A CULTURAL RESOURCE AND HISTORIC BUILDING SURVEY FOR A REMEDIAL INVESTIGATION/FEASIBILITY STUDY AT THE IRON KING MINE-HUMBOLDT SMELTER SUPERFUND SITE, DEWEY-HUMBOLDT, YAVAPAI COUNTY, ARIZONA

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CULTURAL RESOURCE, ENVIRONMENTAL MANAGEMENT AND GIS SERVICES

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Archaeological Consulting Services, Ltd.
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SHPO Standardized Report Abstract

REPORT TITLE: A Cultural Resource and Historic Building Survey for a Remedial Investigation/Feasibility Study at the Iron King Mine-Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

DATE OF REPORT: November 10, 2008

AGENCY PROJECT NO.: EP-W-06-004: Environmental Protection Agency (EPA)

ACS PROJECT NO.: 08-051-02

LAND OWNERSHIP: Private

REGULATORY CONTEXT: Section 106 of the National Historic Preservation Act of 1966 (NHPA); EPA

PERMIT: Arizona State Museum (ASM) Blanket Permit 2008-008bl

PROJECT DESCRIPTION: The Environmental Protection Agency (EPA) is conducting a Remedial Investigation/Feasibility Study (RI/FS) at the Iron King Mine-Humboldt Smelter Superfund Site. The Superfund Site lies near Dewey-Humboldt in Yavapai County, Arizona. Archaeological Consulting Services, Ltd. (ACS) was contracted to conduct archival research, an historic building survey, and an intensive Class III pedestrian cultural resources survey of the Superfund Site to provide an inventory and assessment of cultural resources that might be affected by the proposed undertaking.

LOCATION: The project APE lies in Sections 14, 15, 16, 22, and 23 Township 13 North, Range 1 East (Gila and Salt River Baseline and Meridian) as depicted on the United States Geological Survey (USGS) Prescott Valley South, Poland Junction, Humboldt, and Mayer 7.5' topographic quadrangles west and south of Dewey-Humboldt, Yavapai County, Arizona.

SURVEYED ACRES: 265.1 acres
105 acres/unsurveyed

METHODOLOGY: Archival research was conducted at the Arizona Department of Mining and Mineral Resources in Phoenix, at Sharlot Hall Museum in Prescott, and at the Dewey-Humboldt Historical Society in Dewey-Humboldt. Published materials on the general history of the Humboldt area and mining in Arizona were located at Arizona State University Hayden Library. The project historian also interviewed Skip Rains, a historian with of the Dewey-Humboldt Historical Society.

As the project area is within a Superfund Site with ground contamination of arsenic and lead at levels exceeding health and safety standards, all field crew members had current certification of 24–40 hours of Hazwopper training prior to commencing fieldwork. The fieldwork was conducted by ACS archaeologist Chris Rayle, historian Scott Solliday, spatial analyst Joseph Kliner, and staff scientist Jessica Jensen on September 9–12, 2008. In addition to the historic building survey, the parcels were systematically examined via parallel pedestrian transects spaced not more than 15 m apart. The ground was closely examined for isolated artifacts, artifact scatters, trash dumps, rock alignments, ash, stained soil, or other indications of cultural activity. A Trimble GeoXH receiver with a

Zephyr antennae attachment was used to plot the project area and cultural resources.

NUMBER OF SITES: 2; AZ N:7:430(ASM), AZ N:8:71(ASM)

ELIGIBLE SITES: 2; AZ N:7:430(ASM), AZ N:8:71(ASM)

UNKNOWN ELIGIBILITY: None

NOT ELIGIBLE SITES: None

COMMENTS: ACS's intensive cultural resource survey of the Iron King Mine-Humboldt Smelter Superfund Cleanup Site identified two cultural resources: AZ N:7:430(ASM)/Iron King Mine and AZ N:8:71(ASM)/Humboldt Smelter. Within these two sites, 30 standing structures, representing a combination of modern and historic architecture dating from the early to late twentieth century, were evaluated as part of the historic building survey.

As the archival research for this project demonstrates, the Iron King Mine/AZ N:7:430(ASM) played a significant role in the historic development of the Big Bug Mining District with a period of historic significance from 1899, when Hagen began small scale mining on the property, through the end of the historic period, 1959. A secondary area of historic significance for the property is within the context of Arizona homesteading, relating to the Bybee Homestead in Lot 2 of Section 15; the Bybee Family occupied this property from 1920 until after the end of the historic period. Although the buildings and structures once associated with this homestead have been demolished, their archaeological remains were located during the pedestrian survey.

As part of this investigation, the Iron King Mine property was assessed for eligibility as a historic district for listing on the National Register of Historic Places (National Register). Although the property was found through archival research to be potentially eligible under Criterion A for its association with events that have made a contribution to the broad patterns of local or regional history, the integrity of the property was so compromised that it was found to no longer communicate its historic character. This is due to the recent demolition of all but a few of the dozens of historic buildings, structures, and features on the property that were associated with the mine, as well as the significant amount of ground moving that has occurred since the mine ceased operation. The property no longer retains integrity of setting, feeling, or association. Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the five still extant historic buildings and structures that predate 1959, all—either individually or as part of a historic district—are recommended to be ineligible for listing on the National Register due to losses of integrity or lack of historic significance under Criterion C for architectural merit. The core buildings and structures that together were the heart of the industrial mining complex have been destroyed; the ancillary buildings and structures that remain are of secondary significance and with the loss of the core complex, are found to hold little historical significance on their own. Twenty-one modern structures were built in 1960 or later, and are, therefore, ineligible for inclusion into the National Register of Historic Places based on age. However, the results of the Class III pedestrian survey indicate that the Iron King Mine/AZ N:7:430(ASM) has a demonstrated potential to yield important information regarding the early history of the Big Bug Mining District and homesteading in the region (Criterion D).

Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as eligible for listing on the National Register under Criterion D.

The archival research also demonstrated that the Humboldt Smelter/AZ N:8:71(ASM) also played a significant role in the historical development of the Big Bug Mining District, and therefore was potentially eligible for the National Register as a historic district under Criterion A with a period of historic significance from 1870 to 1937 when the smelter ceased operations. Like the Iron King Mine property, the integrity of the Humboldt Smelter property was so compromised that it was found through this investigation to no longer communicate its historic character. This is due to the past demolition—and removal to another property, in the case of several Nobb Hill dwellings—of all but a few of the dozens of historic buildings, structures, and features that once were present on the property and were associated with the smelter, the associated Nobb Hill residential area, and other historic activities from the period of significance. The property no longer retains integrity of setting, feeling, or association. Therefore, the Humboldt Smelter/AZ N:8:71(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is also recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the four historic standing structures identified on the property, F2 and F4 date to the period of significance (1870–1937), while F1 and F3 date to later periods. However, all of these buildings are recommended as ineligible for National Register listing either individually or as part of a historic district under Criterion C (architectural merit) due to lack of integrity. However, the results of the Class III pedestrian survey indicate that the Humboldt Smelter/AZ N:8:71(ASM) has the potential to yield important information regarding the history of the Big Bug Mining District, as well as information pertinent to the prehistoric and historic past within the greater region (Criterion D). Therefore, AZ N:8:71(ASM) is recommended as eligible for listing on the National Register of Historic Places.

On both the Iron King Mine/AZ N:7:430(ASM) and the Humboldt Smelter/AZ N:8:71(ASM) properties, the cultural features were found to be concentrated into distinct loci that correlated with relative age, cultural affiliation, and/or function. Therefore, research loci were delineated for all feature clusters as a management tool to allow for clarity and efficiency in evaluation, reporting, and recommendations. Each locus is defined in terms of content and spatial extent in the Results section of this report.

Avoidance is recommended for those loci that are recommended as contributing to the National Register eligibility of the Iron King Mine/AZ N:7:430(ASM) and Humboldt Smelter/AZ N:8:71(ASM). These contributing elements include Locus 1 at the Iron King Mine/AZ N:7:430(ASM), as well as Loci 1, 3, 4, and 6 at the Humboldt Smelter/AZ N:8:71(ASM). If avoidance is not possible, ACS recommends archaeological testing (Phase 1 data recovery) to determine the depth and character of the features in these loci prior to any ground disturbance activities. All remaining identified loci, which includes Loci 2–4 at AZ N:7:430(ASM) and Loci 3 and 5 at AZ N:8:71(ASM), have been determined to be non-contributing elements with no further research potential. For these non-contributing elements, no further cultural resources work is recommended.

Additionally, ACS identified an unmarked historic gravesite on the northeastern edge of the mine tailings within the boundaries of the Iron King Mine/AZ N:7:430(ASM). Although there is a wood marker at the grave, it has no writing on it indicating the identity of the individual buried there, and thus, provides no lead for the identification of the next of kin. Therefore, the burial will need to be treated as an unmarked burial in an unregistered cemetery. The probable non-

Native American, historic burial is located within the Area of Potential Effect (APE) and, therefore, if it cannot be avoided prior to ground disturbing remediation activities, it must be disinterred and relocated according to state laws pertaining to unmarked and unregistered cemeteries and graves (ARS 41-844 and 41-865). As part of the required protocols for disinterring unmarked burials in unregistered cemeteries for reburial elsewhere, steps must be taken to attempt identification of the buried individual and their next of kin, including archival research, oral interviews of local inhabitants, and notice in the local newspaper. If next of kin are identified, consultation must proceed with them to determine their preferences for the final treatment and disposition of the disinterred individual. Specific permits and a Court Order may also be required before the disinterment can occur.

Given that both the Iron King Mine and Humboldt Smelter properties are Superfund Sites with portions of those properties heavily contaminated with lead and arsenic, health and safety concerns must be a consideration in terms of implementing the recommended treatments of their cultural resources. If avoidance of those loci recommended for archaeological testing is deemed infeasible in regards to implementing an effective remediation program at either of the properties, assessment of the contaminant levels in those locations will be needed before undertaking archaeological excavations. If contaminant levels are deemed a health or safety concern, no further cultural resources work is recommended. The health and safety of the archaeological field crews must take precedence over any proposed treatment of cultural resources. However, should contamination levels be too great to proceed with the recommended archaeological work, consultation with the State Historic Preservation Office and County officials by the EPA will be needed to determine the appropriate measures to be taken in regards to the unmarked historic burial on the Iron King Mine/AZ N:7:430(ASM) property.

In the event that any significant cultural resources are subsequently discovered during unmonitored construction activities in either parcel, all work in the vicinity of the find should stop and Mr. John Madsen of the Arizona State Museum (ASM) should be notified immediately. If human remains are encountered during any phase of the project, all work in the vicinity must stop and Mr. John Madsen of the ASM must be notified immediately pursuant to state and Federal law.

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Introduction

The Environmental Protection Agency (EPA) is conducting a Remedial Investigation/Feasibility Study (RI/FS) at the Iron King Mine-Humboldt Smelter Superfund Site. The Superfund Site lies near Dewey-Humboldt in Yavapai County, Arizona (Figure 1). Since the project area has been designated an EPA Superfund cleanup site, federal law requires a cultural resource inventory and assessment prior to potential land-disturbing activities in compliance with Section 106 of the National Historic Preservation Act (NHPA).

Archaeological Consulting Services, Ltd. (ACS) was contracted to conduct archival research, a Class III intensive cultural resource, and historic building survey to provide an inventory and assessment of cultural resources that might be affected by the remediation. The survey, conducted under noncollection permit 2008-008bl issued by the Arizona State Museum (ASM), was performed by ACS archaeologist Chris Rayle, historian Scott Solliday, spatial analyst Joseph Kliner, and staff scientist Jessica Jensen on September 9–12, 2007. In consultation with ASM, both the Iron King Mine and the Humboldt Smelter received site numbers; the boundaries for each were based upon the legal parcel boundaries. The Iron King Mine property has been designated as AZ N:7:430(ASM) and the Humboldt Smelter property has been designated as AZ N:8:71(ASM). Eligibility assessment of each property resulted in recommendations that both the Iron King Mine/AZ N:7:430(ASM) and the Humboldt Smelter/AZ N:8:71(ASM) are eligible for listing on the National Register under Criterion D for the potential to yield information about the history of the region. In total, the survey identified 105 historic and modern features within 10 loci at the two sites. Based on the results of this survey and background research, both historic properties could be affected by the proposed undertaking.

Project Area

The project area lies in Sections 14, 15, 16, 22, and 23 Township 13 North, Range 1 East (Gila and Salt River Baseline and Meridian) (Figure 1). The project's area of potential effect (APE) consists of two parcels identified during EA's cursory review of the Superfund Site as probable sources of contamination. Specifically, these parcels included the 198.2 acre Iron King Mine APE and the 171.9 acre Humboldt Smelter APE (Figures 2 and 3). However, "hot zones," which are areas of lead and arsenic contamination such as tailings and ash piles, reduced the surveyable areas within the Iron King APE to 114.2 acres and 150.9 acres within the Humboldt Smelter APE.

The Iron King Mine APE lies within a series of northwest-southeast trending ridges and alluvial fans consisting of gravely sandy clay loams on 5 to 30 percent slopes (USDA 1976). Elevations range from 4,600 ft amsl at the Chaparral Gulch on the north side of the property up to 4,800 ft amsl on the ridge tops (Figure 1). However, the topography of the Iron King Mine APE varies considerably due to 60 years of active mining, and mining related activities. Specifically, these mining related activities have re-contoured the majority of the natural landscape creating a heavily disturbed, pockmarked, and unnaturally rolling landscape which includes: a large tailings pile, mineshafts, ponds and reservoirs, waste rock disposal areas, landfill, building ruins, and overburden storage areas (Figures 2 and 4). Vegetation observed within the APE includes: ironwood, jojoba, manzanita, scrub oak, juniper, seep willow, brittlebush, bursage, broom snakeweed, buckwheat, and various understory grasses.

The Humboldt Smelter APE lies east of the Iron King Mine APE within an area of plains and mesa tops (Figure 1). Specifically, the majority of Humboldt Smelter APE lies on a wide mesa overlooking the Chaparral Gulch to the southwest and the Agua Fria River to the east-southeast (Figure 3). Soils in this area consist of gravelly sandy clay loams to very rocky loams located on 5 to 60 percent slopes (USDA 1976). Similar to the Iron King Mine APE, areas of the Humboldt Smelter APE have been subjected to re-contouring due to previous smelter related activities, including demolition episodes which have reduced the former smelter facility location to an industrial wasteland of ash and slag piles, push piles, and construction rubble (Figures 3 and 5). In total, ACS examined 265.1 acres on privately owned lands.

Culture History

Preceramic Period

The Paleoindian period (10,000–7,500 B.C.) represents the earliest well-documented occupation of North America. Paleoindian lifeways were based on small, nomadic bands that hunted megafauna and gathered wild plants. Sites from this period have been found in southern Arizona (Cordell 1984; Haury 1950; Huckell 1982, 1984), and Pleistocene megafauna (Tessman et al. 2000) and isolated projectile points (e.g., Anduze et al. 1999; Fish and Fish 1977; Motsinger et al. 2000) have been discovered in the Verde Valley and the grasslands north of Walnut Creek. However, no Paleoindian sites have been reported in the Prescott area.

The Archaic period (7,500 B.C.–A.D. 300/500) is divided into Early, Middle, and Late. Early Archaic (7,500–4,800 B.C.) people followed a generalized hunter-gatherer lifeway and a subsistence-settlement strategy involving high residential mobility, annual procurement rounds, and a wide interaction sphere. By the Middle (4,800–1,500 B.C.) and Late Archaic (1,500 B.C.–A.D. 300), populations began settling in semi-permanent and/or permanent villages of circular pithouses where inhabitants focused on cultivating maize and foraging for wild plants (Fish et al. 1986; Huckell 1990; Mabry et al. 1997; Roth 1992). Significant Archaic period occupations have been reported in southern Arizona and the Tucson Basin (e.g., Doyel 1993; Hackbarth 1998; Haury 1957; Huckell 1990; Mabry and Archer 1997; Mabry et al. 1997; Roth 1992). Archaic sites and projectile points dating to this period have been found in the Black Hills and areas north of Prescott, but none have been documented near the current project area.

Ceramic Period

The transition from the Archaic to the Ceramic period—characterized by a shift to a more sedentary, agricultural adaptation and the widespread adoption of pottery—marked the emergence of Formative cultural traditions in the Southwest. In the Prescott region, a cultural tradition known as the Prescott Culture exploited the Juniper, Sierra Prieta, and northern Bradshaw Mountains, as well as the grasslands of adjacent valleys (Macnider and Effland 1989; Stone 1987). Their neighbors included the Hohokam to the south and east, the Mogollon to the east and southeast, the Sinagua to the northeast, the Patayan to the west, the Anasazi to the north and northeast, and the Cohonina to the north.

The origins and cultural affiliation of the Prescott Culture are unclear. Colton (1939) first outlined the basic chronology and characteristics of the Prescott Culture, which he interpreted as affiliated with the Patayan culture of western Arizona. Schroeder (1979; Schroeder 1980) argued that they were a branch of the Hakataya culture, and explained any cultural similarities to the Hohokam as the result of diffusion. Other researchers (e.g., Euler 1958, 1982; Euler and Dobyns 1962; Wood 1980) questioned these interpretations, arguing that the Prescott Culture represented an indigenous development with major influences from the Hohokam area. More recently, Motsinger and others (2000) have proposed a relationship to the southern Sinagua, who inhabited the Flagstaff area and the Verde Valley. It is likely that all these groups influenced their development; archaeological work has found ample evidence of intensive Hohokam occupation from east of the Agua Fria River to west of the Bradshaw Mountains (Macnider and Effland 1989; Motsinger et al. 2000; Punzmann 2000; Stone 1987).

The Ceramic period for the Prescott area has been divided into six temporal phases: Early Formative (A.D. 200–600), Agua Fria (600–850), Prescott (850–1050), Copper Basin (1000–1150), Chino (1100–1300), and Willow Creek (1300–1500) (Motsinger et al. 2000). Early Formative period occupation was characterized by small farming villages made up of shallow pithouses; artifact assemblages show a continuation from Archaic-period tool kits (e.g., Cienega-style projectile points) with the addition of plain ware ceramics (Punzmann et al. 1998; Rapp 2000; Weaver and Rodgers 1999).

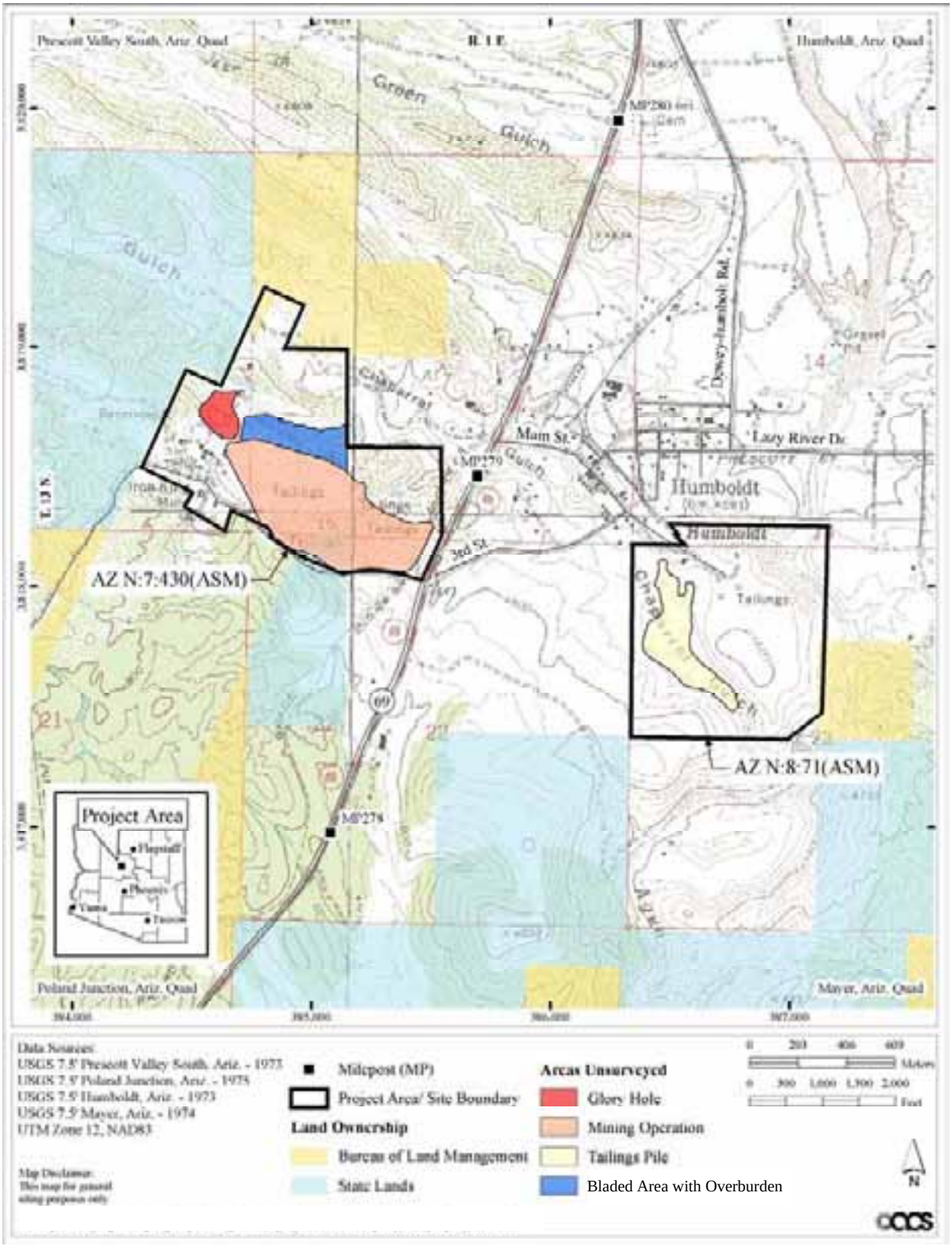

Figure 1. Portions of the USGS 7.5' Prescott Valley South, Poland Junction, Mayer, and Humboldt, Ariz., topographic quadrangles depicting the location of the APE and land jurisdiction.

Figure 2. Aerial photograph of the Iron King Mine APE.

Figure 3. Aerial photograph of the Humboldt Smelter APE.

Figure 4. Overview of the Iron King Mine APE taken from the western boundary facing east.

Figure 5. Overview of the Humboldt Smelter APE taken from smelter location facing southwest.

By the Agua Fria phase, distinctive Hohokam cultural traits, including extensive pithouse villages, imitation buff ware pottery, ceramic figurines, shell artifacts, and other items associated with the Hohokam exchange network began to appear (Horton 2000; Punzmann et al. 1998; Weaver 1996).

The Prescott phase marks the emergence of the Prescott Culture, as defined by diagnostic ceramic types—Prescott Gray Ware, Aquarius Orange, Prescott Black-on-gray—and formal, earthen-walled rectangular pithouses with rounded corners (Barnett 1981; Colton 1939; Horton 2000; Macnider and Effland 1989; Spicer and Caywood 1936; Wood 1980). The Copper Basin phase was recently proposed to account for the numerous sites that appear architecturally transitional between the traditional Prescott and Chino phases (Motsinger et al. 2000:6–7). No absolute dates exist for this poorly understood phase; the primary diagnostic characteristic appears to be the presence of stone-outlined pithouses, sometimes appearing contemporaneously with earlier earthen-walled styles (Euler and Dobyns 1962; Jeter 1977; Macnider and Effland 1989; Ward 1975).

In the Chino phase, above-ground masonry or adobe architecture became common; however, settlements included both pueblos and pithouse-pueblo hamlets, as well as fortified hilltop structures. Settlement pattern was characterized by a gradual shift from valley floors to the upland areas. Artifact assemblages remained relatively unchanged, suggesting continuity in subsistence strategies (Barnett 1981; Colton 1939; Macnider and Effland 1989; Ward 1975; Wood 1978). By the end of the Chino phase, population in the Prescott area decreased significantly. Evidence for the subsequent Willow Creek phase comes from only one site, and diagnostic architectural and artifactual styles are still unclear; however, absolute dates derived from maize place its occupation ca. A.D. 1420–1690 (Grossman 2000; Higgins 2000; Motsinger et al. 2000). Towards the end of the Willow Creek phase, Pai bands began moving in from the west and settling the peripheral areas. Sites containing both Tizon and Prescott Gray wares, as well as Pai-style projectile points, suggest the Pai likely intermingled with remnant Prescott Culture groups (Motsinger et al. 2000:8).

Protohistoric-Historic Period

The Protohistoric period (A.D. 1519–1692) is defined as the time between the Spanish conquest of Mexico, when European influences were first being felt in the Southwest, to the reconquest of New Mexico after the Pueblo Revolt, which signaled the establishment of a permanent European presence in the New World (Gilpin and Phillips 1998). The cultural parameters of this definition include the Spaniards and at least 20 Native American groups representing at least six language families. The cultural affiliations of the tribal groups, however, were not fixed entities but changed throughout the Protohistoric period as a result of biological and cultural exchange between groups (e.g., Brugge 1963, 1981; Carlson 1965; Gilpin and Phillips 1998; Malhi et al. 2003).

When Spanish missionaries entered the Colorado Plateau, they encountered several distinct groups of native people: the Hopi, the Zuni, and various Yuman-speaking tribes of the Lower Colorado River. Later, immigrant groups—including Apaches, Navajos, Paiutes, and Anglo-American settlers—began to arrive and compete for territory and resources (Gilpin and Phillips 1998). The extant Native American groups who claim ancestral or traditional ties to the greater project area include the Prescott-Yavapai and the Yavapai-Apache; others more geographically distant include the Colorado River Indian Tribes (Chemehuevi and Mohave), Hualapai, and Hopi.

Native American Groups

Hualapai, Yavapai-Prescott, and Yavapai-Apache

The name Hualapai or “ponderosa pine people” refers to one of 13 regional Yuman-speaking Northern Pai bands whose members lived at the western base of the Hualapai Mountains (Kniffen et al. 1935:39). In the Protohistoric period, the Northern Pai were largely surrounded by mutually hostile tribes, especially the Yavapai, Apache, and Mohave, and were often beset by internal factionalism and conflict (Dobyns and Euler 1970; Khera and Mariella 1983). The Yavapai, a Southern Pai group, was

linguistically separate from the Hualapai and further distanced from other Pai groups by their close relationship with the Athapaskan-speaking Apaches (Russell 2002). To the east and northeast, the Pai were separated from the Pueblo and Navajo peoples by a substantial expanse of plateau lands, but they maintained generally peaceful trading relationships with these groups (Khera and Mariella 1983:40; Schwartz 1983).

Northern Pai contact with Europeans began in 1776, when Spanish missionary Father Garcés traversed the narrow corridor between present-day Kingman and Peach Springs (McGuire 1983:27); this was followed by intermittent contact in the 1850s by U.S. Army explorers. However, sustained interaction with groups in the Southern Pai territory did not begin until the Hualapai War of 1866, which was sparked by the murder of Wauba Yuma, a respected Pai leader, by Anglo settlers. The two principal U.S. garrisons in the conflict were stationed at Fort Mohave on the Lower Colorado River and at Fort Whipple, north of Prescott (Dobyns and Euler 1970:71). The war ended in 1869 with the surrender of the principal Pai war leaders, Cherum and Leve Leve.

In 1883, a 900,000-acre reservation—representing only a small portion of their former territory—was created for the Hualapai along the Colorado River (McGuire 1983:27). The Yavapai and Apache remain two distinct indigenous groups culturally and linguistically, but have coexisted as one Indian tribal nation since 1934; the Yavapai-Apache Reservation spans 665 acres in the four communities of Camp Verde, Middle Verde, Clarkdale, and Rimrock. The Yavapai-Prescott Indian Tribe, comprised of approximately 160 members, occupies a 1,395-acre reservation adjacent to the City of Prescott.

Chemehuevi

The Chemehuevi are a Southern Paiute group who historically occupied the territory northwest of the Mohave along the Lower Colorado River between modern Lake Havasu and Las Vegas (Spier 1978:9). Traditionally, the Chemehuevi were hunters and gatherers who exploited the desert west of and along the Lower Colorado River. Historically, the Chemehuevi were heavily influenced by the Mohave, from whom they adopted pottery forms, floodplain farming strategies, house types, song series, and an emphasis on dreams and their meanings (Kelly and Fowler 1986:368–370). Although the two tribes sometimes fought each other, once the Chemehuevi became involved with the hostilities in the Lower Colorado River they often united with the Quechan and Mohave against the Cocopah and Halchidhoma (Kelly and Fowler 1986:370). The current Chemehuevi Reservation is located in California, between the Fort Mohave Reservation and the Colorado River Indian Tribe Reservation (CRIT). The Mohave gave the Chemehuevi the right to settle and farm in this area, which is now called the Chemehuevi Valley (Stewart 1983:55). The Chemehuevi Reservation has a population of approximately 500 persons on an area of just over 30,000 acres (Tiller 1996:248), but some of its members reside on the CRIT.

Mohave

The traditional Mohave territory extends along the Lower Colorado River from Lake Mohave (north of Davis Dam) to Tyson Wash on the CRIT, and to the east and west across the Basin and Range province (Stewart 1983:55). Their prehistoric ancestors likely exploited a larger territory as part of the hunting and gathering Mojave Desert/Great Basin peoples; however, by the Historic period, the Mohave primarily occupied the Mohave Valley and the vicinity of the present-day CRIT. In 1859, following the establishment of the reservation, a group of Mohaves from the Mohave Valley moved into this area, but a significant group remained in the Mohave Valley (Stewart 1983:55).

Mohave subsistence patterns were similar to those of other Yuman tribes along the Lower Colorado River. Agriculture, usually in arable lands along the river bottom, was the primary subsistence activity (Stewart 1983:57–59). The Mohave tribe was traditionally divided into at least three bands according to territory, and each band was further subdivided into local groups with one or more leaders; however, at least during the Historic period, there was an overall leader for the entire tribe. Mohave social organization was based on patrilineal clans. Religious leaders among the Mohave were shamans. As with the other Yuman tribes along the Colorado River, dreaming and dreams were an important component of

religion, with some dreams bringing "power" to the dreamer, and investing the shaman with the ability to cure disease as well as cause it. The most important ceremonies for the Mohave, as for other Yuman tribes along the Colorado River, were the rituals associated with death and subsequent commemorative mourning ceremonies (Stewart 1983:62–67).

Hopi

The Hopi believe themselves descended from the Anasazi, the prehistoric Ancestral Pueblo people of the Colorado Plateau and northern New Mexico (Brew 1979); Hopi oral tradition traces their distant roots even further back to the Archaic hunters and gatherers of the Southwest. Archaeological evidence—including pottery style evolution, architecture, and material culture—suggests that the prehistoric and protohistoric Puebloans living along the Little Colorado River likely were the direct ancestors of the Hopi (Adams and Hays 1991).

The Hopi currently live in villages on and around First, Second, and Third Mesas on the Hopi Reservation in northeastern Arizona. The reservation comprises more than 1.5 million acres and has a population of over 10,000 residents (Arizona Commission of Indian Affairs 1993). In addition, several Hopi villages are located at Moenkopi, just south of Tuba City on the Navajo Reservation; through litigation with the Navajo, these villages have only recently been added to the Hopi Reservation (Connelly 1979). Most of these villages have long occupational histories; the village of Hano on First Mesa was established by the Tewa, a Rio Grande Puebloan group, after the Pueblo Revolt of 1680 (Dozier 1966).

Anglo-American Occupation

Soon after the Arizona Territory was created in 1863, gold was discovered along the Hassayampa River and Lynx Creek, and thousands of miners quickly moved into the mountains of central Arizona in search of new strikes. Fort Whipple was established on Granite Creek, north of the Bradshaw Mountains, and served as the first territorial capital until the town of Prescott was built nearby in the following year (Sheridan 1995:70). Prescott was the first permanent settlement north of the Gila River, and continued to be the largest commercial center for the northern region of Arizona.

Despite the rapid growth of Prescott, aside from some large well-developed mines, there were few other settlements in the area. King S. Woolsey started a ranch on the Agua Fria River east of Prescott, but abandoned the effort after several years of fighting off bands of Apaches and Yavapais that frequently came to run off his livestock (Sheridan 1995:72). Darrell Duppa, a notable Phoenix pioneer, built a stage station on the Agua Fria River, but this was also a short-lived venture (Granger 1985:342). By the 1870s the broad plain east of Prescott was known as Lonesome Valley, apparently due to its lack of residents (Granger 1985:349). Levi Bashford built a small stamp mill and smelter on the Agua Fria River, but it was abandoned when the local source of ore was depleted (Rickard 1987:204; Sayre 1985:38). A few small mining claims were filed for sites along Big Bug Creek, but there was no substantial activity in the area until the Prescott and Eastern Railroad was built in 1898 (Myrick 2001:150, 153; Sayre 1990:66, 70, 73). In the following year the Val Verde Copper Company was formed to build a large smelter on a site near the Agua Fria River that was close to both the railroad and several copper mines (Myrick 2001:156–157; Rickard 1987:204; Sayre 1985:38). The Val Verde Copper Company was also responsible for founding the first town in the area for the benefit of the hundreds of employees that were needed to run the smelter (Rains 2008; Swenson ca. 1988:11). However, the town of Val Verde flourished for just a few years. In September 1904 the smelter was destroyed by a fire and the company had no means of rebuilding the plant (Myrick 2001:158).

