Archaeological Investigations at the Fort Lowell-Adkins Steel Property Locus of Fort Lowell, AZ BB:9:40 (ASM), Tucson, Pima County, Arizona

COT Project No. 10-15

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Technical Report No. 2012-12
Desert Archaeology, Inc.

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Submitted to

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Technical Report No. 2012-12
Desert Archaeology, Inc.
3975 North Tucson Boulevard, Tucson, Arizona 85716 • January 2013

COMPLIANCE SUMMARY

Date: 25 January 2013

Report Title: Archaeological Investigations at the Fort Lowell-Adkins Steel Property Locus of Fort Lowell, AZ BB:9:40 (ASM), Tucson, Pima County, Arizona

Client: City of Tucson

Client Project Name: Fort Lowell Contaminated Soil Removal and Archaeological Data Recovery

Compliance Agency: City of Tucson

Compliance Level: Local

Applicable Laws/Regulations:

State: Arizona Historic Preservation Act; State Burial Act(s), ARS 41-844 and ARS 41-865
Local: City of Tucson Resolution No. 12443 (1983); City of Tucson Administrative Directive "Protection of Archaeological and Historical Resources in City Projects" (1995, updated 2005)

Applicable Permits: Arizona Antiquities Act Project Specific Permit, Arizona State Museum, 2010-115; Arizona State Museum Accession Number 2010-487.

Tribal Consultation: Arizona State Museum Burial Agreement 2011-18

Project Description: Desert Archaeology monitored the removal of contaminated soils within the Fort Lowell-Adkins Steel parcel at historic Fort Lowell. Data recovery took place in selected prehistoric and historic period features to recover data to address research questions.

Final Disposition of project artifacts, field notes, data, and records: All project materials will be curated at the Arizona State Museum.

Location:

Land Ownership: City of Tucson
County: Pima
Description: Sections 35 and 36, Township 13 South, Range 14 East on the USGS 7.5 minute topographic quad Tucson North, Arizona (AZ BB:9 [SW]).

Area of Potential Effect (APE): The APE for the project includes the entire Adkins parcel and contains standing historic structures and buildings relating to historic Fort Lowell and archaeological deposits (prehistoric or historical).

Number of Surveyed Acres: N/A

Number of Sites: 2

List of Register-Eligible Properties: Historic Fort Lowell (AZ BB:9:40 [ASM]) and the Hardy Site (AZ BB:9:14 [ASM]). These were included in the Fort Lowell Multiple Resource Area, which was listed on the National Register on 10 April 1978.

List of Register-Ineligible Properties: 0

Summary of Results: The Fort Lowell-Adkins Steel property contains prehistoric cultural resources dating from the Hohokam Sedentary period to the beginning of the Tanque Verde phase of the Hohokam Classic period (A.D. 950 to shortly after 1150). Historical remains from the Fort Lowell era (1873-1891)

American Statehood period (circa 1910-present) were also recovered. A sample of prehistoric and historic period features was excavated and the remaining features were mapped and described. The data recovered is used to address a set of research questions presented in the monitoring plan (Thiel 2011).

Recommendations: The Fort Lowell-Adkins Steel property contains significant cultural resources spanning the prehistoric and historic periods. These include prehistoric pit structures, pits, artifact caches, and a trash mound. Historic period features include structural remains, planting pits, irrigation ditches, fence lines, and trash-filled pits. Features were located in all areas investigated throughout the parcel, and it is highly likely that additional features are present in unexplored areas. Desert Archaeology recommends that ground disturbing activities be limited. If unavoidable, the areas affected should be either explored by archaeological testing (backhoe stripping is the preferred testing method) or if limited disturbance is to occur, by monitoring the disturbance. It is recommended that data recovery take place to recover additional artifacts and samples to further address research questions regarding the prehistory and history of the property.

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ACKNOWLEDGMENTS

Archaeological projects require the skills and talents of many people, and the success of the Fort Lowell Soil Remediation Project was a result of the hard work of many individuals.

The project was funded by the City of Tucson through a grant from the Environmental Protection Agency and a Community Development Block Grant, both for brownfields remediation. Jonathan Mabry, Historic Preservation Officer for the City of Tucson, helped procure funding and provided project oversight. Desert Archaeology, Inc. worked closely with Lisa Cuestas and Lynn Birkenbine of the City of Tucson's Environmental Services. In the field, we coordinated our efforts with Pat Hartshorne of SCS Engineers. Bill Doelle served as Principal Investigator for the project. Trish Castalia, Jean Kramer, Val Hintze, and Mario Arechederra provided logistical support.

The archaeological field crew consisted of Jeff Charest, Olivia Charest, Cannon Daughtry, Allen Denoyer, Steve Ditschler, Sam Higuera Fisher, Chris Lange, Adam Searcy, Tyler Theriot, George Tinseth, and Bill White. Dan Arnit of Innovative Excavating conducted the backhoe work for the project.

Artifacts were processed in the laboratory by Lisa Eppley and Susan Blair. Tanya Yatskieych processed the flotation samples. Artifacts and samples were examined by the following experts: Katie Brower (ground stone), Jeff Charest (feature descriptions), Mike Diehl (ethnobotanical materials and ammunition), James Heidke (ceramics), Chris Lange (shell), Stephanie Reyes (faunal bone), Stacy Ryan (flaked stone), and Steven Shackley (obsidian sourcing).

Henry Wallace flew over the site and took aerial photographs. Tyler Theriot drafted the maps for the report, while Robert Ciaccio illustrated and photographed artifacts. Emilee Mead edited the report, which was formatted by Donna Doolittle.

This report was prepared under budgetary and time constraints, but thanks to the efforts of all these people, it provides valuable new information about the prehistoric Hardy site and historic Fort Lowell.

Homer Thiel
January 2013
Tucson

CHAPTER 1

INTRODUCTION

J. Homer Thiel
Desert Archaeology, Inc.

The City of Tucson (City) developed plans to remove contaminated soils at the Fort Lowell-Adkins Steel property. This action followed the City's acquisition of the last remaining major portion of historic Fort Lowell. The Master Plan for the park as a whole was completed in 2009 (Poster-Frost Associates 2009). Among its recommendations were that a number of post-fort buildings and structures be removed from the Fort Lowell-Adkins Steel property. The City's environmental consultant recommended removal of contaminated soils, based upon site investigation. The City has received an Environmental Protection Agency Brownfields Cleanup Grant to remediate this site.

Desert Archaeology, Inc., participated in the Master Planning process through the preparation of two reports that documented the historical and archaeological resources of the park, as well as archaeological surveys of all City-owned parcels (Thiel 2009; Thiel and Theriot 2008). Desert Archaeology was also contracted to monitor stabilization work for Officers Quarters No. 2 and the adjoining kitchen, and to prepare a plan for demolition monitoring of non-contributing buildings and structures (Thiel 2010). Desert Archaeology also developed a plan for monitoring contaminated soils and data recovery of prehistoric and historic features uncovered during this work (Thiel 2011).

Contaminated soil removal was conducted in January through April 2012. During this work, 0.8 acres of soil was stripped away by a backhoe operator trained in archaeological fieldwork. In all, 74 features were located during fieldwork, including prehistoric pit structures, a trash mound, pits, potbreaks, and a ground stone cache. Fort Lowell-era (1873-1891) features included structural remains, a garden area, irrigation ditches, Cottonwood Row, tree planting pits, and a fenceline. An outhouse pit and a large trash pit dating to the 1920s-1950s were also located. Archaeological features were found in all areas of the property that were examined. Many additional features are likely located in the unexplored portions of the parcel.

Archaeological fieldwork was conducted under an Arizona Antiquities Act permit (2010-115) and an Arizona State Museum (ASM) Burial Agreement (2011-18). Artifacts, samples, field notes, maps, and digital photographs will be archived at ASM as Accession No. 2010-487. In 2010, prior to the start of the monitoring project, the backhoe operator and four Desert Archaeology employees attended a 40-hour HAZWOPER course, as well as an 8-hour refresher course in 2011.

This chapter includes a brief cultural history of the Tucson Basin, a brief history of the use of the Fort Lowell-Adkins Steel property during the historic period, archaeological background, and a research design. Features are described in Chapter 2, while Chapters 3-9 provide descriptions of the artifacts, animal bone, and ethnobotanical materials recovered. Concluding comments and recommendations for future work at the site are presented in Chapter 10.

PROJECT LOCATION AND CULTURAL BACKGROUND

The Fort Lowell area has been occupied for more than 1,000 years. Humans were drawn to the area by the presence of water in the Rillito River and the plant life and animals present in the vicinity.

Project Area Location

The Fort Lowell-Adkins Steel property is located at the southwestern corner of N. Craycroft Road and E. Fort Lowell Road. More specifically, it is in Sections 35 and 36, Township 13 South, Range 14 East on the USGS 7.5 minute topographic quad Tucson North, Arizona (AZ BB:9 [SW]) (Figure 1.1). Pima County Assessor's Parcel numbers for the project area are 110-09-0350, 110-09-0340, 110-09-032A, 110-09-032B, and 110-09-0330.

The current project consists of the removal of soils contaminated by hydrocarbons, metals, and other substances as identified by an environmental site investigation performed by the City's environmental consultant, SCS Engineers. Between 13-60 cm of soil are expected to be removed from contaminated areas.

The Area of Potential Effect (APE) for the project is the Fort Lowell-Adkins Steel property, which includes standing buildings and ruins dating to the Fort Lowell era (A.D. 1873-1891), and the subsequent

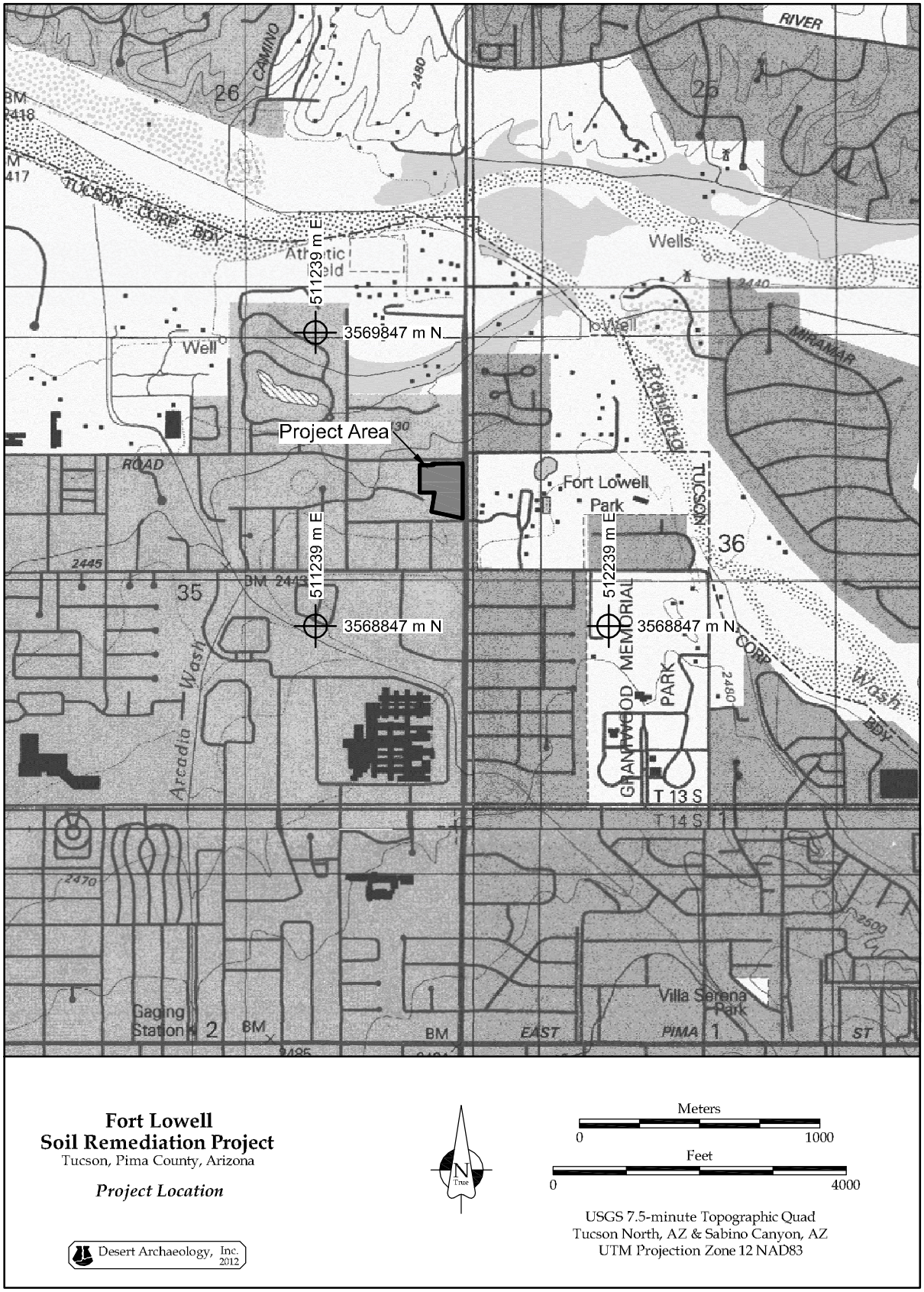

Figure 1.1. Reproduction of USGS 7.5-minute topographic quads Tucson North and Sabino Canyon, Ariz., showing location of the project area.

American Territorial and American Statehood periods (A.D. 1912-present) use of the property as a sanatorium and steel tank fabrication facility (Figures 1.2-1.3). Prehistoric and historic archaeological resources are likely to be present and probably extend into adjacent parcels.

Environmental Setting

The project area is located within the eastern portion of the Tucson Basin, a short distance south of the Rillito River and immediately west of Pantano Wash. Much of the surrounding area is now covered by residential housing, but it once supported vegetation typical of the Arizona Uplands subdivision of the Sonoran Desert Scrub series (Hansen 1996). Spicer (2004) recently prepared a lengthy list of plants and wildlife present in the Fort Lowell area during historic and modern times. In 1895, the area around the fort was described as: "

> On the south, the great plain of Tucson, bare or covered with brushy *Larrea* or mesquite, stretches away for scores of miles; on the north rise gravelly hills which slope up to the mountains. These hills are covered with giant cacti and other desert shrubs. Along the bed of the Rillito grow cottonwood, willow, mesquite, walnut and ash trees (Price 1895:197).

The elevation of the project area averages approximately 2,390 ft above sea level. The area slopes downward to the north and, during times of heavy precipitation, water runs across the Fort Lowell Park area in broad sheets toward the Rillito.

Portions of the project area, with Fort Lowell Park, have been heavily disturbed by the construction of roads and recreational facilities. Much of this work took place in the 1960s and 1970s, prior to the enactment of the cultural resource ordinance by the City. The depth of ground disturbance is unknown, and intact cultural resources may be present beneath existing roads, parking lots, and facilities. Other areas have seen less disturbance, including the Quartermaster and Commissary Storehouse Property and the Donaldson/Hardy parcels, and the likelihood of undisturbed subsurface cultural resources is much higher in these areas.

CULTURAL BACKGROUND OF THE PROJECT AREA

The history of the Southwest and of the Tucson Basin is marked by a close relationship bet-ween people and the natural environment. Environmental conditions have strongly influenced subsistence practices and social organization, and social and cultural changes have, in turn, made it possible to more efficiently exploit environmental resources. Through time, specialized adaptations to the arid region distinguished people living in the Southwest from those in other areas. Development of cultural and social conventions also became regionally specific, and by A.D. 650, groups living in the Tucson Basin can be readily differentiated from those living in other areas of the Southwest. Today, the harsh desert climate no longer isolates Tucson and its inhabitants, although life remains closely tied to the unique resources of the Southwest. The chronology of the Tucson Basin is summarized in Table 1.1.

Paleoindian Period (11,500?-7500 B.C.)

Archaeological investigations suggest the Tucson Basin was initially occupied some 13,000 years ago, a time much wetter and cooler than today. The Paleoindian period is characterized by small, mobile groups of hunter-gatherers who briefly occupied temporary campsites as they moved across the countryside in search of food and other resources (Cordell 1997:67). The hunting of large mammals, such as mammoth and bison, was a particular focus of the subsistence economy. A Clovis point characteristic of the Paleoindian period (circa 9500 B.C.) was collected from the Valencia site, AZ BB:13:74 (ASM), located along the Santa Cruz River in the southern Tucson Basin (Doelle 1985:183-184). Another Paleoindian point was found in Rattlesnake Pass, in the northern Tucson Basin (Huckell 1982). These rare finds suggest prehistoric use of the Tucson area probably began at this time. Paleoindian use of the Tucson Basin is supported by archaeological investigations in the nearby San Pedro Valley and elsewhere in southern Arizona, where Clovis points have been discovered in association with extinct mammoth and bison remains (Huckell 1993, 1995). However, because Paleoindian sites have yet to be found in the Tucson Basin, the extent and intensity of this occupation are unknown.

Archaic Period (7500-2100 B.C.)

The transition from the Paleoindian period to the Archaic period was accompanied by marked climatic changes. During this time, the environment came to look much like it does today. Archaic period groups pursued a mixed subsistence strategy, characterized by intensive wild plant gathering and the hunting of small animals. The only Early Archaic period (7500-6500 B.C.) site known from the Tucson Basin is found in Ruelas Canyon, south of the

Figure 1.2. The Area of Potential Effect at the Fort Lowell-Adkins Steel property.

Figure 1.3. An overview of the Fort Lowell-Adkins Steel property, taken in February 2012 (courtesy of Henry D. Wallace).

Tortolita Mountains (Swartz 1998:24). However, Middle Archaic period sites dating between 3500 and 2100 B.C. are known from the bajada zone surrounding Tucson, and, to a lesser extent, from floodplain and mountain areas. Investigations conducted at Middle Archaic period sites include excavations along the Santa Cruz River (Gregory 1999), in the northern Tucson Basin (Roth 1989), at the La Paloma development (Dart 1986), and along Ventana Canyon Wash and Sabino Creek (Dart 1984; Douglas and Craig 1986). Archaic period sites in the Santa Cruz floodplain were found to be deeply buried by alluvial sediments, suggesting more of these sites are present, but undiscovered, due to the lack of surface evidence.

Early Agricultural Period (2100 B.C.-A.D. 50)

The Early Agricultural period, previously identified as the Late Archaic period, was the period when domesticated plant species were first cultivated in the Greater Southwest. The precise timing of the introduction of cultigens from Mexico is not known, although direct radiocarbon dates on maize indicate it was being cultivated in the Tucson Basin and several other parts of the Southwest by 2100 B.C. (Mabry 2008). By at least 400 B.C., groups were living in substantial agricultural settlements in the floodplain of the Santa Cruz River. Recent archaeological investigations suggest canal irrigation also began sometime during this period.

Several Early Agricultural period sites are known from the Tucson Basin and its vicinity (Diehl 1997; Ezzo and Deaver 1998; Freeman 1998; Gregory, ed. 2001; Huckell and Huckell 1984; Huckell et al. 1995; Mabry 1998, 2008; Roth 1989). While there is variability among these sites—probably due to the 2,150 years included in the period—all excavated sites to date contain small, round, or oval semisubterranean pithouses, many with large internal storage pits. At some sites, a larger round structure is also present, which is thought to be for communal or ritual purposes.

Stylistically distinctive Cienega, Cortaro, and San Pedro type projectile points are common at Early Agricultural sites, as are a range of ground stone and flaked stone tools, ornaments, and shell jewelry (Diehl 1997; Mabry 1998). The fact that shell and some of the material used for stone tools and ornaments were not locally available in the Tucson area suggests trade networks were operating. Agriculture, particularly the cultivation of corn, was important in the diet and increased in importance through time.

Table 1.1. Periods, phases, and chronology of the Santa Cruz Valley-Tucson Basin.

Era/Period	Phase	Date Range
Historic		
American Statehood	–	A.D. 1912-present
American Territorial	–	A.D. 1856-1912
Mexican	–	A.D. 1821-1856
Spanish	–	A.D. 1694-1821
Protohistoric	–	A.D. 1450-1694
Prehistoric		
Hohokam Classic	Tucson	A.D. 1300-1450
	Tanque Verde	A.D. 1150-1300
Hohokam Sedentary	Late Rincon	A.D. 1100-1150
	Middle Rincon	A.D. 1000-1100
	Early Rincon	A.D. 950-1000
Hohokam Colonial	Rillito	A.D. 850-950
	Cañada del Oro	A.D. 750-850
Hohokam Pioneer	Snaketown	A.D. 700-750
	Tortolita	A.D. 500-700
Early Ceramic	Late Agua Caliente	A.D. 350-500
	Early Agua Caliente	A.D. 50-350
Early Agricultural	Late Cienega	400 B.C.-A.D. 50
	Early Cienega	800-400 B.C.
	San Pedro	1200-800 B.C.
	(Unnamed)	2100-1200 B.C.
Archaic	Chiricahua	3500-2100 B.C.
	(Occupation gap?)	6500-3500 B.C.
	Sulphur Springs-Ventana	7500-6500 B.C.
Paleoindian		11,500?-7500 B.C.

However, gathered wild plants, such as tansy mustard and amaranth seeds, mesquite seeds and pods, and agave hearts, were also frequently used resources. As in the preceding Archaic period, the hunting of animals such as deer, cottontail rabbits, and jackrabbits, continued to provide an important source of protein.

Early Ceramic Period (A.D. 50-500)

Although ceramic artifacts, including figurines and crude pottery, were first produced in the Tucson Basin during the Early Agricultural period (Heidke and Ferg 2001; Heidke et al. 1998), the widespread use of ceramic containers marks the transition to the Early Ceramic period (Huckell 1993). Undecorated plain ware pottery was widely used in the Tucson Basin by about A.D. 50, marking the start of the Early Agua Caliente phase (A.D. 50 350).

Architectural features became more formalized and substantial during the Early Ceramic period, representing a greater investment of effort in construction, and perhaps more permanent settlement. A number of pithouse styles are present, including small, round, and basinshaped houses, as well as slightly larger subrectangular structures. As during the Early Agricultural period, a class of significantly larger structures may have functioned in a communal or ritual manner.

Reliance on agricultural crops continued to increase, and a wide variety of cultigens, including maize, beans, squash, cotton, and agave, were an integral part of the subsistence economy. Populations grew as farmers expanded their crop production to floodplain land near permanently flowing streams, and it is assumed that canal irrigation systems also expanded. Evidence from archaeological excavations indicates trade in shell, turquoise, obsidian, and other materials intensified and that new trade networks developed.

Hohokam Sequence (A.D. 500-1450)

The Hohokam tradition developed in the deserts of central and southern Arizona sometime around A.D. 500 and is characterized by the introduction of red ware and decorated ceramics: redonbuff wares in the Phoenix Basin and redonbrown wares in the Tucson Basin (Doyel 1991; Wallace et al. 1995). Red ware pottery was introduced to the ceramic assemblage during the Tortolita phase (A.D. 500-700). The

addition of a number of new vessel forms suggests that, by this time, ceramics were utilized for a multitude of purposes.

Through time, Hohokam artisans embellished this pottery with highly distinctive geometric figures and life forms such as birds, humans, and reptiles. The Hohokam diverged from the preceding periods in a number of other important ways: (1) pithouses were clustered into formalized courtyard groups, which, in turn, were organized into larger village segments, each with their own roasting area and cemetery; (2) new burial practices appeared (cremation instead of inhumation) in conjunction with special artifacts associated with death rituals; (3) canal irrigation systems were expanded and, particularly in the Phoenix Basin, represented huge investments of organized labor and time; and, (4) large communal or ritual features, such as ballcourts and platform mounds, were constructed at many village sites.

The Hohokam sequence is divided into the preClassic (A.D. 5001150) and the Classic (A.D. 11501450) period. At the start of the pre-Classic, small pithouse hamlets and villages were clustered around the Santa Cruz River. However, beginning about A.D. 750, large, nucleated villages were established along the river or its major tributaries, with smaller settlements in outlying areas serving as seasonal camps for functionally specific tasks such as hunting, gathering, or limited agriculture (Doelle and Wallace 1991). At this time, large, basinshaped features with earthen embankments, called ballcourts, were constructed at a number of the riverine villages. Although the exact function of these features is unknown, they probably served as arenas for playing a type of ball game, as well as places for holding religious ceremonies and for bringing different groups together for trade and other communal purposes (Wilcox 1991b; Wilcox and Sternberg 1983).

Between A.D. 950 and 1150, Hohokam settlement in the Tucson area became even more dispersed, with people utilizing the extensive bajada zone as well as the valley floor (Doelle and Wallace 1986). An increase in population is apparent, and both functionally specific seasonal sites, as well as more permanent habitations, were now situated away from the river; however, the largest sites were still on the terraces just above the Santa Cruz. There is strong archaeological evidence for increasing specialization in ceramic manufacture at this time, with some village sites producing decorated redonbrown ceramics for trade throughout the Tucson area (Harry 1995; Heidke 1988, 1996b; Huntington 1986).

The Classic period is marked by dramatic changes in settlement patterns and possibly in social organization. Aboveground adobe compound architecture appeared for the first time, supplementing, but not replacing, the traditional semisubterranean pithouse architecture (Haury 1928; Wallace 1995). Although corn agriculture was still the primary subsistence focus, extremely large Classic period rock-pile field systems associated with the cultivation of agave have been found in both the northern and southern portions of the Tucson Basin (Doelle and Wallace 1991; Fish et al., eds. 1992).

Platform mounds were also constructed at a number of Tucson Basin villages sometime around A.D. 1275-1300 (Gabel 1931). These features are found throughout southern and central Arizona and consist of a central structure that was deliberately filled to support an elevated room upon a platform. The function of the elevated room is unclear; some were undoubtedly used for habitation, whereas others may have been primarily ceremonial. Building a platform mound took organized and directed labor, and the mounds are believed to be symbols of a socially differentiated society (Doelle et al. 1995; Elson 1998; Fish et al., eds. 1992; Gregory 1987).

By the time platform mounds were constructed, most smaller sites had been abandoned, and Tucson Basin settlement was largely concentrated at only a half-dozen large, aggregated communities. Recent research has suggested that aggregation and abandonment in the Tucson area may be related to an increase in conflict and possibly warfare (Wallace and Doelle 1998). By A.D. 1450, the Hohokam tradition disappeared from the archaeological record.

Protohistoric Period (A.D. 14501694)

The Hohokam disappeared from view around A.D. 1450. The timespan between then until the mid-1690s, when Father Kino first traveled through southern Arizona, is called the Protohistoric period (Doelle and Wallace 1990). By that time, the Tohono O'odham people were living in the arid desert regions west of the Santa Cruz River, and groups that lived in the San Pedro and Santa Cruz valleys were known as the Sobaipuri (Doelle and Wallace 1990; Masse 1981). Both groups spoke the O'odham language and, according to historic accounts and archaeological investigations, lived in oval jacal surface dwellings rather than pithouses. One of the larger Sobaipuri communities was located at Bac, where the Spanish Jesuits, and later the Franciscans, constructed the mission of San Xavier del Bac (Huckell 1993; Ravesloot 1987).

Spanish and Mexican Periods (A.D. 16941856)

Spanish exploration of southern Arizona began at the end of the seventeenth century A.D. Early Spanish explorers in the Southwest noted the pres-

ence of Native Americans living in what is now the Tucson area. These groups comprised the largest concentration of population in southern Arizona (Doelle and Wallace 1990). In 1757, Father Bernard Middendorf arrived in the Tucson area, establishing the first local Spanish presence. Fifteen years later, the construction of the San Agustín Mission near a Native American village at the base of A-Mountain was initiated, and by 1773, a church was completed (Dobyns 1976:33).

In 1775, the site for the Presidio of Tucson was selected on the eastern margin of the Santa Cruz River floodplain. In 1776, Spanish soldiers from the older presidio at Tubac moved north to Tucson, and construction of defensive and residential structures began. The Presidio of Tucson was one of several forts built to counter the threat of Apache raiding groups who had entered the region at about the same time as the Spanish (Thiel et al. 1995; Wilcox 1981). Spanish colonists soon arrived to farm the relatively lush banks of the Santa Cruz River, to mine the surrounding hills, and to graze cattle. Many indigenous settlers were attracted to the area by the availability of Spanish products and the relative safety provided by the Presidio. The Spanish and Native American farmers grew corn, wheat, and vegetables, and cultivated fruit orchards, and the San Agustín Mission was known for its impressive gardens (Williams 1986).

In 1821, Mexico gained independence from Spain, and Mexican settlers continued farming, ranching, and mining activities in the Tucson Basin. By 1831, the San Agustín Mission had been abandoned (Elson and Doelle 1987; Hard and Doelle 1978), although settlers continued to seek the protection of the Presidio walls.

American Territorial and American Statehood Periods (1856-Present)

Through the 1848 settlement of the Mexican American War and the 1853 Gadsden Purchase, Mexico ceded much of the Greater Southwest to the United States, establishing the international boundary at its present location. The U.S. Army established its first outpost in Tucson in 1856 and, in 1873, founded Fort Lowell at the confluence of the Tanque Verde Creek and Pantano Wash, to guard against continued Apache raiding.

Railroads arrived in Tucson and the surrounding areas in the 1880s, opening the floodgates of Anglo-American settlement. With the surrender of Geronimo in 1886, Apache raiding ended, and the region's settlement boomed. Local industries associated with mining and manufacturing continued to fuel growth, and the railroad supplied the Santa Cruz River valley with the commodities it could not produce locally. Meanwhile, homesteaders established numerous cattle ranches in outlying areas, bringing additional residents and income to the area (Mabry et al. 1994).

By the turn of the twentieth century, municipal improvements to water and sewer service and the eventual introduction of electricity, made life in southern Arizona more hospitable. New residences and businesses continued to appear within an ever-widening perimeter around Tucson, and city limits stretched to accommodate the growing population. Tourism, the health industry, and activities centered around the University of Arizona and Davis-Monthan Air Force Base contributed significantly to growth and development in the Tucson Basin in the twentieth century (Sonnichsen 1982).

History of Fort Lowell

Fort Lowell was established at its current location in 1873, as Camp Lowell, moving from downtown Tucson following complaints about boisterous soldiers and poor living and sanitary conditions. The fort remained in use until 1891, housing army and cavalry units, some of whom engaged Apache warriors throughout southern Arizona. Following the pacification of the Apache, the fort was abandoned and its contents auctioned off (see Thiel and Theriot 2008).

Fort Lowell-Adkins Steel Property History

Detailed historical research on the Fort Lowell-Adkins Steel property has recently been compiled (Thiel 2009; Thiel and Theriot 2008). A brief summary is presented here.

The portion of the fort within the project area housed three Officers Quarters with kitchens and latrines, the adjutant's office, bakery, guardhouse, a portion of the parade ground, and several *acequias*. The three Officers Quarters (Nos. 1-3), the kitchens for Nos. 1 and 2, and the guardhouse are visible today as standing structures or ruins. Additionally, a portion of the bakehouse was exposed during removal of an underground fuel storage tank.

These structures were largely stripped of usable building materials; however, several of the Officers Quarters remained standing and were probably occupied by Mexican-American families following their abandonment. By the early 1900s, Officers Quarters Nos. 2 and 3 were occupied and used as a sanatorium by members of the Dolly Cate family. Members of the Adkins family purchased the property from Dolly Cate in 1928, and lived on the property

for more than 70 years. By the mid-1930s, the Adkins operated a rest home on the southern portion of the property and ran a steel tank fabrication business in the middle and northern portions of the property. Two residences, a large shed, a windmill and tank, and a variety of other structures were built during the time the Adkins family occupied the property.

The City acquired the property after a complex land exchange in 2006. Following acquisition, cleanup efforts removed scrap and debris from the site, the fort-era structures were consolidated, and the Master Plan was completed (Thiel 2009; Thiel and Theriot 2008).

SIGNIFICANCE ASSESSMENT

National Register of Historic Places

The National Register of Historic Places (National Register) is the nation's inventory of historic sites. It was established after the passage of the National Historic Preservation Act of 1966 to promote preservation and study of historic resources. Most projects involving federal agencies, federal land, or federal funds require evaluation and mitigation of their impacts on properties eligible for the National Register. Additionally, many state and local laws, ordinances, and regulations require similar evaluations.

For a property to be listed in the National Register, it must meet integrity requirements and at least one of four significance criteria. These criteria are: (A) association with events that have made a significant contribution to the broad pattern of our history; (B) association with the lives of persons significant in our past; (C) embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or, (D) that have yielded, or may be likely to yield, information important in prehistory or history.

An important aspect of significance is a property's historic context (cultural affiliation and dates of use). If a historic context cannot be established, or if the property cannot be shown to be significant within its historic context, it does not meet eligibility requirements for inclusion in the National Register. Further, except in special circumstances, properties must be at least 50 years old to be considered for inclusion in the National Register.

The Fort Lowell-Adkins Steel property was included in the Fort Lowell Multiple Resource Area, which was nominated to the National Register of Historic Places in 1977, and was listed on the National Register on 10 April 1978. The property is eligible for inclusion under Criterion A for the events associated with Fort Lowell, under Criterion C for the distinctive architectural elements of Officers Quarters No. 3, and under Criterion D based on the archaeological resources likely to be present dating to the Prehistoric and Historic eras (Thiel et al. 2008:47-48).

ARCHAEOLOGICAL BACKGROUND

Archaeological investigations have been conducted in the Fort Lowell area since 1935, when the Arizona Archaeological and Historical Society and the University of Arizona Anthropology Department visited Fort Lowell and filled treasure-hunters holes around many buildings (Thiel and Theriot 2008).

A records check was conducted at ASM and at AZSITE. Cultural resource survey and site information reported in this section reflects records available in November 2012. Archaeological sites found within 1 mile of the project area are listed in Table 1.2, and the locations of these sites are depicted in Figure 1.4.

Prehistoric Archaeology

Prehistoric archaeological resources were first noted at Fort Lowell in 1884, by Adolf Bandelier (Gregonis 1997b:viii). On Thanksgiving Day, 1917, Dr. Robert F. Gilder, an archaeologist at the University of Nebraska, spent several hours wandering about the ruins. He was surprised to find prehistoric pottery sticking out of the adobe walls. His explorations led him to the borrow pits, where dirt for the adobe was mined, and there, he found additional pottery. Badger holes were a source of pottery and grinding stones. Gilder collected examples of pottery, two ceramic disks, and five manos, probably for the University of Nebraska collections (*Tucson Citizen* 1917).

An archaeological excavation was conducted between 1976 and 1978, by ASM. Linda Gregonis subsequently prepared a site card for the Hardy site in 1979. This prehistoric Hohokam site encompasses a large area surrounding historic Fort Lowell.

The 1976-1978 excavations were conducted on the eastern side of the park near the pecan grove and the baseball diamond; 36 features were documented in a relatively small area. These included nine pit structures, "caliche borrow pits, possible storage pits, a work area, roasting pits, a cemetery-offertory area, and enigmatic groups of postholes" (Gregonis 1997b:11). The features dated from about A.D. 650-1300, indicating the occupation was both lengthy and intensive.

Table 1.2. Previously recorded archaeological sites within 1 mile of the current project area.

AZ ASM Site Number, Name	Site Type	Site Age	Year Recorded
BB:9:118, Hill Farm	Artifact scatter	Prehistoric	1982
BB:9:13	Artifact scatter	Prehistoric	1937
BB:9:14, Hardy Site	Village	Prehistoric	1979
BB:9:19	Artifact scatter	Prehistoric	1938
BB:9:20	Habitation area	Prehistoric	1938
BB:9:219	Artifact scatter	Prehistoric, historic	1987
BB:9:220	Outhouse pit	Historic	1987
BB:9:24	Artifact scatter	Prehistoric	1938
BB:9:25	Possible habitation area	Prehistoric	1938
BB:9:26	Artifact scatter and possible wall alignment	Prehistoric	1938
BB:9:302	Well and water control	Historic	1996
BB:9:309	Habitation area and trash deposits	Prehistoric, historic	1996
BB:9:310	Trash deposits	Historic	1996
BB:9:314	Roasting pit	Prehistoric	1997
BB:9:315	Habitation area	Prehistoric	1997
BB:9:324, Quartermaster's dump	Trash deposits	Historic	1998
BB:9:325, Corbett Canal	Canal	Historic	1998
BB:9:356	Homesite	Historic	2000
BB:9:366	Artifact scatter and possible wall alignment	Prehistoric	2002
BB:9:377	Hearth and artifact scatter	Prehistoric, historic	2003
BB:9:387	Pipe culvert and ditch	Historic	2004
BB:9:40, Fort Lowell	Military fort and site	Historic	1960
BB:9:54	Habitation area	Prehistoric	1969
BB:9:72, Bandquarters, Kitchen	Military building and site	Historic	1973
BB:9:95	Trash mound and artifact scatter	Prehistoric	1980
Nearby Historic Buildings			
MPAEXP-8133	Commissary and Quartermaster Offices		
MPAEXP-8134	Commissary and Quartermaster Offices		
MPAEXP-8135	Commissary Cellar		
MPAEXP-8138	Sutler's Store; Post Trader's Store and Riallito House		
MPAEXP-8140	Sutler's Storehouse		
MPAEXP-8141	Fort Lowell District building		
MPAEXP-8142	Fort Lowell District building		
MPAEXP-8143	Fort Lowell District building		
MPAEXP-8144	Fort Lowell District building		
MPAEXP-8145	Fort Lowell District building		
MPAEXP-8146	Fort Lowell District building		
MPAEXP-8147	Fort Lowell District building		
MPAEXP-8148	Fort Lowell District building		

Two Snaketown phase (A.D. 700-750) features were documented, consisting of a pithouse and a possible storage pit. Only a small portion of the pithouse was uncovered, and its orientation is unknown. Other features from this phase are likely located nearby.

Two nearby pithouses may date to either the late Snaketown or the early Cañada del Oro phase (A.D. 750-850). Only small portions were uncovered. A plastered cemetery-offertory area and three caliche borrow pits dating to this phase were also located. The caliche was mined to make plaster, probably for pithouse floors. The cemetery-offertory area yielded human remains in two small pits, a number of reconstructible vessels, and a human figurine (Gregonis 1997b:11, 31).

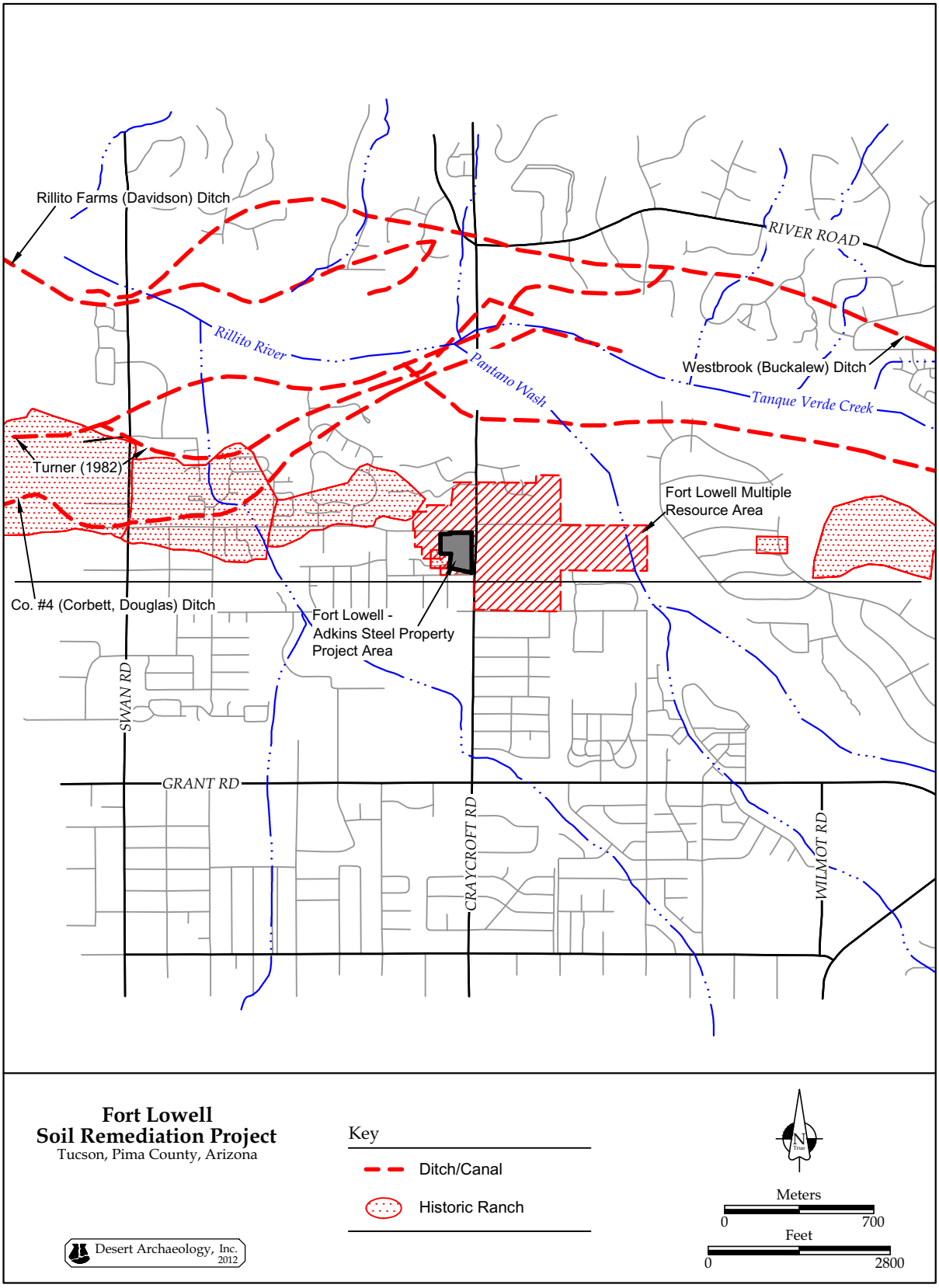

Figure 1.4. For the publicly available version of this report, site location information has been removed from this figure. The figure shows the relationship of the project area to the distribution of historic ranches and irrigation canals/ditches in the area where Pantano and Tanque Verde washes join to form the Rillito River.

A number of pithouses and pits dating to the Rillito phase (A.D. 850-950) were located. Most of the Rillito phase features were heavily damaged by later prehistoric construction activities, so only fragments of the houses survived. In contrast, the three Late Rincon (possibly Tanque Verde) phase (A.D. 1100-1150) pithouses were well preserved. Two of the pithouses were arranged in a courtyard setting; two roasting pits, an activity area, and an ash pile dating to this phase were also uncovered. A few Tanque Verde phase artifacts, dating to roughly A.D. 1150-1300, were found scattered throughout the area.

Gregonis (1997b) excavated a relatively small area, and the density of features was very high in the area explored. Large numbers of features are almost certainly present in the surrounding area.

Work at a nearby prehistoric site, located north of Fort Lowell between the Rillito River and River Road, was conducted in 1982, by ASM personnel. AZ BB:9:54 (ASM) was on the western side of Craycroft Road, and was excavated during a road-widening project. Four pit structures and two caliche mining pits were documented dating to the late Sedentary period, around A.D. 1100. The site may be associated with the Hardy site, AZ BB:9:14 (ASM), perhaps representing a farmstead where residents lived while tending crops along the Rillito (Huntington 1982).

Sometime around A.D. 500, populations in southern and central Arizona began to aggregate into large villages. These villages would remain the focal point of habitation for the next 600 years. Although information about the Hardy site is limited, it appears to be one of these primary villages (Gregonis 1997b). Located above the confluence of the Pantano and Tanque Verde washes, occupants of the Hardy site would have been well positioned to take advantage of arable land and relatively plentiful water. While the exact size of the village is not known, Gregonis (1997b) shows 14 trash mounds at the site. At other sites in the Tucson Basin, trash mounds have been shown to be reliable indicators of pithouse clusters or courtyard groups. The number of trash mounds identified, in conjunction with the likelihood that many others were destroyed, points to a village-sized population living at the Hardy site.

Ceramics dating from the Sweetwater phase (circa A.D. 650-700) and a possible structure dating to that same time indicate settlement of the village occurred during the phase of early village formation in southern Arizona (Gregonis 1997b). Habitation continued through the succeeding Colonial period (A.D. 750-950) and Sedentary period (A.D. 950-1150). Like many of the large villages, the Hardy site appears to have been abandoned by the Tanque Verde phase, with the inhabitants moving to the nearby University Indian Ruin, AZ BB:9:33 (ASM) (Gregonis 1997b).

Historic Archaeology

Fort Lowell was assigned site number AZ BB:9:40 (ASM) by William Wasley in August 1960 (ASM site card). Additional site numbers have been assigned to the fort by other archaeologists—AZ BB:9:72 (ASM) for the bandquarters and kitchen, and AZ BB:9:324 (ASM) for the quartermaster's dump—but both should be considered part of BB:9:40.

Alfred Johnson excavated a portion of Fort Lowell in 1960, prior to construction of a parking lot (Johnson 1960). During Johnson's (1960) project, one of the Officers Quarters was completely excavated, the commanding Officers Quarters were partially excavated, three other Officers Quarters were tested, and several outhouses were excavated, as was a trash-filled pit. Johnson (1960) noted that buildings were constructed from unfired adobe bricks measuring 50 cm by 30 cm by 10 cm. Interior walls of these structures were plastered, while exterior walls were left unplastered.

Artifacts from this excavation are housed at ASM and are contained within 22 boxes (6 glass, 2 ceramic, 2 glass/ceramic, 9 mixed, 1 glass/plaster/ceramic, 1 metal, and 1 glass/wood/ ceramic). These items have never been formally analyzed. A brief examination of the artifacts indicates many are from the post-fort era and represent items discarded by Mexican families living in the abandoned structures, as shown by items with maker's marks that postdate 1891. The Arizona Historical Society (AHS) in Tucson has a manuscript on file containing information about the project (MS 265, AHS). This material includes the original maps drawn by Johnson, drawings of architectural elements found in other buildings and reported to be from Fort Lowell, and a variety of black-and-white photographs.

Excavations in 1982, documented the bandquarters kitchen, where members of the regimental band had a mess hall, kitchen, and storage room during occupation of the fort (Huntington 1982). This structure is located on the eastern side of Craycroft Road and widening of that road necessitated the project, which documented the structure and recovered associated artifacts. At about the same time, excavations were conducted at the cavalry stables and corral, resulting in documentation of standing portions of the wall, as well as recovery of a small number of artifacts (Huntington 1982).

In 1988, the Institute for American Research (now Desert Archaeology, Inc.) conducted monitoring of waterline trenches dug along the eastern side of N.

Craycroft Road, between Glenn Street and St. Gregory's High School (Dart 1988). Eight archaeological features were documented. Three of these features, two pithouses and a roasting pit, were prehistoric. One pithouse yielded Middle Rincon phase (A.D. 1000-1100) ceramics. Five other features dated to the Historic era. Four were associated with Fort Lowell and consisted of the area of the commanding Officers Quarters, two pits, and a midden area. Another feature was a possible irrigation ditch from the Fort Lowell occupation or later.

On 3 October 1990, Jonathan Mabry of Desert Archaeology surveyed the Adkins Steel property for the City of Tucson. He noted the presence of prehistoric and historic artifacts scattered about the property, as well as the three Officers Quarters and the guardhouse of Fort Lowell (Mabry 1990).

Architectural evaluations conducted in 1994 and 1997 at the Hardy homesite, located at the northeastern corner of Craycroft and Fort Lowell roads, and at the Quartermaster and Commissary Storehouse at the northwestern corner of these streets, indicated that features associated with Fort Lowell and the Hardy sites were also likely to be found in these areas (Thiel 1994, 1997).

Monitoring of the emergency stabilization work for the second Officers Quarters and kitchen was conducted in August 2007. Portions of the wooden floor in the southeastern room of this structure were removed so that wall bracing elements could be installed. A whiteware cup and a stoneware Dundee Marmalade jar were found beneath the floor, suggesting additional fort-era refuse may be present in this and other rooms. Newspapers from the 1930s were present beneath the deteriorated linoleum on the southern side of the quarters, in the area of a former porch. Other newspapers from 1920 were present beneath the cement capping elements that once lined the parapet of the quarters and its adjacent kitchen (Thiel and Theriot 2008).

Removal of an underground storage tank in 2007, on the western side of the Adkins steel barn, located a fragmentary brick foundation, or floor support pier, and an ash deposit associated with the post bakery. The uncovered portion was six bricks long, two bricks wide, and several courses tall. Only a small area was uncovered, and the full extent of the feature is not known. It was unclear how much of the bakery was destroyed by placement of the storage tank (Thiel and Theriot 2008).

Removal of a fuel line running from the underground storage tank uncovered portions of the rock foundation of the guardhouse. The guardhouse foundations were partially visible on the ground surface, and additional rock alignments were visible in the trench for the fuel line (Thiel and Theriot 2008).

Artifact-collecting activities have also occurred on the property, focused especially on the latrine features associated with the Officers Quarters. The Fort Lowell Museum contains displays with a number of artifacts purchased from an artifact collector. Some items have also been discovered on the surface within the park, or during excavation of trenches for utility lines. Despite these disturbances, many subsurface features associated with the prehistoric and historic occupation of the site likely remain undisturbed, hidden beneath the modern ground surface.

RESEARCH QUESTIONS

Three research questions guided the monitoring and data recovery efforts on the Fort Lowell-Adkins Steel parcel. The research questions were designed to be applicable for the entire property.

The Prehistory of Fort Lowell

The prehistoric Hardy site lies beneath the later historic Fort Lowell. First noted in 1884, by Adolf Bandelier, relatively little work has been conducted by archaeologists at the site (Thiel et al. 2008:30-32). A small portion excavated within Fort Lowell Park from 1976-1978 uncovered pit structures, pits, and a cremation area, with artifacts dating from A.D. 650-1300 (Gregonis 1997b). Other prehistoric features have been located on the western side of Craycroft Road, north of Fort Lowell Road (Huntington 1982).

The small amount of work and the extensive disturbance of the modern ground surface have left many questions about the prehistory of the Fort Lowell area unanswered. These include the following.

(1) Is an undiscovered Early Agricultural period settlement present at the site? Work since 1994 has revealed that the Tucson Basin was the location of extensive Early Agricultural period settlements, located primarily adjacent to flowing streams (Gregory, ed. 2001; Mabry 1998; Thiel and Mabry 2006). The areas along the Rillito River would seem to be a prime location for Early Agricultural period villages, but, to date, none have been located.

(2) Was the site continuously occupied from the Hohokam Pioneer period to the Hohokam Sedentary period? How did the village move across the landscape through time? Current understanding of the Hardy site has relied on limited excavations and monitoring projects beneath Craycroft Road (Gregonis 1997b; Huntington 1982). The discovery of features with datable artifacts or ethnobotanical

materials suitable for radiocarbon dating should provide a better understanding of the chronology of the site, as well as how settlement patterns changed throughout the history of the site.

(3) Is there evidence for craft manufacture at the household or community level at the site? A number of villages in the Tucson Basin were likely the locations of craft specialization. Pottery was manufactured at the Julian Wash, AZ BB:13:17 (ASM), West Branch, AZ AA:16:3 (ASM), and Valencia sites. There is also evidence that pottery was made at the Hardy site and distributed to the northeastern portion of the Tucson Basin (Heidke 1999). Turquoise may have been collected for trade, and small, decorated ground stone bowls were made at the Redtail site, AZ AA:12:149 (ASM) (Thiel and Elson 2010). Other ground stone production has been noted at Sunset Mesa, AZ AA:12:10 (ASM); Valencia; and Sleeping Snake, AZ BB:9:104 (ASM) (Adams 2000, 2003). Evidence for household level production of shell jewelry has been found at the Julian Wash, Sunset Mesa, and West Branch sites (Vokes 2000, 2005, 2011). Analysis of artifacts recovered from prehistoric features, including the examination of ceramics to determine temper source and manufacturing location, has the potential to extend understanding of activities at the Hardy site (Lindeman 2006).

Daily Life and the Organization of Outdoor Spaces at Fort Lowell

The Fort Lowell-Adkins Steel parcel contains the southwestern corner of historic Fort Lowell, in operation from 1873 through 1891. Three Officers Quarters, their kitchens, their privies, the Adjutant's Office, the bakery, the guardhouse, and a portion of the parade ground are present on the parcel. Surface or subsurface remains are known for all except the parade ground, which may be difficult to locate physically, and the Adjutant's Office. Extensive archival information has been collected for these structures (Thiel and Theriot 2008).

The southern half of the Fort Lowell-Adkins Steel property contains portions of the three quarters, and two of their freestanding kitchens are also present. The kitchen associated with Officers Quarters No. 3 is not visible on the ground surface. The three privies associated with the Officers Quarters are reported to have been looted by artifact collectors and are not visible. Adobe walls separated the quarters from each other, and the foundation of the wall between Officers Quarters Nos. 2 and 3 is visible on the modern ground surface.

The northern half of the property contains the Adjutant's Office, the bake house, and the guardhouse. Portions of the stone and mortar foundation of the guardhouse are visible on the ground surface and were also noted when a modern gasline was removed in 2008. A fired-brick feature associated with the bake house, perhaps a floor joist support, was noted in 2008, when an underground fuel storage tank was removed. As noted, no physical remains of the Adjutant's Office have been located to date.

Extensive archival information survives about the lives of the soldiers and officers living at Fort Lowell. Living conditions, floor plans for buildings, the types of crops raised at the nearby gardens, animals and grain procured from nearby farmers and ranchers, and other information is available. Period photographs show portions of most of the structures. Despite this wealth of information, however, some areas of interest remain unknown.

The material culture of the residents of the Officers Quarters is inadequately documented. The looting of privy features may have destroyed an opportunity to examine the types of dishes, clothing, toys, and other mundane artifacts used by the officers, their wives, their servants, and their children. Other trash-filled features dating to the fort era may be present in backyard areas, and if located, these could provide insights into the possessions and diets of these households.

The presence of walls enclosing the backyards of the Officers Quarters suggests the desire for privacy was strong for these households. Features associated with the fort-era backyards may be located, such as planting holes, postholes for clothesline poles, and animal burials. There is also some question if Officers Quarters No. 3 ever had a backyard kitchen building. The potential is high that new information regarding the organization and use of backyard spaces may be found.

Two research goals could be addressed during work in this area. One would be to identify and document the architectural remnants of the buildings once present. The second would be to identify associated features, such as planting pits, privies, hitching posts, and so forth. Information recovered during the work could provide basic information about how the buildings and surrounding areas were used during the fort era.

A very basic goal would be to locate the Adjutant's Office. This adobe brick building was apparently 50 ft^2, with a porch on the southern, eastern, and northern sides. Despite being invisible on the ground surface, some of the adobe brick foundations could almost certainly be found. Although not noted in fort records, it seems likely that some sort of privy would have been present behind (to the west of) the building. This office was stripped of materials and gradually fell into disrepair. In 1937, it was reported to be in ruins. The discovery of its location would allow for future interpretation of the

structure, as well as accurate placement of interpretative signs.

The location of the bakery has probably been heavily disturbed by an underground fuel storage tank, which was removed in 2008. This adobe brick building was L-shaped, and it measured about 36 ft by 28 ft. Discovery of its foundations would allow for future interpretation. A well was present immediately north of the bakehouse. This structure was depicted on the 1876 map of the fort. The well provided water for bakers, and its discovery provides another interpretative opportunity.

Finally, the guardhouse was present north of the bake house. Remnants of its stone and mortar foundation are visible. The removal of contaminated soils around the foundations should provide an opportunity to more accurately map this building. The building was 52 ft^2, with an attached 48 ft by 28 ft yard where prisoners could exercise. A privy was probably located in the yard, and this may be determined during removal of contaminated soils.

Health Seekers in Early Twentieth Century Tucson

Tuberculosis, frequently called "consumption" or "lung trouble," was a deadly disease prior to the discovery of effective drug treatments in the 1940s. Large numbers of Americans succumbed to the disease, whose cause and preventative measures were vigorously debated by scientists, politicians, and medicine manufacturers. Some people believed that foul air, contaminated water, or heredity caused the disease. By the late nineteenth century, scientists had discovered that a bacteria was the cause, and that spitting and coughing were two factors that led to the spread of the illness. However, convincing the American public that a seemingly invisible, microscopic organism could kill them was challenging (Kravetz and Kimmelman 1998:23-26).

Prior to drug treatments, some people afflicted with tuberculosis moved to Arizona, believing the dry climate and near-constant sunshine would help them regain their health. Among these were prominent Tucson businessman Samuel Hughes, who arrived from California, in 1858 (Sonnichsen 1982:45). The railroad arrival in 1880, increased the number of consumptives arriving, many of whom soon died from the effects of the disease.

Richard "Dixie" and Dolly Cate also moved to Tucson hoping to cure Dixie's tuberculosis. In June 1908, Dixie purchased land in the former Fort Lowell. Unfortunately, he passed away in December 1908. His wife Dolly then opened "Mrs. Cate's Tuberculosis Sanatorium" on the property, using the Officers Quarters and kitchens as housing for 13 male patients in 1920 (Thiel and Theriot 2008:18). She sold the property to Harvey and Fronia Adkins in 1928. The Adkins had come to Tucson in 1926, with their ailing daughter Dicey, who passed away from tuberculosis at the Cate rest home in June 1927. The Adkins, in turn, opened Adkins Rest Home, with 13 patients (10 men and three women) in 1930. The rest home was operated until at least 1950 (Thiel and Theriot 2008:18-19).

Sanatoriums and rest homes for tubercular people closed in the 1950s, as new antibiotics were developed and the treatment of patients passed from private individuals to medical professionals. Tuberculosis remains a health threat today, especially due to the development of antibiotic resistance strains. However, few people know how devastating the disease was in the late nineteenth and early twentieth centuries in Arizona.

Work on the southern portion of the former Fort Lowell-Adkins Steel property may result in the discovery of trash-filled features associated with the Cate and Adkins sanatoria. No previous archaeological projects have been conducted at sanatoriums or rest homes in Arizona. Although tuberculosis-related proprietary medicine bottles are often recovered at American Territorial period archaeological sites in Tucson and Phoenix, these all come from private home contexts, where family members were apparently being treated by medicines that were widely available via local pharmacies or by mail order.

Consequently, the material culture and diet of the residents and staff members of sanatoria and rest homes in Arizona is unknown. While it is likely that most of the items used would be similar to contemporary households in Arizona (for example, whiteware and decal-printed ceramics, commercially produced food and hygiene containers, and so on), it is likely that residents would also have items associated with their struggle to regain their health. Medicine bottles and devices would probably be present in larger quantities than contemporary households. It might be expected that the diet of residents would have been more nutritious than their contemporaries, and conversely, there would be less evidence for alcohol or tobacco consumption. The discovery and excavation of a sample of features associated with the Cate/Atkins rest home would likely provide a new perspective on what life was like for the residents of a tuberculosis sanatorium in early twentieth century Tucson.

CHAPTER 2

ARCHAEOLOGICAL FEATURES DISCOVERED DURING THE FORT LOWELL-ADKINS STEEL SOIL REMEDIATION PROJECT

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Archaeological fieldwork was conducted at the Fort Lowell-Adkins Steel Property locus of the Hardy site, AZ BB:9:40 (ASM), from January through April 2012. In all, 74 archaeological features were located during the removal of contaminated soil (Figure 2.1). A discussion of the methods used during fieldwork, a summary of the finds, and detailed descriptions of selected features are provided in this chapter.

METHODS

The Fort Lowell-Adkins Steel Soil Remediation project was conducted between 12 January and 23 April 2012. An environmental assessment of the Fort Lowell-Adkins Steel Property had been completed following its acquisition by the City of Tucson. The work, conducted by Pat Hartshorne of SCS Engineers, identified areas of soil contaminated by petrochemicals, that is, oil dumped onto the ground, as well as cyanide, arsenic, and lead left behind during the steel tank manufacturing process. Five septic tanks, or cesspools, were also identified for removal. Environmental testing continued during the course of the project and the original boundaries of the excavation units were expanded, where necessary, to clear the property of high levels of hazardous materials. All personnel who worked in the areas of contamination prior to being declared cleared of contamination were Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) trained, undergoing a 40-hour course and an 8-hour refresher course prior to initiation of fieldwork.

Dan Arnit of Innovative Excavating conducted the soil removal. He operated a backhoe equipped with a 7-ft-wide stripping blade. Soil was removed from the contaminated areas in small increments and continued until either the desired depth was reached and/or until visible contamination ceased. Five areas were stripped down to 15 cm below the modern ground surface, while a sixth area was stripped down to approximately 30 cm. One area, within a fort-era structure, was initially mechanically stripped, with additional contamination removed by hand. Following the removal of the contaminated soil, a small amount of additional area was stripped to connect several of the stripping units and to fully expose several features. Five septic tanks, or cesspools, were removed during the course of the project.

All contaminated soil was loaded into containers for removal off-site. A fire hose was used to apply water to work areas to minimize dust. A total of 3,066.97 m^2 was stripped, representing approximately 13.8 percent of the Fort Lowell-Adkins Steel Property.

A grab-sample of diagnostic artifacts was made during stripping from features and nonfeature contexts. As features were located, their edges were marked with white spray paint and each was assigned a feature number, beginning at 101. A few additional features were located during hand-excavation. One feature had been previously assigned a feature number during the initial archaeological survey.

In total, 74 features were designated, with a fenceline, tree planting pits, and a garden area each assigned a primary feature, although each contained numerous individual pits or postholes (Table 2.1).

A sample of features was excavated to answer the research questions proposed in the monitoring plan. A metal detector was used to locate brass or lead artifacts in the historic features. A sample of planting pits and sections of ditches were selected for hand-excavation. The metal detector's reliability varied, and several features where brass or lead were detected failed to produce the pertinent target artifact. Pollen samples were collected from within planting pits.

Ten prehistoric pit structures were located. Control units were excavated in seven structures, either 1 m by 2 m or 2 m by 2 m. Afterward, these houses were completely excavated, in one or two units, with the entryways excavated as a separate unit. All the units were excavated in stratigraphic levels consisting of overburden, Stratum 10, and roof and wall

fall, Stratum 11. Flotation samples were taken from each level. Pollen samples were collected from beneath floor artifacts, which were mapped in place on the floor. Hearths and subfloor pits were excavated separately and assigned subfeature numbers. Postholes were excavated, and those with artifacts were assigned subfeature numbers.

An arbitrary excavation unit was placed in one house, and a narrow test trench was placed in another house. The tenth house was not sampled.

A sample of pits, a ground stone cache, and several pot-breaks was also excavated. Two 1-m by 2-m excavation units were placed in a large trash mound. These were excavated in arbitrary, 10-cm-deep levels, with flotation samples collected from every other level.

Scale drawings were made for all of the pit structures, excavated pits, historic architectural remnants, and for the garden areas. Cross sections and profiles were drawn for pit structures, pits, and ditches. Digital photographs were taken of each excavated feature.

ARCHAEOLOGICAL FEATURES

Archaeological features located on the Fort Lowell-Adkins Steel locus of the Hardy site include prehistoric features dating from the Middle Rincon phase (A.D. 1000-1100) to the start of the Tanque Verde phase (A.D. 1150-1300). A long hiatus in occupation took place until Camp Lowell (later Fort Lowell) was moved to the area in 1873, and several buildings and other features were constructed on the property. An auction was held following the decommissioning of the fort, and successful bidders stripped the buildings and structures of lumber and other materials, exposing most of them to the elements and causing their rapid destruction. The Officers Quarters and two of their kitchen buildings were subsequently re-used as part of a tuberculosis sanitarium and were later used as dwellings.

Features from each of the main occupations, the prehistoric Hohokam, the Fort Lowell era, and the post-fort era, were located during archaeological fieldwork. Summary data on the features are provided in Table 2.1. More detailed descriptions of important features are presented below.

Prehistoric Pit Structures

Ten prehistoric pit structures were located during fieldwork. Seven were completely excavated, two were sampled, and one found late in the project was mapped. Internal features were found in many of the structures (Table 2.2). Most of the houses were burned, and seven contained floor assemblages (Table 2.3).

Feature 104, Late Rincon Phase Pit Structure

Feature 104 (Figures 2.2 and 2.3) was a partially burned, subrectangular true pit structure with a stepped entryway opening to the northeast, and shared a courtyard space with Feature 168. The interior floor area measured approximately 15.91 m^2, and the entry was 1.14 m^2. The total floor area was 17.05 m^2. The structure floor lay 40 cm below the stripped surface and contained no floor assemblage. The northeastern corner contained an intramural storage pit, and the southeastern and southwestern corners each contained a thermal pit. The feature was abandoned in the Late Rincon phase (A.D. 1100-1150). Historic posts, a historic ditch, and a portion of the Fort Lowell parade ground intruded upon the upper structure fill.

Excavation. Mechanical scraping of the area partially defined the northern feature outline. Crew members excavated a 1-m by 2-m screened unit, Unit 113, in the northeastern corner of the structure. Further hand-stripping defined the structure boundaries, and the remaining northern half was excavated and screened as Unit 148. The southern half, Unit 149, was screened and flotation samples were taken from each level of each unit. All intramural features were fully excavated.

Fill Sequence. The feature contained two distinct layers of fill. The upper 20-30 cm of fill consisted of loose, soft, light brown silt, with few charcoal flecks and a high artifact density of 387 artifacts per m^2. The upper layer was almost certainly a postabandonment trash deposit. The lower 5-7 cm of fill above the floor consisted of loose grayish-brown silt, with moderate charcoal and daub inclusions. This lower roof fall layer had a low artifact density of 166 artifacts per m^2.

Construction.

Type. True pit structure.

Wall and Roof. The vertical pit walls served as the lower structure walls. The structure pit measured 4.90 m by 3.60 m. Burned wall plaster covered a few remaining portions in the eastern side of the structure. Heavy rodent and root disturbance, in conjunction with historic intrusion of the Fort Lowell parade ground, negatively affected wall preservation, such that no wall plaster remained in the western half of the feature. Some fallen daub and roof debris were recovered from the lower structure fill. Two postholes flanked the proximal end of the entryway, and three other postholes seem randomly placed throughout the structure, indicating a remodeling or repair of the roof. No exterior posts were located, due to historic disturbance from the parade ground surface.

