



An Archaeological Monitoring and Excavation Project within the Fort Lowell National Register Multiple Resource Area along North Craycroft Road, Tucson, Pima County, Arizona

Prepared by:

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With contributions by:

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We would like to thank Tucson Electric Power for their support of this project. Specifically, Shannon Breslin and Cheryl Eamick with the Land Resources Department were instrumental in gaining additional funding to complete this important contribution.

The Fort Lowell Transformer Pad excavations were completed in 2001. The original personnel affiliated with the field project included Lee Fratt, Ph.D. (principal investigator), Fred Huntington and John Hayes (field directors during different portions of the project), and Ingrid Klune, (M.A.) (crew chief). Crew members included Raphael Ambeliz, Renee Ericson, Patricia Gibson, and Brian Zaglauer. All of the foregoing individuals have since left Tierra to pursue other interests or avenues in archaeology, with the exception of Renee Ericson (now Renee Darling), who today is director of Tierra's Environmental Planning and Cultural Resources Division.

This report was completed because of the efforts of several people. Randye Ferrick, owner and president of Tierra, provided additional funding to complete the artifact analyses and write the report. Joseph Howell (M.A.) distilled field notes and previously completed sections of the report into a workable whole. Ceramic and lithic artifact analyses were completed by Ingrid Klune and Karin Olsson, respectively, soon after the completion of field work along with the faunal analysis by Mike Cook. In 2012, historic artifacts and shell artifacts were analyzed by Joseph Howell and Jeff Jones, respectively. Jenna Hamlin (Ph.D.) searched through old boxes to provide the artifacts to the analysts. Jennifer Hushour (M.Sc.) and Fred Huntington reviewed the draft report. Finally, Stephanie Whittlesey (Ph.D.) and John Murray completed the technical edit.

Barbara K. Montgomery, Ph.D.
Principal Investigator
June 3, 2013

ABSTRACT

PROJECT TITLE: An Archaeological Monitoring and Excavation Project within the National Register Multiple Resource Area along North Craycroft Road, Tucson, Pima County, Arizona

LAND STATUS: Municipal (City of Tucson)

AGENCY: City of Tucson, Arizona State Historic Preservation Office (SHPO)

PROJECT DESCRIPTION: The project consisted of an archaeological monitoring and limited excavation program that was conducted within and adjacent to Fort Lowell City Park beginning in June 2001. The purpose of the project was to monitor the excavation of a trench for an underground electrical utility line and an associated transformer to be installed by Tucson Electric Power (TEP). Two sites were affected by the proposed construction: AZ BB:9:14(ASM), the Hardy site, and AZ BB:9:40(ASM), the historic Fort Lowell site. Tierra archaeologists identified 16 cultural features: 10 prehistoric and 6 historic features. The prehistoric features included seven pit structures, one possible pit structure, an extramural surface with several pits, and a mixed refuse deposit. The historic features included two possible tree wells, three trash pits, and a trash deposit. One pit structure, Feature 2, was completely excavated. The remaining features were mapped in profile and photographed.

TIERRA PROJECT NO.: 1T0-057A

TIERRA REPORT NO.: 2013-111

FIELDWORK DATES: June 20–August 23, 2001

PROJECT LOCATION: The project area was located in Section 36, Township 13 South, Range 14 East, Gila and Salt River Baseline and Meridian (G&SRB&M), on the Tucson North (1992), Arizona, 7.5-minute U.S. Geological Survey (USGS) quadrangle, in Pima County, Arizona. The project area was centered on the western edge of Fort Lowell Park along Craycroft Road, between Glenn Street and Fort Lowell Road.

MANAGEMENT RECOMMENDATIONS: The approved testing plan (Fratt and Huntington 2001) was implemented and cultural remains were evaluated in accordance with the plan. The project was completed, and the new utility line was installed, with no further archaeological work being required.

The client and all subcontractors are reminded that, in accordance with Section 41-844 and 41-865 of the Arizona Revised Statutes, should buried human remains or funerary goods be encountered incidentally on private lands during any ground-disturbing activities associated with the current project or any follow-up work done at any time in the future, all such work must immediately be halted in the vicinity of the finding and the Director of the Arizona State Museum (ASM) must immediately be informed so that a consultation process can be initiated and an appropriate course of treatment decided upon. Under the statute, the Director of the ASM must make an initial response to such a notification within 10 working days; there is, however, no specified limit on the length of time that work may be delayed in order to deal with the finding in an appropriate manner. In any case, work is not to resume until authorization is received from the Director of the ASM. Should the Director fail to respond to the notification within the 10-day window provided in the statute, it can be assumed that authorization to resume work has been granted.

CHAPTER 1

INTRODUCTION AND PROJECT BACKGROUND

Joseph Howell

This document presents the results of archaeological monitoring and limited excavation conducted within and adjacent to Fort Lowell City Park in 2001. The purpose of the project was to monitor excavation of a trench for an underground electrical-utility line and an associated transformer to be installed by the Tucson Electric Power Company (TEP). TEP contracted with Tierra Right of Way Services, Ltd., (then Tierra Archaeological and Environmental Consultants) (Tierra) to design and implement a monitoring plan. The project scope called for limited excavation in the event that important cultural resources were encountered that would be adversely impacted by construction (Frat and Huntington 2001).

The project was located within sites AZ BB:9:14(ASM), the Hardy site, and AZ BB:9:40(ASM), the historic Fort Lowell site. The cavalry-band quarters and the related kitchen at one time had a separate site number, AZ BB:9:72(ASM), but this number was consolidated under AZ BB:9:40(ASM) in 2004 (AZSITE 2004). The project was also located within the Fort Lowell National Register of Historic Places (NRHP) Multiple Resource Area (MRA), which includes the two sites. The Hardy and Fort Lowell sites overlap spatially and essentially represent separate temporal components of a single, long-occupied area.

Fieldwork began June 20, 2001, and continued until August 23, 2001. Lee Fratt was the principal investigator for the project. John Hayes served as field director for approximately the first half of the field session; Fred Huntington then took over field-director duties until the conclusion of the project. Ingrid Klune served as crew chief. Crew members were Brian Zaglauer, Raphael Ambeliz, Patricia Gibson, and Renee Ericson.

Tierra archaeologists identified 16 cultural features in the trench walls while monitoring the utility-trench excavation. Prehistoric features included seven pit structures and one possible pit structure, an extramural surface with several pits, and a mixed deposit of prehistoric fill. Historic features were two possible tree wells, three trash pits, and a trash lens. One feature, Feature 3, was initially thought to be a prehistoric pit, but it was later determined to be a noncultural feature. One pit structure, Feature 2, was situated at the proposed location of a transformer and was completely excavated to avoid adverse impacts. The remaining features were mapped in profile and recorded.

Based on ceramic information, the prehistoric component was occupied from the Rillito phase (A.D. 850–950) to the Tanque Verde phase (A.D. 1150–1300) of the Hohokam temporal sequence. Feature 2, the excavated pit structure, can be dated more precisely to the late part of the Rincon phase, perhaps the transition between the Rincon and Tanque Verde phases, again based on painted ceramics. The historic component produced features dating to the mid-to-late nineteenth century and the early twentieth century.

PROJECT LOCATION

The project area is located in Township 13 South, Range 14 East, Section 36, Gila and Salt River Baseline and Meridian (G&SRB&M), on the Tucson North, Arizona (1992), 7.5-minute U.S.

Geological Survey (USGS) quadrangle, in Pima County, Arizona, on City of Tucson (the City) property (Figure 1). Beginning a short distance west of the northwest corner of North Craycroft Road and Glenn Street, the trench was excavated past the eastern edge of Craycroft Road for a total distance of approximately 140 m. The main trench extended from the approximate center of this trench northward along the western edge of the Fort Lowell Park property for a distance of about 415 m. An additional 65 m of trench were excavated across Craycroft Road at the intersection of Craycroft and East Fort Lowell Roads. The total length of the utility trenching was approximately 600 m (Figure 2).

The majority of the project area was within the boundary of Fort Lowell Historic Park, with other segments of the project area located in the eastern right of way (ROW) of Craycroft Road, the northern ROW of Glenn Street, and the southern ROW of Fort Lowell Road. The entire project area was situated within the boundary of the Fort Lowell National Register MRA.

The project area lies within the Basin and Range Physiographic Province and the Arizona Upland subdivision of the Sonoran Desertscrub biotic community (Turner and Brown 1994). It is situated on the Pleistocene t3 terrace above Rillito Creek (McKittrick 1988). The entire length of the trench was located within a fully developed park and urban landscape with typical infrastructure including roads, sidewalks, and utilities. Archaeological remains are visible on the surface in the project vicinity; the structural remains from historic Fort Lowell are the most prominent.

PREVIOUS RESEARCH

As is the case with many large sites in the Tucson Basin, archaeological studies of the Hardy/Fort Lowell site complex have been predominantly related to a number of monitoring and testing projects intended to mitigate the effects of modern urban development upon prehistoric and historic remains. Previous research is summarized in Table 1. For a more in-depth overview of previous research at the Hardy–Fort Lowell sites prior to 2001, see Gregonis et al. (1997) and Diehl (2000).

The most recent substantial research at the Hardy/Fort Lowell complex was performed by Desert Archaeology, Inc. (DAI), in 2012 (Thiel 2012). This project involved the monitoring of contaminated soil removal at the Lowell-Adkins Steel locus, located near the northwest corner of Fort Lowell and Craycroft Roads. The project located 74 features belonging to both the prehistoric and Historic periods. The prehistoric features date from the Middle Rincon phase (A.D. 1000–1100) to the early Tanque Verde phase (A.D. 1150–1300) and included pit structures, a trash mound, pits, potbreaks, and a ground stone cache. Historic features from the Fort Lowell era (1873–1891) included structural remains, a garden area, irrigation ditches, the western segment of Cottonwood Row, tree planting pits, and a fence line. A privy and a large trash pit dating to the 1920s–1950s were also located (Thiel 2012:1, 17–58).

Table 1 presents previous research from a holistic point of view; that is, it approaches the Hardy/Fort Lowell sites as a single site that encompasses prehistoric and historic components, rather than as two discrete but spatially coincident sites. The table also emphasizes excavation projects rather than surveys. Except for a Tierra project conducted in 2003 and DAI's more recent work at the Lowell-Adkins Steel locus, only projects dating to 1988 and older are presented; projects conducted in the 1990s appear to have been primarily surveys and historic assessments.

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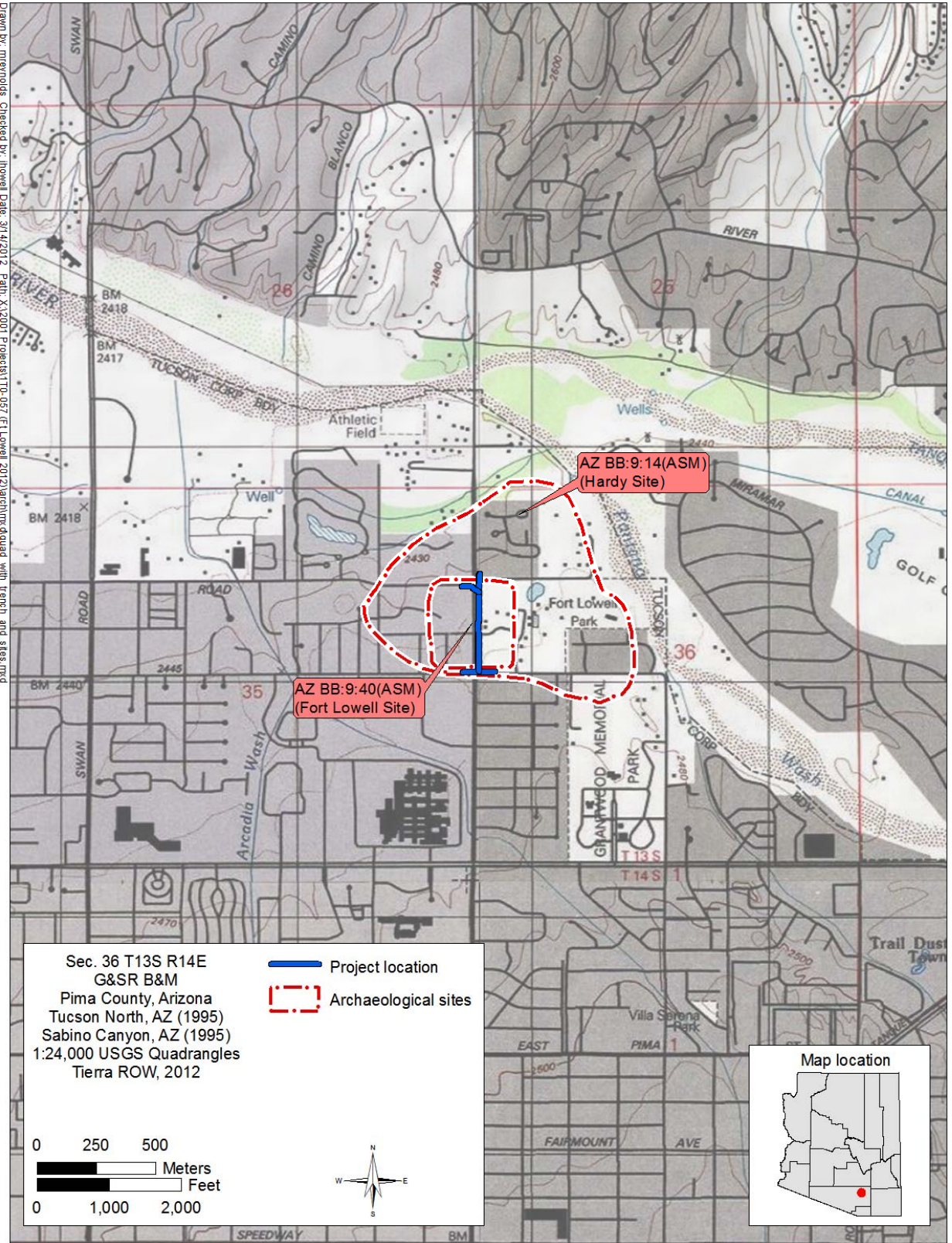


Figure 1. Location of the project area, showing boundaries of AZ BB:9:14(ASM) (the Hardy site) and AZ BB:9:40(ASM) (the Fort Lowell site).



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Figure 2. Location of the TEP utility trench with respect to the historic buildings of Fort Lowell.

Table 1. Previous Research at AZ BB:9:14(ASM) and AZ BB:9:40(ASM)

Date(s)	Institution/ Researchers	Project Purpose	Location	Results	Reference
1884	Adolph Bandelier	–	parade ground and northeast of the fort	Bandelier noted prehistoric remains at Fort Lowell	Gregonis et al. 1997
1937	Frank Mitalsky	–	–	Mitalsky assigned Hardy site ASM number AZ BB:9:14 and described trash mounds and pottery	Gregonis et al. 1997
1960	ASM	parking lot construction	–	Excavation of Commanding Officer's quarters and other officers' quarters, four privies, and a trash pit. Historic museum established	Johnson 1960
ca. 1970	ASM (Bruce Bradley and R. Gwinn Vivian)	swimming pool construction	park swimming pool	Rincon period pit structures noted during pool excavation	Diehl 2000, Gregonis et al. 1997
1974–1975	ASM (Gay Kincade and Gordon Fritz)	sewer line installation	northeast corner of Craycroft and Ft. Lowell Roads	Portion of Fort Lowell Cavalry Band quarters kitchen excavated	Diehl 2000, Gregonis et al. 1997
1974	ASM (Bruce Masse and Gordon Fritz)	baseball diamond construction	northeast corner of park	Test trench revealed three Rillito pit structures and a series of thermal features	Diehl 2000, Gregonis et al. 1997
1976–1978	ASM (Linda Gregonis)	acquisition of 25 acres adjacent to existing park	east of existing park and west of Pantano Wash	Pit structures and features dating from the Sweetwater or Snaketown phase through the late Rincon phase were excavated. A survey of the Fort Lowell neighborhood was also conducted to ascertain the extent of the Hardy site.	Gregonis et al. 1997
1982	ASM (Fred Huntington)	widening of Craycroft Road	northeast corner of Craycroft and Ft. Lowell Roads	Remainder of the band quarters kitchen and a portion of the corral wall excavated.	Huntington 1984
1984	ASM (Lisa Huckell)	municipal water line expansion	south lane of Ft. Lowell Road, 200–920 feet west of Craycroft Road intersection	A Rincon phase trash scatter and possible pit structure, a deer-butcher area, a Tanque Verde pit structure, and a historic trash lens recorded	Huckell 1984
1988	IAR (Allen Dart)	water line installation	east side of Craycroft between Glenn Street and St. Gregory's High School	Two prehistoric pit structures (one with Rincon phase ceramics) and a roasting pit; five historic features (including trash areas, pits, and a possible irrigation ditch) documented	Dart 1988

Date(s)	Institution/ Researchers	Project Purpose	Location	Results	Reference
2003	Tierra Right of Way Services, Ltd.	development	within Grantwood Memorial Park, south of Glenn Street	Testing recorded a single, poorly preserved Hohokam pit structure	Levstik and Thurtle 2003
2012	DAI	contaminated soil removal	Lowell-Adkins Steel locus (west side of Craycroft)	Data recovery following monitoring recorded pit structures and other prehistoric features, and several historic features	Thiel 2013

Key: ASM = Arizona State Museum, IAR = Institute for American Research.

Two earlier projects are most directly relevant to Tierra's 2001 project. The first was conducted by the Institute for American Research (IAR) (now DAI) in 1988 (Dart 1988). This project documented eight features (three prehistoric and five historic) that were revealed during monitoring of a trench for a water main that paralleled the TEP electrical line trench. Like Tierra's trench, the trench monitored by IAR began at the intersection of Glenn Street and Craycroft Road, but it also extended northward past Fort Lowell Road to the entrance of the St. Gregory College Preparatory School (Dart 1988:2). The trench appears to have been located to the west of the TEP trench monitored by Tierra. Four of IAR's features (Features 5–8) were located in the portion of the trench north of the northern terminus of TEP's trench.

Features 1–4 are therefore the most pertinent for comparative purposes, inasmuch as the TEP trench passed close by these features. The features recorded by IAR are described in Chapter 4 for comparative purposes.

The second project was conducted by the Arizona State Museum (ASM) in 1982 (Huntington 1982). This project included an extensive excavation of the Fort Lowell Regimental Cavalry Band kitchen, as well as the cavalry corral to the north (upon which Tierra's 2001 project does not impinge). The project included excavations in Room 1 and Room 2 and examined the architectural attributes of Room 3. The ASM project expanded upon work conducted primarily in Room 3 seven years earlier in 1975 (Kinkade and Fritz 1975). Two structures associated with the cavalry band, the band barracks, and the accompanying kitchen building are known to have been present in the immediate vicinity (with the barracks located south of the kitchen). Tierra field personnel believed that the historic remains encountered in TEP's trench were located within the barracks (Fred Huntington, personal communication, 2012), which apparently had not been previously investigated. However, when the known layout of the fort is georeferenced against the position of the feature (designated Feature 18), it is clear that the excavation was located within the kitchen facilities, specifically near the southeast corner of Room 1. This and other evidence suggests that Feature 18 was in fact located within the band-kitchen building. The issue of the feature's identity is discussed further in Chapters 4 and 5.

REPORT STRUCTURE

The remainder of this document presents the results of the utility-trench monitoring and excavation. Chapter 2 gives a cultural background with an emphasis on the prehistoric and Historic periods of the eastern Tucson Basin. Chapter 3 presents the research questions that guided the study and

laboratory and field methods. Chapter 4 provides descriptions of the features recorded during the project. Chapters 5–9 present analyses of historic artifacts and prehistoric ceramics, lithics, faunal remains, and shell. The report concludes with a summary and conclusions in Chapter 10. Appendices include ceramic and lithic artifact attributes and glossaries.

CHAPTER 2

TUCSON BASIN CULTURE HISTORY

Joseph Howell, David Doak, and Jeffrey T. Jones

To date, the earliest known occupation of the Hardy–Fort Lowell site complex dates to the Sweetwater or Snaketown phase of the Hohokam sequence (Gregonis et al. 1997:3). Therefore, although earlier occupations may certainly be present at the Hardy–Fort Lowell sites, the portion of the cultural-historical sequence preceding the Pioneer period is not discussed. Instead, the culture history begins with the Pioneer period and concludes with the Historic period, including a discussion of the establishment and development of Fort Lowell.

PREHISTORIC PERIOD

Pioneer Period (A.D. 650–750)

Currently, the Pioneer period in the Tucson Basin is not well understood. The first phase of the Pioneer period in the Salt-Gila Basin, the Vahki phase, is equivalent to the Tortolita phase in the Tucson Basin, also called the Early Ceramic period and the red ware horizon (Deaver and Ciolek-Torrello 1995). The remaining phases of the Salt-Gila sequence—Estrella, Sweetwater, and Snaketown—are marked by the appearance of painted pottery, each of which is decoratively distinct. Estrella phase pottery (Estrella Red-on-gray) is distinguished by painted, broadline designs in quartered layouts (typically on bowl interiors). It has been suggested that the appearance of this pottery tradition marks a broadline ceramic horizon similar to the earlier plain and red ware horizons (Whittlesey and Heckman 2000a:8). Incised pottery also appeared during the Estrella phase (Whittlesey and Heckman 2000b:98).

The beginning of the broadline horizon appears to reflect the addition of broadline-decorated pottery to the existing plain and red ware ceramic complex of the Early Ceramic period (Deaver and Ciolek-Torrello 1995). Broadline ceramics are not common in the Tucson Basin and appear to have been restricted to a relatively short time span. The same is true of Sweetwater Red-on-gray and Snaketown Red-on-buff ceramics, which display fine-lined and increasingly elaborate designs. It is unclear if any pre-Colonial period pottery was actually made in the Tucson Basin, or if all of it derived from the Salt-Gila Basin.

During the final phase of the Pioneer period, the Snaketown phase, distinctly Hohokam material-culture traits become evident in the Tucson Basin, particularly in ceramics. The Snaketown phase, when red-on-buff ceramics began to be produced (previous pottery was red on gray), has been viewed by some archaeologists as the beginning of what can be defined as indisputably Hohokam, although others believe that Hohokam culture cannot be defined until the Colonial period, when hallmark traits such as ballcourts and a distinctive mortuary complex appeared (Wallace et al. 1995:576, 606).

Although the early Pioneer period of the Tucson Basin is identified primarily by ceramics, a number of Late Pioneer period settlements have been excavated in the Tucson Basin and its environs (e.g., Czaplicki and Ravesloot 1989; Jones 2012). Architecture, domestic organization, and settlement

pattern differed from the subsequent Colonial period. The Pioneer period was brief, lasting approximately a century.

Colonial Period (A.D. 750–950)

The Colonial period in the Tucson Basin consists of two phases, the Cañada del Oro (A.D. 750–850) and the Rillito (A.D. 850–950). These are comparable to the Gila Butte and Santa Cruz phases of the Salt-Gila Basin. Several distinguishing cultural traits marked the advent of the Colonial period.

During the Colonial period, the Santa Cruz River was recovering from a period of entrenchment that had begun about 50 B.C. This resulted in an environment that was increasingly conducive to floodwater farming (Waters 1992:175). Settlement expanded in the Tucson Basin, and ballcourts were constructed in the Santa Cruz River valley at several settlements. Ballcourts, seen as primary indicators of Mesoamerican influence in the Southwest (Wilcox and Sternberg 1983), likely served as focal points for regional socioeconomic interaction. Ballcourts appear to have replaced the large communal houses of the preceramic Cienega phase and the Early Ceramic period. Village settlement was patterned on individual houses organized into courtyard groups that were oriented around an outdoor area. House clusters (groups of courtyard groups) and precincts (groups of house clusters) were in turn organized around a central plaza. House clusters were associated with trash mounds and cremation cemeteries and probably represented suprahousehold groups such as lineages (Wilcox 1991:256).

Red ware ceramics continued to be produced in small quantities into the Cañada del Oro phase (Wallace et al. 1995:596). Ceramic design began incorporating zoomorphic and anthropomorphic imagery and micaceous temper, which has been interpreted as a result of cultural influence originating in the Salt-Gila Basin (Wallace et al. 1995:601, 605–607). For the first time, it is possible to distinguish clearly between locally made and nonlocal painted pottery.

By the middle of the Colonial period, cremation burial replaced inhumation burial, which had been common in the Pioneer period and preceding times (along with small numbers of cremations) (Crown 1991:145–146; Wilcox 1991:270). Hohokam cremation burials typically included palettes, worked shell, and stone censers as mortuary offerings. Cremations were placed in discrete cemeteries that became components of the typical Hohokam village and were frequently associated with house clusters.

Sedentary Period (A.D. 950–1150)

The Sedentary period in the Tucson Basin is divided into three subphases: the Early, Middle, and Late Rincon, each defined by minor differences in pottery design (Wallace 1986). In the Salt-Gila Basin, it is composed of a single phase, the Sacaton. During the Early Rincon subphase (A.D. 950–1000), the settlements that had been established along major drainages during the Colonial period increased in size, and new settlements expanded along secondary drainages and into bajada environments. This allowed for diversification of agricultural strategies (Crown 1991:149; Wellman and Lascaux 1999:24). Settlement patterning shifted. Small settlements, such as farmsteads, were established in previously unoccupied areas (Elson 1986). Although some villages established during the Colonial period continued to be occupied, many new, large habitations were founded. The latter were organized differently from the Colonial predecessors. No new ballcourts were built, and existing ballcourts were abandoned. This contrasts with the Salt-Gila Basin, where ballcourt construction and the trade network possibly associated with them reached their maximum extent

during the Sedentary period (Doyel 1991b:247). At larger habitations, domestic dwellings continued to be organized into courtyard groups and precincts but were not oriented around a central plaza (Whittlesey and Deaver 2004).

In ceramics, design motifs took on increasingly geometric forms. The distinctive Gila shoulder, in which the sides of a vessel slope downward sharply from the neck to create a low shoulder near the base, is a diagnostic marker of the Sedentary period. Red ware also began to be produced again (after having been abandoned around the end of the Cañada del Oro phase in Tucson). A variety of painted and slipped variations of red-on-brown pottery were made (Deaver 1989), and one result of this experimentation was the distinctive Rincon Polychrome pottery (Whittlesey 2004). Cremation continued to be the most common form of burial, but inhumations became more frequent after having been uncommon during the Colonial period (Crown 1991:149–150). Copper bells, imported from western Mexico, first appeared during the Sedentary period in the Phoenix area, and shell etching was another innovation in material culture in that area (Haury 1976:319).

Around A.D. 1000, at the beginning of the Middle Rincon subphase (A.D. 1000–1100), the Santa Cruz River again became entrenched. One result was a shift in settlement to the northern and eastern regions of the valley (Waters 1992:175–177). This in turn resulted in increasingly scattered settlements as villages became less riverine oriented, at least in this area of the Tucson Basin. In the eastern Tucson region, established villages continued to expand. By the Late Rincon subphase, the continued adaptation of farming strategies (such as *ak chin* and runoff diversion) to secondary drainages and bajadas had become widespread, with some of these niches being farmed for the first time. Environmental uncertainty may have served as the stimulus for non-floodwater farming. For example, there was an increased emphasis on the cultivation of agave on bajadas (Doyel 1991b:246; Whittlesey 2004:26–27).

Formally constructed platform mounds—in contrast to caliche-capped trash mounds, which are known from the Snaketown phase in the Phoenix area—began to be constructed and replaced ballcourts in the Tucson Basin. By about A.D. 1200, they eclipsed ballcourts as the primary form of public architecture in the Phoenix area (Doyel 2000:308). This change may reflect changes in sociopolitical as well as religious organization (Crown and Judge 1991:297). The change may also be seen in the construction of single-room structures (possibly associated with rituals) on the mound summits and the incorporation of surrounding palisades and later, adobe-walled compounds (Doyel 2000:305–307).

