

**MUSEUM OF NEW MEXICO**

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**OFFICE OF ARCHAEOLOGICAL STUDIES**

**TREATMENT PLAN FOR EIGHT SITES AT LAS CAMPANAS DE SANTA  
FE,  
SANTA FE COUNTY, NEW MEXICO**

by  
Stephen S. Post

Submitted by  
Timothy D. Maxwell  
Principal Investigator

**ARCHAEOLOGY NOTES 109**

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## ADMINISTRATIVE SUMMARY

At the request of Las Campanas Limited Partnership of Santa Fe, the Office of Archaeological Studies, Museum of New Mexico, developed a treatment plan for eight archaeological sites. These sites were identified during archaeological surveys conducted by Southwest Archaeological Consultants, Inc. (SAC) and the Office of Archaeological Studies (OAS). The surveys covered about 1,730 ha (4,400 ac) and identified 250 archaeological sites.

The eight sites were determined to be significant because they were older than 75 years and they had the potential to yield new information on Santa Fe area prehistory and history. The eight sites date to the prehistoric and historic periods.

Five of the sites, LA 84758, LA 85759, LA 84775, LA 98680, and LA 98861, date to the prehistoric or early historic periods. Four sites consist of artifact scatters with features and one site consists of a possible cobble-mulched field.

Three sites, LA 84754, LA 84776, and LA 85036, date to the historic period. LA 84754 and LA 84776 are abandoned homesteads or line camps dating from 1920 to 1940. These two sites will be fenced. A rock pile will be tested at LA 84754. LA 85036 is a cobble terrace complex, part of a wheel or tire track, and a berm, dam, and pond unit that may date to the nineteenth and twentieth centuries.

This treatment plan outlines the research questions, data needs, and excavation and analysis methods to be used for each site and artifact assemblage. The treatment plan is submitted in compliance with Santa Fe County Ordinance 1988-17.

Museum of New Mexico Project 41.547  
Santa Fe County Ordinance 1988-17.

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## INTRODUCTION

At the request of Las Campanas Limited Partnership of Santa Fe, the Office of Archaeological Studies, Museum of New Mexico, developed a treatment plan for eight archaeological sites. These sites were identified during archaeological surveys conducted by Southwest Archaeological Consultants, Inc. (SAC) and the Office of Archaeological Studies (OAS). The surveys covered about 1,730 ha (4,400 acres) and identified 250 archaeological sites. The eight sites were determined to be significant because they were older than 75 years and they had the potential to yield new information on Santa Fe area prehistory and history. The treatment plan was prepared in compliance with Santa Fe County Ordinance 1988-17.

Las Campanas de Santa Fe is in Santa Fe County, northwest of Santa Fe and north of the village of Agua Fria (Fig. 1). Site legal descriptions and map locations are in Appendix 1.

This treatment plan contains site descriptions, cultural historical background, research questions, data needs, and excavation and analysis methods. General cultural-historical and environmental information have been omitted. This information has been amply outlined in Post (1992) and Scheick (1991).

A topographic map of the Los Angeles area, showing contour lines, a grid, and labels for 'Los Angeles' and 'Arroyo'. A large black silhouette of a person's head and shoulders is overlaid on the map. A rectangular area is labeled 'surveyed area'.

**Figure 1. Project vicinity map.**

Adapted from USGS 7.5' Agua Fria Quad

## THE TREATMENT PLAN

### Introduction

The OAS and SAC surveys of the Las Campanas de Santa Fe project area have identified 250 archaeological sites. These sites suggest intermittent use of the area spanning 3,800 years beginning about 1800 B.C. Temporally diagnostic isolated occurrences suggest intermittent occupation beginning about 7000 B.C. The sites, isolated occurrences, and checkdams are a dynamic land-use record that results from hunting, gathering, habitation, farming, and ranching.

The first phases of the Las Campanas archaeological study were completed by Southwest Archaeological Consultants, Inc. of Santa Fe between 1990 and 1992. SAC's contribution included survey of 3,300 acres, development of a research design, and testing and excavation at 60 sites. Preliminary results from the testing and excavation have been submitted and final results are in progress.

For the purposes of the OAS contribution to the Las Campanas archaeological study, the research design (Scheick 1991) is of primary interest. The research design is the guide to evaluating site variability and maintaining data comparability for synthetic research efforts. The research design mainly focuses on the artifact scatters and checkdams. While it leaves open the potential for study of agricultural sites beyond checkdams, the agricultural sites are not specifically addressed. For the artifact scatters, the existing research design will be the guiding document. For the agricultural sites, the OAS data recovery plan will direct the research effort.

The OAS data recovery effort and treatment plan will include eight sites, two identified during OAS survey and six identified in the West Golf Course area (Scheick and Viklund 1991). The OAS sites are LA 98680 (LC-3) and LA 98861 (LC-17). The SAC West Golf Course sites are LA 84754 (278-9), LA 84758 (278-13), LA 85759 (278-14), LA 84776 (278-30), LA 84775 (278-31), and LA 85036 (278-51). These sites represent most of the occupation spectrum. LA 98680, LA 98861, LA 84758, LA 85759, and LA 84775 date to the prehistoric or early historic period. LA 84754, LA 84776, and LA 85036 are historic period sites.

The goals of this data recovery plan will be less comprehensive than proposed for the SAC data recovery effort. This is because the site sample is small and the SAC data recovery efforts are, to date, unpublished, except for rough draft descriptive preliminary reports. These two factors render synthetic interpretations based on the OAS data recovery effort premature and potentially spurious. Instead, the OAS data recovery effort will choose research questions that can be dealt with using more site-specific data. We will leave the grander-scale problem domains for the SAC effort.

This data recovery plan will be divided into a brief description of each site (more detailed information is in the survey and testing report, Post 1992), a brief summary of the cultural-historical and functional context and research questions for each site. Data needs and excavation and analysis methods will be combined for the four artifact scatters because it is likely they will yield similar artifact assemblages and features. The excavation and analysis methods will not necessarily follow the SAC plan, but the data that results should be comparable to the SAC

results. The sites will be presented in chronological order.

## LA 84775

### Site Description

The site description is derived from Scheick and Viklund (1991:21-22). The site is on a north-facing hillslope above a drainage. A small ephemeral drainage runs through the eastern edge of the site. The site covers about 1,600 sq m (Fig. 2). The vegetation is piñon-juniper, narrowleaf yucca, cholla and prickly pear cactus, tall and short grasses, and snakeweed. The soils are sandy with some gravel and pebbles.

LA 84775 has been classified as a dispersed lithic artifact scatter. The site assemblage has 18 lithic artifacts of chert, Jemez obsidian, and chalcedony. Artifact types include pieces of angular debris, secondary core reduction flakes, and bifacial thinning flakes. There is one probable Basketmaker II projectile point with a reworked tip.

The site significance is based on the probable Basketmaker II projectile point that dates from 1500 B.C. to A.D. 300. Sites from this period are rare in the project and Santa Fe areas. If this site has a single Basketmaker II component, then it may provide an important assemblage for identifying building diagnostic lithic artifact profiles. The Basketmaker II remains are also the earliest site-based data that can be used to address settlement and subsistence patterns of the Las Campanas area.

### Cultural-Historical and Functional Background

The Basketmaker II or period is the best represented pre-Pueblo occupation component in the Santa Fe area. Recent projects have identified late Archaic-Basketmaker II components southeast (Viklund 1989), southwest (Hannaford 1986; Lent 1988), and east (Lang 1989) of Santa Fe. The greatest number of late Archaic period components was recorded and sample-excavated at Cochiti Reservoir (Chapman 1979).

Most of the sites from these areas could be classified as limited or temporary base camps and limited activity sites. These site types generally have low numbers of or no processing facilities and equipment, an artifact scatter of low density or small cluster, and very few unbroken tools. The artifacts occur in low numbers because the occupation should be short. Facilities and equipment are associated with longer occupations (Binford 1983a; Vierra 1980; Elyea and Hogan 1983). Unbroken tools should have been discarded at residential sites because they were personal gear, which may have been highly curated (Binford 1983b; Kelly 1988). Reuse of a limited base camp or activity area may result in overlapping or refurbishment of features and a higher artifact density. Reoccupation may result in a more scattered feature and artifact distribution. Reuse may be difficult to differentiate from a residential or long-term base camp because both types of occupation result in high density accumulations and intensive use of facilities.



A small number of late Archaic period sites may be residential base camps. These sites have domestic features for habitation, storage, production, and consumption. The artifacts occur in high density clusters and tend to be more diverse, reflecting the greater number of site activities. If reused or reoccupied, these sites can be very difficult to interpret unless the deposits are spatially distinct.

The excavation of LA 61282, a late Archaic period site located along Airport Road in Santa Fe, yielded 14 pit features and the remains of a possible shallow pit structure. The site assemblage has pockets of high density, and it reflects processing, production, and consumption. These factors combine to indicate that the site may have been a residential or limited base camp. The accumulation and superimposition of features indicate that this base camp may have been reused, resulting in the higher artifact density.

Another site in the same area, within the Tierra Contenta development, has yielded deeply buried structural remains and high artifact diversity and density. These factors indicate that the site was a residential base camp. The diagnostic artifacts date to the late Archaic period (Schmader n.d.).

While recognizing that this might have been a simplistic classification, Chapman (1979:68) classified all sites with fire-cracked rock concentrations in the Cochiti Reservoir area as residences. The Cochiti Reservoir sites lacked diverse tool assemblages and low numbers of formal tools, which would bring into question their classification as residential sites. Direct evidence of food processing and consumption was very rare from Cochiti sites with inferences drawn from the presence of hearths, fire-cracked rock, and grinding implements.

In the Las Campanas assemblage there were only three late Archaic period sites from the West Golf Course (including LA 84775) and one late Archaic period site from the western part of Estates III. The late Archaic period sites include spatially extensive scatters of chipped stone debris. Core reduction and tool manufacture debris are present. The largest site, LA 86148, has ground stone and discarded tool fragments. LA 86148 may be a late Archaic base camp. The other sites, including LA 84775, have lower artifact frequencies and less artifact diversity. These sites may be limited base camps or repeatedly used extraction loci. One of the smaller sites has a lithic assemblage predominated by core reduction flakes. This suggests that the late Archaic period residents were actively using the local lithic materials. The small number of late Archaic period sites with limited accumulations of debris suggest part-time use of the area. None of the late Archaic period sites have been excavated, so it is not known if the sites have depth, facilities, or greater artifact diversity and density than is evidenced on the surface.

### Research Questions

Previous research of late Archaic period sites in the Santa Fe area has focused on site specific and regional problems. The Cochiti study examined relationships between site locations and vegetative diversity, site size and artifact density, group size and feature frequency, and subsistence remains and seasonality (Chapman 1979). The Airport Road site (LA 61282) study focused on problems of population increase through immigration or indigenous growth, comparisons between logistical and residential sites using artifact assemblages and site structure,

regional Archaic settlement patterns as reflected by nonlocal materials, the relationship between artifact assemblage and site function, and interregional differences in site structure and artifact assemblage reflecting use of different environments (Lent 1988:17-18). The Las Campanas research design (Scheick 1991:26-27) focuses on land-use patterns on the piedmont slope including variability through time, site function, and changes in regional socioeconomic organization. Within these broad issues are more site-oriented problems of occupation history, subsistence activities, site variability, and lithic raw material procurement and reduction. Problems of a more project-wide scope include determining and reconstructing settlement and subsistence strategies of the piedmont slopes and their role within regional adaptations.

These problem domains are at the site, local, regional, and interregional scales. A research design's effectiveness for dealing with the problems at different scales is conditioned by the number of sites, the artifact assemblage, structure of the sites, and the integrity and preservation of the archaeological deposit. The ability to deal with direct questions about site function and its role in a local and regional system depends heavily on preservation of plant and animal remains. Problems of group size and composition rely on inferences about artifact and feature assemblages that draw extensively on ethnographic analogy and ethnoarchaeological observation and replication.

Previous excavation of late Archaic period sites in the Cochiti Reservoir area yielded very little ethnobotanical remains. Site structure was limited to hearths, fire-cracked rock concentrations, and artifact assemblages that were mostly without formal and expedient tools. Las Campanas Basketmaker II period sites have not been excavated to date, so their artifact and feature composition is not known. Excavation of non-Basketmaker II sites have yielded roasting pits and hearths, and a few grinding, formal, and expedient tools. Debris from material testing and core reduction is the primary archaeological material recovered from Las Campanas sites. Therefore, it seems appropriate that this research design focus on problems that can be addressed with chipped stone artifacts.

Relying on the Las Campanas research design (Scheick 1991) for guidance, data recovery at LA 84775 can be used to address problems that focus on chronology and subsistence activities. Variability in site structure and raw material procurement and reduction strategies will be integrated into subsistence activities and site function. LA 84775 will be the only excavated Archaic period site in the Las Campanas area. Research problems will be addressed at the site level for the Archaic period, and compared with later and undated sites at the local level. Problems at the regional and interregional scale will be addressed if appropriate data are collected.

### *Chronology*

Does LA 84775 date to the Basketmaker II period? This question is simple, but important. The Basketmaker II date that has been assigned to the site is based on a single reworked En Medio-style projectile point. To be certain that LA 84775 dates to the Basketmaker II period, two conditions must be met. Recycling or scavenging of the projectile point must be ruled out, and evidence for a later occupation must be absent.

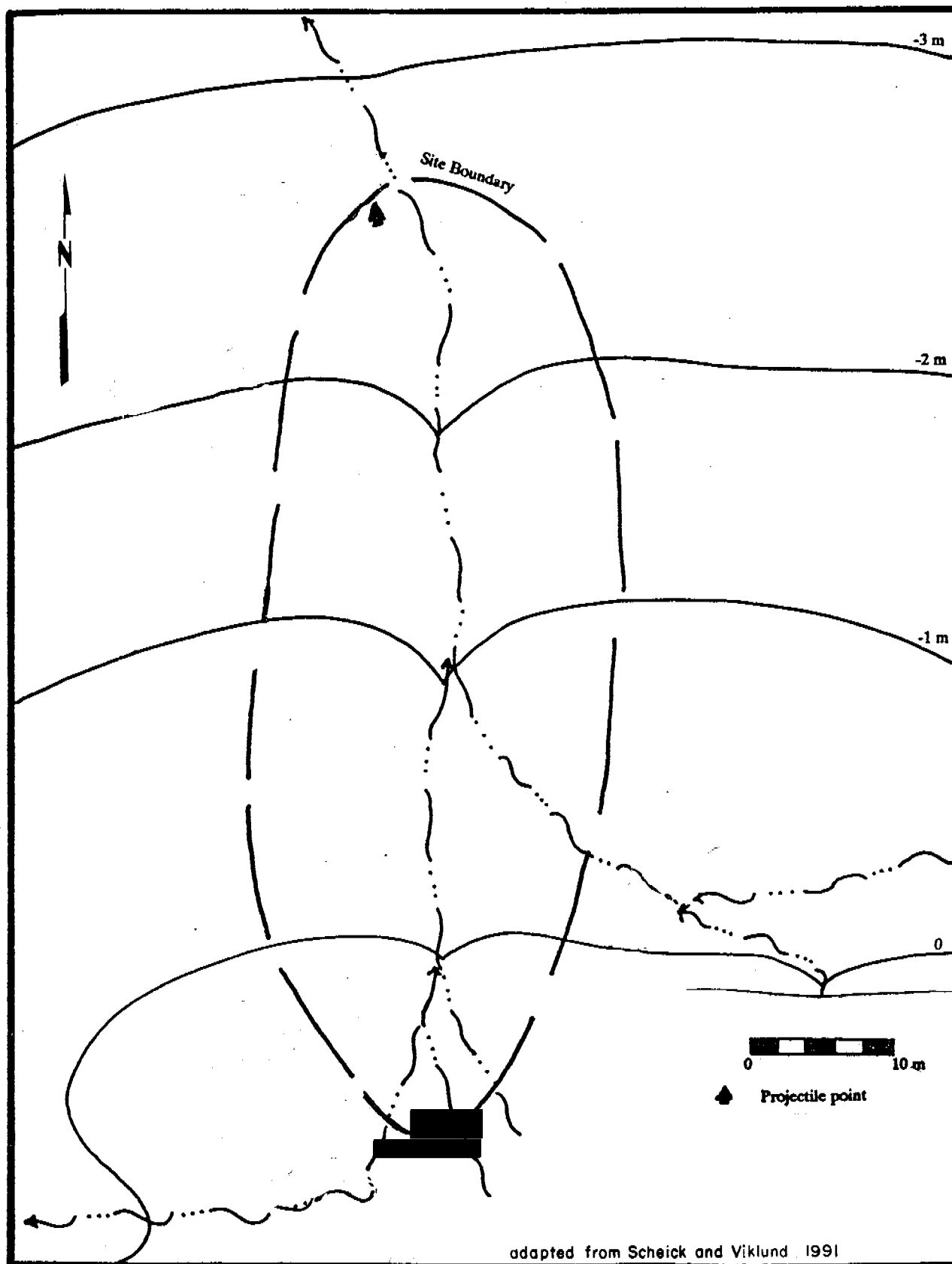


Figure 2. LA 84775 site map.

Addressing the first condition might be difficult because the projectile point is from the site surface. Normally, the best way to detect recycling or scavenging of obsidian artifacts is to compare obsidian hydration dates from original and reworked flake scars. This has proven fruitful in a few studies (Skinner 1989; Post 1991). The surface provenience of the projectile point renders obsidian hydration problematic because of factors that affect rind formation on surface artifacts. An absolute date for original and reworked scars might be erroneous, but a relative date would show if the original scars pre-date the reworked scars, suggesting that reworking occurred at a lengthy interval after the projectile point was made. Obsidian hydration will be considered if there is a question of the site date after excavation is completed.

