— Final —

An Archaeological Inventory Survey of the Former Voice of America Site, Māʻili, Lualualei Ahupuaʻa, Waiʻanae District, Oʻahu

TMK:(1) 8-7-010:007

By

Timothy Rieth

Prepared for:

Element Environmental, LLC.
62-180 Emerson Road
Haleiwa, Hawaiʻi 96712

INTERNATIONAL ARCHAEOLOGICAL RESEARCH INSTITUTE, INC.

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ABSTRACT

This report details archaeological inventory survey investigations at the former Voice of America (VOA) site, covering 34 hectares (84 acres) in Māʻili, Oʻahu (TMK (1) 8-7-010:007). The project area is approximately 500 meters inland from the coast in Lualualei Ahupuaʻa.

The inventory survey was conducted in compliance with Section 106 of the National Historic Preservation Act and corresponding historic preservation regulations of the State of Hawaiʻi (Hawaiʻi Revised States [HRS] Chapter 6E-8 and Hawaiʻi Administrative Rules [HAR] Chapter 13-13-275). Fieldwork consisted of documentation of the archaeological surface features within the project area. A total of 21 features were documented as components of three sites that were provided temporary site designations. The majority of the features correspond to the VOA antenna array and transmitter building constructed in the last years of World War II. The remaining feature is a segment of the Waianae Sugar Company railroad that was likely constructed between 1892 and 1913. No traditional Hawaiian surface features or artifacts were documented, and it is apparent that the area had been heavily modified by historical activities.

The VOA antenna foundation site (Site 50-80-08-7081) and the railroad site (Site 50-80-08-7083) are recommended as eligible for nomination to the Historic Register. No further work is necessary for the former site since high-precision spatial data and the physical attributes of the individual features have been recorded. Preservation, at least in part, is recommended for the railroad bed.

TABLE OF CONTENTS

ABSTRACT iii

LIST OF FIGURES vi

LIST OF PHOTOGRAPHS vii

LIST OF TABLES viii

INTRODUCTION 1
- Project Location 1
- Project Personnel and Dates of Fieldwork 1

FIELD METHODS 3

BACKGROUND 5
- Physical Environment 5
  - Geology and Topography 5
  - Rainfall, Hydrology, and Temperature 6
  - Vegetation and Fauna 7
- Cultural Geography 8
- Historical Background 9
  - Traditional History 9
  - The Māhele and Changes in Land Tenure 10
  - Nineteenth and Twentieth-Century Agricultural Endeavors:
    - Cattle Ranching and Sugarcane 11
      - Cattle Ranching 11
      - Sugarcane: The Waianae Sugar Company 11
  - U.S. Military 11
- Previous Archaeological Research 12

SURVEY RESULTS 17
- Site 50-80-07-7081 17
- Site 50-80-08-7082 28
- Site 50-80-08-7083 32

SUMMARY AND RECOMMENDATIONS 39
- Archaeological Significance Evaluations 39

REFERENCES 43

LIST OF FIGURES

1. The project location displayed on the U.S. Geological Survey topographic map for Lualualei 2
2. Previous archaeological project areas in Lualualei 13
3. Map of the project area displaying the GPS points for features and site boundaries, overlaid on a portion of the U.S. Geological Survey topographic quadrangle 18
4. Overlay of the former VOA project area and the Site -7083 railroad bed on the U.S. Army Corps of Engineers 1909-1913 map of Māʻili 33
5. Plan view of the Feature 10 railroad bed 37

LIST OF PHOTOGRAPHS

1. A representative view of the berms present in the project area, indicating the degree to which the terrain had been modified by construction activities 6
2. The characteristic vegetation of the survey area 7
3. Overview of the burned area showing the increased ground visibility 8
4. Feature 1, concrete pedestal foundation 19
5. Feature 2, concrete pedestal foundation 19
6. Feature 3, concrete pedestal foundation 20
7. Feature 4, concrete pedestal foundation 21
8. Feature 5, concrete pedestal foundation 21
9. Feature 6, concrete pedestal foundation 22
10. Feature 8, concrete pedestal foundation 23
11. Feature 9, concrete pedestal foundation 23
12. Feature 11, concrete pedestal foundation 25
13. Feature 12, concrete pedestal foundation 26
14. Feature 13, concrete pedestal foundation 26
15. Feature 15, concrete pedestal foundation 27
16. Feature 16, concrete pedestal foundation 27
17. Feature 17, concrete pad foundation with metal support 28
18. Feature 18, concrete pedestal foundation 29
19. Example of the Feature 7 concrete fence postholes 30
20. Feature 14, concrete pad 31
21. Feature 19, remnant of the cement block ancillary structure that is part of the VOA transmitter complex 31
22. Feature 20, remnant of the main VOA transmitter building 32
23. Feature 10, railroad bed, western segment 34
24. Feature 10, railroad bed, eastern segment north face 35
25. Feature 10, railroad bed, eastern segment 36

LIST OF TABLES

1. List of Previous Archaeological Projects in Lualualei 14
2. Site Characteristics and NRHP Evaluations 40

INTRODUCTION

At the request of Element Environmental LLC, International Archaeological Research Institute, Inc. (IARII) completed an archaeological inventory survey of 34 hectares (84 acres) in Māʻili, Oʻahu. The project area was a former Voice of America (VOA) transmitter site. The survey was conducted in compliance with Section 106 of the National Historic Preservation Act and corresponding historic preservation regulations of the State of Hawaiʻi (Hawaiʻi Revised States [HRS] Chapter 6E-8 and Hawaiʻi Administrative Rules [HAR] Chapter 13-13-275). The 34-hectare (ha) parcel is considered the Area of Potential Effect (APE) for this project.

PROJECT LOCATION

The project area is located in Lualualei Ahupuaʻa (traditional Hawaiian land division within a district), in the *moku* (traditional district) of Waiʻanae on the leeward side of Oʻahu (Fig. 1). The parcel is approximately 500 meters (m) inland from the shore. Maili Channel bounds the area on the north and a portion of the west side, with houses built along the majority of the western and southern perimeters. The eastern edge follows along the base of a low limestone escarpment. A two-hectare (five acre) section of the original 36-ha (89 acre) VOA site was recently transferred to the State of Hawaiʻi for construction of a transitional housing complex. This complex forms the northwest boundary of the project area.

PROJECT PERSONNEL AND DATES OF FIELDWORK

J. Stephen Athens, Ph.D., was the Principal Investigator for the project. Timothy Rieth, M.A., served as the Project Director. Field technicians at various dates included Eun Ah Hong, B.A.; Jenny Pickett, B.A.; Tony Hofkamp, B.A.; and Trever Duarte, B.A. The inventory survey was conducted on April 27 and from April 29 to May 1, 2009.

Figure 1. The project location displayed on the U.S. Geological Survey topographic map for Lualualei.

FIELD METHODS

A systematic pedestrian survey was undertaken across the project parcel. Survey transects were spaced between 5 and 10 m apart depending on the density of the vegetation. The transect lines were oriented in an approximately east-west direction.

Feature descriptions and assessments, recorded in the field, include: feature characteristics, feature condition assessments, construction method, probable function, and age determinations. Feature locations were recorded with submeter accuracy with a Trimble Pro-XR Global Positioning System (GPS) unit using the North American Datum of 1983 in Universal Transverse Mercator Zone 4 North. Features were assigned to three sites: 50-80-07-7081, -7082, and -7083. Digital photographs were taken for most features with a tape-and-compass map produced for a single feature.

No subsurface testing was conducted and no surface artifacts were collected.

BACKGROUND

This section synthesizes background information for the project area, including the physical environment, cultural geography, traditional and post-Contact history, and previous archaeological research.