Classic Period (A.D. 1150–1450)

Southern Arizona societies experienced drastic changes during the Classic period. In the Tucson Basin, these changes took place in two broad phases, the Tanque Verde (A.D. 1150–1300) and the Tucson (A.D. 1300–1450). During the Tanque Verde phase, Tanque Verde Red-on-brown became common across southern Arizona, while in Phoenix, the production of red-on-buff ceramics declined (Reid and Whittlesey 1997). Some researchers have suggested that the widespread appearance of Tanque Verde Red-on-brown reflects an increasing complexity in the configuration of Hohokam economic and social relationships (Slaughter and Roberts 1996:14). Although pit-structure architecture continued, aboveground adobe or stone-masonry structures, often constructed within enclosing compound walls, became common. These structures were frequently freestanding, unlike multiroom pueblos commonly constructed elsewhere in the Southwest (Rice 2003:10).

In the Tucson Basin, ballcourt construction had ceased by the Classic period, and communities organized around platform mounds, such as the Marana community, flourished (Fish et al. 1992). The Marana community consisted of numerous types of sites organized by environmental zone and extending from the foothills of the Tortolita Mountains to the Santa Cruz River. The community was centered on a platform mound and had extensive agricultural fields that were irrigated by dry farming and canals. *Agave* (*Agave* spp.) was the principal crop grown in the former fields, presumably expanding from agave cultivation on the bajada that began during the Rincon phase and perhaps earlier (Fish et al. 1992:21–24). *Agave* is more drought resistant than many Hohokam domesticates, which would have made it a reliable food source during the drier climatic conditions that prevailed during the early Classic period (Masse 1991).

A serious drought, sometimes called the Great Drought, occurred between A.D. 1276 and 1299 (Reid and Whittlesey 1999:17). The Great Drought had the effect of forcing people who lived in regions north of the Mogollon Rim to travel southward across and off the Colorado Plateau in search of food sources, because local agriculture had failed and could not support the population base. This resulted in an intercultural exchange among several cultural groups. Some Ancestral Pueblo immigrants from the Kayenta region arrived in southeastern Arizona, as reflected at Reeve Ruin in the San Pedro River valley, Goat Hill in the Safford area, and a number of other settlements (Whittlesey and Heckman 2000a:14). Previously, these immigrants had spent some time at Point of Pines before their rooms were burned and they were forced to leave (Haury 1958).

During the Tucson phase, the cultural interaction that resulted from the drought became the impetus for further widespread social changes. Following the abandonment of many Tanque Verde phase settlements, populations aggregated into fewer but larger sites. This process took place across the southern Southwest and has been interpreted as a defensive tactic in the face of an increasing threat of warfare (Doelle and Wallace 1991:331), although the evidence for this is slim. Freestanding adobe structures declined, and contiguous (sometimes multistoried) room blocks and stronger, more substantial walls became the architecture of choice (Doyel 1991a:253). Villages frequently consisted of multiple compounds, occasionally concentrically arranged around a central compound with a platform mound, although most villages in the Tucson Basin were considerably smaller than those of the Salt-Gila Basin (Doyel 1991a:254–256).

The so-called Salado culture appeared in southeastern Arizona in the Tucson phase. Evidence for a Salado presence is primarily Roosevelt Red Ware ceramics. The idea of a Salado culture was first formulated in the 1920s by archaeologists of Gila Pueblo Archaeological Foundation. Initially, it was thought that the Salado were pueblo-dwelling people migrating from the north and expanding into the Tonto Basin where their lifeways were imposed upon or adopted by the Hohokam people already living there (Reid and Whittlesey 1997:238–239). Archaeologists Florence Hawley and Harold Gladwin hypothesized that this migration originated from two areas: first from the upper Gila region and later from the Little Colorado area. Emil Haury (1945) concluded that the Salado peoples did not “invade” the Hohokam so much as coexist in the same geographical region. The Salado were thought to supersede the Hohokam in the lower San Pedro River valley (the region north of Benson) at about this time (Phillips et al. 1993).

Eventually, the migration hypothesis fell into disfavor, and by the 1980s, most Southwestern archaeologists had come to believe that the Salado had developed in place from extant Hohokam populations, the result of increased “social complexity” or the product of environmental processes, rather than an influx of new people. Recent speculation on the Salado has led to a reconsideration of

the migration model (Elson et al. 2000:175), as the widespread demographic movements during the Classic period certainly forced people to move. Current models equate Salado with the Kayenta immigrants, a hypothesis not well supported by the evidence. The Salado enigma likely will continue to puzzle archaeologists and spawn new theories and models.

PROTOHISTORIC PERIOD (A.D. 1450–1540)

The Protohistoric period, the era between the end of the Classic period and the arrival of the Spanish missionaries, is an obscure time in Southwest history. Although the period is not well represented in the archaeological record, in some areas of the Southwest, early Spanish explorers encountered people who were well established. In southern Arizona, the most visible inhabitants were the Pima-speaking O’odham peoples, such as the Sobaipuri of the San Pedro River valley. The major question regarding this era is where the O’odham peoples originated.

There are two potential answers to this question. One is that the Piman-speaking people living in southern Arizona were direct descendants of the Hohokam populations who had survived the social and economic changes that marked the end of the Classic period. The other is that after the decline of the Hohokam and Salado cultures, the Pimans moved into the area essentially as a new cultural entity, although they may have integrated with people who were already present—a possibility suggested by oral tradition (Teague 1993:444).

The notion that Piman speakers were direct descendants of the Hohokam is suggested by the descriptive accounts of the Spanish as they moved northwest from central Mexico into what is now Sonora and Arizona. They found that the majority of people across this region practiced agriculture, contrasted with the hunter-gatherers of California, the Great Basin, and the Athapaskan speakers of the northeast. Other superficial similarities include the lack of political unity beyond the level of individual and autonomous *rancherías*—a system of organization unlike that encountered by the Spanish in Aztec-dominated central Mexico. Finally, trade across the region, although sporadic and not regularized, was widespread and generally did not involve food and tools but emphasized luxury and ceremonial items (Spicer 1962:8–15).

By contrast, Teague (1993) suggested that linguistics and Piman oral traditions support the idea that the Piman speakers the Spanish encountered had migrated into the region from elsewhere. Linguistically, there is continuity between west-central Mexico and southern Arizona that likely existed prehistorically and was paralleled by some aspects of material culture, notably ballcourts (Kelley 1991).

The oral traditions of the Piman people in southern Arizona are consistent with the archaeological record and the linguistic model described above. The traditions focus on the conflict between Elder Brother or P’ittoi, the cultural hero of the Tohono O’odham (who is known as Siuuhu among the Akimel O’odham) and the (Hohokam) Sivanyi or Siwani. In one version of the story, Siwani is a personal name (Saxton and Saxton 1973:147–168), but the word Sivanyi also refers to a Hohokam priesthood and may be related linguistically to Shiwanni, the Zuni directional rain priesthoods (Teague 1993:439). The traditions state that warfare erupted between Siwani (or the Sivanyi) and P’ittoi and his followers, whom he gathered together from among the O’odham people of northern Sonora or who emerged from beneath the earth from a point south of Baboquivari, depending on the account. Following the conflict and the fall of the Sivanyi priesthood, the warriors dispersed. Some returned south to the lower Piman homeland, and some went north to the pueblos, but some

remained in the Gila River valley and intermarried into the local (Hohokam) population, eventually becoming the Pimas Gileños (Teague 1993:444). From the foregoing, it appears plausible that these traditions telling of a rebellion against a priestly hegemony at the end of the Classic period echo events that also are reflected in the archaeological record.

The Spanish, then, likely entered a world that had undergone traumatic social and environmental changes just before their arrival. It was also during this time (around A.D. 1600) that groups of Athapaskan-speaking people (Apache and Navajo) began to migrate to the area from the north and east. Other peoples, such as the Jocomé, Mano, Suma, and Jano, from the plains areas of Texas and New Mexico may have been present in southern Arizona (Seymour 2000), but evidence for their presence is equivocal.

HISTORIC PERIOD (A.D. 1540–1950)

Spanish exploration of the Southwest began as early as 1539 with the preliminary scouting expedition of Fray Marcos de Niza, who had been sent to the region by Mexican viceroy Antonio de Mendoza in response to the accounts of Alvar Núñez Cabeza de Vaca and Estévan, who had wandered to Sonora after being shipwrecked in the Gulf of Mexico in 1528. After Niza returned, Viceroy Mendoza proposed a larger expedition and selected Francisco Vásquez de Coronado as its leader. Coronado's party departed in 1540 in search of the fabled Seven Cities of Cibola. The route of the expedition probably took Coronado through what is now eastern Arizona, although at one time it was speculated that one stop on the journey, Chichilticale or Red House, was in fact the Hohokam adobe house at Casa Grande (Wilson 1999:25–26).

Jesuit missionary Eusebio Kino arrived in Sonora in 1681. After a poorly documented visit to the Casa Grande area in 1694, Kino made a second *entrada* in 1697 (Wilson 1999:24). Setting out from the Nuestra Señora de Dolores mission, Kino traveled north along the San Pedro River and then followed the Gila River to the west, arriving again at Casa Grande on November 18. He was accompanied, in addition to some 20 soldiers and native guides, by Captain Juan Mateo Manje. Manje, unlike Kino, kept well-written journals of his travels. The chronicle of this expedition makes note of small groups of people living along the San Pedro, who were identified as the Sobaípurí (Doelle and Wallace 1990).

Because of the efforts of Padre Kino, the missionizing of the people of the Pimería Alta continued into the early-eighteenth century, although after Kino's death in 1711, the mission system in Sonora began to deteriorate, partly as a result of neglect while Spain was distracted by the War of Spanish Succession (Walker and Bufkin 1979:14). After the Pima Revolt of 1751, the presidio at Tubac was established. It was later relocated to Tucson near the end of 1775. The presidio was intended not only to provide stability for the mission system but also to stem incursions by the Apache. The Apache had been raiding Piman settlements since shortly before the time of Kino's initial contact (Spicer 1962:234), and the escalation of raiding over time resulted in increasing resettlement of the Piman-speaking populace. Beginning around 1790, as a means of bringing raiding to a halt, the Spanish government provided the Apache with rations and supplies, an action that allowed for the expansion of ranching and stock raising in what would eventually become southern Arizona. This time of relative peace ended with the independence of Mexico from Spain in 1821, and with Spanish support no longer available, ranching became nonviable as the Apache once again began raiding (Morrisey 1950:151).

The Mexican-American War began in 1846. The Treaty of Guadalupe Hidalgo, signed in 1848 following the conclusion of the war, ceded the portion of what is now Arizona lying north of the Gila River to the United States. The entire region stretching from the western border of Texas to the California coast became the Territory of New Mexico in 1850 and continued as such until 1863, when the Territory of Arizona was created by President Lincoln. In 1854, the Gadsden Purchase expanded New Mexico Territory from the Gila River south to the present-day Mexican border (Walker and Bufkin 1979:22). The Apache peoples who occupied this region resisted American dominance, as they had with Spanish and later Mexican subjugation. Between 1856 and the 1886 (when Geronimo surrendered), most of the military installations in the newly acquired territory were related to conflicts with the Apachean groups living in the region (Collins et al. 1993:14, 32). It is against this backdrop that Fort Lowell came into prominence in what would later become southern Arizona.

Although Fort Lowell became one of several military posts involved in the Apache conflicts in the latter part of the nineteenth century, it originated during the American Civil War. In May 1862, Tucson was occupied by volunteer Union soldiers of the California Column, commanded by Lt. Col. Joseph R. West, after Confederate soldiers occupying Tucson departed (Collins et al. 1993:43; Diehl 2000:12). Camp Tucson was established at what would later be the location of the Santa Rita Hotel in what is now downtown Tucson. The post was occupied by various Union forces en route to the Rio Grande until 1866, when C Troop of the 1st Cavalry established a permanent presence in the Tucson Basin. The permanent post was built on land on the eastern edge of Tucson, where the Armory Park District is located today (Spicer 2012a). It was named after Brigadier-General Charles R. Lowell, Jr., of the 6th Cavalry, who had been killed in action at the Battle of Cedar Creek (near Strasburg, Virginia) during the war. Later in 1866, the fort was redesignated as a camp, following General Order 44, Department of California, which directed that all Arizona military posts were to be designated as camps, with the exception of Forts Whipple and Yuma (Collins et al. 1993:5).

By 1872, environmental conditions at the post had deteriorated to an unacceptable degree in addition to being too close to the vices and temptations available in Tucson. After General George Crook stated as much in his Annual Report, it was decided to move Camp Lowell approximately nine miles to the east, to a location along Rillito Creek near the confluence of Tanque Verde and Pantano Creeks (Diehl 2000:12-13). The Army designated about 150 square miles for the new fort to ensure the availability of water and grazing land (Bieg et al. 1978). Post Commander Lt. Col. Eugene A. Carr and Territorial Governor Anson P. K. Safford selected the new site. Camp Lowell's original location near Tucson was closed on March 31, 1873. The construction of the new camp proceeded slowly, beginning on March 20, 1873 (when soldiers first began clearing brush) and continuing into 1875, delayed variously by lack of funding and Apache raids (Bieg et al. 1978; Thiel 2009:11). Camp Lowell was not the first non-Native American settlement in the eastern Tucson Basin; camp personnel found a number of Mexican and Euroamerican families already settled in the vicinity.

The newly established Camp Lowell (which would once again become Fort Lowell in 1879) became a major contributor to Tucson's economy. Many Tucson businesses benefited from trade with the post; one estimate is that the camp generated approximately \$150,000 annually to the local economy (Collins et al. 1993:43). One Tucson business, Lord & Williams, was one of the first to reap the benefits of the new installation when it won the contract to manufacture the adobe bricks for the first structures (Thiel 2009:11). In addition to trade with Tucson, the post also provided employment for local residents, many of whom were hired as blacksmiths, teamsters, and for similar tasks (Bieg et

al. 1978). A tavern and supply outlet, known as the Sutler's Store, was constructed in 1873 near the fort by John "Pie" Allen (Spicer 2012a).

Although the presence of the post was beneficial to the local business economy, the post's exploitation of water and timber and its impact on the environment were intense (Diehl 2000:13). The post constructed several acequias and wells, a large portion of the local mesquite was cleared, and grazing land was depleted. This led to conflict between post personnel and some local settlers, who felt that their rights to these resources took priority over those of the military camp. Some settlers were accused of fouling or even blocking off water from the acequias. At one point, the commanding officer ordered that the shacks of the alleged perpetrators be burned (Spicer 2012a).

Despite these difficulties, the fort thrived and eventually became a desirable military-duty station, and many of the officers brought their families. A schoolhouse (combined with a library) was added to the post in 1884 (Bieg et al. 1978). The post employed a teacher on civilian payroll in June of that year; by September, there were three teachers at the post. Soldiers and Tucsonans regularly traveled the nine miles between the fort and Tucson for social events and baseball games. One of the fort's main attractions were concerts provided by the 4th Cavalry Regimental Band, who had their own quarters, bunks, storerooms, and kitchen facilities at the fort (Spicer 2012a; Thiel 2009:12, 19). These facilities were constructed beginning in 1874, with the barracks serving as a storage facility from 1879 to 1882, when no band was stationed at the fort (Bieg 1978).

The post-Civil War military role of Fort Lowell involved tasks pertaining to the dangerous conditions of life in territorial southern Arizona, such as protecting settlers, escorting wagon trains, guarding supplies, and taking similar defensive measures. Troops from Fort Lowell were also called on to patrol the relatively new international border. The central role of the fort, however, was in the redistribution of supplies coming from Fort Yuma and Sonora to other military outposts in Arizona, a role it had inherited from its earlier incarnation as Camp Lowell near Tucson (Collins et al. 1993:43; Thiel 2009:10). Offensive operations were also conducted periodically against Western and Chiricahua Apache groups, but it was not until the Geronimo campaign that the fort took on its full military function. Before this time, the contingent of the fort was generally around 10 officers and 140 enlisted men, a figure that increased to 18 officers and 239 enlisted men in 1886 (Diehl 2000:13; Thiel 2009:12). Personnel belonging to the 2nd, 4th, 5th, and 6th Cavalry Regiments and the 1st, 8th, and 12th Infantry Regiments served at Fort Lowell.

Following the surrender of Geronimo in 1886, the Apache conflict effectively ended. Consequently, the Army came to view Fort Lowell as no longer useful, and in April, 1891, the installation was closed. The lands were transferred to the Department of the Interior to be sold as surplus property (Thiel 2009:13). Land was sold at public auction in 1898, with 40 acres sold to the Territory of Arizona and the remainder sold to private buyers (Diehl 2000:13). Building materials from the fort's structures were also sold.

Shortly afterward, Mexican immigrants began arriving at the fort and began to refurbish and live in the abandoned buildings. They established ranches, truck gardens, wood-cutting services, and other business ventures. The old fort became known as El Fuerte. The Mexican population swelled after 1910 as a result of the Mexican Revolution and the subsequent northward migration it generated. Mormon settlers began moving into the area, attracted by the arable land and availability of water from the Rillito River. The Mormon families came from the north and soon began soliciting Mormon settlers in Chihuahua to relocate. The settlement of Binghampton was established about

two miles west of the old fort around 1900. The settlement was named for the first Mormon patriarch to arrive, Delbert (Nephi) Bingham (Collins et al. 1993:43; Diehl 2000:14; Spicer 2012b).

In the 1920s and 1930s, the Mexican population expanded westward and constructed new adobe buildings, including a school and a series of churches. The community thrived and continued the same occupations practiced by the first settlers, such as farming, wood selling, and making adobes. These trades formed the basis of the economy. Three churches were built in succession. The first was small and had only room enough for masses held monthly by Carmelite priests, with the communicants standing outside under the mesquites for the service. This church, known as the Chapel of the Guardian Angels, was built in 1915 (Collins et al. 1993:43). A larger church built in 1917 was destroyed by a tornado in 1929. Finally, the community erected the San Pedro Chapel, which was dedicated in 1932 and abandoned in 1948 (Spicer 2012b).

The Euroamerican community of the Fort Lowell neighborhood also expanded beginning in the 1920s. One of the more prominent families was the Bolsius family, who arrived in 1934. Brothers Charles and Pete and Pete's wife Nan restored and refurbished the old sutler's store and tavern built by John Allen many years earlier (Spicer 2012c).

University of Arizona President Byron Cummings recognized the historic value of Fort Lowell and took steps for its preservation (Diehl 2000:14–16). The Arizona legislature leased 40 acres of former fort land to the University in 1929. The University undertook various stabilization efforts, such as repairing some of the deteriorating structure walls and fencing the area. The land was sold to George Babbitt in 1944. He withdrew his purchase to allow the Boy Scouts to purchase the land for a camp. The Boy Scouts made some further efforts at preservation. They constructed a roof over the fort hospital and made repairs to its walls. The Boy Scouts sold most of the land to Pima County in 1957. In 1963, the Arizona Historical Society established the first museum at the park, in the commanding officer's quarters and kitchen.

Beginning in the 1970s, parts of Fort Lowell were designated as historic areas in the interests of preservation (Diehl 2000:16). The City of Tucson established a historic district within Fort Lowell Park in 1972. In 1976, the Pima County Board of Supervisors created the Fort Lowell Historic District, incorporating 58 acres of Fort Lowell Park and 126 acres west of the park. Portions of the Fort Lowell and Hardy sites were placed on the National Register of Historic Places (NRHP) as the Fort Lowell Multiple Resource Area (MRA). Additional areas of the fort and its surrounding landscape acquired by the City of Tucson were added as the city continued to grow during the 1980s.

CHAPTER 3

RESEARCH QUESTIONS, FIELD METHODS, AND LABORATORY METHODS

Joseph Howell

The project involved monitoring the excavation of an electrical-utility trench (or more accurately, three connected trenches) along Craycroft Road, Glenn Street, and Fort Lowell Road. Limited excavation was also indicated in the scope of work if cultural resources were encountered. The project area was located within the currently known extents of two sites: AZ BB:9:14(ASM), a prehistoric site known as the Hardy site, and AZ BB:9:40(ASM), the Fort Lowell site. Because prehistoric and historic components were present, the scope of work (Fratt and Huntington 2001) included questions appropriate for both components. We expected that remains from both components would be encountered during the project.

RESEARCH QUESTIONS

The scope of work outlined several research questions. Research questions pertaining to the prehistoric remains from the Hardy site concerned the standard, although important, issues of chronology, site structure, subsistence patterns, and intraregional trade and exchange. Additional questions were addressed as the fieldwork proceeded. These questions included:

1. How old are the prehistoric remains? Previous work (Dart 1988) indicated the presence of pit structures dating to the Hohokam Sedentary period. Do the prehistoric remains encountered by Tierra also date to this time, or do they reflect later or earlier settlement? Data to answer these questions include painted ceramics, diagnostic projectile-point styles, and materials suitable for chronometric dating, such as organic materials for radiocarbon dating.
2. Did the inhabitants depend on floodplain agriculture, or did they practice a broader strategy of resource exploitation? Data collected from pit structures and extramural features may be useful in reconstructing the diet of the prehistoric inhabitants of the Hardy site, including floral and faunal remains and various artifact types used in food processing, such as metates. If it can be demonstrated that pit structures were organized in courtyard groups, can we perceive differences in the resource-exploitation strategies of groups of different sizes?
3. Was the Hardy settlement the center of or participate in a larger regional trade network in the eastern Tucson Basin? Was there significant interaction among the inhabitants of large primary villages located along the Santa Cruz River? Data to address these questions include nonlocal ceramics, exotic goods such as shell and obsidian, and other artifacts that may have been traded between and within regions, especially when compared to data collected from earlier projects.

The research questions pertaining to historic Fort Lowell included:

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1. Are the historic cultural remains associated with the military occupation of Fort Lowell, the Mexican immigrant community of El Fuerte, or the later Euroamerican occupation of the area? Data for answering this question include material remains of ethnicity, such as discernible differences in foodways, religious affiliation, medicines, butchering practices, and so on.
 2. If related to the military occupation, are the remains associated with the officers or enlisted personnel at the fort? Was there a difference in the amount or quality of food available to the two groups? Subsistence remains can inform on this topic, along with information about cuts of meat that were used, alcoholic beverages that were consumed, and other indicators of relative high- or low-status lifestyles.
 3. Did Fort Lowell personnel obtain goods only of local manufacture, or were they connected to a wider regional or national market system? Did the patterns in trade and exchange of goods vary between the military, El Fuerte, and Euroamerican eras? Information to address this topic can be derived from determining the origin of imported goods, such as porcelain from Asian or Europe.
 4. What are the similarities and differences in the land-use patterns of the different groups who lived near Fort Lowell? For the military, structured trash disposal and privy locations would be expected. Are similar patterns apparent for the later occupations?

FIELD AND LABORATORY METHODS

Archaeologists from Tierra monitored the utility trench as it was excavated, watching for changes in sediment color and texture that would signal the presence of a cultural feature and for artifacts appearing in the trench and backdirt. Cultural features were drawn to scale in profile, described, and photographed. Temporally and functionally diagnostic artifacts were collected from some feature profiles and as grab samples from backdirt. Flotation and pollen samples were also collected from several features.

The scope of the project allowed for additional controlled excavation (at a data recovery level of intensity) of any features that might be impacted by the installation of transformers or other equipment beyond the trench footprints. At the principal investigator's discretion, features that would be damaged extensively without additional study also were subject to controlled excavation (Frat and Huntington 2001). Such additional work was implemented at two features, Feature 2 and Feature 18. Standard excavation and recording techniques were used. Further details are presented in Chapter 4.

Feature 2 was excavated in entirety because it coincided with the location of an electrical transformer to be installed as part of the project. Feature 18 was located within the Fort Lowell cavalry-band kitchen. The investigated portion of Feature 18 extended beyond the footprint of the utility trench and was excavated in several levels in conjunction with the replacement or repair of an existing electrical-equipment box.

A total station was used to map Tucson Electric Power's (TEP's) construction impact zone, which was tied into the benchmarks established by TEP for their construction project (Figure 3).



Figure 3. Aerial view of the project area showing features and mapping datum.

All artifacts collected in the field were taken to Tierra's laboratory where they were inventoried, washed, labeled, sorted and analyzed. Analyses of the flaked stone, ground stone, faunal remains, and prehistoric ceramics took place roughly two years after the completion of the fieldwork; consequently, they were not entered into Tierra's database, which had not been implemented at that time. Historic artifacts were initially analyzed about the same time. They were subsequently reanalyzed in February 2012. A small collection of prehistoric shell was also analyzed in February 2012. Because of budgetary limitations, flotation and pollen samples were not analyzed as part of this study. The samples will be curated at the ASM for use in future research.

CHAPTER 4

FEATURE DESCRIPTIONS

Joseph Howell

Seventeen features were identified during monitoring of the Tucson Electric Power (TEP) utility trench. Of these, six were historic, 11 were prehistoric, and one, Feature 3, was determined to be noncultural in origin. This chapter describes the features, presenting them by age (prehistoric or historic), and provides information concerning dating and function. Where relevant, features recorded by the Institute for American Research (IAR) during a similar trenching project conducted in 1988 (Dart 1988) are described. IAR's trench (which was excavated for the installation of a water main) was located to the west of Tierra's trench. The trench excavated during IAR's project began at Glenn Street and Craycroft Road south, but extended past the northern terminus of Tierra's trench. Four features (Features 1–4) recorded by IAR were located within the segment of their trench south of the northern end of Tierra's trench and therefore were fairly close to several features recorded by Tierra. The locations of all features can be seen in Figure 4.

PREHISTORIC FEATURES

Features 1, 2, 3, 5, 7, 8, 9, 11, 14, 15, and 16/17 were prehistoric or estimated to be prehistoric in age. Of these, only one, Feature 2, was fully excavated. Originally, it was thought that Feature 3 was a pit perhaps associated with Feature 2, but on closer examination, it was identified as noncultural in origin. It is not described further. Feature 16/17 was originally thought to be two separate features, but it was later determined that they represented a single area of prehistoric deposition. These features are described together.

Feature 1

Feature 1 was a possible pit structure. The feature was located immediately northwest of Feature 2, where the 65-m trench crossing Craycroft Road forked from the main TEP trench. Unfortunately, the trench collapsed at the feature's location, preventing complete documentation of it. Several photographs were taken of the feature profile prior to the trench's collapse (Photos 1 and 2). The photographs indicate that the structure measured approximately 1.35 m long where it was bisected by the trench. This suggests the trench cut the pit structure across a corner.

Four of 10 sherds collected from the feature were Rincon Red-on-brown, suggesting a possible Sedentary period age.

Feature 2

Feature 2 was a Hohokam pit structure. It was the only feature that was excavated almost in its entirety (a small portion of the eastern edge lying beneath the sidewalk along Craycroft Road was not excavated). The structure was located within the proposed location of one transformer pad scheduled to be installed as part of TEP's project. After it was discovered during the excavation for the transformer-pad foundation, the structure was excavated by first establishing a test unit and then excavating the remainder of the structure in quarters. Fill was removed in three levels: general feature fill, floor fill, and floor contact.

