MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

U.S. 84–SUNSHINE BREAKS: THE TESTING OF TEN SITES SOUTHEAST OF SANTA ROSA, NEW MEXICO

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ARCHAEOLOGY NOTES 165

SANTA FE 1997 NEW MEXICO

ADMINISTRATIVE SUMMARY

Between June 6 and July 1, 1994, the Office of Archaeological Studies, Museum of New Mexico, conducted archaeological testing of ten sites on U.S. 84 southeast of Santa Rosa, Guadalupe County, New Mexico. Limited testing at LA 6762, LA 6763, LA 6764, LA 8017, LA 99845, LA 103316, LA 103317, LA 103318, LA 1033169, and LA 103320 was conducted at the request of the New Mexico State Highway and Transportation Department (NMSHTD) to determine the extent and importance of cultural resources along a 12.0 km (7.5 mile) stretch of U.S. 84 southeast of Santa Rosa, New Mexico. Nine of the sites are on private and NMSHTD land. LA 103319 is on private, NMSHTD, and State Trust land.

All of the sites are surface lithic artifact scatters, probably temporary or seasonal camping locations. No intact features associated with site occupation or use were found at any of the sites within the project area. LA 6762, LA 6764, and LA 103319 are dual-component sites containing lithic artifact scatters and historic Hispanic or Anglo homesteads. In all three cases, the historic component was outside of the project area. LA 103317 is a dual-component site containing a lithic artifact scatter and a number of structures of recent origin associated with a preexisting gas station complex. The only feature present within the project area was a masonry structure built in 1955 that served as a gas station. In all ten cases, the portions of the sites within the project area have been fully documented during testing, and no further investigations are recommended.

Submitted in fulfillment of Joint Powers Agreement DO4971 between the Museum of New Mexico and the New Mexico State Highway and Transportation Department.

MNM Project No. 41.582 (Sunshine Breaks)
NMSHTD Project No. NH-084-1(15)25, CN 2755
CPRC Archaeological Survey Permit No. SP-146
New Mexico State Land Office Survey Permit No. 93/027

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INTRODUCTION

At the request of William L. Taylor, environmental program manager, New Mexico State Highway and Transportation Department (NMSHTD), a limited testing program was conducted at 10 sites (LA 6762–LA 6764, LA 8017, LA 99845, and LA 103316–LA 103320) on U.S. 84 near Santa Rosa, New Mexico (Fig. 1). LA 103317 is on private land and state land administrated by the NMSHTD. The site also partially extends onto State Trust Land. The other nine sites are on a combination of private land and state land administrated by the NMSHTD. Limited testing was conducted under Cultural Properties Review Committee (CPRC) archaeological survey permit No. SP-146, and New Mexico State Land Office survey permit No. 93/027. Fieldwork, carried out between June 6 and July 1, 1994, was conducted by Peter Y. Bullock, assisted by Louis Kimmelman, Raul Troxler, and Marcy Snow. Sherry Butler served as a volunteer. Timothy D. Maxwell acted as principal investigator. Figures and artifacts were drafted by Ann Noble, the report was edited by Tom Ireland, and photographs were printed by Nancy Warren.

Limited testing was conducted at LA 6762–LA 6764, LA 8017, LA 99845, and LA 103316–LA 103320 to determine the extent and importance of the portion of the sites within the project limits. Testing was restricted to the proposed project corridor of planned improvements to U.S. 84, southeast of Santa Rosa, Guadalupe County, New Mexico. The exact location of the sites is in Appendix 2.

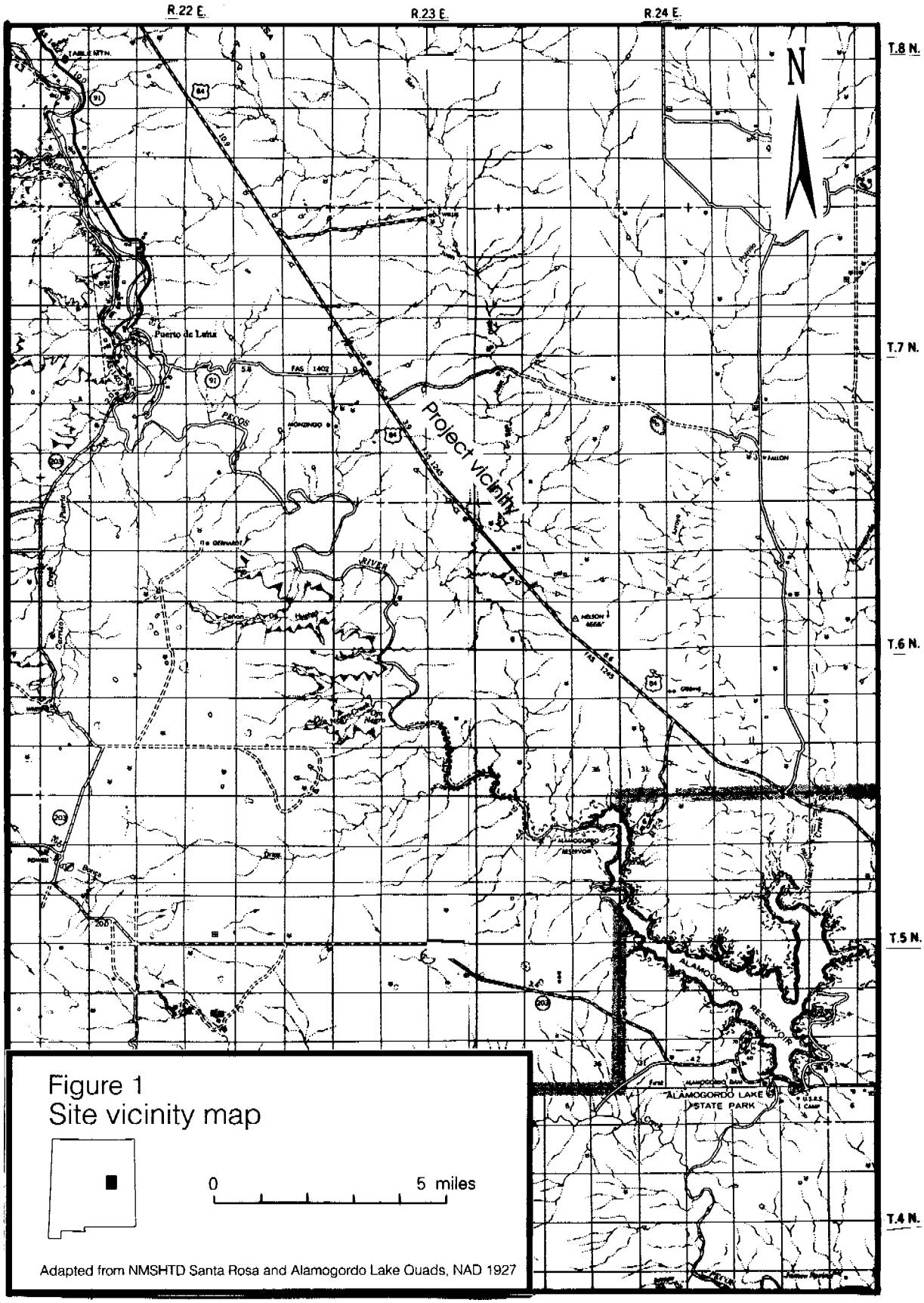

Figure 1
Site vicinity map

ENVIRONMENT

The project area is bounded by the Pecos River on the west. The northern three-quarters of the project area is bounded on the east by San Juan de Dios Arroyo, which then crosses the project area. The southern portion of the project area is within the San Juan de Dios Arroyo drainage area. Elevation within the project area ranges from 1,414.1 m (4,670 ft) in the north to 1,348.7 m (4,454 ft) in the south. The area south of Santa Rosa is primarily rolling mixed grassland. Occasional outcrops of exposed sandstone and shale occur, principally on the tops of ridges. This exposed bedrock forms an area of breaks along the edge of the San Juan de Dios Arroyo drainage. The area supports a cover of mixed grasses and juniper parkland in rocky areas and slopes. Common invasive species include mesquite, cholla, and narrow-leaf yucca.

Geology

Guadalupe County forms part of the Great Plains physiographic province (Jelinek 1967:35). The terrain is characterized by broad plains dipping gradually eastward. In this region of the southern plains, this eastward dip ends where it comes into contact with the caprock of the Llano Estacado.

The Pecos River is approximately 1.6 km (1.0 miles) west of U.S. 84. This is a two-tiered canyon system comprising the oldest portion of the Pecos River Valley, predating the major course shift to the south of the Middle Pecos River in the late Pleistocene (Jelinek 1967:5). This portion of the river valley varies in width and is lined for most of its length by broken cliffs of the second river terrace, formed of sandstone from the Santa Rosa and Chinle formations (Lucas et al. 1985:172-173). Away from the cliff edges, these Triassic sandstones are buried in most places by Pleistocene sands and gravels (Kues et al. 1985:64).

Processes of solution have promoted a karst topography along the Pecos Valley. Water acts on underlying beds of gypsum and limestone, causing the collapse of the surface sandstones and shales of the Santa Rosa formation (Lucas et al. 1985:172). The resulting sinkholes feed surface runoff into the Pecos River and numerous springs and seeps along the Pecos River terraces (Levine and Mobley 1976:11).

Soils within the project area are characteristic of the Haplargids-Torriorthents-Calcirorthids association. Widely distributed, this association is dominated by gently rolling or undulating topography with widely spaced, small, steep escarpments, buttes, and rocky outcrops. This soil association is characterized by a thin brown to reddish-brown noncalcareous fine loam topsoil, usually underlain by a light reddish-brown or pink limy loam. Soils are deep and formed of generally medium to fine alluvial and eolian sediments. These soils tend to be susceptible to erosion where vegetation cover is depleted or removed, and arroyo cutting frequently takes place. Areas of this soil association are usually utilized as rangeland, primarily supporting mixed grasses and mesquite (Maker et al. 1974:67-68).

Soils of the Camborthids-Calciorthids association dominate the southern portion of the project area within the San Juan de Dios Arroyo drainage. The topography of this association is varied, ranging from level or gently sloping broad valley areas to steep escarpments and breaks. Soils are characterized by moderate to deep alluvial deposits. Topsoils are generally light brown to light reddish-brown fine sandy loan. Subsoils are a reddish-brown calcareous sandy loam containing a weak lime zone. These soils are moderately to highly susceptible to erosion. Gullies are common within valley bottoms. This association is used as rangeland, with variable vegetation coverage (primarily mixed grasses) resulting in highly varied use (Maker et al. 1974:70-71).

Climate

The climate of the project area is typical of eastern New Mexico. This climate is characterized as steppe or desert grassland (Castetter 1956:256, Fig. 1). The project area is mixed juniper parkland and mixed grassland. During the Pleistocene this area is likely to have been mixed deciduous-pine woodland (Brunswig 1992:11-13). Although the amount of available moisture appears to have fluctuated repeatedly through the Archaic period, the overall trend for the region has been toward an overall dryer regime with a summer-dominated rain pattern (Sebastian and Larralde 1989:16, Fig. 1.9). In this area of New Mexico most precipitation occurs in the form of summer showers, and winter snow provides less precipitation (Tuan et al. 1973:24, Fig. 6). Annual precipitation in Santa Rosa averages 35 cm (13.8 inches) (Gabin and Lesperance 1977:148-149; Tuan et al. 1973:18, Fig. 2). The average number of frost-free days is 200 (Tuan et al. 1973:87, Fig. 38). South to southwesterly winds averaging 10 miles per hour are prevalent throughout the year (Maker et al. 1974:6-7).

Flora and Fauna

The proximity of the Pecos River Valley officially puts the project area within the woodland biome (Castetter 1956:256, Fig. 1). In reality the project area is in an area of mixing between the woodland biome and the mixed grass biome. Vegetation differences in this area indicate variation in soil and geology rather than climate. Within the project area, juniper parkland occurs in areas of rocky and gravelly knolls, rough broken areas, and north-facing slopes where grasses are poorly developed. The mixed grassland biome exhibits a uniform physiography and vegetative character. Differences in relative vegetation composition result from climatic, topographic, and soil variation (Castetter 1956:266). Grassland is present in areas of medium to fine soils penetrable by grass root systems (Castetter 1956:271). In this area the mixed grassland biome is dominated by short-grass prairie climax vegetation (Levine and Mobley 1976:3). Grasses common to the project area include little bluestem, blue grama, sideoats grama, and sand dropseed. Snakeweed, cholla, and mesquite are common shrubs (Maker et al. 1974:67).

Faunal populations vary according to their habitats and local climatic and geological variations. These habitats tend to correspond with local plant communities. The number of

plant communities close to the project area suggests a range of fauna greater than that characteristic of any one vegetation zone. Faunal species characteristic of the project area include jackrabbit, cottontail rabbit, prairie dog, and assorted small rodents such as mice, ground squirrels, and gophers. Larger faunal species common to the area include antelope, badger, and coyote. Deer and bobcat occur less commonly in the area. Historically, bison were also common in the southern plains adjacent to the Pecos River Valley (Levine and Mobley 1976:16-17).

CULTURAL RESOURCES OVERVIEW

A detailed reconstruction of the cultural history of east-central New Mexico is beyond the scope of this report. Regional summaries are available (Harlan et al. 1986; Levine and Mobley 1975).

Paleoindian Period

The Paleoindian period (10,000-5500 B.C.) was first recognized in 1926 at the Folsom site in northeastern New Mexico (Wormington 1947:20). A series of Paleoindian traditions have since been defined, beginning with Clovis and continuing through Plano (Stuart and Gauthier 1981:294-300). Originally defined on the plains of eastern New Mexico, the Paleoindian cultural area has since been expanded to include virtually all of North America. Although it was originally believed that Paleoindian subsistence depended on big-game hunting, the importance of plant gathering and small-animal hunting is now recognized (McGregor 1965:120; Willey 1966:38; Jennings 1968:78-79; Wilmsen 1974:115; Cordell 1979:19-21; Stuart and Gauthier 1981:31-33).

Paleoindian sites of any period are rare. Paleoindian sites have been recorded in the region, including the Clovis-type Blackwater Draw, Locality No. 1; and Blackwater Draw, El Llano. But few of these sites have been recorded in the general Santa Rosa area. Distinctly shaped Paleoindian projectile points have been found, but usually as isolated finds. One isolated Clovis projectile point base has was found in the Pecos River Valley, just northwest of the project area (Bullock in prep.). Other Paleoindian sites are probably present, buried under alluvial or eolian deposits (Cordell 1982).

Archaic Period

The Archaic occupation of northeastern New Mexico and the upper Pecos River Valley appears to have lasted from 5000 B.C. until about A.D. 1000 (Levine and Mobley 1976). A local chronology has not been developed for this area of New Mexico. Projectile points in eastern New Mexico have been attributed to the Oshara tradition (Irwin-Williams 1973) and cultures of central and western Texas (Johnson 1967).

The Archaic period has been best defined in western New Mexico, where it is generally referred to as the Oshara tradition (Irwin-Williams 1973). This period is distinguished by distinctive projectile points and lithic artifact scatters characterized by grinding implements, fire-cracked rock, and a lack of ceramics. Archaic subsistence adaptions are based on a highly mobile broad-based economy characterized by a combination of seasonally scheduled hunting and gathering activities. The Oshara tradition is divided into five phases: Jay (5500-4800 B.C.), Bajada (4800-3200 B.C.), San Jose (3200-1800 B.C.), Armijo (1800-800 B.C.), and En Medio (800 B.C.-A.D. 400) (Irwin-Williams 1973). Although centered in the northwestern

area of New Mexico, Oshara tradition projectile points do occur as isolated occurrences as far east as the project area.

A sequence of projectile points for central and western Texas was developed by Johnson (1967) based on stratified sites yielding radiocarbon dates. This sequence is divided into five overlapping periods: Period I (8350-4800 B.C.), characterized by Luna and Plainview projectile points; Period II (6810-1315 B.C.), characterized by Early Barbed, Pandale, Nolan, Travis, and Bulverde projectile points; Period III (4850 B.C.-A.D. 110), characterized by Shumla, Almagre, Langtry, Pedernales, and Montell projectile points; Period IV (350 B.C.-A.D. 1245), characterized by Ensor, Frio, Darl, Figuero, and Godley projectile points; and Period V (A.D. 50-1710), characterized by Scallorn, Livermore, Bonham, and Perdiz projectile points. In a number of cases the same projectile point morphologies have been given different names in different places. Additional chronologies, including a localized sequence for the lower Pecos River Valley, have also recently been developed (Regge Wiseman, pers. comm., 1993).

Pueblo Period

Evidence of Puebloan use of the Santa Rosa area is abundant, although no Pueblo sites with residential architecture have been recorded. The recorded pueblos closest to the Santa Rosa area are in Pintada Canyon, approximately 32 km (20 miles) to the west. The Puebloan sites at Pintada appear to date from A.D. 1200-1400. Ceramic assemblages are dominated by Chupadero Black-on-white and brown utilitarian wares (Stuart and Gauthier 1981). Pueblo ceramics are found in association with open-air sites, lithic artifact scatters, and rockshelters along the Pecos River, side canyons, and some main arroyos. The occasional occurrence of other ceramic types indicates regional trade and possible use of the area by Pueblo groups from the Glorieta Mesa and Galisteo Basin areas. Sites associated with Puebloan use of the Pecos River Valley have been recorded on the western side of the Pecos River, opposite the project area (Hannaford 1979), and in the Los Esteros Lake area (Levine and Mobley 1975).

Joronada Mogollon ceramics also occur in the Santa Rosa area, and a number of possible Joronada Mogollon sites have been recorded (Harlan et al. 1986:42; Levine and Mobley 1974). None of the sites recorded for the Santa Rosa area are known to have structures, although they are recorded to the south (Corley 1965), in the Fort Sumner area (Jelinek 1967:119-124).

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

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

Plains Indian

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

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

Hispanic Occupation

The Hispanic presence on the eastern plains of New Mexico was minor prior to the American era. The presence of mobile and potentially hostile Apache, and later Comanche and Kiowa, Indians prevented Hispanic settlement along the upper Pecos until after control by the Untied States in the 1850s. By 1860, 16 Hispanic settlements had been built on Pecos River land grants (Harlan et al. 1986:58), primarily from the Anton Chico Land Grant north. The Agua Negra Land Grant was formalized in 1865 by Don Celso Baca, and the ranch settlement of Agua Negra Chiquita later became the settlement of Santa Rosa. By the 1880s Hispanic settlements were well established at Pintada on Pintada Arroyo, and at Puerto de Luna on the Pecos River. Farming concentrated along the Pecos River and major drainages, but the main economic thrust of the Hispanic population was sheep raising. Sheep raising in the area of Santa Rosa was dominated by two major sheep ranches, the Agua Verde and the Juan de Dios, until the collapse of sheep prices in the 1920s ruined most of the sheep raisers (Harlan et al. 1986:58).