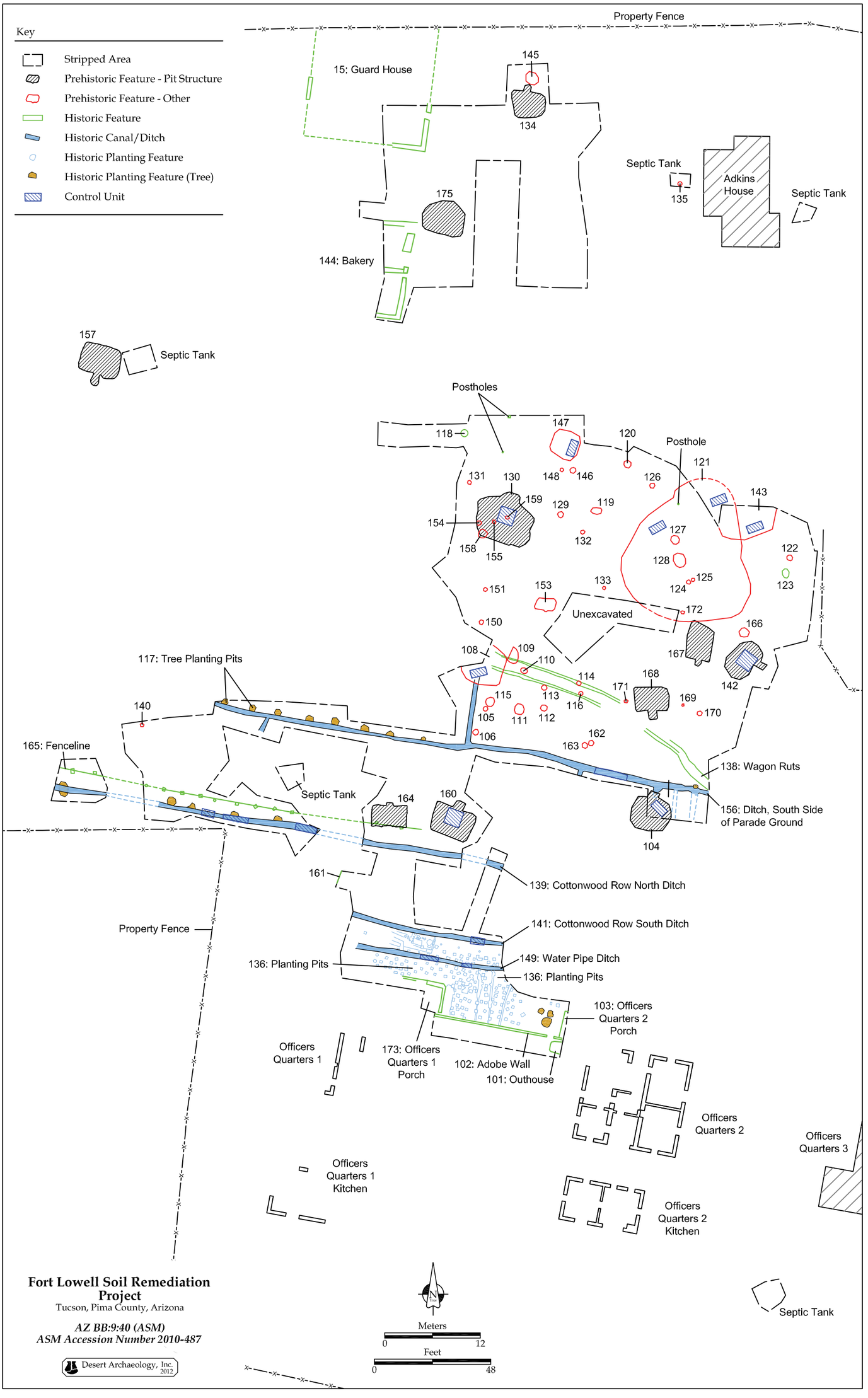

Figure 2.1. Results of archaeological fieldwork, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Table 2.1. List of features documented during the Fort Lowell-Adkins Steel Soil Remediation project.

Feature	Type	Length (m)	Width (m)	Depth (m)	Date	Comments
15	Fort Lowell Guardhouse	–	–	–	1873-1891	Southeastern corner foundation exposed
101	Outhouse pit	1.40	1.30	2.40+	1920s+	Unexcavated, automobile frame stuck out of pit
102	Adobe wall connecting Officers Quarters	16.9	0.27	0.19	1873-1891	Connects Officers Quarters Nos. 1 and 2 along northern side
103	Wooden porch Officer Quarters No. 1	–	–	–	1873-1891+	Attached to northern and eastern sides of Officer Quarters No. 1
104	Pit structure	4.90	3.60	–	Late Rincon	–
105	Small pit	0.64	0.59	–	Historic	Circular, not excavated, no visible artifacts
106	Small pit	0.74	0.70	–	Historic	Not excavated
107	Small pit	0.64	0.57	–		Not excavated
108	Large pit	5.53	5.20	0.32	Late Rincon/Tanque Verde phases	Probable soil mining area
109	Large pit	2.50+	1.60	–	Prehistoric	Not excavated
110	Small pit	0.89	0.70	0.09	Prehistoric	Shallow, basin-shaped pit
111	Small pit	0.62	0.54	0.04	Prehistoric	Sherd concentration in shallow pit
112	Small pit	0.83	0.78	–	Prehistoric	Not excavated
113	Small pit	0.72	0.70	–	Possible Historic	Not excavated
114	Small pit	0.60	0.60	–	Unknown	Not excavated, not sure if real
115	Small pit	1.23	1.09	–	Prehistoric	Not excavated, flaked stone present
116	Sherd cluster	0.33	0.30	–	Prehistoric	Sherd concentration, not pit present
117	Planting pit along Cottonwood Row	1.11	1.02	–	Historic	Round to oval-shaped pit
118	Small pit	0.46	0.22+	0.17	Middle Rincon	Middle Rincon sherds lay on base of pit
119	Small pit	1.35	1.10	0.58	Middle Rincon	Pit containing sherds
120	Ground stone cache	0.46	0.46	0.25	Prehistoric	Pestle and metate preform found in pit
121	Trash mound	17.83	15.4	0.54	Middle Rincon 1	Large trash mound, two 1 m by 2 m excavation units
122	Small pit	0.71	0.69	–	Prehistoric	Not excavated
123	Small pit	1.20	0.90	–	Historic	Contains animal bones
124	Small pit	0.54	0.53	–	Prehistoric	Not excavated, intrudes into Feature 121
125	Small pit	0.45	0.45	–	Prehistoric	Not excavated, intrudes into Feature 121
126	Stone cluster	0.66	0.36	–	Historic	Not excavated
127	Small pit	1.10	1.08	–	Possible Historic	Not excavated
128	Large pit	1.86	1.43	–	Possible Historic	Not excavated, intrudes into Feature 121
129	Roasting pit	0.60	0.50	–	Prehistoric	Not excavated
130	Pit structure	5.70	3.50	0.21	Middle Rincon 2 or 3	–

Table 2.1. Continued.

Feature	Type	Length (m)	Width (m)	Depth (m)	Date	Comments
131	Toasting pit	0.48	0.46	–	Possible Historic	Not excavated, contains rocks
132	Small pit	0.61	0.49	–	Prehistoric	Not excavated, contains sherds
133	Small pit	0.42	0.37	0.19	Prehistoric	Pit contained a core and a large worked sherd
134	Pit structure	4.15	2.55	0.37	Middle Rincon 3 to Late Rincon	–
135	Small pit	0.80	0.80	0.20	Late Rincon	Pit containing sherds
136	Planting pits	–	–	–	1873-1891	About 100 small square and rectangular planting pits
138	Wagon ruts	17.00+	2.05		Historic	Pair of ruts, about 1.65 m apart
139	Ditch	–	0.60	0.20	1873+	South ditch for Cottonwood Row
140	Pit with a pot	0.48	0.48	0.12	Late Rincon	Pit containing several reconstructible vessels
141	Ditch	–	0.58	0.16	1873-1891	Ditch on south and west side of parade ground
142	Pit structure	5.05	3.62	–	Middle Rincon	–
143	Trash area	7.41	4.68	0.23	–	Midden area, may be part of Feature 121
144	Fort Lowell bake house	10.00+	6.32+	0.30	1873-1891	Adobe brick floor and ovens
145	Large pit	–	–	–	Prehistoric	Not excavated
146	Small pit	0.74	0.70	–	Prehistoric	Not excavated
147	Soil mining pit	3.47	3.43	0.35	Middle Rincon	Irregularly shaped pit
148	Small pit	0.64	0.50	0.19	Prehistoric	Basin-shaped pit with sherds
149	Utility trench	–	0.44	0.18	Historic	water pipe was once present
150	Small pit	0.63	0.57	–	Prehistoric	Not excavated
151	Small pit	0.54	0.52	–	Prehistoric	Not excavated
153	Large pit	2.58	1.65	–	Historic	Not excavated
154	Chicken burials	–	–	–	Modern	Several chicken burials intruding into Feature 130
155	Small pit	0.53	0.46	0.39	Prehistoric	Pit intrudes into pit structure Feature 130
156	Parade ground ditch	–	–	–	1873-1891	Planting pits along portions of ditch
157	Pit structure	5.00	3.60	0.23	Transitional Middle Rincon 3 to Late Rinson	–
158	Small pit	1.10	1.05	0.36	Prehistoric	Pit intrudes into pit structure Feature 130
159	Small pit	0.48	0.42	0.29	Prehistoric	Pit intrudes into pit structure Feature 130
160	Pit structure	5.25	3.68	0.46	Mixed Late Rincon to Tanque Verde	–
161	Large pit	2.16	–	0.79	1950s	Adkins family trash
162	Small pit	0.70	0.66	0.08	Prehistoric	Basin-shaped pit with large rock
163	Small pit	0.78	0.72	–	Prehistoric	Not excavated, possibly historic

Table 2.1. Continued.

Feature	Type	Length (m)	Width (m)	Depth (m)	Date	Comments
164	Pit structure	4.45	2.50	0.09	Mixed Late Rincon/Tanque Verde	Storage structure
165	Cottonwood Row picket fenceline	–	–	–	1873-1891	Rectangular to square posts, set 8 ft apart
166	Small pit	1.36	1.14	0.58	Prehistoric	Trash-filled pit
167	Pit structure	4.80	3.14	0.13	Transitional Late Rincon/Tanque Verde	–
168	Pit structure	4.30	3.00	0.12	Late Rincon	–
169	Small pit	0.39	0.39	0.10	Mixed Late Rincon/Tanque Verde	Shallow, basin-shaped pit, contained plain ware sherds
170	Roasting pit	0.60	0.55	–	Prehistoric	Not excavated, contains fire-cracked rocks and sherds
171	Small pit	0.45	0.45	0.15	Prehistoric	Basin-shaped pit, contains ceramic vessel base
172	Small pit	0.46	0.44	0.11	Late Rincon	–
173	Officer Quarters No. 1 porch	–	–	–	1873-1891+	Wooden joists for porch
174	Small pit	0.86	?	0.21	–	Intrudes in Feature 168 pit structure
175	Pit structure	4.90	4.60	0.26	Sedentary period	Not excavated

Table 2.2. Internal features found inside pit structures, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Feature Number	Type	Shape	Length (m)	Width (m)	Depth (m)	Fill	Artifacts[a]	Comments
104.01	Hearth	Elliptical/oblong on top, with a basin-shaped profile	0.34	0.25	0.14	Grayish-brown silt with charcoal flecks	–	–
104.02	Thermal pit	Circular on top, with straight walls and a rounded or flat bottom	0.38	0.42	0.18	Upper 10 cm = charcoal-rich dark brown sandy silt; Lower 8 cm = reddish-brown silty sand	C, GS, mineral	–
104.03	Thermal pit	Elliptical/oblong on top, with a basin-shaped profile	0.82	0.68	0.14	Grayish-brown silt with charcoal flecks	C, FS, FCR	Oxidized rind but unburned pit base
104.04	Nonthermal pit	Circular on top, basin-shaped in profile	0.58	0.56	0.18	Upper 6 cm = charcoal rich dark brown sandy silt with wall melt; Middle 7 cm = wall/roof fall material; Lower 5 cm = nearly black sandy silt with charcoal	–	–
130.01	Hearth	Circular on top, with straight walls and a rounded or flat bottom	0.23	0.23	0.10	Grayish-brown clay loam	–	Well-plastered with a wide plaster apron
130.23	Nonthermal pit	Circular on top, with straight walls and a rounded or flat bottom	0.61	0.55	0.42	Brown sandy loam	C, FS, SH	Pit cut into hard caliche substrate
134.01	Hearth	Circular on top, basin-shaped in profile	0.28	0.28	0.12	Grayish-brown silty loam with ash and charcoal	C	Plaster-lined with a raised collar
142.01	Hearth	Circular on top, basin-shaped in profile	0.32	0.29	0.05	Brown silt with charcoal flecks	C	Plaster-lined, flush with the floor
142.02	Hearth	Circular on top, with straight walls and a rounded or flat bottom	0.19	0.19	0.09	Brown silt with minimal chacoal flecks	C	Plaster-lined, flush with the floor
157.01	Hearth	Circular on top, basin-shaped in profile	0.32	0.30	0.12	Ashy, silty sand	C	Plaster-lined
157.03	Thermal pit	Elliptical/oblong on top with straight walls and a rounded or flat bottom	0.45	0.29	0.11	Light grayish-brown sandy silt with charcoal flecking	–	Oxidized pit edges
157.04	Thermal (ash) pit	Irregular	0.24	0.20	0.06	Ashy grayish brown silt with sand inclusions	C, FS	Oxidized pit edges
160.01	Hearth	Circular on top, basin-shaped in profile	0.28	0.27	0.15	Upper 4 cm = roof fall material; Lower 11 cm = fine gray ash	C	Plaster-lined adobe; apron and hearth rim rose up 4 cm above the floor level
164.01	Potrest	Circular on top, basin-shaped in profile	0.40	0.39	0.09	Tan crumbled adobe and brown silt	–	Adobe-lined

Table 2.2. Continued.

Feature Number	Type	Shape	Length (m)	Width (m)	Depth (m)	Fill	Artifacts[a]	Comments
164.02	Potrest	Circular on top, basin-shaped in profile	0.33	0.27	0.08	Brown silt	–	Adobe-lined
164.03	Potrest	Elliptical/oblong on top, with a basin-shaped profile	0.51	0.36	0.08	–	–	–
164.04	Potrest	Irregular	0.44	0.41	0.08	Brown silt	–	–
164.05	Potrest	Irregular	0.30	0.25	0.08	Brown silt	–	–
167.01	Nonthermal pit	Circular on top, basin-shaped in profile	0.35	0.33	0.12	Brown silt with charcoal flecks	C, FS	–
168.01	Hearth	Circular on top, with straight walls and a rounded or flat bottom	0.20	0.20	0.17	Brown silty sand	–	–

[a]C = ceramic; GS = ground stone; FS = flaked stone; FCR = fire-cracked rock; SH = shell.

Table 2.3. Pit structure floor artifacts, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Feature	Code[a]	Type
130	–	Utilized flake
	–	Utilized core
	–	Multiple-platform core
	–	Red-on-brown hemisperical bowl
	RV 2	Rincon poychrome straight-walled bowl, upside down
	RV 3	Middle Rincon red-on-brown outcurved bowl
	GS 1	Palette
	GS 2	Polisher
	GS 3	Metate
	GS 4	Mano
	GS 5	Polisher
	GS 6	Raw material
	GS 7	Mortar, upside down with red pigment on interior
	GS 8	Polisher
	GS 9	Pestle
	GS 10	Lapstone
	GS 11	Netherstone
	GS 12	Lithic anvil
134	–	Complete flake
	RV 1	Plain ware tall straight-collared jar, above and inside hearth
	RV 2	Middle or Rincon red-on-brown incurved bowl in entryway
	–	Mano
142	–	Tested lithic piece
	–	Complete flake
	SC 1	Plain ware bowl rim
	SC 2	Plain ware body sherds
	GS 1	Netherstone
	GS 2	Netherstone
	GS 3	Netherstone
157	–	Mano
	–	Pestle
	–	Mano
	–	Transitional Middle to Late Rincon Red on brown angled straight-collared jar
160	–	Utilized core
	–	Pressure flaked biface
	RV 1	Sherd cluster (not reconstructible)
	RV 2	Sherd cluster (not reconstructible)
	RV 3	Tanque Verde Red-on-brown tall straight-collared jar
	RV 4	Plain ware fare-rim jar
	–	Pulley-shaped spindle whorl
	GS 1	Pestle
	GS 2	Lapstone
	GS 3	Handstone
	GS 4	Fire-cracked rock
	GS 5	Netherstone
	GS 6	Mano
	GS 7	Mano
	GS 8	Mano
	GS 9	Handstone
	GS 10	Fire-cracked rock

Table 2.3. Continued.

Feature	Code[a]	Type
164	–	Multiple-platform core
	–	Biface fragment
	–	Complete flake
	–	Sherd disk
	–	Plain ware jar, scattered in floor fill
	GS 1	Painted rock
	GS 2	Pestle
	Pigment	
167	RV 1	Plain ware short flare-rim jar
	RV 2	Transitional Late Rincon/Tanque Verde Red-on-brown short flare-rim jar
	GS 1	Netherstone
	GS 2	Handstone
	GS 3	Abrader

[a]RV # = reconstructible vessel; GS # = ground stone; SC = sherd cluster.

Floor. Feature 104 had a well-preserved and level plastered floor, 40 cm below the highest segment of intact wall. It measured approximately 15.91 m^2. The floor had burned patches throughout, but particularly surrounding the hearth and two intramural thermal pits.

Entry. The square entry lay centered on the structure, and was oriented to the northeast. The entry measured 1.03 m in length and 1.22 m in width, tapering to only 1.00 m in width at the distal end. The shallow entry step rose up only 10 cm above the floor surface, with an additional 30-cm-high step up out of the feature. The entry walls and floor were poorly preserved. Two deep postholes flanked the proximal end of the entry, and likely served as doorway supports.

Floor Artifacts. The structure had no distinct floor assemblage.

Remodeling. Missing portions of floor plaster revealed a previous application of plaster below, indicating at least one floor replastering episode. Three irregularly placed postholes in the central and western end of the structure may indicate a roof repair episode.

Internal Features. Four intramural features were located within the structure (see Table 2.2). Feature 104.01 was a poorly preserved, ovate plastered hearth, with a basin-shaped profile that lay in front of the entryway. Features 104.02 and 104.03 were small thermal pits located in the southwestern and northwestern corners of the structure, respectively. Feature 104.04 was a small nonthermal pit situated in the southeastern corner of the structure.

Stratigraphic Relationships. None.

Abandonment and Postabandonment. A lack of floor artifacts and partial burning of the feature suggest the inhabitants cleaned out and perhaps intentionally burned the structure upon abandonment. A high density of artifacts in the upper fill indicates the structure saw extensive reuse as a trash dump postabandonment.

Dating. Ceramic analysis suggests Feature 104 was filled with secondary trash very late in the Late Rincon phase.

Feature 130, Middle Rincon 2 or 3 Pit Structure

Feature 130 (Figures 2.4 and 2.5) was a large, burned, structure-in-pit oriented to the north. Any structures that may have shared a courtyard space with Feature 130 lay to the north or west, outside the mechanically scraped area. The total floor and entry area measured 18.68 m^2, within a house pit measuring 37.2 m^2. It was 33 cm below the stripped surface. The structure floor had two reconstructible vessels and 12 ground stone artifacts. The occupants abandoned the structure in the Middle Rincon phase phase.

Excavation. Mechanical stripping defined the feature outline. A 2-m by 2-m control unit, Unit 138, was placed in the north-central area, near the proposed entryway outline. The remaining eastern half of the structure was exacavated as Unit 142, the western half as Unit 145, and the entryway as Unit 147. All feature fill was screened. The fill between the wall trench and the structure pit edge was hand-excavated and screened separately from the structure fill proper. This structure pit fill theoretically dates from the time of feature construction, while the fill from within the wall trench perimeter dates to the abandonment of the structure. All postholes and intramural features were excavated.

Fill Sequence. The feature contained two strata. The upper 4-7 cm of fill consisted of mottled gray-

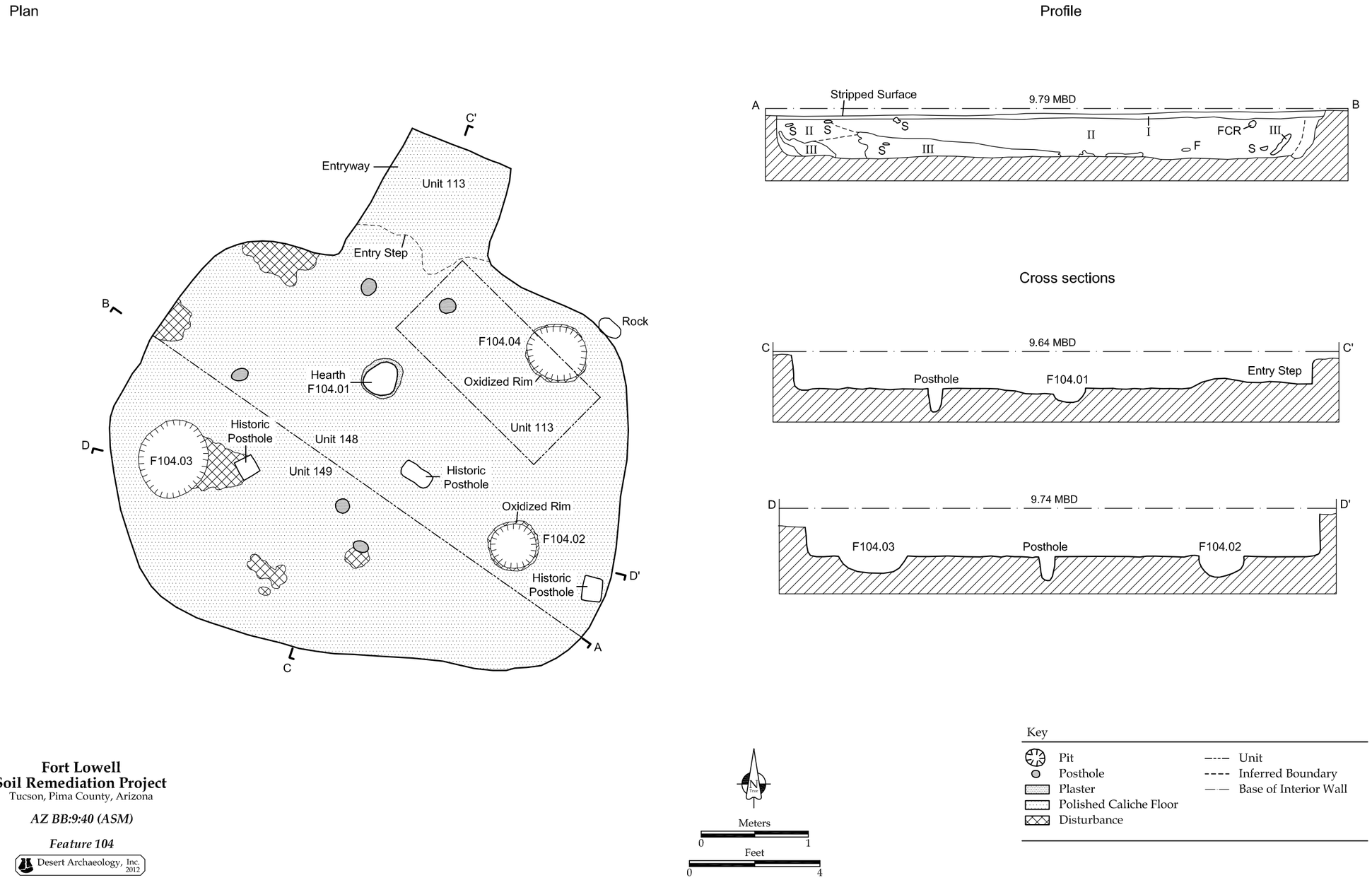

Figure 2.2. Plan view and cross sections of Feature 104, a Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.3. Photograph of Feature 104, a Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

ish-brown, fine-grained clay loam, with a low artifact density of 371 artifacts per m^2. An overlying driveway led to heavy compaction of the upper stratum. The lower 11-16 cm of fill consisted of mottled gray hard, fine-grained clay loam, with a higher artifact density of 284 artifacts per m^2. Artifact density decreased with depth to the floor surface. The lower structure fill contained frequent small pieces of burned daub and charcoal.

Construction.

Type. Structure-in-pit.

Wall and Roof. The structure was dug as a large, irregular structure pit measuring 7.10 m by 5.10 m. A subrectangular wall trench, Feature 130.22, surrounded the structure floor and merged with two entryway floor grooves, one flanking each side, Features 130.04 and 130.21. The structure contained 87 postholes in total; roughly 70 lined the inside perimeter of the structure pit and entryway. Three very large postholes ran down the long axis of the structure, and probably provided the primary roof post support. A 60-cm-long section of adobe structure wall remained just west of the entryway and above the wall trench. The extant adobe wall had a thickness of 4 cm, and rose 5 cm above the average floor level. The wall presumably originated within, or just above, the wall trench. At least 70 postholes, not including entryway postholes, lay within, or immediately surrounding, the wall trench and structure perimeter. At least five of the postholes contained charred post remnants burned in place. Four burned beams lay on the floor in the southern half of the structure.

Floor. Within the wall trench, the livable floor area measured 5.70 m by 3.50 m, for a floor area of 18.09 m^2. The structure had a heavily burned and uneven floor built of smoothed caliche substrate, with the only true plaster in and surrounding the hearth. The floor closely resembled plaster, but closer inspection revealed a well-worked caliche surface. The inhabitants may have wet down and smoothed the existing caliche with ground stone tools to achieve a plaster-like surface. Disturbance heavily damaged the floor in the southeastern quarter of the structure.

Entry. The entry lay centered on the northern side of the structure. The bulbous or teardrop-shaped entry measured 1.70 m in length and 1.10 m in width, tapering to 47 cm wide at the proximal end. The actual entry was approximately 0.59 m^2. A 90-cm-long by 10-cm-wide floor groove and three to six postholes flank each side of the entry. The entry may have had a lintel of stone or wood where a 45-cm-wide gap exists. An upper step of prepared caliche lies 5 cm above the average floor level.

Floor Artifacts. A large number of floor artifacts were present. Flaked stone artifacts included a utilized flake, a utilized core, and a multiple-platform core. Two reconstructible ceramic vessels were found, an upside down Rincon Polychrome bowl found next to the hearth and a Middle Rincon Red-on-brown bowl adjacent to the entryway. Thirteen

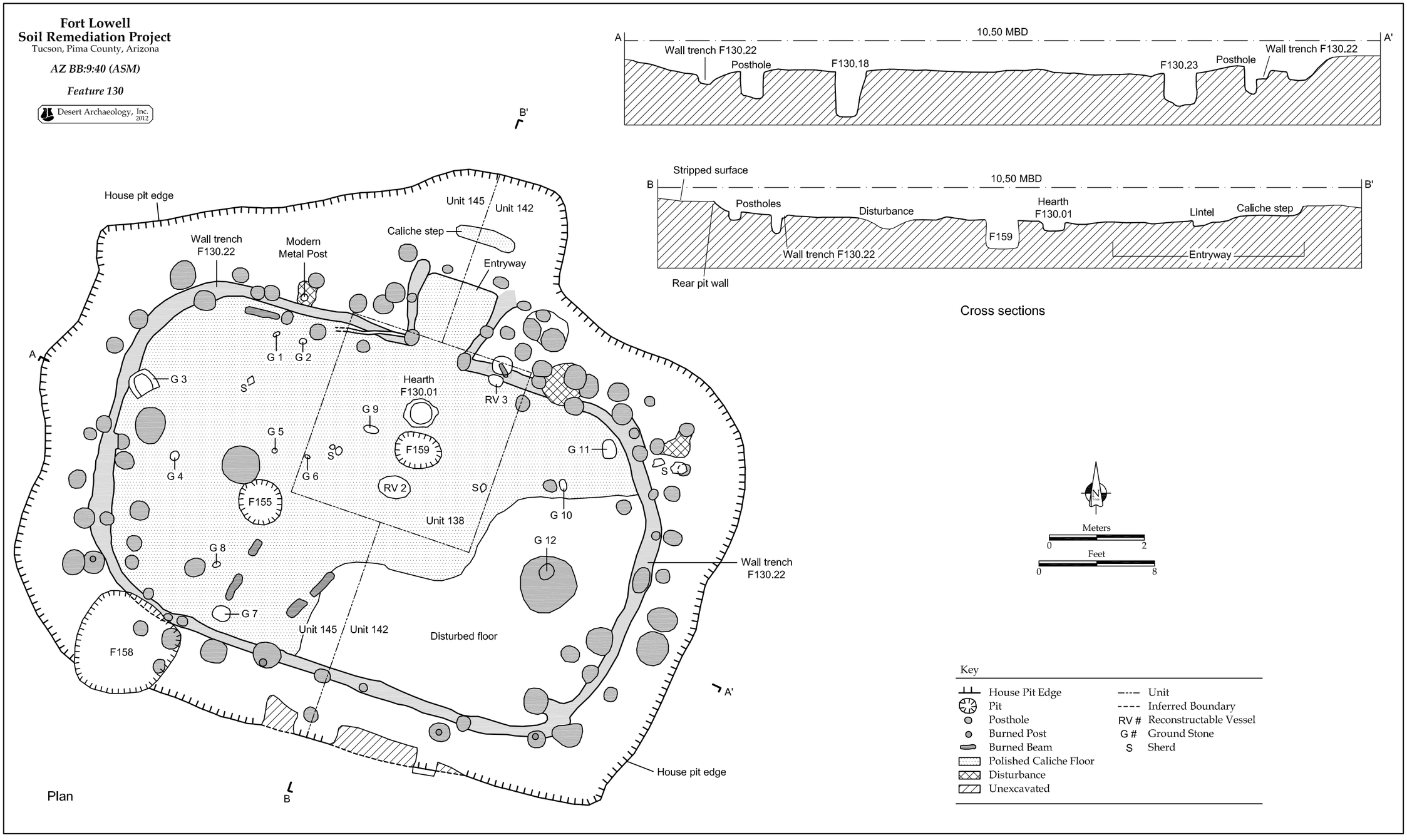

Figure 2.4. Plan view and cross sections of Feature 130, a Middle Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.5. Photograph of Feature 130, a Middle Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

ground stone artifacts were on or near the floor. A palette was found along the northern wall of the structure; nearby was a polisher. The southwestern quarter of the house contained a metate, a mano, a polisher, a piece of raw material, an upside down mortar that had red ochre pigment inside, and a polisher. A pestle was near the hearth. The eastern side of the house contained a lapstone, a netherstone, and a lithic anvil. Some of the ground stone items in the western half of the house were associated with pottery production and may indicate the residents of the house were manufacturing ceramic vessels.

Remodeling. The abundance of perimeter postholes indicates extensive roof repairs or remodels occurred.

Internal Features. The feature contained two intramural features other than postholes (see Table 2.2). Feature 130.01 was a heavily plastered hearth with a wide apron. The hearth lay centered on the entryway, and had vertical sides and a flat base. Moderate disturbance had damaged the plaster lip, but the hearth was well-preserved otherwise. Feature 130.23 was a nonthermal storage pit in the eastern central part of the structure. For additional information on the hearth and pit, see Table 2.2.

Stratigraphic Relationships. Feature 130 did not intrude any features. Eight pits and one modern metal pipe intruded upon the structure. Five pits, Features 154.01-154.05, each containing the bones of a chicken, intruded on the western end of the structure. The intrusive chicken pits likely date to modern or late historic contexts. None of the intrusive chicken pits cut through the structure floor. A small but deep intrusive pit, Feature 155, originated at the top of the roof fall layer and beneath the upper structure fill, indicating the pit cut into the feature after abandonment and roof collapse but prior to the structure filling in completely. A large pit, Feature 158, intruded into the southwestern corner of the structure, cutting through the structure pit edge and three perimeter postholes. A small pit, Feature 159, intruded through the structure floor, possibly postabandonment, but prior to the burning of the structure and collapse of the roof. A modern posthole with a vertical metal pipe was through the feature fill into the northwestern end of the structure, which intruded into the wall trench.

Abandonment and Postabandonment. The structure contained at least 12 ground stone artifacts on the floor, but only four were formal tools. The other

eight were either exhausted or expedient tools. The paucity of formal tools on the floor suggests the occupants may have cleaned out the structure prior to abandonment. The burned floor, burned in situ posts, and burned roof material in the fill indicate the structure burned postabandonment. Multiple pits intruded into the structure postabandonment, but the low artifact density in the upper structure fill suggests the feature may not have been used extensively as a trash dump postabandonment.

Dating. Ceramic analysis temporally places Feature 130 in the Middle Rincon phase. The ceramics recovered from the fill of the house are consistent with a typological placement in Middle Rincon 2 (A.D. 1040-1080), but would require design attribute analysis to be unequivocle. The Rincon Polychrome reconstructible vessel found in the roof fall is consistent with Middle Rincon 2 or Middle Rincon 3 (A.D. 1040-1100).

Feature 134, Middle Rincon 3 to Late Rincon Phase Pit Structure

Feature 134 (Figures 2.6 and 2.7) was a heavily burned true pit structure oriented to the north. The structure lay at the northern edge of the stripped site area, and any likely associated structures lay beneath Fort Lowell Road. The smoothed caliche floor of Feature 134 had a floor and entry surface area of 10.69 m^2, and was 39 cm beneath the stripped surface. A large extramural pit, Feature 145, lay just outside the structure entryway but was not excavated. Structure abandonment dates to the Middle Rincon 3 to Late Rincon phase.

Excavation. Mechanical stripping defined the feature outline. Unit 154, a 1-m by 2-m control unit, was excavated in the north-central portion of the structure, just south of the entryway outline. The remaining southern three-quarters of the structure was excavated as Unit 155, matching the northern edge of Unit 155 to the northern extent of Unit 154, thereby making an east-west profile across the structure. That profile was drawn, and the remaining structure fill to the north was excavated as Unit 156, and the entryway as Unit 157. The excavators screened all fill from all units, and excavated all intramural features.

Fill Sequence. The structure contained two distinct strata. The upper 10-16 cm consisted of heavily compacted light brown sandy silt. The upper structure fill had a low artifact density of 100 artifacts per m^2. The lower 20-26 cm of fill was mottled light yellowish-brown and grayish-brown ashy loam, with abundant fallen roof material, including daub, adobe, plaster, charcoal beams, and caliche granules. The lower roof fall stratum had a low artifact density of 95 artifacts per m^2. This was the lowest artifact density of all the pit structures.

Construction.

Type. True pit structure.

Wall and Roof. The structure pit measured 4.15 m by 2.55 m. The pit walls served as the structure walls, and had a 4- to 8-cm-thick application of plastered adobe. Small pieces of burned roof material lay throughout the lower fill, indicating the roof collapsed after or during burning. The structure had only one central support posthole. No exterior postholes or posts were identified within the adobe walls.

Floor. The heavily burned floor—more so around the structure edges—consisted of a smoothed, prepared caliche surface measuring 9.86 m^2. The inhabitants used the existing caliche substrate by smoothing the substrate, perhaps with ground stone. The prepared caliche surface makes a very stable and compact floor. Only the hearth had actual plaster preparation. The floor was primarily level throughout, and was well-preserved except for moderate rodent disturbance, particularly around the hearth.

Entry. Feature 134 had a long, subrectangular entry oriented to the north, which measured 1.30 m in length and 83 cm in width, with the usuable area of 0.83 m^2. The entry gradually ramped up out of the structure. The entry walls consisted of unplastered adobe some 6 cm thick. The entry floor was prepared caliche like the structure floor, but had a 2- to 4-cm-thick lip separating the entry floor from the house floor. A reconstructible red-on-brown bowl lay in the center of the entry ramp.

Floor Artifacts. Four floor artifacts were found in this structure. A large reconstructible plain ware olla rested in and around the hearth on the floor, suggesting the vessel lay atop the hearth and broke when the structure collapsed. A Middle Rincon Red-on-brown bowl lay in the entryway, and may have been on top of the roof of the structure when it burned. Also present on the floor was a ground stone mano and a complete piece of flaked stone.

Remodeling. Excavators found no evidence of remodeling.

Internal Features. The only intramural feature found other than one posthole was Feature 134.01, the hearth (see Table 2.2). The large hearth had a deep bowl and a raised plaster collar. Large olla fragments lay within the hearth, suggesting the vessel lay atop the hearth and that the falling roof crushed the olla when the structure burned

Stratigraphic Relationships. No other features intruded or were intruded on by Feature 134.

Abandonment and Postabandonment. The heavily burned walls and floor and the thick stratum of burned roof material indicate the structure burned upon abandonment. The presence of a large

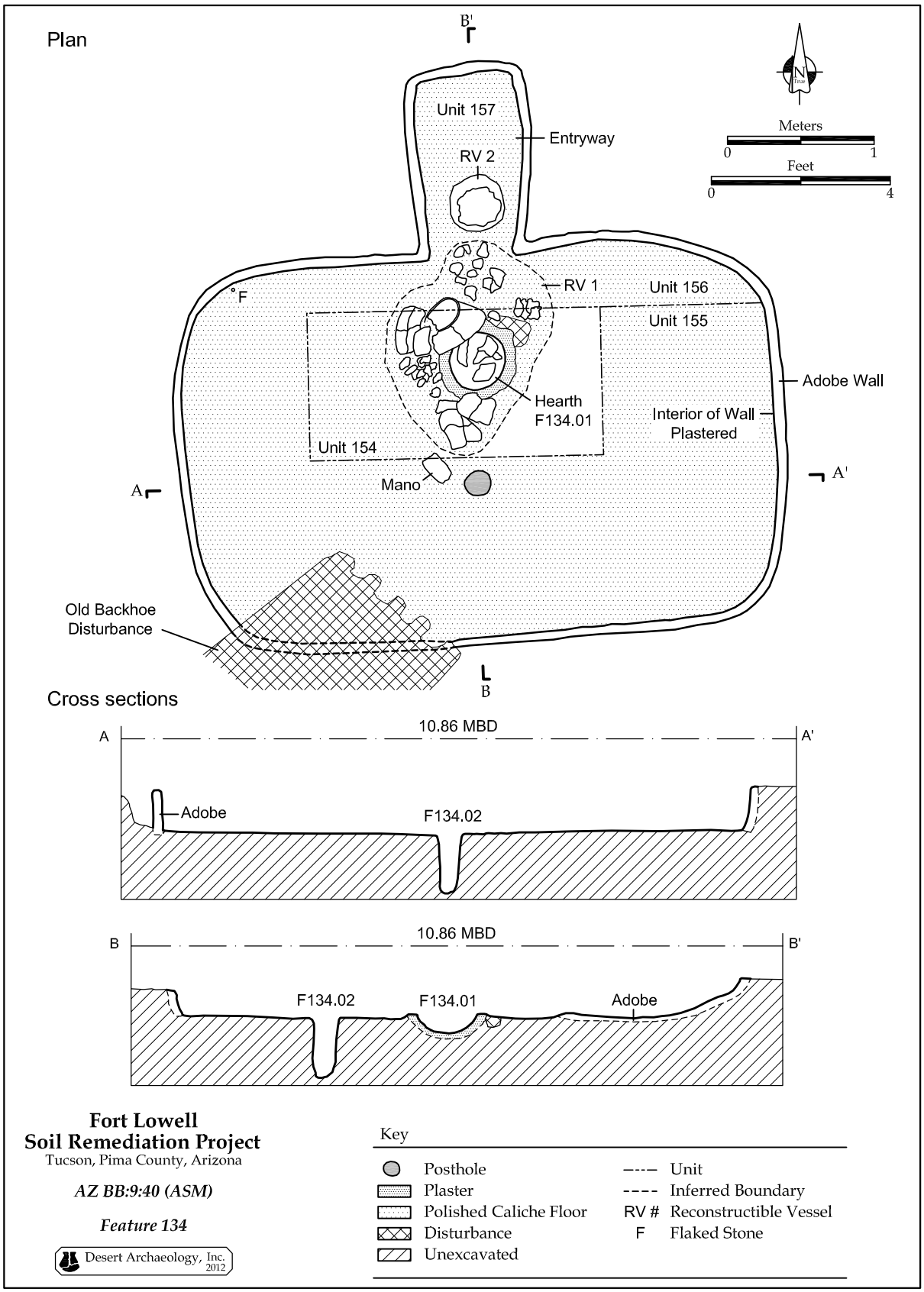

Figure 2.6. Plan view and cross sections of Feature 134, a Middle Rincon 3 to Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.7. Photograph of Feature 134, a Middle Rincon 3 to Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

olla still within the structure could suggest the structure burned catastrophically. However, the heavier burning along the wall to floor transition suggests fuel was added to the structure interior around the base of the walls. Additionally, the presence of a vessel on the entryway floor (and not above the roof fall layer, as would be expected if the vessel lay on the roof when the structure burned) could have been a ritual offering. Finally, the structure had few remaining whole artifacts, indicating an intentional cleaning out and burning of the structure upon abandonment. A slightly higher artifact density in the upper structure fill suggests the structure saw some use for trash dumping postabandonment.

Backhoe activity prior to the project removed the southwestern corner of the structure to within 5 cm of the floor.

Dating. Analysis of the ceramics indicates Feature 134 was abandoned sometime during the Middle Rincon phase. Only plain ware ceramics were recovered from floor and floor pit contexts. The feature fill is consistent with a Middle Rincon 3 (A.D. 1080-1100), typological placement, including the reconstructible vessel in the entryway. However, this would require attribute frequency data for confirmation.

Feature 142, Middle Rincon Phase Pit Structure

Feature 142 (Figures 2.8 and 2.9) was a burned, oval-shaped, structure-in-pit with an entry opening to the east. The structure lay at the eastern edge of the stripped area, so any associations with other structures remains unknown. The floor lay 18 cm below the highest remaining wall, with a total floor and entry area of 16.88 m^2. Floor artifacts included three pieces of ground stone and several ceramic sherds. The structure had two hearths situated near the entryway. Abandonment occurred at some point during the Middle Rincon phase.

Excavation. Mechanical stripping revealed a clear, heavily burned structure and entryway outline. A 2-m by 2-m control unit, Unit 141, was placed in the center of the structure. The remainder of the structure was subsequently excavated, including the entry as Unit 143; all fill from both units was screened. All recognizable intramural features were excavated.

Fill Sequence. The upper 10 cm of structure fill consisted of homogeneous, very compact, light brown, fine-grained sandy silt with small, subrounded sand grains. The upper fill of the structure had an artifact density of 304 artifacts per m^2. The lower 5-10 cm stratum above the floor consisted of hard brown silt, with infrequent subrounded gravels and moderate amounts of charcoal flecking and daub. The lower fill had an artifact density of 210 artifacts per m^2.

Construction.

Type. Structure-in-pit.

Wall and Roof. The structure pit measured 5.05 m by 3.62 m, and had a plastered floor sloping up to plastered pit walls. Although the pit walls had plaster preparation throughout, the interior ring of perimeter postholes argues for a structure-in-pit style

of construction. Feature 142 had 28 postholes; a perimeter ring of roughly 20 postholes surrounded the inside of the structure pit, 4 postholes supported the entry, and 4 postholes lay randomly placed across the central floor area. Small pieces of roof material, daub and charcoal, were in the fill.

Floor. Feature 142 had a fair to poorly preserved plaster floor, with the interior floor area measuring 15.69 m^2. Extensive root and rodent disturbance contributed greatly to the deterioration of the floor plaster. The best-preserved (most heavily burned) small patches of plaster lay primarily in the eastern half of the structure.

Entry. The entry lay centered along the eastern wall of the structure. Two postholes flank each side of the ramped entry. The entryway sides lack the plaster preparation found throughout the rest of the structure. The entryway had a subrectangular shape, with a length of 1.25 m and a width of 1.06 m, for a total usable area of 1.19 m^2.

Floor Artifacts. A small collection of artifacts was recovered on the floor of the house. A tested lithic piece was found along the back of the house, and a flake was found adjacent to the entryway. A few sherds were scattered across the floor, with a plain ware bowl rim and plain ware body sherds along the back wall. Three netherstones were present, one on the northern side of the house, one along the back wall, and one on the southern wall.

Remodeling. The structure had two formal plastered hearths, 12 cm apart, near the entryway. One hearth may have replaced the other, although as neither hearth was sealed, they could have been used simultaneously. Several oddly placed postholes lay scattered across the floor, arguing for roof repair at some point during occupation.

Internal Features. Feature 142 had two formal plastered hearths, Features 142.01 and 142.02 (see Table 2.2). Feature 142.01 had a heavily oxidized rind extending 4 cm out onto the floor surrounding the hearth. The two hearths lie before the entryway, roughly 10 cm apart. Both hearths lay flush with the floor, without rim or collar. Excavators found no evidence that the occupants had sealed either hearth, or that one hearth predates the other.

Stratigraphic Relationships. Feature 142 did not intrude on any other features; no other features intruded on Feature 142.

Abandonment and Postabandonment. The scarcity of floor artifacts suggests the inhabitants cleaned out the structure prior to abandonment. The structure burned, leaving some, but not much, roof debris, indicating a lighter brush structure rather than a heavily walled structure like Feature 160.

Dating. Ceramic analysis indicates the structure dates to the Middle Rincon phase of the Hohokam sequence. The feature fill was mixed Middle and Late Rincon phase, while the floor fill pottery is consistent with Middle Rincon 2 or 3, based on numerous sherds with sectional layouts and Rincon Polychrome.

Feature 157, Transitional Middle Rincon 3 to Late Rincon Phase Pit Structure

Feature 157 (Figures 2.10 and 2.11) was a burned, subrectangular true pit structure with an entry opening to the south. The floor lay 23 cm below the stripped surface, and had a total floor and entry area of 18.94 m^2. Two ground stone manos, a pestle, and two clusters of ceramic sherds, comprising one or two jars, lay on the floor, one of which was red-on-brown. The structure had a formal plastered hearth and two thermal pits as intramural features. The abandonment of Feature 157 dates to the transitional Middle Rincon 3 to Late Rincon phase.

Excavation. The structure was initially located during removal of a modern septic tank on the Adkins property. Subsequent mechanical stripping exposed the feature outline and adobe walls. A 2-m by 2-m control unit, Unit 152, was placed in the southwestern-central portion of the structure. The remainder of the structure was designated Unit 160 and the entryway Unit 163. All fill from all units was screened, and all known intramural features were excavated.

Fill Sequence. The upper 15 cm stratum of fill consisted of loose, dark brown sandy silt with abundant charcoal inclusions. The upper stratum had an artifact density of 303 artifacts per m^2. The lower 5-8 cm overlying the floor consisted of loose grayish-brown silt, containing moderate charcoal flecking, burned daub, and burned structural members. The lower stratum had an artifact density of 180 artifacts per m^2.

Construction.

Type. True pit structure.

Wall and Roof. The structure measured 5.00 m in length and 3.60 m in width. The pit walls served as the structure walls, and had a 7-cm-thick application of plastered adobe. The walls show evidence of burning throughout. The western wall had better overall preservation; mechanical disturbance destroyed the southeastern corner. No external postholes were found, although two central postholes down the long axis of the structure probably provided the primary roof support. Three postholes in the southeastern corner and two others in the central portion of the floor may represent roof repair. Burned roof material lay throughout the lower fill.

Floor. Feature 157 had a floor surface of smoothed caliche substrate, measuring 17.64 m^2. The occupants

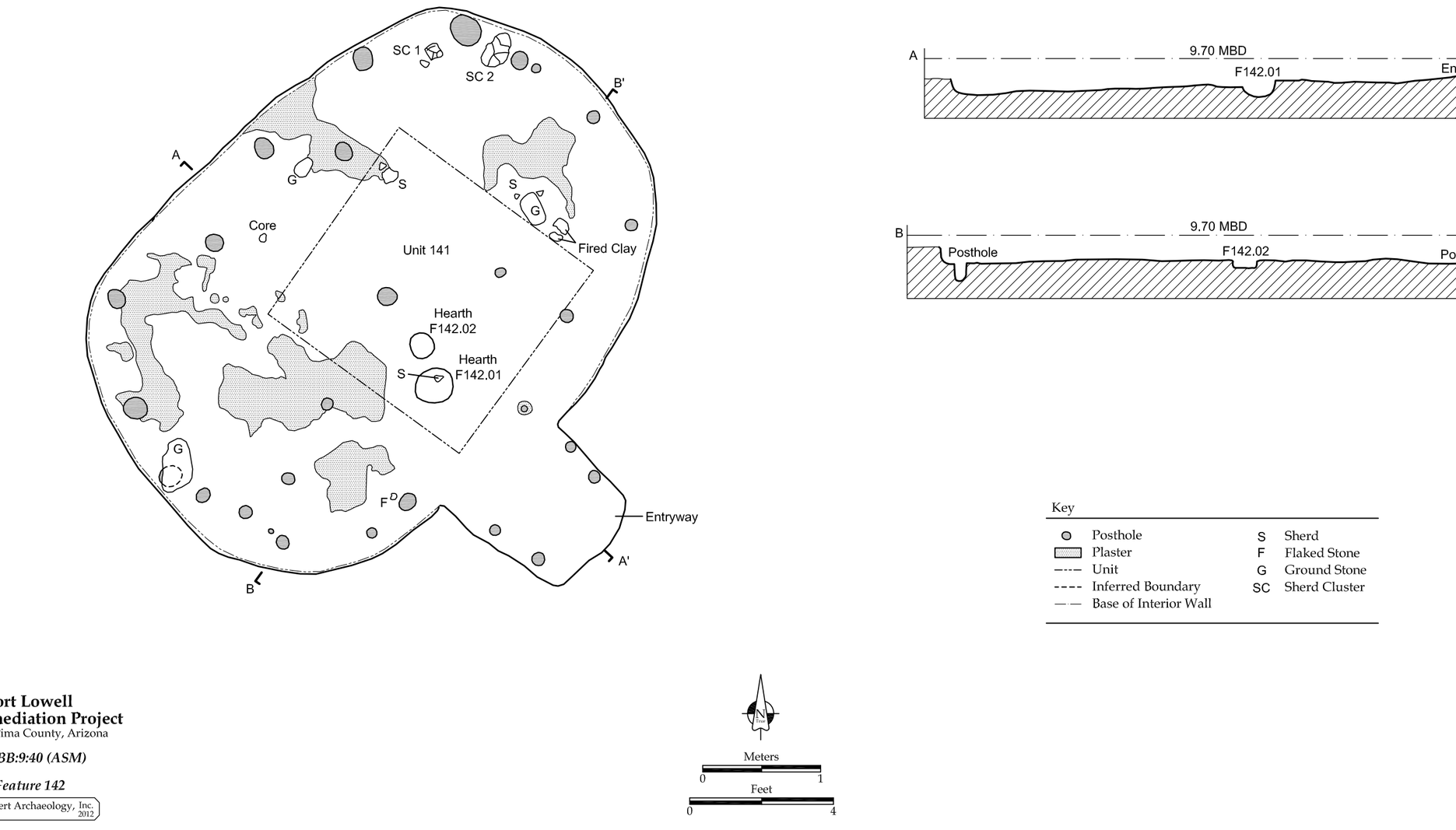

Figure 2.8. Plan view and cross sections of Feature 142, a Middle Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.9. Photograph of Feature 142, a Middle Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

likely worked the natural caliche substrate smooth and level with ground stone. Mechanical disturbance destroyed a small portion of the floor in the southeastern corner. Burning was evident across the entire floor surface.

Entry. The structure had a long bulbous entryway facing south, which measured 1.60 m in length. The entry was 1.05 m at the widest point, narrowing to 76 cm at the proximal end. It had a usable area of 1.3 m^2. The entry walls were built of unplastered adobe, roughly 5-7 cm thick. The entry floor had similar preparation to the structure floor, and it was 10 cm higher than the structure floor and remained level throughout, indicating a step up and out of the structure at the distal end of the entry. A utility trench cut east-west through the entry.

Floor Artifacts. Feature 157 had a sparse floor assemblage. A large decorated sherd lay along the western wall, and a scattering of sherds were present across the floor. A pestle was nearly upright along the center of the northern wall at the back of the house. A pair of manos were in the northwestern corner of the house, close to the back.

Remodeling. Asymmetrical postholes in the southeastern corner and in the central floor area comprised the only evidence of possible remodeling. The irregular posthole placement may suggest roof repair.

Internal Features. The structure contained one formally plastered hearth, Feature 157.01, and two intramural thermal pits, Features 157.03 and 157.04 (see Table 2.2). The structure also contained seven postholes.

Stratigraphic Relationships. Feature 157 did not intrude on any other features. Modern disturbance in the form of a backhoe cut in the southeastern corner and a utility trench through the entryway intruded upon the structure.

Abandonment and Postabandonment. The few artifacts remaining on the floor suggest the inhabitants cleaned out the structure prior to abandonment. Abundant roof fall material in the fill and the oxidized walls and floor all indicate the structure thoroughly burned postabandonment.

Dating. Analysis of the ceramic artifacts indicates the occupants abandoned Feature 157 sometime around the Middle to Late Rincon phase boundary. The fill of the house contained a mixture of Middle and Late Rincon ceramics. Reconstructible vessel 1 is a partial, transitional Middle to Late Rincon jar, based on differential design treatment of the body and neck.

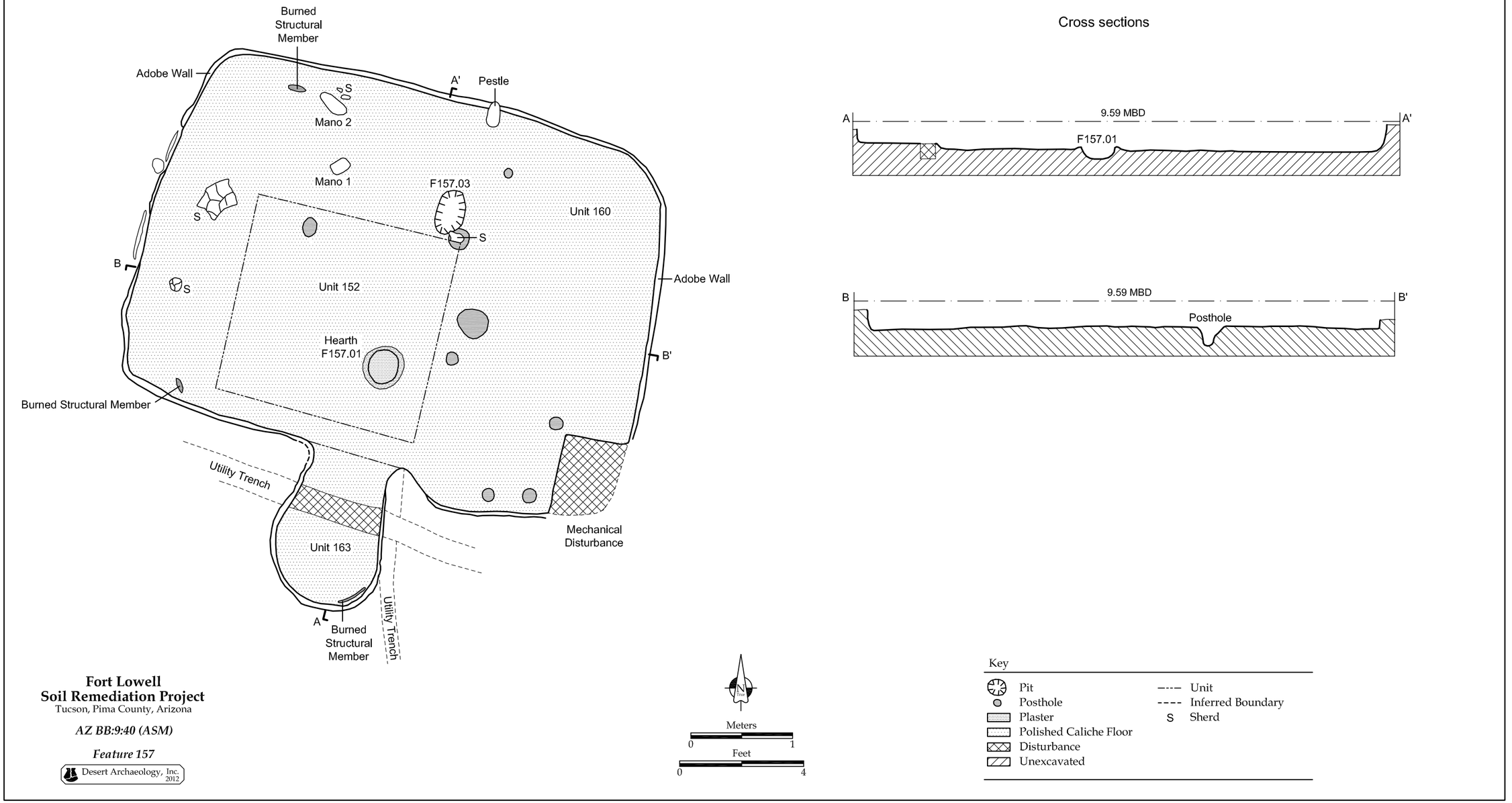

Figure 2.10. Plan view and cross sections of Feature 157, a Middle Rincon 3 to Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.11. Photograph of Feature 157, a Middle Rincon 3 to Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Feature 160, Late Rincon to Tanque Verde Phase Pit Structure

Feature 160 (Figures 2.12 and 2.13) was a rectangular, burned true pit structure with an entry facing to the north. The feature likely shared a courtyard space with Feature 164, which had a similar construction style and orientation. The floor of Feature 160 was 52 cm below the mechanically stripped surface and had a floor and entry area of 16.03 m^2. The structure had 10 ground stone artifacts and four sherd concentrations on the floor, representing three vessels, as well as a modeled ceramic spindle whorl and two pieces of mica. The inhabitants abandoned Feature 160 during the Late Rincon to Tanque Verde phase.

Excavation. The structure outline and adobe walls became clear during mechanical stripping. A 2-m by 2-m control unit, Unit 161, was placed in the north-central portion of the structure, and all Unit 161 fill was screened. The remainder of the structure was excavated as Unit 164. The upper 25 cm of fill from Unit 164 was hand-sampled but not screened, while the lower 18 cm of fill above the floor was screened. Profiles of the exposed structure fill were drawn, one oriented east showing the northern and southern walls, just east of the entry, and the fill in the eastern half of the structure, and another profile depicting the eastern and western walls, near the northeast and northwest corners, and the fill piled up along the northern wall. The entryway was designated Unit 165. The entryway was excavated, based on the stain visible during stripping, and all entryway fill was screened. All apparent intramural features were fully excavated. Several exterior postholes that lay behind the plastered adobe pit walls went unexcavated, in an effort to preserve the walls.

Fill Sequence. The upper 25- to 30-cm-thick stratum consisted of soft, tan, fine-grained loamy sand with some fallen roof material. The upper stratum was likely naturally deposited sediments, which filled the structure postabandonment. The lower 16- to 18-cm-thick stratum consisted of soft, mottled grayish-brown, fine-grained loamy sand, with abundant ash, charcoal, and fallen adobe, daub, and roof plaster. The lower layer represented the fallen burned roof material, and had a moderate artifact density of 143 artifacts per m^2.

Construction.

Type. True pit structure.

Wall and Roof. The structure measured 5.25 m by 3.68 m. The pit walls served as the lower structure walls, and had an 8-cm-thick application of adobe covered with a 1-cm-thick layer of plaster. The southeastern wall had adobe 20 cm in thickness. The walls showed evidence of heavy burning throughout, and were generally well-preserved, although much of the plaster on the upper walls and eastern wall was absent. Heavy rodent disturbance affected the southwestern corner. Rounded voids behind the wall adobe and vertical cracks in the wall plaster likely represent exterior postholes in each corner and along the northern wall. Two postholes centered on the

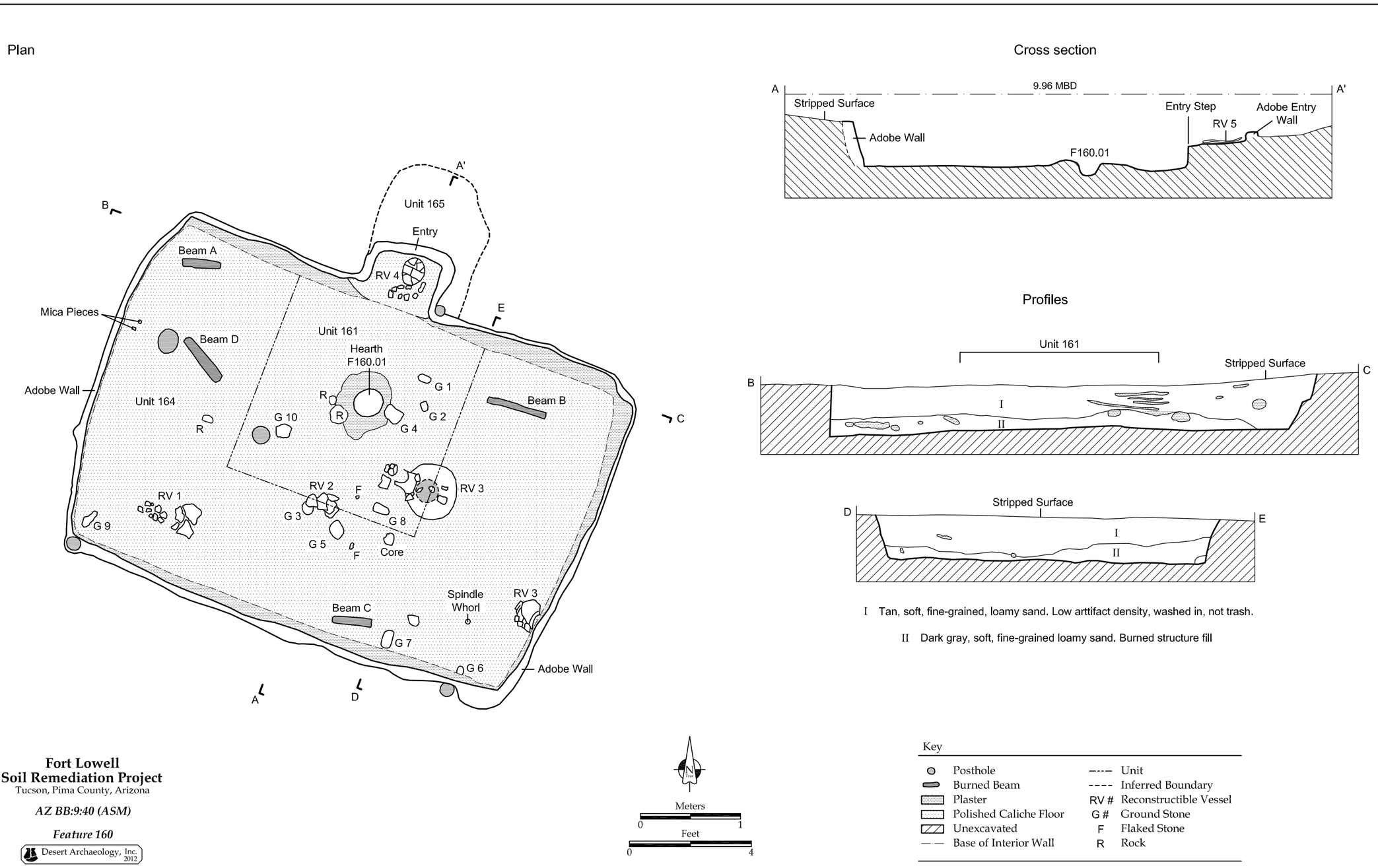

Figure 2.12. Plan view and cross sections of Feature 160, a Tanque Verde phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.13. Photograph of Feature 160, a Late Rincon to Tanque Verde phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

long axis of the structure provided the primary roof support. Feature 160 had a massive, substantial roof. The structure fill had abundant roof and wall material, with adobe slabs up to 9 cm thick and 20 cm long. Much of the fallen wall debris clustered around the edges of the structure. Some of the fallen wall debris retained plaster and impressions of beams, posts, reeds, and finger marks. In some instances, the impressions of tree bark from the beams were evident; these appeared to be ponderosa pine. Four charred structural members lay on the floor, and a sample of each was retained.

Floor. Feature 160 had a caliche floor, smoothed and leveled from the natural substrate, measuring 15.66 m2. The occupants may have prepared the caliche surface with ground stone tools. The floor closely resembles plaster, but the only true plaster lay in the hearth and surrounding apron. The western half of the structure had better overall preservation of the floor, although the floor showed evidence of burning throughout. The southeastern corner had significant insect disturbance, and small roots damaged the floor throughout.

Entry. The entry had a roughly square shape, with a greater lateral width than the length from proximal to distal ends. The entry width measured 75 cm, and the distance from proximal to distal ends measured 70 cm. The structure had a stepped entry, built of solid adobe floor, walls, and step (no plaster), with a usable area of 0.37 m2. The step rose 20 cm high directly from the floor surface. Another 10-cm-high step rose up and over the adobe wall at the distal end of the entry. A broken ceramic vessel lay in the center of the adobe step, perhaps as a ritual offering upon the closure of the structure.

Floor Artifacts. A utilized core and a pressure flaked biface were southeast of the hearth. Three concentrations of ceramics lay scattered across the floor, one of which was a Tanque Verde Red-on-brown jar. An hourglass-shaped modeled ceramic spindle whorl lay in the southeastern corner. Two fragments of mica, each 2-3 cm in diameter lay along the western wall. A utilized core and a pressure flaked biface lay a short distance south of the hearth. The floor artifacts also included 10 pieces of ground stone. A handstone was in the southwestern corner of the house. A pair of manos were along the southern wall close to the eastern side of the house. The remaining five pieces, a pestle, a lapstone, a handstone, a netherstone, a mano, as well as two pieces of fire-cracked rock, were clustered around the hearth. Four burned beams lay scattered across the floor.

Remodeling. Vertical cracks and a slight outward curving of the adobe structure walls at the entryway opening suggests the 20-cm-high adobe step represented an addition to the previous entry, which would have made the entrance accessible with two shorter steps rather than a single large step. Such a remodel might have accommodated young children or an aging or injured inhabitant.

Internal Features. The only intramural floor feature other than postholes was hearth Feature 160.01

(see Table 2.2). The hearth was built of plastered adobe, and had a large mounded apron that rose 4 cm above the floor level. The structure contained three interior postholes. One of the two central support postholes, Feature 160.02, had a much wider upper diameter than the posthole below, like a pit excavated around a post. This posthole/pit contained a number of artifacts, including a projectile point.

Stratigraphic Relationships. Feature 160 did not intrude upon any other feature; no features intruded on Feature 160.

Abandonment and Postabandonment. The occupants likely cleaned out and burned the structure upon abandonment. Few whole or usable artifacts remained on the floor. The floor ceramics included portions of two vessels. The structure had walls and a roof comprised of adobe roughly 8 cm thick. Much of the fallen roof and wall debris fell close to the edges of the structure along the walls. To burn such robust walls so thoroughly would have taken considerable effort. The walls may have been pushed in while or after the structure burned. The upper structure fill had a very low artifact density, suggesting the structure saw little to no postabandonment reuse as a trash dump.

Dating. Reconstructible vessels on the floor place the abandonment of Feature 160 sometime during the Tanque Verde phase of the Tucson Basin Hohokam cultural sequence. Ceramics in the fill of the house are a mixture of predominately Late Rincon Red-on-brown, with lesser amounts of Tanque Verde Red-on-brown sherds.

Feature 164, Late Rincon to Tanque Verde Phase Pit Structure

Feature 164 was a small, rectangular, burned true pit structure, which opened to the north onto a courtyard space shared by Feature 160, a larger but similarly styled structure (Figures 2.14 and 2.15). The floor of Feature 164 lay roughly 20 cm below the stripped surface and had a total floor and entry area measuring 9.18 m^2. Feature abandonment dates to the Late Rincon or Tanque Verde phase.

Excavation. Mechanical stripping defined the feature outline in plan view. A 1-m by 2-m control unit, Unit 176, was placed in the central area just south of the entryway. The remainder of the structure was excavated, including the entryway as Unit 177. All fill from each unit was screened. All intramural features were fully excavated.

