

DRAFT REPORT

EXCAVATION OF THE SAND DUNE SITE (AZ.K-6:11)  
AT HUBBELL TRADING POST NATIONAL HISTORIC SITE,  
GANADO, ARIZONA

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## ABSTRACT

In September and October 1987, personnel from Southwest Archaeological Consultants excavated the Sand Dune Site at Hubbell Trading Post National Historic Site in Ganado, Arizona, under contract to the National Park Service. The site, also identified as HUTR-4 or AZ.K:6:11, was excavated in accordance with the scope of work established by the National Park Service. Work followed test excavations conducted at the site in 1985 by the Park Service, when the basic stratigraphy and site extent were defined and nine features were discovered. During the recent excavation by Southwest, 40 additional features were discovered, the stratigraphy was clarified and refined, the site boundaries were expanded slightly, and the majority of the site was excavated to sterile deposits. Test trenches penetrated sterile deposits in a number of areas. All artifacts, faunal material, and samples collected during excavation have been processed for future analysis.

No prehistoric component was identified at the site. All cultural materials below the recent overburden are associated with a historic Navajo occupation. The most extensive occupation at the site occurred in the lowest cultural levels. Based on ceramics and a radiocarbon date obtained from a sample taken during the 1985 excavation, that occupation appears to date to the mid-eighteenth century. All information pertinent to the historic Navajo occupation at the site has been collected, and archeological clearance is recommended.

## MANAGEMENT SUMMARY

Excavations at the Sand Dune Site were undertaken due to the immediate threat to the site from erosion of the south bank of the Pueblo Colorado Wash; excavations were in accordance with the scope of work summarized below. The original scope of work established by the National Park Service called for excavation of a decreasing percentage of the site within each subsequent layer, excavation of all features encountered, and screening of all units excavated below layer 1. Some changes were made during excavation in the total number of squares excavated, because of discoveries made during excavation and alterations in the stratigraphic interpretation of the site. Due to layer 4's importance, more squares were excavated into that level than originally specified, and fewer squares were opened into layer 5 after probes into the layer revealed it was sterile nearly throughout.

A total of 47 features were excavated at the site in the 1987 season. Two additional features were excavated in 1985. Features from both excavations are described in the feature list provided in the body of the report. The majority of the features excavated were associated with an eighteenth century Navajo occupation of the site. This occupation included at least two structures, presumed to be some form of hogans, that were excavated approximately 50 cm below the occupational ground surface with some type of superstructure built over the depression. The structures were associated with exterior work areas or ramadas, hearths, firepits, refuse pits, a storage structure or other type of small structure, and a small corral or pen. The site is one of very few excavated Navajo sites from the eighteenth century and is significant in the potential information it may yield on the economic and social organization of Navajo communities at this time, on relations with other groups in the area, such as the Hopi, on changes in the economy with increased contact with Whites, and on other processes of acculturation.

Recommendations for analysis include a detailed analysis of all ceramic, lithic, faunal and vegetal material recovered from the site, as well as analysis of all samples taken from features. Particular attention should be paid to the ceramic analysis, to radiocarbon dates from pit structures, occupation surfaces and associated features, and to all artifacts and samples recovered from features 4, 11, 12 and 13, which occurred on the eastern end of the site. In previous excavations, the majority of the prehistoric ceramics had been found in this area; while it appears that these features are all historic, they have not been securely dated. Future analysis should focus on confirming the date of the primary site occupation, on establishing the duration of occupation(s), and on illuminating changes in the economy and society, if any, over the extent of site occupation. In addition it should attempt to establish the extent and manner in which the site was used after the primary occupation.

## INTRODUCTION

Excavation of the Sand Dune Site (AZ.K:6:11), one of eight known archeological sites located at Hubbell Trading Post National Historic Site (Fig. 1), was completed recently by Southwest Archaeological Consultants under contract to the National Park Service (NPS). The site is located on a stabilized sand dune near the entrance to the historic site about 100 m west of Wide Reed Ruin, a fourteenth century Puebloan site. The Sand Dune Site is bounded by Pueblo Colorado Wash on the north, by a smaller tributary to the wash on the east, and by the road into the trading post on the south. The core area of the site, which extends 52 m east-west along the edge of the wash at a maximum 8 m north-south from the wash edge, represents the southernmost portion of the original site. Approximately 60 to 75 percent of the site has been lost through erosion. Work was prompted by site erosion. Plans were made to reduce erosion by building a gabion dam north of the visitor center and a series of gabions along the wash below the site. The gabions will eventually be filled in with sediments from the bank underlying the Sand Dune Site, thus providing a more gentle slope along the southern bank of the wash, but in the process will destroy the remains of the site (Bradford 1987). Consequently, complete excavation of the remaining site area was required. Work was conducted by Southwest Archaeological Consultants in September and October 1987.

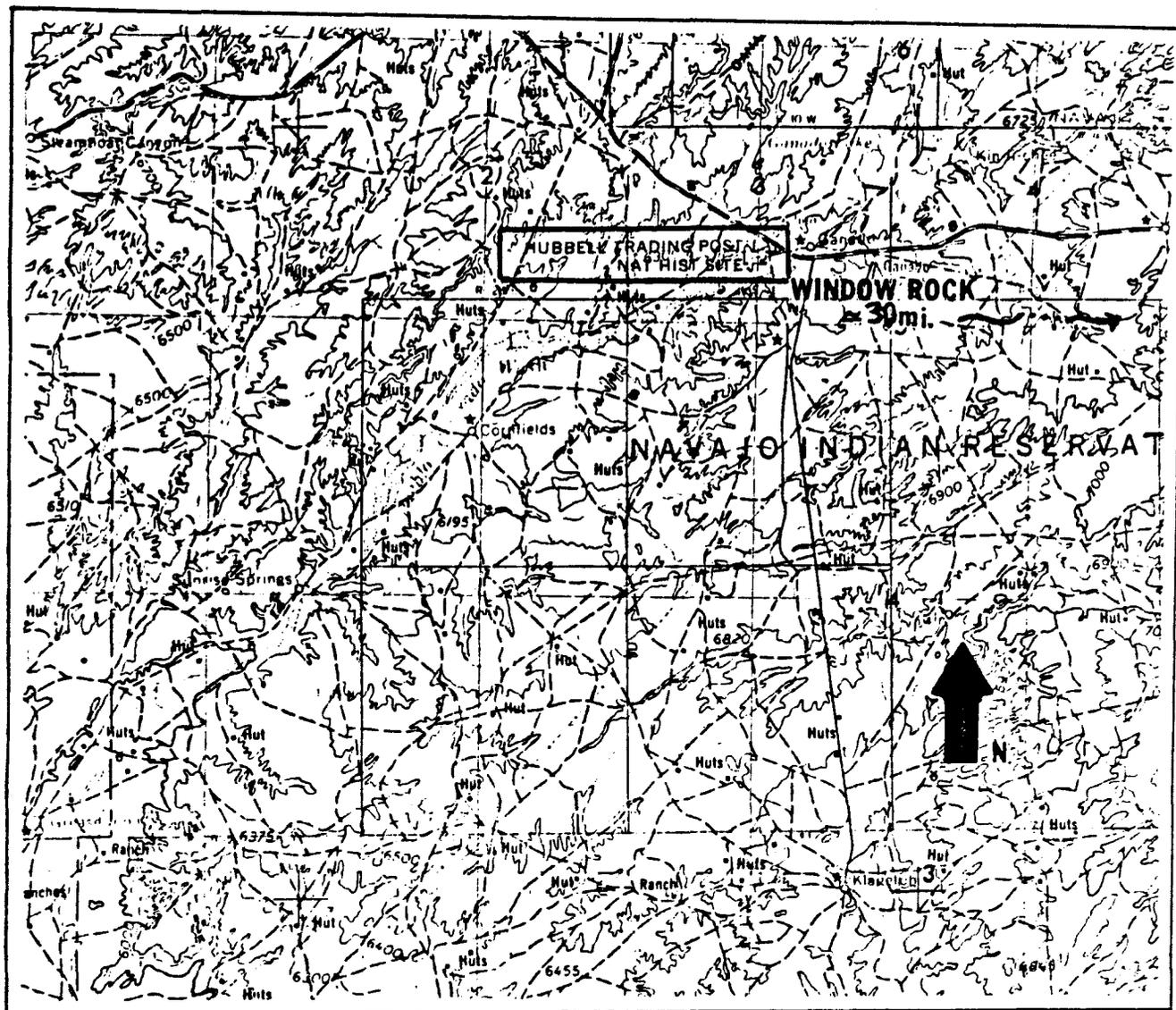
### Scope of Work

As specified in the scope of work, the primary intent of the excavation was to gather data that would 1) allow the site to be dated, 2) provide information on activities occurring at the site, and 3) allow comparison of the Sand Dune Site with other sites from the same time period(s). The contract negotiated between NPS and Southwest called for complete excavation of the site and the processing and cataloguing of artifacts and samples recovered from those excavations. Analysis of artifacts and write-up of a final interpretive report will be contracted for at a later date. Two reports were required, a management summary and a final descriptive report.

Bradford's excavations in 1985 established the presence of five strata at the site, composed of three main cultural strata overlain by more recent deposits of accumulated sand, and nine features. The scope of work called for the removal of layer 1, the recent overburden, from all of the core area of the site using mechanized equipment where feasible. Layer 2, a thin layer of mainly sterile sand, was to be removed by hand but not screened. Layer 3, the first cultural layer identified in 1985, was to be excavated by hand in 50 grid squares within the core area. All excavated sediments were to be screened. Layer 4, defined as possibly representing prehistoric deposits with some mixing of later deposits, was to be excavated and screened in arbitrary 5 cm levels to insure careful vertical control of artifacts. Layer 4 was to be excavated in 25 grid squares within the core area. Layer 5 was to be excavated in 15 grid squares within the core area and screened. All layers were to be excavated within 2 by 2 m grid squares using the grid system established in 1985. The scope of work also called for excavation of all features "according to accepted standards in current archeological method" and for nonartifactual samples to be taken from features where possible.

### Previous Studies at the Site

The Park Service's recognition that erosion has seriously threatened the Sand Dune Site prompted this excavation as well as previous work at the site. The problem of erosion was first noted during the winter of 1978-1979, and a program to monitor the process was established (Bradford 1987). In 1981 Steve Adams conducted salvage excavations on features that were in danger of immediate destruction or damage. Part of a small pithouse and a slab-lined hearth, both eroding out of the northeast corner of the site, were excavated (Adams 1982, cited in Bradford 1987). Further test excavations were conducted by Bradford in



**Figure 1:** Location of Hubbell Trading Post. Map adapted from USGS Quad. Gallup, NM; Arizona (1954 revised 1979). 30-min. Series. 1:250,000.

1983 in connection with road improvements along the entrance road to Hubbell Trading Post (Fig. 2). Three backhoe trenches were dug along the edge of the road to establish the southern boundary of the site, which was determined to lie about 2 m north of the road.

Continuing erosion and plans to strengthen the bridge on the entrance road to the trading post brought Adams back to the site in October 1983. Four trenches and two 2 by 2 m units were excavated in the northeast corner of the site, and an occupation surface was identified (Bradford 1987).