The possibility of multicomponent occupation is raised by the dispersed distribution of the artifacts at LA 84775. Naturally, if the site is multicomponent then the artifact assemblage and features could not be used in total to address other problems of site structure, subsistence, and raw material procurement and core reduction. A determination of single component status may never be certain. A lack of early Archaic or Pueblo period material including earlier projectile point styles or ceramics will be considered support for the late Archaic period designation. Other dating methods will be used if appropriate samples are encountered. These methods would include charcoal for C-14 dating, buried obsidian for obsidian hydration, oxidized hearth walls for archaeomagnetism, or large charcoal for dendrochronology. To date, excavations at Las Campanas have yielded very few samples suitable for absolute and relative dating techniques.

### *Subsistence Activities*

What subsistence activities were conducted at LA 84775 during the Basketmaker II period? Were they different from subsistence activities conducted at other sites from different periods? These two questions apply to site function at site specific and local scales. These questions encompass the analysis and interpretation of site structure and raw material procurement, core reduction, and tool production, use and maintenance.

Site function will be analyzed by using expectations derived from models for hunter and gatherers proposed by Binford (1983a) and Kelly (1988). These models suggest that hunter-gatherers organized their subsistence activities according to the seasonal distribution and abundance of critical resources, such as water, food, shelter, and fuel. The distribution and abundance of critical resources may lead to a subsistence strategy that is residentially or logistically mobile. Depending on which strategy is used, sites may be classified as residential base camps, temporary base camps, limited activity sites or resource extraction locales. Each type of site is predicted to have distinctive artifact and feature assemblages and structure. The site type will be conditioned by subsistence activities, including construction of a residence and storage facilities, food processing and consumption, and tool manufacture and raw material reduction. Thus, subsistence activities reflect the site function within a larger subsistence and settlement system.

As stated before, excavated late Archaic period sites in Cochiti Reservoir and most excavated sites at Las Campanas have a poor track record for yielding direct subsistence data. Ethnobotanical remains are scarce and pollen analysis is usually inconclusive with shallow, open air sites because of the amount of background and intrusive pollen. Indirect evidence of

subsistence is the mostly likely avenue of study, and can include the study of artifacts that include chipped and ground stone.

Chipped stone as an indicator of subsistence activities relies heavily on technological trajectories for core reduction, tool production, use, and maintenance. As mobile hunter-gatherers, Basketmaker II groups may have employed situation-dependent lithic technologies. Distance from residential sites and the source of suitable material for production of tools needed for anticipated tasks have been suggested to heavily condition stone tool technology (Kelly 1988; Binford 1983b). Models proposed by Binford (1983b) and Kelly (1988) will be used to evaluate the LA 84775 assemblage. The chipped stone assemblage will be examined in terms of reduction strategy, assemblage diversity, tool use, and maintenance. These data should reflect the on-site subsistence activities and the position of the site within a larger system.

The presence of ground stone, such as manos and metates, can be used to infer processing activities. Metates, which are large, nonportable items, would be expected at residential sites or temporary base camps that were used for more than a day. Metates at temporary base camps might indicate caching in anticipation of future visits (Binford 1983c). Manos are smaller and more portable and may have been discarded at temporary base camps or limited activity sites. In an area where cobbles are abundant, a mano would not be an indispensable piece of personal gear (Binford 1983b). So, manos are indicators of food processing, but they may not be indicators of the duration of or the intent to reoccupy a site.

Lancaster (1983) has suggested that different manos and metates provide optimal grinding for certain types of seeds or grains. Manos and metates from LA 84775 can be examined from the perspective of functional differentiation. Use of manos for food processing, storage, or immediate consumption may be examined using Lancaster's assumptions.

Features, such as hearths, structures, or storage pits will provide more direct evidence of site function. The hunter-gatherer site typology is hierarchical, in that as length of occupation decreases, so do the diversity and repetition of activities, features, and artifacts. A residential structure, in association with storage features, would be strong evidence of residential occupation. Hearths may have been used at temporary base camps and limited activity sites. Sites without features would have been limited activity sites or resource extraction locales.

The presence of features and their association with artifacts will strongly influence the ability to determine site function. These associations are the basis for site structure analysis. Site structure analysis methods are used to address site formation, activity areas, and group size, for example. For LA 84775, artifact associations and distribution in relation to features will be used to address site formation and length of occupation. Density and diversity measures will be compared for LA 84775 and other sites from Las Campanas to examine changes in site structure and occupation patterns through time within a larger subsistence and settlement system.

Site Description

LA 98680 is an artifact scatter/concentration with a cobble concentration and a single cobble checkdam (Fig. 3). The site covers 450 sq m. Most of the artifacts concentrated in a 10-m-diameter area are associated with a quartzite cobble concentration. The cobble concentration is made of quartzite cobbles that are roughly in a linear arrangement (Fig. 4). The cobbles cover an area 4 by 2.75 m with a northwest to southeast orientation. The linear arrangement is rough, and most of the cobble area is dispersed, suggesting that the concentration was dismantled and scattered.

The checkdam is one cobble wide and intact. It measures 3 m long. The checkdam is at the head of a shallow erosion channel. The cobbles are sitting on the surface and the erosion channel probably formed during the early twentieth century. The checkdam is similar to other historic period check dams in the project area. The checkdam and artifacts are not temporally or functionally associated.

Twenty-five lithic artifacts were recorded or recovered from the surface and test pits within the 10-m-diameter lithic artifact concentration. Two Santa Fe Black-on-white bowl sherds from the same vessel were collected from east of the lithic artifact concentration.

The 25 lithic artifacts can be treated as the same assemblage because they were within a 5-m radius. The 17 core flakes were the most common artifact type. Fourteen of the core flakes were local chert and the other three were black quartzite that occurs in the local gravel deposits. The core flakes were small to large in size, with maximum dimensions ranging from 12 to 78 mm and most of the flakes were thicker than 10 mm. Dorsal cortex was present only on four of the core flakes. None of the core flakes were used or modified. The core flakes result from core reduction with no evidence for tool production or tool use.

There are seven pieces of local chert angular debris. Four of the seven pieces of angular debris are from the test pit within the cobble concentration. They are small with maximum dimensions of less than 20 mm. They may be shatter resulting from hard-hammer percussion reduction of locally available cobbles.

The single tested chert pebble has two negative flake scars that are in the small size range. The tested small pebble indicates that a wide variety of materials were suitable for flake production.

The composition of the artifact assemblage indicates that the primary activity with respect to chipped stone was core reduction and perhaps material testing. Evidence for tool production, use, or maintenance was not found. The materials are all locally available cherts and quartzite that could have been at or near the site. The assemblage exhibits limited variability in technology, but considerable variability in artifact sizes.

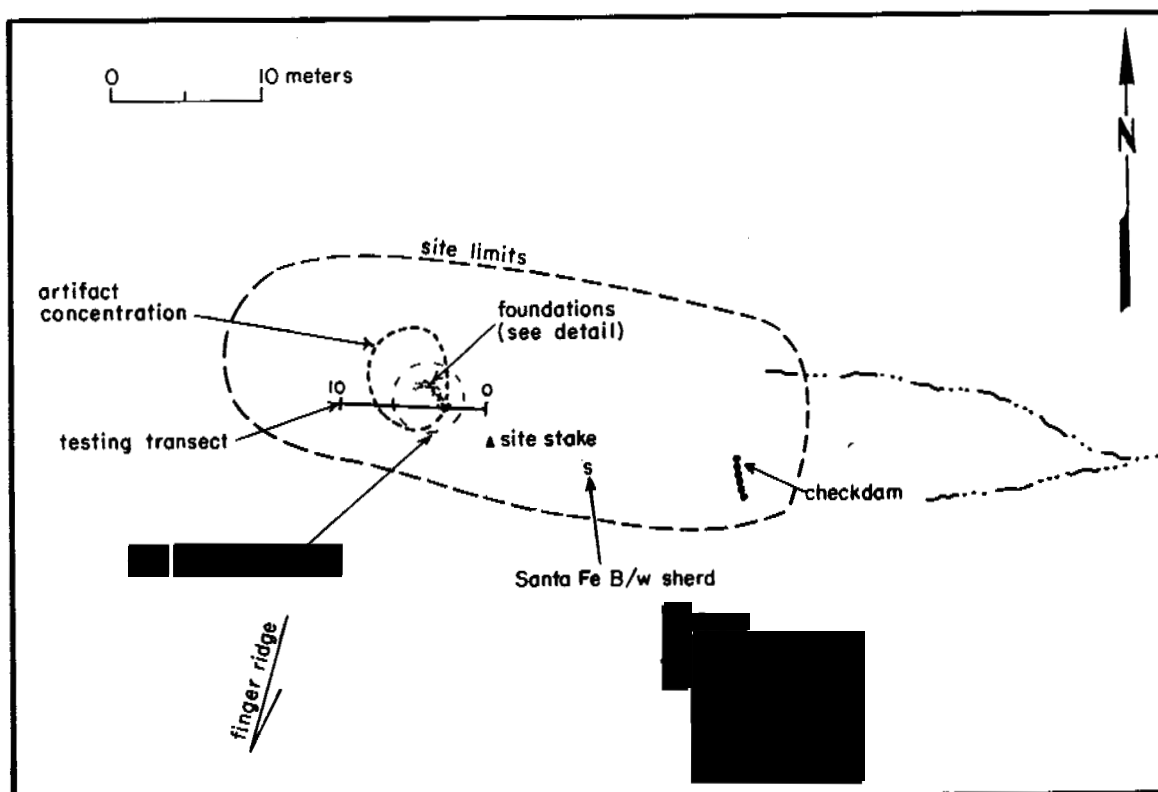


Figure 3. LA 98680 site map.

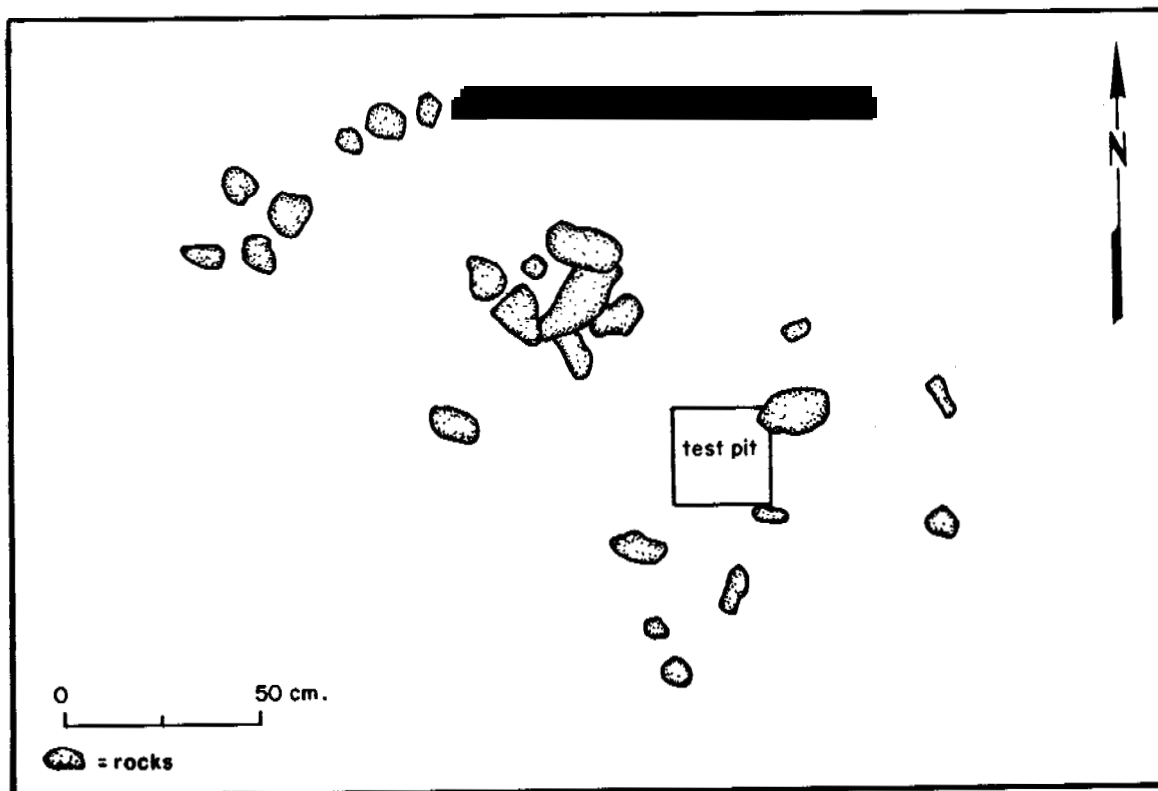


Figure 4. Cobble concentration, LA 98680.

Two Santa Fe Black-on-white bowl sherds are from the same vessel, but they do not fit together. Both sherds have worked or shaped edges. The edges are round, as if they were shaped intentionally and not a by-product of use. The paste is fine grained and slightly vitrified. The temper is fine subangular quartz. The quartz is abundant, making the clay appear self-tempered. The paste is similar to sherds identified by Lang and Scheick (1989:62) from the Agua Fria Schoolhouse site, except that the subangular quartz in Lang's specimens was sparse.

### Cultural-Historical and Functional Background

Based on the Santa Fe Black-on-white bowl sherds, LA 98680 may date to the Coalition period (A.D. 1200 to 1325-1350). The bowl sherds were not in direct association with the cobble concentration and lithic artifacts. Still, the sherds will be treated as contemporaneous with the rest of the site, just as the Basketmaker II projectile point was considered contemporaneous with the rest of the LA 84775 assemblage.

The Coalition period is marked by three major changes in the archaeological record in the Northern Rio Grande: (1) a significant increase in the size and numbers of sites, suggesting an increase in population over the late Developmental period; (2) pithouses as domiciles were replaced by contiguous arrangements of adobe and masonry surface rooms; and (3) a change in pottery-making technology from mineral paint to organic-based painted pottery. These changes were sufficiently important to warrant a new period in the Northern Rio Grande cultural sequence that was divided into two phases: Pindi (A.D. 1220-1300) and Galisteo (A.D. 1300-1325) (Wendorf and Reed 1955). The decorated pottery was divided into Santa Fe Black-on-white and all its local variants (Stubbs and Stallings 1953) for the Pindi phase and Galisteo Black-on-white (Mera 1935) for the later phase. Most of the large sites were established during the Pindi phase. The largest sites continued to grow into the Galisteo phase, anticipating the large villages of the Classic period. Site sizes ranged from 2 to 200 rooms; 15 to 30 rooms was the most frequent size (Stuart and Gauthier 1981:51). Site frequencies in all areas of the Northern Rio Grande increased enormously at this time (Biella and Chapman 1977:203; Orcutt 1991; McNutt 1969).

Site data for the late Coalition period show a thriving community along the Santa Fe River. Farming along the Santa Fe River, the presence of fresh water springs, and the access to diverse environments for subsistence items and raw material all contributed to successful settlement. So successful was settlement that while the communities of the Four Corners area of the American Southwest were declining, the Santa Fe River community was growing. It is presumed that the residents of these Santa Fe River communities were the primary users of the Las Campanas piñon-juniper woodlands and grasslands and arroyo floodplains during the Coalition period.

The Coalition period has the greatest number of dated sites or components within the Las Campanas site assemblage. Twenty-one sites date between A.D. 1200 and 1325. Furthermore, about 40 percent of the isolated sherds from all periods date to the Coalition period. The greatest number of Coalition period sites is in the Estates III/West Golf Course area. These are early or middle Coalition period sites, as defined by the presence of Santa Fe Black-on-white, Galisteo Black-on-white, and Wiyo Black-on-white. Generally, the Coalition period sites range from 300 to 2,800 sq m in area with one site extending over more than 10,000 sq m. The lithic artifacts



are mostly core reduction flakes with ground stone and bifaces only occasionally present. Some of these sites, especially from the Estates III/West Golf Course area, are multicomponent with evidence of later occupations. The low frequency of bifacial tools and ground stone at these sites suggests they were resource extraction loci with processing or consumption occurring at the residence. Hunting may have been staged from these sites, but there is very little evidence of tool production or maintenance. Basically, the Coalition period sites look very similar to the earlier Developmental period sites, except that there are more of them.

### Research Questions

LA 98680 has an artifact assemblage that is similar to a limited activity site or temporary base camp from the Basketmaker II period. LA 98680 is different because it is an unburned cobble concentration. The cobble concentration may be the remains of a foundation or part of a storage facility. The Las Campanas area is 7 to 10 km from the Santa Fe River village sites and is outside the 5 km diurnal gathering range suggested for farmers. Resource areas outside the diurnal range may have been less intensively used unless more permanent camps were established to decrease the amount of travel between gathering loci and the village (Viti-Finzi and Higgs 1970). If the cobble concentration is a foundation, then the site may indicate the use of a staging strategy geared toward more efficient collection and transport of gathered foodstuffs.

If piñon nut gathering was a primary subsistence activity conducted in the Las Campanas area, then distance to the village would have been important because of transport costs. In other words, how many 25 kg bags could a Coalition period gatherer move daily given a round trip of 14 km or more? Thus, distance to the village might have conditioned gathering strategies for Santa Fe River village people.

The 7- to 10-km one-way distance from resource to village seems too long for daily travel and transport of gathered resources. It is more likely that an optimal distance for travel would have been in the 5 km or 10 km round-trip range. This shorter distance may have worked as long as the population of the Santa Fe River remained at the level that a 5-km radius could support. If the population outstripped the carrying capacity of the 5-km radius, then a greater radius would have been needed. To accommodate the need to exploit a larger area, a new strategy for gathering resources might have been developed. Exploiting a larger area at a greater than 10-km radius from the Santa Fe River village may have entailed the concentration of gathered resources at a central location. The resources would have been removed to the village in manageable loads.