The Arizona Smelting Company was organized in 1905 to build a new smelter at the same location where the Val Verde smelter had been (Rickard 1987:204; Sayre 1985:38). A new company town was built one mile west of the Val Verde townsite, and on August 18, 1905, it was named Humboldt. Smelter officials formed the Humboldt Improvement Company to develop the new townsite (Swenson ca. 1988:11). George Colvocoresses, who would later become general manager of the smelter, was

responsible for planning construction of the modern planned community. A company rule stipulated that no saloons would be built west of the railroad spur to the smelter, so all of the saloons, brothels, and gambling houses that were needed for the entertainment of the smelter workers were located in the old townsite of Val Verde (Rains 2008).

The town of Humboldt was destroyed by fire in 1910, and again in 1916, after which the closely spaced wood frame building were replaced with concrete structures (Rains 2008). Humboldt was also hit hard by the influenza epidemic that swept the country in 1918. However, the biggest catastrophe that the town faced was a sudden drop in copper prices after the First World War. Smelter operations were cut back considerably, and there were times when all smelting activities ceased for several years. Humboldt had a population of about 1,200 in 1918, but by 1920, a quarter of the town's residents had left (Hatcher 2001:31–32; Leavitt 2003). By the 1930s only a few hundred people still lived in the town. In 1942 Shattuck Denn Mining Corporation bought the Iron King Mine property located just a mile to the west. With the beginning of large-scale mining operations in the area, it seemed that the town of Humboldt might again grow to be a sizeable community, but almost all of the miners chose to live in Prescott and take advantage of company-sponsored bus service that ran to the mine every day. Humboldt continued to be a very small community.

Archival Research Methods and Results

Archival research was conducted by ACS Senior Historian Scott Solliday at the Arizona Department of Mining and Mineral Resources in Phoenix, at Sharlot Hall Museum in Prescott, and at the Dewey-Humboldt Historical Society in Dewey-Humboldt. Published materials on the general history of the Humboldt area, mining in Arizona, and Sanborn Fire Insurance Maps for the Humboldt Smelter were located at Arizona State University Hayden Library. Unfortunately, no Sanborn Maps were located for the Iron King Mine; it does not appear to have been mapped by the fire insurance company. An interview with Skip Rains, a historian with of the Dewey-Humboldt Historical Society, provided considerable general information about the area, as well as identification and location of important features on the sites.

Iron King Mine

History of the Iron King Mine begins with the discovery of an ore outcropping in 1880. However, it was not until 1899 that J.R. Hagen developed a claim to the site, which held rich deposits of iron sulfide (pyrite), lead, and zinc, with minute amounts of gold, silver, and copper (Gilmour and Still 1968:1241; Pape 1987:81–82). In 1903 Hagen sold his original claim to American Copper Company of New York, which received a patent to the 412-acre Western Copper claim on May 16, 1904 (Figure 6) (Bureau of Land Management 2008). A small miners' camp was established near the mine, and the Prescott and Eastern Railroad (P&ERR) built the Iron King Spur to serve the new mine site (Sayre 1985:45). However, the American Copper Company had financial difficulties and in 1905 the American Gold and Copper Consolidated Mining Company took over the operation and started the first large scale production at Iron King in 1906. For the next two years the company concentrated oxide ores taken near the surface and was using cyanide treatment to recover small amounts of gold and silver (Mills and Hendricks ca. 1945; Myrick 2001:168).

By 1906, the miners' camp, with a population of about 300, including 140 employees of the mine, was called Blanchard, named for the Reverend Ben Blanchard, who was superintendent of the mine (Arizona Department of Mining and Mineral Resources (ADMMR) 1960; Gilmour and Still 1968:1241; Myrick 2001:168; Pape 1987:83; Sayre 1985:45). A small company store was built, and the Iron King Post Office was established in 1907. This settlement was located south of the mine, just south of the project area boundary (Rains 2008). It consisted of a long row of one- and two-bedroom frame cottages built along the broad ridge that extended to the south. A school, which served about 50 students at the camp, was also used as Rev. Blanchard's church on Sundays. While there was considerable activity at the site for a few years, by 1910 the mine was largely inactive and in 1915 it was shut down and many of the company buildings were torn down. For the next ten years the Iron King rail spur was used sporadically by other mines in the area.

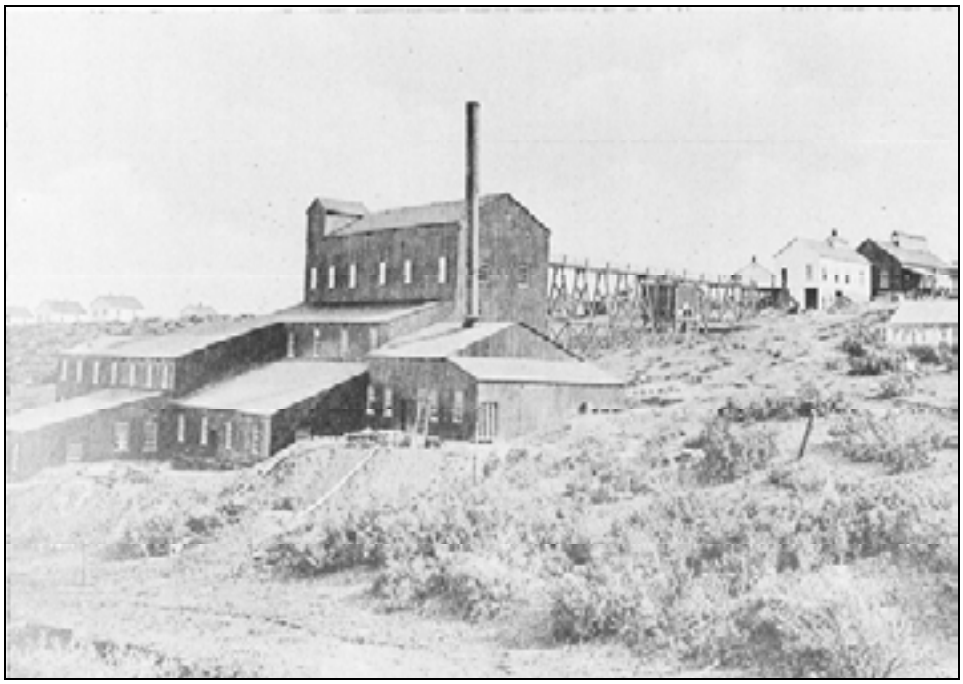

Figure 6. Ca. 1903—1905 Iron King Mine While Owned by American Copper Company (photograph courtesy of Sharlot Hall Museum).

Ownership of the Iron King property passed to several several different people. By 1922, the New York-based partnership of Bell, Doht, and Runyan owned the mine, which was leased to the Southwest Metals Company, operator of the nearby Humboldt Smelter. George Colvocoresses, Southwest Metals' general manager, used the Iron King Mine as a source of low grade sulphide ore to use as flux in the smelter's blaster furnace, but the high pyrite content gave unsatisfactory results (Mills and Hendricks ca. 1945). There was only sporadic production at Iron King through the 1920s (Figure 7), but total production of ore concentrates taken from the mine from 1905-1930 was valued at $100,000 (*Mining Journal* 1942).

As new manufacturing technology was developed in the 1930s, demand grew for lead and zinc as important industrial metals. The first large-scale production at Iron King was started by Fred Gibbs, a Prescott mining engineer who found investors to form the Iron King Mining Company (Myrick 2001:168; Pape 1987:83; Sayre 1985:45). In 1934 Gibbs put down a deposit to purchase the abandoned mine for delinquent property taxes that were owed, and ultimately took title to the site for only $100. He gained the support of Howard Fields, an ore buyer for American Smelting and Refining Company (ASARCO) of El Paso, Texas, New York investor Rod Burnham, and others who joined to form the Iron King Mining Company (IKMC) in 1937. Burnham was president of the company, and H.F. Mills was hired as general manager. Other top managers at Iron King included mine superintendent Clyde Betes and mill superintendent G.E. Jarpe (Barth 1939; *Mining Journal* 1942). IKMC began shipping oxide ores containing gold, silver, and zinc (Pierce 1978). The company initially spent $100,000 for construction of a mill and flotation system with a capacity of 100 tons per day (TPD). In the second year of operation the installation of a new bulk flotation plant increased the mill's capacity to 140 TPD, and several shafts were excavated to a depth of 200-300 feet (Arizona Department of Mining and Mineral Resources (ADMMR) 1960; Mills and Hendricks ca. 1945). In the following year a bank of Denver Sub A flotation cells boosted capacity to 225 TPD. In 1939 the Iron King Mine employed 65 men and was the largest producer of lead and zinc in Arizona. A cyanide plant was added to treat zinc tailings for additional recovery of gold, and by 1941 the mine was producing 1.5 million pounds zinc and 400,000 pounds lead, with small amounts of gold and silver as secondary products (*Mining Journal* 1942).

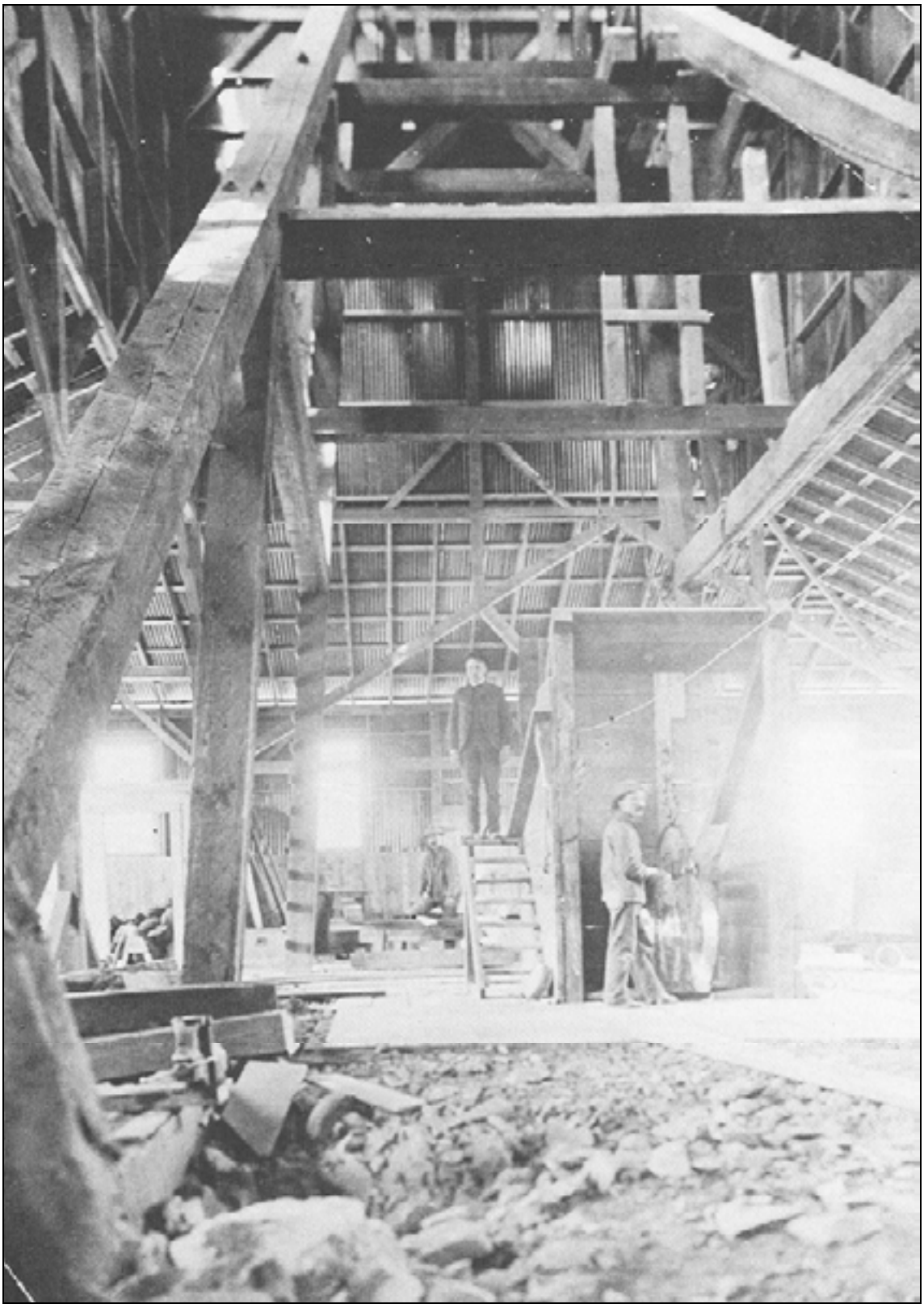

Figure 7. Ca. 1920s Interior View of Headframe and Hoisthouse at Iron King Mine (photograph courtesy of Sharlot Hall Museum).

By 1942 W.A. Gardiner was president of IKMC and A.L. Pessin was hired as the new mill superintendent. Up to 105 men were working at Iron King, and the mill was processing up to 250 TPD (*Mining Journal* 1942; Nebeker 1942a). Iron King Mine had expanded considerably over the previous few years (Figure 8). There were now 25 shafts, some up to 500 feet deep that were sunk 750 feet apart along a 1,500-ft vein. A new three-compartment shaft with a belt conveyor carried ore from the shaft to the mill bins. The mill's ore processing equipment included an I-R Imperial compressor crusher, cone crusher, 3x9-ft Denver ball mill, Dorr Classifier, jigs, 24 Fahrenwald flotation cells, and Dorrco filter. In 1942 the company expected to increase production 75% over the previous year, but ran into financial problems, and on July 1, 1942, sold the Iron King Mine property to Shattuck Denn Mining Corporation for $170,000 plus 30% of net profits for the next five years.

Shattuck Denn had successfully consolidated many mines near Bisbee in 1918, but now those mines were running out of ore, and most of the company's efforts became centered around development of the Iron King Branch (*Mining Journal* 1942; *Mining World* 1941; Nebeker 1942b). Iron King ore had consistently produced profitable levels of five metals, with each ton yielding on average 0.11 ounces of gold and 4.00 ounces of silver, with lead content at 2.5%, zinc at 7.6%, and copper at 0.22%, in addition to a large concentration of low grade iron which was only marginally useful as smelter flux (Mills and Hendricks ca. 1945; Myrick 2001:168). Shattuck Denn retained much of the old management and miners, including general manager Mills and mill superintendent Pessin. Shattuck Denn was interested in the mine site because work to date had exposed the upper part of a massive sulfide ore body consisting of narrow veins and lenses ranging from 2-14 feet in width and up to 400 feet in length (Pierce 1978; Sundeen 1964).

As the United States had just entered World War II, zinc production for war-related manufacturing was a national priority, and plans were made for again boosting Iron King's output. Installation of new equipment included an additional ball mill, classifier, and flotation cells and Wilfley concentrating tables (Arizona Department of Mining and Mineral Resources (ADMMR) 1942–1944; Mills and Hendricks ca. 1945). Ore was transferred from the mine shaft to the mill by a 24-inch conveyor belt. (Figure 9) The ore was first broken down with a Buchanan Blake crusher and a 24-inch Symons shorthead cone crusher, and then sent to two Marcy ball mills and two Dorr classifiers. Zinc sulfate, sodium cyanide, and thiocarbanilide were added to the ground ore and water as reagents, and the classifier overflow, consisting of 20% solids, was pumped to a bank of Denver Sub A flotation cells where Cresylic Acid and Z3 were added. The resulting lead concentrate was thickened and passed through a 4-foot 3-leaf Eimco disc filter.

Figure 8. Ca. 1945 Oblique Aerial View of Iron King Mine (photograph courtesy of ADMMR).

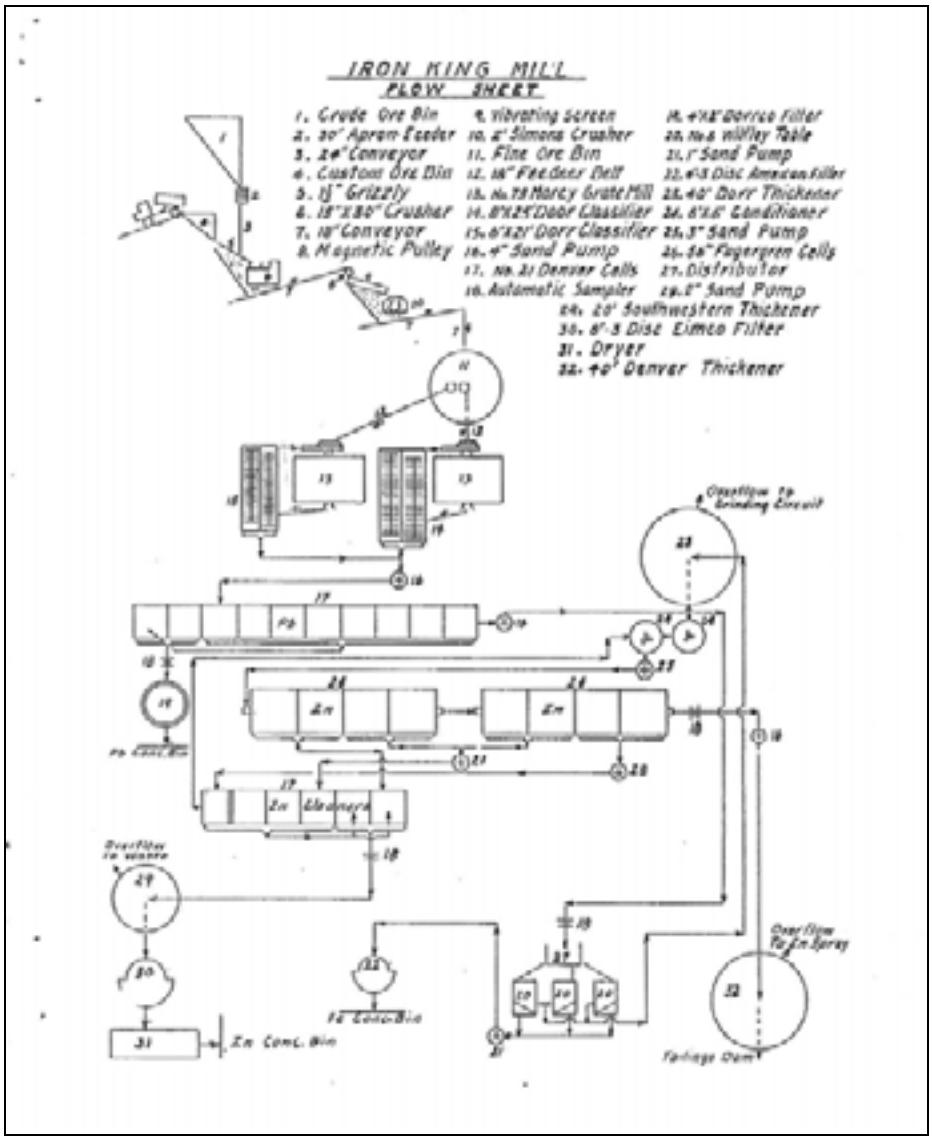

Figure 9. Ca. 1945 Flow Sheet of Milling Process at Iron King Mine (Mills and Hendricks ca. 1945).

For processing of zinc concentrates, leached tailings were soaked in a conditioner tank with hydrated lime and copper sulfate and pumped to a bank of Fagergren 56-inch flotation cells, and then to Denver Sub A No. 21 flotation machines. The zinc concentrates were run through a 6-foot 3-leaf Eimco filter, and then the filter cake was passed over a pan drier. The lead and zinc concentrates were transported by trucks to the railroad siding for shipment to Texas. Lead concentrates (30% lead) were shipped to ASARCO's El Paso smelter, and zinc concentrates (59% zinc) to the company's Amarillo smelter. Additional processing at these plants recovered gold and silver which provided much of Shattuck Denn's revenue (*Mining World* 1953a). After numerous plant expansions, by 1950, the Iron King mill processed 200,000 tons of ore for the year, yielding 20,000 ounces of gold, 800,000 ounces of silver, 10 million pounds of lead, and 20 million pounds zinc (*Engineering and Mining Journal* 1951).

Elmer R. Tompkinson was mine superintendent through the 1950s, and introduced new ore extraction techniques at Iron King (Myrick 2001:168). Previous underground development had been by shrinkage and open stope methods, involving simple removal of ore and waste materials (Sundeen 1964). However, as the mine was expanded to lower levels, there was concern that sudden caving of mined section could cause dangerous air blasts, so further mine development started horizontal-cut-and-fill

stoping (Figure 10) where non-metal bearing waste material was returned by conveyor to fill excavated sections. In addition to improving mine safety, the use of conveyors increased mine output from 450 TPD to 700 TPD, and the company planned to eventually boost production to 1000 TPD. In 1953 Shaft No. 6, which was down to 1780 feet below the surface, was the main operating shaft. A new shaft—Shaft No. 7—was opened, and by mid-1954 it had been extended down to the 1780-ft level, connecting with Shaft No. 6 (Mills and Bombardieri 1956; *Mining World* 1953a, 1953b, 1954). Two years later Shaft No. 7 was taken down to 1,940 feet below the surface, opening up levels 18 and 19. See Figure 11 for an aerial photograph taken of the facilities in 1955.

In 1956 H.P. Mills, who had managed Iron King operations for nearly 20 years, retired. In 1958 Dan M. Kentro became general manager of the mine. Shaft No. 7 was extended down to 2,450 feet, and the mill continued to process ore at a steady rate of about 1000 TPD, using flotation and cyanidation of flotation tailings (*Mining World* 1958). Most mining activity in the surrounding area had ended, but Iron King continued to operate at full production levels with 225 employees (*Phoenix Gazette* 1958). By the end of the decade the Iron King Mine shipped most of the zinc and lead produced in Arizona, and was the state's largest silver producer and third largest gold producer. In 1959 the Shattuck Denn processed 330,000 tons of ore at the site with a mineral content of 34.8 million pounds zinc, 12 million pounds lead, 469,000 pounds copper, 26,837 ounces gold, and 862,780 ounces silver (Arizona Department of Mining and Mineral Resources (ADMMR) 1960).

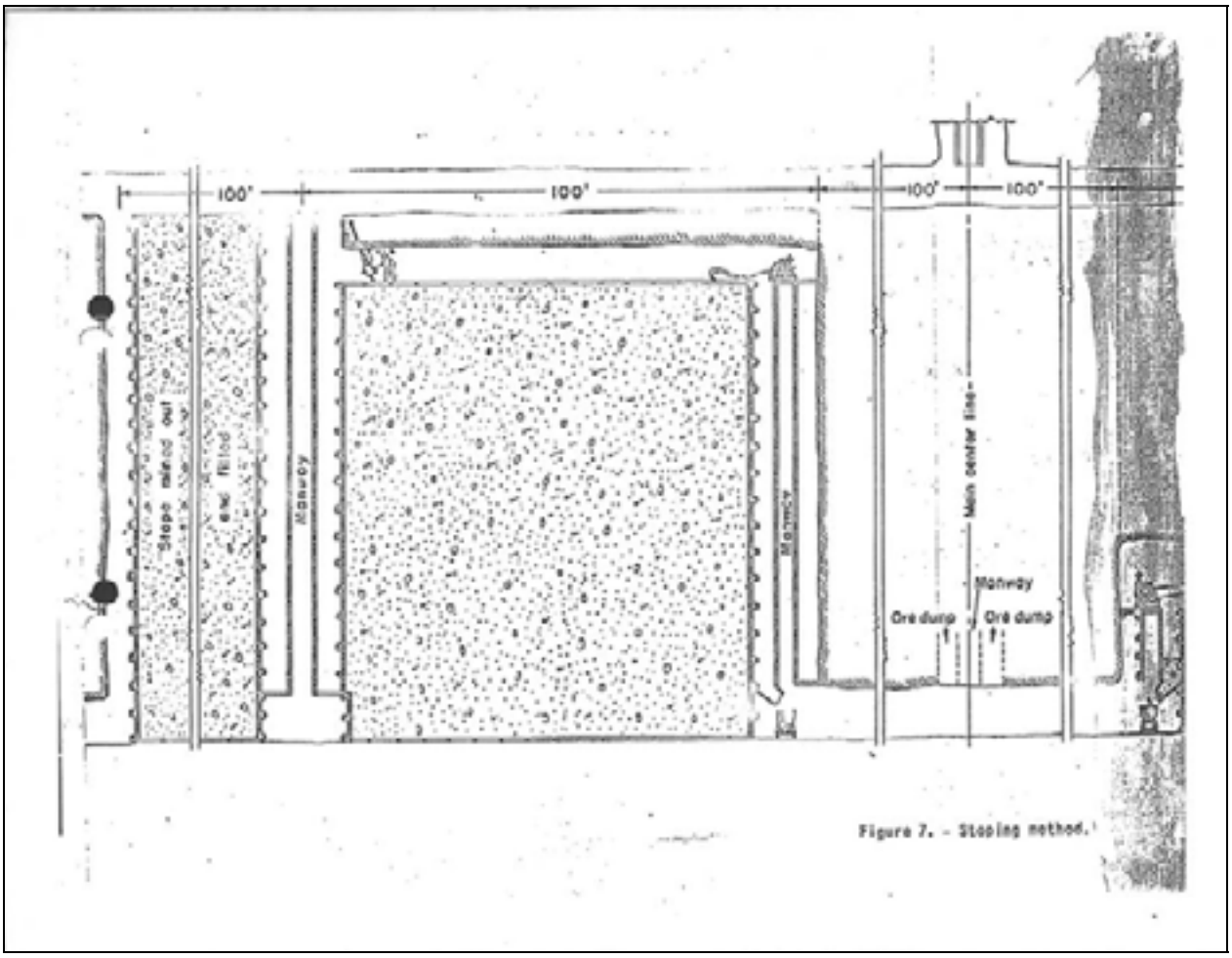

Figure 10. Ca. 1955 Diagram of the Horizontal Cut-and-Fill Stoping Method Used at Iron King Mine in the 1950s (ADMMR).

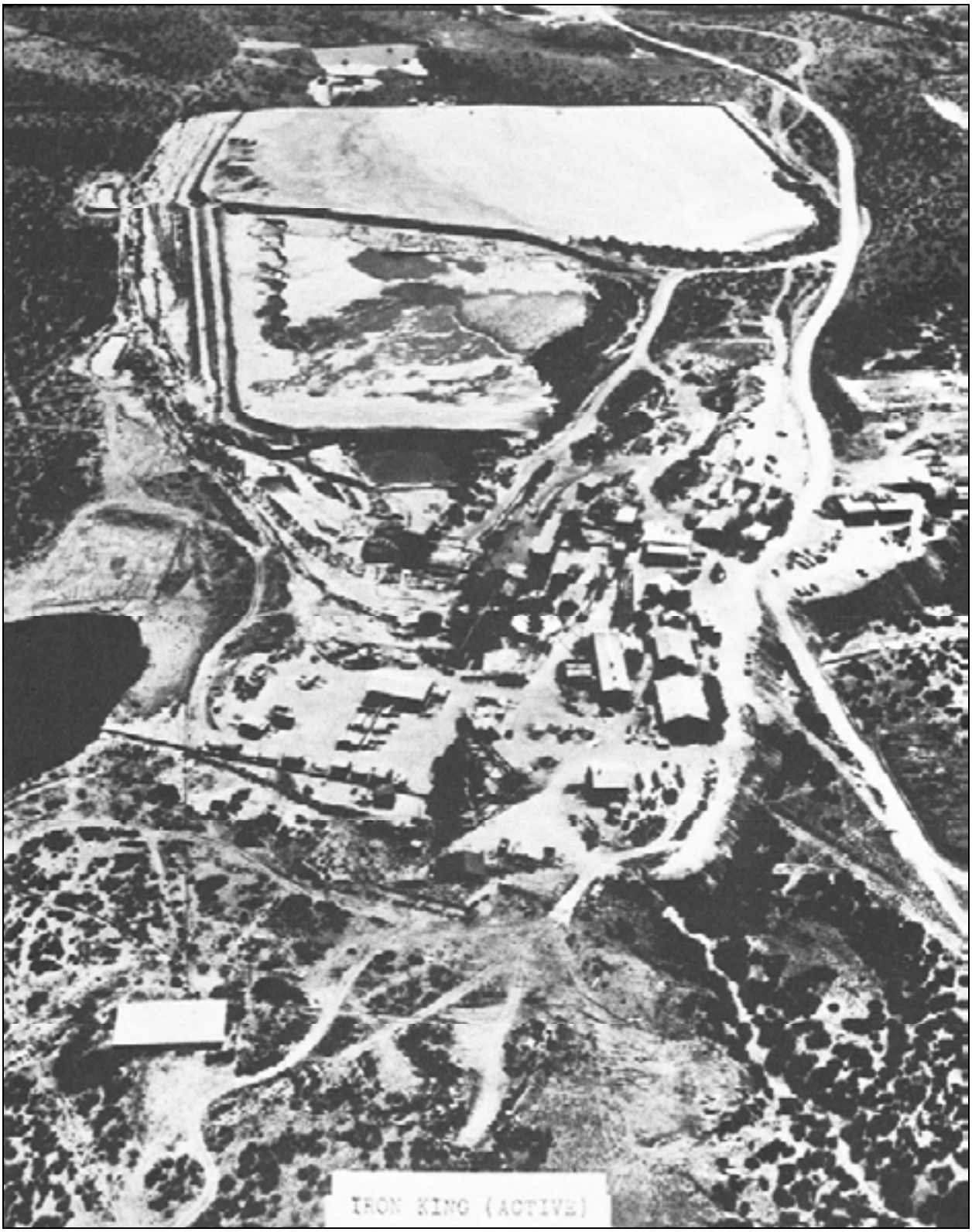

Figure 11. 1955 Aerial View of Iron King Mine, Looking East (photograph courtesy of Sharlot Hall Museum).

While the Iron King operations brought record production and profit levels for Shattuck Denn, the miners were not content with the stagnant pay rates for underground workers. United Steelworkers Local 5761 represented the miners in negotiations with the company in 1961. The miners wanted substantial wage increases, while the company wanted wages to be tied to the market price for zinc and lead. With no agreement reached, on October 6, 1961, 220 men at Iron King walked out on strike (*Arizona Republic* 1961a; Nixon 1961; *Pay Dirt* 1961). Miners at the Inspiration Consolidated Copper Mine also went on strike at the same time, bringing a sudden disruption in Arizona's mine production. Iron King's general manager, Dan Kentro, said that lead and zinc prices were declining, and that he would be forced to choose between laying off 30-40 men or cutting hours to 40-hours a week. Little progress was made in the dispute, and two-week after the strike began Kentro was on vacation and there were no further negotiations. After the mine had been shut down for nearly two months, talks resumed in early December. The union demanded a 25-cent raise across the board, as well as the miners' input on determining the work to be done and the number of men assigned to tasks. Both sides agreed to a 7-cent per hour wage increase plus the establishment of a pension plan to begin in 1963, with wages set to increase if the prices of lead and zinc rose in the future. The strike ended with signed agreement on December 1, 1961 (*Arizona Republic* 1961b; *Pay Dirt* 1961; *Prescott Evening Courier* 1961).

Since the late 1950s underground development at Iron King had been done with traditional vein-mining techniques of square set and horizontal cut-and-fill stoping. However, by 1962 the ore grade began decreasing when the mine reached 2400 feet below the surface (*Arizona Republic* 1962; Parker 1962). Additionally, block caving in the lower levels at the north end of the mine had set off a chain of events causing all levels to collapse, creating a huge glory hole to surface. The new technique of sub-level stoping (Figure 12) was adopted in 1963 to extract the lower grade ore from the deeper levels (Mitchell 1964; Sundeen 1964). With this method, a footwall drift was driven the entire length of an ore vein, about 1,600 feet; cross-cuts were then driven into the ore vein at 110-ft intervals, 300-400 feet in length. Vertical raises were then cut to connect the two levels. Ore was blasted from the drifts on the upper level with ammonium nitrate, and then electric slushers were used to move the massive piles of ore to a raise where it was scraped down the shaft into cars and trammed to the surface. This technique was a much faster way of extracting a large amount of ore. The old method of cut-and-fill stoping produced 6–7 tons per man shift, while sub level stoping produced 16 tons per man shift. By 1965 this method contributed to a peak output of 333,743 tons for the year (Arizona Department of Mining and Mineral Resources (ADMMR) 1961–1967; Myrick 2001:168).

In 1967 there were two main shafts at Iron King, reaching to 2,343 feet and 2,700 feet below the surface, and Curtis Sundeen, the new general manager; and mine superintendent Bill Sloan planned to open new drifts on levels 26 (at 2,600 feet) and 27 (at 2,700 feet) (Arizona Department of Mining and Mineral Resources (ADMMR) 1961–1967; *Arizona Republic* 1962; Parker 1962). However, as miners went deeper, the ore quality rapidly declined. At the same time mining costs were rising while prices for metals were declining, and operations at Iron King were no longer profitable. Shattuck Denn's revenue and profits fell sharply (*Pay Dirt* 1967, 1968; *Wall Street Journal* 1967). In addition to the Iron King Mine, Shattuck Denn also owned the Fireproof Products Company and Richmond Screw Anchor division, which manufactured concrete construction products. In late 1967 the company announced that it would be closing the Iron King Branch (Fuhrman 1967, 1968a). With 220 employees, including 183 miners and 37 salaried technicians, and a payroll of $1.9 million in 1966, the Iron King Branch had been the third largest employer in Yavapai County. All work at the Iron King Mine ended on December 31, 1967 (Fuhrman 1968b). The underground mine works had reached a final depth of 3,250 feet below the surface and a horizontal length of 1,600 feet (Figure 13), and 40 miles of shafts, drifts, crosscuts, raises, and winzes had been excavated (Pierce 1978). In its last years, the mine had a steady output of 1,050 TPD, producing almost all lead and zinc mined in Arizona.