PHYSICAL ENVIRONMENT

GEOLOGY AND TOPOGRAPHY

The former VOA parcel is within the remnant caldera of the Waianae volcano, which formed the Waianae Range. The Waianae Volcanic Series is divided into three members relating to the different stages of building for the shield volcano (Macdonald et al. 1983:426). In addition to the three members that consist of tholeiitic, alkalic, and hawaiite basalts, hundreds of dikes occur throughout the Waianae Range. Potassium-argon dates for the initial mass building of the volcano range from approximately 3.9 and 3.5 million years ago with the later eruptions dating from approximately 3.6 to 3.1 million years ago (Guillou et al. 2000).

The broad amphitheater valleys of the western Waianae Range are characteristic of late-stage valley development (Macdonald et al. 1983:430). Thin, often discontinuous, ridges separate the valleys, which have broad flat bases. The flat valley bottoms have been formed by massive accumulations of alluvial and colluvial sediment, which in Lualualei valley is up to 360 m in thickness (Macdonald et al. 1983:429). Reef limestone substrate is present in the valley, particularly in the current project area and adjacent near-shore areas. Limestone exposures and escarpments are common.

Soils in the project area are primarily Mokuleia clay (Mtb), with smaller areas of Mamala stony silty clay loam, 0 to 12 percent slopes (MnC) and Keaau clay, saline, 0 to 2 percent slopes (KmbA). Mokuleia clay is nearly level at the surface and is characterized by a dark grayish brown clay surface layer about 41 centimeters (cm) thick with an underlying layer of dark brown and light gray single-grain sandy and loamy sand 86-122 cm thick (Foote et al. 1972:95). The surface permeability is slow and the clay is extremely sticky and plastic. Mamala stony silty clay loam, 0 to 12 percent slopes, has a representative profile with a surface layer of dark reddish brown stony silty clay loam approximately 20 cm thick. This layer is underlain by coral limestone and consolidated calcareous sand (Foote et al. 1972:93). Keaau clay, saline, 0 to 2 percent slopes, has a very dark grayish brown clay surface layer measuring about 38 cm thick underlain by a very dark grayish brown and dark brown mottled clay subsoil. The subsoil is deposited atop reef limestone or consolidated coral sand. This soil is strongly affected by salt (Foote et al. 1972:65).

Earth-moving and construction activities associated with the antenna station have significantly modified the terrain within the former VOA parcel. Soil/sediment and stone berms created during previous bulldozing are numerous across the area, often extending for over 10.0 m in length and greater than 1.0 m in height (Photo 1).

Photo 1. A representative view of the berms present in the project area, indicating the degree to which the terrain had been modified by construction activities. View north.

RAINFALL, HYDROLOGY, AND TEMPERATURE

Precipitation in the project area and surrounding valleys is limited by the rain-shadow effect of the Koʻolau and Waianae Ranges. The annual adjusted mean rainfall for two of the closest rain gauges are 548 millimeters (mm) (Mikilua, Station No. 725.00) and 654 mm (Lualualei, Station No. 804.00) (Giambelluca et al. 1986). In general, the average mean annual rainfall for this region ranges from less than 600 mm to 800 mm (Giambelluca et al. 1986:138). The greater amount falls during the winter months, particularly December to February. Winter storms associated with Kona winds often produce rapid and abundant rainfall.

No perennial stream flow is present in the surrounding area of Lualualei. The intermittent Māʻiliʻili Stream, with its multiple branches and tributaries, is located to the north and east of the former VOA parcel. The canalized lower portion and mouth of the stream surround the project area along its northern boundary. Intermittent Ulehawa Stream is south of the project area.

Average minimum temperatures for Waianae range from the low 60°s to 70°s Fahrenheit (approximately 16-22° Celsius) with average maximum temperatures from the low to upper 80°s

Fahrenheit (approximately 31° Celsius) (Price 1973:58). The period from June to September has higher temperatures.

VEGETATION AND FAUNA

The vegetation in the area is dominated by historically introduced grasses, *koa haole* (*Leucaena leucocephala*), and *kiawe* (*Prosopis pallida*) (Photo 2). Several acres of the project area had recently burned prior to the inventory survey, resulting in nearly complete ground visibility due to the lack of grasses (Photo 3).

Multiple historically introduced bird taxa were observed during the survey along with evidence of pig (*Sus scrofa*). Feral and domesticated dogs (*Canis familiaris*) and cats (*Felis catus*) are present, likely along with mice (*Mus musculus*), rats (*Rattus* spp.), and mongoose (*Herpestes javanicus*).

Photo 2. The characteristic vegetation of the survey area. View northwest.

Photo 3. Overview of the burned area showing the increased ground visibility. View north.

CULTURAL GEOGRAPHY

The former VOA project area is located in Lualualei Ahupua‘a within the traditional *moku* (traditional Hawaiian district) of Wai‘anae within along the western coast of O‘ahu. The survey parcel is towards the center, near-shore area of the *ahupua‘a*. Although currently recognized as an *ahupua‘a*, Lualualei was not designated as such a land division during the mid-19th century *Māhele,* which created a system of private land ownership in the archipelago. Traditionally, Lualualei appears to have been an *‘ili ‘aina* (a sub-*ahupua‘a* land division) of Wai‘anae Ahupua‘a (see Nakamura and Pantaleo 1994:5-8). Additional *‘ili ‘aina* within Lualualei valley and consequently now considered subdivisions of Lualualei Ahupua‘a include Hālona, Pūhāwai, Mikilua, and Pāhoa (Kelly 1991: 313-314; Soehren 2002-2004). Mā‘ili, the current name for the residential area and beach park surrounding the project parcel, may have originally been an *‘ili ‘aina* as well (Soehren 2002-2004).

The surrounding Wai‘anae Range and inter-valley ridges are prominent components of the landscape, which define the cultural boundaries of the land at multiple scales from a district level to smaller land holdings. Along the Wai‘anae Range, which forms the eastern boundary for Wai‘anae District and Lualualei valley, Mount Ka‘ala and Kolekole Pass are complementary geographical places. Mount Ka‘ala, at the head of Wai‘anae Ahupua‘a immediately north of Lualualei Ahupua‘a, is the highest peak on O‘ahu. This peak is in contrast with Kolekole Pass at the northeastern boundary of Lualualei,

which provides access to the central plateau of Oʻahu. Mauna Kuwale, Puʻu Kailio, Kauaʻōpuʻu, and Puʻu Pāheʻeheʻe are components of the ridge separating the Waiʻanae and Lualualei valleys, with Puʻu Heleakalā dividing Lualualei and Nānākuli to the south. The discontinuous ridge Puʻu Hulu Kai and Puʻu Hulu Uka incompletely divides the southern half of the Lualualei valley.

HISTORICAL BACKGROUND

The following section summarizes the traditional, pre-Contact Hawaiian history and post-Contact history of Lualualei based on oral traditions, archaeological research, and written documents.

TRADITIONAL HISTORY

The traditional history of the Waiʻanae district is rooted in stories of Hawaiian *ʻakua* (gods). One tradition identifies ʻUlehawa in southern Lualualei as the birthplace of the heroic demigod Māui (Sterling and Summers 1978:65). Māui pulled the Hawaiian islands from the ocean with his magic fishhook in the waters off the Waiʻanae coast and learned the secret of fire making in this area. His mother, the moon goddess Hina, made *kapa* (bark cloth) in Kāneana Cave along the coast (Sterling and Summers 1978:64). The goddess Hiʻiaka, sister of the volcano goddess Pele, also visited this district when she climbed Pōhākea Pass. The normally subservient younger sister viewed Pele's destruction of her beloved forests on Hawaiʻi Island from this vantage point, thus providing her courage to resist Pele (Kelly 1991:316). Kamapuaʻa is also referenced to this area (Pukui et al. 1974:174).