In an attempt to protect Wide Reed Ruin from erosion, rock gabions were constructed below the site. This effort inadvertently resulted in increased erosion by redirecting the water toward the bank beneath the Sand Dune Site, and during spring floods in 1985, approximately 832 sq m of the Sand Dune Site was lost to erosion. The Park Service took emergency action to rechannel the wash and protect the site from further damage. During the summer of 1985, Bradford conducted test excavations at the site to determine the nature and extent of the remaining deposits. Those excavations established the core area of the site, exposed nine features (Fig. 2), and provided samples for radiocarbon dates (Bradford 1987).

During the 1985 excavation at the Sand Dune Site, four 1 by 2 m squares were opened (grid squares 542, 622, 659 and 702) in the southern part of the site. The units were outside the core area of the site. Five complete 2 by 2 m grid squares and six partial ones were excavated along the edge of the arroyo within the central core area of the site, and a 1 by 2 m unit (the northern half of grid square 485) was opened on the east edge of the site. In addition to those grid squares, a series of backhoe trenches was excavated throughout the site to a minimum depth of 2 m below the present ground surface (pgs); these excavations established the extent of the core area and exposed features 1 through 9. Feature 2, a pit structure, feature 3B, a posthole on the occupation surface, and feature 4, a firepit, were excavated completely. Feature 3C, the occupation surface, and feature 4, a rock concentration of uncertain function interpreted originally as a roasting pit, were partially exposed. The remaining features were entirely exposed but were not excavated (Bradford 1987). Those features and the features discovered during the 1987 season are described later in this report.

In addition to the features exposed, the 1985 excavation established the preliminary stratigraphy at the site. The layers present at the site were described as follows in the scope of work provided by the National Park Service.

Layer 1 consisted of a deposit of aeolian sand that ranged in depth from 20 to 60 cm and did not contain enough cultural material to justify tightly controlled excavation. The layer was classified as overburden.

Layer 2 consisted of a thin deposit of light-colored sand up to 6 cm thick, which represented the transition from the overburden to the first cultural layer at the site, but was not cultural itself.

Layer 3 consisted of dark reddish brown aeolian sand stained with ash and charcoal and containing animal bones, lithics and sherds. The layer was described as being up to 10 cm thick and was considered to be the last occupation at the site. Layer 3 was believed to overlie the occupation surface, feature 3C, which represents the late eighteenth century occupation of the site.

Layer 4 consisted of reddish brown silty sand up to 20 cm thick, with charcoal staining and flecking throughout the deposit. It was interpreted as possibly representing the prehistoric component at the site or a transitional zone between the historic and prehistoric layers.



Layer 5 consisted of a dark reddish brown silty sand up to 20 cm thick, with some sparse charcoal flecking and occasional artifacts and animal bone. The artifacts observed in the layer are believed to have resulted from displacement through downward movement in the sand.

The basic stratigraphy at the site was determined primarily from the grid squares opened in the central portion of the site along the edge of the arroyo, particularly from grid square 458, the deepest of the squares excavated in this area in 1985 (Bradford, personal communication October 1987). The western portion of this square included the east edge of feature 10, a pit structure suspected to exist in 1985 but not found. Some interpretations of site stratigraphy thus were based on feature fill. The stratigraphy was refined slightly in 1987 and the extent of the various layers was established. A more complete description of the stratigraphy is provided elsewhere in this report but some important differences may be noted here. Layer 2 was determined to be extremely patchy and sporadic, occurring only along the northern edge of the site within 2 to 3 m of the wash. Layer 3, also localized along the edge of the wash in the central part of the site, was extremely thin over much of the area (1-4 cm in depth) and postdated the primary occupation of the site. Artifacts were found in the layer, but no features occurred in it. Layer 3 may represent a relatively recent, intermittent use of the site. Layer 4 was the primary occupation layer at the site, and most of the features occurred within this layer, all of which are associated clearly with the historic Navajo occupation of the site. Layer 4 includes feature 3C that occurred near the base of the layer rather than at the base of layer 3 as originally believed. Layer 5 appeared to be a poorly established sandy soil, grading gradually into lighter deposit over a depth of 20-30 cm, and was sterile below the top 10 cm of the layer. The eighteenth century occupation surface was the eroded surface of this soil covered in some areas by drift sand (the basal levels of layer 4). The top 5 to 10 cm of layer 5 in the central area of the site appear to represent a buildup of occupational debris.

Five radiocarbon samples were taken during the 1985 excavation, all recovered from features associated with the historic Navajo occupation at the site. Four of the samples yielded dates ranging from ca. A.D. 1470 to 1730. The fifth sample was too small to provide a reliable date. The radiocarbon ages, dates and the features sampled are provided below in chronological order (Bradford 1987).

Feature 6, hearth	480 B.P. $\pm$ 70 (ca. A.D. 1470)
Feature 5, firepit	470 B.P. $\pm$ 50 (ca. A.D. 1480)
Feature 3B, posthole/ash dump	360 B.P. $\pm$ 50 (ca. A.D. 1590)
Feature 3C, occupation surface	220 B.P. $\pm$ 70 (ca. A.D. 1730)

The last date agrees most closely with the ceramic material recovered from features associated with site occupation. As suggested by McKenna (1987:8-9), the disparity in dates is most likely due to the use of dead wood as fuel rather than to a real difference in the dates of the various features.

Most of the ceramics at the site (54.2% of the assemblage from all previous excavations) were Dinetah Utility Ware (Transitional) dating to ca. A.D. 1750-1800. This ware occurred in all areas excavated in the western and central portions of the site in 1985 and was especially prevalent on the occupation surface, feature 3C, in areas peripheral to it, northwest of the occupation surface, and on the southwestern side of feature 2 between features 2 and 3. Hopi Yellow Ware, apparently associated with the Navajo occupation, composed 2.1 percent of the ceramic assemblage found at the site and was concentrated near the eastern edge of feature 3. Prehistoric ceramics from Pueblo I and III were intermixed in the areas dominated by the Dinetah Utility Ware and included fragments of Kana'a Gray from the tenth century, five sherds of Klageto Black-on-white, Kintiel and possibly Klageto orange wares from the late thirteenth century, and some late red and white bichromes. There were no

strong concentrations of any prehistoric ceramics within the areas. The prehistoric ceramics apparently stem from a general, scattered deposit of refuse or from collection by the Navajo inhabitants of the area (McKenna 1987). Some of the early ceramics also may be the result of alluvial redeposition.

In past excavations, Anasazi ceramics dominated collections from the eastern edge of the site. Navajo ceramics occurred less frequently in the eastern part of the site than Anasazi sherds did, at least in those areas where Navajo ceramics were dominant. Ceramics recovered from features excavated by Adams in 1981 and 1983 were Anasazi and dated to the late thirteenth century, and Bradford's excavations in 1985 revealed concentrations of ceramics from the same period. The Anasazi assemblage differs from the ceramics identified at Wide Reed Ruin where White Mountain redwares are the most common decorated wares, Tusayan Grayware is the only utility ware, and Klageto Black-on-white is the most common whiteware bichrome. The Anasazi assemblage from the eastern edge of the Sand Dune Site included sherds from two vessels of Little Colorado Corrugated and a Chuskan Corrugated jar, Tusayan Corrugated sherds representing several vessels, Kintiel Polychrome sherds, and unidentified Tsegi Orange Ware sherds. While no sherds of Klageto Black-on-white were found in the eastern edge of the Sand Dune Site, the five sherds recovered from near feature 3 made this the most common whiteware bichrome from the site. The differences between wares present at the two sites cast some doubt on the theory that the Anasazi ceramics found at the Sand Dune Site are part of an extended site or site complex that includes the Sand Dune Site and Wide Reed Ruin (McKenna 1987).

## ENVIRONMENT

Two previous studies conducted at Hubbell Trading Post have discussed the environment of the area: an assessment of the archeological resources at the National Historic Site (Scurlock 1979) and a study of soil erosion within the park (Euge 1983). The following environmental information is taken primarily from those two reports.

### Topography and Geomorphology

Hubbell Trading Post National Historic Site is located in the south-central part of the Colorado Plateau, where the local topography is characterized by sedimentary mesas and rounded, eroded buttes and alluviated valleys. The maximum relief within 2 miles of the trading post is about 420 feet (Euge 1983:3). On a larger scale, the Defiance Plateau lies 18 miles east of the trading post and rises to more than 8,000 feet in elevation; Black Mesa rises to the northwest. The Pueblo Colorado Wash originates on the Defiance Plateau and flows southwest toward Ganado. Two miles upstream from the trading post is Ganado Lake, a manmade lake formed by a dam. The lake, as well as other areas of the Pueblo Colorado Valley, may have held water seasonally during the prehistoric period (Scurlock 1979:4). Alluvial deposition in the valley followed by later downcutting of the stream has formed multiple terraces along the wash, the oldest terraces having been deposited during a period of alluvial deposition between 2000 B.C. and A.D. 900 and 1200 and later cut during an erosional period roughly A.D. 1100 and 1300. The Sand Dune Site is on a more recent terrace, where the sediments appear to have been deposited during the earlier period of low energy fluvial and slackwater deposits, lasting from about A.D. 1300 to the late 1800s (Euge 1983:13-14). Later aeolian activity apparently reworked the terrace, resulting in the small dune that gave the site its name.

The current depth of the wash resulted from a modern erosional period after 1920. Nineteenth century descriptions of the wash, as well as early photographs of the trading post, indicate that prior to 1920 the banks were only 3 to 4.6 m (10-15 feet) high and the stream was not contained within a well-defined channel but meandered between the banks. An unnamed tributary to Pueblo Colorado Wash, which forms the east boundary of the Sand Dune

on the reservation. The traders exposed the Navajos to American goods, promoted Navajo crafts, and served as interpreters, mediators, and at times, advocates for the Navajos. During that period, Hubbell Trading Post was established.

The present trading post was founded in 1871 or 1872 by Charles Crary, who sold it to William Leonard about four years later. Juan Lorenzo Hubbell had first bought a trading post 4.8 km (3 miles) north of the present town of Ganado in 1876, and in 1878 he abandoned that post and bought the Leonard Trading Post. He filed a homestead claim on 160 acres around the post that was on land not yet included in the Navajo Reservation. Shortly after purchasing the trading post, Hubbell changed its name to Ganado in honor of Ganado Mucho, a Navajo friend. The trading post was successful and Hubbell soon established others at Chinle, Black Mountain, Cornfields, Nazlini, Keams Canyon, Oraibi and Cedar Springs. He was an influential trader and politician in the area until 1914 when he turned the post over to his sons. He died in 1930, but the trading post remained in his family until it became a National Historic Site in 1968 (James 1976:19; Scurlock 1979:20-21).

## RESEARCH DESIGN

Work at the Sand Dune Site was guided by research questions designed to provide data on site chronology, site function and on-site activities. These questions, as specified in the Scope of Work provided by the Park Service, are:

1. What are the dates of the components represented at the Sand Dune Site?
2. What activities took place at the site during both occupations as reflected in the types of extant features and the information obtained from them?
3. Based on the results of item 2, what was the basic function of the site during each of the time periods the site was occupied?
4. How does the Sand Dune Site compare to other sites of comparable time periods in the surrounding region? Is it unique in its function or characteristics or does it fit into an overall pattern for the region during the respective time periods it represents?

