. Reddish or buff profiles indicate final oxidation atmospheres. Black or dark gray profiles result from reduction atmospheres. Color categories recorded for sherd cross sections include *not recorded*, *brownish or red throughout*, *brownish or reddish exterior with dark gray or black core*, *dark gray or black throughout*, and *white or light gray*.

Vessel Form

Vessel form categories were assigned based on observed shapes of rims or the presence and location of polish and painted decorations on sherds. While it is often possible to identify the basic form (bowl versus jar) of body sherds from many Southwestern regions by the location of painted decoration and polishing, such distinctions are much more difficult for Jornada assemblages dominated by brown ware types. For example, in contrast to many Southwest pottery traditions, Jornada Brown Ware bowl and jar sherds can be polished or smoothed on either side. Such observations result in a reluctance to assign brown ware sherds to specific vessel form categories. While the location of surface polishing may convey relevant information, caution must be employed in the resulting interpretations. Therefore, body sherds

were not assigned to specific vessel form categories but placed in a series of categories reflecting the presence and location of surface polishing. Categories recorded for body sherds include *both sides unpolished*, *both sides polished*, *interior side polished*, and *exterior side polished*. The only nonrim sherds assigned to more distinct form categories are jar neck sherds, identified by the presence of multiple curves associated with neck sherds. *Painted bowls* refers to sherds recognized as bowl sherds from painted decorations on the interior surface only. *Necked jar rim* refers to rim sherds derived from jars with relatively wide diameters utilized for cooking or storage.

Modification and Wear

Evidence of postfiring modification and wear of sherds was limited to a single sherd with a drilled repair hole. *Repair drill hole* refers to the presence of purposely drilled holes presumably used in the mending of vessels by lacing together drilled sherds.

Refired Paste Color

Clips from a small number of sherds were fired to controlled oxidation conditions at 950 degree C to standardize ceramic pastes. This provides for a common comparison of pastes based on the influence of mineral impurities (particularly iron) on paste color and may used to identify sherds that could have originated from the same source. The color of each sample was recorded using a Munsell Soil Chart.

Type Categories

Ceramic types represent groupings incorporating information about spatially and temporally important trait combinations. Ceramic items are assigned to typological categories based on a series of observations. First, an item is placed into a spatially distinct ceramic tradition based on temper, paste, and technological traits. Next, it is assigned to a particular ware group based on technological and surface attributes. Finally, a sherd is placed into a type category based on temporally sensitive surface textures or design styles.

Most of the sherds recovered during the Riverside Project displayed traits indicative of Mogollon Brown Ware types. Jornada Mogollon Brown ware types dominate ceramic assemblages at sites covering an extremely wide area, including parts of south-central New Mexico, West Texas, and northern Mexico. El Paso Brown Ware types are best known from sites along the Rio Grande near the Texas–New Mexico border and the Tularosa Basin in south-central New Mexico. El Paso Brown Ware types differ from types belonging to other Jornada Brown Ware traditions solely in the presence of a coarse angular temper of local origin (Anyon 1985; Hard 1983; Jennings 1940; Lehmer 1948; Whalen 1994). Thus, it is often not possible to distinguish El Paso Brown Ware sherds from other Jornada brown ware types without careful characterization of the associated temper. The various El Paso Brown Ware

types, then, are best considered a regional variant of Jornada Brown Ware (Whalen 1994).

Most Jornada Brown wares from sites in the El Paso area exhibit plain surfaces that may be rough to polished. Most El Paso Brown Ware sherds lack distinct surface textures (Jelinik 1967; Jennings 1940; Lehmer 1948). Surface colors range from gray, to brown, to red, and cross sections range from brown to black, with various combinations of exterior and core colors. El Paso Brown Ware sherds are further divided into types based on the presence of painted decoration or surface texture treatments. El Paso Brown Ware types identified during the present analysis include the following:

El Paso Brown Rim, as defined here, is identical to ceramics previously classified as El Paso Plain Brown (Mills 1988). This type refers to smoothed and unpainted El Paso Brown Ware rim sherds. Unpainted rim sherds are assigned to a different type from body sherds, because temporally diagnostic El Paso Polychrome vessels are often undecorated in the lower portion of the vessel only. Thus, it is more likely that unpainted brown ware rim sherds are derived from unpainted vessels.

El Paso Brown Body is similar to sherds previously defined as Unspecified El Paso Brown (Anyon 1985; Hard 1983; Mills 1988). This category includes sherds in which attributes such as paint and rim are most commonly used to distinguish El Paso Brown from El Paso Polychrome vessels are absent.

El Paso Polychrome refers to sherds with pastes and treatments similar to those of El Paso Brown with the addition of painted decorations. El Paso Polychrome is characterized by large geometric motifs executed in red and black paint (Stallings 1931), although many sherds from El Paso Polychrome vessels may exhibit decoration in one color only. Since decoration on jars is often limited to the rim or neck areas, unpainted body sherds from El Paso Polychromes may be classified as El Paso Brown body.