Racial tensions became apparent in the Pecos Valley as Anglo-American settlers, primarily from Texas, moved into the area after the late 1860s. A Texan-Hispano conflict, generated by the Texas war of independence from Mexico, was exacerbated by the fact that Texans tended to be cattle ranchers and Hispanics tended to raise sheep. This mutual dislike occasionally degenerated into violence and conflict. However, the different settlement patterns of the two groups tended to lessen this propensity for conflict. The Hispanic settlements were primarily in the Pecos River floodplain, while the Anglo-Americans tended to settle in dispersed ranches away from the river (Harlan et al. 1986:57-58).

Anglo-American

The United States military became established in the eastern part of New Mexico with the construction of Forts Union, Sumner, and Stanton in the early 1860s (Levine and Mobley 1976:31). However, Anglo-American settlement in the eastern plains of New Mexico did not occur to any great extent until after the American Civil War.

Texas cattle ranchers began moving into the area in the mid-1860s. Some of the first to arrive were Charles Goodnight and Oliver Loving, who brought a heard of cattle to Fort Sumner in 1866. The Loving-Goodnight Trail eventually ran from Cheyenne, Wyoming, south through eastern New Mexico to Belknap, Texas (Harlan et al. 1986:59). Also in 1866, a second herd of cattle was brought to Fort Sumner from Paris, Texas, by John Chisum. Essentially the first Anglo-American settler in the middle Pecos Valley, Chisum eventually controlled a ranch 100 miles wide, stretching for 150 miles along the Pecos River (Broster 1983:13-14).

In time, a number of dispersed ranches were established despite hostile relations between the settlers and the resident Plains Indians. The occurrence of regional "vernacular" architectural styles of some of these early ranch structures aids in their dating. One Texas vernacular style, the "dog trot" house, was comprised of two rows of rooms separated by a covered breezeway. Construction of Texas dog trot houses in the southern plains was limited to the 1860s to the early 1880s, when this style was replaced by Victorian styles because of the increased economic and political integration of the area with the rest of the United States. A classic dog trot house, the Jones-Howard Ranch, has been recorded just east of the project area on San Juan de Dios Arroyo.

Settlement of the area increased rapidly after 1875, with the final defeat of the Comanches and Kiowas and their removal to Oklahoma. This increase in settlement saw increased friction between the Anglo-American and Hispanic populations. A combination of drought and severe winters in 1887 and 1889, with declining cattle prices, ultimately destroyed the great cattle empires of the plains (Harlan et al. 1986:57-58).

The El Paso and Northeastern Railway joined the Rock Island and Pacific Railroad at Santa Rosa in 1902, linking the plains to Albuquerque and cities in the Midwest. Homesteading farmers followed the railroad into the area. In Guadalupe County, the county seat was moved from Puerto de Luna to the bustling railroad town of Santa Rosa in 1912. New Mexico law stated that a county seat could only move if a new county was formed. The county was therefore renamed Lenard Wood County (after the Spanish-American War hero) for two years until the new county seat was established. The county name was then changed back to Guadalupe (Anonymous 1942). Santa Rosa, Portales, and Clovis were all eastern New Mexico railroad towns that prospered as shipping points for livestock and produce (Harlan et al. 1986:59).

Many of the farms in the area continued until the dustbowl days of the 1930s. Drought and the economic slump of the Great Depression forced many of the small landowners to sell

their land (Harlan et al. 1986:60). Most of the area around Santa Rosa reverted to cattle ranching in the 1940s, an activity that continues today. Cattle raised around Santa Rosa are now shipped by truck to Clovis, where they are loaded on trains, or they are trucked directly to Amarillo.

TESTING PROGRAM

A limited testing program was designed for 10 archaeological sites along U.S. 84 south of Santa Rosa and implemented in consultation with the NMSHTD. Nine sites were located on private land and state land administered by the NMSHTD. One site, LA 103319, also extended onto State Trust Land, although most of the site was on private land and state land administered by the NMSHTD.

LA 6762–LA 6764, LA 8017, LA 99845, and LA 103316–LA 103320, east of the Pecos River, are lithic artifact scatters varying in size (Marshall 1994). Four of the sites (LA 6762, LA 6764, and LA 103319) are dual-component sites with both lithic artifact scatters and historic homesteads. LA 103317 is a lithic artifact scatter and the site of a recent gas station. All 10 sites were tested as part of the proposed improvements along 12.0 km (7.5 miles) of U.S. 84 southeast of Santa Rosa, New Mexico. The purpose of the limited testing program was to determine the extent and importance of the portion of the sites within the proposed project area.

Field Methods

A main datum and baseline were established for each site. Surface artifacts were pinflagged to mark 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, and the locations of all test trenches and cultural features were plotted. The location of surface artifacts was plotted with a 50 m tape.

All surface artifacts were piece-plotted, analyzed in the field, and left in place. Artifacts were collected only when they were recovered in a test trench, diagnostic of cultural or temporal affiliation, or in an area of the site that would be disturbed by test trench excavation.

Test trenches measuring 1 by 1 m were hand excavated within the portion of each site within the project area. These test trenches were placed within or adjacent to areas of heavy surface artifact concentration or in other areas of possible prehistoric activity indicated by discolored soil. Existing soil integrity was an added consideration in the placement of test trenches. All of the excavated dirt was screened through 1/4 inch wire mesh, and the artifacts were collected. Test trenches were dug in 10 cm levels until either 20 cm of culturally sterile soil, or bedrock, was reached. The number of test trenches excavated per site varied, depending on surface artifact occurrence, remaining soil integrity, and site size. The number of test trenches excavated did not exceed six per site.

Profiles were drawn of each test trench, and both test trench and general site photographs were taken. Test trenches were backfilled when excavation was completed. Cultural material recovered through these investigations will be curated in 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. The sites are discussed in the order in which they occur within the project area.

LA 103316 Testing Results

LA 103316 is a lithic artifact scatter measuring 140 by 100 m (Fig. 2). It is present on both sides of U.S. 84. The main site area is west of the highway. The elevation of the site is 1,348.7 m (4,454 ft). The site surface slopes downward, toward the west and a shallow drainage north of the site.

A total of 81 artifacts were found on the surface of LA 103316 and piece-plotted. An additional 37 artifacts were recovered from test trenches. All of the artifacts are lithic artifacts. The site is deflated, and most surface artifacts have been redeposited. The area of the site within the existing right-of-way was altered by mechanical equipment during the construction of U.S. 84. Livestock have also had an impact on the site.

Test Trenches

Test Trench 1. Test Trench 1 was dug west of U.S. 84, west of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was limited to a sparse cover of mixed grasses. Six lithic artifacts were collected from the surface of this test trench prior to excavation.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing encountered two strata of material. Stratum 1 was a light brown silty sandy eolian deposit. Fourteen lithic artifacts, all flakes, were recovered from this stratum. Stratum 2 was a dense reddish-brown clay. No artifacts were recovered from Stratum 2.

Test Trench 2. Test Trench 2 was dug in an area of intact topsoil east of U.S. 84 in the northeastern portion of the site. Surface vegetation was composed of mixed grasses. Six lithic artifacts were collected from the surface of the test trench prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing encountered two strata of material. Stratum 1 was a layer of light brown gravel 4 cm deep. This stratum appears to be road fill connected with original highway construction. Stratum 2 was a dark reddish-brown clay. No artifacts were recovered from either Stratum 1 or 2.

Test Trench 3. Test Trench 3 was dug in the central area of the site adjacent to a concentration of surface artifacts. Surface vegetation was a sparse cover of mixed grasses.

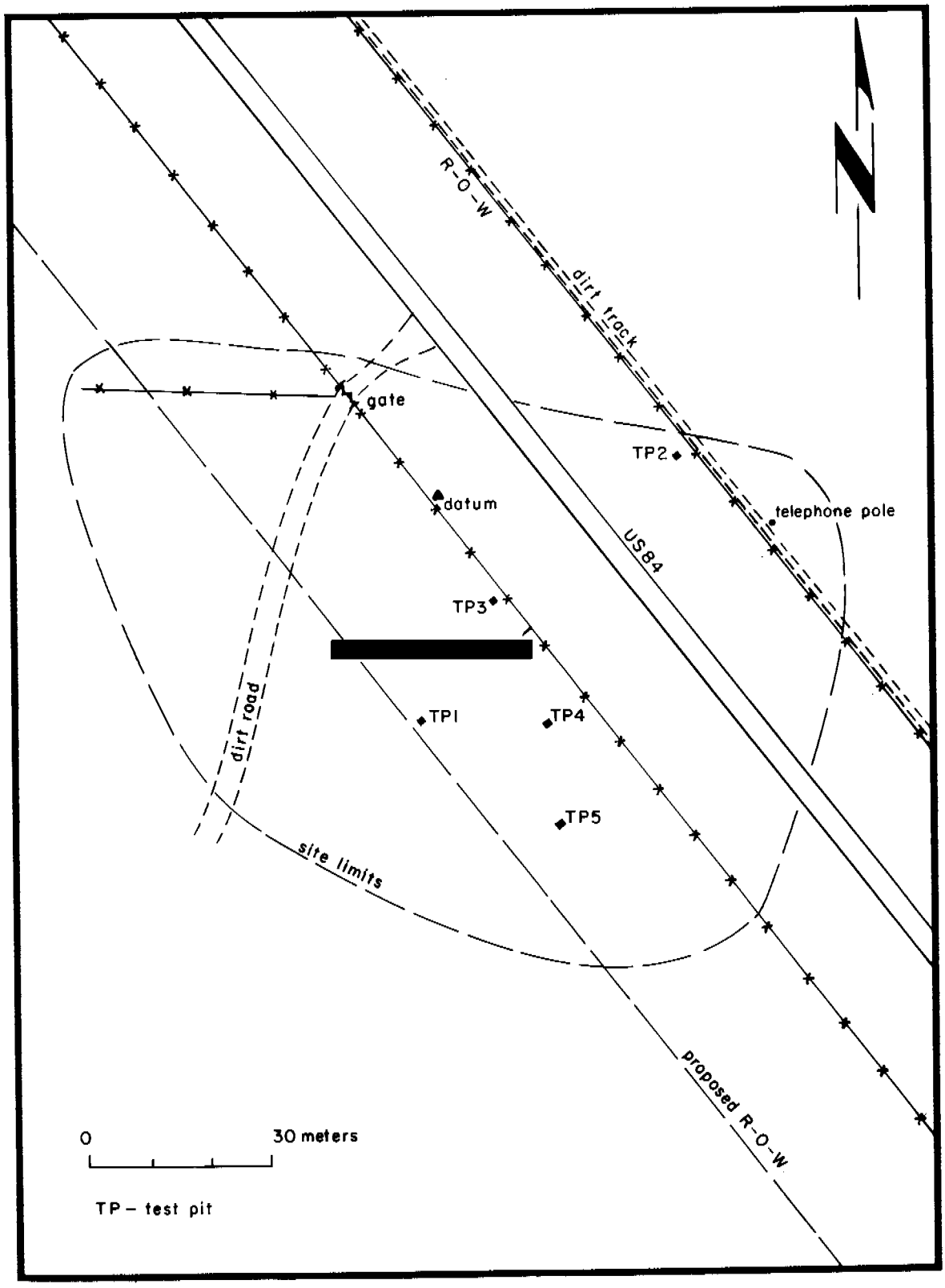

Figure 2. LA 103316 site map.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a light brown gravel layer 3 cm deep. This material appears to be road fill connected with the original highway construction. Seven lithic artifacts were collected from this stratum. Stratum 2 was a dark reddish-brown clay. No artifacts were recovered from Stratum 2.

Test Trench 4. Test Trench 4 was dug in the southern portion of the site in an area exhibiting intact topsoil and adjacent to a surface artifact cluster. Surface vegetation was a thin cover of mixed grasses.

Excavation ended at 20 cm below the modern ground surface in culturally sterile soil. Testing uncovered 2 strata of material. Stratum 1 was a reddish-brown soil containing decaying shale. Stratum 2 was a dense reddish-brown clay. No artifacts were collected from either stratum.

Test Trench 5. Test Trench 5 was dug in the southern portion of the site, west of the existing right-of-way, adjacent to a surface artifact concentration. Six artifacts were collected from the surface of Test Trench 5 prior to excavation.

Excavation of Test Trench 5 ended at 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were encountered in this test trench. Stratum 1 was a fine sandy yellowish-red silty soil. Four lithic artifacts, all flakes, were recovered in Stratum 1. Stratum 2 was a reddish-brown clay containing large amounts of decaying shale. No artifacts were recovered from either Stratum 1 or 2.

Cultural Features

No intact cultural features or deposits were found within the portion of the LA 103316 within the proposed project area.

LA 103317 Testing Results

LA 103317 is a lithic artifact scatter measuring 300 by 160 m (Fig. 3). The site area is relatively flat, with a slight slope toward the west. A number of large gullies cut the western part of the site area. The site elevation is 1,344.4 (4,440 ft). The lithic artifacts are scattered thinly across the site. The site also contains a recent component comprised of a number of structures. These include two masonry structures, one wooden frame structure, a corral, and a masonry-lined well. Only one of the structures, the larger of the two masonry structures, is within the proposed project area. No surface artifacts old enough to be considered "historic" were recorded on the site. The earliest American period materials present dated only as early as the 1950s. Construction of the structure has been documented to 1955.

A total of 44 surface lithic artifacts were found at LA 103317 and piece-plotted. An

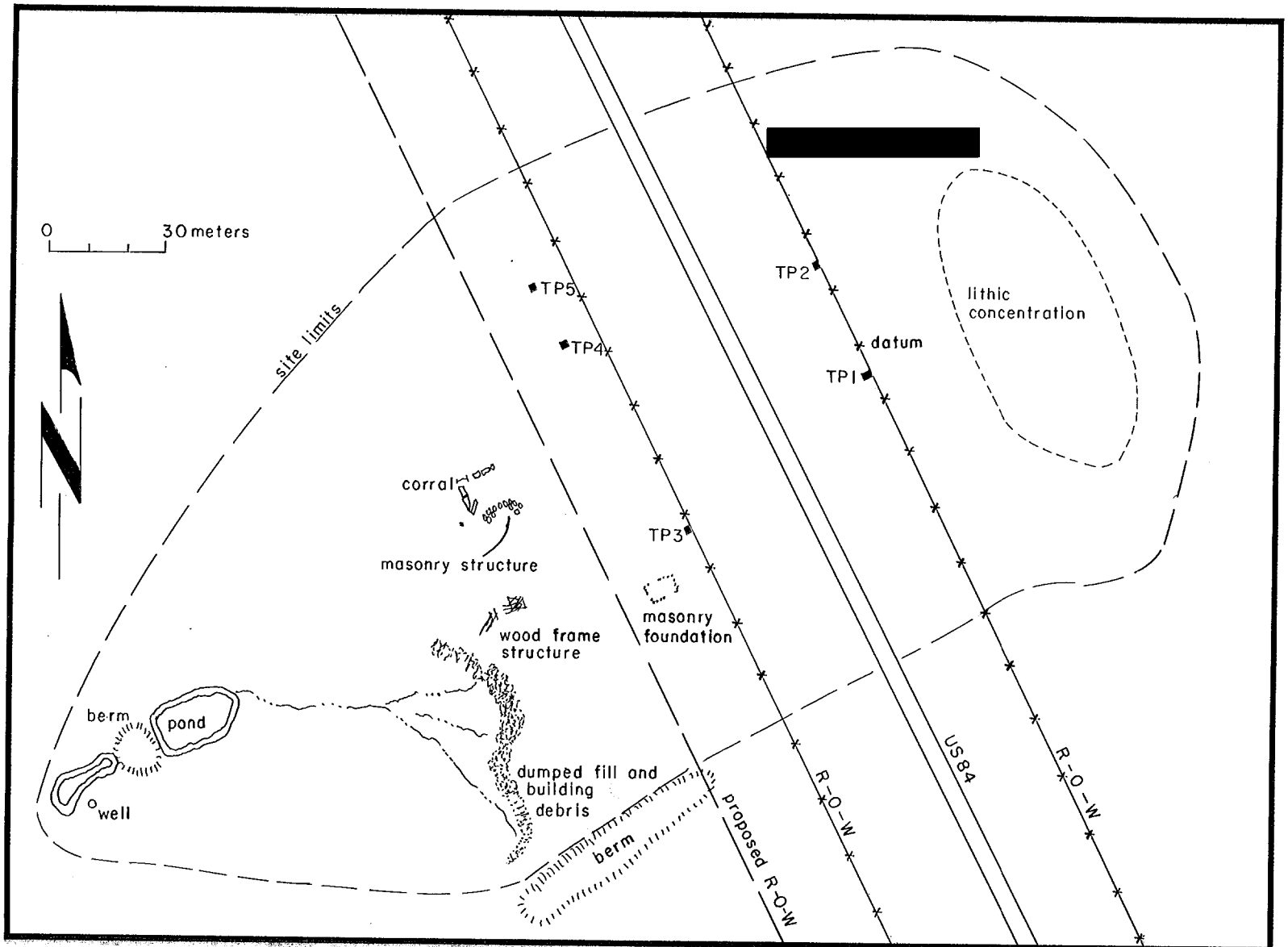

Figure 3. LA 103317 site map.

additional two artifacts were collected from the test trenches. The base of a Lange-style projectile point (Fig. 4) was recorded on the site surface. The site has been deflated, and most of it within the existing right-of-way was altered by mechanical equipment (either filled or scraped) during the original highway construction. The portion of the site within the project area but west of the existing right-of-way containing the recent component has been mechanically scraped to a depth of approximately 10 cm. Structural material from this scraping was redeposited within the gullies to the west for erosion control. Dirt removed by scraping was also used to form the berm at the south end of the site.

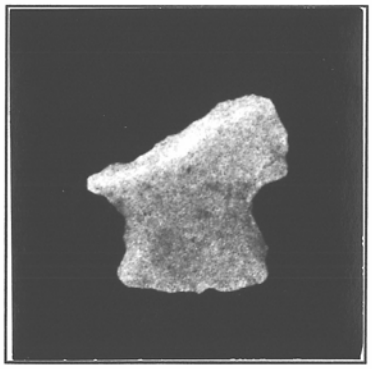

Figure 4. Lange-style projectile pont,LA 103319

Test Trenches

Test Trench 1. Test Trench 1 was dug in an area of the site with intact topsoil and adjacent to a surface artifact concentration. This test trench is west of U.S. 84. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a yellowish-brown silty soil of eolian origin, with some gravel present. Stratum 2 was a reddish-brown clay. No artifacts were recovered from either Stratum 1 or 2.

Test Trench 2. Test Trench 2 was east of U.S. 84, within the existing right-of-way, adjacent to a concentration of surface artifacts. Surface vegetation was a thin cover of mixed grasses. Two artifacts were collected from the surface of this test trench prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a yellowish-brown silty soil containing a small percentage of gravel. Stratum 2 was a reddish-brown clay containing a large number of cobbles and caliche. No artifacts were recovered from either Stratum 1 or 2.

Test Trench 3. Test Trench 3 was on the west side of U.S. 84, west of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a 40-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed one stratum of material, a dense reddish-brown clay containing flecks of caliche. No artifacts were found in this stratum.