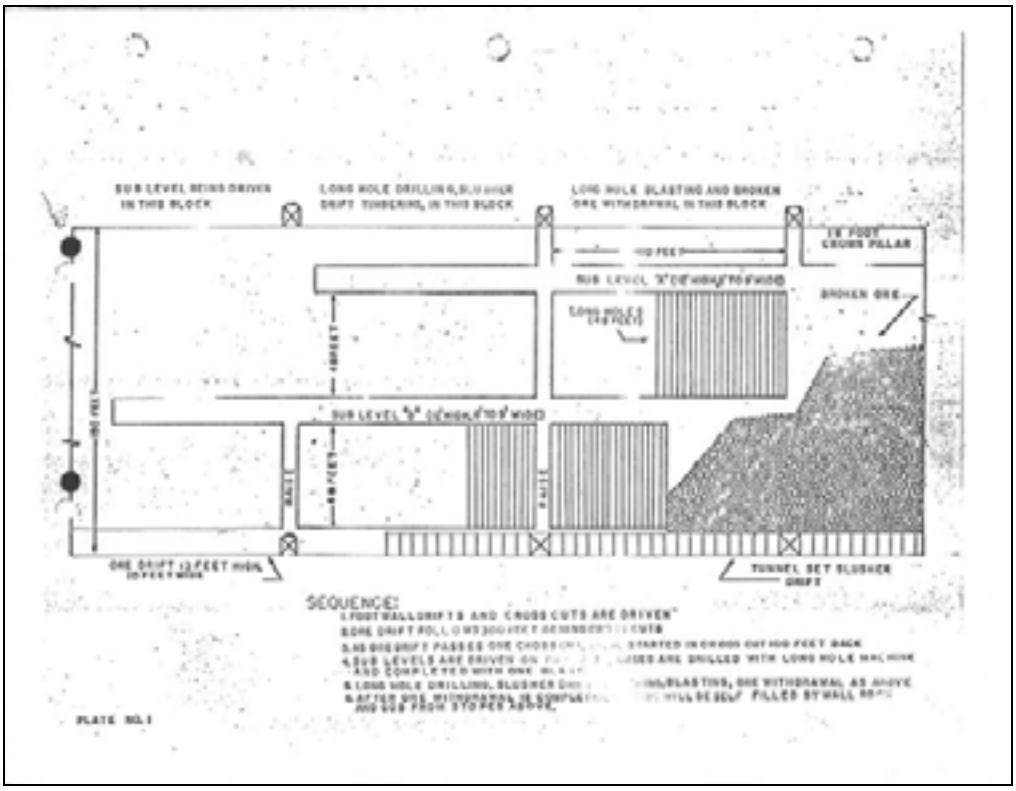

Figure 12 Diagram of the Sub-Level Stoping Method Adopted at Iron King Mine in 1963 (Sundeen 1964).

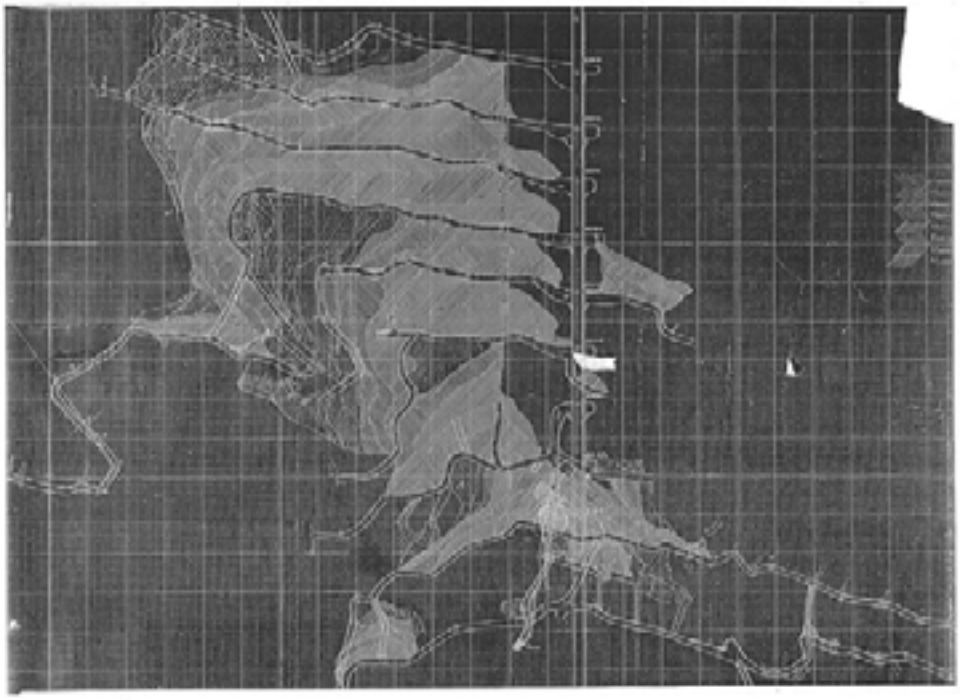

Figure 13. Ca. 1967 Stope Map of the Lowest Underground Levels off off Shaft No. 7 (ADMMR).

In March 1968 the Utah-based partnership of McFarland and Hullinger entered into a 5-year lease agreement with Shattuck Denn that would allow them to reopen the Iron King Mine (Fuhrman 1968b). The new operator eventually employed about 100 men, but with its maximum output of 600 TPD, just over half of the volume that Shattuck Denn had produced, the venture was not profitable, and McFarland and Hullinger closed down their short-lived business at the end of the year (Arizona Department of Mining and Mineral Resources (ADMMR) 1968–1974; Myrick 2001:168). Shattuck Denn proceeded with salvage operations, removing all underground materials and equipment. Before the work was done a broken hoisting cable in Shaft No. 7 prevented removal of some pipe, track, and power cable (*Pay Dirt* 1969b).

However, Shattuck Denn did not halt all work at the site. Since 1960 it had operated a small fertilizer plant that produced a high-quality iron-based soil supplement extracted from the mill tailings. Iron King Superferrite was marketed by Occidental Chemical Company in Western states where alkaline soils required sulfur-based supplements (Arizona Department of Mining and Mineral Resources (ADMMR) 1968–1974; Pierce 1978; Walenga 1989). Jack C. Pierce, vice president of Shattuck Denn and president of its agriculture division, Western Agricultural, was brought to Iron King as the last general manager of general mining operations. After the mine closed he continued on with the development of a retail product for home gardening. Shattuck Denn continued to retain rights to the tailing dumps that were used to produce the fertilizer (*Pay Dirt* 1969a). The tailings were fed from bins to a 3-ft long horizontal screw mixer, where concentrated sulfuric acid added. The resulting chemical reaction converted some of the sulfides to sulfates. After further processing, the wet material was dried in a gas-fired dryer, crushed in a roller crusher, and returned to the mixer, where it was mixed with dry ammonia. The final product was bagged or boxed on site and shipped to distributors. Only a few employees were needed to maintain the very profitable operation. Ironite Products Company of Scottsdale bought Shattuck Denn's superferrite fertilizer plant in 1974 (*Arizona Republic* 1974).

Shattuck Denn also leased the mine, mill, and portions of the tailings dumps to various companies. As metal prices rose again, Silver Jay Mining Company of Tucson sought to purchase the Iron King Mine in 1969 (Fuhrman 1969; *Pay Dirt* 1969a, 1970; *Skillings Mining Review* 1969). Nelson Machinery, the company that had been retained to oversee salvage operations at the mine, started rebuilding the ore mill. Silver Jay entered into a lease-royalty arrangement for milling 400,000 tons of mine tailings over the next four years. The company planned to eventually employ about 200 workers for its silver recovery project, but financial and management problems quickly brought the effort to an end.

Though there were only limited operations at the site after the mine was closed, the Iron King property still held considerable mineral wealth. It was estimated that 750,000 tons ore remaining on six levels of the mine (Greeley 1978). In 1973 Shattuck Denn began divesting itself of the site, and sold most of its holdings to the Brown Company. Most of the mining claims were eventually sold to a California land development company. A large tailing dump and 60 acres of land were sold to Arthur Still, a Tucson geologist. The Fred Gibbs family of Prescott , which still owned much of the subsurface mineral rights, bought surface rights to 56 acres, which included many of the mine buildings and the two main shafts.

A German company, Metex Ltd., acquired rights to the some of the tailings at Iron King in 1979 and began evaluating their suitability for reprocessing (Phillips 1979). Satisfied with the results of their research, the company bought the Ironite fertilizer operations, which included eight buildings, and planned to expand the plant to a capacity of 1,000 TPD, and eventually, to 3,000 TPD (Arizona Department of Mining and Mineral Resources (ADMMR) 1975–1987; Walenga 1989). Metex developed a process of leaching the tailings, which had high iron and zinc content, with ammonium thiosulfate (Metex 1985:1). This recovered residual gold and silver from the tailings and resulted in a high quality fertilizer and soil supplement. A $7 million expansion of the plant in 1988 allowed the company to produce up to 200,000 tons of Ironite per year. The soil supplement plant is now operated by North American Industries and produces Hydromax fertilizers and soil supplements. The property looks

considerably different than it did even just a few years ago due to the recent demolition of the majority of historic buildings and structures.

Humboldt Smelter

The first ore processing activity on the Humboldt Smelter site began in the 1870s when Levi Bashford built a water-powered stamp mill and smelter furnace on the Agua Fria River (Rickard 1987:204; Sayre 1985:38). Bashford operated the Agua Fria Ore Mill (Figure 14) from about 1876 to 1884, smelting $350,000 worth of silver from the Silver Belt Mine, and from a local mine known as the Chaparral Gulch Shaft (Rains 2008). The mill had a capacity of 20 TPD. In 1879 Bashford received a patent for the five-acre mill site, located in the northeast corner of the northwest quarter of Section 23, Township 13 North, Range 1 East (Bureau of Land Management 2008; Rains 2008). Cuts and features associated with the mining activity still exist, but no structural remains of the Agua Fria Ore Mill are evident, ostensibly due to frequent flooding on the Agua Fria River in the early 20th century.

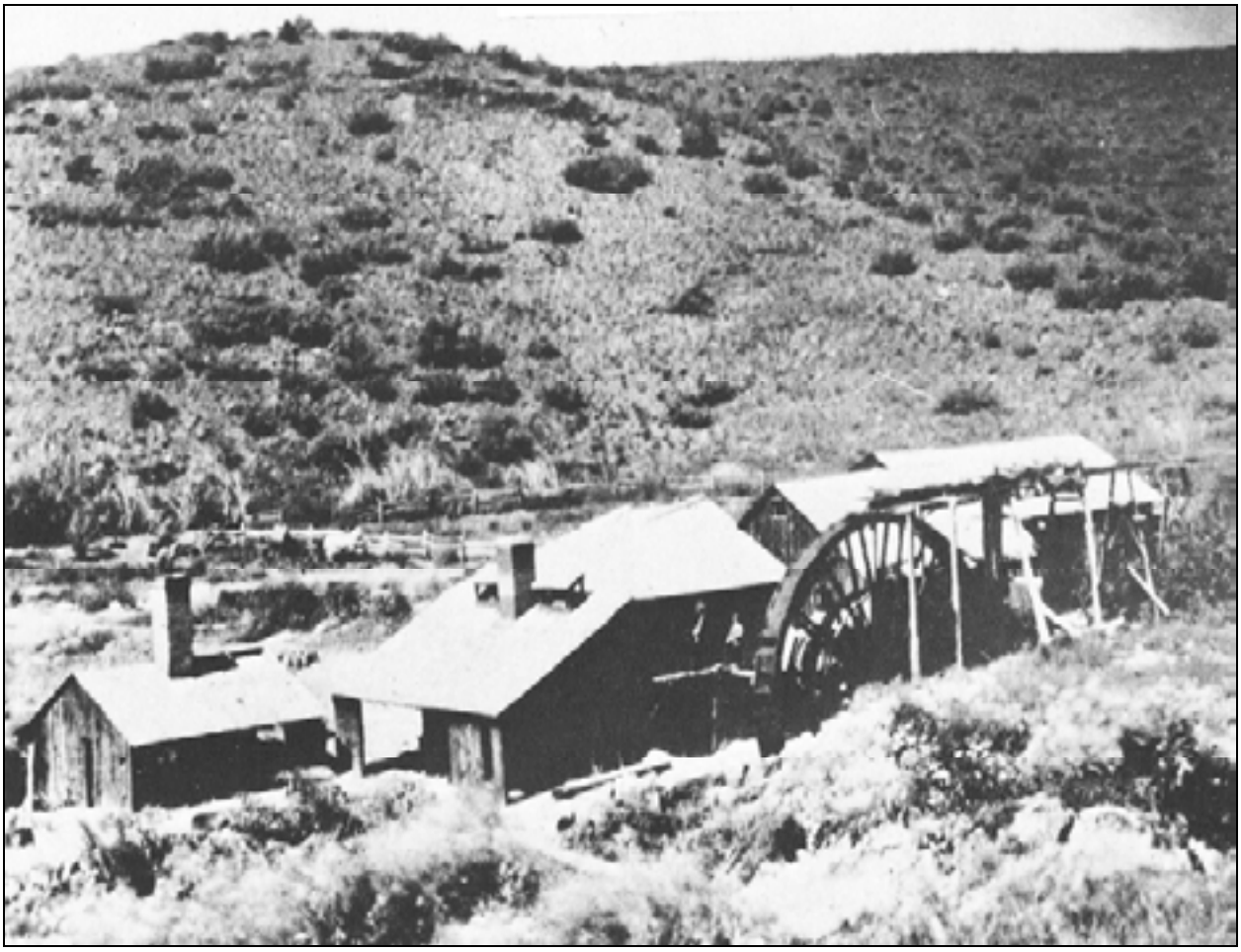

Figure 14. Ca. 1878 Photograph of Agua Fria Smelter, once located on the east side of the Humboldt Smelter Property (photograph courtesy of Sharlot Hall Museum).

The development of mines in the Big Bug District southeast of Prescott proceeded slowly through the end of the 19th century, but construction of the Prescott and Eastern Railroad (P&ERR) in 1898 spurred considerable mining activity along Big Bug Creek (Myrick 2001:150, 153; Sayre 1990: 66, 70, 73). The Val Verde Copper Company, Ltd., was formed in the spring of 1899 to construct a large smelter to serve the numerous mines in the area (Myrick 2001:156–157; Rickard 1987:204; Sayre 1985:38). The company hired Cecil G. Fennell as the general manager in charge of developing the smelter, and in July

1899 the Colorado Fuel & Iron Company began construction of the mills and furnaces. By August much of the smelter complex was completed and a 1.5-mile rail spur, known as the Smelter Spur, connected the site to the P&ERR. The company, now known as the Val Verde Smelting Company, also built a town north of the smelter works to house the workers that would eventually be employed, and the Val Verde Post Office was established on November 24, 1899. The smelter (Figure 15) was put into operation in 1901 with a workforce of 75 men. With an initial capacity of 250 TPD, the Val Verde Smelter did custom milling and smelting for many small mines in the Big Bug District and the Bradshaw Mountains. Copper was the primary ore that was processed. The complex included a concentrating plant operated by the Standard Smelting and Refining Company, where Superintendent H.W. Paulson ran a battery of crushers that reduced the ore to a fine grit before it was fired in a blast furnace to produce metallic copper. In May 1904 the Bradshaw Mountain Copper Mining and Smelting Company, which owned the Blue Bell and De Soto mines south of Mayer, began negotiations to purchase the Val Verde Smelter, which it planned to enlarge to double its capacity. However, on September 28, 1904, workers lost control of a valve, allowing slag to flow onto a wet floor. The resulting steam explosion set off a series of fires that destroyed the smelter and several surrounding buildings (Myrick 2001:158).

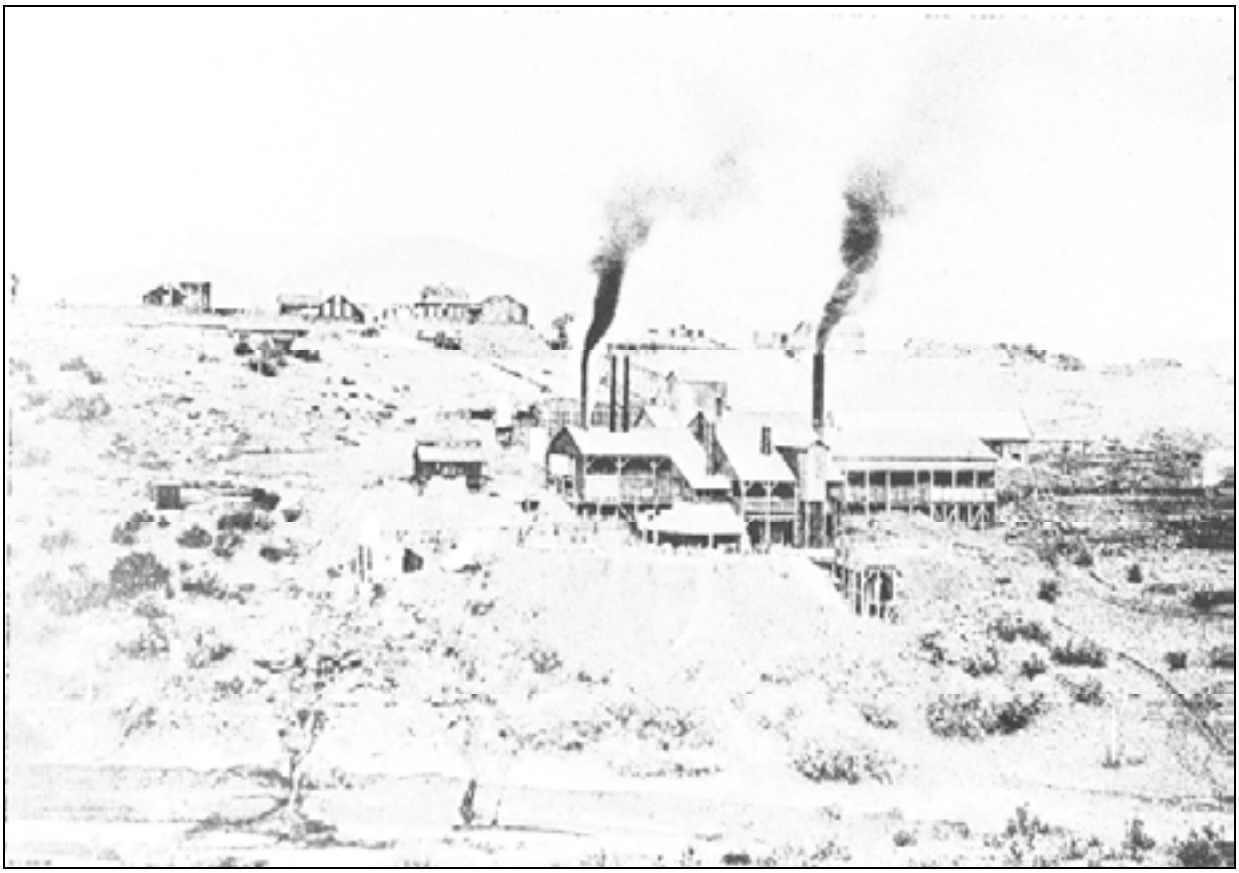

Figure 15. 1903 Val Verde Smelter; Note the Elite Nob Hill Homes above and behind the Smelter (photograph courtesy of Sharlot Hall Museum).

In the following year the Arizona Smelting Company (ASC) was formed to build a new smelter near the site of the destroyed Val Verde Smelter (Rickard 1987:204; Sayre 1985:38). The new company had financial backing from Frank Murphy, owner of the Santa Fe, Prescott & Phoenix Railroad and the P&ERR, and his associates with the Atchison, Topeka & Santa Fe Railroad (*Arizona Republic* 1909). Two New York investors, John I. Elliott, who owned the Blue Bell and De Soto mines, and Charles W. Morse also provided capital for the venture. C.E. Finney was retained as general manager to oversee theconstruction of the smelter and manage its operation. The ASC acquired ownership of the Val Verde property, and started construction of a new smelter northwest of the remains of the previous plant (Figure 16; Figure 17). A new town was built about a mile west of the Val Verde townsite, and on August 18, 1905, it was named Humboldt. Two large furnaces—a 600 TPD plant for processing copper and a 500 TPD plant for lead—opened on March 18, 1906 (Myrick 2001:158). The ASC smelter was apparently the first to successfully use crude oil as the primary fuel for reverberatory type furnaces. Superintendent S.E. Bretherton designed and operated the furnaces However, Elliott was not able to raise enough money for expansion of the smelter complex and he and Finney left the company. The Arizona Exploration Company acquired ownership of the Blue Bell and De Soto mines from Elliott and sought an interest in ASC (Myrick 2001:158–159). As the company was now going to be involved in every step of the extraction, smelting, and shipping of copper, it was reorganized as the Consolidated Arizona Smelting Company (CASC). Though production was sporadic through the first year of operations, the investors were optimistic; but the Panic of 1907 brought a sudden decline in copper prices and the smelter closed down in October 1907.

Figure 16. Ca. 1906 Photograph of Smelter and Mill, Humboldt (photograph courtesy of Sharlot Hall Museum).

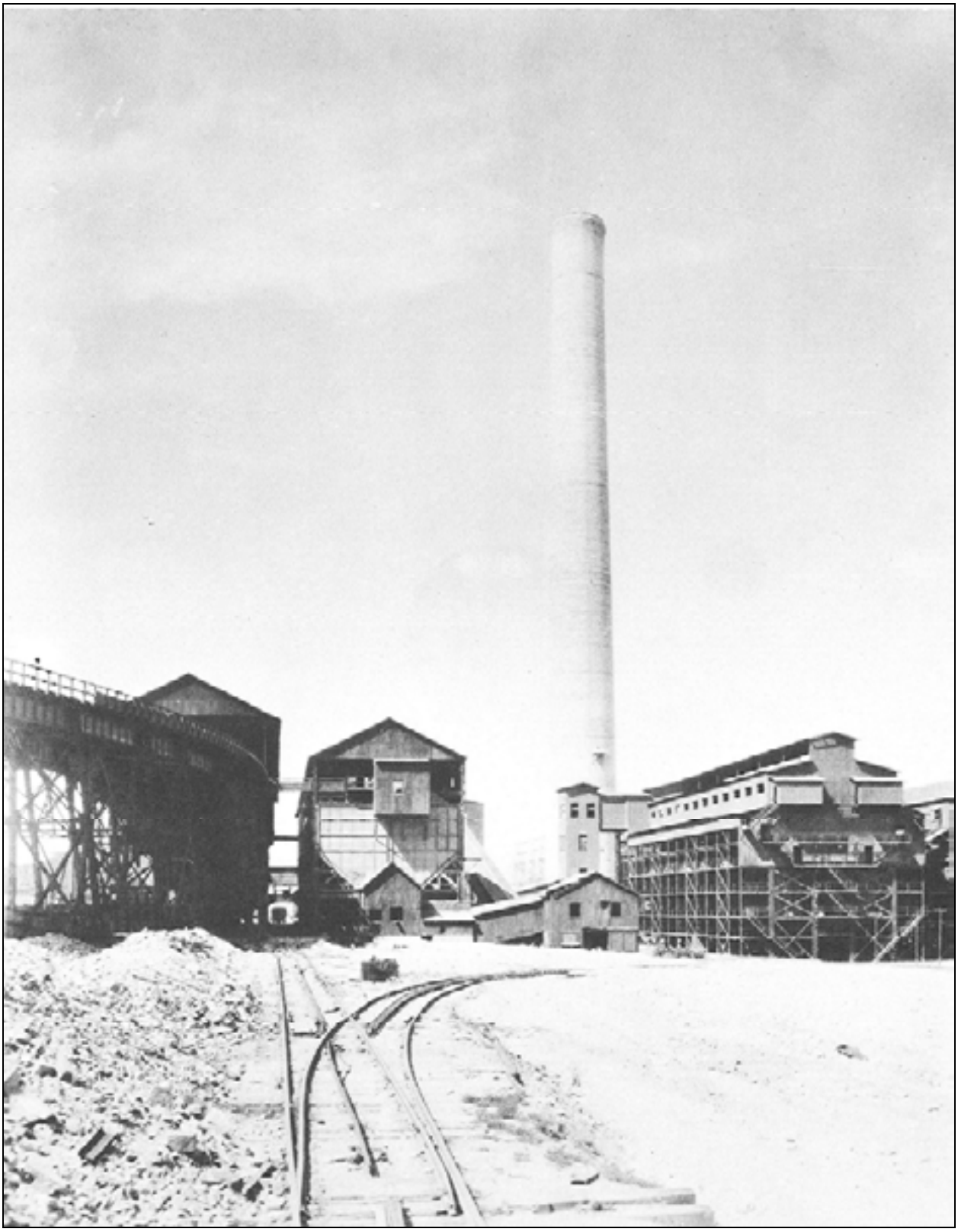

Figure 17. Ca. 1905–1907 Image of Arizona Smelting Company Smelter at Humboldt.

In 1908 the CASC filed for bankruptcy, hoping to protect their investment in the $17.5 million project. Charles W. Morse held the largest share in the company, and Thomas W. Lawson and Charles G. Gates also held considerable stock. No bids were received for the smelter property when it was first offered at auction (*Prescott Journal-Miner* 1908a, 1908b), but the partnership of Ackerman and Hooley later acquired the site with a bid of just $200,000 (Pape 1987:80). A syndicate was quickly formed, comprised of Morse, Ladenberg Thalmann & Company, Assets Realization Company, and the National Bank of North America, and the newly reorganized CASC purchased the property from Ackerman and Hooley, began rehabilitation of the smelter plant, and resumed operations in 1910 (Figure 18–Figure 20) (Myrick 2001:159). The reopening brought an immediate boom of the town of Humboldt.

The smelter was again shut down in 1911 for expansion and improvements (*Prescott Journal-Miner* 1911a, 1911b). The mechanical operations of the plant were originally powered by steam, but new electrical motors were installed as the smelter and the Blue Bell Mine were connected to transmission lines from the Arizona Power Company's Childs Power Plant (Stein and Skinner 1997:29). The smelter was now under the management of A.N. Wethey, general manager; and D.T. Matthews, superintendent In addition to the crushers and classifiers used to reduce the ore, the complex now had a reverberatory furnace, blast furnace, roasting plant, and a flotation mill capable of handling 400 TPD. To maintain the steadily increasing operations at the plant, CASC needed a large permanent workforce. While some employees lived along Main Street in Humboldt, most lived in various camps to the north of the smelter that were known as the Hollow, Cooktown, and Little Mexico, (Rains 2008; White 1941:39). The company provided housing for the general manager, superintendents, and engineers. The small neighborhood for the smelter's upper managers was located on a hilltop south of the smelter works known as Nob Hill (Sanborn Map Company 1917). As prevailing winds blew to the north, they seldom had to contend with the sulfuric fumes from the smokestacks. Notable residents of Nob Hill likely included C.E. Finney (general manager, ca.1905-06), S.E. Bretherton (furnace superintendent, ca.1905-06), A.N. Wethey (general manager, ca.1911-14), D.T. Matthews (superintendent, ca.1911-14), George M. Colvocoresses (general manager, ca.1917-23), and Daniel Milton Riggs (head pipe fitter).

The advent of the First World War I brought great demand for copper, and as the price rose to as high as 32 cents per pound, the smelter quickly upgraded equipment, investing $1.6 million to increase production to 1,000 TPD. In its peak production years in 1916 and 1917, CASC produced 30–35 tons of blister copper (98% pure metallic copper) per day, which with steady operation would produce 2 million pounds of copper bullion per month. The Blue Bell and De Soto mines were at full production with an output of 250 TPD and 100 TPD, respectively (*Engineering and Mining Journal* 1917). The two company mines employed 160 miners and the smelter employed another 440 men (Ackerman 1955). From 1915–1919, CASC produced a total of 34 million pounds of copper from the two company-owned mines alone (Myrick 2001:159). By 1918 the smelter was also doing custom work for 67 other mines in the area.

George M. Colvocoresses became general manager of the CASC smelter in about 1917. In that year he published an article in *Engineering and Mining Journal* (1917) that provides the most detailed description of the operations at the Humboldt Smelter during its most productive years. Ores from the region were generally very hard, but there was great variability in the hardness, copper content, and matrix of the ores that came from different mines. The smelter was equipped with an array of different types of mills, roasters, and furnaces to allow the most effective treatment of each type of ore. The highest quality ore required minimal treatment prior to pyrometallurgical smelting. Ore was crushed and ground and spread on roughing tables where water was used to leach away the gangue (silica) matrix and concentrate the copper-bearing ore. This concentrate was then mixed with fuel and fired in a blast furnace to produce metallic copper. Ores with lower copper content required greater mechanical and chemical treatment before smelting. A Blake jaw crusher was used for the first reduction of the ore, which was then passed to a Symons disc crusher. At each stage, the broken ore passed through trommels and screens to return oversize pieces for further crushing before they were delivered to two 6-foot ball mills. A cone classifier hydraulically separated the coarser particles, which were sent to a pebble mill and then to

roughing tables, and the finely ground particles (fines), which were treated with oil in flotation cells, where copper-bearing particles were carried to the tops of the tanks. The resulting concentrate was then roasted to remove remaining sulfur and smelted in an oil-fired reverberatory furnace where fire was forced over the top of beds of concentrated ore and additional heat was reflected downward from a fire brick-lined vaulted ceiling. After reverberatory smelting, the matte—a semi-metallic copper concentrate—was mixed with flux ores and finished in a converter which forced air into the molten mass during firing. In both the blast and reverberatory type furnaces, the heating of ore reduced it to either matte, which require additional smelting, or blister copper, which was poured into ingot molds. In addition these two products, both types of furnaces produced slag composed of waste metals and non-metallic minerals. Slag rose to the top of the molten mass in the furnace, and this waste was poured down the steep slope to the east of the smelter, where it completely covered any remaining foundations of the 1899 Val Verde Smelter (Rains 2008). All of the pyrometallurgic processes produced hot gases. Some of these gases were captured for production of sulfuric acid, but most were discharged out of tall smokestacks. A series of brick flues carried gases from the two reverberatory furnaces to a large stack, which was built ca.1913 (Ackerman 1955; Sanborn Map Company 1917). A larger stack was built for the converter building about 1917 (Figure 21 and Figure 22) (Sanborn Map Company 1931); this stack and a portion of the main flue that fed it are all that now remains of the CASC smelter complex. The 1917 Sanborn Fire Insurance Map of the Humboldt Smelter property (Figure 23–Figure 26) does not yet show the stack addition; it was likely built after September, which is when the property was mapped (unfortunately, there are no Sanborn Fire Insurance Maps for the Iron King Mine property).

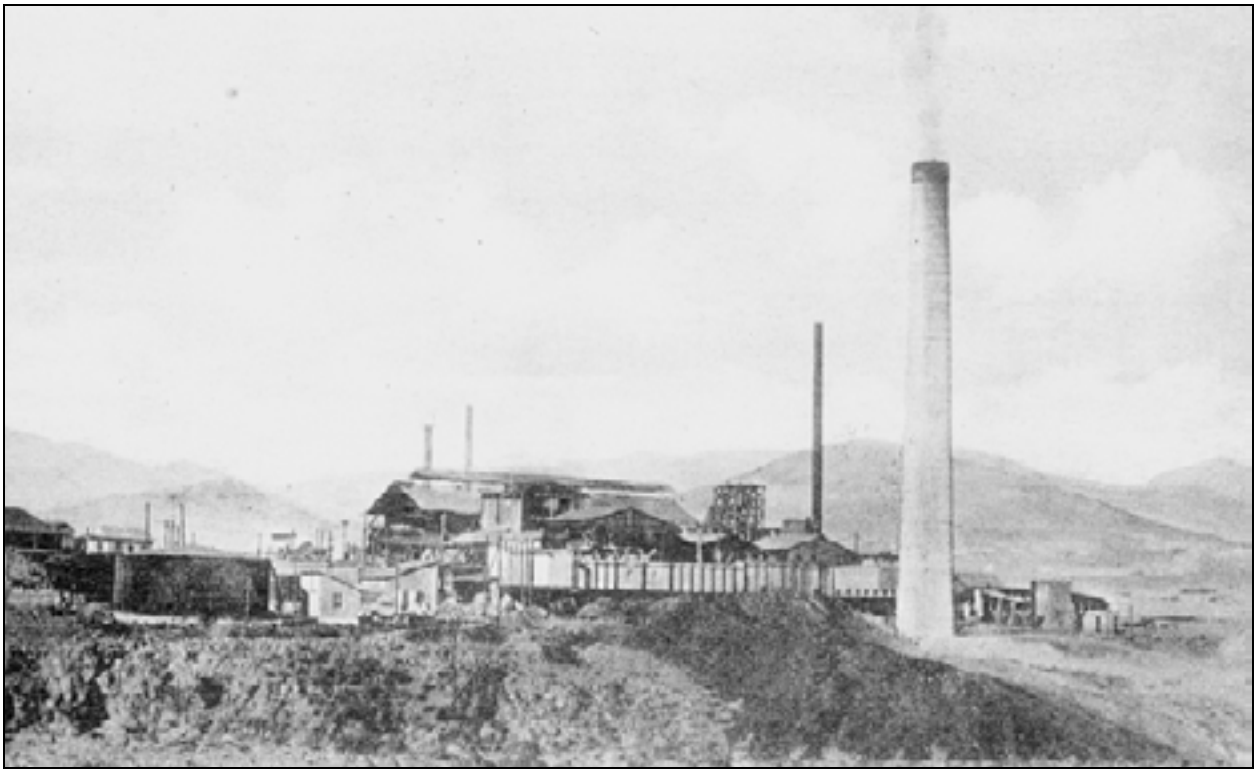

Figure 18. Ca. 1910 Image of Humboldt Smelter (photograph courtesy of Sharlott Hall Museum).