Nonlocal Types

Five of the sherds exhibited pastes, tempers, or decorations indicating they were not produced locally but originated in areas to the north. Most of these types were distinguished by a fine tuff temper similar to that noted in the majority of ceramics from sites in the Mogollon Highlands to the northwest. The combination of pastes and temper found in ceramics from this area appears to reflect the use of self-tempered alluvial or pedognic clays utilized by potters in the Mogollon Highlands (Wilson 1994).

Alma Plain Body refers to polished brown wares with pastes and fine tempers similar to those noted in ceramics from the Mogollon Highlands to the northwest. The single sherd assigned to this type exhibited a higher degree of polishing than the great majority of sherds assigned to El Paso Brown Ware types. San Francisco Red refers to sherds with characteristics similar to those of Alma Plain types, with the addition of a bright red slip.

Indeterminate Mimbres black-on-white exhibits pastes and tempers similar to those of other Mogollon Highland types, with the addition of a white slip with painted decorations in mineral paint. The lack of distinct painted designs on either of the two Mimbres painted sherds precluded their assignment to a temporal type.

One sherd exhibited a white paste and sand temper probably indicative of a vessel produced in the Anasazi region to the north. While it exhibited decoration in mineral paint, the lack of distinct design prevented its assignment to a distinct type, and it was assigned to mineral paint white.

Dating of Sites

The dating of Jornada sites and components based on small ceramic samples can be quite difficult given the conservative nature of ceramic change in the Jornada Mogollon region and general absence of independently dated sites. Conservatism in Jornada Mogollon ceramic technology is reflected by the long dominance of El Paso Brown sherds with similar ranges of paste, temper, and surface textures. Dating studies in the Jornada Mogollon region have relied on the better-dated intrusive types and local painted brown wares that may occur in low frequencies (Lehmer 1948). Given the small number of intrusive and painted types normally recovered from sites in this region, it is usually only possible to reliably date large assemblages. Thus, a great deal of caution must be exercised during dating assignments to small Jornada Mogollon ceramic assemblages such as those recovered during the Riverside Project.

The ceramic occupation of the Southern Jornada Mogollon area is usually divided into three phases: the Mesilla (A.D. 1 to 1100), Doña Ana (A.D. 1100 to 1200), and El Paso (A.D. 1200 to 1400) phases. The Mesilla phase is associated with pithouse occupations. It begins with the introduction of plain brown ware ceramics in about A.D. 0-500 and ends in about A.D. 1100 with the introduction of local painted types such as El Paso Polychrome (Lehmer 1948; Whalen 1994). Pottery is often rare at Mesilla phase components and may even be absent in some cases. Some studies have documented chronological changes during the long-lived production of El Paso Brown vessels by either lumping these sherds into a series of finer-defined subtypes distinguished by combinations of paste and surface characteristics, or through the independent recording and monitoring of potentially sensitive attributes for El Paso Brown Ware types (Whalen 1981, 1994). These examinations indicate gradual changes in Jornada Brown Ware pottery, which may include a decrease in temper size and wall thickness and an increase in fineness of surface finish and hardness through time (Whalen 1994).

Plain ware vessels appear to have been gradually replaced by painted vessels during the Doña Ana phase (Whalen 1977). El Paso Polychrome appears during this period, although early examples may exhibit painted decorations in one color only and retain a number of El Paso Brown traits (Whalen 1981). The Doña Ana phase, thought to date between A.D. 1100 and 1200, is often characterized by a mixture of ceramic types or attributes defined for the

Mesilla and El Paso phases (Carmichael 1985; Lehmer 1948). This may result in difficulties in distinguishing Doña Ana phase mixed assemblages. It is sometimes assumed that a shift toward the almost exclusive production of El Paso polychrome vessels occurred by the beginning of the El Paso phase. It is likely, however, that the production of some unpainted El Paso Brown vessels continued into the early El Paso phase (Seaman and Mills 1988).

Distributions of various attributes and types are utilized to determine the period of occupation for each of the three ceramic-bearing sites tested during the Riverside Project. Table 17 illustrates the distribution of ceramic types at each of these sites.

Dating of LA 98732

While only 31 sherds were recovered during the recent testing of LA 98732 by OAS, early testing in the right-of-way by the El Paso Centennial Museum resulted in the recovery of 216 sherds (O'Laughlin 1977). Based on the dominance of El Paso Brown, the lack of El Paso Polychrome, and the presence of Mimbres Corrugated and Mimbres Black-on-white for assemblages recovered during the earlier testing of this site by the El Paso Centennial Museum, this site was interpreted as reflecting a Mesilla phase occupation with a terminal occupation in about A.D. 1100 (O' Laughlin 1977). The presence of Mimbres Corrugated and Mimbres Black-on-white further indicate that at least some of the occupation of this site dated to the later part of the Mesilla phase. Distributions of types in the 32 sherds recovered from LA 98732 support these earlier dating interpretations. While the great majority of the sherds recovered represent El Paso body sherds (90.6 percent), single sherds of El Paso Brown Rim, Alma Plain Body, and Indeterminate Mimbres Black-on-white were identified. The fact that most sherds were unpolished on both surfaces and the El Paso Brown sherds had an average wall thickness of 5.4 mm also support a late Mesilla phase assignment.