As discussed below, excavation at the site in 1987 revealed only one component at the site, a historic Navajo occupation. The occupation appears to date to the mid-eighteenth century, although some radiocarbon dates from features associated with this occupation excavated in 1985 have provided dates as early as the late fifteenth century (Bradford 1987). The ceramics (Dinetah Utility Ware) and bones of sheep, goats and a horse or mule in features associated with the occupation suggest these early dates are inaccurate. Possibly, the difference results from use of dead wood for firewood by the occupants of the site and the resulting discrepancy in the age of the wood and the age of the feature (McKenna 1987:8-9). On-site activities appear to be primarily domestic. Depressions, which are apparently the remains of partially subterranean hogans, and work areas, hearths, ash pits and ash dumps, post holes, and the remains of a small pen for sheep or goats were found at the site. The presence of corncobs attests to the practice of agriculture. In addition to the eighteenth century occupation, temporary uses of the site occurred during more recent historic periods, probably primarily the late nineteenth and early twentieth centuries represented by isolated artifacts and one feature.

The site is one of the earliest Navajo habitation sites known in northeastern Arizona. As discussed previously, Navajos were definitely present in the region by the mid-eighteenth century, possibly earlier. Navajo presence in the areas around Ganado prior to ca. 1750 is possible but not well supported at this time. The closest parallels for the

site occur in the area of Canyon de Chelly. In 1972 the Museum of Northern Arizona excavated four Navajo sites that dated prior to A.D. 1800 (NA 9712, NA 11367, NA 11372); the latter three sites contained hogans. NA 9712 contained two firepits and a scatter of rocks that could have been the remains of a structure. One of the sites (NA 11367) contained at least 10 and possibly 12 hogans, ash dumps, firepits, a slab-lined cist and a sweathouse. Three of the hogans were corbelled-log structures, and the others could not be identified as to type. The hogans were from 3 to 4.5 m in diameter, were marked by depressions ranging in depth from 8 to 40 cm, and had no postholes associated with them. Historic and prehistoric pottery was found at the site. The other two sites with definable structures contained three and two hogans, respectively. The structures appeared to be corbelled-log hogans and were similar to those already described (James 1976). In many respects, these sites resemble the Sand Dune Site.

A survey by the Navajo Nation Cultural Resource Management Program of a power line right-of-way in the area around Canyon de Chelly in 1984 revealed six sites dating prior to A.D. 1800 (A2-I-60-1, A2-I-60-7, A2-I-60-11, A2-I-60-12, A2-I-60-15). One of the sites (A2-I-60-12) contained the remains of four forked-pole hogans ranging in size from 3 to 5 m, while two others contained features interpreted as possible structures. Ceramic types from these sites include Dinetah Gray, Tusayan Corrugated, Navajo Painted Ware, and at one site that may date as early as 1700, Pinon Gray and Gobernador Polychrome (Anderson n.d.).

#### EXCAVATION METHODS

In the absence of surface artifacts, no surface collections were made. A grab sample of artifacts present on the surface in 1978 was collected by Dave Brugge of the National Park Service, Southwest Regional Office (James Bradford, National Park Service, personal communication, November 2, 1987).

Excavation units were controlled horizontally by using the 2 m grid system superimposed over the site by National Park Service personnel in 1985. Grids were numbered consecutively, beginning in the northwest corner of the site and proceeding west (Fig. 3). When discrete features were encountered, they were given numbers beginning with 10 (following the nine features identified during test excavations) and they then became the primary horizontal control. Excavations continued using those designations. All direction references were made from true north. Rooms and features were excavated in halves depending upon their size. This approach facilitated mapping and stratigraphically based soil removal in accordance with natural deposition or cultural layers. Large features, such as pit structures, were divided further into quarters to allow tighter horizontal control. When a feature was recognized within the confines of another feature, e.g., a hearth within a pit structure, the feature received a separate numerical designation. Vertical provenience was maintained both by below present ground surface (pgs) readings and actual elevations established from a known point (subdatum 2). A number of balks had been left intact for the below pgs readings. The term layer was used to distinguish natural or cultural strata from arbitrarily defined levels. Levels within layers are designated by an Arabic number following a dash or decimal point, e.g., 4.1. All elevations below pgs for arbitrary levels within the stratigraphic layers were taken from the southwest corner of the grid square. That depth was then assigned to all artifacts from that level (e.g., 52-57 cm below pgs is the depth of layer 4.1 in grid square 497 as defined from the depth of that level at the southwest corner of 497). Absolute depths are given in Appendix 1.

Fill of architectural features was removed in arbitrary 10 cm levels in the first quarter of the feature excavated. The remaining portions of the feature were excavated by cultural or natural strata if present. The terms layer and level were used in the same manner for features as well as in the excavation of grid squares. Feature fill lacking internal stratigraphic variation was excavated in arbitrary levels to 10 cm above the floor.



The last 5 cm was assigned floor fill status and bagged separately. All formal artifacts within any layer or level and on any surface were triangulated and received field specimen numbers.

Fill from extramural features and small, intramural features were excavated in halves. If cultural or natural strata were identified in the profile, the remaining half was excavated accordingly. All nonartifactual samples were removed from the second half of the fill and their locations plotted on feature maps.

#### Screening

Quarter-inch hardware cloth was used for screening, except small features, which were screened with one-sixteenth inch mesh. Site fill was screened according to the scope of services requirements. All floor deposits as well as stratified trash and other distinct cultural deposits were screened.

#### Excavation Limits

Excavation limits were established by the contract. The actual extent of the site slightly exceeded the southern site boundaries in some areas, while the areal extent of the cultural layers associated with site deposition varied dramatically. Figure 4 outlines the extent of each cultural layer. Absolute depths of the layers across the site are given in Figure 4. The vertical extent of the site was determined by sterile remains, which varied from 30 to 90 cm below pgs.

#### Nonartifactual Sample Collections

Samples for macrobotanical, pollen, radiocarbon, dendrochronology and other laboratory analyses were retrieved from every potential source of information. Hearths, cists, pits, floors and stratified cultural deposits were routinely sampled. In most circumstances, pollen and macrobotanical samples were recovered from the same strata to ensure interpretive comparability. Sample locations were plotted on feature forms. Information pertinent to pollen and macrobotanical samples was recorded on specially labeled bags to ensure consistency. Pollen sample retrieval included distilled water washes of the sampling instrument. All samples were double-packaged. Radiocarbon and dendrochronological samples were wrapped in tin foil, and string if required, prior to their packaging in paper bags.

#### General Recording

All site information was documented by the field supervisor and her assistant. Additionally, the geoarcheologist on-site was responsible for recording his activities. Feature forms were completed for each excavated feature, including with plan view and profile maps. All other notes were recorded in notebook form. Photographic record sheets were compiled for both black-and-white and color slide shots. Both pre- and post-excavation photographs were taken as well as general site activity shots. Field specimen sheets were completed at the end of every day; each bag of artifacts was assigned an FS number to track it from the field to the laboratory and during analysis.

The site was mapped using an alidade and plane table. All elevations were recorded on the site map relative to site subdatum 2, which was tied into the central datum located south of the entrance road. Individual features were mapped separately on feature forms, grid maps, and the overall site map.

## SUMMARY OF WORK CONDUCTED

### Features

A total of 53 features, inclusive of the nine located in 1985, was identified (Fig. 4). Three of those, features 21, 28 and an unnumbered feature at the base of feature 10, were the result of rodent disturbance. A fourth, feature 30, proved to be part of feature 27. Those four features have been removed from the feature list and site map. Feature 23 consisted of a broken, unmodified sandstone slab and a smaller, angular sandstone cobble with slight ash staining around the rocks. Although this was not strictly a feature, the concentration was left on the map and feature list because it seems to have resulted from cultural activity.

Most of the remaining 48 features occurred in the central part of the site at the base of layer 4 and within the top 5 cm of layer 5 and appear to be associated with the Navajo occupation of the site. These include the occupation surface identified and exposed in the 1985 excavations (feature 3), the pit structure excavated in 1985 (feature 2), a second pit structure (feature 10), an occupation surface and associated fill above it (feature 36), and a large pit reused as a refuse pit, which was probably a storage structure or sweat lodge initially (feature 27). (The term pit structure is used descriptively and is based on test excavation descriptions [Bradford 1987]). These features and the subsidiary features associated with them appear to be the result of the same occupation.

Contrary to conclusions based on the 1985 test excavations, feature 3 is not situated at the top of layer 4 but at the base, from 3 to 5 cm above layer 5. Feature 47, a small hearth found immediately below feature 3C in grid square 499, indicates that this 5 cm is probably the result of reuse or resurfacing of the occupation surface. The occupation surface is associated with a second occupation surface, feature 36, and two associated hearths, features 37 and 46. While the two surfaces are not contiguous, they both occur at the base of level 4. In contrast to the pit structures, these appear to represent the remains of small, exterior ramadas or covered working areas. The fact that each is immediately adjacent to one of the two pit structures helps support this hypothesis.

Two other small, patchy surfaces were found at the base of level 4, but they could not be traced over a large area and were not associated with any other features. Those surfaces, features 29 and 32, probably are the result of puddling on the occupational ground surface rather than an intentionally prepared work area.

Those features occurring at higher levels consisted primarily of small, shallow amorphous lenses of ash and charcoal or postholes. All occurred in layer 4. The ash lenses were treated in two different ways. If the lens was well defined, or was large enough, deep enough, or contained enough charcoal to recover radiocarbon, macrobotanical or pollen samples from it, the lens was given a feature number and treated as such. If the lens was not well defined, e.g., only 1 to 3 cm in depth, and did not contain enough material for samples, the lens was drawn on the grid and site maps and its level of occurrence recorded, but no feature form was filled out, and it did not receive a feature number. All other features are listed below.

### Features List and Descriptions

Pollen and macrobotanical samples were taken from all features excavated during this year's excavation with the exception of the postholes, which provided only enough sediments for pollen samples, the two patchy fragments of surface that could not be traced over a large area (features 29 and 32), and some of the more ephemeral ash stains. Feature forms are available for all features listed with the exception of features 14 and 43, both ephemeral



ash stains from which no samples could be recovered, and feature 45, which consisted of a post taken as a dendrochronological sample. Radiocarbon and other samples taken are noted.

**Feature 1.** A rock concentration identified and exposed in 1985 and excavated this year consisted of 15 sandstone slabs and was located in grid square 494. There were no charcoal, ash or other cultural deposits associated directly with the slabs. The feature was in layer 1, 20 cm below pgs (Bradford 1987).

**Feature 2.** A pit structure eroding out of the side of the wash in grid squares 494 and 495 was excavated in 1985 and interpreted as an early Navajo hogan. It measured 3.22 by 1.18 m and was 56 cm deep at the deepest point. The top of the feature was 80 cm below pgs. The walls were coated with a thin layer of sandy plaster, but the floor was indistinct. No internal features were found within the structure (Fig. 5). The feature is associated with the primary occupation of the site and is believed to date from the second half of the eighteenth century (Bradford 1987). Two support posts were recovered (2-1-1 and 2-1-2) next to feature 2 after removal of feature 1. They appear to be pinon and may provide dendrochronological dates. Feature 2 also appears to be associated with feature 36, a slightly concave occupational surface on the south side of the pit structure.