Figure 19. Ca. 1910 Image of Humboldt Smelter (photograph courtesy of Sharlot Hall Museum).

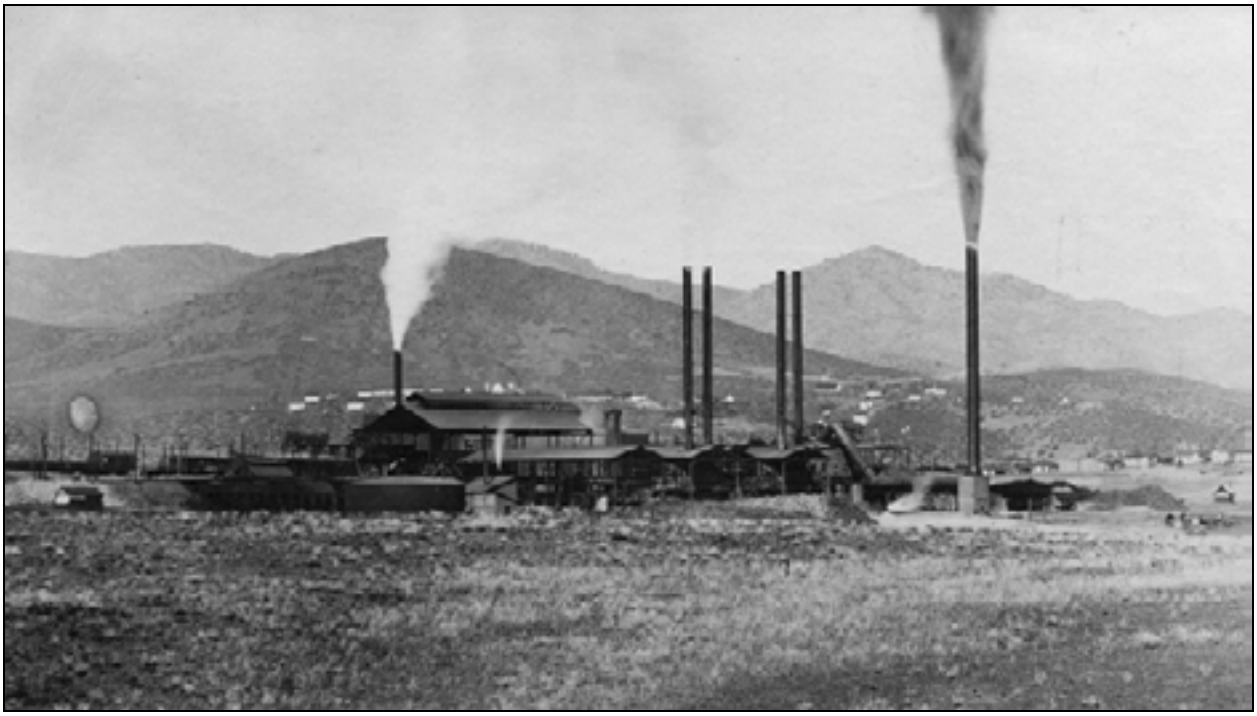

Figure 20. Ca. 1910 Image of Humboldt Smelter (photograph courtesy of Sharlot Hall Museum).

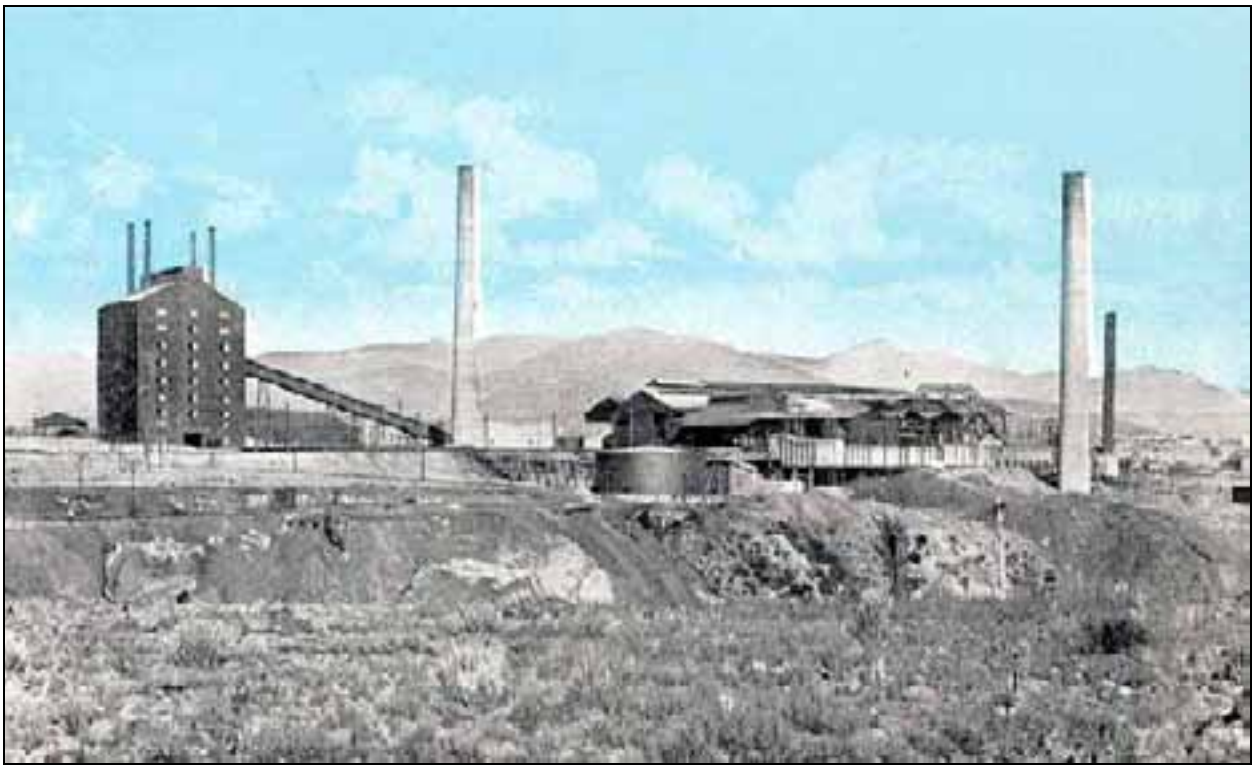

Figure 21. Ca. 1918 Tinted Postcard of Smelter and Sample Mill, Humboldt (image courtesy of Sharlot Hall Museum).

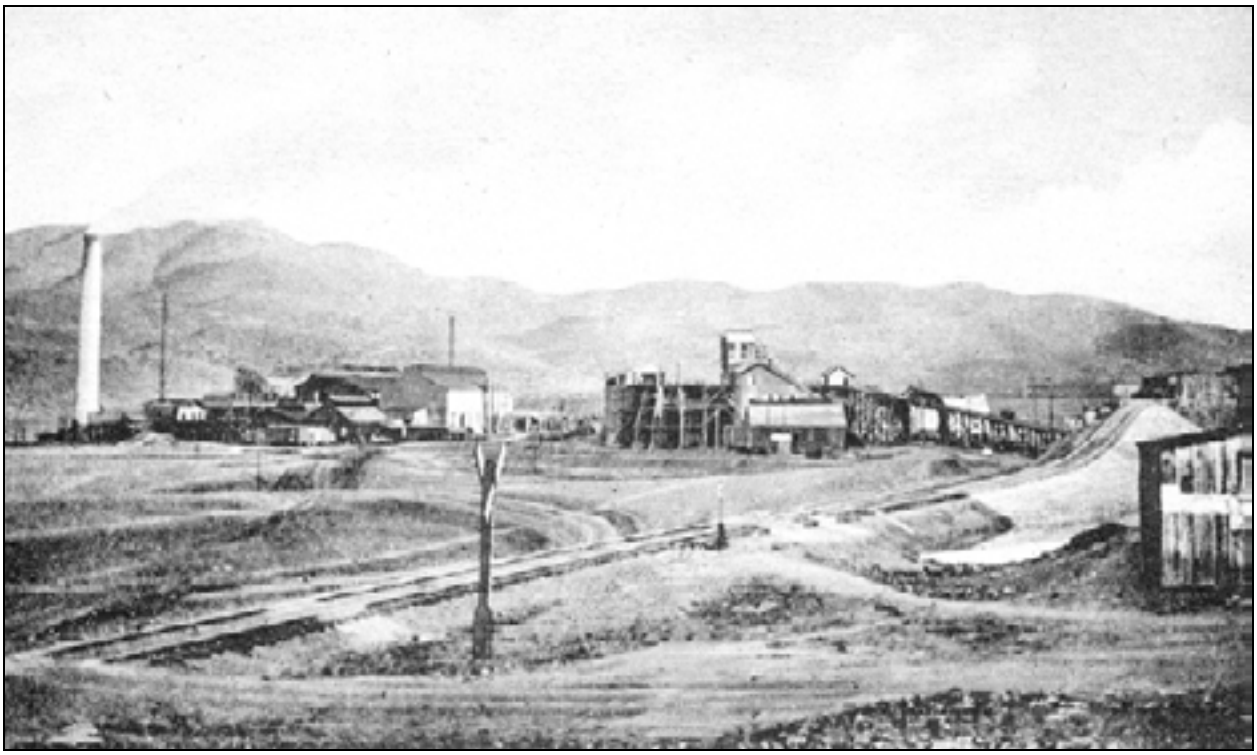

Figure 22. Ca. 1918 Postcard of Smelter and Sample Mill, Humboldt (image courtesy of Sharlot Hall Museum).

When the war ended in 1918 demand for copper immediately dropped and continued production was no longer profitable. CASC carried considerable debt, and unable to meet its obligations, it closed the smelter in 1920 and again sought bankruptcy protection. In 1922 the Southwest Metals Company bought the Blue Bell and De Soto mines and leased the Humboldt Smelter from CASC (Myrick 2001:159; Pape 1987:82; Rickard 1987:204). Colvocoresses was retained as the general manager of the plant, and production resumed for about two years, but the two company mines were nearly depleted by 1924 and the smelter was shut down. The smelter was operated sporadically to serve about 50 other mines in the region until 1927, when much of the equipment was removed and installed in the Phelps Dodge smelter at Clarkdale. The frame homes on Nob Hill moved to Prescott and other nearby communities and the town of Humboldt became largely deserted (Gibbs 1974; Leavitt 2003). The smelter was refitted in 1929 and was put into operation a few times in the 1930s, but it closed permanently in 1937, and Humboldt's population dwindled to about 100 people. The 1931 Sanborn Fire Insurance Map (1917 updated) shows little change from the 1917 version with the exception that the new stack built around 1917 is now depicted.

The smelter site was still used for metal processing and other industrial activities in later decades; however, new equipment had to be brought onto the site for each operation. C.H. Dunning, a Phoenix mining engineer and citrus farmer, acquired a lease on the property in 1942 and throughout the Second World War he reworked the accumulation of Humboldt Smelter tailings, using flotation cells to extract remaining copper (*Mining World* n.d.). W.A. Snyder was superintendent of the 240 TPD mill. Tailings which still had remaining copper content were washed in a classifier where the coarse material was removed as underflow and the fines were floated. The classifier overflow was sent to a 5x5 ft Denver conditioning tank where a reagent was added, and the pulp was then to a No. 250 Denver flotation cell and a 6-cell No. 18 Denver Sub A flotation machine. The copper concentrates were shipped to the Phelps Dodge smelter at Clarkdale, where some gold and silver was also recovered.

By the time that World War II ended, all of the buildings that had been associated with the CASC smelter had been demolished to reduce the taxable value of the property. Only two tall brick smokestacks remained: one of the original 1899 Val Verde Smelter and the large ca.1917 stack of the CASC Smelter. In 1955 the older Val Verde stack was condemned as structurally unsafe and was demolished (Ackerman 1955).

Several other small-scale industrial businesses occupied the smelter site over the next 20 years. A.L. Poarch set up a plant to treat tailings from the nearby Iron King Mine in 1958 under the name Southwestern Industrial Iron and Chemical Company (Lane 1958). He planned to recover sulfur and metals from the tailings using both flotation and smelting. Machinery for a small smelter and fuming plant was delivered but never installed, and in June 1958 Poarch declared bankruptcy. Furnaces, shakers, and flotation cells were sold at an auction on site in September. H.K. Thomas purchased Poarch's remaining interest in the property in 1961, which included steel buildings, ore, and 50 tons of zinc dross—waste material consisting mostly of flue dust and smelter skimmings—from several California die-casting plants (Arizona Department of Mining and Mineral Resources (ADMMR) 1961–1971; Lane 1961; Smith 1962). Thomas planned to process the dross into metallic zinc. He enlarged a steel building to 3,500 sq ft, installed hopper bins, two traveling fire-brick-lined evaporating vats, three pressure digesters, and a small drying kiln. By 1962 Thomas' Chem-Metal Company was using hydrochloric acid to leach zinc concentrate from the dross. It also started processing aluminum dross and scrap shipped from Texas. This process involved passing the waste material over a magnetic separator and a jig, grinding it in a ball mill, and separating aluminum particles with a classifier. The resulting concentrate, which had 65–70% aluminum content, was washed and dried in a 350-degree kiln. Chem-Metal, renamed Thomas Enterprises in 1965, maintained these operations with a staff of no more than four men until about 1970. The Galbraith Lumber Company of Phoenix purchased the 190-acre smelter property and operated a sawmill producing wooden pallets until about 1974 (Heatwole 1974).

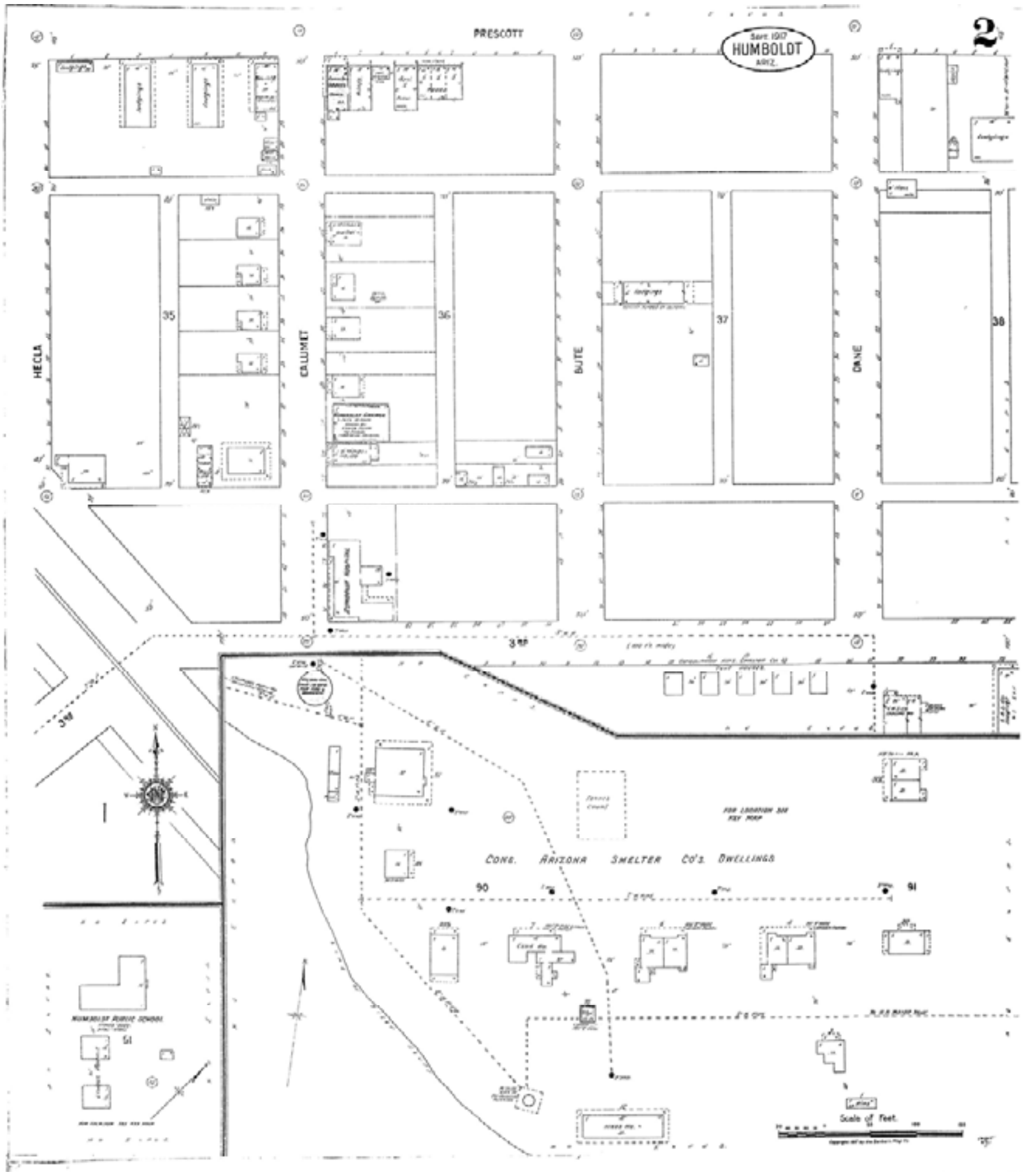

Figure 23. 1917 Sanborn Fire Insurance Map of Humboldt, Arizona depicting portions of downtown (upper) and the Nob Hill residential neighborhood (lower).

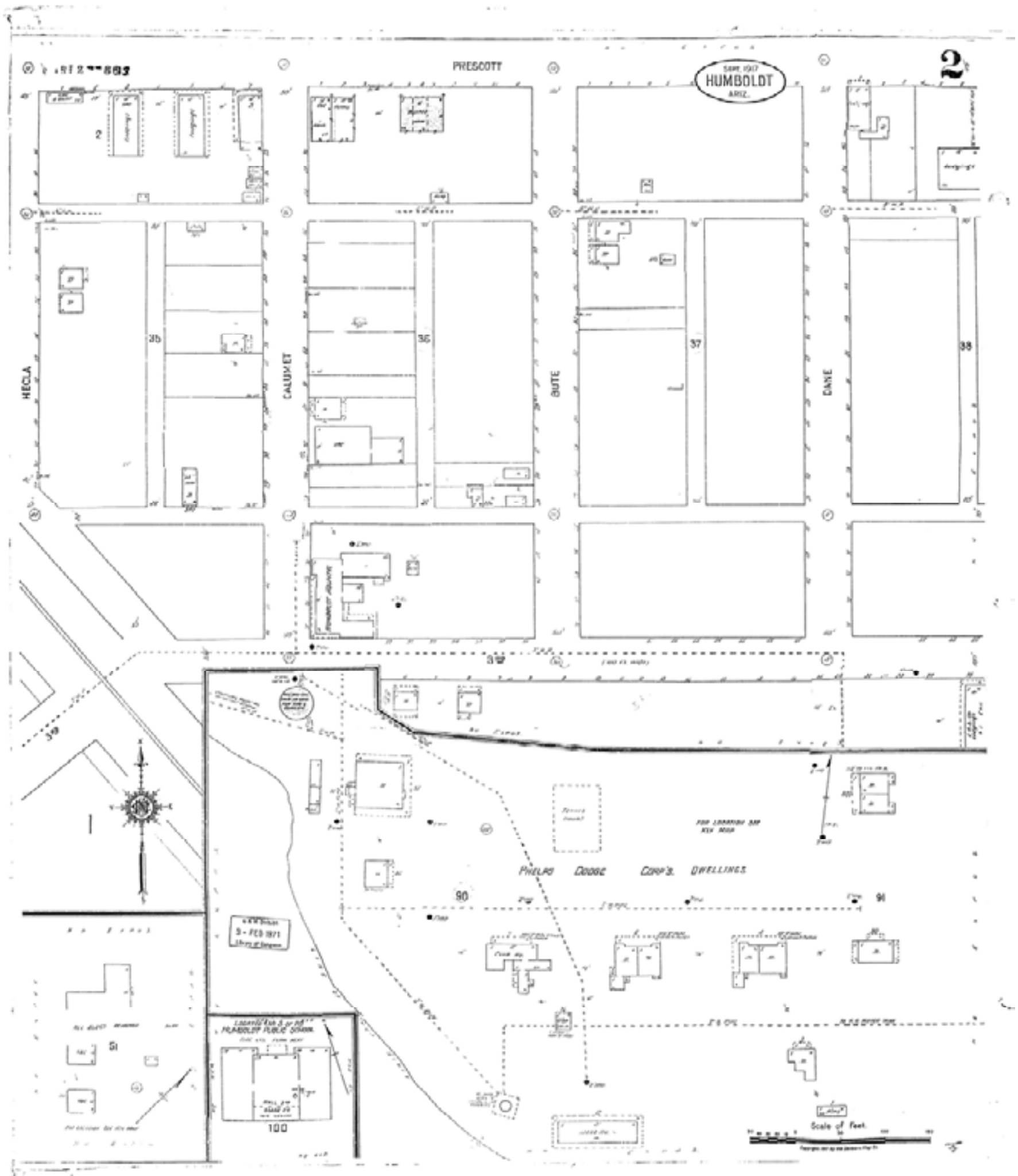

Figure 24. 1931 (1917, Corrected) Sanborn Fire Insurance Map of Humboldt, Arizona depicting portions of downtown (upper) and the Nob Hill residential neighborhood (lower).

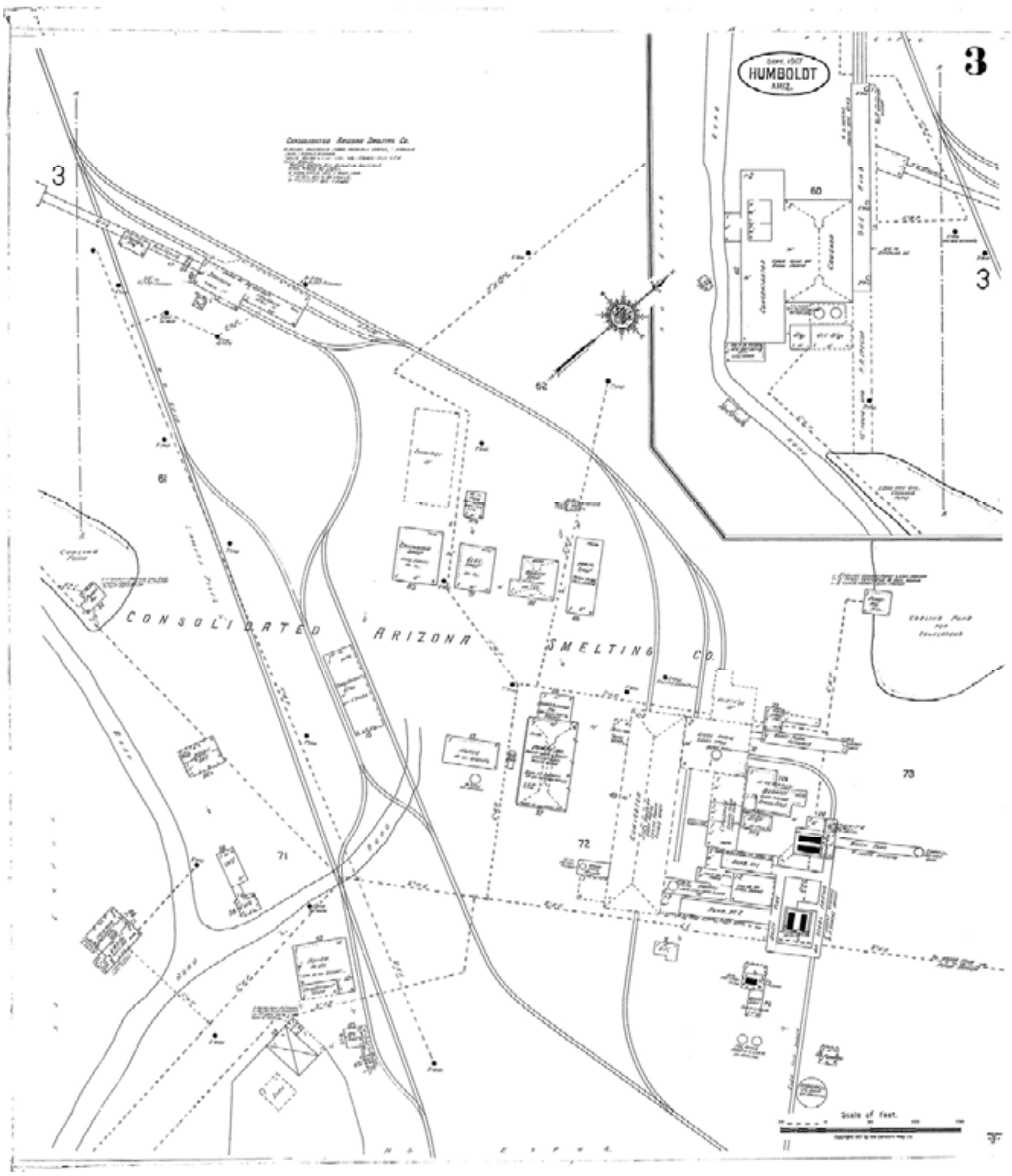

Figure 25. Sanborn Fire Insurance Map (1917) of Humboldt, Arizona depicting the Consolidated Arizona Smelting Company industrial complex.

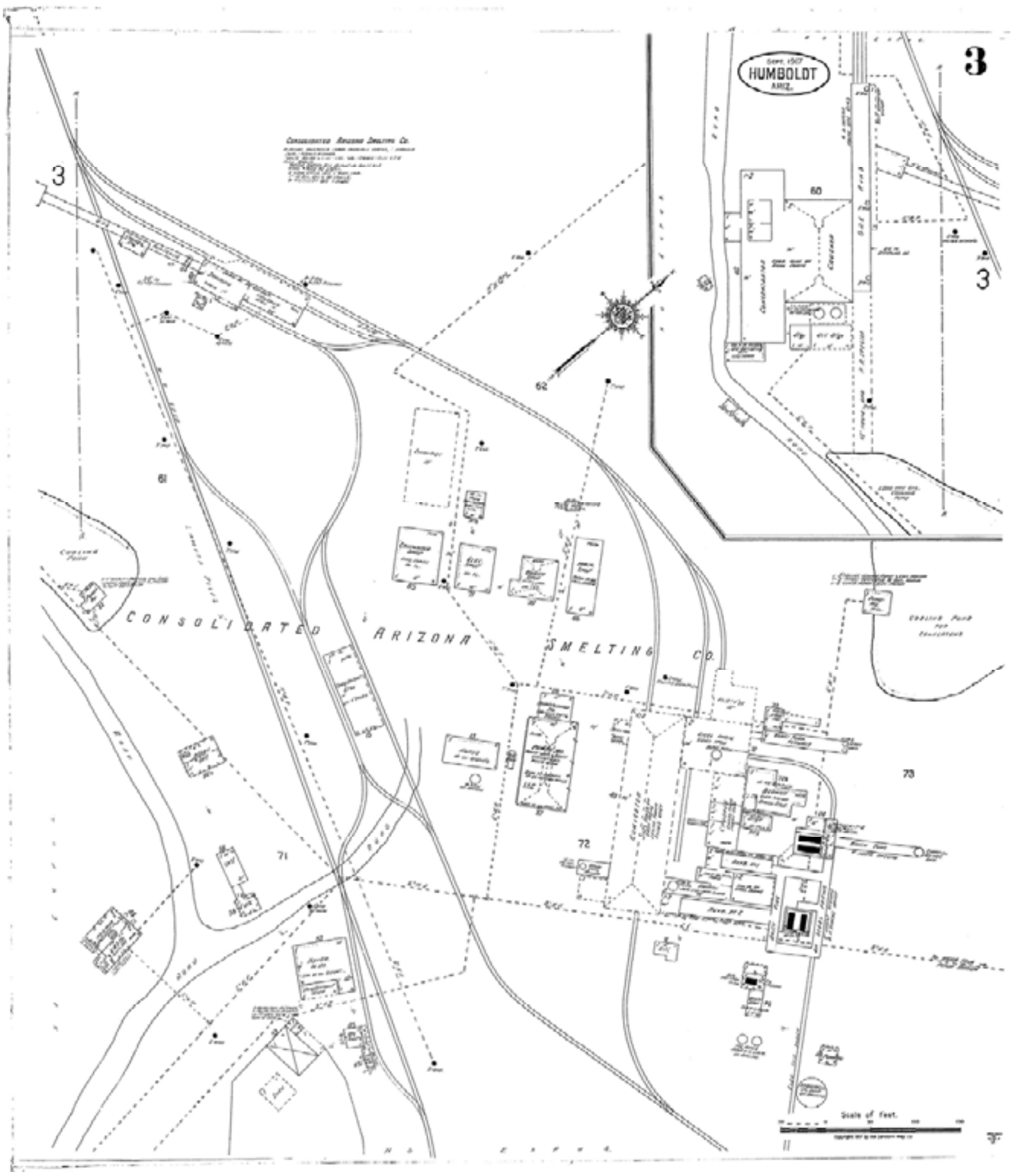

Figure 26. Sanborn Fire Insurance Map (1931) of Humboldt, Arizona depicting the Consolidated Arizona Smelting Company industrial complex.

This was the last known industrial use of the site. Like the Iron King Mine property, the view today across the Humboldt Smelter property is very different than it was during the years it was an active smelter. The great majority of the historic buildings, structures, and features have been demolished and, thus, little of the historic character of the property remains.

Previous Research

Prior to the fieldwork, site and project files were checked at the State Historic Preservation Office (SHPO) and the AZSITE Cultural Resources Database (AZSITE) to determine if any previously recorded cultural resources were within one mile of the project area. The records check revealed at least 12 projects have been conducted nearby (Table 1, Figures 6 and 7). One of these previous projects crossed through the current project area (Howard 2003). At least 18 sites have been identified within one mile of the current project area, of which one, AZ N:11:28(ASM) (Prescott and Eastern Railway), passes through the project APE (Table 2, Figures 8 and 9).

Also reviewed were historic General Land Office (GLO) plats on file at the Bureau of Land Management (BLM) Arizona State office. The 1925 GLO plat indicates an early alignment of the Iron King Road passing through the southwestern portion of the Iron King Mine APE, as well as the AT&SF Railroad (Prescott and Eastern Railway) alignment passing through the southeast corner of the APE (Figure 4). Additionally, the 1925 GLO depicts the smelter building location, a cluster of five buildings south of the smelter, and the railroad spur connecting the smelter to the mainline in the northern portion of the Humboldt Smelter APE (Figure 31).

Table 1. Summary of Previous Archaeological Research Within 1 Mile of Project Area.*

Agency Project No.	Project Description	Reference(s)
1986-78.ASM	State Land Survey	(Rozen 1986)
1986-180.ASM	Poland Junction to Dewey 69kV	(Macnider 1987b)
1987-38.ASM	Poland Junction to Dewey 69kV Addendum	(Macnider 1987a)
1990-182.ASM	ADOT Contract 89-27	(Smithwick 1990)
1991-51.ASM 3811-R 196-I	Rayrock Mines Survey	(Euler 1991)
1992-276.ASM	Survey of an 11.1 Mile Segment of SR69 between Mayer and Dewey	(Hathaway 1992)
1997-139.ASM	Agua Fria Ranch Easement	(Christenson 1997a)
1997-196.ASM	Agua Fria Ranch Easement	(Christenson 1997b)
2003-496.ASM **SHPO-2003-161**	**Kuhles Services Iron King Waste Reduction Facility**	**(Howard 2003)**
SHPO-2003-2592	American Tower Corporation Site #82380	(Crawford 2003)
13.370.SHPO	No data available	AZSITE
020-21-02-296	Proposed Aranda Land Exchange	AZSITE

*Projects in bold text denote those that occur within or directly adjacent to the current survey area

Table 2. Summary of Previously Recorded Cultural Resources Within 1 Mile of Project Area.