Dating of LA 110621

A total of 108 sherds were recovered during OAS testing of LA 110621. While the great majority (95.4 percent) of these sherds were assigned to El Paso Brown body, single sherds were assigned to El Paso Brown rim, El Paso Polychrome, Indeterminate Mimbres Black-on-white, San Francisco Red, and mineral paint white. The single El Paso Polychrome sherd may indicate an El Paso phase component. This is not surprising given the nearby Bob Johns site, representing an El Paso phase village (Brook 1984). The presence of Mimbres Black-on-white and mineral paint white could also indicate an earlier component. Thus, this assemblage could reflect a mixed assemblage dating to the late Mesilla and El Paso phase. However, the dominance of unpolished sherds and average sherd thickness of 5.4 mm is consistent with a Mesilla phase site.

Dating of LA 110622

The seven sherds recovered from LA 110622 were all assigned to El Paso Brown body. It is not possible, then, to assign this site to a particular phase, although the average sherd thickness of 5.7 mm is definitely within the range of a Mesilla phase occupation.

Ceramic Patterns

The small number of ceramics recovered from LA 98732, LA 110621, and LA 110622 provided information on the dating of these sites and associated ceramic trends. All sherds examined were brown wares exhibiting similar pastes and tempers and were assigned to types based on rim form and exterior surface textures (see Table 17). All El Paso Brown Ware sherds had granitic temper (see Tables 18–19), exhibited similar high-iron pastes, and fired to red colors in oxidizing atmospheres. This indicates that all the El Paso Brown Ware sherds recovered could have been produced from the same ceramic sources. Sherds from all three sites displayed a wide range of paste profiles, reflecting variable oxidation and reduction firing atmospheres. The majority (92.3 percent) of the El Paso Brown Ware sherds were unpolished on both sides and appear to have originated from jars, although a few sherds were polished on at least one or both surfaces and could have been from bowls (see Tables 20–22).

Table 17. Ceramic distribution by type

	LA 98732		LA 10621		LA 110622		Total	
	N	%	N	%	N	%	N	%
El Paso Brown body	29	90.6	103	95.1	7	100.0	139	94.6
El Paso Brown rim	1	3.1	1	0.9			2	1.4
El Paso Polychrome			1	0.9			1	0.7
Alma Plain	1	3.1					1	0.7
Mimbres Black-on-white	1	3.1	1	0.9			2	1.4
San Francisco Red			1	0.9			1	0.7
Mineral-painted white			1	0.9			1	0.7
Total	32	100.0	108	100.0	7	100.0	147	100.0

Table 18. Ceramic distribution by temper, LA 98732

	El Paso Brown		Mogollon Brown		Mimbres White		Total	
	N	%	N	%	N	%	N	%
Angular quartz and feldspar	29	90.6	1	3.1			30	93.8
Tuff	1	3.1			1	3.1	2	6.3
Total	30	93.7	1	3.1	1	3.1	32	100.0

Table 19. Ceramic distribution by temper, LA 110621

Temper	El Paso Brown		El Paso Polychrome		Mimbres Red		Mimbres White		Anasazi White		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Angular quartz and feldspar	104	96.3	1	0.9	1	0.9					106	98.2
Sand									1	0.9	1	0.9
Tuff							1	0.9			1	0.9
Total	104	96.3	1	0.9	1	0.9	1	0.9	1	0.9	108	100.0

Table 20. Ceramic type by form, LA 98732

Form	El Paso Brown		Mogollon Brown		Mimbres White		Total	
	N	%	N	%	N	%	N	%
Body (both sides unpolished)	20	62.5					20	62.6
Body (both sides polished)	3	9.4					3	9.4
Body (exterior polished)	3	9.4					3	9.4
Jar neck	3	9.4					3	9.4
Jar neck rim	1	3.1	1	3.1			2	6.3
Painted bowl					1	3.1	1	3.1
Total	30	93.8	1	3.1	1	3.1	32	100.0

Table 21. Ceramic type by form, LA 110622

Form	El Paso Brown		Total	
	N	%	N	%
Body (both sides unpolished)	6	85.7	6	85.7
Body (exterior side polished)	1	14.3	1	14.3
Total	7	100.0	7	100.0

Table 22. Ceramic type by form, LA 110621

Form	El Paso Brown		El Paso Polychrome		Mimbres Red		Mimbres White		Anasazi White		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Body (both sides unpolished)	96	88.9									26	88.9
Body (both sides polished)	3	2.8									3	2.8
Body (interior polished)	2	1.9			1	0.9					3	2.8
Jar neck	1	0.9									1	0.9
Jar neck rim	2	1.9	1	0.9							3	2.8
Painted bowl							1	0.9	1	0.9	2	1.9
Total	104	96.3	1	0.9	1	0.9	1	0.9	1	0.9	108	100.0