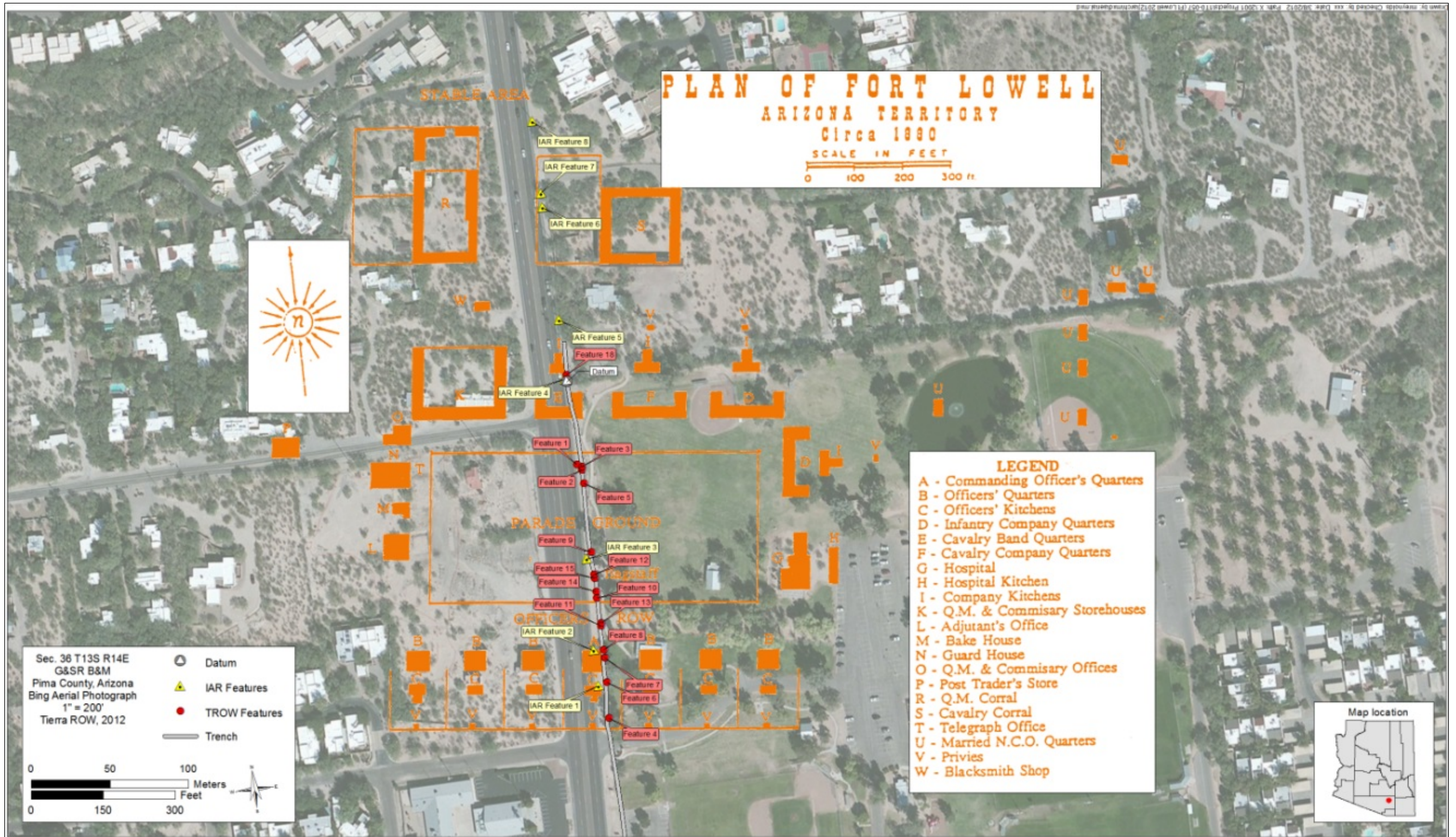


Figure 4. Location of features recorded by Tierra and IAR, with georeferenced historic plan map of Fort Lowell (historic features after Peterson 1963).



Photo 1. Profile of Feature 1, east wall.



Photo 2. Close-up of Feature 1, east wall.

Excavation revealed that the long axis of the structure (oriented east-west) measured 5.75 m from its eastern wall to the edge of the sidewalk (and possibly to about 6.5 m beyond the sidewalk), and its short (north-south) axis measured 4.75 m (Figure 5). The structure floor revealed subfloor pit features and at least eight post holes (Photos 3–6). Remnants of a hearth (Feature 2.04), which was disturbed by excavation of the transformer-foundation hole (Photo 7), and a prepared floor area were also present. The burned post hole was located near the southern edge of the structure and retained a burned portion of the post (Photo 8). Two pits (Features 2.02 and 2.05) each measured approximately 30 cm in diameter and about 20–30 cm deep. The third pit (Feature 2.03) was elliptical in plan view. It measured about 125 by 60 cm and was about 50 cm deep. The structure appeared to be comparatively shallow, perhaps extending no more than 20 cm from the prehistoric surface. The hearth was near the eastern edge of the feature; presumably, the entryway was oriented east, although no explicit evidence for the entryway was recorded.

The feature fill contained abundant sherds, numbering more than 1,000 (see Chapter 6). Diagnostic sherds included Rillito Red-on-brown, Rincon Red-on-brown, and Tanque Verde Red-on-brown. A small number of imported wares were present, including Hohokam Buff Ware, Cibola White Ware, and Trincheras Purple-on-red, suggesting interaction with the Gila Basin, the Colorado Plateau, and the middle Santa Cruz River valley south of the Tucson Basin. A small amount of unfired clay was also found in the upper levels of the fill. This could be construction material or pottery clay.

The fill sherds span the Colonial through the Classic periods. The majority of the temporally diagnostic sherds date to the Sedentary period, however, whether in fill, floor-fill, or floor contexts (see Chapter 6). In addition, five reconstructible vessels (RVs) or partial vessels (PVs) were collected. One is a Rincon Red-on-brown jar with design characteristics of Tanque Verde Red-on-brown, and one is an unidentified local red-on-brown with characteristics of Rincon Red-on-brown and Tanque Verde Red-on-brown. This information places Feature 2 into the latter part of the Rincon phase, possibly overlapping into the early portion of the Tanque Verde phase.

Several stone tools were associated with Feature 2, including a chopper from the structure floor. Two polishing stones were also found on the floor, and an additional five polishing stones were found in higher levels of the fill. The presence of the polishing stones, along with the abundance of ceramics (including the unfired clay) suggests either that pottery making took place in the structure, or the fill included the refuse from a nearby ceramic-manufacturing area.

Feature 3

Feature 3 was located immediately north of Feature 2. It was initially interpreted as a pit; however, on closer inspection, it became evident that it was a noncultural feature. Feature 3 was not documented further.

Feature 5

Feature 5 was a pit structure located immediately south of Feature 2. It was visible in the east trench wall as a well-defined burned layer and an adobe-wall segment, together measuring about 1.2 m long (Figure 6). The profile also indicated some root disturbance and adobe-wall melt. In addition to the root disturbance, a small, previously installed utility trench adjoining the TEP trench at a right angle may have disturbed the feature (Photo 9).

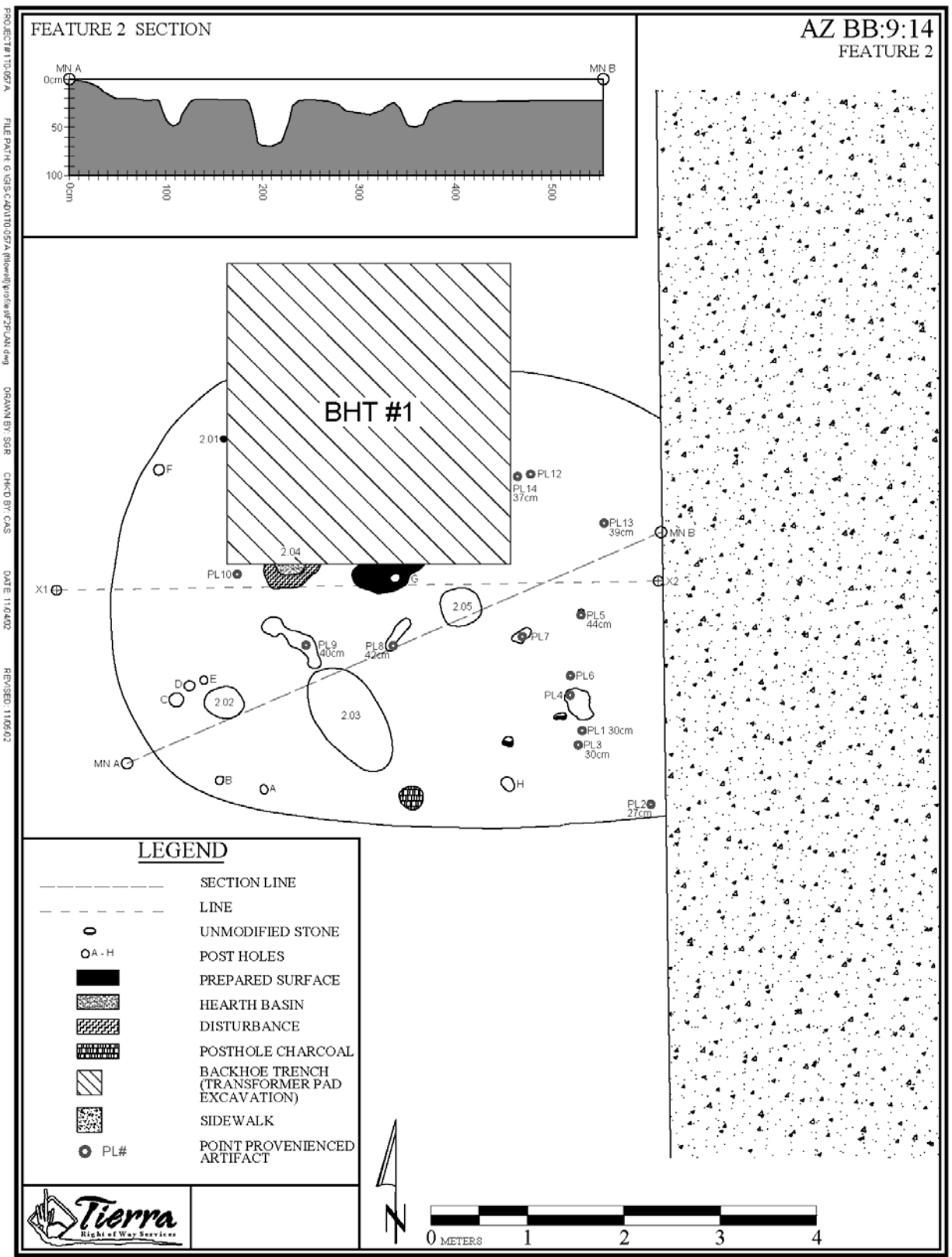


Figure 5. Plan view of Feature 2.



Photo 3. Feature 2, view is to the north.



Photo 4. Overhead view of Feature 2.



Photo 5. Feature 2, view is to the south.



Photo 6. Feature 2, view is to the southeast; note monument in background.



Photo 7. Disturbed hearth (Feature 2.04) in Feature 2.



Photo 8. Burned post remnant in Feature 2.

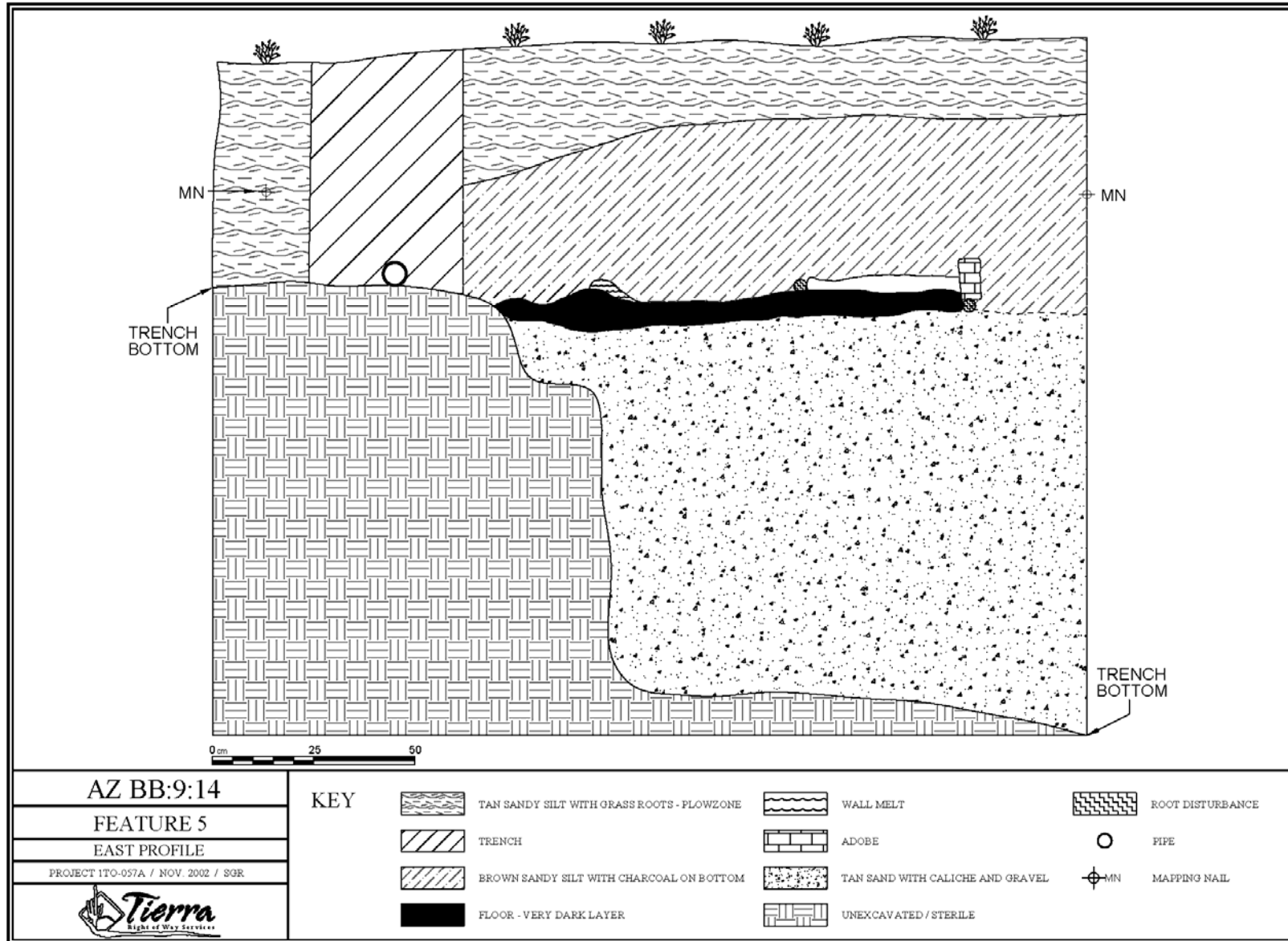


Figure 6. Profile of Feature 5, east wall.



Photo 9. Feature 5 in backhoe trench wall, view is to the east.

The short length of the burned layer suggests that the backhoe cut the corner of the pit structure, and the major portion of the structure lies to the east. The structure's proximity to Feature 2 may indicate that it belongs to the same courtyard group, or it was a rebuilding of Feature 2 (or vice versa). A single diagnostic sherd was associated with the feature, a Rincon Red-on-brown sherd. This suggests a Rincon phase occupation (see Chapter 6).

Feature 7

Feature 7 was a burned pit structure. It was located about 51 m north of the Fort Lowell entrance on Craycroft Road. In the east trench wall, the structure measured about 7 m long; in the west wall, it was slightly longer (Figures 7 and 8; Photos 10 and 11). These comparatively large dimensions suggest that the structure was large, although it is possible that the backhoe cut it along the diagonal axis. The profile exhibited adobe-wall fall and melt, sherds, and what appeared to be a central post hole. The feature also appeared to be moderately disturbed by root and rodent activity. Several fragments of wood, presumably historic in age, were observed near the top of the feature; this suggests that the feature was disturbed historically. The maximum thickness of the feature was about 0.5 m. The post hole extended about 55 cm from the floor.

Feature 7 was located a short distance southeast of IAR's Feature 2. Dart (1988:4) described this feature as a historic trash pit with several discernible strata and hypothesized that the feature was either a foundation pit or crawl space beneath the Fort Lowell Commanding Officer's quarters. This would place Feature 7 within the plotted location of the quarters; however, because Feature 7 was not a Historic period feature, the actual location of the historic building is presumably farther to the west (with IAR's trench cutting across its eastern edge).

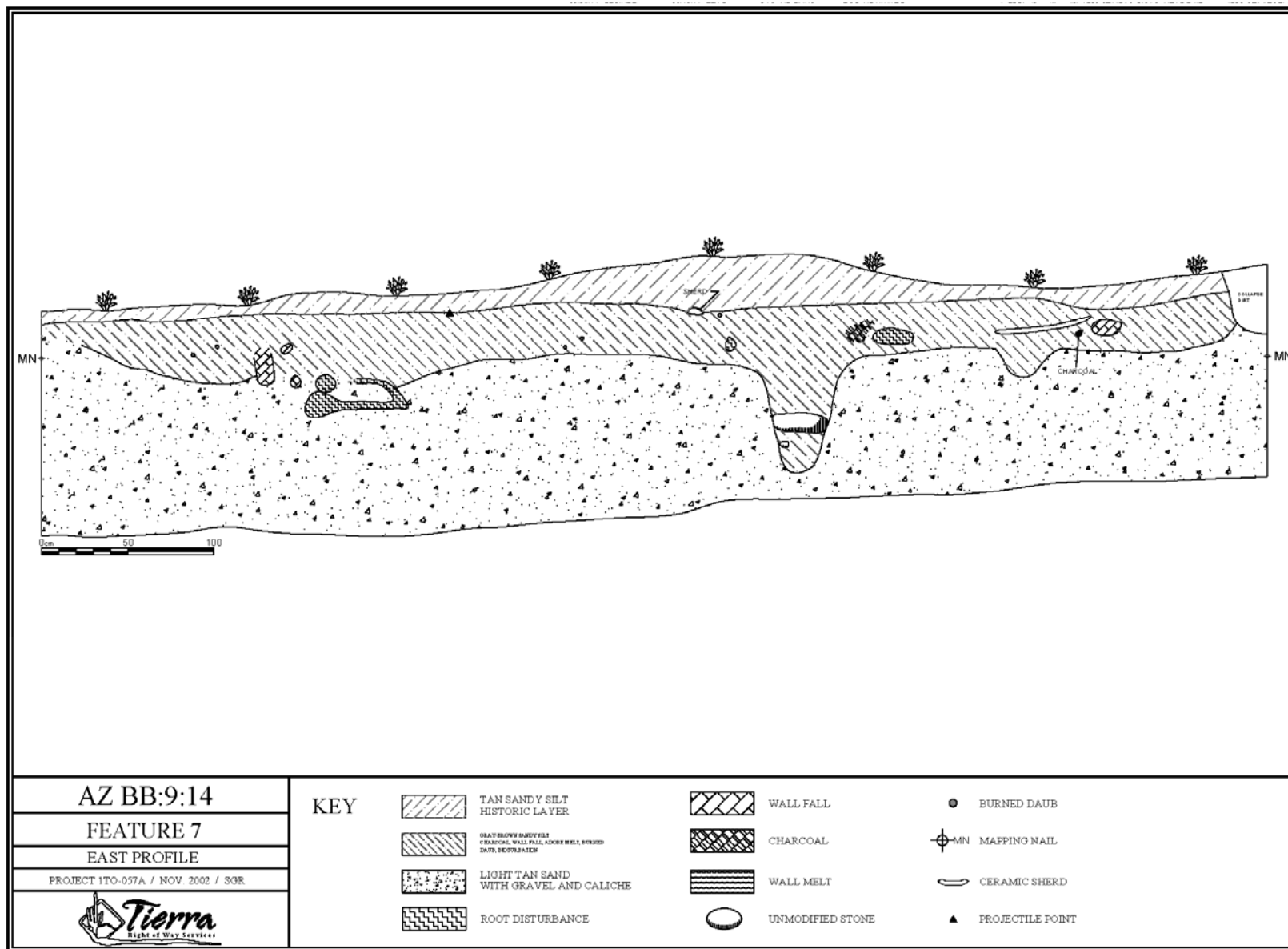


Figure 7. Profile of Feature 7, east wall.

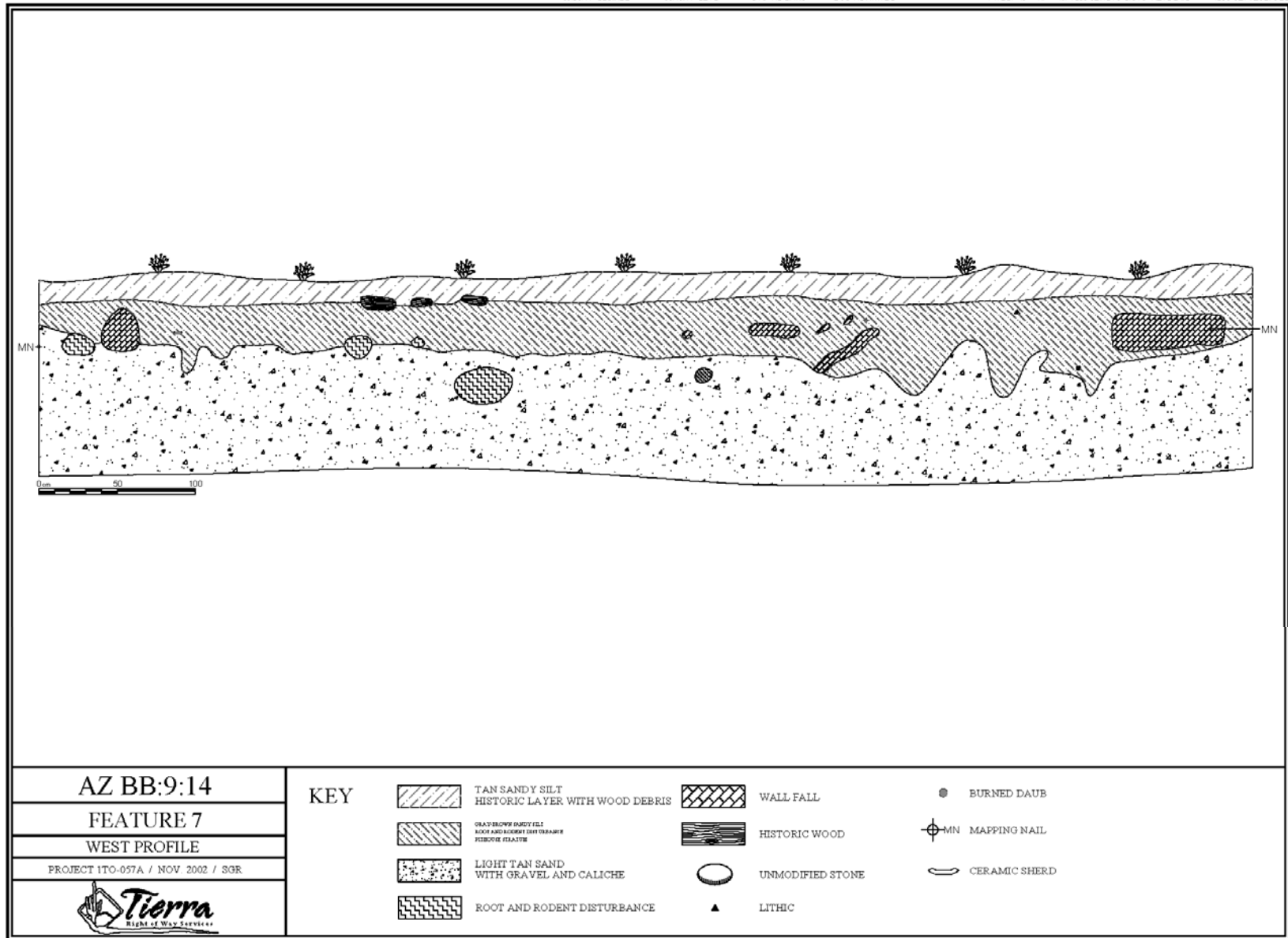


Figure 8. Profile of Feature 7, west wall.



Photo 10. Profile of Feature 7 in east face of backhoe trench.



Photo 11. Profile of Feature 7 in west face of backhoe trench.

The structure was located immediately south of Feature 8, another pit structure. This suggests that the two structures either belonged to the same courtyard group, or one of the features was a rebuilding episode of the other. Although a denticulate tool was collected from the fill removed by the backhoe, no ceramic or other temporally diagnostic artifacts were collected from Feature 7.

Feature 8

Feature 8 was located north of and adjacent to Feature 7. Unlike Feature 7, Feature 8 was not burned. Most of the data for the structure were not available, but based on photographs of the profile, the structure measured approximately 2.5 m long in the east trench wall (Photo 12). This suggests the trench cut through the structure's short axis. No artifacts were collected from Feature 8.

Feature 9

Feature 9 was a burned and trash-filled pit structure located about 120 m north of the Fort Lowell entrance on Craycroft Road (near the Chief Trumpeter sculpture). The feature measured about 3.75 m in the west trench profile; in the east wall, the structure walls were not as well defined, but the feature in that wall was roughly 5 m long (Figures 9 and 10; Photos 13 and 14). The structure may have had adobe walls, with the northern portion of the wall suffering disturbance, possibly from the excavation of an old, now abandoned trench.



Photo 12. Feature 8 in backhoe trench, view is to the east.

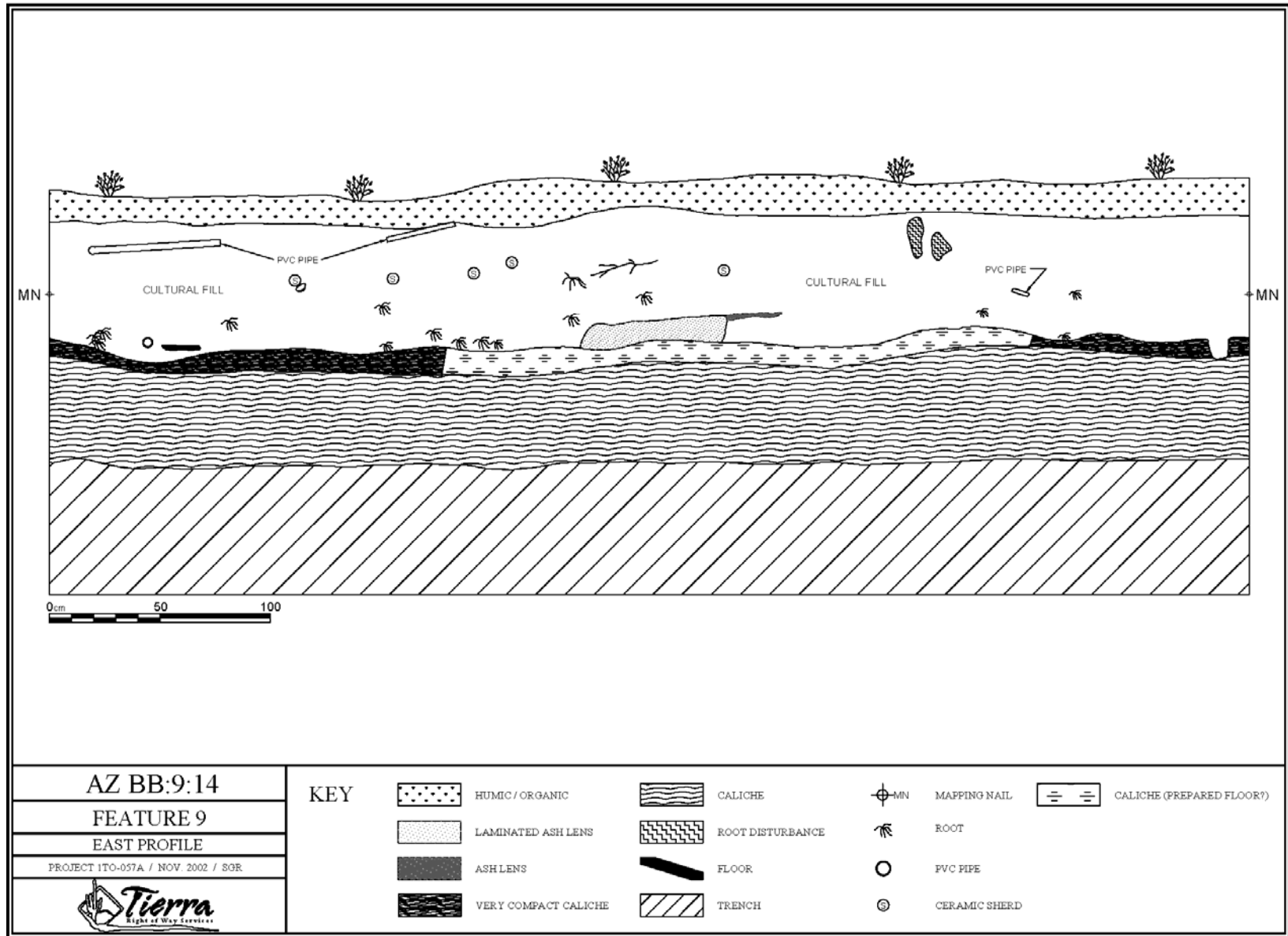


Figure 9. Profile of Feature 9, east wall.