Current archaeological evidence suggests that permanent settlement of the Waiʻanae coast occurred from the 11th to 14th centuries (Cordy 2002). Initial settlement may have centered along the coast, emphasizing the procurement of marine resources, with dryland agriculture immediately inland (Green 1980). Permanent settlement and agriculture in mid- and upper valley areas of Mākaha (Green 1980) and Nānākuli valleys (Cordy 2002:20) did not occur until the 15th to 16th centuries. Residence in upper Lualualei may have begun a century earlier (Dixon et al. 2008). The rich fishing grounds along the Waiʻanae coast provided marine protein, salt, and seaweed, while *kalo* (taro; *Colocasia esculenta*) and *ʻuala* (sweet potato; *Ipomoea batatas*) were starch staples in irrigated and dryland fields, respectively.

With respect to chiefly lineages and genealogies, the Kumuhonua line from Waiʻanae retained seniority over other Nanaʻulu descendants from approximately the early 15th to early-mid 16th centuries (Cordy 1996). During this period three polities were present on Oʻahu, ʻEwa, Kona, and Koʻolaupoko, with the ʻEwa polity subsuming the ʻEwa, Waiʻanae, and Waialua districts (Cordy 2002). Laʻakona (ruling approximately 1420-1440), of the Kumuhonua line, ruled the ʻEwa polity and was recognized as the overall ruler for Oʻahu (Cordy 2002:24). This lineage fell from dominance with the killing of Haka (ruling approximately 1520-1540), an unpopular and dissolute chief. The Waiʻanae district again came to prominence a century later when the heirs of the overall chief of Oʻahu, Kalaimanuia, fought over control of the island. Kalaimanuia's younger son, Haʻo, was killed by order of his brother Kaʻihikapu, prompting Haʻo's son, Nāpūlānahumahiki, to flee to Waiʻanae (Cordy 2002:31). In Waiʻanae, he briefly formed an independent kingdom until his line reunified with the Oʻahu kingdom through marriage in the mid-17th century (Fornander 1880:272-273). However, later periods of struggle between district level chiefs and the overall chief of Oʻahu occurred periodically until Kahekili, the high chief of Maui, conquered Oʻahu in 1783.

Kahekili was followed by Kamehameha as an external ruler of Oʻahu. This occurred during the period of initial trade and contact between Western ships and the Hawaiian people. Kamehameha

appointed the chief Boki as governor of O‘ahu and chief of Wai‘anae district in 1816. In this position Boki demanded that Wai‘anae *maka‘āinana* (commoners) harvest sandalwood in order that he might make payments on his debts to Honolulu merchants and continue his purchase of foreign goods (Sahlins 1992). Spending time harvesting timbers impinged on growing food, and it is presumed that many *maka‘āinana* left Wai‘anae at this time to become laborers in Honolulu (Dixon et al. 2003). The movement of people to town, combined with increased mortality from introduced diseases, led to a dramatically decreased population for Lualualei and Wai‘anae District as a whole.

THE MĀHELE AND CHANGES IN LAND TENURE

Traditional land tenure at the time of western Contact had *ali‘i* (chiefs) and *konohiki* (chiefly land managers) controlling land units, with the complete disenfranchisement of *maka‘āinana* from land ownership. The chiefly claims to land could be very dynamic, with their control dependent upon the fortunes of warfare and the political success of higher-ranking *ali‘i*.

The *Māhele* of the mid-19th century marked a profound change in land tenure, creating a system of private land ownership as a replacement for the traditional structure. In 1845 and 1846, legislation was enacted to establish the Board of Commissioners to Quiet Land Titles. The Land Commission determined an individual’s right to land, issuing an award if the claim was successful, which was authorized by a Royal Patent from the minister of the interior upon payment of a fee. Claims had to be received by the Board between 1846 and 1848, a survey of the property had to be completed, and claimants needed to testify before the Commission between 1850 and 1855 (Moffat and Fitzpatrick 1995:50).

A key phase of the *Māhele* involved the division of lands between Kamehameha III (Kauikeaouli) and the major *ali‘i* and *konohiki*; Kauikeaouli subsequently gave a portion of his lands to the government. Although the “Principles Adopted by the Board of Commissioners to Quiet Land Titles in Their Adjudication of Claims Presented to Them” reserved one-third of the kingdom’s land for the *maka‘āinana*, this principle was never actually executed (Moffat and Fitzpatrick 1995:49). Instead, *kuleana* awards and government land-grant sales were aimed at providing the *maka‘āinana* with fee-simple private ownership of land. *Kuleana* awards required that the claimant could prove they had cultivated the land for two or more years. For those *maka‘āinana* who did not receive *kuleana* awards, government land grants were available. This fee-simple sale of land, however, was also open to non-Hawaiian residents.

In the *Māhele* Kamehameha III claimed the *ahupua‘a* of Lualualei along with Wai‘anae and Nānākuli. Only six Land Commission Awards (LCA) were given in Lualualei valley, all in the *‘ili ‘aina* of Pūhāwai. These six awards, and the rejected land claims by two other adults in the valley, indicate eight families resided in Lualualei during the mid-19th century. The LCA for Lualuale document 163 *lo‘i* (irrigated taro fields), multiple *kula* (dryland) plots possibly used for dryland agriculture but assuredly used for *pili* grass harvesting, and plots of land planted in *wauke* (paper mulberry; *Broussonetia papyrifera*) used for *kapa* production. The following are the LCA in Lualualei: LCA 7436 to Kahi; LCA 7451 to Ka‘ili‘anu; LCA 7452 to Ka‘ahi; LCA 7454 to Kanahele; LCA 7456 to Kaila‘a, and; LCA 8005 to Apiki.

NINETEENTH AND TWENTIETH-CENTURY AGRICULTURAL ENDEAVORS: CATTLE RANCHING AND SUGARCANE

With dramatic changes in land tenureship, population, and economics in Lualualei during the 19th century, two agricultural industries began to dominate the valley: cattle ranching and sugarcane production.

Cattle Ranching

Cattle ranching began in Lualualei in 1851 when William H. Jarrett leased nearly 6,880 ha (17,000 acres) of Crown Land from Kamehameha III (Kelly 1991). Lualualei Ranch, as it was named, eventually changed hands, with partnerships variously between Jarrett, his son Paul Jarrett, and Paul Manini; Jarrett and George Galbraith; and Galbraith and James Dowsett (Kelly 1991:326-327). The lease on the Lualualei Ranch, now held by Galbraith and Dowsett, expired in 1901 and was not renewed.

Soon after Annexation by the United States in 1898, the Territorial Government initiated the division and auction of the Crown Lands in Lualualei valley for homesteads primarily associated with ranching (Kelly 1991:328). Between 1909 and 1915 L.L. McCandless purchased more than half of the first series of homestead lots in Lualualei and used the majority of this land for cattle ranching. The American Military condemned and acquired most of McCandless's land in 1929, although grazing leases continued for several decades.

Sugarcane: The Waianae Sugar Company

The Waianae Company sugar plantation began planting sugarcane in upper Wai‘anae valley in 1878. The company had 121 ha (300) acres of sugarcane planted in Lualualei valley by 1892. The amount of land in Lualualei under cultivation varied during the next half century depending on leases and irrigation. The company leased 1,348 ha (3,332) acres in Lualualei from the Territorial Government in 1901, however in 1910 only 648 ha (1,600 acres) were planted in sugarcane in Wai‘anae and Lualualei valleys combined. In 1931 cane land in Wai‘anae, Mākaha, and Lualualei went from 1,214 ha (3,000 acres) to 486 ha (1,200 acres) in order to concentrate irrigation and increase yields (Kelly 1991:337). A private narrow-gauge railroad transported the sugarcane from the fields to the mill, while the Oahu Railway and Land Company moved the sugar to Honolulu. After the Oahu Railway discontinued service to Wai‘anae in 1946 the Waianae Sugar Company closed.