**Feature 3.** An occupation surface and its associated features, possibly resulting from a ramada or exterior work area, covered most of grid square 499 and part of grid squares 500, 459, 439, 458 and 538. The feature is associated with the historic Navajo occupation of the site and consisted of 3A, a stack of sandstone slabs, 3B, a posthole, and 3C, the surface itself (Fig. 6). The slabs and most of the surface were exposed in 1985, and the posthole was excavated at that time (Bradford 1987). A radiocarbon sample from the posthole gave an age of 360 B.P.  $\pm$  50, or about A.D. 1590, and a second sample from the occupation surface provided an age of 220 B.P.  $\pm$  70, or about A.D. 1730. The later date is more closely in accord with ceramic evidence. Dineta Utility Ware, dating between A.D. 1750 and 1790, was found on the occupation surface. Feature 6, a slab-lined hearth, was set into the surface, and an earlier hearth, feature 47, was found beneath it associated with an earlier use of the surface. Feature 3 was exposed completely and a 1 by 1 m test probe was excavated below it. The surface was shaped irregularly and measured approximately 3.85 by 3.75 m, it ranged from 55 to 62 cm below pgs. All artifacts occurring on the surface were piece plotted on a feature map.

**Feature 4.** A deposit of unmodified sandstone slabs and cobbles, eroding out of the edge of the wash, was located in grid square 485. The top of the feature was 59 cm below pgs on the east side and 74 cm below pgs on the west side. The rocks were set into extremely well compacted, indurated clayey sand and underlain by similar sediments containing small amounts of charcoal. The feature was uncovered in 1985 and thought to be a roasting pit (Bradford 1987). Further erosion of the wash edge in the intervening two years and more complete excavation exposed more rocks, but the exact function of the feature remains unclear. Approximately half of the feature was excavated. The west half of the fill was removed to the top of the darker unit, then a 50 cm test trench was excavated through the center of the feature to determine the extent of the rocks. Occasional rocks were found projecting back to within 10 cm of the south balk of grid square 485 and to a depth of 94 cm below pgs. There were very few artifacts in feature 4, but one of the artifacts found was a piece of glass. Due to this evidence of the recent nature of the feature, the hardness of the well-indurated sediments, and a shortage of time, it was decided not to excavate completely the remainder of the feature. The feature may be the remains of a historic camp associated with the trading post or a recent dump. There was no evidence of a structural alignment.

**Feature 5.** A firepit located in grid square 457 between features 2 and 3 was excavated in 1985 and yielded a radiocarbon age of 470 B.P.  $\pm$  50, or around A.D. 1480

Figure 5: Plan and profile of feature 2, excavated in 1985.  
(Map is being drafted.)



-22-

(Bradford 1987).

Feature 6. A small slab-lined hearth associated with the occupation surface, feature 3C. The feature was exposed in 1985 and excavated this year. The hearth was 50 cm in diameter and 12 cm deep, and rested on the occupation surface, feature 3C, at a depth of 62 cm below pgs. A radiocarbon sample taken during the 1985 excavation gave an age of 480 B.P.  $\pm$  70, or A.D. 1470, although it was clearly set into the occupation surface dated to the mid-eighteenth century. A second radiocarbon sample was taken during excavation.

Feature 7. A small concentration of charcoal eroding out of the wash at the western edge of the site. The feature was identified originally as an ash pit, but on reinspection it appeared to be a charcoal concentration resulting from burned roots. It was not excavated.

Feature 8. A pit eroding out of the wash in grid square 489. The pit was located in 1985 but was not excavated. Attempts to relocate the pit during this excavation failed. At the time it was identified, the intact portion of the pit measured 27 by 21 cm and was 45 cm deep. Since very little of grid square 489 remains, it is assumed that the rest of the pit was lost to erosion.

Feature 9. A large, deep pit eroding out of the wash in the exposed north faces of grid squares 496 and 497 was identified in 1985 and excavated this year. The pit was located 10 cm northeast of feature 27 and was at the same level as that feature, 5 cm below the top of layer 5 and 70 cm below pgs. The half of the pit remaining measured 105 by 50 cm and was 108 cm deep. Due to the large size of the pit and the difficulty of excavating it on the edge of the wash, only the east half was excavated. An Olivella shell bead and animal bones were recovered.

Feature 10. A pit structure (Fig. 7) located in grid squares 420, 460, 500, 459 and 458. The feature was shaped irregularly, possibly as a result of a pit dug into the southwest corner of the structure and measures 4.5 m east-west by 3.75 m north-south including the pit, and was 48 cm deep (Fig. 8). The top of the feature was situated 5 cm above the base of layer 4, from 49 to 66 cm below pgs. There was no distinction between the fill of the pit and the fill of the rest of the structure (Fig. 9), consequently they were not treated separately during excavation. The walls of the structure were of compacted, reddish brown sand from layer 5, into which the structure was dug. The floor was an uneven, compacted surface of clayey sand covered in areas by light, fine grained sand similar in color to layer 2. Along the south edge of the structure, this surface blended into a compacted surface identical to that of the walls, and in the northwest corner of the feature it rose almost 10 cm. Few artifacts were recovered from the upper levels of the fill, but groundstone, sherds and lithics were recovered from floor fill. A sample of fecal matter and a fragment of a post were collected from floor fill in the east half of the structure. Perhaps the most unusual artifact found in this feature, however, was a small, chipped stone cross of pink chert that also was found in floor fill (Fig. 10).

Feature 10A. A small hearth, 49 by 71 by 9 cm, located in the center of feature 10 on the edge of the wash. The hearth was on the floor of the pit structure, 114 cm below pgs; half of it had been eroded. The east half of the remaining portion of the hearth, measuring 71 by 49 by 9 cm, was excavated and a radiocarbon sample taken.

Feature 11. An ash pit, 93 by 123 by 3 cm, in grid square 604. The feature was located in layer 1 at the same level as the top of layer 3E, which ends just west of the feature. The fill was deposited in two layers. The top layer was light gray ash intermixed with discontinuous lenses of light brown sand. A layer of dark brown clay approximately 2 cm thick separated the ash from the lower layer, a mixed deposit of ash, light brown sand, and



Figure 7: Photograph of feature 10.

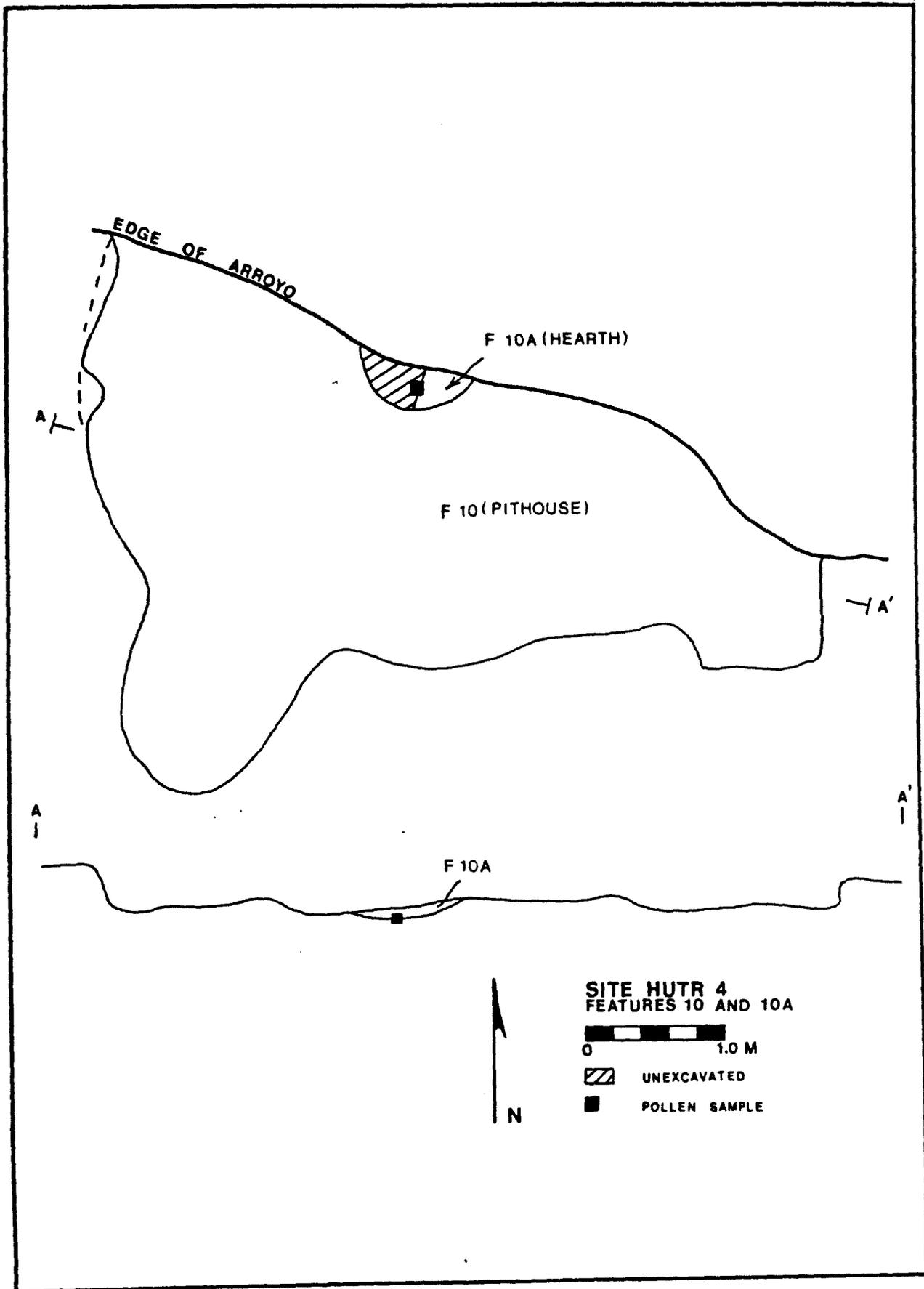


Figure 8: Plan and cross section of features 10 and 10A.