Fill Sequence. The structure contained a single, 9-cm-thick stratum of roof fall debris and trash comprised of loose, light brown silty sand. Extensive rodent disturbance throughout contributed to the loose compaction of the feature fill. The fill contained abundant pieces of burned daub and charcoal, with a high artifact density of 563 artifacts per m^2. This structure had the highest artifact density of the seven, completely excavated structures.

Construction.

Type. True pit structure.

Wall and Roof. The pit walls served as the lower structure walls, and the structure pit measured 4.45 m in length by 2.50 m in width. Adobe walls lined the structure pit, ranging from 10-30 cm in thickness, with an average thickness of 16 cm. A thin preparation of plaster lined the interior of the adobe walls. Fallen roof debris was heaviest in the fill along the structure edges. Some pieces of roof material had embedded impressions of beams, reeds, and possibly even saguaro ribs, indicating the roof and upper wall construction included reed or saguaro rib wattle. No interior or exterior postholes to support the roof were found, although extensive rodent disturbance across the floor may have obscured any postholes.

Floor. The structure had a smoothed caliche floor cut from the natural substrate, measuring 9.18 m^2. The occupants must have excavated a level floor in the caliche layer and prepared the surface by grinding or polishing it with stones. The floor showed evidence of heavy burning in places and abundant rodent disturbance throughout.

Entry. Feature 164 had a roughly square-shaped entry, with a slightly wider opening (60 cm) than the length from the proximal to distal ends (58 cm), with a usable surface area of 0.24 m^2. The entry walls had an adobe lining but lacked the plaster application present in the rest of the structure. The entry floor was a level continuation of the structure floor. The entry had a single 9-cm-deep step up and out, over the adobe wall, to the surface. No evidence was found for entryway postholes.

Floor Artifacts. Sherds from a large plain ware olla was scattered in the fill above the floor. A worked sherd disk was along the northern wall, just west of the entrance. A clump of yellow ochre was present southeast of the entrance. A multiple-platform core, a biface fragment, and a complete flake were present. A pestle was south of the entrance. A painted rock was found next to one of the potrests in the southeastern quarter of the house.

Remodeling. Traces of an additional layer of plaster were found added to the structure's northern wall where the wall curves into the entry, on the western side of the entry.

Internal Features. The structure contained no hearth, but had five shallow potrest features, Features 164.01-164.05, set into the floor in the northeastern, southwestern, and northwestern corners, in

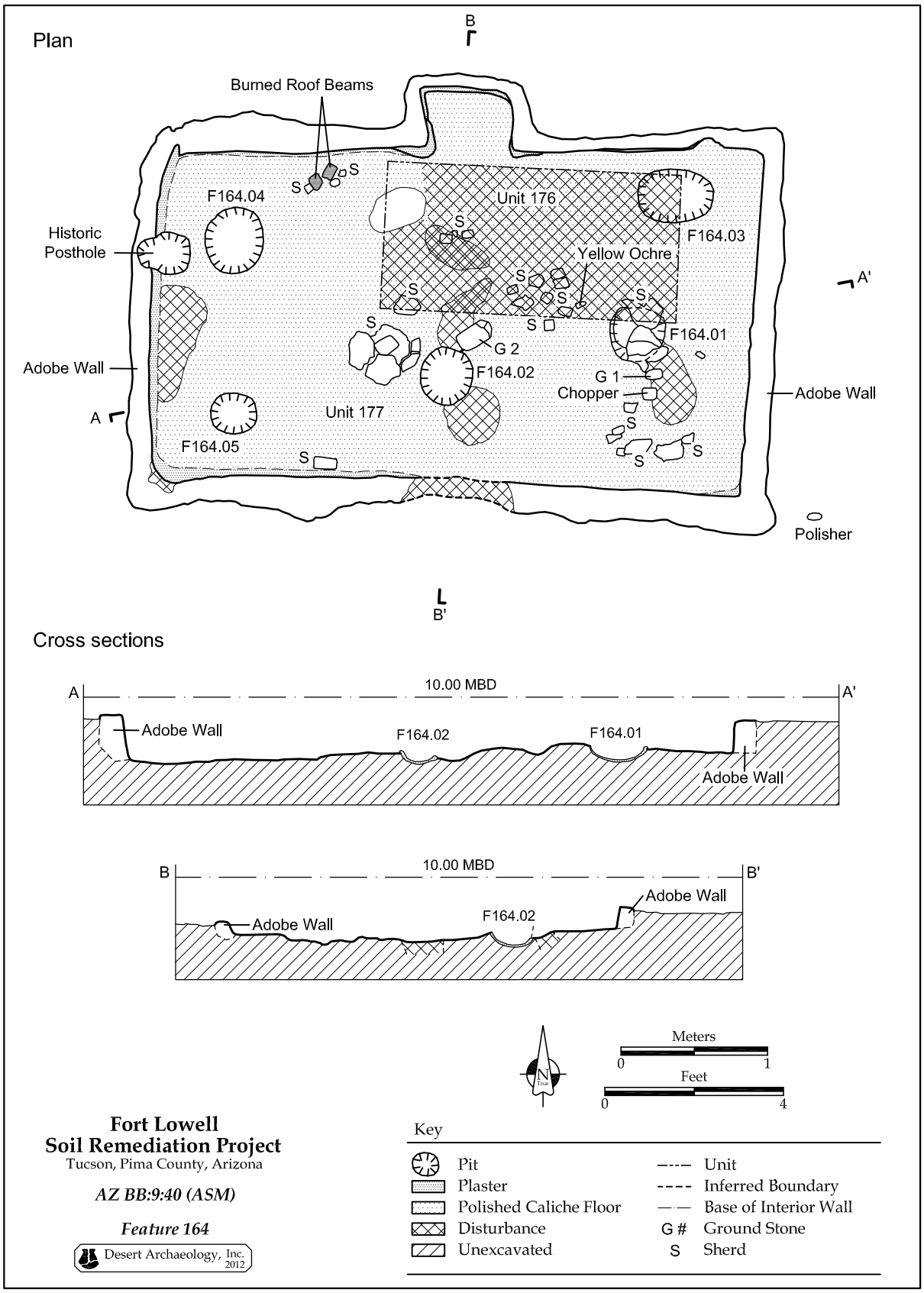

Figure 2.14. Plan view and cross sections of Feature 164, a Late Rincon or Tanque Verde phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

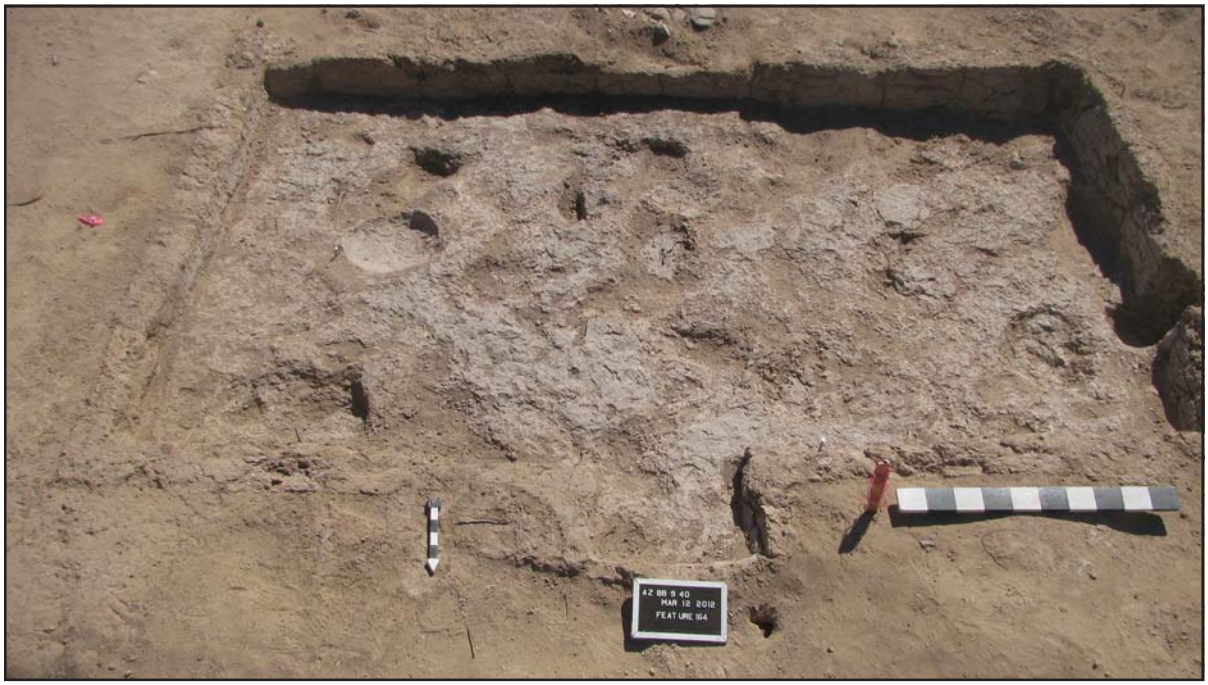

Figure 2.15. Photograph of Feature 164, a Late Rincon or Tanque Verde phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

the rear central floor area, and in the eastern central floor area (see Table 2.2). The eastern central potrest had an olla resting within it.

Stratigraphic Relationships. Feature 164 did not intrude into any other features. A historic or modern utility trench cut through the upper structure fill, and a modern fence posthole cut through the western wall.

Abandonment and Postabandonment. The structure had very few whole artifacts remaining on the floor, indicating the inhabitants may have cleaned out the structure prior to abandonment. Feature 164 had no hearth, but based on the burned walls, floor, and fill, the structure burned, indicating intentional rather than catastrophic burning.

Dating. Ceramic analysis indicates the fill of Feature 164 contains a mixture of predominately Late Rincon Red-on-brown sherds, with lesser amounts of Tanque Verde Red-on-brown pottery.

Feature 167, Transitional Late Rincon to Tanque Verde Phase Pit Structure

Feature 167 (Figure 2.16) was an irregular, unburned pit structure with a possible entry oriented to the south. The structure may have shared a courtyard space with Features 104 and 168. The floor of Feature 167 lay roughly 13 cm below the mechanically stripped surface, with the stain representing the total floor and entry area measuring 15.29 m^2. The abandonment of Feature 167 dates to the transitional Late Rincon to Tanque Verde phases.

Excavation. Mechanical stripping revealed an irregular rectangular feature outline stain, which measured 4.80 m in length and 3.14 m in width. An irregular unit, Unit 179, was placed within the central feature outline, and two reconstructible vessels visible at the stripped surface were recovered. Roughly 30-40 percent of the structure was excavated, and all fill was screened. Additionally, all intramural features were screened.

Fill Sequence. Feature 167 contained a single 13-cm-thick stratum of compact, light brown silty loam, with mottled patches of light brownish-gray loam close to the floor. The fill contained small caliche and charcoal flecks.

Construction.

Type. Unknown.

Wall and Roof. The walls were not exposed, although the abundance of sandy silts within the fill could indicate the presence of adobe walls. No adobe walls were visible in the feature outline during the mechanical stripping of the feature. No fallen roof material was found within the fill, and no postholes were on the exposed floor. The structure may not be well-preserved due to a lack of burning.

Floor. The floor of Feature 167 consisted of unprepared sandy silt substrate, with small calcic gravels, measuring approximately 14.64 m^2. Small patches of floor had a grayish coloration. An oxidized patch in the western central floor may have represented an unprepared hearth.

Entry. A possible entryway was oriented to the south. The entry was centered along the short axis

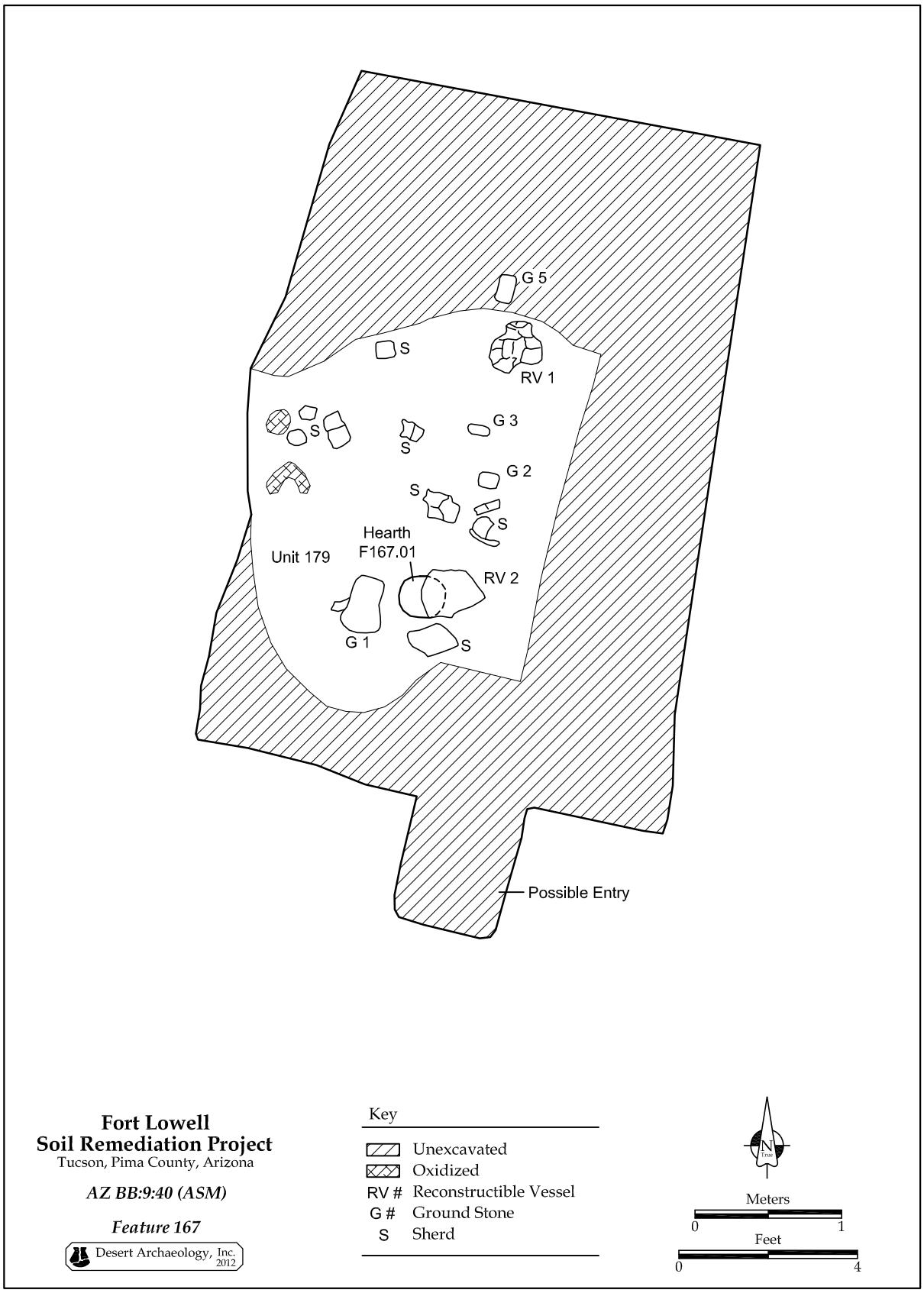

Figure 2.16. Plan view of Feature 167, a Late Rincon or Tanque Verde phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

of the structure, an unusual placement for a Hohokam structure of this style. The entryway had a subrectangular outline, which measured 95 cm by 75 cm, with a usable area of about 0.65 m^2.

Floor Artifacts. The floor artifacts recovered included ceramics from at least two reconstructible vessels, one of which was a large jar, a slab metate, a mano, and a possible polisher.

Remodeling. No evidence of remodeling was found in the partially excavated structure.

Internal Features. One small intramural pit, Feature 167.01, was located (see Table 2.2).

Stratigraphic Relationships. Feature 167 did not intrude upon any other features; no other features intruded on Feature 167.

Abandonment and Postabandonment. The occupants of Feature 167 left a small assemblage of artifacts on the floor upon abandonment. The structure did not burn, and it may have filled with natural eolian deposits postabandonment.

Dating. Analysis of the ceramic artifacts indicates the inhabitants abandoned Feature 167 around the Late Rincon to Tanque Verde phase boundary.

Feature 168, Late Rincon Phase Pit Structure

Feature 168 (Figure 2.17) was a burned pit structure oriented to the south, and it may have shared a courtyard space with Features 104 and 167. The floor was 12 cm below the mechanically stripped surface, and the stain for the feature measured 13.3 m^2. Excavators found no floor artifacts. The inhabitants may have abandoned Feature 168 during the Late Rincon phase.

Excavation. Mechanical stripping revealed the feature outline. A 35-cm-wide hand-trenching unit, Unit 183, was placed through the structure from the proximal end of the entry to the rear wall. The fill was not screened, but a grab sample was taken of the ceramic artifacts, and a flotation sample was collected from the fill.

Fill Sequence. The feature contained two distinct strata of fill. The upper 6 cm consisted of compact, dry, light brown silty sand. The lower 6 cm of fill above the floor consisted of soft, moist, ashy silty sand, with abundant roof fall material and angular lumps of burned daub.

Construction.

Type. Unknown.

Wall and Roof. The feature outline exposed during stripping measured 4.30 m by 3.00 m. Only one small section of the rear wall was exposed, which showed no evidence of preparation. The pit edge rose vertically from the floor surface. No postholes were located. Abundant burned roof material was throughout the lower structure fill.

Floor. Feature 168 had an unprepared floor of leveled sandy substrate, with the stain for the floor measuring about 12.24 m^2.

Entry. The possible entryway, which oriented to the south, was not excavated. The subrectangular entry outline visible at the stripped surface measured 1.20 m in length and 1.00 m in width, with the stain area measuring 1.06 m^2.

Floor Artifacts. No floor artifacts were found within the small area of exposed floor.

Remodeling. No evidence of remodeling was evident.

Internal Features. Only one intramural feature, Feature 168.01, a small plastered hearth, was found (see Table 2.2). The hearth rose up in a small dome several centimeters above the general level of the floor.

Stratigraphic Relationships. Feature 168 did not intrude into any other features. Feature 174, a small ashy pit, intruded through the structure fill and the floor in the center of Feature 168. A historic ditch, Feature 156, intruded through the southwestern corner of the structure.

Abandonment and Postabandonment. Burned roof material in the fill suggests the structure burned after abandonment. The lack of a control unit within the structure prohibits determining an accurate artifact density from the structure, although no trash-rich stratum was found within the fill, arguing against postabandonment reuse as a trash dump.

Dating. Analysis of the ceramics suggests the occupants may have abandoned Feature 168 at some point during the Late Rincon phase.

Feature 175, Sedentary Period Pit Structure

Feature 175 (Figure 2.18) was a burned pit structure whose orientation could not be determined. The floor was 26 cm below the mechanically stripped surface, and the stained area measured about 18.68 m^2. The structure was not excavated. Sherds recovered during stripping dated to the Sedentary period (A.D. 900-1150).

Excavation. Mechanical stripping revealed the feature outline. A small probe was dug to locate the floor. The feature was not excavated, but a grab sample of sherds was collected, as was a small mortar lying upside down on the floor.

Fill Sequence. The feature contained light gray silty sand with small gravels. Many artifacts were present. The fill was noticeably darker than the surrounding sediments.

Construction.

Type. Unknown.

Wall and Roof. Unknown; a burned beam was present in the center of the feature.

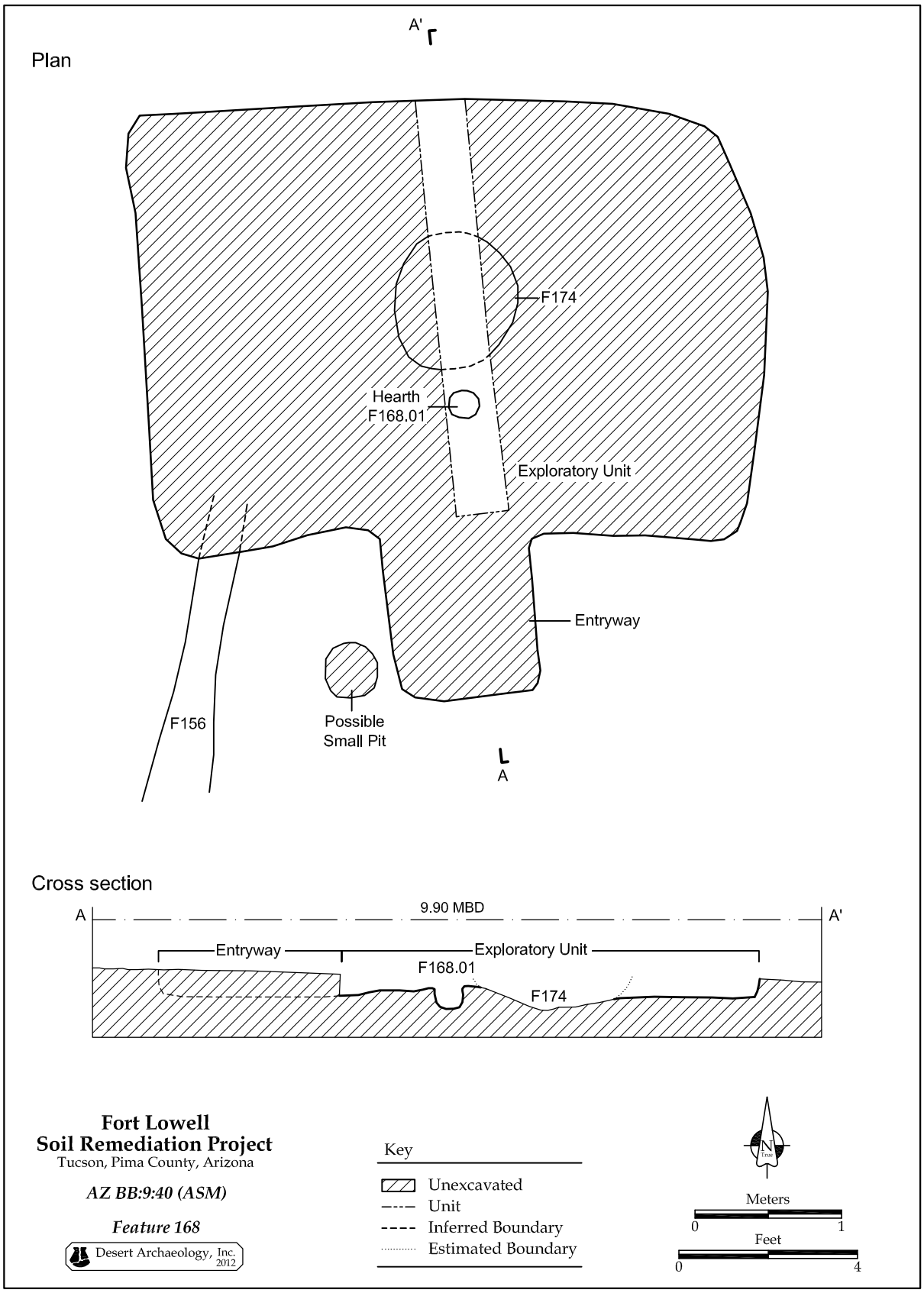

Figure 2.17. Plan view and cross section of Feature 168, a Late Rincon phase pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

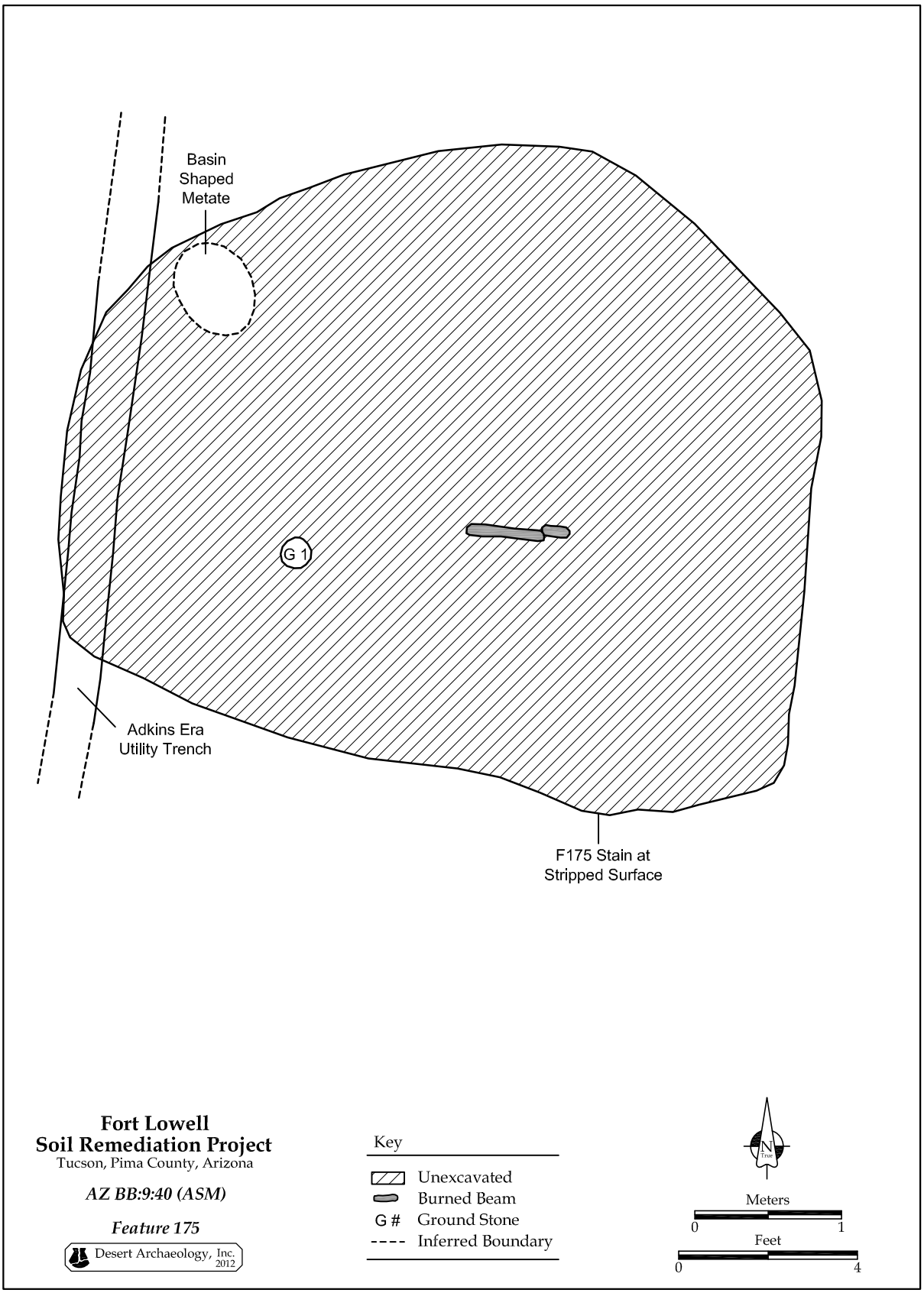

Figure 2.18. Plan view of Feature 175, a Sedentary period pit structure, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Floor. Feature 175 had an unprepared floor, based on the small area located in the probe hole. The floor area measured approximately 4.9 m, east-west, by 4.6 m, north-south.

Entry. No entry could be located.

Floor Artifacts. An upside down mortar with red ochre staining was located in the southwestern quarter of the house. Pieces from a reconstructible red-on-brown jar were present in the fill. A basin metate was in the fill along the northern wall of the house.

Remodeling. No evidence of remodeling was evident.

Internal Features. Unknown.

Stratigraphic Relationships. Feature 175 did not intrude into any other features.

Abandonment and Postabandonment. Burned roof material in the fill and an oxidized edge along the southern wall suggests the structure burned following abandonment. The lack of a control unit within the structure prohibits determining an accurate artifact density from the structure.

Dating. Analysis of the ceramics suggests the occupants abandoned Feature 175 at some point during the Sedentary period.

Other Prehistoric Features

As noted, summary data are reported on all features in Table 2.1. However, a few prehistoric features were unusual enough to warrant more detailed descriptions.

Feature 120, Ground Stone Cache

Feature 120 was a small pit located in the center of the locus, just west of a large trash mound, Feature 121 (Figure 2.19). The pit was 46 cm in diameter and 25 cm deep. An unfinished metate was leaning against the northern wall of the pit, with a pestle standing upright and propped against the metate. The pit contained light brown, loosely compacted silt, and it was difficult to determine the boundaries of the pit. A few sherds and pieces of flaked stone were mixed in with the fill. It is unknown why the ground stone artifacts were cached in the pit.

Feature 121, Trash Mound

Feature 121 was a trash mound located in the central part of the locus. The mound was located during stripping when darker soil with a large amount of ceramics and flaked stone artifacts was encountered. Between 20 cm and 40 cm of soil was removed over the top of the mound to mitigate the contamination of the topsoil. A grab sample of ceramic sherds was made during stripping, and diagnostic ceramics (decorated items and all rims) were retained for analysis. Two 2-m by 1-m excavation units were excavated into the mound. Unit 110 was placed at the high spot within the stripped area. The unit was excavated down to sterile caliche, with an average depth of 57 cm (Figure 2.20). In all, 322 artifacts were recovered. Unit 167 was placed on the northern side of the mound outside the stripped area. The unit averaged roughly 44 cm in depth down to the caliche surface, and contained 308 artifacts. The trash mound contained between 282-350 artifacts per m^2. It is unknown if the mound was leveled during use of the area during the Historic era, although this seems likely.

The mound was approximately 17.83 m long by 15.40 m wide. It was 44-54 cm deep. The upper fill was a brownish-gray, ashy, silty sand that was loosely compact and that was extensively disturbed by rodent burrowing. Below this was a thick layer of reddish-brown to light brown silty sand that had less ash and that was also very rodent disturbed. This layer had much fewer artifacts, and many were likely dragged into the layer by the burrowing rodents. The base of each unit terminated on the natural caliche layer. A nearby area, designated Feature 143, may actually be a portion of the mound.

Ceramics found in the mound date primarily to the Middle Rincon phase. Households of Features 130 and 142 likely contributed trash to the mound.

Adolf Bandelier noted the presence of trash mounds within the Fort Lowell parade ground in 1884 (see Gregonis 1997b:viii). Feature 121 may have been one of the mounds he examined.

Feature 140, Pit With Vessels

Feature 140 was a small pit located during stripping at the far western portion of the stripped area. It was a shallow, basin-shaped pit 48 cm in diameter and 12 cm deep. It contained light brown silt, with a thin lens of ash at the base of the pit. It was selected for excavation due to the presence of numerous ceramic fragments. During analysis, these were determined to be two Late Rincon or Tanque Verde red-on-brown short flare-rim jars. The pit dates to about A.D. 1100, to shortly after A.D. 1150.

Fort-era Features

Feature 15, Guard House

The Fort Lowell guardhouse was constructed sometime soon after the fort was moved to the new location in 1873. In 1875, the guardhouse was described as being 52 ft^2, measuring from the outside

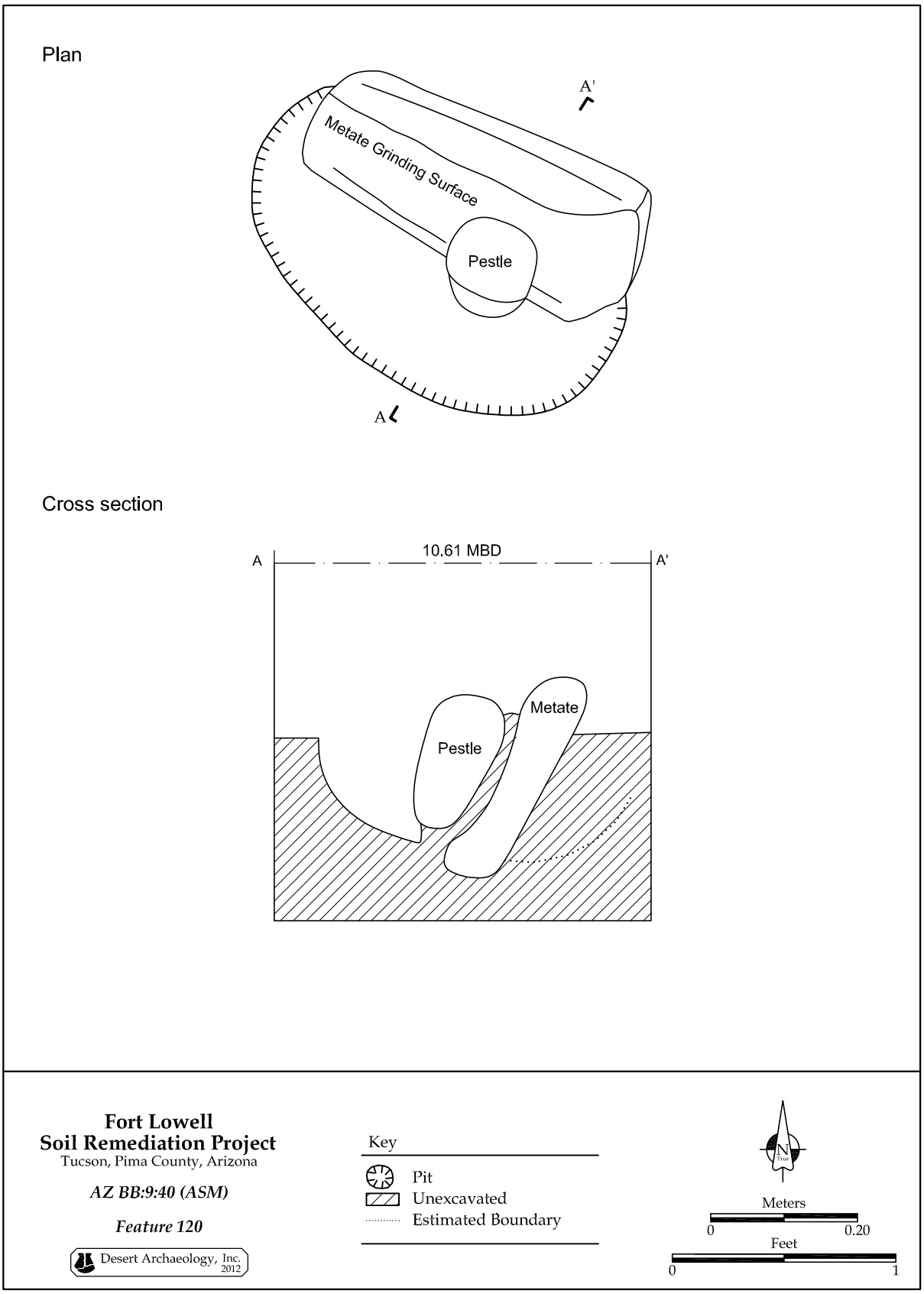

Figure 2.19. Plan view and cross section of Feature 120, a ground stone cache, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

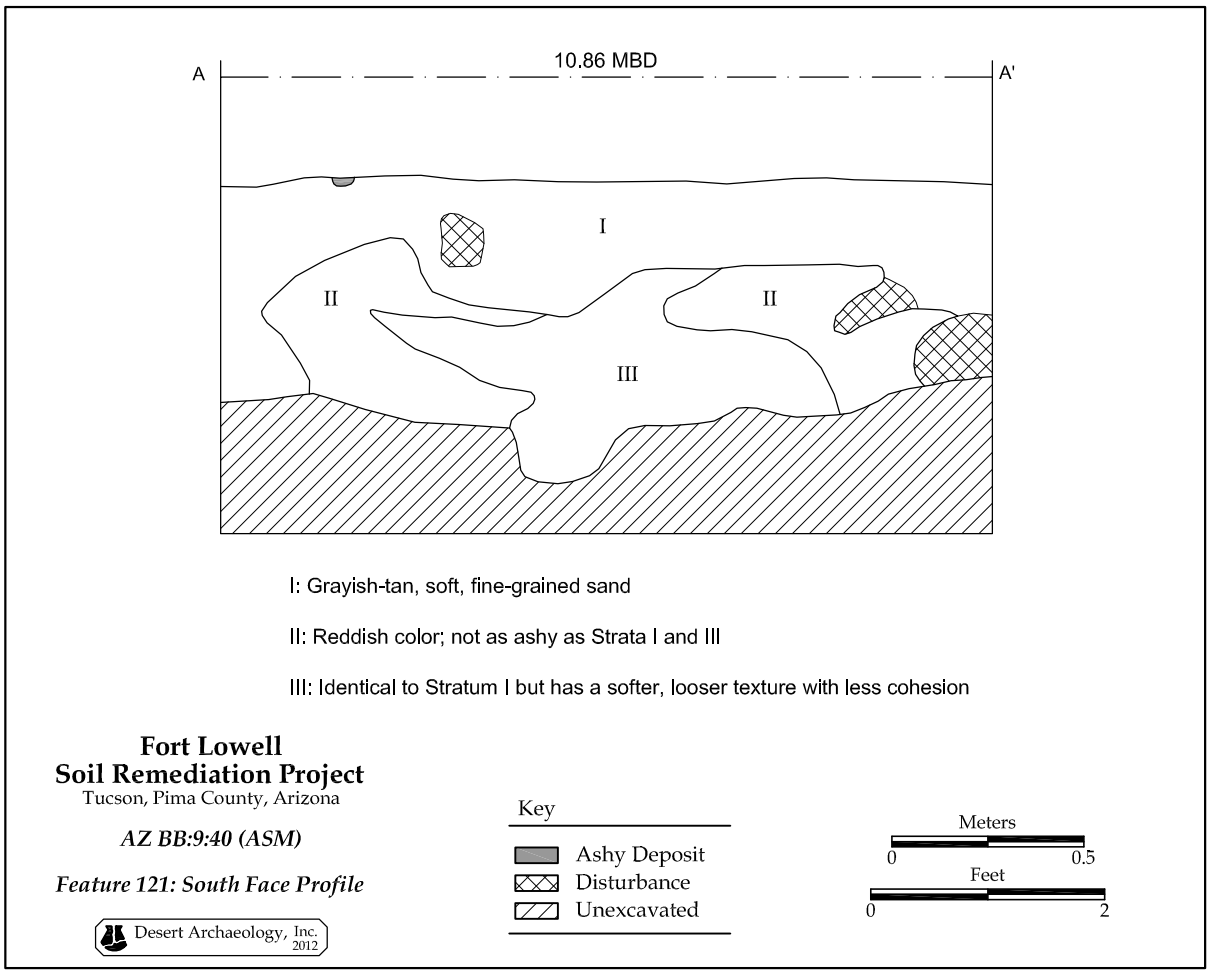

Figure 2.20. Profile of the southern wall of Unit 110 in Feature 121, a trash mound, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

corners, with a 48-ft by 28-ft enclosed yard on its western side. The building had a door in the center of the eastern wall, with offices on each side of a hall. Further in were five cells on the southern half of the building.

An 1883 flooring estimate for the guardhouse indicates the building had 3 large rooms, 3 small rooms, 5 cells, and 2 halls. The building was used until 1891, and after the 1896 auction, it was stripped of usable materials. It gradually fell into ruin, and by the 1970s, only one interior wall remained standing. At the time of the current project, this was a low mound of rocks, and several other walls were visible as lines of stones on the modern ground surface (Thiel et al. 2008:20-21).

Backhoe stripping uncovered the rock and lime mortar foundation of the southeastern corner of the building (Figures 2.21 and 2.22). The rocks appear to have been collected from the Rillito River and from rock outcroppings north of the river. The crude lime mortar may have been locally produced.

The foundation was 80 to 85 cm wide, and it was at least 40 cm deep. It was in fair condition, with a modern electrical utility trench cutting through the eastern wall. The upper courses of rock had probably been removed, and there was no evidence for a floor in this area, which was either the guardroom or the general prison room.

Features 102, 103, and 173, Officers Quarters Nos. 1 and 2

Three features were located that relate to Officers Quarters Nos. 1 and 2. These two buildings were constructed in 1873. Each of the buildings once housed several officers and their families. They were occupied until 1891, when the fort was abandoned. The quarters were used by Dolly Cate and the Adkins family as part of their tuberculosis sanitarium and rest home.

Feature 102 was an adobe brick wall that linked Officers Quarters Nos. 1 and 2 on their northern side.

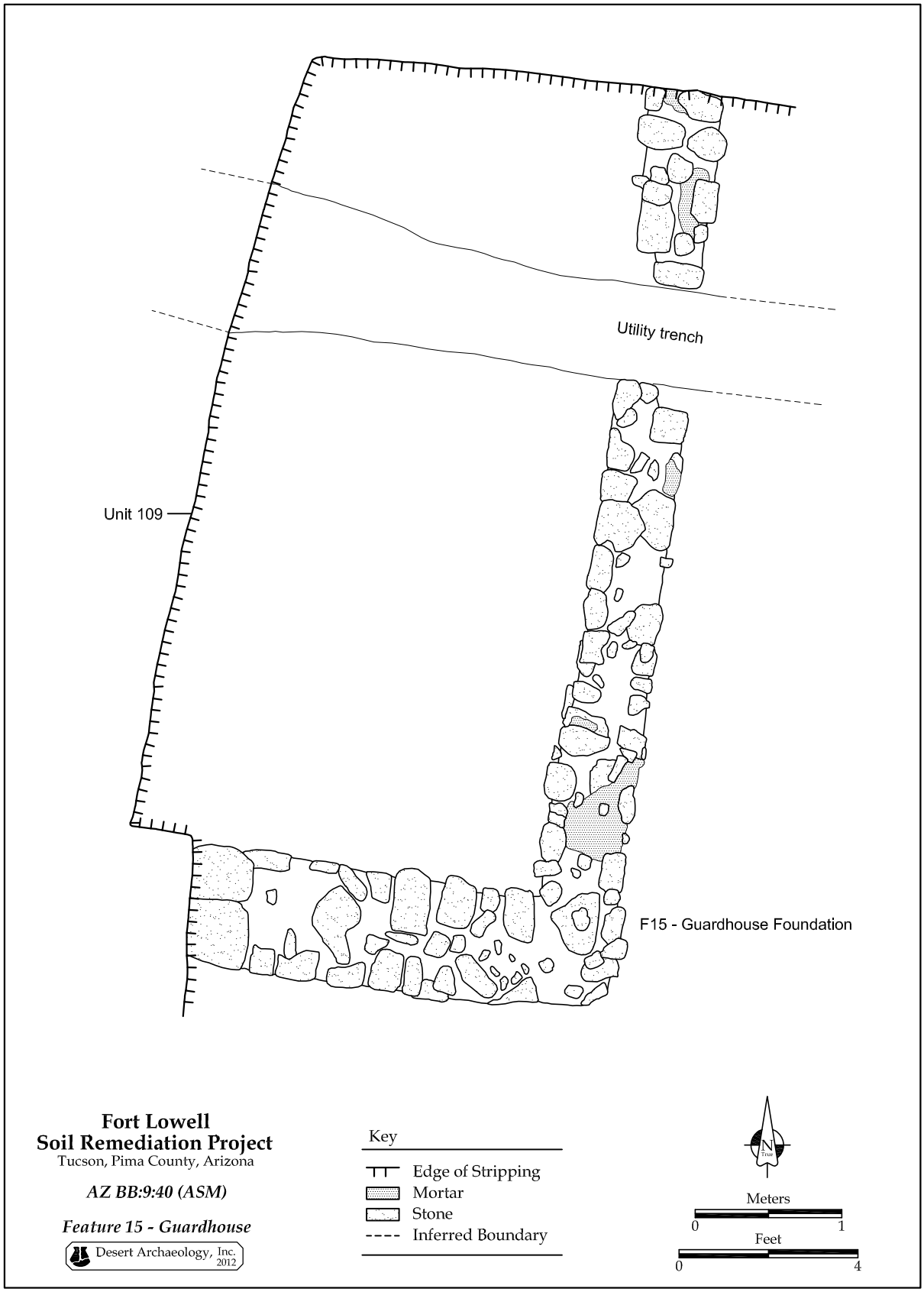

Figure 2.21. Plan view map of Feature 15, the guardhouse foundation, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.22. Photograph of Feature 15, the guardhouse foundation, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

The wall was at least 16.9 m long, extending on each side beyond the stripped boundaries. The wall was 19 cm wide, with individual adobe bricks measuring 19 inches long by 10 inches wide. A ¾-inch-wide mud mortar was present between the bricks, which was grayish-brown or reddish-brown in color. A single course was present. A 1.75-m-wide opening was present on the eastern side of the wall, representing a gateway. The adobe wall served to restrict access into the backyard area between the two dwellings.

Features 103 and 173 were the remnants of wooden porches that once surrounded the exterior of the two quarters. The porches were probably identical, and had wooden floor joists resting directly on the ground surface. Square-headed nails were used to join the joist elements together. Only a small portion of each porch was exposed.

Feature 136, Garden Area

Feature 136 was a set of small planting pits located north of the adobe wall connecting Officers Quarters Nos. 1 and 2, Feature 102, and the southern ditch for Cottonwood Row, Feature 141 (Figures 2.23 and 2.24). The planting pits were located during backhoe stripping when a series of small square to rectangular stains were noted.

Approximately 149 small pits were located, as well as four larger pits along the eastern side, three of which were adjacent to the small gate opening, which may have once held trees or bushes. The smaller pits appear to have been dug with a square-headed shovel. The small pits extend into the unstripped areas, and the total number of pits is unknown. The pits were not present south of the adobe wall, and were also not present north of the southern ditch of Cottonwood Row. The planting pits disappear on the western side of the stripped area, apparently due to extensive disturbance.

Nine of the planting pits were selected for excavation, with a metal detector used to locate pits that might contain interesting metal artifacts. This proved only partially successful, because no metal was found in several of the pits. All the excavated pits were found to be very shallow, ranging from 3-8 cm in depth. The original depth of the pits could not be determined, even though approximately 20 cm of soil had been removed from the area during stripping. The pits contained light grayish-brown clay loam. Only a handful of artifacts were recovered from the pits, including a buckle, a cartridge, a square nail, a brass rivet, a piece of glass, and prehistoric ceramics. None of these artifacts were related to use of the pits and appear to be trash present in the area during use of the garden.

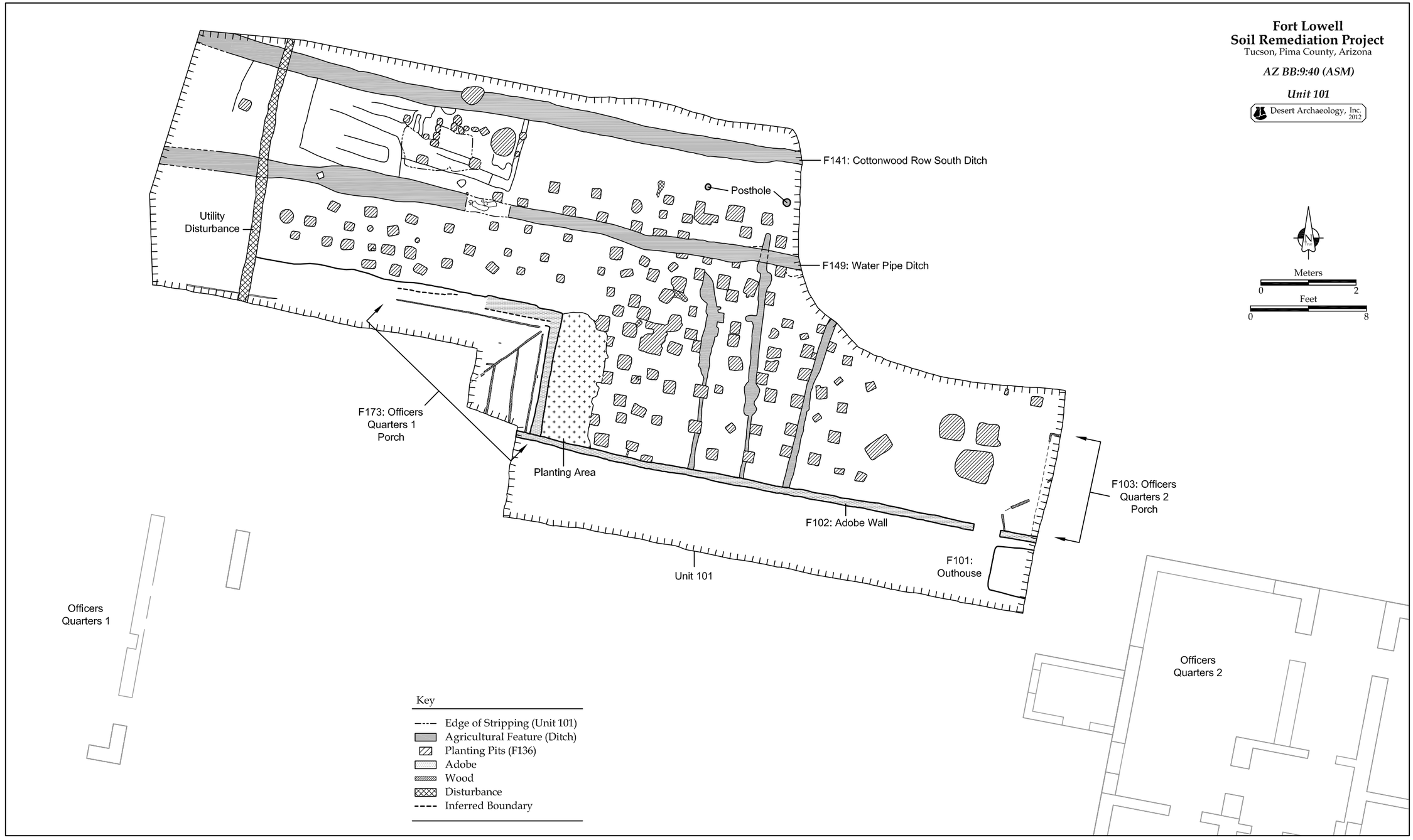

Figure 2.23. Plan view map of the garden area north of the Officers Quarters, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 2.24. Aerial photograph of the garden area north of the Officers Quarters, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (photograph by Henry Wallace).

Feature 138, Wagon Ruts

Feature 138 was a pair of wagon ruts that ran southeast to northwest across the southern side of the parade ground. The ruts were 2.05 m apart (1.65 m apart measuring at their center), with the southernmost rut 55 cm wide and the northernmost only 25 cm wide. The fill of the tracks was noticeably darker brown and more compact than the surrounding soil. The ruts likely formed during a wet period when several wagons ran across the area.

Feature 144, Bakery

Feature 144 was the Fort Lowell bakehouse. As noted in Chapter 1 (this volume), the bakery was an L-shaped building located south of the guardhouse. In 1875, the building was described as being about 31 ft long north-south by 15 ft wide east-west, with an oven addition on the western side. The main portion of the building had three rooms in that year. An addition was added later to the southern side of the building that measured 18 ft east-west by 15 ft north-south.

During backhoe stripping of the area south of the guardhouse, several adobe bricks were discovered adjacent to a mesquite tree. Subsequent stripping and hand-scraping revealed additional adobe brick walls, areas of cement mortar, broken fired bricks, and areas of oxidized adobe bricks (Figure 2.25). Portions of three rooms are visible.

The room at the northeastern corner was 5.6 m long north-south by 4.6 m wide east-west. Portions of all four adobe brick walls were located, with the foundation bricks resting directly on the ground. Individual adobe bricks measured about 48 cm by 28 cm. Additional adobe appears to have been applied to the eastern wall. Rising damp will cause the exterior base of adobe brick walls to spall off. As a result, adobe walls often require extensive repairs. The interior of the room had patches of cement mortar and ashy soil.

Immediately south of this room was a second room. Only a small portion was exposed during stripping. The eastern wall was at least 4.2 m long, while the shared interior (north) wall of the room was 4.6 m wide east-west. No internal features were visible in the room, which may have been used as a sleeping room for the baker.

The third room was located north of the northeastern room and was only partially uncovered by stripping. This was the bake oven room, which originally had a pair of ovens, opening to the east. An adobe wall separated the two ovens, each of which

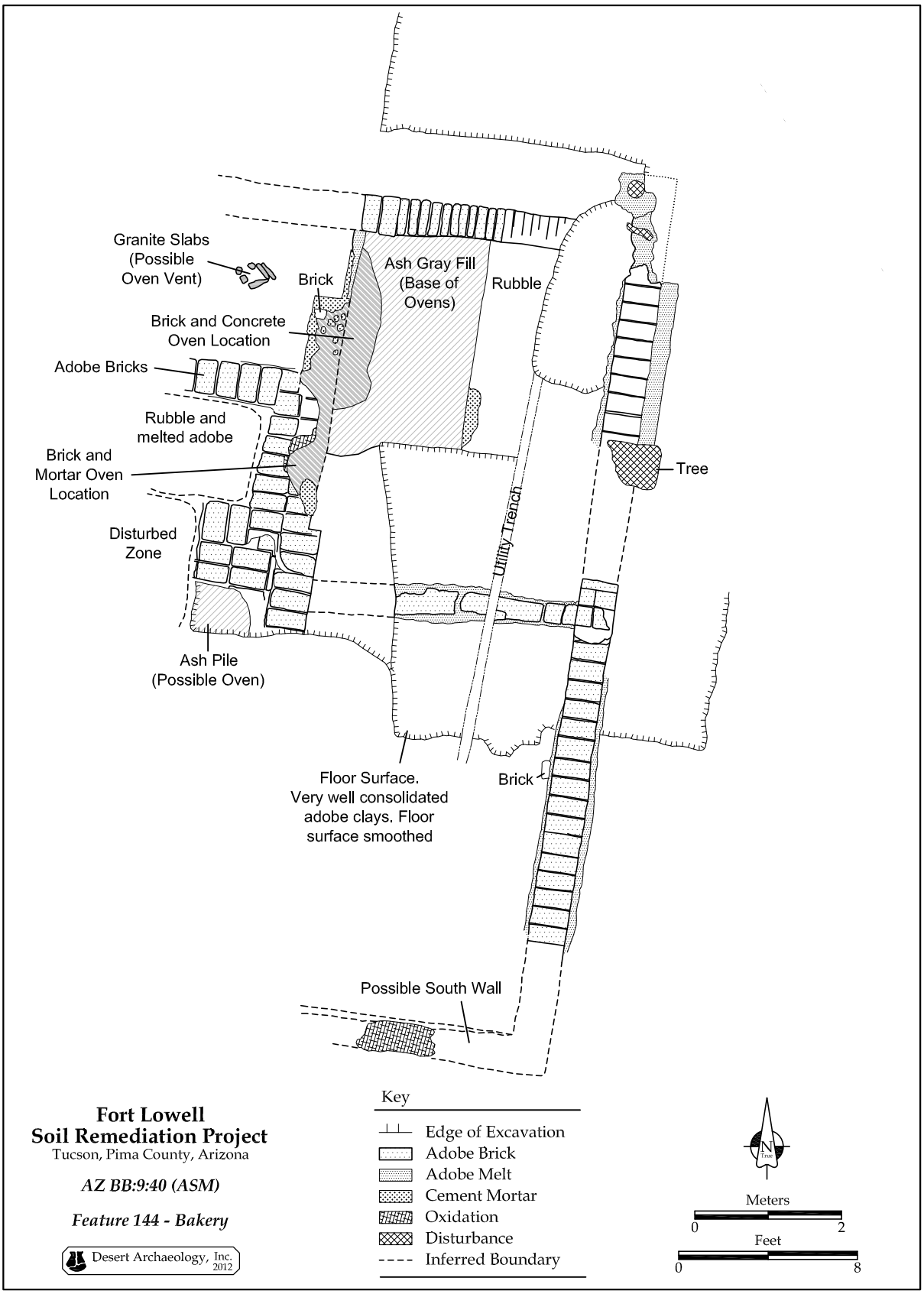

Figure 2.25. Plan view map of the bakery, Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

was 1.1 m wide. The oven was at least 1.0 m long, but only a portion was visible. Pieces of fired brick, rock, and mortar were scattered throughout the interior of the ovens. A brick portion of one of the ovens was previously located during the removal of a large underground fuel storage tank to the west of the stripped area.

Features 117, 139, 141, and 165, Cottonwood Row and Parade Ground Ditches and Fenceline

Historic photographs of Fort Lowell show a cottonwood-lined street running east-west in front of the Officers Quarters. Trees were present on both sides of the street, and this was known as Cottonwood Row. A ditch is present along each side of the street, and wooden planks bridge the ditch to allow access to the dwellings. Photographs looking north onto the parade ground show another row of trees and a probable ditch on the southern side of the ground.

Stripping revealed ditches on both sides of Cottonwood Row, Features 139 and 141, planting pits along the northern side of Cottonwood Row, Feature 117, postholes for a picket fence that was north of the row of trees on the northern side of Cottonwood Row, Feature 165, the ditch on the southern and western sides of the parade ground (Feature 156), and a row of tree planting pits on the northern side of the parade ground southern ditch, also Feature 117 (Figure 2.26).

The ditches from Cottonwood Row were basin-shaped in profile and ranged in width from 58-60 cm and 16-20 cm deep. The ditches were filled with dark grayish-brown silty loam at the top, trending toward a darker brown silt at its base. Four units were excavated into the ditches, selected by running a metal detector over the surface and selecting those with interesting artifacts. Four brass cartridges, a lead bullet, glass fragments, a horseshoe, a bead, nails, and prehistoric ceramics were found in the excavated units.

Feature 156 was the ditch for the parade ground and one 4.2-m-long unit was excavated. The ditch was 82 cm wide and up to 8 cm deep. It was filled with dark brown sandy silt and a piece of sawn bone, a whiteware ceramic sherd, prehistoric sherds, two glass fragments, and a piece of flaked stone were recovered from this area. A small glass bottle for AYER'S PILLS was found within the ditch during stripping.

Feature 117 was the number assigned to the tree planting pits along the various ditches. Five pits were along, or within, the northern ditch for Cottonwood Row. Eight pits were found along, or within, the southern ditch of the parade ground. Several pit features, Features 105, 106, and 115, along the eastern side of the ditch on the west side of the parade ground may also be planting pits for trees, but this is uncertain. None of the planting pits were excavated. They averaged about 1.1 m in diameter, were round to oval in plan view, and were filled with charcoal-stained brown loamy silt.

Feature 165 was a set of postholes for a white picket fence that ran north of the trees along the northern side of Cottonwood Row. In all, 13 postholes, centered about 8 ft apart, were found within the stripped area, two of which cut into pit structure Feature 164. Three of the postholes were excavated, measuring 48 cm by 39 cm, 37 cm by 30 cm, and 34 cm square. The postholes were 10-13 cm deep, although each had been truncated during stripping of overburden. None of the postholes had visible posts, which were likely pulled when people salvaged materials from the fort in the 1890s.

Post-fort Features

Feature 101, Outhouse Pit

Feature 101 was an outhouse pit located immediately northwest of Officers Quarters No. 2. The feature was exposed during backhoe stripping, and was 1.4 m long by 1.3 m wide. A piece of iron protruded from the pit, and when pulled out by the backhoe, it was determined to be an automobile frame that was 2.4 m long. About 20 cm stuck up above the ground surface, so the outhouse pit was at least 2.2 m deep. The pit was not excavated. The feature may actually be a well, although this could not be determined.

Feature 161, Trash Pit

Feature 161 was a trash-filled pit found north of Officers Quarters No. 1, cut into by the backhoe and explored to determine if it contained any contaminated materials. The pit was at least 2.16 m long and was 79 cm deep. The length of the pit was not determined. The feature contained a variety of domestic trash, charcoal, and ashes. Four D-cell batteries were examined in the field and were not collected. These had expiration dates of March 1954 and December 1952 or 1958 (the paper label was difficult to read). These dates indicate the pit contains trash generated by members of the Adkins family or possibly their patients living at their rest home.

SUMMARY

Archaeological fieldwork at the Fort Lowell-Adkins Steel locus of the Hardy site has shown that a large number of prehistoric and fort-era features

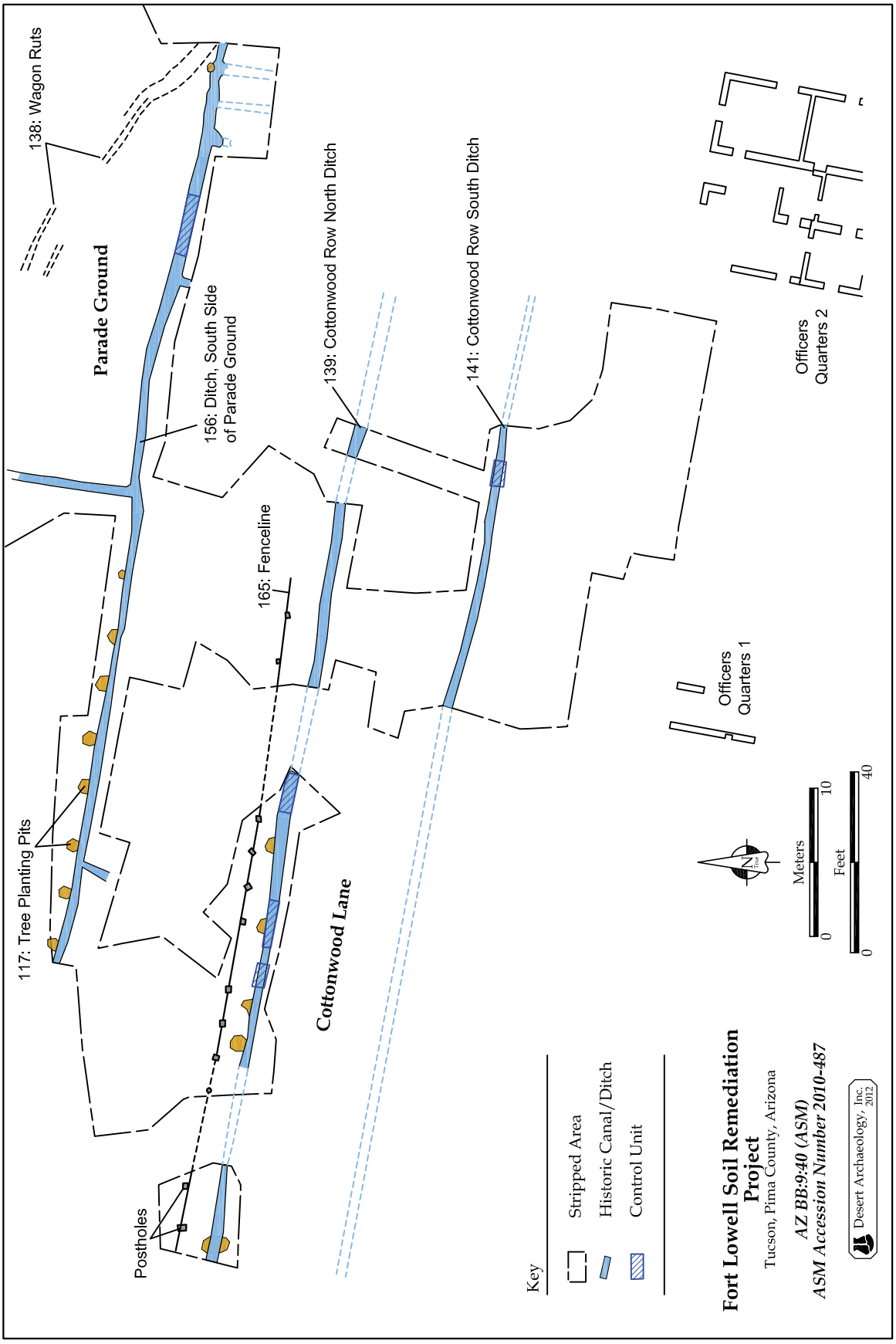

Figure 2.26. Plan view map of features associated with Cottonwood Row.

survived the use of the parcel as an industrial property in the last 70 years.

The prehistoric pit structures located are in excellent condition, most with floor assemblages and sets of datable ceramic artifacts. They date from the Middle Rincon phase to the early Tanque Verde phase, from about A.D. 1000, to shortly after A.D. 1150. Changes in architecture are clearly visible, with earlier structures subrectangular in plan view and the two latest structures rectangular. The previously explored portion of the site, located east of N. Craycroft Road within Fort Lowell Park, had artifacts and features dating to the Pioneer period (A.D. 500-750) to the Late Rincon phase (Gregonis 1997b). That portion appears to have been much more extensively occupied, with 10 houses found in an area measuring about 22 m by 22 m, all of them overlapping to some extent. In contrast, the pit structures uncovered during the current project do not overlap and are probably in courtyard groups.

A variety of other prehistoric features were located at the Fort Lowell-Adkins Steel locus. Most prominent was the large trash mound. Adolf Bandelier noted the presence of trash mounds within the parade ground in 1884. The current mound is approximately 270 m^2 in size, and despite the removal of upper portions during the Historic era and during the soil remediation work, it is estimated to still contain at least 81,000 artifacts.

Other features included a ground stone cache, a cached set of ceramic vessels, roasting pits, and a number of pits of unknown function. Previous fieldwork identified roasting pits, caliche borrow pits, storage pits, and a cemetery-offertory area (Gregonis 1997b). Only a few pieces of cremated human bone were found, mostly in the trash mound, during the current project. Cremation burials are likely present elsewhere on the Fort Lowell-Adkins Steel locus.

The fort-era features are also well-preserved beneath the modern ground surface. Architectural elements of the Officers Quarters were located, providing information that will help guide preservation efforts. A surprise find was the adobe wall running between Officers Quarters Nos. 1 and 2. This wall likely helped enclose the backyard area, creating privacy for the residents. North of the wall was a small garden area, likely where a gardener was growing vegetables. The garden was watered by small ditches extending south from the *acequia* running along the southern side of Cottonwood Row.

Another surprising find were the ditches, trees, and picket fence posts for Cottonwood Row and ditches and planting pits for the southern and western sides of the parade ground. These seemingly ephemeral features were well-preserved and provide basic information about the layout of the fort, information that will be extremely useful for the future interpretation planned at the site.

A large number of artifacts and samples were recovered from the site. These are discussed in Chapters 3-9.

CHAPTER 3

PREHISTORIC POTTERY FROM THE FORT LOWELL-ADKINS STEEL LOCUS OF THE HARDY SITE, AZ BB:9:40 (ASM): DATING, PROVENANCE, TYPOLOGY, AND FUNCTION

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Samples of pottery from the Hardy site, AZ BB:9:14 (ASM), have been reported upon twice previously. Reinhard and Gregonis (1997) provide a short descriptive report about the more than 10,000 sherds and vessels recovered from an archaeological project at the site that was conducted from 1976 to 1978. Temporally diagnostic ceramic types recovered from that project include those made from Sweetwater through Tanque Verde times, circa A.D. 650-1300.

Huntington (1982) provides another short descriptive report on some 8,679 sherds recovered from AZ BB:9:54 (ASM), a locus of the Hardy site located approximately 0.2 km from the portion of the site discussed by Reinhard and Gregonis (1997). Temporally diagnostic ceramic types recovered from BB:9:54 include those made from the Middle Rincon phase through the Tanque Verde phase, circa A.D. 1000-1300.

In this chapter, prehistoric Native American pottery recovered from the Fort Lowell-Adkins Steel locus of the Hardy site is discussed. In all, 6,783 sherds, representing no fewer than 750 vessels, were recovered during this project (Table 3.1). Ceramic types belonging to the Tucson Basin Hohokam red-on-brown, red, polychrome, and plain, Middle Gila Hohokam red-on-buff, and Mimbres Mogollon black-on-white ware series are reported upon. The decorated ceramics recovered from the Fort Lowell-Adkins Steel locus suggest this portion of the Hardy site was occupied from the beginning of the Middle Rincon phase (A.D. 1000-1100) up to sometime early in the Tanque Verde phase (A.D. 1150-1300).

