VOLUME II OF II

Draft Environmental Assessment

PROPOSED H-2 RESIDENTIAL PROJECT, MAUI, HAWAI‘I

(TMK NO. (2)2-1-005:085 and 120(por.))

Prepared for:

H2R, LLC

December 2019

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MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

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DOCKET NO. A97-721,
FEBRUARY 19, 1998
FINDINGS OF FACT,
CONCLUSIONS OF LAW, AND
DECISION AND ORDER

APPENDIX

A

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

In the Matter of the Petition of MAKENA RESORT CORP., a Hawai'i corporation To Amend the Agricultural Land Use District Boundary into the Urban Land Use District for Approximately 145.943 Acres of Land at Makena, Island of Maui, State of Hawai'i, TMKs 2-1-05: 83, 84, 85, por. 108; 2-1-07: 4; and 2-1-08: por. 90	DOCKET NO. A97-721 FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

This is to certify that this is a true and correct copy of the Decision and Order on file in the office of the State Land Use Commission, Honolulu Hawaii.

FEB 19 1998 by
Date Executive Officer

FINDINGS OF FACT,
CONCLUSIONS OF LAW, AND DECISION AND ORDER

LAND USE COMMISSION
STATE OF HAWAII
FEB 19 A 9:40

1/6/02. Sent to DPH Log 007

BEFORE THE LAND USE COMMISSION

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FINDINGS OF FACT,
CONCLUSIONS OF LAW, AND DECISION AND ORDER

MAKENA RESORT CORP., a Hawai'i corporation ("Petitioner"), filed a Petition for Land Use District Boundary Amendment on July 1, 1997; a First Amendment to Makena Resort Corp.'s Petition for Land Use District Boundary Amendment on August 14, 1997; and a Second Amendment to Makena Resort Corp.'s Petition for Land Use District Boundary Amendment on October 17, 1997, pursuant to chapter 205, Hawai'i Revised Statutes ("HRS"), and chapter 15-15, Hawai'i Administrative Rules ("HAR"), to amend the State land use district boundaries by reclassifying approximately 145.943 acres of land from the State Land Use Agricultural District into the State Land Use Urban District at Makena, Island and County of Maui, State of Hawai'i, identified as Tax Map Key Nos. 2-1-05:83, 84, 85, and portion 108; 2-1-07:4; and 2-1-08: portion 90 ("Petition Areas" or "Property"), to be incorporated in the further development of the existing Makena Resort. The Land Use Commission ("Commission"), having heard and

examined the testimony, evidence and arguments presented during the hearing; Petitioner's Proposed Findings of Fact, Conclusions of Law, and Decision and Order; and the responses of the Office of Planning ("OP") and the County of Maui Planning Department ("Planning Department") to Petitioner's Proposed Findings of Fact, Conclusions of Law, and Decision and Order, does hereby make the following findings of fact, conclusions of law, and decision and order:

FINDINGS OF FACT

PROCEDURAL MATTERS

1. Petitioner filed a Petition for Land Use District Boundary Amendment on July 1, 1997; a First Amendment to Makena Resort Corp.'s Petition for Land Use District Boundary Amendment on August 14, 1997; and a Second Amendment to Makena Resort Corp.'s Petition for Land Use District Boundary Amendment on October 17, 1997 (collectively "Petition").

2. Petitioner, Makena Resort Corp., is a Hawai'i corporation, whose business and mailing address is 5415 Makena Alanui, Kihei, Maui, Hawai'i 96753. Petitioner is a wholly owned subsidiary of Prince Resorts Hawaii, Inc., a Hawai'i corporation, which is a part of the Seibu Group of Companies of Japan.

3. On October 13, 1997, OP filed a Statement of Position of the Office of Planning in Support of the Petition.

4. On October 17, 1997, the Planning Department filed a Position of the Maui Planning Department recommending conditional approval of the Petition.

5. No petitions to intervene were filed by third parties in this proceeding.

6. On October 21, 1997, the Commission held a prehearing conference which was attended by the parties.

7. On November 13, 1997, the Commission held a hearing on the Petition pursuant to public notices published on September 2, 1997, in the Honolulu Star-Bulletin and the Maui News.

8. At the hearing, Commission Exhibit No. 1, a letter from Michael Wilson of the Department of Land and Natural Resources ("DLNR"), dated October 22, 1997; Commission Exhibit No. 2, a letter from Don Hibbard, State Historic Preservation Division ("SHPD"), DLNR, dated October 24, 1997; and Commission Exhibit No. 3, a letter from Rae M. Loui, Deputy Director of the Commission on Water Resource Management, dated November 4, 1997, were received into evidence.

DESCRIPTION OF THE PETITION AREAS

9. The Makena Resort comprises approximately 1,030 acres at Makena, Maui, Hawai'i. The Petition Areas are comprised of six separate noncontiguous areas, identified as Petition Areas 1 through 6:

PETITION AREA	TAX MAP KEY	ACRES	LAND USE DISTRICT RECLASSIFICATION FROM AND TO
1	2-1-05:portion 108	83.503	Agricultural to Urban
2	2-1-05:portion 108 2-1-08:portion 90	17.484	Agricultural to Urban
3	2-1-08:portion 90	15.745	Agricultural to Urban

4	2-1-08:portion 90	3.065	Agricultural to Urban
5	2-1-05:83,84,85 and portion 108	25.777	Agricultural to Urban
6	2-1-07:4	0.369	Agricultural to Urban
	Total	145.943	

10. The Petition Areas are owned in fee by Makena Aina Corp. and Maui Prince Hotel Corp., affiliates of Petitioner. Petitioner does not have any fee or leasehold interest in the Petition Areas. Petitioner has no written development agreement; however, Petitioner is one of ten Hawai'i corporations, all wholly owned by Prince Resorts Hawaii, Inc., also a Hawai'i corporation. Makena Aina Corp. and Maui Prince Hotel Corp. are in like manner wholly owned subsidiaries of Prince Resort Hawaii, Inc. Petitioner is the development arm of these affiliate companies which own the Petition Areas.

11. A portion of Petition Area 1 is an existing golf course and the remainder is currently vacant. Petition Areas 2, 3, and 4 are also vacant. Petition Area 5 contains an existing 30-stall beach parking lot and a portion of said Petition Area 5 is in existing golf course use. The remainder of Petition Area 5 is vacant. Petition Area 6 is also currently vacant and, until recently, a single-family dwelling occupied that site.

12. The slope of each of the Petition Areas is as follows: Petition Area 1 is approximately 8 percent, Petition Area 2 is approximately 12 percent, Petition Area 3 is approximately 8 percent, Petition Area 4 is approximately 10

percent, Petition Area 5 is approximately 3 percent, and Petition Area 6 is generally level.

13. The Petition Areas are situated in Zone C of the Flood Insurance Rate Map, which is defined as an area of minimal flooding.

14. The soil characteristics of Petition Area 1 consist of Makena loam soil and Oanapuka extremely stony silt loam. Petition Area 2 is characterized by the Oanapuka series, and Petition Areas 3, 4, 5, and 6 are within the Makena loam soil series. Makena loam soil is characterized by slow to medium runoff and slight to moderate erosion hazards. The Oanapuka series is typified by stones covering 3 to 15 percent of the surface, with moderately rapid permeability and a slight to moderate erosion hazard.

15. All the Petition Areas are classified as overall (master) productivity rating class E under the University of Hawai'i Land Study Bureau's Detailed Land Classification system, and all of the Petition Areas are unclassified under the Agricultural Lands of Importance to the State of Hawai'i ("ALISH") system.

PROPOSAL FOR RECLASSIFICATION

16. Petitioner is ready to proceed with the next phase of development at the Makena Resort. This Petition would permit for the sequential development of this next phase.

17. A portion of Petition Area 1 is already developed as part of the South Golf Course at the Makena Resort. This use is proposed to remain. The remainder of Petition Area 1 and

Petition Areas 2 through 4 are proposed for multi-family residential use. Petition Area 5 is planned to be developed as a 500-room hotel. Petition Area 6 is proposed to be incorporated into the grounds of the existing Maui Prince Hotel without any further development anticipated.

18. Petitioner is proposing the boundary change amendment at this time for the following reasons:

a. The amount of additional multi-family and residential acreage being proposed to be reclassified is approximately equal to already zoned apartment and residential lands which are currently in golf course use.

b. The Petition Areas include portions of properties which are required by affiliated companies of Petitioner after the passage of the Kihei-Makena Community Plan in 1985.

c. The amendments are consistent with the proposed Kihei-Makena Community Plan update.

19. The decision to proceed with development at this time was prompted by the decision by Petitioner to proceed with the development of a privately-owned wastewater treatment facility at Makena.

20. The first step in the next phase of development of the Makena Resort would be the development of the wastewater treatment facility located outside of the Petition Areas. Petitioner anticipates that construction will start by the second quarter of 1998. This would be followed by the commencement of

the development of infrastructure for the next phase of development of parcels M-5, M-6, S-7, M-4, and M-7 for single-family and multi-family residential development. Portions of parcels M-4 and M-7 are in Petition Area 3. The other parcels are outside of the Petition Areas.

21. Petitioner intends to start development of the 500-room hotel in Petition Area 5 by the end of 1999.

22. The estimated total cost of the development of the hotel, wastewater treatment facility, and infrastructure for the development of parcels M-5, M-6, S-7, M-4, and M-7 is $303 million, with the development of the wastewater treatment facility costing approximately $16 million and the hotel costing approximately $180 million.

PETITIONER'S FINANCIAL CAPABILITY TO UNDERTAKE THE PROPOSED DEVELOPMENT

23. The combined balance sheet of Petitioner, along with affiliates Maui Prince Hotel Corp., Makena Aina Corp., and Aina Mua Corp., as of December 31, 1996, indicates total assets of $133,299,247.00 and total liabilities of $24,483,074.00. In addition, the balance sheet indicates additional paid in capital of $166,076,883.00, which was invested in the Makena Resort by the Seibu Group in Japan to date.

24. Petitioner proposes to finance further development at Makena Resort through additional capital investments by the Seibu Group in Japan and also through conventional financing with financial institutions both in Japan and the United States.

STATE AND COUNTY PLANS AND PROGRAMS

25. Petition Areas 1 through 6 are in the State Land Use Agricultural District, as reflected on the Commission's official map, M-9 (Makena).

26. The designations of each of the Petition Areas under the existing Kihei-Makena Community Plan are as follows:

PETITION AREA	
1	Single Family Residential, Multi-Family Residential, Park, and Agriculture
2	Multi-Family Residential and Agriculture
3	Multi-Family Residential and Single-Family Residential
4	Single-Family Residential
5	Hotel
6	Hotel

27. The proposed designations of the Petition Areas under the proposed update to the Kihei-Makena Community Plan are as follows:

PETITION AREA	
1	Multi-Family Residential and Park
2	Multi-Family Residential
3	Multi-Family Residential
4	Multi-Family Residential
5	Hotel
6	Hotel

28. The zoning designations of each of the Petition Areas are as follows:

Petition Area	
1	Interim and Agriculture
2	Interim and Agriculture
3	Interim and Agriculture
4	Interim
5	Interim
6	Interim

29. A portion of Petition Area 1 and all of Petition Areas 5 and 6 are within the County Special Management Area.

NEED FOR THE PROPOSED DEVELOPMENT

30. In August 1996, KPMG Peat Marwick prepared a market assessment for a 500-room hotel and a 1,500 low-density multi-family development at the Makena Resort.

31. Maui County's capture rate of State visitors increased during the 1990s, with occupancies between 73 and 75 percent since 1994. Further, since 1995 room rates have jumped for the island of Maui by 15 percent, giving Maui the highest room rates in the State.

32. If all of Maui's then planned and zoned hotel rooms were built by the year 2015, there would still be market support for the proposed 500-room hotel at the Makena Resort. There were no hotel developments in the 1990s on Maui and, in fact, the hotel inventory for Maui fell by approximately 250

units since 1994. Further, there were approximately 350 fewer condominium units in this rental pool over the same period.

33. With the anticipated growth in visitors to the island of Maui, it was projected that Maui hotel room demand would amount to approximately 7,400 rooms per day and would increase to over 10,000 rooms per day by the year 2010. This growth would require an additional 700 to 2,000 more hotel rooms on the island of Maui than presently exists or that could possibly be built in all of the already zoned lands on the island by the year 2005, and up to 2000 more by the year 2010.

34. The 500-room hotel would be an important factor in meeting the projected shortfall of hotel rooms on the island.

35. With regard to determining long-range absorption rates for multi-family condominium development, developer sales at those projects averaged 50 units per year.

36. The proposed multi-family sites at the Makena Resort, including those proposed for the Petition Areas, would offer panoramic views, frontage on the golf course, privacy, exclusivity, a quiet environment, and low-density units. New multi-family units sales at the Makena Resort would be approximately 75 to 100 units per year. Further, if Petitioner started marketing multi-family condominium units in the year 2000, it would sell out the 1,500 units planned for the entire Makena Resort by the year 2015.

SOCIO - ECONOMIC IMPACTS

37. To date, the Seibu Group of Companies, of which Petitioner is an affiliate, has invested approximately $1.2

billion in the State of Hawai'i and provides employment opportunities for over 2,300 Hawai'i residents, of which 520 are employed at the Makena Resort.

38. While the development of multi-family and single-family units at the Makena Resort will not generate much long-term employment, as development occurs there will be short-term employment with construction jobs. Further, it is anticipated that the development of the 500-room hotel on Petition Area 5 would generate approximately 1,000 hotel construction jobs for a period of 24 months and long-term employment in excess of 500 additional hotel workers.

IMPACT UPON RESOURCES IN THE AREA

Agricultural Resources

39. Since all of the Petition Areas are classified as E under the Land Study Bureau and unclassified under the ALISH system, the removal of these lands from the State Land Use Agricultural District should not represent a significant loss of agricultural land for the island of Maui. The conversion of approximately 145 acres out of a total of approximately 248,457 acres in the Agricultural District on the island of Maui represents the removal of 0.06 percent of the total agricultural lands.

Flora and Fauna

40. The following endemic and indigenous species may be found on the Petition Areas: the Wiliwili tree which is considered endemic but not rare or endangered and the American golden plover, or Kolea, which is considered indigenous but not

rare or endangered. Further, past studies have noted that the Hawaiian black necked stilt, or Aeo, has been spotted in the area. It is considered endemic and also endangered. The native Aeo has been spotted occasionally at brackish water areas or ponds in the Makena region as well as the water hazards of the Makena golf courses. The Kolea has also been spotted on the fairways of the Makena golf courses.

41. Based upon a field inspection, it does not appear that there are any endangered or threaten species of plants or animals within the Petition Areas.

42. The area offshore of the Petition Areas, from the shoreline to the 100-fathom Isobath, between the islands of Maui, Moloka'i, Lana'i, and Kaho'olawe, are the principal breeding and calving area for the wintering population of endangered North Pacific Humpback Whales. This coastal area has been designated part of the Hawaiian Islands Humpback Whale National Marine Sanctuary.

Archaeological and Historical Resources

43. Aki Sinoto Consulting prepared an archaeological inventory survey of each of the six Petition Areas, ranging from inventory level survey to data recovery and monitoring.

44. To date, approximately 50 archaeological surveys have been conducted in the Makena Resort area, 12 of which cover portions of the six Petition Areas.

45. In Petition Area 1, a total of 18 significant sites were found, most of which indicated a traditional Hawaiian agricultural community. Sites consists of enclosures, small

C-shaped structures, and agricultural clearing mounds. Permanent in situ preservation has been recommended for three of these sites and the remaining 15 sites have been recommended for further mitigation work.

46. In Petition Areas 2 and 3, a total of eleven previously unrecorded sites were recovered, nine in Petition Area 2, and two in Petition Area 3. These also indicated traditional Hawaiian agricultural activities. Six of the total sites, five in Petition Area 2 and one in Petition Area 3, have been recommended for further data recovery.

47. Petition Area 4 was covered by three previously completed studies and one recorded site was found which was never further tested. Subsurface testing conducted during this current survey indicated a complete absence of remains, resulting in an evaluation of this site as "no longer significant." This was a natural site that had not been used by prehistoric clients. No further archaeological procedures are recommended in this Petition Area.

48. Petition Area 5 was included in at least four previous studies between 1978 and 1992. During the current survey, no significant remains were present in this Petition Area.

49. In Petition Area 6, archaeological inventory and data recovery procedures were completed in 1994 on a historic habitation complex and archaeological monitoring was conducted during the demolition of existing modern structures, and the

clearing and grading of this parcel. No further significant remains were encountered and the parcel has been cleared by SHPD.

50. Petition Areas 4, 5, and 6 either have no significant historic sites or the sites have already been mitigated, and in Petition Areas 1, 2, and 3, archaeological data recovery of sites significant solely for their information content will be needed prior to any land alteration. Further, in Petition Area 1, several sites are to be preserved. If these mitigation commitments are carried out, impacts to the significant historic sites would be acceptably handled.

51. With regard to native Hawaiian cultural activities, there are no known heiau or other religious sites in any of the Petition Areas.

52. Petitioner has agreed to preserve most of the burial sites in situ. Three known sites are within the existing golf course and there may be several others within the undeveloped areas which will be covered by a preservation plan for Petition Area 1.

Groundwater Resources

53. The Commission on Water Resource Management ("CWRM") recommended coordination with the County to incorporate this project into the County's Water Use and Development Plan. CWRM noted that the water supply source for this project was already overpumping the sustainable yield of the 'Iao aquifer, and CWRM was considering designating the aquifer as a water management area. If the aquifer is designated, all groundwater withdrawals to the purveyor would be subject to water use

permits. The service area would be subject to a declaration of a water shortage or a water emergency. If withdrawals are constrained, uses may be subject to allocation to users by the purveyor.

Recreational Resources

54. The Petition Areas are located in a master-planned resort area. Recreational opportunities in the Kihei-Makena community are abundant and diverse. In the Makena area, there are two championship golf courses, a tennis center, and open space for jogging and walking. Shoreline resources in the vicinity include Makena State Park's Oneloa Beach, the Ahihi-Kinau Natural Area Reserve, and LaPerouse Bay. To the north of the Petition Areas, there are numerous beaches, municipal parks, golf courses, and other recreational opportunities available. The proposed development will not adversely impact existing recreational facilities.

Scenic Resources

55. The proposed development will be in conformance with a consistent design theme throughout the entire Makena Resort. The development will provide open space relief, landscaping, and low-rise building forms to complement existing developed properties and the surrounding environment. Alteration of natural landforms and impacts on public views to and along the shoreline will be minimized.

ENVIRONMENTAL QUALITY

Noise, Air, and Water Quality

56. Construction activities are expected to be limited to daylight hours and all normal dust control measures such as watering and sprinkling will be undertaken by Petitioner.

57. The Department of Health has an air quality monitoring site located approximately 5½ miles to the north of the Petition Areas which monitors particulate matter and sulfur dioxide. To date, the ambient air in the Kihei region is significantly below applicable State standards.

58. The United States Department of the Interior, Fish and Wildlife Service, included the following comments regarding the proposed development in their letter dated October 29, 1997:

> "The affected land area does not contain any Federally endangered or threatened species. However, the Service is concerned that changes in water quality associated with the boundary change may result in the degradation of water quality and thereby impact fish and wildlife resources and habitats. The Service recommends that the boundary change petition incorporate provisions for long-term nearshore and stream water quality monitoring. Sediments, water, and biotic samples should be tested for organochlorine pesticides associated with past agricultural uses, as well as herbicides, insecticides, and termiticides currently used in residential and resort areas and for metals and petroleum hydrocarbons which are generally present in stormwater runoff. This testing should be done as part of a baseline and then continued periodically until the impacts of the proposed land use changes on aquatic and marine habitats have been fully assessed."

ADEQUACY OF PUBLIC SERVICES AND FACILITIES

Highway and Roadway Facilities

59. Access to Makena Resort is provided by Makena Alanui, which is a two-lane undivided roadway through the entire Makena Resort. At its north, Makena Alanui becomes Wailea Alanui

Drive, which is a four-lane divided roadway that runs through the Wailea Resort. The regional accesses are provided by Piilani Highway and South Kihei Road.

60. Makena Alanui presently carries approximately 6,000 vehicles per day.

61. Utilizing generally accepted practices recommended by the Institute of Transportation Engineers, the proposed resort residential development of Petition Areas 1 through 4 would generate peak hour trips ranging from 5 vehicles per hour to 46 vehicles per hour. Petition Area 5 which is planned for a 500-room hotel would generate up to 362 vehicles per hour, and therefore warrant the preparation of a traffic impact analysis report. Except for Petition Area 5, the potential trips generated from the remaining Petition Areas are not considered significant.