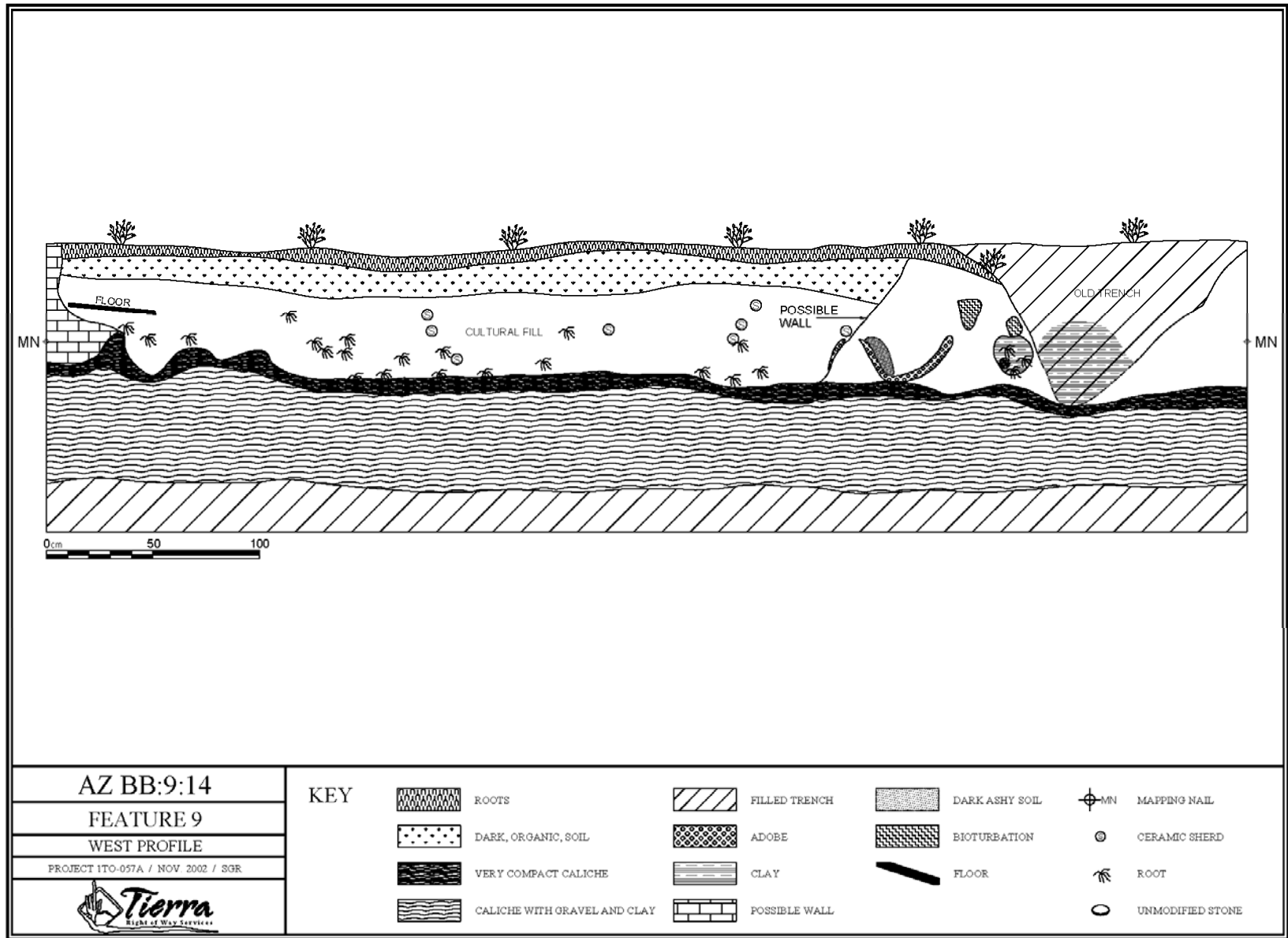


Figure 10. Profile of Feature 9, west wall.



Photo 13. Profile of Feature 9 in east wall of backhoe trench.



Photo 14. Profile of Feature 9 in west wall of backhoe trench.

No subfloor features were evident in the profiles, although possible perimeter post holes were observed. A number of temporally diagnostic ceramics were collected from Feature 9, including two Rincon Red-on-brown sherds, one Sacaton Red-on-buff sherd, and five Tanque Verde Red-on-brown sherds (see Chapter 6). Three Gila Plain, Gila Variety sherds were also recovered, indicating interaction with the Phoenix area. The painted sherds suggest that Feature 9 dates to the Rincon and Tanque Verde phases.

Feature 9 was located a short distance to the northeast of IAR's Feature 3. Feature 3 was interpreted as a pit structure (Dart 1988:7). Similar to Feature 9, the Feature 3 profile displayed a burned layer along its floor, indicating that the structure burned. Although no diagnostic materials were recorded in association with IAR's Feature 3, its proximity to Feature 9 suggests it was contemporaneous, perhaps part of the same courtyard group.

Feature 11

Feature 11 was a pit structure located about 20 m north of Feature 8. The feature was visible only in the east trench wall, and only the edge may have been clipped by the backhoe. The structure may have burned. Most of the data for the feature were not available, and dimensions for the feature cannot be provided. No diagnostic artifacts were collected from Feature 11.

Feature 14

Feature 14 was a pit structure located about 95 m north of the Fort Lowell entrance on Craycroft Road (Photos 15 and 16). Most of the data for the feature, including dimensions and other details visible in the profile, were not available, although it appeared to be unburned. No artifacts were collected from the feature. The feature was intruded and disturbed by Feature 10, which was interpreted as a historic tree well.

Feature 15

Unlike the other prehistoric features recorded during the monitoring project, all of which were pit structures, Feature 15 was a clearly defined extramural surface (Photos 17–20). The surface extended from Feature 14 on the south northward to the vicinity of Feature 12. The distance between the two features makes Feature 15 roughly 13 m long. The feature appeared in the west trench wall as dark and ashy sediment following an undulating, calcified silt or loam substrate. Several pits extended from the surface.

Seventeen sherds were collected from Feature 15. Diagnostic sherds include one Rincon Red-on-brown sherd and one Rincon Red sherd.

Feature 16/17

As mentioned previously, this feature was initially thought to be two separate features. It was described as an area of mixed prehistoric fill in a natural low spot. The area measured 11.2 m long and 0.8 m deep. The feature had a clear southern boundary, but most of the feature had been disturbed by road and utility construction (Photo 21). The portion of the feature originally designated Feature 16 yielded two Tanque Verde Red-on-brown sherds; diagnostic sherds from the Feature 17 area included one Rillito Red-on-brown sherd, and four Rincon Red-on-brown sherds. The range of diagnostic ceramics suggests a long period of accumulation of the fill, and it also indicates that the feature was an area of secondary deposition or a midden and not a disturbed structural feature or features.



Photo 15. Feature 14, view is to the west.



Photo 16. Another view of Feature 14 in west wall.



Photo 17. Feature 15 in west backhoe-trench wall, south-central area.



Photo 18. Feature 15 in west backhoe-trench wall, central area.



Photo 19. Feature 15 in west backhoe-trench wall, another view of central area.



Photo 20. Feature 15 in west backhoe-trench wall, at north end.



Photo 21. Feature 16/17, showing cultural fill and disturbance.

HISTORIC FEATURES

Feature 4

This feature was a shallow trash deposit, ranging from 2–5 cm below the modern ground surface (additional measurements for Feature 4 were not available). It was located just north of the entrance to Fort Lowell Park from Craycroft Road. This location places Feature 4 near the privy in the Commanding Officer’s quarters as depicted by the projection of the historic map of Fort Lowell onto modern satellite imagery of the location. The artifacts recovered from Feature 4 indicate that the deposit dated to around the turn of the twentieth century, however. Feature 4 is therefore a trash deposit unrelated to the privy, although it is possible that the privy continued to be used for trash disposal long after the Army abandoned the fort. Based on the trench profile, the feature did not appear to be particularly substantial (as might be expected if it were part of the privy or a layer within it), and it seems most likely that Feature 4 represents an episode or episodes of dumping associated with the later reoccupation of the fort.

Feature 6

Feature 6 was a trash pit located about 37 m north of the entrance to Fort Lowell Park from Craycroft Road. No imagery or metric data were available for Feature 6. However, based on the amount of historic materials collected from the feature, it appears to have been fairly substantial. Artifacts from the feature indicate that it was used for trash disposal at least as early as 1915 and possibly as early as the turn of the twentieth century or before (see Chapter 5).

Feature 6 was located approximately 7.5 m east of IAR's Feature 1. Feature 1 was a pit appearing in both walls of IAR's trench (Dart 1988:4). Based on glass artifacts from the feature, it appeared to date to sometime before the twentieth century. This suggests that Tierra's Feature 6 represented a continuation in use of the location for trash disposal.

Feature 10

Feature 10 was interpreted as a tree well dating to historic times (Photo 22). Dimensions for the feature are unavailable. It was located just south of Feature 14 near the southern boundary of the Fort Lowell parade ground. It is possible that the tree that once stood at the location was related to the parade ground.

Feature 12

Feature 12 was recorded as a possible tree well (Photo 23). Its location would have placed it within the Fort Lowell parade ground, and similar to Feature 10, it may have once been a tree associated with the parade ground. Its location makes it a better candidate than Feature 10 for an associated tree, based on the projected location of the Fort Lowell facilities.

Feature 13

Feature 13 was a pit located in the west wall of the trench, just north of Feature 11 (Photo 24). The function of pit was undetermined, but oxidized metal fragments were visible in the fill. The pit measured about 3 feet (90 cm) wide and 8 inches (20 cm) deep.



Photo 22. Feature 10, view is to the west.



Photo 23. Feature 12, view is to the west.



Photo 24. Feature 13, view is to the west.

Feature 18

Feature 18 was a trash deposit with portions of surrounding adobe walls (both intact and fallen) within the Fort Lowell Regimental Cavalry Band facilities. It is assumed that the excavated feature was located within the kitchen, although field personnel believed they were within the band barracks. The kitchen building, which had three rooms (see Huntington 1982:3, Figure 1.1.2), was the subject of two earlier studies (Huntington 1982; Kinkade and Fritz 1975). Together, these earlier projects appear to have investigated most of the interior of the kitchen structure. Although the 1982 project excavated 24 1-by-1-m excavation units in Rooms 1 and 2, the location of these units is not clear from the report, and it appears that the TEP trench included an area of the kitchen that had not been previously excavated. Based on the mapped position of the excavation, which was overlaid upon the historic plan of Fort Lowell, Feature 18 was located near, even if not precisely within, the southeast corner of Room 1 of the band-kitchen building.

The feature was found near the northern end of the TEP utility trench and beneath the southern edge of a concrete driveway that turns from Craycroft Road to a road that borders Fort Lowell Park on the north (Figures 11–13; Photos 25–31). The portion of the feature within the footprint of the utility trench and an area extending eastward from the trench (possibly to replace or modify an existing equipment cabinet) was removed, and the eastern adobe wall of the structure was encountered. The deposit (at least the part extending beyond the trench footprint) was excavated in six levels: four levels of fill, floor fill, and floor. Portions of the adobe-brick wall were also exposed in the north profile of the area removed east of the trench, suggesting that the northeast corner of the kitchen or a room within the kitchen was exposed. Wall fall was also observed in the feature fill, indicating that one of the room walls collapsed inward at some point.

Most of the artifacts, most notably those from the lowest levels of the excavation (floor and floor fill), dated to the mid-to-late-nineteenth century, clearly associating the feature with the military occupation of Fort Lowell (see Chapter 5). Little can be said about construction or architectural details. However, evidence of a wood floor was encountered in the form of a few remnant plank remnant plank fragments, a sample of which was collected from the trench fill. Previous excavations have shown that the band kitchen had a total of three floors: an adobe floor (probably the original floor), a wood floor added in 1882, and a second wood floor, set above the first wood floor and possibly added during the post-military occupation of the building (Huntington 1982:19–21). It is uncertain which wood floor was encountered during Tierra's project, although the older artifacts from floor-fill and floor-contact contexts suggest that minimally the lower, original adobe floor was encountered.

Feature 18 was located just slightly north and east of IAR's Feature 4. Feature 4 was described as an extensive, stratified deposit of historic trash extending about 10 m along the length of IAR's trench (Dart 1988:7). According to IAR's interpretation of the feature, it was a midden deposit associated with and lying south of the cavalry-band kitchen. This is in keeping with the assessment that Tierra's Feature 18 was located in the kitchen, rather than the barracks. Tierra's trench does not appear to have encountered IAR's Feature 4, suggesting that the feature was probably a small lens that did not extend significantly beyond IAR's trench. Interestingly, both IAR's and Tierra's trenches would have encountered the cavalry-band barracks. It is unclear why IAR's report did not mention that the trench bisected the actual band-quarters building, particularly because the walls belonging to the east end of the barracks remain visible. Tierra personnel believed Feature 18 was located within the barracks building.

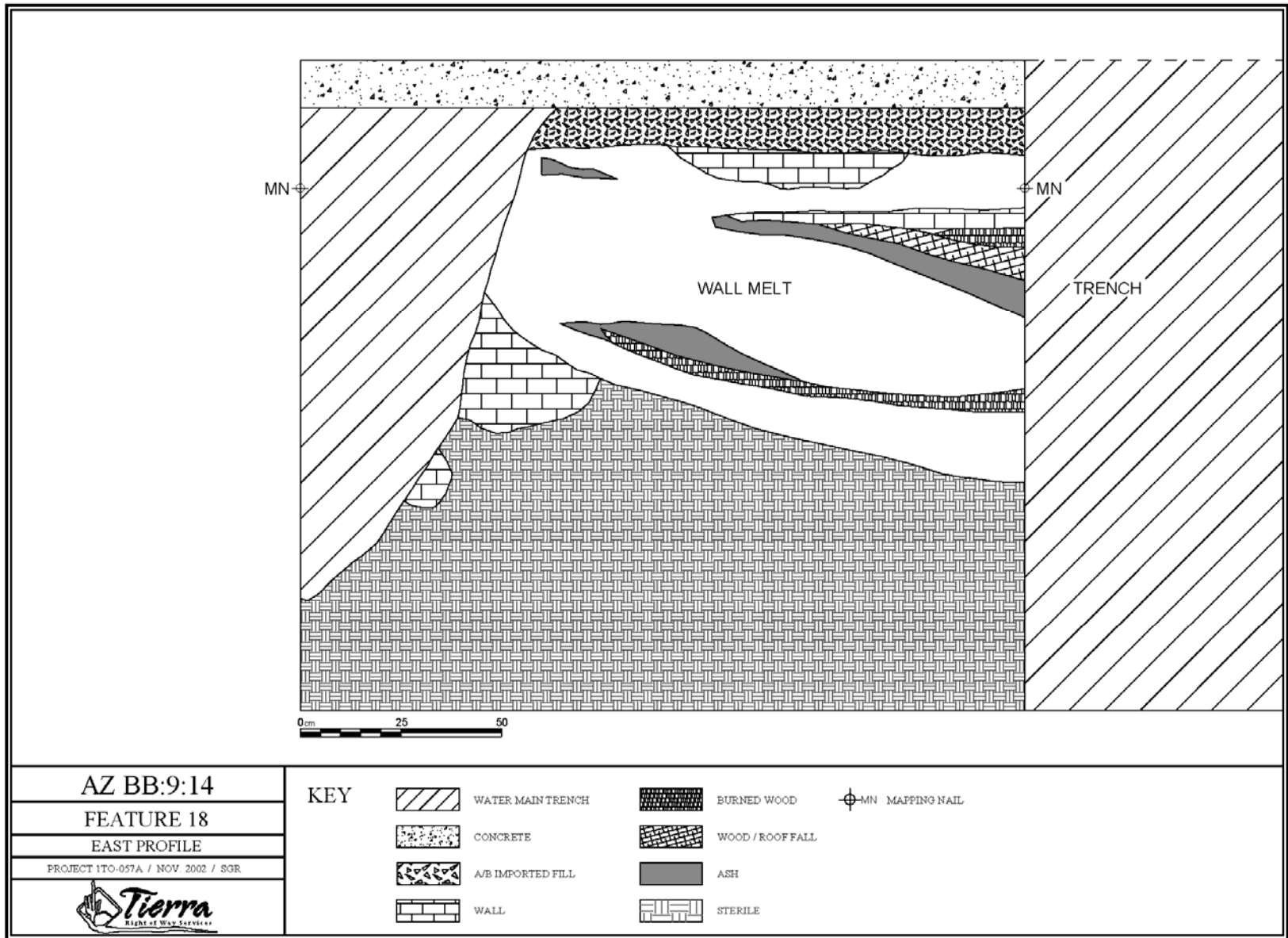


Figure 11. Profile of Feature 18, east wall.

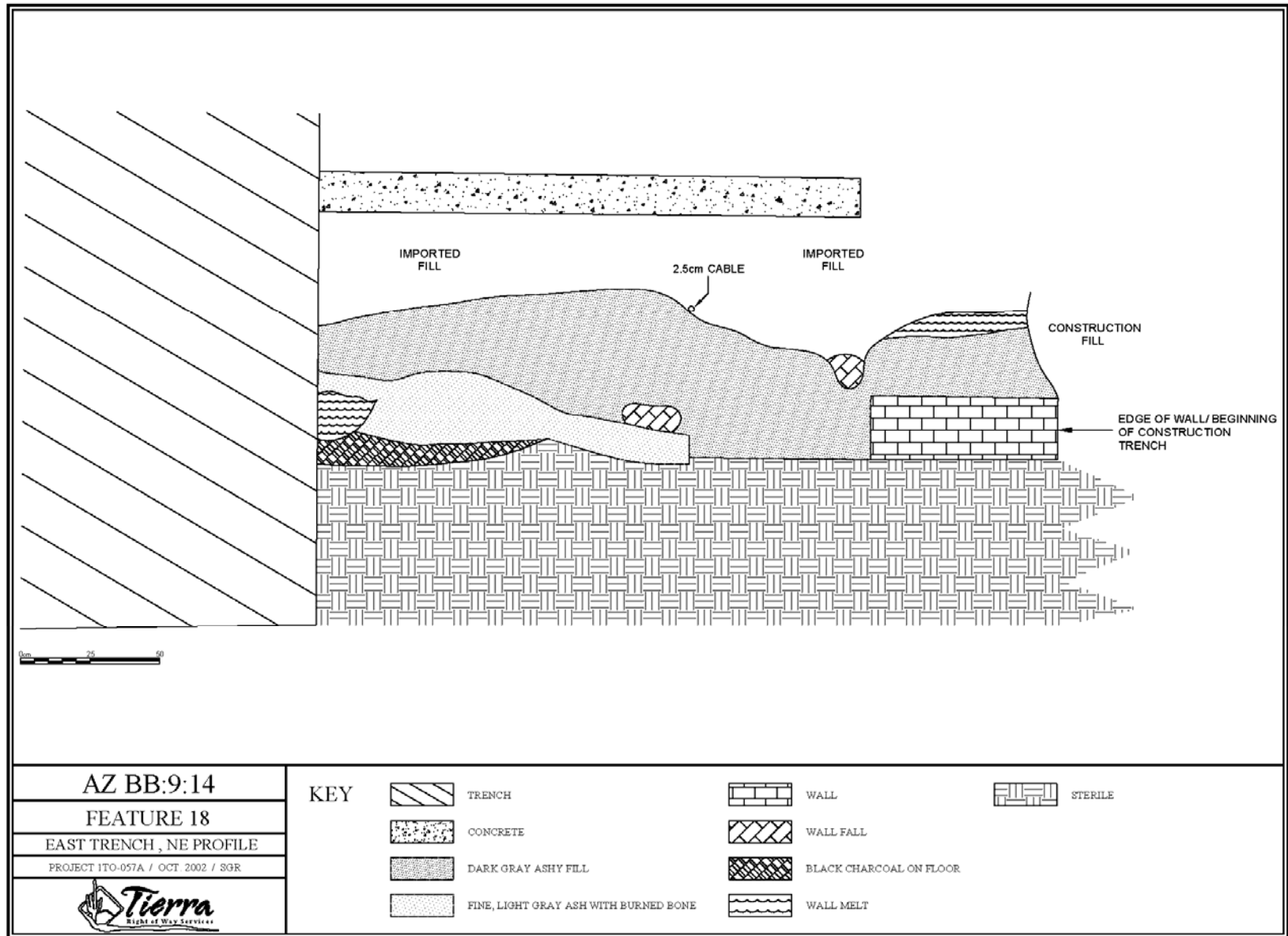


Figure 12. Profile of Feature 18, northeast wall.

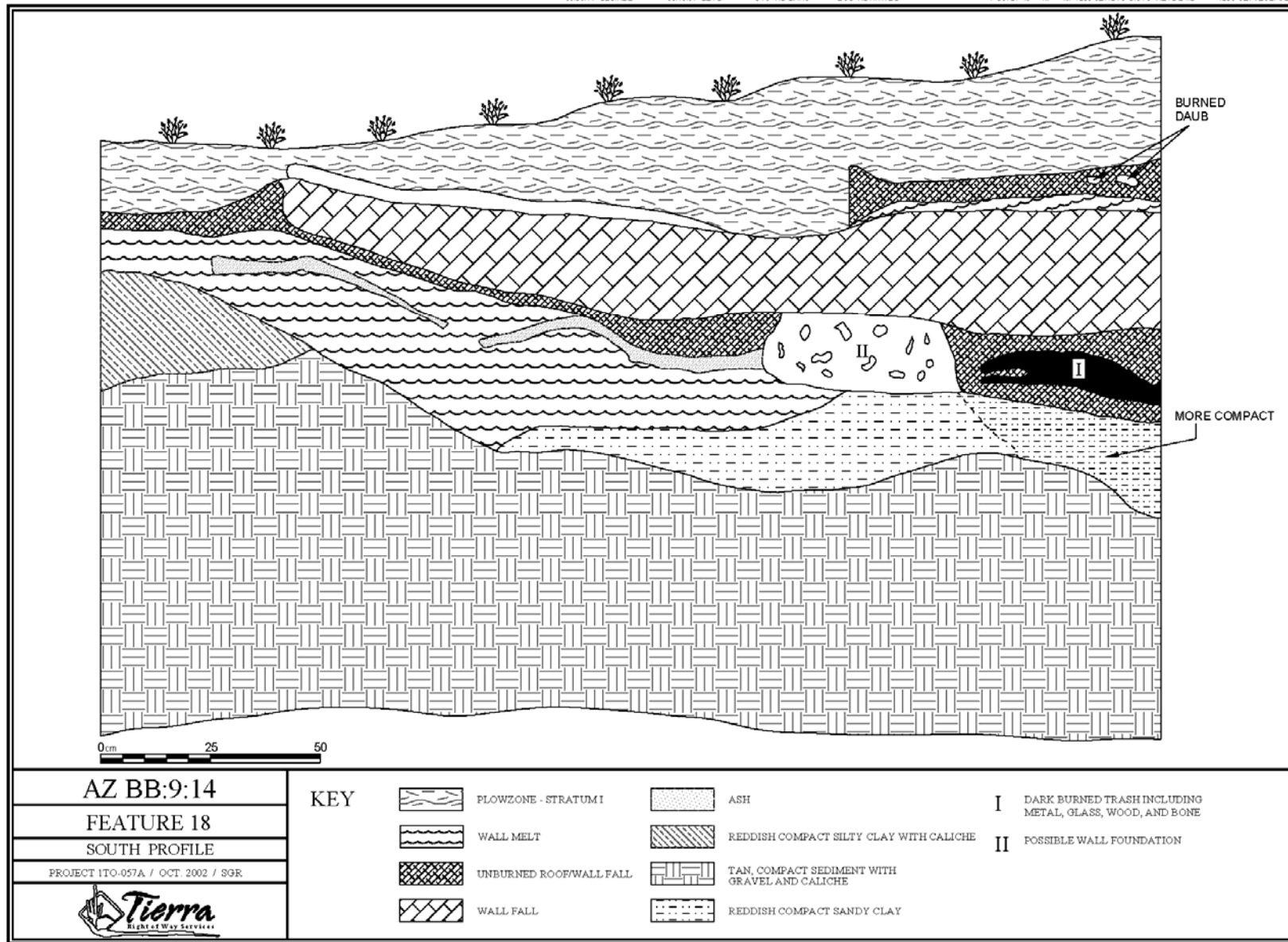


Figure 13. Profile of Feature 18, south wall.



Photo 25. Feature 18, west wall of excavated area (south half).



Photo 26. Feature 18, west wall of excavated area (north half).



Photo 27 Feature 18, portion of east wall of excavated area.



Photo 28. Feature 18, portion of south wall of excavated area.



Photo 29. Feature 18, portion of excavated area; view is downward and to the northwest.



Photo 30. Feature 18, portion of excavated area; view is to the west.



Photo 31. Feature 18, north wall of excavated area extending eastward from trench.

As a final note on Feature 18, Tierra expected that an enlisted-men's privy presumably associated with Feature 18 would be encountered toward the northern end of the utility trench (Fratt and Huntington 2001). This expectation was not met. The privy appears on an 1889 map of the fort (reproduced in Huntington 1982:2, Figure 1.1.1). According to the map, the privy would have been just east of the footprint of TEP's excavation, and therefore the trench bypassed it.

SUMMARY

Tierra recorded ten prehistoric and six historic features during monitoring of TEP's electrical-utility trench. One prehistoric feature, Feature 2, was completely excavated, and one historic feature, Feature 18, was partially excavated. The remaining features were recorded in profile on the walls of the utility trench and identified primarily with sampled artifacts.

The comparatively high frequency of prehistoric features, of which seven were pit structures or possible pit structures, indicates that a substantial area of occupation within the Hardy site lies along Craycroft Road. That the features were encountered by a linear excavation suggests that a significant number of other prehistoric features probably also are present in the areas east and west of the road. Most features were relatively close to the modern surface.

Historic features were less abundant but included several trash deposits and other features. Most significantly, a room within the Fort Lowell cavalry-band kitchen was documented. The room (Feature 18) contained trash dating to the mid-to-late-nineteenth century. IAR also documented two

historic trash features in the vicinity (Dart 1988:7–8). It is likely that historic deposits are significantly more extensive in that area.

CHAPTER 5

HISTORIC ARTIFACTS

Joseph Howell

A total of 350 artifacts from historic contexts was analyzed. The collection was about equally distributed among glass (n = 118), metal (n = 118), and ceramics (n = 114). Because the collection was relatively small, the research questions could be addressed only to a limited extent.

METHODS AND RESEARCH QUESTIONS

The artifacts were separated into three broad categories: ceramics, metal, and glass. Other material types (other than faunal bone, which was analyzed separately) were not present. Analysis of temporally diagnostic artifacts was given priority. Nondiagnostic artifacts (such as glass body shards) were counted, and their basic attributes were described. Emphasis was given to functionally diagnostic attributes of the artifacts when evident.