Site Number	Site Type	Eligibility (Criterion)*	Reference(s)
NA4352 AZ N:8:1(MNA) BLM-AR-02-020-151	O'Brian Ruin: Multicomponent site consisting of a prehistoric masonry structure with associated burials and artifact scatter. Secondary component consists of a modern trash scatter.	Not evaluated	AZSITE
NA4353 AZ N:8:10(MNA) BLM-AR-02-020-157	Prehistoric masonry structure, house platforms, and associated artifact scatter.	Not evaluated	AZSITE
NA4372 AZ N:8:2(MNA) BLM-AR-02-160	Jones Ruin: Colonial Period Hohokam site consisting of mound and ballcourt.	Not evaluated	AZSITE
NA4373 AZ N:8:4(MNA) BLM-AZ-02-159	Prehistoric mounds and burial.	Not evaluated	AZSITE
NA25974	McMahon Ruin: Prehistoric 20 room masonry pueblo.	Not evaluated	AZSITE
AZ N:8:8(ASM) 65-I	Historic Woolsey ranch house built from prehistoric ruin.	National Register listed	AZSITE
AZ N:8:28(ASM)	Historic Humboldt Cemetery	Not evaluated	(Hathaway 1992)
AZ N:11:28(ASM) AR-03-09-03-240	Prescott & Eastern Railway Prescott to Mayer/AT&SF Railroad	Recommended eligible	(Hathaway 1992)
AZ N:12:9(ASM)	Prehistoric compound wall and associated artifact scatter	Not evaluated	(Rozen 1986)
AZ N:12:27(ASM) AR-03-09-03-241	Phoenix Prescott Highway	Recommended eligible	(Macnider 1990)
AZ N:12:68(ASM)	Historic road segment	Recommended not eligible	(Christenson 1997b)
AZ N:12:81(ASM)	Historic road segment	Not evaluated	AZSITE
AZ N:12:83(ASM)	Multicomponent site consisting of prehistoric artifact scatters and petroglyphs, as well as historic rock features.	Not evaluated	AZSITE
AZ N:12:84(ASM)	Prehistoric lithic scatter	Not evaluated	AZSITE
AZ N:12:85(ASM)	Prehistoric lithic scatter	Not evaluated	AZSITE
122-I	Building on Main St. and Old Black Canyon Hwy.	State Register listed	SHPO site files
338-I	Rock Saloon-Rock House	National Register listed	SHPO site files

* Determined: decided by SHPO; Recommended=Archaeologist's opinion

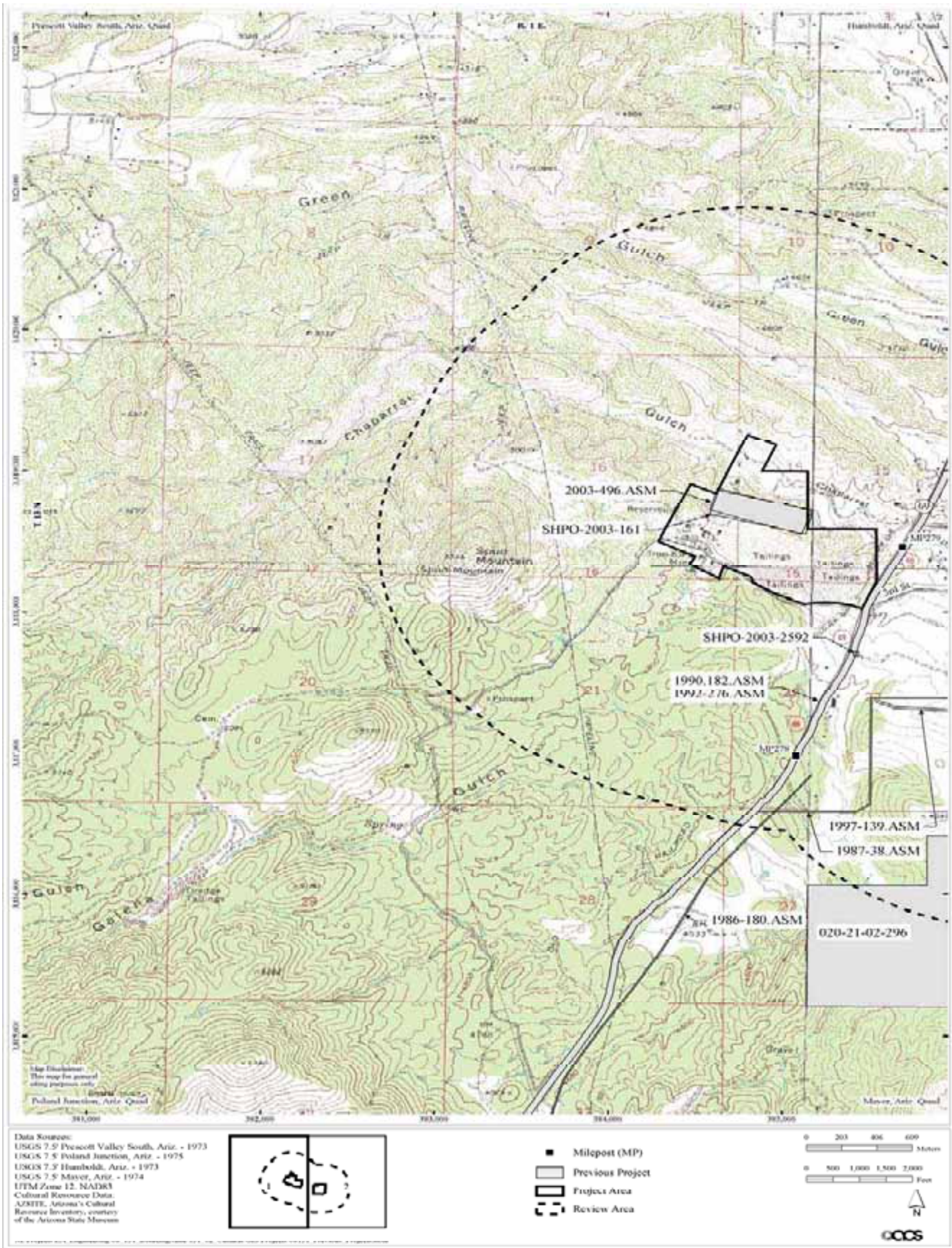

Figure 27. Portions of the USGS 7.5' Prescott Valley South and Poland Junction, Ariz., topographic quadrangles depicting the location of previously conducted cultural resource projects.

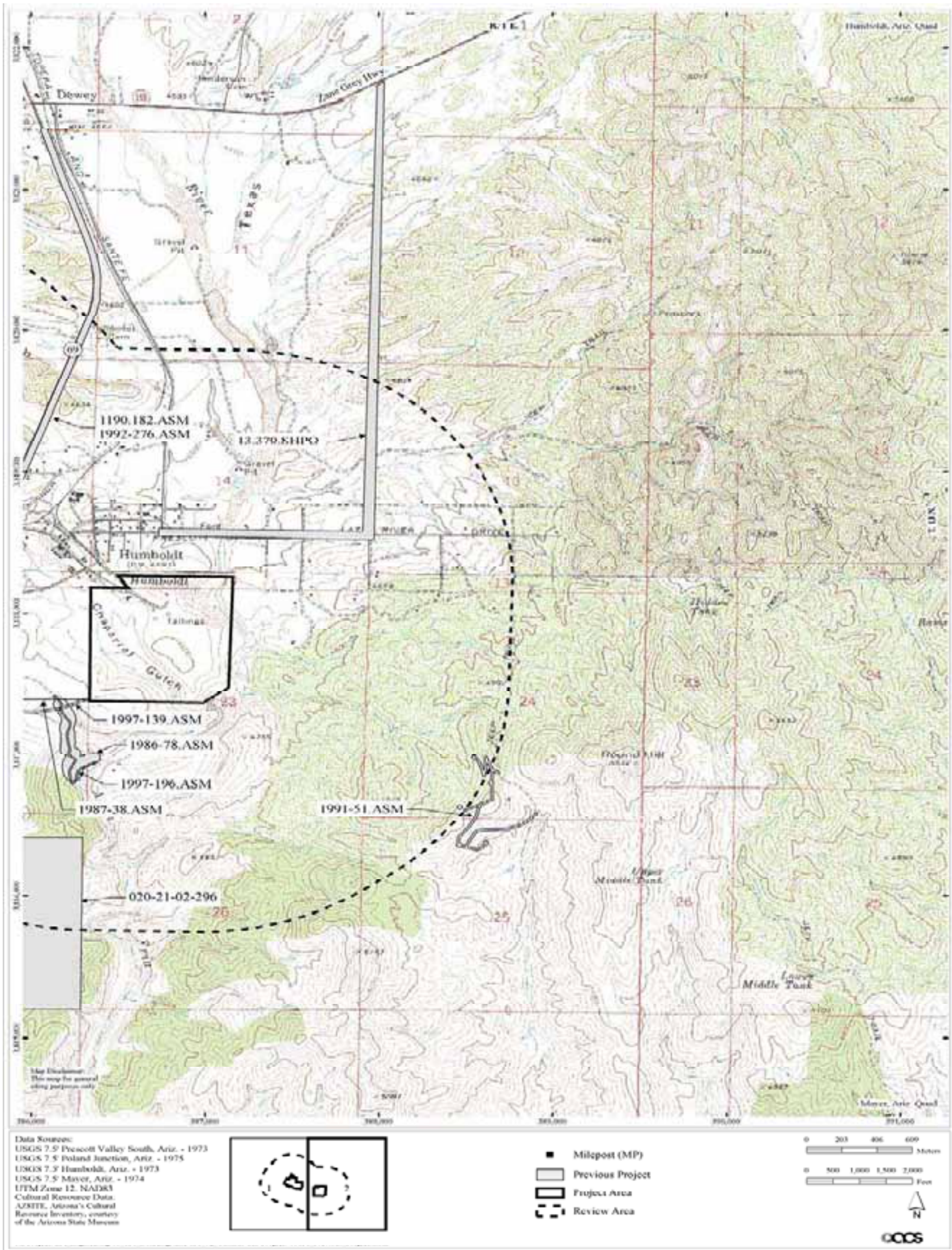

Figure 28. Portions of the USGS 7.5' Mayer and Humboldt, Ariz., topographic quadrangles depicting the location of previously conducted cultural resource projects.

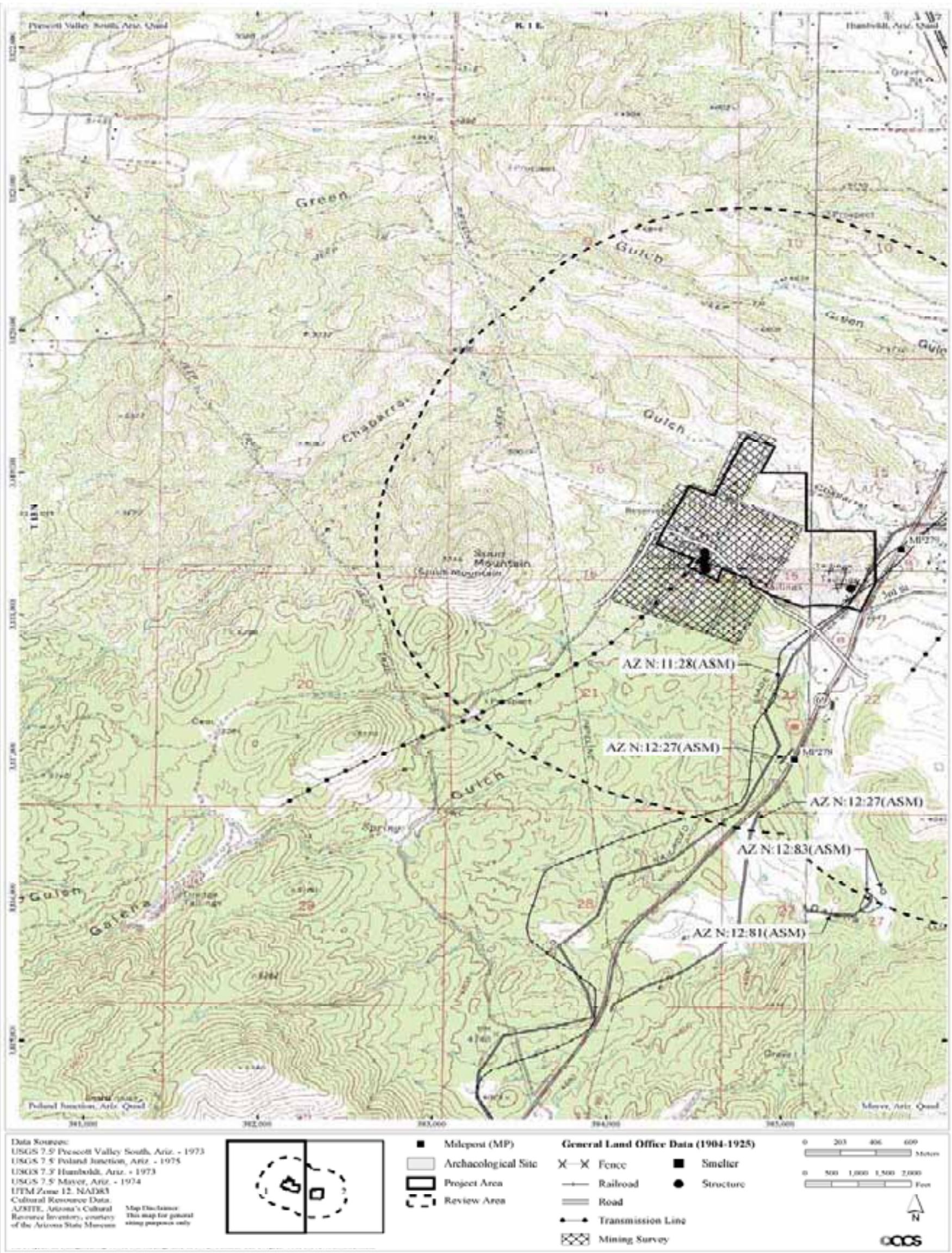

Figure 29. Portions of the USGS 7.5' Mayer and Humboldt, Ariz., topographic quadrangles depicting the location of previously recorded archaeological sites.

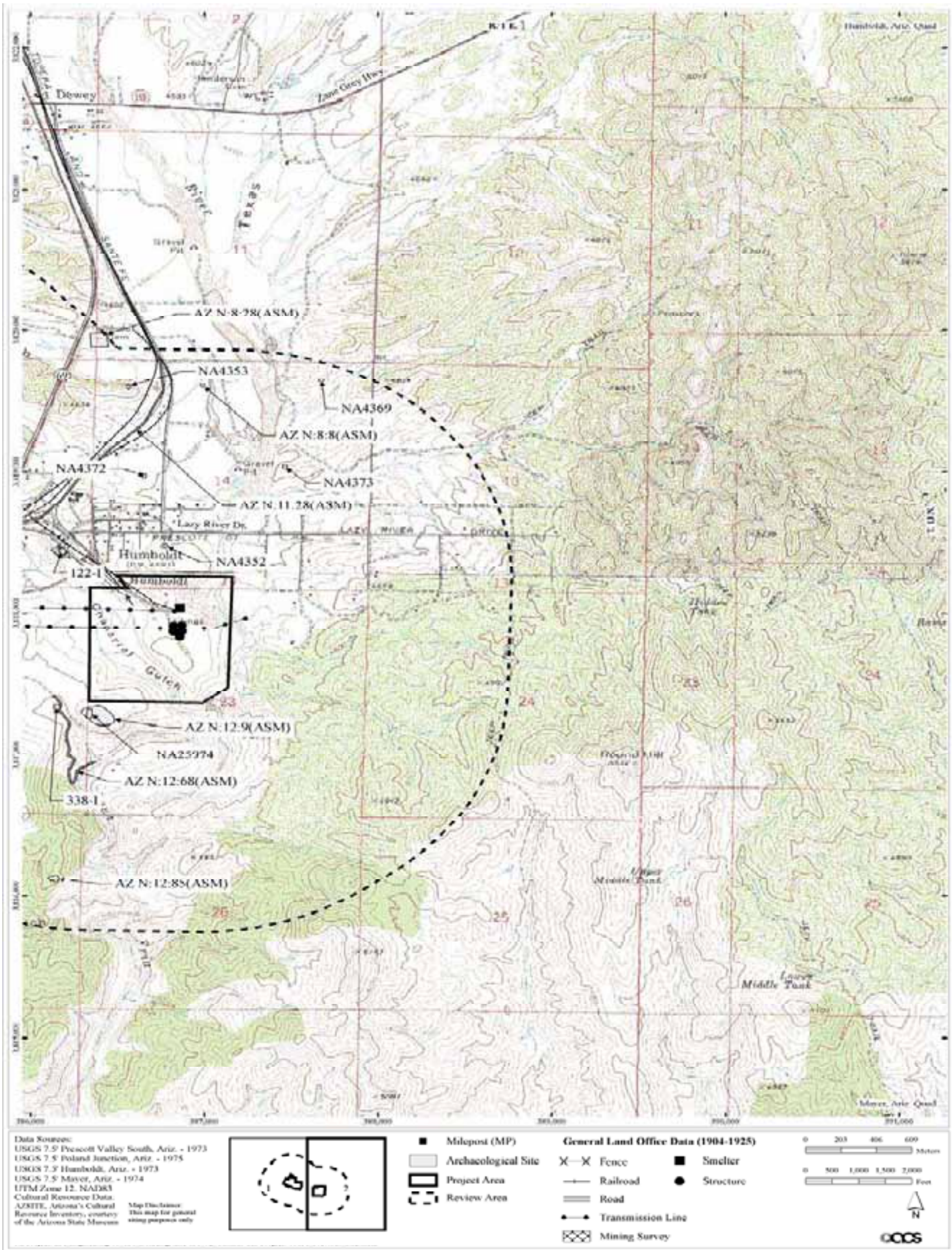

Figure 30. Portions of the USGS 7.5' Mayer and Humboldt, Ariz., topographic quadrangles showing the location of previously recorded archaeological sites.

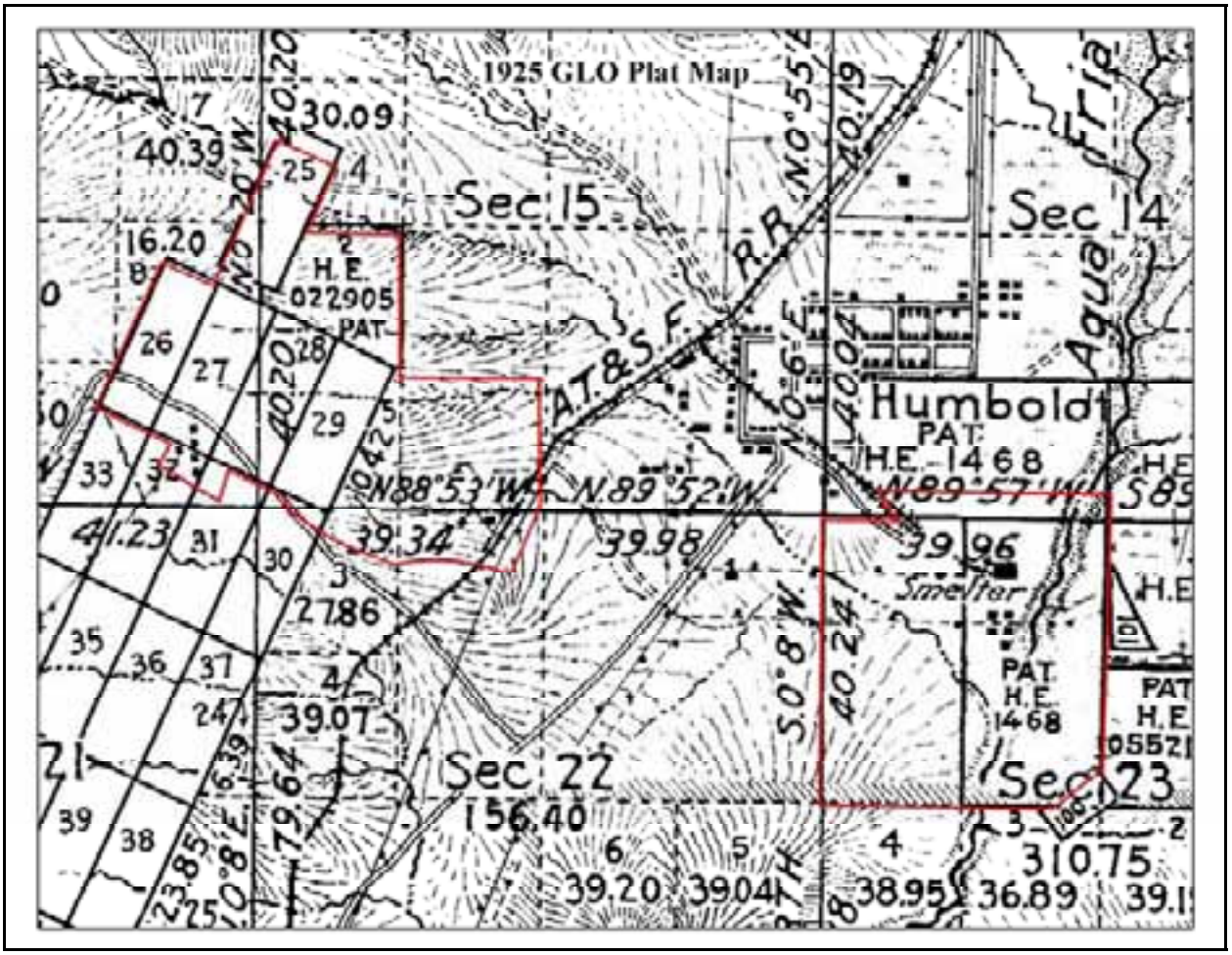

Figure 31. General Land Office survey plat (1925) with projected current project APEs.

Field Methods and Results

As the project area is within a Superfund Site with ground contamination of arsenic and lead at levels exceeding health and safety standards, all field crew members had current certification of 24–40 hours of Hazwopper training prior to commencing fieldwork. The fieldwork was conducted by ACS archaeologist Chris Rayle, historian Scott Solliday, spatial analyst Joseph Kliner, and staff scientist Jessica Jensen on September 9–12, 2008. The parcel was systematically examined via parallel pedestrian transects spaced not more than 15 m apart. The ground was closely examined for isolated artifacts, artifact scatters, trash dumps, rock alignments, ash, stained soil, or other indications of cultural activity. A Trimble GeoXH receiver with a Zephyr antennae attachment was used to plot the project area and cultural resources. As previously stated, both the Iron King Mine and Humboldt Smelter properties are considered historic sites and have been assigned the following site numbers from ASM: AZ N:7:430(ASM) and AZ N:8:71(ASM), respectively. Additionally, the survey identified eight historic loci and two prehistoric loci within the two properties.

A historic building survey was conducted to document all extant buildings (i.e., structures with standing walls). Each building was photographed and measured, and its location recorded. Architectural style and details, as well as any known historical data, were documented on an Arizona State Historic Property Inventory Form (Appendix C). If archival documentation or other sources were not available to determine the date of construction for a building, then an estimated date was based on construction

methods and materials. Architectural integrity was assessed according to standard criteria for historic building surveys, and historical significance was evaluated in relation to the historic contexts for the two sites.

Cultural resources depicted on the 1925 GLO survey encountered during the survey include the Iron King Road alignment, the Humboldt Smelter railroad spur, and the building cluster south of the Humboldt Smelter. However, the survey did not encounter any traces of the AT&SF/Prescott Eastern Railway, AZ N:11:28(ASM), depicted on the historic GLO survey plat (Figure 31). Although a short segment of an elevated railway was noted southwest and outside of the Iron King APE, no noticeable railway bed, or railway features were observed within the APE. Observed historic GLO resources were recorded accordingly as features of either AZ N:7:430(ASM) or AZ N:8:71(ASM). All standing architecture was evaluated as part of the historic building survey (Appendix C). Following standard reporting protocols, prehistoric resources have been recorded using the metric system, while historic resources have been recorded using the English system.

On both the Iron King Mine/AZ N:7:430(ASM) and the Humboldt Smelter/AZ N:8:71(ASM) properties, cultural features were found to be concentrated into distinct loci that correlated with relative age, cultural affiliation, and/or function. Therefore, research loci were delineated for all feature clusters as a management tool to allow for clarity and efficiency in evaluation, reporting, and recommendations. Each locus is defined in terms of content and spatial extent in the following sections of this report.

Sites

AZ N:7:430(ASM)/Iron King Mine

Field Number: ACS1

Location: T13N/R1E/§15(SE¼), 16(NE¼), 22(NW¼)

UTM: N3818545.41 E384944.97

Jurisdiction: Private

Landform: Ridgetops and alluvial fans

Elevation: 4,620 to 4,860 ft amsl

Vegetation: Ironwood, jojoba, manzanita, scrub oak, seep willow, juniper, bursage, broom snakewood, brittlebush, buckwheat, and various understory grasses

Soils: Gravelly sandy clay loam

Site Area: 198.2 acres/114.2 surveyed acres

Site Type: Historic mine and mining facilities

Temporal/Cultural Affiliation: Late Historic (ca. 1880s–1950s)/Euro-American

Description: In consultation with ASM, the boundaries for AZ N:7:430(ASM) were delineated so as to encompasses the entire area of the previously defined Iron King Mine APE, which constitutes the entirety of the historic parcel. The site, which is the historic Iron King Mine complex, lies within the foothills east of Humboldt, Arizona (Figure 1).

In total, ACS identified 50 features within four historic loci at AZ N:7:430(ASM) (Figure 32). The features are a mix of modern and historic standing architecture, as well as the remains of recently demolished historic buildings. Specifically, these features include the ruins of an historic homestead (Locus 1), modern-historic standing architecture and recently demolished historic buildings within the former Iron King Operations Area (Locus 3), and modern structures associated with North American Industries (NAI) facilities (Locus 4).

Locus 1: Bybee Homestead

Locus 1 consists of an historic artifact scatter and associated structural remains. The locus, which measures 388 x 360 ft, lies in the north-central portion of AZ N:7:430(ASM) on a southward facing alluvial fan overlooking the Chaparral Gulch at an elevation of approximately 4,620 ft amsl (Figure 32 and Figure 33). Ten features (F41–F50) and more than 200 artifacts were identified within Locus 1, which includes structural remains, elevated platforms, wall alignments, a small stock tank, and an ephemeral dirt two-track road (Table 3; Appendix A: Figures A1–10). Historic period artifacts primarily consist of domestic ceramics and glassware dating to the early twentieth century. A summary of artifacts can be found in Table 4.

Table 3. AZ N:7:430(ASM) Locus 1 Feature Summary Table.

Feature No.	Description	Figures (in Appendix A)
F41	Northwest-southeast trending dirt two-track road segment approximately 26 ft wide and 400.7 ft in length.	Figure A1
F42	Square stacked stone platform approximately 32 x 20 ft. The platform is 3 ft high on the east side and decreases to 8 in on the west side.	Figure A2
F43	East-west oriented exposed rock alignment measuring 10 x 10.5 ft.	Figure A3
F44	Exposed rectilinear rock wall alignments of a two-room, possibly residential structure measuring 32 x 19 ft. The wall that constitutes F43 appears to connect this structure with F42. The structural remains lie on an east-west axis.	Figure A4
F45	Small circular depression approximately 5.5 ft in diameter. A pile of red brick lies southwest and adjacent to the depression. Most likely this depression served as a stock tank.	Figure A5
F46	Exposed rectilinear rock wall alignments measuring 67 x 18 ft. The structural remains lie on an east-west axis.	Figure A6
F47	Exposed rectilinear rock wall alignments measuring 25 x 13 ft. The structural remains lie on an east-west axis.	Figure A7
F48	Ephemeral rock and sand platform measuring approximately 4 inches high and 103 x 23 ft in area. The platform lies on an east-west axis.	Figure A8
F49	Exposed rectilinear rock wall alignments of a two room structure measuring 39 x 22 ft. The structural remains lie on an east-west axis.	Figure A9
F50	Exposed rectilinear rock wall alignments of a one room structure measuring 22 x 14 ft. The structural remains lie on an east-west axis.	Figure A10

Table 4. AZ N:7:430(ASM) Locus 1 Sample Artifact Summary Table.

Item	Date(s)
General Site Area	
26 Clear glass bottle & jar fragments	1930–present
6 Green glass bottle & jar fragments	1920–present
2 Brown glass bottle & jar fragments	1860–present
2 Amber glass bottle & jar fragments	1914–1930
1 Milkglass glass bottle & jar fragments	1890–1960
1 Aqua glass bottle & jar fragments	1880–1910
1 Aqua glass medicine bottle stopper, “L. Brook & Co”	1880–1910
18 Sun-colored amethyst glass bottle & jar fragments	1880–1920
200 + Window glass fragments	Unknown
3 Stoneware ceramic fragments	Unknown
1 Ironstone fragments	Unknown
7 Whiteware fragments	Unknown
4 Porcelain fragments	Unknown
2 Electric fence ceramic insulators	Unknown
8 Porcelain insulators	Unknown
4 Rusted metal fragments	Unknown
1 Sanitary can	1904–1940
1 Small claw hammer with no handle	Unknown
1 Steel bunghole cap	Unknown
1 Shell button	Post–1855
1 barrel strap	Unknown
1 Rusted 55-gallon drum	Unknown
1 Rusted regular gauge railroad spike	Unknown
2 Rusted bridle buckles	Unknown
1 Pistol cartridge, 9mm Luger, *I*	1902–present
Feature 44	
100 + window glass	Unknown
Feature 45	
40 Red brick	Unknown
Feature 50	
50 + Red brick	Unknown

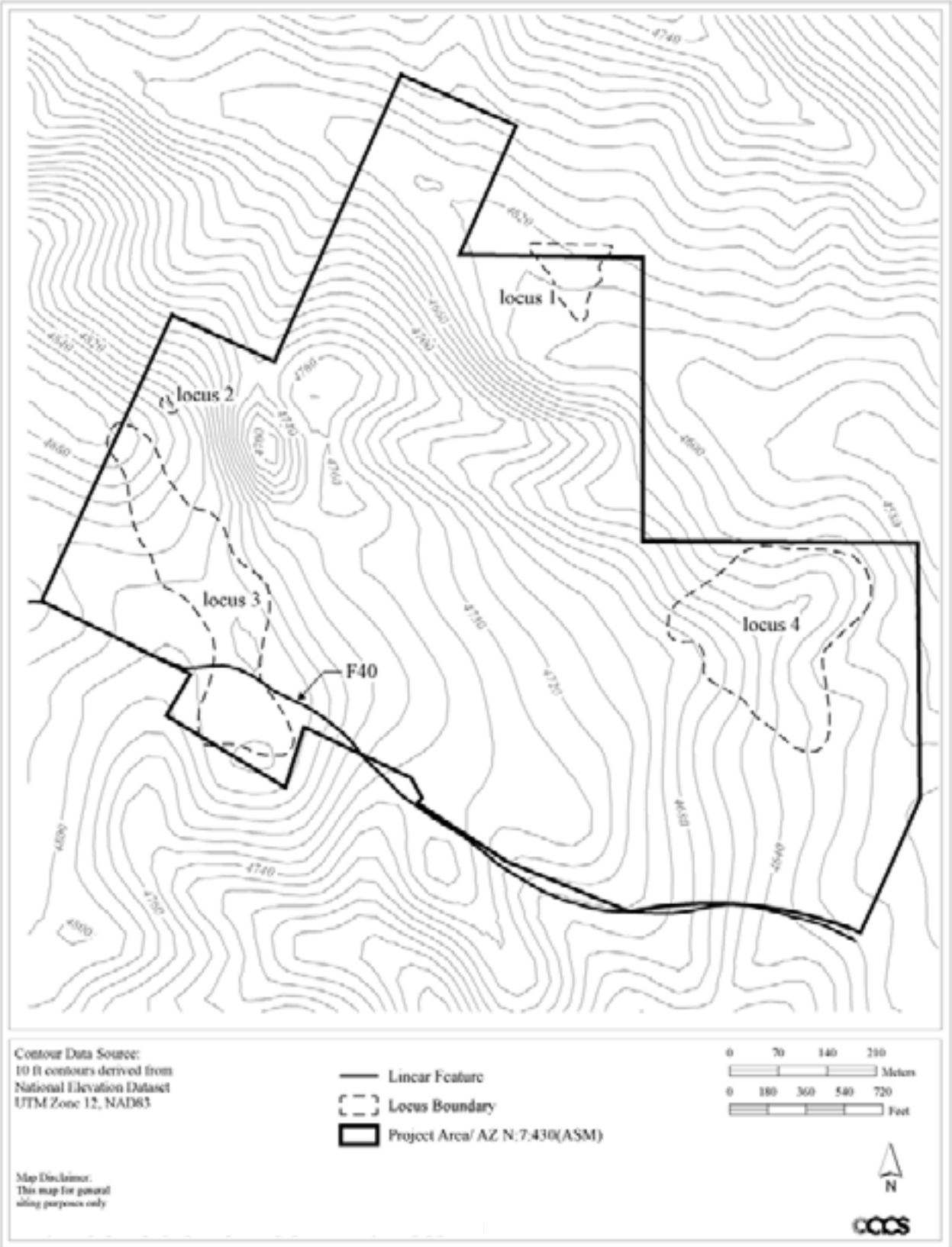

Figure 32. Plan map of AZ N:7:430(ASM)/Iron King Mine.