This model for exploiting a larger area is mostly speculative and based primarily on common sense. Hunter-gatherers arrange base camps and limited activity sites across the landscape to gather resources for transport to the residence. These logistical strategies could have worked just as well for the less mobile Coalition period farmers of the Santa Fe River valley.

LA 98680 has a cobble concentration that may be the disarticulated remains of a foundation. One aspect of the research effort at LA 98680 will focus on determining if the cobble concentration is the remains of a small structure. Another aspect of the research will focus on the artifact assemblage differences with other small Coalition period sites in the Las

Campanas area that may reflect its use as a staging area for gathering. The following problem domains will be addressed in trying to develop the staging model for Coalition period gathering strategies.

### *Chronology*

Does the LA 98680 date to the Coalition period? This question is simple, but important. The Coalition period date that has been assigned to the site is based on two worked Santa Fe Black-on-white sherds. The sherds are not directly associated with the cobble foundation and lithic artifact concentration. To be certain that LA 98680 dates to the Coalition period, supporting evidence should be collected and evidence of earlier occupations should be absent.

Supporting evidence would be the recovery of Santa Fe Black-on-white sherds from within or closer to the cobble concentration and lithic artifact concentration. Independent support could be derived from C-14, obsidian hydration, or archaeomagnetic samples, if appropriate contexts for sample collection exist. The Coalition period date needs to be confirmed or at least not directly refuted. An earlier or later date associated with the cobble concentration and lithic artifact concentration would reject the single-component assumption. Without this assumption a staging model for gathering is an unnecessary explanatory step.

### *Site Function and Structure*

Does the site structure reflect staging activities? Site structure refers to the feature, the artifact assemblage, and the spatial relationships between and within them. The cobble concentration must be shown to be a foundation. The artifact assemblage must reflect what would be used and discarded during the construction and maintenance of a staging area and associated activities.

For the cobble concentration the data recovery effort will focus on determining its function. The cobble concentration will be carefully examined for evidence of construction methods. This evidence may include post holes, adobe chunks, or a change in the soil suggesting melted adobe mortar. The interior of the feature will be examined for evidence of activities besides storage. Their presence would not necessarily exclude storage, but storage as the primary activity would have to be questioned. The size of the foundation and the projected floor area of the structure will be used to assess its use for storage or nonstorage activities.

The artifact assemblage is different from other limited activity sites identified during the OAS survey. There is more angular debris and the artifacts tend to be smaller. These differences may result from the production or maintenance of wood-working tools used in constructing a jacal structure. The excavation will focus on determining the relationship between the lithic artifacts and the cobble concentration. The artifact distributions will be used to determine if the artifacts result from activities conducted within or near the structure, after the structure was abandoned, or during the construction of the structure. Sites that may have been wood-working tool production loci exist in the Sangre de Cristo Mountains (Lang 1989). The assemblages from these sites can be compared with LA 98680.

## Developing a Model

If the feature and artifact data confirm a Coalition period date, they do not refute the possibility that the cobble concentration was a foundation, and artifacts reflect construction and maintenance activities, then is a staging strategy for gathering an appropriate determination? A possible staging model has been very generally proposed. When other conditions are met research will be conducted to better develop the model through ethnographic analogy and archaeological evidence from other areas. This model will look at distance, populations, and environmental constraints on gathering. The model then will be evaluated with the LA 98680 data.

The conditions for proposing a model for staged gathering may not be met. In that case, LA 98680 will be compared with other Coalition period sites for differences in artifact assemblages that may reflect different use within the Las Campanas area.

## LA 84759

### Site Description

LA 84759 is on a rocky escarpment slope, just below a sandstone outcrop ledge. The slope faces east and southeast. The vegetation is piñon-juniper, snakeweed, cholla, and yucca. The soils are loose sand mixed with talus rock and gravel. The site is eroding downslope.

LA 84759 has two lithic artifact concentrations associated with a dispersed scatter of chert core flakes, a Jemez obsidian flake, and two cores. There are also scattered sherds including smeared indented corrugated, Abiquiu Black-on-gray, Kiua or Cochiti Polychrome, undifferentiated black-on-white, and an undifferentiated red ware. The artifacts cover a 3,500 sq m area (Fig. 5). The artifact types and distribution indicate multiple occupations during the early Classic period (A.D. 1325 to 1450) and the historic period from Spanish Colonial to the late Territorial period (A.D. 1760 to 1900).

### Cultural-Historical and Functional Context

Wendorf and Reed (1955) mark the beginning of the Classic period (A.D. 1325-1600) by the appearance of Glaze A and locally manufactured red slipped pottery (see also Mera 1935; Chapman and Enloe 1977). Characterized by Wendorf and Reed as a "time of general cultural florescence," regional populations reached their maximum size and large communities with multiple plaza and room block complexes were established. Although the reasons for the appearance and proliferation of the glaze wares are debatable, many researchers, including Eggan (1950), Hewett (1953), Mera (1935, 1940), Reed (1949), Stubbs and Stallings (1953), and

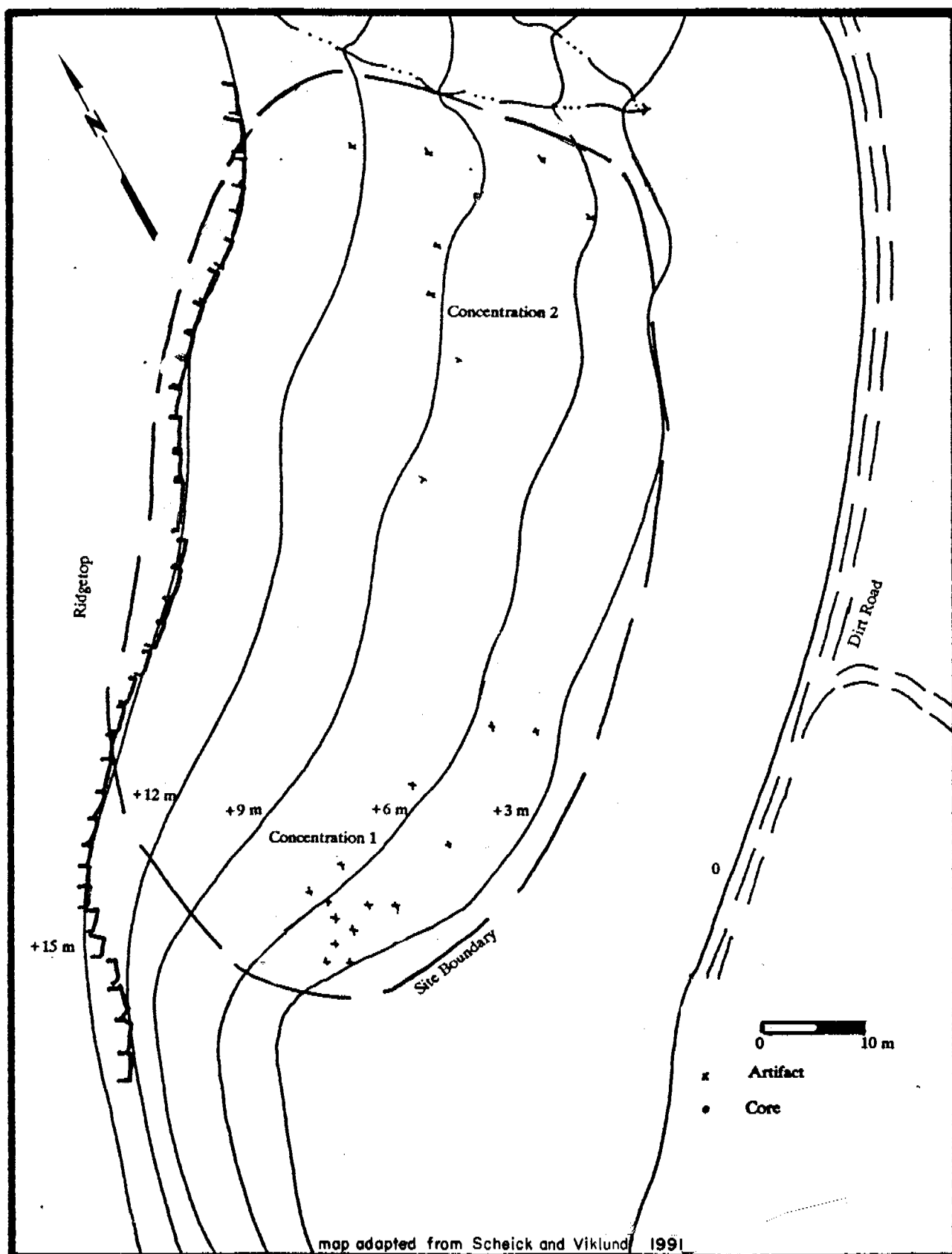


Figure 5. LA 84759 site map.

Wendorf and Reed (1955), believe that the similarity of the new pottery to White Mountain Redware is evidence for large-scale immigration into the area from the San Juan Basin and Zuni region. Steen (1977) argues, however, that the changes seen during this period resulted from rapid indigenous population growth. Steen believes that the population growth was enabled by favorable climatic conditions that allowed Rio Grande populations to practice dry farming in previously unusable areas. Steen also suggests that there was "free and open" trade between the Northern Rio Grande region and other areas, accounting for the observed changes in Classic period material culture.

It is therefore unclear how much of the population increase during this period resulted from immigration or from intrinsic growth. Besides populations migrating from the west, it has also been suggested that some population growth was due to the arrival of people from the Jornada branch of the Mogollon to the south, and perhaps from northern Mexico (Schaafsma and Schaafsma 1974).

Large villages of this period found in the Santa Fe vicinity include the Aqua Fria Schoolhouse site (LA 2), Arroyo Hondo (LA 12), Cieneguilla (LA 16), LA 118, and LA 119. Soon after Glaze B pottery appeared (ca. A.D. 1425), however, only Cieneguilla was still occupied by a large population. Dickson (1979) believes that abandonment of the large villages was due to the drought conditions revealed by tree-ring studies (Rose et al. 1981) and subsequent agricultural failure.

To the south of the project area, in the Santa Fe River Valley, LA 1 and LA 2 are the best known Classic period sites. LA 1 was occupied between A.D. 1325 and 1350, which is the early part of the period (Stubbs and Stallings 1953:155). This may have been a time of population movement and village reorganization. Pindi Pueblo experienced a short interlude of decreased occupation before A.D. 1325, but by A.D. 1330 there was new building and renewed use of older parts of the pueblo (Stubbs and Stallings 1953:14). A similar pattern was suggested for LA 12 (Arroyo Hondo Pueblo) (Lang and Scheick 1989:196). A change in kiva function may be indicated by a change in their frequency (four to two) within villages and a change in their location from subterranean to surface placement. Perhaps as kiva function became more specialized, the number decreased. Plazas were more conspicuous at this time suggesting a more centralized social organization that may have required larger community areas for social or ceremonial functions. It is known that the large villages of the Galisteo Basin, the Rio Grande, and Rio Chama showed the same trends in the construction of fewer kivas and use of larger, more centrally located community space, similar to early Classic period Pindi Pueblo. The full florescence of the Classic period was not realized at Pindi Pueblo because it was abandoned in A.D. 1350, just as the larger villages were being established.

The limited excavation data for LA 2 suggests an occupation that lasted until A.D. 1420, which corresponds to Arroyo Hondo Pueblo and Cieneguilla. Little is known about the early Classic period at LA 2. The abundance of Glaze A pottery suggests that the residents were engaged in regular social or economic interaction with the more southern Classic period villages (Lang and Scheick 1989). Lang and Scheick (1989:195) surmise that LA 2 was the largest village in the Santa Fe River Valley until A.D. 1420. If the village did house between 1,000 and 2,000 people as suggested by Lang and Scheick (1989:196), then the smaller surrounding villages (LA 117, LA 118, and LA 119) may have been abandoned by A.D. 1350 with the local population coalescing at LA 2. An untested hypothesis suggests that this coalescence may have

been brought on by a change in social organization, and not environmental conditions. The resources of the Santa Fe River had been successfully exploited by many smaller villages. Success notwithstanding, sometime after A.D. 1350, everyone may have moved into one large village. If economic resources were equally available to all, then there must have been other social or religious factors that contributed heavily to population aggregation (Cordell 1978:58).

The Classic period sites total 11 in the Las Campanas area and are concentrated in the Estates III/West Golf Course and Estates II areas. The Classic period sites range between 500 and 2,500 sq m in size. They are primarily small concentrations of sherds and lithic artifacts with a dispersed overlay of core flakes from local lithic material. Most of these sites exhibit evidence of core reduction, and occasional utilized flakes or biface fragments. These sites essentially show little change from the preceding period, except the artifact scatters tend to be smaller and the pottery types are different.

The Spanish Colonial period spanned A.D. 1698 to 1821, the year of Mexican independence from Spain. It was a period of settlement growth and expansion in New Mexico. Subsistence ranching within the *partido* system flourished and is evidenced by the Spanish Colonial sites from the Cochiti Reservoir area (Snow 1979). Sites that date between A.D. 1760 and 1880 have not been recorded for the Santa Fe River, except from the Component V excavation at LA 2 (Lang and Scheick 1989:197-198) and a small artifact scatter, LA 87016, near Agua Fria on the north side of the river (Post and Snow 1992).

By the 1750s and continuing into the early nineteenth century, much of the land surrounding Santa Fe had been partitioned into land grants. The Las Campanas area is bordered by confirmed portions of the Jacona and Caja del Rio grants and is within a few miles of the Cieneguilla, Tesuque, and San Ildefonso grants. Post-1700 use may have been restricted to Spanish inhabitants, except for travel. This restricted use would have resulted from the partitioning of land grants.

The Las Campanas area would have been part of the *ejido* or *monte*, the common land that was used by all residents within a grant, but not owned by a single individual (Ebright 1987:19). Therefore, the sites containing and isolated occurrences of Powhoge Polychrome, Kiua Polychrome, or other historic Pueblo pottery types cannot be assigned only to Native American or Spanish use of the Las Campanas area.

#### Research Questions

LA 84759 is the only site in the Las Campanas area associated with a rock ledge and talus slope. Thus, it is likely that site placement is an important condition of site function. The evidence for multiple occupation suggests that site location along the sandstone outcrop and talus slopes was not a random occurrence. The research questions will focus on determining the age of the artifact concentrations and the site function. The two artifact concentrations will be compared with each other and with other Classic period assemblages for differences that relate to site function. If an artifact concentration or activity area can be assigned to the historic period, then the historic, Classic, and other components will be compared.

### *Chronology*

When was the site occupied and how many occupations are evidenced by the lithic artifact concentrations and artifact scatter? LA 84759 exhibits surface artifact distributions from at least two occupation episodes and an artifact scatter that may be associated with the two episodes or are the eroded remains of additional occupation episodes. During the OAS survey, a low correspondence between sherd and lithic artifact concentrations was noted. This weak spatial association made it difficult to determine if the sherds and lithic artifacts were from the same occupation. At LA 84759, the same weak spatial association was reported.

Each concentration will be excavated for associated datable material, which could be more potsherds, projectile points, or features that yield C-14 or archaeomagnetic samples. If the concentrations lack datable material, the scattered potsherds will be point-provenienced to determine more precisely the spatial relationships. Erosion also will be considered as a factor in artifact displacement. Failing to obtain more sherds or chronometric samples from the concentrations, a small area including the different pottery types may be excavated to determine if the sherds are part of a larger, buried deposit or result from a pot drop. More precise site dating will enhance comparisons with sites from the Classic and historic period and between sites of all periods.

### *Site Structure and Function*

Do the different occupations exhibit variability in artifact assemblage content and distribution? Analysis of site structure and by inference, site function, can be conducted across and independently of time. Cross-temporal comparisons will depend on reliable dates for each concentration and the site scatter. Without good temporal control, the artifact assemblage content can be compared between concentrations and the dispersed scatter for nontemporally related differences.

Site structure analysis will examine the distribution of artifacts and artifact attributes. Different site activities or different technologies used for the same activities can be observed and compared. Lithic artifact attributes, such as artifact type, artifact function, dorsal cortex, and artifact size will be used for this analysis.

Based on the survey results, the artifact scatter and concentrations appear to be very similar, except for the presence of potsherds in the site scatter. Core reduction flakes are the most common and they are of local material, except for one piece of obsidian. Excavation may yield an artifact assemblage that is more diverse or of similar content, but in greater numbers, which should result in variability that can be compared.

Site function will be inferred from artifact types and functions as they reflect stages of manufacture, use or maintenance of stone tools. The previously mentioned morphological and technological variables will be used for defining different trajectories. Ceramics will be monitored for vessel form, portion, wear, and reuse since these attributes are important functional indicators and they inform on the use-life of a ceramic tool.

Features, such as architectural remains or hearths and roasting pits, may provide direct evidence of plant gathering or processing. Previous excavation of Las Campanas sites have yielded no architectural remains. Roasting pits and hearths are more common on Las Campanas sites. These features will be excavated and examined for evidence of reuse, ethnobotanical remains, faunal remains, and morphological attributes that may relate to feature function.

The results of the site structure and function analysis will yield data that can be compared with other Las Campanas sites. As SAC data becomes available comparisons may be made that will allow interpretations across time and site type. Because LA 84759 is in a unique setting, differences between LA 84759 assemblage content and structure and other sites will be examined in terms of the topographic features such as slope, aspect, and drainage.

## LA 84758

### Site Description

LA 84758 is within a small semicircular drainage system, between a mesita top and a flat alluvial valley. It is on a slope that is moderately steep with a southwest exposure. The flat alluvial valley is formed by the confluence of two large, unnamed arroyos that drain a large portion of the west project area. The vegetation is piñon-juniper, snakeweed, cholla and prickly pear cactus, and grama grasses. The soil is sandy mixed with cobbles and gravel.