FAUNAL ANALYSIS

Nancy J. Akins

The eight pieces of bone recovered during recent excavations at LA 98732 (Table 23) are consistent with material previously reported from this site. In a much larger sample (n = 1,510), using 1/16 inch mesh screen, O'Laughlin (1977:29-30) recovered a wide variety of taxa, including spadefoot toads, soft-shell and box turtles, snake, quail, owl, cottontail, jackrabbit, kangaroo rat, woodrat, muskrat, and deer. Jackrabbit (21.0 percent) and cottontail (2.8 percent) were the most abundant species, and unidentifiable small-mammal fragments comprised much of the assemblage (76.2 percent).

Jackrabbit and cottontail proportions are similar in this and the larger assemblage. The ratio of cottontails to jackrabbits in the larger sample is .135 compared to .167 here. Given the difference in screen size (the larger sample was more likely to recover small cottontail elements), these ratios are remarkably similar. Burning is common in both. In the larger assemblage, 31.8 percent of the jackrabbit and 46.5 percent of the cottontail bone was burned. Here, the one cottontail element is burned, and 66.7 percent of the jackrabbit elements.

O'Laughlin (1977:35) concludes that jackrabbit was the most frequently hunted taxon at this site, and in the El Paso area, species utilization directly reflects availability. Comparing faunal assemblages from this portion of the state, he finds evidence for three hunting strategies: a highland strategy concentrating on deer and mountain sheep but still utilizing large numbers of rabbits; a lowland strategy characterized by rabbits and some pronghorn; and a riverine strategy oriented towards rabbits but also utilizing species that occur along the river (O'Laughlin 1977:26-27). The few elements recovered during these excavations are consistent with previous finds but add no new information on species utilization at the site.

Table 23. Faunal elements by provenience, LA 98732

Field Specimen	Provenience	Taxon	Element	Comments
101	Test Pit 1 Level 1	*Lepus californicus* jackrabbit	tibia; right proximal tibia	two pieces; fresh break; partially burned; pitted; young adult
101		jackrabbit	rib, left shaft fragment	polished
101		jackrabbit	innominate, right ischium fragment	two pieces; burned gray
200	Test Pit 2 Level 2	jackrabbit	femur, proximal, and one-half shaft	slight etching
200		*Sylvilagus auduboni* desert cottontail	scapula, left glenoid, and one-third of the body	
201	Test Pit 2 Level 3	jackrabbit	metatarsal 2, right proximal, and one-half shaft	burned black; small; probably a young adult
201		small mammal (probably jackrabbit)	long bone shaft fragment (probably tibia or femur)	spiral break; graded burn; scorch to light black

DISCUSSION

The four sites in the NM 273 Riverside Project have been assigned to phases based on their associated pottery (Wilson, this volume). LA 98732 was assigned to the Late Mesilla phase based on redeposited artifacts from the built-up roadbed. O'Laughlin (1977), assigned this site to the Mesilla phase after his excavations. Since no ceramics were recovered at LA 98734, the site has been assigned to the Late Mesilla phase based on ceramics found outside of the highway project area. LA 110622 has been assigned to the Late Mesilla phase. LA 110621 is also a Mesilla phase site, although an El Paso phase component may also be present.

The intensely occupational nature of these sites suggest that they are the result of long-term use. Limited-activity sites contain "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 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, and specialized activity areas.

While short-term limited activity areas with features have been documented that can be assigned to the Jornada Mogollon (Hard 1983; O'Laughlin 1979, 1980; O'Laughlin and Gerald 1977; Whalen 1980, 1994), few habitation sites have been excavated west of the Rio Grande (Whalen 1994; Zamora 1993). Within the project area, intact features have been found at LA 110621, and an intact midden deposit has been excavated at LA 98732. Although features are not present at LA 98734 or LA 110622 within the project limits, site size and artifact densities outside of the project area suggest that features are 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 was especially adaptive 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 with 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. The midden deposit excavated at LA 98732 (O'Laughlin and Gerald 1977) is one example of how

this mixed form of economy can appear within the archaeological record at the site level.

Differentiating between activities through use of the archaeological record can be challenging. The lithic assemblages from these four sites alone suggest limited plant rather than animal processing--an activity discounted by the lack of faunal remains. Ground stone artifacts indicate domesticated maize, wild seed, or possibly mesquite bean collection. Ground stone artifacts were recovered from LA 110621 and LA 110622. Ground stone artifacts were recovered during the excavation of LA 98732, and at LA 98734, ground stone artifacts were present in the portion of the site outside of the project area.