The research questions pertaining to the historic occupation of Fort Lowell that were proposed in the original plan of work (Fratt and Huntington 2001) may be summarized as follows:

1. Are the historic cultural remains associated with the military occupation of Fort Lowell, the Mexican immigrant community of El Fuerte, or the later Euroamerican occupation of the area?
1. If related to the military occupation, are the remains associated with the officers or enlisted personnel at the fort? Was there a difference in the amount or quality of food available to the two groups?
2. Did Fort Lowell personnel obtain goods only of local manufacture, or were they connected to a wider regional or national market system? Did the patterns in trade and exchange of goods vary among the military, El Fuerte, and Euroamerican eras?
3. What are the similarities and differences in the land-use patterns of the different groups who lived near Fort Lowell? For the military, structured trash disposal and privy locations would be expected. Are similar patterns apparent for the later occupations?

Research questions 1 through 3 are discussed, to the extent possible, below. As for question 4, the project area (consisting of a linear trench) was too limited to meaningfully answer questions about local land use, and this question will not directly addressed further.

RESULTS

Three features, Features 4, 6, and 18, contained the greatest density of historic artifacts (Tables 2–4). A few artifacts were also recovered from prehistoric Features 1 and 2; these artifacts obviously were not associated with the features and derived from secondary deposits originating from disturbance or from the overlying sediment above the features. Some historic materials were also recovered from the general fill excavated from the main utility trench, and a few were collected from the modern

ground surface. Three features (Features 10, 12, and 13) were interpreted as historic, but either no artifacts were collected from them, or the artifacts could not be unambiguously associated with the features.

Feature 18

Material clearly associated with the military occupation of the fort was recovered from Feature 18. According to a brief field note taken during the project, the feature was interpreted as a room within the Fort Lowell Regimental Band barracks, but a more recent georeferenced overlay of the plan of Fort Lowell onto modern aerial maps indicates that Feature 18 would actually be located within the band kitchen.

Notable diagnostic artifacts collected from Feature 18 include portions of a medicine bottle used by the Union with the imprint U.[S.A.]/HOSP. D[EPT.], a perfume jar with the product mark L.T. PIVER/PARFUMEUR/A PARIS, and a ceramic maker's mark from a plate produced by Robert Cochran & Co. These artifacts, along with other temporally diagnostic material (including other bottle glass that displays typical nineteenth-century glass-manufacturing technology), demonstrate the temporal placement of the feature, in addition to associating it with the military installation. The perfume jar suggests the presence of an adult woman, which is not surprising, as it is known that officers and noncommissioned personnel brought their families to reside with them at the fort.

As its embossed imprint suggests, the medicine bottle was issued by the U.S. Army Hospital Department (Dalessandro 2011). Hospital Department bottles were widely distributed in the field beginning in 1863 and continued to be used into the 1870s. Many of the bottles were evidently produced at glassworks in Pittsburgh, Pennsylvania, Baltimore, Maryland, and possibly also St. Louis, Missouri.

The perfume jar is an exquisite Flow Blue jar depicting a countryside cow-herding scene, with a shepherd and several cows gazing at a cartouche containing the logo L.M & C^{IE} on the body of the jar. The jar base had the previously mentioned inscription L.T. PIVER/PARFUMEUR/A PARIS. L.M. & C^{IE} was the logo of Leboeuf and Milliet of Creil, France, the manufacturer of the jar (note that the mark was located on the side, and not the base, of the jar). Leboeuf and Milliet produced ceramic wares from 1841 to 1895 and used this particular mark from about 1841 to 1863 (Kovel and Kovel 1986:185). L.T. Piver began producing perfumes in 1774 (L.T. Piver 2012).

Other ceramic maker's marks were rare in the Feature 18 collection, but one in particular merits discussion. This mark was present on a hard-paste earthenware (whiteware) plate fragment and displays the lion and unicorn motif of the British coat of arms, with the manufacturer's logo [WA]RRANTED STONE CHINA/[R.]COCHRAN & CO. GLASGOW. R. Cochran and Company produced ceramic wares from 1846 to 1896 (SCARF 2012a). Although this was the only fragment bearing this particular mark, other whiteware fragments from Feature 18 may have belonged to the same set of dinner ware.

Several other artifacts from Feature 18 also warrant description. One is the decorative brass panel of a powder flask. The panel depicts a stag-in-nature scene. This particular flask was apparently manufactured by the American Cap & Flask Company around 1860 (Ambrose 2012).

Table 2. Historic Ceramics

Ceramic Ware and Form	Provenience											Total
	Feature 1/2	Feature 4	Feature 4/6	Feature 6	Feature 18	Feature 18, Floor	Feature 18, Level 1	Feature 18, Level 2	Surface	Test Probe	Trench Fill	
Earthenware												
Unidentified	–	–	–	1	–	–	–	–	–	–	–	1
Porcelain												
Cup	–	–	–	1	–	–	–	–	–	–	–	1
Saucer	–	–	–	–	–	–	–	–	–	–	1	1
Stoneware												
Bottle	–	–	–	–	5	–	–	–	–	–	–	5
Vessel	–	–	–	–	1	–	–	–	–	–	–	1
Whiteware												
Bowl	–	–	–	3	7	1	1	–	–	–	–	12
Cup	–	–	–	3	8	–	–	–	–	–	–	11
Handle	–	–	1	–	–	–	–	–	–	–	–	1
Mug	–	1	–	–	2	–	–	–	–	–	–	3
Pitcher	–	–	–	2	–	–	–	–	–	–	–	2
Plate	2	1	1	6	13	1	–	1	–	3	9	37
Platter	–	–	–	2	5	–	–	–	–	–	–	7
Saucer	–	–	–	16	–	–	–	–	–	–	2	18
Unidentified vessel	–	1	–	1	2	–	–	–	–	–	–	4
Unidentified	1	–	2	–	–	–	–	–	–	2	–	5
Whiteware, Flow Blue												
Jar, cosmetic	–	–	–	–	1	–	–	–	–	–	–	1
Unidentified	–	1	–	–	–	–	–	–	–	–	–	1
Whiteware, sponge print												
Cup	–	–	–	–	–	–	–	–	1	–	–	1

Ceramic Ware and Form	Provenience											Total
	Feature 1/2	Feature 4	Feature 4/6	Feature 6	Feature 18	Feature 18, Floor	Feature 18, Level 1	Feature 18, Level 2	Surface	Test Probe	Trench Fill	
Whiteware, transfer print												
Plate	-	-	-	-	-	-	-	-	-	-	1	1
Unidentified	-	-	-	-	1	-	-	-	-	-	-	1
Total	3	4	4	35	45	2	1	1	1	5	13	114

Table 3. Historic Metal Artifacts

Metal and Object Type	Provenience											Total
	Feature 1/2	Feature 2, Level 1	Feature 4	Feature 4/6	Feature 6	Feature 18	Feature 18, Floor Fill	Feature, Level 2	Feature 18, Level 3	Feature 18, Level 4	Trench Fill	
Brass												
Button	1	-	-	-	-	-	-	-	-	-	-	1
Can, black power	-	-	-	-	-	1	-	-	-	-	-	1
Grommet	-	-	-	-	-	-	-	-	1	-	-	1
Copper												
Cartridge, gun	-	-	-	-	1	-	-	-	-	-	-	1
Ferrous												
4-hole button	-	-	-	-	-	-	-	-	1	-	-	1
Barrel hoop	-	-	-	-	-	-	1	-	-	-	-	1
Button	-	-	-	-	-	-	-	-	1	-	-	1
Can, kerosene	-	-	-	-	-	-	-	-	-	1	-	1
Can, unidentified	-	-	-	-	-	-	2	-	-	-	-	2
Cap	-	-	-	-	-	1	-	-	-	-	-	1
Horse equipment	-	-	-	-	-	1	-	-	-	-	-	1
Horse shoe	-	-	-	-	-	2	1	-	-	-	-	3
Lamp part	-	-	-	-	-	1	-	-	-	-	-	1
Lid	-	-	-	-	-	6	-	-	-	1	-	7

Metal and Object Type	Provenience											Total
	Feature 1/2	Feature 2, Level 1	Feature 4	Feature 4/6	Feature 6	Feature 18	Feature 18, Floor Fill	Feature, Level 2	Feature 18, Level 3	Feature 18, Level 4	Trench Fill	
Musical instrument	-	-	-	-	-	1	-	-	-	-	-	1
Nail, square head	-	-	2	-	-	7	2	2	3	15	-	31
Nail, wire round	-	1	-	-	-	-	-	-	-	-	-	1
Nail, unidentified	-	-	-	-	-	1	-	-	-	-	-	1
Screw	-	-	-	-	-	-	-	1	-	-	-	1
Strap, hardware	-	-	-	-	-	5	-	-	-	-	-	5
Unidentified	-	-	1	2	-	7	3	-	-	1	3	17
Iron/steel												
Nail, wire round	-	-	-	-	-	2	-	-	-	-	-	2
Screw	-	-	-	-	-	-	1	-	-	-	-	1
Tin												
Can	-	-	-	-	-	5	-	-	-	4	-	9
Can, food, unidentified	-	-	-	-	-	-	1	-	-	-	-	1
Can, hole in top	-	-	-	-	-	1	-	-	-	-	-	1
Can, hole in cap	-	-	-	-	-	3	-	-	-	1	-	4
Can, sardine	-	-	-	-	-	2	-	-	-	-	-	2
Can, scrap	-	-	-	-	-	2	-	-	-	-	-	2
Unidentified	-	-	-	-	-	-	1	-	-	-	-	1
Unidentified metal												
Unidentified	-	-	-	-	-	15	-	-	-	-	-	15
Total	1	1	3	2	1	63	12	3	6	23	3	118

Table 4. Historic Glass Artifacts

Object Type	Provenience										Total
	Feature 1/2	Feature 4	Feature 4/6	Feature 6	Feature 18	Feature 18, Floor Fill	Feature 18, Level 3	Feature 18, Level 4	Surface	Trench Fill	
4-hole button	-	-	-	-	1	-	-	-	-	-	1
Bottle, unidentified	1	2	-	3	12	2	1	-	-	2	23
Bottle, beer	-	-	-	-	1	-	-	-	-	2	3
Bottle, beverage	-	-	-	1	-	-	-	-	-	-	1
Bottle, cosmetic	-	1	-	-	-	-	-	-	-	-	1
Bottle, food	-	-	-	8	-	-	-	-	-	1	9
Bottle, ink	-	-	-	2	-	1	-	-	-	-	3
Bottle, medicine	-	-	-	10	2	2	-	-	-	-	14
Bottle, liquor	-	-	-	1	-	-	-	-	-	1	2
Bottle, proprietary	-	-	-	-	1	1	-	-	-	-	2
Bottle, sauce	-	-	-	1	-	-	-	-	-	-	1
Bottle, soft drink	-	-	-	-	-	-	-	-	1	-	1
Bottle, wine/champagne	-	-	-	-	20	1	-	1	-	1	23
Handle	-	1	-	-	-	-	-	-	-	-	1
Insulator, electrical	-	-	-	-	1	-	-	-	-	-	1
Jar	-	1	-	5	-	-	-	-	-	-	6
Jar, canning	-	-	1	-	-	-	-	-	-	-	1
Jar, preserves	-	-	-	4	-	-	-	-	-	-	4
Lid	-	1	-	-	-	-	-	-	-	-	1
Light fixture	-	-	1	-	-	-	-	2	-	-	3
Marble	-	-	-	-	-	-	-	-	-	1	1
Tumbler	-	1	-	7	-	-	-	-	-	2	10
Window glass	-	-	-	-	5	-	-	-	-	1	6
Total	1	7	2	42	43	7	1	3	1	11	118

Also interesting are several amber glass, bottle-body fragments with a “cribbed” surface pattern resembling cabin logs. These shards originated from a bottle that contained Drake’s Plantation Bitters, produced by Catawba Bitters, a company that made bitters beginning about 1858.

Finally, although not temporally diagnostic, two-thirds of a musical triangle was recovered from Feature 18, a find perhaps not surprising given that Feature 18 was occupied by musicians. Why one segment of the triangle was missing, apparently removed through metal fatigue, is unknown.

Because the band kitchen was the only historic feature clearly associated with the military use of Fort Lowell, it was not possible to provide any comparisons between officers and enlisted men in terms of their consumption of food and other supplies. However, the artifacts from Feature 18 do suggest that they were used and discarded by officers. Dalessandro (2011) noted that bottled (as opposed to boxed or wrapped) medicines were generally used by Union officers. The relative abundance of champagne bottles indicates consumption of what might be considered a luxury beverage, and the perfume jar may have belonged to a wife or other female relative of an officer.

Much of the material was clearly not of local manufacture, but whether these materials were purchased locally (i.e., from Tucson stores) or elsewhere is not clear. However, Fort Lowell served as a military supply-distribution hub, and it is perhaps not surprising that imported goods were readily available (at least for an Army outpost in the middle-to-late nineteenth century and especially to the officers). Although the Feature 18 artifacts are being attributed to officers, this should not be taken to infer that all of the artifacts were necessarily associated with officers exclusively. The Regimental Band consisted of officers and enlisted men, and given the band’s celebrity, goods such as champagne may have been readily available, regardless of rank.

Features 4 and 6

Features 4 and 6 were probably contemporaneous or nearly so. Both contained glass artifacts dating to or postdating 1904; that is, bottles with attributes (specifically suction scars and side seams continuing to their finishes) resulting from production by the Owens Automatic Bottling Machine, which was used by bottle manufactures beginning that year. Both were historic trash deposits and were located at the southern end of the utility trench. Overall, the features appear to date to the early part of the twentieth century, although earlier deposits, dating to the 1890s, could be present as well. Therefore, the features would be associated with the El Fuerte settlement of the fort, loosely placed from the closure of the fort in 1891 to the influx of Euroamerican settlers in the 1920s.

However, the artifacts offered little in terms of ethnicity or economic class; they represent goods that could have been used by either Hispanic or Anglo persons. A few specific remarks and observations on the material recovered from Features 4 and 6 are presented below. Eight artifacts were also collected from the utility trench in the general vicinity of Feature 4 and 6. These artifacts may have been associated with either feature or derived from the surrounding fill. The only diagnostic artifact from this area between the two features was a Ball Mason jar-body shard with a “dropped serif” letter “a” that probably dates the jar from 1896 to 1910 (Clay 2004). This date range is congruent with other artifacts from Features 4 and 6.

Feature 4

Only 14 artifacts were recovered from Feature 4. The artifacts consisted mostly of household debris, including fragments of a lightning jar, a glass canning-jar lid, a ceramic mug, a milk glass cold-cream

or other cosmetics jar, and miscellaneous glass and ceramics. The lightning jar is a patented type of home-canning jar with a glass lid and a metal bail fastener. It was invented in 1882 by William Henry Putnam and continued to be used through the 1960s (Pick Your Own 2013). Two bottle-glass fragments displayed evidence of manufacture by an Owens machine, dating them sometime after 1904. A few metal objects were also present, notably type B cut nails. Type B nails, or square-head nails, were commonly used until approximately 1900 (Visser 2012). Assuming that the trash from Feature 4 was deposited over a relatively brief period, the feature appears to date from shortly after the turn of the twentieth century. This also suggests that Feature 4 is slightly earlier than Feature 6.

Apart from a loose chronological placement of the remains and yielding a gender-specific artifact (the cold-cream jar), Feature 4 provided little information useful in addressing the research questions.

Feature 6

Reliable dates from Feature 6 were available from glass and ceramic artifacts. Bottle glass was plentiful, and both machine-made and mold-blown bottles were represented in the collection. Several bottles were produced by the Owens Automatic Bottling Machine, which was patented (applied for in 1903) and used by bottle manufactures beginning in 1904 (Lindsey 2012a), providing a minimum initial date. However, the Owens automatic bottling machine did not immediately replace other manufacturing methods that continued to be used in many areas until about 1915. A number of the bottle bases were made by mold-blown methods (including cup-bottom molds; see Lindsey 2012b) that were common from the latter half of the nineteenth century to the mid-1910s.

Some specific bottles of interest were noted. These include an ink bottle with CARTER'S/No. 8 embossed on the base. A remnant of a green paper label remained on which a stylized C and I, representing white letters in a blue square, are still visible. Of greater temporal significance was a medicine bottle with the product mark T. ED.LITT/TUCSON, ARIZ./DRUGS. This bottle originated from druggist T. Ed Litt's drug store and soda fountain at Stone Avenue and Congress Street in downtown Tucson. The store was established in 1909 and remained at the location until 1955 (Henry 1992:173–174). There was also a smaller fragment of a second, probably similar bottle within the feature fill.

Diagnostic ceramics from Feature 6 included two whiteware plate fragments with Homer Laughlin maker's marks. The first mark, reading HOMER LAUGHLIN/HUDSON/10 7 N, was produced in October 1927, according to the month/year/plant code (10 = October, 7 = 1927, N = plant, in this case Newall, West Virginia) (Gates and Ormerod 1982:129). The second mark reads [HOMER L]AUGHLIN/HUDSON/...7 N and is probably from the same set of dinner ware. The Homer Laughlin mark suggests that use of the feature as a trash depository continued at least into the late 1920s.

Materials from Feature 6 indicate its use from the early years of the twentieth century (and possibly earlier) to around 1930. The T. Ed Litt medicine bottle and probably the Carter's Ink bottle indicate Tucson was a source for goods during the later occupation of the Fort Lowell area. The railroad was well established in Tucson by the turn of the twentieth century, and products not locally produced, such as the Carter's ink and the Homer Laughlin plates, were no doubt readily available in Tucson. In this sense, the collection is not particularly helpful in answering questions pertaining to participation in local, regional, and national exchange systems, other than demonstrating that the

post-military Fort Lowell community was linked to Tucson's increasing participation in the national economy.

CONCLUSIONS

The historic deposits from the TEP utility-trench monitoring were concentrated in three features, with some materials distributed throughout the general trench fill. Two features, Features 4 and 6, were trash deposits dating to around the turn of the twentieth century. These features contained domestic trash typical of that era. Based on the temporal placement of the artifacts, the features were associated with the Mexican settlement of El Fuerte, although indicators of ethnic identity or identities were not present in the collected artifacts. Feature 18, assessed to lie within the Fort Lowell band kitchen, was associated with the Civil War–era occupation of the fort by the U.S. military and probably also later. The artifacts were most likely associated with officers who had access to “luxury” goods that were probably readily available because of Fort Lowell's role as a supply depot or at least were more easily procured by officers than enlisted personnel. Alternatively, such goods may have been more available to members the Regimental Band, regardless of their military rank.

CHAPTER 6

PREHISTORIC CERAMICS

Ingrid Klune

A total of 1,416 sherds and one fired-clay artifact were collected during monitoring and excavation at the Hardy site and Fort Lowell. The surface collection produced 14 sherds and the fired-clay artifact; 1,235 sherds derived from features, and 167 sherds were recovered from backhoe trenches and other test units. The main objective of the study was to determine the age of each feature using diagnostic ceramics and to identify the origin of intrusive wares. This chapter considers methods and results according to provenience.

METHODS

Recorded attributes include type or ware, vessel part (rim, base, body), vessel shape (bowl or jar), temper, surface treatment, smudging, rim shape (if determinable), and fire clouding following Henry Wallace and James Heidke of the Center of Desert Archaeology (Gregonis 1993; Bernard-Shaw 1990). References used to identify ceramics included Haury (1965, 1976), Kelly et al. (1978), Wallace (1986), Gregonis (1996), Mills et al. (1993), and Arthur Vokes (personal communication, 2001). Established Southwestern pottery types and wares were used to categorize sherds, although most of the collection (especially the plain ware) did not fall into established categories. Table 5 gives a brief description of each type or ware that was identified.

Temper was identified by examining the sherds with the naked eye. Categories for temper included sand, crushed rock, schist, and mica. Mica content was divided into high, medium, and low categories.

Surface finish was divided into six categories: hand smoothed, polished, wiped, slipped, painted, and presence or absence of micaceous sheen. Evidence for these categories included polishing marks and the patterning of those marks, the presence of tiny beads of clay that indicate wiping of the vessel by a cloth or hand, painted markings, and grittiness of the surface (Gregonis 1997).

Table 5. Descriptions of Pottery Types and Wares

Pottery Type (Date)	Description
Rillito Red-on-brown (Colonial period)	Paint is heavy and ranges from brown to cream, to orange, to gray. There is no evidence of deliberate smudging, although fire clouds often obscure the design. The pigment has a tendency to weather a bit. Slip is uncommon, and the surface is often moderately polished. Design elements include scrolls, hachure, checkerboard, bands, and line-and-stagger motifs (Kelly et al. 1978). The use of stylistic and naturalistic life forms is common. Design is commonly on the interior of bowls and exterior of jars (Heckman et al. 2000). Vessel forms include bowls and jars of variable shapes.

Pottery Type (Date)	Description
Rincon Red-on-brown (Sedentary period)	Paint is heavy and ranges from brown to cream, to orange, to gray. Smudging is deliberate. Design is often cursive, and brush work is frequently slap-dash. Slip is uncommon, and the surface is often polished. Design elements include scrolls, hachure, checkerboard, fringe, and lines and panels (Kelly et al. 1978). Common to this type of pottery is an interior design for bowls, and a band along the rim for jars and bowls (Arthur Vokes, personal communication, 2001). Vessel forms include bowls and jars of variable shapes.
Tanque Verde Red-on-brown (Classic period)	Paste ranges in color from tan to reddish brown to dull brown to gray because of poor oxidization or smudging. Paint is reddish brown to orangey red and thick. Bowls and jars may have band elements around the rim. Design elements include stubby fringe (double and opposed), rectilinear interlocking scrolls, and pendent fringe. Vessel shapes include hemispherical bowls and tall-necked jars (Kelly et al. 1978).
Unidentified red-on-brown (not dated)	Tucson Basin style red-on-brown with nonmicaceous temper. Sherds too small and design elements too fragmentary to determine type.
Rincon Red (Sedentary period)	Middle Rincon subphase. Paste is coarse and granular, usually sand colored, generally nonmicaceous. Slip is a deep red and may occur on both interior and exterior. The surface is usually highly polished. The characteristic vessel shapes include outcurved and hemispherical bowls (Kelly et al. 1978).
Sacaton Red (Sedentary period)	Heavily red-slipped, well-polished interiors and hand-finished exteriors. Mottled surfaces from firing blemishes are usual. Vessel walls tend to be thick (average 6 mm). Carries a heavy amount of temper and much mica. Typical vessel shapes include outcurved, semi-flared-rim bowls, outcurved bowls, and incurved bowls (Haury 1976).
Unidentified red (not dated)	Brown paste with a red slip in various colors and finishes. Pieces are too small for diagnostic identification.
Rincon Polychrome (A.D. 1000–1075)	Painted and slipped variant of Rincon Red, also Middle Rincon subphase (Gregonis 1994). Red and black paint and white slip are found on the highly polished surface and may or may not appear on the interior and exterior surfaces (Arthur Vokes, personal communication, 2001).
Unidentified polychrome (not dated)	Brown paste with three colors of paint or slip, most commonly black, variations of red, and white. Sherds in the collection are too small for diagnostic identification.
Sacaton Red-on-buff (Sedentary period)	Contemporaneous with Rincon Red-on-brown. Represents the Gila Basin Tradition. The paste is buff colored, and paint is quite heavy. Temper usually consists of mica-schist or quartz. Surface pores are common. Design elements and brushwork are similar to that of Rincon Red-on-brown. Faint lines are commonly scratched in the decorative surface under the painted patterns. Vessel shapes include variable large bowls and jars with thick vessel walls (Haury 1976).
Unidentified red-on-buff (not dated)	Gila Basin style with nonlocal, nonmicaceous temper. Sherd too small and design elements too fragmentary to determine type.
Unidentified buff ware (not dated)	Nonlocal, nonmicaceous temper. Paste is chalky and porous. A light wash is apparent on both interior and exterior surfaces.
Cibola White Ware (A.D. 650–1325)	Paste color ranging from gray to white with sherd temper, or a combination of sherd and sand temper. Surface decorated with a black mineral paint (Mills et al. 1993).
Unidentified white ware (not dated)	Light gray to white paste with various temper types. Sherds too small for diagnostic interpretation.

Pottery Type (Date)	Description
Trincheras Purple-on-red (A.D. 700–1150)	Bichrome pottery produced in the Altar Valley in Sonora, Mexico, and possibly in southern Arizona. Characterized by a dense, brown paste, often with a carbon core. Decorations are primarily fine-line, elaborate designs, often incorporating a star in the layout. Designs resemble pottery from the Mogollon heartland and the San Simon Valley (Heckman et al. 2000).
Gila Plain, Gila Variety (pre-Classic period)	Plain ware characterized by micaceous sheen and patterned striations on the exterior; surface has high levels of muscovite mica, and the paste may or may not have added schist. Vessel forms include large storage jars, hemispherical and flare-rimmed bowls, seed jars, and scoops, with a high percentage of thin vessel walls (5 mm or less) (Haury 1965, 1976).
Plain ware (throughout sequence)	Variation of local pastes ranging from brown to red to sand in color. Temper consists of sand, crushed rock, or a mixture of both. A micaceous sheen is often present, and vessels are hand smoothed or polished.

RESULTS

The results are presented by provenience, focusing on wares and types, age of the feature as suggested by diagnostic types, and imported vs. local pottery.

Feature 1

Ten sherds were collected from Feature 1. Diagnostic pottery includes four Rincon Red-on-brown sherds that date to the Sedentary period of the Hohokam cultural sequence. The remaining six sherds are plain ware and could not be assigned to any specific date range.

Feature 2

Feature 2 yielded 1,044 sherds from fill, floor fill, and floor contexts (Tables 6–8). The majority are plain ware ($n = 740$), representing 70.9 percent of sherds collected from the feature. Sixty-two Gila Plain, Gila Variety sherds also were identified (6.1 percent of the feature collection). Painted ceramics representing the Tucson Basin include 11 Rillito Red-on-brown sherds (1.1 percent), 105 Rincon Red-on-brown sherds (10.1 percent), 20 Tanque Verde Red-on-brown sherds (1.9 percent), and 80 unidentified red-on-brown sherds (7.7 percent). Additionally, six Rincon Red sherds, one Rincon Polychrome sherd, and three unidentified polychrome sherds were collected, each accounting for less than one percent of the feature collection.

Painted ceramics from Feature 2 originating from outside the Tucson Basin include one Sacaton Red-on-buff sherd, seven unidentified red-on-buff sherds, one Sacaton Red sherd, one unidentified buff sherd, one Trincheras Purple-on-red sherd, one Cibola White Ware sherd, and two unidentified white ware sherds. Each of these types accounts for less than one percent. The Cibola White Ware sherd is a worked pendant blank. It was ground on three sides into a parallelogram shape, and the beginning of a drill hole is evident on the painted (interior) surface.

Three sherds from a single unfired vessel were collected from Feature 2. These pieces suggest pottery manufacture.

Table 6. Distribution of Ceramics Collected from the Fill of Feature 2

Type or Ware	Provenience									Total
	BHT 2	BHT 2 Back-dirt	TU 1, L 1	TU 1, L 2	NE ¼, L 1	NW ¼, L 1	SE ¼, L 1	SW ¼, L 1	Back-fill	
Plain Ware	1	–	44	5	171	19	196	52	–	488
Gila Plain, Gila variety	1	–	–	–	14	–	2	41	–	58
Unidentified white ware	–	–	–	–	–	–	–	2	–	2
Rillito Red-on-brown	–	–	–	–	3	–	1	3	–	7
Rincon Red-on-brown	8	1	2	1	7	–	8	1	1	29
Rincon Red	–	–	–	–	–	–	1	1	1	2
Rincon Polychrome	–	–	–	–	1	–	–	–	–	1
Tanque Verde Red-on-brown	–	–	2	–	1	–	3	7	–	13
Trincheras Purple-on-red	–	–	–	–	1	–	–	–	–	1
Unidentified red-on-brown	–	–	6	–	14	–	11	6	–	37
Unidentified red-on-buff	–	–	–	–	1	–	4	–	–	5
Unidentified polychrome	–	–	–	–	–	–	1	–	–	1
Unfired sherds	–	–	3	–	–	–	–	–	–	3
Total	10	1	57	6	213	19	226	113	1	647

Key: BHT = backhoe trench, TU = test unit, L = level.