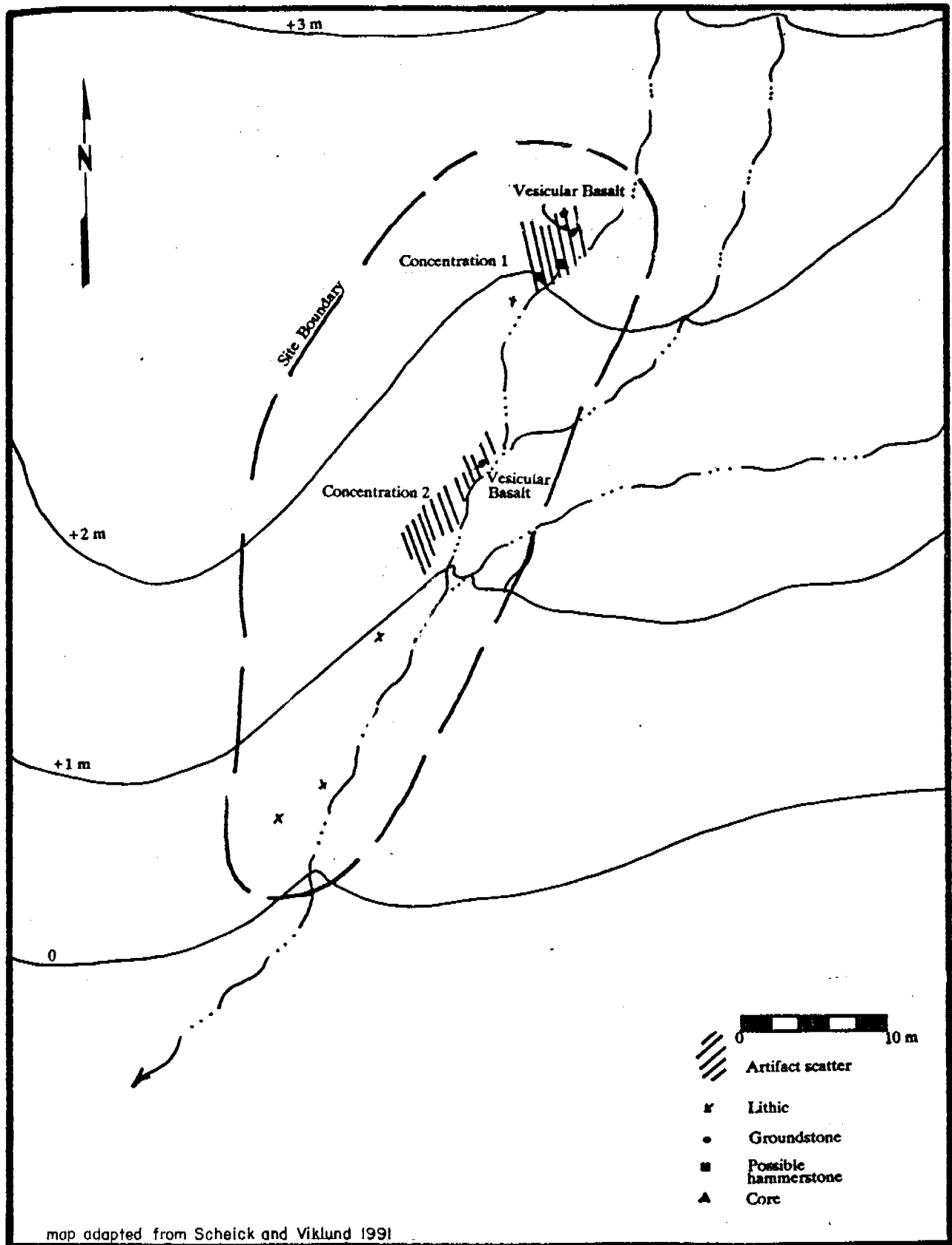
LA 84758 has two major lithic artifact concentrations and a dispersed artifact scatter that cover about 1,000 sq m (Fig. 6). Concentration 1 has 22 artifacts that are mostly chert secondary flakes and pieces of angular debris. Besides the lithic reduction debris there are two metate fragments, a few cores, and a hammerstone. Concentration 2 has 17 artifacts that are mostly chert core flakes. There is one vesicular manuport. The artifact scatter has chert core flakes and pieces of angular debris.

There are no temporally diagnostic artifacts. The artifact types indicate core reduction and possibly some food processing. No features were observed. Other excavated sites in the Las Campanas area that had ground stone also had hearths or roasting pits, so they may be present at LA 84758.

### Cultural-Historical and Functional Context

Temporally nondiagnostic artifact scatters were the most common site type identified during all phases of the Las Campanas survey. Nondiagnostic artifact scatters make up 72 percent of all sites recorded at Las Campanas. Scheick has correctly asserted (1991:103) that before the Las Campanas survey, limited activity sites in the Santa Fe area had been interpreted in a simplistic manner with respect to their role in local settlement and subsistence patterns. Part





**Figure 6. LA 84758 site map.**

of the problem comes from a previous reluctance to classify small artifact scatters as sites when they were found in large numbers (Wiseman 1978). Another problem was that before 1978, the only large-scale survey in the Santa Fe area had been for the Arroyo Hondo project. Dickson (1979) uses the survey data to model hierarchical importance of different resource zones within the Arroyo Hondo sustaining area. As the data from the Las Campanas survey and excavation projects become available, new perspectives and models for Archaic and Pueblo hunting and gathering may be developed.

After the excavation of 10 sites for the Estates I phase of Las Campanas, SAC developed a site typology based on site structure components, such as artifact density and feature presence or absence. This reduced the original classification of 10 site types to three types: artifact concentrations or scatters with features, continuous artifact scatters or concentrations, and dispersed artifact scatters. To date there has not been an analysis of the distribution of these site types through time or relative to artifact density, artifact assemblage composition, site size, or topographic attributes.

LA 84758 is a continuous artifact concentration and scatter. The two artifact concentrations represent two occupation episodes because they are spatially separate. Although the site map does not precisely delimit the boundaries of the artifact concentrations, it would appear that they fall within the high density categories used by OAS and SAC during the survey. This category is one or more artifacts per 2 sq m. This higher density separates them from the site artifact scatter as probable activity areas. It is the artifact composition and the distribution of these artifact areas that is important for understanding the site history.

### Research Questions

The research efforts at LA 84758 will focus on description and analysis of the artifact assemblage and distribution. From this study a profile may be derived that can be compared with the data collected by the SAC data recovery program. Interpretation of the data will focus on site structure, and by inference, site function. If the site can be dated from artifacts or samples collected during the excavation, then the site will be interpreted within the appropriate temporal/functional framework.

### *Site Dating*

During what period(s) was LA 84758 occupied? LA 84758 could not be assigned an occupation date because temporally diagnostic artifacts were not observed in the surface artifact assemblage. The two lithic concentrations are evidence of two occupations. They do not seem to result from reuse by the same group because the concentrations are spatially discrete. Excavation of the concentrations may recover diagnostic artifacts or chronometric samples. During the SAC excavations, when temporally diagnostic artifacts were absent from the surface assemblage they rarely were recovered from subsurface contexts. Thus, the expectation that datable artifacts will be recovered by OAS data recovery is low.

Another pattern that was evident in the SAC excavations is a good correspondence between multiple types of hand tools and subsurface features. LA 84758 has metate fragments and a hammerstone, so hearths or roasting may be present. C-14 samples will be collected from these features if there is charcoal. The charcoal will be sorted by taxon and the sample will be evaluated for its potential to yield a reliable date.

Lithic artifact attributes will be recorded during the laboratory analysis that can be used to create an assemblage profile. This profile can be compared with dated and undated lithic artifact assemblages. These comparisons may provide a relative date, though lithic profile dating will be interpreted very cautiously.

### *Site Structure and Function*

Do the artifact concentrations and scatter exhibit variability in artifact assemblage content and distribution? Analysis of site structure, and by inference, site function will be conducted independently and across time, if datable material is recovered. Cross-temporal comparisons will depend on the reliability of the dating for each concentration and the site scatter. Even without good temporal control the artifact assemblage content can be compared between concentrations and the dispersed scatter.

Site structure analysis will examine the distribution of artifacts and artifact attributes. Different site activities or different technologies used for the same activities can be observed and compared. Lithic artifact attributes, such as artifact type, artifact function, dorsal cortex, and artifact size will be used for this analysis.

Based on the survey results, the artifact scatter and concentrations appear to be very similar, except for the presence of metate fragments and a hammerstone in one concentration. Core reduction flakes are the most common and they are of local material, except for one piece of obsidian. Excavation may yield an artifact assemblage that is more diverse or of similar content, but in greater numbers, which also should result in variability that can be compared.

Site function will be inferred from artifact types and functions as they reflect stages of manufacture, use, or maintenance of stone tools. Morphological and technological variables can be used for defining different trajectories that may result from material procurement, core reduction, or tool production. Ceramics will be monitored for vessel form, portion, wear, and reuse since these attributes are important functional indicators and they inform on the use-life of a ceramic tool.

Features, such as architectural remains or hearths and roasting pits, may provide direct evidence of plant gathering or processing. Previous excavation of Las Campanas sites has yielded no architectural remains. Roasting pits and hearths are more common on Las Campanas sites. These features will be excavated and examined for evidence of reuse, ethnobotanical remains, faunal remains, and morphological attributes that may relate to feature function.

The results of the site structure and function analysis will yield data that can be compared with other Las Campanas sites. As these data become available, comparisons will be made across time and site type.

Site Description

LA 98861 is at an elevation of 1,970 m (6,440 ft) on a northwest-facing slope. The site is just below a ridge top of grassy table land. The site overlooks the floodplain of an unnamed arroyo to the north. The site is on the fringe of the piñon-juniper woodland. The ground cover is blue grama grass, cryptogenic moss, and rabbitbrush. The cryptogenic ground cover is an indicator of stabilized soils that have sustained little or no recent disturbance. The soil is loose fine-grained clay sand mixed with abundant gravel and cobbles.

LA 98861 is a L-shaped cobble-mulched garden with an associated single cobble wide checkdam that covers about 2,700 sq m (Fig. 7). Three chert and one quartzite core flakes are also associated.

The cobble-mulched field is distinguished by a series of parallel linear arrangements of medium to large quartzite and granitic cobbles. Two areas within the field alignment have may internal structure. The area in the northwest portion of the field is 5 by 4 m with medium and large cobbles evenly spaced at 40 to 50 cm intervals. Small cobbles and gravel fill the intervening spaces between larger cobbles. There are at least six alignments of this type. In the

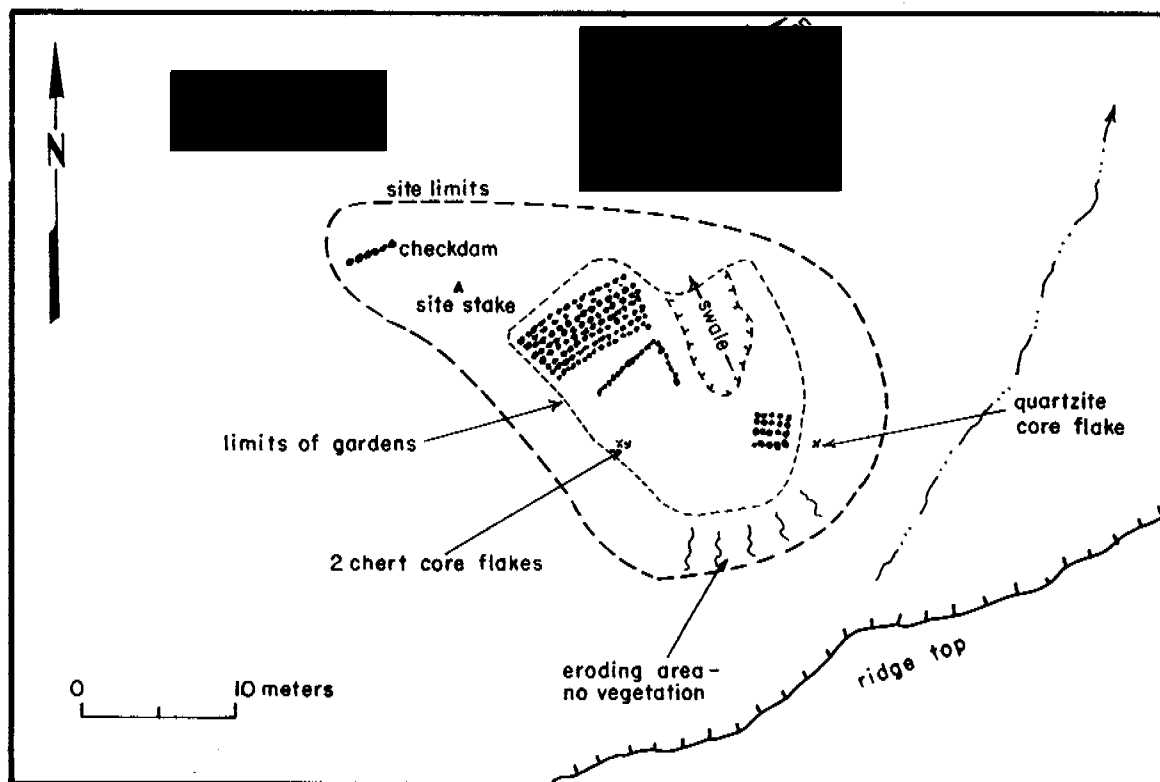


Figure 7. LA 98861 site map.

southeast portion of the field there are closely spaced medium-size cobbles that form a close knit grid. The internal structure of this area is similar to features reported along the Rio Chama north of Española, New Mexico (Anschuetz et al. 1985; Maxwell and Anschuetz 1992).

The associated checkdam is a single cobble wide and intact. It is not in a drainage and the cobbles are mostly buried, suggesting that the feature pre-dates the CCC of the 1930s. The checkdam is 3.0 m long.

There are four core flakes within the cobble-mulched field or on its immediate periphery. Three of the core flakes are chert and the other is quartzite. They are from early and middle stages of core reduction. Two have dorsal cortex and they have a maximum dimension ranging from 32 to 85 mm. The contemporaneity of the artifacts and the field cannot be determined.

### Research Questions

Cobble-mulched fields have been widely reported along the Rio Grande, the Ojo Caliente, and the Rio Chama. These features are assigned to the Coalition and Classic periods (A.D. 1175 to 1500). The fields of the lower Rio Chama have been interpreted as evidence of diverse farming strategies that were employed unevenly across space and throughout the Classic period occupation of the Rio Chama (Maxwell and Anschuetz 1992:67). Researchers argue that the fields reflect a dynamic response to change that may have helped to minimize productive risk, but also served to increase productive capacity.

Cobble-mulched fields have at least four benefits that have been outlined by Maxwell and Anschuetz (1992:44). (1) The cobble mulch may absorb heat during the day and radiate the heat at night, raising the ground temperature. This absorption and radiation cycle raises the soil and ground temperature and may lengthen the growing season by negating the effects of early or late frosts. (2) The cobble mulch allows rapid infiltration of surface runoff, which increases the water available to plants from summer-dominant precipitation. (3) The cobble mulch may increase soil moisture by retaining a greater percentage of winter and spring precipitation. This increases moisture available for seed germination and early plant growth. (4) The cobble mulch may reduce the air movement at the ground surface resulting in less evaporation. These four factors may operate at varying levels of effectiveness increasing potential agricultural production by ameliorating deleterious climatic factors throughout the plant growth cycle.

As an isolated feature, the field at LA 98861 does not imply the dynamism that is suggested for the Rio Chama. It does suggest that farming occurred along the margins of the larger arroyos in the Las Campanas area. This is important because some low density artifact scatters may result from part-time farmers, who tended fields and took advantage of the vast piñon-juniper woodland.

With only one cobble-mulched field in the Las Campanas data base, the goals of the data recovery effort will be modest. Many problem domains relating to functional differences of field types are better addressed with a larger sample. Data recovery efforts at LA 98861 will maintain comparability with recent studies in the Galisteo Basin (Lightfoot 1990), lower Rio Chama (Anschuetz et al. 1985; Maxwell and Anschuetz 1992), and Ojo Caliente (Ware and Mensel 1992)

areas. Long-term experimental and environmental studies will not be conducted, though they may provide the best avenue to understand field variation (Ware and Mensel 1992:98).

### *Site Confirmation*

Is LA 98861 a cobble-mulched field? Authenticity as a cobble-mulched field must be confirmed as part of the excavation at LA 98861. From the literature (Lightfoot 1990:166-178; Anschuetz et al. 1985:75-76, 107-109), criteria for field identification can be outlined.

**Criterion 1.** The gravel should lie on top of the soil and not be intermixed with the soil substratum. This is a functional requirement of cobble or pebble mulches because a reduction in soil pore size and spacing increases evaporation. This combining of silty soil and the cobble mulch creates a seal and increases the potential for crusting (Lightfoot 1990:166). Problems with this criterion are obvious. (1) The field may have been abandoned for over 500 years so that wind-blown soil has mixed with the cobble mulch. (2) The gravel may deflate, erode, and compact on top of the underlying sediment. These actions would result in soil and mulch mixing. Mixing of soil and mulch may make it difficult to discern a difference between the cultural and natural deposit.

The use of this criterion will involve excavation of test trenches that provide a cross-section of the interior and exterior field. The profile will be examined for differences in the vertical distribution of soil and gravel. Presumably, if the field was prepared with a soil substratum and a cobble overburden, some remnant of this arrangement should remain.

