MUSEUM OF NEW MEXICO
OFFICE OF ARCHAEOLOGICAL STUDIES

TESTING THREE SITES NEAR DEFIANCE, NEW MEXICO

Peter Y. Bullock

Submitted by
Eric Blinman, Ph.D.
Principal Investigator

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ADMINISTRATIVE SUMMARY

Between May 18 and July 24, 1992, the Office of Archaeological Studies, Museum of New Mexico, conducted archaeological testing of three sites near Defiance, New Mexico. Testing at LA 86372, LA 86373, and LA 86374 was conducted at the request of the New Mexico State Highway and Transportation Department, to determine the extent and importance of cultural materials present within the proposed right-of-way for the realignment of County Road 1, McKinley County, New Mexico.

Testing at LA 86374, within the proposed right-of-way, located on Navajo Nation Tribal Fee Land, took place between May 18 and June 5, 1992. LA 86374 contains potentially important cultural features. A surface structure, a slab lined hearth, and an intact midden deposit were found that indicate this was a habitation site dating to the Basketmaker III period. This cultural material is confined to a specific area of the right-of-way outside of the construction zone and can be preserved through the use of temporary protective fencing during construction.

Between July 20 and July 24, 1992, the Office of Archaeological Studies conducted archaeological testing at LA 86372 and LA 86373, located on State Trust Land in McKinley County, New Mexico. LA 86372 dated to the Basketmaker III period and was probably a seasonal or temporary camp. A second seasonal or temporary camp dating to the Basketmaker III period, was defined at LA 86373. The data potential of the portions of the two sites within the right-of-way, was determined to be minimal, and no further investigations are recommended.

MNM Project No. 41.526
NMSHTD Project No. BR-0-7531(5)CN 1561
Navajo Nation Cultural Resources Investigation Permit C9203 HPD 92-089
ARPA Permit No. NAO-ARPA-92-002
New Mexico State Land Office Archaeological Excavation Permit No. AE-46

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INTRODUCTION

At the request of the New Mexico State Highway and Transportation Department, an archaeological testing program was conducted at LA 86372 and LA 86373 on State Trust Land, and at LA 86374 on Navajo Tribal Fee Land (Fig. 1). The exact site locations are included in Appendix 4. Testing was conducted by archaeologists from the Office of Archaeological Studies, Museum of New Mexico, under New Mexico State Land Office Archaeological Excavation Permit No. AE-46, Navajo Nation Cultural resources Investigation Permit No. C9203, and ARPA Permit No. NAO-ARPA-92-002. Fieldwork was carried out between May 18 and July 24, 1992. Field work was conducted by Peter Y. Bullock and Charles A. Hannaford. Timothy D. Maxwell acted as principal investigator. Figures were drafted by Rob Turner, the report was edited by Robin Gould, and the photographs were printed by Nancy Warren.

Testing was conducted at LA 86372, LA 86373, and LA 86374 to determine the extent and importance of the portions of the sites located within the proposed project limits. Testing was restricted to the proposed right-of-way of the realignment of County Road 1, near Defiance, New Mexico.

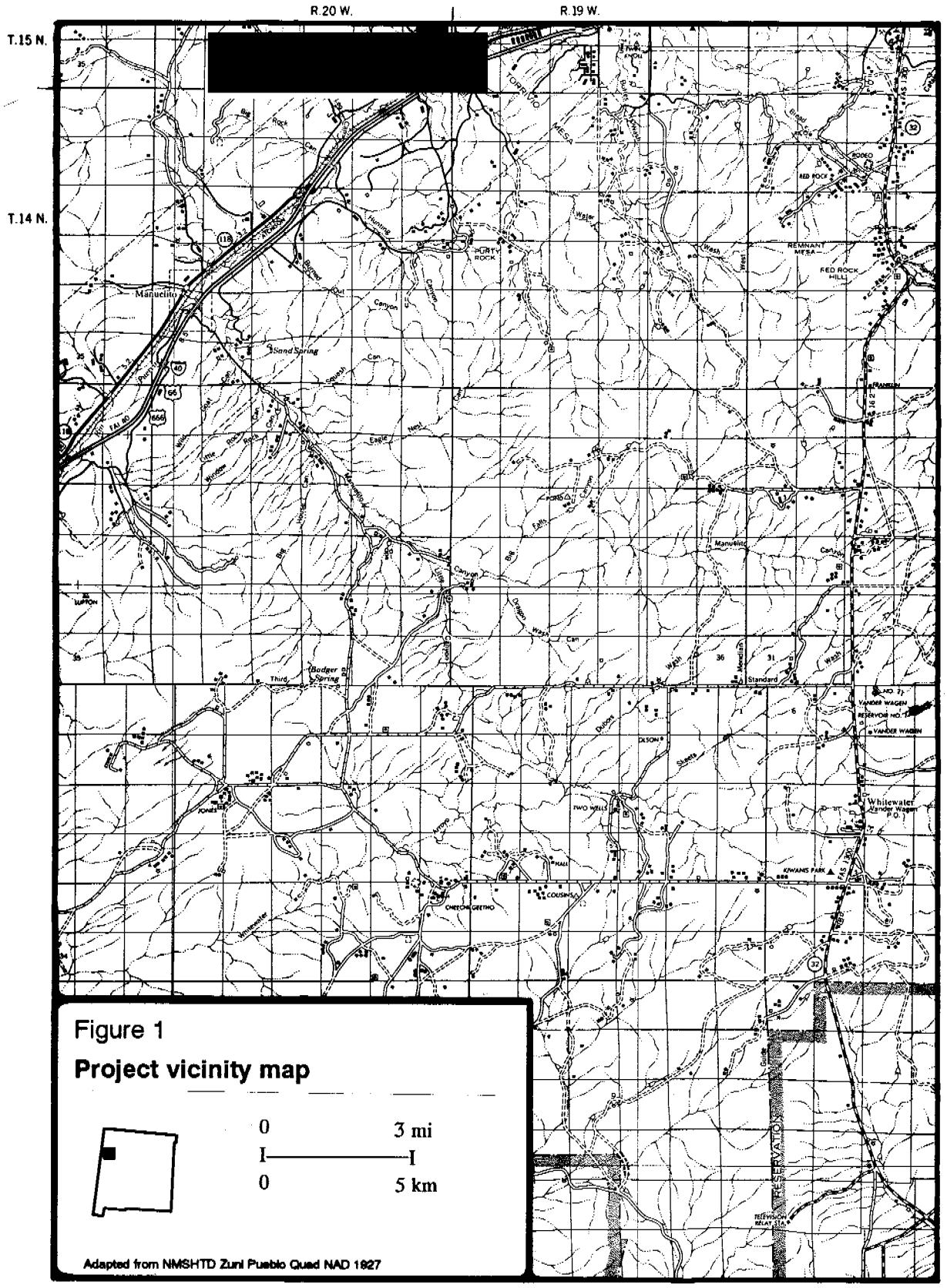

Figure 1

Project vicinity map

Adapted from NMSHTD Zuni Pueblo Quad NAD 1927

ENVIRONMENT

The project area is located on the southern Colorado Plateau in the southwestern corner of the San Juan Basin. This structural subbasin is known as the Gallup Sag, or Gallup Syncline, and is located directly to the west of the Nutria Monocline (Cooley 1959:36). This area, north of Gallup, is a broken landscape composed of subparallel lines of cuestas, ridges, buttes, mesas, and strike valleys (Cooley 1959:66). Elevations for the area range from 2,000 m (6,560 ft) in the valley bottoms to 2,600 m (8,528 ft) in the Chuska Mountains to the north (Hewett 1982:28). Piñon-juniper woodland occurs at the higher elevations, with scattered ponderosa pine in better-watered locales. Lower elevations are dominated by sagebrush, greasewood, and a variety of grasses. Upper elevation soils are rocky and poorly formed. The soils of the valley bottoms consist of fine alluvial silt and sandy clays with channel cutting through the older alluvium. Stabilized sand dunes are also present (Warren 1970:1).

Geology

The Gallup Sag is a thickened sedimentary section separating the Defiance-Zuni Uplift from the Nutria Monocline (Jenkins and Keller 1986:140). This section is composed primarily of Upper Cretaceous yellow and brown sandstones interbedded with blue and iron-gray shales. The principal rock formations are continuous with the Defiance-Zuni Uplift, and consist of Dakota Sandstone, Mancos Shale, and the Crevasse Canyon, Gallup, and Menefee formations comprising the Mesa Verde Group of undifferentiated sediments (Gadway 1959:81). Some Permian and Precambrian deposits are also exposed to the west (Jenkins and Keller 1986:139), and some deeper cuts expose Moenkopi sediments of Jurassic age (Cooley 1959:68). Upper Cretaceous materials occur as mesas, scarps, and buttes. Quaternary materials occur as unconsolidated sediments in widely varying thicknesses, encompassing colluvial, alluvial, landslide, and eolian deposits (Cooley et al. 1969:17). These Quaternary sediments form the bulk of the sand and silty clay deposits that fill the Gallup Sag (Jenkins and Keller 1986:140).

This area is also located in the southwestern part of the San Juan hydrological basin. Seeps and springs from the San Andres-Glorieta aquifer are common within upper valleys in the area and at the base of mesas (White and Kelley 1986:333). Drainage for the project area is the Defiance Draw to the north, or directly into the Puerco River, a tributary of the Colorado River drainage system. The Puerco River is an intermittent surface stream in most stretches, with some stretches carrying surface water year-round (Warren 1970:3). Defiance Draw is dependent on snowmelt runoff and rain for water flow and soil movement.

Three major periods of alluviation, followed by arroyo cutting, occurred during human prehistory. The first episode of alluviation occurred from 11,000-7,500 B.P., and is evidenced by soils containing the bones of *Bison occidentalis* and Folsom point types, by-products of a very wet climate and forested environment. This was followed by an Altithermal Interval from 6,000-4,500 B.P., a period of erosional weathering, arroyo cutting, channel filling, and soil formation (Cooley 1959). A second period of alluviation occurred from 4,000-2,000 B.P., characterized by floodplain aggradation and channel filling, with up to 100 ft of deposition (Sears 1925). The

third period of alluviation took place from A.D. 1200 to 1800 on the Colorado Plateau. Deposits from and during this period consist of fine-grained sands and dark silty clays deposited by slow moving streams and ponds, with occasional overbank flooding (Warren 1970:2). Arroyos cut by the Puerco River and its tributaries are as much as 10 m (30 ft) deep (Warren 1970:1). The heavy arroyo cutting found in modern floodplains appears to be primarily the result of overgrazing, combined with a shifting weather trend toward heavy summer showers (Hewett 1982:38-39).

Soils within the project area are characteristic of the Rock Land-Torriorthents-Haplargids association. A characteristic feature of this mesic soil association is rough, broken topography formed by narrow valleys and upland summits, mesas and buttes, alluvial fans or valley alluvial deposits, and outcrops of bedrock, usually sandstone or shale. Deep, unclassified alluvial soils occupy level to near level valley areas similar to the immediate site area. This alluvial land includes highly variable and stratified soil materials in the flood plains of arroyos and drainage channels. Thin deposits of gravelly alluvium, possible sources of lithic material, occasionally occur on breaks adjacent to the larger drainages (Maker et al. 1974:79). Deep gullies often dissect these deposits (Maker et al. 1974:80).

Other named soils in association within the general project area include Rock Land, a complex of shallow soils and outcrops of sandstone and other sedimentary rocks. Rock Land is characteristic of steep and very steep mesa side slopes, escarpments and breaks. Torriorthents are shallow, 4 to 20 inches (10.1-50.8 cm) deep, slightly calcareous fine sandy loam overlying sandstone bedrock (Maker et al. 1974:79-80). Haplargids are soils with well-developed subsoils that occur on level to gently sloping higher parts of the landscape (Maker et al. 1974:80).

Climate

The climate in this area of New Mexico is characterized as semi-arid to arid continental with low humidity, infrequent summer-dominated precipitation, moderate to strong winds, and a large diurnal temperature variation (Tuan et al. 1973:26). Winters are cold, summers are warm, and days are sunny. Snowfall is common, averaging 15-40 inches (381-1,016 mm) a year (Maker et al. 1974:79).

The project area is within the area of lowland mesas and valleys forming the floodplain of the Puerco River. Mean annual precipitation recorded at Manuelito to the west of the project area is 15.7 inches (398.7 mm) (Gabin and Lesperance 1977:212). Average annual rainfall in the area varies from 12.61 inches (320 mm) at the McKinley Mine to 9.7 inches (246.3 mm) in the Gamerco area. The rainfall discrepancy for the two areas is in part due to the greater area of uplands and higher elevations on the McKinley Mine lease, leading to greater rainfall (Knight 1982:49-51; Tuan et al. 1973:26). Both the McKinley Mine and the project area are located within the summer rainshadow of the Mogollon complex of mountains and mesas (Tuan et al. 1973:31). This serves to temper summer precipitation, although 40 percent of annual precipitation does occur in the months of May, June, July, and August. November is the driest month (Tuan et al. 1973:26).

Prehistorically, a trend in increased precipitation took place in the A.D. 1000s, peaking by A.D. 1100. Caused by a 65-mile shift north of northern winds, this allowed greater access to the area by moisture-bearing southern air masses. This situation was reversed between A.D. 1100 and 1200, with the southern winds pushed out of the area by northern winds moving south. Rainfall decreased to an intermittent level with frequent drought (Knight 1982:51).

Yearly temperatures for the area average 51 degrees Fahrenheit, with an average day to night difference of 32 degrees Fahrenheit. The local growing season averages 140 days, with a range of 90 to 150 days depending on elevation. The last frost-free day usually occurs during the second week of May, with the first killing frost occurring during the third or fourth week in October (Knight 1982:51; Tuan et al. 1973:38). Mean annual temperature recorded at Manuelito is 49.1 degrees Fahrenheit, with yearly extremes occurring in July and December (Gabin and Lesperance 1977:212).

Flora and Fauna

The project area is located within the greasewood-saltbush zone (Castetter 1956), with the floral composition determined by precipitation and soil type and quality (Knight 1982). The greasewood-saltbush community occurs in the lowland areas, including floodplains and alkaline flats. The dominant plant species are greasewood, saltbush, sand dropseed, and bluestem. Grassland communities, located in areas of deeper soils, include Indian ricegrass, three-awn, and galleta.

Other restricted flora zones, though not located within the project area, occur within the general area and contribute to the vegetational diversity extensively exploited by local prehistoric populations. The piñon-juniper community is located in the upland, canyon, and mesa top areas. Higher, nearby mesas contain ponderosa pine primarily on their north and east faces (Maker et al. 1974:79). Riverine plant communities exist within the banks of the Puerco River.

Faunal populations vary according to their habitats. These habitats for the most part correspond to the plant communities. The number of plant communities in proximity to the project area suggests a range of faunal occurrence greater than that characteristic for any single specific vegetation zone. Faunal species characteristic for the project area include jackrabbit, cottontail rabbit, prairie dog, assorted small rodents including squirrels, mice, rats, and gophers. Larger faunal species include antelope, badger, and coyote. Deer and bobcat are also characteristic, but less common, species for the area.

CULTURAL RESOURCES OVERVIEW

A detailed reconstruction of the cultural history of west-central New Mexico is beyond the scope of this report. Regional summaries are available (Gumerman and Olson 1968; Weaver 1978; Nelson and Cordell 1982; Scheick 1983; Kauffman 1985).

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 been expanded to include virtually all of North America. Though originally believed dependent on big-game hunting, the importance of plant gathering and small animal hunting to Paleoindian subsistence is now recognized (McGregor:1965:120; Willey 1966:38; Jennings 1968:78-79; Wilmsen 1974:115; Cordell 1979:19-21, 1982; Stuart and Gauthier 1981:31-33).

Paleoindian sites have rarely been documented in the Gallup area, but these are probably present buried under alluvial deposits (Cordell 1982). Distinctively shaped Paleoindian projectile points have been found.

Archaic Period

The Archaic period in the northern Southwest (5500 B.C.-400 A.D.) is generally referred to as the Oshara tradition (Irwin-Williams 1973). This period is characterized by distinctive projectile points and lithic artifact scatters, which include grinding implements, fire-cracked rock, and a lack of ceramics. Archaic subsistence-adaptations are based on a highly mobile broad-based economy characterized by a combination of seasonally scheduled hunting and gathering activities (Post 1987:7).

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 the En Medio (800 B.C.-A.D. 400) (Irwin-Williams 1973). The first three phases are nonagricultural with a hypothesized increasing dependence on gathered plants, as evidenced by the presence of grinding implements. The cultivation of maize appears during the Armijo phase. Subsistence however, continues to be based on a hunting and gathering economy. Relatively few Archaic sites are known to exist in the peripheral areas of the San Juan Basin, including the project area. This may reflect a prehistoric lack of vegetational diversity required by the Archaic economy (Cordell 1982). Cultural manifestations known as Basketmaker II further north, are usually described for western New Mexico (including the site area) and eastern Arizona, as late Archaic with corn (Wilson and Blinman 1991).

A second Archaic tradition, the Cochise Culture, developed in southwestern New Mexico and southeastern Arizona. The material culture of both the Oshara tradition and the Cochise Culture are similar, differing primarily in projectile point type sequences (Beckett 1973). The Cochise cultural area may have extended as far north as the southwestern portion of the San Juan Basin and the valley of the Puerco River. The project area is within this proposed area of overlap, although no Cochise sites are documented for the area (Beckett 1973:125).

Anasazi Pueblo Period

The Anasazi Pueblo period extends in the San Juan Basin from A.D. 500 to 1300. Traditional temporal divisions of Anasazi culture based on ceramics, are Transitional Basketmaker (pre A.D. 500), Basketmaker III (A.D. 500-700), Pueblo I (A.D. 700-900), Pueblo II (A.D. 900-1100), Pueblo III (A.D. 1100-1300).