Table 7. Distribution of Ceramics from Floor Fill of Feature 2

Type or Ware	Provenience					Total
	TU 1, L 3	NE ¼, L 2	NW ¼, L 2	SW ¼, L 2	SW ¼, L 2	
Plain ware	6	71	12	68	30	187
Gila Plain, Gila variety	2	–	–	2	–	4
Sacaton Red-on-buff	–	–	–	1	–	1
Hohokam Buff Ware	–	1	–	–	–	1
Rillito Red-on-brown	–	–	–	4	–	4
Rincon Red-on-brown	1	1	–	3	3	8
Rincon Red	–	2	–	1	1	4
Tanque Verde Red-on-brown	–	1	1	–	2	4
Unidentified red-on-brown	2	6	1	20	3	32
Unidentified red-on-buff	–	–	–	1	–	1
Unidentified polychrome	–	–	–	1	1	2
Total	11	82	14	101	40	248

Key: L = level, TU = test unit.

Table 8. Distribution of Ceramics from Floor Contact and Subfloor Features in Feature 2

Provenience	Type or Ware							Total
	Plain Ware	Rincon Red-on-brown	Sacaton Red	Tanque Verde Red-on-brown	Unidentified red-on-brown	Unidentified red-on-buff	Cibola White Ware	
General Floor Contact	3	2	–	–	1	–	–	6
PL 3	2	–	–	–	–	–	–	2
PL 4	4	–	–	–	–	–	–	4
PL 5	–	–	–	–	1	–	–	1
PL 6	1	–	–	–	–	–	–	1
PL 7	2	–	–	–	1	–	–	3
PL 8	4	–	–	–	–	–	–	4
PL 9	15	–	–	–	1	–	–	16
PL 10	2	1	–	–	–	–	–	3
PL 12	–	–	1	–	–	–	–	1
PL 13	1	–	–	–	1	–	–	2
Posthole G	2	–	–	–	–	–	–	2
SE ¼, posthole	–	–	–	–	–	–	1	1
Posthole fill	3	–	–	–	1	–	–	4
Feature 2.01	1	53	–	–	–	–	–	54
BHT 2, Feature 2.01	–	1	–	–	–	–	–	1
Feature 2.02	1	–	–	–	–	–	–	1
Feature 2.03, S½	23	1	–	3	5	–	–	32
Feature 2.05	1	10	–	–	–	1	–	12
Total	65	68	1	3	11	1	1	150

Key: BHT = backhoe trench, PL = point located.

In addition to the sherds, five reconstructible vessels (RVs) or partial vessels (PVs) were identified in Feature 2. RV 1 is a plain ware jar with a short, flared rim containing sand, some crushed rock, and mica temper. It has a rounded rim with an 18-cm aperture. Approximately three-fourths of the vessel is present. The temper appears to be local material. The exterior is polished. The PV was found in fill of the SW ¼, Level 1.

PV 2 is an unusual painted vessel that probably represents the local Tucson Basin series, although it could not be identified to type. Less than 25 percent of the vessel is present. It is a hemispherical bowl with sand and crushed-rock temper; the core is carbonized. The interior and exterior surfaces are painted; the execution is poor. The interior is decorated in Rincon style, and the exterior could be either Rincon style or Tanque Verde style, because the design is faded and difficult to see. The lip is painted. PV 2 has a rounded rim with an aperture of 16 cm. PV 2 was found inside RV 1. The PV was found in fill of the SW ¼, Level 1.

RV 3 is painted with another unusual design. Although it is typed as Rincon Red-on-brown, the design, slip, and paint are more in the Tanque Verde style than the Rincon style. The jar has a short, flared rim and a rounded lip; not enough of the rim was present to estimate the aperture. Twelve of the collected sherds were identified as Gila-shoulder pieces. The vessel contains crushed-rock temper. Approximately three-fourths of the vessel is present. Most of the vessel was found in Feature 2.02, although pieces were recovered elsewhere on the floor, from a backhoe trench cutting through the feature, and in TU 1.

PV 4 is a Rincon Red-on-brown, Style B hemispherical bowl with sand temper. The interior is painted and polished, the exterior is polished, and the lip is painted. The rim is rounded, and the aperture measures 28 cm. Less than 25 percent of the vessel is present. PV 4 was found in Feature 2.05.

PV 5 is a plain ware jar with sand, crushed rock, and mica temper. The exterior surface is polished, and the interior is hand smoothed. Fire clouding is present. Rim sherds were not large enough to determine rim shape or aperture. Less than 25 percent of the vessel is present. PV 5 was found in floor contact as PL 9 and 10.

The diagnostic ceramics suggest the fill of Feature 2 derived from occupation ranging from the Colonial to Classic periods of the Hohokam cultural sequence. The floor-contact sherds and those found in the subfeatures, along with the RVs and PVs from those contexts, provide stronger evidence for placing the use of the period in the late portion of the Rincon phase, perhaps overlapping into the early part of the Tanque Verde phase. RV 3 has design characteristics spanning both units of time. PV 4 also dates to the later part of the Rincon phase, and PV 5 has attributes of temper and surface finish that also suggest a late Rincon phase or early Classic period age. In addition, the intrusive wares suggest interactions with the Gila-Salt Basin, the Colorado Plateau, and Sonora, Mexico.

Feature 4

Nine sherds were collected from Feature 4. Eight were identified as plain ware and could not be assigned a specific date range. The remaining sherd was classified as Gila Plain, Gila Variety, which also cannot be dated to any specific time. The sherd is intrusive, as it originated from the Phoenix region, and is indicative of interactions with that area.

Feature 5

Seven plain ware sherds and one Rincon Red-on-brown sherd were collected from Feature 5. The diagnostic sherd suggests that this feature dates to the Sedentary period of the Hohokam cultural sequence.

Feature 6

Two plain ware sherds and one unidentified red-on-brown sherd were collected from Feature 6. None of these sherds is diagnostic. Therefore, no dates can be assigned to the feature.

Feature 9

Feature 9 yielded 46 sherds. Two Rincon Red-on-brown sherds, one Sacaton Red-on-buff sherd, and five Tanque Verde Red-on-brown sherds represent the diagnostic ceramics from the feature.

The Rincon Red-on-brown and Sacaton Red-on-buff sherds date to the Sedentary period. The Tanque Verde Red-on-brown sherds date to the Classic period. The diagnostic sherds suggest an age range from the Sedentary to the Classic periods of the Hohokam cultural sequence. Feature 9 also yielded 35 plain ware sherds and three Gila Plain, Gila Variety sherds. The Sacaton Red-on-buff and Gila Plain, Gila Variety sherds are intrusive wares, indicating interaction with the Gila-Salt Basin.

Feature 11

Only one plain ware sherd was collected from Feature 11. Because no diagnostic sherds were present, dates could not be assigned to the feature.

Feature 15

Seventeen sherds were collected from Feature 15. Diagnostic sherds include one Rincon Red-on-brown sherd and one Rincon Red sherd, both of which date to the Sedentary period of the Hohokam cultural sequence. The remaining sherds include 13 plain ware sherds and two unidentified red-on-brown sherds.

Feature 16/17

Originally, it was thought that Features 16 and 17 were separate features, but closer analysis revealed that they were actually a single feature. A total of 32 plain ware sherds, five unidentified red-on-brown sherds, and two Tanque Verde Red-on-brown sherds was recovered from the portion of the feature originally designated Feature 16. The sherds collected from this part of the feature suggest a date falling within the Classic period.

In total, 34 sherds were collected from the portion of the feature originally designated Feature 17. Diagnostic sherds include one Rillito Red-on-brown sherd and four Rincon Red-on-brown sherds, suggesting a date range from the Colonial through the Sedentary period. The remaining ceramics include 25 plain ware sherds and four indeterminate red-on-brown sherds.

Feature 18

Feature 18 produced 31 sherds, consisting of 23 plain ware sherds, three unidentified red-on-brown sherds, and five unidentified red ware sherds. Because Feature 18 was a historic feature within the cavalry band kitchen area, it is presumed that these sherds either were redeposited by natural processes or discarded within the feature by someone who had collected the sherds in historic times. It also is possible that the sherds originated from the fallen adobe wall within the feature, as Hohokam sherds are known to have been used in the adobe mud in several of the other fort buildings (Gregonis 1997:5–6).

Surface Collection and Trench Fill

A total of 167 sherds was collected from the surface of the site and the backfill of the trenches (Table 9). The surface collection included 10 plain ware sherds and four unidentified red ware sherds. A broken figurine was also found on the surface. Only the body of the figure was present; the head and appendages had broken off. It also is possible that this object is a broken effigy handle, given its curved surface.

Table 9. Distribution of Ceramics Collected from Backhoe Trenches and Backdirt

Type or Ware	Provenience					Total
	BHT along Craycroft Road	BHT 2 Scrape	BHT 2 Backdirt Sample	Main Trench, IO 3	Utility Fill Dirt	
Plain ware	2	53	14	1	54	124
Gila Plain, Gila variety	–	–	1	–	1	2
Rincon Red-on-brown	–	3	4	1	3	11
Rincon Red	1	2	–	–	–	3
Tanque Verde Red-on-brown	–	3	–	–	2	5
Unidentified red-on-brown	–	13	–	–	5	18
Unfired sherds	4	–	–	–	–	4
Total	7	74	19	2	65	167

Key: BHT = backhoe trench, IO = isolated occurrence.

Ceramics collected from the fill and backdirt of the trenches include 125 plain ware sherds, two Gila Plain, Gila Variety sherds, 11 Rincon Red-on-brown sherds, five Tanque Verde Red-on-brown sherds, 18 indeterminate red-on-brown sherds, and three Rincon Red sherds. No sherds could be definitively associated with features. Five unfired clay sherds also were collected from the backhoe trenches.

DISCUSSION

The ceramics collected from Tierra's monitoring at the Hardy site are similar to those collected from previous projects. Excavations conducted between 1976 and 1978 by the ASM yielded many of the same types of ceramics in similar percentages (Gregonis 1997). Rincon Red-on-brown is the most frequent painted type, followed by Tanque Verde Red-on-brown and Rillito Red-on-brown. Similar trade wares were also collected during previous research, including Trincheras series sherds from Sonora. Because Tierra's project was limited to a specific area, was a monitoring rather than data recovery project, and produced a small collection, the recovered ceramics did not contain the variety of ceramic types seen in the previous projects. For example, the collection does not contain the earlier types identified during previous work, such as Sweetwater and Snaketown phase ceramics.

The unfired clay sherds imply some ceramic manufacture at the Hardy settlement, correlating with other evidence including polishing stones, one of which was stained with hematite pigment, and a piece of hematite from Feature 2.

CHAPTER 7

PREHISTORIC FLAKED AND GROUND STONE ARTIFACTS

Karin Olsson

This chapter considers the prehistoric flaked stone and ground stone artifacts collected during Tierra's project. Each artifact class is discussed separately.

FLAKED STONE ARTIFACTS

Fifteen flaked stone tools and 216 pieces of debitage were collected during the project. A large percentage of tools and debitage was recovered from the fill and floor fill of Feature 2. Ceramics recovered from this feature suggest that it was inhabited mainly during the Hohokam Sedentary period (A.D. 950–1150), with a few sherds dating to the Rillito phase of the Colonial period and the Tanque Verde phase of the Classic period (see Chapter 6, this report). Several stone artifacts were found in other features, and some were found on the surface or in the backhoe trenches.

Because only one prehistoric feature, Feature 2, was excavated, and the major part of the material came from weak contexts, the flaked stone material recovered during the monitoring project cannot be used to determine lithic-reduction technology or raw-material use for the settlement as a whole.

Attributes examined during the analysis included platform characteristics, cortex, raw material, edge angle, edge shape, location of retouch, and size. The debitage was analyzed using categories developed by Sullivan and Rozen (1985). Utilization of flakes can be difficult to determine and differentiate from accidental breakage on coarse lithic materials, especially if they are found on the surface or in backhoe trenches, as was the case with many flakes that were collected. For this reason, and because they do not have any retouch, utilized flakes were not considered formal tools.

Previous excavations at the Hardy site were conducted by the Arizona State Museum (ASM) (Gregonis et al. 1997). The artifacts from these excavations were analyzed and described in the report, but no conclusions or interpretations were made. The flaked stone collection from that project included 43 projectile points, 11 bifaces, 22 unifacially retouched tools, 23 utilized flakes, 46 cores, 56 hammerstones, 4 hammerstone fragments, and more than 9,000 pieces of debitage. Locally available raw materials were most common (Reinhard 1997). Because the previous and current collections were studied with different criteria, comparisons are difficult. The vast difference in the size of the collection also precludes meaningful comparisons. Because of these difficulties, the collection from the TEP utility-trench monitoring is considered as contributing information toward understanding lithic technology at the Hardy site.

Tools

Fifteen flaked stone tools were recovered (Table 10). These include two chopping tools, two composite scrapers, three composite tools, five denticulates, one drill, one notch, and one side scraper (see Appendix A).

Table 10. Flaked Stone Tools

Tool Type	Feature/Unit	Level/Context	Raw Material
Chopping tool	Feature 2	floor	basalt
Chopping tool	Feature 9	–	basalt
Composite scraper	BHT	–	basalt
Composite scraper	Feature 16	–	basalt
Composite tool (scraper/scraper)	–	surface collection	basalt
Composite tool (scraper/scraper)	Feature 18	backdirt	quartzite
Composite tool (scraper/notch)	Feature 2	1	quartzite
Core/denticulate	Feature 7	BHT fill	basalt
Denticulate	Feature 2	2	basalt
Denticulate	Feature 2	1	quartzite
Denticulate	Feature 6	BHT fill	quartzite
Denticulate	Feature 2	1	basalt
Drill	Feature 18	1	rhyolite
Notch	Feature 2	1	quartzite
Side scraper	Feature 18	4	quartzite

Key: BHT = backhoe trench.

The composite tools included one scraper/notch and two scrapers with discontinuous, unifacial retouch on two or more edges, also called multiple-edge scrapers. One scraper (more precisely described as a core scraper) was a basalt river pebble that had been pecked to shape and retouched at several places along all edges. It had both convex and concave edges. The implement measured 4.74 cm long, 2.18 cm wide, and 0.95 cm thick. The other scraper had very little retouch on two edges. It had one straight and one convex edge. The scraper/notch had continuous, unifacial retouch on the distal edge and one lateral edge. The notch was on the lower lateral end. It showed some signs of wear.

The drill was made of dark gray, fine-grained rhyolite. It did not have signs of extensive wear. The notch was made of greenish quartzite. The retouch was on the distal end of the flake. It measured 3.2 cm long, 3.61 cm wide, and 1.32 cm thick. The side scraper (or core scraper) was made from a quartzite river cobble that had been burned on three sides. It had continuous, unifacial retouch on one edge. It had signs of wear on this edge and also some hand wear. It was 9.29 cm long, 5.48 cm wide, and 5.2 cm thick.

Quartzite, basalt, and rhyolite were the materials preferred for producing flaked stone tools. The greenish quartzite, rhyolite and basalt are relatively fine-grained materials. Several tools were made from smooth river cobbles that may have been slightly polished. Quartzite and to a lesser degree basalt can be found in the beds of Tanque Verde and Pantano Creeks. The confluence of these creeks is approximately 0.6 mile north of the Hardy site.

Chopping tools are primarily associated with chopping wood or bone. The denticulates, notches, scrapers and the drill were probably used for plant or fiber processing or working wood, bone, antler or hide.

Debitage, Cores, and Hammerstones

Tierra recovered 216 pieces of debitage, including 85 complete flakes (39 percent of the debitage), 31 proximal flakes (14 percent), 33 flake fragments (15 percent), and 58 pieces of debris (27 percent). Six cores or core fragments and three cobble hammerstones were also recovered. Twenty-one platforms (18 percent) were lipped, and 18 (15.5 percent) were prepared. Twenty-seven complete flakes (32 percent) had no cortex, 54 percent had less than 50 percent cortex, and 14 percent had between 50 and 100 percent cortex. A large portion of the debitage had been utilized.

The presence of the cores and hammerstones indicates that core reduction took place at the settlement. This is also suggested by the relatively large flake size: an average length of 3.28 cm, an average width of 2.77 cm, and an average thickness of 0.81 cm. The relatively even distribution of proximal flakes, flake fragments, and debris and the large number of flakes with little or no cortex shows that core reduction and secondary reduction–tool production were carried out, although the relatively low percentage of flakes with greater than 50 percent cortex suggests that the emphasis was on secondary reduction. Lipped platforms are associated with soft-hammer percussion, which in turn is associated with tool manufacture.

The debitage consisted primarily of quartzite and basalt (43 and 31 percent, respectively). It also included rhyolite (18 percent) and andesite, limestone, quartz, sandstone, chert, and indeterminate materials (8 percent). Quartzite can be found as river cobbles in Pantano and Tanque Verde Creeks, and many forms of basalt and rhyolite are found in the Tucson Basin. This indicates that local materials were used, particular those collected in the immediate vicinity of the settlement.

Discussion

Archaeologists generally assume that the Hohokam spent a minimum of time and effort on producing flaked stone tools. Flaked stone from other Hohokam habitation sites in the Tucson Basin (see Eppley 1986; Graff 1985) most often include a large number of complete flakes, utilized flakes with no further retouch, and tools with a limited amount of retouch. Locally available raw materials were preferred. The same can be said for the flaked stone recovered during this project. The tools have a minimal amount of retouch, and a large number of unretouched flakes appear to have been utilized.

Quartzite was the predominant raw material, and it varied in color and quality. A very fine-grained, green quartzite was used for a number of tools. Other raw materials were basalt and rhyolite, which are also common in the Tucson Basin. Several tools were made from smooth river cobbles.

The tools found during this project were used for hide processing (fresh and dry); working wood, bone, or antler; and plant or fiber processing. These were common activities at Hohokam habitations. The diversity of activities reflected in the flaked tools may indicate village-level occupation intensity.

GROUND AND TABULAR STONE ARTIFACTS

Thirteen ground stone tools or tool fragments, three ornaments, and eight indeterminate fragments were recovered (Table 11). Fifteen ground stone tools were found in Feature 2. Two tools and six indeterminate fragments were on the floor; one tool was in the floor fill. One tool fragment was found in Feature 15, an extramural prehistoric surface. Ceramics associated with this feature suggest a Sedentary period age. The indeterminate fragments were also recovered in Feature 2.

Artifacts representing food processing were relatively scarce (19 percent). One possible netherstone fragment was found, also in Feature 2, but it could not be determined how the artifact had been used. Two manos and two mano fragments were found in Feature 2. One vesicular-basalt mano appeared to have been used on a hard surface. It measured 16.5 cm long, 9.35 cm wide, and 5.54 cm thick and had a convex surface. The wear level was moderate, and it may have been reworked. The mano had wear facets on both ends, which suggests that it was used with a trough metate. The second complete mano was loaf shaped, with only one worn facet. It was 22 cm long, 10.3 cm wide, and 7.3 cm thick. The wear level was moderate. This mano was made of a quartzite river cobble that had been pecked to shape along the edges; the implement was burned. The two mano fragments were from the same implement. It had a flat surface, moderate wear and appeared to have been reworked. The manos had probably been used on hard surfaces (i.e., metates) for grinding corn or other seeds. None had any traces of pigment.

Three tabular tool fragments were found. Two fragments, from a highly polished, tabular tool made of black basalt, were found in the fill of Feature 2. The tool was heavily worn.

Table 11. Ground Stone Tools

Tool Type	Condition	Provenience	Level	Raw Material
Bead blank	complete	Feature 2	1	indeterminate
Bead blank	complete	Feature 2	–	indeterminate
Hand stone	fragment	Feature 2	backhoe scrape	indeterminate
Hand stone	fragment	Feature 15	backhoe scrape	quartzite
Mano	complete	Feature 2	backhoe scrape	quartzite
Mano	complete	Feature 2	1	vesicular basalt
Mano	fragment	Feature 2	1	quartzite
Mano	fragment	Feature 2	1	quartzite
Plug	complete	Feature 2	1	indeterminate
Polishing stone	complete	Feature 2	1	indeterminate
Polishing stone	complete	Feature 2	1	indeterminate
Polishing stone	complete	Feature 2	floor	indeterminate
Polishing stone	complete	Feature 2	2	basalt
Polishing stone	complete	Feature 2	floor	basalt
Polishing stone	fragment	Feature 2	1	quartzite
Polishing stone	fragment	Feature 2	backhoe scrape	quartzite

Another tabular tool made of an indeterminate metasedimentary material was found in the fill of Feature 5, a pit structure dating to the Hohokam Sedentary period. It measured 7.5 cm long, 4.22 cm wide, and 0.39 cm thick, and had a rounded (shaped) edge. It showed no signs of wear.

Seven polishing stones were found. These varied from two to nine centimeters in size. One had pigment residue and was found on the floor of Feature 2. It was more or less round and polished smooth on all surfaces. Two surfaces appear to have been used. Most of the polishing stones are heavily worn. Polishing stones are generally associated with the production of pottery, wood or bone items. They can also be used to apply plaster to walls or floors (Adams 1997:33). Three sherds of an unfired ceramic vessel were found in Feature 2 (see Chapter 6, this report). This suggests that pottery was being produced on-site and possibly also in or near the pit structure.

Two possible bead blanks and one plug (possibly used as ear or nose jewelry) were found in Feature 2. The bead blanks were small, rounded stones (less than 0.5 cm in diameter) of indeterminate raw material that appeared to have been heated. The plug measured 1.5 cm long and 1.05 cm in diameter and was slightly curved.

Discussion

With one exception, the ground stone tools and fragments were found in a single feature, Feature 2, a pit structure. Two tools and six indeterminate fragments were recovered from the floor; one tool was found in the floor fill. One indeterminate hand-stone fragment was found in Feature 15, an extramural surface.

A relatively small number of the tools were used for food processing. These are moderately worn and might have been reshaped not long before they were deposited. Only one possible netherstone fragment was found in comparison to three manos. Polishing stones constitute a proportionately large part of the collection. These artifacts usually are representative of pottery production. One had traces of red-pigment residue. Red paint was used for painting pottery and probably also for painting other objects and body decoration. It is possible that Feature 2 was used for pottery production, among other tasks. The unfired sherds found in the feature support this inference.

SUMMARY OF THE FLAKED AND GROUND STONE ARTIFACTS

Several research questions were posed in the original plan of work for the project (Fratt and Huntington 2001). These question included chronology, subsistence, and trade and exchange (see Chapter 3).

The lithic collection was not useful for addressing the issue of chronology, other than it is representative of the flaked and ground stone artifacts typically associated with the Hohokam occupation of southern Arizona. The lithic artifacts also are consistent with the inferred Rincon phase occupation of the site.

Evidence for subsistence activities was only slightly better represented. The flaked and ground stone artifacts suggest specialized activities (typically observed at villages) as well as activities related to subsistence. These may have included harvesting of agave and other plants; plant-fiber processing; working bone, antler, and hide; ceramic production; ornament manufacture; and food processing. A trough mano and use of vesicular basalt in the ground stone tools imply an emphasis on maize rather than wild-seed processing. The flaked stone artifacts indicate core reduction, secondary

reduction, and tool manufacture. Most of these artifacts entered the archaeological record as secondary refuse, with the exception of those found on the floor of Feature 2.

No obsidian was observed, and therefore no inferences can be made regarding regional trade and exchange. The raw materials are locally available, although the volcanic materials may have been obtained in the Tucson Mountains. One small nodule of azurite was recovered from the fill of Feature 2, and hematite (ochre) was found on the floor of the same feature. Azurite is available in the Rincon, Santa Catalina, and Tucson Mountains and was also found in relative abundance at the Tanque Verde Wash site, located about 6 miles east of the Hardy site (Elson 1986). Hematite is used to make pigment and may represent another bit of evidence suggesting ceramic manufacture.

CHAPTER 8

FAUNAL REMAINS

Michael D. Cook

The majority of the faunal remains Tierra recovered from AZ BB:9:40(ASM) and discussed here¹ derived from one feature: Feature 18, a historic trash midden located in the Band Quarters Kitchen complex. Faunal remains from the Feature 18 units and levels have been combined here and analyzed as one unit. The Band Quarters Kitchen complex was occupied by at least three groups: the U.S. Army, a later Mexican immigrant community of El Fuerte (Turner 1982), and a still later Euroamerican farming community. The primary goal of the faunal analysis was to determine which of these groups deposited the animal remains based on possible differences in consumption and disposal between the groups. This goal was attained by identifying what animal species were consumed, what cuts of beef were present, and how the animals were butchered. This information was combined with taphonomic data (weathering, breakage patterns, root etching, bone preservation) to interpret cultural affiliations.

MATERIALS AND METHODS

Tierra collected 259 specimens from Feature 18. All were analyzed. Many specimens could not be identified to skeletal element or taxon (38 percent), with the remainder (62 percent) identifiable to at least some basic skeletal element. Where possible, each specimen was identified to skeletal element, element part, taxon, age, and side, using modern faunal comparative collections at the Western Archeological and Conservation Center, Tucson, Arizona, and the Arizona State Museum. For all specimens, surface modifications and fracture features were recorded. These modifications included butchering marks, chewing, burning, weathering, and root etching. Where evident, bone breakage (not caused by butchering) was recorded as dry (old) or green (fresh). The relative abundance of taxa was calculated using the number of identified specimens (NISP) and the minimum number of individuals (MNI). Frequencies of skeletal element and skeletal part were also calculated. These data were employed to reconstruct patterns of animal consumption, including the variety and relative importance of the animals consumed, the butchering methods used, and the relative percentages of meat cuts. These patterns were used to infer possible socioeconomic and cultural affiliations of those who prepared, consumed, and discarded the remains of the animals.

RESULTS

Taxonomic Representation

At least two species were represented (Table 11): cow (*Bos taurus*) and domestic sheep/goat (*Ovis/Capra* sp.). Small fragments and lack of diagnostic features hindered the taxonomic identification of many specimens, and some were identified only by size class: small, small to medium, medium, medium to large, or large (n = 46). Others could not be identified to any taxonomic or size class (given the site context and the dominance of cow in the collection, many of these specimens probably are cow). A total of 105 specimens was unidentifiable to class, and another 15 specimens were not identifiable beyond the category of mammal.

¹ Faunal remains from Feature 2 consist only of three small, unidentifiable bone fragments, insufficient for accurate analysis and interpretation.

Table 11. Taxonomic Representation

Taxon or Size Class	NISP	MNI	% MNI
<i>Bos taurus</i> (domestic cow)	83	5	83
Medium to large mammal	19	–	–
Large mammal	18	–	–
Small mammal	5	–	–
<i>Ovis/Capra</i> sp. (sheep/goat)	4	1	17
Small-to-medium mammal	2	–	–
Medium mammal	2	–	–
Artiodactyl	5	–	–

Key: MNI = minimum number of individuals; NISP = number identified specimens.

The collection was clearly dominated by *Bos taurus*, which was represented by at least five individuals² (MNI = 5; NISP = 83). The only other species represented was sheep/goat (*Ovis/Capra* sp.) with an MNI of one (NISP = 4). The dominance of cow in terms of MNI suggests a preference for beef over other available, domestic-animal food sources, such as sheep/goat, pig, or chicken. The residents also seem to have relied primarily on domestic animals, although it is possible that some of the small-mammal and medium-mammal size class specimens, as well as the indeterminate artiodactyls pieces, represent wild animals such as deer or rabbit.

Skeletal Element Representation

Sixty-two percent of the specimens (n = 158) were identifiable to at least some basic skeletal element. For all identified specimens, the most common elements were long-bone shaft fragments (n = 34), ribs (n = 30), and vertebrae (n = 21). For specimens identified as *Bos taurus*, the skeletal part representation is listed in Table 12. The relative skeletal element representation of *Bos taurus* specimens was directly associated with specific butchering units, discussed below. *Ovis/Capra* was represented by one individual, with a distal humerus, proximal ulna and proximal radius all belonging to the same juvenile individual (and a juvenile femur most likely from that same individual). This indicates that sheep/goats were consumed to a minimal extent.