Test Trench 4. Test Trench 4 was dug adjacent to a surface artifact concentration in an area of the site with intact topsoil. This test trench was in the northern portion of the site, west of U.S. 84. Surface vegetation was limited to a sparse coverage (20 percent) of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a thin eolian deposit of tan silty soil containing some gravel. Stratum 2 was a dark reddish-brown clay containing some caliche. No artifacts were recovered from either stratum.

Test Trench 5. Test Trench 5 was dug in northern portion of the site, west of both U.S. 84 and the existing right-of-way. The test trench was dug in an area adjacent to a surface artifact concentration. Surface vegetation was a sparse 20-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a thin eolian deposit of fine light brown silty soil containing some gravels. Stratum 2 was a dense, finely textured dark red clay. No artifacts were found in either stratum.

Cultural Features

The base course of a masonry structure is present at LA 103317 within the proposed project area. The structure was built in 1955. The base course of a second masonry structure, the remains of a small wood frame structure, and a wood and wire corral are also present on the site, but they are outside of the proposed project area.

LA 6764 Testing Results

LA 6764 is a diffuse lithic artifact scatter measuring 400 by 220 m (Fig. 5). LA 6764 is on both sides of U.S. 84. The main site area is west of the highway and the existing right-of-way. The site area surrounds a small ridge and sandstone outcrop (Fig. 6). Most of the site area slopes downward toward the south; however, the small portion of the site north of the ridge slopes downward toward the north. The elevation of the site is 1,344.4 m (4,440 ft). A historic component is also present at LA 6764, outside and west of the proposed project area. A small drainage is south of the site. A historic homestead is also present on the site, but it is west of U.S. 84, outside of the project area.

A total of 49 lithic artifacts were found on the surface of LA 6764 and piece-plotted. An additional four lithic artifacts were recovered from test trenches. The site is deflated, and most of the artifacts have been redeposited. Livestock have also had an impact on the site.

Test Trenches

Test Trench 1. Test Trench 1 was dug west of the existing right-of-way in the central portion of the site, adjacent to a cluster of surface artifacts. Surface vegetation was a sparse 20-percent coverage of mixed grasses.

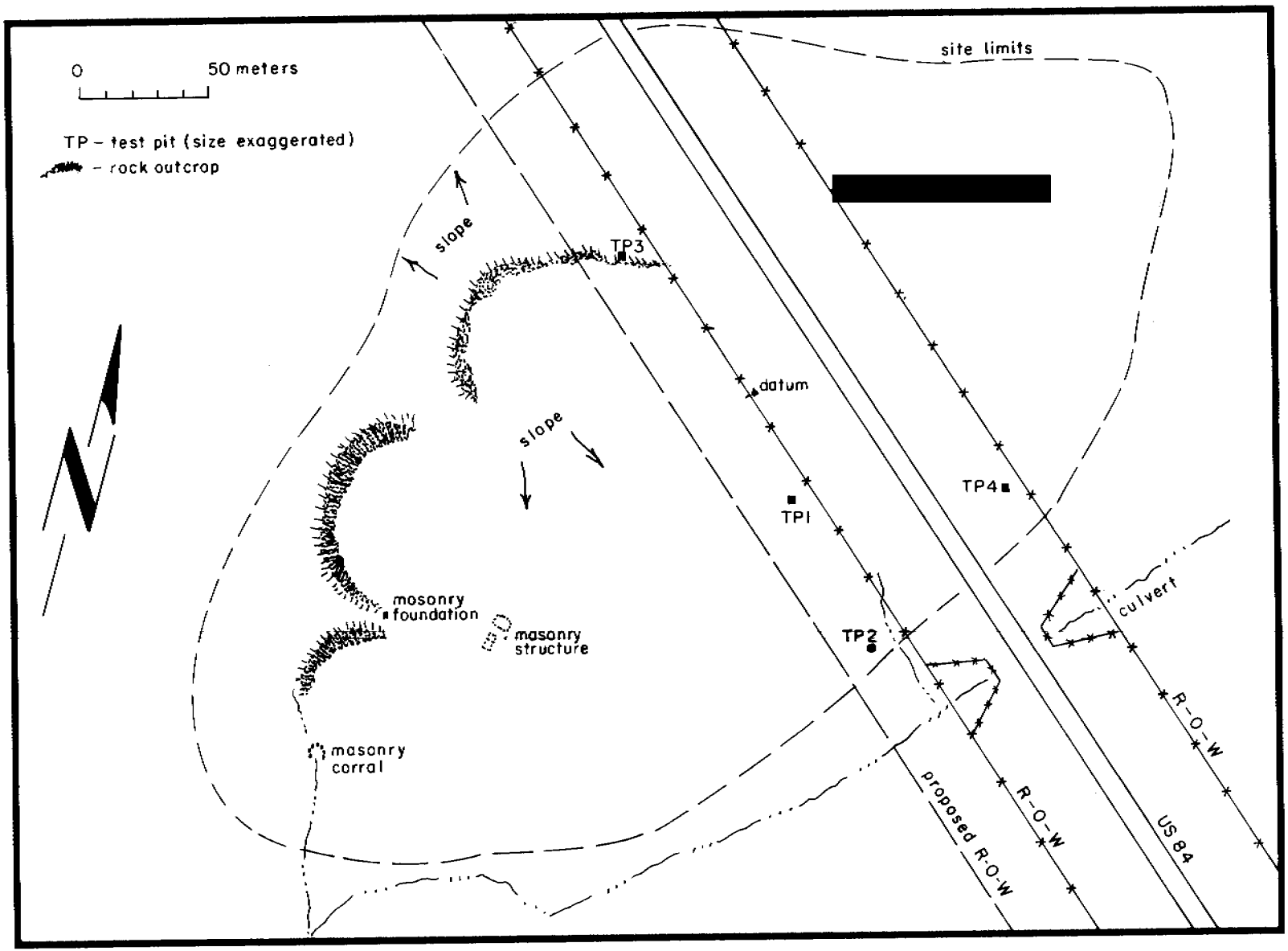

Figure 5. LA 6764 site map.

Figure 6. LA 6764, looking northwest.

Excavation ended at 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay containing some gravel. Stratum 2 was a dark reddish-brown clay containing small amounts of caliche. No artifacts were found in either stratum.

Test Trench 2. Test Trench 2 was dug on the southern edge of the site adjacent to a surface artifact concentration. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay containing some gravel. Stratum 2 was a dense reddish-brown clay containing flecks of caliche. No artifacts were found in either stratum.

Test Trench 3. Test Trench 3 was dug west of U.S. 84 outside of the existing right-of-way in the highest area of the site within the proposed project area. The test trench was dug adjacent to a surface artifact concentration. Surface vegetation was limited to mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay containing

a large percentage of gravel and cobbles. Stratum 2 was a fine pinkish-gray clay containing a caliche and large amounts of gravel and cobbles. No artifacts were found in either stratum.

Test Trench 4. Test Trench 4 was dug east of U.S. 84 within the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a sparse 20-percent cover of mixed grasses.

Excavation ended 30 cm below the modern ground surface in cultural sterile soil. Surface testing revealed two strata of material. Stratum 1 was a fine yellowish-brown silt of eolian origin. Four lithic artifacts, three flakes, and a core, were recovered from this stratum. Stratum 2 was a fine reddish-brown clay. No artifacts were found in Stratum 2.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 6764 within the proposed project area.

LA 6763 Testing Results

The site of LA 6763 is a thin, diffuse lithic artifact scatter that measures 130 by 95 m (Fig. 7). LA 6763 is on both sides of U.S. 84. However, artifacts are concentrated east of the existing right-of-way, and only a small number are present within the proposed project area. The elevation of the site is 1,344.4 m (4,440 ft).

Eight surface artifacts were found at LA 6763 and piece-plotted. No artifacts were recovered from the test trenches. The site is deflated, and most of the artifacts have been redeposited. Much of the site is within the existing right-of-way has been mechanically scraped, possibly in association with the original highway construction.

Test Trenches

Test Trench 1. Test Trench 1 was placed west of U.S. 84 adjacent to a surface artifact concentration. Surface vegetation was a cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-gray clay containing pieces of decaying sandstone, perhaps 20 percent of the material total. Stratum 2 was a light gray sandy soil composed of decaying sandstone. No artifacts were found in either stratum.

Test Trench 2. Test Trench 2 was placed adjacent to a surface artifact concentration. Surface vegetation was limited to a 30-percent coverage of mixed grasses.

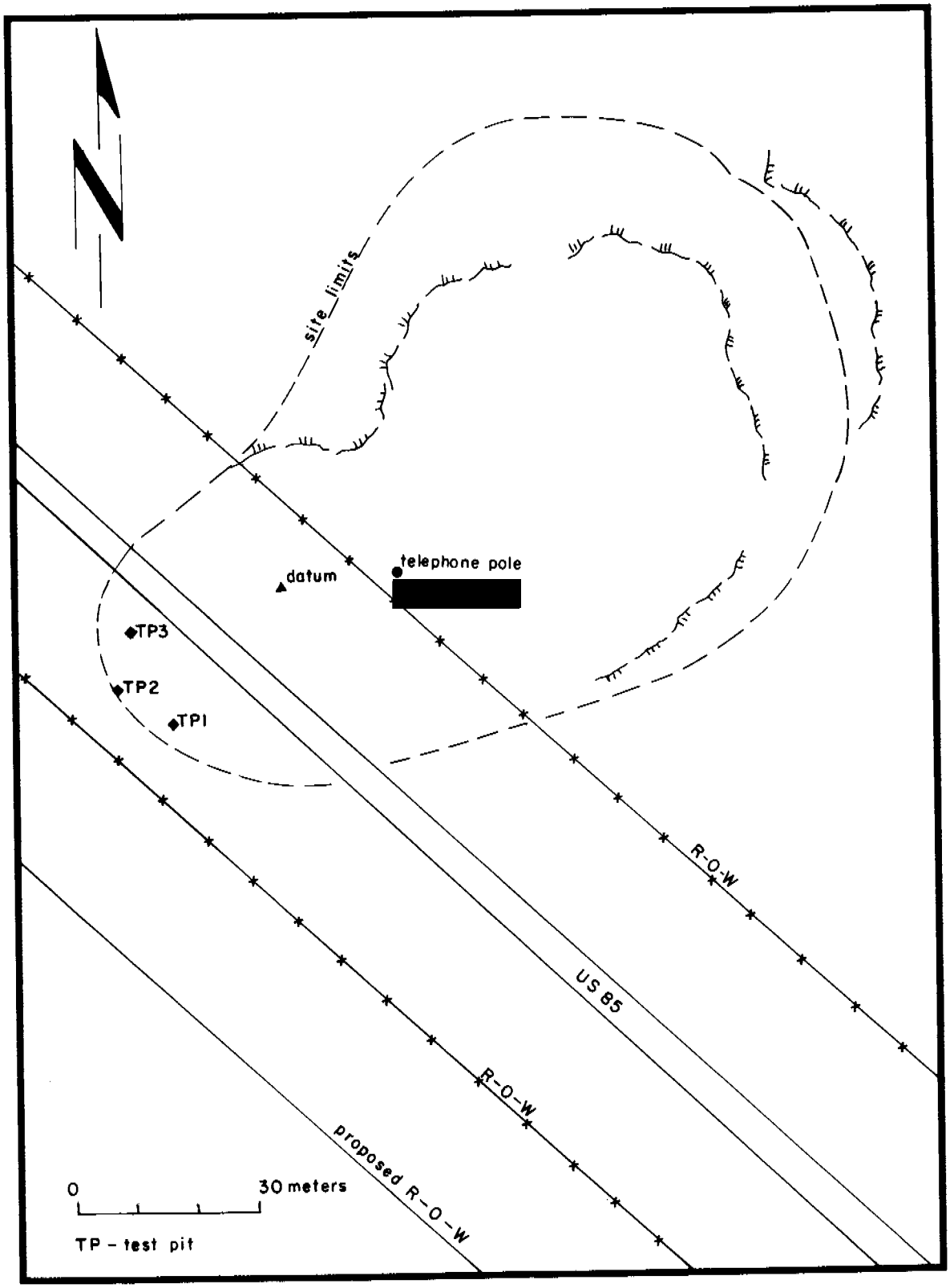

Figure 7. LA 6763 site map.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine textured red clay. Stratum 2 was a light gray decaying fine-grained sandstone. No artifacts were found in either stratum.

Test Trench 3. Test Trench 3 was dug west of U.S. 84, within the existing right-of-way. The test trench was placed adjacent to a surface artifact concentration. Surface vegetation was a 40-percent coverage of mixed grasses.

Excavation ended at 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a dark reddish-brown clay containing gravel. Stratum 2 was a reddish-brown sandy clay containing gravel and some caliche. No artifacts were recovered from either stratum.

Cultural Features

No intact cultural features or deposits were found on the portion of LA 6763 within the proposed project area.

LA 103318 Testing Results

LA 103318 is a diffuse lithic artifact scatter on the south side of San Juan De Dios Arroyo (Figs. 8-9). The site measures 300 by 90 m. Surface artifact concentrations are primarily to the east of the existing right-of-way outside the proposed project area. A borrow pit associated with earlier U.S. 84 highway improvements is present on the south side of the site, west of both U.S. 84 and the existing right-of-way. The site slopes downward toward the San Juan de Dios Arroyo to the north. The elevation of the site is 1,340.2 m (4,426 ft).

A total of 42 lithic artifacts were found at LA 103318 and piece-plotted. No additional artifacts were collected from the test trenches. The site is deflated, and most surface artifacts have been redeposited. Livestock have also had an impact on the site. All of the site area within the existing right-of-way was altered by mechanical equipment during the construction of U.S. 84, and soil in the area of the borrow pit has been displaced by heavy equipment associated with pit use.

Test Trenches

Test Trench 1. Test Trench 1 was dug west of U.S. 84 within the existing right of way. This test trench was placed in one of the few areas within the existing right-of-way not mechanically scraped. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish clay. Stratum 2 was a fine reddish-brown clay containing some caliche. No artifacts were found in either stratum.

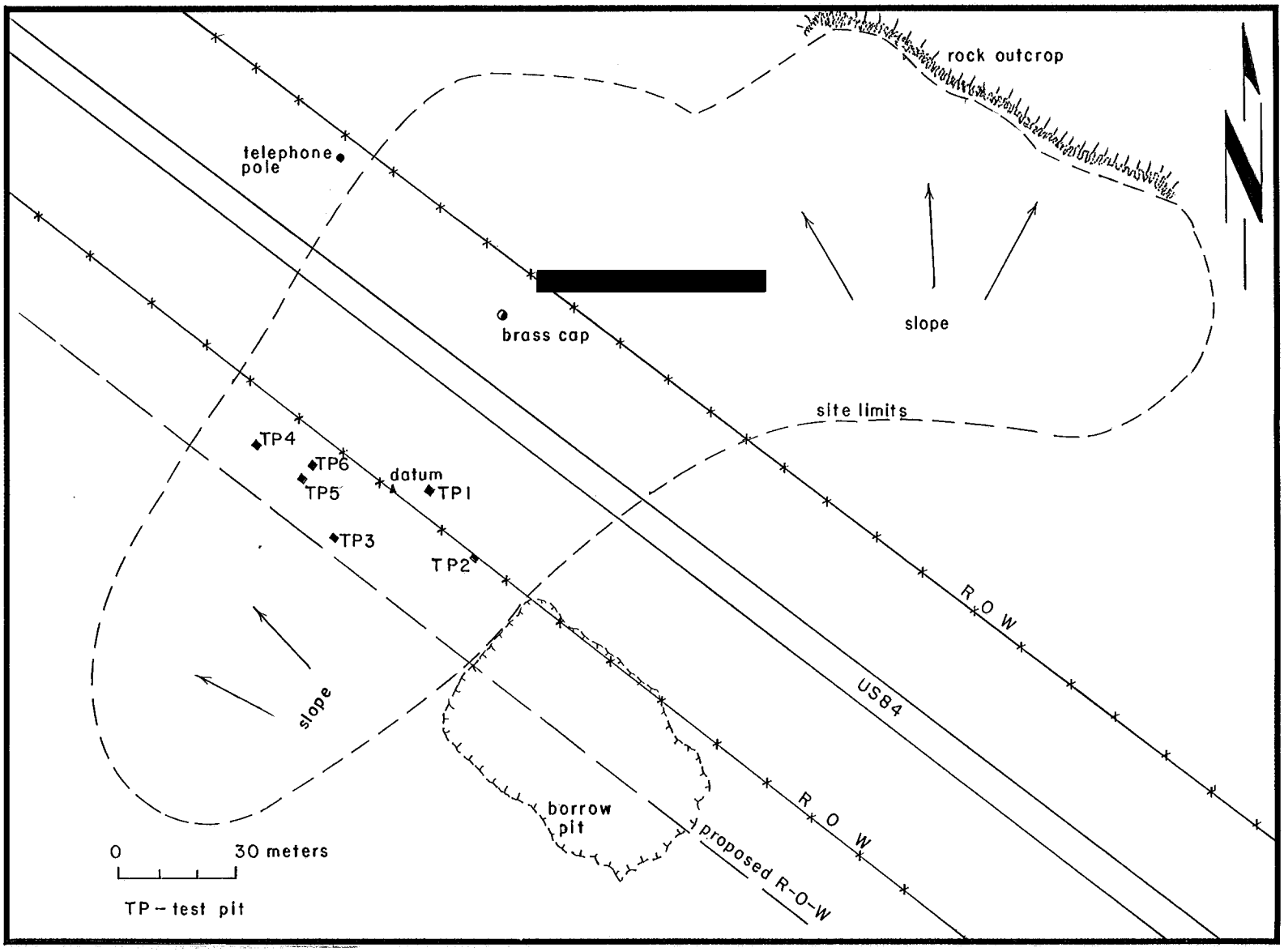

Figure 8. LA 103318 site map.

Figure 9. LA 103318, looking south.

Test Trench 2. Test Trench 2 was dug west of the existing right-of-way in the southern portion of the site. The test trench was dug adjacent to a surface artifact concentration. Surface vegetation was a sparse 10-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay. Stratum 2 was a reddish-brown clay containing caliche. No artifacts were found within either stratum.

Test Trench 3. Test Trench 3 was dug in the central area of the site west of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a sparse 10-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing encountered one stratum of material. It was a fine reddish-brown clay containing small particles of caliche. No artifacts were found within this stratum.

Test Trench 4. Test Trench 4 was dug west of the existing right-of-way, in the central area of the site, adjacent to a surface artifact cluster in an area with intact topsoil. Surface vegetation was limited to a 20-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay. Stratum 2 was a reddish-brown clay containing particles of caliche. No artifacts were found in either stratum.

Test Trench 5. Test Trench 5 was dug west of U.S. 84 outside of the existing right-of-way, adjacent to a surface artifact cluster. Surface vegetation was a 10-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Two strata of material were encountered by testing. Stratum 1 was a reddish-brown clay. Stratum 2 was a reddish-brown clay containing caliche.. No artifacts were found within either stratum.

Test Trench 6. Test Trench 6 was dug west of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a silty red clay. Stratum 2 was a dark reddish-brown clay. No artifacts were found in either stratum.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 103318 within the proposed project area.