Transitional Basketmaker

Transitional Basketmaker is also known as Basketmaker II in the northern portion of the Anasazi cultural area. Characteristics of the Transitional Basketmaker period include the development of ceramics, and the differentiation of those ceramics into what we know as Anasazi and Mogollon (Wilson and Blinman 1991).

Basketmaker III

Basketmaker III marks the beginnings of sedentism, and an increased dependence on cultigens. Small homesteads of pit structures with associated small surface rooms, are the norm, occasionally occurring as loose clusters of homesteads. Pottery consists of Lino Gray utilitarian ware, mineral-painted La Plata Black-on-white, and carbon-painted Lino Black-on-white (Post 1987:9).

The relative homogeneous nature of Basketmaker III architectural and pottery styles has been interpreted as indicative of population mobility and an open communication network (Acklin 1982). A single group identity transcending localized populations is an alternative and more widely held explanation.

Pueblo I

Pueblo I is generally given dates of A.D. 700 to 900 (Pecos Classification). In eastern Arizona and west-central New Mexico, however, Pueblo I is subdivided into White Mound phase (A.D. 750-850), and Kiatuthlanna phase (A.D. 850-930) (Gumerman and Olson 1968:18; Weaver 1978:37), based on excavations in Arizona (Roberts 1931) and New Mexico (Gladwin 1945).

The White Mound phase is characterized architecturally by pit structures of circular, rectangular, or subrectangular shape, containing alcoves or ventilators, with associated surface

rooms of masonry or jacal (Gumerman and Olson 1968:118; Bradford and Scheick 1978). Characteristic pottery is Lino Gray and neckbanded utility wares. White Mound Black-on-white, the local La Plata Black-on-white variant, is also present within this region.

The Kiatuthlanna phase is characterized by deep, circular pit structures utilizing a four-post support system for the roof. Surface rooms are contiguous and of adobe or masonry construction. Some rooms contain interior storage pits (Gladwin 1945:45; Gumerman and Olsen 1968:119; Weaver 1978:37).

Site locations are primarily in upland settings, including hill slopes, talus slopes, and low mesas, away from floodplains and river bottoms (Weaver 1978:37). This locational pattern was observed for the McKinley Mine South Lease (Kauffman 1985:74), and appears to persist, irrespective of general elevation (Post 1987:10).

Characteristic painted ceramics for this phase are Kiatuthlanna Black-on-white and Kana'a Black-on-white (Vivian 1965; Beal 1985). Kiatuthlanna appears to be the local and early variant of Red Mesa design style. Kana'a Black-on-white, common north of the Rio Puerco, suggests possible Kayenta influence in the area at this time (Gumerman and Olson 1968:119).

Pueblo II

The Pueblo II period has generally been dated A.D. 900-1100. In the southwestern San Juan Basin and eastern Arizona, the Pueblo II period is divided temporally into the Red Mesa and Wingate phases (Gladwin 1945; Gumerman and Olson 1968; and Weaver 1978). Sites become more common, reflecting both an increased population as well as a diversity in site types and site locations (Kauffman 1985:26, 422; Post 1987:11), although Scheick (1983:630-631) and Kauffman (1985:26) both believe that population movements, related to wild plant utilization, contributed to greater site density.

The Red Mesa phase dates A.D. 900-975 (Gumerman and Olson 1968:120; Weaver 1978:37). Red Mesa sites are characterized by small linear contiguous surface rooms, deep four-post supported pit structures with masonry entryways, and kivas with masonry faced-interior walls.

Characteristic utilitarian ceramics are Neck-Indented Corrugated, Exuberant Corrugated, and later Overall Indented Corrugated. The principal white ware is Red Mesa Black-on-white, with small amounts of Puerco Black-on-white late in the phase (Post 1987:10).

The Wingate phase of Pueblo II dates A.D. 975-1050 (Gumerman and Olson 1968:120; Weaver 1978:37). Lange (1982:93), however, extends the Wingate phase into the 1100s based on the production period of White Mountain Redwares. Production of Wingate Black-on-red is placed after A.D. 1030 by Breternitz (1966:89, 102). The Wingate phase is marked by the appearance of L- and U-shaped masonry surface pueblos, consisting of up to 10 rooms. These pueblos have one or more associated masonry-faced kivas.

Utilitarian ceramics show little change between Pueblo II phases (Sullivan 1984). Characteristic painted ceramics for the Wingate phase are Puerco Black-on-white, Gallup Black-

on-white. Low frequencies of Red Mesa Black-on-white are also present. Both Puerco and Wingate Black-on-red appear during this period (Post 1987:11).

Interaction can be assumed to have occurred between the local population and elements of the Chaco Phenomenon during the Pueblo II period. This period saw the florescence of the Chaco system during the Chacoan "Classic Bonito" phase (A.D. 1020-1120), through the proliferation of Chacoan outlier sites along the peripheral portions of the San Juan Basin. Chaco outlier sites ring the project area to the northeast and to the southwest (Cordell 1982:128). The substance of this local Chacoan interaction and the form it would have taken is open to conjecture. Whether this was directed toward the redistribution of goods (Vivian 1990), or population (Acklin 1982:595), or served as a religious (Toll 1985), or political system (Sebastian 1988), is still open to debate.

Pueblo III

The Pueblo III period is generally said to extend from A.D. 1100 to 1300. In eastern Arizona and west-central New Mexico it is divided into the Houck phase (A.D. 1050-1250) and the Kintiel phase (A.D. 1250-1325) (Gumerman and Olson 1968:122-124; Weaver 1978:38-39).

The Houck phase (A.D. 1050-1250) is characterized by masonry structures of 20-25 rooms and keyhole kivas. Associated pottery includes Puerco Black-on-white, White Mountain Redware, black-on-red and polychrome types, and both plain and indented corrugated gray wares (Post 1987:12). White Mountain Redware polychromes are particularly diagnostic at this time along the Puerco River (Gumerman and Olson 1968:122).

The Kintiel phase (A.D. 1250-1325) is characterized by population aggregation into fewer, but larger sites. These exhibit interior kivas, great kivas, large plazas, and tend to have satellite communities. In the general project area, these large sites are concentrated in Manuelito Canyon. The primary ceramic types are Klagetoh Black-on-white, and Klagetoh Polychrome (Gumerman and Olson 1968:124; Weaver 1978:39; Post 1987:12).

Previous archaeological work conducted in the general project area shows a differentiation in ceramic affiliation taking place during the Pueblo III period (Acklen 1982; Lang 1983). Lang (1983) believed the Gamerco area to be tied ceramically into the southern San Juan or Chaco sphere. He found that northern ceramics, primarily McElmo Black-on-white, had replaced Gallup and Puerco Black-on-white by the early 1200s (Lang 1983:391). The McKinley Mine North Lease area indicates a similar pattern (Nelson and Cordell 1982; Scheick 1983).

In contrast, the McKinley Mine South Lease shows a continuation of local ceramic production that Acklin (1982:596) believed was tied into the Manuelito Canyon and Zuni uplands to the south and west. The project area north of Defiance would be included in this area of southern influence. Cibola ceramic traditions continued in Manuelito Canyon until the early 1200s (Weaver 1978:38).

Most of the region surrounding the study area was abandoned between A.D. 1200 and 1300, with Manuelito Canyon occupied as late as A.D. 1325 (Weaver 1978:38). Causes of abandonment are subject to speculation. Long-term drought may have destroyed the subsistence

base (Scheick 1983). Nelson and Cordell (1982:983) suggest that shifts in social behavior created by shifts in centers of social organization occurred (Chaco to Manuelito Canyon), which were followed by shifts in population. Political collapse may have caused, or enabled, populations already affected by drought to abandon the area, as part of the general trend of abandonment observed occurring across the whole of the San Juan Basin at this time.

Protohistoric and Historic Navajo

The protohistoric Athabascans of the Southwest (Apaches and Navajos) appear to have originated in the northern plains. They remained a homogeneous group sharing a relatively uniform common language prior to separation (Young 1983:394). Though language differentiation has taken place, even today the language differences between the Navajo and different Apache groups remains near the dialect level (Young 1983).

The arrival of the Athabascans (including Navajos) into the Southwest is still subject to debate. Kluckhohn and Leighton (1962:32) believe the Navajo arrived in New Mexico by A.D. 1000. Opler (1983) prefers a date of no later than A.D. 1400. Gunnerson (1956) believes the Navajo reached the Southwest by 1500, and were in contact with the Pueblos by 1525. Navajo Athabascan occupation of northwestern New Mexico is first documented by the Spanish between 1540 and 1626 (Scheick 1983).

All Athabascans were considered Apaches by the Spanish, who referred to the Navajo as the "Apachea de Navajo" as late as 1733 (Hester 1962:78, table 13). Navajo subsistence was based on hunting and gathering, supplemented with limited agriculture (Brugge 1983:491). Navajo contact with both the Pueblos and the Spanish involved trade, as well as Navajo raiding of Pueblo and Spanish settlements (Hester 1962).

Improved relations between the Navajo and the Pueblos, including Navajo participation (Brugge 1983:491), contributed to the success of the Pueblo Revolt of 1680. Pueblo refugees fleeing the returning Spanish in 1692 were aided and harbored by the Navajos, particularly in the Gobernador and Largo Canyon regions, and remote portions of the upper San Juan (Hester 1962:22).

Navajo movement out of the Gobernador-Largo Canyon areas to Chacra Mesa and the San Juan Basin took place between A.D. 1700 and 1760. Increased pressure from the north by raiding Utes was a major factor in this population shift to the southwest. Cultural modification of the Navajos occurred as Puebloan and Spanish cultural traits were adopted (Hester 1962:95-96; Brugge 1983:493). Sheep and goat raising is recorded among Navajos by 1706 (Hill 1940:396). By A.D. 1776-1780, Navajos were reported in the Gallup area (Hester 1962:79, fig. 24).

The A.D. 1700s saw improved relations between Navajos and the Spanish, as they united to fight the increasingly aggressive Utes. In time, however, pressures created by increased settlement ultimately lead to increased hostility and conflict. Slaving expeditions against Navajos by the Spanish lead to Navajo attacks on Spanish settlements. Sporadic warfare beginning in 1800 continued between the Navajo, and in succession the Spanish, Mexican, and American governments until 1864. Defeat of the Navajos resulted in the physical removal of the Navajo

in the "long walk," to Ft. Sumner in eastern New Mexico. The Navajos were allowed to return to northeastern Arizona and northwestern New Mexico (including the Gallup area) in 1868 (Roessel 1983:510).

Final Navajo displacement in the Gallup area occurred in 1880, when Navajo occupied land was awarded to the Atlantic-Pacific Railroad (McNitt:1962).

Euroamerican Occupation

The Euroamerican occupation of the Gallup area was minor prior to the arrival of the railroad in 1880. The area served as a buffer between the Navajo and Zuni Indian Reservations (Tieljen 1969). Settlement prior to 1880 in the area was limited to military personnel stationed at Ft. Defiance and Ft. Wingate, Indian agents assigned to the local reservations, and assorted missionaries, traders, ranchers, and military suppliers associated with either the reservations or military posts (Scheick 1983).

Land grants were made to the Atlantic-Pacific Railroad in 1880, and railroad construction began the same year. A construction camp and pay office were established by the railroad company. This camp took on the name of the paymaster, becoming known as Gallup. The town of Gallup was incorporated in 1891. The growth of the railroad and its dependent industries enabled the town to grow and prosper (McNitt 1962:233).

The first mining of coal in the Gallup area was begun by Thomas Dye in 1881. The first shipment of coal out of the Gallup area was made the same year by Peynan, McMillan, and Company (Scheick 1983:45). The market provided by the railroad in Gallup enabled the mining industry to survive the boom and bust cycles common to the coal industry elsewhere (Scheick 1983).

Tourism became part of the local economy after the opening of Route 66 in 1926. Gallup was affected by the depression era of the 1930s, though tourism and the presence of the railroad and its associated coal mines tempered the depression's effects on the local population. This period saw the consolidation of the coal mining industry. The decrease in companies was balanced by increased growth fostered by the market diversification (Scheick 1983).

TESTING PROGRAM

A testing program was designed for three sites near the town of Defiance, New Mexico. Two different testing methodologies were applied as mandated by the primary agencies for the two land ownerships. LA 86372 and LA 86373 are located on State Trust Land, and the testing procedures were developed in consultation with the New Mexico State Historic Preservation Division. The site of LA 86374 is located on Navajo Nation Tribal Fee Land, and testing procedures conformed to the requirements of the Navajo Nation Historic Preservation Department.

Description of LA 86372

LA 86372 was found during an archaeological survey for the realignment of McKinley County Road 1. Its exact location is illustrated and described in Appendix 4. The site was described as consisting of a diffuse ceramic scatter measuring 60 m by 30 m (as recorded by Norm Nelson, New Mexico State Highway and Transportation Department, 1991). Identification of the ceramics assigned the site an Anasazi Pueblo I cultural affiliation.

Description of LA 86373

LA 86373 was found during an archaeological survey for the realignment of McKinley County Road 1. Its exact location is described and illustrated in Appendix 4. During survey, the site was defined as a ceramic artifact scatter dating to the Anasazi Pueblo I period, based on the ceramics present. Preliminary inspection suggested it measured 61 by 61 m and had a surface site density in the 100s. At testing, the site was found to measure 494 by 50 m, encompassing three artifact concentrations.

Field Methods

The first step in testing these two sites was to establish a main datum on each site, to which all horizontal and vertical measurements could be tied. A baseline was also established for each site. The surface of both LA 86372 and LA 86373 was inspected to define its horizontal limits. Surface artifacts were pinflagged to locate artifact clusters and to assist in recording and mapping. A plan of each site was produced using a transit, a stadia rod, and a 30-m tape, and the location of all surface artifacts, test trenches, and cultural features were plotted.

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

Horizontal test units were 1-by-1-m squares. Eleven test units were hand excavated within the right-of-way and either within or adjacent to areas of heavy artifact concentrations on the two sites. Five 1-by-1-m test units were hand excavated on LA 86372, and a total of six 1-by-1-m test units were hand excavated on LA 86373. These test units were assigned sequential numbers and were provenienced and mapped from the main site datum. All excavation was completed using hand tools. Test units were excavated in arbitrary 10-cm levels. Soil removed from test trenches was screened through ¼-inch mesh hardware cloth. Artifacts recovered by screening were bagged, assigned a field specimen number, and transported to the laboratory for analysis. Excavation ended when culturally sterile soil deposits were reached. A form describing the matrix encountered (and listing the field specimen numbers) was completed for each excavation unit. No pollen, flotation, or C-14 samples were collected.

Auger tests were placed in the bottoms of each test trench, or in one of adjacent pairs of trenches. A series of 15 auger tests were placed on LA 86372 in the area of Test Trench 3.

Profiles were drawn for each test trench, and both test trench and general site photographs were taken. Test trenches were backfilled when excavation was completed. Cultural materials recovered during these investigations will be curated at the Laboratory of Anthropology, Museum of New Mexico. Field and analysis records will be on file at the Archaeological Records Management System of the Historic Preservation Division.

LA 86372 Testing Results

During testing, LA 86372 was found to be larger than originally defined, measuring 60 m north-south, by 40 m east-west within the right-of-way (Fig. 2). A total of 53 surface artifacts were recorded, 52 ceramics and 1 piece of ground stone. An additional 91 artifacts were recovered from test units. Five 1-by-1-m test units were excavated and are described below. A pit feature, the interior of which had been burned, was found within Test Unit 3.

Test Unit Descriptions

Test Unit 1. Test Unit 1 consists of a 1-by-1-m square placed in an area of high surface artifact concentration. Sparse vegetation, primarily bunchgrass, covered 20 percent of the surface of this unit. No surface rock was present. Ten sherds were collected from the surface of this unit.

Excavation ended 40 cm below the modern ground surface in culturally sterile soil. Three strata were encountered in testing. Stratum 1 was a light brownish gray, fine silty loam. This was 10-cm thick and contained flecks of charcoal and cultural material. A total of 44 artifacts (42 sherds and 2 pieces of chipped stone) were recovered from this stratum. The base of this stratum ends on a possible prehistoric surface. Stratum 2 is a dark, grayish brown alluvial clay. Though some charcoal and artifacts (9 sherds) occurred within the upper portion of this stratum, the majority of this material is culturally sterile. This material graded into Stratum 3, a culturally sterile brown sandy clay. An auger hole was dug in the bottom of Test Unit 1 an additional 80 cm. No additional cultural material was found.