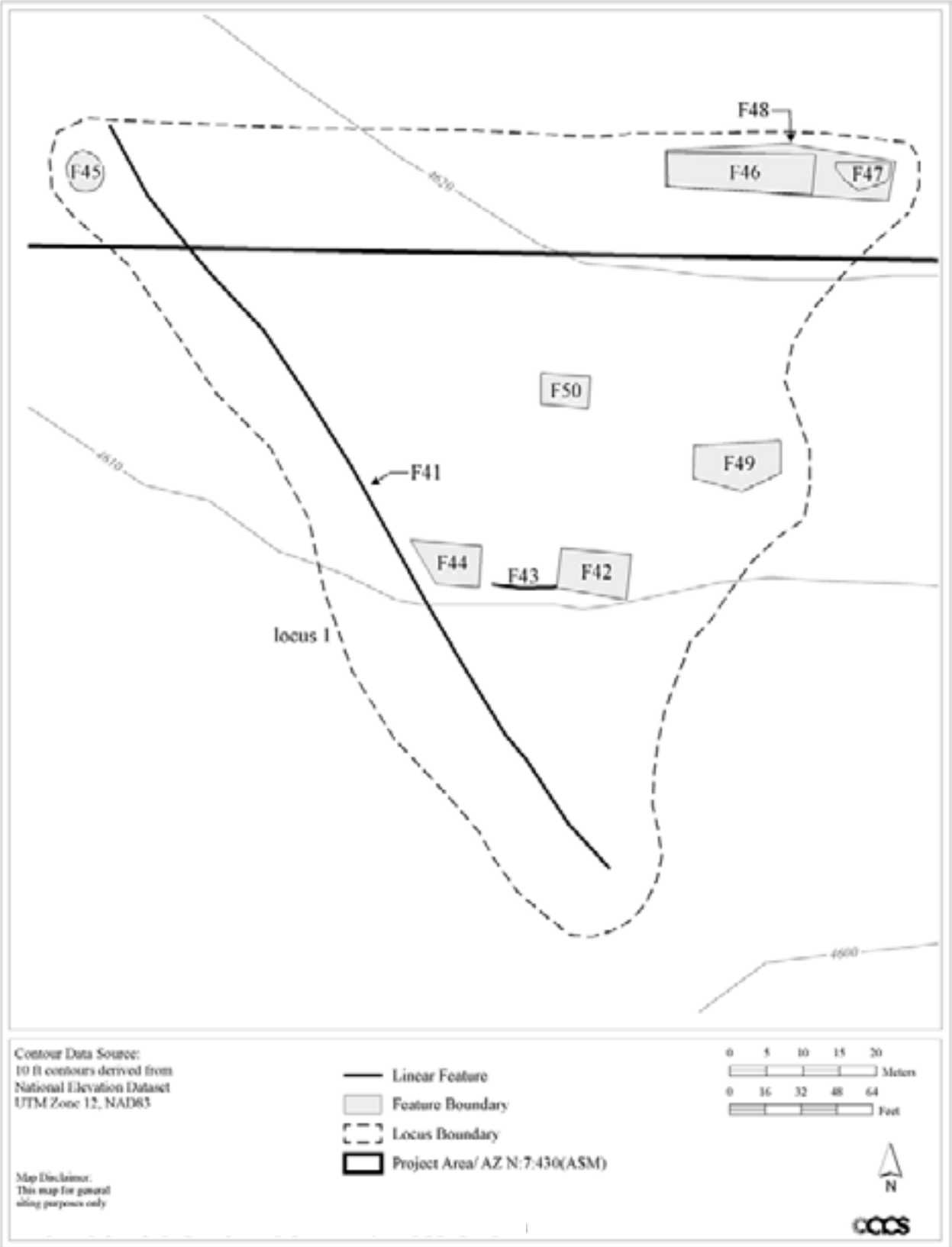

Figure 33. Plan map of AZ N:7:430(ASM) Locus 1.

A search of General Land Office patent records revealed a 1919 land patent (# 022905) issued to Carl B. Bybee for 26.32 acres in Lot 2 of Section 15 (Figure 34). Correlation of U.S. Census Bureau data with the GLO land patent confirms that the Bybee family lived in this parcel west of Humboldt, Arizona in 1920. Although the archaeological features identified during the current survey most likely have a direct association with the Bybee family, it remains unclear if this area represents an ancillary component of the homestead, or is in fact the primary location of the domestic residence.

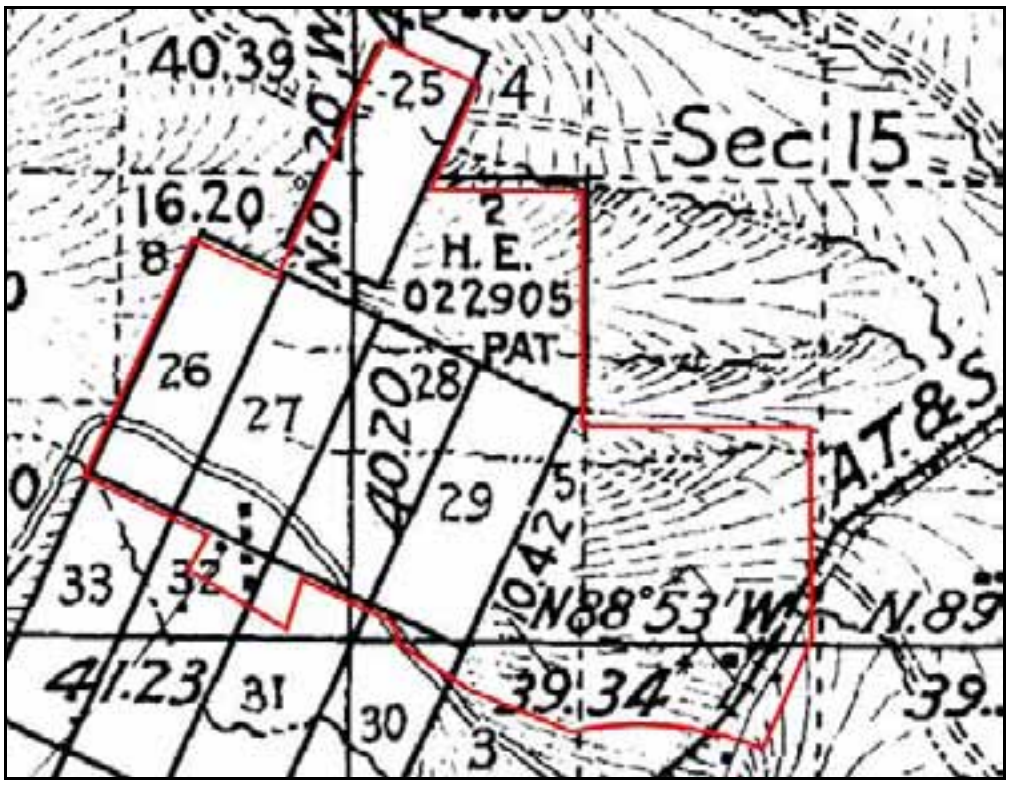

Figure 34. General Land Office (1925) plat depicting Lot 2 (Patent No. 022905) of Section 15.

<u>Locus 2: Historic Artifact Scatter</u>

Locus consists of a low density historic artifact scatter situated on a north facing slope near the western boundary of AZ N:7:430(ASM) at an elevation of approximately 4,820 ft amsl (Figure 32; Figure 35 and Figure 36) No features or structural remains were identified. The locus measures 98 x 68 ft, and observed artifacts consist primarily of domestic ceramics and glassware. A summary of observed artifacts can be found in Table 5.

Table 5. AZ N:7:430(ASM) Locus 2 Sample Artifact Summary Table.

Item	Date(s)
General Site Area	
3 Clear glass bottle & jar fragments	1930–present
1 Green glass bottle & jar fragments	1920–present
9 Aqua glass bottle & jar fragments	1880–1920s
40+ Sun-colored amethyst glass bottle & jar fragments	1880–1920
17 Black (green) glass bottle & jar fragments	Unknown
18 Whiteware, blue and purple flower pattern	Unknown
3 Hole in top cans	c. 1880–1920
4 Meat cans, hole in cap, machine soldered seam	c. 1890–1920

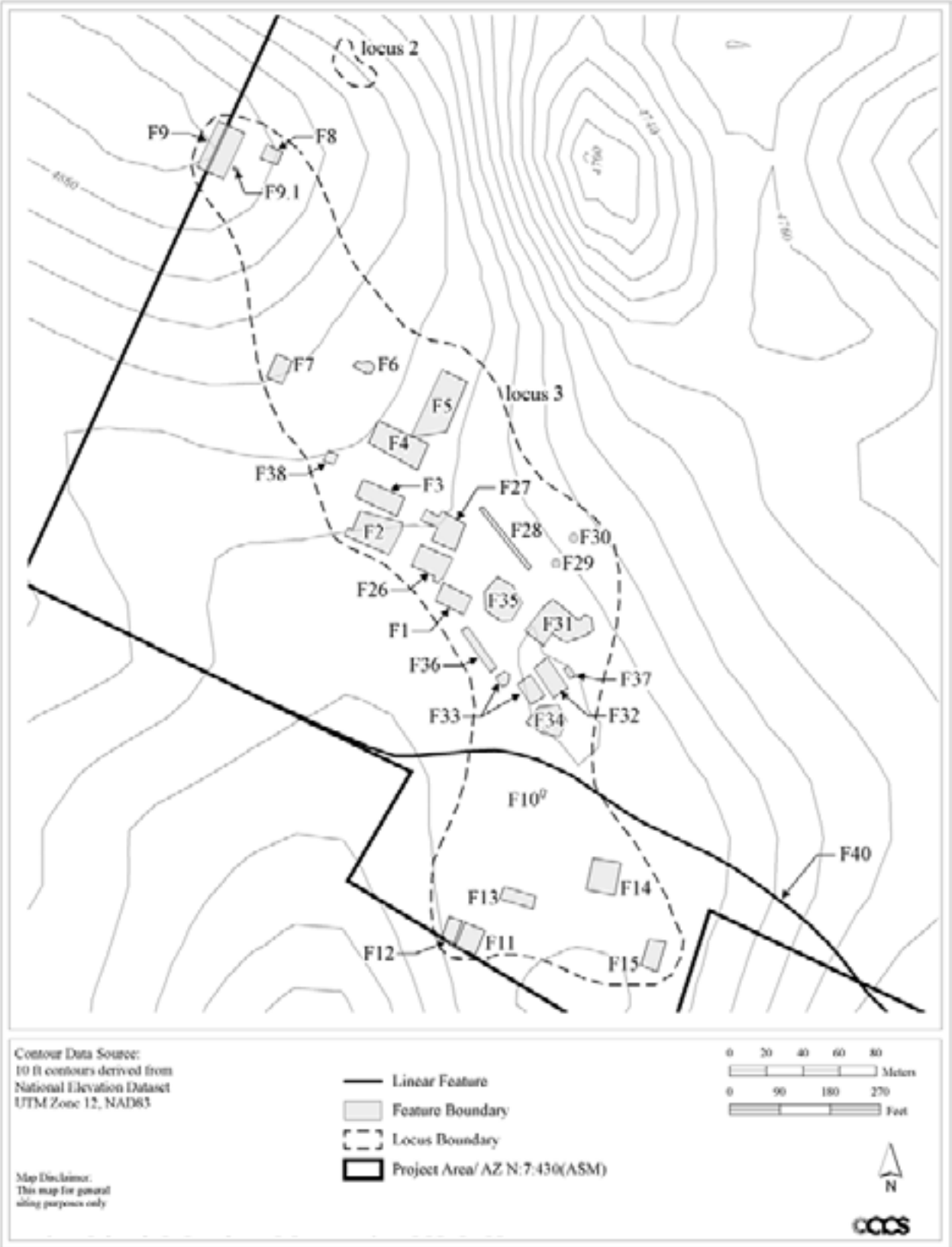

Figure 35. Plan map of AZ N:7:430(ASM) Loci 2 and 3.

Figure 36. Close-up of AZ N:7:430(ASM) Locus 2 facing southeast.

Locus 3: Architecture

Locus 3 consists of a cluster of modern and historic standing architecture, as well as recently demolished historic buildings within the former Iron King Mine Operations Area and former Ironite fertilizer plant area. This locus, which measures 1,735 x 478 ft, lies in the southwestern portion of AZ N:7:430(ASM) on a ridgetop overlooking the mine tailings to the northeast at an elevation of approximately 4,800 ft amsl (Figure 32 and Figure 35). Referred to as the Kuhles property, this built environment is currently a combined lease area for local businesses which includes a port-a-potty waste facility located in the former Ironite fertilizer parcel. At total of 11 historic features and 12 modern features were identified within the locus (Table 6; Appendix A: Figures A11–A40). No historic artifacts were observed. Historic Property Inventory Forms were completed for all standing architecture, and are presented in Appendix C.

Table 6. AZ N:7:430(ASM) Locus 3 Feature Summary Table.

Feature No.	Description	Figures (Appendix A)/ HPIF (Appendix C)
F1	Office (1990): Wood-framed structure measuring 52 x 30 ft.	Figure A11, HPIF
F2	Iron King Mine Shop (1955): Concrete block and metal structure measuring 86 x 61 ft.	Figure A12, HPIF
F3	Shop (1990): Steel-frame shade metal structure measuring 81 x 36 ft.	Figure A13, HPIF
F4	Warehouse/Building 1 (1990): Large steel-framed metal structure measuring 100 x 50 ft.	Figure A14, HPIF
F5	Warehouse/Building 2 (1990): Large steel-framed metal structure measuring 100 x 50 ft.	Figure A15, HPIF
F6	Iron King Mine Shaft No. 7 (ca. 1960s): Small concrete and steel reinforced structure with an area of 42 x 27 ft.	Figure A16, HPIF

Table 6. AZ N:7:430(ASM) Locus 3 Feature Summary Table.

Feature No.	Description	Figures (Appendix A)/ HPIF (Appendix C)
F7	Building, function unknown (1955): Concrete block structure with an area of 44 x 30 ft.	Figure A17, HPIF
F8	Domicile (1960): Wood-framed structure measuring 40 x 29 ft.	Figure A18, HPIF
F9	Iron King Mine Cistern (1950): Large concrete and block structure measuring 85 x 51 and an associated pump station (F.9.1) measuring 10 x 4 ft.	Figure A19–20, HPIF
F10	Transformer House (1980): Small wood-framed structure measuring 12 x 8 ft.	Figure A21, HPIF
F11	Ironite Warehouse (1970): Steel-framed metal structure measuring 46 x 38 ft.	Figure A22, HPIF
F12	Ironite Warehouse (1970): Steel-framed metal structure measuring 35 x 24 ft.	Figure A23, HPIF
F13	Sewage Waste Processing Plant (1980): Poured concrete and steel structure approximately 44 x 38 ft.	Figure A24, HPIF
F14	Ironite Office (1960): Roofless, large concrete block structure measuring 57 x 47 ft.	Figure A25, HPIF
F15	Boiler Room 2 (1960): Wood-framed metal structure measuring 53 x 33 ft.	Figure A26, HPIF
F26	Poured concrete pad/foundation (construction date unknown) measuring 66 x 49 ft.	Figure A27
F27	Poured concrete foundation with machinery supports (construction date unknown) measuring 76 x 52 ft.	Figure A28
F28	Poured concrete foundation/tunnel (construction date unknown) measuring 139 x 8 ft.	Figure A29
F29	Concrete support/foundation (construction date unknown) exposed on a hillside. Majority of support lies buried in the hillside. The foundation measures approximately 2 x 6 ft and 3 ft high.	Figure A30
F30	Poured concrete pad (construction date unknown) measuring 2 x 3.5 ft.	Figure A31
F31	Iron King Mine Mechanical Building (construction date unknown): This feature consists of the remains of a recently demolished split-level building. The upper level consists of a poured concrete foundation with extant walls. The lower level appears to have been a basement floor, and does not have a poured concrete foundation. Construction rubble surrounds the building ruin. The extant building footprint covers an area of 94 x 89 ft.	Figure A32
F32	This feature consists of a recently demolished building (construction date unknown) southeast of F31. A poured concrete foundation with extant walls remains. Construction rubble lies in and around the structure ruin. The extant building footprint covers an area of 66 x 31 ft.	Figure A33
F33	Iron King Main Office (construction date unknown): This feature consists of a recently demolished building southwest of F32. A poured concrete foundation with extant tile flooring and walls remains. A construction debris pile lies off the SW corner of the ruin. The extant building footprint covers an area of 45 x 29 ft.	Figure A34
F34	Iron King Mine Assay Office (construction date unknown): This feature consists of a recently demolished building southeast of F33. A poured concrete foundation covered in construction rubble remains. The extant building footprint covers an area of 64 x 58 ft.	Figure A35
F35	Iron King Mine Foreman's Office (construction date unknown): Recently demolished building that appears to have been a wooden	Figure A36

Table 6. AZ N:7:430(ASM) Locus 3 Feature Summary Table.

Feature No.	Description	Figures (Appendix A)/ HPIF (Appendix C)
	floored structure. No concrete foundation or walls remain, and construction rubble lies in the building footprint. The extant building footprint covers an area of 81 x 67 ft.	
F36	Three modern poured concrete trailer pads (construction date unknown) measuring 90.9 x 14.3 ft.	Figure A37
F37	Small poured concrete foundation/pad (construction date unknown) measuring 20.2 x 12.6 ft.	Figure A38
F38	Feature consists of a low-lying concrete and block cistern (construction date unknown) measuring 19 x 19 ft.	Figure A39
F40	Historic Iron King Road (1925): alignment measures approximately 18 ft wide and 4494.5 ft in length.	Figure A40

Locus 4: Modern Buildings and Historic Gravesite

Locus 4 consists of a cluster of modern buildings, including an historic gravesite, within the NAI property located in the northeastern portion of AZ N:7:430(ASM) (Figure 37). This locus, which measures 1000 x 972 ft, lies on a graded re-contoured ridgetop adjacent and east-northeast of the mine tailings at an elevation of approximately 4,600 ft amsl (Figure 31 and Figure 37). This built environment dates to 1988 when the Ironite fertilizer plant operations moved from its former operation area in the southwest corner of the site to its current location (Schuchardt 2008). A total of eleven modern structures were identified in this locus (Table 7; Appendix A: Figures A41–A50). The historic gravesite (F19) lies on the northeastern edge of the mine tailings overlooking NAI's facilities (Figure 38). Although the grave is demarcated by an oval stone alignment and wooden grave marker, there is nothing indicating whose remains lie buried there.

Site Condition: At best, the overall site condition of AZ N:7:430(ASM) is fair. This assessment stems from the lasting effects of over 60 years of active mining at the site and subsequent demolition of buildings and structures. Not only has the majority of the natural landscape has been subjected to re-contouring from mining related activities, but much of the property has been bladed and overlain with overburden stemming from waste rock and tailings. Moreover, the great majority of the historic mine related structures dating to the period of active mining operations have been demolished.

Despite the magnitude of these disturbances, some areas of AZ N:7:430(ASM) remain free of the effects from previous mining related activities and maintain their historic integrity. In particular, the northeast portion of the site within and west of Locus 1, as well as the area of Locus 2 near the western site boundary remain relatively undisturbed.

State/National Register Recommendation: AZ N:7:430(ASM) is a historic mining complex dating to the early to mid-twentieth century with four distinct loci which include: an historic homestead site (Locus 1), a low-density historic artifact scatter (Locus 2), an historic mine operations facility (Locus 3), and a modern fertilizer plant (Locus 4). As the archival research for this project demonstrates, the Iron King Mine/AZ N:7:430(ASM) played a significant role in the historic development of the Big Bug Mining District with a period of historic significance from 1899, when Hagen began small scale mining on the property, through the end of the historic period, 1959. A secondary area of historic significance for the property is within the context of Arizona homesteading, relating to the Bybee Homestead in Lot 2 of Section 15; the Bybee Family occupied this property from 1920 until after the end of the historic period. Although the buildings and structures once associated with this homestead have been demolished, their archaeological remains were located during the pedestrian survey.

Table 7. AZ N:7:430(ASM) Locus 4 Feature Summary Table.

Feature No.	Description	Figures (Appendix A)/ HPIF (Appendix C)
F16	NAI Maintenance Shed (1988): Steel-framed metal structure measuring 30 x 29 ft.	Figure A41, HPIF
F17	NAI Painter's Shack (1988): Steel-framed metal structure measuring 17 x 10 ft.	Figure A42, HPIF
F18	NAI Lube and Fuel Building (1988): Steel-framed metal structure and associated concrete pad with steel tank supports measuring 50 x 14 ft.	FigureA43, HPIF
F19	Unmarked Gravesite (date unknown): Historic gravesite demarcated by an oval stone alignment and unadorned wooden grave marker. This area measures 9 x 6 ft.	Figure 17
F20	NAI Bldg. 20 Warehouse (1988): Steel-framed metal structure measuring 125 x 100 ft.	Figure A44, HPIF
F21	NAI Production Building 30 (1988): Steel-framed metal structure measuring 88 x 63 ft. Six sub-features (F21.1–6) were identified on the north side of F21. These sub-features are the remains of demolished concrete silo supports.	Figure A45–46, HPIF
F22	NAI Production Packaging Building 40 (1988): Steel-framed metal structure measuring 161 x 126 ft.	Figure A47, HPIF
F23	NAI Shipping Warehouse Building 41 (1988): Steel-framed metal structure measuring 141 x 65 ft.	Figure A48, HPIF
F24	NAI Shipping Warehouse Building 42 (1988): Steel-framed metal structure measuring 150 x 100 ft.	Figure A48, HPIF
F25	NAI Loading Dock (1988): Poured concrete loading dock with an area of 180 x 23 ft.	Figure A48, HPIF
F27	NAI Sentry Post (1988): Poured concrete foundation with machinery supports with an area of 14 x 9 ft.	Figure A49, HPIF
F39	NAI Office (1988): Wood-framed structure measuring 99 x 28 ft.	Figure A50, HPIF

As part of this investigation, the Iron King Mine property was assessed for eligibility as a historic district for listing on the National Register of Historic Places (National Register). Although the property was found through archival research to be potentially eligible under Criterion A for its association with events that have made a contribution to the broad patterns of local or regional history, the integrity of the property is so compromised that it is found to no longer communicate its historic character. This is due to the recent demolition of all but a few of the dozens of historic buildings, structures, and features on the property that were associated with the mine, as well as the significant amount of ground moving that has occurred since the mine ceased operation. The property no longer retains integrity of setting, feeling, or association. Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the five still extant historic buildings and structures that predate 1959, all—either individually or as part of a historic district—are recommended to be ineligible for listing on the National Register due to losses of integrity or lack of historic significance under Criterion C for architectural merit. The core buildings and structures that together were the heart of the industrial mining complex have been destroyed; the ancillary buildings and structures that remain are of secondary significance and with the loss of the core complex, are found to hold little historical significance on their own.

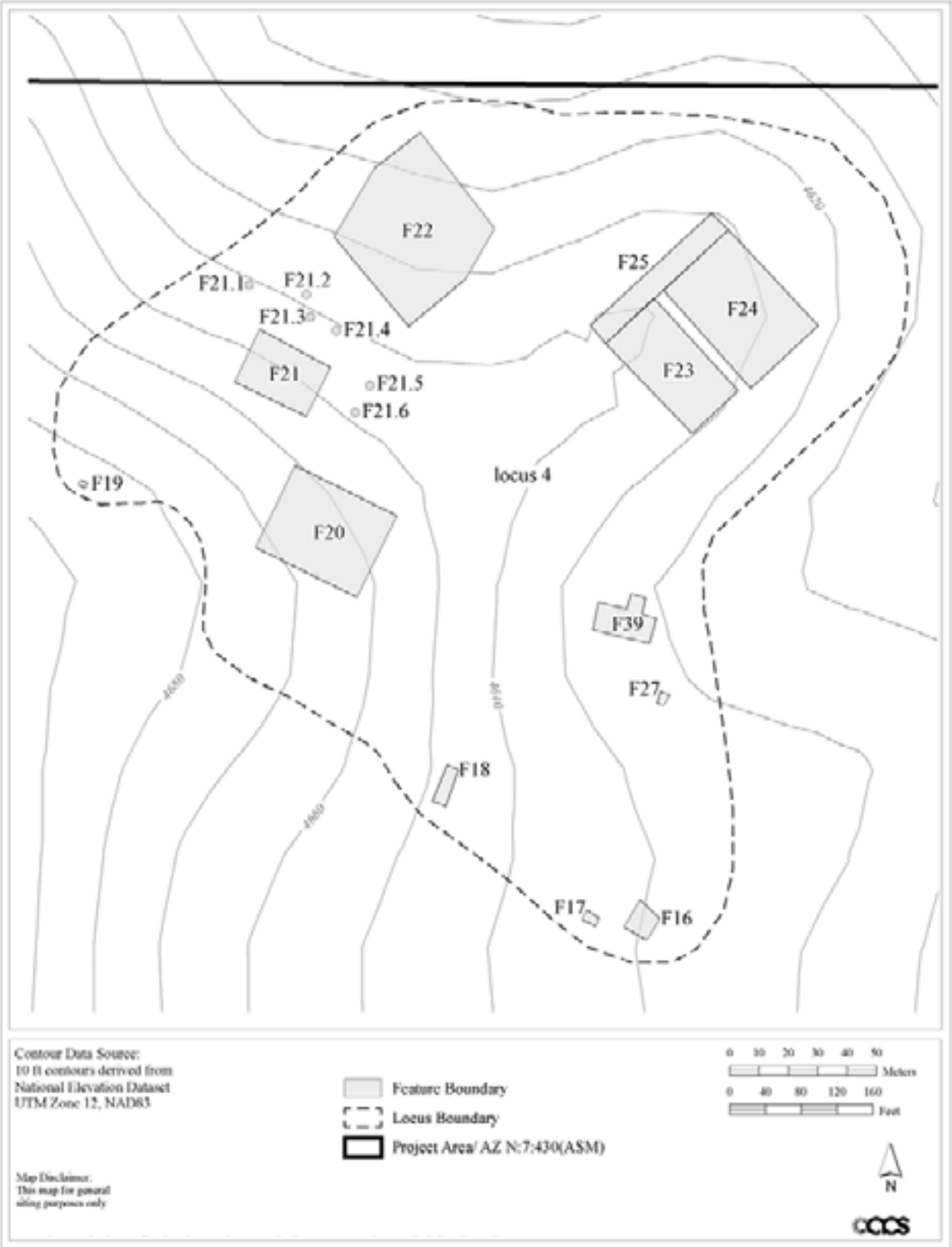

Figure 37. Plan map of AZ N:7:430(ASM) Locus 4.

Figure 38. Close-up of AZ N:7:430(ASM) Locus 4, unmarked burial (F19).

Twenty-one modern structures postdate 1959, and are, therefore, ineligible for inclusion into the National Register of Historic Places based on age. However, the results of the Class III pedestrian survey indicate that the Iron King Mine/AZ N:7:430(ASM) has a demonstrated potential to yield important information regarding the early history of the Big Bug Mining District and homesteading in the region (Criterion D). Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as eligible for listing on the National Register under Criterion D.

Locus 1 represents the remains of an historic homestead dating to the early twentieth-century. Consisting of 10 extant features with an associated artifact scatter, this locus lies in a relatively undisturbed portion of the site, and has good potential for subsurface features and cultural deposits. Moreover, the locus lies in an area that may be potentially free of, or at the very least, may exhibit lower levels of arsenic contamination from the Iron King Mine proper. Based on the features and artifacts observed, as well as its condition, Locus 1 has the potential to yield important information regarding early twentieth-century homesteading in the Big Bug Mining District. Therefore Locus 1 is recommended as contributing to the eligibility of AZ N:7:430(ASM) under Criterion D.

Locus 2 represents a low-density historic artifact scatter dating to the early twentieth century. The scatter consists of metal, glass, and ceramic material which lies on a steep slope near the western boundary of AZ N:7:430(ASM). This area of AZ N:7:430(ASM) remains relatively undisturbed. However, the artifact scatter appears to represent a surface manifestation only, and potential for subsurface deposits or features is low. Specifically, the superficial trash scatter does not help to communicate the historic character of the property, nor hold the potential to yield further information. Mapping and field documentation have exhausted its information potential (Criterion D). Therefore, Locus 2 is recommended as not contributing to the eligibility of AZ N:7:430(ASM).

Locus 3 represents a cluster of historic and modern structures, which includes several building ruins. No historic artifacts were identified within the locus, and modern architecture was not considered for evaluation. Historic structures and ruins identified within Locus 3 date from the early to mid-twentieth century during the peak of the Iron King Mine's operations. The information potential (Criterion D) has

been exhausted through the field recording conducted during this project. Therefore, Locus 3 is recommended as not contributing to the eligibility of AZ N:7:430(ASM).

Locus 4 represents the area of NAI's fertilizer processing facilities which date to 1988 (Schuchardt 2008). Being modern, these structures do not contribute to the eligibility of AZ N:7:430(ASM). However, F19, an historic gravesite which lies on the northeastern edge of the mine tailings, necessitates special treatment. Specifically, the burial will need to be treated as an unmarked burial in an unregistered cemetery. Moreover, the probable non-Native American, historic burial is located within the Area of Potential Effect (APE) and, therefore, if it cannot be avoided during ground disturbing remediation activities, it must be disinterred and relocated prior to ground disturbance activities in accordance with state laws pertaining to unmarked and unregistered cemeteries and graves (ARS 41-844 and 41-865).

AZ N:8:71(ASM)/Humboldt Smelter

Field Number: ACS2

Location: T13N/R1E/§14(SW¼), 23(NW¼)

UTM: N3817810.67 E386746.42

Jurisdiction: Private

Landform: Mesa top

Elevation: 4,400 to 4,600 ft amsl

Vegetation: Jojoba, manzanita, scrub oak, juniper, bursage, broom snakewood, brittlebush, buckwheat, and various understory grasses

Soils: Gravelly sandy clay and very rock loam

Site Area: 171.9 acres/150.9 surveyed acres

Site Type: Multicomponent: Prehistoric artifact scatters, historic smelter complex, historic mine shaft, and historic residential community

Temporal/Cultural Affiliation: Unknown prehistoric/Late Historic (ca. 1880s–1950s)/Euro-American

Description: In concurrence with ASM, AZ N:8:71(ASM) encompasses the entire area of the previously defined Humboldt Smelter APE. AZ N:8:71(ASM) is a multicomponent site which primarily consists of historic remains relating to the Humboldt Smelter. The site lies adjacent and south of Main Street in Humboldt, Arizona (Figure 1).

In total, ACS identified two prehistoric loci (Locus 1–2) and four historic loci (Locus 3–6) within AZ N:8:71(ASM) (Figure 39). Fifty-five features were identified within the four historic loci which include both standing and demolished historic architecture associated with the Humboldt Smelter industrial complex (Locus 5 and 6), the Nob Hill residential neighborhood (Locus 4), and the Chaparral Gulch Shaft (Locus 3). Additionally, the entire mesa top supports a high-density debris field of historic artifacts (N = 500,000 +). Due to the sheer size of the area and number of historic artifacts, sampling within the four historic loci was limited to general field observations of the types of artifacts present. Sanborn Fire Insurance Maps (SFIM) (1917, 1931 [update of 1917 map]) (Figure 23 and Figure 24; Figure 25 and Figure 26) were consulted for feature identification.

Locus 1: Prehistoric Artifact Scatter

Locus 1 consists of a small prehistoric artifact scatter situated on an eastern-facing slope west of the Chaparral Gulch at an elevation of approximately 4,640 ft amsl (Figure 39–Figure 41). The boundary of the locus measures 33.5 x 9.1 m, and no features or structural remains were identified. Observed artifacts included prehistoric ceramics, chipped stone, and groundstone. Locus 1 most likely represents a semi-permanent or permanent habitation area; however, a lack of diagnostic artifacts or surface features precludes a reliable assessment of cultural affiliation. The presence of 24 Prescott Gray sherds roughly dates the site from A.D. 700–1300. A summary of observed artifacts can be found in Table 8.