**Criterion 2.** The gravel and cobbles used in the field had to come from a source exterior to the field. Two potential sources are borrow pits and the surface surrounding the field (Lightfoot 1990:169). No borrow pit was observed at LA 98861, therefore the immediately available surface gravel is the most likely source. If this is true, then there should be a difference in the volume of gravel from within and outside the field. This difference should be apparent in the upper 20 cm of the mulch (Lightfoot 1990:173). It is also probable that the soil to gravel volume would be higher in the upper 5 to 10 cm level outside the field if removed gravel was replaced though erosion by soils and small pebbles.

The gravel volumes can be measured by screening the soil and gravel from within and outside the field. This can be done in gradations of  $< \frac{1}{4}$  inch,  $< \frac{1}{2}$  inch, and  $> \frac{1}{2}$  inch. The amount of each gravel size will be weighed and the weights compared for inside and outside the field. Differences of two times or greater magnitude within the field would be a strong indicator of its authenticity.

**Criterion 3.** The fields may exhibit patterning that defines the limits of the growing area. These patterns may include field borders or dividers. Borders define the field exterior with a single tier of contiguous cobbles that may be upright or lying flat on the ground. Dividers are cobble alignments within the field that form compartments. The function of the compartments is unknown, but may relate to further slowing runoff, directing moisture to specific areas within the field, or to segregating crops that had different growth or maintenance requirements (Lightfoot 1990:169; Maxwell and Anschuetz 1992:61).

An excavation of a sample of the field would include a portion of the border and interior areas that show surface indications of structure. If a border or internal structure is defined this would be confirmation of the authenticity of the field. Confirmation of a border may occur during testing Criteria 1 and 2.

**Criterion 4.** Nonstructural evidence of the field may remain. This evidence would be marker grains of pollen from economic plant species or an abnormally high count of weedy species that would thrive in the disturbed soil of an abandoned field. Species that produce low count pollen can be identified by Intensive Sample Microscopy (ISM [described in Dean 1991]). This technique has proved valuable for identifying economic plant pollen in field contexts (Moore 1992).

During the excavation of the test trenches for testing Criteria 1-3, pollen samples will be collected from the gravel layer 5 to 20 cm below the surface. A pollen sample will be collected from outside the field as a control. If economic pollen is identified, its presence would be a strong indication that the fields are authentic. Unfortunately, this confirmation may come after the excavation is completed, but it will provide a check of conclusions derived from testing Criteria 1-3.

#### *Site Characterization*

What attributes distinguish LA 98861 from the surrounding environment and from other fields recorded in the Rio Chama, Ojo Caliente and near San Marcos Pueblo in the Galisteo Basin? Based on Criteria 1-3, if LA 98861 is determined to be a cobble-mulched field, the second goal of data recovery will be to characterize it in terms of edaphic, topographic, and local environmental variables. Edaphic variables include soil nutrients, composition, and texture. Topographic variables include slope, hydrology, and exposure, to name a few. Local environmental variables include topography, hydrology, elevations, growing season, precipitation, and others (Maxwell and Anschuetz 1992:44).

Characterization of edaphic variables can be done through a soil science laboratory and through field measurements. Excavation of test trenches within and outside the field will provide the basis for comparison of soil nutrients, composition, and texture. A soil sample will be collected from each cultural or natural layer within each test trench inside and outside the field. The samples will be submitted to a soil science laboratory for chemical and composition analysis. This analysis will record present conditions and hopefully detect any major differences that remain from past uses or alterations.

Soil composition and texture will be recorded in the field using standard terminology and techniques as outlined in Butzer (1976:76). These descriptions will be integrated with broader soil descriptions provided by Folks (1975) for Santa Fe County. Recording of gravel composition will be done to address Criterion 2. This information will be incorporated into the field characterization. From the test trench profiles the field construction will be described. The mulch descriptions will include soil depth and character, gravel mulch depth and gravel size variation, gravel color, and other characteristics. Field border, internal features, and cobble size and orientation will be recorded.

Characterization using topographic variables will include more detailed description of the site setting. A detailed contour map of the field and surrounding area will be made to show slope variability within and outside the field. The hydrology and soil data of LA 98861 will be compared with other nearby areas within Las Campanas to address site location.

### *Site Dating*

When was LA 98861 constructed? Cultural-historical reconstructions of the Upper Rio Grande Valley place the use of cobble-mulched fields between A.D. 1300 and 1500. During this period, pueblos along the Rio Chama, Ojo Caliente, and in the Galisteo Basin attained their largest size. Lightfoot (1990) suggests that it was an imbalance between population and traditional field productivity caused by severe drought between A.D. 1400 and 1425 that led to the proliferation of cobble-mulched fields. Lightfoot's position maintains that the cobble-mulched technology was a direct response to environmentally caused subsistence stress. Maxwell (1992) argues that cobble-mulched fields were more effective than other farming techniques in a varied precipitation regime, which led to their increased usage through time. Instead of a response to an immediate problem, cobble-mulched technique existed before the A.D. 1400 to 1425 drought period. The extensive distribution of cobble-mulched fields may reflect long-term use and not just a sudden, explosive response to the A.D. 1400 to 1425 drought.

At the moment, LA 98861 is the only example of a cobble-mulched field in the Las Campanas area. Does it represent, therefore, part of the technological pool of variation employed regularly by Pueblo farmers or does it represent an isolated response within a greater, more widespread response to subsistence stress and population increase aggravated by unfavorable climatic conditions? Dating of the garden to the early fifteenth century would support the latter perspective. Dating before the fifteenth century would lend support to the former perspective.

Dating field components has been problematic. Dates have been derived from association with larger pueblos or the presence of small numbers of temporally sensitive pottery types. Data recovery at LA 98861 will include careful resurvey of the site and surrounding area for temporally sensitive pottery types. LA 98691 is nearby, but dates to the A.D. 1175 to 1325 period. Pottery found within the mulch may be interpreted as predating the construction and deriving from scraping of the exterior for mulch material. Pottery found on the surface of the field will be interpreted as post-dating the field if only one type and more than one sherd from the same vessel is found.

## LA 85036

### Site Description

LA 85036 is on a north-facing hillslope above an entrenched unnamed arroyo that drains a large part of the western project area. The vegetation is piñon-juniper, grama grass, and chamisa. The soils are sandy with some gravel.



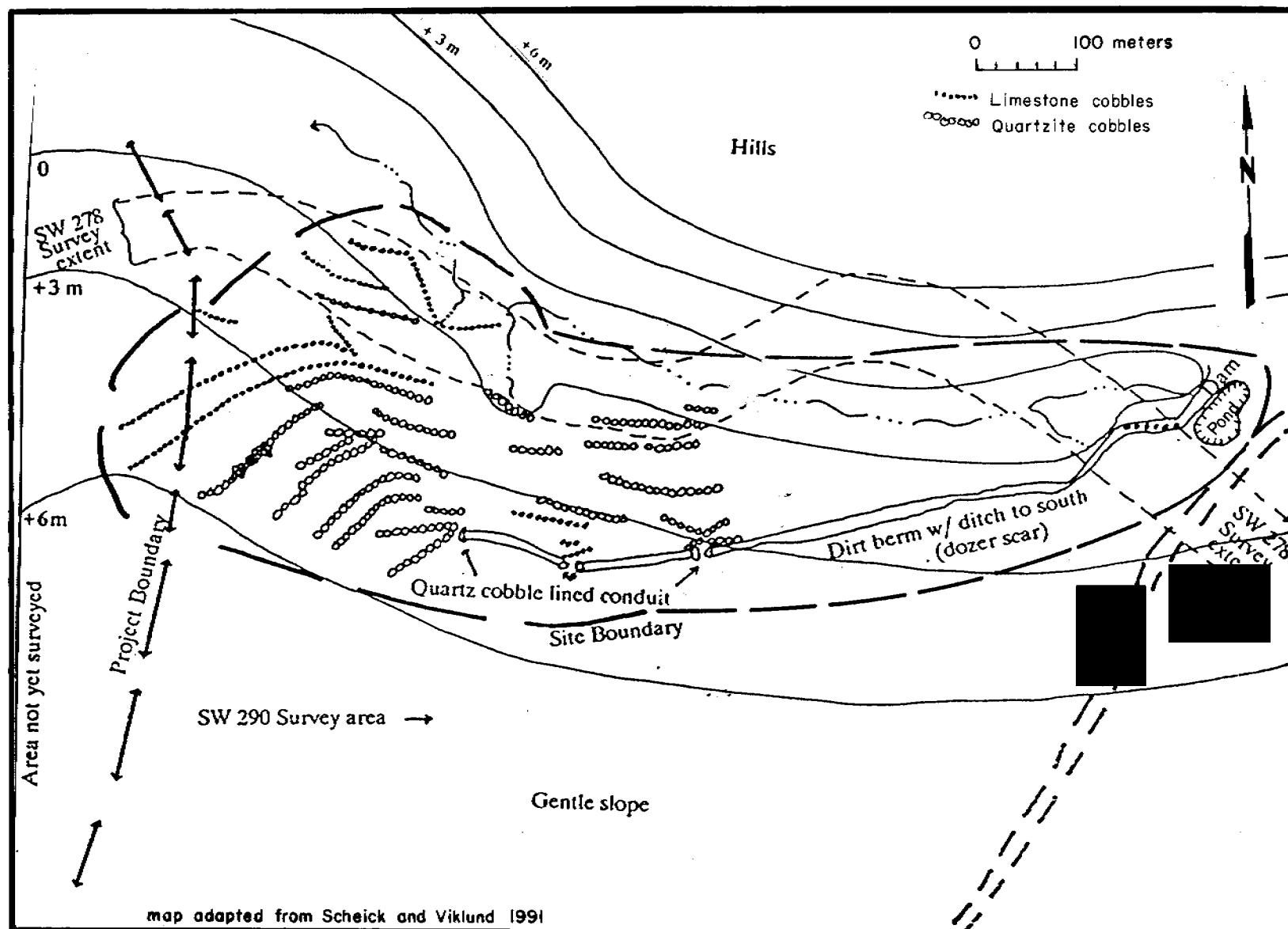


Figure 8. LA 85036 site map.

LA 85036 is a terrace complex that consists of 33 cobble alignments (Fig. 8). Twenty-three of the alignments are quartzite cobbles, nine are limestone, and one has a combination of quartzite and limestone. The alignments are between 30 and 300 m long. They are all one course wide. Spacing between the alignments is 15 to 20 m. Most of the alignments are straight, but a few are curved or have dog legs. SAC staff report that this complex is similar to terrace complexes associated with Galisteo Pueblo (Scheick and Viklund 1991:98). It is suggested that the terrace complex pre-dates the twentieth century.

There is an earthen berm approximately 600 m long that extends 300 m into the terrace complex at the southeast edge of the site. At the east end of the berm is a dam with a small pond formed behind it. Breaks in the berm are accompanied by shorter cobble alignments that may have served as diversion devices.

A third feature, a wheel or tire track, is not mentioned in the survey report, but is visible on 1:100 aerial photograph of the site area. On the photograph, the wheel or tire track appears as a linear feature that is slightly troughed. The track passes through six or seven of the alignments. From the photograph it cannot be determined which feature is earlier.

### Research Questions

LA 85036 is a large terrace complex covering an estimated 210,000 sq m. The alignments within the complex imply variability in construction materials, length, and orientation on the slope. They are spatially associated with a large berm, dam, and pond unit. It is not clear that the cobble alignments and berm, dam, and pond unit are contemporaneous. The berm, dam, and pond unit may have been built with mechanical equipment. The terrace complex appears to have been built by hand.

The survey assessment viewed the alignments within the terrace complex as contemporaneous, probably dating to before the twentieth century. The terrace complex may have been built to support ranching or farming by controlling runoff and soil erosion. The use of quartzite and limestone cobbles is an indication that there may be two construction episodes. The one alignment that exhibits mixed quartzite and limestone cobble construction may result from refurbishing an older alignment.

The research value of LA 85036 is that it represents a large-scale attempt to modify the landscape. Modification of the landscape may have supplemented ranching or agriculture or may have been a conservation measure aimed at retarding erosion and controlling slope runoff. There are three types of features on the site: cobble and limestone alignments; a berm, dam, and pond unit; and wheel or tire tracks. The research will focus on determining the order that these features were constructed, their function at the site level, and their function on a project level scale.

### *Site Chronology*

When were the features constructed? Based on the survey data and consultation with Lony Viklund, SAC project director, it is probable that the three features have different construction

and use periods. The quartzite cobble alignments and the berm, dam, and pond unit may be contemporaneous and the youngest features on the site. Subjectively, the limestone alignments are similar to Spanish Colonial terraces observed at San Marcos Pueblo. The wheel or tire tracks probably formed after the limestone cobble alignments, but before or contemporaneous with the cobble alignments and berm, dam, and pond unit.

This sequence can be evaluated by detailed examination of the spatial relationships of the features. The relative positions of the wheel or tire tracks and the quartzite and limestone cobble alignments need to be evaluated. Do the tracks overlay the limestone and quartzite cobble alignments? Are the limestone and quartzite cobble alignments on top of the wheel or tire tracks? Is one of the alignment types below and the other on top of the wheel or tire tracks? The condition of the cobbles within the wheel or tire tracks can be examined for displacement that might have resulted from wheel or tire-track use.

The quartzite cobble alignments and the berm, dam, and pond unit may be contemporaneous. There are two gaps in the berm that are associated with quartzite cobble-lined conduits. Similarity in material between the other quartzite alignments and the cobble conduits could indicate contemporaneous construction. Spatially, the quartzite cobble alignments are closer to the berm, dam, and pond unit than the limestone cobbles.

Former landowners will be interviewed about the berm, dam, and pond unit to determine when they were built. The interview will help to determine if the construction was done by work crews of the Civilian Conservation Corps or owners of the Santa Fe Cattle Ranch.

#### *Site Characterization*

What are the details of the feature construction and location? Though it is possible that the quartzite cobble alignments and the berm, dam, and pond unit may be contemporaneous and post-date 1930 they need to be sufficiently recorded to be a viable source of information for future research. The limestone cobbles may be older and have functions unrelated to the quartzite cobble alignments and berm, dam, and pond unit. The alignments may pre-date 1920 and represent land-extensive and labor-intensive efforts at land modification. They need detailed recording so they can be used in comparative studies by future researchers. The wheel or tire tracks are an extensive linear feature of unknown function or age. It is not likely that detailed recording of it will reveal information that would clarify age or function questions. However, the wheel and tire tracks may be important indicators of site formation sequence. They will be examined and recorded so the relationships between features can be better understood.

#### *Site Function*

What was the function of the cobble alignments? This study will focus on the alignments because the functions of the berm, dam, and pond unit and wheel or tire tracks are self-evident. The quartzite and limestone cobble alignments appear to be of similar construction. This also would suggest that they had similar functions.

Moore (1981) has classified prehistoric period terraces as supplemental or conservation features. Supplemental features add arable land to the landscape. They are man-made features of imported rock and soil. Moore often found prehistoric refuse mixed with soil behind the terraces. The supplemental terraces were usually more than one tier high and sometimes two cobbles thick. Conservation features were constructed to promote soil and water conservation. Soil erosion would have been retarded and soil build-up enhanced. Control of runoff would have increased water percolation and potential for plant use and reduced the threat of erosion. These forms exhibited natural soil accretion on their upslope side. Cobble alignments will be evaluated in terms of their supplemental and conservation potential.

## TREATMENT PLAN FOR LA 84754 AND LA 84776

LA 84754 and LA 84776 are historic period sites that date between 1900 and 1945. Each site has the remains of a one-room structure, associated extramural features, and a light refuse scatter. LA 84776 has four Jemez obsidian flakes indicating there is an underlying prehistoric occupation. The treatment of LA 84754 and LA 84776 will be different from the other artifact scatters and agricultural sites. Testing and fencing are proposed for LA 84754 and fencing is proposed for LA 84776.

### LA 84754

#### Site Description

LA 84754 is within the floodplain of an unnamed arroyo that drains the west-central part of the Las Campanas property. The arroyo bottom is braided and overgrown with intrusive weeds. The primary plant is yellow matchweed, which is a common weed on cleared lands associated with abandoned homesteads (Jaeger 1978:259). The arroyo is bordered by gentle to steep slopes with a piñon-juniper woodland ground cover and overstory. The slopes are cut by arroyos. The soil is loose fine-grained clay sand mixed with gravel and occasional cobbles.

LA 84754 was previously recorded by Scheick and Viklund (1991:15, 41) during the West Golf Course survey (Fig. 9). It was described as a one-room, sandstone masonry and adobe mortar structure with a viga and plank roof covered with dirt and gravel. The structure has one door and one window. Associated artifacts and three extramural features were identified.

Feature 1 is a collapsed pile or cairn of quartzite cobbles. It measures 2.2 m long by 1.2 m wide. The feature is oblong and may be a marker or just a pile of rocks cleared from the field to the east. The rock cairn is about 100 m southwest of the one-room structure.

Feature 2 is a cobble alignment that is 60 m east of the one-room structure. The cobble alignment has a north-south orientation. It measures 1.3 m north to south by 2.3 m east to west. The east-west line is a double row of cobbles. This alignment may have been the foundation for an outbuilding associated with the occupation of the one-room structure.

Feature 3 is the remains of what is probably an irrigation ditch. The best ditch segment is 40 m long and is 30 to 40 cm deep and about 1 m wide. The ditch segment has been truncated by the arroyo channel. The ditch segment is somewhat problematic because there is no immediately obvious source of water for irrigation.