62. The traffic distribution system within the Makena Resort proposes three connecting roads leading mauka off of Makena Alanui. The roadways connecting to Makena Alanui would be stopped controlled requiring traffic wanting to enter Makena Alanui to stop and yield the right-of-way. Traffic heading south on Makena Alanui desiring to make a left turn will be provided with left-hand turning lanes.

Water Service

63. The average daily demand for potable water for the entire Makena Resort is calculated to be 2.13 million gallons per day ("MGD"). In 1975, the predecessor-in-interest of Petitioner, along with other landowners, entered into the Central Maui Source

Development Agreement. The Joint Venture developed approximately 13.4 MGD additional capacity for the Central Maui System, of which Petitioner is entitled to 4/19ths of said amount. Petitioner believes that said allocation would be sufficient to meet the average daily demand for the entire Makena Resort.

64. The County of Maui Board of Water Supply had the following comments regarding the proposed development, dated October 15, 1997:

> "The applicants are members of the Central Maui Joint Venture project. Source for the project will be deducted from their remaining allocation. Nevertheless, availability of water will be reviewed at the time of application for meter. The applicants should be informed that the project may be subject to delays until new sources are brought on line.
>
> The project requires major system improvements. The upper elevations for four of the six Petition Areas appear to be substandard in regards to the low water pressure available from our water tank, which is located at an elevation of 265'. The applicants are required to provide water for fire and domestic uses according to standards.
>
> The project is served by the Central Maui system. The Department has operating wells in the Iao and Waihee aquifer to serve this system. In addition, the Department has drilled wells in the Paia aquifer, and has built a treatment plant on the Iao Ditch. Although the Paia aquifer wells are experiencing approval delays, the Iao Ditch plan is expected on-line within the next few months.
>
> The Iao aquifer is under scrutiny by the State Commission on Water Resource Management. They will designate if rolling annual average pumpage exceeds 20 MGD. Moving annual average pumpage from the Iao aquifer, as of September 1, 1997 was 19.65 MGD.
>
> We have roughly 430,000 gallons in outstanding water commitments in the form of meter reservations.
>
> The proposed project represents a potential increase in water use of roughly 750,000 gallons per day. Most of this potential use is already reflected in the

> community plan. This estimate is based on state per-acre standards. Actual usage can vary widely with the specifics of project development. Fire, domestic and irrigation calculations will be reviewed during the subdivision and building permit process."

65. Presently within the Makena Resort, there is a 1.5 million gallon low level storage reservoir for potable water. The reservoir is serviced by an existing 30-inch transmission line, reducing down to a 20-inch line and then to a 12-inch line. Leading out of the reservoir is an existing 18-inch line, which is then reduced to 16-inch and 12-inch lines that service the Makena Resort.

66. In order to serve the development of the entire Makena Resort, two additional potable water storage reservoirs would be required. A mid-level storage reservoir with a capacity of 1.5 million gallons and a high level storage reservoir with a capacity with approximately 1.0 million gallons would be required. Additional transmission lines would be required to supply water to these reservoirs.

Wastewater Reclamation

67. Developed portions in the Makena Resort are presently serviced by a private treatment plant located at the southwest corner of the Maui Prince Hotel site. The design capacity of the plant is 127,000 gallons per day ("gpd"), with daily flows to the plant ranging from 30,000 to 107,000 gpd.

68. The wastewater requirements for the entire Makena Resort will be 700,000 gpd during the initial phase and ultimately 1.5 million gallons for the entire Makena Resort. Petitioner proposes to construct a new wastewater reclamation

facility that will be sized for 700,000 gallons, with expansion capacities to 1.5 million gallons.

69. A collection system with sewage lines installed in the roadways will take the wastewater from development sites to three proposed wastewater pump stations. From these pump stations, a pressure line will extend upward to the wastewater reclamation facility.

Drainage

70. Presently, drainage sheet flows through the Makena Resort. There are no major drainways of perennial streams existing in the property.

71. New drainage facilities would be developed along with roadway construction. In addition, with regard to onsite development, the drainage design will take into account County drainage standards. Onsite detention or retention basins will be considered to ensure that there will be no increase in runoff from the Petition Areas that would affect downstream properties.

Solid Waste

72. Residential solid waste is collected by County crews and deposited at the County's Central Maui Landfill. The Central Maui Landfill also accepts commercial waste from private collection companies. Solid waste generated by the proposed development is not expected to adversely impact the services or facilities of the County.

Schools

73. The State Department of Education ("DOE") operates three schools in the Kihei area. Kihei Elementary School and

Kamalii Elementary School cover Grades K to 6, while Lokelani Intermediate School includes Grades 7 and 8. Public school students in Grades 9 through 12 attend Maui High School in Kahului. The proposed development will not adversely affect the service requirement of DOE, compared to the current amount of land already zoned for residential and apartment use.

Police and Fire Protection

74. The County of Maui Police Department, headquartered in Wailuku, services the Kihei-Makena region with its Kihei patrol. Further, fire prevention and protection services are available to the Kihei-Makena area through the Kihei Fire Station located at the corner of South Kihei Road and Waimahaihai Street. Based on the availability of these services, the proposed development will not adversely affect the service requirements of the County Police Department and the Department of Fire Control.

Electrical Power and Communications

75. Currently, electric, telephone and cable T.V. services are available within Makena Resort.

CONFORMANCE WITH THE URBAN DISTRICT STANDARDS

76. The proposed reclassification of the Petition Areas is in general conformance with the standards of the State Land Use Urban District, as set forth in section 15-15-18, HAR, as follows:

(1) It shall include lands characterized by "city-like" concentrations of people, structures, urban level of services and other related land uses.

The Petition Areas are within the master-planned Makena Resort. The parcels to be reclassified are designated for urban use in the existing or proposed community plan, and located adjacent to lands already in golf course or hotel uses.

(2) It shall take into consideration the following specific factors:

A. Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.

The Petition Areas are in close proximity to the existing Maui Prince Hotel and Makena Golf Courses. As part of a master-planned resort, the Petition Areas will served as a center of economic activity. In a broader regional context, when considered with Wailea, the Petition Areas are a part of a regional resort community which provides significant economic benefit to the County.

B. Substantiation of economic feasibility by the Petitioner.

Based on the financial capability of Petitioner and the market demand for the proposed development, the development is economically feasible.

C. Proximity to basic services such as sewers, transportation systems, water, sanitation, schools, parks, and police and fire protection.

Basic infrastructural services such as wastewater collection, transportation systems, and water are located or will be available in close proximity to the Petition Areas. Drainage improvements will be implemented as development occurs for each parcel, and will be in accordance with

applicable County of Maui standards. Schools, parks, and police and fire protection are available to service the Petition Areas.

D. Sufficient reserve areas for urban growth in appropriate locations based on a ten year projection.

The proposed reclassification of the Petition Areas is being requested in the context of improving and enhancing future resort activities and operations. In terms of urban growth, the proposed action will enable Makena Resort to implement land uses as part of its long-range development master plan designed to maintain the Resort's competitiveness over the next 10 to 15 years.

(3) It shall include lands with satisfactory topography and drainage and reasonably free from the danger of floods, tsunami, unstable soil conditions, and other adverse environmental effects.

The Petition Areas are located within Zone C, areas of minimal flooding and are gently sloping. The Petition Areas are not subject to tsunami inundation and unstable soil conditions.

(4) In determining urban growth for the next ten years, or in amending the boundary, land contiguous with existing urban areas shall be given more consideration than non-contiguous land, and particularly when indicated for future urban use on state or county general plans.

The Petition Areas are within the master-planned Makena Resort. All of the Petition Areas abut the existing Urban District boundary. Moreover, most of the Petition Areas are indicated for future urban use in the existing Kihei-Makena Community Plan. All land within the Petition Areas is indicated for urban use on the proposed community plan.

(5) It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the state and county general plans.

The Petition areas are appropriate for Urban District classification. Their location within the Makena master-planned Resort establishes the appropriate land use context for Urban classification. The existing Kihei-Makena Community Plan shows most of the Petition Areas in urban use while the proposed version of the plan shows all of the Petition Areas in urban use.

(6) It may include lands which do not conform to the standards in paragraphs (1) to (5):

(A) When surrounded by or adjacent to existing urban development; and

(B) Only when those lands represent a minor portion of this district.

The Petition Areas are adjacent to existing urban development. The total acreage of the proposed reclassification represents a minor portion of the amount of Urban District lands in the Kihei-Makena region.

(7) It shall not include lands, the urbanization of which will contribute toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services.

The proposed reclassification does not contribute to scattered spot urban development since the Petition Areas are intended to be incorporated as part of the master-planned development of Makena Resort. The proposed action will not necessitate unreasonable public investment in infrastructural facilities or public services.

(8) It may include lands with a general slope of twenty percent or more which do not provided open space amenities or scenic values if the commission finds that those lands are desirable and suitable for urban purposes and that official design and construction controls are adequate to protect the public health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.

The Petition Areas contain slopes significantly less than 20 percent.

CONFORMANCE WITH THE GOALS, OBJECTIVES AND POLICIES OF THE HAWAI'I STATE PLAN; RELATIONSHIP WITH APPLICABLE PRIORITY GUIDELINES AND FUNCTIONAL PLANS

77. The proposed reclassification of the Petition Areas generally conforms to the following goals, objectives, priorities, and policies of the Hawai'i State Plan, as defined in chapter 226, HRS:

§226-4, HRS, State Goals

226-4(1), HRS: A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations.

§226-5, HRS, Objective and Policies for Population

226-5(a), HRS: It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.

226-5(b)(1), HRS: Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.

226-5(b)(2), HRS: Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.

The implementation of the Makena Resort Master Plan will provide increased economic activities and employment opportunities in accordance with community desires as

expressed through the Kihei-Makena Community Plan update process.

§226-6, HRS, Objectives and Policies for the Economy - in General

226-6(a)(1), HRS: Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.

226-6(b)(8), HRS: Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.

The proposed reclassification will provide additional urban lands to facilitate residential and hotel development in the region. With development of the residential and hotel components, construction jobs will be created. In the long-term, hotel-related and residential service employment opportunities will be created.

§226-103, HRS, Economic Priority Guidelines

226-103(1): Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

A. Encourage investments which:

(i) Reflect long-term commitments to the State;
(ii) Rely on economic linkages within the local economy;
(iii) Diversify the economy;
(iv) Reinvest in the local economy;
(v) Are sensitive to community needs and priorities; and
(vi) Demonstrate a commitment to provide management opportunities to Hawai'i residents.

The proposed reclassification will provide additional urban lands to facilitate implementation of the Makena Resort Master Plan. Investment capital for resort and multi-family

development would generate employment multiplier impacts beneficial to the local economy.

§226-104, HRS, Population Growth and Land Resources Priority Guidelines

226-104(b)(1), HRS: Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

226-104(b)(2), HRS: Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the Agricultural District.

The proposed reclassification is located in close proximity to areas where public facilities are available. Roadway improvements, a new water tank, and a wastewater reclamation facility (private) are also proposed to service the future infrastructure demands in Makena. The Petition Areas are designated "E," or very poorly suited for agricultural use by the Land Study Bureau. Under the ALISH system, all of the Petition Areas are "Unclassified." The reclassification of the Petition Areas will not have a significant impact upon agricultural activities in the County of Maui and the State of Hawai'i.

78. The proposed reclassification of the Petition Areas generally conforms to the objectives and policies of the following State functional plans, as defined in chapter 226, HRS: Agriculture, Energy, Historic Preservation, Recreation, Tourism, and Transportation.

CONFORMANCE WITH THE COUNTY OF MAUI KIHEI-MAKENA COMMUNITY PLAN AND GENERAL PLAN

79. The land use designations for the Petition Areas generally conforms with the proposed Kihei-Makena Community Plan. The proposed development also generally conforms with the goals, objectives, and policies of the proposed Kihei-Makena Community Plan. The Kihei-Makena Community Plan update process started in 1992. The plan has been reviewed by the Kihei-Makena Citizens Advisory Committee, the Planning Department, and the Maui Planning Commission. The plan is presently under review by the Maui County Council. The Council held a public hearing on the plan on November 12, 1997.

80. The proposed development of the Petition Areas generally conforms with the General Plan of the County of Maui by addressing the following objectives and policies:

> "To preserve for present and future generations existing geographic, cultural and traditional community lifestyles by limiting and managing growth through environmentally sensitive and effective use of land in accordance with the individual character of the various communities and regions of the County."
>
> "Provide and maintain a range of land use districts sufficient to meet the social, physical, environmental and economic needs of the community."
>
> "To encourage exceptional and continuing quality in the development of visitor industry facilities."

CONFORMANCE WITH COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

81. The proposed reclassification of the Petition Areas is in general conformance with the Coastal Zone Management Program, chapter 205A, HRS, in the areas of recreational resources, historical/cultural resources, scenic and open space

resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources, since mitigation measures will be undertaken for the historical/cultural resources and coastal water quality issues.

RULING ON PROPOSED FINDINGS OF FACT

Any of the proposed findings of fact submitted by Petitioner or other parties not already ruled upon by the Commission by adoption herein, or rejected by clearly contrary findings of fact herein, are hereby denied and rejected.

Any conclusion of law herein improperly designated as a finding of fact should be deemed or construed as a conclusion of law; any finding of fact herein improperly designated as a conclusion of law should be deemed or construed as a finding of fact.

CONCLUSIONS OF LAW

Pursuant to chapter 205, HRS, and the Hawai'i Land Use Commission Rules under chapter 15-15, HAR, and upon consideration of the Land Use Commission decision-making criteria under section 205-17, HRS, this Commission finds upon a clear preponderance of the evidence that the reclassification of the Petition Areas, consisting of approximately 145.943 acres of land in the State Land Use Agricultural District at Makena, Island and County of Maui, State of Hawai'i, identified as Tax Map Key Nos. 2-1-05:83, 84, 85, and portion 108; 2-1-07:4; and 2-1-08: portion 90, into the State Land Use Urban District, is reasonable, conforms to the standards for establishing the Urban District boundaries, is non-

violative of section 205-2, HRS, and is consistent with the Hawai'i State Plan as set forth in chapter 226, HRS, and with the policies and criteria established pursuant to sections 205-17 and 205A-2, HRS.

DECISION AND ORDER

IT IS HEREBY ORDERED that the Petition Areas being the subject of this Docket No. A97-721 filed by Petitioner, Makena Resort Corp., consisting of approximately 145.943 acres of land in the State Land Use Agricultural District at Makena, Island and County of Maui, State of Hawai'i, identified as Tax Map Key Nos. 2-1-05:83, 84, 85, and portion 108; 2-1-07:4; and 2-1-08: portion 90, and approximately shown on Exhibit "A", attached hereto and incorporated by reference herein, is hereby reclassified into the State Land Use Urban District, and the State land use district boundaries are amended accordingly, subject to the following conditions:

1. Petitioner shall provide affordable housing opportunities for low, low-moderate, and gap group income residents of the State of Hawai'i in accordance with applicable laws, rules, and regulations of the County of Maui. The location and distribution of the affordable housing or other provisions for affordable housing shall be under such terms as may be mutually agreeable between Petitioner and the County of Maui.

2. Petitioner shall coordinate with the County of Maui Board of Water Supply to incorporate the proposed project into the County Water Use and Development Plan for the area. Prior to the granting of the first discretionary permit for the

single-family and multi-family residential development described in paragraph 20 hereinabove or the hotel described in paragraph 21 hereinabove and by or before one year from the issuance date of this Decision and Order, Petitioner shall furnish the Commission with a letter from the County of Maui Board of Water Supply confirming that (a) the potable water allocation that will be credited to Petitioner will be available to and sufficient for the proposed project as it is described in the Petition, (b) the availability of potable water will not be an obstacle or impediment to the development of the proposed project as described in the Petition and (c) the proposed project as it is described in the Petition has been incorporated into the County Water Use and Development Plan for the area and that this plan will prevent the continued overpumping of the sustainable yield of the 'Iao aquifer.

3. Petitioner shall participate in the funding and construction of adequate water source, storage, and transmission facilities and improvements to accommodate the proposed project in accordance with the applicable laws, rules and regulations of the County of Maui, and consistent with the County of Maui water use and development plan.

4. Petitioner shall participate in the funding and construction of adequate wastewater treatment, transmission and disposal facilities to accommodate the proposed project under such terms as are agreeable between Petitioner and the County of Maui.

5. Petitioner shall contribute to the development, funding, and/or construction of school facilities, on a pro rata basis for the residential developments in the proposed project, as determined by and to the satisfaction of the State Department of Education ("DOE"). Terms of the contribution shall be agreed upon by Petitioner and DOE prior to Petitioner acquiring county rezoning or prior to Petitioner applying for building permits if county rezoning is not required.

6. Petitioner shall participate in the pro rata funding and construction of adequate civil defense measures as determined by the State of Hawai'i and County of Maui civil defense agencies.

7. Should any human burials or any historic sites such as artifacts, charcoal deposits, stone platforms, pavings, or walls be found, Petitioner shall stop work in the immediate vicinity and contact SHPD. The significance of these finds shall then be determined and approved by SHPD, and an acceptable mitigation plan shall be approved by SHPD. SHPD must verify that the fieldwork portion of the mitigation plan has been successfully executed prior to work proceeding in the immediate vicinity of the find. Burials must be treated under specific provisions of Chapter 6E, Hawai'i Revised Statutes.

8. Petitioner shall follow the State DLNR recommendations for Petition Areas 1, 2 and 3, for archaeological data recovery and preservation. An archaeological data recovery plan (scope of work) must be approved by SHPD. That plan then must be successfully executed (to be verified in writing by the

SHPD), prior to any grading, clearing, grubbing or other land alteration in these areas. In Petition Area 1, three significant historic sites (1969, 2563, 2569) are committed to preservation. A preservation plan must be approved by SHPD. This plan, or minimally its interim protection plan phase, must be successfully executed (to be verified in writing by the SHPD), prior to any grading, clearing, grubbing or other land alteration in these areas.

9. Petitioner shall implement efficient soil erosion and dust control measures during and after the development process to the satisfaction of the State Department of Health and County of Maui.

10. Petitioner shall initiate and fund a nearshore water quality monitoring program. The monitoring program shall be approved by the State Department of Health in consultation with the U.S. Fish and Wildlife Service, the National Marine Fisheries Services, and the State Division of Aquatic Resources, DLNR. Petitioner shall coordinate this consultation process with the concurrence of the State Department of Health. Mitigation measures shall be implemented by Petitioner if the results of the monitoring program warrant them. Mitigation measures shall be approved by the State Department of Health in consultation with the above mentioned agencies.

11. Petitioner shall submit a Traffic Impact Analysis Report (TIAR) for review and approval by the State Department of Transportation and the County of Maui.

12. Petitioner shall participate in the pro rata funding and construction of local and regional transportation improvements and programs including dedication of rights-of-way as determined by the State Department of Transportation ("DOT") and the County of Maui. Agreement between Petitioner and DOT as to the level of funding and participation shall be obtained prior to Petitioner acquiring county zoning or prior to Petitioner securing county building permits if county rezoning is not required.

13. Petitioner shall fund the design and construction of drainage improvements required as a result of the development of the Property to the satisfaction of the appropriate State of Hawai'i and County of Maui agencies.

14. The Petition Areas shall be developed in accordance with the Kihei-Makena Community Plan.

15. Petitioner shall obtain appropriate changes in zoning from the County of Maui for the Petition Areas.

16. Petitioner shall fund, design and construct all necessary traffic improvements necessitated by development of the Petition Areas as required by the State Department of Transportation and the County of Maui's Department of Public Works and Waste Management.

17. Petitioner shall develop the Property in substantial compliance with the representations made to the Commission. Failure to so develop the Property may result in a reversion of the Property to its former classification, a change

to a more appropriate classification, or other reasonable remedy as determined by the Commission.

18. Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Property, prior to development of the Property.

19. Petitioner shall timely provide without any prior notice, annual reports to the Commission, the Office of Planning, and the County of Maui Planning Department in connection with the status of the subject project and Petitioner's progress in complying with the conditions imposed herein. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission.

20. The Commission may fully or partially release or amend the conditions provided herein as to all or any portion of the Property upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by Petitioner.

21. Within 7 days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall (a) record with the Bureau of Conveyances a statement that the Property is subject to conditions imposed herein by the Land Use Commission in the reclassification of the Property, and (b) shall file a copy of such recorded statement with the Commission.

22. Petitioner shall record the conditions imposed herein by the Commission with the Bureau of Conveyances pursuant to Section 15-15-92, Hawai'i Administrative Rules.

DOCKET NO. A97-721 - MAKENA RESORT CORPORATION, a Hawaii corporation

Done at Honolulu, Hawai'i, this 19th day of February 1998, per motion on February 12, 1998.