Four research issues are addressed: (1) feature and context dating; (2) ceramic production and distribution, as reflected in temper provenance and related data; (3) subsistence practices, as reflected in vessel function data; and, (4) refinement of the current Tucson Basin ceramic typology.

ANALYSIS METHODS

Sampling Strategy

The ceramic collection recovered from the Fort Lowell-Adkins Steel locus of the Hardy site was subdivided into four mutually exclusive context- or vessel part-based samples prior to analysis, with the intensity of analysis varying according to sample (see Table 3.1). The most intensively analyzed sample includes the pottery from roof/wall fall, floor, and subfloor contexts of all houses, as well as trash mound Feature 121, Unit 110. All sherds other than unmodified plain ware body sherds were analyzed by the author; unmodified plain ware body sherd counts were provided by laboratory personnel. The full suite of attributes, discussed below, was used in the analysis of this ceramic sample.

The second sample supplemented the first. Included in that sample are all large rim sherds (regardless of ware), worked sherds (regardless of ware), unusual plain ware vessel parts, Tucson Basin red-on-brown pottery exhibiting isolated elements, Tanque Verde Red-on-brown, red-slipped, polychrome, and extrabasinal black-on-white ware recovered from contexts not included in the first sample. The third sample consisted of all field-identified reconstructible vessels recovered from contexts that would otherwise have remained unanalyzed. The full suite of attributes was used to analyze the latter two samples. Finally, no detailed analysis of pottery recovered from contexts that did not otherwise meet one of the analysis criteria discussed above was conducted.

Typological and Contextual Analyses

The first goal of this analysis was to determine the age of all ceramic-bearing deposits. A related

Table 3.1. Ceramic types recovered from the Fort Lowell-Adkins Steel locus of the Hardy Site, AZ BB:9:40 (ASM), reported by sampling strategy.

Ceramic Ware and Type	Production Date Range (A.D.)	Sherds and Vessels from House Roof/Wall Fall, Floor Contact, and Floor Feature Contexts and Trash Mound Feature 121 (Unit 110)		Supplemental (Sherds from Undifferentiated House Fill and Contexts that Would Otherwise Remain Unanalyzed)		Field-identified "Reconstructible Vessels" from Contexts that Would Otherwise Remain Unanalyzed		Unanalyzed Contexts	Row Total	
		Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Sherd Count	Minimum Number of Vessels	Sherd Count
Tucson Basin Red-on-brown Ware										
Indeterminate pre-Classic red-on-brown	500-1150	22	22	0	0	1	1	N/A	23	23
Indeterminate red-on-brown	500-1450	9	9	0	0	3	3	N/A	12	12
Rillito or Early Rincon red-on-brown	850-1000	0	0	0	0	1	1	N/A	1	1
Rillito or Early, Middle, or Late Rincon red-on-brown	850-1150	1	1	0	0	0	0	N/A	1	1
Early Rincon Red-on-brown	950-1000	3	3	0	0	0	0	N/A	3	3
Early or Middle Rincon red-on-brown	950-1100	29	30	9	9	1	1	N/A	39	40
Early, Middle, or Late Rincon red-on-brown	950-1150	14	14	4	5	2	7	N/A	20	26
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown (sherds)	950-1450	10	10	5	5	4	4	N/A	19	19
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown (reconstructible vessel)	950-1450	1	21	0	0	0	0	N/A	1	21
Middle Rincon Red-on-brown (sherds)	1000-1100	73	79	49	75	7	18	N/A	129	172
Middle Rincon Red-on-brown (reconstructible vessel)	1000-1100	1	12	0	0	0	0	N/A	1	12
Middle or Late Rincon red-on-brown (sherds)	1000-1150	73	75	24	25	2	2	N/A	99	102
Middle or Late Rincon red-on-brown (reconstructible vessel)	1000-1150	1	18	0	0	0	0	N/A	1	18
Middle or Late Rincon, or Tanque Verde red-on-brown	1000-1450	15	19	1	1	0	0	N/A	16	20
Transitional Middle to Late Rincon Red-on-brown (reconstructible vessel)	1090-1110	1	13	0	0	0	0	N/A	1	13
Late Rincon Red-on-brown (sherds)[a]	1100-1150	44	92	45	52	10	59	N/A	99	203
Late Rincon Red-on-brown (reconstructible vessel)	1100-1150	0	0	0	0	1	21	N/A	1	21
Late Rincon or Tanque Verde red-on-brown (sherds)	1100-1450	7	15	6	6	1	1	N/A	14	22
Late Rincon or Tanque Verde red-on-brown (reconstructible vessel)	1100-1450	0	0	0	0	2	17	N/A	2	17
Transitional Late Rincon to Tanque Verde Red-on-brown (reconstructible vessel)	1140-1190	1	38	0	0	0	0	N/A	1	38
Tanque Verde Red-on-brown (sherds)	1150-1450	8	17	9	9	1	5	N/A	18	31
Tanque Verde Red-on-brown (reconstructible vessel)	1150-1450	1	74	0	0	0	0	N/A	1	74

Table 3.1. Continued.

Ceramic Ware and Type	Production Date Range (A.D.)	Sherds and Vessels from House Roof/Wall Fall, Floor Contact, and Floor Feature Contexts and Trash Mound Feature 121 (Unit 110)		Supplemental (Sherds from Undifferentiated House Fill and Contexts that Would Otherwise Remain Unanalyzed)		Field-identified "Reconstructible Vessels" from Contexts that Would Otherwise Remain Unanalyzed		Unanalyzed Contexts	Row Total	
		Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Sherd Count	Minimum Number of Vessels	Sherd Count
Tucson Basin Red Ware										
Rincon Red	1000-1100	6	7	32	33	3	3	N/A	41	43
Unidentified red ware type (possibly Rincon Red)		0	0	0	0	1	1	N/A	1	1
Tucson Basin Polychrome										
Rincon Polychrome (sherds)	1000-1100	4	4	2	2	0	0	N/A	6	6
Rincon Polychrome (reconstructible vessel)	1000-1100	1	69	0	0	0	0	N/A	1	69
Tanque Verde Polychrome (black-on-brown exterior; red-on-brown interior)	1150-1450	0	0	1	1	0	0	N/A	1	1
Middle Gila Red-on-buff Ware										
Indeterminate red-on-buff	700-1300	5	5	0	0	1	1	N/A	6	6
Indeterminate buff	700-1300	9	9	0	0	0	0	N/A	9	9
Early Sacaton, Middle Sacaton 1, or Middle Sacaton 2 red-on-buff	900/950-1100	1	1	0	0	0	0	N/A	1	1
Early Sacaton, Middle Sacaton 1, Middle Sacaton 2, or Late Sacaton red-on-buff	900/950-1125/1150	1	1	0	0	0	0	N/A	1	1
Middle Sacaton 1 or Middle Sacaton 2 red-on-buff	1020-1100	1	2	0	0	0	0	N/A	1	2
Middle Sacaton 1, Middle Sacaton 2, or Late Sacaton red-on-buff	1020-1125/1150	2	2	0	0	0	0	N/A	2	2
Mimbres Black-on-white Ware										
Mimbres Style III Black-on-white	1000/1010-early 1200s	0	0	2	2	0	0	N/A	2	2
Other Extrabasinal Prehistoric Ware										
Indeterminate black-on-white		0	0	1	2	0	0	N/A	1	2
Tucson Basin Plain Ware										
Unmodified body sherd (analyzed contexts, see "Sampling Strategy")		N/A	1,265	N/A	N/A	N/A	288	N/A	N/A	1,553

Table 3.1. Continued.

Ceramic Ware and Type	Production Date Range (A.D.)	Sherds and Vessels from House Roof/Wall Fall, Floor Contact, and Floor Feature Contexts and Trash Mound Feature 121 (Unit 110)		Supplemental (Sherds from Undifferentiated House Fill and Contexts that Would Otherwise Remain Unanalyzed)		Field-identified "Reconstructible Vessels" from Contexts that Would Otherwise Remain Unanalyzed		Unanalyzed Contexts	Row Total	
		Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Minimum Number of Vessels	Sherd Count	Sherd Count	Minimum Number of Vessels	Sherd Count
Modified body sherd		5	6	6	6	0	0	N/A	11	12
Rim sherd		61	73	63	65	4	20	N/A	128	158
Neck sherd		22	22	0	0	1	1	N/A	23	23
Tabular handle/spout		0	0	1	1	1	1	N/A	2	2
Sharp "Gila" shoulder		1	1	0	0	0	0	N/A	1	1
Transitional Gila/Classic shoulder		1	1	0	0	0	0	N/A	1	1
Coil handle		1	1	0	0	0	0	N/A	1	1
Reconstructible vessel		4	349	0	0	0	0	N/A	4	349
Indeterminate Tucson Basin Ware										
Indeterminate plain or red-on-brown ware		3	3	1	1	0	0	N/A	4	4
Ceramics from unanalyzed contexts (see "Sampling Strategy")										
All sherds other than unmodified plain ware body sherds		N/A	N/A	N/A	N/A	N/A	N/A	1,295	N/A	1,295
Unmodified body sherd		N/A	N/A	N/A	N/A	N/A	N/A	2,350	N/A	2,350
Column Total		442	2,383	261	300	47	455	3,645	750	6,783

[a]One vessel (two sherds) from Feature 104 undifferentiated house fill is Topawa Variety; another vessel (three sherds) from Feature 164 roof/wall fall may be Topawa Variety.

goal was the identification of deposits suitable for numerical seriation. The approximate age of all ceramic-bearing features was determined based on the types of painted, red-slipped, and polychrome sherds recovered from them (Creel 2006; Danson 1957; Greenleaf 1975; Heckman et al. 2000; Hegmon et al. 1999; Heidke 1990a, 1995, 2012; Kelly 1978; Shafer 2003; Shafer and Brewington 1995; Wallace 1986a, 1986b). Further, sequencing of deposits within the Middle Rincon phase follows guidelines summarized in Heidke (1996a:55-60). Phase date ranges follow those proposed by Wallace and Craig (1988:Table 2.3).

Following the procedure initiated by Wallace (1985:83), all painted, red-slipped, and polychrome pottery, as well as all plain ware rim sherds, reconstructible vessels, necks, shoulders, handles, and modified sherds recovered from a feature, were laid out together in the order of the strata and levels excavated, along with any subfeatures, such as hearths and postholes, that may have been present. In many cases, a number of sherds within a bag or from different strata, levels, or bags within a feature conjoined (that is, the pieces literally fit together), while in other cases, aspects of the sherd's decoration or morphology and temper were similar enough to consider multiple sherds matching portions of a single vessel. When conjoins or matches were observed, the vessel was recorded in the provenience containing the largest portion of the vessel. Because all the temporally diagnostic sherds recovered from a feature were laid out at one time, it was possible to quickly determine if a feature's fill was mixed (containing ceramic types inferred to have non-overlapping production date ranges) and if pieces of the same pot were recovered from more than one vertical or horizontal provenience unit (Kobyliński and Moszczyński 1992). In this way, a more accurate estimate of the minimum number of vessels present in each deposit was obtained (Voss and Allen 2010). Up to 90 ft^2 of analysis space was available at any one time to lay out a feature's ceramic collection.

Information resulting from the contextual analysis was summarized to document the author's impressions regarding each stratum's fill type (ceremonial, de facto refuse/provisional discard, secondary refuse, redeposited secondary refuse, and so forth), typological phase date, confidence in that date, evidence of temporal mixing, and presence of vertical and/or horizontal conjoins/matches. Contexts assigned a phase date with a high degree of confidence became the "well-dated deposits" referred to throughout the rest of this chapter.

Because each stratum within a feature was evaluated separately, a well-dated deposit could consist of just the fill above a roof/wall fall stratum, just the fill in and below a roof/wall fall stratum, just the sherds or vessels on a floor, just the sherds recovered from a subfeature, such as a large floor pit, or some combination of the above. Importantly, as used here, a well-dated ceramic deposit need not date the feature it was recovered from; for example, a well-dated deposit consisting of undifferentiated fill above a roof/wall fall stratum *must* postdate the structure's occupancy to some degree.

Ceramic Attribute Analysis

As many as 14 attributes were recorded from each analyzed sherd or vessel. Ten attributes were recorded from every plain, painted, and/or red-slipped piece of pottery included in one of the three analyzed samples. Those attributes are: ceramic ware, ceramic type, sherd size, vessel part, vessel shape, vessel form (within a shape class), temper type, generic temper source, specific temper source, and presence/absence of post-firing modification, or "working." Additional explanation of the three temper attributes is provided below. They were recorded after examining the edge of each sherd at 15-power magnification, using a Unitron ZSM binocular microscope fitted with a Stocker and Yale Lite Mite Series 9 circular illuminator. Three attributes, rim length, orifice diameter (maximum opening at a vessel's mouth), and aperture diameter (minimum opening at or below a vessel's mouth), were only recorded from rim sherds and reconstructible vessels. Finally, painted sherds exhibiting an isolated element had element type documented.

SUMMARY OF TYPOLOGICAL AND CONTEXTUAL ANALYSIS RESULTS

The 16 well-dated features, and the contexts within them, identified during the ceramic analysis are reported in Table 3.2. Well-dated deposits representing five portions of the ceramic sequence were documented, although the distinction between transitional Late Rincon/Tanque Verde and mixed Late Rincon and Tanque Verde phase contexts is minor. The ceramic types recovered from those deposits are very similar (Table 3.3), and their inferred time of deposition is identical.

Sequencing within the Middle Rincon phase is not reported in Table 3.2 because seriation attributes were not recorded from complete, feature-based collections of red-on-brown pottery. If those data were available, it is likely it would show that Feature 121 accumulated during the Middle Rincon 1 portion of the phase (circa A.D. 1000-1040), Feature 199 during Middle Rincon 2 (circa A.D. 1040-1080),

Table 3.2. Well-dated feature contexts identified during the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), ceramic analysis. (Pottery recovered from the underlined contexts underwent the complete attribute analysis.)

Time	Feature Number (Context[a])
Mixed Late Rincon and Tanque Verde (circa A.D. 1140-1190)	108 (50); 160 (10, 11, 20, 30); 164 (11, 20); 169 (50)
Transitional Late Rincon/Tanque Verde (circa A.D. 1140-1190)	167 (11, 20, 30)
Late Rincon (circa A.D. 1100-1150)	104 (10, 11, 30); 135 (50); 140 (50); 172 (50)
Transitional Middle Rincon 3/Late Rincon (circa A.D. 1090-1110)	157 (10, 11, 20, 30)
Middle Rincon (circa A.D. 1000-1100)	118 (50); 119 (50); 121 (50 [Unit 110]); 130 (10, 11, 20, 30); 142 (11, 20, 30); 147 (50)

[a]Context 10 is undifferentiated room/house fill; Context 11 is roof/wall fall; Context 20 is direct floor contact; Context 30 is fill of a secondary feature located within a structure; Context 50 is fill of a primary, extramural feature.

and Features 130 and 142 during Middle Rincon 2 or 3 based on the author's experience seriating other Middle Rincon phase deposits. The occupants of the latter two houses may have deposited the trash designated Feature 121.

The Late Rincon Red-on-brown pottery recovered from Feature 104 was produced very late in the phase, based on typological reasoning (Heidke 2012). Entryway orientations and typological dating suggest the occupants of Features 167 and 168 likely filled Feature 104. Feature 168 may have been the last house in this courtyard to be occupied, as very few sherds were recovered from it. Therefore, the courtyard formed by Features 104, 167, and 168 may have been occupied slightly earlier than the courtyard formed by Features 160 and 164.

Superimposed Deposits

Four sets of superimposed, ceramic-bearing features were excavated; one involved well-dated features. Late Rincon phase Feature 172 overlay Middle Rincon phase Feature 121. The other three sets included small pits that intruded into Middle Rincon Feature 130. Small pit Feature 155 contained possible Middle Rincon phase trash, Feature 158 had only plain ware, and Feature 159 contained possible Middle Rincon 3 or Late Rincon trash.

Conjoining and Matching Sherd Sets

A total of 21 sets of intrafeature conjoining or matching sherds was identified during analysis, and all but two, those from Feature 134, occur in well-dated deposits (Table 3.4). The remaining 19 sets are present in six of the 16 well-dated features, meaning that 37.5 percent of the well-dated features contained at least one set. No cross-feature matches were identified.

Typological Mixing

Minor temporal mixing is evident in the well-dated deposits. Each temporally mixed sherd must represent one of four distinct forms. Each "out of place" sherd must be earlier or later than their recovery context's inferred date, and each must come from an adjacent phase or a phase separated by even more time from the recovery context's inferred date ("skip phase"). Overall, 4.8 percent of the temporally diagnostic sherds recovered from the well-dated deposits are out of place (see Table 3.3). Many (3.2 percent) are earlier types from an adjoining phase, and some of them likely represent vessels produced during one phase whose useful lives lasted into the next or that were true heirlooms. The presence of temporally mixed sherds belonging to the other three logical groups are more difficult to explain, and these probably represent true mixing, especially the earlier, skip phase sherds (0.9 percent). There is, however, temporal patterning in the skip phase sherd data; that is, all the skip phase sherds were recovered from well-dated Late Rincon and later deposits and all are an earlier type.

CERAMIC ATTRIBUTE ANALYSIS

Indirect Evidence of Pottery Production: Temper Provenance and Type

Archaeologists generally use two general kinds of evidence when reconstructing the organization of ceramic production: direct and indirect (Costin 1991). Direct evidence of pottery production includes raw materials (clay, temper, pigments), forming and finishing tools (turntables, anvils, scrapers, polishers), facilities associated with production (clay storage and mixing basins, kilns, wind screens), and manufacturing debris ("wasters") (Mills and Crown 1995; Stark 1985; Sullivan 1988). Indirect evidence

Table 3.3. Minimum number of vessel counts for the painted and/or slipped ceramic types recovered from well-dated, completely analyzed contexts at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). (Sherds indicative of skip phase mixing are reported in shaded cells.)

		Minimum Number of Vessel Counts					
Ceramic Ware and Type	Production Date Range (A.D.)	Middle Rincon	Transitional Middle Rincon 3/Late Rincon	Late Rincon	Transitional Late Rincon/ Tanque Verde	Mixed Late Rincon and Tanque Verde	Row Total
Tucson Basin Red-on-brown Ware							
Indeterminate pre-Classic red-on-brown	500-1150	511	0	0	3	7	21
Indeterminate red-on-brown	500-1450	0	0	1	1	6	8
Rillito or Early, Middle, or Late Rincon red-on-brown	850-1150	1	0	0	0	0	1
Early Rincon Red-on-brown	950-1000	0	0	1	1	1	3
Early or Middle Rincon red-on-brown	950-1100	23	1	0	1	3	28
Early, Middle, or Late Rincon red-on-brown	950-1150	4	3	1	1	5	14
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown (sherds)	950-1450	3	0	3	0	4	10
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown (reconstructible vessel)	950-1450	1	0	0	0	0	1
Middle Rincon Red-on-brown (sherds)	1000-1100	59	5	1	3	2	70
Middle Rincon Red-on-brown (reconstructible vessel)	1000-1100	1	0	0	0	0	1
Middle or Late Rincon red-on-brown	1000-1150	17	14	10	4	27	72
Middle or Late Rincon, or Tanque Verde red-on-brown	1000-1450	4	0	2	0	9	15
Transitional Middle to Late Rincon Red-on-brown (reconstructible vessel)	1090-1110	0	1	0	0	0	1
Late Rincon Red-on-brown[a]	1100-1150	2	3	10	2	27	44
Late Rincon or Tanque Verde red-on-brown	1100-1450	0	0	0	2	5	7
Transitional Late Rincon to Tanque Verde Red-on-brown (reconstructible vessel)	1140-1190	0	0	0	1	0	1
Tanque Verde Red-on-brown (sherds)	1150-1450	0	0	0	2	5	7
Tanque Verde Red-on-brown (reconstructible vessel)	1150-1450	0	0	0	0	1	1
Tucson Basin Red Ware							
Rincon Red	1000-1100	5	0	0	1	0	6
Tucson Basin Polychrome							
Rincon Polychrome (sherds)	1000-1100	4	0	0	0	0	4
Rincon Polychrome (reconstructible vessel)	1000-1100	1	0	0	0	0	1
Middle Gila Red-on-buff Ware							
Indeterminate red-on-buff	700-1300	4	0	0	0	1	5
Indeterminate buff	700-1300	7	0	0	0	2	9
Early Sacaton, Middle Sacaton 1, or Middle Sacaton 2 red-on-buff	900/950-1100	1	0	0	0	0	1

Table 3.3. Continued.

Ceramic Ware and Type	Production Date Range (A.D.)	Minimum Number of Vessel Counts					
		Middle Rincon	Transitional Middle Rincon 3/Late Rincon	Late Rincon	Transitional Late Rincon/ Tanque Verde	Mixed Late Rincon and Tanque Verde	Row Total
Early Sacaton, Middle Sacaton 1, Middle Sacaton 2, or Late Sacaton red-on-buff	900/950-1125/1150	1	0	0	0	0	1
Middle Sacaton 1 or Middle Sacaton 2 red-on-buff	1020-1100	1	0	0	0	0	1
Middle Sacaton 1, Middle Sacaton 2, or Late Sacaton red-on-buff	1020-1125/1150	1	0	0	0	1	2
Column Total		151	27	29	22	106	335

[a]One vessel from mixed Late Rincon and Tanque Verde phase Feature 164 may be Topawa Variety.

Table 3.4. Summary of analyzed feature contexts having conjoining or matching sherd sets, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Feature Number	Conjoin/Match Number	Number of Sherds (Context[a])	Notes[b]
130	Match No. 6	2 (10, 11)	–
130	Conjoin No. 7	3 (11)	–
130	Conjoin No. 8	69 (10, 11, 20)	RV-2
134	Conjoin No. 9	18 (11, 20)	RV-2
134	Match No. 10	153 (20, 30)	RV-1
140	Conjoin No. 4	3 (50)	–
140	Conjoin No. 5	9 (50)	–
157	Conjoin No. 11	10 (10, 11)	–
160	Conjoin No. 18	32 (10, 11, 20)	RV-4
160	Match No. 19	2 (10, 11)	–
160	Conjoin No. 20	73 (11, 20, 30)	RV-3
160	Match No. 21	8 (11, 20)	RV-1
164	Match No. 12	10 (11, 20)	–
164	Match No. 13	3 (11, 20)	–
164	Match No. 14	2 (11)	–
164	Match No. 15	8 (11, 20)	–
164	Match No. 16	4 (11, 20)	–
164	Conjoin No. 17	3 (11, 20)	–
167	Match No. 1	17 (11, 20, 30)	Sherds from RV-2 bag (parts of RV-1 match)
167	Match No. 2	38 (11, 20)	RV-2
167	Conjoin No. 3	8 (20)	–

[a]Context 10 is undifferentiated room/house fill; Context 11 is roof/wall fall; Context 20 is direct floor contact; Context 30 is fill of a secondary feature located within a structure; Context 50 is fill of a primary, extramural feature.
[b]RV = Reconstructible vessel.

refers to provenance, morphological, and/or design data recorded from pottery (Costin 1991). Successful provenance studies require detailed geological mapping and sampling of ceramic resources, as well as technological analyses of ceramic pastes (Arnold 2000; Costin 2000; Pool 1992; Shepard 1963).

Prehistoric Native American pottery produced in the North American Southwest often contains abundant temper, such as sand, disaggregated rock, and crushed sherd. Both sand and rock tempers can be used as indicators of provenance once their geological sources have been identified (Arnold 1985; Heidke et al. 2002; Shepard 1936, 1942). In this study, most sherds were found to be tempered with sand or a mixture of sand and crushed schist/gneiss and/or muscovite mica. During the last two decades, an intensive program of wash sand sampling in the Tucson Basin has provided clear evidence that many spatially discrete sand temper compositions were available to Native American potters living in the area (Miksa 2011). Accordingly, analysis of the sand temper component of a sherd's paste provides evidence about whether the pot was produced in the Tucson Basin, and, if so, where it is likely to have been made.

Generic compositions are defined when the sands within a well-defined region are studied and it is determined that they can be divided into subsets based on similar compositions. Generic compositions are also visible in sand-tempered pottery, where they are characterized as "generic" temper resources. Generic compositions can often be subdivided further based on additional spatial and compositional information. When that is accomplished, petrofacies, or sand composition zones, are defined. Individual petrofacies compositions may also be visible in sand-tempered pottery, or pottery produced from a clay that naturally contains sand-sized grains, where they are characterized as "specific" temper resources. These specific temper resource zones are also referred to as petrofacies. Currently, 38 petrofacies are defined for the greater Tucson Basin (Figure 3.1).

Temper Provenance

Interpretation of temper provenance data is contingent upon understanding what sand temper resources were locally available to potters residing at the Fort Lowell-Adkins Steel locus of the Hardy site.

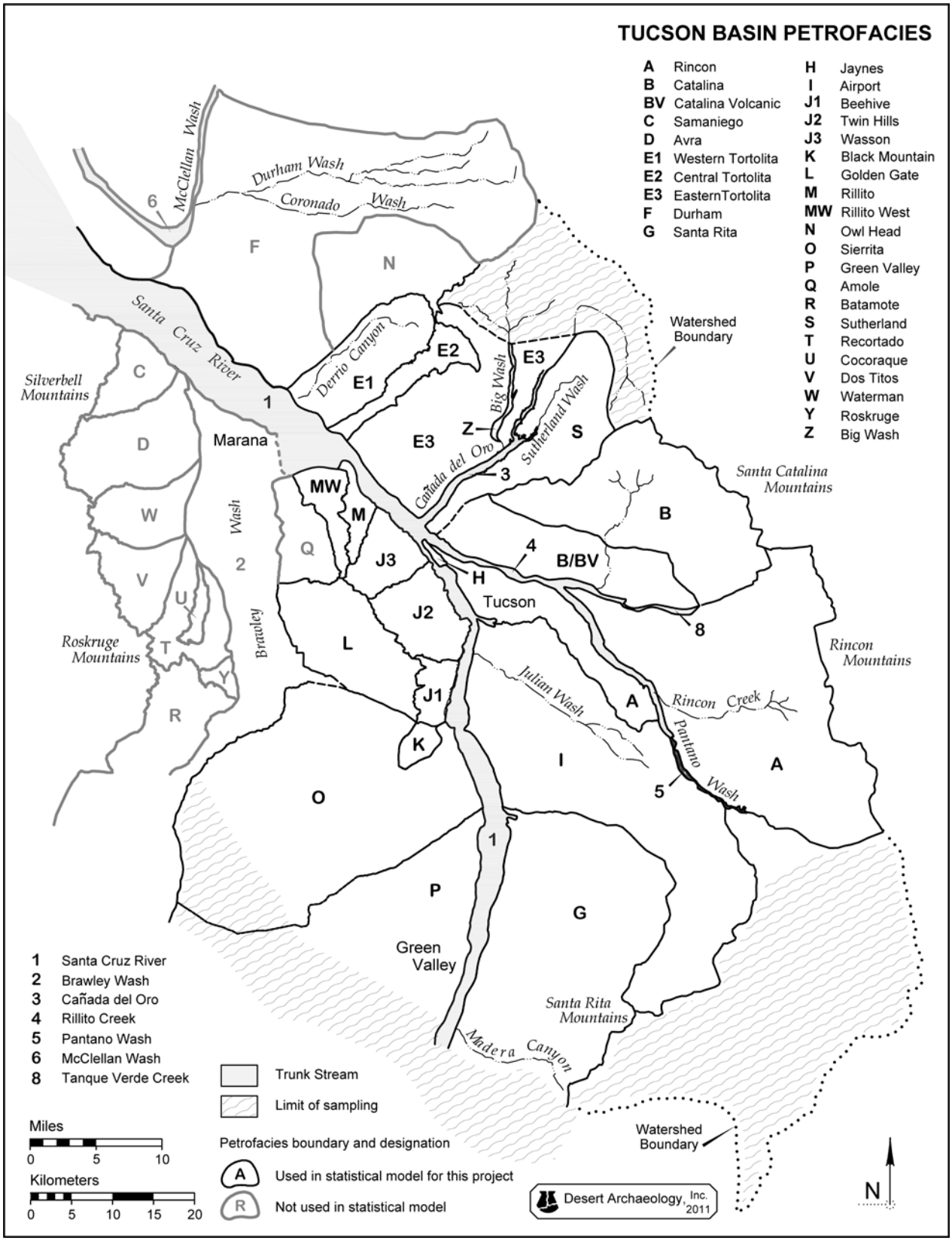

Figure 3.1. Current Tucson Basin petrofacies map, showing locations, letter designations, and names.

In two recent studies, Heidke et al. (2002) and Heidke (2011a) summarize the distance that traditional potters are known to travel to collect sand temper. The data indicate that potters who use sand temper tend to exploit nearby resources. In the combined data batch of 24 cases, 71 percent of the potters were found to travel no more than 1 km to collect sand, and 3 km was the farthest distance documented.

Those facts lead to the conclusion that any sand-tempered pottery with a composition similar to that available in washes located within 3 km of the archaeological site that the sherd was recovered from should, in a behavioral sense, be considered the product of "local" manufacture (because some potters are known to travel that far to collect sand temper). However, the evidence also suggests that agreement between the composition of a sherd's sand temper and the sands found in the washes located closest to its recovery site may be a better measure of "local" ceramic production. Sand-tempered pottery displaying compositions that are not available within 3 km of a site are best considered "nonlocal" items.

The Fort Lowell-Adkins Steel locus of the Hardy site is located in the Rincon Petrofacies (A), although portions of the Catalina/Catalina volcanic (B/Bv), Rillito Creek (4), Pantano Wash (5), and Tanque Verde Creek (8) petrofacies are located within 3 km of the locus. All six of these areas contain sands derived from metamorphic rocks. During analysis, the provenance of metamorphic sand-tempered sherds was characterized as indeterminate, or unspecified, unless it displayed the key grains known to define the Catalina/Catalina volcanic composition, which has been verified during four projects (Heidke 1996c; Heidke and Lavayen 2009; Heidke and Miksa 2009; Heidke et al. 2009). This approach was used because the author has never worked with a pottery collection from a site located in the Rincon Petrofacies and the current project lacked funding for petrographic verification of temper provenance.

Three nonlocal tempers were also observed. The correctness of the author's characterization of those compositions has been tested and verified repeatedly. Of particular importance is the Beehive Petrofacies (J1) temper composition. In total, 74 samples of that composition have been analyzed during eight recent projects, and all have been verified as correct (Gregory et al. 2005; Heidke 2000a, 2003a, 2003b; Heidke and Lavayen 2009; Heidke and Miksa 2009; Heidke et al. 1998; Heidke et al. 2009). Potters residing at West Branch, AZ AA:16:3 (ASM); Valencia, AZ BB:13:15 (ASM), AZ BB:13:74 (ASM), and AZ BB:13:103 (ASM); and Julian Wash, AZ BB:13:17 (ASM), are known to have been actively involved in ceramic production and exchange during the Sedentary period (A.D. 950-1150). West Branch is located in the Beehive Petrofacies, while Valencia and Julian Wash are located within 3 km of the Beehive Petrofacies. The Beehive Petrofacies, per se, is located approximately 14-24 km southwest of the Hardy site.

The Twin Hills Petrofacies south (J1s) composition represents another important temper resource area. That designation refers to tempers displaying an abundance of hypabyssal volcanic grains. Seventeen sand-tempered sherds with that composition have been analyzed during seven recent projects, and all have been verified as correct (Gregory et al. 2005; Heidke 2000a, 2003a, 2003b; Heidke and Lavayen 2009; Heidke et al. 1998; Heidke et al. 2009). Importantly, all of those samples have high counts of hypabyssal volcanic grains. Pottery tempered with Twin Hills south sand is inferred to have been made at the St. Mary's Hospital Ruin, AZ AA:16:26 (ASM) (Heidke 1999; Heidke et al. 2002), which is located approximately 9.25 km southwest of the locus.

The third nonlocal provenance group is Twin Hill Petrofacies north. Seven sand-tempered sherds with that composition were analyzed during a recent project, and all were verified as correct (Heidke 2012). Sherds characterized as having that composition are inferred to have been made with a Twin Hills Petrofacies sand composition unlike that found in sherds attributed to the St. Mary's Hospital Ruin. The northern portion of the Twin Hills Petrofacies lies 9.25-23.5 km southwest of the locus.

Temper provenance data are presented in Tables 3.5 and 3.6. Plain ware data are limited to that recorded from rim sherds and reconstructible vessels, while the red-on-brown, red, and polychrome ware data include all vessel parts. Provenance data recorded from pottery recovered from the well-dated, completely analyzed contexts are reported in Table 3.5, and supplemental temper source data for rare slipped and/or painted ceramic types from other contexts are reported in Table 3.6.

The temper in the greatest number of sherds was characterized as an indeterminate/unspecified metamorphic composition. Some, or all, of that pottery may have been produced at the Hardy site, either at the Fort Lowell-Adkins Steel locus or in another part of the village. Direct evidence of production, four pottery polishers, was recovered from one of the Middle Rincon phase contexts at the locus, Feature 130 (Chapter 5, this volume). Seven additional polishers have been recovered from other areas at the site (Gregonis 1997b:45, $n = 3$; Huntington 1982:126, $n = 4$).

Temporal trends in the provenance data of Sedentary period painted and/or slipped pottery types recovered from the Fort Lowell-Adkins Steel locus of the Hardy site are consistent with those discussed in Clark et al. (2013) and Heidke (2009, 2011b:545-

Table 3.5. Temper source data recorded from the ceramic types recovered from well-dated, completely analyzed contexts at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), based on minimum number of vessel counts. (Sherd and reconstructible vessel counts are merged except for plain ware vessel parts; plain ware counts are based on rim sherds and reconstructible vessels.)

Ceramic Ware and Type	Production Date Range (A.D.)	Metamorphic[a]		Volcanic[a]				Indeterminate	Row Total
		Indeterminate	B/Bv	J1	J2s	J2n	Indeterminate		
Tucson Basin Red-on-brown Ware									
Indeterminate pre-Classic red-on-brown	500-1150	5	1	6	2	1	2	4	21
Indeterminate red-on-brown	500-1450	3	0	2	2	0	0	1	8
Rillito or Early, Middle, or Late Rincon red-on-brown	850-1150	0	0	0	1	0	0	0	1
Early Rincon Red-on-brown	950-1000	0	1	2	0	0	0	0	3
Early or Middle Rincon red-on-brown	950-1100	5	1	15	4	1	0	2	28
Early, Middle, or Late Rincon red-on-brown	950-1150	8	2	2	0	1	0	1	14
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown	950-1450	4	1	2	3	0	1	0	11
Middle Rincon Red-on-brown	1000-1100	20	7	27	11	1	2	3	71
Middle or Late Rincon red-on-brown	1000-1150	32	8	8	8	7	2	7	72
Middle or Late Rincon, or Tanque Verde red-on-brown	1000-1450	6	1	1	1	1	3	2	15
Transitional Middle to Late Rincon Red-on-brown	1090-1110	0	1	0	0	0	0	0	1
Late Rincon Red-on-brown	1100-1150	18	9	1	7	8	0	1	44
Late Rincon or Tanque Verde red-on-brown	1100-1450	1	2	0	1	2	0	1	7
Transitional Late Rincon to Tanque Verde Red-on-brown	1140-1190	1	0	0	0	0	0	0	1
Tanque Verde Red-on-brown	1150-1450	0	1	0	3	3	0	1	8
Tucson Basin Red Ware									
Rincon Red	1000-1100	0	0	6	0	0	0	0	6
Tucson Basin Polychrome									
Rincon Polychrome	1000-1100	0	0	5	0	0	0	0	5
Tucson Basin Plain Ware									
Rim sherds and reconstructible vessels		18	4	11	13	3	0	13	62
Indeterminate Tucson Basin Ware									
Indeterminate plain or red-on-brown ware		0	0	2	0	0	0	1	3
Column Total		121	39	90	56	28	10	37	381

[a]Petrofacies abbreviations: B/Bv = Catalina/Catalina volcanic; J1 = Beehive; J2s = Twin Hills south; J2n = Twin Hills north. Indeterminate metamorphic sources include the Rillito Creek (4), Pantano Wash (5), Tanque Verde Creek (8), Rincon (A), Catalina/Catalina volcanic (B/Bv), and Owl Head (N) petrofacies. Indeterminate volcanic sources include the Avra (D), Beehive (J1), Twin Hills (J2n [north] and J2s [south]), Wasson (J3), Golden Gate (L), Batamote (R), Recortado (T), Waterman (W), and Roskruge (Y) petrofacies.

Table 3.6. Supplementary temper source data recorded from select ceramic types recovered from other contexts at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), based on minimum number of vessel counts. (Sherd and reconstructible vessel counts are merged.)

Ceramic Ware and Type	Production Date Range (A.D.)	Metamorphic[a]		Volcanic[a]			Indeterminate	Row Total
		Indeterminate	B/Bv	J1	J2s	Indeterminate		
Tucson Basin Red-on-brown Ware								
Tanque Verde Red-on-brown	1150 - 1450	1	0	1	4	1	4	11
Tucson Basin Red Ware								
Rincon Red	1000 - 1100	1	1	25	2	2	4	35
Tucson Basin Polychrome								
Rincon Polychrome	1000 - 1100	0	0	2	0	0	0	2
Tanque Verde Polychrome (black-on-brown exterior; red-on-brown interior)	1150 - 1450	0	0	0	0	1	0	1
Column Total		2	1	28	6	4	8	49

[a]Petrofacies abbreviations: B/Bv = Catalina/Catalina volcanic; J1 = Beehive; J2s = Twin Hills south. Indeterminate metamorphic sources include the Rillito Creek (4), Pantano Wash (5), Tanque Verde Creek (8), Rincon (A), Catalina/Catalina volcanic (B/Bv), and Owl Head (N) petrofacies. Indeterminate volcanic sources include the Avra (D), Beehive (J1), Twin Hills (J2n [north] and J2s [south]), Wasson (J3), Golden Gate (L), Batamote (R), Recortado (T), Waterman (W), and Roskruge (Y) petrofacies.

551). In short, potters residing at the West Branch, Valencia, and Julian Wash sites were regional specialists in the production of Early Rincon Red-on-brown, Middle Rincon Red-on-brown, Rincon Red, and, especially, Rincon Polychrome vessels tempered with Beehive Petrofacies sand, although the emphasis placed on making each ware seems to have varied by village. In addition to the specialists residing at those villages, at least five additional Middle Rincon villages, including the Hardy site, produced pottery that was not distributed as widely throughout the basin.

The basin-wide distribution of Beehive Petrofacies sand-tempered pottery ended by the beginning of the Classic period (A.D. 1150-1450), circa A.D. 1150. By that time, the Tucson Basin Hohokam ballcourt system had been abandoned for at least 50 years, and the last remnants of intraregional economic, social, and political integration, which the ball game's ceremonies and market places had once enabled, ceased. Gone were the ritual paraphernalia and iconography that had characterized the Hohokam for hundreds of years—palettes, stone bowls, censers, and the lizard-snake-quail-water bird symbolism (Wilcox 1991a:57; Wilcox and Sternberg 1983:243). Platform mounds replaced ballcourts as the places where people celebrated astronomical or mythological events (Wilcox 1991c:120-121). Activities held in platform mound communities apparently played a significant role in the distribution of Classic period goods (Bayman 1994:77; Doelle et al. 1995:385, 440; Fish and Fish 2000:247-248; Heidke 2004:107), and new subregional networks of ceramic production and exchange emerged.

Temper Type

Temper type data are summarized in Tables 3.7 and 3.8. As with the provenance data, plain ware data are limited to those recorded from rim sherds and reconstructible vessels, while the temper type data for other wares include all vessel parts. Temper type data recorded from pottery recovered from the well-dated, completely analyzed contexts are reported in Table 3.7, while supplemental temper type data for rare slipped and/or painted ceramic types are reported in Table 3.8. Review of the tables shows that: (1) most of the pottery recovered from the Fort Lowell-Adkins Steel locus is sand tempered; and, (2) over time, a greater percentage of the red-on-brown pottery is sand tempered. Most of the remaining sherds exhibit tempers consisting of a mixture of sand and schist/gneiss and/or muscovite mica in variable amounts. One sherd tempered with phyllite was documented in the plain ware. Phyllite is a nonlocal, and possibly extrabasinal, temper type. Zahniser (1970:116) described AZ BB:14:45 (ASM) as a quarry site, and phyllite is present there (Heidke 1986:187).

VESSEL FUNCTION

Rim sherds with measurable orifice and/or aperture diameters were placed into functional categories determined by their ware, overall morphology, and mouth size (Braun 1980). Braun's (1980) morphological classification is based on Shepard's (1995:230) geometric taxonomy of vessel shape, while the functional categories he developed are based on characteristics of historic and modern Piman, Yuman, and Puebloan pottery. The ethnographically based model Braun (1980) developed provides an objective and replicable way to examine prehistoric pottery function. The model does, however, represent indirect evidence of use, and therefore, yields conclusions that must be phrased as "inferred uses" (Rice 1996:140). The methodology used here has been described in detail elsewhere (Heidke 2006).

The results of the classification of the Fort Lowell-Adkins Steel locus vessels into Shepard-Braun functional categories are shown in Table 3.9, by time and ware. Overall, five inferred functions and one unknown were identified: storage (25.6 percent), cooking (35.6 percent), individual serving vessels (0.9 percent), small group serving vessels (15.6 percent), large group serving vessels (21.8 percent), and a vessel of unknown function (0.5 percent). The functional data can also be examined by time, aggregating data from A.D. 1000-1110 contexts (Middle Rincon and transitional Middle Rincon 3/Late Rincon) and A.D. 1100-1190 contexts (Late Rincon, transitional Late Rincon/Tanque Verde, and mixed Late Rincon and Tanque Verde), thereby creating two data batches, each approximately 100 years in length.

The frequency of inferred functions in the A.D. 1000-1110 data are: storage = 24.4 percent, cooking = 40.0 percent, individual serving vessels = 0.9 percent, small group serving vessels = 14.8 percent, large group serving vessels = 19.1 percent, and a vessel of unknown function = 0.8 percent. The frequency of inferred functions in the A.D. 1100-1190 data are: storage = 27.1 percent, cooking = 30.2 percent, individual serving vessels = 1.0 percent, small group serving vessels = 16.7 percent, and large group serving vessels = 25.0 percent.

Rice (1987:Table 9.5) reports the average percentage of storage (16 percent; range = 2-31), cooking (53 percent; range = 26-87), and serving (23 percent; range = 8-41) vessels present in 10 different ethnographically known cultures. The percentage values of storage vessels present at the Fort Lowell-Adkins

Table 3.7. Temper type data recorded from the ceramic types recovered from well-dated, completely analyzed contexts at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), based on minimum number of vessel counts. (Sherd and reconstructible vessel counts are merged except for plain ware vessel parts; plain ware counts are based on rim sherds and reconstructible vessels.)

Ceramic Ware and Type	Production Date Range (A.D.)	TT4	TT3	TT2	TT6	TT1	TT5	TT8	TT10	Indeterminate	Row Total
Tucson Basin Red-on-brown Ware											
Indeterminate pre-Classic red-on-brown	500-1150	15	5	0	0	0	0	0	0	1	21
Indeterminate red-on-brown	500-1450	7	0	1	0	0	0	0	0	0	8
Rillito or Early, Middle, or Late Rincon red-on-brown	850-1150	1	0	0	0	0	0	0	0	0	1
Early Rincon Red-on-brown	950-1000	1	1	1	0	0	0	0	0	0	3
Early or Middle Rincon red-on-brown	950-1100	19	5	3	0	0	0	0	0	1	28
Early, Middle, or Late Rincon red-on-brown	950-1150	13	1	0	0	0	0	0	0	0	14
Early, Middle, or Late Rincon, or Tanque Verde red-on-brown	950-1450	11	0	0	0	0	0	0	0	0	11
Middle Rincon Red-on-brown	1000-1100	51	15	2	1	0	0	1	0	1	71
Middle or Late Rincon red-on-brown	1000-1150	67	5	0	0	0	0	0	0	0	72
Middle or Late Rincon, or Tanque Verde red-on-brown	1000-1450	13	1	0	1	0	0	0	0	0	15
Transitional Middle to Late Rincon Red-on-brown	1090-1110	1	0	0	0	0	0	0	0	0	1
Late Rincon Red-on-brown	1100-1150	42	1	0	1	0	0	0	0	0	44
Late Rincon or Tanque Verde red-on-brown	1100-1450	7	0	0	0	0	0	0	0	0	7
Transitional Late Rincon to Tanque Verde Red-on-brown	1140-1190	1	0	0	0	0	0	0	0	0	1
Tanque Verde Red-on-brown	1150-1450	8	0	0	0	0	0	0	0	0	8
Tucson Basin Red Ware											
Rincon Red	1000-1100	3	3	0	0	0	0	0	0	0	6
Tucson Basin Polychrome											
Rincon Polychrome	1000-1100	4	1	0	0	0	0	0	0	0	5
Tucson Basin Plain Ware											
Rim sherds and reconstructible vessels		49	2	2	1	3	2	1	1	1	62
Indeterminate Tucson Basin Ware											
Indeterminate plain or red-on-brown ware		2	0	0	1	0	0	0	0	0	3
Column Total		315	40	9	5	3	2	2	1	4	381

Note: TT1 is high LMT (> 25 percent schist/gneiss), TT2 is high LMT/low sand (7-25 percent schist/gneiss), TT3 is low LMT/high sand (1-7 percent schist/gneiss), TT4 is high sand (< 1 percent schist/gneiss), TT5 is high muscovite mica (> 25 percent MUSC), TT6 is mixed sand and muscovite mica (1-25 percent MUSC), TT8 is mixed sand, schist/gneiss, and muscovite mica (1-25 percent LMT+MUSC), and TT10 is high phyllite (> 25 percent LMTP).

Table 3.8. Supplementary temper type data recorded from select ceramic types recovered from other contexts at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), based on minimum number of vessel counts. (Sherd and reconstructible vessel counts are merged.)

Ceramic Ware and Type	Production Date Range (A.D.)	TT4	TT3	Row Total
Tucson Basin Red-on-brown Ware				
Tanque Verde Red-on-brown	1150-1450	11	0	11
Tucson Basin Red Ware				
Rincon Red	1000-1100	20	15	35
Tucson Basin Polychrome				
Rincon Polychrome	1000-1100	1	1	2
Tanque Verde Polychrome (black-on-brown exterior; red-on-brown interior)	1150-1450	1	0	1
Column Total		33	16	49

Note: TT3 is low LMT/high sand (1-7 percent schist/gneiss), and TT4 is high sand (< 1 percent schist/gneiss).

Table 3.9. Vessel function reported by time and ware, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Ware and Vessel Function	Middle Rincon	Transitional Middle Rincon 3/Late Rincon	Late Rincon	Transitional Late Rincon/ Tanque Verde	Mixed Late Rincon and Tanque Verde	Row Total
Plain ware cooking	38	8	14	3	12	75
Plain ware storage	8	2	3	0	0	13
Plain ware large group serving	3	0	2	0	0	5
Red-on-brown ware storage	12	6	13	2	8	41
Red-on-brown ware large group serving	16	3	15	0	7	41
Red-on-brown ware small group serving	13	2	14	0	2	31
Red-on-brown ware individual serving	0	0	1	0	0	1
Red-on-brown ware unknown	0	1	0	0	0	1
Red ware small group serving	1	0	0	0	0	1
Polychrome small group serving	1	0	0	0	0	1
Red-on-buff ware individual serving	1	0	0	0	0	1
Column Total	93	22	62	5	29	211

Steel locus as a whole and in the two temporal subdivisions fall within the ethnographic range. Similarly, all the cooking vessel percentage values fall within the ethnographic range. However, one of the serving vessel values falls outside the ethnographic range. The overall percentage of serving vessels, 38.4 percent, falls within the range documented by Rice (1987), as does the percentage recovered from A.D. 1000-1110 deposits (34.8 percent). The percentage of serving vessels recovered from A.D. 1100-1190 deposits (42.7 percent) slightly exceeds the upper value of the ethnographic range (41 percent).

A synthetic study of Tucson Basin Hohokam vessel function resulted in the same finding. Half the serving vessel percentage values in that study exceeded the ethnographic range by 1.3-8.9 percent (Heidke 2011a:291). Serving vessels probably broke quite often due to their frequent use. The higher values for serving vessels observed in the Fort Lowell-Adkins Steel locus data and elsewhere suggests a consistent bias toward the overrepresentation of serving vessels in archaeological collections of potsherds from Tucson area sites.

Reconstructible Vessels

Vessels ranging from 25-100 percent complete were considered reconstructible. A total of 29 reconstructible vessels were identified as such in the field, but only 14 proved to be. The ceramic type, temper source, completeness, vessel form, orifice and aperture diameter, and inferred function of those vessels are reported in Table 3.10. Cases are sorted by sampling strategy, feature number, and context.

Eleven of the reconstructible vessels were recovered from houses. Two of these were recovered from roof/wall fall contexts and nine from floor contact.

Table 3.10. Reconstructible vessel inventory, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Feature Number	Context[a]	Deposit Date[b]	Ceramic Type	Temper Source	Completeness (Percent)	Vessel Form	Orifice Diameter (cm)	Aperture Diameter (cm)	Function	Notes[c]
Contextual										
130	11	MR	Early, Middle, or Late Rincon, or Tanque Verde red-on-brown	Catalina	25-50	Hemispherical bowl	29.0	—	Large group serving	RV-1
130	20	MR	Rincon Polychrome	Beehive	50-75	Straight-walled bowl	20.0	—	Small group serving	RV-2; C#8; Figure 3.2
130	20	MR	Middle Rincon Red-on-brown	Indeterminate Metamorphic	25-50	Outcurved bowl	17.0	—	Small group serving	RV-3
134	11	MR3-LR	Middle or Late Rincon red-on-brown	Indeterminate Metamorphic	25-50	Incurved bowl	29.0	28.0	Storage	RV-2; C#9; composite layouts rare in Middle Rincon, more common in Late Rincon; ticked solid elements in band? Figure 3.3
134	20	MR3-LR	Plain ware	Indeterminate Metamorphic	75-99	Tall straight-collared jar	22.5	20.0	Cooking	RV-1; M#10
157	20	MR3/LR	Transitional Middle to Late Rincon Red-on-brown	Catalina	25-50	Angled straight-collared jar	18.0	16.0	Storage	Pot break no. 1; sharp-shouldered; Figure 3.4
160	20	LR&TV	Tanque Verde Red-on-brown	Catalina	75-99	Tall straight-collared jar	17.5	15.0	Storage	RV-3; sharp-shouldered; Figure 3.5
160	20	LR&TV	Plain ware	Twin Hills north	25-50	Tall flare-rim jar	21.0	19.0	Cooking	RV-4; C#18; differential firing/breakage
164	20	LR&TV	Plain ware	Twin Hills south	25-50	Indeterminate jar	27.0	24.0	—	
167	20	LR/TV	Transitional Late Rincon to Tanque Verde Red-on-brown	Indeterminate Metamorphic	50-75	Short flare-rim jar	16.0	12.5	Storage	RV-2; M#2; sharp-shouldered; Figure 3.6
167	20	LR/TV	Plain ware	Twin Hills south	75-99	Short flare-rim jar	18.0	15.5	Cooking	RV-1
Field-identified "reconstructible vessels" from contexts that would otherwise remain unanalyzed										
140	50	LR	Late Rincon or Tanque Verde red-on-brown	Twin Hills north	25-50	Short flare-rim jar	12.5	10.0	Storage	—
140	50	LR	Late Rincon or Tanque Verde red-on-brown	Twin Hills north	25-50	Short flare-rim jar	11.0	9.0	Storage	—
172	50	LR	Late Rincon Red-on-brown	Catalina	25-50	Hemispherical bowl	26.0	—	Large group serving	Rim is ground

[a]Context 11 is roof/wall fall; Context 20 is direct floor contact; Context 50 is fill of a primary extramural feature.

[b]Phase abbreviations are: MR = Middle Rincon; MR3/LR = transitional Middle Rincon 3/Late Rincon; MR3-LR = Middle Rincon 3 or Late Rincon; LR = Late Rincon; LR/TV = transitional Late Rincon/Tanque Verde; LR&TV = Late Rincon and Tanque Verde.

[c]Refers to "C#" (conjoin number) and "M#" (match number) reported in Table 3.4.

The nine reconstructible vessels on house floors were recovered from six well-dated structures. Three structures had two vessels on their floor, and the other three structures had one. The reconstructible vessels from houses that exhibited large sections of visible design are illustrated in Figures 3.2-3.6.

The remaining three vessels fell outside the primary sampling strategy; all were recovered from small pits.

ASPECTS OF TYPOLOGY AND STYLE

Isolated Elements

Painted Hohokam pottery types often utilize isolated, often geometric, elements and/or representations of life forms in their designs (Haury 1976:Figures 12.73, 12.86, 12.87, 12.99; Heidke 1990b:Figure 6.7, 1995:Figures 5.24-5.26; Wallace 1986a:Figure 6.5). Some of the Middle Rincon, Late Rincon, and Tanque Verde Red-on-brown pottery recovered from the Fort Lowell-Adkins Steel locus of the Hardy site display isolated elements. The element categories utilized here use Haury's (1976) scheme, except elements that Haury (1976) did not encounter; those elements have been given new, sequential category numbers. Eighteen elements were documented in the collection, most of which have been seen before. However, Middle Rincon Red-on-brown element category 222, lines of linked diamond-shaped boxes with single dots in their centers, is new.

The occurrence of elements observed on Middle Rincon Red-on-brown pottery is reported in Table 3.11, by temper source. Thirty-eight vessels are represented, as one vessel displayed two elements. The occurrence of elements observed on Late Rincon and Tanque Verde Red-on-brown pottery is reported in Table 3.12, by temper source. Three Late Rincon Red-on-brown vessels are represented; each vessel displayed a single element. Three Tanque Verde Red-on-brown vessels are represented; one of them displayed two elements.

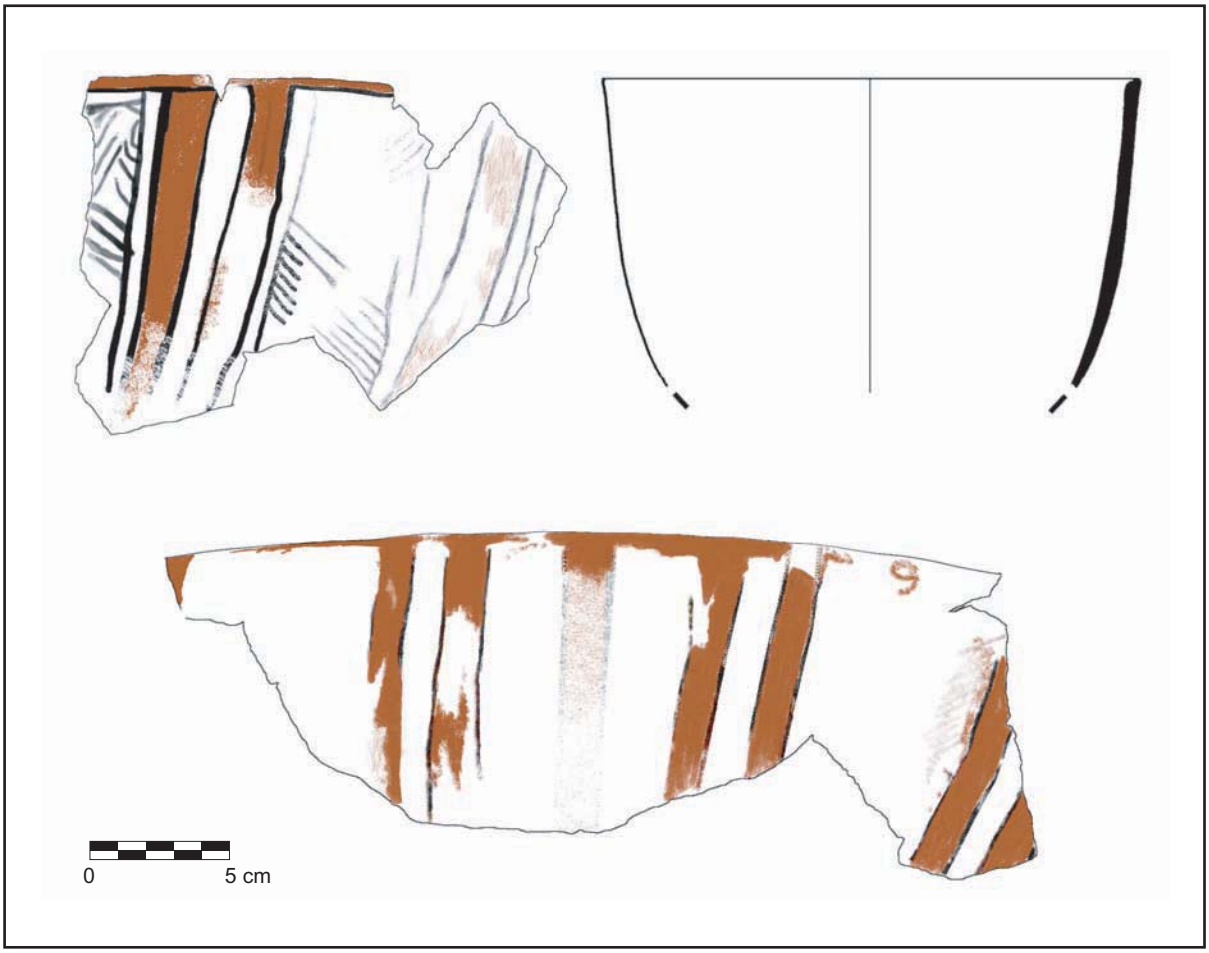

Figure 3.2. Rincon Polychrome straight-walled bowl recovered from Feature 130, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog No. 1).

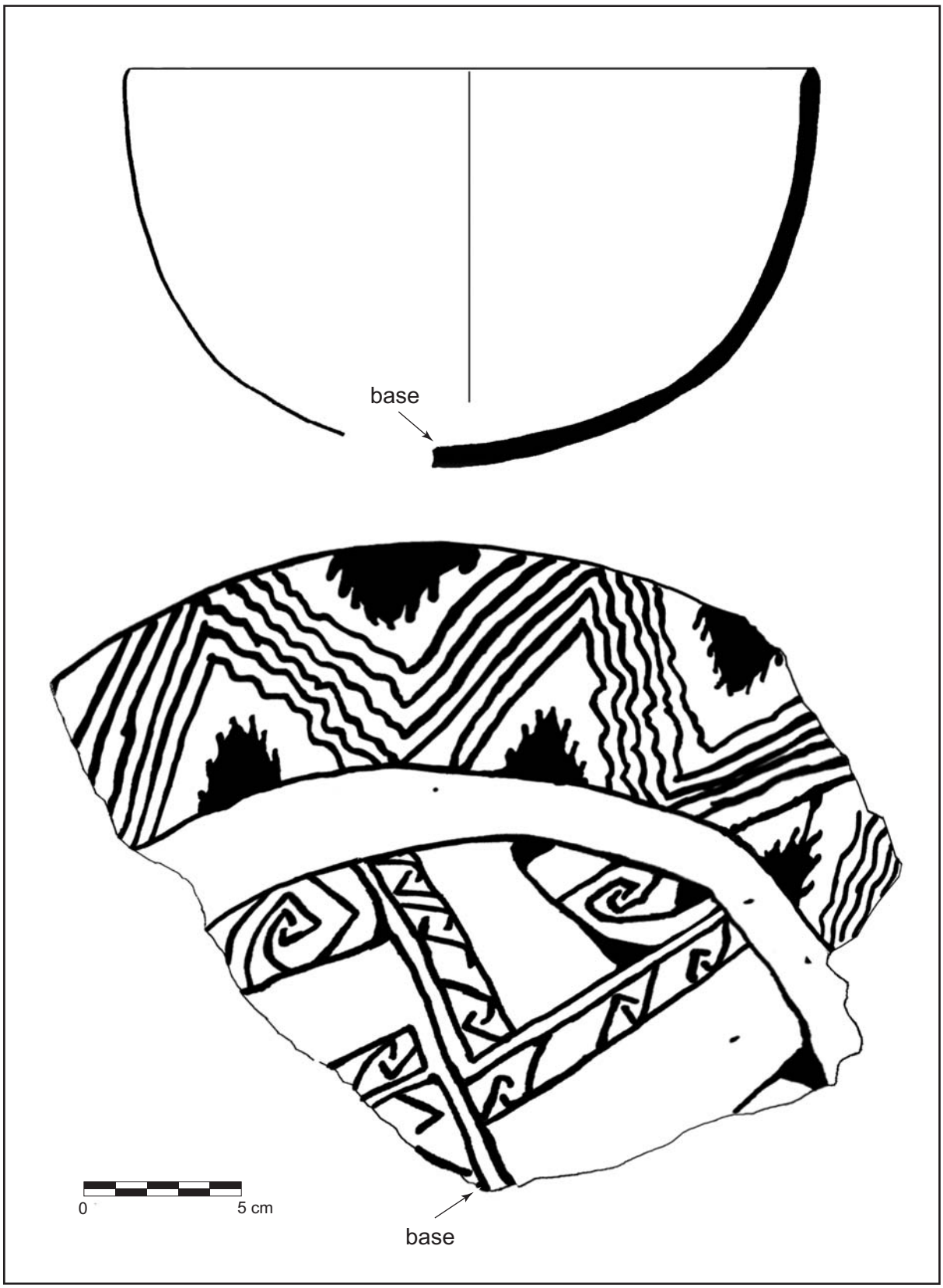

Figure 3.3. Middle or Late Rincon red-on-brown incurved bowl recovered from Feature 134, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog No. 2).

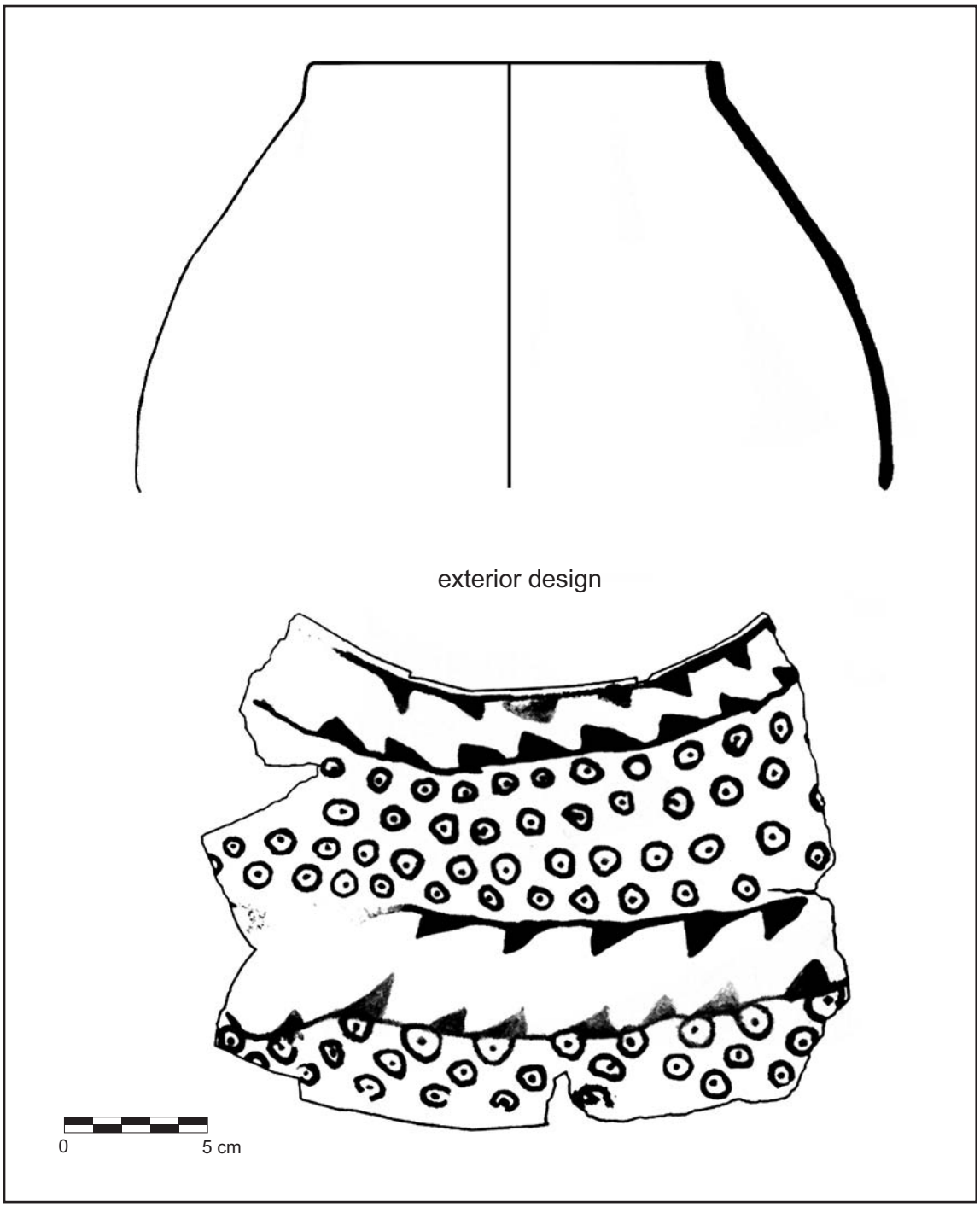

Figure 3.4. Transitional Middle to Late Rincon Red-on-brown angled straight-collared jar recovered from Feature 157, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog No. 3).