Butchering

Application of known cattle-butcher techniques and standard cuts of beef from the late nineteenth and early twentieth centuries provided evidence for determining the socioeconomic and ethnic affiliation of the people who discarded the animal remains in Feature 18 of the Band Quarters Kitchen complex. This area was occupied by military personnel during the 1870s and 1880s and after the fort's abandonment in 1891, was reoccupied by Mexican immigrants. Later, the area was settled by Euroamerican farmers. Identification of butchering practices and consumption preferences suggested a link between the recovered faunal remains and the Mexican occupants.

² The MNI of five for *Bos taurus* is based on two whole left juvenile astraguli, one left juvenile astragalus fragment, three left distal juvenile tibia fragments, and two left adult pelvi.

Table 12. Skeletal Elements Represented in *Bos taurus* Specimens

Skeletal Element	Number
Rib	20
Vertebra	13
Pelvis	13
Tibia	12
Podial	11
Humerus	8
Femur	3
Phalanx	1
Scapula	1
Radius	1

Two factors were keys to this interpretation: (1) the type of cut used to disassemble the animal carcass (e.g., saw or knife); and (2) the resulting butchering unit (meat cut). Other factors, such as presence and degree of burning and the slaughtering ages of the cattle, provided supplemental evidence.

The modern industry of meat processing began in the late-nineteenth century and began with the butchering of cattle carcasses into primary (wholesale) cuts and secondary (retail) cuts (Chapin-Pyritz and Mabry 1994:154). The initial stage of processing into primary butchering units was most likely done inside a local slaughterhouse and the next stage producing smaller, individual cuts was probably carried out inside retail butcher shops in Tucson (Chapin-Pyritz and Mabry 1994:154). These two processes produce different skeletal elements and modifications (e.g., saw cuts in different areas).

Saw marks produced by this butchering process indicate a clear connection between discarded, sawed bones and the butchering that produced them. Saw marks are identified as irregular, somewhat parallel striations from a metal saw blade that was moved repeatedly across the bone surface (Chapin-Pyritz and Mabry 1994:154) and result when the carcass is disarticulated and carved into specific retail cuts (Crader 1990; Szuter 1985). Two other cattle-disarticulating methods were used in the late-nineteenth and early-twentieth centuries: chopping by cleavers and hand cuts with metal knives. In the Southwest, Mexicans traditionally used cleavers for this purpose, whereas Euroamerican butchers preferred handsaws (Chapin-Pyritz and Mabry 1994:155). Hand cuts with metal knives appear as straight, thin lines with few or no visible cross sections (Chapin-Pyritz and Mabry 1994:154). These knife cuts appear when meat is cut from the bone or when joints are separated (Chapin-Pyritz and Mabry 1994:154).

Sixty-eight specimens³ (26 percent) had at least one saw cut, including 10 specimens with two or more saw cuts each. Only three specimens (1 percent) displayed metal knife cuts (two rib-shaft fragments and a distal tibia). These three knife-cut specimens also had been saw cut. The knife cuts may represent additional food preparation by the consumers. The relative dominance of saw-cut

³ Many of the specimens without saw cuts were small fragments that had broken after discard and deposition. These specimens may have fractured from a saw-cut specimen after discard.

bones indicates that most, if not all, of the cattle remains had been preprocessed before being purchased by the consumers. The saw-cut specimens were mostly large pieces, indicating a whole section had been purchased and the meat then cut from the bone at home. Two small, saw-cut specimens also were present, however. These were circular, humerus mid-shaft sections (arm butchering unit) that most likely represented steaks or soup bones.

Based on the sawing, it is likely that the cattle had been butchered inside a local slaughterhouse or retail butcher shop. This allowed many specimens to be assigned to a particular cut of meat based on 15 types of standard butchering units (Chapin-Pyritz and Mabry 1994:155). The relative values of these meat cuts (Manning 1905) were then used to suggest the possible economic status of the consumers. Standard butchering units and relative values are shown in Figure 14.

Sixty-four specimens were accurately assigned to a meat cut. The most common cut was hindshank (n = 23), accounting for 36 percent of the identifiable cuts. Other common cuts included arm (n = 7; 10 percent), rib (n = 8; 12 percent), and rump (n = 9; 14 percent). Three of the least valuable meat cuts (hindshank, arm, and foreshank, ranked at 7, 8 and 9, respectively by Manning (1905) accounted for more than half (53 percent) of the cuts. Conversely, the most valuable cuts represented only 28 percent of the total cuts (12 percent rib, 9 percent sirloin, and 6 percent short loin).

The preference for lower-quality and less-valuable meat cuts may suggest a relatively lower economic status for the consumers (Table 13). Furthermore, foot and lower-leg bones (e.g., foreshank and hindshank cuts) are often found at sites occupied by Hispanics and were used in traditional Mexican dishes such as menudo (Thiel and Faught 1994:209). Hindshank and foreshank cuts represent 42 percent of all identified cuts in Feature 18, suggesting that the consumers of the cattle and the people who discarded the bone refuse at the Band Quarters Kitchen complex were more likely of Mexican rather than Euroamerican ethnicity. However, it is equally likely that enlisted soldiers were consuming lower-quality meats provided by local butchers, possibly for use in soups or stews. More importantly, the high percentage of lower-quality meat cuts may be an artifact of a small sample size. Huntington's (1982) limited work in Feature 18 recovered a greater percentage of higher-quality meat cuts, including ribs, chuck and rump.

Slaughtering Ages

Determination of age was based on relative epiphyseal fusion (Silver 1963). Relative ages (adult/juvenile) were calculated by listing all elements with ossification centers and scoring these centers as fused, unfused, or showing an epiphyseal line. If epiphyses or other age-diagnostic features were not present on a specimen, it was scored as indeterminate. Most specimens (82 percent) were indeterminate as to age (Table 14). Of those showing diagnostic aging features (n = 46), 32 had unfused epiphyses, two still retained epiphyseal lines, and only seven were fused. Five additional specimens were determined to be juvenile (despite lacking epiphyseal features) based on their clear articulation and association with other juvenile specimens. In total, there were 39 juvenile specimens.

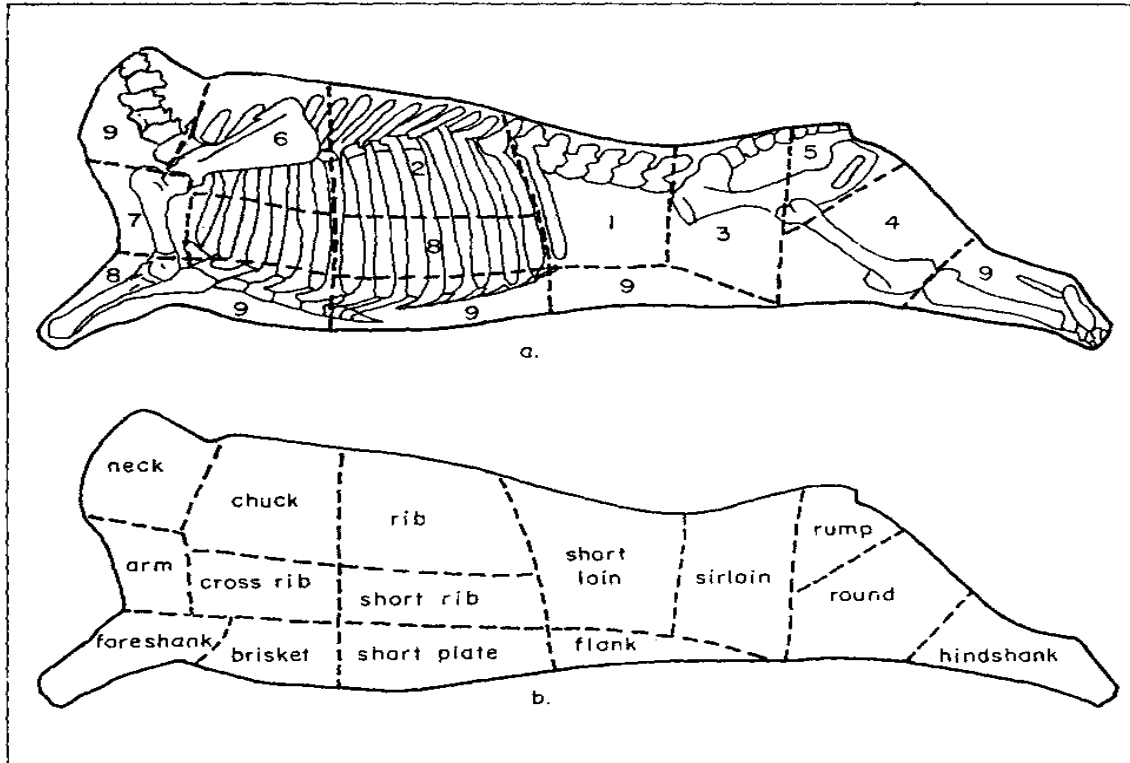


Figure 14. Standard cattle-butchering units and relative values; (a) turn-of-the-twentieth-century rankings (Manning 1905); (b) names of beef-butchering units (Chapin-Pyritz and Mabry 1994:155).

Table 13. *Bos taurus* Remains by Standard Cattle-Butchering Units

Butchering Unit	Value	Number	%
High-value units	–	18	28
Short loin	1	4	6
Rib	2	8	12
Sirloin	3	6	9
Intermediate-value units	–	12	18
Round	4	2	3
Rump	5	9	14
Chuck	6	1	1
Low-value units	–	34	53
Arm	7	7	10
Foreshank	8	4	6
Hindshank	9	23	36

Table 14. *Bos taurus* Remains by Slaughtering Age.

Age Diagnostic	Number	% Total	% Diagnostic
Indeterminate	213	82	–
Age Diagnostic	46	18	–
Unfused	32	15	69
Epiphyseal line	2	–	5
Fused	7	3	15
Other juvenile	5	1	11
Total juveniles	39	15	85

Young cattle were often sent to fatten at the slaughterhouse before butchering. Thus, the predominance of juvenile cattle supports the conclusion that these animals had been butchered at a slaughterhouse. However, there were seven *Bos taurus* specimens that were fused. Of these, five specimens were at least three to four years old⁴, and two others were at least one to two years of age⁵. The older age of these slaughtered cattle may relate to an economic decision by the consumer to purchase older-aged beef, which may have been less costly.

Burning

Presence and degree of burning were recorded and categorized as smudged, burned, or calcined. Smudged bones showed only minor burning on part of the specimen. Burnt bones were completely burned (black), and calcined were heavily burned (white/gray). Ninety-eight specimens (37 percent) showed some degree of burning. These included 32 smudged, 42 burned, and 24 calcined specimens. The burning most likely represents modification from cooking. The heavily burned bones (calcined) may represent prolonged burning after removal of meat and discard; however, the fact that much of the collection was not burned also could indicate that the animal remains may not have been purposely burned in the trash midden as a disposal process.

Chewing

Five specimens showed possible carnivore chewing. All were saw-cut, rib-shaft fragments of *Bos taurus*. Chewing was most likely by domestic pets (dogs) or nearby wild carnivores with access to the remains after human consumption.

Breakage Patterns

Fragmented bone ends that showed no evidence of human butchering (e.g., cut, chop, saw) were scored as having either dry or green breaks, although many highly fragmented specimens or those lacking cortical surface could not be scored. Several features were used to determine whether a bone was broken when fresh/green (at or near the animal's death and consumption) or when dried (long after discard or burial). These breakage patterns may indicate that animals could have been processed for consumption by means other than cutting, sawing, or chopping, such as tearing. Other patterns indicate taphonomic factors, such as postdepositional destruction, which may affect relative abundance of taxa and elements.

⁴ Two proximal humeri, one distal humeri, and two pelvi.

⁵ One distal radius and one distal tibia.

Breakage patterns were scored for 116 bone ends, resulting in 98 dry breaks and 18 green breaks. This indicates that much of the bone breakage caused by factors other than butchering was postdepositional in nature. In fact, many specimens representing dry breaks were small (often unidentifiable) fragments that most likely eroded from larger, diagnostic specimens after discard and burial. When possible, these specimens were pieced together and recorded as one specimen. These small, unidentifiable specimens are unlikely to have affected the interpretations (most data were assessed first with and then without these specimens included). Hence, the effect of postdepositional destruction on the taphonomic interpretations of this assemblage was minimal.

Weathering

Each skeletal element was observed for presence and degree of weathering using the methods put forth by Behrensmyer (1978). Most specimens (75 percent) showed no evidence of weathering, and 24 percent showed slight weathering. Only five specimens displayed a heavy degree of weathering. The general lack of weathering indicates that the animal remains may have been buried at or near the time of their disposal. Root etching was present on 37 specimens (14 percent), indicating some postdepositional bone-surface modification. However, most root etching was minimal and did not interfere with the identification of surface modification features.

INTERPRETATIONS AND CONCLUSIONS

Although much of the foregoing analysis is relatively straightforward, the small sample size may have affected overall interpretations, and further excavations may alter or add to these interpretations. Based on the faunal remains analyzed in this study, several conclusions can be made. The occupants or consumers who deposited the animal remains in the Feature 18 trash midden at the Fort Lowell Band Quarters Kitchen complex were relying mostly on domestic cattle for animal food resources, particularly cow (*Bos taurus*). The predominance of saw-cut cattle bones cut into standard butchering units clearly indicates preprocessed butchering inside a local slaughterhouse or retail butcher shop.

The high percentage of low-value cattle butchering units may suggest an economic decision to purchase less costly cuts of cattle and may be related to the economic status of these consumers. More importantly, the high proportion of lower-leg and foot bones of cattle (e.g., hindshank butchering units) could indicate a preference for these cuts in traditional Mexican dishes. In conclusion, these interpretations are most consistent with the consumption of animals by the Mexican immigrant community of El Fuerte who occupied the fort area after its abandonment by the U.S. Army in 1891. However, this interpretation is greatly inhibited by a small sample size and limited understanding of the rationing practices of the soldiers at the fort. Further archaeological investigation of the feature and archival research regarding meat consumption practices of the enlisted soldiers specific to the Band Quarters may elicit a better understanding of the foodways of the various inhabitants of the Band Quarters Kitchen complex.

CHAPTER 9

SHELL ARTIFACTS

Jeffrey T. Jones

This chapter presents an analysis of marine and freshwater shell artifacts recovered during limited excavations at the Hardy site, AZ BB:9:14(ASM), a prehistoric Hohokam village within the Fort Lowell Multiple Resource Area (MRA). The shell artifacts were collected from Feature 2, a pit structure likely occupied during the Sedentary period of the Hohokam cultural sequence (see Chapter 4).

GENERA AND SPECIES

The shell nomenclature and biological determinations were made according to Keen's *Sea Shells of Tropical West America* (1971) and Bequaert and Milles's *The Mollusks of the Arid Southwest* (1973). Two sources of shell were available to the prehistoric inhabitants of southern Arizona: marine shell from the Pacific Coast of California and the Gulf of California, and freshwater and terrestrial mollusks that were common to the rivers and streams throughout southern Arizona (Vokes 2005). One marine genus and one freshwater genus were identified in the Hardy site collection (Table 15). All specimens were unworked fragments, and all were found in Feature 2.

Marine Shell

The single marine-shell artifact is an unworked fragment of *Laevicardium elatum*, a species found in the Gulf of California and the Pacific Coast. Although little can be said about a single shell artifact, its presence in the Tucson Basin does allow the analyst to speculate on where it came from and how it may have arrived in the eastern Tucson Basin. Previous research has demonstrated that the Hohokam were actively involved in a complex exchange of shell material. Howard (1993:328) stated that in southern Arizona, "a complex system of interregional interactions existed in which the procurement, production, and distribution of raw shell and finished shell ornaments occurred and changed through time."

Survey projects and data recovery investigations conducted in the 1960s and 1970s in the western Papaguería revealed shell-trade routes that stretched from the Gulf of California into the Hohokam region (Fontana 1965; Rosenthal 1978). Raw-shell material may have been transported from the Gulf to such Papaguería sites as Lost City, Verbena Village, and those located in the Quijotoa Valley, where evidence for extensive ornament production indicates long-standing shell-production activities.

Table 15. Shell Artifacts from Feature 2

Feature	FN	Horizontal Context	Vertical Context	Species	Number	MNI
2	15	—	Level 1	<i>Anodonta californiensis</i>	10	1
2	49	SW ¼	Level 2	<i>Anodonta californiensis</i>	3	1
2	81	SE ¼	Level 2, floor fill	<i>Laevicardium elatum</i>	1	1

Key: MNI = minimum number of individuals, FN = field number.

More recent research suggests the Hohokam maintained a kinship-based procurement and exchange strategy that involved logistical forays into the Papaguería and into the coastal zone of northern Sonora, Mexico, to acquire not only marine shell but also obsidian and salt (Mitchell and Foster 2011:176). The shell artifact may have come into the Hardy site through such activities. Although obsidian was not recorded during the 2001 excavations at the Hardy site, it was identified during earlier investigations there (Gregonis 1997b). Marine shell may have been moved into the settlement along one of these routes bringing trade goods into the Tucson Basin. That the piece of shell is unworked may indicate it was raw material for ornament production that was broken or became otherwise unusable and was discarded.

Freshwater Shell

Thirteen poorly preserved fragments of *Anodonta californiensis* were also recovered. *Anodonta californiensis* is a fairly large, gracile bivalve common to most Arizona freshwater sources until the early 1900s, when water-retention modifications were made to the freshwater system (Bequaert and Miller 1973:220–223). Currently, the species is restricted to areas of the Black River in east-central Arizona. *Anodonta* has been recovered from other prehistoric sites in the Tucson Basin (Vokes 1995), and Haury (1976) suggested the species was used as a food source as well as raw material for local craftspersons due to its prominence at prehistoric sites located along the Salt River. None of the fragments recovered from Feature 2 exhibit cut or worked edges, suggesting the shell was collected as a food source, although its intended use as an ornament cannot be ruled out.

The species can survive only in association with certain species of fish, as its glochidium (larvae) must attach itself to that fish's fins while transforming into a stationary clam (Bequaert and Miller 1973:221). This limits the source of the shell to prehistorically perennial streams such as the Santa Cruz River and possibly Sabino Creek. This species of shell is recovered from historical-period sites as well and appears to have been used by some local groups as a dietary supplement in the Historic period (Bequaert and Miller 1973).

DISCUSSION

Although the excavations at the Hardy site produced a miniscule shell collection, several observations can be cautiously advanced. The residents were participating in some sort of procurement and exchange system to obtain marine shell. Furthermore, the unworked marine shell artifact may hint at some level of shell-ornament production at the site. *Laevicardium* shells were used for bracelets, whole-shell pendants (when immature), and cut-shell pendants. Occasionally, whole shells were used as cups or paint palettes.

The residents of Feature 2 were apparently using freshwater-shell species as a food source, as evidence for their use in craft production was not found. The number of artifacts represented by the freshwater shell is not entirely clear. The 13 fragments derived from two proveniences within Feature 2 but may represent a single artifact. Thus, the minimum number of shell artifacts from Feature 2 may be two, but it is equally possible that the fragments represent a greater number of items. Unfortunately the small size of the sample limits the level of confidence one can have in these impressions and observations.

CHAPTER 10

CONCLUSIONS

Joseph Howell

Sixteen archaeological features were documented during the monitoring of Tucson Electric Power's (TEP's) electrical-utility trench along the west shoulder of Craycroft Road, the north shoulder of Glenn Street, and the south shoulder of Fort Lowell Road. Ten features were prehistoric, and six were historic. The project was located within the boundaries of AZ BB:9:14(ASM)—the prehistoric Hardy site—and AZ BB:9:40(ASM)—the historic Fort Lowell site. Both sites are part of the Fort Lowell National Register MRA.

PREHISTORIC COMPONENT

Seven prehistoric features were pit structures, and another was a possible pit structure. Other prehistoric features included a midden area and an extramural surface. Several research questions were proposed for prehistoric remains encountered during this project; these are outlined in Chapter 3 of this report. They are reiterated here along with the results generated by the project.

Chronology

The first questions concerned the age of the site. How old are the prehistoric remains? Previous work (Dart 1988) indicated the presence of pit structures dating to the Hohokam Sedentary period. Do the prehistoric remains encountered by Tierra also date to this time, or do they reflect later or earlier settlement?

Dating of the features was accomplished by ceramic cross-dating. Organic materials for radiocarbon dating were collected from several features but because of budgetary constraints were not submitted for analysis. The samples will be curated with the ASM for the use of future researchers. Tierra's results were in keeping with those of Dart (1988). Based on ceramics, Feature 2, the single prehistoric pit structure that was excavated in its entirety, was most intensively used during the Sedentary period occupation of the Hardy site. Although a wide variety of Colonial through Classic period sherds were found in structure fill and floor fill, suggesting a long use life for the structure, the floor-contact and subfeature-fill sherds dated primarily to the Sedentary period (95.8 percent of the diagnostic sherds). The reconstructible vessels (RVs) and partially reconstructible vessels (PVs) in floor contact or in subfloor features also indicated a late Rincon–early Tanque Verde phase date.

Diagnostic sherds from Features 5 and 9 (pit structures) also indicate a Sedentary period (Rincon phase) occupation or use of those features. Feature 15, an extramural surface, also had associated Rincon phase sherds. Feature 16/17, a probable trash midden, yielded ceramics ranging from the Colonial to Classic periods, indicating a long period of use.

One aspect of site chronology that should be noted is the absence of evidence for occupation earlier than the Colonial period. Previous research documented occupations dating to the Sweetwater and Snaketown phases (Gregonis 1997a:3).

Subsistence

A second set of questions concerned subsistence. Did the inhabitants depend on floodplain agriculture, or did they practice a broader strategy of resource exploitation? Data collected from pit structures and extramural features may be useful in reconstructing the diet of the prehistoric inhabitants of the Hardy site, including floral and faunal remains and various artifact types used in food processing, such as metates. If it can be demonstrated that pit structures were organized in courtyard groups, can we perceive differences in the resource-exploitation strategies of groups of different sizes?

Questions of subsistence, diet, and resource procurement cannot be addressed in depth at this time. Flotation and pollen samples were taken from several features but were not analyzed because of budgetary constraints and will be curated at the Arizona State Museum (ASM). Ground and flaked stone artifacts did not shed much light on the nature of subsistence activities, and although several manos and mano fragments were found in Feature 2, most of the lithic artifacts were suggestive of activities such as fiber processing and pottery manufacture. Subsistence-related activities such as farming and gathering wild plants were carried out at locations other than the Hardy site. Feature 2 may have served as a functionally specific structure where subsistence activities were not emphasized.

Interaction and Exchange

The third set of questions concerned interaction and exchange. Was the Hardy settlement the center of or participate in a larger regional trade network in the eastern Tucson Basin? Was there significant interaction between the inhabitants those of large primary villages located along the Santa Cruz River?

Feature 2 yielded a number of nonlocal ceramic sherds. Imported ceramics originating in the Salt-Gila Basin include Gila Plain, Gila Variety; Sacaton Red-on-buff; and Sacaton Red. Other exotic ceramics included a small amount of Cibola White Ware, unidentified white ware, and a Trincheras Purple-on-red sherd. Although the original research questions inquired into the issue of intraregional trade with the rest of the eastern Tucson Basin and with communities along the Santa Cruz River, the ceramic sample is more illuminating in terms of interregional, long-distance trade. In addition, the unfired sherds, hematite (ochre), and polishing stones, one of which was pigment stained, found in Feature 2 imply that a primary function of the structure was ceramic production, possibly for trade with or between regions.

A question not proposed in the original plan of work pertains to site extent and structure. Although the small sample area prevents an in-depth look into this topic, some remarks are nonetheless worth making here. First, the density of habitation features along the relatively small extent of the project are—a linear trench—indicates that the location was an intensively inhabited part of the Hardy site in prehistoric times, and perhaps suggests that additional remains (structural and otherwise) are dense in nearby areas east and west of the trench. Additionally, this locus of the Hardy did not appear to extend south of the main entrance to Fort Lowell Park, based on the lack of features in the TEP trench south of this point. This is underscored by the water-main trench excavated by IAR in 1988, which also lacked cultural features south of the park entrance (Dart 1988). Because of the small project area, little can be said in regard to site structure, but the proximity of some of the pit structures, such as Tierra's Features 1, 2, and 5 and Tierra's Feature 9 and the Institute for American Research's (IAR's) Feature 3, hints at the existence of courtyard groups (see Figure 4).

HISTORIC COMPONENT

Several research questions were proposed for the historic remains expected to be encountered during the project. Each of these questions is closely tied to the characteristics of the artifacts recovered from the historical-period features and therefore, the historic research questions have been partially addressed in the analysis of the artifacts (see Chapter 5).

Age and Cultural Affiliation

The first question concerned age and cultural affiliation. Are the historic cultural remains associated with the military occupation of Fort Lowell, the Mexican immigrant community of El Fuerte, or the later Euroamerican occupation of the area?

Based on the analysis of the artifacts, two features, Features 4 and 6, dated to the early-twentieth century, with a possibly earlier date for Feature 4 (i.e., late nineteenth to early twentieth centuries). Both were trash deposits. Feature 18, located within the Fort Lowell Regimental Band kitchen, dated to the mid-to-late nineteenth century. These were the only three historic features from which artifacts were collected; the other three features (Features 10 and 12, tree wells, and Feature 13, a pit) yielded no artifacts (although Feature 13 contained unidentifiable metal materials).

In terms of chronology, the artifacts recovered from the historic features indicated associations with the military occupation of Fort Lowell in the case of Feature 18, and with the later El Fuerte period of the occupation of the fort in the case of Features 4 and 6. The artifacts collected from Feature 18 were consistent with the types of material that military personnel stationed at the fort would be expected to use and discard. The material from Features 4 and 6, however, was ambiguous in regard to addressing questions of the ethnic identity of those discarding the trash. Therefore, it is difficult to say if the material is necessarily related to the Mexican settlers whose presence characterized the El Fuerte period or to another group, although the artifacts fall within the period chronologically. Faunal remains recovered from Feature 18, consisting of lower-quality cuts of beef, may be indicative of cuts utilized for traditional Mexican dishes; however, these cuts, likely purchased from local butchers, may also have been rationed to enlisted soldiers occupying the Band Quarters.

Officers vs. Enlisted Men

The second question concerned the military occupation. If related to the military occupation, are the remains associated with the officers or enlisted personnel at the fort? Was there a difference in the amount or quality of food available to the two groups of men?

At least some artifacts from Feature 18 were associated with the military occupation of Fort Lowell. Analysis indicated that the artifacts were possibly associated with officers rather than enlisted personnel. This was suggested by a fragment of a medicine bottle distributed by the U.S. Hospital Department, which dispensed medicine to Union troops during the Civil War and for some years following, with officers typically receiving medicine in glass bottles. An association with officers was also suggested by the remains of several champagne bottles. However, because the trash appears to have originated as a secondary deposit, questions pertaining to the feature's use by officers or enlisted personnel may have limited relevance here.

Of more relevance is the possibility of later reoccupation of the structure, particularly during the El Fuerte phase of settlement at the fort. The band-barracks structure is known to have been occupied by a Señor Ricardo Diaz and his family, but it is unknown if the Diaz family or anyone else occupied

the kitchen facilities (Huntington 1982:10). Remains recovered from Feature 18 provided no evidence of an occupation of the structure following the 1891 abandonment of Fort Lowell by the military. This supports the contention that the remains did in fact represent Room 1 of the band kitchen, although Huntington (1982:31–32) hypothesized a post-military occupation of the kitchen based on evidence of a second wood floor and fireplace within the structure, both believed to have been installed after 1891. As discussed earlier, it was initially assumed that the TEP trench encountered the band barracks and not the kitchen (see Chapters 1 and 4, this volume). Whether the excavation occurred within the kitchen or the barracks, the artifacts, with the possible exception of the faunal remains, did not support an El Fuerte era (or later) occupation of the building.