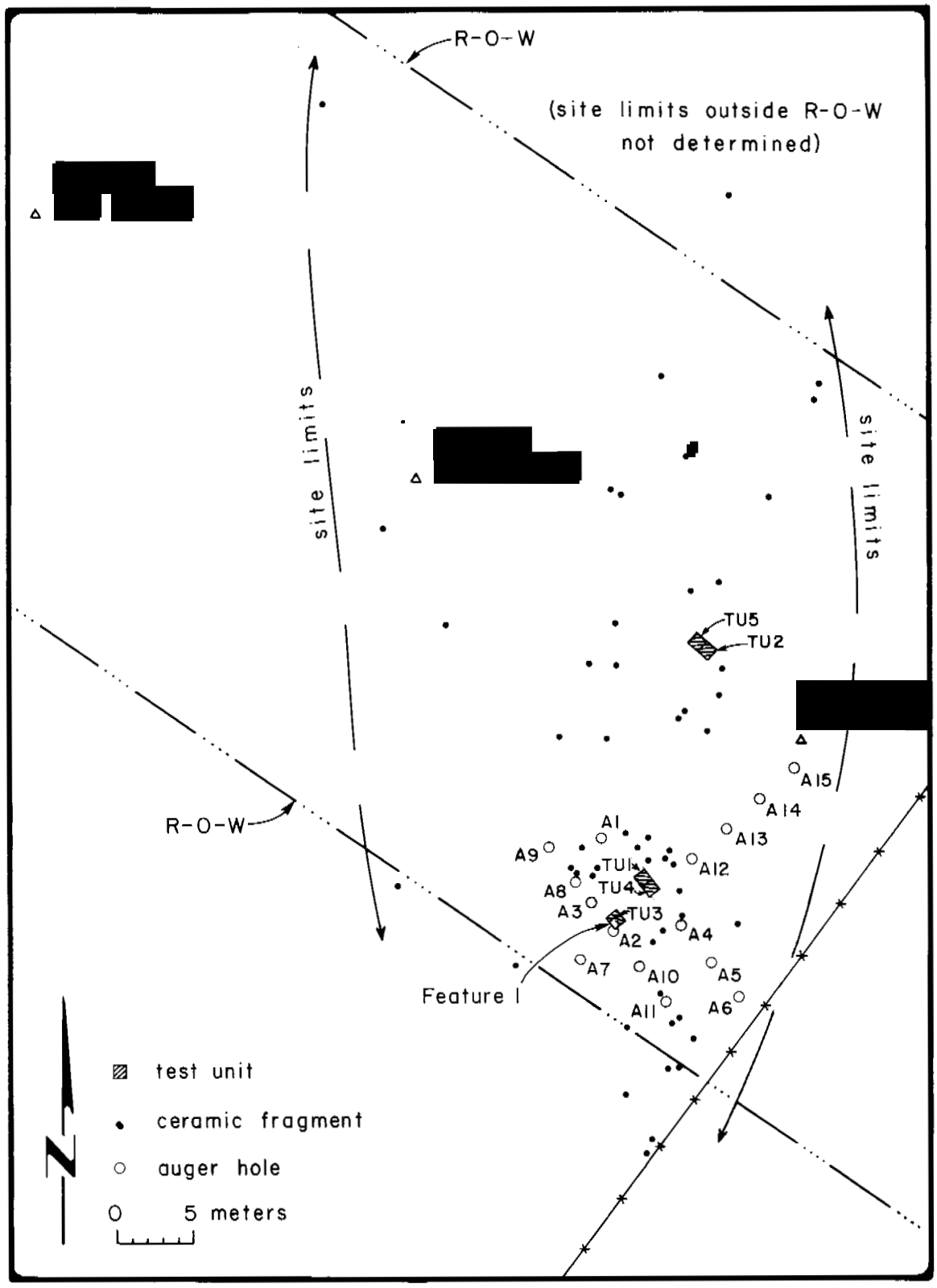

Figure 2. LA 86372, site map.

Test Unit 2. Test Unit 2 consisted of a 1-by-1-m test unit placed to the north of the main site artifact concentration. Surface vegetation was 90 percent snakeweed and mixed grass coverage. No surface rock was present. Three sherds were recovered from the surface.

Excavation ended 40 cm below the present ground surface. Two strata were found within Test Unit 2. Stratum 1 consisted of a fine silty loam. This contained some charcoal and some artifacts (seven sherds, one lithic artifact). Stratum 2 was a culturally sterile dark brown clay. An auger hole was dug in the bottom of Test Unit 2 to an additional depth of 80 cm.

Test Unit 3. Test Unit 3 was located in the southern portion of the site where cultural material was revealed in an auger test. Surface vegetation at Test Unit 3 consisted of mixed grasses and snakeweed. No surface rock was present. Three sherds were collected from the surface. A feature, the interior of which had been burned prior to being filled, was found within this test unit at a depth of 30 cm below the modern ground surface.

Excavation ended 40 cm below the modern ground surface. Three strata were found. Stratum 1 was a fine, pale brown silty loam containing some cultural material. Stratum 2 consisted of a brown alluvial clay containing some charcoal, burned clay, and artifacts. This material was located above the definable edges of the feature, but it was indistinguishable from the actual feature fill. Nine sherds were recovered from this material. Stratum 3 was a light brownish gray alluvial clay. This material forms the area outside of the defined feature and is culturally sterile.

A series of 15 auger tests were dug in the area of Test Unit 3, both to define and to isolate the location of the feature. Only one of these auger tests, located within the feature, showed any evidence of subsurface cultural material.

Test Unit 4. Test Unit 4 was placed in an area of mixed grasses adjacent to Test Unit 1. This unit was dug in an effort to increase exposure of a possible prehistoric surface. No surface artifacts were present on the surface. Stratum 1 was a light brownish gray containing some charcoal flecks. This stratum ended on a possible prehistoric ground surface. Stratum 2 is a dark brown alluvial clay. Some charcoal is present in the upper portion of this stratum, but it appears to have originated from Stratum 1. The majority of this material is culturally sterile and grades into Stratum 3. Stratum 3 is a culturally sterile brown sandy clay. No artifacts were recovered from Test Unit 4.

Test Unit 5. Test Unit 5 was dug adjacent to Test Unit 2, in an effort to increase the coverage of the area tested north of the main surface artifact concentration. Surface vegetation consisted of 80 percent coverage of mixed grasses and snakeweed. No surface artifacts were collected.

Excavation ended 40 cm below the present ground surface. Two strata were found within this trench. Stratum 1 consists of a fine silty loam, containing some charcoal flecks. Stratum 2 was a culturally sterile dark brown clay. No artifacts were recovered from Test Unit 5.

Auger Tests

A series of 15 auger tests were placed in the area of the site adjacent to Test Units 1, 3, and 4.

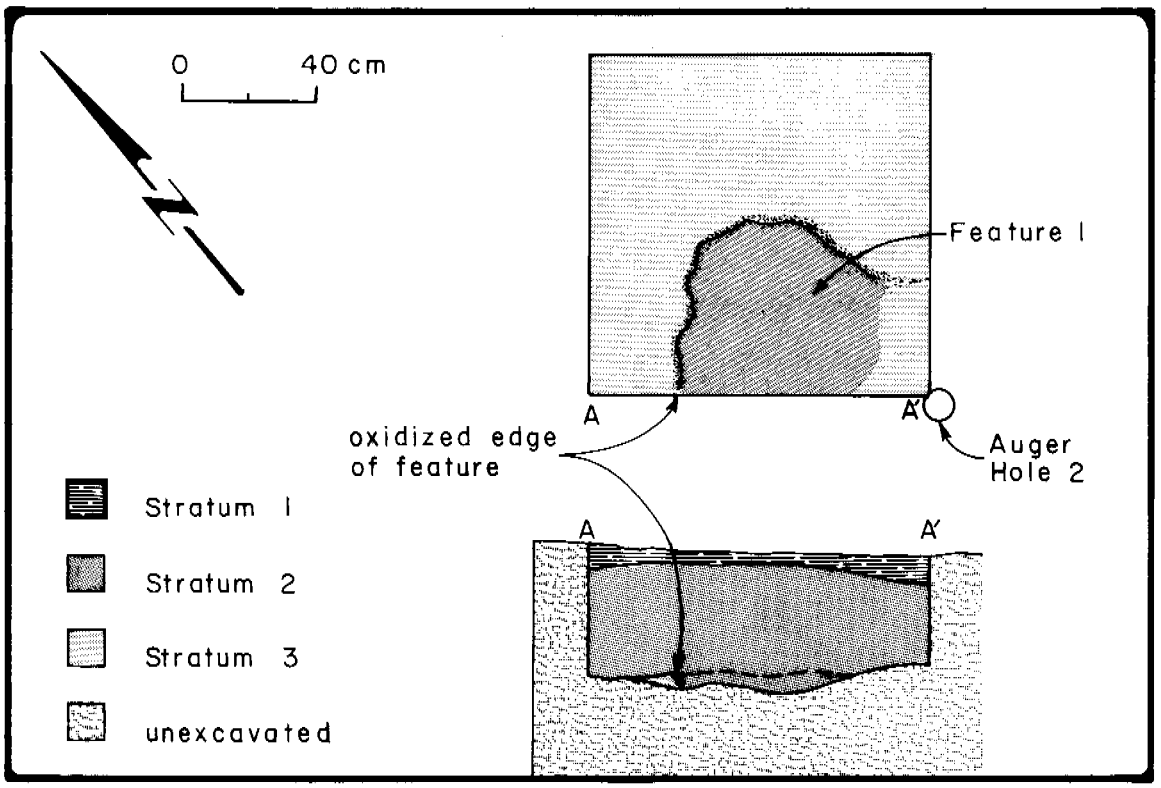

Figure 3. LA 86372, Test Unit 3, plan and profile.

One auger test indicated the presence of cultural material (Fig. 3). Auger Test 2 showed charcoal to be present at a depth of 50 to 60 cm. This auger test prompted the excavation of Test Unit 3. No cultural material was found in any of the other auger tests. These tests did however serve to define the area of cultural material found to occur within Test Units 1, 3, and 4 (Table 1).

Cultural Features

Intact cultural features at LA 86372 are limited to the single pit found within Test Unit 3 (Fig. 3). This consists of a pit dug into culturally sterile alluvial clay. A portion of its walls appears to have collapsed. The probable dimensions of the pit are roughly 60 by 50 cm, although its irregular outline made an exact measurement problematic. Small amounts of burned clay and charcoal are contained within the feature fill, and the pit appears to have been oxidized by burning prior to being filled. The oxidation layer is 0.5 cm in width and is present on the intact portion of the feature interior. Though the feature is oxidized, the depth of the oxidized rind is not adequate for archaeomagnetic dating. The oxidation of a burned feature must be a minimum of 1 cm for archaeomagnetic dating to be possible (Dan Wolfman, pers. comm., 1992).

A possible prehistoric ground surface was present within Test Unit 1. The adjacent Test Unit 4 was excavated in an effort to better evaluate this surface. Although a prehistoric surface may have been present, there were no cultural features or artifacts present that were directly associated with it.

LA 86373 Testing Results

During the mapping of surface artifacts, LA 86373 was found to be considerably larger than originally defined. The site was found to measure 494 m southeast-northwest by 50 m southwest-northeast (Fig. 4). Artifact concentrations defined three distinct areas within the site boundary. A total of six 1-by-1-m test units were hand excavated and are described below. Complete site total was 224 surface artifacts. An additional 52 artifacts were recovered from test units.

Area 1 contained the dense concentration of surface ceramic artifacts that originally was considered the total LA 86373 site area. The portion of the site comprising Area 1 is partially deflated with heavier artifact concentrations in eroded areas. A total of 181 artifacts was recorded on the surface of Area 1, occurring as two concentrations within a dispersed scatter. One cultural feature was encountered in Area 1 (Figs. 5 and 6).

Two of the units dug in Area 1 were located in deflated artifact scatters and two were in undeflated areas. Most of the artifacts recovered came from the surface or upper 10 cm of fill. Sterile soil was generally encountered at depths of 15-20 cm. An area within Area 1 was also shovel scraped. One feature was found. Test Unit 3 intersected the extreme edge of a pit that contained several upright slabs (possible lining stones). Area 1 is dated by ceramics to the Basketmaker III period.

The portion of the site containing Areas 2 and 3 are heavily deflated; most surface artifacts appear to have been redeposited by erosional processes. The presence of livestock may have also contributed to site degradation. A total of 7 artifacts were analyzed on the surface of Area 2, and 34 were analyzed on the surface of Area 3.

Test Unit Descriptions: Area 1

Test Unit 1. Test Unit 1 was located in the northern portion of Area 1. This test trench was placed in an area not as deflated as most of Area 1. No vegetation or surface rock was present in this square prior to excavation. Two sherds were collected from the surface.

Excavation ended 40 cm below the modern ground surface. Testing revealed three strata of material. Stratum 1 consisted of a gray, fine alluvial clay. Stratum 2 was a dark grayish brown clay. This graded into Stratum 3, a pale brown sandy clay. No subsurface cultural material was found within this test trench. An auger hole was placed in the bottom of the trench for an additional 70 cm. No cultural material was found.

Test Unit 2. Test Unit 2 was located adjacent to the area of greatest surface artifact concentration. Sparse grasses covered 30 percent of the test unit prior to excavation. No surface rock was present. Sixteen sherds were recovered from the surface.

Excavation ended 30 cm below the modern ground surface when sterile soil was reached. Three strata were recorded for Test Unit 2. Stratum 1 was a brown eolian loam that contained some cultural material, including five sherds. Stratum 2 consisted of a dark brown clay. Some

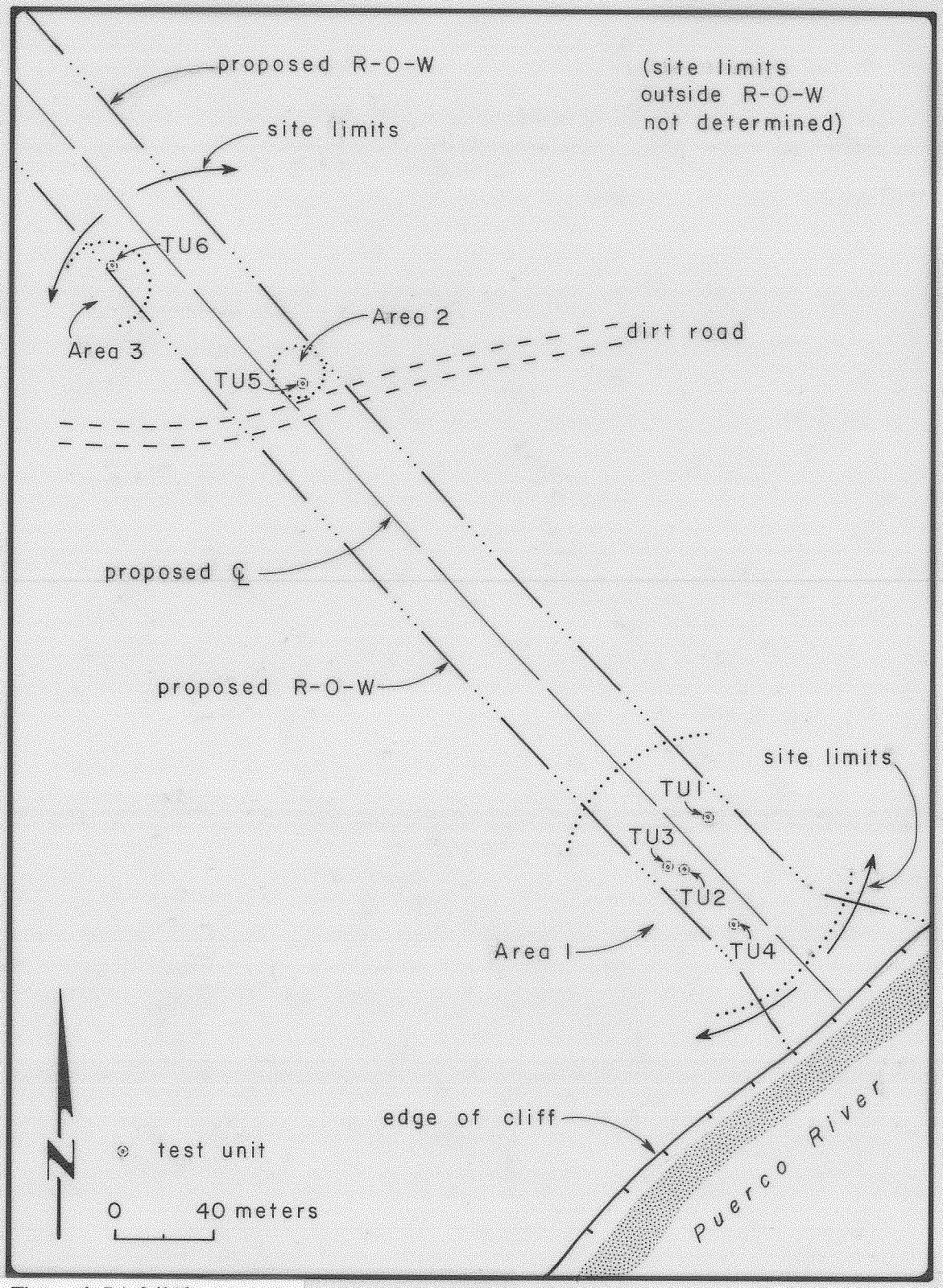

Figure 4. LA 86373, site map.

Figure 5. The Puerco River at LA 86373, Area 1.