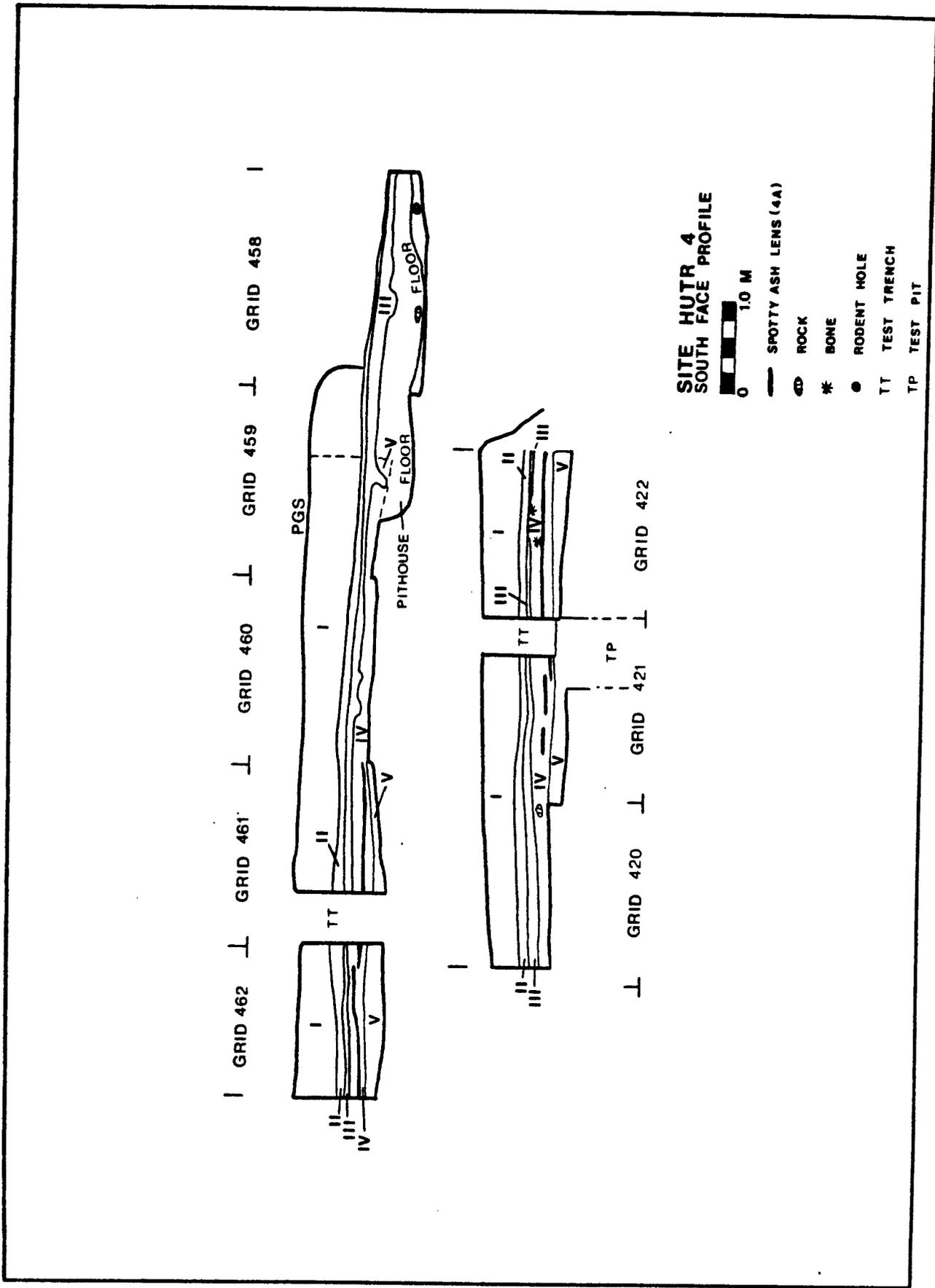


Figure 9: South face profile of fill above and within feature 10.

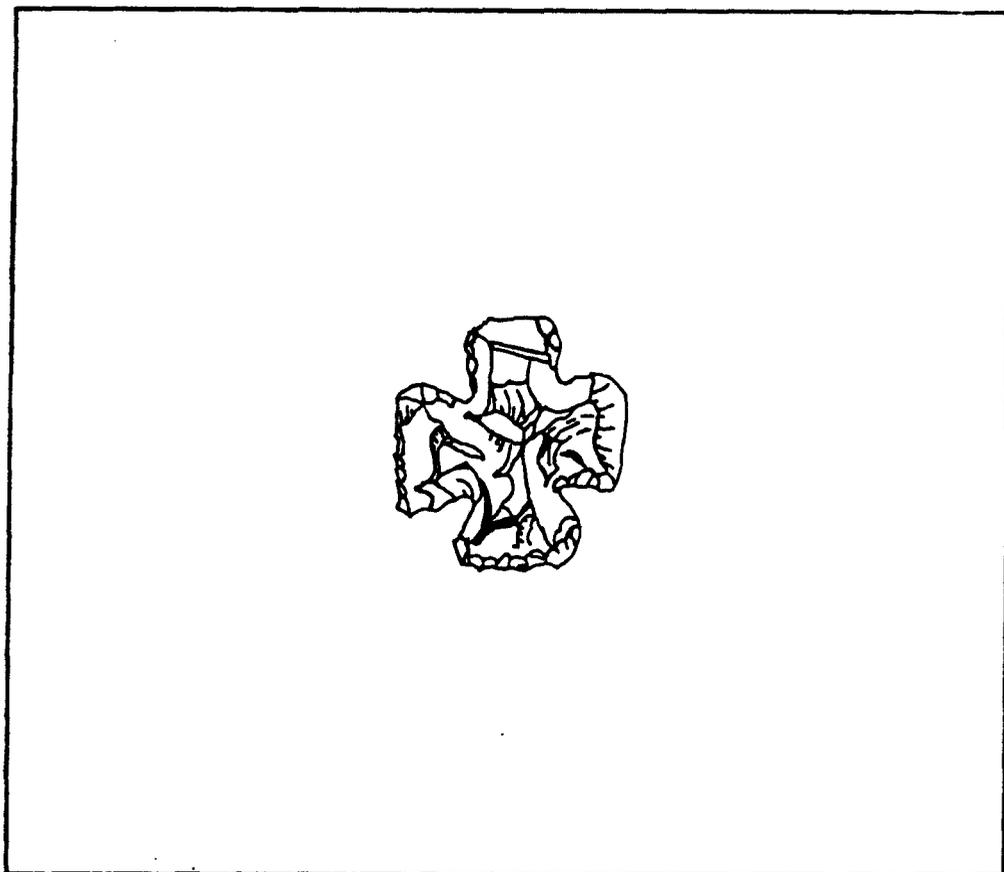


Figure 10: Lithic cross from floor fill of feature 10.  
(2.5 times the original size.)

clay. There was no evidence of burned sand or clay, indicating the feature was not used as a hearth. The pit contained bone from either sheep or goat, ceramics, lithics and groundstone. A radiocarbon sample was taken.

**Feature 12.** An ash pit similar to feature 11 that apparently was dug out and reused. A shallow pit containing charcoal and ash was cut into an earlier, slightly deeper one containing ash. The earlier pit was partially covered by sterile, light brown sand and was separated into two levels by a thin layer of dark brown clay, the same layer that covered the bottom of the later pit. As with feature 11, there was no evidence this feature was used as a hearth. Ceramics, bones and a small shaped sandstone slab were recovered from the feature. The feature was cut by Adam's test trench 2 from the 1983 excavations at the site. Approximately one-third of the feature remained and measured 150 by 36 by 10 cm. A radiocarbon sample was taken.

**Feature 13.** A small, shallow, irregularly shaped ash pit, 60 by 70 by 10 to 15 cm, located in the southwest corner of grid square 605 and the northwest corner of grid square 645, 6 cm below pgs. Fill consisted of lenses of ash, dark brown clay and brown sand. A radiocarbon sample was taken.

**Feature 14.** A small, irregular stain of ash and charcoal with no appreciable depth was located on the west edge of grid square 564 in layer 3E. No samples were taken.

**Feature 15.** A small, ephemeral ash lens, approximately 30 cm in diameter and 1 to 2 cm deep, located in grid square 534, 5 cm below the top of layer 4, 50 cm below pgs. No artifacts were found in the feature. A radiocarbon sample was taken.

**Feature 16.** A small, irregular ash pit, approximately 62 cm in diameter and 6 cm deep, located at the northeast corner of grid square 493, 5 cm below the top of layer 4 and 53 cm below pgs. Two radiocarbon samples were taken.

**Features 17 through 20.** A group of four small, extremely shallow postholes in grid squares 501 and 461 at the top of layer 4, 28 to 29 cm below pgs. The postholes were all 10 to 11 cm in diameter and 2 to 3 cm deep. Pollen samples were taken.

**Feature 22.** A small, shallow posthole similar to features 17 through 20, 5 cm below the top of layer 4 and 56 cm below pgs in grid square 463. The posthole also was 10 cm in diameter and 3 cm deep. A pollen sample was taken.

**Feature 23.** A broken, unmodified sandstone slab and an angular sandstone cobble associated with smears of charcoal and ash that apparently resulted from rodent or root disturbance. The feature was 10 cm below the top the layer 4, 52 cm below pgs. The position of the slab may have resulted from cultural activity but was not a true feature.

**Feature 24.** A cooking pit (feature 24B) and associated ash pit (feature 24A) were located 15 cm below the top of layer 4, 3 to 5 cm above the top of layer 5 in grid square 463. The top of feature 24A was 59 cm below pgs; that of feature 24B was 60 cm below pgs. The two pits were contiguous and covered by a smear of ash and charcoal up to 5 cm thick. The cooking pit was oval, 73 by 88 by 27 cm and located in the northwest corner of the grid square. The pit contained four layers of fill, the first mixed ash and charcoal. The second was a rim of compacted brown sand up to 5 cm thick, encircling the north and west sides of the pit. The third was a continuation of the ash and charcoal from layer 1 mixed with fine brown sand extending beneath the rim formed by layer 2. Beneath the ash layers was a layer of dark brown-to-black charcoal-stained sand. The sand at the base of the pit was oxidized. The ash pit was smaller (50 cm in diameter and 10 cm deep), contained only one layer of fine ash and charcoal, and was located 10 m southeast of the cooking pit in the center of the grid

square. These two pits were at the same level as the occupation surfaces and pit structures and probably are associated with the Navajo occupation of the site. Two radiocarbon samples were taken from the smear of ash and charcoal at the top of the features, and one was taken from within each of the pits.

**Feature 25.** An irregular, thin lens of ash and charcoal associated with layer 4A and located in grid square 461, 5 cm below the top of layer 4 and 59 to 60 cm below pgs. The lens extended 54 by 38 by 5 cm. Although this appeared to be part of a larger, patchy, discontinuous lens of scattered ash and charcoal covering parts of four grid squares (layer 4A), the lens was treated as a feature because a radiocarbon sample was taken.

**Feature 26.** A pit located in the northwest corner of grid square 462, approximately 15 cm below the top of layer 4 and 5 cm above the top of layer 5. The pit measured 64 by 74 by 14 cm and was 67 cm below pgs. Fill consisted of relatively clean, light brown sand. No artifacts were found. This pit appears to be associated with the eighteenth century occupation of the site.

**Feature 27.** A large pit or small pit structure (Fig. 11) located in grid squares 537 and 497, 5 cm below the top of layer 5 and 69 cm below pgs (Fig. 12). The pit measured 195 by 205 cm and is a maximum of 44 cm deep. Fill consisted of discontinuous lenses of ash and charcoal separated by lenses of ashy brown sand (Fig. 13). A high density of bone, much of it burnt, sherds and lithics were retrieved. The walls and floor of the pit consisted of light, reddish brown sand. There were no compacted or prepared surfaces. However, a posthole (feature 44) and several possible remnants of postholes with post shims were found on the northwest edge of the pit. Three radiocarbon samples were taken. The feature appears to be associated with the primary Navajo occupation of the site.