LA 103319 Testing Results

LA 103319 is on the [redacted] The site is a large, unevenly diffuse lithic artifact scatter on both sides of U.S. 84 measuring 210 by 180 m. The site area slopes downward toward the San Juan de Dios Arroyo to the south (Fig. 11). The elevation of the site is 1,340.2 m (4,426 ft). A historic component, comprised of a historic homestead, rock quarry, and ford is also present at the site. This historic component is east of the existing right-of-way and outside of the proposed project area.

A total of 117 surface artifacts were found at LA 103319 and piece-plotted, including 116 lithic artifacts and one historic artifact. The historic artifact is a piece of wagon harness, the iron tip of a single-tree. Two additional lithic artifacts were recovered from test trenches excavated at the site. The site is deflated, and some slope erosion has also taken place. Most surface artifacts have been redeposited. Livestock have also had an impact on the site. Most of the site area within the existing right-of-way was mechanically scraped as part of the original U.S. 84 highway construction.

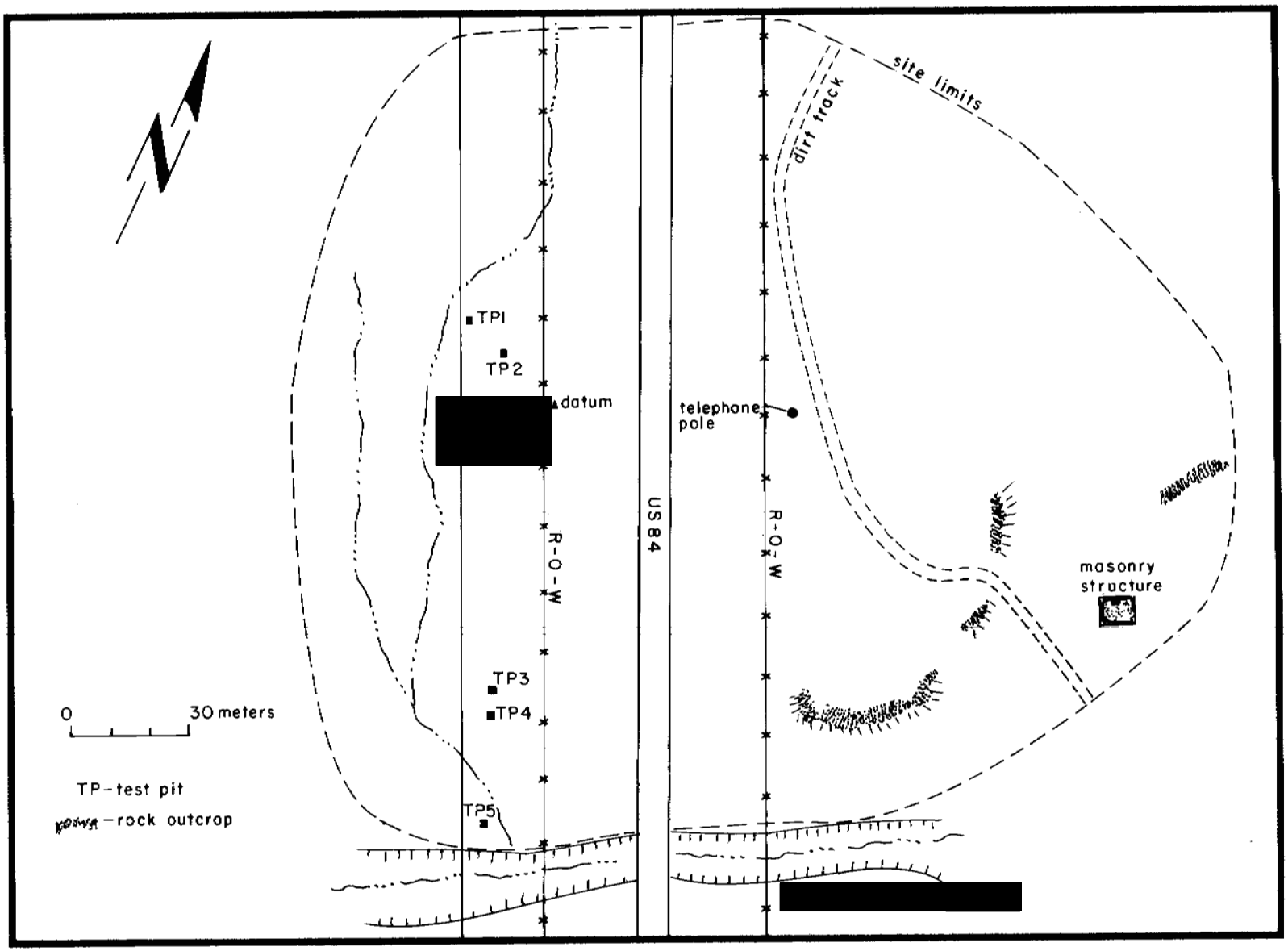

Figure10. LA 103319, site map.

Figure 11. LA 103319, looking south, with [redacted] *in the background.*

Test Trenches

Test Trench 1. Test Trench 1 was dug in the northern area of the site, west of the existing right-of-way. The test trench was dug in an area adjacent to a surface artifact concentration. Surface vegetation was a 20-percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Two strata were revealed in testing. Stratum 1 was a reddish-brown silty clay. Stratum 2 was a sandy light gray clay composed of decaying sandstone. No artifacts were found within either stratum.

Test Trench 2. Test Trench 2 was dug in the central area of LA 103319, west of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a 50-percent coverage of mixed grasses.

Excavation ended 12 cm below the existing modern ground surface at bedrock. Testing revealed two strata of material. Stratum 1 was a brown silty surface duff layer. Stratum 2 was a light brown clay. A fine grained light gray sandstone bedrock was present beneath Stratum 2. No artifacts were found within either stratum.

Test Trench 3. Test Trench 3 was dug in the southern portion of the site, outside of the existing right-of-way, adjacent to a surface artifact cluster. Surface vegetation included mesquite, yucca, and mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a sandy silty soil. One lithic artifact was recovered from this stratum. Stratum 2 was a yellowish-red clay. Stratum 3 was a reddish-brown alluvial gravel and cobble deposit. No artifacts were found in Stratum 2 or 3.

Test Trench 4. Test Trench 4 was placed west of the existing right-of-way in the central portion of the site and adjacent to a cluster of surface artifacts. Surface vegetation included both mixed grasses and mesquite.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a yellowish-red soil of possibly eolian origin. Stratum 2 was a red clay. No artifacts were recovered from either stratum.

Test Trench 5. Test Trench 5 was placed at the southern edge of the site, west of the existing right-of-way and near the bank of San Juan de Dios Arroyo. The test trench was dug in an area of intact topsoil, adjacent to a concentration of surface artifacts. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 40 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a thin eolian deposit of fine brown silty soil. One lithic artifact, a flake, was found in this material. Stratum 2 was a reddish-brown clay. Stratum 3 was a dark reddish-brown clay containing particles of caliche. No artifacts were found in Stratum 2 or 3.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 103319 within the proposed project area.

LA 6762 Testing Results

LA 6762 is a diffuse lithic scatter measuring 630 by 330 m concentrated west of the existing right-of-way (Fig. 12). The site area is hilly and includes a number of rocky outcrops, with a general downward slope toward the east (Fig. 13). The elevation of the site is 1,417.1 m (4,680 ft). The site is on both sides of U.S. 84, but the lithic artifact component is limited to the western side of the highway. There are also two historic components at the site: a historic homestead east of the existing right-of-way, and a historic rock-art panel west of the existing right-of-way. Both historic components are outside of the proposed project area.

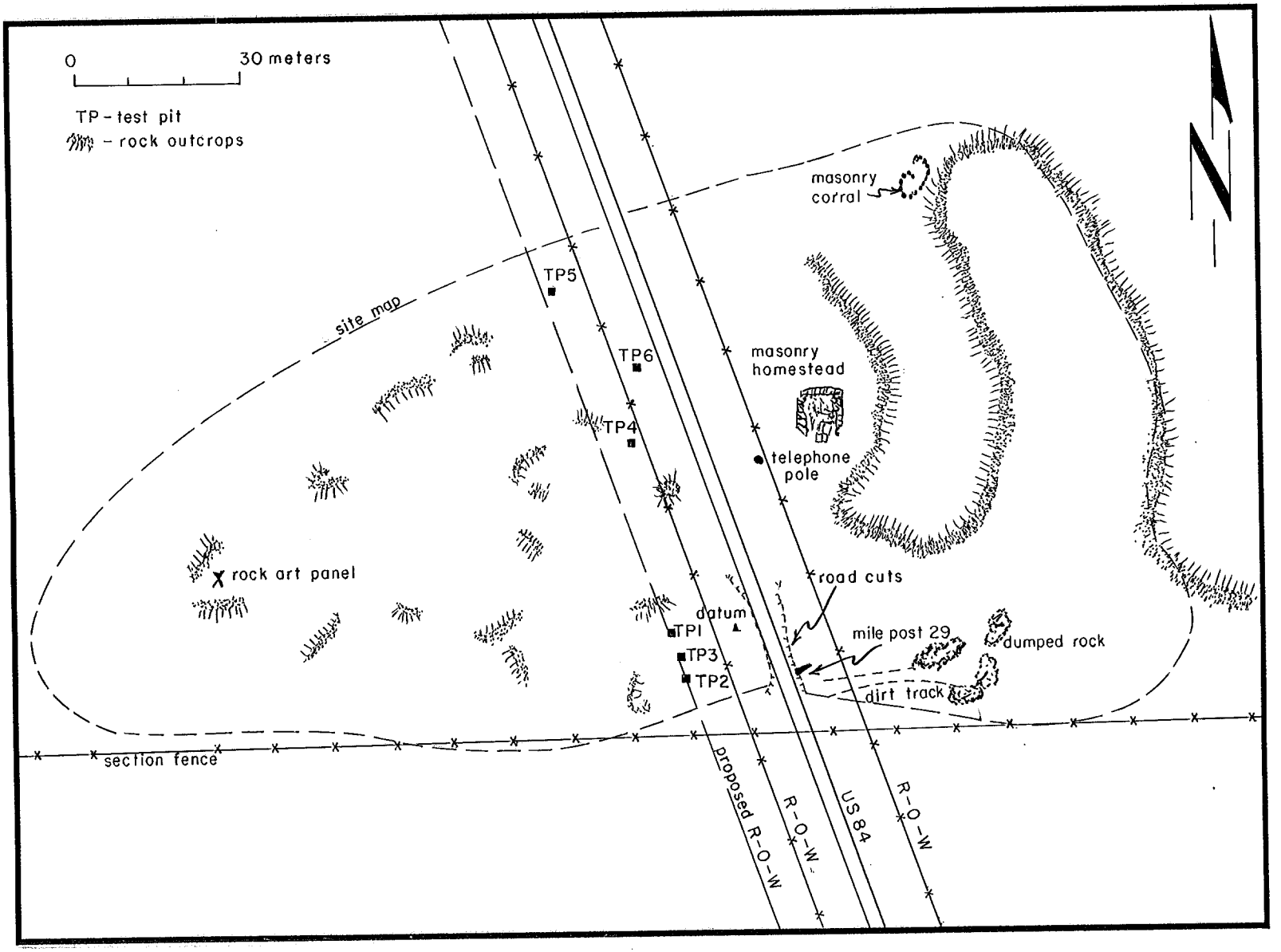

Figure 12. LA 6762 site map.

Figure 13. LA 6762, looking east.

A total of 268 lithic artifacts were found on the surface of LA 6762, west of U.S. 84, and piece-plotted. A Harrell-style projectile point (Fig.14) was recovered from the present ground surface. The site is deflated, and most of the surface artifacts have been redeposited. Livestock have also had an impact on the site. Fourteen additional artifacts were collected from the test trenches at LA 6762.

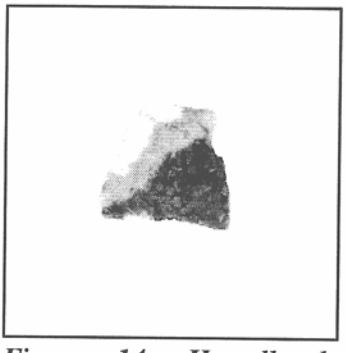

Figure 14. Harrell-style projectile point, LA 6762.

Test Trenches

Test Trench 1. Test Trench 1 was dug west of the existing right-of-way, in the southern portion of the site, adjacent to a surface artifact concentration. Surface vegetation was a 20-percent cover of mixed grasses. One lithic artifact was collected from the surface of Test Trench 1 prior to excavation.

Excavation ended at 12 cm below the modern ground surface at bedrock. Testing revealed two strata of material. Stratum 1 was a sandy brown soil eolian in origin. Seven lithic

artifacts were found in this material. Stratum 2 was a decaying sandstone bedrock. No artifacts were found in Stratum 2.

Test Trench 2. Test Trench 2 was dug within the project area, in the southern portion of the site, outside of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a dense cover of mixed grasses. One lithic artifact was collected from the surface of Test Trench 2 prior to excavation.

Excavation ended at 30 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-brown silty clay. Three lithic artifacts, all flakes, were found in this stratum. Stratum 2 was a dark reddish-brown clay containing some caliche. No artifacts were found in Stratum 2.

Test Trench 3. Test Trench 3 was also dug in the southern area of the site. It was placed in the project area west of the existing right-of-way, adjacent to a concentration of surface artifacts. Surface vegetation was a dense cover of mixed grasses.

Excavation ended at 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-brown clay. Stratum 2 was a light gray sandy soil composed of decaying sandstone. No artifacts were found in either stratum.

Test Trench 4. Test Trench 4 was dug in the central area of the site, within the project area but outside of the existing right-of-way, adjacent to a surface artifact cluster. Surface vegetation included prickly pear cactus, mixed grasses, and milkweed.

Excavation ended 50 cm below the modern ground surface at bedrock. Testing revealed a single stratum of material, a fine brown silt, eolian in origin. One lithic artifact, a flake, was found in this material. A light gray fine grained sandstone was present beneath this stratum.

Test Trench 5. Test Trench 5 was dug in the northern area of LA 6762. This test trench was placed within the project area outside of the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was limited to a 30-percent cover of mixed grasses.

Excavation ended at 14 cm below the modern ground surface at bedrock. Testing revealed two strata of material. Stratum 1 was a fine silty brown clay. Stratum 2 was a silty dark brown clay containing particles of caliche. A fine grained light gray sandstone was present beneath Stratum 2. No artifacts were found in either stratum.

Test Trench 6. Test Trench 6 was dug adjacent to a surface artifact concentration within the existing right-of-way, west of U.S. 84. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface at bedrock. Testing revealed two strata of material. Stratum 1 was a fine silty brown soil, eolian in origin. Stratum 2 was a light brown sandy soil composed of decaying sandstone. A light brown fine grained

sandstone is present beneath Stratum 2. No artifacts were found in either stratum.

Cultural Features

No intact cultural features or deposits were found in the portion of LA 6762 within the proposed project area.

LA 8017 Testing Results

LA 8017 is a large lithic scatter on both sides of U.S. 84. The site measures 435 by 430 m (Fig. 15) and extends north from an existing gravel pit (west of the existing right-of-way) to the southern edge of two borrow pits. The site is relatively flat but slopes downward toward the north and east. The elevation of the site is 1,417.1 m (4,680 ft).

A total of 343 lithic artifacts were found on the surface at LA 8017 and piece-plotted. Twenty-five additional lithic artifacts were recovered from test trenches on the site. The site is deflated and most of the surface artifacts have been redeposited. Livestock have also had an impact on the site. Areas of the site adjacent to the gravel pit and the two borrow pits appear to have experienced displacement during pit use.

Test Trenches

Test Trench 1. Test Trench 1 was dug in the highest portion of the site, near its southern edge. This test trench was within the existing right-of-way west of U.S. 84. It was dug adjacent to a surface artifact concentration, in an area of intact topsoil. Surface vegetation was a 40% cover of mixed grasses. One lithic artifact was collected from the surface of Test Trench 1 prior to excavation.

Excavation ended 40 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a silty gray clay. One lithic artifact, a flake, was found in this stratum of material. Stratum 2 was a light gray sandy clay. Stratum 3 was a reddish-gray clay. No artifacts were found in either Stratum 2 or 3.

Test Trench 2. Test Trench 2 was dug within the existing right-of-way, west of U.S. 84. The test trench was dug in the southern area of the site adjacent to a surface artifact concentration. Surface vegetation was limited to a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed 2 strata of material. Stratum 1 was a light brown silty soil containing some gravel. Stratum 2 was a pale brown silty clay. No artifacts were found in either of these two stratum.

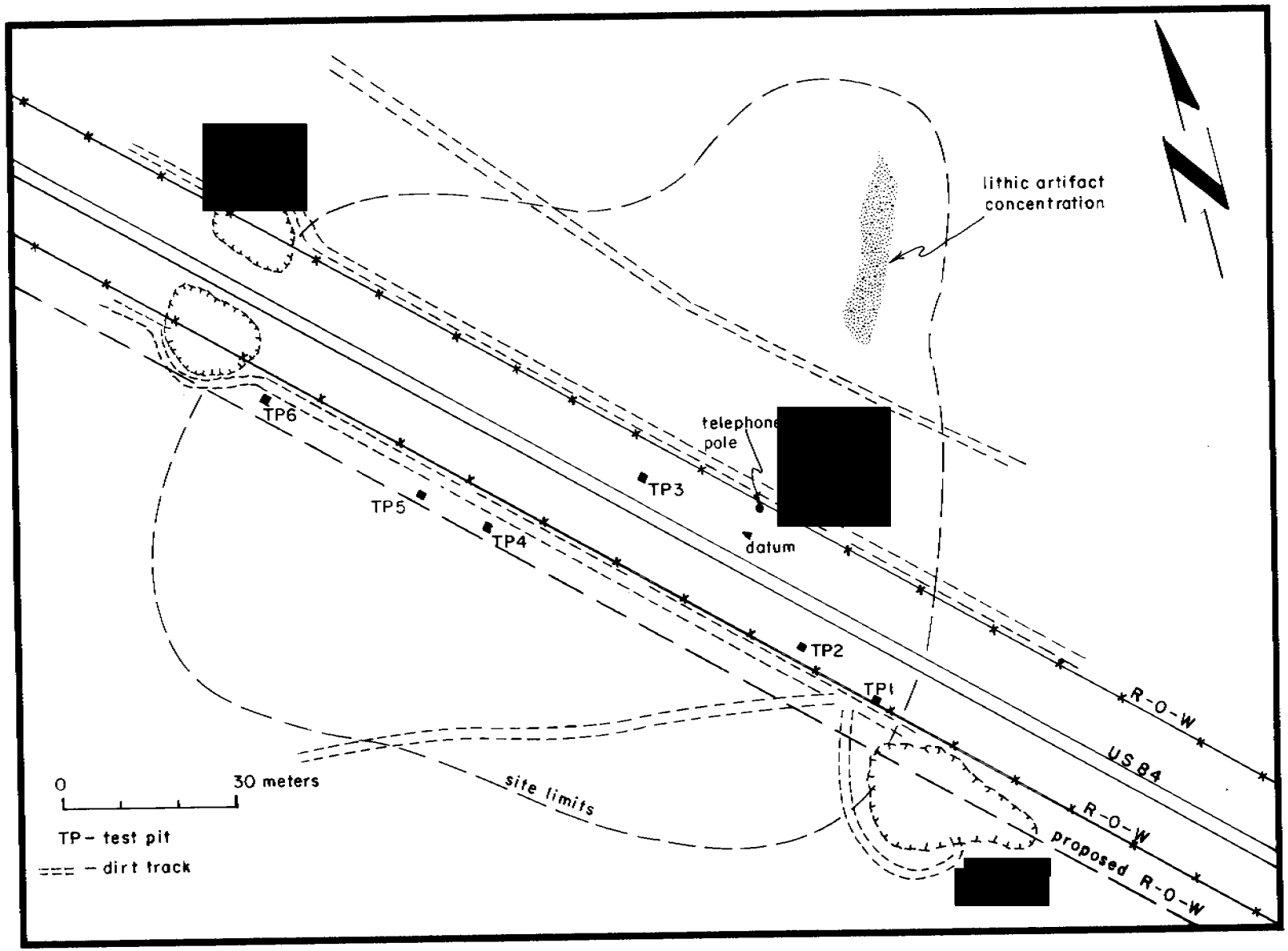

Figure 15. LA 8017 site map.