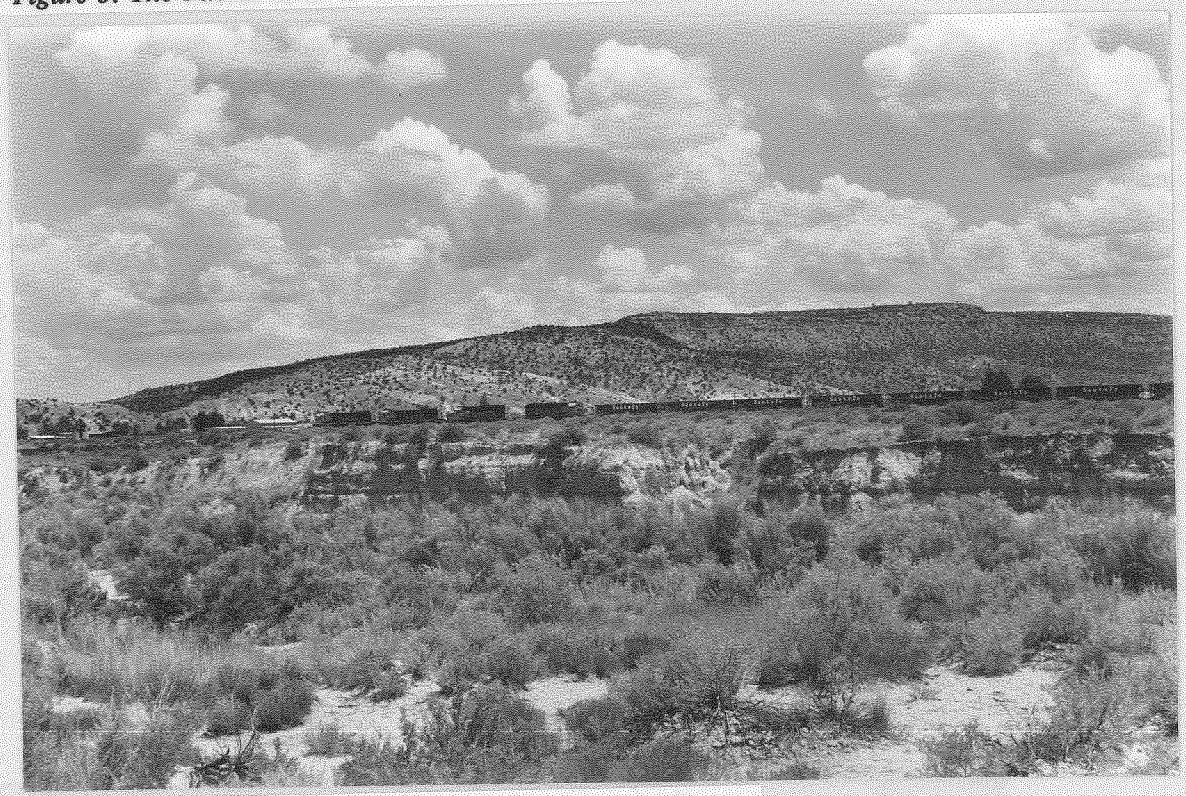

Figure 6. LA 86373, Area 1 in foreground, looking southeast.

cultural material was present within this stratum, but was localized within a prominent rodent burrow. Stratum 3 was a light yellowish brown alluvial clay. No cultural material was found below Stratum 1 that was not redeposited. An auger hole was placed in the bottom of the trench for an additional 70 cm. No cultural material was found.

Test Unit 3. Test Unit 3 was placed adjacent to what appeared to be an upright slab. Surface vegetation consisted of 90 percent ground coverage of primarily snakeweed, with some mixed grasses. No artifacts were found on the surface.

The slab was found to occur within the fill of a possible pit feature, and may have formed part of a slab lining. The feature was slightly intersected by Test Unit 3, exposing the feature fill (Fig. 7). Three strata occurred outside of the feature, two strata were inside. Stratum 1 occurred across the top of the total unit, both within and outside of the feature. This was a pale brown eolian sand containing four sherds. Stratum 2, located outside of the feature, is a culturally sterile dark brown clay. Stratum 3, also outside the feature, is a fine silty alluvial clay. Stratum 4, consisting of feature fill, is a yellowish brown alluvial deposit. This fill is formed of alternating laminae of fine silt and sand, indicative of the type of fill commonly found within features abandoned in an open state.

Test Unit 4. Test Unit 4 was placed adjacent to a surface artifact concentration, in an area of eroded upland that appeared not to have been deflated. Surface vegetation consists of 30 percent coverage in mixed grasses. No surface rock was present. Two sherds were found on the surface.

Excavation ended at 30 cm below the surface. Testing revealed three strata present, but no cultural material, features, or deposits. Stratum 1 was an alluvial silty sand. Stratum 2 consisted of a yellowish brown sandy clay. Stratum 3 was a light yellowish alluvial silty clay. All strata were culturally sterile. An auger hole was placed in the bottom of the trench for an additional 70 cm. No cultural material was found.

Shovel Scraping

An area of 4 sq m was shovel stripped in an effort to define the pit associated with the slabs in Test Unit 3. The area was stripped to a depth of 10 cm. A total of 12 sherds were collected. Though one additional slab associated with the feature was found in this manner, the rest of the feature could not be defined.

Test Unit Descriptions: Area 2

Area 2 was previously recorded as a small I.O. cluster (Fig. 8). Artifact occurrence was limited to the modern ground surface. Testing found no evidence of subsurface features or deposits. The ceramics present are a combination of La Plata Black-on-white (Basketmaker III), and later White Mountain Redware (Pueblo II-III) with Pueblo II-III corrugated. This combination of temporal material, and lack of intact cultural deposits, suggests the artifacts at Area 2 are redeposited material.

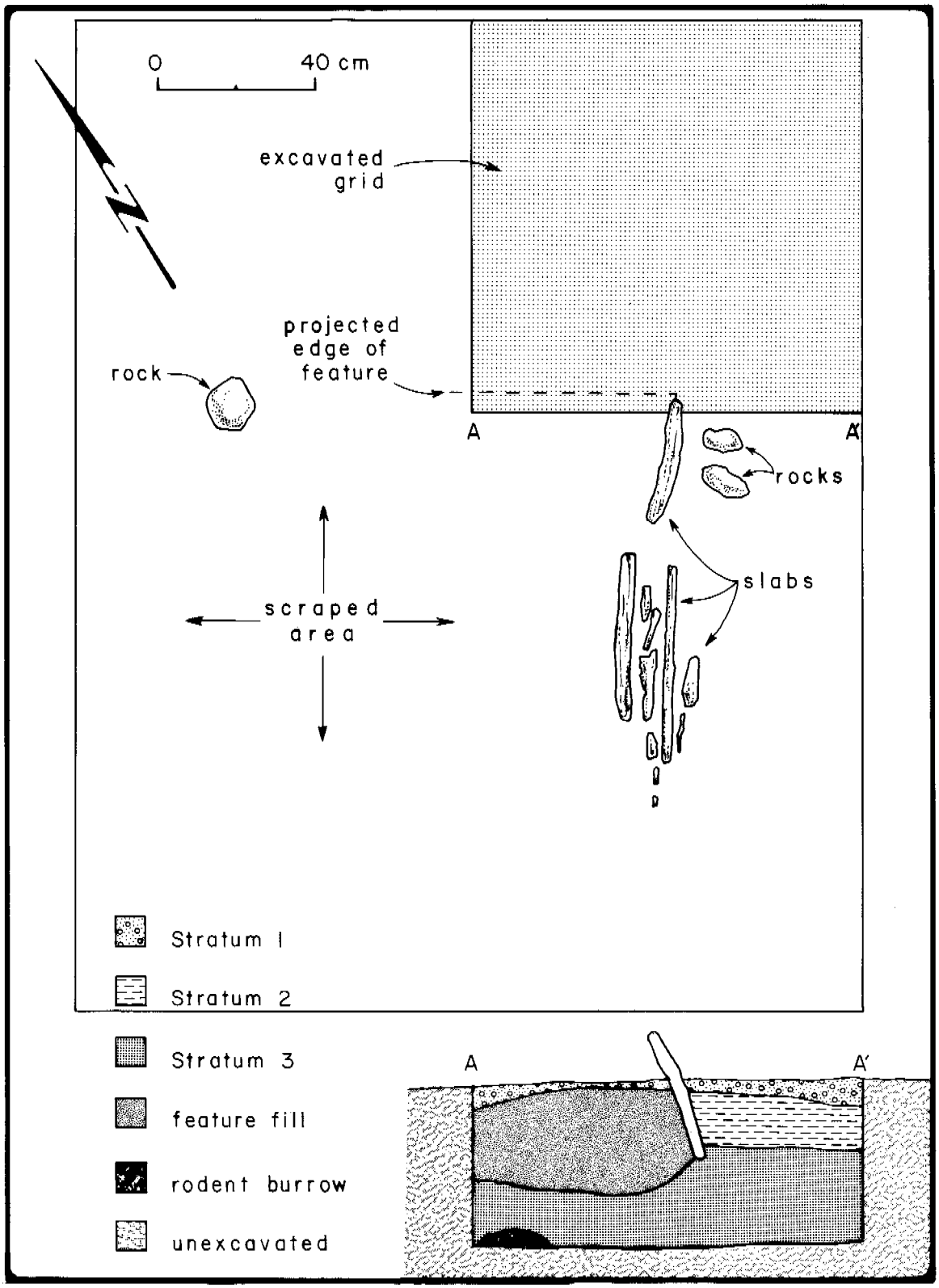

Figure 7. LA 86373, Area 1, Test Unit 3, plan and profile.

Figure 8. LA 86373, Area 2, looking south.

Figure 9. LA 86373, Area 3, looking southwest.

Test Unit 5. Test Unit 5 was located within the small artifact cluster in Area 2. No surface rock was present. Surface vegetation consisted of mixed grasses and snakeweed. Five sherds were collected from the surface of the trench.

Excavation ended at a depth 30 cm below the surface. Two strata were found in testing, with the unit excavation ending at the top of a third. Stratum 1 consisted of a light gray silt. Below this was the light gray clay comprising Stratum 2. Test Unit 3 ended at contact with Stratum 3, a yellowish brown alluvial clay. No artifacts were found below the modern ground surface. No cultural features or deposits were found. The bottom of the trench was augered an additional 80 cm, but no cultural material was found.

Test Unit Descriptions: Area 3

Area 3 consisted of a dense surface artifact concentration. As with Area 2, testing found no evidence of subsurface features or deposits. Artifacts were limited to the modern ground surface. The ceramics in this area are all attributed to Pueblo II-III period.

Test Unit 6. Test Unit 6 was located within the surface artifact cluster in Area 3. Surface vegetation was limited to 50 percent coverage in mixed grasses. Small pieces of burned sandstone were present on the surface, but no artifacts were noted (Fig. 9).

Excavation ended at 30 cm below the surface. Testing revealed two strata to be present within Test Unit 6. These consisted of Stratum 1 a yellowish brown silty sand, and Stratum 2 a brown clay. No cultural features or deposits were recovered from Test Unit 6, and no artifacts were found below the modern ground surface.

Cultural Features

A single cultural feature was found at LA 86373. This was located within Area 1 in the southeastern portion of the site. The feature appears to be a rectangular pit, with possible remnant slab lining. The feature fill consists of alluvial clay and sand lensing to a depth of 26 cm. No cultural material, charcoal, or evidence of burning was visible, and the base of the feature was not compacted into a definite floor.

Description of LA 86374

During survey, LA 86374 was defined as a ceramic and lithic artifact scatter 152 by 183 m, with associated burned cobbles, ground stone, and one intact feature lined with upright sandstone slabs. Surface artifact density was described as being in the 1,000s. The site was identified as dating to the Basketmaker III period based on the ceramics present.

Most of the site area consists of a large surface artifact scatter south of an area of cultural features and deposits. Erosion and heavy grazing along an unimproved road probably accounts for the large size and diffuse nature of the surface artifact distribution. The presence of a hearth, a burned surface structure, and a midden area suggests LA 86374 is a habitation site. The

architectural focus of the site area appears to extend to the north and is located outside of the right-of-way.

Field Methods

A baseline was established with a transit along the southern side of the right-of-way, and a system of 3-by-3-m grids was superimposed over the portion of the site located within the right-of-way and extending east of the originally defined site boundary. Artifacts were then collected from the surface of that portion of the site located within the right-of-way through use of this 3-by-3-m grid system. A main datum was also established to which all horizonal and vertical measurements were tied. A plan of the site was produced using a transit and a stadia rod or 30 m tape, and the locations of all test trenches, backhoe trenches, scraped areas, and cultural features were plotted.

Artifacts were collected when they were recovered in a test trench. Surface artifacts were also collected. High surface artifact densities and surface indications of intact subsurface cultural features within the right-of-way north of the existing road resulted in a postponement of surface collecting in this area of the site until after the investigation for intact subsurface cultural features and deposits.

Test trenches on LA 86374 were 2 by 1 m in size and were provenienced according to the general grid system. Seven 1-by-2 m test trenches were hand excavated within the right-of-way and within areas of heavy surface artifact concentrations. Excavation of the test trenches was completed using hand tools. Test excavations were dug in arbitrary 10-cm or 20-cm levels, depending on artifact occurrence. Soil removed from test trenches was screened through ¼-inch mesh hardware cloth. All artifacts recovered (whether by screening or surface collection) were bagged, assigned a field specimen number, and transported to the laboratory for analysis. A form describing the matrix encountered (and listing excavation depths and field specimen numbers) was completed for each level excavated. Excavation ended when culturally sterile soil was reached.

Profiles were drawn for each test trench. Photographs were taken of each test trench. Test trenches were backfilled when excavation was completed. Cultural materials recovered during these investigations will be curated at the Archaeological Repository, Laboratory of Anthropology, Museum of New Mexico. Field and analysis records will be on file at the Archaeological Records Management System of the Historic Preservation Division.

Backhoe trenches were dug across portions of the site, within the right-of-way, parallel to the right-of-way centerline. A total of four backhoe trenches were dug at LA 86374. All backhoe trenches were 1-m wide and were dug to a depth of 1 m, differing only in length. No artifacts were collected from the backhoe trenches, although both a tree-ring sample and a pollen sample were collected from the one subsurface cultural feature found in this manner. Profiles were drawn for each backhoe trench, and photographs were taken.

A mechanical blade was used to scrape the main area of the site within the right-of-way to a depth of 10 cm. An area within the proposed right-of-way adjacent to the recorded site was

also scraped to a depth of 10 cm. Areas of the site not scraped include the portion with confirmed intact cultural materials, and those portions of the site too small for the mechanical equipment.

Testing Results

During testing, the surface artifact concentration of LA 86374 was found to confirm the site boundary as surveyed; however, subsurface features were limited to that portion of the site located north of existing County Road 1. A total of 374 artifacts were collected from the surface of the site. Seven 2-by-1-m test trenches were excavated and are described below. A total of 565 artifacts was recovered from the test trenches. One subsurface midden deposit and one subsurface feature (a burned structure) was found. A slab-lined hearth was previously recorded on the site during survey. Four test trenches were dug to a depth of 60 cm. One was dug to a depth of 75 cm. Two test trenches that proved to be culturally sterile were excavated to a depth of 40 cm. Auger holes were dug into the bottom of each test trench to confirm culturally sterile soil had been reached (Fig. 10).

Test Trench Descriptions

Test Trench 1. Test Trench 1 was placed at 459N/70E, north of County Road 1 in the northwestern portion of the site. This test trench was placed in a concentration of surface artifacts and burned jacal, adjacent to a previously recorded slab-lined hearth. Surface vegetation for this grid was limited to sparse mixed grasses. Small mixed quartzite and undifferentiated igneous gravels were the only surface rock present. Thirty surface artifacts were collected from this grid, 29 sherds and 1 lithic artifact.

Excavation ended 60 cm below the modern ground surface in culturally sterile soil. Testing encountered three strata of material. Stratum 1 was a dark sandy clay containing both organic and cultural material. Charcoal and burned jacal were present throughout this stratum, which bottomed on what appeared to be a prehistoric ground surface. Twenty-eight artifacts, consisting of 27 sherds and 1 metate fragment, were recovered from this stratum. Stratum 2 was a fine dark brown laminated alluvial clay loam. Six sherds were collected from rodent burrows located within this stratum. Stratum 3 was an fine alluvial silty clay. No artifacts were found within Stratum 2 or 3. An auger hole was placed in the bottom of the test trench for an additional 50 cm. No artifacts were recovered from the auger.

Test Trench 2. Test Trench 2 was placed at 425N/71E in the north-central part of the site. This test trench was located in the area of the heaviest surface artifact concentration. A sparse growth of mixed grasses with some greasewood constituted the vegetation present in this grid. Surface rock was comprised of several pieces of burned sandstone and a small quantity of undifferentiated igneous pebbles. Seventy-seven sherds were collected from the surface of this grid.

Excavation extended 75 cm below the modern ground surface into sterile soil. Testing revealed three strata. Stratum 1 forms the cultural layer, consisting of an intact midden deposit. This is a dark cultural midden deposit comprised of a dark brown to black clayey soil containing

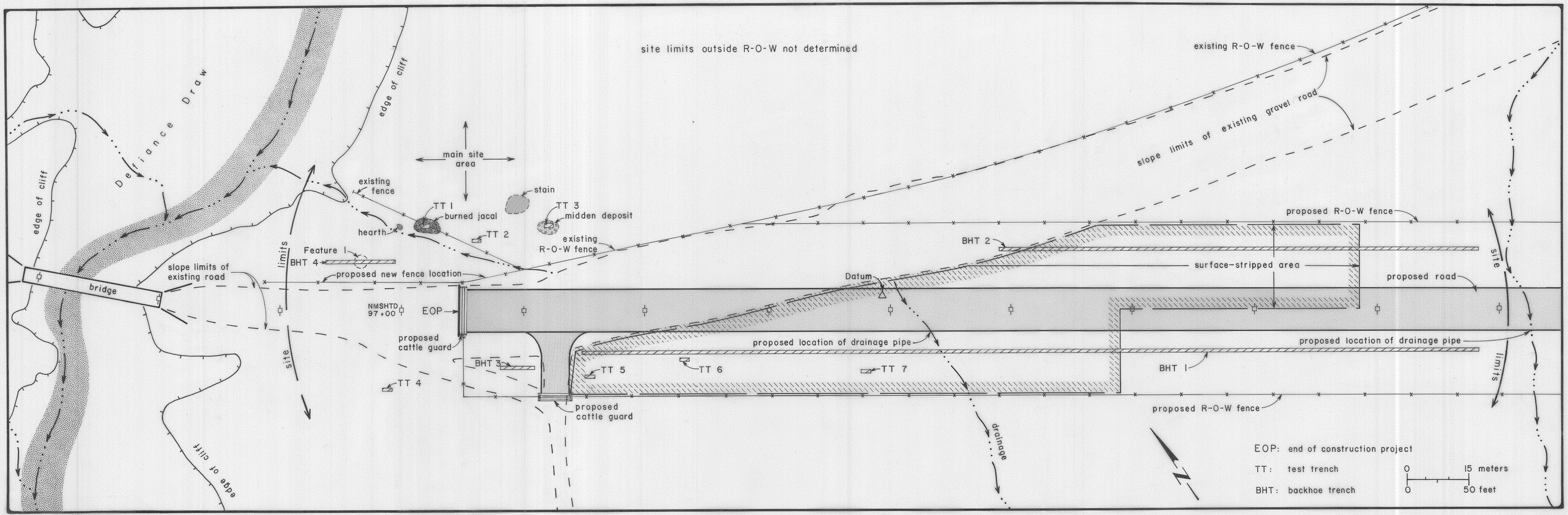

Figure 10. LA 86374, site map.