**Feature 29.** A small, irregular area, possibly an occupation surface, measuring 30 by 60 cm, was located at the base of layer 4 in the east half of grid square 497 and the west half of 486. The surface overlay the northeast edge of feature 27 but could not be traced across the entire feature, perhaps partially because of rodent disturbance. The west edge of the feature was cut by a rodent hole. The feature may have been the result of puddling from surface water rather than an intentionally prepared surface.

**Feature 31.** A series of ash dumps resulting in an irregularly shaped deposit of ash, charcoal, and brown sand lenses containing corn cobs, bones, sherds and lithics. Tops of the dumps were located in grid square 533, 5 cm below the top of layer 5 and 55 cm below pgs. The feature was 1.06 by 1.52 by .25 m. A radiocarbon sample was taken from the first lens of ash and charcoal.

**Feature 32.** An irregular surface at the base of layer 4 in the northern half of grid square 572. The surface did not appear to continue to the south or east but may have been dug through on the north and west prior to discovery. The feature measured 95 by 125 cm. No artifacts were associated with it, and no samples were taken. The feature, like feature 29, may have resulted from water puddling on the occupational ground surface rather than from an intentionally prepared or heavily used occupational surface.

**Feature 33.** A small pit (33A) and hearth (33B) located on the southwestern corner of grid square 533, 5 cm above the base of layer 4. The pit was 30 cm in diameter, 5 cm deep, and cut into the hearth. Fill consisted of light brown sand and large pieces of charcoal. The hearth was 83 by 48 by 7 cm and contained a central deposit of ash and charcoal surrounded by black, charcoal-stained sand. A radiocarbon sample was taken from each feature. Both features apparently were associated with the primary Navajo occupation of the site.



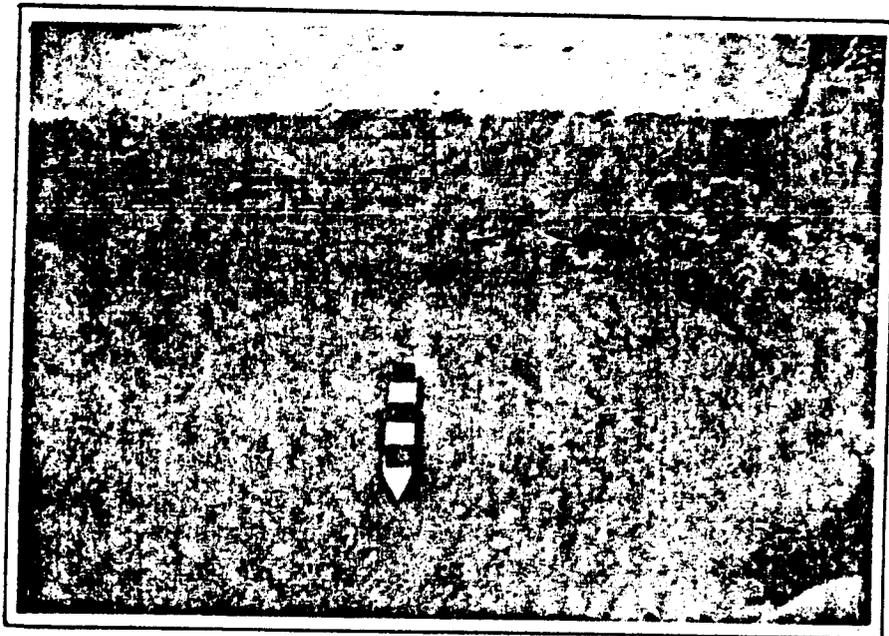


Figure 12: Location of feature 27 below site fill layers.

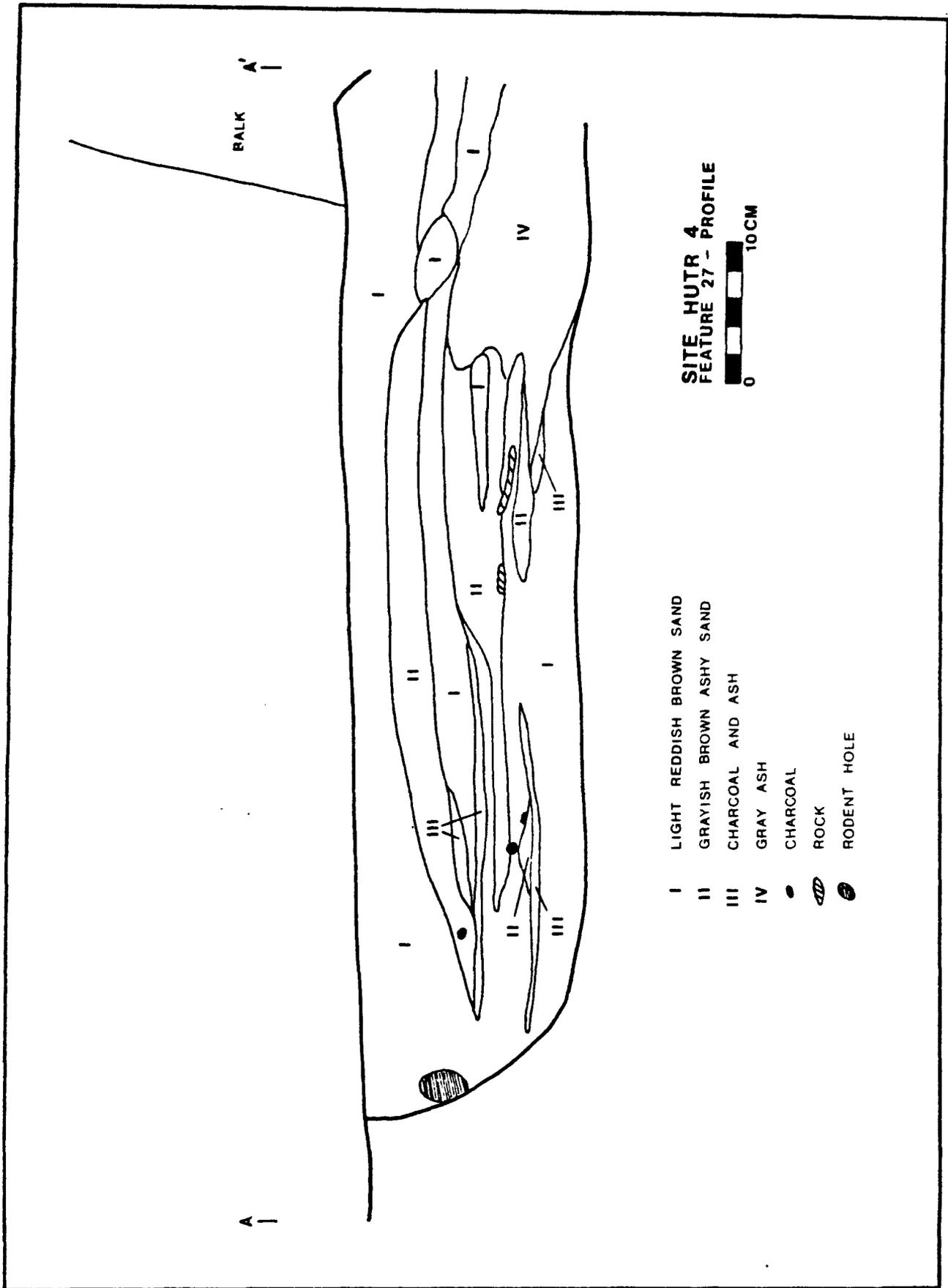


Figure 13: Profile of feature 27.

Features 34 and 35. Two postholes located about .85 m apart in grid square 537 at the top of layer 4, 43 and 49 cm below pgs, respectively. They were similar to features 17-20 and 22, although slightly larger. Feature 34 measured 18 by 15 by 4 cm, and feature 35, 13 by 12 by 2 cm. Both were filled with light colored, coarse-grained sand. No samples were taken from either of these features.

Feature 36. A slightly dish-shaped occupation surface, possibly from a hogan or ramada, and the fill above it (Fig. 14). The feature was located in grid squares 494, 496, 535, 536, 575 and 576. The top of the fill ranged from 43 cm below pgs at the west edge to 63 cm below pgs at the east edge of the feature, and the floor was 63 cm below pgs on the east edge, 74 cm below pgs in the center, and 69 cm below pgs on the west edge. Two hearths were associated with the feature (Fig. 15): feature 37, located on the eastern edge of the floor, and feature 46 that was located slightly east and below feature 37, which was associated with an earlier use of the surface. A slab metate and two pieces of groundstone were found on the floor of feature 36, and a mandible of Equus sp. was found in floor fill. The floor of feature 36 partially covered an earlier surface, feature 36A, which formed an oblong mound of compacted sand beneath the east edge of feature 36 and extended about .35 m into grid square 534. The floor of feature 36 extended over the top of the west side of the mound. Feature 36A appears to be the remnants of an earlier floor associated with feature 46. The floor continued underneath feature 36, sloping down to the west towards feature 46, but could not be traced up to the feature. The mound was oriented northwest-southeast, was 100 cm long by 25 cm wide by 15 cm high, and was underlain by what appeared to be yet another occupation surface merging into 36A at the base of the mound (Fig. 16). The series of surfaces appear to represent the reuse and resurfacing of the floor in the structure or enclosed area the feature represents. The function of this mound is unknown, but it may have been part of a doorway or the juncture of the floor and wall.

Feature 37. A hearth, 80 cm in diameter and 7 cm deep, located on the east side of the floor of feature 36. The top of the feature was 73 cm below pgs. The top 5 cm of the fill consisted of ash and charcoal and was underlain by a 2 cm thick layer of dark, charcoal-stained sand. A radiocarbon sample was taken from the feature.

Feature 38. A large deposit of what appears to be sheep dung located at the base of layer 4 in grid squares 385, 386, 425 and 426. The feature extended 2.5 m by 3.5 m, was a maximum of .10 m deep, and ranged from 40 to 45 cm below pgs at the southwest corner of grid square 422. The deposit was associated with three small postholes, features 39 through 41, and probably represent the remains of small corral or pen. However, a hearth, feature 42, also was associated with the feature. Since a hearth would not usually occur in a corral or sheep pen, it may slightly predate the corral, or the feature may have been used as a lambing pen. In addition to a pollen and macrobotanical sample, a phosphate sample was taken from the deposit.

Features 39 through 41. Three small postholes associated with feature 38. Feature 39 is located in the dung deposit and was 12 cm in diameter and 10 cm deep. The top of the posthole was 48 cm below pgs at the southwest corner of grid square 422. Feature 40 and 41 were located 10 cm apart, about 90 cm south of the dung deposit and 1.75 cm south-southeast of feature 39. Feature 40 was 9 cm in diameter and 2 cm deep, and feature 41 was 15 cm in diameter and 6 cm deep. Pollen samples were the only samples taken from the features.

Feature 42. A hearth surrounded by feature 38 and dug into the sand below. The feature was located on the east edge of the dung deposit and ca. 50 cm below pgs at the southwest corner of the grid square 422. The hearth measured 51 by 70 by 12 cm. The sand beneath was reddened from burning. Burnt bones, retouch flakes and sherds were recovered from the hearth.