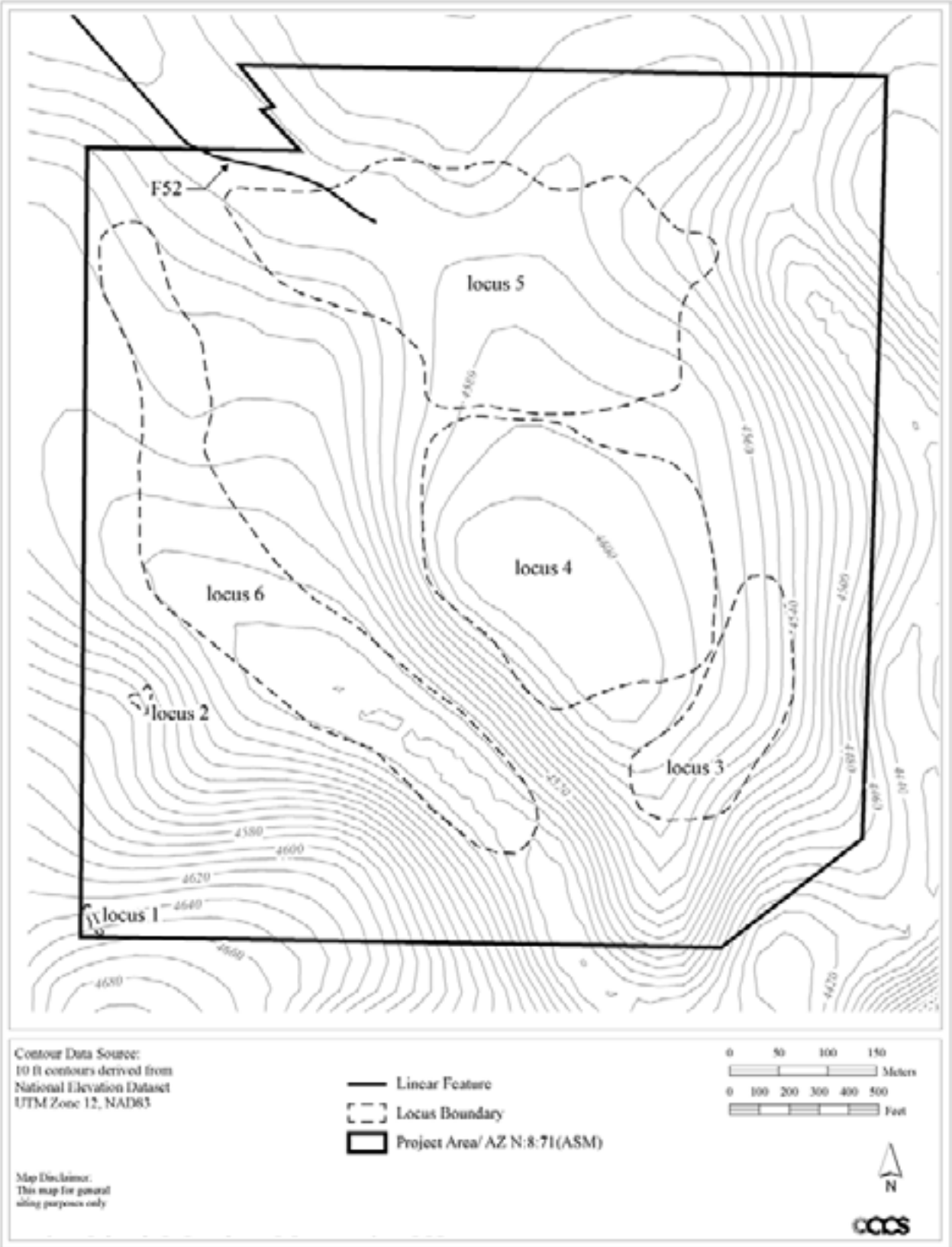

Figure 39. Plan map of AZ N:8:71(ASM)/Humboldt Smelter.

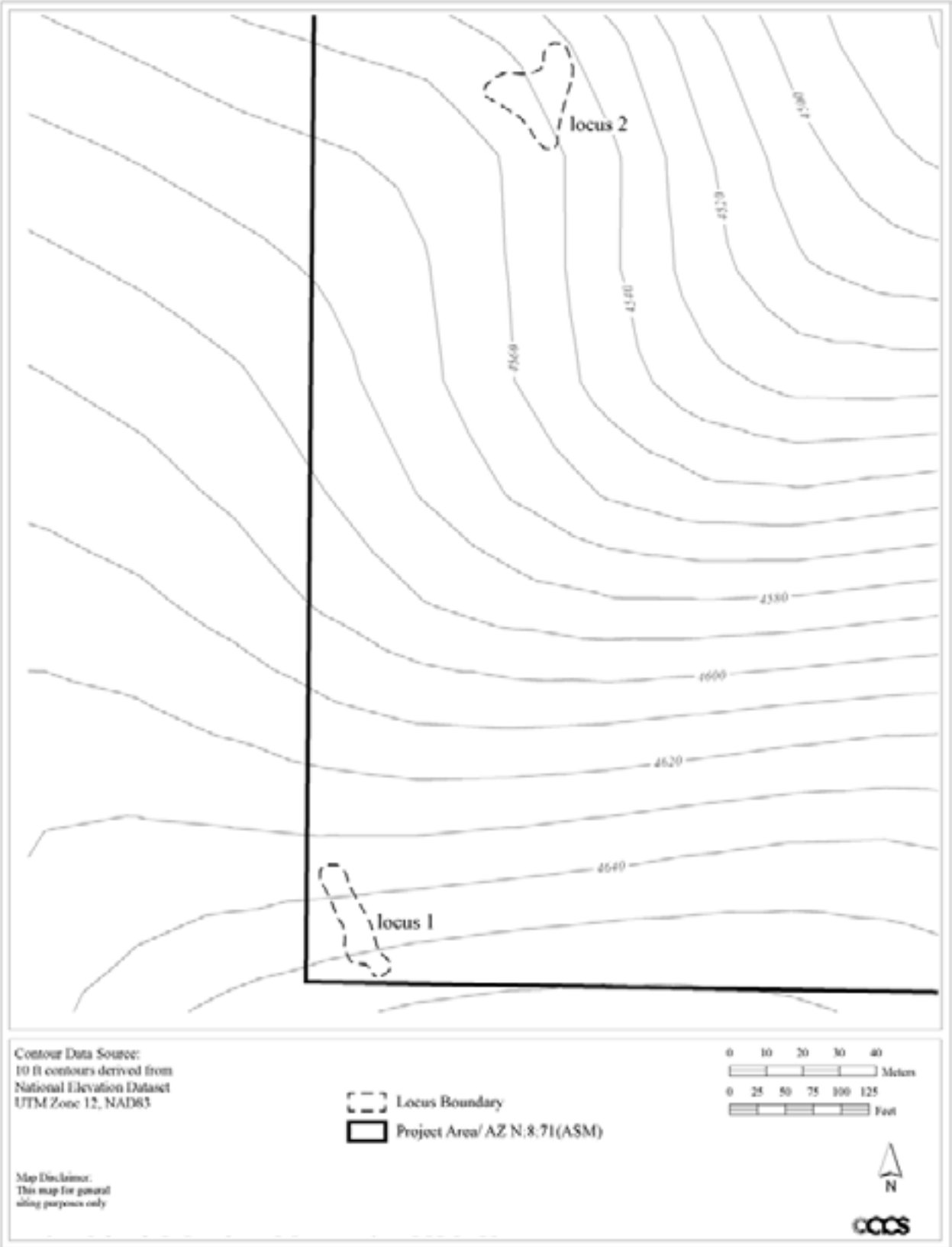

Figure 40. Plan map of AZ N:8:71(ASM) Loci 1 and 2.

Figure 41. Overview of AZ N:8:71(ASM) Locus 1 facing northeast.

Table 8. AZ N:8:71(ASM) Locus 1 Sample Artifact Summary Table.

Item	Date(s)
General Site Area	
24 Prescott Gray sherds	A.D.700–1300
1 unidentified prehistoric white ware ceramic sherd	Unknown
7 Fine grained basalt chipped stone flakes	Unknown
1 Fine grained basalt core	Unknown
9 Rhyolite chipped stone flakes	Unknown
1 Quartz chipped stone flakes	Unknown
1 Sandstone mano	Unknown

Locus 2: Prehistoric Artifact Scatter

Locus 2 consists of a small prehistoric artifact scatter situated on a natural shelf overlooking the Chaparral Gulch at an elevation of approximately 4,520 ft amsl (Figure 39 and Figure 40; Figure 42). The locus boundary, which measures 29 x 22.9 m, lies approximately 204.2 m northeast of Locus 1 (Figure 39). No features or structural remains were identified. Observed artifacts included prehistoric ceramics and chipped stone. Locus 2 most likely represents a semi-permanent or permanent habitation area; however, a lack of diagnostic artifacts or surface features precludes a reliable assessment of cultural affiliation. The presence of 14 Prescott Gray and 3 Aquarius Orange sherds roughly dates the site from A.D. 800–1300. A summary of observed artifacts can be found in Table 9.

Table 9. AZ N:8:71(ASM) Locus 2 Sample Artifact Summary Table.

Item	Date(s)
General Site Area	
14 Prescott Gray sherds	A.D.700–1300
3 Aquarius Orange sherds	A.D.800–1300
1 Fine grained basalt chipped stone flake	Unknown
8 Rhyolite chipped stone flakes	Unknown
5 Chert chipped stone flakes	Unknown
2 Quartz chipped stone flakes	Unknown
1Chalcedony chipped stone flake	Unknown

Figure 42. Overview of AZ N:8:71(ASM) Locus 2 facing northeast.

Locus 3: Historic Mining and Associated Railroad Features

Locus 3 consists of a group of features which lie on a steep southeastern-facing slope overlooking the Agua Fria River at an elevation of approximately 4,540 ft amsl (Figure 39 and; Figure 43). Five features (F22, F32–35), as well as 1,000s of historic artifacts were identified within Locus 3 which includes: 1) the remains of the historic nineteenth century Chaparral Gulch Shaft mining facility, 2) two retaining walls, 3) a demolished structure, and 4) the remains of a railroad water tank (Table 10; Appendix B: Figures B2–B13). Observed historic artifacts include domestic ceramics, glassware, narrow-gauge rail, and metal cans dating from the late nineteenth century to mid-twentieth century. Sanborn Fire Insurance Maps (1917, 1931) were consulted for feature identification (Figure 23 and Figure 24). Although the Sanborn maps do not depict the southeast corner of the mesa top, they do indicate the location of a 2-inch water pipe trending east from the Nob Hill area (Locus 4) to a railroad water tank off-map. Comparison of the SFIMs and the overall plan map of AZ N:8:71(ASM) (Figure 39) suggests that the water tank referenced by the SFIMs is F22.

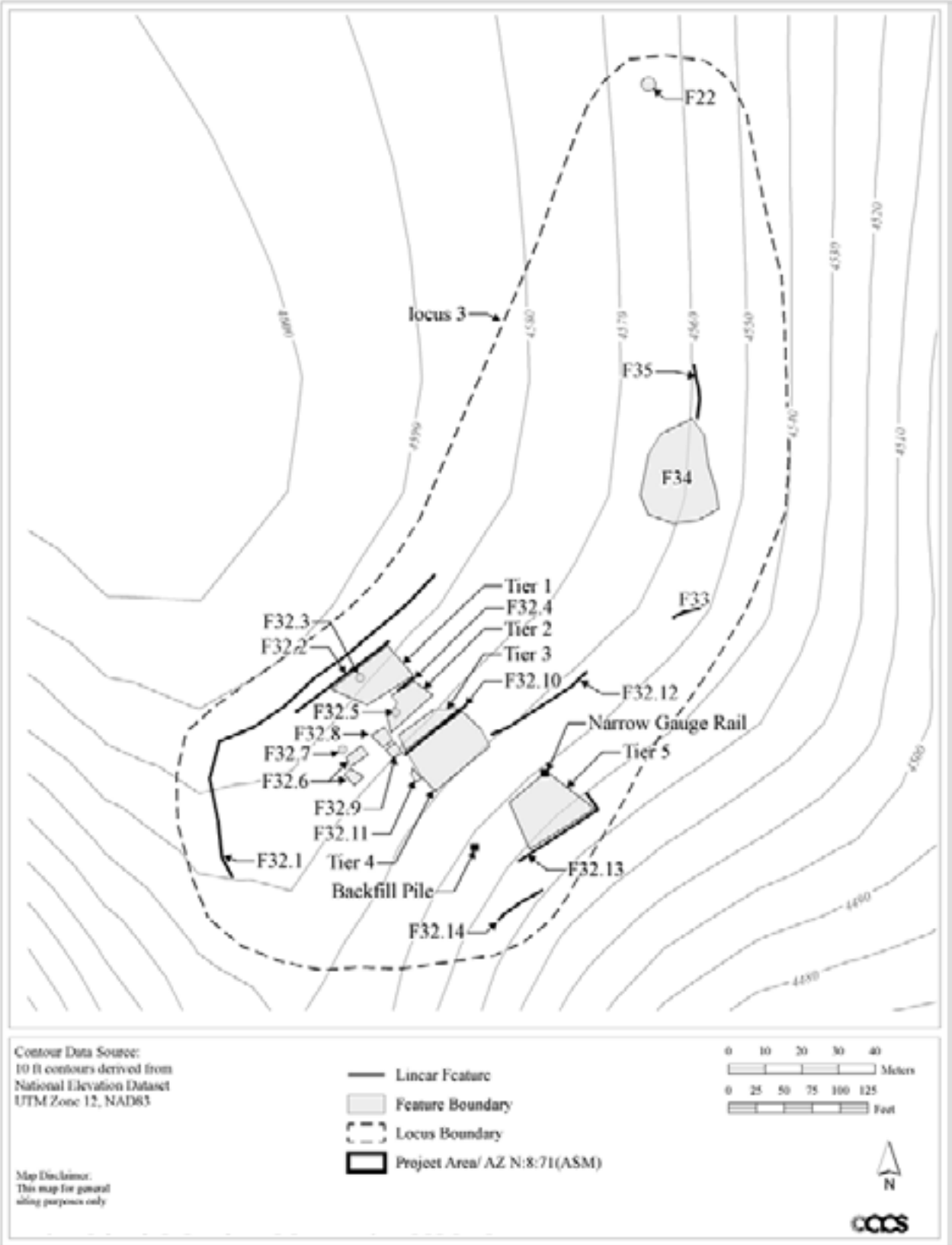

Figure 43. Plan map of AZ N:8:71(ASM) Locus 3.

Table 10. AZ N:8:71(ASM) Locus 3 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F22	Railroad water tank (1880s). Feature consists of a brick lined tank foundation measuring 13 ft in diameter and approximately 3 ft deep. Ceramic piping was observed in the western wall.	Photograph not available
F32	Chaparral Gulch Shaft (1880s). This feature consists of five level-planed, excavated tiers (F32) which lie on a steep southeast-facing slope overlooking the Agua Fria River. Several sub-features were identified on the varying tiers which include retaining walls constructed from stacked vesicular basalt blocks, two filled in mine shaft depressions, three concrete supports, and foundation remnants indicative of a small structure. Numbered north to south as Tiers 1–5, these tiers vary in their size and definition. *Tier 1*, which covers an area of 64 x 36 ft, lies just below a dirt two-track road (F32.1) at the top of the slope. A crumbling stacked stone retaining wall (F32.2) approximately 2 ft high and 105.5 ft long defines the northwest side of the tier. An approximately 10 x 10 ft abandoned mineshaft depression and mound (F32.3) lies in the northwest corner of this tier. Feature 32.1, which trends northeast-southwest above the Chaparral Gulch Shaft, appears to start just southwest of the F32 and extends north-northeast along the eastern edge of the mesa top. Although this feature is presently a dirt two-track, it may have served as a narrow-gauge railbed for hauling raw ore to Bashford's original Agua Fria Ore Mill to the north. The remains of a railroad water tank, F22, lies just northeast and downslope along the same natural contour that the two-track follows. However, no evidence for a railbed, i.e., spikes or rail, were encountered. The road measures approximately 16 ft wide and 373 ft long. *Tier 2* lies below Tier 1 and measures 50 x 24.5 ft in area. A crumbling stone stacked retaining wall (F32.4) approximately 3.5 ft high, 2 ft wide, and 19.5 ft long defines the northwest side of the tier. This tier provides the location of another abandoned 10 x 10 ft mineshaft depression and mound (F32.5). *Tier 3* lies below Tier 2 and measures 61 x 14 ft in area. It appears that there may have been a retaining wall between Tier 2 and Tier 3; however, no distinguishable alignments were observed between the two. Moreover, the space between the two tiers is not as cleanly defined. Although no sub-features were identified within this tier, an area of structural remains (F32.6) and two remnant tower supports (F32.8 and F32.9) lie just west of Tier 2 and 3. F32.6 consists of foundation elements, which includes two poured concrete pads measuring 18.8 x 9.5 ft and 14.5 x 10.9 ft respectively, and two debris piles of red brick, vesicular basalt block, and concrete rubble. It appears that the two foundation remnants are part of the same structure. A rusted water pipe (F32.7) extends out of the ground just northwest of this feature. F32.8 and F32.9 are remnant tower supports constructed of stacked stone and steel reinforced concrete. These features stand approximately 4 ft high and measure approximately 4 ft in length. The supports measure 1 ft wide at the top and increase to an area of 3 to 4 ft wide at the bottom. *Tier 4*, which lies below Tier 3, measures 63 x 43 ft in area, and is the most well-defined and level tier in F32. A well-preserved stacked stone retaining wall (F32.10) measuring 6.5 ft in height, 2 ft in width, and 71.3 ft in length defines the northwest side of the tier. A third concrete and stacked stone tower support (F32.11) with similar dimensions as F32.8 and F32.9 lies on the west side of the tier. Ephemeral traces of exposed milled lumber were noted along the central northwest-southeast axis of the	Figures B2–10

Table 10. AZ N:8:71(ASM) Locus 3 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
	tier trending southeast. Also, a dirt trail extends to the northeast from Tier 4 along the natural contour of the slope for approximately 104 ft before dissipating into the natural landscape (F32.12). This trail aligns with two retaining wall features and a demolished structure ruin (F33–35) that lie on the same natural contour to the northeast. Moreover, this contour lies just east and adjacent of the railroad water tank (F22). Therefore, F32.12 may have served as a narrow-gauge railbed for hauling raw ore to Bashford's original Agua Fria Ore Mill to the north. Although no direct evidence for a railbed was noted on Tier 4, a narrow-gauge rail was observed below this tier in the side of the slope at the base of Tier 5. It remains unclear whether this narrow gauge rail lies in situ or was discarded in its current location. Tier 5 lies downslope below Tier 4, but does not lie adjacent. The tier measures 68.7 x 48.5 ft, and a stacked stone retaining wall (F32.13), approximately 4 ft high, 2 ft wide, and 104.4 ft long, defines the southeast side of the tier. An area of amorphous yellow tailings staining lies along the northwest/southeast center axis of Tier 5, and appears to be in alignment with the exposed traces of milled lumber on Tier 4. Additionally, a narrow-gauge railroad track was noted embedded in the slope on the east-northwest side of the tier, and a large backfill pile was observed on the west side of the tier. Another stacked stone retaining wall (F32.14) measuring approximately 4 ft high, 2 ft wide and 48.5 ft in length lies 50 ft below and southwest of Tier 5. This area has not been leveled, and appears to be natural.	
F33	Basalt retaining wall/rock pile measuring approximately 8 inches high, 2 ft wide, and 26.7 ft long.	Figure B11
F34	This feature consists of a possible demolished structure ruin measuring 95.3 x 71.3 ft in area. No foundation or extant walls were observed; however, the area lies strewn with red brick, vesicular basalt block debris, and a high-density historic artifact scatter consisting of domestic refuse.	Figure B12
F35	Basalt retaining wall/rock pile measuring approximately 1 ft high, 2 ft wide, and 49.7 ft long.	Figure B13

Locus 4: Historic Nob Hill

Locus 4 consists of 19 features (F20, F23–31, and F36–44), which lie within an extensive historic artifact debris field situated on a mesa top between the Agua Fria River and the Chaparral Gulch at an elevation of approximately 4,600 ft amsl (Figure 39 and Figure 44). Specifically, Locus 4 represents the remains of a company neighborhood, known colloquially as Nob Hill, developed by the CASC for upper company management circa 1908–1910. Known for its lavish architecture and amenities, Nob Hill provided company officials and their families an upper-class atmosphere which included sidewalks, manicured and fenced yards, a riding stable, and tennis courts (Bromley 2004);(Leavitt 2003).

Following a decline that began with the lay-off of 700 employees in 1927, at least three Nob Hill homes were physically removed and relocated to Prescott, while a fourth was removed and relocated to Chino Valley (Leavitt 2003). The 1931 SFIM depicts the buildings as still present on the property, so they most likely were moved after this date. According to Bromley (2004), the last house on Nob Hill burned down in 1950. No standing architecture from the period remains; however, extant historic features include house foundations, remnant infrastructure, and the Nob Hill tennis courts (Table 11; Appendix B: Figures B14–B34). Sanborn Fire Insurance Maps (1917, 1931) were consulted for feature identification (Figure 25 and Figure 26).

Table 11. AZ N:8:71(ASM) Locus 4 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F20	Modern water tank (1960): Feature consists of a steel water tank resting on a poured concrete foundation measuring approximately 22 ft in diameter and 12 ft high. A date noted on the concrete foundation reads 1960, post-dating the Nob Hill neighborhood. Based on this date, it is possible that the tank was built for A.L. Poarch's failed Southwestern Industrial Iron and Chemical Company (1958–1961).	Figure B14
F23	This feature consists of a poured concrete entranceway, wall alignments, and foundations blocks west of the western Nob Hill sidewalk (F25). Concrete supports at the entranceway may have held monuments. Remaining building footprint measures 49 x 35 ft.	Figure B15
F24	This feature consists of several concrete fragments of a demolished foundation on the east side of the western Nob Hill sidewalk (F25) opposite of F23.	Figure B16
F25	Nob Hill sidewalk (1908–1910): Feature consists of a sidewalk system measuring 457.4 ft in total length. The individual sidewalk blocks measure 60 x 57 inches. This u-shaped sidewalk system anchors the Nob Hill neighborhood on three segments: two parallel segments oriented north-south separated by a center segment oriented east-west.	Figure B17
F26	Nob Hill water tank (1908–1910): Feature consists of a circular poured concrete foundation measuring 30 ft in diameter. According to the 1917 and 1931 SFIMs, this tank held 100,000 gallons of water for fire and domestic use.	Figure B18
F27	Nob Hill dormitory/servant's quarters (1908–1910): Feature consists of a long rectilinear concrete pad measuring 53.7 x 51.4 ft. 1917 and 1931 SFIMs suggest that the concrete pad served as the foundation for a small single-story, wood-frame structure labeled as "R'ms", which may have served as dormitories. Two building rubble debris piles lay adjacent to F27 which most likely stems from its demolition. However, this debris may be a mix of F27 and a large adjacent domicile (F37).	Figure B19
F28	Nob Hill domicile (1908–1910): Feature consists of four extant concrete foundation blocks and a single utility pole eyehook within an area measuring 52 x 37 ft. SFIMs depict this area as the location of small east-facing single-story single-family, wood-frame domicile with a shingle roof and full front porch.	Figure B20
F29	Nob Hill domicile (1908-1910): Feature consists of ephemeral rectilinear rock wall alignments covering an area of 48 x 29 ft. A large concrete foundation block lies on the north side. A steel grounding rod sticks out of the ground on the SW corner. The 1917 SFIM depicts this area as the location of north-facing single-story, wood-frame single-family domicile with both front and back porches.	Figure B21
F30	Nob Hill Mess House (1908–1910): Feature consists of rectilinear concrete wall alignments with associated concrete foundation blocks and supports. This area measures 107 x 51 ft., which includes concrete rubble and wooden beams that lie within and around the structural remains. SFIMs depict this area as the location of a north-facing single-story, wood-frame domicile with a complete wrap around porch. The maps label this structure as "Mess House"	Figure B22
F31	Mess House sewer outlet (1908–1910): Feature consists of a concrete sewer pipe box outlet and associated steel support rods. This feature lies on measures 52 x 18 inches and is 1 ft high. The sewer pipe is 5 inches in diameter. Most likely associated with the Nob Hill Mess house (F30).	Figure B23
F36	Nob Hill domicile (1908–1910): Feature consists of concrete foundation wall alignments which lie on the south side of the south Nob Hill sidewalk (F25). The foundation covers an area which measures 50 x 35 ft. No poured concrete foundation was observed; however, concrete supports suggest a wood-floored single-story, wood-frame structure. SFIMs depict this as the location of a north-facing single-story multi-family duplex with a shingle roof, full front and side porch, and an addition on the southwest corner.	Figure B24

Table 11. AZ N:8:71(ASM) Locus 4 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F37	Nob Hill domicile (1908–1910): Feature consists of rock wall foundation alignments with an associated poured concrete foundation measuring 75.6 x 9.8 ft. The foundation wall alignments consist of stacked basalt blocks approximately 1.5 ft high. Traces of cement mortar were noted on many of the blocks. SFIMs depict this area as the location of a large east facing single-story domicile which included a ¾ wrap around porch with a small entry porch on the rear (concrete foundation).	Figures B25–26
F38	Nob Hill domicile (1908–1910): This feature consists of concrete foundation wall alignments which lie on the south side of the south Nob Hill sidewalk (F25). The foundation covers an area which measures 50 x 35 ft. No poured concrete foundation was observed; however, concrete supports suggest a wood-floored single-story structure. SFIMs depict this as the location of another north-facing single-story, wood-frame multi-family duplex with a shingle roof, full front porch, and an addition with a composition roof on the southwest corner.	Figure B27
F39	Nob Hill domicile (1908–1910): Feature consists of a small three-sided wall alignment of vesicular basalt measuring 11 x 9.8 ft. SFIMs depicts this area as the location of a north-facing, single-story, wood-frame domicile with two full side porches, a small entry porch, and a shingle roof. Non-domestic artifacts observed include ceramic assay crucible fragments and chemical bottle shards.	Figure B28
F40	Nob Hill dormitory/servant's quarters (1908–1910): Feature consists of a small poured concrete foundation measuring 10 x 10 ft. SFIMs depict this area as the location of a north-facing single-story single-family, wood-frame domicile with a ¾ front porch and shingle roof. According to the SFIMs, a small one-room structure, possibly a dormitory or servant's quarters, lies south and behind the main house. Based on the size of the foundation, this feature most likely represents the remains of the smaller one-room structure. Similar to F39, non-domestic artifacts observed includes ceramic assay crucible fragments and chemical bottle shards.	Figure B29
F41	Nob Hill fire hydrant (1908–1910): Feature consists of basalt blocks arranged around a small circular depression measuring approximately 1 ft in diameter. SFIMs indicate this as the location of a fire hydrant.	Figure B30
F42	Nob Hill domicile (1908–1910): Feature consists of two concrete foundation blocks and associated brick debris. SFIM maps depict this area as the location of a west-facing single-story multi-family duplex with a full front porch and shingle roof.	Figure B31
F43	This feature consists of low-lying poured concrete foundation wall alignments measuring 48 x 39 ft. No poured concrete foundation was observed within the wall alignments; however, a poured concrete foundation with a stairway leads to a basement floor on the east side. An extant red brick chimney base lies in situ where the upper level connects with a basement level on the east side of the ruin. The remains of this feature appear more modern, and no structures are indicated in this area on the SFIMs.	Figures B32–33
F44	Nob Hill tennis courts (1908–1910): Feature consists of a concrete pad with tennis court markings. Ash piles cover most of the pad, and only a quarter of the court on the west side is exposed.	Figure B34

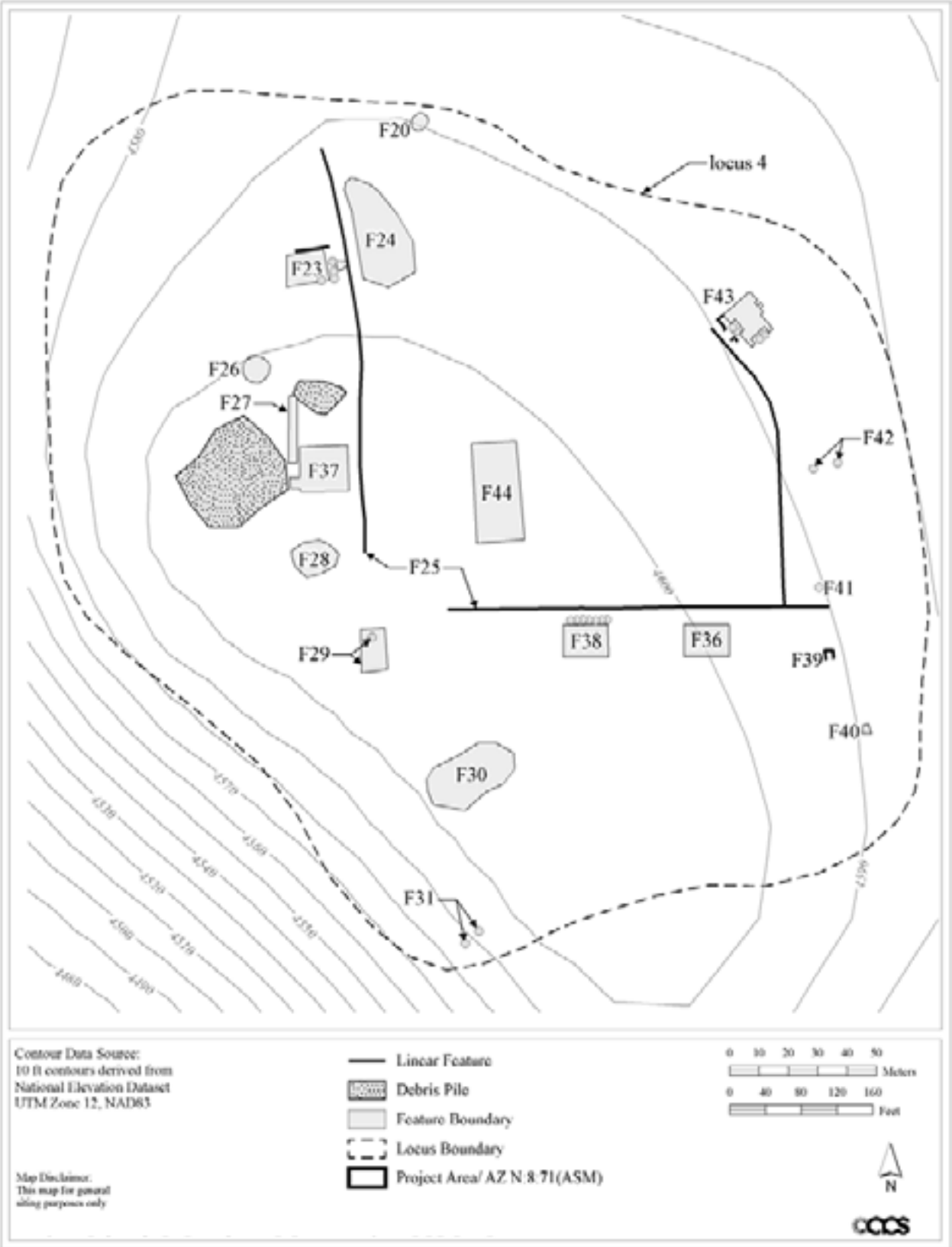

Figure 44. Plan map of AZ N:8:71(ASM) Locus 4.

Locus 5: Historic Smelter Complex

Locus 5 consists of 29 features (F1–18, F20, F45–46, and F48–52) situated on the north end of a mesa top between the Agua Fria River and the Chaparral Gulch at an elevation of approximately 4,540 ft amsl (Figure 39 and Figure 45). This area represents the industrial "heart" of CASC's smelter complex dating from 1908–1937, and is best described as an industrial wasteland consisting of demolished structures and lead contaminated ash piles. Some extant building foundations from the period remain, and at least two buildings of the period remain standing structures (F3 and F4) (Table 12; Appendix B: Figures B35–B60). However, identification of many features remains problematic due to the condition, as well as the nature of the locus. Specifically, many of the extant foundations are partially buried by demolition rubble and ash piles. Sanborn Fire Insurance Maps (1917, 1931) were consulted for feature identification (Figure 23 and Figure 24).