DEFIANCE

large quantities of organic material, ash, and charcoal. Extending down from the modern ground surface, this stratum is 38-cm thick at its greatest depth. Artifact frequencies are high within this deposit, with 296 artifacts (290 sherds, 1 piece of ground stone, 2 pieces of bone, and 3 lithic artifacts) collected from this stratum. Stratum 2 was a grayish brown, fine-grained, laminated alluvial clay. Stratum 3 was a fine yellow alluvial clay. Twenty-nine sherds were collected from the fill of rodent burrows located within Strata 2 and 3. No artifacts or cultural materials were collected from the lower two strata themselves. A 75-cm deep auger hole was placed in the bottom of the test trench. Stratum 3 was found to continue another 40 cm, then was replaced by a fine gray silt that extended to the bottom of the auger hole. No artifacts were found in the auger.

Test Trench 3. Test Trench 3 was placed at 446N/67E in the northwestern part of the site. Modern vegetation was extremely sparse, with a 20 percent coverage of bunch grass. Surface rock was limited to undifferentiated igneous and quartz pebbles. Seven sherds were collected from the surface of this grid.

Excavation ended 60 cm below the modern ground surface. Testing revealed four strata. Stratum 1 was a fine- to medium-brown sandy clay-loam extending over only two-thirds of the grid area. Cultural material was present within Stratum 1, but in limited quantity, occurring as isolated charcoal flecks, one lithic artifact, and four sherds. Stratum 2 was a dark brown alluvial clay-loam. Stratum 3 was a fine alluvial grayish brown sandy clay. Stratum 4 was a tan alluvial silty clay. One sherd was found in a rodent burrow located within Stratum 2. No other artifacts were collected from Strata 2-4. A 60-cm deep auger hole was placed in the bottom of the test trench. No artifacts or cultural deposits were found.

Test Trench 4. Test Trench 4 was placed at 464N/28E in the southwestern part of the site, south of County Road 1. This test trench was placed in an area of relatively high surface artifact concentration. Surface vegetation within this grid was a heavy growth of mixed grasses and some greasewood. There was no surface rock in this grid. Five sherds were collected from the surface prior to excavation.

Excavation ended 60 cm below the modern ground surface. Testing revealed three strata were present. Stratum 1 was a dark brown clay containing organic material. One piece of ground stone and 24 sherds were collected from this stratum. Stratum 1 grades into Stratum 2, a light-gray fine to medium alluvial sandy clay containing 5 percent coal inclusions. This stratum grades into Stratum 3, a light-brown laminated alluvial clay. No artifacts were collected from either Stratum 2 or Stratum 3, although 10 sherds were collected from the fill of rodent burrows located within these strata. An auger hole was placed in the bottom of the trench to an additional depth of 40 cm reaching a dry gray sand. No artifacts or cultural deposits were found.

Test Trench 5. Test Trench 5 was placed at 419N/31E in the south-central part of the site. Surface vegetation in this grid was a mixture sparse grasses and greasewood. No surface rock was found in this grid. Collected surface artifacts totaled six sherds.

Excavation ended 60 cm below the modern ground surface. Testing revealed two strata. Stratum 1 was a dark brown clay containing organic material. Three sherds were recovered from this stratum, which grades into Stratum 2. Stratum 2 is a light-brown alluvial clay. No artifacts were collected from Stratum 2, although one sherd was recovered from the fill of rodent burrows

located within the stratum. No auger hole was placed in this trench. No cultural features or deposits were found.

Test Trench 6. Test Trench 6 was placed at 395N/35E in the southeastern part of the site. Surface vegetation was composed of a thick growth of mixed grasses and greasewood. No surface rock was found, although three sherds were collected from the surface of this grid.

Excavation ended 40 cm below the modern ground surface, revealing two strata. Stratum 1 was a fine textured dark clay containing organic material. Stratum 2 was a fine alluvial tan sandy clay containing some medium sand lensing and coal inclusions. An auger hole to an additional depth of 40 cm was placed in the bottom of the trench. No artifacts or cultural features or deposits of any kind were found.

Test Trench 7. Test Trench 7 was placed at 350N/32E in the southeastern corner of the site. Surface vegetation in this grid was comprised of sparse mixed grasses. No surface rock was found. Surface artifacts from this grid totaled five sherds.

Excavation ended 40 cm below the present ground surface. Testing revealed three strata that graded into each other without definite breaks. Stratum 1 was a dark brown clay containing organic material. Stratum 2 was a fine, tan, sandy clay. Stratum 3 was a fine, silty alluvial, tan clay. A 40-cm deep auger hole was placed in the bottom of the trench. No artifacts or subsurface cultural features or deposits were found.

Backhoe Trench Descriptions

Backhoe Trench 1. Backhoe Trench 1 began at 192N/32E and extended across the southern part of the site, parallel to and south of the right-of-way centerline, for a length of 224 m. This trench was excavated to a depth of 1 m.

Testing revealed two strata similar to those found within the test trenches. Stratum 1 was a dark brown clay containing organic material. Stratum 2 was a light tan laminated alluvial fine sandy clay. No artifacts or cultural features or deposits were found.

Backhoe Trench 2. Backhoe Trench 2 began at 197N/62E and extended across the eastern part of the site, parallel to and north of the right-of-way centerline, for a length of 120 m. Trench depth was 1 m.

Two strata similar to those found in Backhoe Trench 1 were found. Stratum 1 was a dark brown organic-rich clay. Stratum 2 was a light tan fine sandy clay. No cultural deposits or features were found. No artifacts were collected.

Backhoe Trench 3. Backhoe Trench 3 began at 434N/35E and extended for a length of 9 m. This trench was designed to investigate a small area in the western part of the site surrounded by roads. The trench was dug to a depth of 1 m.

Excavation revealed four strata. Stratum 1 was redeposited overburden resulting from the blading of County Road 1. Stratum 2 was a dark brown clay containing organic material. Stratum 3 was an silty alluvial light brown clay. Stratum 4 was a fine silty light gray clay. No subsurface cultural features or deposits were found. No artifacts were collected.

Backhoe Trench 4. Backhoe Trench 4 began at 461N/62E in the northwestern part of the site. This backhoe trench was excavated to a length of 18 m and a depth of 1 m.

Testing revealed three strata. Stratum 1 was a dark brown clay, similar to that found in every other backhoe trench or test trench. Stratum 2 was a fine light brown sandy clay. Stratum 3 was a light brown fine silty clay.

One feature was found within Backhoe Trench 4, at 470N/62E. This is a layer of oxidized burned clay covered with a thick layer (5-10 cm) of charcoal and ash. The feature appears to be a burned surface structure, perhaps constructed of jacal. The feature is located 10 cm below the modern ground surface. It is visible in both profiles of the backhoe trench, and extends 1.80 m along the length of the trench. The feature was not excavated, and no artifacts were collected. One tree-ring sample and one pollen sample were collected from the exposed portion of the feature.

Blading Description

Surface Scraping. After the excavation of the test trenches and backhoe trenches, a mechanical blade was used to remove surface soils from a large portion of the site within the right-of-way. The portion of the site scraped was located south of County Road 1 and east of the southern side road for a total area of 1,620 sq m. This area was scraped to a depth of 10 cm. An additional area of 4,036 sq m within the right-of-way and adjacent to the site, was also scraped to a 10-cm depth, because of the presence of sparse surface artifacts. No cultural deposits or features were found. No artifacts were collected.

Cultural Features

Intact cultural features found within the proposed right-of-way at LA 86374 are restricted to the portion of the site located within the right-of-way and north of existing County Road 1. These cultural materials consist of two features and a midden deposit. One feature is a slab-lined hearth that was located during survey by the New Mexico State Highway and Transportation Department. The other feature appears to be a small burned structure, located within Backhoe Trench 4. The structure consists of a thick, heavily oxidized layer of clay covered with a thick layer of charcoal and ash (varying in thickness from 5 to 8 cm) and containing at least one upright post. The midden deposit varies in thickness from 10 to 20 cm, and consists of dark charcoal and ash-filled silty soil containing a large number of artifacts, primarily ceramics.

ANALYTIC METHODS

Artifacts were divided and analyzed by material type. Separate analytical methods were used for ceramics, lithic artifacts, and ground stone artifacts.

Ceramics

Attributes were analyzed that would provide a description of the overall ceramic assemblage, would date the assorted occupations, and would determine vessel form and function (Wilson 1992). All sherds were assigned to typological categories based on a combination of attributes (Wilson n.d.). See Appendix 1 for the ceramic analysis variable and value lists.

Ceramic Attributes

Tempering Material. Sherds were assigned to temper categories by examining freshly broken surfaces through a binocular microscope. Characterizations of temper using a binocular microscope are coarse, but broad tempering categories may be identified by ranges in the color, shape, fracture, and reflectivity of tempering particles. These categories signify material sources that were available and used as tempering agents in different geographic areas, and are similar to categories employed in previous studies of Anasazi pottery (Blinman et al. 1984; Hurst 1985; Wilson 1988). Temper categories recognized during the present study include the following.

Indeterminate is used in cases where material type and source of tempering material is unknown. This may include either unusual tempering materials that cannot be identified or material that has been ground so small that it can not be recognized.

Sherd refers to the use of crushed potsherds as tempering material. This temper consists of angular to subangular particles that are relatively small and are usually white, buff, gray, or orange in color. These are easily distinguished from rock tempers by their dull nonreflective appearance. Small reflective lithic particles may be included inside or outside the sherd fragments, and may represent temper present in sherd fragments. In some cases, fairly large particles occur along with crushed sherd and may indicate that both crushed rock and sherd particles were added. If both sherd particles and distinctive rock fragments occur together, the combination of the two temper categories were recorded together.

Quartz Sand refers to rounded or subrounded, well-sorted, moderately sized to large sand grains. These grains are transparent, white, or gray, and are sometimes frosted. Matrix is generally absent. This temper is common in ceramics produced throughout most of the Kayenta and Cibola region, although it may be present in some items produced within a limited area of the Mesa Verde region.

Pigments. The pigment type of decorated wares was recorded. Paint pigment categories were assigned on the basis of surface characteristics. Both organic (carbon) and mineral paint

categories were identified on the basis of combinations of surface characteristics (Shepard 1965).

None indicates there is no evidence of any pigment on that sherd.

Organic Paint refers to the use of vegetal pigments only. The presence of organic paint alone is recognized by the presence of pigment soaked into rather than deposited on the surface. Thus, organic pigments do not obscure surface irregularities, and streaks and polish are visible through the paint. The painted surface is lustrous, depending on the degree of surface polishing. The pigment may be gray, black, bluish, and occasionally orange in color. The edges of the painted designs may be fuzzy and indistinct.

Mineral refers to the use of ground minerals, usually iron oxides, as pigments. These are applied as powdered compounds, usually in a suspension with an organic binder. Mineral pigments are usually dull, and may be black, brown, red, or greenish in color. The pigment rests on the vessel surface, may be thick, and exhibits visible relief when viewed through a binocular microscope. Therefore, mineral pigments obscure and cover surface polish and irregularities. Since mineral pigments are usually applied with an organic binder, some characteristics of organic paint may also be present.

Fugitive Red refers to application of red hematite pigment on the surface of a vessel after it has been fired. The pigment tends to come off easily if the vessel is washed or handled. Often the presence of pigment is only visible within cracks, surface imperfections, or limited areas of a sherd.

Vessel Form. All sherds were applied to vessel form categories based on apparent shape. A problem encountered with sherd-based vessel form classifications is that broken sherds are only subsamples of the parent vessels, and the resolution of vessel form characterization is dependent on sherd size and the portion of the vessel (Blinman 1988). Thus, functional inferences based on sherd collections are often ambiguous and may be misleading. The consistent placement of all sherds into similarly defined vessel form categories maximizes the potential of small collections, but requires form class definitions that may convey variable degrees of resolution. Rim sherds often may be assigned to more specific categories than body sherds. A description of the vessel form categories recognized during the present study follows.

Indeterminate includes sherds for which the basic form cannot be determined due to either extreme wear or ambiguous shape characteristics.

Bowl rim includes sherds identified as bowls by the presence of inward slope from the rim, and in contrast to bowl body identifications includes sherds belonging to all ware classes. Smaller gray ware rim sherds are sometimes difficult to distinguish from seed jar rims.

Bowl body includes white ware bowl body sherds identified by the presence of interior painted or polished surfaces. The bowl category may include some sherds that may belong to dippers and that can only be distinguished from bowls by the presence of distinctive handles or rim wear. Body sherds of gray ware bowls lack interior polish or decoration, and these sherds are likely to be classified as jar body sherds.

Seed jar rim refers to spherical shaped vessels with openings near the top. Rim sherds with outward slope from the rim were classified as seed jars. The rims exhibit constriction but no curvature indicative of a neck. Seed jars often exhibit punched holes near opposite sides of the rim, presumably used for closure or suspension. Smaller seed jar sherds, where constriction is not evident, may sometimes be misclassified as bowls.

Olla rim refers to vessel forms with relatively narrow rim diameters and elongated necks. These forms often have handles low on their sides, presumably aiding in dispensing contents and in carrying. Many of the isolated handles may derive from this vessel form. Some difficulty in distinguishing rim sherds derived from ollas from those belonging to wide mouth jars is likely.

Olla neck refers to nonrim neck sherds that, based on curve and diameter, definitely derive from an olla neck. This category was rarely used, since all but the most obvious neck sherds were placed into the "necked jar body" category.

Cooking/Storage jar rims refer to jar forms with relatively wide rim diameters that could have been utilized for cooking or storage. Rim sherds belonging to this form are distinguished from those belonging to ollas by wider rim diameters and the less extreme neck constriction. For small rim sherds, however, it is often difficult to distinguish ollas from small wide-mouth jars on the basis of rim diameter alone. A certain amount of overlap between these two forms exists, and it is often difficult to determine if sherds with moderate rim diameter and neck constriction should be classified as wide-mouth jars or ollas.

Cooking/Storage jar neck refer to nonrim sherds that definitely derive from cooking/storage jars. Only the most obvious sherds were placed into this category, as the great majority of all jar neck sherds were placed into the "necked jar body" category.

Jar body includes specific body sherds that could not be placed into more specific categories. All gray ware body sherds were classified as jars, but a few could have derived from bowls. White ware body sherds were assigned to this category only if they exhibited evidence of painting or polishing on the exterior surface.

Ceramic Typological Categories

Ceramic Tradition. Ceramic traditions refer to broad regions of geographic origin usually assigned on the basis of temper, although paint, manufacturing technology, and stylistic attributes may influence these assignments. These ceramic traditions generally correspond to long-recognized regions of the Southwest (Kidder 1924; Colton and Hargrave 1937). Because of the wide distribution of stylistic and technological treatments within the Anasazi, it is generally not possible to identify the specific ceramic tradition represented without first identifying temper (Wilson n.d.).

Ware Category. Ceramic items are placed into gray, white, red, or indeterminate ware categories based on surface color and treatment. Most gray wares are unpainted and unpolished vessels fired in a nonoxidizing atmosphere. This category may include sherds lacking paint derived from painted unpolished white ware vessels. Early gray ware vessels associated with Transitional Basketmaker assemblages may be polished. White ware refers to painted or polished

sherds where gray or white surface colors were created by a nonoxidizing firing atmosphere (Wilson n.d.). Red ware sherds are derived from vessels where high-iron clay was strongly oxidized during firing to produce red or orange background colors.

Type Assignment. Each ceramic item was assigned to either a formal or grouped type category based on temporally sensitive styles and manipulations. Those sherds exhibiting the distinctive characteristics as described in published reports of particular regional traditions were assigned to formal types. Formal type assignments include both a geographic and descriptive name. Ceramics that lacked styles or manipulations required for their placement into a particular formal type, but still exhibited characteristics with known temporal significance, were assigned to a grouped type. Grouped types include only a descriptive name (Wilson n.d.). Where temper was not observed (in-field analysis), sherds were assumed to be from the Cibola tradition and were assigned Cibola type names.

Cibola Tradition Types

Cibola tradition types include ceramics made in a wide area covering much of the northwestern part of New Mexico, including a very large area encompassing much the areas south of the San Juan River and north of the Mogollon Rim (Sullivan 1984; Windes 1977). Cibola gray and white ware types are generally distinguished by the presence of sand, sand and sherd, or sherd temper, a light colored paste, and mineral paint.

Gray Wares. Lino Gray refers to sherds known to have been derived from unpolished, completely smoothed vessels. This category is only assigned to rim sherds, as similar body sherds could also have been derived from forms exhibiting banded or corrugated treatments along rim or neck.

Pueblo II/III Corrugated refers to corrugated rim sherds exhibiting intermediate rim eversion (between 30 to 35 degrees), characteristic of vessels commonly produced during the late part of the Pueblo II and early part of the Pueblo III periods.

Plain Gray refers to unpolished gray body sherds that could have originated from Lino Gray vessels as well as the lower portions of neckbanded, neck coiled, or corrugated forms.

Corrugated Gray refers to body sherds exhibiting thin overlapping or indented coils.