LAND USE COMMISSION
STATE OF HAWAI'I

By _____
RUPERT K. CHUN
Chairperson and Commissioner

By (opposed)
M. CASEY JARMAN
Vice Chairperson and Commissioner

By (absent)
LAWRENCE N.C. ING
Vice Chairperson and Commissioner

By _____
P. ROY CATALANI
Commissioner

By _____
ISAAC FIESTA, JR.
Commissioner

By _____
HERBERT S.K. KAOPUA, SR.
Commissioner

By _____
MERLE A. K. KELAI
Commissioner

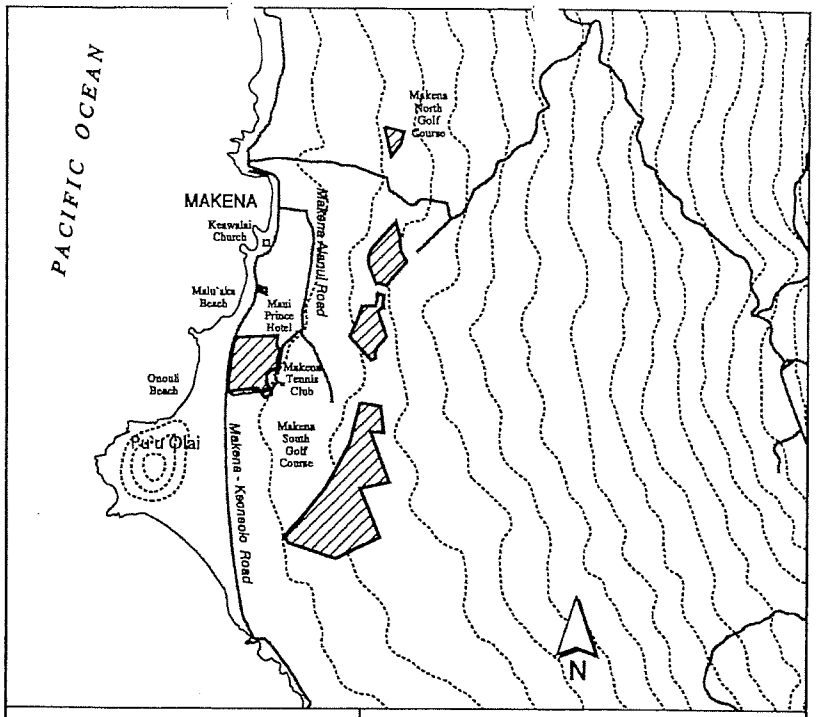
By _____
JOANN N. MATTSON
Commissioner

By (absent)
PETER YUKIMURA
Commissioner

Filed and effective on
February 19, 1998

Certified by:

_____
Executive Officer



A97-721 / MAKENA RESORT CORP.,
A Hawai'i Corporation

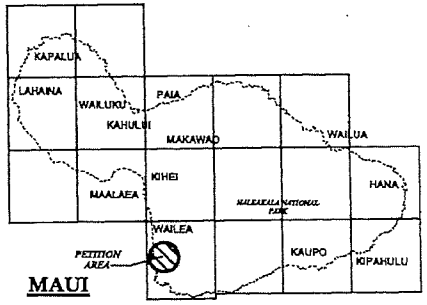
LOCATION MAP

TAX MAP KEY NO.: 2-1-05: 83, 84, 85, & por. 108; 2-1-07: 4; & 2-1-08: por. 90

Makena, Maui, Hawai'i

APPROVED AREA

EXHIBIT " A "



BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

In the Matter of the Petition of	)	DOCKET NO. A97-721
	)	
MAKENA RESORT CORP.,	)	CERTIFICATE OF SERVICE
a Hawai'i corporation	)	
	)	
To Amend the Agricultural Land Use	)	
District Boundary into the Urban	)	
Land Use District for Approximately	)	
145.943 Acres of Land at Makena,	)	
Island of Maui, State of Hawai'i,	)	
TMKs 2-1-05: 83, 84, 85, por. 108;	)	
2-1-07: 4; and 2-1-08: por. 90	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the Findings of Fact, Conclusions of Law, and Decision and Order was served upon the following by either hand delivery or depositing the same in the U. S. Postal Service by certified mail:

DEL. RICK EGGED, Director
Office of Planning
P. O. Box 2359
Honolulu, Hawaii 96804-2359

CERT. DAVID W. BLANE, Director of Planning
Planning Department, County of Maui
250 South High Street
Wailuku, Hawaii 96793

CERT. JEFFREY SCHMIDT, ESQ.
Corporation Counsel
Office of the Corporation Counsel
County of Maui
200 South High Street
Wailuku, Hawaii 96793

CERT. ERIC T. MAEHARA, ESQ., Attorney for Petitioner
Grosvenor Center, Suite 2530
737 Bishop Street
Honolulu, Hawaii 96813

DATED: Honolulu, Hawaii, this 19th day of February 1998.

ESTHER UEDA
Executive Officer

ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS

APPENDIX

A-1

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

LAND USE COMMISSION
STATE OF HAWAII
2012 AUG 27 A 11:48

In The Matter Of The Petition Of MĀKENA RESORT CORP. To Amend The Land Use District Boundary Of Certain Land Situated At Mākena, Island Of Maui, State Of Hawai'i, Consisting Of Approximately 146.209 Acres From The Agricultural To The Urban District, Tax Map Keys: 2-1-05: 83, 84, 85, Por. 108; 2-1-07: 4; And 2-1-8: Por. 90	DOCKET NO. A97-721 ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS; CERTIFICATE OF SERVICE

ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS

AND

CERTIFICATE OF SERVICE

THIS IS TO CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF THE DOCUMENT ON FILE IN THE OFFICE OF THE STATE LAND USE COMMISSION, HONOLULU, HAWAI'I.

8/27/12 BY _____
Date Executive Officer

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

LAND USE COMMISSION
STATE OF HAWAII
2012 AUG 27 A 7:45

In The Matter Of The Petition Of MĀKENA RESORT CORP. To Amend The Land Use District Boundary Of Certain Land Situated At Mākena, Island Of Maui, State Of Hawai'i, Consisting Of Approximately 146.209 Acres From The Agricultural To The Urban District, Tax Map Keys: 2-1-05: 83, 84, 85, Por. 108; 2-1-07: 4; And 2-1-8: Por. 90	DOCKET NO. A97-721 ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS

ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS

On May 2, 2012, ATC Makena N Golf LLC, ATC Makena S Golf LLC, ATC Makena Land SF1 LLC, ATC Makena Land MF1 LLC, ATC Makena Land MF2 LLC, ATC Makena Land MF3 LLC, ATC Makena Land C1 LLC, ATC Makena U1 LLC, ATC Makena Land B1 LLC, ATC Makena Land MF4 LLC, ATC Makena Land SF2 LLC, and ATC Makena Land AH1 LLC, all Delaware limited liability companies (collectively "Movant")[1] filed a Motion For Sixth Amendment To The Findings Of Fact, Conclusions

[1] Movant acquired the interest in the Petition Area through a foreclosure action by Commissioner's Deed dated August 27, 2010, recorded as Document Number 2010-125618 and Commissioner's Deed dated

Of Law, And Decision And Order, Filed On February 19, 1998 And For Release Of Certain Conditions ("Motion For Sixth Amendment") and Exhibits "A" through "E," pursuant to sections 15-15-70 and 15-15-94, Hawai'i Administrative Rules ("HAR").

Movant requests that the State of Hawai'i Land Use Commission ("Commission") (1) amend Condition Number 12 of this Commission's Order Granting Receiver's Motion For Fifth Amendment To The Findings of Fact, Conclusions Of Law, And Decision And Order, Filed On February 19, 1998, dated May 10, 2010, based on the Movant's ongoing efforts to formalize an agreement with the State of Hawai'i Department of Transportation ("DOT") that will satisfy the condition;[2] and (2) release Condition Numbers 4, 15, 21, and 22 of the Findings Of Fact, Conclusions Of Law, And Decision And Order filed February 19, 1998, based on the Movant's predecessor-in-interest's compliance with these conditions.

Condition Number 4 states as follows:

4. Petitioner shall participate in the funding and construction of adequate wastewater treatment, transmission and disposal facilities to accommodate the proposed project under such terms as are agreeable between Petitioner and the County of Maui.

Condition Number 12 states as follows:

12. Petitioner shall participate in the pro rata funding and construction of local and regional transportation improvements and programs, including dedication of rights of way as determined by the State Department of Transportation ("DOT") and the County of Maui. Agreement between

August 27, 2010, recorded as Document Number 2010-125620 in the Bureau of Conveyances of the State of Hawai'i.

[2] Condition Number 12 was previously amended in 2000, 2002, 2005, 2008, and 2010.

Petitioner and DOT as to the level of funding and participation shall be obtained within twelve (12) years from June 1, 2000.

Condition Number 15 states as follows:

15. Petitioner shall obtain appropriate changes in zoning from the County of Maui for the Petition Areas.

Condition Number 21 states as follows:

21. Within seven (7) days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall (a) record with the Bureau of Conveyances a statement that the Property is subject to conditions imposed herein by the Land Use Commission in the reclassification of the Property, and (b) shall file a copy of such recorded statement with the Commission.

Condition Number 22 states as follows:

22. Petitioner shall record the conditions imposed herein by the Commission with the Bureau of Conveyances pursuant to Section 15-15-92, Hawai'i Administrative Rules.

On May 18, 2012, the County of Maui Department of Planning ("DP") filed a written statement deferring to the DOT with respect to the proposed amendment to Condition Number 12 and raising no objections to the release of Condition Numbers 4, 15, 21, and 22.

On June 19, 2012, the State of Hawai'i Office of Planning ("OP") filed a response supporting the proposed amendment to Condition Number 12 and the release of Condition Numbers 4, 15, 21, and 22.[3]

[3] OP had no objections to the release of Condition Numbers 21 and 22, provided any amendments to the conditions are also recorded with the Bureau of Conveyances.

The Commission considered the Motion For Sixth Amendment on August 2, 2012, at Kahului, Maui, Hawai'i. B. Martin Luna, Esq., and Stanford Carr appeared on behalf of the Movant. James Giroux, Esq., and Kurt Wollenhaupt appeared on behalf of the DP. Bryan C. Yee, Esq., and Lorene Maki appeared on behalf of OP.

At the meeting, the Movant filed Supplemental Exhibits "F" through "I" and provided a presentation in support of the Motion For Sixth Amendment. Both the DP and OP rested on their respective pleadings in support of the Motion For Sixth Amendment.[4]

After discussion and deliberation by the Commissioners, a motion was made and seconded to grant the Motion For Sixth Amendment. The motion was subsequently amended and seconded to grant (1) the proposed amendment to Condition Number 12; (2) the release of Condition Numbers 4, 15, and 21; and (3) an amendment to Condition Number 22 to require the recordation of the conditions and every amendment thereto with the Bureau of Conveyances. There being a vote tally of 6 ayes, 0 nays, 3 excused, the amended motion carried.

ORDER

This Commission, having duly considered the Motion For Sixth Amendment, the oral and written arguments presented by the parties, and further representations made during the hearing, and an amended motion having been made

[4] At the beginning of the meeting, Commissioner Inouye disclosed that the Movant's counsel was a family friend. The parties had no objections to Commissioner Inouye's participation in the proceeding.

and seconded at a hearing on August 2, 2012, in Kahului, Maui, Hawai'i, and the amended motion having received the affirmative votes required by section 15-15-13, HAR, and good cause appearing therefrom,

HEREBY ORDERS that Condition Number 12 of this Commission's Order Granting Receiver's Motion For Fifth Amendment To The Findings of Fact, Conclusions of Law, And Decision And Order, Filed On February 19, 1998, dated May 10, 2010, be amended to read as follows:

> 12. Petitioner shall participate in the pro rata funding and construction of local and regional transportation improvements and programs, including dedication of rights of way as determined by the State Department of Transportation ("DOT") and the County of Maui. Agreement between Petitioner and DOT as to the level of funding and participation shall be obtained within fourteen (14) years from June 1, 2000.

IT IS ALSO ORDERED that Condition Number 22 of the Findings Of Fact, Conclusions Of Law, And Decision And Order filed February 19, 1998, shall be amended to read as follows:

> 22. Petitioner shall record the conditions imposed herein by the Commission and every amendment thereto with the Bureau of Conveyances pursuant to Section 15-15-92, Hawai'i Administrative Rules.

IT IS FURTHER ORDERED that Condition Numbers 4, 15, and 21 of the Findings Of Fact, Conclusions Of Law, And Decision And Order filed February 19, 1998, be and are hereby RELEASED.

All other conditions to the Findings Of Fact, Conclusions Of Law, And Decision And Order filed February 19, 1998, are affirmed and shall continue in full force and effect.

ADOPTION OF ORDER

The undersigned Commissioners, being familiar with the record and proceedings, hereby adopt and approve the foregoing ORDER this 27th day of August, 2012. This ORDER may be executed in counterparts. This ORDER shall take effect upon the date this ORDER is certified by this Commission.

Done at Honolulu Hawai'i, this 27th day of August, 2012, per motion on August 2, 2012.

LAND USE COMMISSION

STATE OF HAWAI'I

APPROVED AS TO FORM

Deputy Attorney General

By (excused)
KYLE CHOCK
Chairperson and Commissioner

By
RONALD HELLER
Vice- Chairperson and Commissioner

By
CHAD McDONALD
Vice- Chairperson and Commissioner

By _____
SHELDON BIGA
Commissioner

By _____
LANCE INOUYE
Commissioner

By (excused)
JAYE NAPUA MAKUA
Commissioner

By _____
ERNEST MATSUMURA
Commissioner

By (excused)
THOMAS CONTRADES
Commissioner

By _____
NICHOLAS W. TEVES JR.
Commissioner

Filed and effective on:

August 27, 2012

Certified by:

DANIEL ORODENKER
Executive Officer

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

In The Matter Of The Petition Of MĀKENA RESORT CORP. To Amend The Land Use District Boundary Of Certain Land Situated At Mākena, Island Of Maui, State Of Hawai'i, Consisting Of Approximately 146.209 Acres From The Agricultural To The Urban District, Tax Map Keys: 2-1-05: 83, 84, 85, Por. 108; 2-1-07: 4; And 2-1-8: Por. 90	DOCKET NO. A97-721 CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

I hereby certify that a copy of the ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS was served upon the following by either hand delivery or depositing the same in the U. S. Postal Service by regular or certified mail as noted:

	HAND DELIVERED	REGULAR MAIL	CERTIFIED MAIL
JESSE SOUKI, DIRECTOR Office of Planning 235 S. Beretania Street Rm. 600 Honolulu, Hawai'i 96813	X		

	HAND DELIVERED	REGULAR MAIL	CERTIFIED MAIL
BRYAN YEE, ESQ. Deputy Attorney General Hale Auhau, Third Floor 425 Queen Street Honolulu, Hawai'i 96813		X	
WILLIAM SPENCE, DIRECTOR Department of Planning County of Maui 250 South High Street Wailuku, Hawai'i 96793		X	
JAMES GIROUX, ESQ. Corporation Counsel Department of the Corporation Counsel County of Maui 200 South High Street Wailuku, Hawai'i 96793			X
B. MARTIN LUNA, ESQ. Carlsmith Ball LLP One Main Plaza, Suite 400 2200 Main Street Wailuku, Hawai'i 96793			X

Honolulu, Hawai'i, August 27, 2012

DANIEL ORODENKER
Executive Officer

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

LAND USE COMMISSION
STATE OF HAWAII
2012 AUG 27 A 11:48

In The Matter Of The Petition Of MĀKENA RESORT CORP. To Amend The Land Use District Boundary Of Certain Land Situated At Mākena, Island Of Maui, State Of Hawai'i, Consisting Of Approximately 146.209 Acres From The Agricultural To The Urban District, Tax Map Keys: 2-1-05: 83, 84, 85, Por. 108; 2-1-07: 4; And 2-1-8: Por. 90	DOCKET NO. A97-721 ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS; CERTIFICATE OF SERVICE

ORDER GRANTING WITH MODIFICATION MOVANT'S MOTION FOR SIXTH AMENDMENT TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED ON FEBRUARY 19, 1998 AND FOR RELEASE OF CERTAIN CONDITIONS

AND

CERTIFICATE OF SERVICE

THIS IS TO CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF THE DOCUMENT ON FILE IN THE OFFICE OF THE STATE LAND USE COMMISSION, HONOLULU, HAWAI'I.

8/27/12 BY _____
Date Executive Officer

2019 ANNUAL REPORT FOR DOCKET NO. A97-721

APPENDIX

A-2

H2R, LLC

January 31, 2019

LAND USE COMMISSION
STATE OF HAWAII
2019 FEB -4 P 12: 09

RECEIVED

DEPT. OF PLANNING
COUNTY OF MAUI
FEB 01 2019
RECEIVED

COUNTY OF MAUI
DEPT OF PLANNING

Land Use Commission
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804-2359

SUBJECT: Annual Report for Land Use Commission Docket No. A97-721 (Makena Resort), TMK (2)2-1-005:085

Dear Executive Officer Orodenker:

H2R, LLC hereby submits this Annual Report for Docket No. A97-721 with respect to the 27.825-acre subject parcel that it currently owns in Makena, Maui Hawaii. It is noted that the parcel was identified in Docket No. A97-721 by TMK (2)2-1-005:083, 084, and 085, but has been consolidated into a single parcel (TMK (2)2-1-005:085).

I. INTRODUCTION AND BACKGROUND

As background, on February 19, 1998, the Land Use Commission of the State of Hawaii (the "Commission") filed its "Findings of Fact, Conclusions of Law, and Decision and Order" (the "1998 D&O"), which reclassified 145.943 acres of land in Makena, Maui, Hawaii from the State Land Use Agricultural District into the State Land Use Urban District (hereinafter, the "LUC Reclassified Property").

This Annual Report covers one (1) of the LUC Reclassified Parcels, hereafter referred to as the H2R Parcel, that is owned by H2R, LLC (TMK (2)2-1-005:085) and does not address any properties owned by others including the ATC Makena Entities ("ATC Makena").

It is noted that, on August 27 of 2012, the Commission filed an Order Granting with Modification Movant's Motion for Sixth Amendment to the Findings of Fact, Conclusions of Law, and Decision and Order, Filed on February 19, 1998, and for Release of Certain Conditions (the "2012 Amendment"). In compliance with the 2012 Amendment, the Commission released the LUC Reclassified Property from Conditions 4, 15, and 21, and amended Conditions 12 and 22 (thereafter renumbered to 11 and 19). An Amended and Restated Declaration of Conditions was recorded on September 7, 2012, in the Bureau of Conveyances as Doc. A-46330782.

II. REPORT ON COMPLIANCE WITH LUC CONDITIONS

Pursuant to Condition No. 17, the following Annual Report presents the conditions set forth in the 1998 D&O (as amended by the 2012 Amendment) and a status of

2005 Main Street, Wailuku, Maui, Hawaii 96793 · Phone: (808) 244-1500 · Fax: (808) 242-2777

compliance for each condition:

Condition No. 1

Petitioner shall provide affordable housing opportunities for low, low- moderate, and gap group income residents of the State of Hawai'i in accordance with applicable laws, rules, and regulations of the County of Maui. The location and distribution of the affordable housing or other provisions for affordable housing shall be under such terms as may be mutually agreeable between Petitioner and the County of Maui.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to the provisions of this condition and shall comply accordingly.

Condition No. 2

Petitioner shall coordinate with the County of Maui Board of Water Supply to incorporate the proposed project into the County Water Use and Development Plan for the area. Prior to the granting of the first discretionary permit for the single-family and multi-family residential development described in paragraph 20 of the Decision and Order or the hotel described in paragraph 21 of the Decision and Order and by or before one year from the issuance date of this Decision and Order, Petitioner shall furnish the Commission with a letter from the County of Maui Board of Water Supply confirming that (a) the potable water allocation that will be credited to Petitioner will be available to and sufficient for the proposed project as it is described in the Petition, (b) the availability of potable water will not be an obstacle or impediment to the development of the proposed project as described in the Petition and (c) the proposed project as it is described in the Petition has been incorporated into the County Water Use and Development Plan for the area and that this plan will prevent the continued over pumping of the sustainable yield of the Iao aquifer.

Response: H2R, LLC understands that this condition has been complied with. According to the Twentieth Annual Report submitted by ATC Makena in 2018, this condition was complied with as set forth in a letter from David Craddick, Director of the Department of Water Supply, County of Maui, dated February 18, 1999, which was included in its Second Annual Report.

Additional letters regarding compliance with this condition, dated October 1, 2003, from Petitioner to the Department of Water Supply, and the response from George Tengan, Director of Water Supply, dated October 7, 2003, were attached to ATC Makena's Sixth Annual Report.

In regards to the H2R Parcel, H2R, LLC has obtained and installed a water

meter from the Department of Water Supply to serve its parcel.