U.S. MILITARY

The presence of the U.S. Military in Lualualei and adjacent areas of leeward O‘ahu began incrementally in 1917 but greatly expanded to become the major landholder in 1929. Camp Andrew, a 12.5 ha (31 acre) military recreation area, was created along the Nānākuli coast in 1917 (Nakamura and Pantaleo 1994). In 1918, the American Army established an amphibious training camp at Pōka‘i Bay as part of the Wai‘anae Military Reservation (Flood et al. 1994), and Kolekole Road was improved to provide access to the bay in 1923 (Kelly 1991). Between 1929 and 1933 the U.S. Navy obtained approximately 3,238 ha (8,000 acres) at the head of the Lualualei valley to establish the Naval Ammunition Depot and Naval radio transmission station. Infrastructure at the Ammunition Depot was expanded during World War II (WWII) with the construction of additional magazines, storage buildings, and houses (Landrum et al. 1997). During this time, the Oahu Railway and Land Company laid railroad

tracks into the valley so the military could transport munitions to the storage areas (Kelly 1991:340). In the latter years of WWII, the Voice of America radio transmitter station was constructed in Māʻili within the current project area. After the end of WWII, the Lualualei Branch experienced renewed activity during the Korean War. Between the late 1980s and late 1990s it was downsized significantly and now functions primarily as an ammunition depot. Significantly for the present project area, the VOA antenna and transmission buildings were razed in the 1970s.

PREVIOUS ARCHAEOLOGICAL RESEARCH

A substantial portion of the Lualualei valley has been subject to archaeological research (Fig. 2). Table 1 lists the previous archaeological projects, their general locations, levels of investigation, and numbers of archaeological features and sites that were recorded. Two studies are of primary relevance to the current project: the archaeological assessment for the transitional housing situated at the northwestern corner of the project area (Tulchin and Hammatt 2007, 2008) and the inventory survey of the surrounding land to the north, east, and south of the project area (Jimenez 1994; Mayberry and Rosendahl 1994). Prior to summarizing the results of these surveys, a general synthesis of the results of previous research in the valley as a whole is warranted.

Beyond the Lualualei Branch at the head of the valley, a relative paucity of traditional Hawaiian features and cultural deposits have been recorded. Historical and modern disturbance and land alterations relating to ranching, sugarcane, other agricultural endeavors, and the development of military infrastructure have affected the preservation of any traditional Hawaiian features, particularly along the valley floor. A survey of the Naval Computer and Telecommunications Center Area Master Station (NCTAMS) Radio Transmitter Facility, to the east of the current project area documented no archaeological features (Robins and Anderson 1998).

Archaeological investigations along the ridges and slopes of Lualualei have documented an equally limited number of pre-Contact and historical archaeological features. No pre-Contact archaeological remains were identified along the southern slopes of Puʻu Māʻiliʻili (Flood and Dixon 1994), and a survey along the northeast ridge documented two possible field shelters that did not offer conclusive evidence for pre-Contact construction and use (Tulchin et al. 2003). Along the southwestern slopes of Puʻu Heleakalā to the south of the current project area (Bordner 1977) did not identify any archaeological remains. A more recent survey of a portion of Bordner's survey area recorded one pre-Contact rockshelter and a WWII bunker (O'Leary and McDermott 2006). Hammatt et al. (1993) documented a traditional Hawaiian habitation complex and wall remnant along with historical cattle and habitation sites along the northwestern slopes of Puʻu Heleakalā.

Archaeological work along the shoreline has documented intact pre-Contact cultural deposits (McDermott and Hammatt 2000) and burials (Hammatt and Shideler 1990). McDermott and Hammatt's (2000) inventory survey of ʻUlehawa Beach Park resulted in the identification of two subsurface cultural layers that contained vertebrate and invertebrate midden, and traditional and historical artifacts. The cultural deposits were interpreted as evidence of intermittent or temporary habitation activities along the coast.

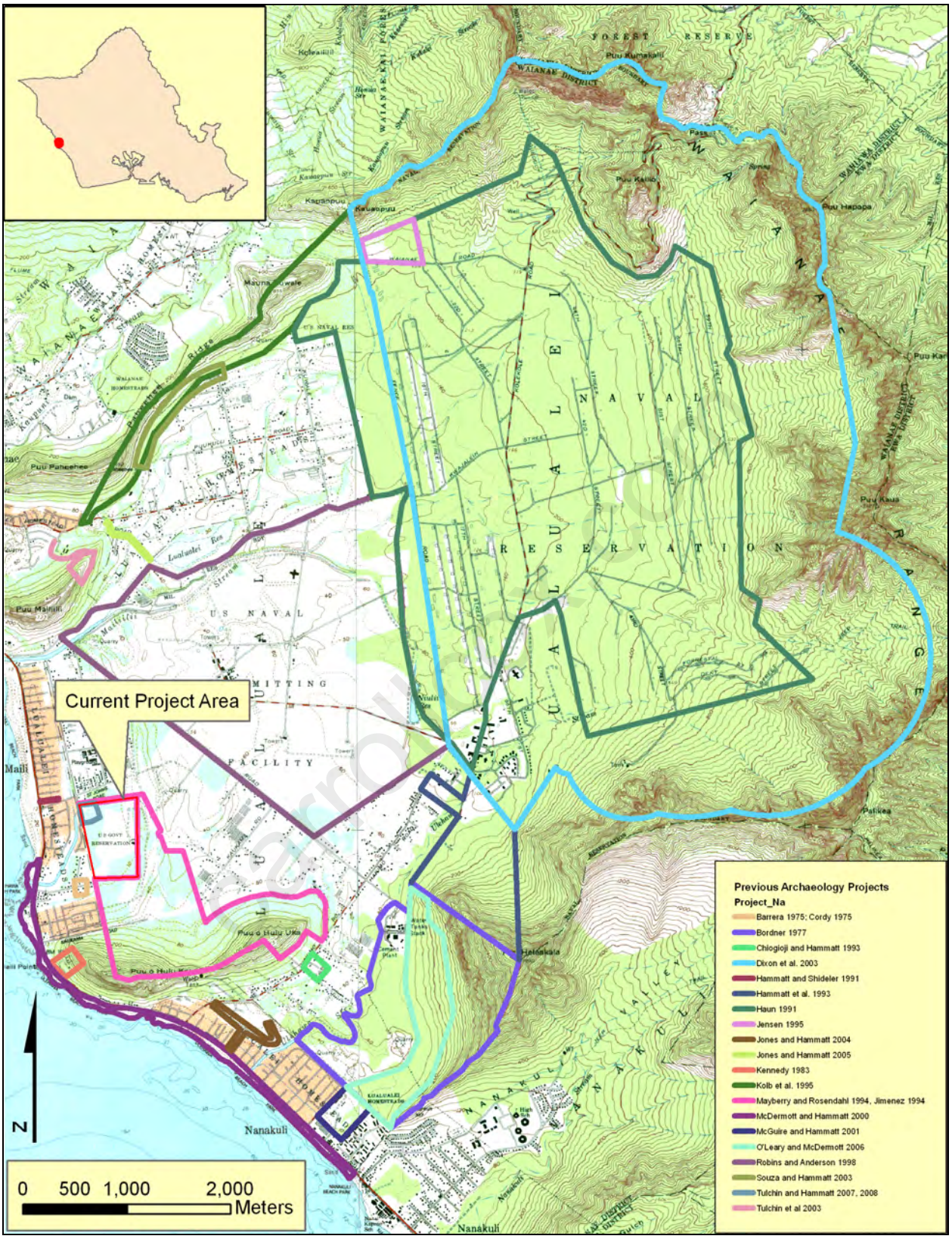

Figure 2. Previous archaeological project areas in Lualualei.

Table 1. List of Previous Archaeological Projects in Lualualei.