Polished Gray refers to polished utility wares that are associated with the earliest Anasazi occupations. These sherds are very similar to early brown wares of the Mogollon region, but the resources used in production clearly originated in the Anasazi region. In contrast to other Anasazi utility (gray) wares, these sherds exhibit a polish on one or more surfaces, but the forms are indicative of utility wares. Surface color varies from a yellow-red, brown, to a gray color, depending on clay characteristics and the consistency of the firing regimen.

White Wares. La Plata Black-on-white exhibits surface characteristics and painted designs indicative of the majority of white wares produced during the Basketmaker III period. Surfaces are usually unpolished, and designs usually consist of isolated forms oriented near the rim. Commonly occurring design motifs include flagged triangles, parallel lines, and motifs derived

from basket-stitch designs.

Whitemound Black-on-white exhibits surface characteristics and painted designs indicative of the majority of the white wares produced during the Pueblo I period. Surfaces are sometimes, but not always, polished. Designs are very similar to those found on La Plata Black-on-white but occur with overall layouts rather than isolated designs.

BM III or P I Black-on-white refers to sherds exhibiting surface treatments and painted design styles indicative of ceramics that could have been produced during either the Basketmaker III or Pueblo I periods.

Pueblo II/III Black-on-white refers to painted ceramics that cannot be placed into a specific type but exhibit manipulation or decoration indicating they were produced sometime during the Pueblo II or Pueblo III period.

Painted White refers to unpolished painted white wares where there is insufficient evidence of design elements to assign the sherd to even broadly defined temporal styles.

Polished White refers to unpainted polished white wares.

Indeterminate White Mountain Redware represents a fairly specialized tradition produced in the southern Anasazi area and widely distributed throughout the Southwest (Carlson 1970). White Mountain Redwares are characterized by a light paste, sherd temper, and a dark red slip. Surfaces are well polished. Painted decorations are executed in sharp black mineral or organic paint; white paint is present on White Mountain Polychrome. This category refers to White Mountain Redware sherds that do not exhibit sufficient design elements to support assignment to a formally defined type.

To maintain compatibility with other Anasazi ceramic analyses, the system of analysis used in this study is based on the system used by the La Plata Highway Project (Wilson n.d.). For all sherds analyzed, data covering provenience, descriptive attributes, and typological classifications were recorded. Attribute lists and classifications are from Wilson (n.d.).

LA 86372

A total of 52 sherds was analyzed from the surface of LA 86372. An additional 88 sherds were recovered and analyzed from test units on this site. These sherds are listed by type and vessel form in Table 1. All sherds, both formal and grouped types, could be derived from Lino Gray and La Plata Black-on-white vessels. Fugitive Red was present on a single plain gray jar body sherd.

Table 1. LA 86372 Ceramic Analysis

Pottery Type	Surface Artifacts		Subsurface Artifacts		Total	
	(N)	(%)	(N)	(%)	(N)	(%)
Lino Gray Seed Jar	1	2			3	0
Plain Gray Jar Body	48	92	81	92	129	92
La Plata B/w Bowl Rim	1	2	4	5	5	4
La Plata B/w Bowl Body	2	4	3	3	5	4
Totals	52	100	88	100	140	100

LA 86373

A total of 224 surface sherds was analyzed at LA 86373. Fifty-two additional sherds from test units were analyzed. Each discrete area of the site is reported separately. The sherds in the collection from Area 1 (Table 2) are similar to those from LA 86372 in that all could have been derived from Lino Gray and La Plata Black-on-white vessels. The few ceramics recovered from Area 2 of LA 86373 document a mixture of vessel types (Table 3), including undifferentiated corrugated gray ware sherds, sherds from one or more La Plata Black-on-white vessels, and sherds from one or more White Mountain Redware vessels. Area 3 collections may also reflect an unusual mixture (Table 4). Gray wares consist of both corrugated and plain surfaced sherds, but the plain gray sherds are not so abundant as to suggest the unequivocal presence of Lino Gray vessels. The white ware sherds represent multiple vessels, but the scant evidence of design style only indicates that the vessels could be of any Pueblo II or Pueblo III white ware type.

LA 86374

Analyzed surface sherds at LA 86374 totaled 373, and an additional 554 sherds were recovered from test trenches (Table 5). The sherds reflect the presence of multiple vessels of Lino Gray, Lino Smudged, and La Plata Black-on-white vessels. The only sherds that could not have come from vessels of these types are the undifferentiated corrugated gray wares and the single sherds of Lino Black-on-gray. Fugitive Red wash was present on 14 sherds, primarily plain gray jar body sherds (13), although one sherd was Lino Gray.

Table 2. LA 86373 Area 1 Ceramics

Pottery Type	Surface Artifacts		Subsurface Artifacts		Totals	
	(N)	(%)	(N)	(%)	(N)	(%)
Lino Gray Jar Rim	1	0			1	0
Lino Gray Seed Jar	1	0			1	0
Plain Gray Jar Body	177	98	51	98	228	98
La Plata B/w Bowl Rim	1	0			1	0
La Plata B/w Bowl Body			1	2	1	0
Totals	180	100	52	100	232	100

Table 3. LA 86373 Area 2 Ceramics

Pottery Type	Surface Artifacts		Totals	
	(N)	(%)	(N)	(%)
Corrugated Jar Body	5	50	5	50
La Plata B/w Bowl Rim	1	10	1	10
La Plata B/w Bowl Body	1	10	1	10
White Mountain Redware Bowl Rim	1	10	1	10
White Mountain Redware Bowl Body	2	20	2	20
Totals	10	100	10	100

Table 4. LA 86373 Area 3 Ceramics

Pottery Type	Surface Artifacts		Totals	
	(N)	(%)	(N)	(%)
Corrugated Gray Jar Body	14	41	14	41
Corrugated Gray Jar Rim	1	3	1	3
Plain Gray Jar Body	10	29	10	29
P II-III B/w Jar Body	4	12	4	12
P II-III B/w Bowl Body	5	15	5	15
Totals	34	100	34	100

Table 5. LA 86374 Ceramics

Pottery Types and Vessel Forms	Surface Artifacts		Subsurface Artifacts		Totals	
	(N)	(%)	(N)	(%)	(N)	(%)
Corrugated Gray Jar Body	5	1			5	1
Lino Gray Bowl Rim	9	2	8	1	17	2
Lino Gray Jar Rim			1	0	1	0
Lino Gray Jar Necked Body			1	0	1	0
Lino Gray Seed Jar	5	1	14	3	19	2
Lino Gray Olla Rim			1	0	1	0
Lino Smudged Jar Body	1	0			1	0
Lino Smudged Bowl Body			3	1	3	0

Pottery Types and Vessel Forms	Surface Artifacts		Subsurface Artifacts		Totals	
	(N)	(%)	(N)	(%)	(N)	(%)
Lino B/G Bowl Body	1	0			1	0
Plain Gray Jar body	322	86	468	84	790	85
Plain Gray Necked Jar Body	1	0	5	1	6	1
La Plata B/W Jar Body			1	0	1	0
La Plata B/w Necked Jar Body			1	0	1	0
La Plata B/w Bowl Rim	11	3	29	5	40	5
La Plata B/w Bowl Body	15	4	22	4	37	3
La Plata B/w Seed Jar	1	0			1	0
White Ware Jar Body	1	0			1	0
White Ware Bowl Rim	1	0			1	0
Totals	373	100	554	100	927	100

Ceramic Dating

The ceramics identified during testing indicate a Basketmaker III or very early Pueblo I occupation at all three sites. Sites from the Basketmaker III period are characterized by distinctive ceramic assemblages dominated by gray ware sherds. Almost all of the gray wares produced during this period exhibit completely smoothed surfaces, resulting in their classification as either Lino Gray (when rim sherds are present) or plain gray body sherds. White ware sherds are present but are generally rare in Basketmaker III assemblages. The distinctive painted designs of this period are assigned to La Plata Black-on-white in the Cibola region, or to Lino Black-on-white or Chapin Black-on-white in adjacent regions. Fugitive red washes are common on Basketmaker III pottery on exterior surfaces of white ware bowls and gray ware ollas (Wilson 1992), and the occurrence of fugitive red in the Defiance collections conforms to this pattern.

Although the Basketmaker III period is assigned dates from as early as A.D. 450, occupations predating the mid-sixth century A.D. tend to include polished gray wares (Obelisk Gray), often in association with polished brown wares (Wilson and Blinman 1991; Wilson et al. 1992). Only after about A.D. 600 are Basketmaker III occupations dominated by the unpolished gray wares that are distinctive of mainstream Anasazi ceramics. The absence of polished gray or brown wares in the testing assemblages places them within the later Basketmaker III period, probably postdating A.D. 600 (Dean Wilson, pers. comm., 1992).

Documenting ceramic change within the immediately post-A.D. 600 period has proved to be largely unsuccessful, due to the lack of consistent stylistic variability in the ceramics. The general scarcity of painted white wares has limited stylistic studies, and the apparent conservative nature of painted styles makes the potential of recognizable short-term motif change limited (Wilson 1992). Attempts at documenting changes in white ware frequencies over time in Basketmaker III assemblages have met with mixed results (Blinman 1988; Hurst 1985; Wilson 1992). The frequency of fugitive red has also been considered a possible indicator of change over time, but results are inconclusive (Erickson 1988; Wilson 1992).

Criteria for distinguishing Basketmaker III occupations from later Pueblo I ceramic assemblages include changes in white ware design styles, the presence of red wares, and the initiation of neckbanding in gray wares (Wilson 1992). The first of these criteria appear at about A.D. 725, but all are not consistently present until late in the eighth century. All of the positive evidence in the Defiance collections point to pre-A.D. 725 occupations, but when taken individually, the collections from all but LA 86374 are too small to rule out an extension of one or more of the occupations into the mid-eighth century.

Corrugated gray ware sherds and late black-on-white pottery indicates the presence of an undifferentiated Pueblo II-III presence at LA 86373, Areas 2 and 3. A minor Pueblo II-III use of LA 86374 is indicated by the trace of corrugated gray ware sherds in the surface collection from that site. Within corrugated ceramics, only the upper necks and rims are temporally diagnostic (Breternitz et al. 1974). The far more abundant body sherds only imply that an occupation occurred after the adoption of corrugation, sometime after A.D. 900. Black-on-white ceramics for the Pueblo II-III periods are characterized by increased design complexity and increased variability in design at any one time. Coupled with this are variations in ceramic attributes such as pigment type, temper type, and an increase in slipping and polishing through time (Breternitz et al. 1974; Windes 1977). White ware sherds also comprise larger percentages of the ceramic assemblages within the later Pueblo II-III period. Even when sherd collections do not include sherds that can be assigned to formal types, these changes can be used to distinguish post-A.D. 900 white wares from earlier occupations. White Mountain Redware production did not begin until after A.D. 900, and even when red ware sherds cannot be assigned to a formal type, their presence implies an undifferentiated Pueblo II-III age.

Although Pueblo II-III occupations can be defined for two sites, none of the individual sherds can be used to narrow the dating range. It is unlikely, however, that the aggregate of unidentifiable black-on-white sherds is derived from an early tenth-century occupation since even small Red Mesa Black-on-white sherds tend to be recognizable. Thus, it is more likely, but not definite, that the traces of Pueblo II-III ceramics at the two sites reflect prehistoric activity post-dating A.D. 1000.

Production and Exchange

No evidence of pottery production was found on any of the tested sites. This includes the absence of kiln features, unfired clay or clay vessels, and tools associated with ceramic production. This lack of production evidence prevents us from characterizing local ceramics within the Cibola ceramic tradition. Therefore, the resolution of exchange data is limited to ceramics produced outside of the Cibola region.

The temper used in the ceramics from these three sites is predominately quartz sand (99.9 percent). This is indicative of the Cibola ceramic tradition; however, interregional trade or contact did take place. One sherd from the Kayenta ceramic tradition (Lino Black-on-gray) was present at LA 86374. Organic paint in combination with sherd temper is indicative of the Kayenta tradition when it occurs during the Basketmaker III period. This one sherd is thus the only evidence of possible long-distance exchange or interaction to occur on these three sites.

Vessel Form

The presence of ceramics in a given archaeological context is usually the result of the use, breakage, and discard of ceramic vessels (Wilson 1992). Attributes relating to vessel shape, size, material resources, surface manipulation, and wear patterns reflect the intended and actual use of ceramic vessels in various economic or social activities (Table 6) (Blinman 1988; Wilson 1992). Therefore, ware and vessel form data can provide some information concerning the range of activities at sites.

For Basketmaker III ceramics as a whole, jar body sherds were the largest category (89 percent), followed by bowls (7 percent), and seed jars (2 percent). The majority (90 percent) of the Basketmaker III gray ware sherds were classified as jar body sherds. The remaining 10 percent was dominated by seed jar rim sherds (9 percent) and traces of olla and jar rims (1

Table 6. Vessel Form and Implied Function

Vessel Form	Implied Function
Jar Body	Various functions depending on form
Bowl	Mixing as a stage in food preparation; serving
Wide Mouth Jar	Boiling of food; short-term storage, including food
Seed Jar	Short or long-term storage; large examples used for cooking in Basketmaker III contexts.
Olla	Storage and transportation of liquids, fine-grain solids

(Source: Wilson 1992)

percent). The variability of white ware vessel forms is extremely low when compared to gray ware forms. Bowls make up 99 percent of the white ware sherds recovered from these sites. No red wares were present in the Basketmaker III components.

The limited range of vessel forms on LA 86373 Area 3 probably reflects the small ceramic sample. Jars make up 85 percent and bowls make up 15 percent of the total assemblage. Pueblo II-III sherds are predominately corrugated (44 percent), followed by plain gray ware (29 percent), and undifferentiated Pueblo II-III black-on-white (27 percent) (see Table 4).

Pueblo II-III vessel form by ceramic type indicates jars make up 100 percent of both the plain gray ware and corrugated sherds. Undifferentiated Pueblo II-III black-on-white sherds are 44 percent jars and 56 percent bowls.

Sherds from these sites indicate a variety of activities took place associated with ceramic vessels, including the preparation of food and the storage of perishables. Exchange or regional interaction was limited during the Basketmaker III period, as indicated by the single Lino Black-on-gray sherd.

Regional exchange or interaction appears to have been nonexistent during the Pueblo II-III period, as indicated by our admittedly limited ceramic assemblage.

Any implied conclusions based on the ceramic data should be approached with caution. The testing of the three sites was limited, and the size of the resulting ceramic assemblages low.

Lithic Artifacts

Discussion of the lithic artifact data is hampered by the small size of the assemblages. Three lithic artifacts were recovered from LA 86372; LA 86373 contained no lithic artifacts; and a total of seven lithic artifacts were recovered from LA 86374. No temporally diagnostic lithic artifacts were recovered from any of the three sites.

Attributes analyzed on lithic artifacts included material, texture, percentage of dorsal cortex, artifact portion, alteration (both cultural and noncultural), wear, and weight. Debitage was divided into flakes and angular debris based on the presence or absence of striking platform, bulbs of percussion, or recognizable ventral surface. Attributes recorded on flakes included platform type (if present) and presence or absence of wear. Artifact and attribute definitions are taken from the *OAS Lithic Analysis Standardization Manual* (1990). See Appendix 2 for a complete lithic analysis variable and value list.

Depending on intended use, the most desirable materials for lithic reduction and tool use are cryptocrystalline, isotropic, and silicious lithic materials with elastic qualities (Crabtree 1972:4-5). Materials possessing these qualities include chert, silicified wood, obsidian, quartzitic sandstone, some basalts, some siltstones, and some quartzites. These fine-grained materials (specifically chert and silicified wood) constitute 90 percent (nine artifacts) of the total lithic assemblage from both sites. A medium-grained material (siltstone), makes up the remaining 10 percent (one artifact).

LA 86372

The lithic artifact assemblage recovered from LA 86372 consists of three artifacts, all of which are core flakes. None of the lithic artifacts shows evidence of wear. Two of the flakes were chert, and one was siltstone. Both of these materials occur locally. The preponderance of nonutilized core flakes suggests lithic reduction occurred at LA 86372, although this small sample need not be representative of the range of lithic artifact production and use. This lack of obvious wear on the flakes suggests either nonuse, limited use, or use of the flake edges only on soft materials.

LA 86374

The site of LA 86374 also yielded a small lithic artifact assemblage. This consisted of seven artifacts, two of which were formal tools. The remaining artifacts are debitage, including two pieces of utilized debitage. Retouch is present only on the formal tools. One tool was a drill made from a core flake. The second tool was a biface that had been used as both a knife and a scraper. Evidence of wear was detected on three edges of the biface. No evidence of wear was present on the drill.

Lithic raw materials at LA 86374 are silicified wood and a single piece of chert. Both of these materials occur locally. Silicified wood commonly occurs in the Cretaceous formations of the Defiance-Zuni Uplift (Gadway 1959). The percentage and range of artifacts made of silicified wood (core flakes to a finished drill), suggests processing of this material took place at LA 86374. The presence of both bipolar flakes and core flakes with both an absence and presence of wear in particular (Table 7) support the conclusion of lithic reduction as one of a number of activities to have occurred on this site. Bipolar flakes are a by-product of early stage lithic reduction. The small number of lithic artifacts makes any conclusions of the amount of lithic reduction to have occurred speculative. The nature of the one chert artifact recovered, a biface utilized as both a knife and a scraper, may be indicative of variability in material procurement.