Test Trench 3. Test Trench 3 was dug west of U.S. 84 within the existing right-of-way, in the central portion of the site. Test Trench 3 was dug adjacent to a surface artifact concentration. Surface vegetation included mixed grasses and prickly pear cactus. One lithic, a core flake, was collected from the surface of the test trench prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed 2 strata of material. Stratum 1 was a yellowish-red silty soil containing some gravel. Stratum 2 was a dark red sandy clay. No artifacts were found in either Stratum 1 or 2.

Test Trench 4. Test Trench 4 was dug in the central portion of the site, west of both U.S. 84 and the existing right-of-way. This test trench was dug adjacent to a surface artifact cluster, in an area of intact topsoil. Surface vegetation was a 40% cover of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed 2 strata of material. Stratum 1 was a reddish-brown clay. One lithic artifact was recovered from this stratum. Stratum 2 was a reddish-brown clay containing particles of caliche. No artifacts were found in Stratum 2.

Test Trench 5. Test Trench 5 was dug in the portion of the project area located outside of the existing right-of-way, in the northern area of the site. The test trench was dug adjacent to a surface artifact cluster. Surface vegetation was a 30% cover of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed 2 strata of material. Stratum 1 was a yellowish-red silty gravel layer. One lithic artifact was recovered from this stratum. Stratum 2 was a reddish-brown clay. No artifacts were found in Stratum 2.

Test Trench 6. Test Trench 6 was dug near the northern edge of the site. This test trench was adjacent to a surface artifact concentration, and near the western borrow pit. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 40 cm below the modern ground surface in culturally sterile soil. Testing revealed 3 strata of material. Stratum 1 was a yellowish-red silty soil. Eighteen lithic artifacts were collected from this stratum. Stratum 2 was a reddish-brown clay. Stratum 3 was a reddish-brown clay containing some caliche. No artifacts were found in either Stratum 2 or 3. This area of the site has been heavily churned by machinery associated with use of the borrow pits.

Cultural Features

No intact cultural features or deposits were found in the portion of LA 8017 within the proposed project area.

LA 99845 Testing Results

LA 99845 is a lithic artifact scatter on both sides of U.S. 84 measuring 275 by 130 m (Fig. 16). The main portion of the site extends west of U.S. 84. The site is relatively flat, with a slight rocky knoll west of U.S. 84. The elevation of the site is 1,420.1 m (4,690 ft).

A total of 272 lithic artifacts were found on the surface within the proposed project area at LA 99845 and piece-plotted. An additional 11 lithic artifacts were collected from test trenches. One microgravers, characteristic of the Late Paleoindian culture, was found at LA 99845. The site is deflated, and most surface artifacts have been redeposited. Livestock have also had an impact on the site.

Test Trenches

Test Trench 1. Test Trench 1 was dug in the central portion of the site, west of both U.S. 84 and the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a dense cover of mixed grasses. One lithic artifact was collected from the surface of Test Trench 1 prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-brown silty clay. Stratum 2 was a reddish-brown clay. No artifacts were found in either stratum.

Test Trench 2. Test Trench 2 was dug within the project area, in the central portion of the site, outside of the existing right-of-way, adjacent to a surface artifact cluster. Surface vegetation was a dense cover of mixed grasses. Two lithic artifacts were recovered from the surface of Test Trench 2 prior to excavation.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a reddish-brown silty sand. Three lithic artifacts, all flakes, were found in this material. Stratum 2 was a reddish-brown clay. Stratum 3 was a reddish-gray clay. No artifacts were found in Stratum 2 or 3.

Test Trench 3. Test Trench 3 was dug west of the existing right-of-way in the central area of LA 99845. The test trench was dug adjacent to a surface artifact concentration. Surface vegetation was a sparse 10-percent cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-brown clay. Stratum 2 was a reddish-brown clay containing caliche particles. No artifacts were found in either stratum.

Test Trench 4. Test Trench 4 was dug within the project area outside of the existing right-of-way, west of U.S. 84, adjacent to a surface artifact concentration. Surface vegetation was a

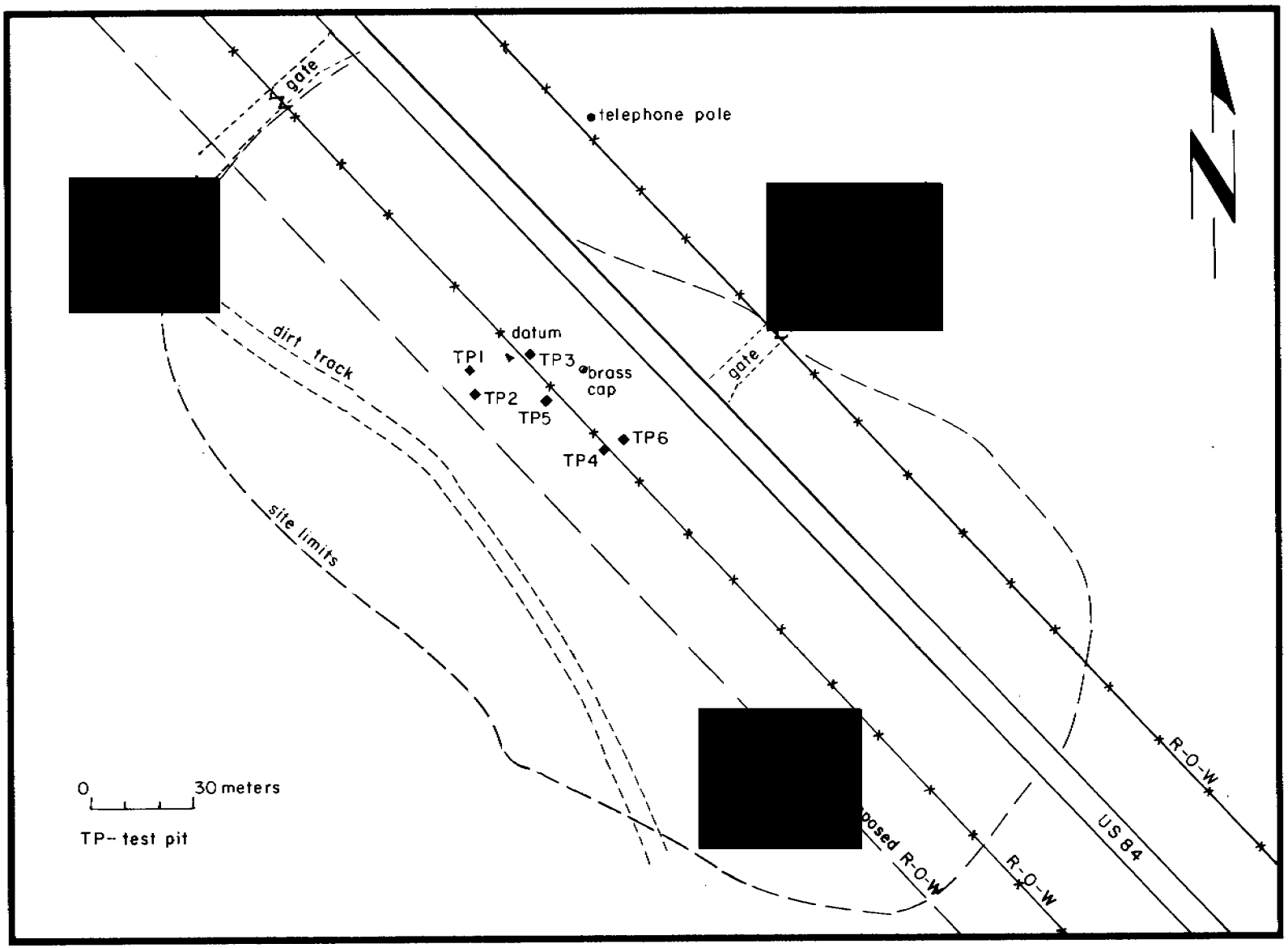

Figure 16. LA 99845 site map.

40-percent cover of mixed grasses. One lithic artifact was collected from the surface of this test trench prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material.. Stratum 1 was a reddish-brown clay. Stratum 2 was a reddish-brown clay containing caliche and large amounts of decaying shale. No artifacts were found in either stratum.

Test Trench 5. Test Trench 5 was dug within the existing right-of-way on the west side of U.S. 84, adjacent to a surface artifact concentration. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface at bedrock. Testing revealed two strata of material. Stratum 1 was a reddish-brown clay. Stratum 2 was a decaying reddish-brown shale. No artifacts were found in either stratum.

Test Trench 6. Test Trench 6 was dug west of U.S. 84 within the existing right-of-way, adjacent to a surface artifact cluster. Surface vegetation was limited to a 40-percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a yellowish-red silty soil containing some gravel. Two lithic artifacts were found within this stratum of material. Stratum 2 was a reddish-brown clay containing caliche and large amounts of decaying shale. No artifacts were found in Stratum 2.

Cultural Features

No intact cultural features or deposits were found in the portion of LA 99845 within the proposed project area.

LA 103320 Testing Results

LA 103320 is a lithic artifact scatter measuring 65 by 60 m (Fig. 17). The site is east of U.S. 84, and the main artifact concentration is east of the existing right-of-way, outside of the proposed project limits. A borrow pit associated with earlier highway improvements is on the southern edge of the site. The site is relatively flat. Its elevation is 1,420.1 m (4,690 ft).

A total of sixteen lithic artifacts were found on the surface at LA 103320 and piece-plotted. No additional artifacts were found in any of the test trenches. The site is deflated, and most of the surface artifacts have been redeposited. Livestock have also had an impact on the site. The area of the site adjacent to the borrow pit experienced displacement associated with borrow pit use.

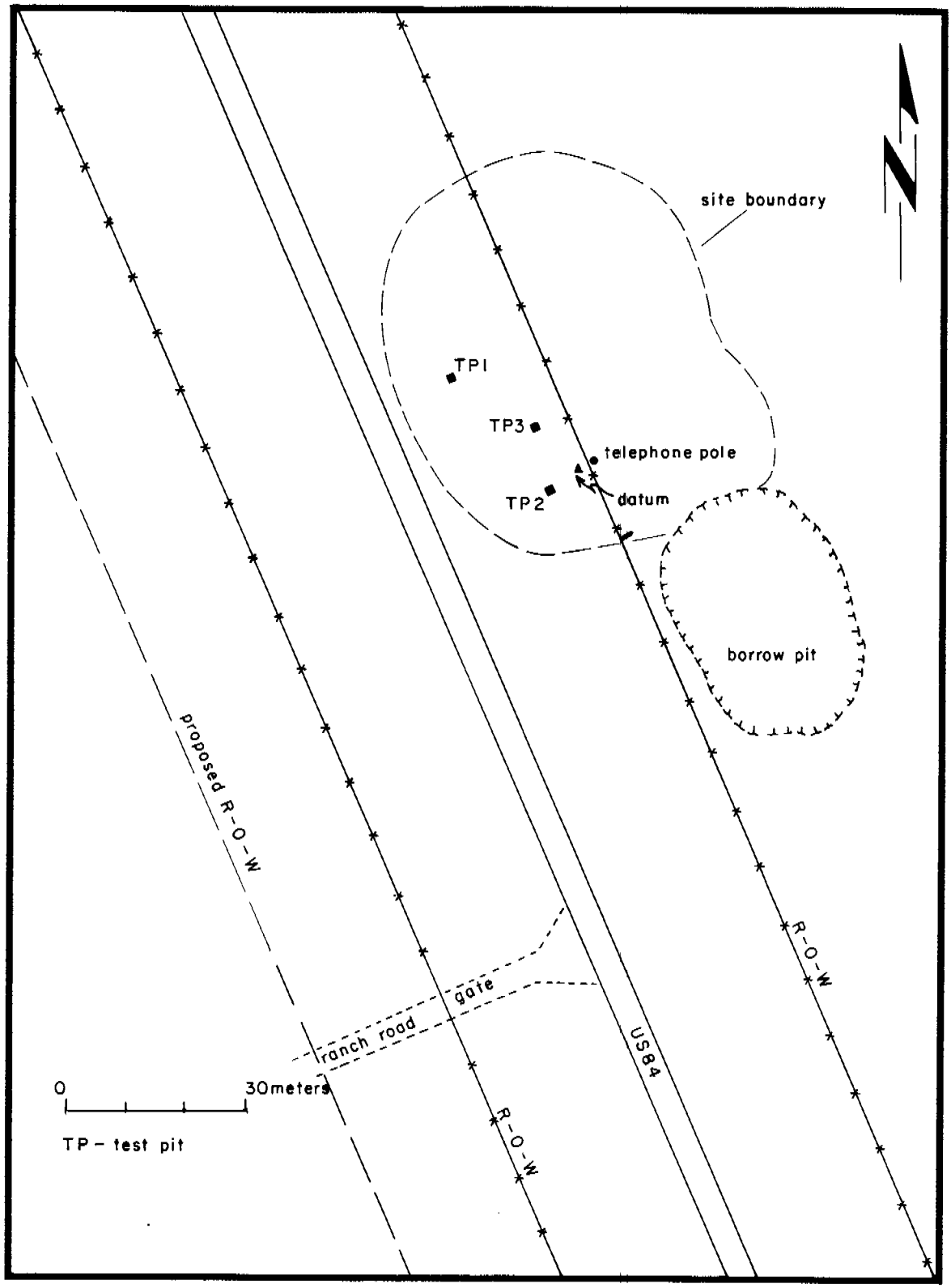

Figure 17. LA 103320 site map.

Test Trenches

Test Trench 1. Test Trench 1 was dug east of U.S. 84 within the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a 40-percent cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a reddish-brown silty clay. Stratum 2 was a dark red clay. No artifacts were found in either stratum.

Test Trench 2. Test Trench 2 was dug east of U.S. 84 within the existing right-of-way, adjacent to a surface artifact concentration. Surface vegetation was a 40-percent cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a silty red clay. Stratum 2 was a dark red clay. No artifacts were found within either stratum.

Test Trench 3. Test Trench 3 was dug adjacent to a surface artifact concentration, east of U.S. 84, within the existing right-of-way. Surface vegetation was a dense cover of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Testing revealed two strata of material. Stratum 1 was a fine reddish-brown clay. Stratum 2 was a reddish-brown clay containing particles of caliche. No artifacts were found in either stratum.

Cultural Features

No intact cultural features or deposits were found in the portion of LA 103320 within the proposed project area.

SUMMARY

Ten prehistoric archaeological sites were tested within the proposed project area associated with planned improvements to U.S. 84, south of Santa Rosa, Guadalupe County, New Mexico. All of the sites are lithic artifact scatters. Three of the 10 sites also have historic components, but all of them are outside of the project area. A recent gas station structure (ca. 1955) is present within the project area at the site of LA 103317. Testing of portions of ten sites within the proposed project area has established that none has the potential to yield more information, and no further archaeological work is recommended.

A single intact cultural feature occurs on one site within the proposed project area: a recent masonry structure at LA 103317. No historic artifacts were found associated with this structure, and because of its age and limited information potential, no further archaeological work is recommended.

LITHIC ARTIFACT ANALYSIS

A total of 1,334 artifacts from ten sites were analyzed. A majority of the artifacts (1,240), from the present ground surface, were analyzed in the field. A small number of artifacts (94) were collected and analyzed in Santa Fe. Surface artifacts collected in 1962 from two of the four sites recorded at that time were also analyzed: 42 from LA 6763 and 37 from LA 8017.

Analytic Methods

Attributes chosen for the in-field 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* (OAS 1995) were followed.

Microwear analysis was deemed impractical and too time consuming for in-field analysis. Microwear analysis is also limited in its ability to make specific interpretations concerning the worked material (Neusius 1988:211). Relative distinctions in artifact wear can be made based upon the hardness of the contact material (Neusius 1988:211), but failure to deal with the variation caused by differences in material properties (Brose 1975), including hardness, makes most such interpretations questionable. In areas of active environmental action, such as these site areas, weathering also confuses microwear studies (Schurrenberger and Bryan 1985:137).

The following attributes were included in analysis:

Material Type

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

Morphology (Artifact Type)

Morphology refers to the form of the artifact.

Portion

Portion is the part of the artifact recovered. Flakes and tools can be whole or

fragmentary. Angular debris and cores are whole by definition.

Dorsal Cortex

Cortex is estimated to the nearest 10-percent increment. For flakes this is the cortex on the dorsal surface. Cortex on the platform is not included in this category. For other morphological types, the percentage of cortex on all surfaces is estimated and combined.

Flake Platform

Flake platform is recorded for whole and proximal flakes. Either the morphology of the impact area prior to flake removal or extreme modifications of the impact area caused by the actual flake removal is coded.

Size

Artifact *size* is recorded in millimeters.

Edge Number

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

Function

Function characterizes and describes the use of artifacts.

Wear Patterns

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

Analytic Results

It was assumed that the environmental setting of the sites suggests the types of activities for which the locale was suited and that any activities indicated by the lithic artifact assemblage can be used to define the range of tasks represented. We can also define a list of expectations about when and how the site area was used. The same general use can result in different artifact assemblages depending on the cultural group using the area. Thus, a hunting party

from a logistically organized pueblo might utilize the space differently from hunters from an Archaic mobile seasonal camp. The sites were evaluated within this context.

In the field, a bias toward larger, more easily observed flakes probably skewed our data on flake size and morphology. Large flakes tend to be core flakes from early stages of reduction and to exhibit unmodified platforms. The predominance of core flakes exhibiting cortical or single-faceted platforms in these assemblages may be the result of a sampling bias of this type, rather than early-stage lithic reduction. Few hammerstone flakes (spalls from hammerstones) were found at any of the sites. Angular debris, which occurs at all stages of flintknapping, was also present in low quantities. Low proportions of angular debris to flakes indicate tool manufacturing.

The lithic artifact data are presented by attributes to allow comparisons between the 10 sites.

Material Selection

Material selection serves as an indication of human decision-making processes regarding the suitability of materials (Young and Bonnichsen 1985:128). The testing of material samples presumed to be usable lithic material and their subsequent discard for a variety of factors--few readily apparent--indicates the accepted suitability of lithic materials for tool manufacture or use.