Reference	Location	Level of Investigation	Total Sites	Total Features
McAllister 1933	Lualualei Ahupuaʻa	Reconnaissance	8	—
Barrera 1975	Māʻili	Inventory Survey	6	6
Cordy 1975	Māʻili	Data Recovery	—	—
Bordner 1977	Lualualei Ahupuaʻa; Base of Puʻu Heleakalā	Inventory Survey	—	—
Kennedy 1983	Lualualei Ahupuaʻa; Base of Puʻu o Hulu Kai and Puʻu o Hulu Uka	Inventory Survey	—	—
Hammatt and Shideler 1990	Māʻili	Monitoring	1	7
Haun 1991	Lualualei Ahupuaʻa	Inventory Survey	131	1,004
Chiogioji and Hammatt 1993	Māʻili	Inventory Survey	—	—
Hammatt et al. 1993	Lualualei Ahupuaʻa	Inventory Survey	8	—
Jimenez 1994	Lualualei Ahupuaʻa; Base of Puʻu o Hulu Kai and Puʻu o Hulu Uka	Inventory Survey	26	—
Mayberry and Rosendahl 1994	Lualualei Ahupuaʻa; Base of Puʻu o Hulu Kai and Puʻu o Hulu Uka	Reconnaissance Survey	26	—
Landrum et al. 1997	Lualualei Ahupuaʻa	Overview Survey	597	1020
Rechtman et al. 1998	Lualualei Ahupuaʻa	Management Plan		
Robins and Anderson 1998	Lualualei Ahupuaʻa	Reconnaissance Survey	3	—
McDermott and Hammatt 2000	Lualualei Ahupuaʻa; ʻUlehawa	Inventory Survey	2	—
Dixon et al. 2003	Lualualei Ahupuaʻa	Inventory Survey		

Table 1. List of Previous Archaeological Projects in Lualualei (continued).

Reference	Location	Level of Investigation	Total Sites	Total Features
Tulchin et al. 2003	Lualualei Ahupua‘a	Inventory Survey	3	3
O’Leary and McDermott 2006	Lualualei Ahupua‘a	Inventory Survey	2	2
Tulchin and Hammatt 2007, 2008	Mā‘ili	Inventory Survey	—	—

The limited evidence for traditional Hawaiian habitation along the coast, valley floor, and valley ridges is in contrast to the concentration of habitation and agricultural features documented at the head of the valley (Dixon et al. 2003; Haun 1991). Haun (1991) documents the results of an inventory survey of the Naval Magazine, Lualualei Headquarters Branch (NAVMAG LLL) and the contiguous NCTAMS Eastern Pacific Radio Transmitter Facility; an area that encompasses the entirety of the head of the Lualualei valley. The majority of the 131 recorded sites, which include 1,004 features, relate to traditional Hawaiian agricultural and habitation activities. Additional features included ceremonial structures and areas associated with the procurement of lithic material and the manufacture of lithic tools. Based on the survey data and radiocarbon dating results, Haun (1991) proposed that the interior of the valley was initially temporarily occupied by the mid-15th century. By the mid to late 17th century and continuing until the early 19th century population increased as residence became permanent.

Dixon et al. (2003) conducted a survey of the Lualualei Branch that included most of the area reported in Haun (1991) along with areas further upslope. In general, their results corroborate the earlier data but indicate that initial habitation in the area may have been a century earlier, during the mid-14th century. Additionally, statistical analysis of the more recent survey results identified eight spatial clusters of sites that were interpreted as representing local communities distributed along the slopes of upper Lualualei valley (Dixon et al. 2008). Further, settlement was not randomly distributed across the landscape, but situated to allow access to agricultural land at higher elevations that received greater rainfall.

Archaeological results from parcels immediately surrounding the current project area have provided minimal data on traditional Hawaiian settlement and later historical occupation. Tulchin and Hammatt’s (2007, 2008) survey of a 2.4 ha (6 acre) parcel forming the northwest corner of the current project area documented a single VOA antenna pedestal foundation (recorded as Feature 1 during the current survey). No traditional Hawaiian features were documented. Mayberry and Rosendahl (1994) conducted a reconnaissance survey of land along the north, east, and south boundaries of the present survey parcel. Jimenez (1994) completed an additional inventory survey of this area. Twenty-six sites were recorded, 24 of which dated to the 20th century. The other two sites, recorded by Jimenez (1994) are traditional Hawaiian sites containing intact cultural deposits. Jimenez (1994) obtained from one a radiocarbon date with a probability distribution from the early 15th to late 17th centuries.

SURVEY RESULTS

Twenty-one surface features were recorded, forming three archaeological sites. Two of the sites are components of the VOA station while the third site relates to the historical sugar industry in Lualualei (Fig. 3).

SITE 50-80-07-7081

Site 50-80-08-7081 includes 16 features (Features 1-6, 8, 9, 11-13, 15-18, 21) that were foundations for the VOA antenna system. The features are configured in three nearly linear and parallel arrangements oriented northeast-southwest and extending across the length of the parcel. The pedestals along each row average 85.0 m apart, while the rows are separated on average by about 90.0 m. Fifteen of the features are standardized pedestal foundations, measuring 1.52 m in length and width with variable height. Each has a slightly convex upper surface and a central posthole that supported a creosoted pole. Some of the pedestals have additional components to stabilize the pole or associated wires in the forms of smaller concrete blocks and steel and concrete uprights. Remnants of creosoted poles, heavy-gauge guide wires, and ceramic insulators are present throughout the area surrounding these features.

Feature 1 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.82 m in height (Photo 4). The upper surface of the pedestal is convex and a central posthole is present measuring 0.4 m in diameter. The posthole is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is a rectangular impression measuring 0.72 m in length and 0.26 m in width. Bolt attachments along the edges of the impression would have secured a metal support structure presumably to stabilize the creosoted pole in the posthole. A small-diameter metal pipe that projects from the north side of the pedestal possibly functioned as conduit for electrical wire. The foundation is in good condition.

Feature 2 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.1 m in height (Photo 5). The posthole measures approximately 0.4 m in diameter and is filled with a mixture of tar/creosote and gravel. No additional components are present. The foundation is in good condition.

Feature 3 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.68 m in height (Photo 6). The posthole measures 0.4 m in diameter and is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is a rectangular impression identical to that at Feature 1. Bolt attachments along the edges of the impression would have secured a metal support structure presumably to stabilize the creosoted pole located in the posthole. A small-diameter metal pipe projecting from the north side of the pedestal possibly functioned as conduit for electrical wire. The foundation is in good condition.