Of particular importance is the position of these sites within the ecological edge area of the leeward slope and riverine environmental zones (O'Laughlin 1980: Fig. 5). Habitation sites generally occur in ecological edge areas: the areas of contact between different biotic communities, generally where physical changes in the landscape have taken place. Ecological edge areas are "the most convenient locations for proximity to the widest variety and stability of resources" (Epp 1985:332). 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 1985). 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 (Whalen 1994:132), Thurmond (1990:17) suggests that these biotic borderlands maximize both the density and diversity of available faunal and floral resources. This increased availability of resources should result in a larger range of and more short-term activities in these ecological edge areas. The repeated use of an area should occur as different plant (and possible animal) resources become available throughout the year (O'Laughlin 1980:230), allowing the degree of exploitation needed to support a sedentary population.

The ecological zone, or zones, of the site location may also reflect the types of animals procured. O'Laughlin and Gerald (1977) developed a model of Jornada Mogollon hunting strategies based on site location. Sites were divided by their locations in the landscape. People at highland sites utilized a hunting strategy based on deer. People at lowland sites utilized a rabbit-oriented strategy. A riverine hunting strategy formed the third type, essentially a lowland rabbit-based hunting strategy with the addition of migratory water fowl, fish, and riverine mammals (O'Laughlin and Gerald 1977). The Sandy Bone site (LA 98732) exemplifies the riverine hunting strategy.

As more 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 increasingly refined interpretations of these data.

RECOMMENDATIONS

LA 98732

LA 98732 is a ceramic and lithic artifact scatter. Based on the ceramic assemblage (see Wilson, this volume), this site has been assigned to the Mesilla phase. The portion of this site within the NM 273 right-of-way was excavated by a UTEP field school. More recently, the site has been severely deflated. Livestock, a gas pipeline, and vehicular traffic have also modified the site area. All of the artifacts present are in redeposited highway fill. No intact cultural features or deposits were found.

Archaeological testing within the proposed project limits at LA 98732 did not reveal any cultural features or deposits likely to yield important information on the prehistory of LA 98732 or the region. No further investigations are recommended.

LA 98734

LA 98734 is a ceramic and lithic artifact scatter. Although no ceramics were recovered within the project area, this site has been assigned to the late Mesilla phase based on ceramics from portions of the site outside of the proposed project area. This site has been severely deflated and the artifacts redeposited. Also, the presence of a gas pipeline, an underground telephone cable, and a storm drain system have modified the site. The site has also been modified by two dirt tracks parallel to the highway. No intact cultural features or deposits were found.

Archaeological testing within the proposed project limits at LA 98734 did not reveal any cultural features or deposits likely to yield important information on the prehistory of LA 98734 or the region. No further investigations are recommended.

LA 110621

LA 110621 is an extensive ceramic and lithic artifact scatter with two features (probable pit structures) and a midden deposit. Ceramic analysis (Wilson, this volume) indicates that LA 110621 dates to the Mesilla phase.

Excavation revealed two features. Their size and depth suggest they are probably pit structures. One feature cuts through the second, suggesting at least two periods of site occupation. Confirmation of site reuse during the Mesilla phase would be a major contribution to archaeology in southern New Mexico.

A midden deposit was located 12 m northwest of the features at LA 110621. Although ceramics show this deposit to be contemporary with the features, the depth of the deposit

indicates a single, long-term occupation of the site. This appears to contradict the evidence of repeated site use indicated by the pit structures, suggesting more complexity of Mesilla phase site structure than previously assumed.

Archaeological testing within the proposed project limits has revealed cultural features and deposits likely to yield important information on the prehistory of LA 110621 and the region. We recommend data recovery at LA 110621.

LA 110622

LA 110621 is a ceramic and lithic artifact scatter. Based on the ceramic assemblage (see Wilson, this volume), this site has been assigned to the Mesilla phase. The site has been severely deflated and the artifacts redeposited. Most of the site area within the proposed project area was removed during with earlier highway construction. Livestock and vehicular traffic have also modified the site area. A charcoal lens is present, but no artifacts are associated with it, suggesting it represents a noncultural grass fire. No intact cultural features or deposits were found.

Archaeological testing within the proposed project limits at LA 110621 did not reveal any cultural features or deposits likely to yield important information on the prehistory of LA 110621 or the region. No further investigations are recommended.

A DATA RECOVERY PLAN FOR LA 110621

Previous research in the Santa Teresa area has focused on both site-specific and regional problems. The Santa Teresa Project focused on relationships between site structure and geomorphic processes, and temporal differences between chipped stone assemblages (Moore 1992: 68-69). The Sandy Bone site (LA 98732) study was directed toward the study of subsistence and seasonality (O'Laughlin and Gerald 1977), resulting in a model of regional faunal procurement differentiation based on biotic zones. This model was successfully expanded in the Keystone Dam study to incorporate plant resources (O'Laughlin 1980). Zamora (1993) examined social organization and regional interaction at the Cristo Rey site (LA 1644). The La Cabraña Project (Foster et al. 1981) examined dietary diversity and procurement strategies at an El Paso phase habitation site. Further to the east in the Hueco Bolson, research has focused on residential mobility (Whalen 1980, 1994).