Late Rincon, Topawa, and Cortaro Red-on-brown

The Fort Lowell-Adkins Steel locus of the Hardy site yielded a relatively large sample of Late Rincon Red-on-brown pottery, often associated with small amounts of Tanque Verde Red-on-brown (Figures 3.7-3.10). That association suggests two things. First, that most of the Late Rincon Red-on-brown pottery must have been made relatively late in the Late Rincon phase. Second, that all the Tanque Verde Red-on-brown pottery must have been made relatively early in the Tanque Verde phase. The direct association of those two types provides a way to

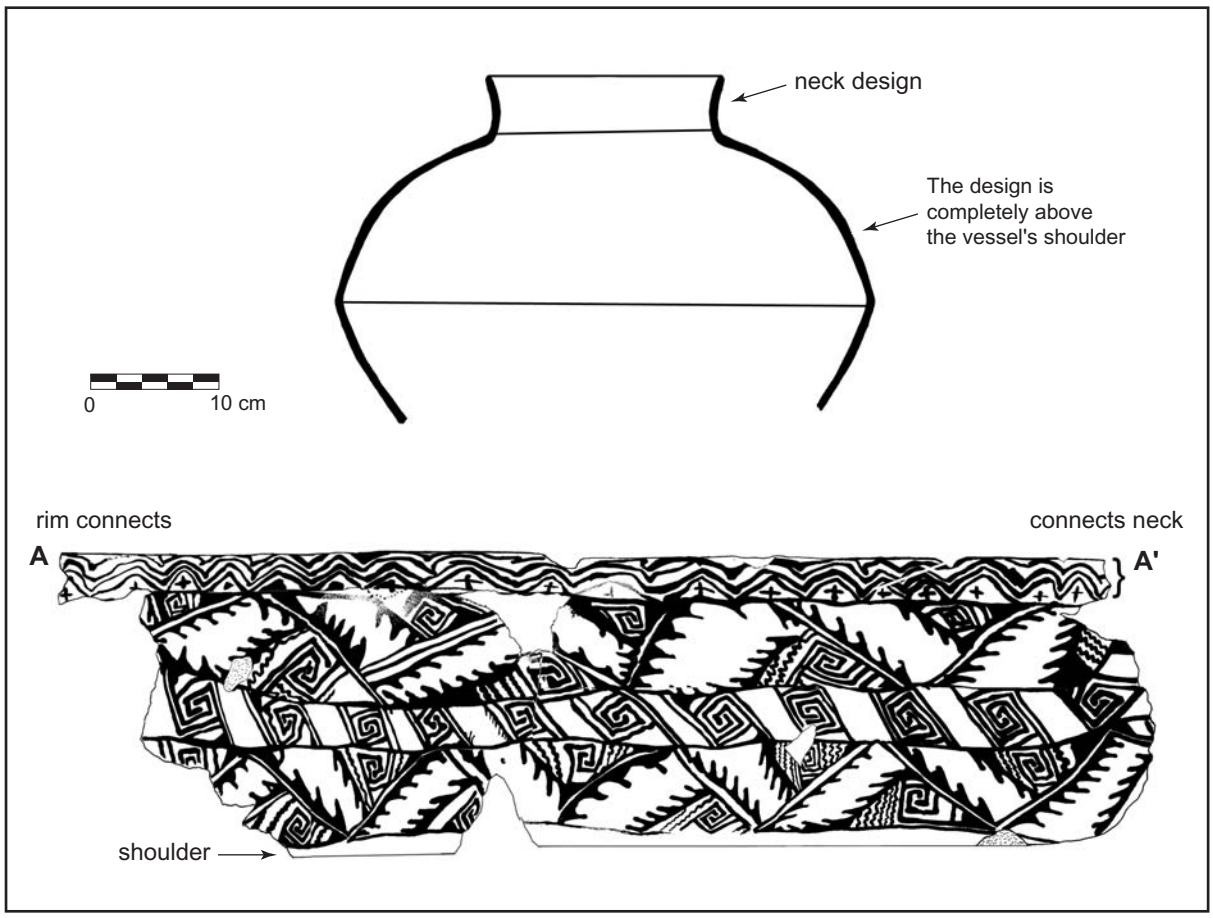

Figure 3.5. Tanque Verde Red-on-brown tall straight-collared jar recovered from Feature 160, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog No. 4).

identify a suite of attributes used by potters late in the Late Rincon phase. It also informs on long-standing questions regarding the transition from late pre-Classic to Classic period pottery decoration; specifically, if deposits of Late Rincon Red-on-brown pottery can be seriated, should Topawa Red-on-brown recovered from Tucson areas sites be considered a regional variety of the type or a Late Rincon Red-on-brown variant, and if the hypothesized ceramic type "Cortaro Red-on-brown" is a valid concept.

Late Rincon Red-on-brown had its inception in the sectioned layouts made by Middle Rincon phase potters, and often relied on the wavy-capped fringe motif (Wallace 1986b:53). Major differences between the two types relate to a reduction in the complexity of layouts over time, with an emphasis in the Late Rincon phase on open space, use of multiple adjacent parallel lines as integral parts of the design, and increased popularity of rectilinear elements and motifs (Wallace 1986b:58). Potters continued to make the interior surface a bowl's primary design field, as was the practice throughout the pre-Classic (Wallace 1986b:57).

A less well-known aspect of the type's description involves the presence of an empty space between a bowl's rim and design (Wallace 1986b:56-57), an attribute shared with Late Sacaton Red-on-buff (Wallace 2004:Figure 3.22). Recently, design field separation has been shown to be both a part of Late Rincon potters' overall design vocabulary, as pots displaying the attribute were made in multiple locations, and to have increased in frequency over time (Heidke 2012:284). Six additional Late Rincon Red-on-brown seriation attributes were suggested more than 15 years ago (Heidke 1995:311-315). The use of white slip appears to have ended very early in production of the type. The use of the wavy-capped fringe motif ended sometime before the type stopped being made, while the frequency of saw-tooth lines and, especially, ticked lines, increased through time. Potters began using banded layouts and cross-hatch sometime near the end of the type's manufacture.

Five attributes of the Late Rincon Red-on-brown pottery recovered from the Fort Lowell-Adkins Steel locus of the Hardy site argue for it having been made late in the phase. Two of those attributes were noted

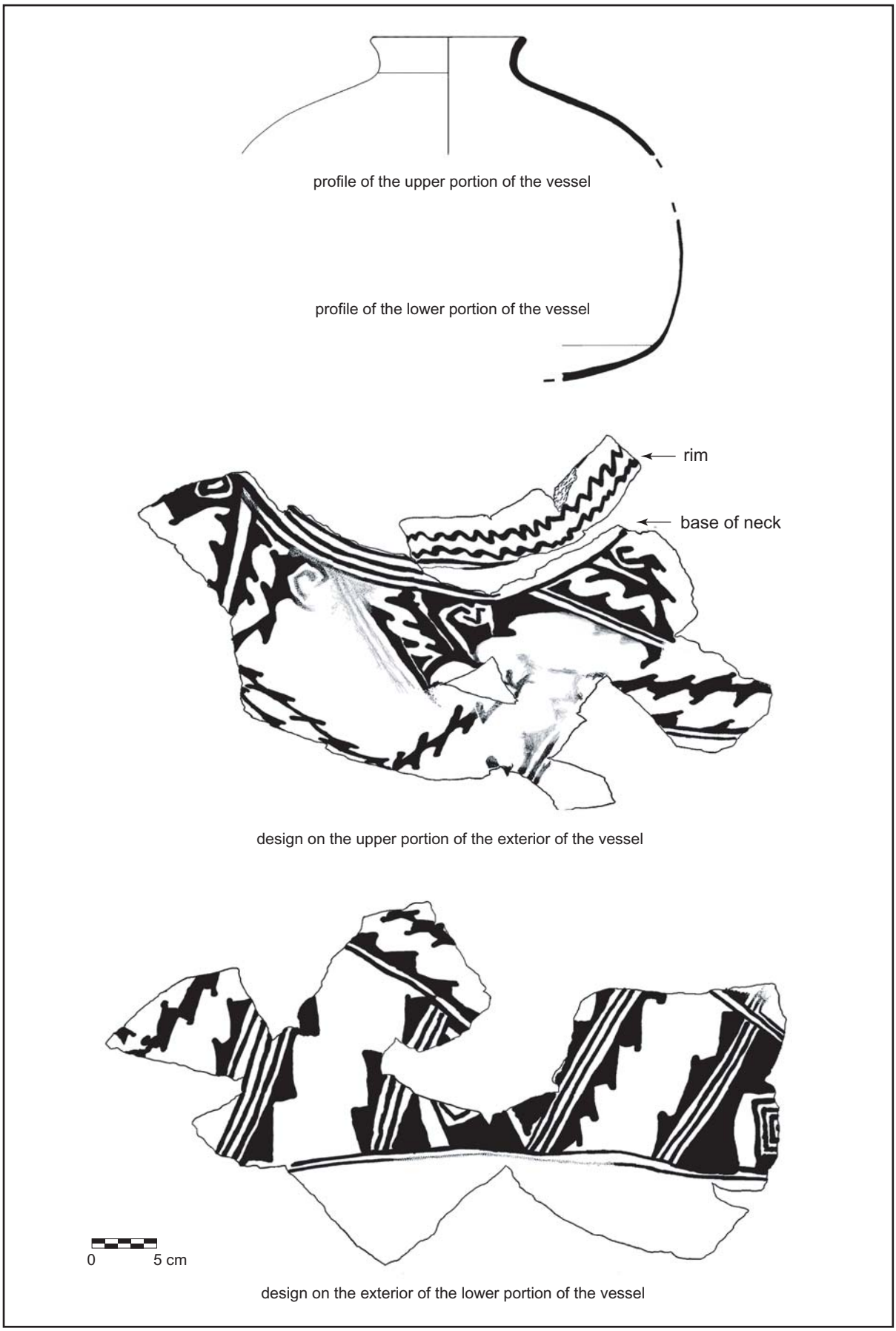

Figure 3.6. Transitional Late Rincon to Tanque Verde Red-on-brown short flare-rim jar recovered from Feature 167, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog No. 5).

Table 3.11. Middle Rincon Red-on-brown isolated elements, reported by temper source, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

		Temper Source[a]				
Element Category (Categories 1-129 after Haury 1976:Figure 12.99)		J1	J2s	B	Indeterminate Metamorphic	Row Total
1		1	3	1	1	6
2		1	0	0	0	1
9		3	1	0	0	4
19		1	0	0	0	1
32		1	0	0	0	1
34.5		0	0	0	1	1
47		0	1	0	0	1
55.1		6	1	1	1	9
55.2		0	0	0	1	1
76		0	0	0	1	1
77		1	0	0	0	1
96		0	1	0	3	4
104.1		1	0	0	0	1
104.3		0	1	0	1	2
104.4		0	0	1	2	3
134.1		1	0	0	0	1
222		0	0	0	1	1
Column Total		16	8	3	12	39

[a]Petrofacies abbreviations: J1 = Beehive, J2s = Twin Hills south, B = Catalina. Indeterminate metamorphic sources include the Rillito Creek (4), Pantano Wash (5), Tanque Verde Creek (8), Rincon (A), Catalina/Catalina volcanic (B/Bv), and Owl Head (N) petrofacies.

Table 3.12. Late Rincon Red-on-brown and Tanque Verde Red-on-brown isolated elements, reported by temper source, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

		Late Rincon Red-on-brown Temper Source[a]		Tanque Verde Red-on-brown Temper Source[a]			
Element Category (Categories 1-129 after Haury 1976:Figure 12.99)		J2n	Indeterminate Metamorphic	J2s	B	Indeterminate	Row Total
1		0	0	1	0	0	1
47		1	0	0	1	1	3
104.3		0	2	0	0	0	2
208		0	0	0	1	0	1
Column Total		1	2	1	2	1	7

[a]Petrofacies abbreviations: B = Catalina, J2s = Twin Hills south, and J2n = Twin Hills north. Indeterminate metamorphic sources include the Rillito Creek (4), Pantano Wash (5), Tanque Verde Creek (8), Rincon (A), Catalina/Catalina volcanic (B/Bv), and Owl Head (N) petrofacies.

Figure 3.7. Late Rincon Red-on-brown sherds from Feature 104, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog Nos. 42-52).

above: design field separation and ticked lines. At least 14 bowls exhibiting design field separation were present in the Late Rincon Red-on-brown collection (see Figure 3.7a-c, h and Figure 3.9a), as were 24 vessels with ticked lines (see Figure 3.7d-h and Figure 3.9b).

The third, and previously unnamed, design attribute, referred to here as a ticked solid, was present

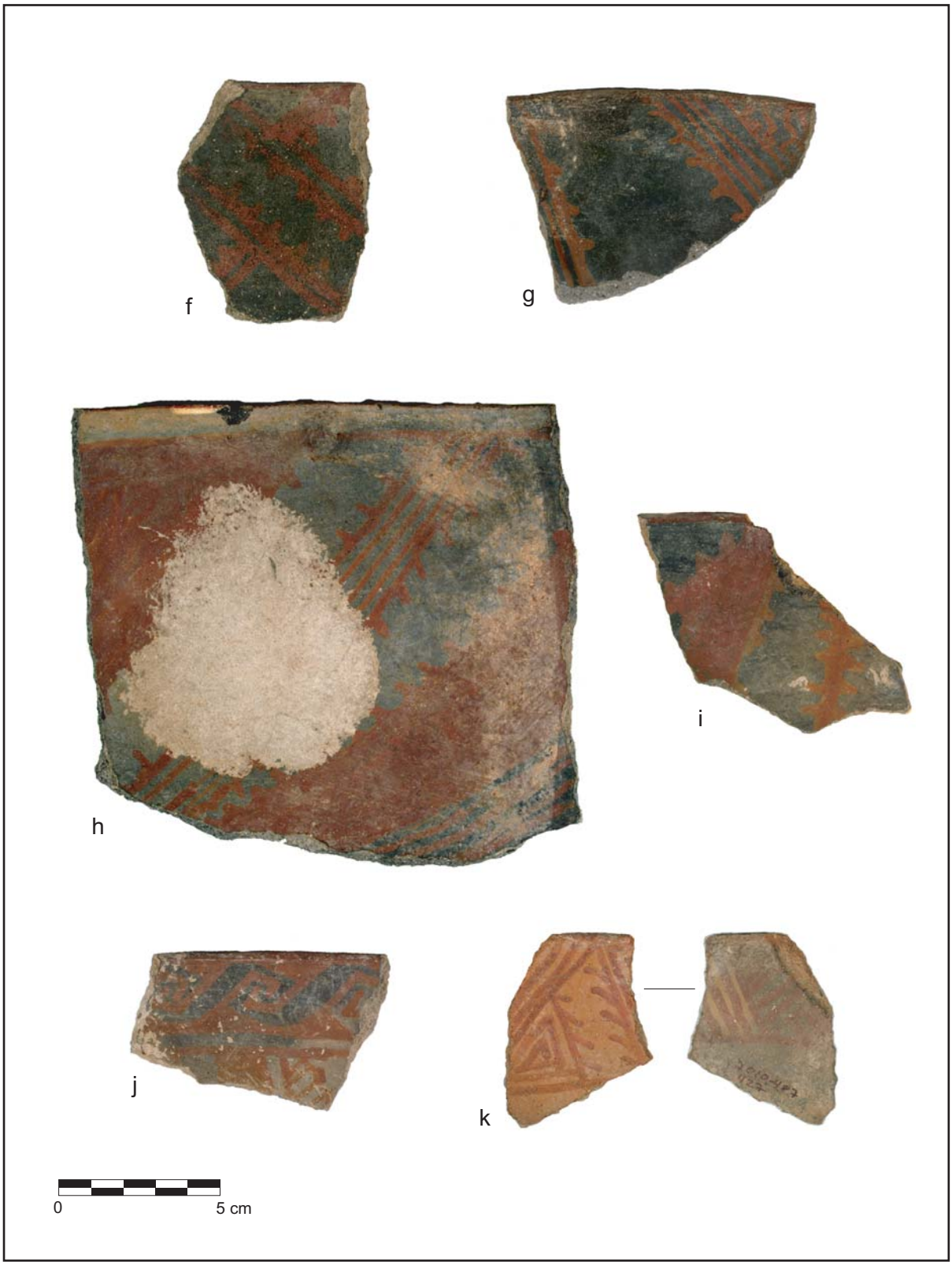

Figure 3.7. Continued.

Figure 3.8. Late Rincon Red-on-brown (a) and Tanque Verde Red-on-brown (b-c) sherds from Feature 167, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog Nos. 53-55).

on at least seven Late Rincon Red-on-brown vessels (see Figure 3.7h-i and Figure 3.9c). Descriptions of the type have not mentioned this attribute before, nor have any of the illustrated examples of the type displayed it. However, ticked solids are present on a vessel typed as transitional Late Rincon/Tanque Verde Red-on-brown (Heidke 1995:Figure 5.8c), a vessel referred to as Cortaro Red-on-brown (Kelly 1978:Figure 4.26), and on many examples of Tanque Verde Red-on-brown (Beckwith 1987:Figures 13.3b, 13.4a; Dart 1987:Figure 8.6b; Deaver 1989:Figure 4.1d; Faught 1995:Figure 3.24; Fish et al. 1992:Figure 3.3 lower left; Greenleaf 1975:Figures 3.7b, 3.9 upper right; Gregonis 1997a:Figure 5.4b; Kelly 1978:Figure 4.34a; Scantling 1940:Figures 8a, 9i; Wallace and Dart 1990:Figure 3.1p), indicating widespread use of the motif beginning around A.D. 1140. The Late Rincon Red-on-brown pottery from the Fort Lowell-Adkins Steel locus suggests potters began to use the ticked solid motif even earlier.

The fourth attribute relates to overall design layout (Wallace 1986b:Figure 2.1), specifically banded and composite layouts. In the absence of a large rim sherd or reconstructible vessel, it is often difficult to determine unequivocally if a layout is banded or composite. However, at least two Late Rincon Red-on-brown vessels recovered from the Fort Lowell-Adkins Steel locus exhibit composite layouts (see Figure 3.7j). The extant portions of another five vessels are too small to determine their layouts with certainty; the design layout of each of those vessels could be either banded or composite (see Figure 3.7c).

Finally, one, and possibly two, vessels exhibit designs consistent with the type Topawa Red-on-brown (see Figures 3.7k and 3.10a, respectively); that is, bowls with rectilinear design bands on their interior and exterior surfaces (Withers 1973:31, Figure 15). However, both vessels are tempered with sands from Tucson area petrofacies, whereas the type site for Topawa Red-on-brown, Valshni Village, AZ

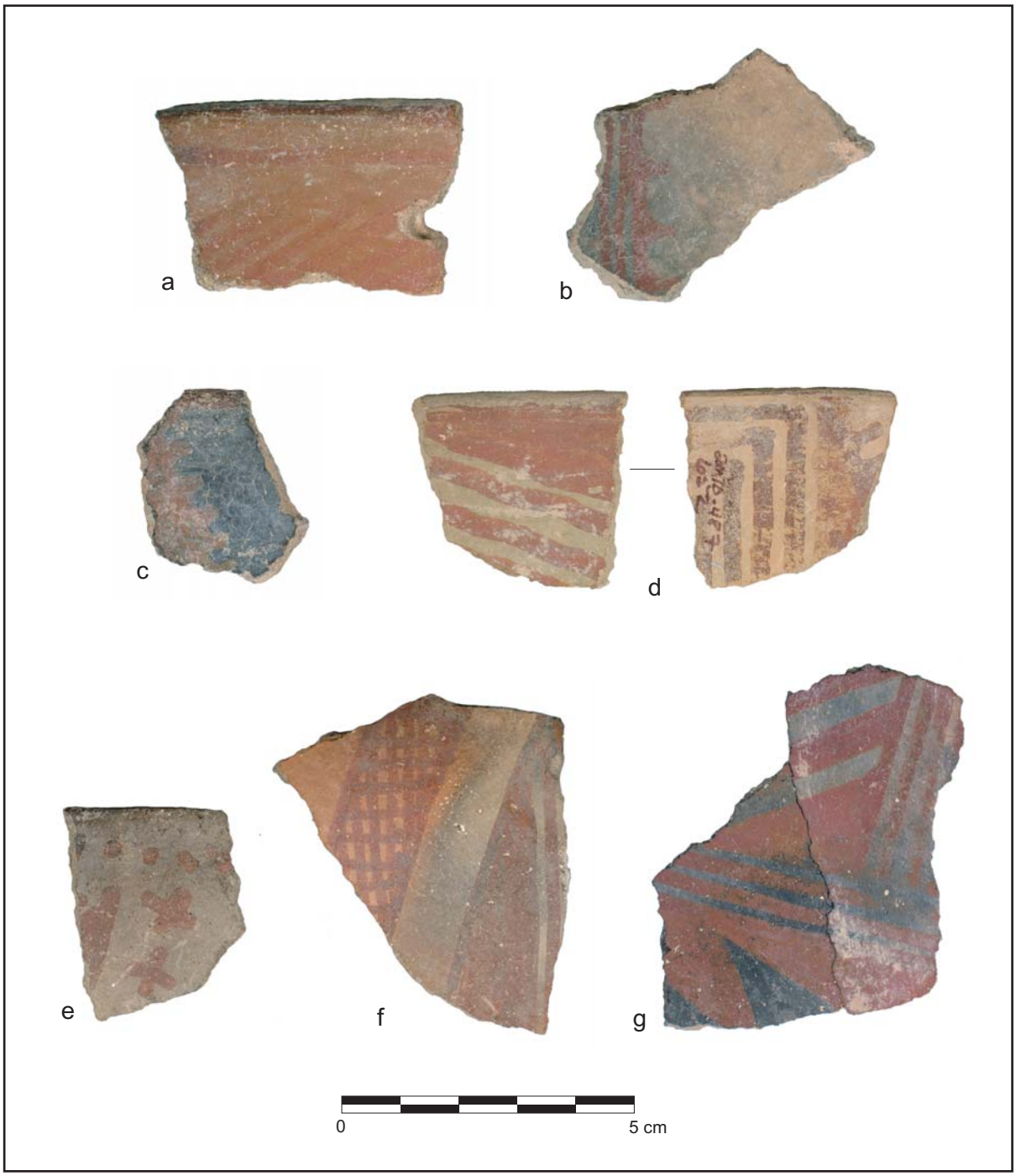

Figure 3.9. Late Rincon Red-on-brown (a-c) and Tanque Verde Red-on-brown (d-h) sherds from Feature 160, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog Nos. 6, 56-62).

DD:1:11 (ASM), is located west of Tucson in the Papaguería. In the past, sherds such as these have been referred to by Greenleaf (1975:54, Figure 3.11) as "Topawa Red-on-brown (Tucson Variety)" and by Wallace (1985:133-134, Figure 7.19; 1986b:57) as "Late Rincon Red-on-brown, Topawa Variant."

Colton (1953:52-57) proposed rules for naming Southwestern ceramics that archaeologists follow to this day. According to Colton (1953:51, 55), a *ware* is defined as a group of vessels sharing characteristics of clay composition, kind of temper, method of construction, surface treatment, type of paint, and firing atmosphere; a *type* is defined as a group of pottery vessels that are alike in every important characteristic except vessel form. A *variety* differs from the type it is related to in one or more minor

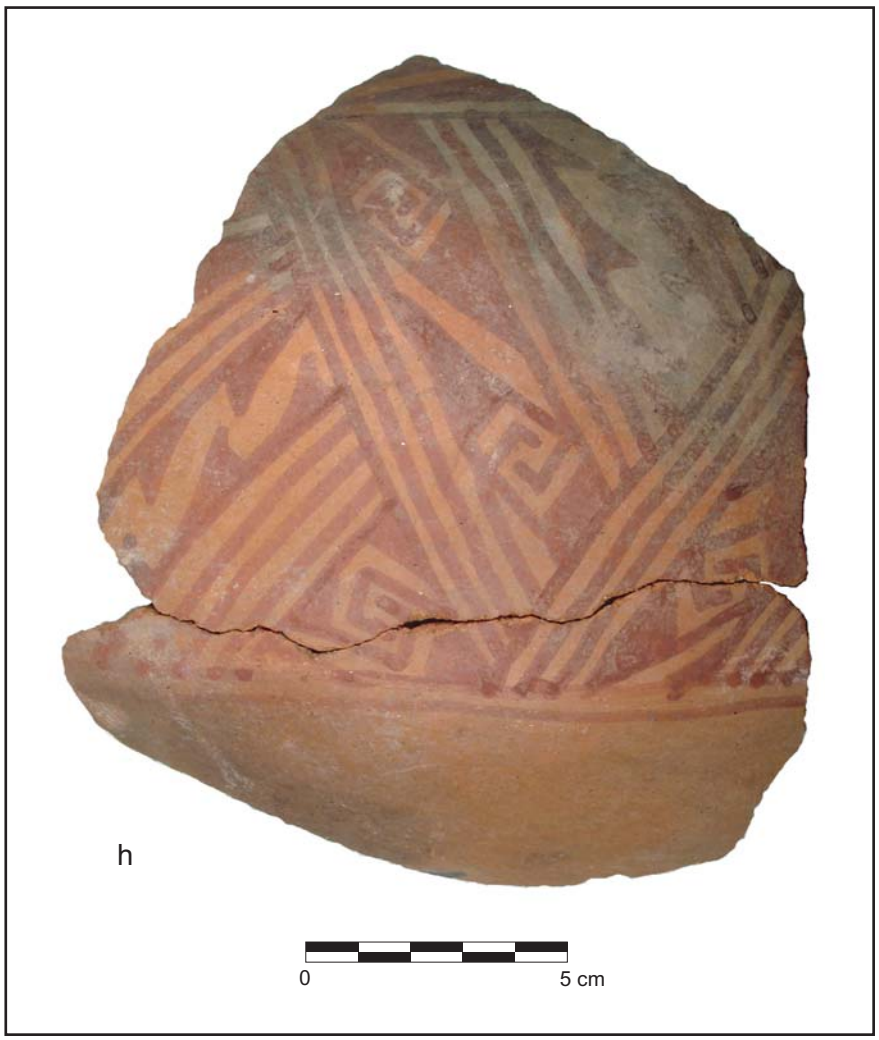

Figure 3.9. Continued.

characteristics (Wheat et al. 1958:35). Following Colton's (1953) conventions, Greenleaf's (1975) designation is clearly wrong, and Wallace's (1985) is nearly correct. A more appropriate designation would be "Late Rincon Red-on-brown, Topawa Variety."

Greenleaf (1975:54) envisioned "Topawa Red-on-brown (Tucson Variety)" as a type (*sic*) that bridged "...the gap between interior decorated Late Rincon Red-on-brown and exterior decorated Tanque Verde Red-on-brown bowls." The very low frequency of Late Rincon Red-on-brown, Topawa Variety sherds in the current collection suggests this was probably not the case. Indeed, this variety may have been made throughout the Late Rincon phase. The example(s) in the current collection show, with certainty, that the variety was made late in the phase.

The occurrence of the five attributes discussed above are summarized, by temper source, in Table 3.13. Only the presence ("P") of an attribute in pottery from a given source is reported to avoid frequency data that may be misleading due to the sampling constraints of the project. Examination of Table 3.13 shows that these attributes were aspects of Late Rincon potters' overall design vocabulary, as pots displaying them contain sands from at least five different sources. The widespread use of these attributes makes them particularly amenable to frequency seriation, as they do not appear related to any one production source. The ability to seriate deposits of Late Rincon pottery now seems to be a realistic goal, especially when the attributes presented here are combined with those suggested previously, for example, the frequency of multiple adjacent parallel lines, white slip, wavy-capped fringe, sawtooth lines, and crosshatch.

Some of the Late Rincon Red-on-brown bowls recovered from the Fort Lowell-Adkins Steel locus of the Hardy site, especially those making use of ticked lines and solids, could be considered Cortaro Red-on-brown. That is, "...an interior decorated bowl, its design verging on the Tanque Verde" (Kelly 1978:47, Figure 4.26). However, pure, unmixed deposits of Cortaro Red-on-brown pottery have yet to be found. Their absence suggests that Kelly's (1978) hypothesized type exists within the range of Late Rincon Red-on-brown.

Plain Ware Handles

Plain ware coil and tab handles were recovered from Late Rincon and transitional Late Rincon/Tanque Verde phase contexts at the Fort Lowell-Adkins Steel locus of the Hardy site. They are especially notable because handled-vessels are extremely rare before the Classic period (Hammack 1977). The coil handle was recovered from posthole Feature 104.05, a Late Rincon phase context (Figure 3.11a).

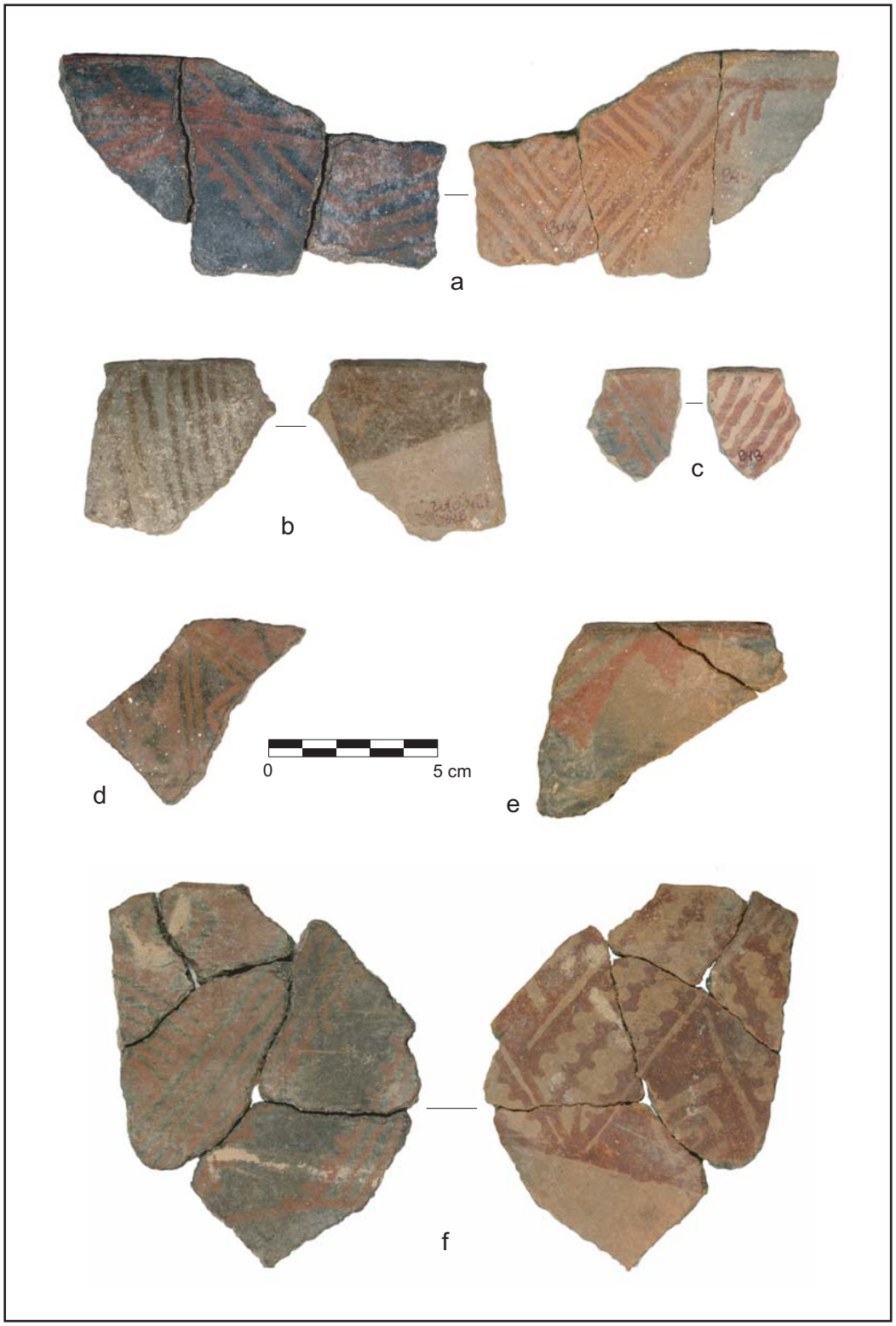

Figure 3.10. Late Rincon Red-on-brown (a, d) and Tanque Verde Red-on-brown (b-c) sherds from Feature 164 (Catalog Nos. 63-66); Late Rincon Red-on-brown (e) and Tanque Verde Red-on-brown (f) sherds from Feature 169 (Catalog Nos. 67-68), the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Table 3.13. Hypothesized Late Rincon Red-on-brown seriation attributes observed in the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM), pottery collection, reported by temper source. ("P" indicates attribute present.)

				Layout		
Temper Source	Design Field Separation	Ticked Line	Ticked Solid	Composite	Banded or Composite	Topawa Variety
Twin Hills north (J2n)	P	P	P	–	P	P
Indeterminate Metamorphic[a]	P	P	P	–	P	–
Twin Hills south (J2s)	P	P	P	P	–	–
Catalina (B)	P	P	–	P	–	P?
Beehive (J1)	–	–	–	–	P	–

[a]Indeterminate metamorphic sources include the Rillito Creek (4), Pantano Wash (5), Tanque Verde Creek (8), Rincon (A), Catalina (B), Catalina volcanic (Bv), and Owl Head (N) petrofacies.

A tab handle was recovered from the upper fill Feature 104 (Figure 3.11b); another tab handle was recovered from Late Rincon phase small pit Feature 135 (Figure 3.11c). The third, and last, plain ware tab handle was recovered from the floor of transitional Late Rincon/Tanque Verde phase pithouse Feature 167 (Figure 3.11d).

MODIFIED SHERDS

Twenty-one modified, or worked, sherds were recovered during the current project. The type of modification is reported in Table 3.14, by sampling strategy, and a full accounting of the modified sherds and vessels recovered from well-dated contexts, is reported, by time and ware, in Table 3.15. Some of the modifications, such as mendholes and ground rims, probably reflect actions taken to extend the useful lives of the modified vessels. Edge grinding may reflect reuse of sherds as scraping or digging tools (Schiffer 1987:30; Van Buren et al. 1992:95-96). The overall shape of one edge-ground sherd resembles a pottery "rib tool" (Figure 3.11e). Rib tools are often used in conjunction with paddle-and-anvil forming to open, shape, curve, and smooth the interior surface of a vessel. Unperforated disks may represent gaming pieces or an early step leading to the production of perforated disks. Partially perforated disks exhibit incompletely drilled holes on one or both sides. Perforated disks have a hole in, or near, their center, and are generally thought to have functioned as flywheel weights for spinning (Teague 1998:47-52). Partial, disk-shaped objects without an extant center section were recorded as perforation indeterminate.

Sherd Disks

The ware, state of perforation, and diameter of sherd disks recovered from well-dated contexts are reported in Table 3.16. Disk size may be related to degree of finishing. Unperforated disks range from 4.00-6.75 cm diameter (mean average = 4.90 cm), whereas the partially perforated and perforated disks range from 3.25-4.00 cm diameter (mean average = 3.75 cm), suggesting the unperforated disks represent an early stage in the manufacture of partially and fully perforated disks. The partially and fully perforated disks would have been well-suited to spinning cotton, based on Teague's (1998:Figure 2.18) graph relating fiber type to whorl diameter.

The pottery collections from the Hardy site discussed by Reinhard and Gregonis (1997) and Huntington (1982) also produced sherd disks. Seventy sherd disks and disk fragments were recovered from the portion of the site excavated between 1976 and 1978. Twenty-two were indeterminate fragments (31.4 percent), 20 were unperforated (28.6 percent), 5 were partially perforated (7.1 percent), and 23 were completely perforated (32.8 percent) (Reinhard and Gregonis 1997:31). The diameter of unperforated disks ranged from 2.7 cm to 6.4 cm, while the diameter of the five partially perforated disks averaged 6.0 cm (Reinhard and Gregonis 1997:33). Huntington (1982) did not report the number of disks recovered from BB:9:54, nor their state of perforation. However, he notes that they ranged from 3.0 cm to 10.0 cm diameter, with most falling between 4.0 cm and 6.0 cm.

OTHER FIRED CLAY OBJECTS

Other types of fired clay objects were recovered from four features; these are listed in Table 3.17 by feature number. Most are modeled spindle whorls. One was recovered from transitional Middle Rincon 3/Late Rincon Feature 157, two from Late Rincon Feature 104, and the last one from mixed Late Rincon and Tanque Verde Feature 160. Reinhard and Gregonis (1997:31; also, Gregonis 1997b:22) also report the recovery of a modeled spindle whorl from

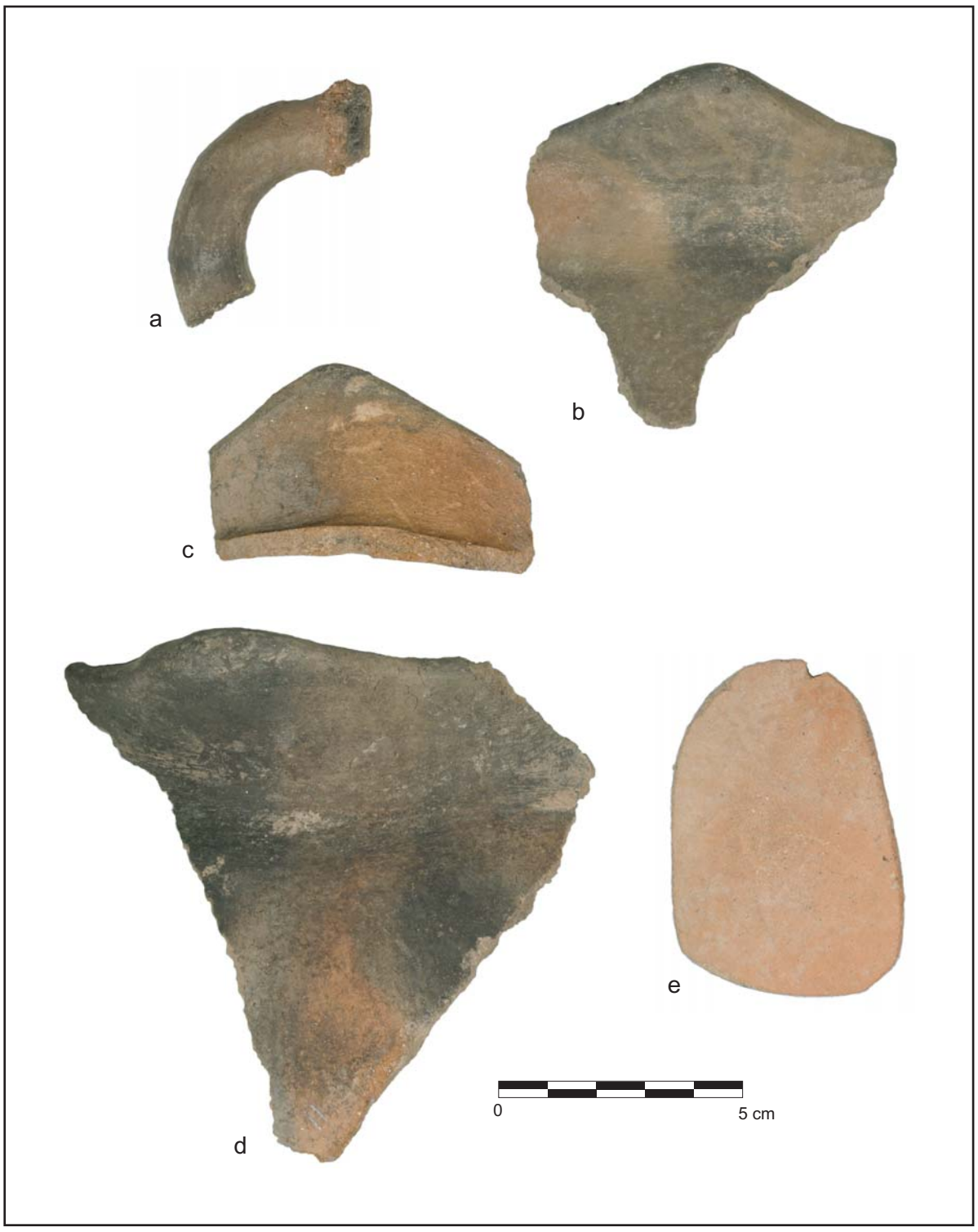

Figure 3.11. Plain ware coil handle (a), tab handles (b-d), and worked sherd "rib tool" (e), the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Catalog Nos. 69-73).

a Late Rincon phase context at the site. Two spindle whorl shapes were identified in the Fort Lowell-Adkins Steel locus collection: spherical (n = 3; Figure 3.12a-c) and pulley (n = 1; Figure 3.12d). Both of the spindle whorls recovered from Feature 104 are tempered with behaviorally local Catalina Petrofacies sand; the provenance of the remaining two whorls is indeterminate. Finally, a possible zoomorphic figurine tail was recovered from Feature 166, a context that may have been deposited during Middle

Table 3.14. Types of modified sherds and vessels recovered from the well-dated contexts and other excavated portions of the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). (Column percentage values are reported.)

	Sample		
Type of Modification	Recovered from House Roof/Wall Fall, Floor Contact, and Floor Feature Contexts and Trash Mound Feature 121 (Unit 110) (*n* = 9)	Recovered from Undifferentiated House Fill and Contexts that Would Otherwise Remain Unanalyzed (*n* = 11)	Recovered from Field-identified "Reconstructible Vessel" that Would Otherwise Remain Unanalyzed (*n* = 1)
Mendhole	22.2	0.0	0.0
Rim ground	11.1	0.0	100.0
1 edge ground	11.1	9.1	0.0
2 edges ground	11.1	0.0	0.0
Sherd disk, unperforated	22.2	54.5	0.0
Sherd disk, partially perforated	0.0	18.2	0.0
Sherd disk, perforated	0.0	9.1	0.0
Sherd disk, perforation indeterminate	11.1	0.0	0.0
Other shaping	11.1	9.1	0.0

Rincon times; it is tempered with behaviorally local Catalina Petrofacies sand. Two complete zoomorphic figurines, a bear and a dog, were previously recovered from Sedentary or early Classic period contexts at the site (Reinhard and Gregonis 1997:30-31).

EXTRABASINAL BLACK-ON-WHITE WARE

Most extrabasinal pottery recovered from the Fort Lowell-Adkins Steel locus of the Hardy site is Middle Gila Hohokam red-on-buff ware. However, small portions of three black-on-white bowls were recovered. Two are Mimbres Style III Black-on-white. One of them is typologically middle Style III, based on the presence of two wide framing lines below the rim (Shafer and Brewington 1995:20). The third black-on-white pot may also be middle Style III, as the only paint on that bowl rim sherd occurs on the lip. According to Shafer and Brewington (1995:20), some Mimbres middle Style III vessels have black lip bands and no other decoration.

Mimbres Style III Black-on-white pottery was produced from A.D. 1000 to the early 1200s (Hegmon et al. 1999:Table 1), with middle Style III production occurring from A.D. 1060-1110 (Shafer and Brewington 1995:20). The definite middle Style III bowl rim sherd from the Fort Lowell-Adkins Steel locus was recovered from undifferentiated fill of pithouse Feature 157 (Figure 3.13b). The typological date for that context is transitional Middle Rincon 3/Late Rincon, circa A.D. 1090-1110. The possible middle Style III rim sherd was recovered from undifferentiated fill of pithouse Feature 142 (Figure 3.13a). The typological date for roof/wall fall and floor contexts of that feature is Middle Rincon 2 or 3, circa A.D. 1040-1100, although the undifferentiated fill above those deposits contained a mixture of Middle and Late Rincon pottery (i.e., A.D. 1000-1150). The other Mimbres Style III Black-on-white sherd was recovered from undifferentiated fill of pithouse Feature 104 (Figure 3.13c). The typological date for that context is Late Rincon, circa A.D. 1100-1150.

The occurrence of Mimbres Black-on-white ware pottery in Tucson area sites is summarized in Table 3.18. The data summarized there should be viewed as exploratory in nature, as the literature search conducted for its compilation was not exhaustive. However, four characteristics of the distribution are obvious. First, 33 of the 42 Mimbres sherds (78 percent) were recovered from large villages; that is, except the Tanque Verde Wash site, AZ BB:13:68 (ASM), the sites with common names. Second, when style is mentioned, virtually all cases are Mimbres Style III, and when a temporal subdivision of Style III is mentioned, it is always middle Style III. Third, while the reported temporal affiliation of the Mimbres pottery spans the late Colonial to early Classic period, circa A.D. 850-1300, the most common affiliation is with the Sedentary period, circa A.D. 950-1150, especially the Middle and Late Rincon phases. Finally, Mimbres middle Style III sherds have been recovered from transitional Middle Rincon 3/Late Rincon and Late Rincon contexts.

SUMMARY

Portions of no fewer than 750 Tucson Basin Hohokam red-on-brown, red, polychrome, and plain,

Table 3.15. Types of modified sherds and vessels recovered from well-dated contexts, including supplemental deposits, reported by ware, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Phase and Ware	Mendhole	Rim Ground	1 Edge Ground	Sherd Disc, Perforation Indeterminate	Sherd Disc, Unperforated	Sherd Disc, Partially Perforated	Sherd Disc, Perforated	Other Shaping	Row Total
Middle Rincon Phase									
Red-on-brown ware	0	0	0	0	1	1	0	0	2
Red ware	0	0	0	1	0	1	0	0	2
Plain ware	0	0	0	0	3	0	0	1	4
Transitional Middle Rincon 3/Late Rincon Phase									
Red-on-brown ware	0	0	0	0	0	0	1	0	1
Plain ware	0	0	1	0	0	0	0	0	1
Late Rincon Phase									
Red-on-brown ware	0	1	0	0	0	0	0	0	1
Transitional Late Rincon/Tanque Verde Phase									
Plain ware	0	0	0	0	1	0	0	0	1
Mixed Late Rincon and Tanque Verde Phase									
Red-on-brown ware	2	1	0	0	1	0	0	0	4
Plain ware	0	0	1	0	2	0	0	0	3
Column Total	2	2	2	1	8	2	1	1	19

Table 3.16. Sherd disks from well-dated contexts, including supplemental deposits, reported by ware, state of perforation, and diameter, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Time	Ware	State of Perforation	Diameter (cm)
Middle Rincon	Red-on-brown	Unperforated	5.25
Middle Rincon	Red-on-brown	Partially perforated	4.00
Middle Rincon	Red	Indeterminate	8.00
Middle Rincon	Red	Partially perforated	3.25
Middle Rincon	Plain	Unperforated	4.00
Middle Rincon	Plain	Unperforated	4.00
Middle Rincon	Plain	Unperforated	4.50
Transitional Middle Rincon 3/Late Rincon	Red-on-brown	Perforated	4.00
Transitional Late Rincon/Tanque Verde	Red-on-brown	Unperforated	4.00
Mixed Late Rincon and Tanque Verde	Plain	Unperforated	4.25
Mixed Late Rincon and Tanque Verde	Plain	Unperforated	6.50
Mixed Late Rincon and Tanque Verde	Plain	Unperforated	6.75

Middle Gila Hohokam red-on-buff, and Mimbres Mogollon black-on-white ware vessels were recovered from the Fort Lowell-Adkins Steel locus of the Hardy site. That count includes 9 red-on-brown, 4 plain, and 1 polychrome reconstructible vessels. The decorated ceramics indicate this portion of the site was occupied from the beginning of the Middle Rincon phase until sometime early in the Tanque Verde phase, or approximately A.D. 1000-1190. Most of the extrabasinal pottery is Middle Gila Hohokam red-on-buff ware; however, small portions of three black-on-white ware bowls were recovered. Two are Mimbres Style III Black-on-white; one is typologically middle Style III. The third black-on-white pot may also be middle Style III.

The temper composition observed in the greatest number of sherds was characterized as an unspecified metamorphic composition. Some, or all, of that pottery may have been produced at the Hardy site, either at the Fort Lowell-Adkins Steel locus or in another part of the village. Direct evidence of production was recovered from a Middle Rincon phase context at the locus, further supporting the idea that ceramic manufacture occurred there. A large percentage of the Middle Rincon Red-on-brown, Rincon Red, and, Rincon Polychrome pottery is tempered with nonlocal Beehive Petrofacies sand, and was likely made by regional specialists living at the West Branch, Valencia, and Julian Wash sites. Also present are red-on-brown vessels tempered with nonlocal Twin Hill Petrofacies sands. Over time, an increasing amount of the decorated pottery recovered from the locus was made in that area.

Most of the pottery recovered from the locus is sand-tempered, and, over time, a greater percentage of the red-on-brown pottery was tempered with sand. Other tempers consist of mixtures of sand and schist/gneiss and/or muscovite mica, although one sherd tempered with nonlocal, and possibly extrabasinal, phyllite was documented in the plain ware.

Rim sherds with measurable orifice and/or aperture diameters were placed into functional categories determined by their ware, overall morphology, and mouth size, using an ethnographically based model developed by Braun (1980). Five inferred functions—storage, cooking, individual serving, small group serving, and large group serving—were identified, as well as one unknown. Percentages of storage, cooking, and serving vessels were compared with similar frequency data from 10 ethnographically known cultures, and examined three ways (that is, for the locus as a whole and split into two batches, each representing approximately 100 years of deposition).

The percentage values of storage and cooking vessels present at the locus, as a whole, and in the two temporal subdivisions fell within their ethnographic ranges. However, while the overall percentage of serving vessels and the percentage recovered from A.D. 1000-1110 deposits fell within the ethnographic range, the percentage of serving vessels recovered from A.D. 1100-1190 deposits exceeded the upper value of the ethnographic range. That finding occurred in an earlier, synthetic study of Tucson Basin Hohokam vessel function, where half the serving vessel percentage values exceeded the ethnographic range. The higher values for serving vessels observed in the Fort Lowell-Adkins Steel locus data and elsewhere suggests a consistent bias toward a slight overrepresentation of serving vessels in archaeological collections of potsherds from Tucson area sites.

Forty-four Middle Rincon, Late Rincon, and Tanque Verde Red-on-brown ceramics recovered from the locus displayed isolated elements. Element

Table 3.17. Miscellaneous fired clay objects from the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Artifact Type	Figure	Feature Number	Context[a]	Deposit Date	Modal Fired Clay Color	Maximum Dimensions (length/height by width/diameter, cm)	Temper Source	Comments
Modeled spindle whorl, spherical	3.12a	104	10	Late Rincon	Tan	1.1 by 3.1	Catalina	Hollow sphere; hole in whorl is 0.5 cm diameter
Modeled spindle whorl, spherical	3.12b	104	11	Late Rincon	Black	3.0 by 3.0	Catalina	Solid sphere; medial incision; off-center hole diameter is 0.5 cm
Modeled spindle whorl, spherical	3.12c	157	11	Transitional Middle Rincon 3/Late Rincon	Black	1.6 by 2.7	Indeterminate	Compressed sphere; medial incision; hole in whorl is 0.5 cm diameter
Modeled spindle whorl, pulley-shaped	3.12d	160	20	Mixed Late Rincon and Tanque Verde	Tan	3.5 by 3.2	Indeterminate	Traces of red pigment visible on surface; hole in whorl is 0.6 cm diameter
Zoomorphic figurine tail?	–	166	50	Middle Rincon?	Orange	4.3 by 2.6	Catalina	–

[a]Context 10 is undifferentiated room/house fill; Context 11 is roof/wall fall; Context 20 is direct floor contact; Context 50 is fill of a primary, extramural feature.

Figure 3.12. Other fired clay objects from the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): spherical-shaped (a-c) (Catalog Nos. 74-76) and pulley-shaped (d) (Catalog No. 77) spindle whorls.

categories were reported using a scheme developed by Haury (1976). Eighteen element categories were documented. Most have been seen before; however, one element occurring on a Middle Rincon Red-on-brown vessel had not been documented previously.

A relatively large sample of Late Rincon Red-on-brown pottery was recovered from the locus, often in association with small amounts of Tanque Verde Red-on-brown. That association provided a way to identify a suite of five, often co-occurring, attributes used by potters located throughout the basin late in the Late Rincon phase. They are: design field separation, ticked lines, ticked solids, banded and composite layouts, and rectilinear design bands on interior and exterior bowl surfaces, such as Late Rincon Red-on-brown, Topawa Variety. The widespread use of these attributes makes them particularly amenable to frequency seriation, especially if they are combined with other seriation attributes suggested previously, such as the frequency of multiple adjacent parallel lines, white slip, wavy-capped fringe, sawtooth lines, and cross-hatch.

One plain ware coil handle and three tab handles were recovered from Late Rincon and transitional Late Rincon/Tanque Verde phase contexts at the locus. Their presence is notable, because handled-vessels are thought to be extremely rare before the Classic period. Their recovery provides another, in-

Figure 3.13. Possible Mimbres middle Style III sherds from the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): Feature 142 (a), Mimbres middle Style III sherd from Feature 157 (b), and Mimbres Style III sherd from Feature 104 (c) (Catalog Nos. 78-80).

dependent line of evidence regarding the temporal placement of the deposits.

Twenty-one modified, or worked, sherds were recovered during the project. Kinds of modification include mendholes, rim grinding, edge grinding, and shaping, including unperforated, partially perforated, and completely perforated disks. The range and average diameter of the unperforated disks is greater than that of the partially perforated and perforated disks, suggesting the unperforated disks represent an early stage in the manufacture of partially and fully perforated disks. Based on their size, the partially and fully perforated disks would have been well-suited to spinning cotton.

In addition to the worked and unworked sherds and reconstructible vessels, five other fired clay objects were recovered from the Fort Lowell-Adkins Steel locus of the Hardy site. Four are modeled spindle whorls. They were recovered from transitional Middle Rincon 3/Late Rincon, Late Rincon, and mixed Late Rincon and Tanque Verde deposits. The fifth object is a possible zoomorphic figurine tail; it was recovered from a deposit that may have accumulated during the Middle Rincon phase.

Table 3.18. Mimbres Black-on-white ware ceramics recovered from Tucson area sites.

AZ ASM Site Number	Common Name	Ceramic Ware or Type (Quantity)	Temporal Affiliation	Citation
AA:12:18	Hodges	Mimbres Style III B/W (1)	Unplaced	Kelly 1978:Table 4.15
AA:12:57	Los Morteros	Mimbres Style III B/W (2)	Middle Rincon 2 or 3 (Feature 3274) and Middle Rincon, Late Rincon, and Tanque Verde (Feature 3236)	Heidke 1995:422, Table 5.2
AA:12:84	–	Mimbres Style III B/W (1)	Unplaced	Heidke 2000b:Table 3.12
AA:16:26	St. Mary's Hospital	Mimbres Style III B/W (1)	Unplaced	Jacobs 1979:Table 3
BB:9:14	Hardy	Mimbres B/W ("a few")	Unplaced	Reinhard and Gregonis 1997:29
BB:9:40	Hardy	Mimbres middle Style III B/W (1)	Transitional Middle Rincon 3/Late Rincon (Feature 157)	Current report
		Mimbres Style III B/W (1)	Late Rincon phase (Feature 104)	
BB:9:52	–	Mimbres Style III B/W (unknown)	Unplaced	Wallace and Holmlund 1982
BB:9:54	Hardy	Mimbres B/W (1)	Middle and Late Rincon phase	Huntington 1982:114, Figure 11.4.9a
BB:9:60	–	Mimbres Style III B/W (unknown)	Sedentary period	Wallace and Holmlund 1982
BB:9:104	Sleeping Snake	Mimbres Style III B/W (1)	Middle Rincon, Late Rincon, and Tanque Verde phase	Smith 2007:Table 13.4
BB:13:15	Valencia	Mimbres Style III B/W (5)	Late Rincon phase	Wallace 1985:132-133, Figure 7.18a, b, d, e
BB:13:16	Punta de Agua	Mimbres B/W (1)	Unplaced	Greenleaf 1975:Table 3.1
BB:13:16A	Punta de Agua	Mimbres Style III B/W (1)	Possibly Late Rincon phase	Doelle and Wallace 1986:41, Plate 9, Table 2.1; Wallace, personal communication 2012
BB:13:16C	Punta de Agua	Mimbres Style III B/W (1)	Sedentary period	Doelle and Wallace 1986:41, Plate 9, Table 2.1; Wallace, personal communication 2012
BB:13:17	Julian Wash	Mimbres Style II or III B/W (1)	Indeterminate (Feature 97)	Heidke 2011a:Table 4.1
		Mimbres middle Style III B/W (1)	Late Rincon phase (Feature 475)	Heidke 2011a:271, Table 4.1, Figure 4.2b
BB:13:41	Punta de Agua	Mimbres B/W (1)	Middle Rincon phase	Greenleaf 1975:Table 3.1
BB:13:43	Punta de Agua	Mimbres B/W (2)	Middle Rincon phase	Greenleaf 1975:Table 3.1
BB:13:49	–	Mimbres B/W (3)	Late Rincon and Tanque Verde phase	Greenleaf 1975:Table 3.1
BB:13:50	Punta de Agua	Mimbres B/W (9)	Middle and Late Rincon phase	Greenleaf 1975:76-77, Table 3.1, Figure 3.26a-c
BB:13:68	Tanque Verde Wash	Mimbres Style III B/W (unknown)	Sedentary and Classic period	Ahlo 1975
BB:13:182	–	Mimbres Style III B/W (1)	Sedentary period	Doelle and Wallace 1986:41, Plate 9, Table 2.1; Wallace, personal communication 2012
BB:13:232	–	Mimbres Style III B/W (1)	Middle Rincon, Late Rincon, and Tanque Verde phase	Doelle et al. 1985:22, Table A.2

Table 3.18. Continued.

AZ ASM Site Number	Common Name	Ceramic Ware or Type (Quantity)	Temporal Affiliation	Citation
BB:13:233	–	Mimbres Style III B/W (1)	Middle Rincon, Late Rincon, and Tanque Verde phase	Doelle et al. 1985:23, Table A.2
BB:14:3	Freeman	Mimbres B/W (3)	Late Colonial and Sedentary phase	Simpson and Wells 1984:118, Table 23, Figure 34d-f
BB:14:13	–	Mimbres Style III B/W (unknown)	Unplaced	Wallace and Holmlund 1982
BB:14:17	49er's	Mimbres Style III B/W (unknown)	Sedentary period	Wallace and Holmlund 1982
BB:14:246	–	Mimbres B/W (1)	Sedentary period (and possibly Late Colonial phase)	Simpson and Wells 1983:83, Table 14
BB:14:310	–	Mimbres B/W (1)	Sedentary period (and possibly Late Colonial phase)	Simpson and Wells 1984:118, Table 23

CHAPTER 4

FLAKED STONE ARTIFACTS

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Investigations at the Hardy site, AZ BB:9:40 (ASM), resulted in the recovery of 3,960 flaked stone artifacts, collected from 9 pit structures, 9 extramural pits, 3 trash concentrations, and 3 Historic era ditches. Sampling resulted in the analysis of 497 artifacts, or 13 percent of the recovered assemblage. The analyzed sample consists of artifacts from two pit structures, Features 160 and 164, a sample from trash concentration Feature 121, all artifacts on structure floors, and all projectile points and bifaces identified during preliminary laboratory coding. Analysis focused on identifying procurement and reduction patterns, as well as temporal affiliations of the projectile points.

Artifacts were classified using standard methods developed for Desert Archaeology, Inc., projects, first grouping the artifacts by class (debitage, core, uniface, biface, core tool, core hammer) and then by type, based on form, retouch, or macroscopically visible use-wear (see Sliva 1997 and 2006b for a full discussion of methods and terminology). Attributes recorded for each artifact included raw material, maximum dimension (mm), weight (gm), presence/absence of cortex, and platform type, when applicable. Additional measurements taken for projectile points include blade, base, and neck width, blade length, and haft length.

ASSEMBLAGE DESCRIPTION

The distributions of flaked stone artifacts and raw materials are presented in Table 4.1. Metamorphic material, primarily quartzite, and cryptocrystalline sedimentary rock were represented in equal amounts, both occurring at a rate of 34 percent. Much of the cryptocrystalline material consisted of translucent and opaque gray chert, with some jasper and chalcedony also present. Unspecified igneous rock, rhyolite, and basalt together occurred at a rate of 28 percent, and a small amount of limestone and quartz were also identified. The igneous and metamorphic material may have been collected from the Rillito River streambed or nearby washes or drainages, while the chert is of unknown provenance. Miska and Tompkins (1998:688) note that chert "occurs in a variety of geological contexts in the Tucson Basin," but whether the current material was procured locally is unknown. One piece of obsidian was recovered and was analyzed by energy-dispersive x-ray fluorescence (EDXRF). The obsidian was from Picketpost Mountain in Superior, Arizona, approximately 125 km from the Tucson Basin (Appendix A, this volume).

Debitage composed 92 percent of the analyzed assemblage, and consisted of 242 complete flakes, 184 flake fragments, and 30 pieces of angular debris. Six of the complete flakes were identified as bifacial thinning flakes, based on their platform attributes and shape. Complete flakes ranged in size from 10.03 mm to 73.59 mm, with a mean size of 31.93 mm. The five analyzed cores included two multiple-platform cores, two core fragments, and a tested cobble. The complete cores were all found on structure floors: an exhausted core made of quartzite from Feature 130, a small burned cobble with only one or two flakes removed in Feature 142, and a large (102.38 mm) multiple-platform core on the floor of Feature 164.

The 18 retouched and utilized implements, excluding projectile points, included 1 utilized flake, 2 utilized cores, 2 core hammers, 1 unifacially retouched flake, and 12 bifaces. Their distribution and characteristics are provided in Table 4.2. The bifaces were recovered from five pit structures. A drill, found in pithouse Feature 104, measured 55.76 mm long and had a long bit and a wide base that is comfortable to hold (Figure 4.1). The tip had worn smooth from use, and a light sheen extended down the sides of the bit approximately 15 mm. Other bifaces include a preform fragment, two nonextensively retouched bifaces, the distal half of a quartz biface that may have been a drill, six bifaces in various stages of production, and a thick, early stage biface fragment.

Nineteen projectile points were recovered, 12 of which were common in the Classic period (A.D. 1150-1450) (Table 4.3). These consisted of seven Classic Side-notched points, four Arizona Triangular styles, and a Classic Serrated point, all styles that are found at Classic period sites in the Tucson Basin and throughout southern Arizona (Sliva 1997, 2002, 2006a). Two Sedentary Serrated points were identified, and both were finely made. The first, made of

Table 4.1. Distribution of analyzed artifacts and raw materials at the Hardy site AZ BB:9:40 (ASM).

	Debitage	Cores	Unifaces	Bifaces	Core Tools	Core Hammers	Total	Percent
Rhyolite, fine-grained	22	–	–	–	–	–	22	4.4
Rhyolite, medium-grained	2	–	–	–	–	–	2	0.4
Basalt, fine-grained	3	–	–	–	–	–	3	0.6
Basalt, vesicular	1	–	–	–	–	–	1	0.2
Igneous, fine-grained	90	2	–	–	–	1	93	18.7
Igneous, medium-grained	19	–	–	–	–	–	19	3.8
Obsidian	0	–	–	1	–	–	1	0.2
Quartzite, fine-grained	63	1	–	–	1	1	66	13.3
Quartzite, medium-grained	9	–	–	–	–	–	9	1.8
Quartzite, very fine-grained	35	–	–	–	–	–	35	7.0
Metamorphic, fine-grained	52	1	1	1	1	–	56	11.3
Metamorphic, medium-grained	3	–	–	–	–	–	3	0.6
Metasediment, fine-grained	1	–	–	–	–	–	1	0.2
Sedimentary	1	–	–	–	–	–	1	0.2
Limestone	10	–	–	–	–	–	10	2.0
Unspecified fine-grained material	3	–	–	–	–	–	3	0.6
Chert	135	1	–	28	–	–	164	33.0
Jasper	2	–	–	–	–	–	2	0.4
Chalcedony	2	–	–	–	–	–	2	0.4
Cryptocrystalline, unspecified	1	–	–	–	–	–	1	0.2
Quartz	2	–	–	1	–	–	3	0.6
Total	456	5	1	31	2	2	497	99.9
Percent	91.8	1	0.2	6.2	0.4	0.4	100	

gray chert, was found in the upper fill of pithouse Feature 157. Serrations ran the length of the blade, and it had a wide, flat base (Figure 4.2j), which varies from the usual Tucson Basin Sedentary Serrated styles. Similar points were also recovered from sites in the northern Santa Rita Mountains (Rozen 1984:Figure 5.12 a-i) and one from Honey Bee Village, AZ BB:9:88 (ASM), in the northern Tucson Basin, where it was noted to be a New River variation (Sliva and Ryan 2012:451; see also Hoffman and Doyel 1985:Figure 13.1; Marshall 2007:Figures 7.2, 7.13).

Another serrated point blade, made from Superior obsidian, was recovered from pithouse Feature 130 (see Figure 4.2g). Although the base was missing, the long serrated blade resembles a point recovered from a cremation at Hodges Ruin, AZ AA:12:18 (ASM), also made from Superior obsidian (Ryan 2009). Sedentary Serrated points are firmly associated with the Sedentary period (A.D. 950-1150) in southern Arizona (Sliva 2006a). Another point fragment found in trash concentration Feature 121 (see Figure 4.2f) had wide, deep serrations forming barbs; it may also be a Sedentary period point style. Four non-diagnostic blade fragments were also present in the assemblage.

SPATIAL AND TEMPORAL DISTRIBUTION

Three features were selected for analysis in this study: Features 121, 160, and 164. Feature 121 was a trash concentration that filled during the Middle Rincon phase (A.D. 1000-1100). Fifty-seven percent of the assemblage was analyzed (n = 152). Metamorphic rock represents over half the material, igneous rock was well-represented, and cryptocrystalline material occurred at a rate of 7 percent. All the analyzed artifacts were debitage except a core hammer and a barbed projectile point fragment. The average size of the 79 complete flakes was 29.04 mm, and two bifacial thinning flakes were identified, made from fine-grained igneous and metamorphic material.

Feature 160 was a structure abandoned during the Tanque Verde phase (A.D. 1150-1300) of the Classic period. In total, 166 artifacts from the floor fill and floor were analyzed. These consisted of 154 pieces of debitage, a core, a unifacially retouched fragment, a utilized core, a core hammer, three bifaces, four Classic period projectile points, and a non-diagnostic point fragment. Mean size of the 78 complete flakes was 32.14 mm, and three bifacial thinning flakes were identified; two of these were

Table 4.2. Flaked stone implements, excluding projectile points, in the analyzed assemblage from the Hardy site, AZ BB:9:40 (ASM).

	Artifact Type	Feature Number	FN	Context	Raw Material	Characteristics
Debitage	Utilized flake	130	524	Floor	Fine-grained quartzite	A series of crescent-shaped breaks along one lateral edge suggests use in a longitudinal motion
Uniface	Acute retouched fragment	160	712	Floor fill	Fine-grained metamorphic	Small flake with acute retouch
Core tools	Utilized core	130	525	Floor	Fine-grained metamorphic	Flakes removed from one area and edge has a sheen over cortical surface and some impact fractures
		160	796	Floor	Fine-grained quartzite	Flakes removed from multiple platforms; one edge is rounded and has light abrasion wear, possibly used in a transverse motion
Core hammers	Core hammer	121	193	Trash fill	Fine-grained quartzite	Light battering wear around two edges
	Core hammer	160	788	Roof/wall fall	Fine-grained igneous	Single-platform core with minor battering in several areas
Bifaces	Late-stage biface	104	352	Pithouse fill	Chert	Thick triangular-shaped biface with slightly convex base; step fractures on one aspect
	Drill	104	470	Pithouse fill	Fine-grained metamorphic	Use-wear on distal end and along sides of bit
	Nonextensively retouched biface fragment	142	311	Pithouse fill	Chert	Flake fragment with marginal pressure flaking along one edge
	Biface fragment	142	310	Pithouse fill	Quartz	Distal fragment, diamond cross-section, possibly a drill(?)
	Nonextensively retouched biface	160	712	Floor fill	Chert	Thin flake with marginal pressure-flaking along two edges
	Biface fragment	160	712	Floor fill	Chert	Thick flake in the early stages of thinning
	Biface fragment	160	892	Floor	Chert	Small pressure-flaked flake fragment with some cortex on one aspect
	Biface fragment	164	867	Floor fill	Chert	Basal end, flat base and only marginally thinned, possibly a preform
	Biface	164	847	Floor fill	Chert	Bifacially thinned across one face, only partially thinned on other aspect
	Biface fragment	164	860	Floor	Chert	Thin flake fragment with bifacial pressure-flaking
	Preform fragment	167	875	Floor fill	Chert	Concave base, straight margins, distal end missing
	Biface fragment	167	874	Floor fill	Chert	Pressure-flaked medial fragment

Figure 4.1. Drill recovered from pithouse Feature 104, the Hardy site, AZ BB:9:40 (ASM) (FN 470, Catalog No. 2010-487-41).

made of translucent gray chert and the other of fine-grained quartzite. Two bifaces in the floor fill were made of semitranslucent gray chert with some light brown mottling, similar to material observed in the debitage. One of the bifaces was a thick flake in the early stages of reduction, and the other was a thin triangular-shaped flake with marginal pressure flaking along two edges. A utilized core and a small, pressure-flaked biface fragment were found on the floor. A posthole contained another Classic period projectile point. Thirty percent of the artifacts were made of chert, and the remainder was a mix of igneous and metamorphic rock.