Two materials dominate these artifact assemblages: chert and a form of metamorphic sandstone commonly known in the area as graywacke (Banks 1990:89) (Appendix 2, Tables A1-A10). Frequencies of artifacts made of these materials varies from site to site. Siltstone and silicified wood are also present in large percentages at several of these sites. All four of these materials commonly occur in the local Pleistocene gravel and Pecos River Terrace deposits. Lithic artifacts comprised of metamorphic sandstone form the largest category of material use at four sites: LA 6763 (42.0 percent), LA 103318 (38.0 percent), LA 103319 (63.6 percent), and LA 103320 38.0 percent). Chert is the most common material at the remaining six sites: LA 6762 (76.4 percent), LA 6764 (49.0 percent), LA 8017 (53.7 percent), LA 99845 (65.9 percent), LA 103316 (59.3 percent), and LA 103317 (54.3 percent). Silicified wood is the second most common occurring material at three sites: (LA 6762, LA 6764, and LA 103317), all of which are dominated by chert artifacts. Other materials present in small quantities are quartzite, quartzitic sandstone, and rhyolite, all readily available locally.

Material resembling Alibates chert is present at one site in the project area, LA 103317. Although this material resembles Alibates chert from the Canadian River Valley, to the northeast, it cannot be confidently attributed to this source. Small pieces of similar material were visible in the local Pleistocene gravels, suggesting a possible Pecos Valley origin. The identification of cherts in this area of New Mexico is proving more complicated than previously thought. Cherts from the Tecovas, Chinle, and Yeso formations occur in this general region of the Pecos Valley (Banks 1990:88). These cherts--in particular, Tecovas

chert, because of its wide range of color and texture--are easily confused with other cherts (Banks 1990:92). Madera cherts, originating in the Sangre de Cristo Mountains, are also present in the Pecos River Valley (Banks 1990:89). The wide range of color, texture, and flaking properties of Madera cherts (Banks 1990:72) includes material similar in appearance to Alibates chert.

Artifact Morphology and Material

Core flakes make up the largest morphological group within each of the site assemblages. Core flakes also make up the largest morphological category within most material categories, although not the smaller material classes. Metamorphic sandstone, chert, and to a lesser extent siltstone and silicified wood are the main materials utilized on these 10 sites.

Flake Morphology and Flake Portion

The largest category of flake portion in each of the site assemblages is whole flakes (Appendix 2, Tables A11-A20). Proximal flake fragment is the second largest category in most cases. Lateral flake fragment is the second most common flake portion at three sites: LA 6764, LA 99845, and LA 103320. Less flake portion variation is present within other flake morphology categories. This may be at least partially a result of the small numbers of artifacts within these categories. Biface thinning flakes occur in a wide range of portion categories at LA 6762, where they constitute 7.2 percent of the artifact assemblage.

Flake portions may have been affected by the presence of both vehicular traffic and livestock on the sites. Most of the sites have experienced vehicle traffic within the project area. Cattle and horses can also easily break or modify flakes by stepping on them. All 10 of the sites within the project area have been heavily grazed for decades.

Dorsal Cortex and Platform Type

The amount of cortex on lithic artifacts and the predominance of core flakes exhibiting cortical or single facet platforms can provide possible evidence of reduction strategies pursued in a particular location. Cortical and single-facet platforms predominate (Tables A11-A20). Single- facet platforms are the most common form present at all sites except one. Cortical platforms are more common at LA 103320--an admittedly small data set.

The large majorities in these two platform types indicate a low level of labor expended in lithic-tool production. These data suggest two possibilities: only primary and secondary lithic reduction took place at these sites, and the lithic artifacts present are the result not of tool manufacturing but of expedient tool use.

Dorsal cortex is present on a majority of artifacts in each site assemblage except that

of LA 6762. The percentage of artifacts with cortex varies considerably between sites where it predominates, from a low of 53.4 percent at LA 103317 to a high of 86.8 percent at LA 6764. LA 6762 has a percentage of artifacts with cortex of 42.2 percent.

The span of cortex occurrence indicates material reduction. The greater the range of cortex present within a material category, the more likely it is that reduction of that material took place (Appendix 2, Tables A21-A30). In this manner, evidence of the reduction of metamorphic sandstone and chert is present at three sites: LA 6763, LA 103319, and LA 103320. The reduction of metamorphic sandstone, chert, and siltstone is evident at LA 6762, LA 8017, LA 103316, and LA 103318. The reduction of both chert and silicified wood appears to have taken place at LA 103317. Cortex occurrence at LA 99845 suggests that while the reduction of both metamorphic sandstone and chert dominate the assemblage, reduction of all recorded material types took place.

Utilization by Material

Analysis of utilization is limited primarily to presence or absence and a description of the form of utilization or wear. Bidirectional wear is traditionally considered an indication of cutting or slicing, while unidirectional wear was thought to indicate scraping. Experiments conducted by Vaughan (1985) and James L. Moore (pers. comm., 1992) indicate that wear patterns are unreliable indicators of the type of use.

Notches and denticulates are more specialized tools and may be indicators of specific activities connected with the manufacture and maintenance of items constructed from perishable materials (Wilke 1977:14-15). Like other tools, however, they may also have been used in a variety of ways for which they were not designed. The range of recorded wear patterns from these sites show that a number of activities, involving more than just tool manufacturing and finishing, took place at these locales.

Single-function artifacts (artifacts with a single utilized, retouched, or retouched and utilized edge) at all 10 sites are primarily chert, with metamorphic sandstone a close second in material use. Siltstone is third and silicified wood forth in material utilization (Appendix 2, Tables A31-A40). These four materials span the widest range of functional categories within sites, although most functional categories span the whole range of material types at some of the ten sites. LA 6764, LA 99845, and LA 103320 have the narrowest range of materials represented by functional categories. Utilized artifacts at LA 6764 are limited to chert and silicified wood. Utilized artifacts at LA 99845 and LA 103320 are limited to chert and metamorphic sandstone.

Artifacts exhibiting two multiple functions parallel single-function artifacts in material use (Tables A31-A40). Metamorphic sandstone and chert predominate at all sites except LA 6764 and LA 103317. At these two sites, the data sets show greater frequencies of chert and silicified wood. Quartzitic sandstone is present within the majority of categories at LA 103319. LA 99845 has both quartzite and siltstone, while quartzite occurs at LA 6763. Siltstone and

silicified wood make up part of this category at LA 8017. The widest range of two multiple function artifacts by material type occurs at LA 6762, where materials include metamorphic sandstone, chert, rhyolite, siltstone, and quartzitic sandstone.

Artifacts exhibiting three multiple functions (Tables A31-A40) occur in small numbers at seven sites: LA 6762, LA 6763, LA 8017, LA 99845, LA 103316, LA 103317, and LA 103319. The number of materials represented decreases as the number of artifacts decreases, and the number of functions increases.

Artifacts exhibiting four functions (Tables A31-A40) are present at only two sites: LA 6763 and LA 8017. The number of artifacts and materials represented continues to decrease as the number of functions increases.

Material Quality

Single-function artifacts reflect the dominate material type of each site assemblage: metamorphic sandstone (medium- to course-grained), chert (medium- to fine-grained), or siltstone (medium- to fine-grained). This pattern of material use is repeated with multiple-function artifacts. Artifact use thus appears to be determined by material availability and not material quality.

Finer-grained lithic materials (chert, silicified wood, fine-grained quartzite, and siltstone) are exactly the cryptocrystalline, isotropic, highly silicious lithic materials with elastic qualities that are usually considered the most desirable for reduction (Crabtree 1972:4-5). These materials also produce the sharpest cutting edges, rather than the more durable edges produced by coarser-grained materials (Akins and Bullock 1992:26).

The material quality of both single- and multiple-function classes indicates selection for convenience (locally available materials) rather than for material quality. Two possibilities are suggested by this selection for convenient materials regardless of the accessibility of a variety of other lithic resources. Both are related to project-area site locations near the Pecos Valley.

Use of the project area by groups unfamiliar with the region may account for preference for the immediately locally available lithic material. Kelly and Todd (1988:231-244) suggested just such a strategy for the early Paleoindian period. A similar exploitation strategy by later Archaic, Anasazi, historic Pueblo, or even Plains groups unfamiliar with the area is possible.

The reliance on immediately available lithic resources may be related to the possible sudden need for lithic tools, presumably by successful hunting parties. This need for quickly made, expedient tools could result in the utilization of the immediately available lithic material of adequate quality. This use strategy could be dictated by a hunting strategy designed for exploitation of the local landscape, transcending cultural affiliation.

Tools

Use of the sites as logistical or resource extraction locations rather than residential areas should be supported by the presence of bifaces and biface resharpening flakes (Akins and Bullock 1992:27). A biface is a flake or core blank that has been reduced on both faces from two parallel but opposing axes (Kelly 1988:718). Bifaces can be used as tools or cores without further modification, thus maximizing tool edges and providing durable, long-use-life tools while minimizing the amount of lithic material transported. Bifaces have the advantage over other lithic tools of being reliable, easy to maintain, and reshapable as raw material. A difference in biface occurrence should be evident in residential and logistical sites (Kelly 1988:721-723). Biface production and use in residential sites should result in large proportions of biface flakes, low numbers of utilized biface flakes, low numbers of simple cores, and a high frequency of expedient flake tools as opposed to utilized biface flakes. Bifacial tools would be produced and maintained in residential sites, but used as tools or cores at logistical sites, resulting in large numbers of utilized biface thinning flakes. Large unifaces may also occur as part of this biface tool complex. Sites within the project area that could be residential, based on this criteria, are LA 8017, LA 99845, and LA 103317.

Limited numbers of bifaces and biface resharpening flakes show evidence of biface production and use, but the noncore flake tool component at most of these sites is too small to allow their evaluation through application of this model. The large numbers of cores and core flakes suggest an emphasis on local rather than exotic materials (Kelly 1988:719).

The debitage to tool (including utilized debitage) ratios and percentages vary from site to site (Table 1). A debitage:tool ratio could aid in suggesting its relative date when diagnostic artifacts are absent. The lower the debitage:tool ratio, the older the site should be. An in-depth discussion of this material occurs later in this report.

The proportion of formal tool forms comprising prehistoric tool kits tends to change through time and space, reflecting the range and duration of activities pursued (Christenson 1987:77). The nature of these assemblages is such that any classification of cultural affiliation beyond a rough determination of Late Paleolithic, Early Archaic, or Archaic is not possible. Tool location has been determined to aid in the interpretation of site occupation (Schlanger 1991). These sites are too deflated and modified for this to be successfully attempted. The use of utilized debitage as expedient tools may indicate that a wider range, or more intense pursuit, of activities took place than those represented by the formal tools. Utilized debitage may also represent the occurrence of an unplanned or unexpected activity (Akins and Bullock 1992:28-29).

Table 1. Debitage:tool ratio by site

Site	Debitage:Tool Ratio	Tool Percentage
LA 6762	2.8	35.1
LA 6763	1.3	74
LA 6764	2.7	35.8
LA 8017	2.6	37.8
LA 99845	2.3	43.5
LA 103316	3.5	28.1
LA 103317	3.0	32.6
LA 103318	2.1	47.6
LA 103319	4.3	22.8
LA 103320	2.0	50.0

DISCUSSION

A search of the New Mexico Cultural Resource Information System (NMCRIS) files at the Laboratory of Anthropology shows 50 sites with cultural affiliations within the 15 USGS quadrangles surrounding the project area. A study of these sites by topography (Table 2) shows that Archaic and Anasazi sites occur in the widest variety of topographical locations. Cliff edge, cliff/bluff/scarp, and terrace have the widest range of occupations through time. These numbers are based solely on recorded sites.

All of the sites except one (LA 6762) are on or adjacent to a slope affording long-distance visibility in at least one direction, including the three sites on San Juan de Dios Arroyo (LA 6763, LA 103318, and LA 103319). We can assume that site placement is related to this long-range visibility, although the limited number of sites in this study may not reflect regional patterning. In contrast, LA 6762, although on a high land form, is in rough terrain among a number of rocky outcroppings. This suggests an attempt to gain shelter from the elements through use of the landscape.

The Pecos River Valley is an area of cultural and ecological contact and interaction. The area was utilized by most of the prehistoric cultural groups of eastern New Mexico, but there appears to have been no permanent prehistoric presence of any of these groups in the valley (Ward et al. 1987). At present this portion of the Pecos Valley is juniper parkland and riverine habitat along the Pecos River and its main side canyons and arroyos (Sebastian and Larralde 1989:10, Fig. 1.5). Juniper parkland is also present in areas of broken terrain within the grasslands east of the Pecos River Valley. These areas and the river valley function as ecological edge areas--areas of contact between different biotic communities. They generally occur at changes of elevation or where physical changes are present in the landscape. Ecological edge areas are "the most convenient location for proximity to the widest variety and stability of resources" (Epp 1984:332). Correlations have been demonstrated between site location and ecological edge areas for sites dating from the Archaic period to the Protohistoric in Saskatchewan, Canada (Epp 1984), and for Archaic sites in the northern San Juan Basin of New Mexico (Reher and Witter 1977:124). A similar positive correlation has been demonstrated by Thurmond (1990:13-20) for Paleoindian sites in the southern plains. Thurmond (1990:17) suggests that site concentrations along many of these biotic borderlands maximize density as well as diversity of faunal and floral food resources. The almost continuous utilization of the Pecos River Valley through time seem to support the concept of the area as one of relative abundance based on an increased variety of available resources.

It is likely that the 10 sites within the project area, although not occupied at the same time, were all connected with the utilization of faunal and floral resources. The juniper parkland and riverine areas provided habitat for deer, a number of smaller mammal species such as jackrabbit and cottontail rabbits, and a variety of bird species. Within historic time, pronghorn and bison have lived on the open grasslands east and west of the Pecos Valley. The overlapping distributions and adjacent habitats of these species suggests that all of them were exploited by the inhabitants of these sites.

The lithic artifact assemblage suggests a number of activities for each of these sites. Hunters processing game, maintaining or supplementing their tool kit, or simply passing the time by flintknapping would contribute to a varied assemblage. The repeated utilization of specific camp or processing sites may also help explain the composition of these artifact assemblages.

Knowing how the site areas may have been used may provide clues to who used the sites and when they were used. A model combining hunter-gatherer subsistence practices (Binford 1980), Early and Late Archaic subsistence practices (Irwin-Williams 1984), and observations of prehistoric and historic Pueblo subsistence practices has been developed (Schelberg and Akins 1987; Akins and Bullock 1992:32) (Table 3). This model is based on the premise that there is enough variation in how these different groups would have utilized the same resource to enable some evaluation of lithic assemblages, even if diagnostic artifacts are not present.

Early Archaic groups were essentially foragers (Binford 1980:5-9; Irwin-Williams 1984:9). These groups moved their residential bases frequently and gathered food on a daily basis during short forays from these bases. Longer forays, or resource procurement trips, were made by specialized work parties (e.g., hunters) to subcamps. These subcamps, or "extractive locations," were used for short periods of time, a fact exhibited by low rates of tool abandonment. Early Archaic tools should reflect high cost acquisition and curation and a wide niche exploitation based on smaller animals and unspecialized gathering. Greater mobility and dependence on hunting could be reflected in the use of nonlocal lithic resources and greater technological skill (Schelberg and Akins 1987:20; Akins and Bullock 1992:33). The longer the foray, the greater the amount and complexity of the equipment utilized (Kelly 1988:720). Lithic assemblages from Early Archaic sites thus should lack cores, and the amount of cortex in the assemblage should be low, indicating that primary reduction was performed elsewhere, at the place of material procurement. This, combined with a relatively high level of nonlocal materials, is consistent with the high degree of mobility suggested for the Early Archaic (Akins and Bullock 1992:33).

Later Archaic groups are classified as collectors--groups who live on stored food for at least part of the year and who gather food in logistically organized food procurement groups (Akins and Bullock 1992:33; Binford 1980:10). Middle and Late Archaic groups, operating with broader economic bases and higher population densities, should produce lithic assemblages indicative of reduced exploitative areas, the scheduling of resource utilization, and storage (Akins and Bullock 1992:33; Irwin-Williams 1984:9-10). Resources would be exploited by task-oriented groups focused on a specific resource that could be gathered in quantity. Middle and Late Archaic assemblages should therefore be dominated by nonlocal materials, and specialized tools should be present at task-oriented sites (Akins and Bullock 1992:34).

Anasazi and historic Pueblo subsistence is better understood if postulated Anasazi subsistence were based on historic Pueblo organization. Small mammals and birds were hunted individually and opportunistically, but were also hunted in large-scale communal hunts. Larger

mammals--deer, pronghorn, and bison--were hunted individually when it was possible but were usually hunted by hunting parties. White (1962:301-302) wrote that at Zia, these hunts lasted for approximately six days. Vegetal foodstuffs were gathered in a similar manner, gathered individually except when seasonally occurring plants or fruit became available in large quantities. In these cases, organized communal gathering took place (White 1962:302).

Modern Pueblo activities, including hunts, were scheduled in advance around agricultural duties. Because these hunting parties had definite focus and goals, we would expect a high degree of preparation to have taken place. However, because of the lower degree of dependence on hunting than in nonagricultural societies, we would expect a lower level of technological expenditure (Akins and Bullock 1992:35). Lithic assemblages from Anasazi sites reflect an expedient lithic technology, in which flakes were produced primarily as short-term disposable tools. Formal tools, other than projectile points, tend to be rare. A similar pattern seems to exist for historic Plains Indian sites. Flakes are commonly present, but formal tools, other than projectile points, tend to be rare.

Lithic artifact attributes have been used by a number of researchers to distinguish Archaic from Anasazi artifact assemblages. Archaic assemblages tend to have more formal tools and associated small production flakes. Anasazi expedient tool production or core reduction tends to produce larger core flakes. Material preference in tool use also distinguishes the two groups. A set of expectations derived from subsistence patterns, degrees of mobility, and level of technology is presented in Table 3. This suggests that material use should help distinguish Early from Late Archaic sites, and that technology will help distinguish Archaic from Anasazi sites (Akins and Bullock 1992:36).

In Tables 4-7, the 10 sites within the project area are compared with a number of sites in the same general area of eastern New Mexico and the upper Pecos Valley. A range of time periods and site types are represented. Although differences in methods of analysis can make some comparisons difficult, general trends can be observed.

The sites picked for comparison tend to be single-component sites with good cultural designations based on the presence of diagnostic artifacts. LA 55693 is approximately 3 km (2 miles) east of the project area. LA 57453 is west of Portales, approximately 128 km (80 miles) southeast of the project area. LA 18455, LA 18469, LA 18674, LA 18580, LA 18472, LA 18476, and LA 18669 are in the Los Esteros Project, approximately 32 km (20 miles) north of the project area in the Pecos River Valley.