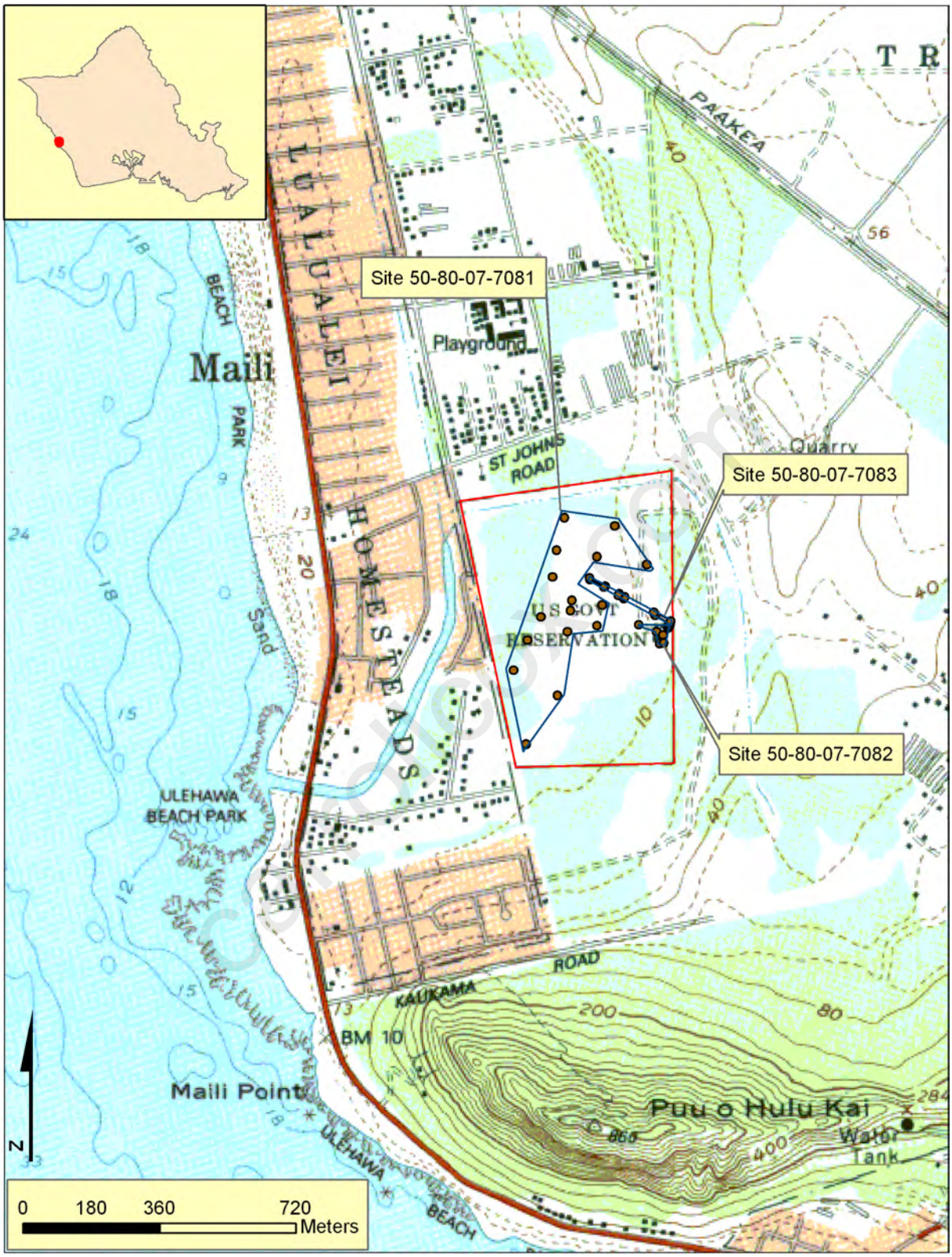

Figure 3. Map of the project area displaying the GPS points for features (brown circles) and site boundaries (blue lines), overlaid on a portion of the U.S. Geological Survey topographic quadrangle.

Photo 4. Feature 1, concrete pedestal foundation. View west.

Photo 5. Feature 2, concrete pedestal foundation. View west.

Photo 6. Feature 3, concrete pedestal foundation. View west-northwest.

Feature 4 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.1 m in height (Photo 7). The posthole measures approximately 0.4 m in diameter and is filled with a mixture of tar/creosote and gravel. A second, smaller concrete block measuring 0.8 m in length, 0.7 m in width, and 0.25 m in height is positioned adjacent to the posthole to provide additional support for the pole. A metal stanchion for the pole guide wires is cemented into the upper surface of the pedestal. The pole and associated cables are present east of the feature. No additional components are present. The foundation is in good condition.

Feature 5 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.84 m in height (Photo 8). The posthole, which retains the base of the creosoted pole, measures approximately 0.4 m in diameter. A small-diameter metal pipe projecting from the north side of the pedestal may have functioned as conduit for electrical wire. No additional components are present. The foundation is in good condition.

Feature 6 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.95 m in height (Photo 9). The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is a rectangular impression measuring 0.72 m in length and 0.26 m in width. The metal support structure that was attached to the pedestal at this point has fallen along the east side of the feature. The support consists of a steel plate approximately 0.7 m in length and 0.3 m in width with two parallel steel bars projecting from either end, each approximately 2.0 m in height. A concrete block measuring 0.63 m in length, 0.47 m in width, and 0.46 m in thickness is constrained by the two rails towards the base of the support, acting as a counterweight to stabilize the support structure. The foundation is in good condition.

Photo 7. Feature 4, concrete pedestal foundation. View west.

Photo 8. Feature 5, concrete pedestal foundation. View west.

Photo 9. Feature 6, concrete pedestal foundation. View north-northeast.

Feature 8 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.1 m in height (Photo 10). The posthole measures approximately 0.4 m in diameter and is filled with a mixture of tar/creosote and gravel. A second, smaller concrete block measuring 0.8 m in length, 0.7 m in width, and 0.25 m in height is adjacent to the posthole to provide additional support for the pole. The pole and associated cables are present to the east of the feature. No additional components are present. The foundation is in good condition. At least two welded steel jackets for creosoted poles were noted in the surrounding area.

Feature 9 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.9 m in height (Photo 11). The posthole measures 0.28 m in diameter and is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is a rectangular impression measuring 0.72 m in length and 0.26 m in width. Bolt attachments along the edges of the impression would have secured a metal support structure presumably to stabilize the creosoted pole located in the central posthole. A small-diameter metal pipe projects from the north side of the pedestal that possibly functioned as conduit for electrical wire. The foundation is in good condition.

Photo 10. Feature 8, concrete pedestal foundation. View southwest.

Photo 11. Feature 9, concrete pedestal foundation. View southwest.

Feature 11 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.95 m in height (Photo 12). The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is an intact, upright metal support structure, which is identical to the structure documented at Feature 6. The support consists of a steel plate measuring approximately 0.7 m in length and 0.3 m in width with two parallel steel bars projecting from either end approximately 2.0 m in height. A concrete block measuring 0.63 m in length, 0.47 m in width, and 0.46 m in thickness is secured between the two rails towards the base of the support, acting as a counterweight to stabilize the support structure. The foundation is in good condition.

Feature 12 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.25 m in height (Photo 13). The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. A remnant of the creosoted post and associated cables are present on the surrounding ground surface. The foundation is in good condition.

Feature 13 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.1 m in height (Photo 14). The upper surface of the pedestal is convex and a central posthole is present measuring approximately 0.4 m in diameter. The posthole is filled with a mixture of tar/creosote and gravel. A second, smaller concrete block measuring 0.8 m in length, 0.7 m in width, and 0.25 m in height is adjacent to the posthole to provide additional support for the pole. No additional components are present. The foundation is in good condition.

Feature 15 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.95 m in height (Photo 15). The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. Along the east side of the upper surface is a rectangular impression measuring 0.72 m in length and 0.26 m in width. The metal support structure that was formerly attached to the pedestal at this point is fallen along the east side of the feature. The support consists of a steel plate measuring approximately 0.7 m in length and 0.3 m in width with two parallel steel bars projecting from either end approximately 2.0 m in height. A concrete block measuring 0.63 m in length, 0.47 m in width, and 0.46 m in thickness is secured between the two rails towards the base of the support, acting as a counterweight to stabilize the support structure. The remnant of the creosoted pole and steel jacket is located approximately 10.0 m to the east of the pedestal. The foundation is in good condition.

Feature 16 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.1 m in height (Photo 16). The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. The foundation is in good condition.

Feature 17 is a concrete pad and upright metal support structure. The concrete pad measures 1.2 m in length, 1.2 m in width, and is set at the surrounding grade (Photo 17). The metal support structure is identical to the components recorded at Features 6, 11, and 15. The support consists of a steel plate measuring 0.66 m in length and 0.25 m in width with two parallel steel bars projecting from either end 2.57 m in height. A concrete block measuring approximately 0.6 m in length, 0.5 m in width, and 0.5 m in thickness is secured between the two rails towards the base of the support, acting as a counterweight to stabilize the support structure. The feature is in good condition.

Photo 12. Feature 11, concrete pedestal foundation. View northwest.

Photo 13. Feature 12, concrete pedestal foundation. View south.

Photo 14. Feature 13, concrete pedestal foundation. View south.