A probable field is indicated by the presence of yellow matchweed in the arroyo channel and margins. The field area covers a 300 by 80 m area. As mentioned before yellow matchweed is a common invader species at abandoned homestead sites with fields. An alternative is that the arroyo bottom was used as a large corral for temporary penning of livestock. This would fit if

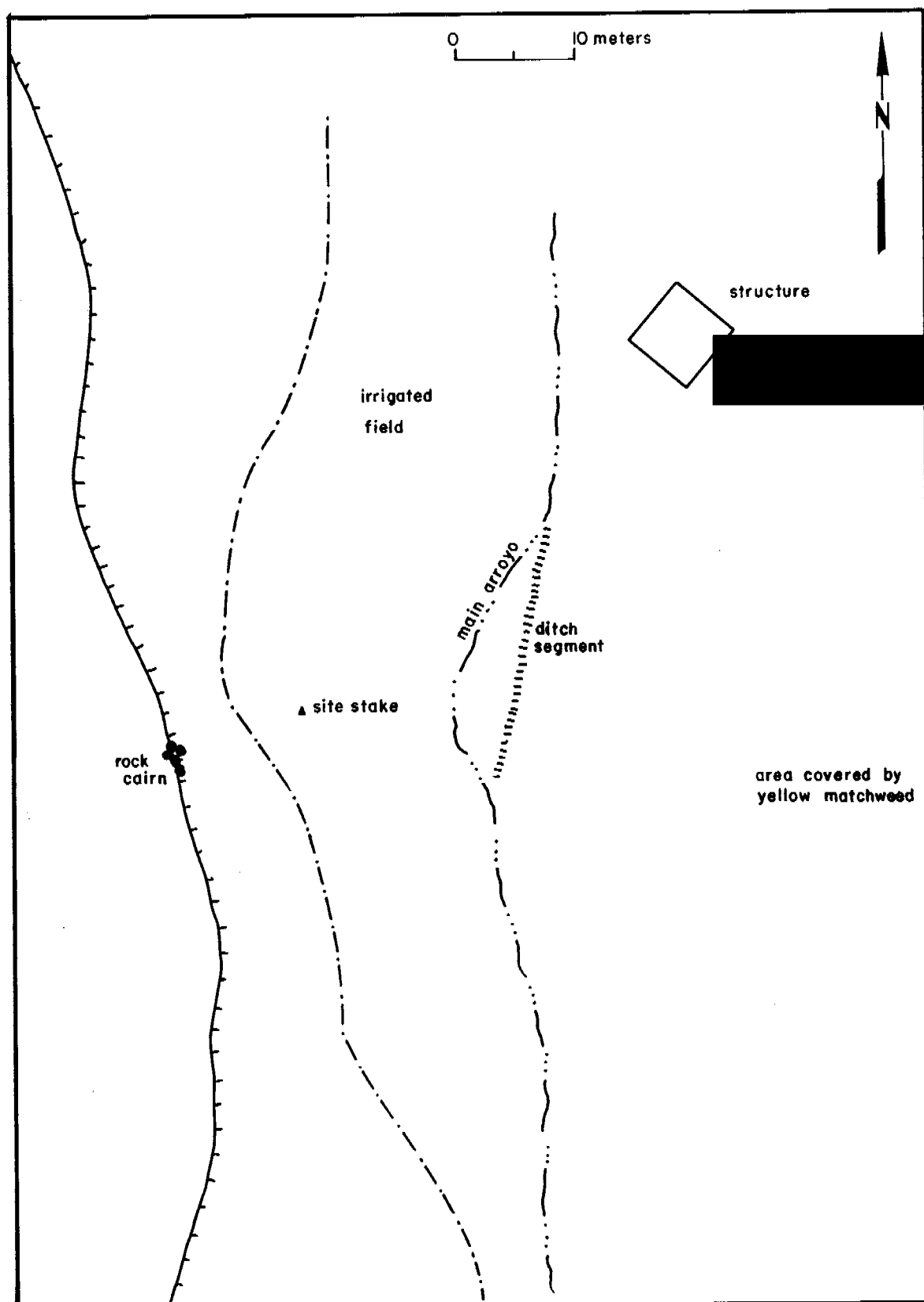


Figure 9. LA 84754 site map.

the one-room structure was a line camp as suggested by Scheick and Viklund (1991:98). The line camp is suggested to date to the 1930s or 1940s. Three soldered hole-in-top milk cans that probably date to the turn of the century were found during survey.

### Research Questions

What is the function of Feature 1, the rock cairn? The rock cairn appears to be a marker associated with the structure and fields. Before any construction is begun in the area it should be confirmed that the rock pile is not marking a historic grave site. To this end, testing of the rock cairn has been proposed.

### Testing Procedures

The rock cairn will be recorded with a scaled sketch map, photographs, and a narrative. A 1-by-1-m test unit will be placed over one-third of the cairn and overlap to the cairn exterior. The test pit will be excavated in 10 cm levels to a maximum of 1 m deep. If no cultural materials or human remains are encountered, an auger test will be placed in the bottom of the test pit. It will be bored until undisturbed soils are encountered or 1.5 m below the pit bottom. If no cultural materials are encountered, the testing will stop and new recommendations will be made to Las Campanas and Santa Fe County.

A procedural and treatment guide for human remains is provided at the end of this report (Appendix 2). Excavation and recording techniques outlined for other sites will be followed.

### Fencing

Previously, fencing had been recommended to protect LA 84754 during golf course construction. Fencing is proposed for the areas around the structure and the possible foundation (Feature 2). A 5-m-radius buffer will be maintained around the structure and possible foundation. The refuse scatter is dispersed and consists mostly of redeposited parts of the structure. Fencing is not recommended for nonfeature areas. The field and possible irrigation ditch have been recorded during the OAS survey. These features have been truncated by the arroyo and are no longer intact. Fencing is not recommended for the field and irrigation ditch. Construction should be allowed to proceed in these areas.

## LA 84776

### Fencing

LA 84776 has been described in Southwest Report 278 (Scheick and Viklund 1991:22) (Fig. 10). The site consists of a partly collapsed one-room masonry structure surrounded by a

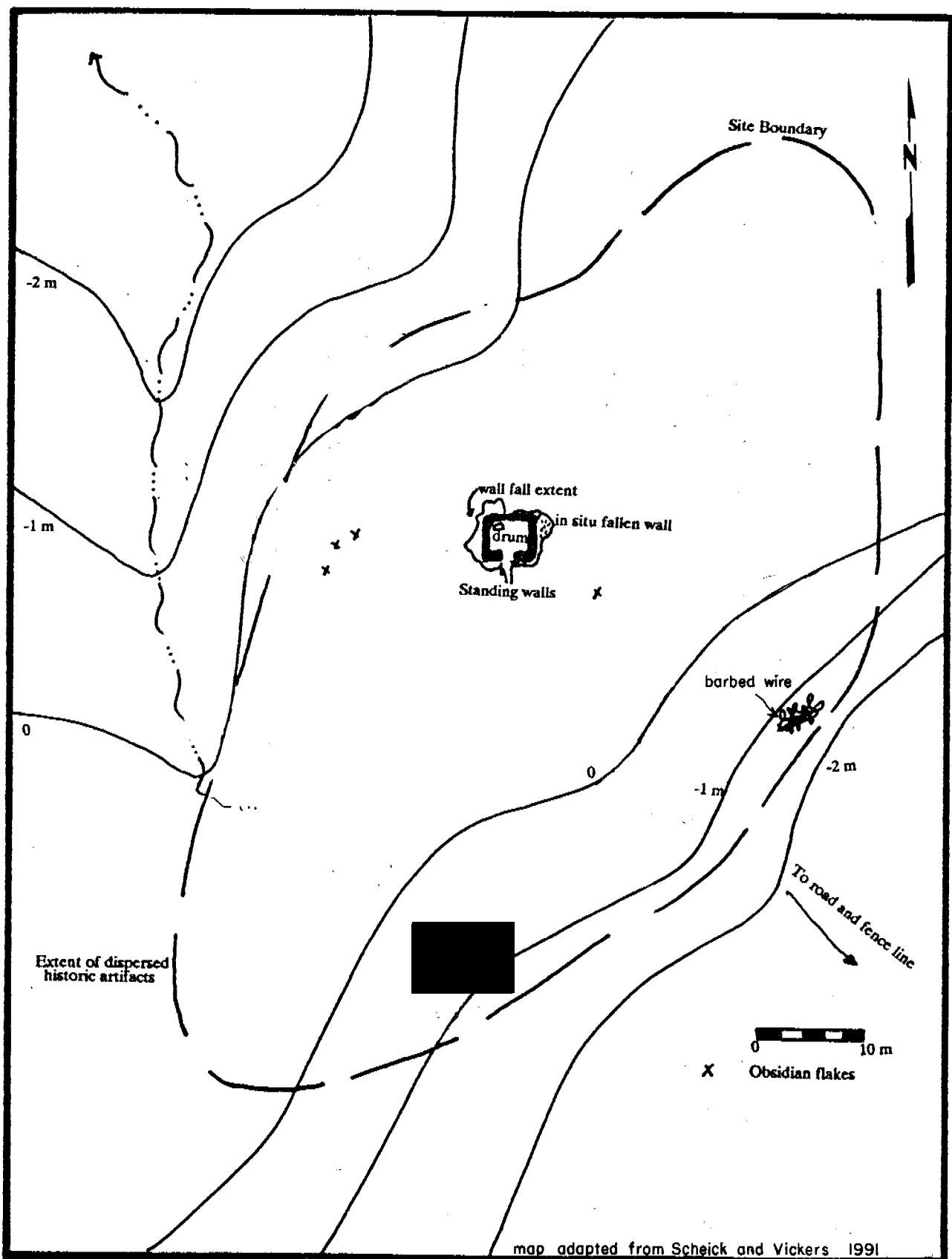


Figure 10. LA 84776 site map.



dispersed artifact scatter. Unlike LA 84754, the LA 84776 artifact scatter reflects domestic, ranching, and productive activities that occurred at the site.

It was recommended that fencing be placed around LA 84776. The fencing will surround the dispersed artifact scatter and a 5-m buffer outside the scatter. OAS staff will flag the site limits. Las Campanas personnel will install metal fence posts and single strand wire around the perimeter. This fencing will remain in place until golf course construction is completed or data recovery has been completed. Data recovery at LA 84776 has not been scheduled for the immediate future. Therefore, a data recovery plan is not included in this document.



## DATA NEEDS FOR THE ARTIFACT SCATTERS AND LA 98680

Research questions for LA 84775, LA 98680, LA 84759, and LA 84758 address related problems of chronology, site structure, and site function. LA 98680 is different because the research effort focuses on the cobble concentration, but the chronological and functional problems also will be addressed. This discussion will present data sources that will result from excavations and their relevance to the research questions.

### Site Dating

LA 84775, LA 98680, and LA 84759 had datable artifacts recorded during the survey. No datable artifacts were recorded at LA 84758. The datable artifacts tended not to be closely associated with artifact scatters or features. Association between the dates and the artifact concentrations cannot be assumed. The excavation will attempt to obtain more reliable dates.

LA 84775 is a Basketmaker II site that is dated by a reworked dart point. A more reliable date would be obtained by recovering at least one more dart point of a similar style. Excavation units will be contiguous to examine the relationship between diagnostic artifacts and the site scatter. If the artifact distribution remains dispersed and the association between the artifacts cannot be improved, then conclusions about the late Archaic period occupation will be tentative.

LA 98680 and LA 84759 are dated by associated pottery types. Excavation units will be contiguous to better determine the relationship between the sherds and the site scatter. Excavation of large areas within the concentrations will provide data that will confirm or refute dates derived from artifact associations. Sherds found within artifact concentrations will be used to date the concentration. If after excavation the concentrations lack sherds, then the sherds will be piece-plotted and arguments for association based on erosion patterns or relative proximity will be made. The strategy of excavated contiguous units within concentrations will be used at LA 84758.

To summarize, datable artifacts must be recovered in association with concentrations or features. Excavation methods will focus on collecting datable artifacts from concentrations or confirming their absence. The reliability of the associated dates will be strongly influenced by the number and types of artifacts found.

Chronometric samples may be collected from excavated features or subsurface deposits that will provide independent dates of the diagnostic artifacts. Potential dating methods include C-14, archaeomagnetism, obsidian hydration, and dendrochronology. Each method has strengths and weaknesses that will be evaluated on a case-by-case basis. For example, obsidian hydration is not reliable for surface artifacts, but can be used with obsidian from buried contexts. C-14 is often a viable option because charcoal is abundant in archaeological contexts. C-14 must be used cautiously because of "old wood" problems that often result in false dates.

### Site Structure and Function

LA 84775, LA 98680, LA 84759, and LA 84758 are similar sites that consist of an artifact scatter or concentration. Only LA 98680 has a possible feature. Site structure and functional analysis will be based on the morphological, technological, and function attributes of artifacts, artifact assemblage composition and attribute relationships, and the spatial relationships among attributes, artifacts, and features.

Site structure or spatial relationships are important for understanding site history. Discrimination between occupation episodes leads to inferences about the activities that occurred during different occupations. Only LA 84775 does not have one or more artifact concentrations. Site structure analysis for LA 84775 will be possible if artifact concentrations or features are encountered during excavation. The other three sites have at least one concentration and a possible feature or two artifact concentrations. The relationships between these potential analytical units will be examined as part of the site structure analysis.

Site function is heavily based on inferences drawn from ethnographic and replication studies. It is from these data that inferences about lithic technologies, tool functions, and feature functions can be drawn. Site function will be examined from the combined perspectives of ethnography, experimentation, and the archaeological evidence from previous Las Campanas projects. The Las Campanas data will be used as it becomes available.

It has been demonstrated that these sites have assemblage variability and inherent spatial structure. The expectations raised by the site structure and function study should be met. The success of the studies will vary depending on the quantity and integrity of the archaeological materials and deposits.

## DATA NEEDS FOR LA 98861

The data recovery effort for LA 98861 will focus on site confirmation, site characterization, and site dating. Confirmation and characterization are exploratory and descriptive studies. Site dating will be aimed at contributing to understanding the timing of when cobble-mulched fields were used in area outside the Rio Chama, Rio Ojo Caliente, and San Marcos Pueblo.

### Site Confirmation

Site confirmation depends on examining the cobble-mulched garden relative to the four criteria derived from the literature. These criteria are based primarily on construction and composition of the cobble-mulched field. Field construction and composition will be documented through surface examination and subsurface excavations within and outside the cobble-mulched field. The study will include stratigraphic profile descriptions, examination of gravel composition and volume, and definition of border and internal compartment construction. Confirmation from pollen study will come after excavation and should support the excavation-based interpretation.

### Site Characterization

To provide a detailed site characterization, edaphic, topographic, and local environmental variables will be recorded or researched. Edaphic variables relate to attributes of the soil and gravel of the cobble-mulched field. Topographic variables relate to site location and their relationship to land forms. Local environmental variables relate to field viability within existing and past environmental conditions.

Data on edaphic variables come from excavation. The soil will be characterized according to texture, composition, minerals, and nutrients, color, moisture retention capacity, and others. These data can be collected in the field by documenting trench profiles using standard geomorphological terminologies and techniques. Soil composition, minerals, and nutrients can be determined from soil analysis. Samples will be collected from within and outside field contexts for soils analysis.

Topographic variables can be addressed by more detailed recording of site setting. Some of these variables include microtopography, ground cover density and composition, slope, aspect, and gravel and cobble composition of adjacent slopes, and other variables. These variables place the field in an immediate spatial and environmental context.

Local environmental variables include topography, hydrology, elevations, growing season, precipitation patterns, and others. These data will be collected from available literature for modern and paleoenvironments.

### Site Dating

Once it has been determined that LA 98861 is a cobble-mulched field, a site date will be assigned, if possible. Dating cobble-mulched fields is difficult because they cannot be directly dated using available methods. Indirect dates are derived from proximity to villages or fieldhouses or from associated temporally diagnostic artifacts, such as pottery. There are no nearby villages or fieldhouses, so dating from associated artifacts is the only possible avenue.

The site surface and surrounding area will be reexamined for temporally diagnostic artifacts. Artifacts that are found will be piece-plotted. If surface and subsurface artifacts from the same period are recovered, then the field may post-date or be contemporaneous with the artifact deposition. If artifacts are only found on the surface, stronger credence would be given to an interpretation of the field pre-dating the artifacts. At best the interpretations will be based on circumstantial evidence.

## DATA NEEDS FOR LA 85036

The data recovery at LA 85036 will focus on site chronology, characterization, and function. The first two objectives will be addressed for all three features. Function will only be addressed for the quartzite and limestone alignments for previously stated reasons.

### Site Chronology

Site chronology addresses the sequence of feature construction and use. This sequence will be developed from field observations of spatial relationships between features and evidence of post-abandonment displacement of cobble alignments. Actual dates for construction of the features may be gained from interviews, but it is more likely that only the berm, dam, and pond unit will be remembered. From survey data and discussions with SAC staff, it is likely that the sequence can be defined by field observations.

### Site Characterization

Description of all features will include optical transit mapping, narrative descriptions, and photographic recording. These methods will combine to accurately describe the features in relation to each other. Detailed recording will include evidence of construction methods, size, and condition.

Additional characterization of the cobble alignments will be derived from subsurface contexts. Stratigraphic trenches will be excavated through the three longest quartzite and limestone alignments and through the one alignment that is a combination of quartzite limestone. These trenches will be 1 m by 3 m. They will expose the subsurface soils above and below the alignments. The soils will be characterized following the standards outlined by Butzer (1976).

### Site Function

The cobble alignments will be evaluated according to probable function. This study will be based on classification of the terraces as supplemental or conservation features. The LA 85036 features appear to be conservation features, but this will be confirmed by excavation. The stratigraphic trenches will be used to evaluate if the features are supplemental or for conservation. Pollen samples will be collected from four of the alignments. The pollen samples will be examined for economic pollen and pollen counts that might suggest if changes in vegetation occurred between the time that the two types of alignments were constructed.