Condition No. 3

Petitioner shall participate in the funding and construction of adequate water source, storage, and transmission facilities and improvements to accommodate the proposed project in accordance with the applicable laws, rules and regulations of the County of Maui, and consistent with the County of Maui water use and development plan.

Response: H2R, LLC understands this condition has been satisfied. In 1976, the Petitioner participated in the Central Maui Source Development Joint Venture and also the Central Maui Transmission Joint Venture, which developed water sources in Waiehu, Maui and a transmission line from the newly developed water sources down to the Wailea and Makena regions. Further, in 1985, Makena Resort constructed a 1.5 million gallon water storage tank at the Makena Resort. As mentioned above, H2R, LLC has obtained and installed a water meter from the Department of Water Supply to serve the H2R Parcel.

Condition No. 4

Petitioner shall contribute to the development, funding, and/or construction of school facilities, on a pro rata basis for the residential developments in the proposed project, as determined by and to the satisfaction of the State Department of Education ("DOE"). Terms of the contribution shall be agreed upon by Petitioner and DOE prior to Petitioner acquiring county rezoning or prior to Petitioner applying for building permits if county zoning is not required.

Response: H2R, LLC understands that this condition has been satisfied. As stated in the ATC Makena's Annual Twentieth Report, an Educational Contribution Agreement for Makena Resort between the Petitioner and Department of Education was made in August 17, 2000. Under this agreement, the parties agreed on a cash contribution by Petitioner, which shall represent a fair-share payment for the development, funding and/or construction of school facilities.

Condition No. 5

Petitioner shall participate in the pro rata funding and construction of adequate civil defense measures as determined by the State of Hawai'i and County of Maui civil defense agencies.

Response: H2R, LLC understands that this condition has been complied with. As discussed in the Twentieth Annual Report submitted by ATC

Makena, ATC Makena agreed to allow the State Department of Defense (DOD) to develop two (2) locations for emergency sirens on land owned by ATC Makena. The DOD initially requested to develop the sirens at the Makena Wastewater Treatment Plant (WWTP) and near Makena Big Beach (Oneloa) (sirens 157 and 158, respectively). ATC Makena executed Rights of Entry/License Agreements with DOD in 2012, however, DOD informed ATC Makena that they decided to change the location of one of the sirens from Makena Big Beach (Oneloa) to Makena State Park. In 2017, DOD completed installation of the siren at the Makena WWTP.

Condition No. 6

Should any human burials or any historic sites such as artifacts, charcoal deposits, stone platforms, pavings, or walls be found, Petitioner shall stop work in the immediate vicinity and contact SHPD. The significance of these finds shall then be determined and approved by SHPD, and an acceptable mitigation plan shall be approved by SHPD. SHPD must verify that the fieldwork portion of the mitigation plan has been successfully executed prior to work proceeding in the immediate vicinity of the find. Burials must be treated under specific provisions of Chapter 6E, Hawai'i Revised Statutes.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to the provisions of this condition and will comply.

Condition No. 7

Petitioner shall follow the State DLNR recommendations for Petition Areas 1, 2 and 3, for archaeological data recovery and preservation. An archaeological data recovery plan (scope of work) must be approved by SHPD. That plan then must be successfully executed (to be verified in writing by the SHPD), prior to any grading, clearing, grubbing or other land alteration in these areas. In Petition Area 1, three significant historic sites (1969, 2563, 2569) are committed to preservation. A preservation plan must be approved by SHPD. This plan, or minimally its interim protection plan phase, must be successfully executed (to be verified in writing by the SHPD), prior to any grading, clearing, grubbing or other land alteration in these areas.

Response: The H2R Parcel is located in Petition Area 5, and as such, is not subject to the provisions of this condition. It is noted that an Archaeological Preservation Plan (APP) and an Archaeological Monitoring Plan (AMP) for the H2R Parcel were prepared in compliance with the requirements of Chapter 6E, HRS, consistent with the findings of Archaeological Inventory Surveys (AIS) for the H2R Parcel which were accepted by the State Historic Preservation Division (SHPD) in July 2008.

Both APP and AMP were accepted by the SHPD in July 2009, the acceptance letters for which are presented herein as **Exhibit "A"**.

Condition No. 8

Petitioner shall implement efficient soil erosion and dust control measures during and after the development process to the satisfaction of the State Department of Health and County of Maui.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to provisions of this condition and will comply at the appropriate time prior to development of the H2R Parcel.

Condition No. 9

Petitioner shall initiate and fund a nearshore water quality monitoring program. The monitoring program shall be approved by the State Department of Health in consultation with the U.S. Fish and Wildlife Service, the National Marine Fisheries Services, and the State Division of Aquatic Resources, DLNR. Petitioner shall coordinate this consultation process with the concurrence of the State Department of Health. Mitigation measures shall be implemented by Petitioner if the results of the monitoring program warrant them. Mitigation measures shall be approved by the State Department of Health in consultation with the above mentioned agencies.

Response: ATC Makena, as the owner of Makena Resort (and majority of the LUC Reclassified Property), conducts and funds the nearshore water quality monitoring program required by this condition. The most recent monitoring reports are submitted each year as part of ATC Makena's Annual Report. These reports are also transmitted to the State Department of Health (DOH).

Condition No. 10

Petitioner shall submit a Traffic Impact Analysis Report (TIAR) for review and approval by the State Department of Transportation and the County of Maui.

Response: H2R, LLC understands that this condition has been complied with. As set forth in the Twentieth Annual Report submitted by ATC Makena, a Traffic Impact Analysis Report (TIAR) was prepared and submitted for review by the State Department of Transportation (DOT) and the County of Maui as part of the Change in Zoning application. Following certain comments by DOT, revisions were made to the TIAR and resubmitted to DOT. The letter from DOT which confirms and accepts the TIAR was

included in ATC Makena's Third Annual Report.

Furthermore, ATC Makena also prepared and submitted a Makena Resort Master Traffic Study, dated June 6, 2003 (Revised September 14, 2003), which was submitted to the DOT and County of Maui, and approved by the County on September 26, 2003. The Makena Resort Mater Traffic Study was included in ATC Makena's Sixth Annual Report.

In regards to the H2R Parcel, a TIAR (assessing traffic impacts related to the H2R Parcel) will be prepared and submitted to DOT for review and approval prior to development of the parcel.

Condition No. 11

(as amended) Petitioner shall participate in the pro rata funding and construction of local and regional transportation improvements and programs including dedication of rights-of-way as determined by the State Department of Transportation ("DOT") and the County of Maui. Agreement between Petitioner and DOT as to the level of funding and participation shall be obtained within fourteen (14) years from June 1, 2000.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to provisions of this condition and will comply.

Condition No. 12

Petitioner shall fund the design and construction of drainage improvements required as a result of the development of the Property to the satisfaction of the appropriate State of Hawai'i and County of Maui agencies.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to provisions of this condition and will comply.

Condition No. 13

The Petition Areas will be developed in accordance with the Kihei-Makena Community Plan.

Response: H2R, LLC acknowledges that it will develop the H2R Parcel in accordance with the Kihei-Makena Community Plan.

Condition No. 14

Petitioner shall fund, design and construct all necessary traffic improvements

necessitated by development of the Petition Areas as required by the State Department of Transportation and the County of Maui Department of Public Works and Waste Management.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to the provisions of this condition and will comply.

Condition No. 15

Petitioner shall develop the Property in substantial compliance with the representations made to the Commission. Failure to so develop the Property may result in a reversion of the Property to its former classification, a change to a more appropriate classification, or other reasonable remedy as determined by the Commission.

Response: H2R, LLC acknowledges that the H2R Parcel is subject to the provisions of this condition and will comply.

Condition No. 16

Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Property, prior to development of the Property.

Response: H2R, LLC acknowledges that it is subject to the provisions of this condition and will comply. Pursuant to this condition, a letter was submitted to the Commission on October 9, 2018 regarding the transfer of ownership of the H2R Parcel from Hawaii Development LLC to H2R, LLC. See **Exhibit "B"**.

Condition No. 17

Petitioner shall timely provide without any prior notice, annual reports to the Commission, the Office of Planning, and the County of Maui Planning Department in connection with the status of the subject project and Petitioner's progress in complying with the conditions imposed herein. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission.

Response: In compliance with Condition No. 17, this Annual Report is being submitted by H2R, LLC for the H2R Parcel.

Condition No. 18

The commission may fully or partially release or amend the conditions provided

herein as to all or any portion of the petition area upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by Petitioner.

Response: H2R, LLC acknowledges the provisions of this condition.

Condition No. 19

(as amended) Petitioner shall record the conditions imposed herein by the Commission and every amendment thereto with the Bureau of Conveyances pursuant to Section 15-15-92, Hawai'i Administrative Rules.

Response: H2R, LLC acknowledges that it is subject to the provisions of this condition.

If you have any questions or require any further information, please contact Brian Ige of my office at (808) 244-1500 or brian@dowlingco.com.

Sincerely,
H2R, LLC
By DDC, LLC
Its Member
By Dowling Company, Inc.
Its Member

Everett R. Dowling
President

Encl.
cc: Leo R. Asuncion, Jr., State of Hawaii, Office of Planning (w/enclosure)
Ann Cua, County of Maui, Department of Planning (w/enclosure)
Yukino Uchiyama, Munekiyo Hiraga (w/enclosure)
K:\DATA\H2R LLC\Makena H-2 DBA CIZ Compliance\Applications\SLUC Compliance\2019AnnualRptLteSLUC.docx

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

July 21, 2009

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793
lisa@ashmani.com

LOG NO: 2009.2918
DOC NO: 0907PC53
Archaeology

SUBJECT: Chapter 6E-42 Historic Preservation Review – REVISED Archaeological Preservation Plan for SIHP #50-50-14-6371, -6373, -6374, -6377, -6378 and -6379
Maluaka Ahupua'a, Makawao District, Island of Maui, Hawai'i
TMK: (2) 2-1-005:085 and (2) 2-1-005:108 por.

Thank you for the opportunity to again review this plan, which our staff received in PDF format on July 14 of 2009 (Rotumno-Hazuka and Pantaleo 2009): *Archaeological Preservation Plan for Sites 50-50-14-6371, -6373, -6374 Feature 1, -6377, -6378 and -6379*...Archaeological Services Hawai'i, LLC.

The plan was reviewed by SHPD staff on June 17 (SHPD LOG NO: 2008.5257; DOC NO: 0906PC32) and again on July 6 of 2009 (SHPD LOG NO: 2009.2892; DOC NO: 0907PC04), resulting in several requested revisions.

The preservation plan now contains the required information as specified in HAR §13-277-3 regarding the contents of preservation plans in general and is acceptable. An associated monitoring plan, received in July of 2008, was held pending acceptance of the preservation plan and will now be reviewed under separate cover.

Now that the plan has been accepted pursuant to HAR §13-277, please send one hardcopy of the *revised* document clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF file on CD to the attention of "SHPD Library" at the Kapolei SHPD office.

If you have any questions or comments regarding this letter, please contact the SHPD's Lead Maui Archaeologist, Ms. Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, FAX (808) 270-7634
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

EXHIBIT A.

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

July 21, 2009

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793
lisa@oshmaui.com

LOG NO: 2008.3045
DOC NO: 0907PC54
Archaeology

SUBJECT: Chapter 6E-42 Historic Preservation Review –
Archaeological Monitoring Plan for Parcel H-2
Maluaka Ahupua'a, Makawao District, Island of Maui, Hawai'i
TMK: (2) 2-1-005:085; (2) 2-1-005:108; (2) 2-1-005:120 por.

Thank you for the opportunity to review this plan, which although originally submitted in 2008 was not subject to formal SHPD review until now. The plan (Rotumno-Hazuka and Pantaleo 2008): *Archaeological Monitoring Plan for Parcel H-2*...Archaeological Services Hawai'i, LLC, was received by our staff in hardcopy format on July 23 of 2008 but held pending acceptance of an archaeological inventory survey report and associated site preservation plan.

The plan was proactively prepared by your firm as a result of a long-standing archaeological consultant commitment between your firm and the project developer. Precautionary archaeological monitoring for all ground altering disturbance in the project area was recommended upon completion of at least two prior archaeological inventory surveys within the bounds of the current subject parcels, during which several culturally and historically significant sites have been identified (SHPD LOG NO: 2008.3048; DOC NO: 0807PC41 and SHPD LOG NO: 2008.4506; DOC NO: 0810PC21). Those known to be in the immediate vicinity of the proposed project include SIHP #50-50-14-6366 [post-Contact period walls/wall segments, wooden house remnant, concrete slab foundations, surface *'ili 'ili* and refuse scatters, mounds], -6367 [late pre-Contact to early post-Contact L- and U-shaped enclosures], -6371 [pre-Contact habitation platform and five walled pits], -6372 [mid 19th century habitation midden scatter and wooden shack], -6373 [pre-Contact habitation enclosures and platform] -6374 [four boundary walls and a modified outcrop wall, all post-Contact in origin], -6376 [pre-Contact to early post-Contact habitation and agricultural features], -6377 [pre-Contact habitation U-shape and circular walled pit probably used for agriculture], -6378 [pre-Contact habitation square enclosure and modified outcrop with constructed pits and a natural cupboard] and -6379 [two rectangular pre-Contact habitation enclosures and platforms].

Feature 1 of -6374 and five other sites (-6371, -6373, -6377, -6378 and -6379) are subject to archaeological site preservation commitments (SHPD LOG NO: 2008.5257/DOC NO: 0906PC32; SHPD LOG NO: 2009.2892/DOC NO: 0907PC04; SHPD LOG NO: 2009.2918/DOC NO: 0907PC53). *Please note, we expect to receive written and photographic verification that short-term preservation measures are in place prior to the onset of ground altering activity within the subject parcels.*

As specified in the monitoring plan, there will be one archaeological monitor on site for each piece of ground altering machinery in operation during the proposed project. A coordination meeting with the construction crew and all other pertinent parties to explain monitoring procedures and that the monitoring archaeologist has the authority to halt work in the vicinity of a culturally significant find will be undertaken, and should anything of cultural significance be identified, the SHPD will be consulted for mitigation recommendations. The plan further states that in the event human remains are inadvertently exposed, both the SHPD and Maui/Lana'i Islands Burial Council (MLIBC) will be notified and appropriate burial protocol followed once jurisdictional determination has been made. *No human remains will be collected or removed from the project area unless specifically authorized by the SHPD.* A report detailing the findings of the monitoring activity will be prepared and submitted to our office for review within 180 days after the completion of the project.

The plan contains the required information as specified in HAR §13-279-4(a) regarding monitoring plans in general and is acceptable.

Now that the monitoring plan has been accepted pursuant to HAR §13-279, please send one hardcopy, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF file on CD to the attention of "SHPD Library" at the Kapolei SHPD office.

If you have any questions or comments regarding this letter, please contact the SHPD's Lead Maui Archaeologist, Ms. Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, FAX (808) 270-7634
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

H2R, LLC

October 9, 2018

Daniel E. Orodenker, Executive Officer
State of Hawai'i Land Use Commission
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawai'i 96804-2359

Ref: LUC Docket No. A97-721 Makena Resort
Subject: Notice of Sale of Property

Dear Mr. Orodenker:

We are writing to inform your office that ownership of property identified as TMK (2)2-1-005:085 (27.825 acres) was recently transferred from Hawaii Development LLC to H2R, LLC as of October 1, 2018. The 27.825-acre property is one of a number of parcels within the Makena Resort area that were included in the subject docket.

This notification is being provided pursuant to Condition No. 16 of the Findings of Fact, Conclusions of Law, and, Decision and Order dated February 19, 1998 as amended by the Land Use Commission on September 7, 2012:

> 16. *Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Property, prior to development of the Property.*

Should you have any questions or require additional information, please do not hesitate to contact Brian Ige of my office at (808) 244-1500.

Very truly yours,
H2R, LLC

Everett Dowling

cc: County of Maui Department of Planning
Mr. Trent Moore, Hawaii Development LLC
Yukino Uchiyama, Munekiyo Hiraga

2005 Main Street • Wailuku, Maui, Hawaii • Phone: (808)244-1500 • Fax: (808)242-2777 • www.dowlingco.com

EXHIBIT B.

ORDINANCE NO. 3613

APPENDIX

B

ORDINANCE NO. 3613

BILL NO. 117 (2008)

A BILL FOR AN ORDINANCE TO AMEND PORTIONS OF LAND ZONING MAP NOS. 5 AND 514 TO ESTABLISH A-2 APARTMENT DISTRICT, B-2 COMMUNITY BUSINESS DISTRICT, B-R RESORT COMMERCIAL DISTRICT, H-M HOTEL DISTRICT, PK-1 NEIGHBORHOOD PARK DISTRICT, PK-4 GOLF COURSE PARK DISTRICT, R-1 AND R-3 RESIDENTIAL DISTRICT ZONING (CONDITIONAL ZONING) FOR LANDS SITUATED AT MAKENA, MAUI, HAWAII

BE IT ORDAINED BY THE PEOPLE OF THE COUNTY OF MAUI:

SECTION 1. Pursuant to Chapters 19.08, 19.12, 19.14, 19.18, 19.22, 19.510, and 19.615, Maui County Code, portions of Land Zoning Map Nos. 5 and 514 are hereby amended for certain parcels of land located in Makena, Maui, Hawaii, identified in Table 1, comprising approximately 603.303 acres, and more particularly described in Exhibit "A", which is attached hereto and made a part hereof, and in Land Zoning Map No. L-585, on file in the Office of the County Clerk of the County of Maui and which is by reference made a part hereof.

Table 1

CHANGE IN ZONING				
TMK	Lot No.	From	To	Acres
2-1-5:por. 108, por. 120; 2-1-6:36, por. 57; 2-1-8:por. 78, por. 79, por. 81, por. 90	1, 17, 18	County Ag, A1, A2, R1, GC & OS, R-3, OZ	PK-4	437.085
2-1-5:por. 108; 2-1-8:por. 78, por. 79, por. 81, por. 90	2A, 2C, 8A, 8C, 21B	County Ag, R1, A1, R-3, OZ, GC & OS, STP	A2	119.719
2-1-8:por. 90	4,6	A1, A2	R3	3.361
2-1-7:por. 68	11B	R-2	BR	0.460
2-1-5:por. 108, por. 124; 2-1-6:por. 56, por. 57, por. 59; 2-1-7:por. 68, 93, por. 94	5, 12, 13, 14, 16	Park, R-2, GC & OS, R-1, H-M	PK-1	4.205
2-1-5:83, 84, 85, por. 108, por. 120, 2-1-7:4	15B, 19	GC & OS, B-R, A-1, OZ	HM	28.173
2-1-5:por. 108	20	A2, GC & OS, R-3	B2	9.817
2-1-5:por. 108	22A	A2	R1	0.483
Total				603.303

SECTION 2. Pursuant to Section 19.510.050, Maui County Code, the changes in zoning established by this ordinance, as set forth in Table 1 above, comprising approximately 603.303 acres and delineated on Land Zoning Map No. L-585, are subject to the conditions set forth in Exhibit "B", which is attached hereto and made a part hereof, and the Unilateral Agreement and Declaration for Conditional Zoning, which is attached hereto and made a part hereof as Exhibit "C".

SECTION 3. Existing zoning in Land Zoning Map No. 514, which is not changed by this ordinance, identified in Table 2, comprising 152.386 acres, and more particularly described in Exhibit "D", which is attached hereto and made a part hereof, is incorporated within Land Zoning Map No. L-585, remaining in full force and effect.

Table 2

EXISTING ZONING (ORDINANCE NO. 832)			
TMK	*Lot No.*	*Zoning*	*Acres*
2-1-5:por. 108 2-1-8:por. 78, por. 79, por. 80, por. 90, 98, por. 99, 100, 106	2B, 3, 8B, 8D 10, 21A	A-2	97.628
2-1-7:92	7	R-3	0.420
2-1-8:por. 80, por. 99	9	R-2	2.918
2-1-7:por. 68; 2-1-8:por. 80	11A	B-R	9.062
2-1-5:86, por. 124, 125; 2-1-6:37, por. 56, por. 59	15A	H-M	38.262
2-1-5:por. 108	22B	R-1	4.096
Total			152.386 acres

SECTION 4. This ordinance shall take effect upon its approval.