Table 12. AZ N:8:71(ASM) Locus 5 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F1	Unknown office building (1950): Feature consists of a roofless, single-story L-shaped block and concrete structure measuring 69 x 30 ft. (See HPIF in Appendix C)	Figure B35
F2	CASC Assay Office (1910): Feature consists of a single-story red brick and concrete structure measuring 44 x 34 ft. (See HPIF in Appendix C)	Figure B36
F3	Galbraith Lumber Company Sawmill (1970): Feature consists of a single story corrugated steel structure measuring 62 x 45 ft. This standing structure lies in the general location of the original Consolidated Arizona Smelting Company's General Office.	Figure B37
F4	CASC Flue and Smokestack (circa 1917): Feature consists of a rectilinear brick flue on elevated steel reinforced concrete piles with an attached brick smokestack. The 1931 SFIM depicts the flue as attached to the main converter building east and adjacent to the flue. This structure is the most visible feature that remains of CASC's smelter complex, and is what most people consider to be the "smelter." The structure measures approximately 156 x 18 ft and is elevated 30 ft above ground level. The smokestack height is 235 ft.	Figure B38
F5	CASC Ore Conveyor (1908–1910): Feature consists of three exposed concrete alignments measuring approximately 5 x 1 ft. SFIMs depict this area as the location of a northwest-southeast trending elevated steel-frame ore conveyor that connected with F8.	No image available
F6	CASC Ore Conveyor (1908–1910): Feature consists of a concrete foundation which measures approximately 8 x 2.5 ft, and 1 ft high. SFIMs depict this area as the location of a northwest-southeast trending elevated steel-frame ore conveyor that connected with F8.	No image available
F7	CASC Ore Conveyor (1908–1910): Concrete foundation and footing which measures approximately 8 x 1 ft, and 1 ft high. SFIMs depict this area as the location of a northwest-southeast trending elevated steel-frame ore conveyor that connected with F8.	No image available

Table 12. AZ N:8:71(ASM) Locus 5 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F8	CASC Concentrate Storage Building (1908–1910): Feature consists of a rectilinear concrete foundation wall alignment measuring 160 x 33 ft. These foundation wall alignments measure approximately 2 ft high and are 20 inches wide. Two concrete wall partitions follow the length of the building within the foundation walls measuring approximately 28.5 inches wide. It appears that the building was demolished down to ground level, leaving an intact basement level; however, the lower levels have been filled with earth and building rubble between the interior walls up to the current ground level. SFIMs depict this area as the location of the CASC concentrate storage building. Described as an iron corrugated and steel-framed structure, the building held crushed ore prior to being sent down the conveyor to the roaster building (F14).	Figures B39 and B40
F9	Feature consists of two u-shaped concrete tank supports and two associated low concrete walls measuring 32 x 10 ft in area. SFIMs do not depict any structures in this location; however, the maps do depict a narrow-gauge rail line trending southeast around the north side of F8 near this location.	Figure B41
F10	CASC Carpenter and Electric Shop (1908–1910): Feature consists of two exposed linear concrete alignments measuring 8.7 x 1 ft and 22.1 x 1 ft respectively. It appears that there are more extant foundation remnants; however a matrix of demolition debris and ash piling extensively covers this area. 1917 and 1931 SFIMs depict this area as the general location of the CASC carpenter and electric shops, which are labeled as single-story metal clad structures. It appears that the debris may be from the demolitions of F8, F10, and F11.	Figure B42
F11	CASC Pipe Treading Building (1908–1910): Feature consists of a poured concrete foundation measuring 25 x 13 ft with 8 reinforced concrete supports. The supports measure 23¾ x 24¾ inches. 1917 and 1931 SFIMs depict this area as the location of the pipe treading building, which is described as a small metal clad structure.	Figure B43
F12	CASC Machine Shop (1908–1910): Feature consists of a large poured concrete foundation with remnant steel-frame supports measuring 153.1 x 132.8 ft. 1917 and 1931 SFIMs depict this area as the location of the machine shop, which is described as an iron corrugated and steel-frame structure.	Figure B44
F13	CASC Power and Transformer House (1908–1910): Feature consists of a concrete building ruin measuring 247.7 x 80.9 ft. It appears that the building was demolished to ground level leaving basement levels that have subsequently been filled in with a matrix of ash and construction rubble. 1917 and 1931 SFIMs depict this area as the location of the CASC power and transformer houses. Both structures sat on the same foundation, and are described as corrugated iron and steel frame structures.	Figure B45
F14	CASC Roaster Building (1908–1910): Feature consists of a stacked stone wall in association with steel-reinforced poured concrete wall and pad which covers an area measuring 26 x 12 ft. Northeast and adjacent to the concrete wall lays the concrete pad, which includes a steel tank support. A steel drum/tank lies adjacent to the pad. The 1931 SFIM depicts this area as the location of the CASC roadster building, which is described as a large eight-story structure. No information on construction materials was labeled on the SFIM.	Figure B46
F15	CASC oil storage tank (1908–1910): Feature consists of a large stone-lined, circular platform which measures 68 ft in diameter and 1 ft high. 1917 and 1931 SFIMs depict this as the location of a 300,000 gallon oil storage tank. No information on construction materials was labeled on the SFIM.	Figure B47
F16	This feature consists of a linear rock wall alignment which lies on the northeast edge of the mesa overlooking the Agua Fria River. The wall measures approximately 4 ft long, 4 ft high and 1 ft wide.	Figure B48

Table 12. AZ N:8:71(ASM) Locus 5 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F17	CASC elevated brick flue (1908–1910): Feature consists of a linear wall alignment with steel girder reinforcement measuring 40.2 ft in length. The exposed alignment lies near a slag pile on the edge of the eastern face of the mesa overlooking the Agua Fria River. 1917 and 1931 SFIMs depict this area as the location of an elevated brick flue and chimney similar to F4. However, this flue was attached to the opposite side of the converter building.	Figure B49
F18	CASC Flue (1908–1910): Feature consists of a concrete pad with an associated concrete support measuring 25.3 x 14.9 ft. The pad lies northwest and adjacent to F17 near a slag pile on the edge of the eastern face of the mesa overlooking the Agua Fria River. 1917 and 1931 SFIMs depict this area as the location of an elevated brick flue and smokestack similar to F4. However, this flue was attached to the opposite side of the converter building.	Figure B50
F21	Collapsing wood and steel frame structure approximately 10 x 10 ft and 12 ft high. Appears to have functioned as a sorter. Steel railroad tracks lie on top of the framing for sorting and a steel hopper is present in the front. This structure appears to have been part of a larger structure that is now covered by ash piling.	No image available
F45	CASC Hardware Warehouse and Implement Shed (1908–1910): Feature consists of a large poured concrete foundation measuring 91 x 62 ft. A back wall approximately 5 ft high still stands to the south, and a metal lift plate was observed in the northwest corner. 1917 and 1931 SFIMs depict this area as the location of a hardware warehouse and implement shed.	Figure B51
F46	This feature consists of concrete and reinforced foundation wall alignments measuring 16 x 11 ft. No poured concrete floor. Extant concrete walls approximately 2 ft high with red brick supports on the SW and NW corners suggest that the foundation once supported a small red brick structure.	Figure B52
F48	CASC Retaining Wall (post-1931): Feature consists of a large basalt masonry retaining wall trending southeast along the edge of the Chaparral Gulch. The wall is constructed in three tiers. The two bottom tiers are dry stacked basalt. The upper tier is capped and mortared with concrete. The wall measures approximately 1.5 ft wide and varies from 3.5 to 8 ft high. Total length of F48 is 540.1 ft. Portions of the wall have collapsed, and construction debris has been put in place as fill. A large pile of concrete support block debris lies along the northwest portion of the wall. A rectilinear concrete enclosure (F48.1) approximately 3 ft high and measuring 41 x 18 ft in area lies on the south side of F48. 1917 and 1931 SFIMs do not depict the retaining wall; however, the maps do depict a road alignment that matches the location and orientation of F48. Therefore, F48 most likely paralleled this road along its southern edge. No traces of the road remain. Regarding F48.1, SFIMs depict a small single-story metal clad structure of unknown function near this location; however, it remains unclear if F48.1 represents the same structure.	Figure B53–B55
F49	This feature consists of a series of three elongated reinforced concrete supports. The supports, oriented southwest-northeast, each measure approximately 36 ft long, 18 inches wide, and 2 ft high. 1917 and 1931 SFIMs depict this area as the location of a 45 ft high elevated railroad trestle that connected the CASC concentrator and crusher with a 1,500,000 gallon cooling pond. Therefore, it is likely that F49 represents support foundations for the railroad trestle (ca. 1908–1910).	No image available
F50	This feature consists of two reinforced concrete supports measuring approximately 14 ft long, 3 ft wide, and 7 ft high. Although not depicted on the 1917 and 1931 SFIMs, F49 lies in a location labeled as a 1,500,000 gallon cooling pond.	Figure B56

Table 12. AZ N:8:71(ASM) Locus 5 Feature Summary Table.

Feature No.	Description	Figures (in Appendix B)
F51	CASC Cooling Pond Pump House (1908–1910): Feature consists of a small, roofless concrete and reinforced building measuring 11 x 7 ft partitioned into two rooms measuring 4 x 4 ft each. 1917 and 1931 SFIMs depict this area as the location of a 1,500,000 gallon cooling pond and pump house.	Figure B56
F52	Smelter Spur (1899): This feature consists of a former railbed for a spur that once connected the smelter complex with the Prescott and Eastern Railway 1.5 miles to the northwest. Presently, the spur is a dirt two-track road which measures approximately 16 ft wide and 1285.7 ft long.	Figure B57
F53	CASC Boiler Shop (1908–1910): Feature consists of a remnant foundation which lies on a raised tier overlooking the machine shop foundation (F12) to the northeast. The partial foundation measures approximately 140 x 67 ft. SFIMs depict this area as the location of the CASC boiler shop, which is described as a single-story metal clad structure.	Figure B58
F54	CASC Oil Storage Pump House (1908–1910): This feature consists of a small, square, poured concrete foundation with a dividing wall and machinery supports. The foundation measures 16.2 x 15.2 ft and 1 ft high. Red brick debris surrounds the concrete foundation suggesting that the structure was constructed from this material. SFIMs depict this area as the location of an oil storage pump house associated with an adjacent oil storage tank (F15).	Figure B59
F55	This feature consists of a partially exposed concrete foundation measuring approximately 95 x 20 ft. Similar to F13, F55 appears to have been demolished to ground level and the remaining basement levels have been subsequently filled with a matrix of construction rubble and ash. A pair of concrete machinery supports (F55.1) measuring approximately 2 x 4 ft, and 4 ft high lie adjacent and northeast of F55. This structure is not depicted on the 1931 SFIM, and may date to C.H. Dunning's 240 TPD operations during WWII.	Figure B60

Locus 6: Historic Tailing Dam and Artifact Scatter

Locus 6 lies west of Locus 5 extending down a gentle south-facing slope into the Chaparral Gulch where elevations range between 4,540 and 4,440 ft amsl (Figure 39 and Figure 46). The northwest portion of Locus 6 is a relatively shallow portion of the Chaparral Gulch, and represents a tailings storage site that extends southeast to a tailings dam (F19) at the bottom of the gulch (Figure 47 and Figure 48). This dam (F19), constructed of reinforced concrete, measures 105 ft across the gulch and 12 ft wide at the top of the structure (Figure 47). At this time, a construction date for the dam remains unknown.

Another feature identified during survey includes a small area consisting of 10 concrete supports measuring 8¼ x 8¼ inches (F47). The supports lie in a double-row arrangement of five supports each within an area 30 x 15 ft (Figure 48). Feature 47 lies situated on the western edge of the gulch just outside of the tailings, and no further traces indicative of a structure were identified. A third feature, consisting of a partially concrete foundation with machinery supports, was identified, but not recorded, due to its location deep within the arsenic-laden tailings.

The western portion of Locus 6, opposite the tailings pile, lies of a narrow ridge which extends southeast eventually leveling off into the gulch (Figure 49). Similar to Locus 4 of AZ N:8:71(ASM), the upper northwestern portion of this ridge represents one large, continuous historic artifact scatter consisting of 1000s of fragments of domestic glassware and ceramics, sanitary cans, and structural debris. A northwest-southeast trending modern dirt two-track access road cuts across the center of the ridge down to the gulch.

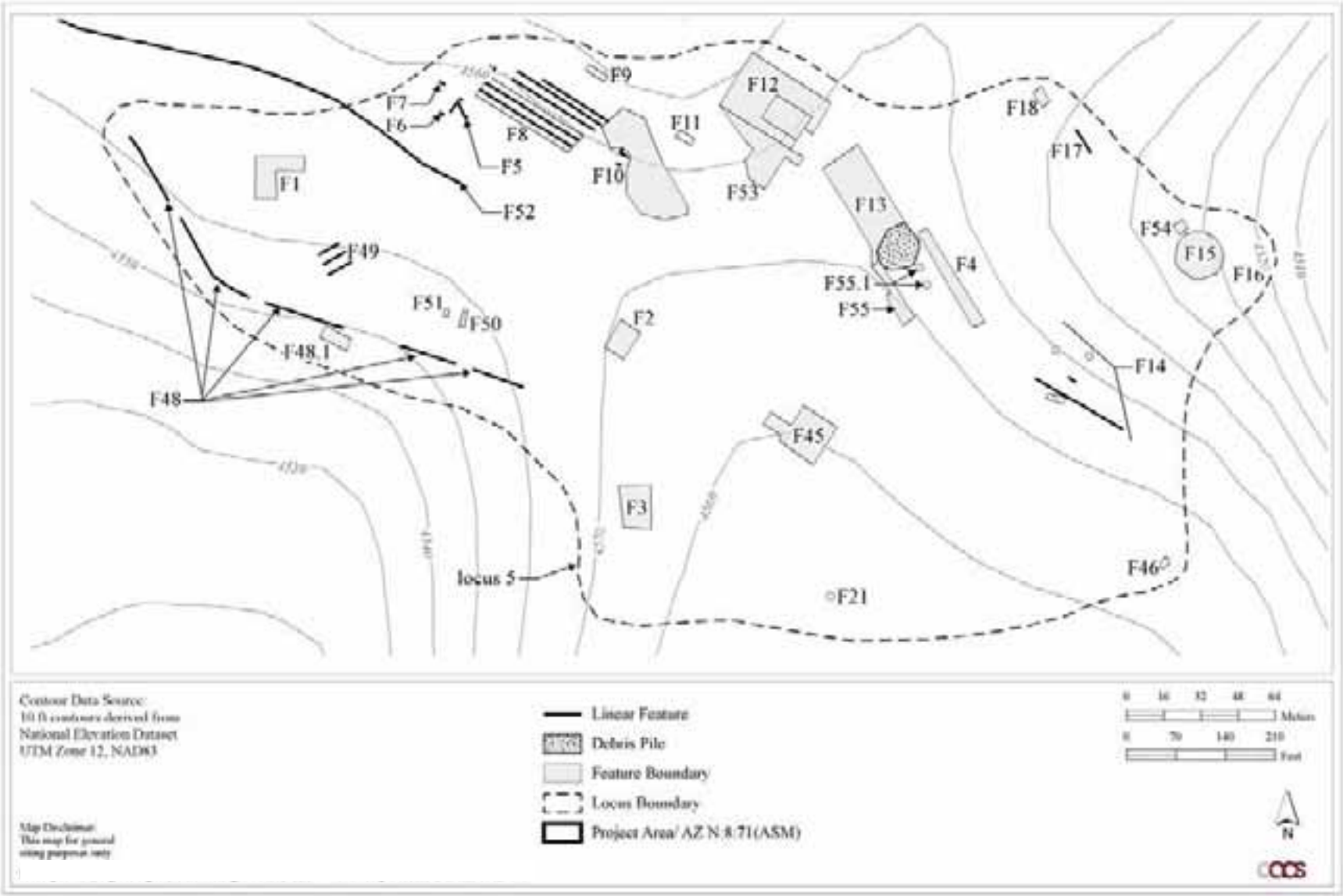

Figure 45. Plan map of AZ N:8:71(ASM) Locus 5.

Site Condition: Overall site condition of AZ N:8:71(ASM) is good. This assessment stems from the relatively undisturbed nature of the site. Unlike AZ N:7:430(ASM), which a large portion of has been subjected to extensive alteration of the natural landscape, AZ N:8:71(ASM) by comparison, remains relatively undisturbed. Although both sites are modified built environments, extensive industrial use of AZ N:8:71(ASM) has been far more limited in time and scope, and much of the historic use-area of the site, specifically Loci 3 and 4, remains as it was when industrial use of the site came to a halt some 40 years ago. Indeed, tailings, ash and slag piles from the CASC operations have left their mark on the landscape. However, the historic loci west and south of the old smelter operations, including the prehistoric loci (Loci 1 and 2) on the opposite side of the Chaparral Gulch have potential for significant undisturbed subsurface deposits.

State/National Register Recommendation: AZ N:8:71(ASM) is a historic ore smelting complex with six distinct loci which include: two prehistoric artifact scatters (Loci 1 and 2), an historic mine shaft (Locus 3), an historic residential neighborhood (Locus 4), and the ruins of CASC's smelter facility (Loci 5 and 6).

The archival research for this project indicates that the Humboldt Smelter/AZ N:8:71(ASM) also played a significant role in the historical development of the Big Bug Mining District, and therefore is potentially eligible for the National Register as a historic district under Criterion A with a period of historic significance from 1870 to 1937 when the smelter ceased operations. Like the Iron King Mine property, the integrity of the Humboldt Smelter property is so compromised that this investigation found the property no longer communicates its historic character. This is due to the past demolition—and removal to another property, in the case of several Nob Hill dwellings—of all but a few of the dozens of historic buildings, structures, and features that once were present on the property and were associated with the smelter, the associated Nob Hill residential area, and other historic activities from the period of significance. The property no longer retains integrity of setting, feeling, or association. Therefore, the Humboldt Smelter/AZ N:8:71(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is also recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the four historic standing structures identified on the property, F2 and F4 date to the period of significance (1870–1937), while F1 and F3 date to later periods. However, all of these buildings are recommended as ineligible for National Register listing either individually or as part of a historic district under Criterion C (architectural merit) due to lack of integrity. However, the results of the Class III pedestrian survey indicate that the Humboldt Smelter/AZ N:8:71(ASM) has the potential to yield important information regarding the history of the Big Bug Mining District, as well as information pertinent to the prehistoric and historic past within the greater region (Criterion D). Therefore, AZ N:8:71(ASM) is recommended as eligible for listing on the National Register of Historic Places.

Loci 1 and 2 represent small prehistoric artifact scatters with no extant structures or discernable features. However, these loci lie in an unmodified, undisturbed portion of the site opposite the Chaparral Gulch, and have the potential to yield significant information regarding the prehistory of the region. Therefore, Loci 1 and 2 are recommended as contributing to the overall eligibility of AZ N:8:71(ASM).

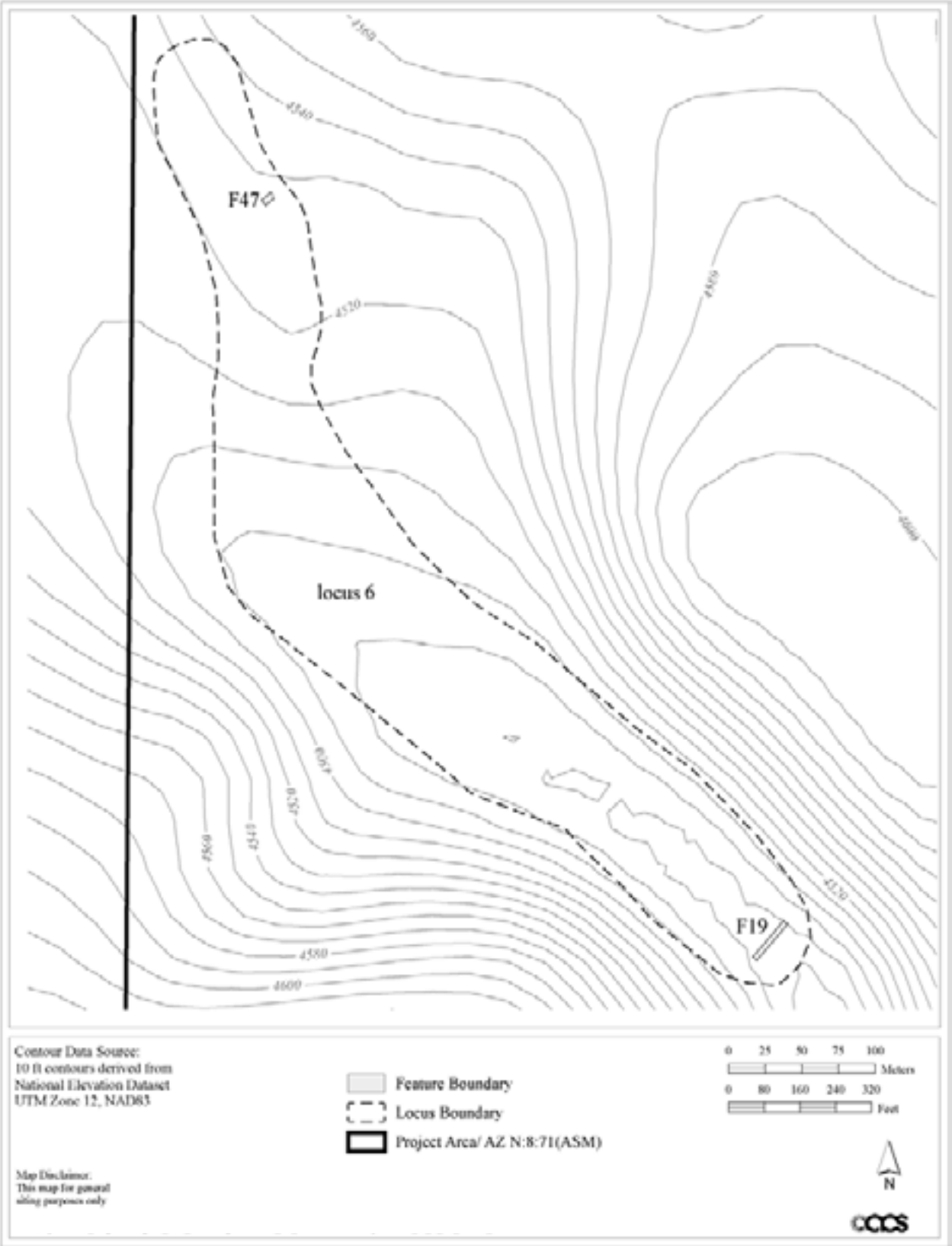

Figure 46. Plan map of AZ N:8:71(ASM) Locus 6.

Figure 47. Overview of AZ N:8:71(ASM) Locus 6 tailings dam (F19) facing southwest.

Figure 48. Overview of AZ N:8:71(ASM) Locus 6 concrete supports (F47) facing northeast.

Figure 49. Overview of AZ N:8:71(ASM) Locus 6 facing southeast.

Locus 3 represents the remains of an historic late nineteenth century mining facility: the Chaparral Gulch Shaft. This locus consisting of five excavated tiers with at least two associated mine shafts, as well as remnant concrete supports and foundations, remains relatively undisturbed due to its distance from the smelter (Locus 5). Local history suggests that the Chaparral Gulch Shaft was a primary producer of raw ore for Bashford's original Agua Fria Ore Mill, which directly contributed to the subsequent establishment of the Val Verde and CASC smelters (Criterion A) (Rains 2008). However, what remains of the Chaparral Gulch Shaft no longer communicates the historic character of the property, nor holds the potential to yield further information (Criterion D). Therefore, Locus 3 is recommended as not contributing to the overall eligibility of AZ N:8:71(ASM).

Locus 4 represents the archaeological remains of a CASC company neighborhood dating to 1908–1910. This neighborhood, known as Nob Hill, provided housing for the company's upper management. All of the neighborhood's residential structures have long since been demolished, or in the case of four homes, relocated (Leavitt 2003). Although many structural remnants such as the sidewalks and house foundations remain, providing evidence for the neighborhood layout, their data potential was exhausted through archival research and field documentation during this project. However, the entirety of the locus lies within an extensive historic artifact scatter which appears to have significant depth. Therefore, Locus 4 has the potential to yield further information (Criterion D), and is recommended as contributing to the overall eligibility of AZ N:8:71(ASM).

Locus 5 represents the remains of the CASC smelter facility dating to 1908–1937. Specifically, this locus embodies the industrial "heart" of CASC's smelting facility, which once included the main converter and reverbaratory furnaces with their accompanying elevated brick flues and smokestacks, the main railroad spur connecting the facility to the Prescott and Eastern Railway, as well as an extensive system of storage buildings, ore conveyors, narrow-gauge rail spurs, and numerous specialized shops. Presently, this area is an industrial wasteland of remnant foundations and lead-contaminated waste piles.

Field observations suggest that most of the building demolitions reduced the structures to ground level, and buildings with basement floors were subsequently filled with a matrix of earth, demolition rubble, and lead-contaminated ash.

In total, ACS identified 29 features within Locus 5 which consist of 25 foundation remnants and four standing structures. As previously stated, this area has been subjected to extensive ground disturbance, and research potential is limited. Moreover, lead contamination throughout the locus precludes any subsurface investigations. Of the four historic standing structures identified within Locus 5, F2 and F4 date to the period of significance (1870–1937), while F1 and F3 date to later periods. However, all of these buildings are recommended as ineligible for National Register listing due to lack of integrity (Appendix C). Mapping and field documentation have exhausted the information potential of Locus 5, and it is recommended as not contributing to the overall eligibility of AZ N:8:71(ASM).

Locus 6 represents the western portion of CASC's smelter operation. Primarily used as a tailings storage area, this locus stretches southeast around the bluffs of Nob Hill (Locus 4) down to the bottom of the Chaparral Gulch where a tailings dam (F19) holds back the waste. An extensive historic artifact scatter lies opposite the tailings storage area on narrow ridge above the Chaparral Gulch, and a second feature consisting of a series of concrete supports (F47), lies on the east edge of this ridge. Although F19 remains intact and functional, mapping and field documentation have exhausted its information potential. However, the artifact scatter that lies outside of the tailings pile remains relatively undisturbed and appears to have depth. Therefore, Locus 6 has high potential for buried subsurface deposits which may yield significant information regarding the history of the smelter, and is recommended as contributing to the overall eligibility of AZ N:8:71(ASM).

Summary and Recommendations

ACS' intensive Class III cultural resources and historic building survey of the Iron King Mine-Humboldt Smelter Superfund Cleanup Site in Sections 14, 15, 16, 22, and 23 Township13 North, Range 1 East (Gila and Salt River Baseline and Meridian) identified 2 sites.

AZ N:7:430(ASM) is the historic Iron King Mine complex which includes four distinct loci: an historic homestead site (Locus 1), a low-density historic artifact scatter (Locus 2), an historic mine operations area (Locus 3), and North American Industries' modern fertilizer plant facilities (Locus 4). As the archival research for this project demonstrates, the Iron King Mine/AZ N:7:430(ASM) played a significant role in the historic development of the Big Bug Mining District with a period of historic significance from 1899, when Hagen began small scale mining on the property, through the end of the historic period, 1959. A secondary area of historic significance for the property is within the context of Arizona homesteading, relating to the Bybee Homestead in Lot 2 of Section 15; the Bybee Family occupied this property from 1920 until after the end of the historic period. Although the buildings and structures once associated with this homestead have been demolished, their archaeological remains were located during the pedestrian survey.

As part of this investigation, the Iron King Mine property was assessed for eligibility as a historic district for listing on the National Register of Historic Places (National Register). Although the property was found through archival research to be potentially eligible under Criterion A for its association with events that have made a contribution to the broad patterns of local or regional history, the integrity of the property is so compromised that it is found to no longer communicate its historic character. This is due to the recent demolition of all but a few of the dozens of historic buildings, structures, and features on the property that were associated with the mine, as well as the significant amount of ground moving that has occurred since the mine ceased operation. The property no longer retains integrity of setting, feeling, or association. Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the five still extant historic buildings and structures that predate

1959, all—either individually or as part of a historic district—are recommended to be ineligible for listing on the National Register due to losses of integrity or lack of historic significance under Criterion C for architectural merit. The core buildings and structures that together were the heart of the industrial mining complex have been destroyed; the ancillary buildings and structures that remain are of secondary significance and with the loss of the core complex, are found to hold little historical significance on their own. Twenty-one modern structures are present that were built in 1960 or later, and are, therefore, ineligible for inclusion into the National Register of Historic Places based on age. However, the results of the Class III pedestrian survey indicate that the Iron King Mine/AZ N:7:430(ASM) has a demonstrated potential to yield important information regarding the early history of the Big Bug Mining District and homesteading in the region (Criterion D). Therefore, the Iron King Mine/AZ N:7:430(ASM) is recommended as eligible for listing on the National Register under Criterion D. Each of the identified historic loci within AZ N:7:430(ASM) have been assessed as either contributing or non-contributing to the National Register eligibility of the site under Criterion D and management recommendations for the treatment of the contributing elements are provide in Table 13.

Table 13. AZ N:7:430(ASM) Cultural Resources Summary.

Locus Number	Description	Status	Management Recommendations
Locus 1	Historic homestead	Contributing element	Avoid; if avoidance not possible, recommend archaeological testing.
Locus 2	Historic artifact scatter	Non-contributing element	No further archaeological work.
Locus 3	Historic mine operations area	Non-contributing element	No further documentation or archaeological work.
Locus 4	NAI fertilizer plant facilities	Non-contributing element	Avoid historic burial; if avoidance not possible, disinter and relocate in accordance with state law (see discussion in text).

Although Locus 4 represents NAI's modern fertilizer processing facilities which date to 1988 (Schuchardt 2008), ACS identified an unmarked historic gravesite on the northeastern edge of the mine tailings. Although there is a wood marker at the grave, it has no writing on it indicating the identity of the individual buried there, and thus, provides no lead for the identification of the next of kin. Therefore, the burial will need to be treated as an unmarked burial in an unregistered cemetery. Information provided to ACS (Schuchardt 2008) indicates that the remains are those of a young girl, a daughter of a miner, who died during a burglary in the late 19th- or early 20th-century. The probable non-Native American, historic burial is located within the APE and, therefore, if it cannot be avoided prior to ground disturbing remediation activities, it must be disinterred and relocated according to state laws pertaining to unmarked and unregistered cemeteries and graves (ARS 41-844 and 41-865).

Due diligence is required, as per state requirements, to attempt to locate the next of kin. Therefore, it is recommended that additional research be conducted to attempt to identify the individual, such as reviewing historic copies of local newspapers. Such research was not with the scope of the current project. At a minimum, the client must place a notice in a local newspaper for 30 days stating their intention of relocating the non-Native American grave at Iron King Mine to whichever cemetery has been selected, and requesting that any next of kin come forward within the 30 day period. Prior to disinterment, a Burial Permit will be required from the Arizona State Museum, which requires the submission of a Work Plan for the disinterment and reinterment. Additionally, a court order from the County Court

granting permission for exhumation may also be required. Due to health concerns, once the body is removed, it must be taken to a sterile laboratory environment; a funeral home and/or funerary specialist may, therefore, be required. In accordance with state law, if next of kin are identified, they are allowed to determine the appropriate final cemetery for reburial.

AZ N:8:71(ASM) is the historic Humboldt Smelter complex with six distinct loci which include: two prehistoric artifact scatters (Loci 1 and 2), an historic mine shaft (Locus 3), an historic residential neighborhood (Locus 4), and the ruins of CASC's smelter facility (Loci 5 and 6). The archival research for this project indicated that the Humboldt Smelter/AZ N:8:71(ASM) also played a significant role in the historical development of the Big Bug Mining District, and therefore was potentially eligible for the National Register as a historic district under Criterion A with a period of historic significance from 1870 to 1937 when the smelter ceased operations. Like the Iron King Mine property, however, the integrity of the Humboldt Smelter property is so compromised that this investigation found the property no longer communicates its historic character. This is due to the past demolition—and removal to another property, in the case of several Nob Hill dwellings—of all but a few of the dozens of historic buildings, structures, and features that once were present on the property and were associated with the smelter, the associated Nob Hill residential area, and other historic activities from the period of significance. The property no longer retains integrity of setting, feeling, or association. Therefore, the Humboldt Smelter/AZ N:8:71(ASM) is recommended as ineligible for listing on the National Register of Historic Places (National Register) under Criterion A. It is also recommended as not eligible for listing under Criterion B as archival research found no persons of historic significance that were associated with the property. Of the four historic standing structures identified on the property, F2 and F4 date to the period of significance (1870–1937), while F1 and F3 date to later periods. However, all of these buildings are recommended as ineligible for National Register listing either individually or as part of a historic district under Criterion C (architectural merit) due to lack of integrity. However, the results of the Class III pedestrian survey indicate that the Humboldt Smelter/AZ N:8:71(ASM) has the potential to yield important information regarding the history of the Big Bug Mining District, as well as information pertinent to the prehistoric and historic past within the greater region (Criterion D). Therefore, AZ N:8:71(ASM) is recommended as eligible for listing on the National Register of Historic Places under Criterion D. Each of the identified historic loci within AZ N:7:430(ASM) have been assessed as either contributing or non-contributing to the National Register eligibility of the site under Criterion D and management recommendations for the treatment of the contributing elements are provide in Table 14.

Table 14. AZ N:8:71(ASM) Cultural Resources Summary.

Locus Number	Description	Status	Management Recommendations
Locus 1	Prehistoric artifact scatter	Contributing element	Avoid; if avoidance not possible, recommend archaeological testing.
Locus 2	Prehistoric artifact scatter	Contributing element	Avoid; if avoidance not possible, recommend archaeological testing.
Locus 3	Historic mine	Contributing element	No further documentation or archaeological work
Locus 4	Historic residential neighborhood	Contributing element	Avoid; if avoidance not possible, recommend archaeological testing.
Locus 5	Historic smelter facility	Non-contributing element	No further documentation or archaeological work
Locus 6	Historic smelter facility	Contributing element	Avoid; if avoidance not possible, recommend archaeological testing.

Based on the results of this survey and background research, historic properties may be affected from ground disturbance related to potential remediation activities. Therefore, it is recommended that the

historic homestead (Locus 1) within AZ N:7:430(ASM)/Iron King Mine be avoided. Likewise, it is recommended that Loci 1, 2, 4, and 6 within AZ N:8:71(ASM)/Humboldt Smelter be avoided. If these loci cannot be avoided, it is recommended that archaeological testing occur within the project APE to determine the presence and condition of the subsurface deposits. If intact deposits are found, then data recovery may be necessary to mitigate the adverse effect of the potential remediation on the cultural resources.

Additionally, the gravesite within Locus 4 of AZ N:7:430(ASM) must be treated as an unmarked burial within an unregistered cemetery. It must be stressed that if the burial cannot be avoided prior to ground disturbing remediation activities, it must be disinterred and relocated according to state laws pertaining to unmarked and unregistered cemeteries and graves (ARS 41-844 and 41-865). Treatment is described in the preceding section.

Given that both the Iron King Mine and Humboldt Smelter properties are Superfund Sites with portions of those properties heavily contaminated with lead and arsenic, health and safety concerns must be a consideration in terms of implementing the recommended treatments of their cultural resources. If avoidance of those loci recommended for archaeological testing is deemed infeasible in regards to implementing an effective remediation program at either of the properties, assessment of the contaminant levels in those locations will be needed before undertaking archaeological excavations. If contaminant levels are deemed a health or safety concern, no further cultural resources work is recommended. The health and safety of the archaeological field crews must take precedence over any proposed treatment of cultural resources. Should contamination levels be too great to proceed with the recommended archaeological work, consultation with the State Historic Preservation Office and County officials by the EPA will be needed to determine the appropriate measures to be taken in regards to the unmarked historic burial on the Iron King Mine/AZ N:7:430(ASM) property.

If any cultural resources are identified during construction, work must stop in the vicinity of the find and John Madsen of ASM (520-621-4795) must be notified. If human remains are encountered during any phase of the project, all work must stop and John Madsen must be notified immediately pursuant to state law.

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