Feature 164 is a structure that dates to the Late Rincon (A.D. 1100-1150) or the Tanque Verde phase. The structure contained 154 flaked stone artifacts, all of which were analyzed. This assemblage was unique in that 58 percent of the artifacts were made of chert (n = 90). As in Feature 160, much of the chert was semitranslucent gray, and at least 25 pieces of debitage were gray with maroon or brown mottling, and they may have been from the same source, or possibly even nodule. Artifacts consisted of 149 pieces of debitage, 2 cores, and 3 bifaces. The average size of the 82 complete flakes was 33.16 mm, and only one bifacial thinning flake was identified, made of a light gray translucent chert. An opaque gray chert core fragment and two bifaces were in the fill above the floor. One of the bifaces is a large gray chert flake with pressure flaking across one aspect and partway across the other. The biface may have been abandoned during manufacture due to the thickness around the platform that impeded further thinning. The other biface is a fragment with a flat base; it was made from brown and gray mottled chert. Floor artifacts consisted of a large multiple-platform core made of igneous rock, a complete chert flake, and a gray chert biface fragment. The triangular-shaped biface was pressure flaked on one aspect, with only nonextensive retouch on the other; there was no retouch along the base.

More than 900 pieces of flaked stone were recovered from Feature 104, a structure that filled with domestic refuse during the Late Rincon phase. Only bifacial tools were included in the analyzed sample. These consisted of a drill (see Figure 4.1), a complete biface, and seven projectile points. Five Classic period projectile points were identified, and two nondiagnostic blade fragments were present.

DISCUSSION

The debitage in the analyzed assemblage from the Hardy site indicates that reduction activity focused on hard-hammer core reduction of locally available material, with a preference for finer-grained metamorphic and igneous material. During the Late Rincon to early Classic period occupation at the site, chert was procured in greater amounts, and it was used to manufacture tools. Evidence for this is found in Features 160 and 164, where, in some instances, the pressure flaked bifaces were the same material as the debitage. The amount of recovered bifacial thinning flakes is low (n = 6), although small pressure flakes may not have been captured in the ¼-inch screens used during excavations. Several points were manufactured from material that closely resembles the chert debitage, and some of the projectile points may have been manufactured at the site, although this cannot be conclusively determined. The analyzed sample from Sedentary period (A.D. 950-1150) contexts is limited, although a visual scan of all the artifacts from those features indicates only small quantities of cryptocrystalline material were recovered, and the high frequency of chert from Features 160 and 164 is unique.

Most of the projectile points recovered are Classic period points. Classic Side-notched and Arizona Triangular points have been noted to occur in small amounts in Sedentary-Classic transitional contexts in the Tucson Basin, as well as in the Tonto Basin (Ryan 2011:163; Sliva 2002:Figure 9.3; Sliva and Ryan 2012:482-483), and this may also be the case at the Hardy site. Alternatively, the Classic period points from contexts that date to the Late Rincon phase may just be an indicator of postabandonment reuse of the features during the Classic period. The three Sedentary period points were found in the northern portion of the stripped area. The complete Sedentary

Table 4.3. Projectile points recovered from the Hardy site, AZ BB:9:40 (ASM).

Feature	Context	FN	Point Type	Material	Length (mm)	ASM Catalog Number	Figure Number
104	Pithouse fill	390	Arizona Short Triangular	Translucent gray chert	14.35	2010-487-26	4.2a
104	Pithouse fill	429	Arizona Short Triangular	Translucent gray chert	15.09	2010-487-27	4.2b
104	Pithouse fill	531	Classic Side-notched	Translucent gray and brown mottled chert	19.43	2010-487-28	4.2c
104	Pithouse fill	403	Classic Side-notched	Semitranslucent dark gray chert	26.59	2010-487-29	4.2d
104	Pithouse fill	476	Non-diagnostic blade fragment	Brown chert	18.93	–	–
104	Pithouse fill	406	Non-diagnostic blade fragment	Translucent gray chert	10.49	–	–
104	Floor fill	384	Classic Side-notched	Light gray opaque chert	22.70	2010-487-30	4.2e
121	Trash concentration	188	Barbed blade fragment	Light gray opaque chert	22.28	2010-487-31	4.2f
130	Roof/wall fall	593	Sedentary Serrated?	Superior obsidian	28.58	2010-487-32	4.2g
142	Roof/wall fall	262	Classic Side-notched	Translucent gray and light brown mottled chert	18.89	2010-487-33	4.2h
142	Pithouse fill	269	Arizona Concave-base Triangular	Translucent gray chert	19.54	2010-487-34	4.2i
142	Pithouse fill	312	Non-diagnostic blade fragment	Semitranslucent gray and brown mottled chert	18.02	–	–
157	Pithouse fill	613	Sedentary Serrated	Translucent gray chert with minor brown pitting	32.13	2010-487-35	4.2j
157	Roof/wall fall	904	Classic Side-notched	Translucent gray and light brown mottled chert	18.97	2010-487-36	4.2k
160	Floor fill	715	Classic Side-notched	Translucent gray chert	14.16	2010-487-37	4.2l
160	Floor fill	714	Classic Serrated	Translucent gray and light brown chert	21.31	2010-487-38	4.2n
160	Floor fill	672	Classic Side-notched	Semitranslucent gray and light brown chert	26.42	2010-487-39	4.2o
160	Floor fill	713	Non-diagnostic blade fragment	Translucent gray chert	15.87	–	–
160.02	Posthole	894	Arizona Triangular	Semitranslucent gray chert	21.03	2010-487-40	4.2m

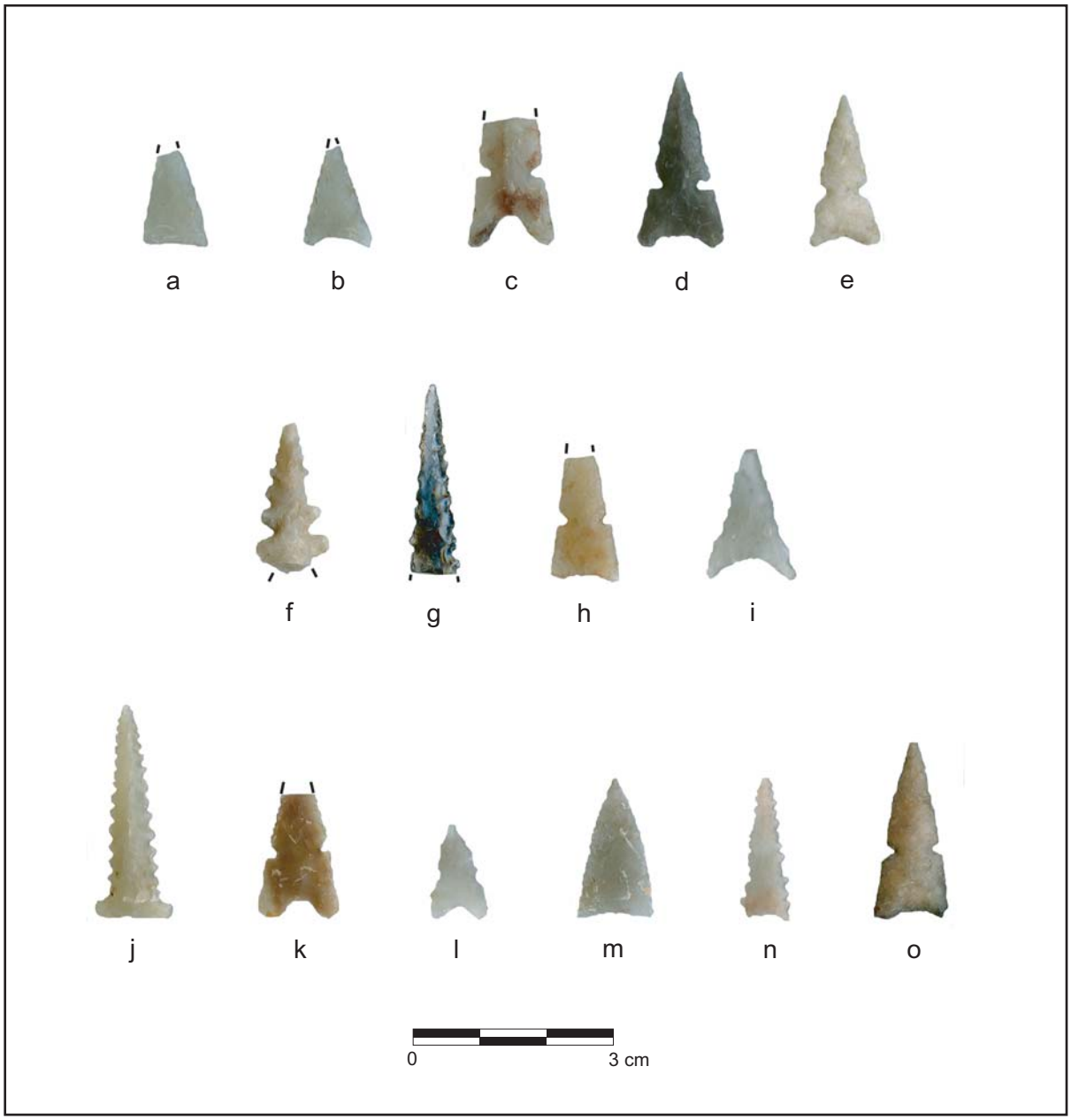

Figure 4.2. Select projectile points recovered from the Hardy site, AZ BB:9:40 (ASM): (a-e) pithouse Feature 104; (f) trash concentration Feature 121; (g) pithouse Feature 130; (h-i) pithouse Feature 142; (j-k) pithouse Feature 157; pithouse Feature 160.

Serrated point was similar to styles seen outside of the Tucson Basin, and the obsidian point may have entered the site in finished form. The assemblage did not contain any obsidian debitage, although obsidian debitage and points were recovered during earlier excavations at the Hardy site (Gregonis 1997b).

CHAPTER 5

GROUND STONE, ROCKS, AND MINERALS FROM THE FORT LOWELL-ADKINS STEEL LOCUS OF THE HARDY SITE, AZ BB:9:40 (ASM)

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The archaeological fieldwork conducted during the Fort Lowell-Adkins Steel soil remediation resulted in the recovery of a variety of ground stone artifacts from prehistoric contexts. Analysis of the artifacts was conducted with two specific research goals in mind. The first goal was to determine if the Hardy site, AZ BB:9:40 (ASM), was continuously occupied throughout the Hohokam Pioneer (A.D. 500-750) and Sedentary (A.D. 950-1150) periods . The second goal was to identify the extent to which craft specialization may have occurred on both the household and the community level.

A sample of 82 artifacts (71 percent) was selected from the 115 ground stone artifacts recovered during excavation. The sample was analyzed according to the methods developed by Adams (2002). Ground stone artifacts from 11 features were analyzed, including nine pit structures, two extramural pits, and sheet trash. The ground stone assemblages found within pit structures were analyzed in their entirety. The unanalyzed artifacts were from pithouse fill and other postoccupational contexts that were not useful for answering the research questions. A few exceptions were analyzed if the items were unusual.

Previous excavations within the Hardy site resulted in the recovery of a large assemblage of ground stone artifacts (Gregonis 1997b). These include whole manos (n = 20), mano fragments (n = 51), 16 handstone and handstone fragments, 1 whole metate, 34 metate fragments, 8 grinding surfaces, 9 abraders, 1 complete mortar, 2 mortar fragments, 3 pestles, 3 polishers, 1 reamer, 1 possible hide-processing tool, 9 other ground stone artifacts, 8 tabular knives, 1 carved bowl fragment, 2 complete palettes, 3 palette fragments, 4 mica ornaments, 1 argillite disk bead, 1 argillite nose plug, 1 serpentine bead, 3 turquoise beads, and 8 other turquoise items. Not all of these categories match those described below. A variety of minerals and unworked stone items were also found, including red ochre, an Apache tear, and cuprous material (Gregonis 1997b).

PIT STRUCTURES

Pit structures at the Hardy site were occupied sometime during the Middle Rincon phase (A.D. 1000-1100) to the Tanque Verde phase (A.D. 1150-1300), and are associated with several different types of activities (Table 5.1). Activities associated with pit structures include the processing of food sources and pigments, as well as the manufacture of pottery and stone tools (Table 5.2). Artifacts discussed in this section were recovered from contexts closely associated with pit structures, including floor assemblages, floor fill, and roof/wall fall. Artifacts recovered from these features, but not directly associated with pit structures, are described as postoccupational fill.

Feature 175

Feature 175 is one of the earliest pit structures excavated during this project, and it dates to the Sedentary period (A.D. 950-1150). A medium-sized cobble mortar was the only ground stone artifact recovered from this feature. The mortar was naturally rounded, with a shallow basin covered in red pigment (Munsell value 10R 4/8). The rock type of the mortar was a micaceous granite, which may have been purposely chosen by the prehistoric owner due to the sparkling flecks within the mortar stone that would have been added to the pigment or paint mixed in the basin.

Feature 142

Feature 142 is an oval-shaped structure-in-pit that dates to the Middle Rincon phase. The structure was burned after use, and based on the nature of the burned material, it was likely a light brush structure. The floor of the structure was plastered, although it was poorly preserved due to extensive root and rodent disturbance.

Table 5.1. Artifact type and number found in pit structures and other features at the Hardy site, AZ BB:9:40 (ASM).

Feature	104	130	134	142	157	160	164	167	175	Other[a]	Total
Artifact											
Abrader	–	–	–	–	–	–	–	1	–	–	1
Awl	–	–	–	–	–	–	–	–	–	1	1
Donut stone	–	–	–	–	–	–	–	–	–	1	1
Handstone	–	2	–	–	–	2	–	1	–	–	5
Lapstone	–	2	1	–	1	1	–	1	–	–	6
Lithic anvil	–	1	–	–	–	–	–	–	–	–	1
Mano	–	1	1	–	1	3	–	–	–	1	7
Metate	–	2	–	–	–	1	–	–	–	1	4
Mortar	–	1	–	–	–	–	–	–	1	–	2
Netherstone	–	2	1	3	–	1	–	1	–	–	8
Ornament	1	–	–	–	–	–	–	–	–	–	1
Painted rock	–	–	–	–	–	–	1	–	–	–	1
Palette	–	1	–	–	–	–	–	–	–	–	1
Pestle	–	3	–	–	2	1	1	–	–	1	8
Pigment	–	2	–	–	–	–	1	–	–		3
Polisher	–	6	2	–	1	1	–	–	–	–	10
Raw material	–	1	–	–	1	2	–	–	–	–	4
Unidentified	–	5	4	–	–	–	–	–	–	–	9
Subtotal	1	29	9	3	6	12	3	4	1	5	73
Ecofact											
Crystal	–	–	–	–	1	–	–	–	–	–	1
Fire-cracked rock	–	1	2	–	–	2	–	–	–	–	5
Fossil	–	2	–	–	–	–	2	–	–	–	4
Subtotal	–	3	2	–	1	2	2	–	–	–	10
Total	1	32	11	3	7	14	5	4	1	5	83

[a]Other includes non-pit structure features, as well as sheet trash.

Table 5.2. Nature of ground stone artifacts from all contexts at the Hardy site, AZ BB:9:40 (ASM).

Context	Pithouse	Other[a]	Total
Posthole	5	–	5
Floor	37	–	37
Floor fill	15	–	15
Roof/wall fall	9	–	9
Pithouse fill	12	–	12
Feature fill	–	4	4
Sheet trash	–	1	1
Subtotal	78	5	83
Condition			
Broken	27	2	29
Sample	4	–	4
Whole	47	3	50
Subtotal	78	5	83
Burned			
No	29	4	33
Yes	25	1	26
Heat cracked	22	-	22
Subtotal	76	5	81

Table 5.2. Continued.

Context	Pithouse	Other[a]	Total
Design			
Expedient	42	-	42
Strategic	11	5	16
Subtotal	53	5	58
Wear			
Light	18	-	18
Moderate	23	4	27
Heavy	5	1	6
Unused	11	–	11
Subtotal	57	5	62
Use			
Single	38	3	41
Multiple	14	1	15
Recycled	4	–	4
Unused	10	1	11
Subtotal	66	5	71
Sequence			
Concomitant	13	1	14
Sequential	10	–	10

Table 5.2. Continued.

Context	Pithouse	Other[a]	Total
Both	2	1	3
Subtotal	25	2	27
Activities			
Food processing	5	3	8
General processing	10	–	10
Pigment processing	8	–	8
Manufacture	8	–	9
Pottery manufacture	7	–	7
Stone manufacture	3	–	3
Decorative	2	–	2
Paraphernalia	3	–	3
Multiple	12	–	12
Unused	2	–	2
Subtotal	60	4	64

[a]Other includes non-pit structure features, as well as sheet trash.

Only three ground stone artifacts were found in this feature, two flat netherstones and a third netherstone with secondary use as a hammerstone. These tools were lightly used in both processing and manufacturing activities. They were burned on all but one side, which may indicate they were positioned on the floor when the structure burned.

Feature 104

Feature 104 is a Late Rincon phase pit structure with an intramural pit and two thermal pits dug into a well-preserved, true plaster floor. This structure had no distinct floor assemblage, although an abundance of artifacts was found in the upper fill, indicating the structure was reused as a trash dump. Due to the disturbed context of this feature, only one artifact, a turquoise bead with a cylindrical hole, was analyzed (Figure 5.1).

Feature 130

Feature 130 dates to the Middle Rincon 2 or 3 phase (A.D. 1040-1100). The feature consists of a large pit structure that underwent extensive burning, preserving several burned beams and five postholes with charred post remains in situ. The floor of the structure was made of the existing caliche layer, which may have been wetted and smoothed over into a plaster-like surface.

The large ground stone assemblage from this feature includes 32 artifacts. Six polishers were found, four of which have use-wear consistent with pottery manufacture. One of the polishers is a well-used basalt pebble, worn into facets and a glossy sheen. The basalt does not resemble local basalt from the Tucson Mountains, and it may be from a source outside the Tucson Basin.

A handstone polisher with multiple possible uses was also found in Feature 130 (Figure 5.2). One surface of the handstone has been worn flat, with a shape consistent with use as a mano. However, a finger groove encircles the perimeter of the tool, which is more typical of a pottery anvil than a mano. The opposite side of the tool has been worn quite flat, and has a dull sheen on the surface that is more consistent with use as a polisher. One of the uses of this tool may have been to smooth over a caliche or plaster floor.

The next most represented activity type is pigment processing, possibly in support of ceramic manufacture. Several tools stained with pigment, as well as processed pigment, were found in Feature 130. A mortar and a pestle, both with red paint (Munsell value 10R 3/4), were found next to each other on the structure floor along the back wall (Figures 5.3-5.4). The mortar was made from a naturally rounded rock. The basin was manufactured by pecking, and was subsequently worn into a conical shape, possibly by use. The mortar was found basin-side down, with some pieces of processed pigment directly below it. Paint drips are visible on the outside of the tool. The pestle compatible with the mortar has two shades of red (Munsell values 10R 3/4, and 10R 5/6).

Two whole lapstones, a whole netherstone, and two metate fragments were also found in this feature. One of the metate fragments is a flat/concave

Figure 5.1. Turquoise bead, with a cylindrical hole, from Feature 104, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (Field Number 375, Catalog No. 2010-481-14).

Figure 5.2. Multiple-use tool from Feature 130, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): (a) flat polishing surface with a sheen; (b) tool was used as a polisher on one side and a mano on the other. The mano surface may have been used concomitantly as a pottery anvil. Finger grooves are consistent with the description of the tool as a pottery anvil (Field Number 515, Catalog No. 2010-481-7).

Figure 5.3. Pestle with pigment from Feature 130, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). This pestle was found proximally to, and is compatible with, FN 510 (Field Number 518, Catalog No. 2010-481-8).

metate, which appears to have been redesigned as a trough metate. The fragment is similar to the whole trough metate found in Feature 120. The netherstone was used in general processing activities. The lapstones show patchy wear against a stone surface, indicating they may have been used in the manufacture of small stone objects.

Also found in Feature 130 was a simple palette with a plain raised border. The palette is interesting in that it was modified after it was broken (Figure 5.5). Because the palette is unused, the break may have occurred during manufacture, with the broken edge subsequently smoothed over.

Four pieces of fire-cracked rock were found in contexts associated with the occupation of the pit structure. Two additional fire-cracked rocks, as well as one lightly used pebble polisher, were in postoccupational fill.

Feature 134

Feature 134 is a heavily burned pit structure dating from Middle Rincon 3 to the Late Rincon phase. Ground stone artifacts recovered from this feature include a trough mano, a lapstone, a netherstone, a pottery polisher, and a handstone polisher. All ground stone found in this feature was badly burned and heat-cracked. Two pieces of fire-cracked rock were also found in the pithouse fill, and were likely related to burning of the structure.

The presence of the trough mano indicates food processing was one of the activities performed at this feature. The pottery polisher is evidence of pottery manufacture, as well as stone manufacture, because the pebble polisher was secondarily used as a pecking stone. The lapstone was made of a lump of schist that was almost certainly procured directly from the Santa Catalina Mountains. Based on the irregularity of the lapstone basin and the softness of the rock type, this tool may have been used for the manufacture of small stone objects or possibly shell, although extensive burning of the artifact caused use-wear analysis to be inconclusive.

Feature 157

Feature 157 dates from the Middle Rincon 3 to the Late Rincon phase. The primary activity associated with this feature is processing. Two moderately

Figure 5.4. Mortar with pigment from Feature 130, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). Mortar was used to process paint, likely in conjunction with FN 518 (Field Number 510, Catalog No. 2010-481-9)

used processing tools were recovered, a trough mano (Figure 5.6) and a pestle, as well as a broken pestle blank. Two other artifacts found in this feature relate to the procurement of resources. One is a broken fragment of a quartz crystal; the other is a quartzite river cobble, which was found in one posthole. The crystal fragment was obtained for an unknown purpose. The quartzite cobble may have been collected for eventual use as a stone tool, or was possibly used in its unaltered state as a support for the wooden post.

Postoccupational fill included a cobble lapstone with different wear patterns on opposing surfaces, as well as a pebble used to polish stone and to abrade pigment.

Feature 164

Feature 164 dates from the Late Rincon to the early Tanque Verde phase. The main activity associated with this feature is pigment processing. Three pieces of raw pigment were found in Feature 164. The pigment is unusual in that it may be fossilized coral fragments, which, when heat treated, turn brilliant red and yellow (Munsell values 2.5YR 4/6 [red], 10YR 6/6 [yellow]). Another unusual artifact found in this feature is a sandstone river cobble with color on each naturally flat surface (Figure 5.7). One side has a red paint (Munsell value 2.5YR 3/6) that looks more like paint that has been mixed on a palette than applied as a design. The opposite side has a black pigment applied in a round shape with five rays extending from one side. Microscopically, the black does not have continuous coverage and is powdery, as if the black image was drawn onto the rock using charcoal.

Feature 160

Feature 160 dates to the Late Rincon to the Tanque Verde phase. It is adjacent to Feature 164. A broad range of activities were performed in this feature, including resource processing and manufacturing. Pigment (Munsell value 10R 4/8) was found on one tool. Two large pieces of unaltered mica were also found in this feature. Activities at Feature 160 may have been focused on pigment production and ornamentation.

Many of the tools found in Feature 160 had multiple uses. One pestle was secondarily used as a hammerstone. Another tool was originally a trough mano that was secondarily used as a lapstone to

Figure 5.5. Bordered palette from Feature 130, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). The palette was broken during manufacture and was reshaped to smooth the broken edge (Field Number 453, Catalog No. 2010-481-10).

Figure 5.6. Trough mano from Feature 157, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): (a) the used surface has been burned completely; (b) the opposite surface has been pecked to roughen the stone and to improve the grip of the user (Field Number 825, Catalog No. 2010-481-11).

abrade pigment (Munsell value 10R 4/8). Another tool had three uses. It was primarily used as a flat mano on one side. The mano was then modified by a shallow mortar, which was ground into the surface. The opposite side of the tool had a third use as a lapstone, and was used to shape something resilient (Figure 5.8). This mano is also interesting, because its use against a flat metate is indicative of Anasazi food-processing technology.

Almost all the artifacts from this feature were burned, in most cases, badly. Five pieces of fire-cracked rock were also found. Because the fire-cracked rock and the burned artifacts were all associated with the pit structure floor, they are likely related to the burning of the structure.

Feature 167

Several different types of ground stone tools were associated with Feature 167, which dates to the Late Rincon to Tanque Verde phase. All the tools found in this feature are related to processing activities. Ground stone tools found include a flat netherstone, a handstone, and a pebble abrader, as well as another lapstone that was also used as a pestle. All the tools showed only light wear, and were fashioned from naturally shaped river cobbles. The flat netherstone is the only artifact to have been manufactured. It was flaked along the bottom to shape, and to sit levelly on the ground.

OTHER FEATURES AND TRASH

Ground stone artifacts found in extramural features and sheet trash were generally not analyzed. However, a few artifacts were analyzed, based on their rare or unusual nature.

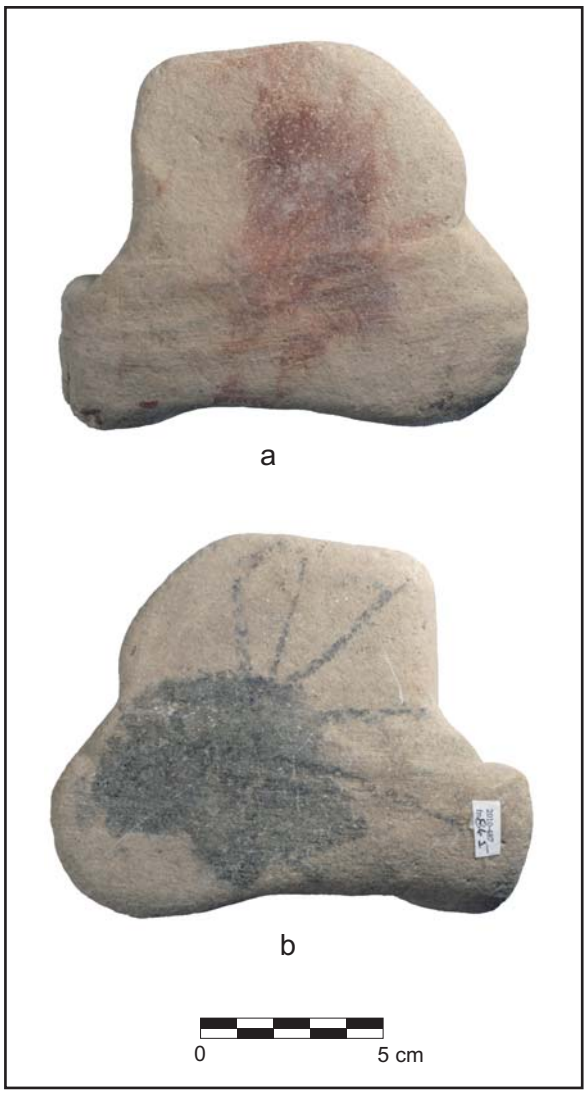

Figure 5.7. Painted rock from Feature 164, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): (a) red paint has been applied in a seemingly shapeless blur; this side of the rock may have been used as a paint palette of some kind; (b) a black pigment has been applied as an unidentifiable image; microscopically, the black pigment has spotty coverage; the image was likely drawn on the rock using charcoal (Field Number 865, Catalog No. 2010-481-12).

Sheet Trash

One donut stone was found at the Hardy site. Unfortunately, upon discovery, it was accidentally broken into several pieces that could only be partially reconstructed. The donut stone was unusually thick, and had been drilled from both sides to create a biconical hole. The perimeter has an encircling groove. The rock type is unusual for a donut stone. It was made from indurated tuff, likely from the Tucson Mountains, which is a relatively hard rock, but still soft enough to carve easily.

Feature 120

Feature 120 was an ill-defined pit. The two ground stone artifacts found in this feature are a pestle with finger grooves and an unfinished trough metate. The pestle was probably used in food processing, and while the metate may have also been intended for food processing, it provides an example of stoneworking activities. The tools were probably stored in this location for future use.

Feature 121

Feature 121 was a trash midden. Of the five ground stone artifacts found in this feature, only one was analyzed. Stone awls are unusual, and all that remains of this one is a broken tip (Figure 5.9). The tip is polished, but it is not possible to determine if the polishing was intended and produced during manufacture, or if it is a by-product of its function and constitutes use-wear.

Feature 147

Feature 147 was a large pit. One ground stone artifact was found, a trough mano that may have been used in three different metates (Figure 5.10). One of the mano surfaces is curved and was likely used in a deep trough metate. The opposite surface was also used in a trough metate, but had also been secondarily worked against a flat metate, as evidenced by the ends of the mano that have the characteristic trough wear not worn away by the second use against a flat surface. Another unusual attribute of this mano is the presence of finger grooves, which extend all the way along both edges. Finger grooves and flat metates are common to Anasazi technological tradition and not Hohokam technological traditions (Adams 2002:112, 124-125; 2010).

ROCK TYPES AND PROVENANCE

The Hardy site is located at the piedmont of the Santa Catalina Mountains, just south of the Rillito River in Tucson, Arizona. Most of the rocks used were intrusive igneous or metamorphic in type, which are the common rocks that make up the meta-

Figure 5.8. Multiple-use tool from Feature 160, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): (a) tool was primarily used as a mano against a flat netherstone; after use as a mano, the surface was modified with a shallow basin; (b) the opposite side of the tool has been used as a lapstone (Field Number 804, Catalog No. 2010-481-13).

Figure 5.9. Broken tip of an awl from Feature 121, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). The tip of the awl has been polished, either as a part of manufacture, or from use-wear (Field Number 194, Catalog No. 2010-481-15).

morphic core complex of the nearby Santa Catalina Mountains (Table 5.3). Most (73.2 percent) of the ground stone artifacts were manufactured from rock commonly found in the Santa Catalina Mountains. Of these, 78.3 percent had water wear, indicating they were procured from a nearby riverbed, such as the Rillito River. Numerous (19.5 percent) rocks found at the site were probably not locally procured. Some of these nonlocal materials (12.2 percent of the assemblage) were not immediately local to the site, but are abundant in the Tucson Basin, primarily originating in the Tucson Mountains some 24-32 km away. These rock types include all extrusive igneous rocks found at the site, both vesicular and non-vesicular basalts, andesites, and rhyolites, as well as two examples of indurated tuff. Given the great distance between the source for these volcanic rocks and the Hardy site, as well as the flow patterns of local waterways, it is not possible for these material types to have occurred in the site area naturally; thus, they were likely brought to the site purposely. The abundance of nonlocal rock types in the ground stone assemblage may indicate an easterly movement of people, or trade networks that extend to the Tucson Mountains (Table 5.4).

Of the remaining 14.6 percent of artifacts analyzed, 7.3 percent are rock types found at several locations within the Tucson Basin and cannot be identified as local or nonlocal, and 7.3 percent were rock types not found within the Tucson Basin and have an unknown origin. These include the pigment sources found in Feature 164, as well as the faceted basalt pottery polisher and the multipurpose polishing tool, both found in Feature 130.

CONCLUSIONS

Of the 72 artifacts analyzed, 60 percent were recovered as whole artifacts. More than half (63 percent) of the artifacts analyzed had been burned, with 46 percent of those burned badly enough to have been heat cracked. A little more than half (53 percent) of the artifacts analyzed showed moderate to heavy wear, while 29 percent showed light wear, and 18 percent appeared to have no use-wear at all. Interestingly, 21 percent of the tools in the assemblage had multiple uses; however, one-third of these artifacts was found in a single feature, Feature 160, dating to the Late Rincon to Tanque Verde phase.

Activities represented at the Hardy site include general processing, food processing, and pigment processing, which together, comprise 41 percent of the activities represented. The second most represented activity is manufacturing, including both stone and pottery manufacture, which makes up 30 percent of the activities at this site.

Overall, there is evidence of a long prehistoric occupation of the site, from about A.D. 1000-1300.

Figure 5.10. Trough mano from Feature 147, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM). Mano may have been used in three different metates: (a) surface was used in a deeply curved metate; (b) surface was used in a trough metate before being reused against a flat surface; both sides have been resharpened, indicating extended use (Field Number 832, Catalog No. 2010-481-16).

Based on the ground stone assemblage, however, this occupation may have been more intermittent than continuous. The high percentage of only lightly used artifacts may suggest short-term occupation, or possibly the removal of more well-used and prized ground stone tools prior to periods of abandonment. The number of reused tools in Feature 160 may indicate a period of longer occupation, or possibly a reuse of found tools, left behind by previous inhabitants.

Some anomalies in technology were also present at the Hardy site. The finger grooves, as well as the flat mano and netherstone surfaces, may be the result of the migration of a single person, for unknown reason, prior to the larger influx of Anasazi influence.

Regarding the second research goal of this excavation, there is some evidence of prehistoric craft specialization at the Hardy site. Although definitive pottery-manufacturing tools were found in only Features 130 and 134, the number of the tools and the extent of their use-wear indicates that Feature 130 may have been the dwelling of a potter involved with the manufacture of pottery for more than personal use.

Two unfinished metates found at the site are evidence of ground stone tool production. Several other tools from the assemblage were also used in the manufacture of stone tools. A netherstone, a lapstone, and a pecking stone had use-wear consistent with use against stone. Several of the other artifacts were used for stone or shell manufacture; however, the extent of damage done to many of the artifacts by burning made use-wear analysis often inconclusive.

There is also evidence for pigment processing in four of the six excavated pit structures. Raw material for pigment and processed pigment was found at the site in many colors and forms. Paint and powdered pigment were found in several shades of red (Munsell values 10R 3/4, 10R 4/6, 10R 4/8, 10R 5/6, 10R 6/6, 2.5YR 3/6, and 2.5YR 4/6). Yellow (Munsell value 10YR 6/6) and black pigments were also used. The time periods during which these structures were occupied cover the entire temporal span of occupation at the site.

Table 5.3. Summary of rock types used to make artifacts from all contexts, the Hardy site, AZ BB:9:40 (ASM).

Rock Type	Pithouse	Other[a]	Total
Andesite	3	1	4
Aplite	1	–	1
Basalt	1	–	1
Biotite	1	–	1
Fossil	2	–	2
Gneiss	2	1	3
Granite	16	1	17
Hematite, earthy	2	–	2
Hematite/Limonite	1	–	1
Muscovite	1	–	1
Quartz crystal	1	–	1
Quartzite	21	1	22
Rhyolite	1	–	1
Sandstone	13	–	13
Schist	2	–	2
Tuff	1	1	2
Turquoise	1	–	1
Vesicular basalt/Andesite	4	–	4
Total	74	5	79

[a]Other includes non-pit structure features, as well as sheet trash.

Table 5.4. Provenance of rock types used to make artifacts from all contexts at the Hardy site, AZ BB:9:40 (ASM).

Provenance	Total	Percent
Local		
Rillito River	47	57.3
Santa Catalina Mountains	13	15.9
Subtotal	60	73.2
Nonlocal		
Santa Cruz River	3	3.7
Tucson Mountains	7	8.5
Subtotal	10	12.2
Other		
Tucson Basin (material found in multiple locations in Tucson Basin)	6	7.3
Unknown	6	7.3
Subtotal	12	14.6
Total	82	100.0

CHAPTER 6

SHELL ARTIFACTS FROM THE FORT LOWELL-ADKINS STEEL PROPERTY WITHIN THE HARDY SITE, AZ BB:9:40 (ASM)

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Recent excavations by Desert Archaeology, Inc., at a small portion of the prehistoric Hohokam Hardy site, AZ BB:9:40 (ASM), produced a small collection of shell artifacts, with 50 pieces of shell representing 48 artifacts. The Hardy site is located on the historic Fort Lowell property; however, the shell artifacts in the current collection derived from prehistoric features only, including pit structures, trash mounds, and a small extramural pit. The dates of the features ranged from the Sedentary period (A.D. 950-1150) into the Tanque Verde phase (A.D. 1150-1300) of the Classic period (A.D. 1150-1450), based on associated ceramics, demonstrating continuity through time, not only in the occupation of the site, but of some of the ornament forms as well.

Plain bracelets were the most ubiquitous of the finished ornaments in the current collection (46 percent), with a moderate representation of beads (10 percent), rings (8 percent), and cut-shell pendants (6 percent), with fragmentary material, both worked and unworked, and manufacturing material comprising the remaining 30 percent of the collection. Although fewer in number, the shell species and ornament forms present are similar to the shell material recovered during previous excavations at the Hardy site in 1976-1978, by University of Arizona students and other volunteers (Gregonis 1989). The bulk of the shell material is marine in origin, with only one specimen of freshwater shell present. The recovered shell species and ornament forms are what would be expected at other contemporaneous Hohokam sites in the Tucson Basin.

The finished ornaments are mostly manufactured from marine shells, with only a single occurrence from an indigenous freshwater species. The marine species are represented by the Gulf of California and possibly by the coastal waters of southern California, the latter of which may have been the production locus for the cut-shell ornament manufactured from an unidentifiable nacreous shell, possibly *Haliotis.* In this chapter, a descriptive summary is provided of the shell artifact analysis for the current project at the Hardy site. A discussion of the distribution of shell ornaments, by chronology and context, is also presented, followed by comparisons of the current shell collection from the Hardy site with earlier excavations. (Hildreth 1997).

METHODOLOGY

Each specimen was examined visually, using a 10x hand-lens. A set of linear measurements was obtained through the use of a digital vernier caliper, and recorded to the nearest hundredth of a millimeter (mm). The diameters of any perforations were also measured, and manufacturing technique identified when possible. A detailed record for each specimen was developed that included a written description of the artifact and attributes such as the condition, shape, decorative motifs, and technological features. When possible, the relative completeness of the artifact was estimated. For ornaments, if a full set of linear measurements could be obtained, it was considered to be complete. For fragmented material, this amount is the percentage of the original valve present. Fragments that could be refitted were considered to be a single occurrence (minimum number of individuals [MNI]), with the number of fragments recorded (number of individual specimens [NISP]). In some cases, shell fragments that do not refit but that display similar morphological characteristics are considered as coming from the same shell. For all ornament types, use of the artifact is evaluated to determine if it was the primary use (the original or first use of the artifact), or was it designed for a particular use but then reused or redesigned. For example, a broken *Glycymeris* bracelet will occasionally be reworked into another form, such as a needle or a pendant. Photographs and illustrations of selected artifacts were also made.

The ornament classification structure used is based largely on that developed by Haury (1937, 1976) for the shell material from Snaketown, AZ

U:13:1 (ASM). The identification to genus and, if possible, to species for the marine shell were made in accordance with Keen (1971) and McConnaughey and McConnaughey (1992). For prehistoric shell ornaments, many researchers have proposed that the Hohokam obtained their Panamic shell specimens along the northern Sonoran Coast of the Gulf of California, due to the close proximity of that region (Haury 1976; Hayden 1972). Haury (1976:307) notes that Cholla Bay, a smaller cove within the larger Adair Bay, could have provided many of the species found in Hohokam sites. Hayden (1972:78, 81) also suggested the area as a probable source of Hohokam shell, including the coastal area around and south of Puerto Peñasco (Rocky Point). Trails and petroglyphs of shells in the area, especially around the Sierra Pinacate (Hayden 1972:78) support this proposal. These later prehistoric trails were almost certainly founded along even earlier Archaic trading systems (King 1994; Tagg et al. 2007).

The freshwater shell was identified using Bequaert and Miller (1973). Definitions of terminology used in the descriptions relating to the structural elements of the shell that were used during the analysis, as well as useful descriptive illustrations, can be found in glossaries available in resources such as Keen (1971) and Brusca (1980).

HARDY SITE, AZ BB:9:40 (ASM), SHELL MATERIAL

The shell material recovered during recent excavations at the Hardy site is represented by five identifiable marine genera, two unidentifiable marine genera, and a freshwater genus (Table 6.1). All the marine specimens that could be identified are native to the waters of the Pacific Ocean, with both the Gulf of California and the southern California coast represented. *Glycymeris, Laevicardium elatum, Pecten,* and *Spondylus/Chama* were the only identifiable bivalves (pelecypod) present, with two occurrences of marine shells that could not be identified due to intense modification of the shell; one of these may be *Haliotis*. Only a single univalve (gastropod) was represented in the current collection, a bead made from the upper portion of a *Conus* shell. Most of the marine shells present derive from the Panamic Province, which extends from the Gulf of California to northern Ecuador, with perhaps only a single representative, the possible *Haliotis*, representing the Pacific coastal waters of southern California. *Haliotis* shells can be found primarily along the cooler waters of the Pacific Province, which stretches from the state of Washington south to parts of lower California, with an occasional specimen from Mexico. Most of the marine shell can be collected along the beach, except the *Haliotis*, or abalone, which is a deep water univalve typically collected by dredging or diving. It is only rarely found on the beach after a storm surge.

GENERA AND SPECIES

The shell specimens recovered during the most recent excavations at the Hardy site are listed in Table 6.1 by genera and, if possible, to the species level. Also provided is the MNI, as well as the ornament form for the shell artifacts. Occurrences of *Glycymeris* shell artifacts dominate the collection of marine shell ornaments (n = 30), followed by *Laevicardium* (n = 10), *Spondylus* (n = 3), and single occurrences of *Pecten* and *Conus*. Only two of the marine shells were unidentifiable to species due to extensive modification of the shell, one of which may be a *Haliotis*, or abalone. For the freshwater shell, only a single occurrence of *Anodonta californiensis* was recovered.

Marine Shells

Pelecypods

The most common genera in the current marine shell assemblage is *Glycymeris*, which is not unusual for prehistoric Hohokam ornament assemblages. The frequency of *Glycymeris* artifacts is primarily an indicator of its prevalent use for the manufacture of shell jewelry, especially bracelets. The thicker, more robust *Glycymeris* shells were more sturdy when used for bracelet manufacturing than other shell types. The raw valves derived from the Gulf of California, and those species most favored by the Hohokam included *Glycymeris maculata* and *Glycymeris gigantea.* These two species are restricted to the warmer waters found in that locale, and are still found on the beach today. White, beach-drift specimens, which are dead shells, as well as a few retaining their natural coloration, were selected, by size, for the manufacturing of bracelets and ring-pendants.

When a valve is substantially reduced to create a bracelet, it is sometimes not possible to distinguish the *Glycymeris maculata* from the *G. gigantea*, except by measuring the diameter of the band. Anything smaller than 50 mm is categorized as *Glycymeris* sp., unless natural coloration is present to distinguish the species, while anything larger will be categorized as *Glycymeris gigantea*. Fossilized shells were occasionally used by the Hohokam for bracelet manufacturing if access to nicer shells was restricted, a phenomenon that occurred during the Sedentary period due to the large demand for bracelets, which

Table 6.1. Shell species and artifact forms from the Hardy site, AZ BB:9:40 (ASM).

	Beads					Pendants			Bracelet	Ring-Pendant	Manufacturing		Fragmentary Material		
	Whole Shell	Disk	Irregular	Claw	Cap	Zoomorphic	Geometric	Geometric, Unknown Form	Plain	Plain	In Process Bracelet	Reworking Bracelet	Worked	Unworked	Total
Marine Pelecypods															
Glycymeris sp.	1	–	–	–	–	–	–	1	21	4	1	1	–	–	29
Glycymeris gigantea	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Laevicardium elatum	–	–	–	–	–	1	–	–	–	–	–	–	6	3	10
Pecten sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Spondylus/Chama	–	1	1	1	–	–	–	–	–	–	–	–	–	–	3
Unidentified marine bivalve	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Marine Gastropods															
Conus sp.	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Unidentified marine nacreous	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Freshwater Shell															
Anodonta californiensis	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1
Total	1	2	1	1	1	1	1	2	22	4	1	1	6	4	48

reduced the amount of available shells. However, fossil shell is more brittle, and it breaks easily and is a darker gray color, thus, it was not the first choice of the artisans. There were no examples of fossilized shells in the current collection.

The large Pacific cockle, *Laevicardium elatum*, is a bivalve that can attain lengths exceeding 150 mm, and it is a light yellow color when fresh. While the range extends northward to include the coast of southern California, the specimens in the current marine assemblage are likely of Mexican origin. It has morphological attributes that aid in identifying smaller fragments of the shell. It is fairly thin, and it has large flattened side panels and distinctive vertical ribs that are flat and relatively evenly spaced across the broad back of the shell. This valve is frequently used for carved shell ornaments, such as pendants and beads, although it has also had utilitarian uses, such as a container or scraper (Haury 1950; Nelson 1991). In the current collection, most of the fragmented shell material are fragments of *Laevicardium elatum*, a reflection of the fragility of the complete valve. Several fragments with worked edges or that have been modified but are incomplete are an indication that some ornament manufacturing occurred at this site.

Single occurrences of *Spondylus/Chama* and *Pecten* sp. are in the current collection. Both are members of the Pectinidae family (scallops), and they prefer the warm waters of the Gulf of California. They are found at the extreme low tide zone and offshore, in sand. They are thin-walled bivalves with distinct ribs on the exterior of the shell as well as remarkable coloration. The identification of various *Pecten* species is frequently based on the colored patterns on the exterior of the shell; thus, if the specimen is very small or is bleached/beach drift, the colorations will be missing, making it difficult to assign the shell to a particular species. In prehistoric times, these particular mollusks were utilized as whole shell beads and pendants by simply abrading or drilling a perforation near the hinge area. Depending on the size of the valve, the smaller shells would be utilized as beads, with the larger shells serving as pendants. The larger, flatter left-hand valve of the *Pecten* shell was often used as a whole shell pendant, leaving the valve unmodified except the perforation for suspension, which was typically made on the upper back of the valve. The hinge area of the very colorful *Spondylus* and *Chama* shells was also used to create unusual beads and pendants.

Gastropods

Gastropods, or univalves, have a single shell. Ornaments manufactured from gastropods include rings and many styles of beads and pendants. In the current collection, a single occurrence of *Conus* is represented. The typical shell is broad at the top of the body whorl, gradually tapering to a narrow base. The low spire is stepped or turreted in some species. The outer lip is thin and easily broken. *Conus* is usually assigned to species based on the distinctive patterns of color on the shell exterior. They inhabit the shoreline from Magdalena Bay, Baja California, throughout the Gulf of California, and south to Peru.

Haliotis sp. is a large shell typically found off the Pacific coast, as it prefers the colder waters there. This beautiful, iridescent shell was highly prized and was used extensively by the indigenous populations of central and southern California for making ornaments of personal adornment. It was also commonly traded with groups who lived in the interior (King 1990). Ornaments made from *Haliotis,* especially beads and pendants, have been recovered from many archaeological sites in the Great Basin region that date as early as the Archaic period, as well as from Basketmaker sites located in northern Arizona and southern Utah (Bennyhoff and Hughes 1987; Lindsay et al. 1968). California shell artifacts have been recovered from archaeological sites in the Southwest that date from Basketmaker II through Pueblo IV from species limited to the Pacific coast, and in forms that are identifiable with Californian types (Gifford 1947:61). The exterior mantle, or periostracum, is often used to identify the shell to species; thus, intense modification of the shell to form an ornament sometimes removes this identifying attribute. However, enough of the exterior mantle is occasionally present to assist in the identification. Unfortunately, this is not the case with the current shell specimen.

Freshwater Shells

The native *Anodonta californiensis* was the only freshwater specimen recovered during the current excavations, with one ornament present. The project area is in close proximity to the confluence of the Rillito River and Pantano Wash, which may have been the source of this species. *A. californiensis* was indigenous to most of the permanent rivers and streams of Arizona, such as the Colorado, Salt, Gila, San Pedro, and Santa Cruz, prior to the development of dams constructed during the early part of the twentieth century (Bequaert and Miller 1973:220-223). Currently, it is restricted to a short segment of the Black River in eastern Arizona. The reduction in distribution is thought to be due to the elimination of the native fish that served as the host for the glochidium stage of the clam's development cycle, which it parasitizes while transforming into the free

living clam. When the specific host fish disappear from the habitat, the clam also becomes extinct.

Moderate amounts of A*nodonta californiensis* have been recovered from prehistoric and historic sites in the Phoenix Basin and in the Salt/Gila River drainages (Haury 1976:308; Schroeder and Virden 1994:189; Vokes 1988:373), with smaller amounts from the Tucson Basin (Bequaert and Miller 1973:221; Lister and Lister 1989:Figure 3.35), suggesting it may have been a minor food source to supplement dietary needs. It may also have been harvested from the canals for this purpose. Occasionally, ornaments manufactured from this freshwater shell have been recovered from archaeological contexts. *Anodonta* is very shiny, or nacreous, on the interior of the shell, which made it popular among consumers of shell ornaments. However, it becomes especially fragile and brittle when dried, so artisans would have had to collect fresh specimens for ornament manufacturing, cutting the shell when it was still green and pliable to reduce breakage. Local artisans may have tried to utilize *Anodonta* to meet the local demand when access to *Haliotis* or *Pteria/Pinctada* as a raw material or finished ornament was restricted. The dearth of this shell species in the current assemblage is similar to other Hohokam sites in the Tucson Basin, which may indicate a deficiency of an appropriate ecological environment within the local river system to support this particular freshwater shell, especially when compared to that of the Phoenix Basin.

ARTIFACT ASSEMBLAGE

Finished Shell Artifacts

Finished shell ornaments recovered from the current excavations were low density, and included mostly bracelets, with a secondary emphasis on beads and pendants (Table 6.2). The remaining 25 percent of the collection consisted of fragmentary material, both modified and unmodified, and a small amount of manufacturing evidence. Although the collection is small, it is quite diverse in shell species and ornament forms.

Beads

Although few in number, the six beads that were recovered are variable not only in the shell species used, but in the ornament form as well. Although several beads were from the same feature, some are burned, while others are not, suggesting they are not all from the same necklace. All were recovered from pithouses, either from the structural fill, floor fill, or a posthole.

Whole Shell

A single whole shell bead manufactured from a juvenile *Glycymeris* shell was recovered from a posthole associated with Feature 160, a pithouse dating to the Late Rincon to Tanque Verde phase (Figure 6.1d). Whole shell beads are the simplest form to manufacture as little is done to modify the shell other than creating a perforation for suspension. The perforation can be made by punching, drilling, or abrading a hole into the shell so it can be strung. The beak of the umbo on the current specimen had been perforated by abrading it, creating a flat grinding facet across the umbo. The shell was otherwise unmodified, and it was unburned. Most *Glycymeris* whole shell beads are usually associated with Classic period contexts (Nelson 1991:56).

Discoidal

Two discoidal, or disk, beads were recovered from the structural fill of Feature 104, a pithouse dating to the Late Rincon phase (A.D. 1100-1150). One of the disk beads was manufactured from an unidentified marine bivalve, and was darkly burned and cracking. It was slightly oval in plan view and rectangular in cross section. The biconically drilled perforation was large, measuring 3.01 mm in diameter. The bead itself measured 8.76 mm in length, 8.72 mm in width, and 4.20 mm in thickness. The second disk bead from this feature (Figure 6.1c) was manufactured from *Spondylus/Chama.* Based on the patterning of the colors, it may have been made from the muscle scar area on the interior of the valve. The shell is a cream base with pinkish-red colorations (the colors are represented on both *Spondylus* and *Chama* shells, which makes them difficult to differentiate). The bead is large, with a biconically drilled perforation measuring 2.94 mm in diameter, and it is slightly oval in plan view and rectangular in cross section. It measures 7.39 mm in length, 7.31 mm in width, and 3.71 mm in thickness.

Irregular Bead-pendant

A nearly complete, large irregular bead-pendant made from either *Spondylus* or *Chama* was also recovered from the structural fill of Feature 104 (Figure 6.1b). This bead-pendant style had previously been known as a ground-shell pendant (Gladwin et al. 1937:141). This form is recovered more frequently from later Sedentary and Classic period sites, especially from mortuary contexts (Nelson 1991:63). This style of bead is manufactured from a thick, irregular piece of shell, sometimes from near the hinge, of the larger valves. The edges of the bead are ground smooth, while retaining the irregular form of the

Table 6.2. Distribution of shell artifacts, by time period and context, at the Hardy site, AZ BB:9:40 (ASM).

Feature	Feature Type	Phase	Context	Shell Species	Artifact Form	Minimum Number of Individuals
142	Pit structure	Middle Rincon	Structural fill	*Glycymeris* sp.	Bracelet	1
142	Pit structure	Middle Rincon	Structural fill	*Glycymeris* sp.	Ring-pendant	1
142	Pit structure	Middle Rincon	Floor fill	*Glycymeris* sp.	Ring-pendant	1
104	Pit structure	Late Rincon	Structural fill	*Glycymeris* sp.	Bracelet	2
104	Pit structure	Late Rincon	Structural fill	*Glycymeris* sp.	Bracelet, in process	1
104	Pit structure	Late Rincon	Structural fill	*Conus* sp.	Cap bead	1
104	Pit structure	Late Rincon	Structural fill	*Spondylus/Chama*	Irregular bead-pendant	1
104	Pit structure	Late Rincon	Structural fill	Unidentified Marine bivalve	Disk bead	1
104	Pit structure	Late Rincon	Structural fill	*Spondylus/Chama*	Disk bead	1
104	Pit structure	Late Rincon	Floor fill	*Glycymeris* sp.	Bracelet	2
130	Pit structure	Middle Rincon 2 or 3	Structural fill	*Anodonta californiensis*	Geometric pendant	1
130	Pit structure	Middle Rincon 2 or 3	Structural fill	*Glycymeris* sp.	Bracelet	2
130	Pit structure	Middle Rincon 2 or 3	Structural fill	*Laevicardium elatum*	Worked fragment	1
130	Pit structure	Middle Rincon 2 or 3	Structural fill	*Pecten* sp.	Unworked fragment	1
130	Pit structure	Middle Rincon 2 or 3	Floor fill	*Laevicardium elatum*	Zoomorphic pendant	1
130	Pit structure	Middle Rincon 2 or 3	Floor fill	*Laevicardium elatum*	Worked fragment	2
130	Pit structure	Middle Rincon 2 or 3	Floor fill	*Glycymeris* sp.	Bracelet	4
130	Pit structure	Middle Rincon 2 or 3	Floor fill	*Glycymeris* sp.	Ring-pendant	1
130.16	Posthole	Middle Rincon 2 or 3	Feature fill	*Glycymeris* sp.	Bracelet	1
130.19	Posthole	Middle Rincon 2 or 3	Feature fill	*Glycymeris* sp.	Bracelet	1
130.23	Floor pit	Middle Rincon 2 or 3	Feature fill	*Glycymeris* sp.	Bracelet	1
130.31	Posthole	Middle Rincon 2 or 3	Feature fill	*Glycymeris* sp.	Bracelet	1
134	Pit structure	Middle Rincon 3/Late Rincon	Floor fill	*Laevicardium elatum*	Worked fragment	1
157	Pit structure	Middle Rincon 3/Late Rincon	Structural fill	*Glycymeris gigantea*	Bracelet	1
157	Pit structure	Middle Rincon 3/Late Rincon	Structural fill	*Laevicardium elatum*	Worked fragment	1
157	Pit structure	Middle Rincon 3/Late Rincon	Structural fill	*Spondylus/Chama*	Claw bead	1
157	Pit structure	Middle Rincon 3/Late Rincon	Floor fill	*Glycymeris* sp.	Bracelet	2
157	Pit structure	Middle Rincon 3/Late Rincon	Floor fill	*Laevicardium elatum*	Worked fragment	1
160	Pit structure	Late Rincon/Tanque Verde	Roof/wall fall	*Glycymeris* sp.	Bracelet	1
160	Pit structure	Late Rincon/Tanque Verde	Floor fill	*Glycymeris* sp.	Bracelet	1
160	Pit structure	Late Rincon/Tanque Verde	Floor fill	*Glycymeris* sp.	Reworking a bracelet segment	1
160.02	Posthole	Late Rincon/Tanque Verde	Feature fill	*Glycymeris* sp.	Whole shell bead	1

Table 6.2. Continued.

Feature	Feature Type	Phase	Context	Shell Species	Artifact Form	Minimum Number of Individuals
121	Trash mound	Middle Rincon 1	Feature fill	*Laevicardium elatum*	Unworked fragment	1
121	Trash mound	Middle Rincon 1	Feature fill	*Glycymeris* sp.	Bracelet	2
121	Trash mound	Middle Rincon 1	Feature fill	*Glycymeris* sp.	Pendant, unknown form	1
143	Trash deposit	Not dated	Feature fill	*Glycymeris* sp.	Ring-pendant	1
167	Pithouse	Late Rincon/Early Tanque Verde	Floor fill	*Laevicardium elatum*	Unworked fragment	1
172	Small pit	Not dated	Feature fill	*Laevicardium elatum*	Unworked fragment	1
0	Sheet trash	Not dated	Overburden containing cultural material	*Unidentified Marine Nacreous*	Cut-shell, rectilinear	1
Total						48

Figure 6.1. Selected shell artifacts from the Hardy site, AZ BB:9:40 (ASM): (a) Feature 104, *Conus* cap bead (FN 414, Catalog No. 2010-487-17); (b) Feature 104, *Spondylus*/*Chama* irregular bead/pendant (FN 414, Catalog No. 2010-487-18); (c) Feature 104, *Spondylus*/*Chama* disk bead (FN 355, Catalog No. 2010-487-19); (d) Feature 160, *Glycymeris* whole shell bead (FN 897, Catalog No. 2010-487-20); (e) Feature 130, *Laevicardium* zoomorphic pendant (FN 576, Catalog No. 2010-487-21); (f) unidentified nacreous rectangular pendant (FN 105, Catalog No. 2010-487-22); (g) Feature 142, *Glycymeris* ring (FN 314, Catalog No. 2010-487-23); (h) Feature 157, *Glycymeris* plain bracelet (FN 682, Catalog No. 2010-487-24); (i) Feature 130.23, *Glycymeris* plain bracelet (FN 581, Catalog No. 2010-487-25); (j) Feature 121, *Glycymeris* bracelet (FN 221, Catalog No. 2010-487-98).

shell. The perforations for suspension are sometimes asymmetrical to the bead surface and are typically large. Two perforations are occasionally drilled into the same bead.

A large perforation for suspension was biconically drilled in the current specimen, but has broken. The bead is darkly burned, and some worm damage is present. In unburned ornaments of this style, the pinkish color is similar to *Spondylus* or *Chama*. This bead style is known primarily from burial contexts, although two specimens were recovered from non-mortuary contexts during the 1985 excavations at the San Xavier Bridge site, AZ BB:13:14 (ASM), where both Classic period and post-Classic features were present. The current bead-pendant measures 20.67 mm in length, 10.52 mm in width, and 7.56 mm in thickness. The biconical perforation measures 1.26 mm in diameter.

Cap

A cap bead made from the spire end of a *Conus* shell was also recovered from the structural fill of Feature 104 (Figure 6.1a). The upper portion of the univalve was removed at the body whorl just above the aperture. The apex of the spire was removed, and the opening was enlarged by uniconically drilling to create a large perforation for stringing. This perforation measures 4.53 mm in diameter. The large bead is somewhat oval in plan view and irregularly shaped in profile. The shell is white beach drift, with no colorations or markings to aid in identification

to species. The shell is unburned, with caliche adhering to the surface. There is a smooth, polished area on what may have been the back of the bead, "use-wear" from where it rubbed on something soft such as a textile. The bead is cracked, and the lower edge is irregular from chippage. The bead measures 16.52 mm in length, 15.44 mm in width, and 9.22 mm in thickness. Two cap beads made from *Conus* shells are reported from the 1985 excavations at the San Xavier Bridge site, which had features that were both Classic period as well as post-Classic (Vokes 1987:257). No cap beads were previously recovered from the Hardy site.

Claw

The lower portion of a claw-shaped bead made from a *Spondylus* or *Chama* shell was recovered from the floor fill of pithouse Feature 157. The bead broke at the perforation, which was biconically drilled through the upper, wider portion of the thick bead. The shell is a creamy white base with light to dark pink colors swirling throughout the white. The bead is wider near the upper portion and center, and then tapers to a curved and rounded point. The sides of the bead have been ground flat, giving the bead a wedge-shaped cross section. The piece measures 12.65 mm in length, 6.15 mm in width, and 5.51 mm in thickness. These beads have been recovered from other prehistoric sites dating to the late Colonial period (A.D. 750-950) and into the Sedentary period of the Hohokam sequence, but are not typically found earlier (Haury 1976:310). Several claw-shaped beads have been recovered from the San Xavier Bridge site in a context that suggests they were worn as a bracelet (Vokes 1987:257).

Pendants

A small assortment of pendant forms was recovered during the recent excavations at the Hardy site. Only one pendant was complete, while the remaining three were fragments of pendants. Several different shell species were utilized to create the ornaments.

Zoomorphic

A fragment of a cut-shell pendant in a zoomorphic shape was recovered from the floor fill of Feature 130, a pithouse dating to the Middle Rincon 2 or 3 phase (Figure 6.1e). The pendant fragment is in the form of either a very gracile and stylized lizard or other quadruped form, and was manufactured from a *Laevicardium* shell. Only about 50 percent of the pendant is present. The ornament broke across the perforation for suspension, and a small chip was broken off the end. It is linear in plan view and thin, with the ribbing of the shell running diagonally across the width of the ornament, possibly to enhance the decorative element of the pendant. The body has a slight curvature, similar to what is found on lizard ornaments. The perforation for suspension was biconically drilled, and is placed where the piece widens, representing either the center of the body or near the head end. One appendage is present at the end opposite the perforation; it is small and tabular. The appendage indents inward to the body, then comes downward as if there had been a tail (tabular?) carved at the end. The remainder of that end is broken off, however, so the final shape is unknown. Both surfaces of the ornament have been ground smooth and are fairly flat. The wider end, where the perforation is located, measures 5.42 mm in width, while the end where the appendage is located measures 3.44 mm in width. The length of the portion present is 18.51 mm, while the thickness is 2.01 mm. The perforation for suspension was biconically drilled, measuring 2.5 mm for the interior diameter. The piece is similar to either a lizard or quadruped, as the Hohokam used the tabular appendage style on both forms during the Sedentary to Classic periods (Jernigan 1978:Figure 17).

Geometric

A nearly complete rectilinear ornament made from an unidentified nacreous marine shell (cf. *Haliotis*) was recovered during stripping (Figure 6.1f). The shell had been extensively modified, making it difficult to assign to species. The ornament is rectilinear in plan view, being wider at the base and tapering toward the top of the ornament. No perforation is present, although a series of three shallow grooves were incised at the narrow end on both sides of the ornament, which would allow string to be tied around the top for suspension. The piece is plan-convex in cross section, and is fairly thin, as both surfaces have been ground smooth. One of the sides has been ground to vertical while the opposite side is more tapered, similar to the marginal edge of the valve. The ornament measures 30.52 mm in length, 10.78 mm in width, and 1.91 mm in thickness.

A fragment of a cut-shell pendant made from *Anodonta* was recovered from the structural fill of pithouse Feature 130. The item appears to be mostly geometric in form, based on the portion that displays worked edges. A tiny uniconical perforation, drilled from the interior of the shell, is located along one cut edge, which probably represents the top of the pendant. One side is cut at a diagonal, suggesting the ornament may have been rectangular in plan view. However, the remaining edges are irregular

from breakage, so the final form is unknown. The shell is unburned, and periostracum is still present on the exterior. The piece measures 10.50 mm in length, 9.58 mm in width, and 0.67 mm in thickness.

Finally, a small fragment of a cut-shell pendant made from *Glycymeris* sp. was recovered from the feature fill of Feature 121, a trash mound. The piece is broken, so the final form is unknown. The pendant is irregularly shaped in plan view, and both surfaces have been ground flat and smooth. The end where the perforation is located has been tapered slightly; thus, in profile, it is not as thick as the rest of the piece. One short side is curvilinear; it has been cut and ground smooth to shape. A curvilinear line parallel to the edge has been incised just above this worked edge. This side measures 11.56 mm in length. The two adjacent sides are irregular from breakage, measuring 20.12 mm and 10.36 mm in length, respectively. The end opposite the curvilinear side is broken at a diagonal, but contains part of a large perforation that was biconically drilled, measuring 2.57 mm in diameter.

Bracelets

Twenty-two fragments of *Glycymeris* bracelets were recovered during the current excavations. No complete specimens were present in the collection, and none of the fragments appear to have been decorated or painted. The size and shape of the band is dependent on the size of the shell used and the extent to which the shell was ground down. The lengths of the band segments ranged from 14.42 mm to 56.27 mm, with a mean of 31.36 mm. Nineteen of the bracelet fragments are categorized as non-dorsal, meaning they came from the side and/or ventral margin area. The width and thickness of the non-dorsal bracelet fragments were measured to rank them according to Haury's (1976:313) band typology, which was developed to track changes through time for the Snaketown collection.

Haury (1976) noted that the earlier bracelet bands recovered from Pioneer period (A.D. 500-750) sites were often more narrow and thinner, with the umbones not perforated and a squared cross section. This earlier, more gracile style was designated Type 1. Although this band style continues through time, it is recovered less frequently than during the early part of the Pioneer period. Through time, the bands became wider and thicker, with the umbo perforated approximately 50 percent of the time; this Type 2 band is essentially a late Pioneer, Colonial, and Sedentary form. The Type 3 band found in the Classic period thus becomes much broader, with the umbo barely modified and rarely perforated. The width of the non-dorsal band segments ranged in width from 3.75 mm to 9.54 mm, with a mean of 6.05 mm. The thickness of the non-dorsal band segments ranges from 1.92 mm to 5.42 mm, with a mean of 4.08 mm. This suggests some of the bands fall within the Type 2 category, which includes the Sedentary period, with the larger bands falling into the Type 3 category, which was the predominate form in the later Classic period. None of the band segments were assigned to the more gracile Type 1 category.

Three of the bracelet fragments were dorsal margins with the umbo still attached (see Figure 6.1h-i). Two of the bands had umbones that had been shaped into a large, rounded dome. The third band had the umbo modified into a pointed profile. All three of the umbones had been perforated by flat grinding, with the holes subsequently reamed out. As mentioned, this band treatment was prevalent during the Sedentary period and just slightly into the Classic period. All three bracelets had similar band treatments, which included smoothing the taxodontic hinge plate, nearly obliterating the hinge teeth. The exterior surface treatment included the steepening of the outer marginal edge as well as the inner edge to a more vertical aspect, creating a rectangular cross section of the band.