Photo 15. Feature 15, concrete pedestal foundation. View north.

Photo 16. Feature 16, concrete pedestal foundation. View west.

Photo 17. Feature 17, concrete pad foundation with metal support. View east.

Feature 18 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and approximately 0.45 m in height (Photo 18). The posthole measures 0.32 m in diameter and is filled with a mixture of tar/creosote and gravel. No additional components are present. The remnant of the creosoted pole and its steel jacket lie on the ground several meters to the east. The foundation is in good condition.

Feature 21 is a concrete pedestal foundation measuring 1.52 m in length, 1.52 m in width, and 0.2 m in height. The posthole measures 0.3 m in diameter and is filled with a mixture of tar/creosote and gravel. No additional components are present. The foundation is in good condition.

SITE 50-80-08-7082

Site 50-80-08-7082 includes four features (Features 7, 14, 19, and 20) relating to the VOA transmitter buildings and ancillary features. Three of the features (Features 14, 19, and 20), including the remnants of the transmitter buildings, are located along the center point of the eastern boundary of the parcel. The remaining feature (Feature 7) consists of the concrete postholes for a series of fence lines that traversed the property.

Photo 18. Feature 18, concrete pedestal foundation. View northwest.

Feature 7 includes multiple square concrete posthole structures that are distributed across the project area (Photo 19). One of these postholes retains the base of a wooden 7-inch by 7-inch (0.18 m by 0.18 m) post. Heavy vegetation in most of the parcel likely obscures numerous additional postholes. As the remnant of a fence line(s) support system the feature is in poor condition.

Feature 14 is a concrete pad measuring 3.1 m in length, 1.2 m in width, and 0.2 m in height (Photo 20). Three metal posts project from the center of the pad, spaced approximately 0.6 m apart. The posts are secured with a coarse concrete that postdates construction of the underlying slab. Feature 14 is located along the west side of the transmitter building complex and appears to relate to these structures (Features 19 and 20). The feature is in good condition.

Feature 19 is the remnant of a cement block structure measuring 6.7 m in length, 3.05 m in width, and at least 1.78 m in height (Photo 21). The structure has a poured concrete slab foundation with cement block exterior and interior walls. Most of these walls have been demolished to their base course of blocks. The structure is partitioned into two rooms, with the south room measuring 3.48 m in length and 2.85 m in width and the north room measuring 2.85 m in length and 2.6 m in width. The feature is located approximately 10.0 m northeast of Feature 20, the remnant of the main transmitter building. The feature is in poor condition.

Photo 19. Example of the Feature 7 concrete fence postholes. View north.

Photo 20. Feature 14, concrete pad. View north.

Photo 21. Feature 19, remnant of the cement block ancillary structure that is part of the VOA transmitter complex. View west.

Feature 20, the remnant of the main transmitter building, is approximately 32.0 m in length and 10.0-15.0 m in width (Photo 22). The superstructure has been demolished, but the concrete slab foundation is mostly intact. A large channel or conduit is in the slab presumably to hold electrical wires for the antenna array. The building's walls were constructed with reinforced cement blocks capped with reinforced concrete bondbeams. An asphalt road and a concrete curb separate Features 19 and 20 and provided access to these structures. The feature is in poor condition.

Photo 22. Feature 20, remnant of the main VOA transmitter building. View northwest.

SITE 50-80-08-7083

Site 50-80-08-7083 consists of a single feature (Feature 10), which is a remnant raised railroad bed from the Waianae Sugar Company. The sugar company began planting sugarcane in Lualualei in 1892 and continued production in the valley until 1946. An Army Corp of Engineers map dated 1909-1913 shows the current project area planted in sugarcane (Fig. 4). Interestingly, three features approximately correspond with the recorded railroad bed, although all of the features are more than 100 m northeast of Feature 10 when georeferenced. One of the features is labeled as a railroad segment, yet this feature is furthest from the location of Feature 10. The second linear feature is unlabeled on the map and appears to be either a transportation feature or boundary wall. The feature that most closely approximates the location of Feature 10 appears to be an unimproved road. Admittedly these are ambiguous results, yet considering the vast degree of difference between the accuracy and precision of early 20th century maps and recordation using a GPS it is likely that Feature 10 is the railroad segment denoted on the Corps of Engineers map.

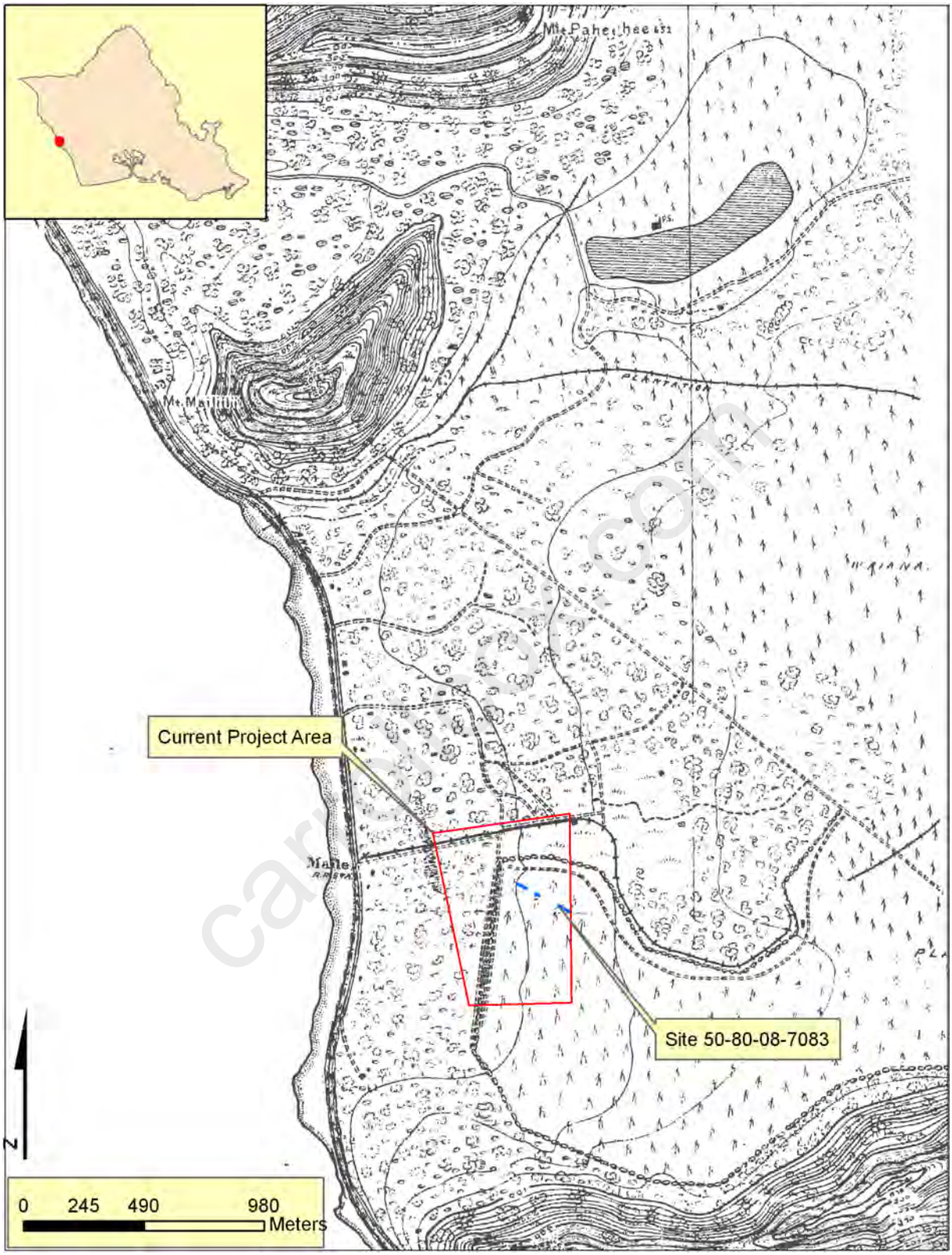

Figure 4. Overlay of the former VOA project area and the Site -7083 railroad bed on the U.S. Army Corps of Engineers 1909-1913 map of Māʻili (U.S. Army Corps of Engineers 1913).