Main consideration is directed toward four "marker" attributes within the lithic assemblages, which are believed to reflect cultural change in a time-sensitive manner: the ratio between debitage and tools (including utilized debitage), the percentage of flakes in the assemblage, the percentage of cores, and the percentage of bifaces. Two general trends should be present in a comparison of this type. One is an increase in both the debitage:tool ratio and the percentage of flakes within the assemblage through time. The second is a corresponding decrease in the percentage of the assemblage composed of bifaces and cores. Through a comparison of these attributes, cultural affiliation can be determined for sites where diagnostic

artifacts are not present. This is accomplished by plotting each site's position within a progression between well-dated sites (sites with diagnostic material) (Bullock in prep.).

In a perfect world, all four of our marker attributes would confirm the position of a specific site, relative to firmly dated sites within a general region. It is more likely that one or more of these four attributes will not conform as expected. Site variation, whether real or caused through sampling bias, can easily affect one or more of these percentages. However, the general trend should be sufficient to place the site within a cultural affiliation, relative to other sites, even if no finer resolution is possible (Bullock 1995).

Of the ten sites within the project area, three (LA 6762, LA 6763, and LA 99845) contain diagnostic artifacts that allow them to be assigned to specific cultural periods. The lithic artifact assemblage at LA 6762 contains a late prehistoric period, Harrell-style projectile point. Harrell projectile points have been tentatively dated to A.D. 1300-1650 or 1750. However, the debitage:tool ratio at this site is higher than expected for this time period.

A Middle Archaic date of 650-300 B.C. has been assigned to site LA 6763, based on the presence of a Lange-style projectile point base. This period assignment is not supported by the high percentage of cores present on the site and the low debitage:tool ratio.

The lithic assemblage at LA 99845 contains a beaked graver, usually considered characteristic of the late Paleoindian period. All of the data supports this period assignment. Both the debitage:tool ratio and the percentage of flakes in the assemblage are low, and the percentage of both bifaces and cores are high.

A study of our four marker attributes strongly suggests that LA 8017 can be assigned to a the Late Paleoindian–Early Archaic. The data also strongly supports an assignment of LA 6764 to the Early Archaic period. LA 103316 and LA 103319 can probably be assigned to the Late Archaic period, based on strong evidence from the marker attributes.

The other three sites have been assigned to a general "Archaic" cultural period because finer dating resolution is not possible with the data available. The attributes indicate these sites fall within the Archaic period (although LA 103317 could be late prehistoric). Generally, three attributes agree at each of these sites, but the forth disagrees by a large enough margin to make any finer resolution suspect. It is possible that conflicting site data results from the presence of more than one site component. It also could be a by-product of site modification.

Obviously, these are tenuous phase assignments. However, the whole point of this exercise has been to do more than simply assigning a generic "Archaic" label to lithic artifact scatters lacking diagnostic artifacts. Lithic artifact scatters contain more information then is usually believed, but it has to be looked for. Patterns are present within this data that should be time sensitive and reflect cultural change. The degree of resolution possible may be limited, and the results may be tenuous, but lithic artifact scatters will only provide more information if approached with the expectation that the information exists.

ASSESSMENTS AND RECOMMENDATIONS

Information derived from surface mapping, test excavations, and the analysis of their artifact assemblages provides insight into the functions of these 10 sites and the portions of the sites within the proposed right-of-way.

LA 103316

LA 103316 is a Late Archaic site. The site may have been a limited activity area, although the deflated nature of the site area makes it impossible to identify any specific activities that may have occurred there. No intact cultural features or deposits were found. The artifact assemblage is primarily debitage, although a few formal tools are also present. All artifacts were found on the modern ground surface or within the top 10 cm of soil.

Archaeological testing within the proposed right of way at LA 103316 did not reveal any features or deposits likely to yield important information on the prehistory of LA 103316 or the region. It is our opinion that no further investigations are needed at LA 103316.

LA 103317

LA 103317 is a dual-component site. The assemblage suggests that the early component is an Archaic lithic artifact scatter. The lithic artifact assemblage is composed solely of utilized or nonutilized debitage. This, combined with the low total number of artifacts, suggests that use of the site was short-termed. There is evidence of flintknapping and a single instance of game or material processing. No intact features or deposits were found associated with this period of site use. All artifacts were found on the modern ground surface or within the top 10 cm of soil.

The second component at LA 103317 is the footing of a recent masonry structure that served as a gas station and a small grocery store. Discussions with Earnest Chaves, grandson of the structure's original owner, revealed that the gas station was built by Manuel Cordova in 1955 and began operations that year. The station was affiliated with the Malco gasoline company, and a small grocery store was housed in the stone station building. Supplies, including gasoline, were brought by truck from Fort Sumner. Upon the death of Manuel Cordova, his wife, Antonia Chaves, operated the gas station until it closed in 1959. The 500-gallon underground gasoline tank was dug up and sold for scrap metal in 1960 by the owner's grandson, Earnest Chaves, who still lives in the area. The land eventually was sold to the Werthiem Ranch, the present owners. The building was torn down in 1975.

Archaeological testing within the proposed right-of-way at LA 103317 did not reveal any features or deposits likely to yield important information on the prehistory or history of LA 103317 or of the region. The footing of the masonry gas station building is not likely to

yield information beyond that already documented. It is our opinion that no further investigations are needed at LA 103317.

LA 6764

LA 6764 is a probable an Early Archaic site. The artifacts present suggest it is a limited-activity area. However, the deflated nature of the site makes it impossible to determine what specific activity may have occurred. All artifacts were found on the present ground surface or in the upper 10 cm of soil.

Archaeological testing within the proposed right-of-way at LA 6764 did not reveal any intact features or deposits likely to yield important information on the prehistory of LA 6764 or of the region. It is our opinion that no further investigations are needed at LA 6764.

LA 6763

LA 6763 is probable a Middle Archaic limited-activity area. The deflated nature of the site area makes it impossible to determine the specific activities that may have occurred. The artifact assemblage ranges from debitage to formal tools. No diagnostic artifacts or features or deposits were found. All artifacts were found on the modern ground surface or in the upper 10 cm of soil.

Archaeological testing within the proposed right-of-way at LA 6763 did not reveal any features or deposits likely to yield important information pertaining to the prehistory of LA 6763 or of the region. It is our opinion that no further investigations are needed at LA 6763.

LA 103318

LA 103318 is a probable Archaic site. As with most of the project area, the site is heavily deflated, making definite site function (residential or limited-activity area) impossible to determine. Large numbers of flakes suggest lithic reduction took place at this site. No intact features or deposits were found. All artifacts were found on the modern ground surface or in the top 10 cm of soil.

Archaeological investigations within the proposed right-of-way did not reveal any features or deposits likely to yield important information on the prehistory of LA 103318 or on the region. It is our opinion that no further investigations are needed at LA 103318.

LA 103319

LA 103319 is a Late Prehistoric site. Lithic artifact range from debitage to formal

tools. The high number of flakes suggests flintknapping took place at this site. No features, deposits, or diagnostic artifacts were found. All artifacts were on the modern ground surface or within the top 10 cm of soil.

Archaeological testing within the proposed right-of-way did not reveal any features or deposits that were likely to yield important information on the prehistory of LA 103319 or of the region. It is our opinion that no further investigations are needed at LA 103319.

LA 6762

LA 6762 is a Late Prehistoric site. This period assignment is based on the presence of a Harrell-style projectile point. The site is not a residential site, but probably served as a logistical procurement camp. The deflated nature of the site are makes it impossible to determine what specific activities may have occurred. No intact features or deposits were found. All artifacts at the site were found on the present ground surface or within the upper 10 cm of soil.

Archaeological testing within the proposed right-of-way at LA 103319 did not reveal any features or deposits likely to yield important information on the prehistory of LA 103319 or of the region. It is our opinion that no further investigations are needed.

LA 8017

LA 8017 is probable a Late Paleoindian–Early Archaic site. The artifact assemblage suggests this is a residential site. The site is heavily deflated, and most of the artifacts have been redeposited. The artifact assemblage is large, and the lithic artifacts range from debitage to formal tools. No diagnostic artifacts were found. No intact features or deposits were found. All of the artifacts were found on the modern ground surface or within the top 10 cm of soil, except in areas of the site adjacent to the existing gravel pit and borrow pits, where some churning of the soil has taken place..

Archaeological testing in the proposed right-of-way did not reveal any features or deposits likely to yield important information on the prehistory of LA 8017 or of the region. It is our opinion that no further investigations are needed at LA 8017.

LA 99845

LA 99845 is a probable Late Paleoindian site. Although the artifact assemblage also suggests this is a residential site, the heavily deflated nature of the site area makes this determination speculative. The range of lithic artifacts at the site ranges from debitage to formal tools. One diagnostic artifact, a beaked graver, was found on the site surface of LA 99845. No intact features or deposits were found. All of the artifact were found on the modern

ground surface or in the top 10 cm of soil.

Archaeological testing within the proposed right-of-way at LA 99845 did not reveal features or deposits likely to yield important information on the prehistory of LA 99845 or of the region. It is our opinion that no further investigations are needed at LA 98845.

LA 103320

LA 103320 is a probable Archaic site. However, the number of artifacts here is so small that any determination of cultural or temporal affiliation is suspect. The site is heavily deflated, and most artifacts have been redeposited. No diagnostic artifacts or intact features or deposits were found. All artifacts were found on the modern ground surface.

Archaeological testing within the proposed right-of-way did not reveal any features or deposits likely to yield important information on the prehistory of LA 103320 or of the region. It is our opinion that no further investigations are needed at LA 103320.

CONCLUSIONS

Ten prehistoric archaeological sites were tested within the proposed right-of-way and project area of planned improvements to U.S. 84 southeast of Santa Rosa, Guadalupe County, New Mexico. One site (LA 99845) shows direct evidence of Paleoindian occupation, a microgravers. Two other sites were also assigned to temporal periods based on the presence of diagnostic artifacts. The base of a Lange point at LA 6763 indicates the site dates to the Middle Archaic period. The presence of a Harrell-style projectile point suggests LA 6762 is a late prehistoric site. LA 8017 has been tentatively assigned to the Late Paleoindian–Early Archaic period based on core and flake percentages and debitage:tool ratios. The use of debitage:tool ratios in combination with flake and core percentages has enabled LA 103316 to be assigned to the Late Archaic period. The same method allows us to assign LA 103319 to the Late Prehistoric period. LA 6764 has been assigned to the Early Archaic period, also on the basis of flake and core percentages and debitage:tool ratios. The three remaining sites (LA 103317, LA 103318, and LA 103320) likely date to the Archaic period.

The heavily deflated nature of the sites and site modification caused by livestock prevents the determination of site type as habitation, limited-activity area, or seasonal resource procurement area. One site (LA 103317) contains a feature within the project area. Documentation has shown this feature to be of recent age and unlikely to yield additional information important to the understanding of local or regional history.

It is our opinion that no further investigations are needed at any of the 10 sites within the project area.

Table 2. Cultural affiliation of sites by topography in the 15 USGS quadrangles surrounding the project area (number and percentage)

Topography	Paleoindian	Archaic	Anasazi	Mogollon	Historic Pueblo	Plains
Arroyo/wash			1 5.2			
Blowout		1 5.8	1 5.2			
Canyon rim	1 100	5 29.4	4 21.0			2 28.5
Cliff/ scarp/bluff		2 11.7	2 10.5	2 40.0		2 28.5
Hilltop			1 5.2			
Hill slope		2 11.7		1 20.0		1 14.2
Low rise						1 14.2
Mesa/butte		1 5.8	1 5.2			1 14.2
Open canyon			1 5.2			
Ridge			1 5.2	1 20.0		
Terrace		3 17.6	5 26.3			
Other (unknown)		3 17.6	2 10.5	1 20.0	1 100	
Totals	1 100	17 99.6	19 99.5	5 100	1 100	7 99.6

Table 3. Expected Early and Late Archaic and Anasazi lithic assemblages

	Late Paleoindian-Early Archaic	Late Archaic	Anasazi
Subsistence pattern	forager	collector	collector
Degree of mobility	high	intermediate	low
Lithic materials	nonlocal	some nonlocal	few nonlocal
Technology	biface	biface	expedient
Archaeological Results			
Debitage:tool ratio	low	low	high
Flake percentage	high	high	very high
Core percentage	high	present	low
Bifaces	present	present	few present

Table 4. Comparison of selected lithic assemblage attributes, project sites vs. sites in the general upper Pecos Valley

Site number	LA 55693	LA 57453	LA 99845*	LA 8017*
Time period	LatePaleoindian/ Early Archaic	Late Paleoindian/ Early Archaic	Late Paleoindian	Late Paleoindian/ Early Archaic
Site type	lithic scatter	lithic scatter	lithic scatter	lithic scatter
Number of lithics	161	80	285	404
Material %		(debitage only)		
chalcedony	7.4	11.0		
chert	53.4	24.0	65.9	53.7
siltstone	3.1		4.8	3.9
quartzite	1.2	58.0	2.4	1.2
quartzitic sandstone	29.2		1.7	1.9
metamorphic sandstone			20.3	36.9
other	5.6	7.0	4.5	2.2
Cortex %				
0	23.6		22.8	19.8
1-30	16.9		26.6	26.0
31-60	21.7		19.7	15.9
61-90	12.3		26.0	28.4
91-100	25.5		4.9	9.9
Debitage:tool ratio	1.9	1.9	2.3	2.6
% flakes	58.3	56.0	75.6	78.2

Site number	LA 55693	LA 57453	LA 99845*	LA 8017*
% cores	24.8	8.4	18.7	15.8
% bifaces	4.3	8.4	4.0	3.2
% ground stone		16.8		

Source: LA 55693 (Harlan et al. 1986); LA 57453 (Lintz et al. 1988)

Sites marked with an asterisk (*) are within the U.S. 84-Sunshine Breaks project area.

Table 5. Comparison of selected lithic assemblage attributes, project sites vs. sites in the general upper Pecos Valley

Site number	LA 6764*	LA 6763*	LA 103320*	LA 103318*
Time period	Early Archaic	Middle Archaic	Archaic	Archaic
Site type	lithic scatter	lithic scatter	lithic scatter	lithic scatter
Number of lithics	53	50	16	42
Material %				
chalcedony				
chert	49.0	34.0	43.7	31.0
siltstone	3.7	6.0		19.0
quartzite	1.9	12.0	6.2	4.7
quartzitic sandstone	1.9	1.0		2.4
metamorphic sandstone		42.0	50.0	38.1
silicified wood	43.3			
other		4.0		4.7
Cortex %				
0	13.2	34.0	25.0	26.2
1-30	22.6	24.0	12.6	28.5
31-60	26.4	20.0	18.8	7.2
61-91	28.3	18.0	31.4	33.3
91-100	9.4	4.0	18.8	4.8
Debitage:tool ratio	2.7	1.3	2.0	2.1
% flakes	83.0	83.1	81.2	81.0
% cores	15.0	15.1	18.8	11.9
% bifaces	1.9	1.9		
% ground stone				

Sites marked with an asterisk (*) are within the U.S. 84-Sunshine Breaks project. [see other tables]

Table 6. Comparison of selected lithic assemblage attributes, project sites vs. sites in the general upper Pecos Valley

Site number	LA 103317*	LA 18674	LA 103316*	LA 103319*
Time period	Archaic	Archaic	Late Archaic	late prehistoric
Site type	lithic scatter	rockshelter	lithic scatter	lithic scatter
Number of lithics	46	346	118	118
Material %				
chalcedony				
chert	54.3		59.3	31.3
siltstone			14.4	5.0
quartzite	2.1		0.8	1.7
quartzitic sandstone	2.1		5.0	1.7
metamorphic sandstone	2.1		16.1	59.3
silicified wood	34.8			
other	4.2		4.2	0.8
Cortex % LA 18674				
0	28.3		46.6	41.5
1-30	23.9		21.1	22.0
31-60	21.7		7.5	12.7
61-90	26.0		18.6	20.3
91-100			5.9	3.4
Debitage:tool ratio	3.0	6.2	3.5	4.3
% flakes	82.7	86.3	88.9	89.7
% cores	13.1	6.3	6.8	8.4
% bifaces	4.4	3.1	0.5	0.84
%Groundstone		2.6	1.5	

Source: Ward et al. 1987 (LA 18674)

Sites marked with an asterisk (*) are within the U.S. 84-Sunshine Breaks project area.

Table 7. Comparison of selected lithic assemblage attributes, project sites vs. sites in the general upper Pecos Valley

Site number	LA 6762*	LA 18580	LA 18472	LA 18669	LA 18476
Time period	late prehistoric	Anasazi	historic Pueblo	historic Pueblo	protohistoric Plains
Site type	lithic scatter	lithic scatter	lithic scatter	rockshelter	tipi settlement
Number of lithics	296	183	1852	5351	3365
Material %					
chalcedony					
chert	76.3				
siltstone	5.4				
quartzite	0.3				
quartzitic sandstone	4.1				
metamorphic sandstone	4.3				
other	9.5				
Cortex %					
0	57.8				
1-30	19.1				
31-60	8.8				
61-90	10.8				
91-100	3.4				
Debitage:tool ratio	2.8	25.1	33.2	16.3	21.5
% flakes	89.5	96.1	97.0	94.0	98.5
% cores	4.7	0.5	0.1	0.8	less than .0
% bifaces	3.4	1.6	1.0	3.0	less than .0
% ground stone		1.0	0.4	1.1	less than .0

Source: Mobley 1978 (LA 18476); Ward et al. 1987 (LA 18472, LA 18580)

Sites marked with an asterisk (*) are within the U.S. 84-Sunshine Breaks project area.