The bracelet fragments in the current collection were distributed among features across the site, with all but a few in the structural and floor fills of six of the 10 pithouses. Two pithouses, Features 130 and 160, also had bracelet fragments in the fill of architectural features, such as postholes and a floor pit. Gregory (2001:39) has posited that the presence of shell artifacts, as well as other special items of animal bone or stone, in floor features, such as postholes, may have been an intentional behavior at the time of construction. The placement of these items may be a votive or dedicatory deposit rather than a lost artifact or displacement from other contexts by taphonomic agents, such as rodent disturbance or flooding of the feature. This phenomena was recorded from excavations at Los Pozos, AZ AA:12:91 (ASM) (Gregory 2001:Table 2.1), where shell, animal bone, and stone and clay artifacts were recovered from the postholes of 12 pit structures. Similar items were also recovered from the fill of intramural pits that had been intentionally filled during the use-life of the pit structure, which suggests these items may also have been intentionally placed (Gregory 2001:Table 2.2). It is possible this same behavior is seen in some of the features at the Hardy site.

Rings

Four fragments of plain rings made from juvenile *Glycymeris* shells were recovered. Rings made

from this shell species are manufactured in a similar manner to the bracelets; that is, by removing the back of the valve by flat grinding until the shell is perforated. The inner edge is often reamed to smooth it, similar to bracelets. The rings are occasionally carved or painted, although the current specimens are undecorated. Two ring fragments were recovered from the fill of pithouse Feature 142. One (Figure 6.1g) consisted of a ventral margin and two side margins that were intact, and it had an interior diameter of 16.45 mm. One side margin fragment was recovered from the feature fill of Feature 143, a trash deposit. This particular piece had an interior diameter of 9.56 mm. A dorsal margin with an umbo fragment of a ring was recovered from the floor fill of Feature 130. The umbo was left natural and had not been perforated. The dorsal margin had been ground flat, smoothing out the hinge teeth and flattening the beak on the umbo. The fragment was too small to project a band diameter. While occasionally an earlier shell ring is found, they are recovered primarily from late Colonial into Sedentary and Classic period contexts, most notably, the Sedentary period. Rings were also made from *Conus* shells, although there were no examples present in the current collection.

Manufacturing Evidence

A small amount of ornament manufacturing occurred at the Hardy site. A fragment from a small *Glycymeris* bracelet that broke during manufacturing was recovered from the structural fill of Feature 104 (see Table 6.2). The back of the valve had been reduced, leaving a wide grinding facet. The inner edge was irregular from being chipped, but it had not yet been reamed out. The exterior surface was natural, but the outer marginal edge was steepened by grinding it on something abrasive (a lapstone?), leaving a narrow vertical facet. The fragment is too small to project a band diameter, although it appeared to have been small, such as a child-sized band. The piece was burned, probably from being thrown into trash after it broke.

The second specimen is a bracelet segment that was being reworked. This piece of shell material was recovered from the floor fill of Feature 160. The bracelet broke at the side margin; two small u-shaped notches, adjacent to each other, had been carved in a perpendicular direction across the upper edge of the band, either in an attempt to decorate the band, or to rework a broken bracelet segment into a pendant or other form. The ends of the bracelet segment are irregular from breakage; one of the ends is broken at one of the cuts carved into the band.

Fragmentary Material

It is not uncommon to salvage fragments of shell material during the recovery process of an archaeological excavation. Fragments of shell that exhibit worked or modified edges may have originally been complete ornaments that broke, due to the fragile nature of shell. Unmodified fragments of shell material may represent whole valves of shell or a portion of a whole pendant or bead that broke. In the current collection, six fragments of marine shell appear to have been modified (13 percent of the collection), while four fragments do not appear to display any modifications (8 percent of the collection).

Worked

The presence of worked pieces of shell could represent either finished ornaments that broke, or they could be portions of in-process ornaments that broke. The worked shell fragments in the current collection are all from *Laevicardium* shells, and were recovered from the floor fill or structural fill of four pithouses. One, from Feature 134, is a curvilinear piece that may have been a disk pendant, although no perforation was present to determine if it was a pendant. Another, from Feature 157, is a ventral margin piece that is trapezoidal in plan view. One side is cut and ground along a vertical rib line. A second side is perpendicular to this side, and it has also been cut and ground. The ventral margin has also been ground slightly and is at a diagonal to the rib line, while the fourth short side is irregular from breakage. It may have been a geometric pendant that was either in-process or broke, but no perforation for suspension is present. The remaining three pieces display at least one edge that has been cut and ground; unfortunately, not enough of the artifact is present to know the intended form. A piece of worked shell from Feature 130 may have been part of a zoomorphic pendant that broke, but not enough is present to determine without question. The piece is irregular in plan view, with a curvilinear cut and ground edge, in addition to two other edges that may have been forming part of a zoomorphic body shape.

Unworked

Only four fragments of unworked shell were recovered during the recent excavations, and these were from a variety of contexts. A single piece of *Pecten* (cf. *Pecten vogdesi*) shell, badly burned, was recovered from the structural fill of Feature 130. It is a body fragment from the flatter left-hand valve, typically used for whole shell pendants, which are frequently recovered from mortuary contexts, such

as found in the Phoenix Basin, Snaketown, and the Grewe site, AZ AA:2:2 (ASM), near Casa Grande (Nelson 1991:47-48). No perforation was present on the fragment; thus, it cannot formally be assigned to the pendant category.

Three unworked fragments of *Laevicardium* were recovered that were quite small and that may represent portions of ornaments that broke, or fragments of manufacturing material. However, no whole valves or portions of such were recovered. These fragments were recovered from the floor fill of pithouse Feature 167, the fill of trash mound Feature 121, and the fill of Feature 172, an extramural pit containing a reconstructible vessel.

Chronological Distribution

The distribution of the shell artifacts, by time period and context at the Hardy site, is presented in Table 6.2. The features were relatively dated by ceramics associated with the respective features. The prehistoric features that contained shell material were distributed across the northern half of the project area, with a cluster of habitation features in the central portion of the project area and a few outliers in the northern portion of the work area. A concentration of historic features was located in the southern half of the project area, with fewer historic features scattered in the northern half of the project area.

Seven of the shell artifacts (15 percent of the collection) were recovered from undated features. None of the pithouse features had any shell material associated with the floor; however, all (25 percent of the collection) had at least one shell artifact associated with floor fill, the layer of dirt sitting on the floor. Five of the pithouses, Features 142, 104, 130, 134, and 157, were assigned to the Sedentary period, specifically the Rincon, Middle Rincon, and Middle-Late Rincon phases. Feature 142 was the earliest, with a bracelet fragment and two ring fragments; Feature 104 was next oldest, with four bracelet fragments, four beads, and an in-process bracelet fragment; Feature 130 had the highest density of shell artifacts, including 6 bracelet fragments, 2 pendants, 1 ring fragment, and 3 worked and 1 unworked shell fragments. Several architectural features associated with Feature 130 also had shell bracelet fragments in their feature fill, including three postholes and one floor pit.

Feature 134 contained only a single shell artifact, a worked fragment of *Laevicardium*, associated with the floor fill. Feature 157 had seven pieces, including three bracelet fragments, a claw bead, and three worked fragments of *Laevicardium.* Feature 160, dating to the Late Rincon to Tanque Verde phase of the Classic period, had two bracelet fragments and a bracelet segment that was being reworked. A whole shell bead was recovered from the fill of a posthole associated with the pithouse. As discussed the presence of these kinds of artifacts in structural features, such as postholes and floor pits, may have been an offering of some sort.

Seven shell artifacts were recovered from Features 121 and 143, a large trash mound near the center of the occupation area, with an associated small trash deposit area along the eastern edge of the mound. A *Glycymeris* ring and bracelet fragments, as well as an unworked fragment of *Laevicardium*, were recovered from Feature 121, while a ring fragment was recovered from Feature 143. One pithouse, Feature 167, had an unworked fragment of *Laevicardium* associated with the floor fill. Feature 172, a small pit that contained a reconstructible vessel, also had an unworked fragment of *Laevicardium* in the pit fill. Finally, a cut-shell rectilinear pendant made from unidentified marine nacreous shell (cf. *Haliotis*, or abalone) was recovered during stripping from Stratum 4, designated as sheet trash, or overburden containing cultural material.

Comparison with 1976-1978 Material

The collection of shell artifacts from the most recent excavations is small but diverse. When compared to previous work, there are similarities in shell species and artifact forms, although several previously present are missing from the current collection (Hildreth 1997:Table 5.1). In all, 320 pieces of shell material were collected during the 1976-1978 excavations from a much larger project area. The features excavated at that time dated from the Snaketown phase (A.D. 700-750) of the Pioneer period to the Late Rincon phase, all of which correspond with the current project, but with some earlier features. However, several Tanque Verde phase features present in the current project area suggest the site expanded to the west during the later sequences of the Hohokam occupation. All the shell species from the current collection were also recovered from the earlier excavations. However, several species are different, including *Chione californiensis, Haliotis, Olivella, Pyrene, Turitella* and *Vermetidae.*

Another difference between the two collections includes the ornament forms recovered previously, when compared to the current collection. The earlier excavations recovered whole shell *Olivella* beads, *Vermetus* worm segment beads, a *Pyrene* whole shell bead, several frog effigy pendants, bilobed beads, and a *Haliotis* bird effigy pendant fragment (Hildreth 1997:Figure 5.1), all of which are missing from the current collection. Similarities include many *Glycym-*

eris bracelets, most of which were plain, but several that were incised with geometric motifs, an abstract snake, and a carved frog motif. A total of 10 ring fragments was reported previously, seven made of *Glycymeris* shell and three made from *Conus*. Hildreth (1997:56) reported that two of the *Glycymeris* ring fragments were incised with abstract snake motifs similar to the motif found on the incised bracelets at the site, one of which was from an activity surface dated to the Late Rincon phase. Also present was a single example of a rectangular piece of inlay, as well as a *Glycymeris* bracelet that had been painted with specular hematite in a geometric repetitive design of chevrons and interlocking frets recovered from the cemetery area surface dating to the Cañada del Oro phase (A.D. 750-850).

CONCLUSIONS

The current collection of shell artifacts recovered from the Hardy site are similar to what one could find at contemporaneous Sedentary and early Classic period sites in the Tucson region, such as Snaketown; Hodges Ruin, AZ AA:12:18 (ASM); and the San Xavier Bridge site (Haury 1976:309-321; Kelly 1978:112-120; Vokes 1987:251-269). Occupants of this portion of the Hardy site were clearly involved in the same exchange networks as the earlier occupants and others in the region for procuring ornaments of personal adornment made from marine shells, either from the Gulf of California or the coastal waters off southern California. A small amount of finished ornaments could be made locally from the native freshwater shell *Anodonta* to supplement the demand for iridescent shell beads and pendants.

The bulk of the shell material was either complete or fragmented portions of finished ornaments with very little unmodified fragmented material. Several ornament forms only found from Sedentary period deposits and later are present, including *Glycymeris* whole shell beads, rings, and perforated bracelets. Unfortunately, no shell artifacts were recovered from floor surfaces, but rather, only in the structural fill and floor fill layers. Some of the artifacts were burned while others were not, which suggests they were probably deposited as trash after the abandonment and collapse of the pithouses. Shell ornaments recovered from architectural features, such as postholes and floor pits, suggests the occupants participated in some sort of ritual behavior that was shared through time, as this occurred in both Feature 130, a Middle Rincon 2 or 3 phase pithouse, as well as Feature 160, a Late Rincon to Tanque Verde phase pithouse, both of which were located near the central portion of the project area. This same phenomenon has occurred in other features dating back several hundreds of years to the Early Agricultural period (1200 B.C.-A.D. 50), as mentioned. The shell ornaments seemed to have arrived at the site in a finished state. The presence of manufacturing evidence was minimal, suggesting the artisans responsible were involved in a small-scale industry for either personal use or minimal exchange.

CHAPTER 7

RINCON PHASE MACROBOTANICAL SPECIMENS FROM THE FORT LOWELL-ADKINS STEEL LOCUS OF THE HARDY SITE, AZ BB:9:40 (ASM)

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Archaeological excavations at the Hardy site, AZ BB:9:40 (ASM), within the Fort Lowell-Adkins Steel property, Tucson, resulted in the recovery and analysis of flotation samples and hand-collected macrobotanical specimens from prehistoric houses. All dated features corresponded to the Middle Rincon phase (A.D. 1000-1100) or the Late Rincon phase (A.D. 1100-1150) of the Hohokam Sedentary period (A.D. 950-1150). Seven flotation samples from hearths on pithouse floors and 27 macrobotanical specimens from postholes and roof debris were analyzed. Contents of flotation samples indicate the residents of these houses relied primarily on farming, and they augmented their agriculture-based diet by harvesting local wild foods. Locally available trees and shrubs account for all the wood charcoals from these houses. In this chapter, the contents of the samples are described, the uses of the identified plants are reviewed, and the assemblage is compared with other, contemporary, charred plant tissue assemblages in the eastern Tucson Basin. Although the charred plant tissue recovery rates were low and the total number of samples few, the prehistoric plant remains from the Fort Lowell-Adkins Steel locus are broadly consistent with contemporary assemblages from the eastern Tucson Basin.

IDENTIFIED SEED TAXA

Maize cupules (cob tissue) and six other kinds of seeds were observed in the Hardy site assemblage. The identified taxa and their uses are described below. The frequencies of identified seeds and maize cupules are listed in Table 7.1.

Cheno-am, Amaranthaceae/Chenopodiaceae (Goosefoot or Pigweed)

Cheno-ams are undifferentiated goosefoot (*Chenopodium* sp.) or pigweed (*Amaranthus* sp.). Although these taxa are members of discrete families, the seeds are of similar size and general shape; when distorted or fragmentary, they may be indistinguishable from each other. For a discussion of likely uses, see *Chenopodium* below.

Chenopodium sp., Chenopodiaceae (Goosefoot)

Goosefoot seeds were observed in samples from Features 134.01 and 168.01, hearths in pithouses. Goosefoot occurs commonly at elevations from 2,500-9,000 ft and flower from June through September (Kearney and Peebles 1973:253). Moerman (1998:154-157), Minnis (1991:240), and Rea (1997:202-203) each noted that the greens were consumed by Native Americans in the southwest as a potherb; the seeds were parched, winnowed, and used in a variety of foods. The consumption of modest amounts of pigweed greens, furthermore, in a basal maize-bean diet can dramatically improve the total quality of the diet (Food and Agriculture Organization of the United Nations [FAO] 1992:131). The inclusion of goosefoot in preparations involving the common bean (*Phaseolus* sp.) can extend the shelf life of cooked food (Logan et al. 2004).

Descurainia sp., Cruciferae (Tansy Mustard)

Tansy mustard flowers from March through April (Kearney and Peebles 1973; Parker 1990:146-147), and is a signature cold season annual in the greater Tucson Basin. Ethnographically documented uses of the plant are numerous (Moerman 1998:197-198), with the strongly flavored seeds used as a flavoring agent and to make a mush. The greens were often used as a potherb.

Gramineae (Grass Family)

One grass family seed fragment was found in one flotation sample from hearth Feature 134.01. Grasses

Table 7.1. Contents of flotation samples from the Hardy site, AZ BB:9:40 (ASM), Tucson, Arizona.

					Wood and Stem Charcoal							Seeds and Cupules						
Feature	FN	Phase	Volume (l)	Weight (gm)	Agavaceae (Agave Family, Floret Stems)	*Atriplex* sp. (Saltbush)	*Acacia/Prosopis* sp. (Acacia/Mesquite)	Desert Tree Legume (Acacia, Ironwood, Mesquite or Paloverde)	*Fouquieria* sp. (Ocotillo)	*Phragmites* sp. (Common Reed)	*Populus/Salix* sp. (Cottonwood/Willow)	*Phaseolus vulgaris* (Common Bean)	*Zea mays* (Maize Cupules)	Cheno-am (Goosefoot or Pigweed)	*Chenopodium* sp. (Goosefoot)	*Descurainia* sp. (Tansy Mustard)	Gramineae (Wild Grass Family)	*Sporobolus* sp. (Sacaton Grass)
130.01	509	Middle Rincon 2 or 3	4.0	33.8	2	0	0	12	0	1	5	0	0	0	0	0	0	0
134.01	689	Middle Rincon 3 to Late Rincon	3.0	27.9	6	0	0	10	0	0	4	2	0	0	3	1	1	60
142.01	330	Middle Rincon	4.0	13.9	0	1	0	10	0	4	0	0	1	1	0	0	0	0
142.02	332	Middle Rincon	2.0	7.6	0	0	20	0	0	0	0	0	0	0	0	0	0	0
157.01	753	Middle Rincon 3 to Late Rincon	5.0	56.5	0	0	0	0	15	0	5	0	0	0	0	0	0	0
160.01	744	Late Rincon to Tanque Verde	4.0	19.9	0	0	0	0	0	11	9	0	1	0	1	0	0	0
168.01	902	Late Rincon	3.0	11.1	0	0	0	1	0	1	0	0	0	0	0	0	0	0

grow throughout the year and in widely different seasons. Wild grass seeds are generally among the least preferred plants due to the poor energy returns, as compared to the effort required to harvest and process them (Jones and Madsen 1989).

Phaseolus vulgaris, Leguminosae (Common Bean)

One entire and one fragment of a domesticated common bean were found in hearth Feature 134.01 flotation sample. Beans, in conjunction with maize and squash, form the agricultural triad of traditional Southwestern subsistence economies (Ford 1981). They are particularly good complements for maize, because they contain amino acids, which are difficult to obtain from maize, and because they are generally high in protein and calories (FAO 1992). Their presence in the project flotation samples is undoubtedly attributable to their consumption as food.

Sporobolus sp., Gramineae (Sacaton Grass)

Dropseed, or sacaton grass, occurs in Arizona at elevations from 1,000-7,000 ft (Kearney and Peebles 1973), flowering at higher elevations in July and August, and bearing ripe seeds in September (Adams 1988). Dropseed is arguably the most productive grass species in southern Arizona. It forms almost pure stands in some riparian contexts, and grows well even in dry years (de Alba Avila 1983). Sixty sacaton grass seeds were observed in one flotation sample from Feature 134.01. Due to the abundance in that sample, their potential to augment an agricultural subsistence base (Moerman 1998), and their occurrence in a hearth, they are presumed to represent the remnants of a cooking accident during food preparation.

Zea mays, Gramineae (Maize)

Maize is the well-known cultigen that originated in Mexico, and was transmitted to southern Arizona by 2,200 B.C. (Diehl 2005). It is one of the highest yield (in kilograms, or Calories, per hectare planted) agricultural grain crops in the world. By the eighth century A.D, flour-kernelled hybrids were introduced to the Southwest (Adams 1994; Galinat 1988; Upham et al. 1987, 1988). The cupules in the flotation samples are almost certainly by-products from the consumption of maize as food, although the dried cobs may also have been burned as fuel.

IDENTIFIED WOOD TAXA

Seven kinds of wood or stem charcoal were observed in the Hardy site assemblage. The properties of each and their uses are reviewed below. Wood charcoal frequencies are described in Table 7.1. Hand-collected macrobotanical specimens also contained wood charcoal, and they are described in Table 7.2.

Agavaceae (Agave Family)

Two wood florets from Agavaceae (agaves or yuccas) were observed in hearth Feature 130.01. The agave family occurs throughout Arizona, at elevations ranging up to 7,500 ft (Kearney and Peebles 1973). Agave family leaves yield fiber, and their meristems may concentrate sugar; agave family plants were, therefore, common sources of food throughout the American Southwest. At least one source indicates the fruiting heads, which could include florets, were harvested and eaten as a flavor additive (Russell 1908).

Acacia/Prosopis sp., Leguminosae (Acacia/Mesquite)

Undifferentiated acacia/mesquite charcoal was observed in one hearth, Feature 142.02, and in a fragment of a charred support post collected as a macrobotanical specimen in pithouse Feature 147. Acacia and mesquite are common Sonoran Desertscrub, paloverde-cacti series (Arizona uplands subdivision) (Turner and Brown 1994:200-201) overstory plants throughout the Tucson Basin. Acacia and mesquite are both dense (relatively high specific gravity) and resinous (National Academy of Sciences 1980), properties that make acacia and mesquite very useful as fuel and for load-bearing posts and cross-beams in prehistoric house construction.

Atriplex sp., Chenopodiaceae (Saltbush)

One saltbush wood charcoal fragment was observed in hearth Feature 142.01. Saltbush is a common woody shrub at elevations below 6,000 ft throughout Arizona (Kearney and Peebles 1973). It is a many-branched shrub, with thin, brittle branches that make it an ideal source of kindling. There are a variety of documented uses of the wood throughout Arizona, from arrow poison (derived from diseased bark tissue) to dye (Moerman 1998:115-117).

Table 7.2. Charred, hand-collected macrobotanical specimens from the Hardy site, AZ BB:9:40 (ASM), Tucson, Arizona.

Feature	FN	Phase	Description	Weight (gm)
130	252	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	35.7
130	276	Middle Rincon 2 or 3	*Prosopis* sp. (mesquite) wood charcoal	57.3
130	441	Middle Rincon 2 or 3	*Fouquieria* sp. (ocotillo) wood charcoal	0.9
130	451	Middle Rincon 2 or 3	*Olneya* sp. (ironwood) wood charcoal	0.3
130	567	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	9.6
130	573	Middle Rincon 2 or 3	*Pinus edulis* (pinyon pine) wood charcoal	19.1
130	592	Middle Rincon 2 or 3	*Olneya* sp. (ironwood) wood charcoal	0.4
130.05	504	Middle Rincon 2 or 3	*Fouquieria* sp. (ocotillo) wood charcoal	0.2
130.07	494	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	19.2
130.24	569	Middle Rincon 2 or 3	*Prosopis* sp. (mesquite) wood charcoal	> 300.0
130.25	568	Middle Rincon 2 or 3	*Prosopis* sp. (mesquite) wood charcoal	2.6
130.26	570	Middle Rincon 2 or 3	*Acacia/Prosopis* sp. (acacia/mesquite) wood charcoal	36.6
130.27	565	Middle Rincon 2 or 3	*Prosopis* sp. (mesquite) wood charcoal	39.3
130.28	564	Middle Rincon 2 or 3	*Prosopis* sp. (mesquite) wood charcoal	9.2
130.29	571	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	5.5
130.30	583	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	33.5
130.31	572	Middle Rincon 2 or 3	*Populus*/*Salix* (cottonwood/willow) wood charcoal	26.0
134	559	Middle Rincon 3 to Late Rincon	*Populus*/*Salix* (cottonwood/willow) wood charcoal	17.5
157	817	Middle Rincon 3 to Tanque Verde	*Acacia/Prosopis* sp. (acacia/mesquite) wood charcoal	1.8
157	829	Middle Rincon 3 to Tanque Verde	*Prosopis* sp. (mesquite) wood charcoal	35.8
160	675	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	1.6
160	720	Tanque Verde	*Phragmites* sp. (common reed) stem charcoal	0.5
160	808	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	10.1
160	809	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	8.5
160	810	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	11.1
160	811	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	12.0
164	868	Tanque Verde	*Populus*/*Salix* (cottonwood/willow) wood charcoal	10.9

Desert Tree Legumes, Leguminosae

Desert tree legumes were the most abundant wood in the assemblage, and accounted for 28 percent (33 of 117 counted charcoal fragments) in flotation samples from the Fort Lowell-Adkins Steel locus. Desert tree legumes are undifferentiated wood charcoal consistent with any of the following plants: acacia (*Acacia* sp.), ironwood (*Olneya* sp.), mesquite (*Prosopis* sp.), or paloverde (*Cercidium* sp.). Specimens identified as desert tree legumes could not be assigned to a genus due to small fragment sizes or distortion from burning. As with acacia/mesquite, desert tree legumes are high density, resinous plants that would have been useful either as fuel or for load-bearing posts or roof beams in pithouses.

***Fouquieria* sp., Fouquieriaceae (Ocotillo)**

Ocotillo wood charcoal was observed in one flotation sample from hearth Feature 157.01, and two macrobotanical specimens were collected from house Feature 130. Ocotillo grows in southern Arizona at elevations below 5,000 ft (Kearney and Peebles 1973), in both the Arizona Uplands and Lower Colorado River subdivisions of the Sonoran Desertscrub biotic province (Turner and Brown 1994). Ethnographically documented local uses include fuel, architectural construction, and fence construction to protect garden plots from rodents (Moerman 1998:234).

***Phragmites* sp., Gramineae (Common Reed)**

Common reed grows around the world in floodplain contexts that are frequently or constantly saturated (Kearney and Peebles 1973:89). Prehistoric uses of this plant are legion, including the manufacture of arrow foreshafts, basketry, pipe stems, prayer sticks (among the Navajo), reed cigarettes, and roof matting, among others (Moerman 1998:394-395). When dried, it was also undoubtedly useful as kin-

dling. Common reed was found in four flotation samples and one macrobotanical specimen.

Pinus edulis, Pinaceae (Pinyon Pine)

One fragment of pinyon pine wood was observed in a macrobotanical specimen from Feature 130, a middle Rincon phase pithouse. Pinyon pine wood is not immediately available in the vicinity of the Hardy site. The closest source would have been in deep canyons on the south face of the Santa Catalinas, or on montane slopes at elevations around 6,000 ft (Kearney and Peebles 1973). It is possible, however, that the pine wood in the Hardy assemblage was collected from the nearby Rillito Wash, as substantial rains often result in the erosion of montane taxa into streams, which are subsequently carried into the lower piedmont by episodes of heavy flooding. Given that only one fragment of pine was observed, rather than multiple pieces from multiple contexts or houses, it does not seem like pine was an important resource at the Hardy site.

Populus/Salix sp., Salicaceae (Cottonwood/Willow)

Cottonwood (*Populus* sp.) and willow (*Salix* sp.) thrive in riparian contexts throughout the Southwest. Their primary uses were as construction material for load-bearing posts and roof beams, as well as for fuel. Cottonwood/willow wood charcoal was observed in four hearths, Features 130.01, 134.01, 157.01, and 160.01, and in 13 post or beam fragments collected as macrobotanical specimens. The great abundance of cottonwood/willow among post fragments is evidence of their use in construction in Features 130, 134, 160, and 164.

Prosopis sp., Leguminosae (Mesquite)

Six hand-collected macrobotanical specimens yielded large pieces of mesquite from supporting posts and roof beams. Those occurred in Features 130 and 157, and are evidence of their use as architectural construction elements.

DISCUSSION

The study of the plant macroremain assemblage from the Hardy site leads to two conclusions. First, low recovery rates at the Fort Lowell-Adkins Steel portion of the Hardy site indicate it may have been on the margins of the local community, with respect to the intensity of activities or occupation, because the total quantity of food detritus is very low, compared with samples taken from large, intensively occupied sites. Second, the Hardy site assemblage is both quickly and accurately described as the detritus of people who made their living primarily by farming, and augmented farmed foods with food and woods from locally available plants. In these characteristics, it is similar to other Middle Rincon phase eastern Tucson Basin sites. These points are reviewed, briefly, below.

The Fort Lowell-Adkins Steel Portion of the Hardy Site, AZ BB:9:40 (ASM), was Not Intensively Occupied

The overall seed recovery rates from the Hardy site were low compared with other Tucson Basin sites. Recovery rates in the range of less than one seed per liter are consistent with sites that were used intermittently, for brief intervals, or as fieldhouses on the margins of a larger community. Only 71 charred seeds or maize cupules were observed in the Hardy site assemblage, and the average number of seeds observed per liter of flotation sample was 2.8 seeds/liter. If, however, the 60 sacaton grass seeds from Feature 134.01 (see Table 7.1) are viewed as an outlier and that data point is ignored, the average was 0.4 seeds/liter. By comparison, the Julian Wash site, AZ BB:13:17 (ASM), in the southern Tucson Basin, a large, Rincon phase community, yielded 2.0 seeds per liter on average (Diehl 2011a). A moderately sized Rincon phase settlement, the Tanque Verde Wash site, AZ BB:13:68 (ASM), in the eastern Tucson Basin yielded 6.2 seeds/liter in the most recently excavated Northwest Locus (Diehl 2011b). Based on those comparisons, it seems likely that the portion of the Hardy site within the Fort Lowell-Adkins Steel parcel (Chapter 1, this volume) was either on the periphery of a more intensively occupied "core" of the site, or the entire site was itself a satellite of a more intensively occupied site in the eastern Tucson Basin.

The range of identified seed taxa was small compared with other Rincon phase sites. Only seven kinds of food plant remains were observed. The observation provides further evidence that the Fort Lowell-Adkins Steel portion of the Hardy site was ancillary to a hypothetical primary activity and occupation center located elsewhere. As an alternative explanation, however, it is noteworthy that the number of identified food taxa in a charred plant assemblage tends to increase as the number of analyzed flotation samples increases; that is, the more samples

one analyzes, the greater the variety of food plants observed. The low number of food taxa in the Hardy site assemblage may, therefore, be more a consequence of the limited number of prehistoric contexts suitable for analysis and the consequent analysis of only seven flotation samples. More intensively studied Rincon phase sites in the Tucson Basin, such as the Julian Wash and Tanque Verde Wash sites, typically yield 10-13 taxa within the general categories of crops (beans, maize, or squash), crop weeds (plants such as goosefoot or tansy mustard), cactus seeds (typically saguaro, and often prickley pear or hedgehog), agave "heart" tissue, mesquite pods or seeds, and a few weeds and grasses

Consistency in Food Consumption among Eastern Tucson Basin Rincon Phase Sites

Despite the narrower range of food taxa at the Hardy site, the assemblage was generally consistent with other Rincon phase sites in the eastern Tucson Basin. Here, the Hardy site's Middle to Late Rincon phase assemblage is compared with Middle Rincon phase assemblage components from the Cienega site, AZ BB:9:143 (ASM) (Miksiceck 1990), and the Tanque Verde Wash site (Diehl 2011b). Table 7.3 illustrates these claims by comparing the ubiquities of food plants among three eastern Tucson Basin Middle Rincon or Middle to Late Rincon phase sites. Here, the ubiquity of a taxon is a measure of its importance to the occupants of a site relative to other sites. It is defined as the number of features that contained at least one charred seed of a particular taxon, such as maize, versus the total number of features that contained at least one charred seed of any kind. For example, although seven Hardy site features were analyzed, only five contained at least one charred seed (see Table 7.1). Maize was present in two samples; therefore, the "ubiquity" of maize is 0.40.

The two points of similarity among all three sites are these: (1) almost all Rincon phase sites yield plant assemblages that emphasize the use of agriculture and only the very best of non-cultivated foods; and, (2) all assemblages include only plants that were available in the immediate vicinity of the site.

By inspection, it is apparent that the most common food plant tissues in eastern Tucson Basin Rincon phase macrobotanical assemblages are, as measured by ubiquity, either crops or crop weeds. In each assemblage, maize is the most abundant food plant. In each, crop weeds are present and among the next most abundant remains. Judging by the rate at which plants turn up in samples from different features, agricultural products and wild plants that grow near agricultural ones are the most commonly occurring food plants. Further, it is evident (considering the foregoing discussion of plant availability and range of documented uses) that all grow well within the Sonoran Desertscrub community, which characterizes open spaces within and on the margins of the Tucson Basin.

All the plants were likely available within 1 km of the Cienega, Hardy, and Tanque Verde Wash sites. With respect to foods that could be acquired from plants, rather than on the hoof, Middle Rincon phase Hohokam in the eastern Tucson Basin were locavores. There is no evidence of montane plants, such as acorns, juniper berries, pinyon nuts, or canyon grapes, that would have been available if people had ranged into the upper piedmont areas of the Santa Catalina or Rincon mountains. The same observation may be made for the wood charcoal from the Hardy site. All the wood charcoals are typical Sonoran Desertscrub, Arizona Uplands, Acacia-Paloverde-Cactus scrub series plants that were likely available within 1 km of the site.

Wood Charcoal and Construction

The hand-collected macrobotanical specimens described in Table 7.2 were recovered from fallen roof timbers and postholes within Rincon phase pithouses. Of the 27 macrobotanical specimens, 17 were recovered from Feature 130, a Middle Rincon 2 or 3 phase pithouse. Six more were recovered from Feature 160, a Late Rincon to Tanque Verde phase pithouse. Of the four remaining specimens, three were from Middle Rincon houses and one from a Late Rincon to Tanque Verde house.

The selection of woods for construction is consistent with the use of cottonwood/willow and mesquite for load-bearing construction elements. Of the 10 specimens gathered from postholes in Feature 130, 6 were mesquite or acacia/mesquite, 4 were cottonwood/willow, and 1 was an ocotillo fragment. The ocotillo was probably intrusive in Feature 130.05; only 0.2 gm of ocotillo was observed in that sample. In contrast, the remaining post elements were substantial pieces of blocky charcoal. Most were collected from larger segments of charred wood that appeared to be post remnants.

The posthole samples differ from the samples collected from roof fall contexts. Of the 17 roof fall specimens from all houses, 9 were cottonwood/willow, 3 were mesquite or acacia/mesquite, 2 were ironwood, 1 each were common reed, ocotillo, and pine. Although the differences are not statistically significant given the small number of samples and the strong bias to posts from Feature 130, it appears that the preference was for cottonwood/willow for roof beams, and mesquite or cottonwood/willow for support posts.

Table 7.3. Food plant ubiquities in flotation samples from Middle and Late Rincon phase sites in the eastern Tucson Basin.

Taxon/Category	Common Name	Cienega Site, AZ BB:9:143 (ASM) (16 features)	Hardy Site, AZ BB:9:40 (ASM) (7 features)	Tanque Verde Wash Site, AZ BB:13:68 (ASM) (57 features)
Crops				
Cucurbita sp.	Squash	0.06	0.00	0.02
Gossypium sp.	Cotton	0.25	0.00	0.08
Phaseolus sp.	Common or tepary bean	0.13	0.20	0.25
Zea mays	Maize	0.69	0.40	0.51
Crop Weeds				
Cheno-ams	Goosefoot or pigweed	0.25	0.20	0.46
Chenopodium sp.	Goosefoot	–	0.20	–
Descurainia sp.	Tansy mustard	0.25	0.20	0.07
Cactus Fruit				
Carnegiea gigantea	Saguaro cactus	0.00	0.00	0.07
Echinocereus sp.	Hedgehog cactus	0.06	0.00	0.02
Opuntia sp.	Prickley pear cactus	0.31	0.00	0.02
Tree Legumes				
Prosopis juliflora	Mesquite	0.00	0.00	0.14
Lesser Weeds				
Boerhaavia sp.	Spiderling	0.00	0.00	0.04
Compositae	Sunflower family	0.06	0.00	0.00
Polanisia sp.	Clammyweed	0.13	0.00	0.00
Portulaca sp.	Purslane	0.00	0.00	0.02
Sphaeralcea sp.	Globemallow	0.00	0.00	0.04
Wild Grasses				
Gramineae (wild)	All wild grasses	0.19	–	0.35
Sporobolus sp.	Sacaton grass	0.00	0.20	0.00
Number of Food Plant Taxa		11	7	14

CONCLUSIONS

The limited number of flotation samples and macrobotanical specimens from the Hardy site limits the degree of certainty that can be placed upon the findings in this chapter. That said, however, the foregoing study of charred wood and food plant tissues from the Hardy site contributes incrementally to a growing body of information about Rincon phase subsistence and resource use in the eastern Tucson Basin. The Hardy site macrobotanical assemblage, for all its sparsity, is consistent with the assemblages observed from other eastern Tucson Basin sites, such as the Cienega site and the Tanque Verde Wash site. In all three cases, subsistence efforts were concentrated on food production by farming maize and beans. Further, in all three cases, efforts were supplemented by the use of wild food resources that were locally available. The chief difference, therefore, between the Fort Lowell-Adkins Steel portion of the Hardy site, as compared with the other sites, is one of intensity. Key local species that Rincon phase Hohokam are known to have used, including cactus fruit and mesquite pods, did not occur in the Hardy site assemblage. Their absence is probably explained either by the limited number of samples from the Hardy site, or by a relatively brief occupation in the Fort Lowell-Adkins Steel portion of that site, as compared with other eastern Tucson Basin Middle and Late Rincon phase sites.

CHAPTER 8

HISTORIC ARTIFACTS FROM THE FORT LOWELL-ADKINS STEEL LOCUS OF THE HARDY SITE, AZ BB:9:40 (ASM)

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The Fort Lowell-Adkins Steel locus of the Hardy Site, AZ BB:9:40 (ASM), was the location of a military fort from 1873 through 1891, a tuberculosis sanitarium beginning in the early 1900s, and was the home and business location for the Adkins family from the 1930s onward.

A relatively small number of historic artifacts were recovered during the current project. Fort-era artifacts were located in planting pits and ditches, and they intruded into prehistoric features. A single pit feature dating to the Adkins occupation was also located. These artifacts are described here, by material type.

NON-NATIVE AMERICAN CERAMICS

Fifty fragments of non-Native American ceramics were recovered from eight features and from the general site area.

Nonfeature ceramics included a white porcelain doorknob and a whiteware sherd marked IRONSTONE with an English crest below.

In the area north of Officers Quarters Nos. 1 and 2, a wash basin or chamber pot base marked "HOMER LAUGHLIN/ HOTEL/ CHINA" was located. This mark dates to circa 1901-1915 (Gates and Ormerod 1982:135). Nine fragments from a whiteware saucer marked "HOMER LAUGHLIN/ MADE IN U.S.A/ 13 N" probably dates to 1913. Two matching maker's marks, on separate whiteware vessels, featured a wreath, but the maker could not be identified. Also recovered were two additional whiteware sherds and a piece of large brown-glazed electrical porcelain, probably for a power pole insulator. Most of these items do not date to the occupation of the fort.

Seven sherds were found in the upper fill of pit structure Feature 104, four pieces of plain whiteware, two pieces from a stoneware crock glazed brown on its exterior and white on its interior, and a small piece of European majolica with pink and green glazed sides.

A small whiteware sherd and a fragment from a brown stoneware ink or beverage bottle were found in the northern ditch of Cottonwood Row, Feature 139. Two fragments of a pale pink earthenware flowerpot and one fragment from a porcelain doll head with molded curls were found in Feature 141, the southern ditch of Cottonwood Row. A small piece of whiteware was found in Feature 142, a prehistoric pit structure. One fragment of plain whiteware was found in Feature 149, a post-fort pipe trench. Two other fragments of whiteware were found in Feature 156. A fragment of electrical porcelain was found in the upper fill of Feature 157, a prehistoric pit structure.

Sixteen sherds were recovered from Feature 161, an Adkins family-era trash pit. These included a plain whiteware cup, a yellow Fiesta ware-style tea cup, a cup with decal-printed interior border with pink roses, green foliage, and abstract designs, a small thick restaurant china plate, a whiteware bowl with an illegible maker's mark, three other whiteware dish fragments, a whiteware bowl marked "KNOWLES" that dates between 1910 and 1948 (Gates and Ormerod 1982:100), and a piece of electrical porcelain, a C-shaped ring with an attached screen that allowed the item to be screwed into a wall and a wire strung through it, used to retrofit buildings with electricity.

GLASS

Several hundred glass artifacts were located in seven features and in nonfeature contexts, primarily small fragments of bottle glass. Nonfeature glass artifacts were 3 sun-colored amethyst medicine or extract bottle finishes, 2 pieces of bright green bottle finish, 1 brown liquor bottle finish, 1 light blue mineral water bottle finish, and 2 fragments of a light blue screw-top food bottle finish. A light blue medicine bottle base was unmarked. A fragment of cobalt blue glass was embossed "— PAT—/ —S. H. PHI—/ —AL COMPA[NY]/ —OOK." A complete shoe polish bottle has remnants of a red label and was marked "575" on its base. A clear milk bottle base was embossed "DAIRY" on its side.

Many fragments of glass were found intrusive into Feature 104, a pit structure, including 43 fragments of sun-colored amethyst, 27 aqua, 5 blue, and 46 clear bottle glass, as well as 3 pieces of aqua-colored window glass. Two fragments of aqua bottle glass with embossed lettering were also recovered, one piece marked "—N G," and the other "–S— / FOR—."

One fragment of clear bottle glass was found in Feature 121, a prehistoric trash mound, obviously brought into the feature by a burrowing animal.

Two tiny bits of glass were found in a small planting pit, Feature 136.02. Three other pieces, 1 clear, 1 aqua, and 1 blue, were found in another planting pit, Feature 136.09.

Four pieces of aqua-colored window pane glass were recovered from Feature 139, the northern ditch for Cottonwood Row. A fragment of brown bottle glass, five pieces of clear bottle glass, and one piece of glass with small circles on the exterior, perhaps from a dish, were found in excavation Unit 137 in the same feature.

A smashed piece of aqua-colored window pane glass and a fragment of clear bottle glass were found in Feature 149, the post-fort pipe trench.

A small clear glass bottle marked "AYER'S/ PILLS/ LOWELL, MASS" and a sun-colored amethyst jar finish were found during backhoe stripping in Feature 156, the southern ditch for the parade ground. Two other pieces of sun-colored amethyst bottle glass were found in the excavation placed in the ditch.

A large number of bottles was present in Feature 161 ($n = 47$), a pit where trash was deposited by the Adkins family or by patients at their rest home (Table 8.1). A wide variety of bottle types were found, including aftershave, cologne, and cosmetics. Three Borden's instant coffee jars had lids noting that the contents were 100 percent coffee. Other food bottles held mustard, pancake syrup, and olives or pickles. Three alcoholic beverage bottles, including a "GORDON'S" gin, were present. Nine medicine bottles were found, including "MURINE," for treating eyes, and "MILK OF MAGNESIA." One bottle had a partial paper label, identifying it as containing Parson's Sudsy Ammonia (Figure 8.1). A handful of bottles had dates on their bases ranging from 1948-1954.

METAL

Seventeen pieces of ammunition were recovered during the project (Figure 8.2; Table 8.2). Two lead bullets were found, both .50 caliber and neither fired. Fifteen cartridges were collected . Identified manufacturers were the Union Metallic Cartridge Company ($n = 2$), U.S. Cartridge Company ($n = 1$), the Frankford Arsenal ($n = 6$), and the Western Cartridge Company ($n = 1$). Two were shotgun shells dating to the late nineteenth century. The other 13 included .22 ($n = 3$), .25-20 ($n = 1$), .45-70 ($n = 4$), .50-45 ($n = 3$), and .50-70 ($n = 3$). Headstamps indicate many of the cartridges were manufactured during the Fort Lowell eras, with dates of 1878, 1882, and 1883. One cartridge dates to 1910-1927, and was likely discarded during use of the property as a sanitarium. Eight of the pieces were located in fort-era features, the porch area of Officers Quarters No. 1, a planting pit in the garden area, and in the northern ditch of Cottonwood Row. Two other cartridges were found in the fill of a pit structure, Feature 104, likely introduced by rodent burrowing. The remaining ammunition was located during backhoe stripping in the overburden layer.

Other metal artifacts were located during backhoe stripping or found in features. A pair of identical cast iron stove legs was recovered during stripping near the Officers Quarters (Figure 8.3). The legs are unmarked and feature a stylized foliage design. They were probably used for a potbelly-style wood stove.

Other metal artifacts found in the garden area north of the quarters were an old style coat hook, a face plate for a door, and a hard-wrought square nail. A portion of an automobile dashboard clock marked "MFD. BY/ THE GEORGE BORG CORP./ CHICAGO, U.S.A." was found. A number "124056" is also present, but a search of patent numbers failed to locate one with these numerals for a clock. The company manufactured clocks for a variety of automobiles from at least 1940s into the 1960s.

An aluminum lid embossed "MENLEY & JAMES LTD./ SAMPLE/ IODEX/ C. METHYL SAL./ RUB IN UNTIL COLOR/ DISAPPEARS/ NEW YORK, MONTREAL/ LONDON" was once affixed to a medicinal preparation container. This ointment contained wintergreen, iodine, petroleum jelly, and paraffin wax, and is still manufactured today. The ointment dates to the sanitarium, or Adkins occupation, of the property.

Horse shoes were found in the northern and southern ditches of Cottonwood Row, Features 139 and 141 (Figure 8.4).

A bronze plaque found in the area around the guard house came from an electrical device and was marked "WESTINGHOUSE ELEC & MFG CO/ PITTSBURGH, PA./ DIRECT CURRENT." Below this are a set of patent dates ranging from 31 October 1882 to 22 March 1892. Google Patents reveals that the device with the oldest patent date was an "apparatus for regulating electric currents." The plaque was probably attached to a piece of machinery used by a member of the Adkins family.

Table 8.1. Glass bottles recovered from Feature 161, an Adkins-era trash pit, the Hardy site, AZ BB:9:40 (ASM).

Glass Color	Contents	Side Embossing	Base Embossing
Clear	Aftershave	–	MENNEN/ 18 54
Clear	Aftershave	–	–
Clear	Ammonia	PARSON'S SUDSY AMMONIA	PARSONS AMMONIA CO. INC./ 23 I 6/ 48/ 1610-A
Clear	Ammonia	–	PARSONS AMMONIA CO. INC./ 23 I 5/ 48/ 1432-8/ DES. PAT. APPLIED FOR
Green	Aspirin	ST. JOSEPH'S ASPIRIN	7 8/ 3 [Owens-Illinois mark]
Brown	Bleach	PUREX	1 LM 56/ 615L
Clear	Coffee	BORDEN/ MADE FROM/ 100% PURE COFFEE/ IT'S ALL COFFEE [on metal lid]	104/ 14
Clear	Coffee	BORDEN/ MADE FROM/ 100% PURE COFFEE/ IT'S ALL COFFEE [on metal lid]	–
Clear	Coffee	OUR/ REGULAR PRICE/ LESS 20c/ BORDEN'S 5 OZ SIZE/ KEEP COVER ON TIGHT	1051/ 12
Clear	Coffee	–	10 60 C/ 6
Clear	Cologne	WOODBURY [on plastic lid]	WOODBURY'S/ 553-5
Milk	Cosmetic	[stylized foliage]	–
Clear	Cosmetic	–	1696/ 0 B/ 5
Clear	Eye medicine	–	MURINE/ 7
Clear	Food	–	[Anchor Hocking mark]
Clear	Food	–	10-20B/ 6 27
Clear	Food	–	1652/ TEMPERGLASS 4 B
Clear	Food	–	17 I 4 [Owens-Illinois mark]
Clear	Food	–	1707/ 7011
Clear	Food	–	2 9/ 3 [Owens-Illinois mark]
Clear	Food	–	23 I 1/ 2951-C 6B [Owens-Illinois mark]
Clear	Food	–	2706/ MG 27
Brown	Food	–	81-67/ 6 4/ 750 [Anchor Hocking mark]
Clear	Food	–	A/ 14
Clear	Food	–	Illegible mark
Clear	Gin	FEDERAL LAW FORBIDS/ SALE OR RE USE OF/ THIS BOTTLE/ GORDON'S/ LINDEN/ NEW JERSEY	R-514/ 18 55/ 10 [Owens-Illinois mark]
Clear	Liquor	FEDERAL LAW FORBIDS SALE/ OR RE USE OF THIS BOTTLE	D-9/ 118 55/ M-89A
Clear	Liquor	FEDERAL LAW FORBIDS SALE/ OR RE USE OF THIS BOTTLE	MADE IN U.S.A./ S072 0 126/ 19 67 54
Clear	Medicine	3 1/2	OWEN'S 1 2 [Owens-Illinois mark]
Clear	Medicine	3 1/2 SANI-GLAS	BROCKWAY
Brown	Medicine	PARKE-DAVIS	A/ 28 54

Table 8.1. Continued.

Glass Color	Contents	Side Embossing	Base Embossing
Green	Medicine	–	23 I/ 6A/ 9205-A
Brown	Medicine	–	2894-A/ 20 5/ 5A [Owens-Illinois mark]
Clear	Medicine	–	4/ F/ 9-325
Brown	Medicine	–	DES. PAT/92148
Cobalt	Medicine	–	GENUINE / PHILLIPS/ MADE IN U.S.A.
Clear	Mustard	–	L/ 16
Clear	Olive/pickle	–	2209 2 0 21 HA [Hazel Atlas mark]
Clear	Perfume?	–	55 7
Clear	Shoe polish	DYAN-SHINE	BARTON'S/ HA/ 6 3/ DYANSHINE
Clear	Shoe polish	–	L-875/ 3 17 [Anchor Hocking mark]
Clear	Syrup	–	–
Clear	Unknown	NORWICH	1337/ 0 B/ 6
Aqua	Unknown	–	3 0/ 11 [Owens-Illinois mark]
Clear	Unknown	–	4620/ HA/ M 6-10
Clear	Unknown	–	A-8/ 12 I 9/ 6
Clear	Unknown	–	A-S/ 12 I/ 7

Figure 8.1. A Parson's Sudsy Household Ammonia bottle from Feature 161, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FN 664, Catalog No. 2010-487-81).

Two artifacts were found on the ground surface near the water tower. An elaborate escutcheon with a keyhole has curlicues and foliage, and was probably once attached to a piece of furniture. A pocket watch piece was marked "THE EINGRARA COMPANY/ BRISTOL, CONN USA." Research failed to identify the company.

A 10-inch-long iron stake was found north of Cottonwood Row, near the prehistoric pit structure Features 160 and 164. The item is hand-wrought, and was probably used to stake horses so they would not wander away. A brass harness rivet was found in one of the garden planting pits, Feature 136.09.

A small suspender, or pants pronged buckle, and a pants rivet were found in the fill of prehistoric pit structure Feature 104, brought in by burrowing rodents. An iron washer and a screw plug were also found in that feature. Several other modern artifacts were found in the upper fill of this pit structure, and included bolts, washers, nuts, a harness rivet, wire, a clothing buckle, a tin can lid, and hand-wrought and machine-made nails.

A gilded bronze hand-held flagstaff tip was found in the prehistoric trash mound, Feature 121, while backhoe stripping (Figure 8.5). The tip is five inches long, and was attached to a wooden pole by an iron nail.

A pair of nails was found in Feature 130, a prehistoric pit structure. Other hand-wrought nails were found in the small planting pits, Features 136.04 and 136.08. A machine-made nail was also found in one of the planting pits, Feature 136.09, and a small brass rivet was found in Feature 136.03.

Pieces from three other hand-wrought nails and a pair of small staples were found in the southern ditch of Cottonwood Row, Feature 139.

A decorative brass item was found in one of the ditches for Cottonwood Row, Feature 141 (Figure 8.6). The item was once attached to something, perhaps a wooden box. A name in cursive writing, which appears to be "E. T. Garther," is present, but the signature is very difficult to read. Three 3-inch-long hand-wrought nails were found in the same ditch, as were a hook and eye, perhaps from a military uniform.

Several units were excavated into Feature 149, a water pipe trench postdating occupation of the fort. Nails, wire, and several pieces of corrugated metal roofing were found in the trench. The roofing pieces originated from the Officers Quarters, which received metal roofs in 1879.

A brass teaspoon was found in Feature 161, an Adkins-occupation trash pit. The spoon does not appear to be marked.

OTHER HISTORIC MATERIALS

A small blue glass bead was found in the southern Cottonwood Lane ditch, Feature 141. A graphite pencil lead and several pieces of hard rubber were found in the upper fill of a pit structure, Feature 104. A shoe heel was found in Feature 161, an Adkins-era trash pit, as was a rubber ball for a douche or enema kit.

An orange plastic token found on the surface of the property was marked "GOV./ HARRY ADKINS/ DRAFT/ BEER/ GOOD UNTIL/ APRIL 30/ 1986" on one side and "LODGE 747/ PAP ROYAL ORDER OF MOOSE/ TUCSON, AZ" on the other (Figure 8.7).

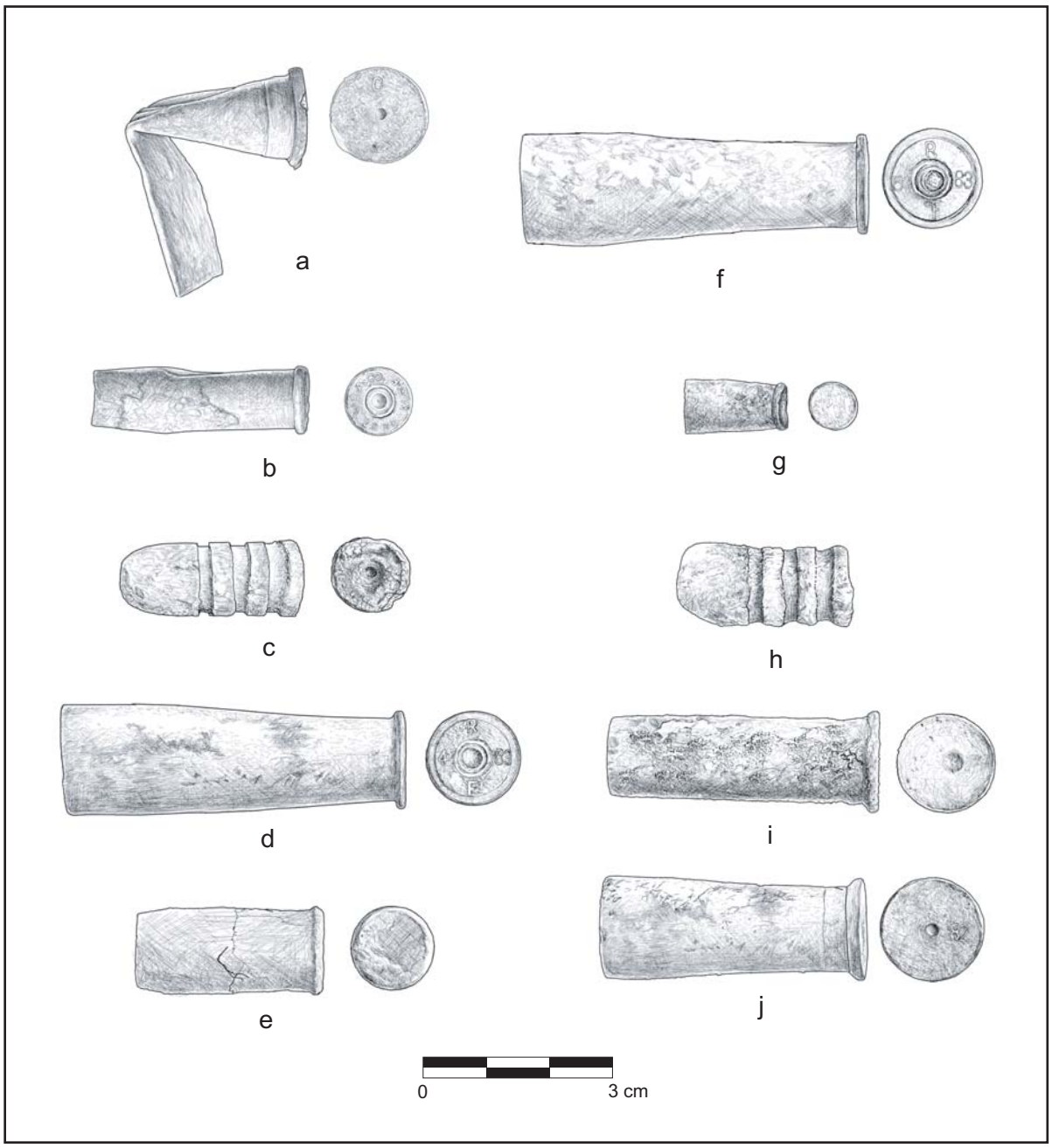

Figure 8.2. Ten pieces of ammunition found at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM): (a-b). Feature 0 (FN 139, Catalog Nos. 2010-487-82/-83); (c) Feature 0 (FN 177, Catalog No. 2010-487-84); (d) Feature 0 (FN 889, Catalog No. 2010-487-85); (e) Feature 134.04 (FN 167, Catalog No. 2010-487-86); (f) Feature 139 (FN 150, Catalog No. 2010-487-87); (g-j) Feature 139 (FN 231, Catalog Nos. 2010-487-88/-91).

CONCLUSIONS

The historic artifacts found during the soil contamination work at the Fort Lowell-Adkins Steel locus of the Hardy Site date to three different phases of use of the site. The area was part of Fort Lowell between 1873 and 1891. Bullets and cartridges, horseshoes, some clothing items, and some of the bottle fragments were lost or discarded by the soldiers and their family members. The corrugated iron roofing pieces found in a later feature originated from the roofs of the Officers Quarters. The cartridges indicate a wide variety of firearms were used by the soldiers at the fort. The relatively small number of items probably reflects the disposal of most refuse away from the fort interior. The dump for Fort Lowell is

Table 8.2. Ammunition recovered during the Fort Lowell-Adkins Steel Soil Remediation project.

		Cartridge Dimensions (inches)							
Feature	FN	Overall Length	Rim Diameter	Base Diameter	Neck Diameter	Headstamp	Notes	Identification (made by and for)	Figure
0	104	1.06+b	.520	.500	N/A	None	Broken, benet primed	.50-45 US carbine	–
0	104	Brass base cap of paper shotgun shell				U.M.C. Co. No. 12 Smokeless	High brass.89"	12. Gauge Shotgun shell made by UMC, late 19thC, pre-Remimgton	
0	104	Brass base cap of paper shotgun shell				No. 12 U.S. Climax	Low brass .28"	12 Ga. late 19thC made by US Cartridge Co (sold to Winchester 1924)	–
0	139	2.06	.605	.515	N/A	C 3 F 78	All copper, benet primed	.45-70, Frankford Arsenal, March 1878, headstamp indicates carbine round but otherwise consistent model 1873 US rifle	8.2a
0	139	1.32	.405	.340	–	25-20 W.C.F.	Flattened at neck	.25-20 WCF 1878-1931	8.2b
0	177	One bullet, cast lead, cal .50. 26.0 grams (401 grains), consistent with .50-70 US, not fired						–	8.2c
0	889	2.11	.603	.515	–	R 4 F 83	Flattened at neck, boxer primed	.45-70, Frankford Arsenal, April 1883, for model 1873 US rifle	8.2d
103	141	0.27	.245	.245	N/A	U	Rimfire	Union Metallic Cartridge, .22 CB CAP 1888-1942	–
104	420	.417	.273	.232	N/A	Diamond	Rimfire	.22 short, 1857-present, this cartridge made 1910-1927 by Western Cartridge Co.	–
104	420	–	–	–	–	None	All copper, benet primed, mutilated	Consistent with .50-45 carbine	–
136.04	167	1.11	.530	.515	N/A	None	All copper, benet primed	.50-45 US Carbine , circa 1866	8.2e
139	150	2.10	.608	.510	N/A	R 5 F 83	Boxer primed centerfire	.45-70 Frankford Arsenal. May 1883, for model 1873 US rifle	8.2f
139	150	2.10	.608	.510	N/A	R 4 F 83	Boxer primed centerfire	.45-70 Frankford Arsenal, April 1883, for Model 1873 US Rifle	–
139	231	.650-690	.278	.230	N/A	H	Bent, rimfire	.22 long, 1887-present, Winchester headstamp	8.2g
139	231	1.610	.606	.514	N/A	1 F	All copper, benet primed	.50-70 US, Frankford Arsenal, Model 1866 “trapdoor Springfield”	8.2i
139	231	1.610	.606	.514	N/A	1 82	All copper, benet primed	.50-70 US, Frankford Arsenal, Model 1866 "trapdoor springfield," probably January 1882	8.2j
139	231	One bullet, cast lead, cal .50. 26.0 grams (401 grains), consistent with .50-70 US, not fired						–	8.2h

Figure 8.3. A cast iron stove leg recovered from the garden area north of Officers Quarters Nos. 1 and 2, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FN 104, Catalog No. 2010-487-92).

Figure 8.4. A pair of horseshoes recovered from the ditches on either side of Cottonwood Row, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FNs 155 and 900, Catalog Nos. 2010-487-93 and -94).

Figure 8.5. A gilded bronze flagpole tip recovered from the vicinity of Feature 121, the prehistoric trash mound, within the Fort Lowell parade ground, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FN 118, Catalog No. 2010-487-95).

Figure 8.6. A decorative brass item from Feature 141, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FN 155, Catalog No. 2010-487-96).

Figure 8.7. A plastic draft beer token found on the surface of the property, the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM) (FN 115, Catalog No. 2010-487-97).

reported to be somewhere north of the City-owned portions of the fort.

A few ceramic items, dishes, a probable chamberpot base, and some electrical porcelain, probably date to use of the property as a sanitarium by Dolly Cate. The buildings used by Dolly Cate were probably wired for electricity in the 1910s or 1920s. The unexcavated outhouse pit, Feature 101, may contain additional items discarded by residents of the sanitarium or the subsequent Adkins rest home.

A single feature contained trash discarded by the Adkins family, or other people who lived on the property. The items were discarded between 1948 and 1954. Instant coffee, men's cologne, aspirin, and Fiesta-style dishes were among the consumer goods purchased and used by residents. Most of the feature was left intact, and could be explored in the future by archaeologists interested in the lives of mid-twentieth century Tucsonans.

CHAPTER 9

VERTEBRATE FAUNA FROM THE FORT LOWELL-ADKINS STEEL PROPERTY, WITHIN THE HARDY SITE, AZ BB:9:40 (ASM)

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A small faunal assemblage was recovered from 13 features at the Hardy site, AZ BB:9:40 (ASM). Three of the features are historic, and the remaining 10 are prehistoric. Both wild and domesticated species were identified at the site, although most of the domesticated specimens were found in prehistoric features and represent later dumping and burial of trash and unwanted, perhaps diseased, livestock.

Previous excavations within Fort Lowell resulted in the recovery of a small sample of faunal bone (Gregonis 1997b). Jackrabbits were most common; other species included desert cottontail, ground squirrel, an artiodactyl, green-winged teal, hawk, quail, and mourning dove. The report does not include the number of identified specimens (NISP), although the text indicates most of the bone was too small to identify. The remaining pieces were heavily calcined by exposure to heat.

METHODS

The assemblage was identified to the most specific taxonomic group possible using the Desert Archaeology, Inc., comparative collection and the collections housed at the Arizona State Museum (ASM). Specimens identifiable only to class were grouped by animal size, when possible. These categories include small-medium (quail-sized), small mammal (cottontail-sized), small-medium mammal (jackrabbit-sized), large mammal (deer-sized), very large mammal (cattle-sized), and unspecified mammal (unknown size). When identification to class was not possible, specimens were grouped under the unspecified animal (unknown class) category. A probable juvenile domestic pig (cf. *Sus scrofa*) mandible with teeth could only be tentatively identified owing to the lack of appropriate comparative material.

Other primary data recorded were element, element side and portion, amount present, fusion, environmental, animal, and human modifications, burning, length, and if breaks were old or recent. The primary unit of analysis is NISP. However, the nearly complete domestic chicken (*Gallus gallus*) skeletons in some features were each counted as one specimen. Therefore, the NISP for domestic chicken is equivalent to the minimum number of individuals (MNI) in this analysis. This was determined by taking the most common paired element, dividing into lefts and rights and using the higher number as the MNI. Differential fusion among elements that would indicate separate age classes was also considered in calculating the MNI. The MNI for all other discrete taxa is one each. Data were recorded in Oracle Forms Runtime and exported to Excel for analysis and tabulation.

DESCRIPTION OF ASSEMBLAGE

Sixty-six specimens were recovered from the current project area (Table 9.1). Fifty percent (n = 33) are mammalian, 30 percent (n = 20) are unspecified animal, and the remaining 20 percent (n = 13) are bird. Only 36 percent of the assemblage was identifiable to at least the order level. The most common taxa include domestic chicken (*Gallus gallus*; n = 10), jackrabbit (*Lepus* sp.; n = 5), and domestic cattle (*Bos taurus*; n = 4). Only one specimen was recovered each for cottontail (*Sylvilagus* sp.), sheep/goat (*Ovis/Capra*), even-toed ungulates (Artiodactyla), horse or burro (*Equus* sp.), and probable domestic pig (cf. *Sus scrofa*). The 33 percent identifiable only to class include large mammal (n = 8), small-medium mammal (n = 5), unspecified mammal (n = 3), small mammal (n = 2), small-medium bird (n = 1), and unspecified bird (n = 1).

DISCUSSION

Specimens were recovered from both historic and prehistoric contexts at this site. Some deposits are disturbed, as evidenced by the presence of domesti-

Table 9.1. Taxa present at the Hardy site, AZ BB:9:40 (ASM), by feature, measured by number of identified specimens (NISP).

	Feature													
Taxon	104	108	119	121	130	134	136.1	149	154	156	157	160	161	Total
Gallus gallus (domestic chicken)[a]	1	–	–	–	4	–	–	–	5	–	–	–	–	10
Small-medium bird (quail-sized)	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Unspecified bird (unknown size)	–	–	–	–	2	–	–	–	–	–	–	–	–	2
Sylvilagus sp. (cottontail)	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Lepus sp. (jackrabbit)	–	–	–	2	2	–	–	1	–	–	–	–	–	5
Artiodactyla (even-toed ungulate)	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Ovis/Capra (sheep/goat)	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Bos taurus (domestic cattle)	–	–	–	–	–	–	–	1	–	1	–	–	2	4
cf. *Sus scrofa* (probable domestic pig)	–	–	–	–	1	–	–	–	–	–	–	–	–	1
Equus sp. (horse or burro)	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Unspecified mammal (unknown size)	1	–	1	–	1	–	–	–	–	–	–	–	–	3
Small mammal (cottontail-sized)	–	–	–	–	2	–	–	–	–	–	–	–	–	2
Small-medium mammal (jackrabbit-sized)	1	1	–	1	2	–	–	–	–	–	–	–	–	5
Large mammal (deer-sized)	4	–	–	–	–	–	3	–	–	–	–	1	–	8
Very large animal (cattle-sized)	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Unspecified animal (unknown class)	2	–	–	3	10	2	1	–	–	–	2	–	–	20
Total	12	1	1	7	24	2	4	3	5	1	3	1	2	66

[a]NISP for domestic chicken is equivalent to minimum number of individuals (MNI); see Methods section.

cated species in prehistoric features. Of the 13 features with animal bone, pithouse Features 104 and 130 have the highest NISP, with 12 and 24 specimens, respectively. Domestic chicken was present in the fill from both features, as well as in the roof-wall fall from Feature 130. Five nearly complete domesticated chicken burials, designated Feature 154, intruded into the upper fill of Feature 130. The burial of complete chickens is somewhat unusual. Motivation for this method of disposal could have been to contain the spread of infection, if the chickens were diseased; however, pathologies were noted on only three elements. They may have resulted from abnormal growth due to infection or they may represent healed fractures. Most quick-killing diseases are unlikely to leave visible traces on chicken elements. The fact that the heads were still attached to the remains and that the remains were complete suggests the chickens died from disease, rather than being killed by humans or animals.

Also present in Feature 130 is the probable domestic pig mandible. Similarly, the sheep/goat specimen in pithouse Feature 157 also represents historic disturbance of a prehistoric feature.

Only domestic cattle and horse or burro were found in historic features. These include the water pipe ditch, Feature 149; a ditch, Feature 156; and a trash concentration, Feature 161. One other historic context, Feature 136, includes two unspecified animal specimens. The two wild taxa, cottontail and jackrabbit, were recovered from pithouse Feature 104 and prehistoric trash concentration Feature 121. These were common prey of prehistoric people in the area.