## EXCAVATION AND ANALYSIS METHODS

The excavation and analysis methods will vary between the sites with features and artifact scatters (LA 84775, LA 98680, LA 84759, and LA 84758) and the agricultural sites (LA 85036 and LA 98861). This discussion will be divided between the two site types.

### Sites with Features and Artifact Scatters

LA 84775, LA 98680, LA 84759, and LA 84758 consist of components that can be divided into surface artifact concentrations, scatters, and features. LA 84775 is a dispersed artifact scatter, the other sites have two components. The general excavation and recording methods will be the same for all four sites. Each excavation and analysis methodology will be tailored to suit the site configuration.

### *Field Methods*

The following are the general and specific field methods that will be used at each site:

1. Each site surface will be reexamined and the concentrations, artifact scatters, and site limits will be pinflagged.
2. All surface artifacts will be collected. The method will depend on the artifact distribution. Concentrations will be collected using 2-by-2-m grid units. The size of the collection area will depend on the concentration size. Artifacts that are outside the concentrations will be piece-plotted with an optical transit and 30 m measuring tape. Artifacts that are close to collection grids will be piece-plotted by triangulation. Piece-plotting will only be used at LA 84775 unless reexamination defines artifact concentrations.
3. A grid system will be superimposed across the site. Each 2-by-2-m collection unit will have a north and west designation. The signature corner will be the northeast corner. All artifacts within collection grids will be placed in bags with the grid designation. Piece-plotted artifacts will be assigned consecutive numbers and will be integrated into the grid system in the lab using a mapping program. This will allow for the creation of density plots for site structure analysis.
4. Excavation of the four sites will emphasize data collection from contiguous units to support site structure analysis. The excavation methods will include a combination of surface stripping and deeper grid excavation.

At sites with artifact concentrations, the concentration area will be entirely surface stripped in 2-by-2-m grids. Artifact density from each unit will be monitored. Grids with the highest numbers of artifacts will then be excavated in 1-by-1-m grids. If more than 8 sq m exhibit high artifact density, then the two grids exhibiting the most artifact diversity will be excavated. This will provide the best indication of the range of site activities. If features are

found during excavation, then they will be included in the 2-by-2-m excavation areas. If artifact density within the surface-stripped layer is lower than the surface artifact density, then two units will be chosen based on surface artifact diversity.

At LA 98680, which has a cobble concentration, the entire limits of the cobble and artifact concentration will be surface stripped in 2-by-2-m units. The 8 sq m of subsurface excavation will focus on the cobble concentration to recover evidence of construction methods. If additional features are found outside the cobble concentration, then another 2-by-2-m unit will be excavated around the feature.

At LA 84775, which is a dispersed artifact scatter, two to four 8-by-8-m areas will be surface stripped. The areas will be maintained within a grid system. Areas will be chosen based on artifact types. For instance, the area including the projectile point or areas with biface flakes would be surface stripped. After surface stripping, 2-by-2-m units will be excavated at features or artifact concentrations. These units will be expanded to accommodate additional subsurface features or concentrations. If there are no concentrations or features, then a 1-by-4-m trench will be excavated within each surface-stripped area. Internal provenience control will be maintained by a 1-by-1-m unit. Excavations will be expanded as features or subsurface artifact concentrations are encountered.

5. Excavation will be by hand, using standard archaeological hand tools. All fill will be screened, with the mesh size determined by the excavation context. Screen mesh no larger than ¼ inch will be used. All 1-by-1-m units will be excavated in 10-cm levels. If cultural strata are encountered, they will become the excavation unit. Within these strata, 10-cm excavation levels will be used to provide finer control of artifact locations. The 10-cm levels will allow comparisons between excavation units using density and volume measures.

As excavation proceeds, diagnostic and large artifacts or potential structural components of features will be mapped using the closest set point. Mapping of large artifacts or disarticulated feature components will aid in the identification of occupation levels or surfaces.

Excavation will continue until sterile soils are encountered. To insure that sterile levels have been reached within the excavation units, auger holes will be placed in the bottom of each 2-by-2-m or 1-by-4-m unit at the four corners.

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

6. Feature excavation will proceed by exposing the top of the feature and the area immediately surrounding it. The stain or soil change will be mapped and photographed (if appropriate). The feature will be excavated in cross section in 10-cm levels, exposing the natural stratigraphy. In the unlikely event that large features are encountered, 20-cm levels may be used to speed up overburden removal. Exposed artifacts or components will be located as described above. Artifacts from each level will be bagged separately. The exposed cross section will be profiled and the soil levels described, using a Munsell Color Chart and standard geomorphological terms. The second half of the feature will be excavated in natural levels or 10-cm arbitrary levels. All

the fill from the second half will be fine screened. If a feature is larger than 50 cm in diameter and 50 cm deep but less than 1 m in diameter and 1 m deep, then one-half of the cross section will be fine screened. Larger features will have lower levels fine screened. Fine screening is a good way to obtain primary depositional information, recover botanical remains, and recover very small artifacts that normally slip through ¼-inch mesh.

Once the feature is completely excavated, feature maps and profiles will be drawn and tied into the grid system and absolute elevations. Drawings will include a scale, north arrow, and key to abbreviations and symbols. Written description will be done on standard forms that will include provenience, dimensional, soil matrix, artifact, construction, temporal, excavation technique, and other data. Photographs will record the feature excavation progress and the final excavated form. Photographs will include a metric scale, north arrow, and mug board with the LA and feature number, and date. All photographs will be recorded on a photo data sheet.

Artifacts recovered from each provenience will be bagged and labeled by unit, stratigraphic or arbitrary level, date, and excavator's name. A specimen number will be assigned to all bags by provenience and a running field artifact catalogue maintained for each site. Materials necessary for immediate preservation of fragmentary and unstable faunal and ethnobotanical remains will be used. Large lithic artifacts will be bagged separately to minimize bag wear. Very small flakes and angular debris will be placed in vials or bags within the artifact bag, so they are not lost during cleaning.

7. Ethnobotanical and C-14 samples will be collected from features and other possible cultural contexts. Samples will be ranked according to their context and data potential. Preferred samples should lack sources of potential contamination from burrows and nests, prolonged exposure during excavation, and proximity to modern surfaces or disturbance. First priority samples will be taken from lower strata and feature floors and interiors. Second priority samples will come from upper feature fill or proveniences that exhibit limited evidence of disturbance. If first and second priority sample proveniences are absent, the third priority samples from disturbed or less intact contexts will be collected.

After the hearths, roasting pits, or other pit features are cross-sectioned, the sample potential will be assessed. If samples are collected they will consist of at least 1 liter of soil for flotation analysis and 2 tbsp for pollen analysis, and will be collected from the best strata. The samples will be put into plastic bags that have been kept sealed. If burned seeds or wood are encountered, up to 20 g will be collected for radiocarbon analysis. All samples will be collected with a dry, clean, trowel or tweezers and placed immediately into a bag or tin foil. Carbon samples will only be collected from first and second priority contexts, unless third priority contexts are all that are available. Archaeomagnetic samples will be collected according to the processing laboratory standards.

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

8. It is highly unlikely that human remains will be encountered. However, the procedures outlined in Appendix 2 are offered as a guideline in the event that they are encountered. These procedures are based on OAS, Museum of New Mexico, and legally defined guidelines.

#### Field Methods, LA 98861

The following are the general and specific field methods that will be used at LA 98861.

1. The site surface and surrounding area within a 30-m radius from the edge of the cobble-mulched field will be reexamined and all artifacts or features pinflagged.
2. All surface artifacts will be piece-plotted and located on the site map and collected.
3. A detailed transit map of the field will be made using a 30-m tape. Azimuth will be recorded to the nearest minute. Distance will be measured to the nearest millimeter. Elevation will be recorded to the nearest centimeter. The border of the field will be outlined at 1-m intervals. Every cobble in each alignment will be located and recorded by length and width to the nearest centimeter. Slope contours will be mapped at regular intervals.
4. A sample of the field will be hand-excavated to confirm its authenticity and to expose internal field structure. The sample will be judgmental and not a statistical sample.

To test for authenticity, at least four 1-by-2-m units will be placed along the exterior of the field. Locations will be chosen from areas that have the most convincing surface indications. If, after four units have been excavated, the authenticity has not been confirmed, four more units will be placed inside the field. The interior units will be placed in areas that evidence internal structure. If these units do not confirm authenticity, then work will be abandoned and no further work conducted. If authenticity is confirmed by border trenches, then four 1-by-2-m units will be excavated within the field at locations that show surface indications of internal structure.

5. Excavation will be by hand, using standard archaeological hand tools. Fill from all border units and half of each interior unit will be screened through screens grading from ¼ inch to 1 inch. Each bucket of fill will be weighed. The fill will be screened through each screen size with the remainder weighed each time and the weight recorded. This will allow for characterization of gravel volumes at different levels within the field and comparison with gravel volumes from outside the field. Excavation will be done in natural or cultural levels. These levels should be recognized by changes in gravel composition and soil character.

In the border units there will be no attempt to leave cobbles in place, since the purpose is to expose a profile of the field. Cobbles will be triangulated within the excavation unit before they are removed. Interior units will have cobbles removed in half of the unit to expose the profile. The other half will have cobbles left in place to document the internal structure.

6. Vertical control within excavation units will be maintained from a site datum or subdatum. The datums will be established during the mapping. Absolute elevations will be recorded in the

field.

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

Feature maps and profiles will be drawn and tied into the site map. Profile and plan-view drawings will include a scale, north arrow, and key to abbreviations and symbols. Written description will be done on standard forms that will include provenience, dimensional, soil matrix, artifact, construction, temporal, excavation technique, and other data. Photographs will record the feature excavation progress and the final excavated form. Photographs will include a metric scale, north arrow and mug board with the LA and feature number, and date. All photographs will be recorded on a photo data sheet.

8. Pollen samples will be collected from within the cobble mulch. At least 2 tbsp will be collected and the samples will be put into sealed plastic bags.

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

9. It is highly unlikely that human remains will be encountered. The procedures outlined in Appendix 2 are offered as a guideline, however, in the event that they are encountered. These procedures are based on OAS, Museum of New Mexico, and legally defined guidelines.

#### Field Methods, LA 85036

The following are the general and specific field methods that will be used at LA 85036.

1. The site surface and surrounding area will be reexamined and all artifacts pinflagged. Both ends and the middle of cobble alignments will be double-flagged.
2. All surface artifacts will be piece-plotted and located on the site map and collected.
3. A detailed site map using a transit, 30-m tape, and stadia rod will be made. Azimuth will be recorded to the nearest minute. Distance will be measured to the nearest centimeter. Elevation will be recorded to the nearest centimeter. Each cobble alignment will be mapped at 5-m intervals or at irregularities in the alignment. The berm will be mapped at 30-m intervals and at breaks within the berm. Detailed sketch maps will be made of berm breaks and cobble conduits. The dam and pond will be mapped using enough points to define the feature outline. Slope contours will be mapped at regular intervals.
4. Detailed recording of the cobble alignments will include counting the number of cobbles,

measuring every twentieth cobble in the 15 m or longer alignments, and every tenth cobble in alignments that are less than 15 m long, and describing the condition of the alignment. Each alignment will be photographed.

Detailed recording of the wheel and tire tracks and berm, dam, and pond unit will include narrative description and photographs. Scaled sketch maps will be drawn to supplement the site map. Descriptive information will include dimensions, construction, relationship to other features, and condition.

5. Seven of the alignments will be partly exposed to examine construction methods, soil stratigraphy, and to collect pollen samples. Three quartzite and three limestone alignments and the one combination material alignment will be examined. Two 1-by-2-m trenches will be excavated perpendicular to each alignment exposing the soil profile and the alignment. Excavation will be in 20-cm levels. The soil from one trench at each alignment will be screened with ¼-inch mesh.

6. Detailed description of the soil profile will include soil color, texture, compaction, composition, and organic content. Recording will use standards outlined in Butzer (1976). Pollen samples will be collected from each trench below the most modern soil horizon. Five samples will be processed and examined for economic plant pollen or changes in pollen count that may relate to a change in ground cover.

7. As the excavation of a trench is completed, documentation will consist of field notes and excavation unit forms compiled by the excavator. The forms will contain locational, dimensional, stratigraphic, and contextual information. General notes will be kept by the project director and site assistants.

8. Each unit will be backfilled as excavation and recording is completed.

#### Laboratory Methods. All Sites

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

The lithic artifact analysis will follow the guidelines of the Office of Archaeological Studies Lithic Artifact Analysis Manual. The lithic analysis is particularly suited to monitoring technological organization. Morphological and functional attributes emphasize reduction stage, manufacture and maintenance, and tool use and discard. These are the main foci of the research orientation and implementation.

The ceramics will be identified according to existing regional typologies for the Middle and Northern Rio Grande. Sources of information may include Stubbs and Stallings (1953), Lang and Scheick (1989), Mera (1935), and Chapman and Enloe (1977). The primary foci of the

ceramic analysis will be dating, function, use-life, and source of manufacture.

Faunal remains will be analyzed in the OAS Laboratory by Linda Mick-O'Hara. Depending of the size, condition, and preservation of the specimens they will be monitored for species, sex, age, portion, condition, evidence of butchering, and evidence of taphonomic processes. Faunal remains are important indicators of subsistence strategy and site formation. The detail of the analysis will be tempered by the abundance and condition of the faunal remains.

Upon completion of the attribute identification, the coded data will be entered into a DBase III or Statistical Package for the Social Sciences (SPSS) data entry program. Statistical manipulation of the data base will be performed using SPSS PC + Version 3. Statistical tests will be geared towards examining patterns in artifact distribution that reflect technological organization. Tests and analytical techniques that may be used include Chi-square tests for independence, correspondence, and cluster analysis to identify similar assemblages within the Las Campanas area. Results of the tests will be illustrated with graphs, tables, charts, and distribution maps. The computerized data base may be used to generate a project artifact catalogue. Artifacts with attributes important to analysis and site interpretation will be illustrated for the report.

Laboratory analysis of collected pollen samples will be conducted by the Castetter Laboratory for Ethnobotanical Studies, Department of Biology, University of New Mexico. The flotation and macrobotanical remains will be analyzed at the Office of Archaeological Studies by the staff ethnobotanist. The analyses will identify plant resources that were used prehistorically.

Carbon-14 dating will be conducted by Beta Analytic, Inc., of Coral Gables, Florida. Archaeomagnetic analysis will be conducted by Dr. Daniel Wolfman, on staff at the Office of Archaeological Studies. The purpose of these analyses will be to obtain the most accurate range of dates possible for cultural strata and features.

For LA 85036, former landowners will be interviewed about the berm, dam, and pond unit to determine when they were built. The interview will help to determine if the construction was done by work crews of the Civilian Conservation Corps or owners of the Santa Fe Cattle Ranch.

### Research Results

The final report will be published in the Museum of New Mexico's *Archaeology Notes* series. The report will present all important excavation, analysis, and interpretive results. Included will be photographs, maps, and tables. Raw data such as field notes, maps, photographs, and artifact catalogues will be given to the State Historic Preservation Division, Archaeological Records Management System, currently located in the Laboratory of Anthropology in Santa Fe. The artifact collection will be curated at the Museum of New Mexico's archaeological repository or a facility of Las Campanas's choice.





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**APPENDIX 2**  
**MANUAL FOR THE ARCHAEOLOGICAL TREATMENT OF HUMAN REMAINS**  
**ON STATE AND PRIVATE LANDS**  
**IN THE STATE OF NEW MEXICO**

**David A. Phillips, Jr., Director**  
**and**  
**Linda Mick-O'Hara**  
**Office of Archaeological Studies**  
**Museum of New Mexico**

**P.O. Box 2087, Santa Fe, New Mexico 87504-2087**  
**(505) 827-8953**

## PREFACE

This manual has prepared as a guide for the archaeological treatment of human remains in unmarked burial grounds on state lands, local public lands, and private lands in the State of New Mexico. It is based on Section 18-6-11.2 NMSA, on Historic Preservation Rule No. 89-1, and on the stipulations of our annual state permit for excavation of unmarked burials.

The manual assumes that burials will be excavated under an annual burial excavation permit issued by the state, and not under a project-specific (individual) burial permit.

Human remains in marked burial grounds (such as cemeteries) are accorded separate treatment under state law, and generally cannot be disturbed without a court order. Procedures in this manual do not apply to such remains.

The manual will be updated periodically. Staff members should be sure to use the most recent version of the manual.

The state law on unmarked human burials does not apply to federal and tribal trust lands in New Mexico. Procedures for unmarked burials on federal and tribal trust lands will vary by agency, tribe, and local office. Once again, the first step after encountering human remains is to contact the Office of Archaeological Studies (OAS) home office. Afterwards, the field supervisor will usually need to contact the local agency archaeologist (and also the tribal governor's office, in the case of trust lands). Besides informing these persons about the discovery, the field supervisor should ask whether they have any specific instructions on the treatment of the remains.

## PRE-FIELD PREPARATION

Before any fieldwork begins, it is the field supervisor's responsibility to:

- Know which laws and regulations apply to the discovery of human remains in the project area.

- Review the permits or rights-of-entry under which the project will be completed, to determine whether there are any special stipulations regarding human remains.

- Obtain field copies of the permits or rights-of-entry for the project. These copies are to be kept available at the work site, in case of challenges by law enforcement agents or concerned members of the general public.

- Obtain a field copy of this manual, to be kept at the work site for quick reference.



## **PROCEDURE TO BE FOLLOWED ON INITIAL FIELD DISCOVERY OF HUMAN REMAINS**

Whenever human remains are encountered during archaeological field studies, the field supervisor will halt any activities that may further disturb those remains and will contact the Office of Archaeological Studies (OAS) by telephone, to report the discovery and to receive further instructions.