Research Questions

Data recovery at LA 110621 can be used to address questions of chronology, occupation history, and subsistence and mobility. Faunal and lithic raw material procurement strategies will be integrated into the study. LA 110621 will be the third Mesilla phase site to be excavated on the western terrace of the Rio Grande in the Santa Teresa area. Chronology and occupation history will be addressed on the intrasite level. Subsistence and mobility will be addressed at the intrasite level and at the intersite level for the Santa Teresa area.

Chronology

When was the site occupied, and what form of occupation is indicated? LA 110621 has two features (probable pit structures), one of which cuts through the fill of the second. Two distinct occupational episodes are thus indicated. However, the presence of a well-developed trash midden suggests a continuum of occupation at the site.

Excavation at LA 110621 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. 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 ceramic styles through time provide a coarse indication of occupation length. The similarity of the ceramics recovered from the 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 ceramic 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 110621 is represented by the sequence of overlapping features, 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 these factors are present at LA 110621. A large El Paso phase pueblo site, LA 110620, is adjacent to LA 110621. The close proximity of the two sites suggests that they represent separate aspects of the same occupational sequence.

The study of occupation history at LA 110621 will use the sequence of feature construction and 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 will aid in identifying activity and discard areas. Analysis of the ceramics associated with each occupational episode will aid in both the reconstruction of the site's occupational history and any possible association between LA 110621 and LA 110620.

Subsistence

What activities were conducted at LA 110621, and are there differences in the activities through time, within the occupational sequence? Does the subsistence data reflect sedentary or seasonal site use? Subsistence can be directly inferred from dietary evidence and indirectly investigated through the technology of procuring and processing food. Dietary evidence includes flora and faunal remains. Technological evidence includes the tools used in the procurement and processing of food and the tools used to manufacture them. 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. A model of faunal subsistence has been suggested for the general site area (O'Laughlin and Gerald 1977). This suggests three hunting strategies, each based on a category of terrain: highland, lowland, and riverine. The highland strategy is based on deer, the lowland on rabbits

and some pronghorn. The riverine strategy (employed along the Rio Grande) is similar to the lowland with the additional resources of fish, turtle, water fowl, and other small mammals. Wild plant utilization, based on seasonal availability, has been demonstrated for the Jornada Mogollon in the general site area by O'Laughlin (1980), and Hard (1983).

LA 116021, on the first river terrace, is near the border of the lowland and riverine strategy areas. This should serve to maximize the quantity of available plant and animal resources supplementing the cultivation of maize.

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 maize cultivation 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. Residential sites such as LA 110621 should have an artifact assemblage reflecting mixed activities.

Subsistence and changes in subsistence strategy can be addressed through the investigation 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 (O'Laughlin and Gerald 1977).

Contexts likely to yield floral and fauna remains are hearths, storage pits, floor contact, and deep midden deposits. A midden deposit is present at LA 110621. Since processing the entire midden deposit is not practical, samples will be collected from it during excavation, processed, and analyzed for macrobotanical remains. Floor contact within a pit structure is likely at LA 110621, with its two probable pit structures. If storage pits are present, pollen samples can 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 from the presence of ground stone artifacts, such as manos and metates. Both manos and metates are expected at LA 110621, a residential site. The form of a metate may indicate 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 of the grinding of maize. This functional

differentiation will be used in the analysis of manos and metates from LA 110621.

Features such as hearths, pit structures, and storage pits will provide more direct evidence of site function. Along with the midden deposit, pit structures indicate that LA 110621 is a residential site. The existence of extramural hearths and storage pits will provide additional evidence of site function and activities.

Features and their association with artifacts will provide information on 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 110621, 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 110621 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 on 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 the delineation of features and associated surfaces. The excavation methods will include surface stripping and feature excavation. Previously excavated test units will be relocated.

Testing delineated an area of subsurface features and deposits measuring 8 by 40 m. This area will be surface stripped by hand to a depth of 10 cm below the modern ground surface 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 through the use of a site datum tied into the grid system. Subdatums tied to the site datum will be used as appropriate.

Features and cultural deposits are present at LA 110621 at a depth of 10 cm below the modern ground surface. Since the presence of features is considered an indicator of an occupational level, once surface stripping has been completed, any features or cultural deposits 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.

As excavation proceeds, structural components of features will be mapped using the closest set point. The mapping of features will aid in identifying occupational levels or surfaces. Excavation will continue until culturally sterile soils are 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 immediately 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 drawn, and the stratigraphy will be 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 C-14 samples will be collected as appropriate. All dirt removed during excavation will be screened in 1/4 inch wire mesh, and the artifacts will be bagged and labeled by excavation unit.

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 key to abbreviations and symbols. Written descriptions on standard forms 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.

Pit structures will be approached in the same manner as features. A portion of the 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. If found, human remains 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. C-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.