Figure 14: Photograph of feature 36 and associated features.

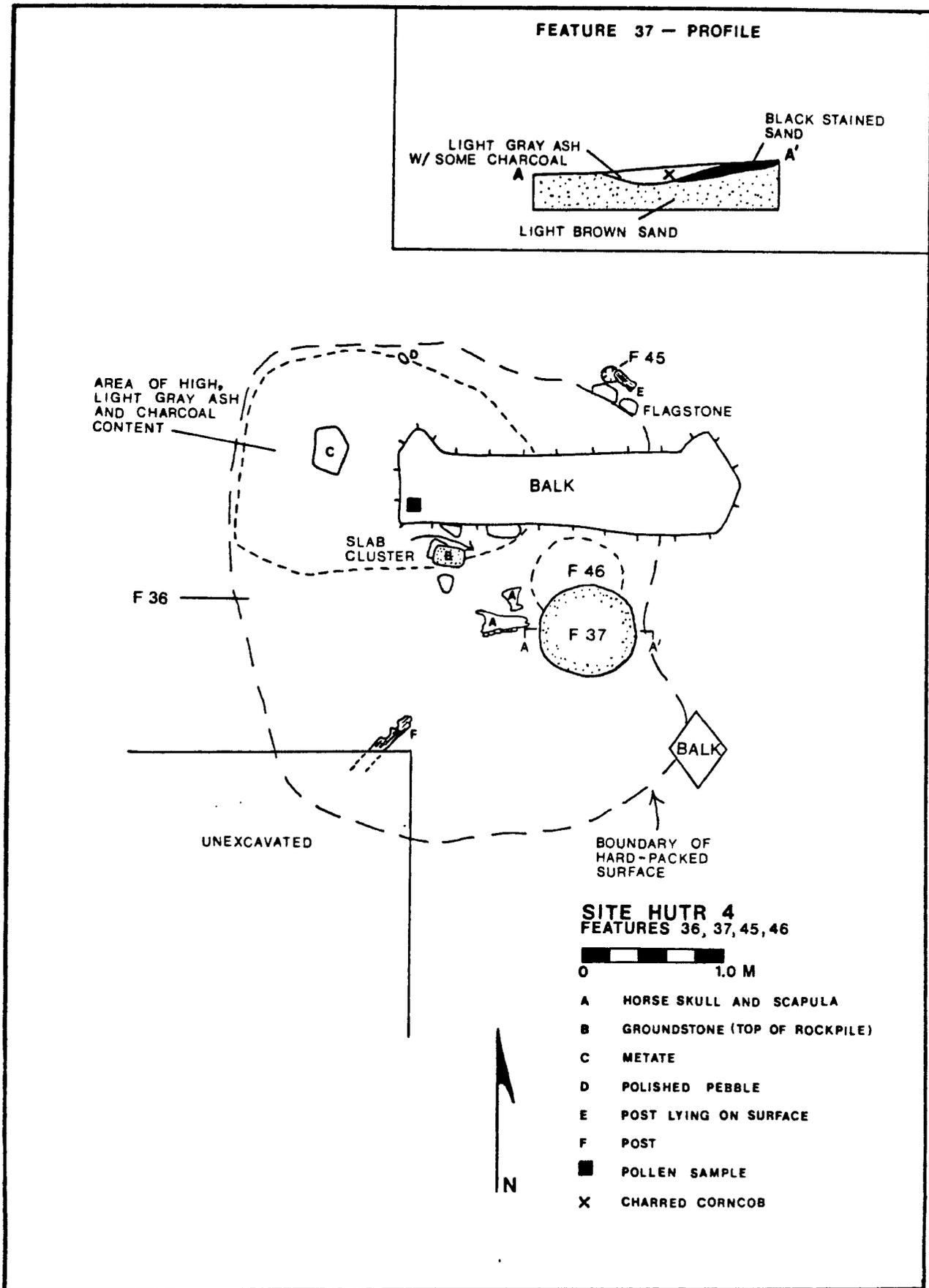


Figure 15: Plan of feature 36 and associated features.



Feature 43. A shallow, amorphous stain of ash and charcoal in layer 3E and grid square 525. No samples were taken.

Feature 44. A posthole with an intact post located 30 cm north of the northwestern edge of feature 27. The top of the feature was 10 cm below the top of layer 5, 74 cm below pgs. The posthole was 13 cm in diameter and 39 cm deep. The post, which appeared to be pinon, is slightly smaller in diameter and also 39 cm long. The post was taken as a dendrochronological sample.

Feature 45. A post lying adjacent to two thin sandstone slabs, which were lying next to the north edge of feature 36, 30 cm south of the south edge of feature 2. It is not clear which of the two features the post is associated with. If the features were contemporaneous, as they appear to have been, it may be associated with both. The post was taken as a dendrochronological sample.

Feature 46. A small hearth, partially underlying feature 37, beneath the floor in the east half of feature 36. The hearth appears to be associated with the floor, feature 36A. The top of the hearth was 80 cm below pgs. The hearth was 44 cm in diameter and 18 cm deep. The fill consisted of lenses of sand, ash and charcoal.

Feature 47. A small hearth, 60 by 70 by 10 cm deep, located immediately below the occupation surface, feature 3C, at a depth of ca. 60 cm below pgs. The fill consisted of ash and charcoal. The feature appeared to rest on a second surface immediately below 3C. Due to a time shortage, the surface was not followed beyond the area of the hearth. The hearth and patch of occupation surface rested directly on the top of layer 5. There were no cultural deposits below the feature in layer 5.

In summary, 28 features, including all the structural features found at the site, are associated with the primary occupation level. These are features 2, 3A, 3B, 3C, 5, 6, 9, 10, 10A, 24A, 24B, 26, 27, 29, 31, 32, 33A, 33B, 36, 37, 38, 39, 40, 41, 42, 44, 45, 46 and 47. All of these occurred at the bottom of layer 4 and the top of layer 5. The features are the result of Navajo occupation of the site believed to date from the mid-eighteenth century. Feature 8 may have been associated with that occupation as well, but since it was lost to erosion prior to this excavation, its relationship to other features cannot be established definitely. Of these features, 9, 26, 27, 31, 32, 36A, 44, 46 and 47 were situated at or in the top 10 cm of layer 5. The rest occurred in the bottom 5 cm of layer 4 as well, but it is also possible that localized erosion of layer 5 and shifting sand on the dune prior to occupation resulted in the bottom levels of layer 4 being deposited at different times in different areas of the site. Feature 7 occurred in layer 5 below the level of primary occupation at the site and it appeared to be noncultural.

Features 4, 14 and 43 occurred in layer 3E on the east edge of the site. Features 11, 12 and 13 occurred in layer 1 at the same level as layer 3E, immediately adjacent to the southeastern extent of the layer. The stratigraphy at the east end of the site did not connect to that of the rest of the site; thus, the relationships of these features to the rest of site is unknown. Ceramics and faunal remains recovered from these features suggest they also are historic, and a piece of glass from feature 4 suggest it, at least, may be fairly recent. Further dating of these features must wait for the results of analysis.

Features 15, 16, 17, 18, 19, 20, 22, 25, 34 and 35 occurred in the top 5 cm of layer 4. Seven of these features (17-20, 22, 34-35) were small, shallow postholes. The others were two ash lenses and an ash pit. Feature 23, an unmodified sandstone slab, occurred 10 cm below the top of layer 4.

Feature 1, a concentration of small sandstone slabs, occurred in layer 1, 20 cm below

pgs and is presumed to be associated with recent historic use of the site of a temporary or transient nature.

### Site Stratigraphy

There was little deviation from the methodology specified in the scope of work. However, differences between the expected stratigraphy as revealed in the test excavations and the actual stratigraphy as it occurred over much of the site (Fig. 17) necessitated some changes in procedure, particularly with respect to layers 3 and 5. Layer 1 was removed with a bulldozer from most of the site during the first day of excavation. Along the northern part of the site near the wash edge, it was removed with shovels but not screened. When artifacts or nonartifactual samples were encountered during excavation of this layer, they were collected. Layer 2 was removed by hand wherever it occurred. This layer was patchy, extremely thin (1-2 cm) in many places, and confined primarily to the northern edge of the site. No artifacts were recovered from the layer. Layer 3, dark reddish brown-to-brown sand ranging from 1 to 10 cm thick, did not occur across the whole site. The layer appeared to be limited to the north-central parts of the site and was absent along the west, south, and east edges. Layer 3 occurred in all or part of 36 grid squares and was excavated completely.

A layer similar in color, but unrelated stratigraphically, to layer 3 was found to underlie layer 1 on the eastern end of the site, east of a shallow drainage ditch extending from the road northeast to the wash. Although this was the second stratum encountered on that end of the site, it was called 3E because of its occupational context. All the sediments on that end of the site were extremely well compacted and moderately well indurated. This was true of layer 3E, which also contained lenses of water-laid clay, apparently of natural rather than cultural, origin. Layer 3E ranged from 5 to 15 cm in depth and sloped towards the north, it was thickest on the southern edge of its extent and thinnest along the edge of the wash (Fig. 18). Based on artifacts and features associated with the layer, it was judged to result from historic occupation of the site. However, there was considerable evidence of disturbance to deposits by recent dumping and stream action. The latter may be associated with the drainage ditch, with flooding of the small wash that runs into Pueblo Colorado Wash from the south, or both. Whatever the source of the disturbance, mixing of artifacts probably occurred in the area. Layer 3E occurred in all or part of an estimated 11 grid squares and was excavated in nine of those. The sediments from the layer were screened with the exception of those from the southern half of grid square 485; they were removed before the layer was recognized. Artifacts occurred in low densities in the layer. Deposits below the layer were sterile.

Layer 4, light, reddish brown, silty sand containing flecks of charcoal and ash stains, occurred throughout the central core area of the site and was absent on the west and east ends of the site and along the southern edge near the road. Small discontinuous lenses of ash and charcoal occurred throughout the site in the layer. In grid squares 421, 382, 383 and parts of 461, a more extensive ash lens occurred in the bottom 5 to 10 cm of layer 4. This was called 4A and excavated separately. In the southwestern corner of the site, the layer contained few artifacts, very little charcoal, and was quite thin. In those grid squares, it overlay sterile deposits. There was no definable layer 5.

Layer 4 was completely removed in 30 squares, one-half of four squares, and one-quarter of one square. In two of the partially excavated squares, portions were excavated, while the remainder of the squares was excavated to within approximately 5 to 8 cm of the base of the layer. In those squares, features 19, 3A, 3B, 3C and 6 occurred at this level. Most of the occupation of the site occurred at the base of layer 4 and the top of layer 5.