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APPENDIX 2: LITHIC ANALYSIS DATA

Table A1. Artifact morphology by material type, LA 6762

	Material Type																Total	
	Metamorphic Sandstone		Chert		Alibates		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	11	84.6	180	79.6	1	50.0	3	100.0	12	75.0			10	83.3	17	73.9	234	79.1
Biface thinning flake			14	6.2	1	50.0							2	16.7	2	8.7	19	6.3
Resharpening flake	1	7.7	5	2.2											1	4.3	7	2.4
Hammerstone flake			4	1.8											1	4.3	5	1.7
Biface early stage			4	1.8													4	1.4
Biface middle stage			1	0.4													1	0.3
Projectile point									1	6.3							1	0.3
Uniface core			1	0.4													1	0.3
Bidirectional core			10	4.4					1	6.3							12	4.1
Multidirectional core	1	7.7	5	2.2							1	100.0			1	4.3	6	2.0
Angular debris																	1	0.3
Unmodified cobble			2	0.9					2	12.5					1	4.3	5	1.7
Total	13	100.0	225	100.0	2	100.0	3	100.0	16	100.0	1	100.0	12	100.0	23	100.0	296	100.0

Table A3. Artifact morphology by material type, LA 6764

	Material Type										Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Core flake	20	76.9	1	50.0			1	100.0	19	82.6	41	77.4
Biface thinning flake	1	3.8									1	1.9
Resharpening flake									2	8.7	2	3.8
Uniface core			1	50.0							1	1.9
Bidirectional core									1	4.3	1	1.9
Multidirectional core	5	19.2							1	4.3	6	11.1
Chopper					1	100.0					1	1.9
Total	26	100.0	2	100.0	1	100.0	1	100.0	23	100.0	53	100.0

Table A5. Artifact morphology by material type, LA 99845

	Material Type														Total	
	Metamorphic Sandstone		Chert		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	36	62.1	136	72.3	4	57.1	6	42.9	5	71.4	4	80.0	3	50.0	194	68.1
Biface thinning flake	3	5.2	7	3.7					1	14.3					11	3.9
Resharpening flake			1	0.5											1	0.4
Hammerstone flake	4	6.9	5	2.7											9	3.2
Biface early stage			5	2.7			2	14.3							7	2.5
Biface middle stage			1	0.5											1	0.4
Uniface core	2	3.4													2	0.7
Bidirectional core	2	3.4	4	2.1	1	14.3									7	2.5
Multidirectional core	8	13.8	24	12.8	1	14.3	6	42.9	1	14.3			1	16.7	41	14.4
Tested cobble	3	5.2													3	1.1
Angular debris			2	1.1							1	20.0	1	16.7	4	1.4
Unmodified cobble			1	0.5											1	0.4
Chopper			2	1.1											3	1.1
Total	58	100.0	188	100.0	7	100.0	14	100.0	7	100.0	5	100.0	6	100.0	285	100.0

Table A7. Artifact morphology by material type, LA 103317

	Material Type												Total	
	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	1	100.0	22	88.0	1	50.0			1	100.0	11	68.8	36	78.3
Biface thinning flake											1	6.3	1	2.2
Hammerstone flake			1	4.0									1	2.2
Biface early stage			1	4.0									1	2.2
Bidirectional core			1	4.0									1	2.2
Multidirectional core					1	50.0					3	18.8	4	9.7
Tested cobble											1	6.3	1	2.2
Chopper							1	100.0					1	2.2
Total	1	100.0	25	100.0	2	100.0	1	100.0	1	100.0	16	100.0	46	100.0

Table A9. Artifact morphology by material type, LA 103319

	Material Type												Total	
	Metamorphic Sandstone		Chert		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	67	95.7	26	70.3	2	33.3	2	100.0	2	100.0	1	100.0	100	84.7
Biface thinning flake			2	5.7									2	1.6
Hammerstone flake	1	1.4	3	8.1									4	3.4
Uniface core					1	16.7							1	0.8
Bidirectional core			1	2.7									1	0.8
Multidirectional core	2	2.9	5	13.5	1	16.7							8	6.8
Angular debris					1	16.7							1	0.8
Chopper					1	16.7							1	0.8
Total	70	100.0	37	100.0	6	100.0	2	100.0	2	100.0	1	100.0	118	100.0

Table A11. Flake morphology by portion and platform type, LA 6762

	Portion										Total	
	Whole		Proximal		Medial		Distal		Lateral		N	%
	N	%	N	%	N	%	N	%	N	%		
Core flake	166	88.3	30	90.9	10	90.9	13	76.5	15	93.8	234	88.3
Biface thinning flake	12	6.4	2	6.1	1	9.1	4	28.5			19	7.2
Hammerstone flake	4	2.1	1	3.0							5	1.9
Resharpening flake	6	3.2							1	6.3	7	2.6
Total	188	100.0	33	100.0	11	100.0	17	100.0	16	100.0	265	100.0

	Platform												Total	
	Absent		Cortical		Single		Multiple		Collapsed		Crushed		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	21	80.8	34	94.4	145	94.2	19	57.6	6	100.0	8	88.9	233	88.3
Biface thinning flake	5	19.2	1	2.8	3	1.9	10	30.3					19	7.2
Hammerstone flake			1	2.8	3	1.9					1	11.1	5	1.9
Resharpening flake					3	1.9	4	12.1					7	2.7
Total	26	100.0	36	100.0	154	100.0	33	100.0	6	100.0	9	100.0	264	100.0

Table A13. Flake morphology by portion and platform type, LA 6764

	Portion								Total	
	Whole		Proximal		Distal		Lateral		N	%
	N	%	N	%	N	%	N	%		
Core flake	35	92.1	2	100.0	1	100.0	3	100.0	41	93.2
Biface thinning flake	1	2.6							1	2.3
Resharpening flake	2	5.3							2	4.5
Total	38	100.0	2	100.0	1	100.0	3	100.0	44	100.0

	Platform												Total	
	Absent		Cortical		Single		Multiple		Collapsed		Crushed		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	1	100.0	15	100.0	16	100.0	7	70.0	1	100.0	1	100.0	41	93.2
Biface thinning flake							1	10.0					1	2.3
Resharpening flake							2	20.0					2	4.5
Total	1	100.0	15	100.0	16	100.0	10	100.0	1	100.0	1	100.0	44	100.0

Table A15. Flake morphology by portion and platform type, LA 99845

	Portion										Total	
	Whole		Proximal		Medial		Distal		Lateral		N	%
	N	%	N	%	N	%	N	%	N	%		
Core flake	157	89.2	13	86.7	3	100.0	8	100.0	14	100.0	194	89.8
Biface thinning flake	10	5.7	1	6.7							12	5.6
Hammerstone flake	9	5.1									9	4.2
Resharpening flake			1	6.7							1	0.5
Total	176	100.0	15	100.0	3	100.0	8	100.0	14	100.0	216	100.0

	Platform												Total	
	Absent		Cortical		Single		Multiple		Collapsed		Crushed		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	10	90.9	47	92.2	103	93.6	19	65.5	10	100.0	5	100.0	194	89.8
Biface thinning flake	1	9.1	3	5.9	1	0.9	7	24.1					12	5.6
Hammerstone flake			1	2.0	6	5.5	2	6.9					9	4.2
Resharpening flake							1	3.4					1	0.5
Total	11	100.0	51	100.0	110	100.0	29	100.0	10	100.0	5	100.0	216	100.0

Table A17. Flake morphology by portion and platform type, LA 103317

	Portion										Total	
	Whole		Proximal		Medial		Distal		Lateral		N	%
	N	%	N	%	N	%	N	%	N	%		
Core flake	27	96.4	5	100.0	1	100.0			3	100.0	36	94.8
Biface thinning flake							1	100.0			1	2.6
Hammerstone flake	1	3.6									1	2.6
Total	28	100.0	5	100.0	1	100.0	1	100.0		100.0	38	100.0
	Platform										Total	
	Absent		Cortical		Single		Collapsed				N	%
	N	%	N	%	N	%	N		%			
Core flake	1	50.0	12	92.3	21	100.0	2		100.0		36	94.8
Biface thinning flake	1	50.0									1	2.6
Hammerstone flake			1	7.7							1	2.6
Total	2	100.0	13	100.0	21	100.0	2		100.0		38	100.0

Table A19. Flake morphology by portion and platform type, LA 103319

	Portion										Total	
	Whole		Proximal		Medial		Distal		Lateral		N	%
	N	%	N	%	N	%	N	%	N	%		
Core flake	64	93.1	15	100.0	3	100.0	6	85.7	8	100.0	100	94.4
Biface thinning flake	1	1.4					1	14.3			2	1.8
Hammerstone flake	4	5.5									4	3.8
Total	73	100.0	15	100.0	3	100.0	7	100.0	8	100.0	106	100.0

	Platform												Total	
	Absent		Cortical		Single		Multiple		Collapsed		Crushed		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Core flake	9	90.0	31	96.9	51	96.2	5	71.4	2	100.0	2	100.0	100	94.4
Biface thinning flake	1	10.0					1	14.3					2	1.8
Hammerstone flake			1	3.1	2	3.8	1	14.3					4	3.8
Total	10	100.0	32	100.0	53	100.0	7	100.0	2	100.0	2	100.0	106	100.0

Table A21. Cortex percentage by material type, LA 6762

% Cortex	Material Type																Total	
	Metamorphic Sandstone		Chert		Alibates		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
0	2	15.4	135	60.3	2	100.0	2	66.7	4	25.0			7	58.3	18	70.3	170	57.8
10	1	7.7	13	5.8									1	8.3	2	8.6	17	5.8
20	3	23.1	15	6.7					1	6.3							19	6.5
30	2	15.4	14	6.3			1	33.3	2	12.5					1	4.3	20	6.8
40	1	7.7	6	2.7					1	6.3			2	16.7			10	3.4
50			7	3.1					2	12.5					1	4.3	10	3.4
60			6	2.7													6	2.0
70			5	2.2									1	8.3			6	2.0
80	1	7.7	10	4.5					4	25.0			1	8.3			16	5.4
90			7	3.1					1	6.3	1	100.0			1	4.3	10	3.4
100	3	23.1	6	2.7					1	6.3							10	3.4
Total	13	100.0	224	100.0	2	100.0	3	100.0	16	100.0	1	100.0	12	100.0	23	100.0	294	100.0

Table A23. Cortex percentage by material type, LA 6764

% Cortex	Material Type										Total	
	Chert		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%		
0	4	15.4							3	13.0	7	13.2
10	3	11.5							1	4.3	4	7.5
20	1	3.8							2	8.7	3	5.7
30	1	3.8							4	17.4	5	9.4
40									1	4.3	1	1.9
50	4	15.4			1	100.0			2	8.7	7	13.2
60	3	11.5							3	13.0	6	11.3
70	2	7.7					1	100.0	2	8.7	5	9.4
80	4	15.4	1	50.0					2	8.7	7	13.2
90	2	7.7							1	4.3	3	5.7
100	2	7.7	1	50.0					2	8.7	5	9.4
Total	26	100.0	2	100.0	1	100.0	1	100.0	23	100.0	53	100.0

Table A25. Cortex percentage by material type, LA 99845

% Cortex	Material Type														Total	
	Metamorphic Sandstone		Chert		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
0	14	24.1	44	23.4	1	14.3			1	14.3	2	40.0	3	50.0	65	22.8
10	6	10.3	16	8.5	1	14.3	1	7.1	1	14.3	1	20.0			26	9.1
20	3	5.2	24	12.8			1	7.1			1	20.0	1	16.7	30	10.5
30	8	13.8	11	5.9	1	14.3									20	7.0
40	2	3.4	16	8.5	1	14.3	2	14.2							21	7.4
50	3	5.2	9	4.8			3	21.4							15	5.3
60	4	6.9	10	5.3			3	21.4	2	28.6			1	16.7	20	7.0
70	7	12.1	13	6.9	1	14.3	1	7.1	1	14.3					23	8.1
80	5	8.6	16	8.5	2	28.6	3	21.4	1	14.3			1	16.7	28	9.8
90	5	8.6	17	9.0							1	20.0			23	8.1
100	1	1.7	12	6.4					1	14.3					14	4.9
Total	58	100.0	188	100.0	7	100.0	14	100.0	7	100.0	5	100.0	6	100.0	285	100.0

Table A27. Cortex percentage by material type, LA 103317

% Cortex	Material Type												Total	
	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
0	1	100.0	6	24.0							6	37.5	13	28.3
10			3	12.0									3	6.5
20			2	8.0	1	50.0					1	6.3	4	8.7
30			3	12.0							1	6.3	4	8.7
40			1	4.0									1	2.2
50			2	8.0	1	50.0					3	18.8	6	13.0
60			3	12.0									3	6.5
70			1	4.0							1	6.3	2	4.3
80			3	12.0					1	100.0	2	12.5	6	13.0
90			1	4.0			1	100.0			2	12.5	4	8.7
100														
Total	1	100.0	25	100.0	2	100.0	1	100.0	1	100.0	16	100.0	46	100.0

Table A29. Cortex percentage by material type, LA 103319

% Cortex	Material Type												Total	
	Metamorphic Sandstone		Chert		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
0	36	51.4	12	32.4							1	100.0	49	41.5
10	6	8.6	1	2.7									7	5.9
20	6	8.6	4	10.8									10	8.5
30	6	8.6	2	5.4	1	16.7							9	7.6
40	1	1.4	2	5.4					1	50.0			4	3.4
50			4	10.8									4	3.4
60	3	4.3	4	10.8									7	5.9
70	2	2.9	1	2.7			1	50.0					4	3.4
80	5	7.1	3	8.1	2	33.3	1	50.0					11	9.3
90	3	4.3	3	8.1	3	50.0							9	7.6
100	2	2.9	1	2.7					1	50.0			4	3.4
Total	70	100.0	37	100.0	6	100.0	2	100.0	2	100.0	1	100.0	118	100.0

Table A31. Artifact function by material type, LA 6762

	Material Type														Total	
	Metamorphic Sandstone		Chert		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Utilized debitage	2	22.2	20	32.8	1	50.0	5	38.5			1	12.5	3	30.0	32	30.8
Retouched debitage	1	11.1	5	8.2			1	7.7			2	25.0	1	10.0	10	9.7
Utilized/retouched debitage	5	55.6	19	31.1			3	23.1			2	25.0	2	20.0	31	29.8
Hammerstone	1	11.1	3	4.9			2	15.4	1	100.0			2	20.0	9	8.7
Chopper			2	3.3											2	1.9
Graver			2	3.3											2	1.9
Notch			1	1.6											1	1.0
Scraper, undifferentiated			2	3.3									1	10.0	3	2.9
Scraper, end					1	50.0					1	12.5			2	1.9
Scraper, side			3	4.9			2	15.4			2	25.0	1	10.0	8	7.7
Knife			4	6.6											4	3.8
Total	9	100.0	61	100.0	2	100.0	13	100.0	1	100.0	8	100.0	10	100.0	104	100.0
Second Function																
Utilized debitage			4	30.8			1	20.0							5	20.8
Retouched debitage			2	15.4			1	20.0			2	50.0			5	20.8
Utilized/retouched debitage	1	100.0	6	46.2			2	40.0			1	25.0			10	41.7

Table A32. Artifact function by material type, LA 6763

	Material Type										Total	
	Metamorphic Sandstone		Chert		Siltstone		Quartzite		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%		
Utilized debitage	7	36.8	4	40.0					1	100.0	12	32.4
Retouched debitage	3	15.8	2	20.0	1	33.3	1	25.0			7	18.9
Hammerstone	2	10.5					2	50.0			4	10.8
Chopper	2	10.5	1	10.0	2	66.7					5	13.5
Notch			1	10.0							1	2.7
Scraper, end	2	10.5									2	5.4
Scraper, side	1	5.3									1	2.7
Knife	2	10.5	2	20.0			1	25.0			5	13.5
Total	19	100.0	10	100.0	3	100.0	4	100.0	1	100.0	37	100.0
Second Function												
Utilized debitage	2	18.2	1	33.3							3	18.8
Retouched debitage	4	36.4	2	66.7							6	37.5
Hammerstone							1	50.0			1	6.3
Scraper, end	1	9.1									1	6.3
Scraper, side	2	18.2									2	12.5
Knife	2	18.2					1	50.0			3	18.8
Total	11	100.0	3	100.0			2	100.0			16	100.0
Third Function												
Utilized debitage	2	50.0			1	100.0	1	100.0			3	50.0

Table A33. Artifact function by material type, LA 6764

	Material Type								Total	
	Chert		Siltstone		Quartzite		Silicified Wood		N	%
	N	%	N	%	N	%	N	%		
Utilized debitage	2	22.2	1	100.0	1	100.0	3	37.5	7	36.8
Retouched debitage	1	11.1					2	25.0	3	15.8
Utilized/retouched debitage	2	22.2					1	12.5	3	15.8
Hammerstone	2	22.2							2	10.5
Notch							1	12.5	1	5.3
Scraper, undifferentiated	2	22.2							2	10.5
Scraper, side							1	12.5	1	5.3
Total	9	100.0	1	100.0	1	100.0	8	100.0	19	100.0
Second Function										
Retouched debitage							2	100.0	2	66.7
Scraper, undifferentiated	1	100.0							1	33.3
Total	1	100.0					2	100.0	3	100.0

	Material Type												Total	
	Metamorphic Sandstone		Chert		Rhyolite		Siltstone		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Notch	1	7.7	1	16.7									2	9.5
Scraper, undifferentiated			2	33.3									2	9.5
Scraper, side	3	23.1	1	16.7							1	100.0	5	23.8
Knife							1	100.0					1	4.8
Total	13	100.0	6	100.0			1	100.0			1	100.0	21	100.0
Third Function														
Utilized debitage			1	50.0									1	20.0
Retouched debitage	1	50.0											1	20.0
Utilized/retouched debitage	1	50.0											1	20.0
Notch							1	100.0					1	20.0
Scraper, undifferentiated			1	50.0									1	20.0
Total	2	100.0	2	100.0			1	100.0					5	100.0
Fourth Function														
Scraper, undifferentiated			1	100.0									1	100.0
Total			1	100.0									1	100.0

	Material Type														Total	
	Metamorphic Sandstone		Chert		Rhyolite		Siltstone		Quartzite		Quartzitic Sandstone		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Scraper, undifferentiated	1	16.7													1	4.8
Scraper, end			1	9.1											1	4.8
Scraper, side	1	16.7											1	100.0	2	9.5
Microgravel	1	16.7													1	4.8
Total	6	100.0	11	100.0			2	100.0	1	100.0			1	100.0	21	100.0
Third Function																
Utilized debitage			1	50.0					1	100.0					2	50.0
Chopper							1	100.0							1	25.0
Scraper, end			1	50.0											1	25.0
Total			2	100.0			1	100.0	1	100.0					4	100.0

Table A37. Artifact function by material type, LA 6762

	Material Type												Total	
	Metamorphic Sandstone		Chert		Alibates		Siltstone		Quartzite		Silicified Wood		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Utilized debitage	1	100.0	3	42.9	1	100.0			1	100.0	2	50.0	8	53.3
Retouched debitage			1	14.3							1	25.0	2	13.3
Utilized/retouched debitage							1	100.0					1	6.7
Hammerstone			2	28.6									2	13.3
Notch			1	14.3									1	6.7
Scraper, undifferentiated											1	25.0	1	6.7
Total	1	100.0	7	100.0	1	100.0	1	100.0	1	100.0	4	100.0	15	100.0
Second Function														
Utilized debitage											1	50.0	1	33.3
Retouched debitage			1	100.0							1	50.0	2	66.7
Total			1	100.0							2	100.0	3	100.0
Third Function														
Utilized debitage											1	100.0	1	100.0
Total											1	100.0	1	100.0

Table A39. Artifact function by material type, LA 103319

	Material Type										Total	
	Metamorphic Sandstone		Chert		Siltstone		Quartzite		Quartzitic Sandstone		N	%
	N	%	N	%	N	%	N	%	N	%		
Utilized debitage	3	27.3	3	27.3			1	100.0			7	25.9
Retouched debitage			2	18.2							2	7.4
Utilized/retouched debitage	1	9.1			1	33.3					2	7.4
Hammerstone	1	9.1	4	36.4	1	33.3					6	22.2
Graver	2	18.2									2	7.4
Denticulate	1	9.1							1	100.0	2	77.4
Scraper, undifferentiated			2	18.2	1	33.3					3	11.1
Scraper, end	2	18.2									2	7.4
Knife	1	9.1									1	3.7
Total	11	100.0	11	100.0	3	100.0	1	100.0	1	100.0	27	100.0
Second Function												
Retouched debitage			1	100.0							1	20.0
Utilized/retouched debitage	3	100.0							1	100.0	4	80.0
Total	3	100.0	1	100.0					1	100.0	5	100.0
Third Function												
Utilized/retouched debitage									1	100.0	1	100.0
Total									1	100.0	1	100.0