After hearths, features, and pit structures are cross-sectioned, potential for macrobotanical 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 foil. Samples will only be collected from contexts with a high potential for remains. Archaeomagnetic samples and dendrochronological samples will be collected according to the processing laboratory's standards.

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.

8. An updated map of the site will be made, using a transit, stadia rod, and 50 m tape. The map will include feature locations, excavation areas, and relevant topographic features.

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. Specialists will be consulted for special requirements 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 the Office of Archaeological Studies' *Standardized Lithic Artifact Analysis*. Morphological and functional attributes will emphasize material reduction, manufacture and maintenance, and tool use.

Ceramics will be identified according to existing regional typologies for the Jornada Mogollon cultural sphere. Analysis will take place in the OAS laboratory, conducted by C. Dean Wilson. The primary foci of analysis will be dating, function, and source of manufacture.

Faunal remains will be analyzed in the OAS laboratory by Nancy J. Akins. 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 depend on the abundance and condition of the recovered faunal remains.

Macrobotanical remains from collected samples will be analyzed at OAS by the staff ethnobotanist, Mollie S. Toll. The analysis will identify plant resources used prehistorically and aid in the study of subsistence and site function.

Specialized dating techniques will be conducted by contracted specialists: C-14 by Beta Analytic, pollen analysis by Rick Holloway, and dendrochronology by the Tree-Ring Laboratory at the University of Arizona. Archaeomagnetic analysis will be conducted by the OAS archaeomagnetic laboratory.

Research Results

A report on the results of data recovery will be published in the OAS 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 given to the Historic Preservation Division, Archaeological Records Management Section, at the Laboratory of Anthropology in Santa Fe. The artifact collection will be curated in the Museum of New Mexico's Archaeological Research Collection.

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APPENDIX 3: POLICY ON COLLECTION, DISPLAY AND REPATRIATION OF CULTURALLY SENSITIVE MATERIALS

Office of Cultural Affairs
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Rule No. 11 POLICY ON COLLECTION, DISPLAY AND REPATRIATION OF CULTURALLY SENSITIVE MATERIALS Adopted: 01/17/91

I. INTRODUCTION

The policy of the Museum of New Mexico is to collect, care for, and interpret materials in a manner that respects the diversity of human cultures and religions.

Culturally sensitive materials include material culture as well as the broader ethical issues which surround their use, care, and interpretation by the Museum. The Museum's responsibility and obligation are to recognize and respond to ethical concerns.

II. DEFINITIONS;

A. "Culturally sensitive materials" are objects or materials whose treatment or use is a matter of profound concern to living peoples; they may include, but are not limited to:

1. "Human remains and their associated funerary objects" shall mean objects that, as a part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later;

2. "Sacred objects" shall mean specific items which are needed by traditional religious leaders for the practice of an ongoing religion by present-day adherents;

3. Photographs, art works, and other depictions of human remains or religious objects, and sacred or religious events; and

4. Museum records, including notes, books, drawings, and photographic and other images relating to such culturally sensitive materials, objects, and remains.

B. "Concerned party" is a museum-recognized representative of a tribe, community, or an organization linked to culturally sensitive materials by ties of culture, descent, and/or geography. In the case of a federally recognized indian tribe, the representative shall be tribally-authorized.

C. "Repatriation" is the return of culturally sensitive materials to concerned parties. Repatriation is a collaborative process that empowers people and removes the stigma of cultural paternalism which hinders museums in their attempts to interpret people and cultures with respect, dignity, and accuracy. Repatriation is a partnership created through dialogue based upon cooperation and mutual trust between the Museum and the concerned party.

D. The Museum of New Mexico's Committee on Sensitive Materials is the committee, appointed by the Director of the Museum of New Mexico, that shall serve as the Museum of New Mexico's advisory body on issues relating to the care and treatment of sensitive materials.

III. IDENTIFICATION OF CONCERNED PARTIES

A. The Museum shall initiate action to identify potentially concerned parties who may have an interest in culturally sensitive material in the museum's collections.

B. The Museum encourages concerned parties to identify themselves and shall seek out those individuals or groups whom the Museum believes to be concerned parties.

C. The Museum's sensitive materials committee shall review all disputed individual claims of concerned-party status in consultation with the tribe, community, or organization which the individual(s) claims to represent. The Museum's sensitive materials committee shall assist, when necessary, in designating concerned parties who have an interest in culturally sensitive materials contained in the collections of the Museum of New Mexico.

D. The Museum shall provide an inventory of pertinent culturally sensitive materials to recognized concerned parties.

E. The Museum shall work with concerned parties to determine the appropriate use, care and procedures for culturally sensitive materials which best balance the needs of all parties involved.