When calling in the discovery to OAS, the field supervisor should have the following information jotted down, in case it is requested:

- A. The location of the burial ground. For burials at a recorded site, the LA number should be enough. For burials not at recorded sites, the office staff will need to know the legal location (to the quarter-section) and the UTM coordinates of the burial ground.
- B. Land ownership; also, the address and telephone number of the owner (or land manager), if known.
- C. A preliminary general description of the burial ground, including age, cultural affiliation, and minimum number of individuals.
- D. The telephone number of the local law enforcement unit with jurisdiction over the burial ground.
- E. A telephone number or physical location where the supervisor can be reached.

The remains (including burial goods and associated deposits) are not to be disturbed until the field supervisor contacts OAS. The remains will be covered over with approximately 5 cm. of backdirt, plastic sheeting, and approximately 5 cm. of loose dirt to protect them. In addition to these protective measures, we recommend covering any exposed aspects (i.e. vertebrae or cranium) with dust pans prior to the above procedures to guard against accidental damage. Other research activities, which do not affect the burial, may continue during this time.

Burial remains not in situ, and that are in clear danger of being destroyed or stolen if left where found, are to be provided the minimum amount of handling consistent with their conservation.

If the remains appear to be part of a crime site, do not move or touch anything at the site, and do not walk about the crime site. In general, any recent human remains (less than 50 years old) should be considered part of a crime site until proven otherwise.

After OAS is contacted, the field supervisor will usually need to contact the local law enforcement authorities about the discovery. This is usually the city police within municipal boundaries, or the county sheriff in rural areas.

The local law enforcement authority is then required to contact both the Office of the Medical Investigator (OMI) and the State Historic Preservation Officer (SHPO), so the OMI and SHPO can determine who has jurisdiction over the remains. Local authorities can contact the SHPO at 827-8320. (Please record the names of all the individuals you contact during this official notification procedure.)

If human remains are isolated during the testing phase of a project, the same notification procedures must be followed. Testing is then halted in the unit containing human remains and these remains should be protected from further damage.

If the remains appear to be part of a crime scene, this will usually end OAS's involvement in the matter. If the burial ground or remains are archaeological, the following additional steps will be taken.

If it appears that specific living relatives can be identified quickly, by means of local inquiries, OAS may direct the field supervisor to contact relatives regarding the burial grounds, and will attempt to ascertain their wishes before undertaking any further actions regarding the burials.

The Director, OAS will then submit to the SHPO a letter of intent to use the OAS's annual permit for excavation of burials, with the following information:

- A. A legal description of the location of the burial ground (to the nearest quarter). If the land is not platted, the UTM coordinates will be provided instead.
- B. A statement of land ownership.
- C. A copy of the appropriate USGS 7.5 minute quadrangle segment showing the location of the burial ground.
- D. Written authorization from the landowner to remove the burial. If an existing permit or right-of-entry for general archaeological excavations has been obtained, a copy of that document will be attached for this purpose.
- E. The name, address, and telephone number of the individuals performing or supervising the excavations.
- F. Documentation of procedures to identify living relatives, as appropriate to the specific case, along with a preliminary statement on the proposed disposition of the remains.
- G. The tentative time frame for carrying out the excavations.

OAS will notify the SHPO of discoveries and pending excavations in terms of whole burial grounds (i.e., sites) rather than on a feature by feature basis. This will allow us to avoid submitting multiple letters of notification for a single burial ground.

Once the letter of intent has been prepared and submitted, the OAS office will notify the field supervisor to proceed with excavation of the remains.

## GUIDELINES FOR THE EXCAVATION OF HUMAN REMAINS

Once the OAS has notified the field supervisor that a letter of intent has been submitted, excavation of the burial grounds may proceed. (The field supervisor should not simply assume that this step has been taken after he first notifies the Section office of the initial discovery of the remains.) Notification will be verified by OAS before the field supervisor proceeds with excavation.

Prior to the initiation of burial excavation, any feature with which a burial is associated should be clearly defined and mapped. Overburden or fill should be excavated to within 10 cm. of the burial to make exposure, documentation, and exhumation of the remains as time efficient as possible. A person trained in and familiar with the OAS procedures for the excavation of human remains may then proceed with the excavation of the human remains as requested by the field supervisor.

Burials will be excavated in terms of a horizontal and vertical site grid tied to a datum. If the burials are encountered as part of general site excavations, full records will be kept as an integral part of the excavation process. All articulated human remains along with displaced elements that are determined by the excavator to part of a given burial should be given a single field specimen (FS) number. Other associated materials should contain a reference to that FS as part of the provenience information.

The following minimum standards will be followed in the excavation of burials. An OAS **Burial Form** will be filled out for each burial excavated. Additional procedures will be required as part of project data recovery plans.

- A. Human remains and the surrounding pit or feature will be excavated entirely by hand using tools in a manner that will not damage the bone. The burial should be protected from the sun whenever possible. Bones should be cleaned only with soft brushes and dental or pottery tools as necessary to define the elements for sketch maps and photography. Elements should be pedestalled to maintain their depositional positions.

All fill will be screened through ¼ inch mesh. The fill immediately adjacent to skeletal elements or within the body cavity will either be collected or sifted using window screen. Fill will be removed by strata or by arbitrary levels where strata cannot be defined. Levels will not exceed 10cm. in thickness, and strata greater than 10 cm. in thickness will be subdivided into levels.

- B. As excavation proceeds all bones from the burial should be left in place for mapping and photographing once the majority of the burial is exposed. (Disarticulated human remains should be treated in this manner, as well.) Depth readings should be taken, at least, at the base of the cranium and at the lowest aspect of the pelvis so the position of the torso in the ground may be determined. All bones displaced from

their anatomical positions should be noted and included in all mapping and photographing of the burial as evidence of ground disturbance, rodent disturbance, etc.

- C. At least, one flotation sample (1 liter) and one pollen sample will be taken from the pelvic cavity of each in situ burial in order to recover dietary information. (All pollen samples should be taken a clean trowel and placed in two (2) Whirl-paks which should not be tightly closed if the soil is notably moist. Samples should be clearly labeled as to the sample area.) There may be insufficient material to obtain the optimal sample sizes, but the sample area **should not** be expanded to include material that may not relate to the pelvic cavity. As time and money permits, optional pollen samples from the head and neck region to detect materials placed on or around the body during interment, or from the foot area for pollens associated with the feet or sandals are also recommended. Other samples (such as radiocarbon samples) should also be collected as appropriate. (See field procedures for collection techniques.)
- D. The provenience of fill artifacts will be differentiated from the skeleton itself and from items that can be interpreted as grave goods. Fill artifacts will be grouped with their horizontal and vertical provenience. Potential grave goods will be point provenienced and assigned the same provenience number as the human remains. All field specimen numbers will be associated with the burial FS.

All grave goods should be carefully handled and documented as part of the burial, as mentioned above. If pottery containers are present, they should be presumed to have held contents at the time of interment. These should be removed complete with fill, whenever possible, once recording has been completed. The vessel(s) should be protected from damage or contamination, but unless laboratory processing is immediate, it should not be placed in an airtight container. If the fill must be removed or separated from the container in the field, a flotation sample should be taken from the fill immediately in contact with the interior base of the vessel. Pollen samples will be obtained in the lab as pollen washes from the interior surface of the container.

- E. Burials in intact coffins should be removed in one piece, to preserve the integrity of the burial it contains and to because the living relatives may wish to have the burial reinterred as it was found. When the burial cannot be removed in one piece, it will be exposed as completely as possible before any remains or associated items are removed.

If cremations or disarticulated remains are encountered, field recordation should include mapping each level and frequent photographic documentation as the excavation proceeds. If the cremation or

disarticulated remains are contained within a pottery vessel, it should be removed intact, if possible, and processed in the lab. If this is not possible, both a flotation and pollen sample should be taken from the vessel fill.

- F. Scale plan drawings of the burial will be prepared and should include all displaced bone and grave goods. If the burial is in an upright position, a side view should also be prepared. If the burial is in a feature (such as a pit), a scale plan and profile of the feature should be incorporated into the drawings made. Labels for any fragmentary or disturbed remains, and grave goods should be incorporated into these drawings, again to document disturbance. All drawings must be at a consistent scale and include the following: a scale, a north arrow, a key and labeling for grave goods, and as clear a definition of the elements present as is artistically possible for the recorder.

Photographs will be taken to document the layout of the remains while the latter is in situ with associated grave goods, if present. Photographs should also be taken to document the relationship between the burial and the burial pit or associated features. If the associated artifacts cover the remains, additional photographs should be taken after the artifacts have been collected. Whenever possible, photographs should be taken from several directions to insure adequate documentation of the burial and compensate for shadow and light variation. Close-up views of the disposition of head, hands, and feet, are encouraged, along with displaced elements and disturbed areas.

All photographs should include a north arrow pointing to true or magnetic north, consistent with the project guidelines; a scale; and a photo board containing the LA number, feature number, and burial number.

- G. Field records (which may be part of overall site records) will indicate field methods used, observations about soils and feature fills, the context of the burial within the site. Records should include the orientation of the burial, depth readings taken, its interment position, a description of displaced elements or missing elements, a description of all grave goods, any disturbance noted during excavation (i.e. rodent, geological) along with any other pertinent observations.
- H. After all recording is complete, bones should be removed by individually excavating each element. (Never pull on an element that is not completely excavated and loose.) Cleaning should be limited to the removal of large clumps of dirt that may break free during shipment. Dirt should be left within the skull. Each element should be wrapped in acid-free paper and cushioned in the burial box with cotton batting. Bones of individual hands and feet should be wrapped together and clearly labeled left or right. Dirt filled skulls should be secured in the

box to prevent damage to other elements. (If acid-free paper is not available, newspaper or tissue paper may be used for the duration of shipment only.) The box should be clearly labeled with complete provenience information.

While burials are exposed, members of the general public, including the media, will not be allowed to view the remains. During any site tours for the general public, any human remains and associated artifacts will be covered. Except for photographs or other images taken as part of archaeological records, no photographs or other recorded images of the human remains or associated burial goods will be allowed. These restrictions are consistent with Museum of New Mexico Board of Regents policy (SRC Rule 11).

Crew members are not allowed to take photographs of the remains or burial goods for personal use.

If the burial ground is not part of a site already in the Archaeological Records Management System (ARMS), an ARMS form will be completed.

Within seven days of completion of permitted excavations, the field supervisor will notify the SHPO (through the Director, OAS) that excavations have been completed and that efforts to carry out a plan for disposition of the remains has begun.

If the excavation is delayed beyond the current permit period, the field supervisor will notify the SHPO (through the Director, OAS) of the delay, and will request an extension of the permit period. This request must be received by the SHPO before the permit period expires.

If the proposed excavation is canceled, the field supervisor will notify the SHPO (through the Director, OAS) of this change in plans. This notification will state that no fieldwork was completed relative to the burials, and will state the reason for the request.

## **PROCEDURES FOR LABORATORY STUDY AND REPORT PREPARATION**

On arrival at OAS or a field laboratory, human remains and any associated funerary objects will be placed in locked storage, apart from other collections. These items will not be removed from locked storage except when being cleaned or analyzed.

At a minimum, laboratory analysis of the human remains will consist of the following steps:

- A. Determination of the age, sex, and stature of the individual or individuals.
- B. Anthropometrics should be done on all elements, if possible, along with the identification of any pathologies present.
- C. Photo-documentation of the remains in general and of any specific features such as pathologies. It is important to remember that in the event of reburial of the remains, such photographs will become a primary source of information on the remains.

At a minimum, laboratory analysis of the associated funerary goods or other artifacts will consist of the following steps:

- A. A written inventory of all items associated with, and removed from, the burial. This list will be submitted to the SHPO through the Director, OAS as part of the disposition plan for the remains. The list will be specific in terms of the class, type, quantity, and condition of items recovered.
- B. Scaled photographs of all recovered items, to be submitted with the written inventory. The photographs will be labeled with "OAS/MNM", the burial provenience (site number, burial or feature number, and county), the date of excavation, and the disposition of the remains (e.g., reburied at site, or in MNM repository). It is important to remember that these photographs, like those of the actual remains, may one day become a primary source of information on the burial.
- C. The collected fill within associated vessels or from the vicinity of the remains will be floated or fine-screened, except for any samples reserved for pollen analysis or other specialized analysis.
- D. Collected pollen and other specialized samples will be analyzed as appropriate under a general sampling and analysis protocol for the site as a whole.



In addition, general analysis of the burial site will attempt to confirm field observations of the age and cultural affiliation of the burials. Appropriate methods for this general analysis may include ceramic cross-dating, point styles, tree-ring dating, radiocarbon dating, etc.

At times during analysis, disarticulated human remains may be located among other archaeological collections. In such cases, the project supervisor will notify the SHPO (through the Director, OAS) that such remains have been encountered within the general site collection, and that such remains will henceforth be included with, and treated as, part of the burial collection from that burial ground.

Within twelve months of the end of fieldwork at the site containing a burial ground, OAS will complete the analysis of burials, will prepare a complete report on those burials to the SHPO, and will have the remains and artifacts ready for final disposition. Two copies of the final report will be submitted to the SHPO. The reports will either be issued as separate Archaeology Notes, or will be in a format suitable for inclusion as appendices in the final project report. In the latter case, a preliminary Archaeology Notes number will be assigned (e.g., "This report constitutes an appendix to Archaeology Note 587, which is in preparation).

If, due to unforeseen circumstances, the final burial report cannot be prepared within this period, the project supervisor will request (through the Director, OAS) an extension of the permitted analysis period. This request will include an estimated completion date for the final report, and will include two copies of an interim report.

The final burial report will include (be accompanied with) the following sections or information:

- An abstract or summary.
- A general verbal description of the location of the burial, accompanied with a general project location map, in such a way that this information cannot be used to pinpoint the original location of the burial. This description will include a statement of land ownership and current surface lessee. The map will note the identity of the project, the name of the person who prepared the map (not the draftsman!), a scale, and a north arrow.
- An appendix with the legal description of the site location (to the nearest quarter-quarter section), UTM coordinates, and a pinpoint location map based on the local USGS topographic quadrangle. The map will note the identity of the project, the name of the USGS quad, the name of the person who prepared the map (not the draftsman!), a scale, and a north arrow.
- A description of excavation and recording methods used, along with names of persons who took part in excavation of the remains.
- A determination of the cultural and temporal placement of the remains, including a discussion of the criteria used to make this determination.
- A plan drawing that shows the physical position of the human remains in relation

to associated funerary objects and features. This drawing will include a north arrow, scale, and key to map symbols. (A profile drawing should be included for upright burials.)

- An inventory of all funerary objects, artifacts, and other remains associated with the burial. (Don't forget items such as pollen samples!) The inventory list should be accompanied by scaled, labeled photographs of each item.
- Photographs of the burial, organized in terms of a photo catalogue. The report will explicitly state where the photos will be stored. (Glossy black and white photographs are preferred by SHPO.)
- A description of the final disposition of the human remains and all associated objects or items. If the burial remains are reinterred, the exact location of reinterment will not be included in the final project report. If the burial remains are curated, the curating facility should be identified. If any remains are retained by a landowner, the address of the landowner should be stated.

## **PROCEDURES FOR IDENTIFICATION OF LIVING RELATIVES AND DISPOSITION OF REMAINS AND BURIAL ITEMS**

As part of the initial notification that OAS will be using its annual excavation permit, the Director, OAS will provide a brief statement on the preliminary approach to identifying and notifying living relatives, and will indicate tentative recommendations regarding the disposition of the remains.

If it appears that specific living relatives can be quickly identified, OAS will hold off excavation of the burial until an attempt is made to notify these relatives. As an example, if an unmarked burial is found at an early 20th century ranch house, it may be possible to quickly identify the direct descendants of the individual by making a few local inquiries. The preliminary stated wishes of these individuals will be considered in any decisions on excavating the remains, and an update will be provided to the SHPO before the remains are excavated.

Concurrently with excavation and analysis of the remains, OAS will assist in identifying (and consulting with) living relatives of the individuals involved, above and beyond any preliminary efforts as described above.

For unmarked Native American burials, state regulations require the SHPO and Office of Indian Affairs (OIA) to coordinate efforts to identify and consult with living relatives. OAS will assist in this process as requested. Information that may be useful to the SHPO and OIA's consultation efforts should be passed on by supervisors to the Director of OAS.

For unmarked non-Native American burials, the burden of identifying and consulting with living relatives falls on OAS. Supervisors will attempt to contact possible relatives in writing. If this approach is not possible, legal notices will be placed in local newspapers. Once contacted, possible relatives will be given at least 30 days to make recommendations on the disposition of human remains and associated burial goods.

Within 45 days of the completion of excavations at a site, OAS will submit a proposal for the disposition of human remains and associated goods. This proposal will describe any consultations completed or underway, comments from living relatives, relevant permit stipulations, and the wishes of the landowner if known. The proposal will outline one or more possible plans for the disposition of the remains.

If reburial or curation at a specific location can be proposed as one alternative, or the only possibility, the disposition proposal will provide the legal location of the reburial site or curatorial facility. The list of objects found with the remains will be submitted with this disposition plan.

The disposition plan will include the exact location for any proposed reburial activity.

The SHPO will notify OAS when the disposition plan has been approved or rejected. In the latter case, the SHPO will provide specific instructions for disposition of the remains. Within 30 days of this notification, or within an alternative period specified by the SHPO, the project

director will complete the disposition plan and will notify the SHPO (through the Director, OAS) of this fact.

If disposition is delayed beyond the time allowed for this purpose, the project supervisor will notify the SHPO (through the Director, OAS) and will request an extension to allow this process to be completed, before the original disposition period has expired.