APPROVED AS TO FORM
AND LEGALITY:

JAMES A. GIROUX
Deputy Corporation Counsel
County of Maui
S:\CLERICAL\LJN\ORD\CIZ\makenaciz.wpd

EXHIBIT "A"

LOT 1

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the east corner of Lot 4, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6534.89 feet North and 5431.77 feet East and running by azimuths measured clockwise from True South:

1.	220°	49'	873.25	feet;
2.	256°	29'	84.21	feet;
3.	165°	55'	1593.43	feet;
4.	190°	24'	588.16	feet;
5.	256°	16'	455.77	feet;
6.	321°	48'	330.00	feet;
7.	225°	38'	785.00	feet;
8.	273°	10'	225.00	feet;
9.	339°	50'	455.00	feet;
10.	356°	04'	644.00	feet;
11.	24°	11'	473.24	feet;
12.	332°	54'	368.41	feet;
13.	53°	38'	476.77	feet;
14.	341°	41'	1020.78	feet;

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15. 18° 33' 508.13 feet;

16. 63° 38' 260.00 feet;

17. 109° 40' 624.94 feet;

18. 61° 11' 476.09 feet;

19. 82° 24' 697.74 feet;

20. 100° 08' 61.96 feet;

21. 93° 13' 68.47 feet;

22. 64° 06' 739.18 feet;

23. 86° 17' 183.77 feet;

24. 3° 56' 605.61 feet;

25. 333° 18' 306.94 feet;

26. 34° 32' 200.78 feet;

27. 4° 16' 1085.16 feet;

28. 338° 16' 254.87 feet;

29. 5° 38' 320.00 feet;

30. 354° 21' 819.44 feet;

31. 284° 48' 80.00 feet;

32. Thence on a curve to the left with a radius of 312.00 feet, the chord azimuths and distance being:
3° 53' 118.17 feet;

33. 352° 58' 250.50 feet;

34. 54° 12' 226.64 feet;

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35. 16° 00' 235.58 feet;

36. 86° 54' 122.98 feet;

37. Thence on a curve to the right with a radius of 200.00 feet, the chord azimuth and distance being:
133° 52' 292.38 feet;

38. 180° 50' 165.32 feet;

39. Thence on a curve to the left with a radius of 350.00 feet, the chord azimuth and distance being:
169° 55' 132.57 feet;

40. 159° 00' 269.14 feet;

41. 69° 50' 297.36 feet;

42. 346° 36' 537.96 feet;

43. 292° 30' 122.64 feet;

44. 349° 00' 112.00 feet;

45. 5° 44' 76.00 feet;

46. 298° 50' 108.00 feet;

47. 266° 30' 178.00 feet;

48. 226° 49' 125.00 feet;

49. 284° 18' 113.00 feet;

50. 335° 24' 85.00 feet;

51. 5° 16' 94.21 feet;

52. 19° 20' 296.21 feet;

53. 8° 41' 825.97 feet;

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54. 333° 56' 335.68 feet;

55. 331° 32' 60.00 feet;

56. 287° 11' 449.29 feet;

57. 79° 41' 30" 15.69 feet;

58. 339° 25' 1173.59 feet;

59. 59° 36' 994.00 feet;

60. 89° 54' 1190.00 feet;

61. 147° 59' 136.00 feet;

62. 132° 41' 297.53 feet;

63. 198° 00' 725.57 feet;

64. 176° 00' 447.36 feet;

65. Thence on a curve to the right with a radius of 330.00 feet, the chord azimuth and distance being:
242° 49' 53.5" 94.82 feet;

66. 226° 00' 60.76 feet;

67. 175° 00' 188.10 feet;

68. 203° 00' 904.81 feet;

69. 177° 00' 130.83 feet;

70. 97° 00' 49.54 feet;

71. 45° 00' 545.00 feet;

72. 82° 00' 290.00 feet;

73. 350° 00' 200.00 feet;

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74. 12° 00' 535.00 feet;

75. 27° 00' 1080.61 feet;

76. 84° 48' 40" 362.94 feet;

77. 174° 48' 40" 197.82 feet;

78. 172° 13' 30" 242.57 feet;

79. 177° 24' 40" 503.40 feet;

80. 179° 05' 40" 1118.06 feet;

81. 181° 51' 795.48 feet;

82. Thence on a curve to the right with a radius of 470.00 feet, the chord azimuth and distance being:
228° 26' 41" 539.91 feet;

83. 263° 30' 384.04 feet;

84. Thence on a curve to the left with a radius of 480.00 feet, the chord azimuth and distance being:
230° 02' 22.5" 529.31 feet;

85. 196° 34' 45" 469.73 feet;

86. Thence on a curve to the right with a radius of 520.00 feet, the chord azimuth and distance being:
214° 49' 40.5" 325.67 feet;

87. 233° 04' 36" 39.92 feet;

88. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being:
211° 34' 36" 425.14 feet;

89. 190° 04' 36" 1728.09 feet;

90. Thence on a curve to the left with a radius of 630.00 feet, the chord azimuth and distance being:
173° 01' 36" 369.44 feet;

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91. 155° 58' 36" 174.49 feet;

92. Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being:
165° 58' 36" 267.42 feet;

93. 175° 58' 36" 632.95 feet;

94. Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being:
189° 16' 36" 354.28 feet;

95. 202° 34' 36" 33.29 feet;

96. 278° 44' 513.03 feet;

97. 274° 40' 565.11 feet;

98. 285° 50' 611.29 feet;

99. 261° 30' 60.00 feet;

100. 250° 00' 149.21 feet;

101. 220° 49' 133.84 feet to the point of beginning and containing a gross area of 439.373 Acres, less the following described Parcel "AG," AG area of 22.100 Acres and a net area of 417.273 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared by:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

R. M. TOWILL CORPORATION
CIVIL ENGINEERS • SURVEYORS
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EXHIBIT "A"

PARCEL AG

CHANGE IN ZONING -MAKENA

Beginning at a point along the southwest corner of this parcel, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6696.43 feet North and 6345.55 feet East and running by azimuths measured clockwise from True South:

1. 189° 19' 406.00 feet;
2. 160° 00' 253.95 feet;
3. 226° 00' 134.20 feet;
4. 165° 40' 676.68 feet;
5. 261° 42' 357.70 feet;
6. 203° 22' 205.00 feet;
7. 176° 36' 556.00 feet;
8. 218° 12' 418.20 feet;
9. 293° 29' 75.82 feet;
10. 353° 38' 431.00 feet;
11. 13° 46' 516.00 feet;
12. 341° 56' 128.00 feet;
13. 49° 10' 504.68 feet;
14. 341° 13' 180.33 feet;

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Construction Management

15.	295°	26'	189.94	feet;
16.	350°	15'	798.05	feet;
17.	31°	40'	193.57	feet;
18.	102°	03'	495.21	feet to the point of beginning and containing an area of 22.100 Acres

R. M. TOWILL CORPORATION

Description prepared by:

RYAN M. SUZUKI
LICENSED PROFESSIONAL LAND SURVEYOR
No. 10059
HAWAII, U.S.A.

Ryan M. Suzuki
Licensed Professional Land Surveyor
Certificate Number 10059

420 Waiakamilo Road
Honolulu, Hawaii 96817
October 30, 2001

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R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
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Surveying
Construction Management

EXHIBIT "A"

LOT 2-A

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being the northeast corner of Lot 2-B, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 7557.74 feet North and 5232.55 feet East, and thence running by azimuths measured clockwise from True South:

1.	277°	15'	432.02	feet;
2.	Thence on a curve to the right with a radius of 630.000 feet, the chord azimuth and distance being: 19° 53' 09" 83.82 feet;			
3.	23°	42'	216.33	feet;
4.	36°	12'	313.71	feet;
5.	167°	40'	598.39	feet to the point of beginning and containing an area of 3.065 Acres.

R. M. TOWILL CORPORATION

Description Prepared by:

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420 Waiakamilo Rd., #411
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March 6, 2000

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EXHIBIT "A"

LOT 2-C

CHANGE IN ZONING - MAKENA

Beginning at the north corner of this piece of land, same being the northwest corner of Lot 2-B, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 7501.96 feet North and 4386.71 feet East, and thence running by azimuths measured clockwise from True South:

1. 352° 54' 447.59 feet;
2. 262° 50' 139.91 feet;
3. Thence on a curve to the right with a radius of 400.00 feet, the chord azimuth and distance being: 295° 28' 431.41 feet;
4. 328° 06' 427.44 feet;
5. Thence on a curve to the left with a radius of 770.00 feet, the chord azimuth and distance being: 356° 53' 05" 144.52 feet;
6. 81° 30' 60.00 feet;
7. 105° 50' 611.29 feet;
8. 94° 40' 565.11 feet;
9. 98° 44' 513.03 feet;
10. 202° 34' 36" 208.81 feet;

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11. Thence on a curve to the left with a radius of 480.00 feet, the chord azimuth and distance being: 163° 35' 00.5" 604.06 feet;
12. 266° 13' 36" 993.06 feet to the point of beginning and containing an area of 26.045 Acres.

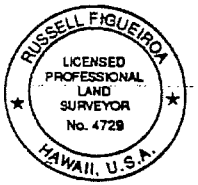

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EXHIBIT "A"

LOT 4

CHANGE IN ZONING - MAKENA

Beginning at the east corner of this piece of land, same being also the north corner of Lot 1, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6534.89 feet North and 5431.77 feet East and running by azimuths measured clockwise from True South:

1.	40°	49'	133.84	feet;
2.	70°	00'	149.21	feet;
3.	Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being: 193° 51' 585.61 feet;			
4.	216°	12'	27.28	feet;
5.	347°	40'	264.59	feet;
6.	355°	16'	180.40	feet to the point of beginning and containing an area of 2.047 Acres.

R. M. TOWILL CORPORATION
Description Prepared by

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Certificate Number 4729

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 5

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5881.42 feet North and 2759.80 feet East and running by azimuths measured clockwise from True South:

1.	92°	58	36"	39.43	feet;
2.	180°	58'	36"	258.00	feet;
3.	143°	58'	06"	86.83	feet;
4.	159°	08'	40"	195.00	feet;
5.	89°	58'	40"	185.00	feet;
6.	108°	35'	10"	90.10	feet;
7.	154°	06'		95.00	feet;
8.	168°	51'	10"	50.00	feet;
9.	285°	58'	40"	175.32	feet;
10.	325°	30'		28.97	feet;
11.	276°	10'		106.90	feet;
12.	267°	30'		12.18	feet;
13.	300°	28'	40"	107.65	feet;

14.	314°	18'	40"	129.85	feet;
15.	356°	42'	40"	102.65	feet;
16.	2°	58'	36"	345.20	feet to the point of beginning and containing an area of 1.753 Acres.

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 6

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, same being also the southeast corner of Lot 1, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5964.86 feet North and 5478.10 feet East and running by azimuths measured clockwise from True South:

1.	Thence on a curve to the right with a radius of 800.00 feet, the chord azimuth and distance being: 13° 47' 08" 437.11 feet;				
2.	161°	14'		336.04	feet;
3.	Thence on a curve to the right with a radius of 170.00 feet, the chord azimuth and distance being: 169° 17' 47.61 feet;				
4.	177°	20'		29.90	feet;
5.	262°	24'		224.49	feet to the point of beginning and containing an area of 1.314 Acres.

R. M. TOWILL CORPORATION

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RUSSELL FIGUEIROA
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HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 8-A

CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being the northwest corner of Water Tank Lot, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4112.28 feet North and 4961.40 feet East, and thence running by azimuths measured clockwise from True South:

1. 166° 42' 308.18 feet;
2. Thence on a curve to the right with a radius of 800.000 feet, the chord azimuth and distance being: 192° 01' 684.19 feet;
3. 217° 20' 464.61 feet;
4. Thence on a curve to the left with a radius of 800.00 feet, the chord azimuth and distance being: 213° 29' 12" 107.34 feet;
5. 341° 14' 164.46 feet;
6. 344° 28' 149.88 feet;
7. Thence on a curve to the right with a radius of 360.00 feet, the chord azimuth and distance being: 352° 43' 103.32 feet;
8. 0° 58' 40.45 feet;
9. Thence on a curve to the left with a radius of 740.00 feet, the chord azimuth and distance being: 339° 17' 50.5" 546.49 feet;

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10. Thence still on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 293° 43' 10" 24.32 feet;
11. 41° 46' 714.65 feet;
12. 115° 14' 37" 193.40 feet;
13. 80° 43' 37" 83.59 feet to the point of beginning and containing an area of 16.019 Acres.

RUSSELL FIGUEIROA
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March 6, 2000

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EXHIBIT "A"

LOT 8-C

CHANGE IN ZONING - MAKENA

Beginning at the west corner of this piece of land, same being the southeast corner of Lot 20, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1082.64 feet North and 4521.81 feet East, and thence running by azimuths measured clockwise from True South:

1. 169° 29' 300.08 feet;
2. 172° 58' 607.06 feet;
3. Thence on a curve to the right with a radius of 312.00 feet, the chord azimuth and distance being: 183° 53' 118.17 feet;
4. 104° 48' 80.00 feet;
5. 174° 21' 819.44 feet;
6. 185° 38' 320.00 feet;
7. 158° 16' 254.87 feet;
8. 184° 16' 1023.34 feet;
9. Thence on a curve to the right with a radius of 800.00 feet, the chord azimuth and distance being: 336° 11' 11" 646.02 feet;
10. 0° 00' 218.30 feet;
11. 1° 23' 101.39 feet;
12. 268° 25' 387.00 feet;

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13. 199° 35' 45.94 feet;
14. 185° 35' 461.50 feet;
15. 350° 43' 37" 49.50 feet;
16. Thence on a curve to the right with a radius of 390.00 feet, the chord azimuth and distance being: 0° 47' 37" 136.34 feet;
17. 290° 00' 196.45 feet;
18. 20° 00' 77.96 feet;
19. 359° 20' 271.78 feet;
20. 51° 42' 32" 102.20 feet;
21. 343° 30' 02" 608.02 feet;
22. 43° 02' 30" 316.00 feet;
23. 14° 24' 34" 152.58 feet;
24. 353° 30' 93.00 feet;
25. 67° 00' 547.80 feet;
26. 336° 30' 435.00 feet;
27. 5° 52' 30" 385.93 feet;
28. 278° 55' 20" 461.31 feet;
29. 355° 06' 45" 581.81 feet;
30. 93° 48' 30" 357.94 feet;
31. 337° 30' 02" 1229.37 feet;
32. 79° 41' 30" 658.22 feet;

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33. 107° 11' 449.29 feet;

34. 151° 32' 60.00 feet;

35. 153° 56' 273.55 feet;

36. Thence on a curve to the left with a radius of 4300.00 feet, the chord azimuth and distance being:
198° 20' 01" 1201.65 feet;

37. 273° 30' 143.50 feet to the point of beginning and containing an area of 68.048 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 11-B

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the northeast corner of Lot 12, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4702.48 feet North and 2652.75 feet East and running by azimuths measured clockwise from True South:

1. 290° 00' 167.01 feet;

2. 20° 00' 119.98 feet;

3. 110° 00' 167.01 feet;

4. 200° 00' 119.98 feet to the point of beginning and containing an area of 0.460 Acre.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 12

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4737.88 feet North and 2555.47 feet East and running by azimuths measured clockwise from True South:

1. 290° 00' 103.52 feet;
2. 20° 00' 119.98 feet;
3. 110° 00' 192.27 feet;
4. 236° 53' 123.55 feet;
5. Thence on a curve to the left with a radius of 322.00 feet, the chord azimuth and distance being: 234° 35' 45" 25.70 feet to the point of beginning and containing an area of 0.406 Acre.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

RUSSELL FIGUEIROA LICENSED PROFESSIONAL LAND SURVEYOR No. 4729 HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 13

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northwest corner of Lot 15-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4227.10 feet North and 2235.27 feet East and running by azimuths measured clockwise from True South:

1. 80° 37' 62.31 feet;
2. 180° 48' 82.89 feet;
3. 144° 10' 67.92 feet;
4. 275° 11' 80.51 feet;
5. Thence on a curve to the left with a radius of 323.00 feet, the chord azimuth and distance being: 350° 53' 46" 3.15 feet;
6. 350° 37' 119.00 feet to the point of beginning and containing an area of 0.173 Acre.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

RUSSELL FIGUEIROA LICENSED PROFESSIONAL LAND SURVEYOR No. 4729 HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 14

CHANGE IN ZONING - MAKENA

Beginning at the south corner of this piece of land, same being also the southwest corner of Lot 22-B, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1682.37 feet South and 2542.61 feet East and running by azimuths measured clockwise from True South:

1. 132° 41' 403.29 feet;
2. Thence on a curve to the left with a radius of 750.00 feet, the chord azimuth and distance being: 251° 35' 05.5" 261.08 feet;
3. 352° 12' 359.21 feet to the point of beginning and containing an area of 1.012 Acres.

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March 6, 2000

EXHIBIT "A"

LOT 15-B

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4070.33 feet North and 2317.94 feet East and running by azimuths measured clockwise from True South:

1. 274° 44' 70.62 feet;
2. 318° 59' 24.00 feet;
3. 272° 25' 94.80 feet;
4. 358° 50' 104.20 feet;
5. 107° 59' 125.00 feet;
6. 160° 05' 12.00 feet;
7. 27° 35' 10.00 feet;
8. 102° 45' 48.60 feet;
9. 179° 00' 12.02 feet;
10. Thence on a curve to the left with a radius of 328.00 feet, the chord azimuth and distance being: 174° 48' 30" 47.95 feet;
11. 170° 37' 20.88 feet to the point of beginning and containing an area of 0.353 Acres.

RUSSELL FIGUEIROA
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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 16

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 3108.23 feet North and 1889.16 feet East and running by azimuths measured clockwise from True South:

1. 124° 42' 107.24 feet;
2. 101° 04' 28.00 feet;
3. 91° 12' 6.00 feet;
4. Thence on a curve to the left with a radius of 25.00 feet, the chord azimuth and distance being: 65° 13' 30" 21.90 feet;
5. 39° 15' 20.00 feet;
6. 305° 15' 9.00 feet;
7. 39° 40' 16.00 feet;
8. 137° 57' 13.00 feet;
9. 76° 00' 37.00 feet;
10. Thence on a curve to the left with a radius of 250.00 feet, the chord azimuth and distance being: 136° 41' 45" 141.58 feet;
11. 228° 50' 20.00 feet;
12. 252° 28' 53.00 feet;

13.	293°	57'		53.00	feet;
14.	221°	13'		29.00	feet;
15.	129°	34'		17.00	feet;
16.	216°	13'		17.00	feet;
17.	300°	34'		57.00	feet;
18.	230°	38'		56.17	feet;
19.	248°	53'		34.90	feet;
20.	311°	36'	15"	139.84	feet;
21.	29°	20'		124.40	feet to the point of beginning and containing an area of 0.861 Acre.

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March 6, 2000

R. M. TOWILL CORPORATION

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EXHIBIT "A"

LOT 17
CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being also the northwest corner of Lot 19, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 2860.50 feet North and 1798.77 feet East and running by azimuths measured clockwise from True South:

1.	205°	07'		153.25	feet;
2.	207°	52'	44"	90.02	feet;
3.	258°	14'		590.87	feet;
4.	270°	00'		339.85	feet;
5.	290°	26'		441.91	feet;

6. Thence on a curve to the right with a radius of 520.00 feet, the chord azimuth and distance being:
39° 10' 37.5" 249.83 feet;

7.	53°	04'	36"	39.92	feet;

8. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being:
48° 28' 31.5" 93.06 feet;

9.	110°	29'		234.97	feet;
10.	90°	45'		960.11	feet to the point of beginning and containing an area of 9.372 Acres.

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
October 22, 2000 Rev.

EXHIBIT "A"

LOT 18

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1722.80 feet North and 1532.63 feet East and running by azimuths measured clockwise from True South:

1.	112°	00'	34.98	feet;
2.	93°	30'	649.05	feet;
3.	180°	37'	109.74	feet;
4.	193°	19'	209.91	feet;
5.	197°	25'	294.96	feet;
6.	195°	35'	167.83	feet;
7.	150°	49'	112.43	feet;
8.	187°	04'	126.83	feet;
9.	165°	36'	110.87	feet;
10.	236°	33'	142.75	feet;
11.	258°	37'	105.15	feet;
12.	229°	30'	93.02	feet;
13.	291°	08'	0.16	feet;
14.	222°	30'	78.00	feet;

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15. 246° 39' 136.00 feet;

16. 274° 44' 33.00 feet;

17. 182° 05' 116.00 feet;

18. 302° 34' 87.00 feet;

19. 229° 39' 53.65 feet;

20. Thence on a curve to the right with a radius of 250.00 feet, the chord azimuth and distance being:
316° 41' 45" 141.58 feet;

21. 76° 00' 12.00 feet;

22. 47° 49' 278.45 feet;

23. 40° 00' 285.81 feet;

24. 16° 30' 708.56 feet;

25. 292° 00' 503.50 feet;

26. 8° 00' 135.00 feet to the point of beginning and containing an area of 10.440 Acres.