Local vs. Nonlocal Markets

The third question concerned the nature of the market system operating at Fort Lowell. Did Fort Lowell personnel receive goods only of local manufacture, or were they connected to a wider regional or national market system? Did the patterns in trade and exchange of goods vary between the military, El Fuerte, and Euroamerican eras?

Little could be said about participation in the local and national economies, other than the artifacts were consistent with what is already known about their contexts. In the case of the material from Feature 18, many of the artifacts were likely available via the fort's role as a military supply-distribution hub. Butchering marks, including saw marks, on the cattle remains from Feature 18, indicate that beef was purchased from local butchers or slaughterhouses. The post-military Fort Lowell community was linked to Tucson's increasing participation in the national economy (which had commenced in 1880 with the arrival of the railroad), and the material recovered from Features 4 and 6 reflects that participation (although the use of pharmaceutical goods from Tucson was indicated by bottle fragments originating at T. Ed Litt's downtown drug store).

Land Use Patterns

The fourth question concerned land-use patterns. What are the similarities and differences in the land use patterns of the different groups who lived near Fort Lowell? For the military, structured trash disposal and privy locations would be expected. Are any similar patterns visible for the later occupations?

As noted in Chapter 6, it was difficult to provide answers to the fourth research question because of the limited footprint of the project area. Feature 18 was encountered about where it was expected, based on projections of the original Fort Lowell buildings onto modern-day maps. Features 4 and 6 may have been deposits of household trash discarded from reoccupied structures near their location. The two closest candidates would be the Commanding Officer's quarters and its associated kitchen. If associated with these buildings, Features 4 and 6 would have related to their later reoccupation. Dart (1988:4) has documented historic remains more clearly associated with the structures. IAR's Feature 1 was located within, or very near, what would have been the location of the Commanding Officer's kitchen. IAR's Feature 2 would have been located within the Commanding Officer's quarters; Dart interpreted this deposit as belonging to a foundation or crawlspace beneath the building. Artifacts within IAR's Feature 1 were interpreted as belonging to the period when the fort was active or shortly afterward. Diagnostic artifacts were not recovered from IAR's Feature 2, but historic brick and plaster were present, indicating its location within the building footprint. Again, Features 4 and 6, if related to the Commanding Officer's quarters or kitchen (both were located

south and east of the Commanding Officer's quarters near the kitchen), were likely related to the later post-military reoccupation of those or other buildings.

APPENDIX A
ATTRIBUTES RECORDED FOR FLAKED AND GROUND
STONE ARTIFACTS

Table A.1. List of Attributes Recorded for Cores

<i>Site Number</i>	<i>Cortex</i>
<i>Provenience number</i>	0%
<i>Bag number</i>	1–20%
<i>Condition</i>	21–50%
Complete	51–99%
Fragment	100%
<i>Core type</i>	<i>Number of flake scars</i>
Bidirectional	<i>Number of faces</i>
Bipolar	<i>Number of faces flaked</i>
Core-hammer	<i>Largest flake scar (mm)</i>
Hammerstone	<i>Size class (cm)</i>
Multiple platforms	0–1
Opposed platform	2–3
Radial	3–4
Single platform	4–5
Tested	5–6
Indeterminate	6–7
<i>Raw Material</i>	7–8
Agate	8–9
Andesite	9–10
Basalt	10–11
Chalcedony	11+
Chert	NA
Dacite	<i>Burned?</i>
Diorite	Yes
General igneous	No
General metasediment	<i>Battered?</i>
Granite	Yes
Jasper	No
Limestone	<i>Length (mm)</i>
Metasediment	<i>Width (mm)</i>
Mudstone	<i>Thickness (mm)</i>
Obsidian	<i>Count</i>
Quartz	<i>Comments</i>
Quartzite	
Rhyolite	
Sandstone	
Schist	
Silicified limestone	
Siltstone	
Indeterminate	

Table A.2. List of Attributes Recorded for Flaked Stone Tools

<i>Site number</i>	<i>Raw material</i>
<i>Provenience number</i>	Agate
<i>Bag number</i>	Andesite
<i>Tool type</i>	Basalt
Biface	Chalcedony
Chopper	Chert
Composite tool	Dacite
Core chopper	Diorite
Core denticulate	General igneous
Core scraper	General metasediment
Core tool	Granite
Denticulate	Jasper
Domed scraper	Limestone
Drill	Metasediment
End scraper	Mudstone
Composite (multiple-edge) scraper	Obsidian
Notch	Quartz
Perforator	Quartzite
Side scraper	Rhyolite
Spurred scraper	Sandstone
Indeterminate	Schist
<i>Bifacial or unifacial retouch</i>	Silicified limestone
Bifacial	Siltstone
Unifacial	Indeterminate
<i>Condition</i>	<i>Size class (cm)</i>
Angular debris	0–0.5
Complete	0.5–1
Fragment	1–1.5
Proximal	1.5–2
Indeterminate	2–3
<i>Continuous or discontinuous retouch</i>	3–4
Continuous	4–5
Discontinuous	5–6
<i>Retouch location</i>	6–7
Convergent	7–8
Distal	8–9
Lateral	9–10
Lateral–2	10–11
Multiple	11+
Proximal	NA
Indeterminate	
<i>Number of retouched edges</i>	

<i>Platform preparation</i>	<i>Lipping?</i>
Ground	Yes
Scarred	No
Trimmed	<i>Cortex</i>
Indeterminate	0%
None	1–20%
NA	21–50%
<i>Platform type</i>	51–99%
Cortical	100%
Crushed	<i>Count</i>
Faceted	<i>Burned?</i>
Plain	Yes
Punctiform	No
None	<i>Comments</i>
Indeterminate	
NA	
<i>Split platform?</i>	
Yes	
No	

Table A.3. List of Attributes Recorded for Debitage

<i>Site number</i>	<i>Raw material</i>
<i>Provenience number</i>	Agate
<i>Bag number</i>	Andesite
<i>Flake type</i>	Basalt
Backed	Chalcedony
Bipolar	Chert
Blade	Dacite
Core reduction	Diorite
Pressure flake	General igneous
Thinning flake	General metasediment
Utilized	Granite
Indeterminate	Jasper
<i>Condition</i>	Limestone
Angular debris	Metasediment
Complete	Mudstone
Fragment	Obsidian
Proximal	Quartz
Indeterminate	Rhyolite
<i>Platform preparation</i>	Sandstone
Scarred	Schist
Trimmed	Silicified limestone
None	Siltstone
Indeterminate	Indeterminate
NA	<i>Size class (cm)</i>
<i>Platform type</i>	0–0.5
Cortical	0.5–1
Crushed	1–1.5
Faceted	1.5–2
Plain	2–3
Punctiform	3–4
None	4–5
Indeterminate	5–6
NA	6–7
<i>Split platform?</i>	7–8
Yes	8–9
No	9–10
<i>Lipping?</i>	10–11
Yes	11+
No	NA
<i>Cortex</i>	<i>Count</i>
0%	<i>Burned?</i>
1–20%	Yes
21–50%	No
51–99%	<i>Comments</i>
100%	

Table A.4. List of Attributes Recorded for Ground Stone Artifacts

<i>Burning</i>	<i>Residue</i>
Heat Cracked	Caliche
Indeterminate	Carbon
No	Clay
Yes	Indeterminate
<i>Condition</i>	Organic
> 1/2	Pigment
Fragment	Multiple
Complete	None
<i>Design</i>	<i>Maximum Length (mm)</i>
Expedient	<i>Maximum Width (mm)</i>
Incomplete	<i>Maximum Thickness (mm)</i>
Indeterminate	<i>Weight (g)</i>
NA	<i>Size class</i>
Strategic	0–1
<i>Raw material</i>	1–2
Agate	2–3
Andesite	3–4
Basalt	4–5
Chalcedony	5–6
Chert	6–7
Chrysacola	7–8
Conglomerate	8–9
Diorite	9–10
General igneous	10–11
General metasediment	11+
Granite	<i>Manufacturing technique</i>
Jasper	Chipped
Limestone	Cut
Malachite	Ground
Obsidian	Ground surface only
Olivine	Indeterminate
Quartz	Multiple
Quartzite	None
Rhyolite	Pecked
Sandstone	Polished
Schist	<i>Number of used surfaces</i>
Silicified limestone	1
Silicified sandstone	1, corner
Siltstone	1, edge
Steatite	2, adjacent
Tuff	2, opposite
Turquoise	Multiple
Vesicular basalt	Multiple corners

<i>Raw material</i> , cont.	<i>Number of used surfaces</i> , cont
Other	Multiple edges
Indeterminate	Indeterminate
<i>Texture</i>	None
Coarse	<i>Surface manufacture</i>
Conglomerate	Natural
Fine	Worn
Fine vesicles	Ground
Indeterminate	Pecked
Large vesicles	Pecked and ground
Large/fine vesicles	Resharpended, ground
Medium	Resharpended, pecked
<i>Surface shape</i>	Combination
Basin	Indeterminate
Concave	<i>Surface length</i>
Convex	<i>Surface width</i>
Edge	<i>Surface wear</i>
Flat	Light
Flat edge/convex end	Moderate
Flat end/concave edge	Heavy
Flat end/convex edge	Unused
Serrated edge	Indeterminate
Irregular	<i>Wear level</i>
Multiple	Highs only
Indeterminate	Highs and lows
<i>Stroke</i>	Highs and some lows
Chopping	Smooth all over
Circular/reciprocal	Smooth spots
Circular, flat	Unused
Circular, rocking	Indeterminate
Crushing Flat	<i>Wear type</i>
Cutting	Abrasion
Pecking	Abrasion/chips
Pounding	Impact fractures
Reciprocal, flat	Impact fracture/sheen
Reciprocal, rocking	Manufacture only
Scraping	Sheen
Slicing	Multiple
Multiple	None
Indeterminate	Indeterminate
NA	<i>Recycle</i>
<i>Artifact category</i>	<i>Reuse</i>
Container	<i>Handstone artifact type</i>
Hafted tool	Abrader
Hand stone	Mano
Netherstone	Pecking stone

Artifact category, cont.

Ornament
Paraphernalia
Structural
Tabular tool
Indeterminate

Container artifact type

Bowl
Censer
Palette
Plug

Container shape

Bifurcate, flat bottom
Bifurcate, round bottom
Effigy, flat bottom
Effigy, round bottom
Rectangular, flat bottom
Rectangular, round bottom
Round, flat bottom
Round, round bottom
Other
Indeterminate

Border type

Anthropomorphic
Zoomorphic
Flat border, incised
Flat border, plain
Flat border, shaped
Raised border, incised
Raised border, plain
Raised border, shaped
Indeterminate

Border width

Border height

Ornament artifact subtype, geometric

Disk
Rectangular
Square/diamond
Triangular

Ornament artifact type

Bead
Bracelet
Button
Ear spool
Figurine
Indeterminate
Mosaic tesserae
Nose/lip plug

Handstone artifact type, cont.

Pestle
Polishing stone
Indeterminate

Handstone artifact subtype

Abrader, flat
Abrader, grooved
Mano, basin
Mano, flat/concave
Mano, trough
Mano, indeterminate
Pestle, block
Pestle, cobble
Pestle, cylindrical
Pestle, pebble
Pestle, indeterminate

Structural artifact type

Activity feature element
Architectural element
Indeterminate artifact type
Indeterminate fragment
Not an artifact

Netherstone artifact type

Lithic anvil
Pottery anvil
Metate
Mortar
Indeterminate

Netherstone artifact subtype

Metate, $\frac{3}{4}$ trough
Metate, closed trough
Metate, open trough
Metate, basin
Metate, flat/concave
Metate, indeterminate
Pottery anvil, plain
Pottery anvil, grooved
Pottery anvil, handled
Pottery anvil, indeterminate

Ornament artifact type, cont.

Pendant

Ring

Toggle

Ornament artifact subtype, bead

Blank

Broken

Convex

Cuboid

Cylindrical/barrel

Disk

Teardrop

Triangular

Tube

Uncut tube

Zoomorphic

Irregular

Indeterminate

Ornament artifact subtype, figurine

2 dimensional

3 dimensional

Anthropomorphic

Zoomorphic

Indeterminate

Ornament artifact subtype, mosaic tesserae

Curvilinear

Rectilinear

Indeterminate

Hafted tools artifact subtype

Axe, $\frac{3}{4}$ groove

Axe, $\frac{3}{4}$ groove, double bit

Axe, full groove

Axe, full groove, double bit

Axe, indeterminate

Maul, $\frac{3}{4}$ groove

Maul, full groove

Maul, indeterminate

Bit edge damage

Abraded

Battered

Chipped

Multiple

None

Bit edge shape

Original

Resharpened

Incomplete

Indeterminate

Tabular tool artifact type

1 concave edge

1 convex edge

1 irregular edge

1 straight edge

>1 concave edge

>1 convex edge

>1 straight edge

Multiple edges

Hafted

Notched

Shaped but not used

Too fragmentary

Paraphernalia artifact type

Ball

Cruciform

Donut stone

Manuport

Mineral sample

Perforated disk

Pipe

Plummet

Shaped stone

Spindle whorl

Stone ring

Ornament artifact subtype, pendant

2 dimensional

3 dimensional

Anthropomorphic

Zoomorphic

Geometric

Inlay

Blank

Tab

Indeterminate

Hole type

Biconical

Conical

Cylindrical

Natural

Remodeled

Broken

Incomplete

Hole type, cont.

Indeterminate

Hole use wear

No

Yes

Bit edge sharpness

Dull

Flattened

Rounded

Sharp

Broken

Incomplete

APPENDIX B
GLOSSARY OF FLAKED STONE AND GROUND STONE
TERMS

Karin Olsson

GLOSSARY OF FLAKED STONE TERMS¹

Angular debris: Unmodified shatter lacking prominent flake characteristics.

Backed flake or blade: Retouched flake or blade that exhibits a sharp cutting edge on one margin and one natural cortical surface on the opposite margin.

Bidirectional core: Flakes are removed from two platforms not opposite one another.

Biface: Bifaces are produced by the removal of flakes from two surfaces of a cobble or a flake and exhibit continuous, extensive bifacial retouch; straight to convex edges; and no hafting elements.

Bifacial core: Flakes are removed from a common margin on the core.

Bifacial thinning flake: see **Tool production flake**

Bipolar core: Flakes are removed from opposing platforms with the core resting on an anvil during flaking.

Bipolar flake: The opposing ends of the flake show signs of crushing, bulbs of percussion, and stress lines moving in two directions toward one another.

Blade: A flake that is twice as long as it is wide, with parallel lateral margins.

Chopper: Pebble or block that exhibits an asymmetrical cutting edge obtained by the removal of at least two large flakes from one face (unifacial) or two faces (bifacial).

Complete flake: A flake that is whole.

Composite scraper: see **Multiple-edge scraper**.

Composite tool: A tool that exhibits more than one tool type (i.e., denticulate, side scraper, etc.).

Core: A core is the parent material from which flakes are struck. Core types are defined on the basis of the number of platforms present and the directions of the flake removals. The number of flake scars and direction of flaking were recorded for complete cores. These two variables were used to identify the morphology and the degree of reduction of complete cores.

Core chopper: A tool fashioned on a core blank that exhibits an asymmetrical chopping or cutting edge obtained by the removal of at least two large flakes from one or two faces.

Core condition: Refers to the completeness of the core; two conditions were observed:

**Complete
Fragment**

¹ This glossary provides the most typically used terms for flaked stone analysis. These definitions are primarily taken from Andrefsky (1998), Bordes (1961), Debénath and Dibble (1994), and Whittaker (1994).

Core denticulate: A core with continuous, denticulate retouch on one or more edges.

Core hammer: A hammerstone produced from a nodule by removing selected flakes and using its edges and apices percussively (in simplistic terms, a core used as a hammer). Signs of impact damage or crushed edges and apices indicate typical core hammer use wear.

Core-reduction flake: A product of hard-hammer percussion exhibiting a large platform and well-defined bulb of percussion; seldom displays platform lipping.

Core scraper: A core that exhibits continuous, unifacial retouch on one or more retouched edges.

Core tool: Any core that has been used as or modified into a tool; the core represents the blank on which the tool is produced through flaking.

Cortical platform: Platform with any amount of cortex.

Crushed platform: Platform marked by a number of step scars or by a single concavity in that location. Often, enough of the core remains to allow for identification of the platform type (e.g., plain or cortical).

Debitage: Encompasses all unretouched flakes that were struck from parent material and is the byproduct of either core reduction or tool manufacture and maintenance. Flakes are characterized by the presence of a striking platform, bulb of percussion, stress fissures, ventral ripples, lateral margins, and termination.

Debitage condition: Refers to the completeness of the flake; four possible conditions were observed:

Complete flake

Proximal flake: Broken flake that retains the striking platform.

Flake fragment: Broken flake with no striking platform.

Angular debris: Shatter, generally lacking ordinary flake attributes such as a bulb of percussion.

Denticulate: Flake or angular debris that exhibits two or more contiguous notches.

Dmax: Short for maximum diameter. Refers to the maximum dimension of a flake, tool, core, or other artifact without reference to its intended length (where such exists).

Domed scraper: A concave-shaped core exhibiting a retouched distal edge.

Drill: Flake or angular debris that exhibits continuous, extensive bifacial retouch forming a bit with a diamond-to-square-shaped cross section; hafting element common.

End scraper: Flake or angular debris that presents continuous, unifacial retouch that is medium to steep, on proximal or distal end.

Expedient uniface: Flake or angular debris that exhibits discontinuous, marginal, unifacial retouch on one or more edges.

Faceted platform: Platform with flakes removed from the platform surface to provide an increased platform angle and to remove irregularities in the raw material.

Feathered (flake termination): Occurs when the interior and exterior surfaces of the flake gradually intersect, resulting in a sharp edge.

Flake: Characterized by the presence of a striking platform, a bulb of percussion, stress fissures, ventral ripples, lateral margins, and termination.

Flake condition: see **Angular debris, Complete, Fragment, Proximal**

Flake core: A flake that has been used as a core. Usually difficult to distinguish from a retouched or reduced flake.

Flake fragment: A flake that lacks a platform (i.e., the medial or distal portion of a flake).

Flake termination: see **Feathered, Hinge fracture**

Flake type: see **Backed, Bipolar, Blade, Core reduction, Pressure flake, Tool-production flake, Utilized flake**

Hard-hammer percussion: Process of striking a core or tool with another stone (hammerstone) to remove a flake.

Hammerstone (core type): A rock used to detach flakes from an objective piece. These usually show signs of impact damage, such as crushed edges.

Hinge fracture (flake termination): Occurs when a lack of force is given relative to the mass of material being removed, resulting in the interior surface rising abruptly toward the exterior surface.

Lipping: The platform exhibits a small lip located on the interior portion of the flake.

Multiple-edge scraper: A flake or angular debris that presents continuous, unifacial retouch that is medium to steep, on one or more edges.

Multiple-platform core: A core from which flakes were removed in random directions from at least three platforms.

Notch: A flake or angular debris that presents a narrow, concave working edge produced by a single flake removal or a series of small flake removals.

Opposed-platform core: A core from which flakes were removed from two platforms located on opposing faces.

Perforator: Flake or angular debris that exhibits marginal or invasive unifacial retouch, isolating a single sharp point that protrudes from an edge.

Plain platform: Platform with no cortex or flake scars, consisting of a single surface.

Platform preparation, ground: The exterior margin of the platform exhibits a round edge and or an area of abrasion or both (the result of preparing the platform for flake removal).

Platform preparation, scarred: Remnant scars from the removal of a previous flake(s) are present.

Platform preparation, trimmed: A flake or flakes have been removed from the dorsal surface of the flake (from the platform).

Platform thickness: This is measured along the platform surface from the point of percussion to the exterior margin of the flake and perpendicular to the interior surface of the flake.

Platform type: see **Cortical, Crushed, Faceted, Plain, Punctiform**

Platform width: This is measured from one lateral margin of the platform to the other.

Pressure flake: A small flake removed from the edge of a tool by pressing against it, usually with an antler or bone tool, instead of striking it.

Projectile point: A bifacially flaked implement that exhibits a regular, formal shape and includes hafting elements such as notches or a stem.

Proximal flake: A partial flake that retains a platform.

Punctiform platform: Extremely narrow or small platform, usually associated with the production of blades.

Radial core: A core from which flakes were removed from the entire perimeter of the core and that usually converge toward the center of the core.

Retouched implement: Any flake, chunk, or other piece of material exhibiting some visible edge modification (i.e., the presence of intentional flake removals along the same edge). An alternative term for tool (see **Tool**). Retouched pieces include:

Formally retouched tools: The patterned retouch (nature and location) corresponds to a traditionally established tool typology, such as projectile points, bifaces, drills, graters, perforators, notches, denticulates, side scrapers, end scrapers, and core tools.

Expediently retouched tools: Characterized by unpatterned, irregular, and often nonextensive retouch.

Scarred platform: Platform consisting of two or more noncortical surfaces formed by flake-scar margins (remaining from previous flake removals).

Side scraper: Flake or angular debris that presents continuous, unifacial retouch that is medium to steep on one or more lateral edges (straight, convex, or concave).

Single-platform core: A core from which flakes were removed from a single striking platform.

Size class: The size of all flakes (including complete, fragment, proximal, and split flakes, and angular debris) is recorded using a template with a series of 10-mm nested squares. This method provides a rapid and accurate way to establish artifact-size distribution necessary for determining the stages of artifact production as well as evaluating remnant use life.

Soft-hammer percussion: Core and tools (particularly bifaces) struck with a bone, antler, or wooden hammer to remove flakes.

Split platform: A flake that is reduced by half from the platform to the distal margin during hard-hammer percussion.

Tested core: A core with fewer than three flake scars.

Tool: A tool is a flake (see **Core tool**) that has been retouched by percussion (hard hammer or soft hammer) or pressure flaking. Tools can be classified as either formal tools or expedient tools:

Formal tool: A formal tool is an implement associated with a specific retouch that corresponds to a traditionally established tool type, such as projectile points, bifaces, various scrapers, drills, graters, perforators, and notches and denticulates.

Expedient or informal tool: Characterized by an unpatterned, non-extensive retouch. Southwestern tools often have an informal appearance, because most of these implements are made on unstandardized flakes. What makes these tools formal, however, is the standardized type of retouch applied to the edges.

Tool Condition: Refers to the completeness of the tool; two conditions were observed:

Complete: In general, a complete tool retains about 90 percent or greater of its form.

Fragment: Less than 90 percent of the tool remains.

Tool length: From the point of percussion to the most distal point on the tool for complete tools (i.e., its technological length); otherwise refers to the **Dmax** of the object (see **Dmax**).

Tool-production flake (includes **Biface thinning flake**): These flakes result from the production and repair of tools by soft-hammer percussion and are characterized by the presence of platform lipping, small platform area in relation to flake size, platforms that are often scarred or that often exhibit some form of preparation, multiple dorsal scars, lack of point-of-impact features (typical of hard-hammer percussion), and a generally curved profile.

Tool thickness: Measurement taken at the intersection of the length and width.

Tool width: Measurement taken between the tool edges at the midpoint of, and perpendicular to, the axis length.

Utilized flake: Flakes that are not intentionally retouched but exhibit clear evidence of modification caused by use. These modifications consist of rounding and smoothing of an edge (wear damage), or microspalling and crushing (edge damage). It is difficult, however, to distinguish these two types of modification with the naked eye or even with a 10×-power hand lens. Although used, these flakes are technically classed as a type of debitage rather than expedient tools.

Wedge: A bifacially flaked piece characterized by extensive flaking on its faces and crushing on two opposing margins.

GROUND STONE TERMS²

Abrader: Artifact with a rough surface that was used to shape the surfaces of other items (Adams 1997:11). Includes grooved abraders (arrow-shaft smoothers or straighteners).

Bead: Ornament subtype with a central perforation that, when suspended, causes the edge of the artifact to be most visible.

Button: Small, disk-shaped ornament used as a fastener.

Censer: Container subtype with a cylindrical basin and elaborate, engraved or carved designs.

Container: A ground stone implement used for holding or carrying materials. The container types are broken down into subtypes by shape:

- Bowl**
- Censer**
- Palette**
- Plug**

Donut stone: Large, perforated disk with perforation less than one-half the diameter of the entire artifact. The hole is usually drilled from both sides, making it biconical.

Hafted tool: Ground stone tool designed for attachment to a handle or hilt. Includes:

- Axe**
- Maul**
- Adze**
- Hoe**
- Indeterminate**

Hand stone: Used generally to refer to all handheld ground stone tools. The term also specifically refers to handheld tools that lack specific attributes that would allow them to be sorted into a narrower hand stone subtype (i.e., mano, pestle). Includes:

- Abrader**
- Indeterminate**
- Mano**
- Pecking stone**
- Pestle**
- Polishing stone**

Indeterminate: Refers to an artifact that is an identifiable as ground stone but cannot be placed in a formal category because of a lack of recognizable attributes.

² These terms are adapted primarily from Adams (2002) and Fratt (1992).

Mano: Hand-stone tool type, used in conjunction with a metate for grinding (see **Metate**). Includes the following types:

Basin: Mano used in a basin metate, manipulated with a combination of circular and reciprocal strokes.

Flat/concave: Mano used in a flat/concave metate. Mano is shorter in length than the width of the metate.

Trough: Mano used in a trough metate.

Indeterminate: Mano subtype cannot be determined.

Metate: Netherstone tool type, used in conjunction with a mano, for grinding (see **Mano**). Includes the following types:

Three-fourths trough: Metate with strategically designed raised borders that run three-fourths of the perimeter of the working surface of the metate.

Basin: Metate with a manufactured circular or elliptical basin in which a mano is manipulated in circular or reciprocal strokes.

Closed trough: Metate with strategically designed raised borders that run around the entire perimeter of the working surface of the metate.

Flat/concave: Metate used with a mano shorter in length than the working surface of the metate. The working surface of the metate can develop a concavity similar to basin metate, but in this case, the concavity is worn for use, not constructed.

Open trough: Metate with strategically designed raised borders, where the borders are open at both ends of the working surface of the metate.

Indeterminate: Metate subtype cannot be determined.

Mosaic tesserae: Small, thin pieces of shaped stone created for attachment to a backing material.

Netherstone: Used generally to refer to the bottom stone against which some material was worked. The term also specifically refers to working surfaces that lack specific attributes that would allow them to be sorted into a narrower netherstone type.

Mortar: A stone with a concavity pecked into one surface that was used with a pestle for pounding or grinding. Includes both portable and bedrock mortars.

Ornament: Item designed to be worn on the person. Includes:

Bead

Bracelet

Button

Earspool

Mosaic tesserae

Nose or lip plug

Pendant

Ring

Toggle

Palette: Netherstone tool type with decorated formal borders; used in rituals.

Polishing stone: Small pebbles (often water worn) with one or more nearly flat surfaces that show striations, scratches, or sheen resulting from use. Typically used for polishing ceramics before firing. Hand-stone tool type.

Pendant: Ornament subtype with a perforation which, when suspended, caused the broad surface of the artifact to be most visible.

Pestle: Hand-stone tool type used to pulverize, crush, or grind. Often, but not exclusively, used in a mortar.

Specialized implements: Personal and group ritual equipment, gaming devices, weights, representations (morphic, geometric, and abstract), as well as items whose specific functions are unknown. Includes:

- Ball**
- Cruciform**
- Donut stone**
- Manuport**
- Mineral sample**
- Perforated disk**
- Pipe**
- Plummet**
- Shaped stone**
- Stone ring**

Tabular tool: This artifact category describes “thin, tabular pieces of stone of varying sizes, with one or more edges used in cutting, scraping, slicing, or chopping motions (Adams 2002:189).”

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