Table 7. LA 86374, Lithic Analysis

Morphology	Core Flakes	Bipolar Flake	Biface	Totals
Debitage	2	1		3
Utilized Debitage	2			2
Tools	1		1	2
Totals	5	1	1	7

A number of activities are represented by noticeable wear in the lithic artifact assemblage from LA 86374 (no utilization was evident on any of the artifacts from LA 86372). Both cutting and slicing are represented by the unidirectional (slicing) and bidirectional (cutting) wear on utilized flakes. The drill, though not showing evidence of wear, indicates another form of processing that may have taken place at LA 86374. Bifaces are multipurpose tools that could be used in a number of ways, involving a number of activities, from the manufacture and maintenance of other tools made of perishable materials, to direct use in the processing of both plant and animal foodstuffs (Moore 1991:25). Evidence for this multifunctional use is apparent with the biface from LA 86374, which had evidence of two distinctive types of wear. The range of activities suggested by this small lithic artifact assemblage is consistent with expectations for habitation sites like LA 86374, which is known to have at least one structure.

The ratio of lithic artifacts to sherds at the tested sites is unusually low for Anasazi sites in general, but reflects the ratios noted for other Basketmaker III sites in Gallup area (Post 1987). Total artifact numbers from the Basketmaker III assemblages of LA 86372, LA 86373 Area 1, and LA 86374 are 10 lithic artifacts as compared with 1,315 sherds, for a ratio of 1:131. Ratios at contemporary Anasazi sites in other settings tend to be higher, such as a ratio of 1:4 at Pozo Hamlet in the Dolores Valley of southwestern Colorado (Nelson 1986).

Ground Stone Artifacts

Attributes analyzed on ground stone artifacts included material and material texture, which serve to identify rock types; preform morphology, which measures the form of raw material used; production input, which measures the amount of labor invested in tool manufacture; plan view outline, which codes for various regular artifact forms; and ground surface texture, which describes the roughness of grinding surfaces. These give us a picture of raw material choices and production costs for both ground stone artifacts and artifact assemblages (Bullock et al 1990). See Appendix 3 for a complete list of ground stone analysis variables and values. Since manufacturing techniques and materials are similar between grinding equipment and some architectural elements, fragments of architectural materials are included in the discussion of ground stone.

Other aspects of ground stone analysis involve artifact typology and evidence of wear. The variables and attributes used in groundstone analysis and their definitions are taken from the *OAS Draft Standardized Ground Stone Analysis Manual* (Bullock et al. 1990).

Ground stone at LA 86372 is limited to a single fragment of a shaped sandstone slab. This artifact shows no evidence of wear, and was probably a portion of a structural element. Sandstone slabs commonly occur on Basketmaker III sites as lining for hearths and along the base of walls (Gooding 1980).

Three pieces of ground stone were recovered from LA 86374. Two of these were fragments of worked slabs, similar to the piece found at LA 86372. Neither of these showed any evidence of having been utilized as a tool. The third piece of ground stone from LA 86374 consisted of the corner portion of a open ended trough metate. This was constructed of medium-grained sandstone. The interior grinding surface had been roughly pecked (sharpened) with a

hammerstone, indicating repeated use prior to breakage. No ground stone was present on LA 86373.

The ground stone artifacts suggest a number of conclusions regarding site composition and activities. The metate fragment from LA 86374 indicates the processing of maize or wild seeds. Its breakage, possibly during resharpening, is consistent with the longer and more intense occupation indicated by the existence of at least one structure at the site and the abundance of material culture.

Architectural slabs generally occur within features or structures. Sandstone slabs were found within the fill of a feature at LA 86373, although their actual association is problematic, and one slab-lined feature was found at LA 86374. No features were associated with the slab fragment found at LA 86372, although features could be located outside of the right-of-way or may have been dismantled.

Bone

Two pieces of bone were recovered from LA 86374, Test Trench 3. These were found to be fragments of a radius and an ulna. Their size indicates they are from either a mammal or large bird. The fragmentary nature of the bone made more specific identification impossible. The size combined with the extremely fragmentary nature of the bone indicates they are from either dog or turkey.

ASSESSMENTS AND RECOMMENDATIONS

Information derived from the surface mapping and test excavations at these three sites, and analysis of their artifact assemblages, provides insight into site function and aids in the interpretation of those portions of the sites existing within the proposed right-of-way.

LA 86372

LA 86372 is a Basketmaker III period site, possibly with a limited- or seasonal-use history. No evidence of structures was encountered within the right-of-way, and intact cultural deposits are limited to the presence of a single pit. The pit, although burned, does not contain the depth of oxidized soil required for archaeomagnetic dating, and its fill reflects post-abandonment rather than use-related deposits. The presence of lithic reduction flakes without evidence of wear, suggests that lithic reduction was one of the activities to occur at this site. Although the ceramic assemblage is relatively large, the sherds were derived from the breakage of only a limited number of forms and perhaps only a few vessels. The sherds occurred as a diffuse scatter within the upper 10 cm of soil, reflecting either dispersed sheet trash from a source outside of the right-of-way or disturbance.

Archaeological testing within the right-of-way at LA 86372 did not reveal features or deposits likely to yield important additional information on the prehistory of LA 86372 or the region. It is our opinion that no further investigations are needed at LA 86372.

LA 86373

Three distinct areas of cultural material occur within the portion of the right-of-way that transects LA 86373. Area 1, located above the Puerco River, appears to have been a possible temporary camp or seasonal site dating to the Basketmaker III period. This area of the site is largely deflated, no lithic artifacts were found, and the ceramics were distributed in two light concentrations within a diffuse scatter. The only cultural feature encountered was a pit remnant. The data recovery potential of this feature is limited, based on the deflated nature of the site, poor feature definition, the lack of burning, and the low number of artifacts found associated with it.

The other two areas of LA 86373 (Areas 2 and 3) consisted solely of surface sherds. No subsurface cultural material or features of any kind were found within either of these two areas. The surface sherds at Area 2 were a mixture of Basketmaker III and Pueblo II-III pottery types. The surface sherds at Area 3 all could date to the Pueblo II-III period, but they may also be a mixture. All of this material within the right-of-way appears to have been subject to disturbance or redeposition.

The archaeological testing of the portion of LA 86373 within the proposed right-on-way did not reveal any cultural features or deposits likely to yield important additional information

on the prehistory of LA 86373 or the region. It is our opinion that no further investigations are needed at LA 86373.

LA 86474

A number of intact cultural features and an intact midden deposit were found within the proposed right-of-way at LA 86374. Both of the features and the deposit date to the Basketmaker III period. The two features consist of a slab-lined hearth and a burned surface structure. The surface structure contains at least one upright post. The midden deposit consists of a charcoal and ash-rich soil deposit (up to 20-cm thick), containing large numbers of artifacts. The presence of a structure and extensive midden suggests that LA 86374 was a habitation site, a conclusion supported by the number of activities documented by the material culture. Material and food processing, utilizing drills and bifaces, took place. The presence of a metate fragment indicates grain processing occurred at LA 86374. The range of lithic artifacts present includes debitage, utilized debitage, and formal tools. Lithic reduction also appears to have taken place at LA 86374.

Archaeological testing at LA 86374 has documented the presence of potentially important intact cultural features within a restricted portion of the proposed right-of-way. These are confined to a small portion of the right-of-way located north of County Road 1. Although within the right-of-way, this portion of LA 86374 is outside of the construction zone, and its information potential will not be jeopardized by construction activity connected with this highway realignment. Temporary fencing should adequately protect this area from construction-related activity.

Archaeological testing did not reveal any features or deposits within that portion of the site within both the right-of-way and the construction zone. It is our opinion that no further investigations are needed within LA 86374 provided that the portion of the site within the right-of-way and outside of the construction zone is adequately protected.

CONCLUSIONS

Three prehistoric archaeological sites were tested within the proposed right-on-way of the realignment of County Road 1, near Defiance, McKinley County, New Mexico. All three sites have evidence of Basketmaker III occupations, and the presence of Pueblo II-III ceramics indicates limited later use of two of the sites. Only one site appears to be a habitation based on the presence of structures and a midden, and the other sites are diffuse scatters that are probably the result of seasonal or limited activity use of the areas.

At two of the sites (LA 86372 and LA 86373), features were encountered within the proposed right-of-way, but by their nature and condition they are unlikely to yield additional information important to the understanding of local or regional prehistory. It is our opinion that no further investigations are needed at LA 86372 and LA 86373.

Intact portions of a Basketmaker III habitation site do extend into a limited portion of the proposed right-of-way at LA 86374, however these lie outside of the construction zone for the realignment project. It is our opinion that fencing of that portion of LA 86374 during construction will provide adequate protection, and that no further investigations are needed at LA 86374.

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APPENDIX 1. CERAMIC ANALYSIS VARIABLE/VALUE LIST

Site number: LA NNNNNN

FS number: NNNN

Point provenience number: NNN

Lot number: NNN (catalog number that links the data line with the physical artifact or artifacts)

* Classification, generic and specific: NNNN,NNNN

Indeterminate tradition:

0	Indeterminate ware
100	Indeterminate gray
101	Plain Rim (Chapin Gray)
102	Wide Neckbanded (filleted, Mocassin Gray)
103	Narrow Neckbanded (coiled or clapboarded, Mancos Gray)
104	Fillet Rim Gray (Mummy Lake Gray)
105	Pueblo II Corrugated (Mancos Corr.)
106	Pueblo II/III Corrugated (Dolores Corr.)
107	Pueblo III Corrugated (Mesa Verde Corr.)
108	Plain Gray
109	Corrugated Gray
110	Mud Ware
111	Incised Corrugated
112	Polished Gray
200	Indeterminate White
201	Basketmaker III Black-on-white (Chapin Black-on-white)
202	Pueblo I Black-on-white (Piedra Black-on-white)
203	Kana'a style Black-on-white (White Mesa Black-on-white)
204	Red Mesa style Black-on-white (Cortez Black-on-white)
205	Pueblo II Black-on-white (undifferentiated, Mancos Black-on-white)
206	Pueblo II Black-on-white (Black Mesa style, Mancos Black-on-white)
207	Pueblo II Black-on-white (Sosi style, Mancos Black-on-white)
208	Pueblo II Black-on-white (Dogoszhi style, hatchured lines, Mancos Black-on-white)
209	Pueblo II Black-on-white (Chaco style, Mancos Black-on-white)
210	Polychrome White (Tin Cup Polychrome)
211	Early P III Black-on-white (McElmo Black-on-white)
212	Late P III Black-on-white (Mesa Verde Black-on-white)
213	BM III or P I Black-on-white
214	P I or P II Black-on-white
215	P II or P III Black-on-white
216	P III Black-on-white (undifferentiated)
217	Painted Black-on-white
218	Polished White
219	Polished Black-on-white (Late)
220	Transitional P III (McElmo-Mesa Verde Black-on-white)
221	Pueblo II Black-on-white (squiggle Dogoszhi style, Mancos Black-on-white)
300	Indeterminate Red
301	Pueblo I Red-on-orange (Abajo Red-on-orange)
302	Pueblo I Black-on-red (Buff Black-on-red)
303	Pueblo II Black-on-red (Deadmans Black-on-red)

304 Pueblo II-III Black-on-red
305 Pueblo III Black-on-red
306 Pueblo II-III Polychrome
307 Pueblo III Polychrome
308 Polished red
309 Polished Black-on-red
310 Polished Polychrome
311 Thick-Slip Red
312 Thick-Slip Black-on-red
313 Thick-Slip Polychrome

400 Indeterminate Smudged
401 Plain Smudged
402 Corrugated Smudged
403 Plain Brown

Mesa Verde tradition (temper--crushed igneous and any combination thereof; some quartizites and sandstones):

1000 Indeterminate Ware

1100 Indeterminate Gray
1101 Chapin Gray
1102 Moccasin Gray
1103 Mancos Gray
1104 Mummy Lake Gray
1105 Mancos Corrugated
1106 Dolores Corrugated
1107 Mesa Verde Corrugated
1108 Plain Gray
1109 Corrugated Gray
1110 Mud ware
1111 Incised Corrugated
1112 Twin Trees Gray

1200 Indeterminate White
1201 Chapin Black-on-white
1202 Piedra Black-on-white
1203 White Mesa Black-on-white
1204 Cortez Black-on-white
1205 Mancos Black-on-white (undifferentiated)
1206 Mancos Black-on-white (Sosi style)
1207 Mancos Black-on-white (Dogoszhi style)
1208 Mancos Black-on-white (Gallup style)
1209 Mancos Black-on-white (Chaco style)
1210 Tin Cup Polychrome
1211 McElmo Black-on-white
1212 Mesa Verde Black-on-white
1213 BM III or P I Black-on-white
1214 P I or P II Black-on-white
1215 P II or P III Black-on-white
1216 P III Black-on-white
1217 Painted Black-on-white
1218 Polished White
1219 Polished Black-on-white
1220 Transitional P III Black-on-white
1221 Mancos Black-on-white (squiggle Dogoszhi style)

1300 Indeterminate Red
1301 Dolores Red
1302 Abajo Red-on-orange
1303 Abajo Polychrome
1304 Bluff Black-on-red
1305 McPhee Black-on-red
1306 Deadmans Black-on-red
1307 Plain Red
1308 Black-on-red

Cibola tradition (temper--sand and some sandstones, sherd; sherd in redwares):

2000 Indeterminate Ware

2100 Indeterminate Gray
2101 Lino Gray
2102 Wide Neckbanded (filleted)
2103 Narrow Neckbanded (clapboarded, coiled)
2104 Neck Corrugated (corrugated and plain)
2105 P II Corrugated (little eversion)
2106 P II-III Corrugated (moderate eversion)
2107 P III Corrugated (extreme eversion)
2108 Plain Gray
2109 Corrugated Gray
2110 Obelisk Gray

2200 Indeterminate White
2201 La Plata Black-on-white
2202 Whitemound Black-on-white
2203 Kiatuthlanna Black-on-white
2204 Red Mesa Black-on-white
2205 Puerco/Escavada Black-on-white
2206 Gallup Black-on-white
2207 Chaco Black-on-white
2208 Chaco/McElmo Black-on-white
2209 BM III or P I Black-on-white
2210 P I or P II Black-on-white
2211 P II or P III Black-on-white
2212 P III Black-on-white
2213 Painted White
2214 Polished White
2215 Polished Black-on-white

2300 White Mountain Red Ware Indt.
2301 Puerco Black-on-red
2302 Wingate Black-on-red
2303 Wingate Polychrome
2304 St. Johns Black-on-red
2305 St. Johns Polychrome
2306 Springerville Polychrome
2307 Pinedale Black-on-red
2308 Pinedale Polychrome
2309 White Mountain Indeterminate Polychrome

Chuska tradition (temper--trachybasalt and combinations):
3000 Indeterminate Ware

3100 Indeterminate Gray
3101 Bennett Gray
3102 Sheep Springs Gray
3103 Tocito Gray
3104 Gray Hills Banded
3105 Newcomb Corrugated
3106 Captain Tom Corrugated
3107 Blue Shale Corrugated
3108 Hunter Corrugated
3109 Plain Gray
3110 Neck Corrugated Gray
3111 Corrugated Gray
3115 Lino Smudged self-tempered
3116 Non-smudged self-tempered clay

3200 Indeterminate White
3210 Crozier Black-on-white
3211 Drolet Black-on-white
3212 Naschitti Black-on-white
3213 Taylor Black-on-white
3214 Brimhall Black-on-white
3220 Theodore Black-on-white
3221 Tunicha Black-on-white
3222 Newcomb Black-on-white
3223 Burnham Black-on-white
3224 Chuska Black-on-white
3225 Toadlena Black-on-white
3226 Nava Black-on-white
3227 Crumbled House Black-on-white
3240 BM III or P I Black-on-white
3241 P I or P II Black-on-white
3242 P II or P III Black-on-white
3243 P III Black-on-white
3244 Painted White
3245 Polished White
3246 Polished Black-on-white

3300 Indeterminate Red
3301 Sanostee Red-on-orange (red paint)
3202 Sanostee Red-on-orange (black paint)
3203 Polished Red (unpainted)

Kayenta tradition (temper--sand, volcanic ash, sherd, some sandstones; sand and sherd for redwares):
4000 Indeterminate Ware

4100 Indeterminate Gray
4101 Lino Gray
4102 Kana'a Gray
4103 Medicine Gray
4104 Coconino Gray
4105 Honani Tooled
4106 O'Leary Tooled
4107 Tusayan Corrugated
4108 Moenkopi Corrugated
4109 Kiet Siel Gray
4110 Rainbow Gray

4111 Plain Gray

4200 Indeterminate White
4201 Lino Black-on-gray
4202 Lino Black-on-gray
4203 Black Mesa Black-on-white
4204 Sosi Black-on-white
4205 Dogoszhi Black-on-white
4206 Flagstaff Black-on-white
4207 Tusayan Black-on-white
4208 Kayenta Black-on-white
4209 BM III or P I Black-on-white
4210 P I or P II Black-on-white
4211 P II or P III Black-on-white
4212 P III Black-on-white
4213 Painted Black-on-white
4214 Polished White
4215 Polished Black-on-white

4300 Indeterminate Red
4301 Deadmans Black-on-orange
4302 Medicine Black-on-orange
4303 Tusayan Black-on-red
4304 Tusayan Polychrome
4305 Cameron Polychrome
4306 Citadel Polychrome
4307 Tsegi Red-on-orange
4308 Tsegi Black-on-orange
4309 Tsegi Black-on-orange
4310 Kiet Siel Black-on-red
4311 Kiet Siel Polychrome
4312 Plain Black-on-red
4313 Plain Polychrome

Mogollon tradition (temper–crushed quartz, sherd, sand, some sandstones, some volcanics):

5000 Indeterminate Ware

5100 Indeterminate Brown
5101 Alma Plain
5102 Alma Rough
5103 Alma Punched
5104 Alma Incised
5105 Alma Incised, smudged interior
5106 Alma Pinched
5107 Alma Scored
5108 Alma Neck Banded
5109 Three Circle Neck Corrugated
5110 Three Circle Neck Corrugated, punched body
5111 Reserve Plain Corrugated
5112 Reserve Plain Corrugated, smudged interior
5113 Reserve Indented Corrugated
5114 Reserve Indented Corrugated, smudged interior
5115 Reserve Plain and Indented Corrugated
5116 Reserve Incised Corrugated
5117 Reserve Incised Corrugated, smudged interior