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "A"

LOT 19
CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the southwest corner of Lot 17, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 2860.50 feet North and 1798.77 feet East and running by azimuths measured clockwise from True South:

1. 270° 45' 960.11 feet;

2. 290° 29' 234.97 feet;

3. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being:
30° 13' 36" 273.70 feet;

4. 16° 34' 45" 469.73 feet;

5. Thence on a curve to the right with a radius of 420.00 feet, the chord azimuth and distance being:
50° 02' 22.5" 463.14 feet;

6. 83° 30' 384.04 feet;

7. Thence on a curve to the left with a radius of 530.00 feet, the chord azimuth and distance being:
64° 36' 48.5" 343.12 feet;

8. Thence still on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being:
88° 22' 23.5" 27.10 feet;

9. Still on a curve to the right with a radius of 128.00 feet, the chord azimuth and distance being:
157° 16' 50" 113.27 feet;

10.	186°	50'	20"	333.75	feet;
11.	188°	23'	20"	251.10	feet;
12.	185°	03'		142.40	feet;
13.	190°	10'		131.42	feet;
14.	197°	07'		297.40	feet;
15.	197°	07'	03"	32.00	feet to the point of beginning and containing an area of 27.820 Acres.

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
October 22, 2000 Rev.

EXHIBIT "A"

LOT 20

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the west corner of Lot 8-C, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1082.64 feet North and 4521.81 feet East and running by azimuths measured clockwise from True South:

1.	93°	30'	326.35	feet;
2.	185°	16'	94.21	feet;
3.	155°	24'	85.00	feet;
4.	104°	18'	113.00	feet;
5.	46°	49'	125.00	feet;
6.	86°	30'	178.00	feet;
7.	118°	50'	108.00	feet;
8.	185°	44'	76.00	feet;
9.	169°	00'	112.00	feet;
10.	112°	30'	122.64	feet;
11.	166°	36'	537.96	feet;
12.	249°	50'	297.36	feet;
13.	339°	00'	269.14	feet;

14. Thence on a curve to the right with a radius of 350.00 feet, the chord azimuth and distance being:
349° 55' 132.57 feet;

15. 0° 50' 165.32 feet;

16. Thence on a curve to the left with a radius of 200.00 feet, the chord azimuth and distance being:
313° 52' 292.38 feet;

17. 266° 54' 122.98 feet;

18. 196° 00' 235.58 feet;

19. 234° 12' 226.64 feet;

20. 352° 58' 356.56 feet;

21. 349° 29' 300.08 feet to the point of beginning and containing an area of 9.817 Acres.

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420 Waiakamilo Rd., #411
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March 6, 2000

EXHIBIT "A"

LOT 21-B

CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being also the southwest corner of Lot 21-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 621.97 feet South and 2447.61 feet East and running by azimuths measured clockwise from True South:

1. 305° 18' 317.33 feet;

2. Thence on a curve to the left with a radius of 330.00 feet, the chord azimuth and distance being:
14° 45' 03" 27.46 feet;

3. 12° 22' 233.89 feet;

4. Thence on a curve to the right with a radius of 500.00 feet, the chord azimuth and distance being:
30° 19' 22" 308.29 feet;

5. Thence still on a curve to the right with a radius of 750.00 feet, the chord azimuth and distance being:
71° 35' 05.5" 261.08 feet;

6. 65° 15' 204.55 feet;

7. 84° 48' 40" 60.44 feet;

8. 207° 00' 985.50 feet to the point of beginning and containing an area of 6.542 Acres.

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March 6, 2000

EXHIBIT "A"

LOT 22-A

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northeast corner of Lot 22-B, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 906.70 feet South and 2849.74 feet East and running by azimuths measured clockwise from True South:

1. 125° 18' 175.40 feet;

2. Thence on a curve to the right with a radius of 330.00 feet, the chord azimuth and distance being: 215° 51' 12" 211.80 feet;

3. 356° 00' 273.69 feet to the point of beginning and containing an an area of 0.483 Acres.

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420 Waiakamilo Rd., #411
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March 6, 2000

EXHIBIT "B"

Conditions of Zoning

INTRODUCTORY NOTES:

A. Unless otherwise specified, each condition applies to each project.

B. The following definitions shall apply to these conditions:

"County" means the County of Maui.

"Developer" means Keaka LLC; Makena Golf, LLC; Makena Hotel, LLC; Makena MF-2&3, LLC; and Makena Resort Services LLC; their successors and permitted assigns; and any future developer or owner of any property that is the subject of this Change in Zoning.

"Project" means each development that requires an SMA permit from the Maui Planning Commission.

"SMA" means Special Management Area.

"State" means the State of Hawaii.

Density and Height Restrictions

1. In the R-1, R-2, and R-3 Residential District zoned areas, the density shall not exceed 2.5 single-family dwelling units per acre.

2. In the A-2 Apartment District zoned areas, the density shall not exceed eight units per acre, and the building height shall not exceed 45 feet. Height shall be measured from the natural or finish grade, whichever is lower.

3. In the B-2 Community Business District zoned areas, the gross floor area of each building shall not exceed 60 percent of the total lot area.

4. On Lot 19 (H-M Hotel District), the building height shall not exceed 45 feet and shall be consistent with the Urban Design Standards for Building Form in the Kihei-Makena Community Plan; no more than 89 units shall be developed; and no lockout units shall be allowed. Height shall be measured from the natural or finish grade, whichever is lower.

5. The developer shall preserve Makena's significant views of the Pacific Ocean and the broad vista to the Central Maui and Upcountry regions. The use of walls higher than four feet in frontyard setbacks shall be prohibited.

Noise Mitigation

6. In the B-2 Community Business District zoned areas, the following permitted uses shall incorporate acoustical measures into the facility to mitigate potential noise impacts: amusement enterprises, including billiard and pool halls; auditoriums and theaters; baseball and football stadiums and other sport activities and amusements; bowling alleys; dancing and hula studios; gymnasiums; miniature golf courses; music conservatories and music studios; physical-culture studios; and printing, lithography, and publishing shops.

Lighting Standards

7. All exterior lighting shall be shielded from adjacent residential properties and nearshore waters, and shall be fully shielded to prevent uplight. Lighting requirements in force at the time of building permit application shall be applied.

Screening of Certain Uses

8. In the B-2 Community Business District zoned areas, merchandise, equipment, and supplies shall be stored within enclosed buildings or enclosed areas that are appropriately screened with fencing and landscape planting for the following permitted uses: equipment rental and sales yards; hardware and garden supply

stores; parcel delivery stations; and printing, lithography, and publishing shops.

Education

9. The developer, its successors and permitted assigns, shall pay the Department of Education $3,000 per dwelling unit upon issuance of each building permit to be used, to the extent possible, for schools serving the Kihei-Makena Community Plan area; provided that, should the State pass legislation imposing school impact fees that apply to the Makena Resort Area, the developer, its successors and permitted assigns, shall from that point forward comply with the State requirements, or contribute $3,000 per dwelling unit, whichever is greater. Should a previous agreement exist between the Department of Education and the landowner, this condition shall prevail.

Transportation

10. The developer shall provide pedestrian and bicycle access ways within the roadways throughout and fronting the Makena Resort Area. A schematic plan for pedestrian and bicycle access ways throughout and fronting the Makena Resort Area shall be submitted to the Department of Planning for consideration by the Maui Planning Commission in conjunction with SMA permit applications.

11. The developer shall make a contribution to the County for traffic improvements in an amount equal to $5,000 per unit. The contribution shall be paid to the County prior to issuance of the initial building permit. Upon adoption of a traffic impact fee ordinance, the developer shall comply with the ordinance in lieu of this voluntary contribution. Should a traffic impact fee ordinance be adopted prior to the collection of this contribution, the applicable amount shall be the greater of the two. Such contributions or fees shall not be counted towards Condition No. 12 below.

12. Upon commencement of the first phase of construction, the developer shall pay its pro-rata share to upgrade

Piilani Highway from Kilohana Drive to Wailea Ike Drive to four lanes of traffic, and shall cooperate with the State Department of Transportation and other area developers to implement such improvements concurrent with development.

13. The developer shall provide construction access roads from Piilani Highway to the construction sites. Construction traffic shall be prohibited on Kilohana Drive, Wailea Ike Drive, Wailea Alanui Drive, and Makena Alanui Drive to the extent practicable.

14. The developer shall develop and submit a Transportation Management Plan ("TMP"), to be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation. The purpose of the TMP shall be to reduce traffic generated by construction activity related to the Makena Resort Area. The TMP shall provide for programs such as park and ride, shuttles, and/or restrictions on worker access to ongoing construction activity during peak hour traffic. Upon approval, project contractors shall implement the TMP during construction activities. The developer shall submit an annual report to the State Department of Transportation, the County Department of Public Works, the County Department of Transportation, and the Maui County Council to document the success of the TMP in meeting its benchmarks of reducing traffic during project construction.

    The TMP shall be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation prior to issuance of each SMA permit within the Makena Resort Area.

15. As part of the first SMA application, the developer shall submit a TMP to reduce the dependency on individual vehicular transportation modes. The TMP shall be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation to address post-construction traffic issues.

Civil Defense

16. The developer shall participate in the pro rata funding and construction of adequate civil defense measures as determined by the State and County civil defense agencies.

Historical and Cultural Resources

17. Should any human burials or any historic sites such as artifacts, charcoal deposits, stone platforms, pavings, or walls be found, the developer shall stop construction work in the immediate vicinity and notify the State Historic Preservation Division (SHPD), the Maui/Lanai Island Burial Council (MLIBC), and the Maui County Cultural Resources Commission (CRC).

18. The developer, its successors and permitted assigns, shall provide a comprehensive preservation/mitigation plan pursuant to Chapter 6E, Hawaii Revised Statutes, that has been approved by the State Historic Preservation Division, Department of Land and Natural Resources, and the Office of Hawaiian Affairs prior to any grading within the project area.

Nearshore Water Quality

19. Marine monitoring programs shall be conducted which include monitoring and assessment of coastal water resources (groundwater and surface water) that receive surface water or groundwater discharges from the hydrologic unit where the project is located. Monitoring programs shall include both water quality and ecological monitoring.

    Water Quality Monitoring shall provide water quality data adequate to assess compliance with applicable State water quality standards at Hawaii Administrative Rules Chapter 11-54. Assessment procedures shall be in accordance with the current Hawaii Department of Health ("HIDOH") methodology for Clean Water Act Section 305(b) water quality assessment, including use of approved analytical methods and quality control/quality assurance measures. The water quality

data shall be submitted biannually, or every six months, to HIDOH for use in the State's Integrated Report of Assessed Waters prepared under Clean Water Act Sections 303(d) and 305(b). If this report lists the receiving waters as impaired and requiring a Total Maximum Daily Load ("TMDL") study, then the monitoring program shall be amended to evaluate land-based pollutants, including: (1) monitoring of surface water and groundwater quality for the pollutants identified as the source of the impairment; and (2) providing estimates of total mass discharge of those pollutants on a daily and annual basis from all sources, including infiltration, injection, and runoff. The results of the land-based pollution water quality monitoring and loading estimate shall be submitted to the HIDOH Environmental Planning Office, TMDL Program.

    The ecological monitoring shall include ecological assessment in accordance with the Coral Reef Assessment and Monitoring Program protocols used by the Department of Land and Natural Resources. The initial assessment shall use the full protocol. Subsequent biannual assessments can use the Rapid Assessment Techniques. Results shall be reported biannually to the Aquatic Resources Division, Department of Land and Natural Resources.

    The monitoring and assessments shall be conducted by degreed scientists experienced with Clean Water Act programs, water quality monitoring, water quality assessment, water quality-based permitting, water quality modeling, watershed planning, and TMDL. Study design should be made available for both public review and peer review by the State Department of Health, Department of Aquatic Resources, and the University of Hawaii researchers. Results of monitoring shall be published and publicly available online.

20. The developer shall implement efficient soil-erosion and dust-control measures during and after development to the satisfaction of DOH and the County.

Transfer of Ownership

21. The developer shall give notice to the Department of Planning and the Council of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Makena Resort Area, prior to any development.

Compliance with Conditions

22. The developer shall provide timely annual compliance reports to the Planning Director and the Council. The compliance reports shall include: (a) the status of the developer's compliance with each of these conditions; and (b) a reasonable estimate of the time needed for full compliance.

23. Failure to fulfill any condition may result in a reversion to former or more appropriate zoning or community plan designations or other remedies.

24. If any of the property subject to this Change in Zoning is consolidated with other property for purposes of an SMA permit application, these conditions shall apply to the entirety of the consolidated property.

Residential Workforce Housing

25. The developer shall comply with the County's Residential Workforce Housing Policy as provided in Chapter 2.96, Maui County Code.

Water

26. The developer shall comply with all applicable County water ordinances.

    The water rates for the residential workforce housing units shall be no higher than the general water consumer rates set by the County in its annual budget, for as long as the units are subject to Chapter 2.96, Maui County Code.

27. The developer shall provide a water conservation plan for the Makena Resort Area, approved by the Department of Water Supply, prior to the issuance of any SMA permits. For each project, the developer shall construct a dual waterline system to accommodate the use of non-potable water for landscaping and irrigation purposes prior to the issuance of any building permits.

Energy

28. All energy systems for all residential, commercial, and hotel units shall be designed and constructed to meet all applicable ENERGY STAR® requirements established by the Climate Protection Division of the United States Environmental Protection Agency in effect at the time of construction. For purposes of this condition, energy systems shall include all hot-water systems, roof and attic areas, outside walls, windows, air-cooling systems, and heating systems.

29. All residential, commercial, and hotel units shall comply with Chapter 16.16, Maui County Code.

30. All air-cooling systems and all heating systems for laundry facilities, swimming pools, and spa areas shall make maximum use of energy-efficient construction and technology.

Access for Parks and Recreation

31. The developer shall construct a minimum of 60 new parking stalls at Maluaka Beach, including at least 10 at the north end, within one year of the issuance to the developer of any SMA permit by the Maui Planning Commission relating to a parcel or a portion thereof that is a subject of this Change in Zoning. Unless necessary to protect public safety or to comply with State or Federal law, the required parking stalls need not be asphalt surfaced. Development costs and land shall not satisfy park dedication requirements.

32. The developer shall develop an expansion of the beach park at the south end of Maluaka Beach, such that the beach park shall comprise at least 1.5 acres of land

area for public use and beach access. The developer shall submit the necessary applications required for the expansion within six months of the approval of this Change in Zoning. The land area of the expansion of the existing park shall be applied as credit toward satisfying a portion of any applicable park dedication requirements.

33. To the extent practicable, the developer shall provide, in perpetuity, traversable lateral shoreline access in the area between the shoreward boundary and the mauka boundary of the Makena Resort Area. Costs associated with this condition shall not satisfy park dedication requirements.

34. Within one year of the approval of this Change in Zoning, the developer shall initiate and fund a plan for the development of the State Park at Makena for the State Department of Land and Natural Resources and the Department of Parks and Recreation, soliciting and taking into consideration the comments of various user groups, including Surfrider Foundation, Savemakena.org, Maui Tomorrow, the Kihei Community Association, and the Makena Homeowner's Association. The plan shall incorporate recreational, landscaping, parking, and facility concepts as a guide for future development of the park. Costs associated with this condition shall not satisfy park dedication requirements.

35. The developer shall renovate and beautify Makena Landing (TMK: 2-1-007:094), see attached map, in coordination with the Department of Parks and Recreation and the State Department of Land and Natural Resources. Costs associated with this condition shall not satisfy park dedication requirements.

36. The developer shall maintain Makena Landing (TMK: 2-1-007:094), North Maluaka (TMK: 2-1-007:068), and South Maluaka (TMK: 2-1-005:124), see attached map, and all future parklands within the Makena Resort Area.

Hawaiian Island Architecture

37. To exhibit respect for the Hawaiian culture and a Hawaiian sense of place, structures within the Makena Resort Area shall be based on or inspired by principles of Hawaiian island architecture in design and construction.

Native Forests and Species

38. The developer shall provide a baseline study survey of flora and fauna as part of each SMA permit application within the Makena Resort Area; the study shall be conducted by recognized independent experts on Hawaiian flora and fauna and list all endemic, indigenous, and endangered species, their distribution in the Makena Resort Area and adjacent shorelines. This study shall also include a preservation/mitigation plan and comments from the State Department of Land and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Corps of Engineers, and the Maui representative of the Hawaii Wildlife Fund and The Nature Conservancy.

Transient Vacation Rentals/Time Shares

39. No transient vacation rentals or time shares shall be allowed within this Makena Resort rezoning application area; and further, no special use permit or conditional permit for such accommodations shall be accepted by the Department of Planning.

Hotel Limitation

40. A second hotel shall not be constructed within the Makena Resort Area.

LEED Certified Buildings

41. All buildings constructed within the Makena Resort Area shall be LEED (Leadership in Energy and Environmental Design) certified if they are 500 square feet or larger.

Dwelling Units

42. New dwelling units shall not exceed 800, excluding residential workforce housing.

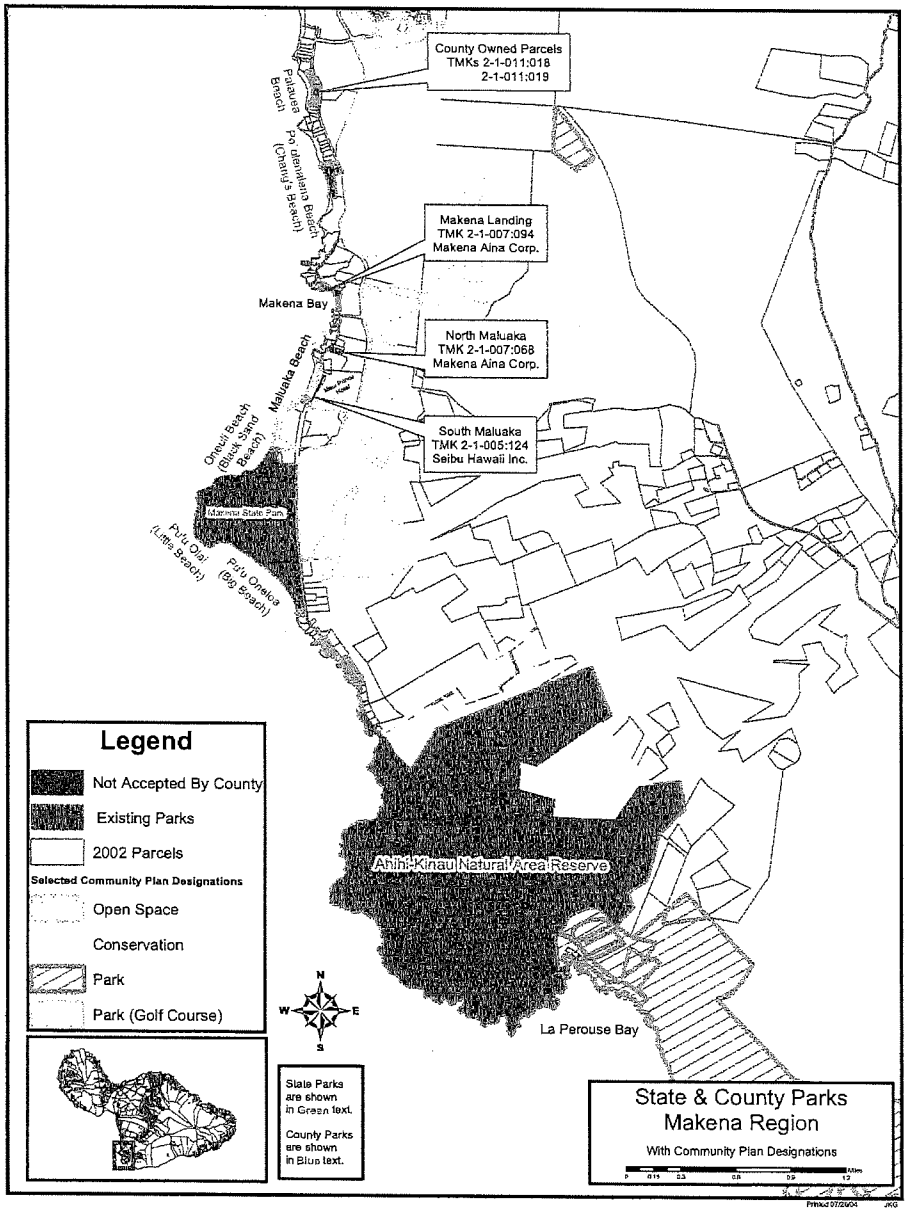
Police

43. The developer, its successors and permitted assigns, shall contribute $1,000 per market-priced unit, collected at issuance of building permit, to the County, for the development and maintenance of a police station in South Maui.

Emergency Evacuation

44. The developer shall provide Driveway "D" from Makena Alanui Road to Makena Resort Sewage Treatment Plant and beyond as an emergency evacuation route for the area.