Feature 10 includes three segments of an originally continuous railroad bed (Photos 23-25; Fig. 5). The railroad had been destroyed in places during construction of the VOA station, producing 40.0-85.0 m wide gaps between the three remaining segments of the railroad bed. The feature segments are constructed with dry laid angular and tabular basalt and coral boulders and cobbles. The exterior edges have a slight batter angle. Basalt boulders are often present as the lower courses, with the majority of the railroad bed constructed with limestone boulders and slabs. Intact edges retain up to nine courses of stone. The interior fill of the feature is primarily limestone boulders and cobbles. The upper surfaces vary between the segments: the western segment is paved with limestone slabs and exhibits a slightly concave surface; the central segment lacks the formal paving but exhibits a concave surface; and the eastern segment has a relatively even surface partially paved with small cobbles and pebbles. The western segment measures 48.0 m in length, 4.9 m in width, and 0.7-1.5 m in height. The central segment measures 17.0 m in length, 4.7 m in width, and 0.9-1.2 m in height. The eastern segment measures 52.0 m in length, 5.4 m in width, and 1.4-2.0 m in height.

Photo 23. Feature 10, railroad bed, western segment. View west.

Photo 24. Feature 10, railroad bed, eastern segment north face. View southwest.

Photo 25. Feature 10, railroad bed, eastern segment. View east.

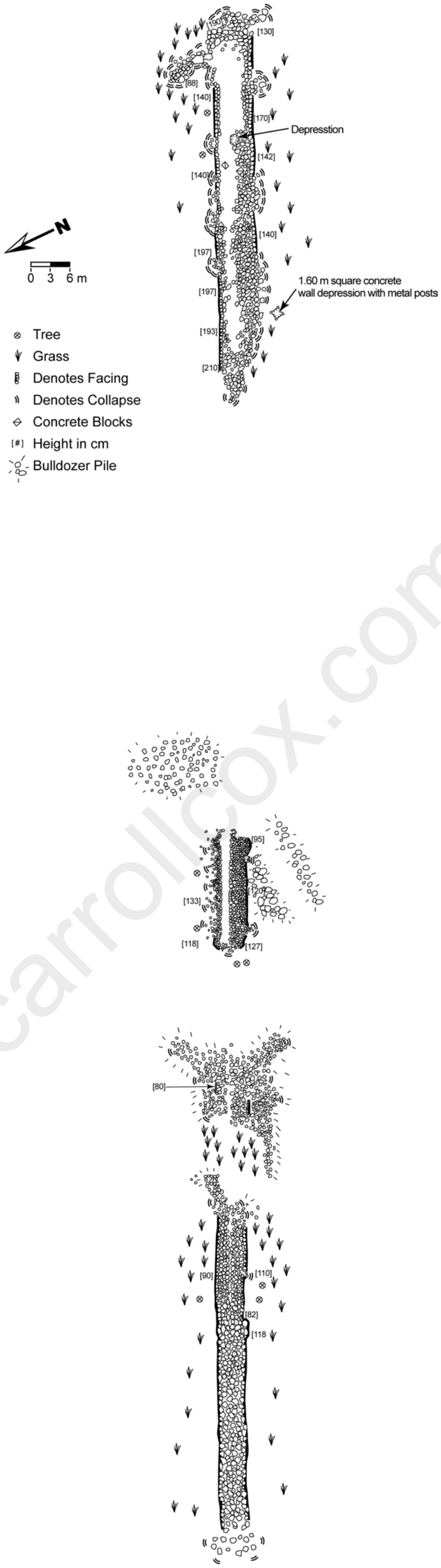

Figure 5. Plan view of the Feature 10 railroad bed.

SUMMARY AND RECOMMENDATIONS

An archaeological inventory survey of the 34 ha (84 acre) former VOA parcel documented 21 archaeological features. The majority of the features relate to the VOA antenna array (Site 50-80-07-7081) and associated transmitter buildings (Site 50-80-07-7082), which were constructed during the waning years of WWII and were demolished by the 1970s. The remaining feature includes multiple segments of a formerly continuous elevated dry laid masonry railroad bed (Site 50-80-07-7083) built by the Waianae Sugar Company. No traditional Hawaiian surface features or artifacts were identified, and it is apparent that the current ground surface and topography had been greatly modified by the construction of the VOA facility.

ARCHAEOLOGICAL SIGNIFICANCE EVALUATIONS

The National Register Bulletin 16A, How to Complete the National Register Registration Form (Anonymous 1991), indicates that, "Properties listed in the National Register of Historic Places possess historic **significance** and **integrity**" (emphasis added in original).

Whether a site has ***significance*** is based on one of four criteria:

A. Association with historic events or activities,

B. Association with important persons,

C. Distinctive design or physical characteristics, or

D. Potential to provide important information about prehistory or history.

Besides possessing significance as determined by one of the above criteria, a property eligible for listing on the National Register of Historic Places (NRHP) must also have ***integrity***, and historical integrity must be evident in some combination of the qualities of *location*, *design*, *setting*, *materials*, *workmanship*, *feeling*, and *association*. As explained in the NR Bulletin, "All seven qualities do not need to be present for eligibility as long as the overall sense of past time and place is evident." Also, for archaeological sites (as opposed to standing historical structures), integrity is "generally based on the degree to which remaining evidence can provide *important* information" (emphasis added).

In addition, listed or eligible properties must be at least 50 years old.

Finally, listed or eligible properties must be "significant when evaluated in relationship to major trends of history in their community, State, or the nation."

Table 2 lists the sites, their associated features, and NRHP evaluations.

Table 2. Site Characteristics and NRHP Evaluations.

Site No.	Feature No.	Function	Temporal Category	NRHP Significance	NRHP Integrity	NRHP Eligibility	Proposed Mitigation
50-80-07-7081	16 (Features 1-6, 8, 9, 11-13, 15-18, and 21)	Voice of America Antenna System	Mid-20th century	A, D	Moderately altered	Eligible	No further work
50-80-07-7082	4 (Features 7, 14, 19, and 20)	Voice of America Transmitter Buildings	Mid-20th century	A, D	Poor	Not Eligible	No further work
50-80-07-7083	1 (Feature 10)	Sugar plantation railroad	Late 19th/early 20th century	C, D	Moderately altered	Eligible	Preservation

Site 50-80-08-7081, the concrete pedestal foundations (Features 1-6, 8, 9, 11-13, 15-18, and 21), is eligible for nomination to the NRHP following significance criteria A and D with moderately altered integrity. This integrity determination is predicated on the intact characteristics of the individual pedestals, which, however, are only remnant components of a larger integrated antenna system that included creosoted poles, guide wires, antennae, and other support features. No further work is necessary for this site, since high-precision spatial data and the physical attributes of the individual features have been recorded.

Site 50-80-08-7082, the remnants of the transmitter buildings (Features 7, 14, 19, and 20), is not eligible for nomination to the NR. Although the site is significant under criteria A and D, the buildings have poor integrity. No further work is necessary.

Site 50-80-08-7083, the railroad bed (Feature 10), is eligible for nomination to the NR following significance criteria C and D and moderately altered integrity. Construction of the former VOA station resulted in the discontinuous nature of the railroad bed within the project area, yet the individual segments retain well preserved dry laid masonry. The site is relevant for an understanding of the plantation-era history of Hawai‘i and is evocative of that time and the sugar industry. Preservation is recommended for this site, although this could consist of preserving a single segment of the railroad bed, preferably either the northwest or southeast sections which are in the best condition.

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