Layer 5 consisted of what appeared to be an old, poorly developed soil of medium to



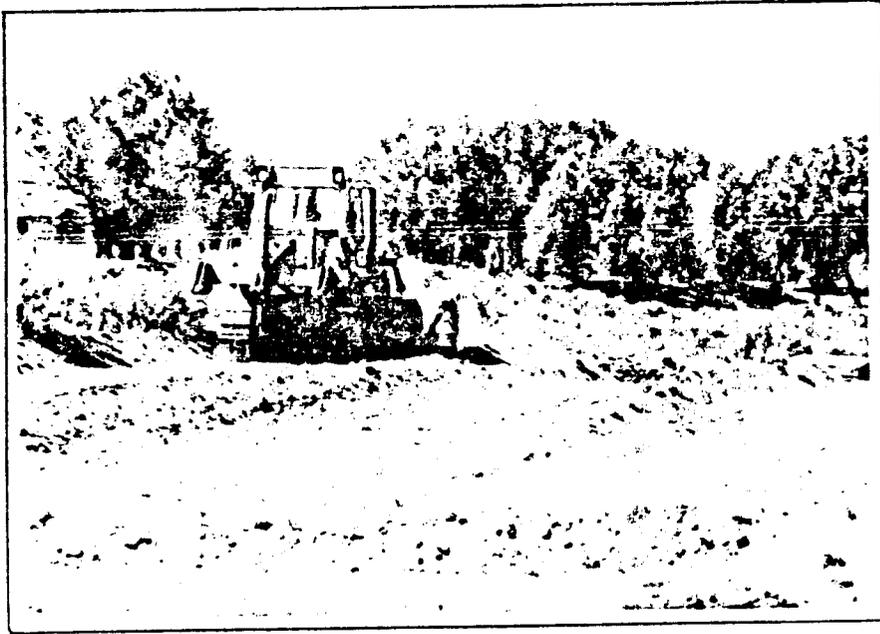


Figure 18: Road grader removing layer 1.

dark, reddish brown sand blending gradually into lighter sediments. Apparently, it occurred originally across the entire site but was absent presently on the east end of the site because of erosion. The layer extends to the level of the wash at grid square 530. This coincides with the location of the drainage ditch crossing the site. A total of 17 squares and five partial squares was opened into layer 5. Of the 17 complete squares, eight were excavated 5 cm into layer 5, two were excavated 10 cm into the layer, two were excavated 15 cm into the layer, and four were excavated 20 cm into the layer. Layer 5 was removed completely from one square, but it was only 10 cm thick. Excavation was halted 20 cm below the top of layer 5 in the north half of the square and 30 cm below the top of the layer in the south half of the square. In all of those squares, artifacts were recovered primarily from the top 5 cm of the layer. The few artifacts and bones found below the level apparently resulted from displacement or rodent disturbance.

After discussion with Peter McKenna, it was decided that, rather than continuing to open up entire squares in sterile deposits, 1 m sq test probes would be excavated into layer 5 to test for cultural deposits. Five such probes were excavated. The southwest quarter of grid square 575 was excavated to a depth of 15 cm below the top of layer 5, the northwest quarter of grid square 533 was excavated to a depth of 20 cm below the top of layer 5, the northwest quarter of 423 and the northeast quarter of 573 were excavated to 25 cm below the top of layer 5, and a 1 by 1 m square in the center of grid square 499 was excavated to 30 cm below the top of layer 5. In addition, a 2 by 5 m test trench was opened 20 cm into layer 5 in one square. No cultural materials were recovered from any of the units.

In addition to those squares, four squares were excavated into sterile deposits underlying layer 4 in the southwestern corner of the site. Layer 5 could not be defined in those squares. The sediments from those units were lighter than layer 5, resembling the sand below layer 5 in color. Grid squares 502, 503, the east half of 504, and a 2 by 5 m test trench in the west quarter of 541 were excavated 10 cm into the sterile layer. This may represent an area of localized erosion, possibly an area of dune blowout.

Two squares were opened between grid 571, the easternmost square with stratigraphy corresponding to that in the western and central parts of the site, and the grid squares opened into layer 3E at the east end of the site. The stratigraphy in those two squares, 569 and 567, consisted of recent deposits overlying sterile layers. They were excavated to a maximum depth of 102 cm and 89 cm, respectively, below pgs. The units were extremely well compacted and appeared to be mostly water-laid deposits.

#### Summary and Interpretations of Features and Stratigraphy

As mentioned above, the main occupation at the site occurred at the base of layer 4 and the top of layer 5 and appears to have been associated with an eighteenth century Navajo community of undetermined size. Bones apparently of sheep, goat, cattle and horse or mule occurred in features at that level. Dinetah Utility Ware also occurred in significant quantity in the layers. At least two hogans and two exterior or partially covered work areas were present at the site. These structures appear to have been roughly contemporaneous. Since much of the site has been lost to erosion, it is impossible to estimate its original size.

The main site occupation apparently was followed by a period of less intense use of the site. The ash and charcoal lenses, the artifacts and animal bones recovered throughout layer 4 suggest layer 4 represents a build-up of occupational debris.

Layer 3 seems primarily to represent a post occupational accumulation of sediments. The layer contained artifacts but no features. The limited extent and shallow depth of the layer suggest deflation and erosion may have removed much of the layer. Such disturbance

could have resulted in the mixing of artifacts from layer 1 with those of layer 3 as well. Layer 2 appears to have been an aeolian deposit occurring in patches across the north edge of the site. Layer 1 consisted entirely of recent overburden; this is a dune deposit with the exception of sediments on the east end of the site, which were waterlaid.

None of the strata excavated could be associated with a prehistoric occupation of the site, either the prehistoric component of the site has been lost completely through erosion, none occurred, or it occurs at levels deeper than layer 5. One sherd was found eroding from the face of the wash 2.67 m below pgs, in all likelihood, the location of the sherd is a result of displacement.

#### Artifacts and Samples Recovered

An artifact count indicates 1,678 bones, 638 sherds, 232 lithics and 38 pieces of groundstone were recovered from the site. Approximately 30 pieces of glass and 10 pieces of metal from cans were collected from layer 1. Forty-one pollen samples, 27 macrobotanical samples, 23 radiocarbon samples, 7 dendrochronological and 1 phosphate samples were collected from features. Other samples recovered include 15 wood fragment samples, 8 macrobotanical samples of seeds and corncobs, 7 samples of minerals or pigments, 3 Olivella shells, probably used as beads, and one piece of eggshell.

#### RECOMMENDATIONS FOR ANALYSIS

The recent excavations at the Sand Dune Site have provided partial answers to the questions outlined in the research design for excavation and analysis. Based on the information recovered during excavation, the following conclusions have been drawn. Analysis preliminary interpretations.

1. Only one primary component was present at the Sand Dune Site in the areas excavated in 1987. This was the eighteenth century Navajo occupation of the site. More recent activities resulted in scattered debris and a few features including shallow postholes and ash dumps, but those remains do not appear to have stemmed from a more recent, extended occupation. The three ash pits and two ash stains associated with occupation layer 3E (features 11, 12, 13, 14 and 43) appear to be historic as well but have not been dated and could represent another occupational component at the site. The analysis of ceramic and faunal remains and radiocarbon samples taken from these features and layer 3E should focus on dating this occupation and its relationship to the eighteenth century occupation. No features or area of the site excavated during the 1987 excavation yielded evidence for a prehistoric component. It appears this component was restricted to the northeastern corner of the site and has been lost entirely to erosion.

2. Activities represented at the site by features were predominantly domestic. Structural depressions, presumably associated with hogans, exterior working areas, hearths, ash dumps, ash/refuse pits, other pits of unknown function and an animal pen provide evidence of a habitation site. Due to extensive erosion on the north edge of the site, the size of the site is unknown. Corncobs found in features demonstrate agriculture was part of the subsistence strategy, with fields presumably located on the floodplain of the Pueblo Colorado Wash. Sheep and/or goats were kept by the Navajo inhabitants, and the presence of an Equus mandible in feature 36 suggests horses were kept as well. An analysis of ceramics and lithics from features and layers associated with this occupation will extend our knowledge of on-site activities. Analyses of the faunal, pollen, macrobotanical and soil samples collected will provide more information on the economy of the Navajo inhabitants. It is recommended that approximately 66 percent of the pollen and macrobotanical samples be submitted for analysis. Samples should be selected from all habitation features and represent all vertical and horizontal provenience differences noted by the excavator in this

report. For example, samples from features in the eastern and western edges of the site as well as from the main occupation area should be submitted. Superimposed features should be sampled to provide data on possible changes in site area use. Because of the redundancy in the faunal assemblage, it is recommended it also be sampled.

3. During the eighteenth century the Sand Dune Site apparently was a small community of Navajos living in sunken or partially subterranean hogans. As mentioned, the exact size of the community cannot be estimated reliably.

4. As discussed previously, the closest parallels to the Sand Dune Site are Navajo habitation sites dating prior to A.D. 1800 from the Canyon de Chelly region. Those sites are similar to the Sand Dune site in architecture, ceramics and, to the extent it can be estimated, size. Because the site is one of the earliest, permanent sites known in northeastern Arizona, it is important that future analysis focus on confirming or refuting the site date. To accomplish this, it is recommended that radiocarbon samples from features 11, 12, 16, 37, 46, 47, 27, 24B, 42, 10A and 6 be processed, and that all seven dendrochronological samples be analyzed. Further analysis also will allow a more detailed understanding of cultural influences and contacts among the occupants of the Sand Dune Site, other Navajos moving into the region, and other cultural groups, including the Hopi and Spanish. In addition, the site can provide baseline data for examining the effects of Anglos and trading post economies on local Navajo subsistence and material culture.

#### **SIGNIFICANCE OF THE WORK**

The 1987 excavation at the Sand Dune Site has provided a more complete understanding of site stratigraphy and of the extent and time of the primary occupation. Future analysis of the artifacts and samples will allow a more complete assessment of the activities occurring at the site and the nature and duration of historic use.

Although final assessment of site significance must wait for a complete analysis of the artifacts and samples collected, initial results indicate that the primary occupation was historic Navajo. Based on recovered ceramics and the radiocarbon date from feature 3C, that occupation appears to have dated to the second half of the eighteenth century. Since few well-documented, early Navajo sites are known, the Sand Dune Site provides an opportunity to gain important information on the activities occurring at such a site, the duration of occupation, and its chronological and cultural relationship to later sites in the area. Because the main occupation of the site predates the establishment of the trading post and use of the site continued after this occupation, valuable information may be gained on the effect of the trading post on the local economy and on the activities and material culture of the inhabitants. Likewise, a more generalized acculturation processes may be illuminated. Important correlations between economic changes and settlement and social organization as defined by Kelley (1978) and York (1983) also may be examined.

#### **RECOMMENDATIONS FOR ARCHEOLOGICAL CLEARANCE**

An estimated 90 to 95 percent of all known cultural materials present at the Sand Dune Site have been excavated and all possible information bearing on cultural occupation at the site collected. The main occupation level at the site, situated at the base of layer 4 and the top of layer 5, was completely exposed and excavated. Test probes and entire squares were opened below this level throughout the site into layer 5 to a depth of between 15 and 30 cm below the last cultural remains encountered. There is no evidence of cultural occupation at a depth greater than 5 cm below the top of layer 5 anywhere on the site, with the exception of one sherd found protruding from the bank of the wash 2.67 m below pgs. It seems most likely that the location of the sherd is the result of displacement or disturbance, consequently, clearance is recommended.

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