IV. IDENTIFICATION AND TREATMENT OF CULTURALLY SENSITIVE MATERIALS

A. Within five years of the date of adoption of this policy, each Museum unit shall survey to the extent possible (in consultation with concerned parties, if appropriate) its collections to determine items or material which may be culturally sensitive materials. The Museum unit shall submit to the Director of the Museum of New Mexico an inventory of all potentially culturally sensitive materials. The inventory shall include to the extent possible the object's name, date and type of accession, catalogue number, and cultural identification. Within six months of submission of its inventory to the Director of the Museum of New Mexico, each Museum unit shall then develop and submit, a plan to establish a dialogue with concerned parties to determine appropriate treatment of culturally sensitive items or materials held by the unit.

B. As part of its treatment plans for culturally sensitive materials, the Museum reserves the right to restrict access to, or use of, those materials to the general public. The Museum staff shall allow identified concerned parties access to culturally sensitive materials.

C. Conservation treatment shall not be performed on identified culturally sensitive materials without consulting concerned parties.

D. The Museum shall not place human remains on exhibition. The Museum may continue to retain culturally sensitive materials. If culturally sensitive materials, other than human remains, are exhibited, then a good-faith effort to obtain the advice and counsel of the proper concerned party shall be made.

E. All human skeletal remains held by the Museum shall be treated as human remains and are de facto sensitive materials. The Museum shall discourage the further collection of human remains; however, it will accept human remains as part of its mandated responsibilities as the State Archaeological Repository. At its own initiation or at the request of a concerned party, the Museum may accept human remains to retrieve them from the private sector and furthermore, may accept human remains with the explicit purpose of returning them to a concerned party.

IV. REPATRIATION OF CULTURALLY SENSITIVE MATERIALS

A. On a case-by-case basis, the Museum shall seek guidance from recognized, concerned parties regarding the identification, proper care, and possible disposition of culturally sensitive materials.

B. Negotiations concerning culturally sensitive materials shall be conducted with professional discretion. Collaboration and openness with concerned parties are the goals of these dialogues, not publicity. If concerned parties desire publicity, then it will be carried out in collaboration with them.

C. The Museum shall have the final responsibility of making a determination of culturally sensitive materials subject to the appeal process as outlined under section VII A.

D. The Museum of New Mexico accepts repatriation as one of several appropriate actions for culturally sensitive materials only if such a course of action results from consultation with designated concerned parties as described in Section III of this policy.

E. The Museum may accept or hold culturally sensitive materials for inclusion in its permanent collections.

F. The Museum may temporarily accept culturally sensitive materials to assist efforts to repatriate them to the proper concerned party.

G. To initiate repatriation of culturally sensitive materials, the Museum of New Mexico's current deaccession policy shall be followed. The curator working with the concerned party shall complete all preparations for deaccession through the Museum Collections Committee and Director before negotiations begin.

H. Repatriation negotiations may also result in, but are not limited to, the retention of objects with no restrictions on use, care, and/or exhibition; the retention of objects with restrictions on use, care and/or exhibition; the lending of objects either permanently or temporarily for use to a community; and the holding in trust of culturally sensitive materials for the concerned party.

I. When repatriation of culturally sensitive materials occurs, the Museum reserves the right to retain associated museum records but shall consider each request for such records on an individual basis.

VI. ONGOING RECOVERY OR ACCEPTANCE OF ARCHAEOLOGICAL MATERIALS

A. In providing sponsored archaeological research or repository functions, the Museum shall work with agencies that regulate the inventory, scientific study, collection, curation, and/or disposition of archaeological materials to ensure, to the extent possible under the law, that these mandated functions are provided in a manner that respects the religious and cultural beliefs of concerned parties.

B. When entering into agreements for the acceptance of, or continued care for, archaeological repository collections, the Museum may issue such stipulations as are necessary to ensure that the collection, treatment, and disposition of the collections include adequate consultation with concerned parties and are otherwise consistent with this Policy.

C. In addition to the mandated treatment of research sites and remains and in those actions where treatment is not mandated, defined, or regulated by laws, regulations, or permit stipulations, the Museum shall use the following independent guidelines in recovering or accepting archaeological materials:

1. Prior to undertaking any archaeological studies at sites with an apparent relationship to concerned parties, the Museum shall ensure that proper consultation with the concerned parties has taken place.

2. When so requested by concerned parties, the Museum shall include an observer, chosen by the concerned party, in the crew of an archaeological study.

3. The Museum shall not remove human remains and their associated funerary objects or materials from their original context nor conduct any destructive studies on such remains, objects, and materials, except as part of procedures determined to be appropriate through consultation with concerned parties, if any.

4. The Museum reserves the right to restrict general public viewing of in situ human remains and associated funerary objects or items of a sacred nature and further shall not allow the public to take or prepare images or records of such objects, materials, or items, except as part of procedures determined to be appropriate through consultation with concerned parties. Photographic and other images of human remains shall be created and used for scientific records only.

5. The Museum reserves the absolute right to limit or deny access to archaeological remains being excavated, analyzed, or curated if access to these remains would violate religious practices.

APPENDIX 4: TESTING AND SITE EVALUATION PROPOSAL

SHPO Log 43648

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.