CHAPTER 10

CONCLUDING THOUGHTS

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The removal of contaminated soil at the Fort Lowell-Adkins Steel locus of Fort Lowell provided an opportunity to peer beneath the ground surface. Previous work within the Fort Lowell Park and along N. Craycroft Road has uncovered archaeological features from the prehistoric, fort-era, and post-fort use of the area. Both prehistoric and historic features were expected to be found during the clean-up efforts, and this proved to be the case. These features had survived the intense historic use of the property as a military fort, a tuberculosis sanitarium, a residence, and as a steel tank manufacturing location.

Prior to fieldwork, three research questions were prepared to guide the monitoring and data recovery efforts on the Fort Lowell-Adkins Steel parcel (Chapter 1, this volume). Information collected during fieldwork, architectural features, extramural features, and artifacts are all used to examine each of the questions.

THE PREHISTORIC HARDY SITE

The prehistoric Hardy site, AZ BB:9:14 (ASM), lies beneath the remnants of Fort Lowell and the adjacent modern neighborhoods. The site was first recognized in 1884, by anthropologist Adolf Bandelier, who described trash mounds and a scatter of prehistoric pottery on the Fort Lowell parade ground (Gregonis 1997b). Over the next 90 years, archaeologists occasionally visited the site and conducted informal observations. In the mid-1970s, the University of Arizona and the Arizona Archaeological and Historical Society conducted survey, testing, and data recovery fieldwork within Fort Lowell Park (Gregonis 1997b:6). A few additional smaller projects have taken place along N. Craycroft Road (Dart 1988; Huntington 1982). The current project adds to existing information about the site.

In Search of the Early Agricultural Period

Recent excavations along the Santa Cruz River on the western side of the Tucson Basin have revealed numerous settlements dating to the San Pedro (1200-800 B.C.), Early Cienega (800-400 B.C.), and Late Cienega (400 B.C.-A.D. 50) phases of the Early Agricultural period (1200 B.C.-A.D. 50). Improvements for Interstate 10 (I-10) and the Rio Nuevo Project spurred the extensive exploration of portions of the floodplain, revealing these previously unknown sites (Thiel and Mabry 2006).

Less fieldwork has been conducted along the drainages on the eastern side of the Tucson Basin, and a basic question is if people were living and farming along the Rillito, Pantano, and Tanque Verde water courses. Given the intensive occupation of Fort Lowell during the Hohokam era, this seems likely.

Archaeological fieldwork has located few Early Agricultural period sites in eastern Tucson. The best known and most thoroughly studied has been the Milagro site, AZ BB:10:46 (ASM), found along Tanque Verde Creek (Huckell et al. 1995). This site was explored between 1984 and 1994 during a series of projects. Two pit structures, roasting pits, bell-shaped pits, and other pit features were located. At the time of its discovery, very little was known about this timespan, and the presence of maize in many of the Milagro site features, some of which were radiocarbon dated to 2900 B.P. (about 900 B.C.), was surprising. Since that time, the excavation of sites along the Santa Cruz River has revealed elaborate irrigated field systems, pit structures, ceremonial houses, early pottery, ritual artifacts, and artifacts from distant places, indicative of long distance trade (Sliva 2005).

The Hardy site seems like a good candidate for an Early Agricultural period settlement, given its placement a few hundred meters south of the Rillito, which once flowed year-round. Linda Gregonis (personal communication, 2012), in hindsight, thinks a semicircular set of postholes found during the mid-1970s excavation may be the remnants of an Early Agricultural period pit structure. In the published report (Gregonis 1997b), she described the postholes as being about 2 m in diameter, within the range of Early Agricultural period structures, and that many pieces of flaked stone were present in the area.

No Early Agricultural period features were identified during the current project, which might suggest this portion of the Hardy site was not utilized during that time. Early Agricultural sites are often situated quite close to rivers and streams, and the

Fort Lowell-Adkins Steel parcel may simply be too far away from the Rillito. Therefore, the question about whether there is an Early Agricultural settlement in the vicinity of Fort Lowell is currently unresolved.

The Hardy Site during the Hohokam Era: Dating and Site Structure

Archaeological survey, monitoring, testing, and data recovery over the past 120 years have shown that the Hardy site was occupied from the Snaketown phase (A.D. 700-750) of the Hohokam Pioneer period (A.D. 500-750) through the beginning of the Tanque Verde phase (A.D. 1150-1300) of the Hohokam Classic period (A.D. 1150-1450).

The earliest observations were made by Adolf Bandelier in 1884, when he noticed trash mounds and ceramics on the parade ground, as well as the ruins of an aboveground structure northeast of the fort (Gregonis 1997b). A site card completed in 1937 also recorded trash mounds and the presence of artifacts on the ground surface and eroding out of historic period adobe bricks (Arizona State Museum site card for BB:9:14).

In the early 1970s, a swimming pool was constructed at the park and archaeologists noted "thick Hohokam deposits, including some Rincon phase pit houses" (Gregonis 1997b:6).

Two previously published archaeological projects uncovered prehistoric features within the site (Gregonis 1997b; Huntington 1982). Pima County purchased a 25-acre parcel east of the existing Fort Lowell Park in 1975. Archaeologists from the University of Arizona mapped the visible prehistoric features, noting the presence of at least six trash mounds and three trash concentrations. Subsequent excavation of test units and trenches, in addition to profiling an existing ditch, revealed seven intact subsurface features. One 20-m by 20-m area was selected for excavation, and work was conducted in the area between 1976 and 1978, by the University of Arizona and the Arizona Archaeological Historical Society. Twenty-nine features were located in the area, overlapping and cutting into each other, evidence for an intensive occupation of this relatively small area (Figure 10.1).

Sixteen pit structures and three sets of postholes, possibly from ephemeral structures, were located. Earlier pit structures had walls supported by lines of posts, some set in floor grooves, with the floors cut into the underlying caliche. The earlier structures were generally poorly preserved.

In contrast, three structures dating to the Late Rincon phase (A.D. 1100-1150) were better preserved. The three structures were rectangular with thick puddled adobe walls. Two of the three had stepped entryways. Each of the houses had a hearth, and one had two hearths and a scatter of postholes for posts that held up the roof, or perhaps for internal features.

The function of the sets of postholes was uncertain, with two described as possibly being for sheltered work areas, or ramadas (Gregonis 1997b). As noted, since then Gregonis (personal communication 2012) thinks that one of the posthole sets might be an Early Agricultural period structure. The other two might be for ramadas, or perhaps the remnants of very poorly preserved pit structures.

Other features located included caliche mining and mixing pits. The lime-rich caliche was likely dug out to make material for floor or wall plaster, or possibly for the puddle adobe walls. Roasting pits are commonly found at prehistoric sites and were used to roast foodstuffs. Other pits were described as storage pits. It is difficult to determine the function of many pits, especially those used for food or artifact storage, if the pits were emptied or if the contents decomposed.

An unusual find was a plaster floor with a pair of pits cutting into it; the pits contained cremated human bone. Nearby were three artifact concentrations that yielded reconstructible ceramic vessels, a figurine, flaked stone items, shell artifacts, and cremated human bone. The feature was not completely excavated, and other cremations might have been present. Gregonis (1997b:15-16) describes this as a cemetery-offertory area.

The 29 features were densely packed into a relatively small area. For about 500 years, people utilized the same spot over and over. Five trash mounds surrounded the location, perhaps indicative of the occupants generating refuse over a long timespan (Gregonis 1997b).

In 1982, the Arizona State Museum excavated a small Rincon phase site located on a ridge north of the Rillito, a short distance north of the Hardy site. Although assigned a separate site number, the pit structures located on the ridge were probably constructed and occupied by people closely associated with the larger site (Huntington 1982).

In 1984, the Arizona State Museum conducted testing beneath Fort Lowell Road between N. Columbus Blvd. and N. Craycroft Road, prior to placement of a waterline. Two pits structures were located, one dating to the early Tanque Verde phase and the second possibly to the Rincon phase. A scatter of Late Rincon to early Tanque Verde phase ceramics was also located (Huckell 1984).

In 1988, the Institute for American Research (later Desert Archaeology, Inc.) monitored utility work on the eastern side of N. Craycroft Road, on the west side of Fort Lowell Park. Eight features were located,

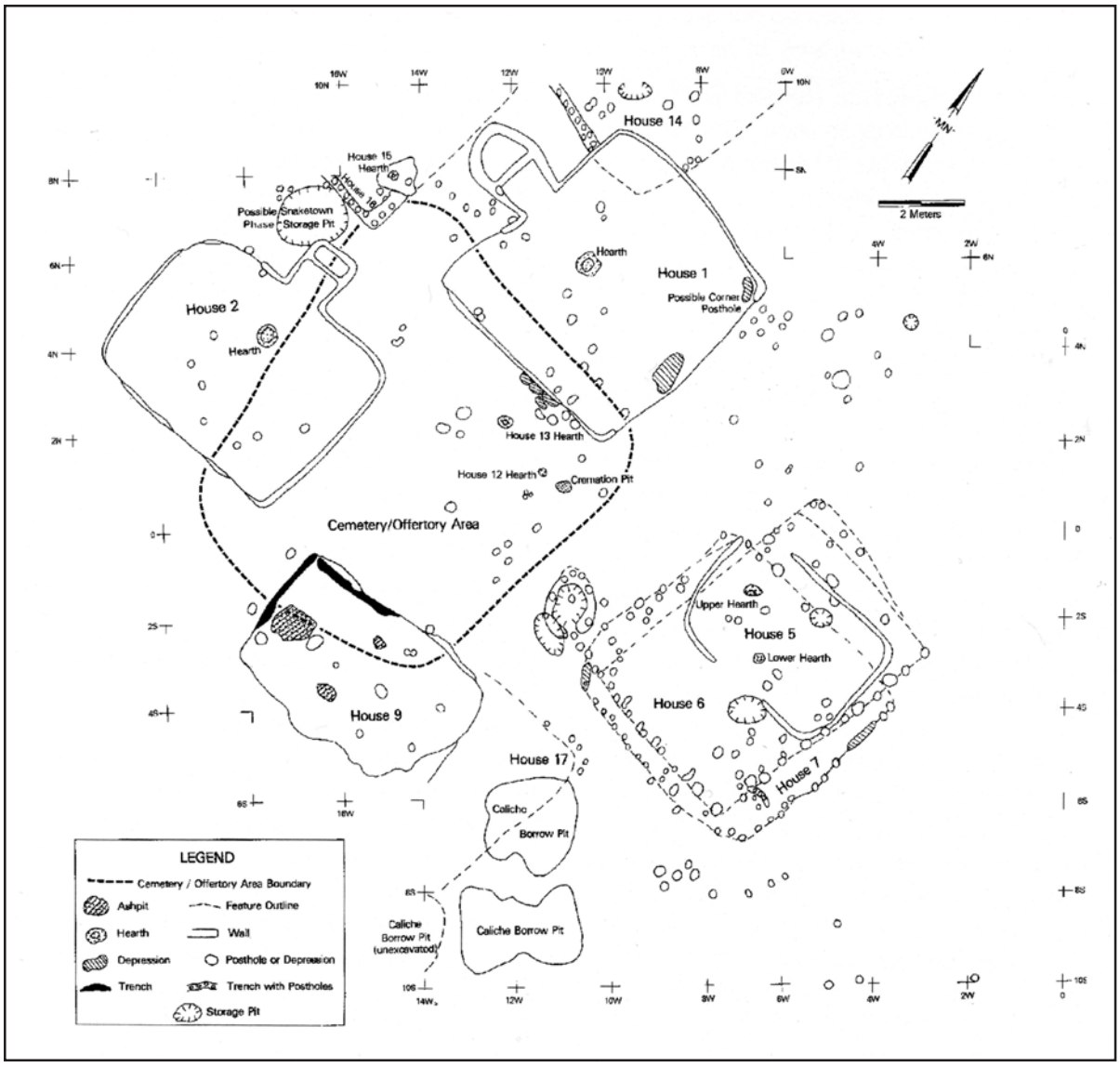

Figure 10.1. Map of the main excavation area of the Fort Lowell Park locus of the Hardy site, AZ BB:9:14 (ASM) (from Gregonis 1997b:12).

three of which dated to the Prehistoric era. Two pit structures were present; one contained undatable plain ware ceramics, and the second yielded Middle (A.D. 1000-1100) to Late Rincon ceramics. The third feature was a roasting pit (Dart 1988).

After 1988, research at the Hardy site stalled. The City of Tucson acquired the Adkins parcel in a complex land deal, and Desert Archaeology personnel conducted surveys, mapping, and historical research for this parcel and the remaining portion of the park (Thiel 2009; Thiel et al. 2008).

The archaeological work conducted in 2012 at the Fort Lowell-Adkins Steel locus located 49 prehistoric Hohokam features. Analysis of the recovered ceramics indicates the features ranged in time from the Middle Rincon phase of the Hohokam Sedentary period (A.D. 950-1150) to very early in the Tanque Verde phase of the Hohokam Classic period. This is a shorter timespan than the features located at the portion of the site explored by the University of Arizona in the mid-1970s (Gregonis 1997b).

A much larger area was examined at the Fort Lowell-Adkins Steel property, totaling some 3,067 m^2. The density of features was much lower than the portion of the Hardy site explored in the mid-1970s. In contrast to the excavation block within the park, very few overlapping features were discovered at the Fort Lowell-Adkins Steel locus. The intensity of occupation, perhaps because the area is on the margin of the site, was much less.

The 49 features included 10 pit structures, a trash mound and an adjacent trash concentration, a soil

mining pit, 3 large pits (more than 1.5 m in diameter), 28 small pits (less than 1.5 m in diameter), 2 roasting pits, a pit with several ceramic vessels, and a sherd cluster.

Nineteen of the features contained datable ceramics (Figure 10.2). Four temporal clusters of features were identified. In the Middle Rincon phase, the center of the investigated area contained two pit structures, a large trash mound, a soil mining pit, and several smaller pits. Due to the boundaries of the stripping area, it could not be determined if courtyard groups were present for the two structures, although this seems likely, given the size of the trash mound, which contains a large number of artifacts (despite having been truncated by the use of the property and the environmental cleanup).

Another cluster consists of two pit structures, dating to the transition between Middle Rincon 3 to the Late Rincon, about A.D. 1080 to shortly after 1100, and are located north and west of the earlier feature cluster. Again, the stripping boundaries do not allow for a determination as to whether the pit structures were in courtyard groups.

Four features date to the Late Rincon phase. All are located south of the earlier features. Three pit structures likely form a courtyard group, as they face each other with a small space empty of features between them. The area to the east was not stripped, and it would not be surprising if another pit structure was present in that area, facing west. A small pit is located behind and to the north of one structure, cutting into the earlier trash mound. This represents one of a handful of prehistoric feature superpositioning located during the project. The fourth feature was an unusual set of reconstructible vessels located some distance to the west. This feature may be a ritual deposit. When initially discovered, it was thought the feature might be a cremation burial; however, no cremated bone was found.

The last cluster consists of a pair of pit structures, a large pit and a small pit, dating to the transition between the Late Rincon to early Tanque Verde phases, around A.D. 1150 (Figure 10.3). The structures and the large pit were located west of the Late Rincon phase structures. One of the structures was a dwelling while the other was a storehouse and probably a lithic workshop. The area directly north of the houses was not stripped, and it would not be surprising if another structure were present, facing south.

It is intriguing to note the general lack of superpositioning of features in this portion of the Hardy site. People appear to have moved across the landscape, purposely avoiding places where people had previously lived. This contrasts strongly with the area excavated within Fort Lowell Park in the mid-1970s, where 12 pit structures were found stacked on top of each other in a 20-m by 20-m area. This may suggest the Fort Lowell-Adkins Steel locus of the Hardy site is on the periphery of the site.

Pit structures and datable artifacts have been located within the Hardy site during five different projects (see Gregonis 1997b and this report). The earliest occupation was found within the block excavation in Fort Lowell Park, with structures, a ceremonial area, and soil mining pits dating to the Snaketown, Cañada del Oro, and Rillito phases (A.D. 700-950). It is not known if there were other portions of the Hardy site occupied during this timespan, or if the occupation was restricted to this small area.

In contrast, the Hohokam Sedentary period saw people living throughout the Hardy site. Pit structures have been found in five locations within the site, as well as a separate locus north of the Rillito, and Middle to Late Rincon ceramics have been found in all of these areas. Throughout the Tucson Basin, the Sedentary period saw people spreading out. Prior to this period, people had tended to live in communities centered around a plaza, the settlements static and long-lasting. During the Sedentary period, however, the Hohokam throughout the Tucson Basin began to establish new, smaller settlements in previously unoccupied areas. Population increase may have been one reason for the development of new villages.

At the Hardy site, two of the five areas with pit structures have features dating to the transition between the Late Rincon phase and the early Tanque Verde phase. This may suggest a contraction in settlement occurred at this time, perhaps a reduction in the number of people living at the site.

When was the Hardy site abandoned? A few Gila Polychrome sherds have been found scattered about the site, dating to the Tucson phase (A.D. 1300-1450) of the Hohokam Classic period. The site may have been sparsely occupied during this phase, or features from this period may have been destroyed by historic activities. Bandelier noted aboveground ruins northeast of the fort during his 1884 visit: "there is still no doubt that there has been a pueblo there, as there is too much pottery about. The latter resembles that of the Gila" (Lange and Riley 1970:207).

Hohokam Craft Activities at the Hardy Site

The Hohokam were master craftspersons, creating tools, clothing, and artwork for their own households or for trade with other households and villages. They are especially well known for their decorated ceramics and shell jewelry. They also manufactured plain ware ceramics for storage and cooking purposes, flaked stone tools and weapons, ground stone implements, shell and stone jewelry,

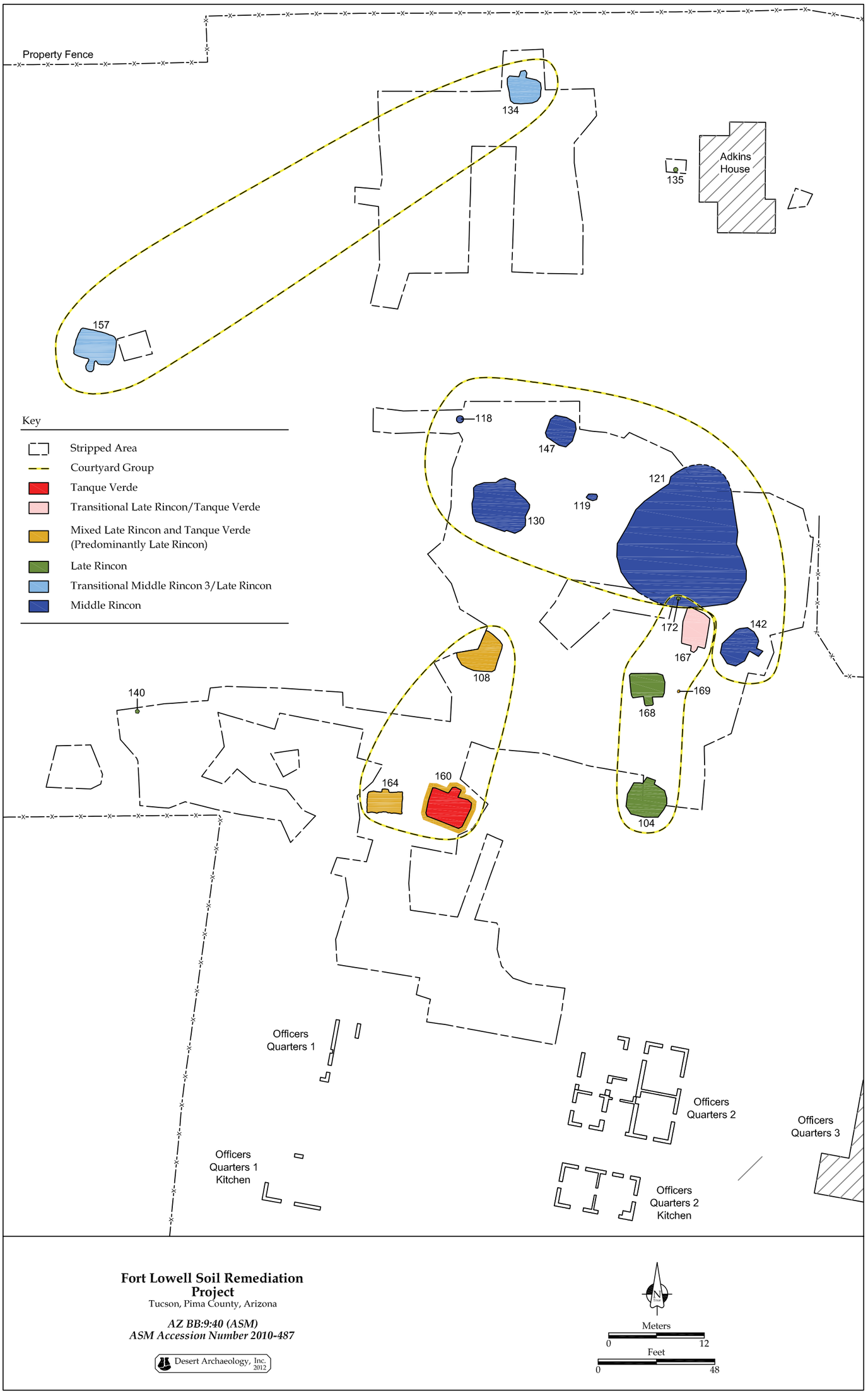

Figure 10.2. Ceramic dates identified four clusters of similarly dated features at the Fort Lowell-Adkins Steel locus of the Hardy site, AZ BB:9:40 (ASM).

Figure 10.3. Two pit structures, Features 160 and 164, the Hardy site, AZ BB:9:40 (ASM), appear to be from a courtyard group, with the deeper structure used as a dwelling and the shallower structure used as a storage and manufacturing area.

and bone tools. Archaeologists frequently find these items during archaeological excavations. While rare, surviving examples of basketry, textiles, and wooden items indicate these were also crafted. However, due to their organic nature, they are rarely recovered from archaeological sites.

Archaeological research in the Tucson Basin has identified craft manufacturing at many sites, and there is evidence that some of the larger villages had specialists who produced certain items, such as decorated ceramic vessels or carved stone bowls, which were traded throughout the Tucson Basin and beyond.

Archaeologists can identify craft production through the presence of tools used to make items (for example, pottery polishers, antler flaking tools, spindle whorls), raw materials (lumps of pigment, obsidian nodules, pottery temper), manufacturing waste (stone flakes, fragments of shell, cotton seeds and pollen), manufacturing facilities (pottery kilns), and unfinished items.

Prior to the current project, the Hardy site was suspected to be the likely location of ceramic manufacturing for pottery found throughout the eastern Tucson Basin (Heidke 1999). A goal of the current project was to determine if craft production occurred and at what scale, whether for household usage or for trade with other households or communities.

Analysis of the ceramic sherds found at this portion of Hardy site revealed that many had temper consistent with the petrofacies in the area, providing indirect evidence for ceramic manufacture at the site. Previous research has shown that potters living at West Branch, AZ AA:16:3 (ASM); Valencia, AZ BB:13:74 (ASM); and Julian Wash, AZ BB:13:17 (ASM), during the Hohokam Sedentary period produced large quantities of ceramics that were distributed throughout the Tucson Basin. Five smaller sites, including the Hardy site, manufactured ceramics at a smaller scale, and the vessels created were not as widely traded.

Supporting evidence for ceramic production at this portion of the Hardy site includes four polishers found in a pit structure, Feature 130. These polishers had been used to smooth the surfaces of ceramic vessels. A mortar, pestle, and two pieces of pigment were found in the same house. The red pigment could have been used for red ware or red-on-brown pottery.

Pigment processing also occurred in Feature 164, with three pieces of pigment material present in the floor material. Two of these were pieces of fossilized coral, an uncommon find. Feature 164 was unusual in that it appears to have been a storage facility, with five potrests cut into the floor of the structure. While the structure was being excavated, it was hypothesized that large jars may have rested on the floor, perhaps filled with dried corn or other foodstuffs. It is also possible that the vessels were produced by people occupying the adjacent structure, Feature 160, and the potrests were for completed pieces.

Finally, a sherd resembling a "rib tool" was recovered from a nonfeature context during backhoe stripping. This type of tool is used during paddle-and-anvil ceramic production to smooth and shape the interior surface of a vessel.

Evidence for pottery production was found in two of the seven completely excavated structures in this area of the Hardy site. A more detailed analysis of the ceramics, focusing on tempering materials, as well as a reexamination of ceramics from the 1970s excavation, might yield a better understanding of ceramic production at the site.

Flaked stone artifacts were also manufactured at the Fort Lowell-Adkins Steel locus of the Hardy site. This is not surprising, however, given that flaked stone tools were probably made at most Hohokam sites. The analyzed assemblage included 92 percent debitage, with flakes, angular debris, and bifacial thinning flakes also identified. Five complete cores were found on the floors of three pit structures, one each in Features 130, 142, and 164. Some of the cores had a few flakes removed, while another had been extensively reduced.

Nine retouched and utilized tools were found, including core hammers, utilized cores, a utilized flake, and a unifacially retouched flake. Twelve bifaces were recovered. One was a drill found in Feature 104, which could have been used to drill holes in wood. Seven other bifaces were discarded during the manufacturing process. Nineteen projectile points were found, and these were typical of points made during the Sedentary and Classic periods in southern Arizona.

One piece of obsidian from Picketpost Mountain in Superior, Arizona, about 125 km north of the site, was recovered. The remaining materials were local, and could have been obtained from the Rillito streambed or from other washes and drainages.

Artifacts from a test unit in the trash mound, Feature 121, which dates to the Middle Rincon phase, and floor fill and floor artifacts from adjacent pit structures Features 160 and 164, which likely date to the transition between the Late Rincon and Tanque Verde phases, were analyzed in detail. During excavation, archaeologists thought the flaked stone materials from these structures differed dramatically from those seen in the other pit structures and in the large trash mound. Analysis confirmed this. More than half the flaked stone from the trash mound was metamorphic rock, followed by igneous rock, and only 7 percent cryptocrystalline material. Cryptocrystalline materials were much more common in the two pit structures, with chert comprising 30 percent of the stone from Feature 160 and 58 percent from Feature 164. There was evidence that stone was being flaked in Feature 164. It is unknown why residents of the site began to use more chert later in the site's occupation, or perhaps this was simply the preference of the knapper working in this household.

Two chipping areas were found in the block excavation area at the Fort Lowell Park locus of the Hardy site. Quartzite was the most common type of flaked stone, representing 40 percent of the recovered material, followed by fine-grained basalt (25 percent), igneous stone (14 percent), and chert (13 percent) (Gregonis 1997b).

Limited evidence for ground stone production was found at the Fort Lowell-Adkins Steel locus. An unfinished metate was found cached with a pestle in a small pit, Feature 120, which was located in that portion of the site occupied during the Middle Rincon 3 to Late Rincon transition. Work had begun on smoothing the grinding surface of the metate, but it was not completed. Elsewhere, a few rocks that had been collected for manufacture into tools or for processing into pigment were recovered.

Manufacture of ground stone items does not appear to have been a major focus of activity at the Hardy site.

Most of the ground stone tools found at the Fort Lowell-Adkins Steel locus were used for general processing (smoothing caliche floors, woodworking, grinding pigments) or for food processing. A few unusual pieces may have had ritual significance, such as a crystal and a palette. The palette was found in the roof fall of pit structure Feature 130, and it appears to have never been used. A truly unusual piece was a painted rock found on the floor of pit structure Feature 164. It had a black design on one side and red paint on the other. The purpose of this piece is unknown, although it may have served as a paint palette.

The Hohokam created textiles and cordage from cotton and agave fibers. Evidence for production includes recovered plant remains (pollen or macrobotanical), production tools (perforated disks and whorls, tabular tools, scrapers, and choppers), and finished items, although cordage and textiles rarely survive at open-air sites (Lindemann 2006:70-84).

Flotation samples from pit structure hearths were examined, and agave was found in the hearths of pit structure Features 130 and 134. Because agave was also processed as a food source, the presence of agave tissue in a feature is not definitive proof for fiber production.

Four modeled ceramic spindle whorls were found in pit structures at the Fort Lowell-Adkins Steel locus, two in Feature 104, dating to the Late Rincon, one in Feature 157, which dates to the transition between Middle Rincon 3 and the Late Rincon; and the fourth in Feature 160, which dates to very early in the Tanque Verde phase. Three perforated, or partially perforated, sherd disks were recovered,

two from trash mound Feature 121, dating to the Middle Rincon phase, and one from pit structure Feature 157, which dates to the transition between Middle Rincon 3 and the Late Rincon.

A stone awl was found in the trash mound, Feature 121. Awls were frequently used in weaving and leatherwork. Bone awls were also associated with textile production. However, bone preservation is very poor at the Hardy site, and none were recovered from the Fort Lowell-Adkins Steel locus.

A modeled spindle whorl was found in a pit structure, House 5, at the Fort Lowell Park locus of the Hardy site (Gregonis 1997b:31). Also found at that locus were numerous examples of round, perforated disks, some of which were in the process of being manufactured from scraps of broken pots.

Evidence suggests fiber and textile production occurred at the Hardy site. More evidence was found at the Fort Lowell locus, and may suggest specialized production occurred there. Fewer fiber and textile tools were found during the current project, which may indicate production was taking place at the household level.

Shell artifacts were found at the two excavated loci, and evidence for shell manufacturing was found at both. More than 300 pieces of shell were recovered from the Fort Lowell Park locus. A shell manufacturing area was found near the Late Rincon phase House 1, with "scraps of unworked shell, a pendant blank, and *Glycymeris* and *Olivella* species shell bracelet and ring fragments. Also found on the surface was a grooved abrader…" (Hildreth 1997:51-52). Fragments of unworked shell were found in two other areas. Completed artifacts included beads, pendants, plain and carved bracelets, rings, an inlay, and a piece of painted shell (Hildreth 1997). It seems likely that one or more shell craftspersons were living and working in this portion of the Hardy site.

Fewer shell artifacts were found at the Fort Lowell-Adkins Steel locus, although there was still some evidence of manufacturing there. These included a *Glycymeris* bracelet that broke while it was being made and another bracelet that was reworked. Ten other worked and unworked fragments were recovered, and may represent manufacturing debris. The remaining shell artifacts were complete, either made at the site or brought in from elsewhere. The vast majority of shell found at the site was from the Pacific coast.

Other Hohokam Findings: Architecture and Diet

Seven pit structures were completely excavated at the Fort Lowell-Adkins Steel locus. One structure, Feature 130, was a house-in-pit, with a wall groove containing numerous postholes, some with burned posts still in place. The other six structures were true pithouses, with adobe-lined walls and a handful of postholes scattered across the floor, some of which may have been used for nonstructural purposes, such as racks or elevated floor areas. The earlier structures were subrectangular with rounded interior corners, while the two latest structures, Features 160 and 164, were rectangular with very sharp, 90-degree corners in the house interiors. All the houses had formal entries, and five of the six had stepped entrances.

Construction methods in this portion of the Hardy site included the use of mud plaster for hearths, walls, and some entryways. Floors were generally made by wetting and polishing the existing caliche substrate. This produced a hard surface that resembled the plaster floors seen in many other Hohokam pit structures.

All the completely excavated structures had evidence for burning, with charred beams, burned daub, and charcoal lying on each floor and in hearths. Samples of wood or stems used as construction materials were recovered from five of the structures, while the contents of hearths were examined for six houses, including Feature 168, which was only sampled by a trench.

The house-in-pit, Feature 130, had 10 postholes with beams either inside or adjacent to the hole. Four posts were cottonwood or willow, and another four were mesquite. Another was identified as either acacia or mesquite, while the last was an ocotillo stem. The house was constructed with a variety of wood, including some that was probably collected from close to the Rillito. Other wood specimens from the floor of the house included ironwood and a chunk of pinyon pine, which would have originated from the Catalina Mountains to the north. Residents of the site may have traveled into the mountains to collect wood for construction purposes, although the pine could have washed down the mountain and been collected from a streambed. Common reed was found in the hearth, and may have come from a piece of woven matting.

One piece of cottonwood or willow was collected from Feature 134. Feature 142 had fragments of common reed in one of the two hearths present on the floor. Two pieces of wood, one from a mesquite and another from an acacia or mesquite, were found in Feature 157. Fifteen pieces of ocotillo stem were found in that structure's hearth. An unusual find within Feature 157 was a piece of wall plaster bearing human fingerprints (Figure 10.4).

Features 160 contained four cottonwood or willow beam fragments, and common reed stems were found on the floor and in the hearth, presumably from a piece of matting used inside the structure.

Figure 10.4. Fingerprints visible on a piece of wall plaster from Feature 157, the Hardy site, AZ BB:9:40 (ASM).

Numerous pieces of fired daub lay on the floor of this structure. The daub bore impressions that indicate the walls and ceiling of the house had been covered with mud plaster, which had been smoothed by hand, as some of the pieces appear to have palm and fingerprint impressions. Large round beams extended across the roof of the structure, while ocotillo ribs were used in the walls.

A single piece of cottonwood was found in Feature 164. Many pieces of burned daub were also found in this structure, with the same construction techniques used in the adjacent Feature 160. These two structures varied dramatically in depth, with the floor of Feature 164 only a few centimeters below the modern ground surface. It seems likely that the majority of this structure was aboveground, in contrast to Feature 160.

The two latest structures, Features 160 and 164, lacked mesquite charcoal, which raises the question if sources for mesquite had been exhausted in the nearby areas by the beginning of the Tanque Verde phase, resulting in the exclusive use of cottonwood for structural elements.

Relatively little direct evidence for diet was found at this locus. Beans were found in the Feature 134 hearth, and maize was found in the hearths of Feature 142 and 160. A number of seeds from other edible wild plants, goosefoot, tansy mustard, and sacaton grass, were found in hearths. Faunal bone was very poorly preserved at the site, and only a small number of burned cottonwood, jackrabbit, and small bird bone was found in the prehistoric features. Manos and metates used for food processing were found in many features, suggesting processing of maize and wild seeds often occurred at this portion of the Hardy site.

DAILY LIFE AND THE ORGANIZATION OF OUTDOOR SPACES AT FORT LOWELL

The southwestern corner of Fort Lowell, utilized by the U.S. military between 1873 and 1891, is present on the Fort Lowell-Adkins Steel locus. Today, the ruins of the guardhouse, Officers Quarters Nos. 1 and 2 and their kitchens, and the standing Officers Quarters No. 3 are present at the site. Other

fort-era structures and features, a well between the guardhouse and the bakery, the bakery, Adjutant's Office, the parade ground, Cottonwood Row, the kitchen for Officers Quarters No. 3, and the privies for the three officers quarters are known to have been present on the parcel, but were not visible on the ground surface. A previous report contains extensive archival information about these structures and features on the parcel (Thiel 2008).

Additional features and artifacts would likely provide new information about everyday life at the fort. Two research goals were to be addressed by fieldwork: (1) to identify and document the physical remains of the Fort Lowell architecture and landscape; and, (2) to use artifacts and food remains to more fully understand the daily life of the Fort Lowell soldiers and civilians.

Unfortunately, relatively few artifacts dating to occupation of the fort were recovered. The areas explored were all public areas of the fort, accessible to the soldiers, their family members, and visiting civilians. Archaeologists recovered a small amount of ammunition, a flagpole tip, an AYER'S PILL bottle, horseshoes, and a pair of stove legs in the excavated features or that were exposed during backhoe stripping.

The ammunition was the most interesting find, providing information about the types of weapons issued to the soldiers and indicating it was acquired from several manufacturers.

The overall lack of artifacts suggests the items that were found had been accidentally lost and that the military was diligent about keeping public spaces free from trash. Anecdotal information suggests fort-era trash was discarded around the periphery of the fort in trash dumps, most of which have been subsequently destroyed by development. Other trash was discarded into the latrines behind the officers dwellings, which were reportedly excavated by an artifact collector. It would seem likely latrines were also associated with the guardhouse, bakery, and Adjutant's Office; if so, these have yet to be located.

In contrast, valuable information about the layout of the fort, landscaping efforts, and the architecture of several buildings was collected during the project (Figure 10.5).

Portions of the guardhouse were visible prior to fieldwork as piles and alignments of rocks. Stripping resulted in the discovery of the southeastern corner of this structure. The eastern half of the bakery was located to the south. The Adjutant's Office is present south of the bakery, although this area was not explored as part of the current project. Its location can be determined now by overlaying the 1876 Fort Lowell map and the previously located structures onto an aerial photograph.

Fort-era photographs document Cottonwood Row, a tree-lined street running east-west in front of the officers quarters. The photographs indicate the street had a ditch on each side, with wooden planks used to span the southern ditch, allowing access to the officers quarters. Cottonwood trees were present on both sides of the street. A white picket fence was present on the northern side, north of the cottonwood trees. In the distance, a second row of trees was present north of the fence. A portion of Cottonwood Row has been re-created on the eastern side of N. Craycroft Road, but was not placed in the original alignment.

Stripping revealed a portion of the Cottonwood Row alignment. The road was 10.75 m wide. It was bounded on its northern and southern sides by a shallow ditch. Holes for five cottonwood trees were found along the exposed portion of the northern ditch. At least one tree hole was found next to the southern ditch. An alignment of postholes was found approximately 1.5 m north of the northern ditch, representing the remains of the picket fence. The postholes averaged some 4.63 m apart.

The southern boundary of the parade ground was located, marked by the presence of a shallow ditch. This ditch was 14.1 m north of the northern ditch for Cottonwood Row. There is some evidence to suggest smaller ditches may have run south from the southern ditch and connected with the northern ditch of Cottonwood Row. The western edge of the parade ground apparently also had a shallow ditch, although only a small portion was located. Seven tree planting pits were present along the northern side of the southern ditch, west of the western edge of the parade ground.

The Master Plan for the Fort Lowell-Adkins Steel property calls for the re-creation of a portion of Cottonwood Row. The archaeological evidence for this set of landscape features allow for its placement on the original location, even down to the replacement of the picket fence.

Evidence for landscaping and gardening was found on the southern side of Cottonwood Row (Figure 10.6). More than 100 small rectangular and square planting pits were present south of the southern ditch for Cottonwood Row and north of an adobe wall connecting Officers Quarters Nos. 1 and 2. Small irrigation ditches ran south from the southern ditch for Cottonwood Row. The planting pits appear to have been dug with a flat-nosed shovel or spade. The area appears to have been a small vegetable or flower garden. Fort-era artifacts were found in some of the planting pits, although it is unknown if the garden dates to the fort occupation or to the subsequent use of this portion of the fort as a tuberculosis sanitarium.

Figure 10.5. The 1875 Fort Lowell map and the archaeological findings made during the current project, overlaid on an aerial photograph of the Fort Lowell-Adkins Steel property.

Figure 10.6. Aerial photograph showing the ruins of Officers Quarters Nos. 1 and 2 and a garden area north of the quarters, Fort Lowell.

HEALTH SEEKERS IN EARLY TWENTIETH CENTURY TUCSON

Dolly Cate opened Mrs. Cate's Tuberculosis Sanatorium on the property around 1908, after the death of her husband from that disease. Many people hoped that Tucson's dry climate would promote health, and about a dozen patients lived in the officers quarters. Cate sold the property to the Adkins family, who operated a rest home until at least 1950.

It was hoped that features associated with the sanitarium would be located and that the artifacts and food remains they contained would provide information about what life was like for tuberculosis patients. Only two features were found. An unexcavated outhouse pit was found west of Officers Quarters No. 2. It was not excavated, although the removal of a car frame part indicates it was at least eight feet deep. It is also possible the feature was a well, but this cannot be determined.

A small portion of a pit containing trash dating from 1948-1954 was cut into by the backhoe northwest of Officers Quarters No. 1. A grab sample of artifacts was collected from Feature 161, and included food and beverage bottles, cologne and perfume bottles, the metal lids from Borden's Instant Coffee jars, and a PARSON'S SUDSY AMMONIA bottle. Nine medicine bottles were present, although the contents of only two could be identified, MURINE, a soothing eye drop, and MILK OF MAGNESIA, an anti-diarrheal and stomach remedy. Some of the items may have been used in the Adkins rest home, although it is also possible these were discarded by members of the Adkins family. Other features or trash associated with the sanatorium were not located.

Only a small area in the vicinity of the Officers Quarters was examined, and it is possible that trash-filled features associated with this use of the property remain undiscovered. It is also possible that trash was discarded away from and off the property into the surrounding desert. Given the nature of occupation, with as many as a dozen tuberculosis sufferers present, it would not be surprising if efforts were made to destroy trash by incineration or by burying refuse. Regardless, it was not possible to examine the questions regarding sanitarium material culture and diet with the recovered items.

RECOMMENDATIONS

Archaeological monitoring and subsequent data recovery at the Fort Lowell-Adkins Steel property revealed that prehistoric and historic archaeological features are very well preserved beneath the modern ground surface. This was somewhat surprising, considering the lengthy and intensive use of the property since the 1930s as a steel tank manufacturing location. Approximately 13 percent of the parcel was examined, and 75 cultural features were located. Many additional undiscovered features are likely present. The location and orientation of the uncovered pit structures suggests that, in most cases, other pit structures are likely to be present, forming courtyard groups. The prehistoric occupation lasted perhaps 200 years, and cremation burials of the site residents are almost certainly somewhere near the uncovered pit structures. There are also likely more pit features relating to food storage, caching behavior, and cooking.

For the Historic era, the location of the Adjutant's Office, a well between the guardhouse and bakery, the kitchen for Officers Quarters No. 3, and the latrines for the three officers quarters can now be predicted based on the 1876 Fort Lowell map and on the recent archaeological finds. Portions of Cottonwood Row, the boundaries of the parade ground, and additional features associated with the other buildings, such as latrines near the bakery and Adjutant's Office or walls delineating the officers quarters, are likely present.

Desert Archaeology, Inc., recommends that all planned ground-disturbing activities within the Fort Lowell-Adkins Steel parcel be evaluated prior to the beginning of the project. Small disturbances, such as the placement of a post, can be monitored by an archaeologist. Larger disturbances may require testing, and if significant features are located, data recovery. The best and most cost-effective course of action is to limit ground disturbances wherever possible.

APPENDIX A

ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM THE FORT LOWELL SITE, AZ BB:9:40 (ASM)

M. Steven Shackley
Archaeological X-ray Fluorescence Spectrometry Laboratory

GEOARCHAEOLOGICAL XRF LAB

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LETTER REPORT

AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM THE THE HISTORIC FORT LOWELL SITE (AZ BB:9:40 ASM)

1 October 2012

Stacy Ryan
Desert Archaeology, Inc.
3975 N Tucson Blvd.
Tucson, AZ 85716

Dear Stacy,

The projectile point distal fragment was produced from Superior (Picketpost Mountain) obsidian. The analysis for this study was conducted on the ThermoScientific *Quant'X* XRF spectrometer at the Geoarchaeologcial XRF Laboratory, Albuquerque, New Mexico. Specific instrumental methods can be found at http://www.swxrflab.net/anlysis.htm, and Shackley (2005). Source assignment was made by comparison to source standard data in the laboratory. Analysis of the USGS RGM-1 standard indicates high machine precision for the elements of interest (Table 1 here).

Sincerely,

M. Steven Shackley, Ph.D.
Director

VOICE: 510-393-3931
INTERNET: shackley@berkeley.edu
http://www.swxrflab.net/

REFERENCE CITED

Shackley, M.S.
2005 *Obsidian: Geology and Archaeology in the North American Southwest*. University of Arizona Press, Tucson.

Table 1. Elemental concentrations for the archaeological samples. All measurements in parts per million (ppm).

Sample	Ti	Mn	Fe	Rb	Sr	Y	Zr	Nb	Pb	Th	Source
593	1290	478	8126	124	23	24	90	30	20	11	Superior (Picketpost Mtn)
RGM1-S4	1541	292	13344	147	107	23	212	8	20	12	standard

GROUND STONE DATA FROM THE FORT LOWELL-ADKINS STEEL LOCUS OF THE FORT LOWELL SITE, AZ BB:9:40 (ASM)

Katie Brower
Desert Archaeology, Inc.

Table B.1. Ground stone data from the Fort Lowell-Adkins Steel locus of the Fort Lowell site, AZ BB:9:40 (ASM).

Feature	Feature Type	Context	Context 2	FN	Artifact Type	Subtype	Count	Condition	Burning	Design	Wear	Use	Sequence	Second Artifact Type
0	Sheet trash	Sheet trash	Other	853.01	Donut stone	Grooved	1	Broken	No	Strategic	Moderate	Single	–	–
104	Pithouse	Pithouse fill	Pithouse	375.01	Ornament	Bead, tube	1	Whole	No	Strategic	Moderate	Single	–	–
120	Other	Feature fill	Other	183.01	Pestle	Natural	1	Whole	Yes	Strategic	Moderate	Single	–	–
120	Other	Feature fill	Other	184.01	Metate	Trough	1	Whole	No	Strategic	Moderate	Unused	Concomitant	–
121	Trash	Feature fill	Other	194.01	Awl	Straight	1	Broken	No	Strategic	Moderate	Single	–	–
130	Pithouse	Roof/wall fall	Pithouse	280.01	Netherstone	Flat/Concave	1	Whole	Yes	Expedient	Moderate	Single	–	–
130	Pithouse	Pithouse fill	Pithouse	290.01	Fire-cracked rock	–	1	Broken	Heat cracked	–	–	–	–	–
130	Pithouse	Floor fill	Pithouse	298.01	Unidentified	–	1	Broken	Heat cracked	–	–	Recycled	Sequential	Fire-cracked rock
130	Pithouse	Floor fill	Pithouse	298.02	Unidentified	–	1	Broken	Heat cracked	–	–	Recycled	Sequential	Fire-cracked rock
130	Pithouse	Floor fill	Pithouse	299.01	Handstone	Polisher	1	Whole	No	Expedient	Moderate	Single	–	–
130	Pithouse	Floor fill	Pithouse	300.01	Fossil	Fossil	1	Whole	No	–	–	–	–	–
130	Pithouse	Floor fill	Pithouse	302.01	Polisher	Pebble	1	Whole	No	Expedient	Moderate	Single	–	–
130	Pithouse	Floor fill	Pithouse	304.01	Handstone	Basin	1	Whole	Yes	Expedient	Light	Single	Concomitant	–
130	Pithouse	Floor fill	Pithouse	442.01	Pigment	Processed	1	Sample	No	Strategic	Unused	Unused	–	–
130	Pithouse	Pithouse fill	Pithouse	444.01	Unidentified	–	1	Broken	Heat cracked	–	–	Recycled	Sequential	Fire-cracked rock
130	Pithouse	Pithouse fill	Pithouse	445.01	Polisher	Pebble	1	Whole	No	Expedient	Light	Single	–	–
130	Pithouse	Floor fill	Pithouse	452.01	Fossil	Fossil	1	Whole	Yes	Expedient	–	–	–	–
130	Pithouse	Floor	Pithouse	453.01	Palette	Flat border	1	Broken	Yes	Strategic	Unused	Unused	–	–
130	Pithouse	Roof/wall fall	Pithouse	479.01	Polisher	Pebble	1	Whole	Yes	Expedient	Moderate	Single	–	–
130	Pithouse	Floor	Pithouse	510.01	Mortar	Basin	1	Whole	Yes	Strategic	Heavy	Single	–	–
130	Pithouse	Floor	Pithouse	511.01	Pigment	Processed	1	Sample	No	Strategic	Unused	Single	–	–
130	Pithouse	Floor	Pithouse	512.01	Polisher	Faceted	1	Whole	No	Expedient	Heavy	Single	–	–
130	Pithouse	Floor	Pithouse	513.01	Polisher	Blank	1	Whole	No	Expedient	Moderate	Single	–	–
130	Pithouse	Floor	Pithouse	514.01	Metate	Flat/Concave	1	Broken	No	Expedient	Heavy	Single	–	–
130	Pithouse	Floor	Pithouse	515.01	Mano	Flat/Concave	1	Whole	No	Strategic	Heavy	Multiple	Concomitant	Polisher
130	Pithouse	Floor	Pithouse	516.01	Polisher	Pebble	1	Whole	No	Expedient	Heavy	Single	–	–
130	Pithouse	Floor	Pithouse	517.01	Raw material	Tools	1	Whole	Yes	–	Unused	Unused	–	–
130	Pithouse	Floor	Pithouse	518.01	Pestle	Cobble	1	Whole	Yes	Expedient	Moderate	Single	Sequential	–
130	Pithouse	Floor	Pithouse	519.01	Lapstone	Flat/Concave	1	Whole	No	Expedient	Light	Single	–	–
130	Pithouse	Floor	Pithouse	520.01	Netherstone	Flat/Concave	1	Whole	Yes	Expedient	Moderate	Single	–	–
130	Pithouse	Floor	Pithouse	521.01	Lithic anvil	–	1	Whole	Yes	Expedient	Light	Multiple	Concomitant	Netherstone
130	Pithouse	Roof/wall fall	Pithouse	591.01	Unidentified	–	1	Broken	–	–	–	–	–	–
130	Pithouse	Roof/wall fall	Pithouse	591.02	Unidentified	–	1	Broken	Heat cracked	–	–	–	–	–
130.02	Posthole	Posthole	Pithouse	482.01	Pestle	Natural	1	Broken	Yes	Expedient	Light	Single	–	–
130.02	Posthole	Posthole	Pithouse	482.02	Metate	–	1	Broken	Yes	Strategic	–	–	–	–
130.02	Posthole	Posthole	Pithouse	485.01	Lapstone	Flat/Concave	1	Whole	Yes	Expedient	Light	Single	–	–
130.02	Posthole	Posthole	Pithouse	487.01	Pestle	Natural	1	Whole	No	Expedient	Light	Single	–	–
134	Pithouse	Floor	Pithouse	690.01	Mano	Trough	1	Whole	Yes	Strategic	Moderate	Multiple	Concomitant	Lithic anvil
134	Pithouse	Roof/wall fall	Pithouse	605.01	Unidentified	–	1	Broken	Heat cracked	–	–	Single	Sequential	–
134	Pithouse	Roof/wall fall	Pithouse	633.01	Unidentified	–	1	Broken	Heat cracked	–	–	Single	Sequential	–
134	Pithouse	Roof/wall fall	Pithouse	745.01	Lapstone	Flat/Concave	1	Whole	Heat cracked	Expedient	Moderate	Single	Sequential	–
134	Pithouse	Roof/wall fall	Pithouse	746.01	Polisher	Handstone	1	Whole	Heat cracked	Expedient	Moderate	Single	–	–
134	Pithouse	Pithouse fill	Pithouse	543.01	Unidentified	–	1	Broken	Heat cracked	–	–	Single	Sequential	–
134	Pithouse	Pithouse fill	Pithouse	543.02	Fire-cracked rock	–	1	Broken	Heat cracked	–	–	–	–	–
134	Pithouse	Pithouse fill	Pithouse	551.01	Unidentified	–	1	Broken	Heat cracked	–	–	Single	Sequential	–
134	Pithouse	Pithouse fill	Pithouse	551.02	Fire-cracked rock	–	1	Broken	Heat cracked	–	–	–	–	–
134	Pithouse	Pithouse fill	Pithouse	599.01	Netherstone	Flat	1	Broken	Heat cracked	Expedient	Light	Single	–	–
134	Pithouse	Pithouse fill	Pithouse	629.01	Polisher	Pebble	1	Whole	Yes	Expedient	Moderate	Multiple	Concomitant	Pecking stone
142	Pithouse	Floor	Pithouse	319.01	Netherstone	Flat	1	Whole	Yes	Expedient	Light	Single	–	–
142	Pithouse	Floor	Pithouse	321.01	Netherstone	Flat	1	Whole	Yes	Expedient	Light	Single	–	–

Table B.1. Continued.

Feature	Feature Type	Context	Context 2	FN	Artifact Type	Subtype	Count	Condition	Burning	Design	Wear	Use	Sequence	Second Artifact Type
142	Pithouse	Floor	Pithouse	325.01	Netherstone	–	1	Whole	Yes	Expedient	Light	Multiple	Concomitant	Hammerstone
147	Large pit	Feature fill	Other	832.01	Mano	Trough	1	Whole	No	Strategic	Heavy	Multiple	Sequential/Concomitant	Mano
157	Pithouse	Pithouse fill	Pithouse	619.01	Polisher	Pebble	1	Whole	No	Expedient	Moderate	Multiple	Concomitant	Abrader
157	Pithouse	Pithouse fill	Pithouse	621.01	Lapstone	Flat/Concave	1	Whole	No	Expedient	Moderate	Single	Concomitant	Lapstone
157	Pithouse	Floor	Pithouse	825.01	Mano	Trough	1	Whole	Heat cracked	Strategic	Moderate	Single	–	–
157	Pithouse	Floor	Pithouse	827.01	Pestle	Blank	1	Broken	Yes	Expedient	Unused	Unused	–	–
157	Pithouse	Floor	Pithouse	828.01	Pestle	Natural	1	Whole	Yes	Expedient	Moderate	Multiple	Concomitant	Polisher
157	Pithouse	Floor fill	Pithouse	905.01	Crystal	Crystal fragment	1	Broken	No	–	–	–	–	–
157.02	Posthole	Posthole	Pithouse	822.01	Raw material	Tools	1	Whole	No	–	Unused	Unused	–	–
160	Pithouse	Roof/wall fall	Pithouse	658.01	Metate	–	1	Broken	Yes	–	–	Recycled	Sequential	Fire-cracked rock
160	Pithouse	Floor fill	Pithouse	676.01	Raw material	Unaltered	1	Whole	No	–	Unused	Unused	–	–
160	Pithouse	Floor fill	Pithouse	716.01	Polisher	Pebble	1	Whole	No	Expedient	Light	Single	–	–
160	Pithouse	Floor fill	Pithouse	719.01	Raw material	Ornament	1	Sample	No	–	Unused	Unused	–	–
160	Pithouse	Floor	Pithouse	797.01	Pestle	Natural	1	Whole	Yes	Expedient	Moderate	Multiple	Sequential/Concomitant	Hammerstone
160	Pithouse	Floor	Pithouse	798.01	Lapstone	Flat/Concave	1	Broken	Heat cracked	Strategic	Moderate	Single	–	–
160	Pithouse	Floor	Pithouse	799.01	Handstone	–	1	Whole	Heat cracked	Expedient	Light	Multiple	Concomitant	Pestle
160	Pithouse	Floor	Pithouse	800.01	Fire-cracked rock	–	1	Broken	Heat cracked	–	–	–	–	–
160	Pithouse	Floor	Pithouse	801.01	Netherstone	Flat	1	Whole	No	Expedient	Light	Single	–	–
160	Pithouse	Floor	Pithouse	802.01	Mano	Flat/Concave	1	Broken	Heat cracked	–	Moderate	Multiple	–	Fire-cracked rock
160	Pithouse	Floor	Pithouse	803.01	Mano	Trough	1	Whole	Yes	Expedient	Moderate	Multiple	Concomitant	Lapstone
160	Pithouse	Floor	Pithouse	804.01	Mano	Flat	1	Whole	Heat cracked	Expedient	Moderate	Multiple	Sequential/Concomitant	Mortar
160	Pithouse	Floor	Pithouse	805.01	Handstone	–	1	Broken	–	–	–	–	–	–
160	Pithouse	Floor	Pithouse	806.01	Fire-cracked rock	–	1	Broken	Heat cracked	–	–	–	–	–
164	Pithouse	Floor fill	Pithouse	846.01	Fossil	Coral	1	Whole	No	–	Unused	Unused	–	Pigment
164	Pithouse	Floor fill	Pithouse	846.02	Fossil	Coral	1	Whole	No	–	Unused	Unused	–	Pigment
164	Pithouse	Floor	Pithouse	864.01	Pigment	Parent pigment	1	Sample	No	Expedient	Unused	Unused	–	–
164	Pithouse	Floor	Pithouse	865.01	Painted rock	–	1	Whole	No	Expedient	–	Single	–	–
164	Pithouse	Floor	Pithouse	866.01	Pestle	Cobble	1	Broken	Yes	Expedient	Light	Multiple	Concomitant	Netherstone
167	Pithouse	Floor fill	Pithouse	872.01	Lapstone	Flat/Concave	1	Whole	No	Expedient	Light	Multiple	Concomitant	Pestle
167	Pithouse	Floor	Pithouse	880.01	Abrader	Pebble	1	Whole	No	Expedient	Light	Single	–	–
167	Pithouse	Floor	Pithouse	882.01	Handstone	Flat/Concave	1	Whole	Yes	Expedient	Light	Single	–	–
167	Pithouse	Floor	Pithouse	883.01	Netherstone	Flat	1	Whole	No	Strategic	Moderate	Single	–	–
175	Pithouse	Floor	Pithouse	911.01	Mortar	Rock	1	Broken	Heat cracked	Expedient	Moderate	Single	–	–

Table B.1. Continued.

Feature	Feature Type	Designed Activity	Actual Activity	Length (cm)	Width (cm)	Thickness (cm)	Weight (gm)	Rock Type	Material Provenance	Residue	Color
0	Sheet trash	Paraphernalia	–	–	–	6.9	–	Tuff	Tucson Basin (material found in multiple locations in basin)	–	–
104	Pithouse	Ornamentation	Decorative	0.9	0.9	0.4	–	Turquoise	Tucson Basin (material found in multiple locations in basin)	–	–
120	Other	Food processing	Food processing	18.4	10.2	10.3	2,398.0	Granite	Tortolita and Santa Catalina mountains	–	–
120	Other	Food processing	Food processing	49.5	31.5	8.7	–	Gneiss	Santa Catalina Mountains	–	–
121	Trash	Cutting/Scraping	Manufacture	–	0.6	0.5	–	Andesite	Tucson Mountains	–	–
130	Pithouse	General processing	General processing	19.7	16	5.2	2,464.0	Quartzite	Rillito River	–	–
130	Pithouse	–	–	–	–	–	–	–	–	–	–
130	Pithouse	–	Multiple	–	–	–	–	Vesicular basalt/Andesite	Tucson Mountains	–	–
130	Pithouse	–	Multiple	–	–	–	–	Quartzite	Rillito River	–	–
130	Pithouse	Smoothing	Manufacture	7.8	3.9	2.1	75.0	Sandstone	Rillito River	–	–
130	Pithouse	Paraphernalia	–	1.2	1	0.6	–	Fossil	Tucson Basin (material found in multiple locations in basin)	–	–
130	Pithouse	Polishing	Pottery manufacture	4.6	2.8	1.4	24.5	Quartzite	Rillito River	–	–
130	Pithouse	Smoothing	Manufacture	6.6	2.4	1.6	34.0	Quartzite	Rillito River	–	–
130	Pithouse	General processing	Pigment processing	–	–	–	–	Hematite, earthy	Tucson Basin (material found in multiple locations in basin)	Pigment	10R 4/6
130	Pithouse	–	Multiple	–	–	–	–	Andesite	Tucson Mountains	–	–
130	Pithouse	Polishing/Smoothing	Manufacture	4.7	3.4	26	63.5	Quartzite	Rillito River	–	–
130	Pithouse	Paraphernalia	–	1.5	1.3	0.7	–	Fossil	Tucson Basin (material found in multiple locations in basin)	–	–
130	Pithouse	Paraphernalia	Ritual	8.4	5.1	0.7	–	Schist	Tortolita, Santa Catalina and Rincon mountains	–	–
130	Pithouse	Polishing	Pottery manufacture	7.3	2.9	2	78.0	Quartzite	Rillito River	–	–
130	Pithouse	General processing	Pigment processing	11.8	18.5	8.9	3,513.0	Granite	Tortolita and Santa Catalina mountains	Pigment	10R 3/4
130	Pithouse	General processing	Pigment processing	–	–	–	–	Hematite, earthy	Tucson Basin (material found in multiple locations in basin)	Pigment	10R 4/6
130	Pithouse	Polishing	Pottery manufacture	5.6	4.7	1.6	61.0	Basalt	Unknown	–	–
130	Pithouse	Polishing	Pottery manufacture	6.7	5.3	2.9	156.0	Quartzite	Rillito River	–	–
130	Pithouse	Food processing	Food processing	–	29.4	8	–	Gneiss	Santa Catalina Mountains	–	–
130	Pithouse	Food processing	Multiple	9.9	9.4	4.7	687.0	Granite	Unknown	–	–
130	Pithouse	Polishing	Pottery manufacture	4.7	3.6	2.2	53.5	Quartzite	Rillito River	–	–
130	Pithouse	Resource procurement	Unused	7.5	3.2	2	67.5	Quartzite	Rillito River	–	–
130	Pithouse	General processing	Pigment processing	14.3	8.3	6.6	1,110.5	Granite	Rillito River	Pigment	10R 3/4
130	Pithouse	General processing	Stone manufacture	10.4	7.6	3	327.0	Granite	Rillito River	–	–
130	Pithouse	General processing	General processing	18.1	15.6	4.2	1,861.0	Quartzite	Rillito River	–	–
130	Pithouse	General processing	Stone manufacture	17.1	14.8	5	1,669.0	Granite	Rillito River	–	–
130	Pithouse	–	–	–	–	–	–	Tuff	Tucson Mountains	–	–
130	Pithouse	–	–	–	–	–	–	Sandstone	Rillito River	–	–
130.02	Posthole	Food processing	Food processing	–	–	–	–	Andesite	Santa Cruz river	–	–
130.02	Posthole	Food processing	Food processing	–	–	–	–	Vesicular basalt/Andesite	Tucson Mountains	–	–
130.02	Posthole	Polishing	Manufacture	15.6	7.4	3	476.5	Sandstone	Rillito River	–	–
130.02	Posthole	General processing	General processing	16.9	8.9	7.6	2,058.0	Andesite	Santa Cruz river	–	–
134	Pithouse	Food processing	Food processing	17	8.8	4.3	–	Sandstone	Rillito River	–	–
134	Pithouse	–	–	–	–	–	–	Sandstone	Rillito River	–	–
134	Pithouse	–	–	8	6.2	0.5	–	Sandstone	Rillito River	–	–
134	Pithouse	–	–	11.7	7.6	4.6	520.0	Schist	Santa Catalina Mountains	–	–
134	Pithouse	Polishing	Manufacture	7.1	5.6	5.1	294.5	Quartzite	Rillito River	–	–
134	Pithouse	–	–	–	–	–	–	Granite	Santa Catalina Mountains	–	–
134	Pithouse	–	–	–	–	–	–	Quartzite	Rillito River	–	–
134	Pithouse	–	–	–	–	–	–	Vesicular basalt/Andesite	Tucson Mountains	–	–
134	Pithouse	–	–	–	–	–	–	Granite	Santa Catalina Mountains	–	–
134	Pithouse	–	–	–	–	2.9	–	Sandstone	Rillito River	–	–
134	Pithouse	Polishing/Smoothing	Stone manufacture	6.15	38.0	3.4	137.5	Quartzite	Rillito River	–	–
142	Pithouse	General processing	Manufacture	27.1	17.5	7.5	6,545.0	Gneiss	Rillito River	–	–
142	Pithouse	General processing	General processing	32	18.6	7.3	6,754.0	Granite	Rillito River	–	10R6/6

Table B.1. Continued.

Feature	Feature Type	Designed Activity	Actual Activity	Length (cm)	Width (cm)	Thickness (cm)	Weight (gm)	Rock Type	Material Provenance	Residue	Color
142	Pithouse	Food processing	Stone manufacture	14.7	11	8.2	1,704.5	Quartzite	Rillito River	–	–
147	Large pit	Food processing	Food processing	17.8	9.3	3.9	1,141.0	Quartzite	Rillito River	–	–
157	Pithouse	Polishing	Multiple	8.5	5.2	5.3	336.0	Quartzite	Rillito River	Pigment	2.5YR 4/6
157	Pithouse	General processing	Manufacture	13.2	8.1	7.3	1,202.0	Quartzite	Rillito River	–	–
157	Pithouse	Food processing	Food processing	16.9	10.5	4.6	1,324.5	Quartzite	Tortolita and Santa Catalina mountains	–	–
157	Pithouse	General processing	–	33	12.4	9.8	–	Granite	Rillito River	–	–
157	Pithouse	Food processing	General processing	25.5	11.9	8.8	4,117.5	Granite	Rillito River	–	–
157	Pithouse	Paraphernalia	Procurement	–	–	–	–	Quartz crystal	Unknown	–	–
157.02	Posthole	Resource procurement	Unused	9.9	9.3	6.9	879.5	Sandstone	Rillito River	–	–
160	Pithouse	Food processing	Multiple	–	–	–	–	Vesicular basalt/Andesite	Tucson Mountains	–	–
160	Pithouse	Resource procurement	–	6.4	4.5	1.1	50.5	Biotite	Unknown (loose micas from gneiss, schist or other coarse grained metamorphic rock)	–	–
160	Pithouse	Polishing	Manufacture	4.5	3.1	2.1	43.5	Quartzite	Rillito River	–	–
160	Pithouse	Ornamentation	Decorative	–	–	–	–	Muscovite	Unknown (loose micas from gneiss, schist or other coarse grained metamorphic rock)	–	–
160	Pithouse	General processing	Multiple	121.2	7.72	7.11	971.5	Sandstone	Rillito River	–	–
160	Pithouse	General processing	General processing	–	–	–	–	Granite	Tortolita and Santa Catalina mountains	–	–
160	Pithouse	General processing	Multiple	12.4	9.92	6.6	1,140.5	–	Rillito River	–	–
160	Pithouse	–	–	–	–	–	–	Granite	Santa Catalina and Rincon mountains	–	–
160	Pithouse	General processing	General processing	16	11.6			Granite	Rillito River	–	–
160	Pithouse	General processing	Multiple	–	–	–	–	Sandstone	Rillito River	–	–
160	Pithouse	Food processing	Pigment processing	18.5	8.9	4.4	1,125.0	Aplite	Rillito River	Pigment	10R 4/8
160	Pithouse	Food processing	Multiple	14.3	8.1	5.6	879.0	Sandstone	Rillito River	–	–
160	Pithouse	–	–	–	–	–	–	Quartzite	Rillito River	–	–
160	Pithouse	–	–	–	–	–	–	Rhyolite	Santa Cruz River	–	–
164	Pithouse	General processing	Pigment processing	–	–	–	1,068.0	–	Unknown	–	–
164	Pithouse	General processing	Pottery manufacture	–	–	–	1,295.0	–	Unknown	–	–
164	Pithouse	General processing	Pigment processing	–	–	–	45.0	Hematite/Limonite	Unknown	Pigment	10YR 6/6
164	Pithouse	Paraphernalia	Ritual/Symbolic/Decorative	12.1	9.2	3.5	462.0	Sandstone	Rillito River	Pigment	2.5YR 3/6
164	Pithouse	General processing	Multiple	–	12.6	8.2	–	Granite	Rillito River	–	–
167	Pithouse	General processing	Multiple	16.3	11.2	5.5	1,619.0	Quartzite	Rillito River	–	–
167	Pithouse	Abrading	General processing	6.6	5.1	2.8	135.0	Granite	Rillito River	–	–
167	Pithouse	General processing	General processing	12.9	9.1	6.8	1,191.5	Sandstone	Rillito River	–	–
167	Pithouse	General processing	General processing	39.3	26.1	5.5	7,213.5	Quartzite	Rillito River	–	–
175	Pithouse	General processing	Pigment processing	15.4	6.4	12.6	–	Granite	Rillito River	10R 4/8	

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