5118 Reserve Punched Corrugated
5119 Tularosa Patterned Corrugated
5120 Tularosa Fillet Rim
5121 Reserve Smudged
5140 Woodruff Brown
5141 Woodruff Red
5142 Woodruff Incised
5143 Woodruff Smudged
5150 Forestdale Plain
5151 Forestdale Smudged
5152 Early smudged interior
5200 Indeterminate White
5201 Three-Circle Red-on-white
5202 Reserve Black-on-white
5203 Mimbres Bold Face Black-on-white
5204 Mimbres Classic Black-on-white
5205 Socorro Black-on-white
5206 Tularosa Black-on-white
5210 Corduroy Black-on-white

5300 Indeterminate Red
5301 San Francisco Red
5302 Tularosa White-on-red
5303 Woodruff Red
5304 Forestdale Red

Sand temper tradition (temper--sand; sherd and sand):

6000 Indeterminate ware

6100 Indeterminate gray
6101 Plain Rim
6102 Wide Banded
6103 Narrow Banded
6104 Fillet Rim
6105 P II Corrugated
6106 P II/III Corrugated
6107 P III Corrugated
6108 Plain Gray
6109 Corrugated Gray
6110 Mud Ware
6111 Incised Corrugated
6200 Indeterminate White
6201 BM III B/W
6202 Pueblo I B/W
6203 Kana'a style B/W
6204 Red Mesa style B/W
6205 Pueblo II B/W (undif)
6206 P II B/W (Black Mesa style)
6207 P II B/W (Sosi style)
6208 P II B/W (Dogoszhi style)
6209 P II B/W (Chaco style)
6210 Polychrome White
6211 Early P III B/W
6212 Late P III B/W
6213 BM III-P I B/W

6214	P I-P II B/W
6215	P II-P III B/W
6216	P III B/W
6217	Painted B/W
6218	Polished White
6219	Polished B/W
6220	Transitional P III B/W
6221	P II B/W (Squiggle hatchure)

Post-Anasazi (non-Puebloan):

7000	Indeterminate Ware
7100	Indeterminate Navajo
7101	Dinetah Gray
7102	Dinetah Gray (La Plata var.)
7200	Indeterminate Polychrome
7201	Gobernador Polychrome
7500	Indt. Micaceous Brown Ware
7501	Plain Micaceous Brown Ware
7502	Neckbanded Micaceous Brown Ware
7503	Incised Micaceous Brown Ware

Temper: (NN)

0	Not examined
1	Indetermined
2	None
3	Igneous rock
4	Igneous rock and sand
5	Quartzite
6	Fine sandstone
7	Multilithic sandstone
8	Sherd
9	Igneous rock and sherd
10	Igneous rock, sand, and sherd
11	Quartz and sherd
12	Fine sandstone and sherd
30	Quartz sand
31	Quartz sand and sherd
32	Trachybasalt
33	Trachybasalt and sherd
34	Trachybasalt and sand igneous
35	Fine crushed sand self-temper

Pigment type: NN,NN (exterior, interior)

0	Not applicable
1	Indeterminate
2	None
3	Organic paint (strong)
4	Organic paint (diffuse)
5	Mineral paint (strong)
6	Mineral paint (diffuse)
7	Mineral paint (glazed)
8	Glaze paint

9	Clay paint (not partial slip)
10	Clay paint (partial slip)
11	Clay and mineral paints
12	Organic and mineral
99	Other

Prefiring basic vessel form: NN

0	Not applicable
1	Indeterminate
2	Bowl rim
3	Bowl body
4	Seed jar (tecomate) rim
5	Olla rim
6	Olla neck
7	Cooking/storage jar rim
8	Cooking/storage jar neck
9	Pitcher
10	Necked jar body
11	Feather box (rim or end)
12	Beaker
13	Mug
14	Canteen
15	Kiva jar rim
16	Kiva jar lid
17	Jar body (axially symmetric)
18	Jar body (nonaxially symmetric)
19	Bowl or jar body
20	Ladle (bowl and handle)
21	Ladle bowl (only)
22	Ladle handle (only)
23	Open gourd dipper
24	Bird effigy
25	"Submarine" effigy
26	Canid, ursid, or ungulate effigy
27	Frog effigy
28	Gourd effigy
29	Effigy foot
30	Other effigy
31	Indeterminate effigy
32	Figurine
33	Miniature bowl
34	Miniature seed jar
35	Miniature necked jar
36	Miniature other form
37	Pipe
38	Miniature jar body
39	Nonvessel
40	Keyhole handle
41	Tray rim
42	Double-flared bowl
43	Button
44	Stick holder
99	other

Prefiring vessel appendages: NN

0	Not applicable

1	Indeterminate
2	None
3	Ladle handle, solid
4	Ladle handle, hollow
5	Lug handle (not effigy)
6	Horizontal strap handle
7	Vertical strap handle
8	Indeterminate strap handle
9	Horizontal single coil handle
10	Vertical single coil handle
11	Indeterminate single coil handle
12	Horizontal multiple coil handle
13	Vertical multiple coil handle
14	Indeterminate multiple coil handle
15	Recessed handle
16	Tapered gourd effigy handle
17	Animal effigy handle
18	Transverse tube or rod
19	Indeterminate handle stub
20	Perforation for suspension or closure
21	Perforated lug
22	Coiled applique
23	Vertical pinch
24	Rattle handle
25	Punched hole
26	Pinched handle
99	Other

Use wear (related to prefiring vessel form): NN

0	Not applicable
1	Indeterminate
2	None
3	Moderate sooting (valid for exterior only)
4	Heavy sooting (valid for exterior only)
5	Mineral deposits (interior)
6	Mineral deposits with sooting
7	Organic deposits (interior)
8	Organic deposits with sooting
9	Rim chipping
10	Dipper wear
11	Interior abrasion (without sooting)
12	Interior abrasion (with sooting)
13	Interior erosion (without sooting)
14	Interior erosion (with sooting)
15	Exterior abrasion (without sooting)
16	Exterior abrasion (with sooting)
17	Punched hole (DO NOT USE)
18	Rim abrasion
19	Mineral slip (exterior) Fugitive red
20	Mineral slip (interior and exterior)
99	Other

Postfiring modification (unrelated to original vessel use): NN

0	Not applicable

1	Indeterminate
2	None
3	Drill hole to repair vessel
4	Drill hole for suspension or closure
5	Drill hole, indeterminate function
6	Drill hole start
7	Jar modified into bowl
8	Olla modified into seed jar
9	Rim reshaped without changing vessel form
10	Unfacial retouch (tool)
11	Bifacial retouch (tool)
12	Unifacial grinding (tool)
13	Bifacial grinding (tool)
14	Ceramic scraper
15	Scoop
16	Saucer form (abraded)
17	Saucer form (chipped)
18	Pendant
19	Pendant blank
20	Spindle whorl
21	Disk
22	Small regular form (abraded)
23	Small regular form (chipped)
24	Handle sherd, abraded at break
25	Handle stub, abraded at break
26	Truncated sherd edge
27	Rounded sherd edge
28	Inner beveled
29	Outer beveled sherd edge
30	Multiple beveled sherd edge
31	Chipped sherd edge
32	Drilled hole and beveled edge
33	Reshaped neck
34	Reshaped ladle handle
35	Reshaped effigy head
36	Serrated edge
37	Handle reshaped into pipe
38	Drill hole and drill hole start
39	Ceramic drill
40	Bowl made into spoon
41	Scraper (exterior)
99	Other

Sherd count (old breaks): NNNN

Sherd weight (total for lot): NNNN.N grams

Vessel number: NN

Rim characteristics:
Radius (mm): NNN

Arc (degrees): NNN

Fillet width (mm): NN

Thickness (base of taper; mm): N.N

Eversion: NN

0	not applicable
1	Indeterminate
2	Inverted >100 degrees
3	Inverted 100-80 degrees
4	Inverted 80-45 degrees
5	Inverted 10-45 degrees
6	Inverted 1-10 degrees
7	Everted 0-10 degrees
8	Everted 10-20 degrees
9	Everted 20-30 degrees
10	Everted 30-40 degrees
11	Everted 40-50 degrees
12	Everted 50-60 degrees
13	Everted 60-70 degrees
14	Everted 70-80 degrees
15	Everted 80-90 degrees
16	Everted >90 degrees

Orifice characteristics:

Radius (cm): NN.N

Arc (degrees): NNN

Orifice depth below rim (cm): N.N

APPENDIX 2. CHIPPED STONE ANALYSIS VARIABLE/VALUE LIST

FS number: NNNN
Point Provenience Number: NN
Lot Number: NNN

Material:

000	unknown
001-099	cherts & chalcedonies
001	chert, undiff.
002	Pedernal chert
003	Tecolote chert
004	Washington Pass chert
005	Brushy Basin chert
006	Baldy Hill chert
007	Alibates chert
008	Tecovas chert
009	clastic chert
010	San Andreas chert
080	chalcedony, undiff.
100-199	silicified woods
100	silicified wood, undiff.
101	Zuniwood
200-299	obsidians
200	obsidian, undiff.
201	Jemez, generic
202	Polvadera Peak
203	Grants Ridge
204	Red Hill
205	Antelope Wells
206	Mule Creek
300-399	other igenous rocks
300	igneous, undiff.
310	nonvesicular basalt
320	vesicular basalt
330	granite
340	rhyolite
400-499	sedimentary rocks
400	sedimentary, undiff.
410	limestone
420	sandstone
430	siltstone
440	mudstone
450	shale
500-599	metamorphic rocks
500	metamorphic, undiff.
510	quartzite, undiff.
530	quartzite sandstone
540	schist
541	serpentine

600-699	minerals
600	mineral, undiff.
610	turquoise
620	azurite
621	malachite
630	quartz crystal
631	massive quartz
632	mica
633	gypsum
634	calcite
635	selenite
640	galena
641	hematite
650	coal
651	jet
660	fossil, undiff.
661	crinoid stem
670	concretion, undiff.
671	concretion, sandstone
672	concretion, hematite
999	other

Material Texture and Quality:

0	indeterminate
1	glassy
2	glassy and flawed
3	fine-grained
4	fine-grained and flawed
5	medium-grained
6	medium-grained and flawed
7	coarse-grained
8	coarse-grained and flawed

Morphology:

00	indeterminate
01	angular debris
02	core flake
03	biface flake
04	resharpening flake
05	notching flake
06	bipolar flake
07	blade
08	hammerstone flake
09	pressure flake
10	ground stone flake tool
20	tested cobble
21	core, undiff.
22	unidirectional core
23	bidirectional core
24	multidirectional core
25	pyramidal core

30	cobble tool, undiff.
31	cobble tool-unidirectional
32	cobble tool-bidirectional
40	uniface, undiff.
41	uniface-early stage
42	uniface-middle stage
43	uniface-late stage
50	biface, undiff.
51	biface-early stage
52	biface-middle stage
53	biface-late stage

Dorsal Cortex:

Estimate in 10 percent increments.

Flake Platform:

00	not applicable
01	cortical
02	cortical and abraded
03	single facet
04	single facet and abraded
05	multifacet
06	multifacet and abraded
07	retouched
08	retouched and abraded
09	abraded
10	collapsed
11	crushed
12	absent
13	ground stone-ground surface
14	modified-retouched to make a tool

Weight in grams: NNNN

Count: NNNN

Ground Surface Present:

0	no
1	yes

Photo/Illustrate:

0	no
1	yes

Portion:

0	indeterminate frag
1	whole
2	proximal
3	medial

4	distal
5	lateral

Edge Number: NNN

Function:

000	not applicable
001	utilized debitage
002	retouched debitage
003	utilized/retouched debitage
004	utilized/retouched core
010	hammerstone
011	chopper
012	plane
013	axe
015	hoe
016	maul
017	tchamahia
018	anvil
050	drill-perforator
051	graver
052	notch
053	denticulate
100	scraper, undiff.
101	end scraper
102	side scraper
103	end-side scraper
104	uniface, undiff.
150	biface, undiff.
151	knife

Wear Patterns:

00	not applicable
01	unidirectional utilization
02	bidirectional utilization
03	unidirectional retouch
04	bidirectional retouch
05	rounding
06	rounding and 01
07	rounding and 02
08	rounding and 03
09	rounding and 04
10	bidirectional retouch and abrasion
11	battering-one edge only
12	battering-multiple edges
13	battering-50% of tool edges
14	pitting
15	1 and 3
16	2 and 4
17	4 and 11

Comments: NNNN

APPENDIX 3
GROUND STONE VARIABLE VALUE LIST

FS Number: NNNN
Point Provenience Number: NNN
Material: NNN
Note: See Chipped Stone Manual for complete code list for cherts, chalcedony, silicified woods, obsidian, and minerals

000	unknown
000-099	chert, chalcedony
100-199	silicified wood
200-299	obsidian
300	igneous undifferentiated
310	nonvesicular basalt
320	vesicular basalt
321	scoria
322	pumice
323	tuff
330	granite
340	rhyolite
341	welded tuff
400	sedimentary undifferentiated
410	limestone
411	travertine
420	sandstone
430	siltstone
440	mudstone
450	shale
500	metamorphic undifferentiated
510	quartzite undifferentiated
530	quartzite sandstone
540	schist
541	serpentine
600	mineral undifferentiated
610	turquoise
620	azurite
621	malachite
630	quartz crystal
631	quartz - massive
632	mica
633	gypsum
634	calcite
635	selenite
640	galena
641	hematite
650	coal
651	jet
660	fossil undifferentiated
670	concretion undifferentiated
999	other

Material Texture and Quality: N

0	indeterminate/NA
1	glassy
2	fine-grained
3	medium-grained
4	large-grained

Preform Morphology: N

0	indet
1	rounded cobble
2	core
3	chunky angular
4	flattened cobble
5	slab, NFS
6	slab, thick (10 cm+)
7	slab, thin (5-10 cm)
8	slab, v. thin (5 cm)

[2]Production Input: N

0	indet
1	none (natural form)
2	slightly modified (50% area)
3	mostly modified (50%-99%)
4	fully shaped

[2]Shaping: N

0	indet
1	none
2	grinding
3	flaking
4	pecking
5	grinding and flaking
6	grinding, flaking, pecking
7	flaking and pecking
8	grinding and pecking
9	other

Length: NNN

Complete?:	0	No
	1	Yes

Width: NNN

Complete?:	0	No
	1	Yes

Thickness: NNN

Complete?:	0	No
	1	Yes

Weight:

Metate Depth: NNN

Mano Cross-Section Form: NN

0	indet
1	bicovex
2	convex-concave
3	dome-one flat side
4	subrectangular

5	square or rectangular
6	wedge
7	loaf
8	irr. - one flat side
9	irr. - one concave side
10	irr. - one convex side
11	diamond
12	airfoil
14	trapezoidal

Plan View Outline Form: NN

0	indet
1	circular
2	oval
3	subrectangular
4	irregular
5	square
6	rectangular
7	subtriangular
8	wedge
9	other regular form

[2]Photo/Illustrate: N

0	no
1	yes

Flaked Stone: N

0	no
1	yes

Use Number: NN

Portion: N

0	indet
1	whole
2	end fragment
3	medial fragment
4	edge fragment
5	internal fragment
6	corner
7	corner(s) only missing
8	logitudinally split frag.

Function: NNN

000	indet, fragmentary
001	indet, nfs
002	polishing stone, pottery
003	polishing stone, plaster
004	abrading stone
005	shaft straightener
006	shaped slab
007	sandal last
008	jar cover
011	anvil
012	pitted pounding stone
013	palette

014	lapidary stone
015	mortar
016	coral
017	bowl
020	hammerstone
030	mano, nfs
031	one-hand mano
040	two-hand mano, nfs
041	two-hand mano, trough
042	two-hand mano, slab
043	two-hand mano, loaf-shaped
050	metate, nfs
051	metate, basin
052	metate, trough, nfs
053	trough, ends open
054	trough, ends closed
055	trough, one end open
056	metate, slab
060	maul, nfs
061	maul, notched
062	maul, grooved
067	mining tool
070	axe, nfs
071	axe, notched, 1
072	axe, notched, 2
073	axe, notched, 3
074	axe, chipped, notched
075	axe, grooved, nfs
076	axe, grooved, 3/4
077	axe, grooved, full
078	axe, grooved, spiral
080	hoe, nfs
081	hoe, notched
082	hoe, grooved
083	tchamahia
085	adze/plane
086	wedge
090	cylindrical tool, nfs
091	pestle
092	paint stone
100	ornament, nfs
101	pendant
102	bead
110	pipe, nfs
111	cloudblower
120	concretions, crystals, minerals...

[2]Ground Surface Cross-section: N

0	indet
1	flat
2	concave
3	convex
4	grooved
5	irregular
6	faceted
7	other

[2]Ground Surface Sharpening: N

0	no
1	yes

[2]Ground Surface Texture: N

0	not applicable
1	indet
2	coarse
3	moderate
4	fine
5	polished

[2]Primary Wear: NN

0	indet
1	none
2	striations
3	pitting
4	edge damage
5	beveling
6	battering
7	polishing
8	grooving
9	grinding
10	other

[2]Secondary Wear: NN (Codes follow primary wear)

[2]Alterations: N

0	indet
1	none
2	drilled
3	incised
4	grooved
5	notched
6	2, 3
7	2, 3, 4
8	2, 3, 4, 5
9	2, 4
10	2, 4, 5
11	2, 5
12	3, 4
13	3, 4, 5
14	3, 5
15	4, 5
20	other

Residues: N

0	indet
1	none
2	pigment stains
3	inorganic, other
4	gum or pitch
5	organic, other