S:\CLERICAL\LJN\ORD\CIZ\Makena conditions (12-10-08).doc



I hereby certify that this is
a true copy from the records
of the Bureau of Conveyances,
as

Susan M. Cummings

Registrar of Conveyances
Assistant Registrar, Land Court
State of Hawaii

Doc 3813077
CTN AS LISTED HEREIN
DEC 15, 2008 09:00 AM

Doc 2008-187619
DEC 15, 2008 09:00 AM

LAND COURT SYSTEM | REGULAR SYSTEM

Return by Mail (X) Pickup ( ) To:

OFFICE OF THE COUNTY CLERK
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, HI 96793

Total No. of Pages: 64

UNILATERAL AGREEMENT AND
DECLARATION FOR CONDITIONAL ZONING

DECLARANTS	AFFECTS TAX KEY NOS.	DECLARANTS' INTERESTS ACQUIRED BY DOCUMENT NOS.
KEAKA LLC	(2) 2-1-5:83, 84, 85, 108 (por), 120 (por)	2005-083571
MAKENA GOLF, LLC	(2) 2-1-6:36, 57; (2) 2-1-8:81, 90; (2) 2-1-5:120 (por), 108 (por)	2007-114462
	(2) 2-1-8:78	3620072, TCT 864,773
MAKENA HOTEL, LLC	(2) 2-1-6:59; (2) 2-1-7:4; (2) 2-1-5:124	2007-114461
MAKENA RESORT SERVICES LLC	(2) 2-1-7:68, 94; (2) 2-1-6:56	2007-114464
	(2) 2-1-7:93	3620074, TCT 864,775
MAKENA MF-2&3, LLC	(2) 2-1-8:79	3620075, TCT 864,776

EXHIBIT "C"

UNILATERAL AGREEMENT AND
DECLARATION FOR CONDITIONAL ZONING

THIS INDENTURE made this 11th day of December, 2008, by all of the following entities (each referred to hereinafter as a "Declarant" and collectively as "Declarants"), each of which is a Delaware limited liability company and each of which has its principal place of business at 2005 Main Street, Wailuku, Hawaii 96793, and each of which owns the land areas situate at Makena, Kihei, Maui, Hawaii, identified for real property tax purposes by Tax Map Key No(s). listed below:

KEAKA LLC, owner of Tax Map Keys (2) 2-1-5:83, 84, 85, 108 (por.) and 120 (por.);

MAKENA GOLF, LLC, owner of Tax Map Keys (2) 2-1-6:36 and 57; (2) 2-1-8:81 and 90; (2) 2-1-5:120 (por.); (2) 2-1-5:108 (por.); and (2) 2-1-8:78 (being Lot 1-A shown on Map 5 of Land Court Application 1846 and noted on Transfer Certificate of Title No. 864,773);

MAKENA HOTEL, LLC, owner of Tax Map Keys (2) 2-1-6:59; (2) 2-1-7:4; and (2) 2-1-5:124;

MAKENA RESORT SERVICES LLC, owner of Tax Map Keys (2) 2-1-7:68 and 94; (2) 2-1-6:56; and (2) 2-1-7:93 (being Lot 2-B shown on Map 1 of Land Court Application 1846 and noted on Transfer Certificate of Title No. 864,775);

MAKENA MF-2&3, LLC, owner of Tax Map Key (2) 2-1-8:79 (being Lot 7-A shown on Map 4 of Land Court Application 1846 and noted on Transfer Certificate of Title No. 864,776).

WITNESSETH:

WHEREAS, the Council of the County of Maui, State of Hawaii, hereinafter referred to as "Council", is considering the establishment of zoning for said land areas or portions thereof, comprised of approximately 603.303 acres (hereinafter referred to as the "Property"), which are more particularly described in Exhibit "1" which is attached hereto and made a part hereof, and which are also listed on Exhibit "2" which is attached hereto and made a part hereof, and which are more particularly identified in Land Zoning Map No. L-585 which is on file in the Office of the County Clerk of the County of Maui; and

WHEREAS, the Council recommends through its Land Use Committee, Committee Report No. 08-154, that said establishment of zoning be approved for passage on first reading subject to certain conditions pursuant to Maui County Code, Section 19.510.050; and

WHEREAS, Declarants have agreed to execute this instrument pursuant to the conditional zoning provisions of Maui County Code Section 19.510.050;

NOW THEREFORE, Declarants hereby make the following Declaration:

1. That this Declaration is made pursuant to the provisions of Section 19.510.050, Maui County Code, relating to conditional zoning;

2. That until written release by the County of Maui, the Property, and all parts thereof, is and shall be held subject to the covenants, conditions, and restrictions contained herein and that all of such covenants, conditions, and restrictions shall be effective as to and shall run with the land as to the Property, from and after the recording of this Declaration with the Bureau of Conveyances or Land Court of the State of Hawaii, without the execution, delivery or recordation of any further deed, instrument, document, agreement, declaration, covenant or the like with respect thereto by any Declarant, the County of Maui, or any heir, devisee, executor, administrator, personal representative, successor or assign; that the acquisition of any right, title or interest in or with respect to all or any portion of the Property by any person or persons, entity or entities, whomsoever, shall be deemed to constitute the acceptance of all of the covenants, conditions, and restrictions of this Declaration by such person or persons, entity or entities, and that upon any transfer of any right, title or interest in or with respect to all or any portion of the Property the same shall be subject to, and the transferee shall assume and be bound and obligated to observe and perform, all of the covenants, conditions, and restrictions of this Declaration;

3. This Declaration and all of the covenants, conditions, and restrictions contained herein shall continue to be effective as to and run with the land in perpetuity, or until a Declarant notifies the appropriate County Department that any of said covenants, conditions and restrictions are satisfied by the Declarants and the appropriate County Department verifies the satisfaction and provides a written release of the covenant, condition or restriction;

4. The term "Declarant" and any pronoun in reference thereto, wherever used herein, shall be construed to mean the singular or the plural, the masculine or the feminine or the neuter, and vice versa, and shall include any corporation, and shall be held to mean and include each "Declarant", its heirs, devisees, executors, administrators, personal representatives, successors, and assigns;

5. That the Declaration shall become fully effective on the effective date of the zoning ordinance approving the establishment of the zoning districts described on Exhibit "2" attached hereto and made a part hereof, and this Declaration shall be recorded in the Bureau of Conveyances or Land Court of the State of Hawaii;

6. That Declarants agree to develop the Property in conformance with the conditions set forth in Exhibit "3", which is attached hereto and made a part hereof and which shall be made a part of the zoning ordinance; and

7. That the conditions imposed are reasonable and rationally relate to the objective of preserving public health, safety and general welfare and such conditions fulfill the need for the public service demands created by the proposed uses;

AND IT IS EXPRESSLY UNDERSTOOD AND AGREED that until released in writing by the County, the conditions imposed in this Declaration shall run with the land identified hereinabove and shall bind and constitute notice to all subsequent lessees, grantees, assignees,

mortgagees, lienors and any other persons who claim an interest in said land, and the County of Maui shall have the right to enforce this Declaration by appropriate action at law or suit in equity against all such persons, provided that Declarants or their successors and assigns may at any time file a petition for the removal of the conditions and terminate this Unilateral Agreement, such petition to be processed in the same manner as petitions for change in zoning.

IN WITNESS WHEREOF, the undersigned has executed this Declaration the day and year first above written.

DECLARANTS:

KEAKA LLC

By MAKENA INVESTORS LLC
Its Managing Member

By DOWLING COMPANY, INC.
Its Manager

By _____
EVERETT R. DOWLING
Its President

MAKENA GOLF, LLC

By HONUA LLC
Its Managing Member

By HONUA MEZZ 2, LLC
Its Managing Member

By HONUA MEZZ 3, LLC
Its Managing Member

By HONUA MEZZ 4, LLC
Its Managing Member

By NAMALU LLC
Its Managing Member

By _____
EVERETT R. DOWLING
Its Manager

APPROVED AS TO FORM
AND LEGALITY:

_____
JAMES A. GIROUX
Corporation Counsel
County of Maui

MAKENA HOTEL, LLC

By HONUA LLC
Its Managing Member

By HONUA MEZZ 2, LLC
Its Managing Member

By HONUA MEZZ 3, LLC
Its Managing Member

By HONUA MEZZ 4, LLC
Its Managing Member

By NAMALU LLC
Its Managing Member

By _____
EVERETT R. DOWLING
Its Manager

MAKENA RESORT SERVICES LLC

By HONUA LLC
Its Managing Member

By HONUA MEZZ 2, LLC
Its Managing Member

By HONUA MEZZ 3, LLC
Its Managing Member

By HONUA MEZZ 4, LLC
Its Managing Member

By NAMALU LLC
Its Managing Member

By _____
EVERETT R. DOWLING
Its Manager

MAKENA MF-2&3, LLC

By MAKENA LAND, LLC
Its Managing Member

By HONUA LLC
Its Managing Member

By HONUA MEZZ 2, LLC
Its Managing Member

By HONUA MEZZ 3, LLC
Its Managing Member

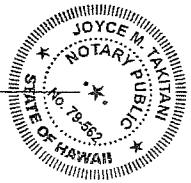
By HONUA MEZZ 4, LLC
Its Managing Member

By NAMALU LLC
Its Managing Member

By _____
EVERETT R. DOWLING
Its Manager

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 11th day of December, 2008, before me personally appeared EVERETT R. DOWLING, to me personally known, who, being by me duly sworn, did say that he is the President of Dowling Company, Inc., a Hawaii corporation, the Manager of Makena Investors LLC, a Hawaii limited liability company, the Managing Member of Keaka LLC, a Delaware limited liability company, and that the foregoing instrument was signed on behalf of said corporation by authority of its Board of Directors, and on behalf of said limited liability companies, and the said EVERETT R. DOWLING acknowledged said instrument to be the free act and deed of said corporation and said limited liability companies.



Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.

My commission expires: 8/16/11

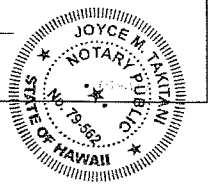
Date of Doc: 12/11/08 # Pages: 64

Name: Joyce M. Takitani Second Circuit

Doc. Description: Unilateral Agreement and Declaration for Conditional Zoning

Notary Signature

NOTARY CERTIFICATION



STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 11th day of December, 2008, before me personally appeared EVERETT R. DOWLING, to me personally known, who, being by me duly sworn, did say that he is the Manager of Namalu LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 4, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 3, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 2, LLC, a Delaware limited liability company, the Managing Member of Honua LLC, a Delaware limited liability company, the Managing Member of Makena Golf, LLC, a Delaware limited liability company, and that the foregoing instrument was signed on behalf of said limited liability companies, and the said EVERETT R. DOWLING acknowledged said instrument to he the free act and deed of said limited liability companies.

Joyce M Takitani
Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

My commission expires: 8/16/11

Date of Doc: 12/11/08 # Pages: 64

Name: Joyce M. Takitani Second Circuit

Doc. Description: Unilateral Agreement and Declaration for Conditional Zoning

Joyce M Takitani
Notary Signature

NOTARY CERTIFICATION

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 11th day of December, 2008, before me personally appeared EVERETT R. DOWLING, to me personally known, who, being by me duly sworn, did say that he is the Manager of Namalu LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 4, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 3, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 2, LLC, a Delaware limited liability company, the Managing Member of Honua LLC, a Delaware limited liability company, the Managing Member of Makena Hotel, LLC, a Delaware limited liability company, and that the foregoing instrument was signed on behalf of said limited liability companies, and the said EVERETT R. DOWLING acknowledged said instrument to be the free act and deed of said limited liability companies.

Joyce M Takitani
Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

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Joyce M Takitani
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STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

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Joyce M Takitani
Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.

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STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 11th day of December, 2008, before me personally appeared EVERETT R. DOWLING, to me personally known, who, being by me duly sworn, did say that he is the Manager of Namalu LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 4, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 3, LLC, a Delaware limited liability company, the Managing Member of Honua Mezz 2, LLC, a Delaware limited liability company, the Managing Member of Honua LLC, a Delaware limited liability company, the Managing Member of Makena Land, LLC, a Delaware limited liability company, the Managing Member of Makena MF-2&3, LLC, a Delaware limited liability company, and that the foregoing instrument was signed on behalf of said limited liability companies, and the said EVERETT R. DOWLING acknowledged said instrument to be the free act and deed of said limited liability companies.

Joyce M Takitani
Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

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Name: Joyce M. Takitani Second Circuit

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Joyce M Takitani
Notary Signature

NOTARY CERTIFICATION

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

LOT 1

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the east corner of Lot 4, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6534.89 feet North and 5431.77 feet East and running by azimuths measured clockwise from True South:

1.	220°	49'	873.25	feet;
2.	256°	29'	84.21	feet;
3.	165°	55'	1593.43	feet;
4.	190°	24'	588.16	feet;
5.	256°	16'	455.77	feet;
6.	321°	48'	330.00	feet;
7.	225°	38'	785.00	feet;
8.	273°	10'	225.00	feet;
9.	339°	50'	455.00	feet;
10.	356°	04'	644.00	feet;
11.	24°	11'	473.24	feet;
12.	332°	54'	368.41	feet;
13.	53°	38'	476.77	feet;
14.	341°	41'	1020.78	feet;

15.	18°	33'	508.13	feet;
16.	63°	38'	260.00	feet;
17.	109°	40'	624.94	feet;
18.	61°	11'	476.09	feet;
19.	82°	24'	697.74	feet;
20.	100°	08'	61.96	feet;
21.	93°	13'	68.47	feet;
22.	64°	06'	739.18	feet;
23.	86°	17'	183.77	feet;
24.	3°	56'	605.61	feet;
25.	333°	18'	306.94	feet;
26.	34°	32'	200.78	feet;
27.	4°	16'	1085.16	feet;
28.	338°	16'	254.87	feet;
29.	5°	38'	320.00	feet;
30.	354°	21'	819.44	feet;
31.	284°	48'	80.00	feet;

32. Thence on a curve to the left with a radius of 312.00 feet, the chord azimuths and distance being:
3° 53' 118.17 feet;

33.	352°	58'	250.50	feet;
34.	54°	12'	226.64	feet;

35. 16° 00' 235.58 feet;

36. 86° 54' 122.98 feet;

37. Thence on a curve to the right with a radius of 200.00 feet, the chord azimuth and distance being:
133° 52' 292.38 feet;

38. 180° 50' 165.32 feet;

39. Thence on a curve to the left with a radius of 350.00 feet, the chord azimuth and distance being:
169° 55' 132.57 feet;

40. 159° 00' 269.14 feet;

41. 69° 50' 297.36 feet;

42. 346° 36' 537.96 feet;

43. 292° 30' 122.64 feet;

44. 349° 00' 112.00 feet;

45. 5° 44' 76.00 feet;

46. 298° 50' 108.00 feet;

47. 266° 30' 178.00 feet;

48. 226° 49' 125.00 feet;

49. 284° 18' 113.00 feet;

50. 335° 24' 85.00 feet;

51. 5° 16' 94.21 feet;

52. 19° 20' 296.21 feet;

53. 8° 41' 825.97 feet;

54. 333° 56' 335.68 feet;

55. 331° 32' 60.00 feet;

56. 287° 11' 449.29 feet;

57. 79° 41' 30" 15.69 feet;

58. 339° 25' 1173.59 feet;

59. 59° 36' 994.00 feet;

60. 89° 54' 1190.00 feet;

61. 147° 59' 136.00 feet;

62. 132° 41' 297.53 feet;

63. 198° 00' 725.57 feet;

64. 176° 00' 447.36 feet;

65. Thence on a curve to the right with a radius of 330.00 feet, the chord azimuth and distance being:
242° 49' 53.5" 94.82 feet;

66. 226° 00' 60.76 feet;

67. 175° 00' 188.10 feet;

68. 203° 00' 904.81 feet;

69. 177° 00' 130.83 feet;

70. 97° 00' 49.54 feet;

71. 45° 00' 545.00 feet;

72. 82° 00' 290.00 feet;

73. 350° 00' 200.00 feet;

74. 12° 00' 535.00 feet;

75. 27° 00' 1080.61 feet;

76. 84° 48' 40" 362.94 feet;

77. 174° 48' 40" 197.82 feet;

78. 172° 13' 30" 242.57 feet;

79. 177° 24' 40" 503.40 feet;

80. 179° 05' 40" 1118.06 feet;

81. 181° 51' 795.48 feet;

82. Thence on a curve to the right with a radius of 470.00 feet, the chord azimuth and distance being:
228° 26' 41" 539.91 feet;

83. 263° 30' 384.04 feet;

84. Thence on a curve to the left with a radius of 480.00 feet, the chord azimuth and distance being:
230° 02' 22.5" 529.31 feet;

85. 196° 34' 45" 469.73 feet;

86. Thence on a curve to the right with a radius of 520.00 feet, the chord azimuth and distance being:
214° 49' 40.5" 325.67 feet;

87. 233° 04' 36" 39.92 feet;

88. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being:
211° 34' 36" 425.14 feet;

89. 190° 04' 36" 1728.09 feet;

90. Thence on a curve to the left with a radius of 630.00 feet, the chord azimuth and distance being:
173° 01' 36" 369.44 feet;

91. 155° 58' 36" 174.49 feet;

92. Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being:
165° 58' 36" 267.42 feet;

93. 175° 58' 36" 632.95 feet;

94. Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being:
189° 16' 36" 354.28 feet;

95. 202° 34' 36" 33.29 feet;

96. 278° 44' 513.03 feet;

97. 274° 40' 565.11 feet;

98. 285° 50' 611.29 feet;

99. 261° 30' 60.00 feet;

100. 250° 00' 149.21 feet;

101. 220° 49' 133.84 feet to the point of beginning and containing a gross area of 439.373 Acres, less the following described Parcel "AG," AG area of 22.100 Acres and a net area of 417.273 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared by:

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

PARCEL AG
CHANGE IN ZONING -MAKENA

Beginning at a point along the southwest corner of this parcel, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6696.43 feet North and 6345.55 feet East and running by azimuths measured clockwise from True South:

1.	189°	19'	406.00	feet;
2.	160°	00'	253.95	feet;
3.	226°	00'	134.20	feet;
4.	165°	40'	676.68	feet;
5.	261°	42'	357.70	feet;
6.	203°	22'	205.00	feet;
7.	176°	36'	556.00	feet;
8.	218°	12'	418.20	feet;
9.	293°	29'	75.82	feet;
10.	353°	38'	431.00	feet;
11.	13°	46'	516.00	feet;
12.	341°	56'	128.00	feet;
13.	49°	10'	504.68	feet;
14.	341°	13'	180.33	feet;

15.	295°	26'	189.94	feet;
16.	350°	15'	798.05	feet;
17.	31°	40'	193.57	feet;
18.	102°	03'	495.21	feet to the point of beginning and containing an area of 22.100 Acres

R. M. TOWILL CORPORATION

Description prepared by:

RYAN M. SUZUKI
LICENSED PROFESSIONAL LAND SURVEYOR
No. 10059
HAWAII, U.S.A.

420 Waiakamilo Road
Honolulu, Hawaii 96817
October 30, 2001

Ryan M. Suzuki
Licensed Professional Land Surveyor
Certificate Number 10059

LOT 2-A

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being the northeast corner of Lot 2-B, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 7557.74 feet North and 5232.55 feet East, and thence running by azimuths measured clockwise from True South:

1. 277° 15' 432.02 feet;
2. Thence on a curve to the right with a radius of 630.000 feet, the chord azimuth and distance being: 19° 53' 09" 83.82 feet;
3. 23° 42' 216.33 feet;
4. 36° 12' 313.71 feet;
5. 167° 40' 598.39 feet to the point of beginning and containing an area of 3.065 Acres.

R. M. TOWILL CORPORATION

Description Prepared by:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

LOT 2-C

CHANGE IN ZONING - MAKENA

Beginning at the north corner of this piece of land, same being the northwest corner of Lot 2-B, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 7501.96 feet North and 4386.71 feet East, and thence running by azimuths measured clockwise from True South:

1. 352° 54' 447.59 feet;
2. 262° 50' 139.91 feet;
3. Thence on a curve to the right with a radius of 400.00 feet, the chord azimuth and distance being: 295° 28' 431.41 feet;
4. 328° 06' 427.44 feet;
5. Thence on a curve to the left with a radius of 770.00 feet, the chord azimuth and distance being: 356° 53' 05" 144.52 feet;
6. 81° 30' 60.00 feet;
7. 105° 50' 611.29 feet;
8. 94° 40' 565.11 feet;
9. 98° 44' 513.03 feet;
10. 202° 34' 36" 208.81 feet;

11. Thence on a curve to the left with a radius of 480.00 feet, the chord azimuth and distance being:
163° 35' 00.5" 604.06 feet;

12. 266° 13' 36" 993.06 feet to the point of beginning and containing an area of 26.045 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared by:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

LOT 4

CHANGE IN ZONING - MAKENA

Beginning at the east corner of this piece of land, same being also the north corner of Lot 1, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6534.89 feet North and 5431.77 feet East and running by azimuths measured clockwise from True South:

1. 40° 49' 133.84 feet;

2. 70° 00' 149.21 feet;

3. Thence on a curve to the right with a radius of 770.00 feet, the chord azimuth and distance being:
193° 51' 585.61 feet;

4. 216° 12' 27.28 feet;

5. 347° 40' 264.59 feet;

6. 355° 16' 180.40 feet to the point of beginning and containing an area of 2.047 Acres.

R. M. TOWILL CORPORATION
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March 6, 2000

LOT 5

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5881.42 feet North and 2759.80 feet East and running by azimuths measured clockwise from True South:

1.	92°	58	36"	39.43	feet;
2.	180°	58'	36"	258.00	feet;
3.	143°	58'	06"	86.83	feet;
4.	159°	08'	40"	195.00	feet;
5.	89°	58'	40"	185.00	feet;
6.	108°	35'	10"	90.10	feet;
7.	154°	06'		95.00	feet;
8.	168°	51'	10"	50.00	feet;
9.	285°	58'	40"	175.32	feet;
10.	325°	30'		28.97	feet;
11.	276°	10'		106.90	feet;
12.	267°	30'		12.18	feet;
13.	300°	28'	40"	107.65	feet;

14.	314°	18'	40"	129.85	feet;
15.	356°	42'	40"	102.65	feet;
16.	2°	58'	36"	345.20	feet to the point of beginning and containing an area of 1.753 Acres.

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March 6, 2000

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LOT 6

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, same being also the southeast corner of Lot 1, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5964.86 feet North and 5478.10 feet East and running by azimuths measured clockwise from True South:

1. Thence on a curve to the right with a radius of 800.00 feet, the chord azimuth and distance being:
   13° 47' 08" 437.11 feet;
2. 161° 14' 336.04 feet;
3. Thence on a curve to the right with a radius of 170.00 feet, the chord azimuth and distance being:
   169° 17' 47.61 feet;
4. 177° 20' 29.90 feet;
5. 262° 24' 224.49 feet to the point of beginning and containing an area of 1.314 Acres.

R. M. TOWILL CORPORATION

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March 6, 2000

LOT 8-A

CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being the northwest corner of Water Tank Lot, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4112.28 feet North and 4961.40 feet East, and thence running by azimuths measured clockwise from True South:

1. 166° 42' 308.18 feet;
2. Thence on a curve to the right with a radius of 800.000 feet, the chord azimuth and distance being:
   192° 01' 684.19 feet;
3. 217° 20' 464.61 feet;
4. Thence on a curve to the left with a radius of 800.00 feet, the chord azimuth and distance being:
   213° 29' 12" 107.34 feet;
5. 341° 14' 164.46 feet;
6. 344° 28' 149.88 feet;
7. Thence on a curve to the right with a radius of 360.00 feet, the chord azimuth and distance being:
   352° 43' 103.32 feet;
8. 0° 58' 40.45 feet;
9. Thence on a curve to the left with a radius of 740.00 feet, the chord azimuth and distance being:
   339° 17' 50.5" 546.49 feet;

10. Thence still on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being:

293° 43' 10" 24.32 feet;

11. 41° 46' 714.65 feet;

12. 115° 14' 37" 193.40 feet;

13. 80° 43' 37" 83.59 feet to the point of beginning and containing an area of 16.019 Acres.

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March 6, 2000

LOT 8-C

CHANGE IN ZONING - MAKENA

Beginning at the west corner of this piece of land, same being the southeast corner of Lot 20, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1082.64 feet North and 4521.81 feet East, and thence running by azimuths measured clockwise from True South:

1. 169° 29' 300.08 feet;

2. 172° 58' 607.06 feet;

3. Thence on a curve to the right with a radius of 312.00 feet, the chord azimuth and distance being:
183° 53' 118.17 feet;

4. 104° 48' 80.00 feet;

5. 174° 21' 819.44 feet;

6. 185° 38' 320.00 feet;

7. 158° 16' 254.87 feet;

8. 184° 16' 1023.34 feet;

9. Thence on a curve to the right with a radius of 800.00 feet, the chord azimuth and distance being:
336° 11' 11" 646.02 feet;

10. 0° 00' 218.30 feet;

11. 1° 23' 101.39 feet;

12. 268° 25' 387.00 feet;

13. 199° 35' 45.94 feet;

14. 185° 35' 461.50 feet;

15. 350° 43' 37" 49.50 feet;

16. Thence on a curve to the right with a radius of 390.00 feet, the chord azimuth and distance being:
0° 47' 37" 136.34 feet;

17. 290° 00' 196.45 feet;

18. 20° 00' 77.96 feet;

19. 359° 20' 271.78 feet;

20. 51° 42' 32" 102.20 feet;

21. 343° 30' 02" 608.02 feet;

22. 43° 02' 30" 316.00 feet;

23. 14° 24' 34" 152.58 feet;

24. 353° 30' 93.00 feet;

25. 67° 00' 547.80 feet;

26. 336° 30' 435.00 feet;

27. 5° 52' 30" 385.93 feet;

28. 278° 55' 20" 461.31 feet;

29. 355° 06' 45" 581.81 feet;

30. 93° 48' 30" 357.94 feet;

31. 337° 30' 02" 1229.37 feet;

32. 79° 41' 30" 658.22 feet;

33. 107° 11' 449.29 feet;

34. 151° 32' 60.00 feet;

35. 153° 56' 273.55 feet;

36. Thence on a curve to the left with a radius of 4300.00 feet, the chord azimuth and distance being:
198° 20' 01" 1201.65 feet;

37. 273° 30' 143.50 feet to the point of beginning and containing an area of 68.048 Acres.

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March 6, 2000

LOT 11-B

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the northeast corner of Lot 12, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4702.48 feet North and 2652.75 feet East and running by azimuths measured clockwise from True South:

1.	290°	00'	167.01	feet;
2.	20°	00'	119.98	feet;
3.	110°	00'	167.01	feet;
4.	200°	00'	119.98	feet to the point of beginning and containing an area of 0.460 Acre.

R. M. TOWILL CORPORATION

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RUSSELL FIGUEIROA LICENSED PROFESSIONAL LAND SURVEYOR No. 4729 HAWAII, U.S.A.

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March 6, 2000

LOT 12

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4737.88 feet North and 2555.47 feet East and running by azimuths measured clockwise from True South:

1.	290°	00'	103.52	feet;
2.	20°	00'	119.98	feet;
3.	110°	00'	192.27	feet;
4.	236°	53'	123.55	feet;

5. Thence on a curve to the left with a radius of 322.00 feet, the chord azimuth and distance being: 234° 35' 45" 25.70 feet to the point of beginning and containing an area of 0.406 Acre.

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March 6, 2000

LOT 13

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northwest corner of Lot 15-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4227.10 feet North and 2235.27 feet East and running by azimuths measured clockwise from True South:

1.	80°	37'	62.31	feet;
2.	180°	48'	82.89	feet;
3.	144°	10'	67.92	feet;
4.	275°	11'	80.51	feet;
5.	Thence on a curve to the left with a radius of 323.00 feet, the chord azimuth and distance being: 350° 53' 46" 3.15 feet;			
6.	350°	37'	119.00	feet to the point of beginning and containing an area of 0.173 Acre.

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March 6, 2000

LOT 14

CHANGE IN ZONING - MAKENA

Beginning at the south corner of this piece of land, same being also the southwest corner of Lot 22-B, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1682.37 feet South and 2542.61 feet East and running by azimuths measured clockwise from True South:

1.	132°	41'	403.29	feet;
2.	Thence on a curve to the left with a radius of 750.00 feet, the chord azimuth and distance being: 251° 35' 05.5" 261.08 feet;			
3.	352°	12'	359.21	feet to the point of beginning and containing an area of 1.012 Acres.

R. M. TOWILL CORPORATION

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LOT 15-B

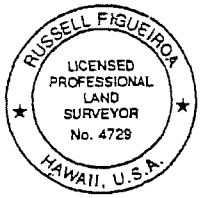
CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4070.33 feet North and 2317.94 feet East and running by azimuths measured clockwise from True South:

1.	274°	44'	70.62	feet;
2.	318°	59'	24.00	feet;
3.	272°	25'	94.80	feet;
4.	358°	50'	104.20	feet;
5.	107°	59'	125.00	feet;
6.	160°	05'	12.00	feet;
7.	27°	35'	10.00	feet;
8.	102°	45'	48.60	feet;
9.	179°	00'	12.02	feet;

10. Thence on a curve to the left with a radius of 328.00 feet, the chord azimuth and distance being:
174° 48' 30" 47.95 feet;

11. 170° 37' 20.88 feet to the point of beginning and containing an area of 0.353 Acres.



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March 6, 2000

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LOT 16

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 3108.23 feet North and 1889.16 feet East and running by azimuths measured clockwise from True South:

1.	124°	42'	107.24	feet;
2.	101°	04'	28.00	feet;
3.	91°	12'	6.00	feet;
4.	Thence on a curve to the left with a radius of 25.00 feet, the chord azimuth and distance being: 65° 13' 30" 21.90 feet;			
5.	39°	15'	20.00	feet;
6.	305°	15'	9.00	feet;
7.	39°	40'	16.00	feet;
8.	137°	57'	13.00	feet;
9.	76°	00'	37.00	feet;
10.	Thence on a curve to the left with a radius of 250.00 feet, the chord azimuth and distance being: 136° 41' 45" 141.58 feet;			
11.	228°	50'	20.00	feet;
12.	252°	28'	53.00	feet;

13.	293°	57'		53.00	feet;
14.	221°	13'		29.00	feet;
15.	129°	34'		17.00	feet;
16.	216°	13'		17.00	feet;
17.	300°	34'		57.00	feet;
18.	230°	38'		56.17	feet;
19.	248°	53'		34.90	feet;
20.	311°	36'	15"	139.84	feet;
21.	29°	20'		124.40	feet to the point of beginning and containing an area of 0.861 Acre.

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March 6, 2000

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LOT 17
CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being also the northwest corner of Lot 19, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 2860.50 feet North and 1798.77 feet East and running by azimuths measured clockwise from True South:

1. 205° 07' 153.25 feet;
2. 207° 52' 44" 90.02 feet;
3. 258° 14' 590.87 feet;
4. 270° 00' 339.85 feet;
5. 290° 26' 441.91 feet;
6. Thence on a curve to the right with a radius of 520.00 feet, the chord azimuth and distance being: 39° 10' 37.5" 249.83 feet;
7. 53° 04' 36" 39.92 feet;
8. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being: 48° 28' 31.5" 93.06 feet;
9. 110° 29' 234.97 feet;
10. 90° 45' 960.11 feet to the point of beginning and containing an area of 9.372 Acres.

R. M. TOWILL CORPORATION
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RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared By:

420 Waiakamilo Rd., #411
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October 22, 2000 Rev.

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R. M. TOWILL CORPORATION
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LOT 18

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1722.80 feet North and 1532.63 feet East and running by azimuths measured clockwise from True South:

1.	112°	00'	34.98	feet;
2.	93°	30'	649.05	feet;
3.	180°	37'	109.74	feet;
4.	193°	19'	209.91	feet;
5.	197°	25'	294.96	feet;
6.	195°	35'	167.83	feet;
7.	150°	49'	112.43	feet;
8.	187°	04'	126.83	feet;
9.	165°	36'	110.87	feet;
10.	236°	33'	142.75	feet;
11.	258°	37'	105.15	feet;
12.	229°	30'	93.02	feet;
13.	291°	08'	0.16	feet;
14.	222°	30'	78.00	feet;

15.	246°	39'	136.00	feet;
16.	274°	44'	33.00	feet;
17.	182°	05'	116.00	feet;
18.	302°	34'	87.00	feet;
19.	229°	39'	53.65	feet;

20. Thence on a curve to the right with a radius of 250.00 feet, the chord azimuth and distance being:
316° 41' 45" 141.58 feet;

21.	76°	00'	12.00	feet;
22.	47°	49'	278.45	feet;
23.	40°	00'	285.81	feet;
24.	16°	30'	708.56	feet;
25.	292°	00'	503.50	feet;
26.	8°	00'	135.00	feet to the point of beginning and containing an area of 10.440 Acres.

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March 6, 2000

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LOT 19
CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being also the southwest corner of Lot 17, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 2860.50 feet North and 1798.77 feet East and running by azimuths measured clockwise from True South:

1. 270° 45' 960.11 feet;
2. 290° 29' 234.97 feet;
3. Thence on a curve to the left with a radius of 580.00 feet, the chord azimuth and distance being:
   30° 13' 36" 273.70 feet;
4. 16° 34' 45" 469.73 feet;
5. Thence on a curve to the right with a radius of 420.00 feet, the chord azimuth and distance being:
   50° 02' 22.5" 463.14 feet;
6. 83° 30' 384.04 feet;
7. Thence on a curve to the left with a radius of 530.00 feet, the chord azimuth and distance being:
   64° 36' 48.5" 343.12 feet;
8. Thence still on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being:
   88° 22' 23.5" 27.10 feet;
9. Still on a curve to the right with a radius of 128.00 feet, the chord azimuth and distance being:
   157° 16' 50" 113.27 feet;

10. 186° 50' 20" 333.75 feet;
11. 188° 23' 20" 251.10 feet;
12. 185° 03' 142.40 feet;
13. 190° 10' 131.42 feet;
14. 197° 07' 297.40 feet;
15. 197° 07' 03" 32.00 feet to the point of beginning and containing an area of 27.820 Acres.

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R. M. TOWILL CORPORATION

Description Prepared By:

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
October 22, 2000 Rev.

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

LOT 20

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the west corner of Lot 8-C, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1082.64 feet North and 4521.81 feet East and running by azimuths measured clockwise from True South:

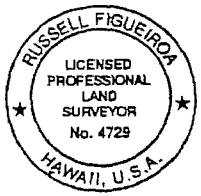
1.	93°	30'	326.35	feet;
2.	185°	16'	94.21	feet;
3.	155°	24'	85.00	feet;
4.	104°	18'	113.00	feet;
5.	46°	49'	125.00	feet;
6.	86°	30'	178.00	feet;
7.	118°	50'	108.00	feet;
8.	185°	44'	76.00	feet;
9.	169°	00'	112.00	feet;
10.	112°	30'	122.64	feet;
11.	166°	36'	537.96	feet;
12.	249°	50'	297.36	feet;
13.	339°	00'	269.14	feet;

14. Thence on a curve to the right with a radius of 350.00 feet, the chord azimuth and distance being: 349° 55' 132.57 feet;

15.	0°	50'	165.32	feet;

16. Thence on a curve to the left with a radius of 200.00 feet, the chord azimuth and distance being: 313° 52' 292.38 feet;

17.	266°	54'	122.98	feet;
18.	196°	00'	235.58	feet;
19.	234°	12'	226.64	feet;
20.	352°	58'	356.56	feet;
21.	349°	29'	300.08	feet to the point of beginning and containing an area of 9.817 Acres.



R. M. TOWILL CORPORATION

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

LOT 21-B

CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being also the southwest corner of Lot 21-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 621.97 feet South and 2447.61 feet East and running by azimuths measured clockwise from True South:

1. 305° 18' 317.33 feet;
2. Thence on a curve to the left with a radius of 330.00 feet, the chord azimuth and distance being: 14° 45' 03" 27.46 feet;
3. 12° 22' 233.89 feet;
4. Thence on a curve to the right with a radius of 500.00 feet, the chord azimuth and distance being: 30° 19' 22" 308.29 feet;
5. Thence still on a curve to the right with a radius of 750.00 feet, the chord azimuth and distance being: 71° 35' 05.5" 261.08 feet;
6. 65° 15' 204.55 feet;
7. 84° 48' 40" 60.44 feet;
8. 207° 00' 985.50 feet to the point of beginning and containing an area of 6.542 Acres.

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Licensed Professional Land Surveyor
Certificate Number 4729

LOT 22-A

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northeast corner of Lot 22-B, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 906.70 feet South and 2849.74 feet East and running by azimuths measured clockwise from True South:

1. 125° 18' 175.40 feet;
2. Thence on a curve to the right with a radius of 330.00 feet, the chord azimuth and distance being: 215° 51' 12" 211.80 feet;
3. 356° 00' 273.69 feet to the point of beginning and containing an an area of 0.483 Acres.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

END OF EXHIBIT "1"

EXHIBIT "2"

Table 1

CHANGE IN ZONING				
TMK	**Lot No.**	**From**	**To**	**Acres**
2-1-5:por. 108, por. 120; 2-1-6:36, por. 57; 2-1-8: por. 78, por. 79, por. 81, por. 90	1, 17, 18	County Ag, A1, A2, R1, GC & OS, R-3, OZ	PK-4	437.085
2-1-5:por. 108; 2-1-8: por. 78, por. 79, por. 81, por. 90	2A, 2C, 8A, 8C, 21B	County Ag, R1, A1, R-3, OZ, GC & OS, STP	A2	119.719
2-1-8:por. 90	4, 6	A1, A2	R3	3.361
2-1-7:por. 68	11B	R-2	BR	0.460
2-1-5:por. 108, por. 124; 2-1-6:por. 56, por. 57, por. 59; 2-1-7:por. 68, 93, por. 94	5, 12, 13, 14, 16	Park, R-2, GC & OS, R-1, H-M	PK-1	4.205
2-1-5:83, 84, 85, por. 108, por. 120; 2-1-7:4	15B, 19	GC & OS, B-R, A-1, OZ	HM	28.173
2-1-5:por. 108	20	A2, GC & OS, R-3	B2	9.817
2-1-5:por. 108	22A	A2	R1	0.483
TOTAL				603.303

EXHIBIT "3"

Conditions of Zoning

INTRODUCTORY NOTES:

A. Unless otherwise specified, each condition applies to each project.

B. The following definitions shall apply to these conditions:

"County" means the County of Maui.

"Developer" means Keaka LLC; Makena Golf, LLC; Makena Hotel, LLC; Makena MF-2&3, LLC; and Makena Resort Services LLC; their successors and permitted assigns; and any future developer or owner of any property that is the subject of this Change in Zoning.

"Project" means each development that requires an SMA permit from the Maui Planning Commission.

"SMA" means Special Management Area.

"State" means the State of Hawaii.

Density and Height Restrictions

1. In the R-1, R-2, and R-3 Residential District zoned areas, the density shall not exceed 2.5 single-family dwelling units per acre.

2. In the A-2 Apartment District zoned areas, the density shall not exceed eight units per acre, and the building height shall not exceed 45 feet. Height shall be measured from the natural or finish grade, whichever is lower.

3. In the B-2 Community Business District zoned areas, the gross floor area of each building shall not exceed 60 percent of the total lot area.

4. On Lot 19 (H-M Hotel District), the building height

shall not exceed 45 feet and shall be consistent with the Urban Design Standards for Building Form in the Kihei-Makena Community Plan; no more than 89 units shall be developed; and no lockout units shall be allowed. Height shall be measured from the natural or finish grade, whichever is lower.

5. The developer shall preserve Makena's significant views of the Pacific Ocean and the broad vista to the Central Maui and Upcountry regions. The use of walls higher than four feet in frontyard setbacks shall be prohibited.

Noise Mitigation

6. In the B-2 Community Business District zoned areas, the following permitted uses shall incorporate acoustical measures into the facility to mitigate potential noise impacts: amusement enterprises, including billiard and pool halls; auditoriums and theaters; baseball and football stadiums and other sport activities and amusements; bowling alleys; dancing and hula studios; gymnasiums; miniature golf courses; music conservatories and music studios; physical-culture studios; and printing, lithography, and publishing shops.

Lighting Standards

7. All exterior lighting shall be shielded from adjacent residential properties and nearshore waters, and shall be fully shielded to prevent uplight. Lighting requirements in force at the time of building permit application shall be applied.

Screening of Certain Uses

8. In the B-2 Community Business District zoned areas, merchandise, equipment, and supplies shall be stored within enclosed buildings or enclosed areas that are appropriately screened with fencing and landscape planting for the following permitted uses: equipment rental and sales yards; hardware and garden supply stores; parcel delivery stations; and printing, lithography, and publishing shops.

Education

9. The developer, its successors and permitted assigns, shall pay the Department of Education $3,000 per dwelling unit upon issuance of each building permit to be used, to the extent possible, for schools serving the Kihei-Makena Community Plan area; provided that, should the State pass legislation imposing school impact fees that apply to the Makena Resort Area, the developer, its successors and permitted assigns, shall from that point forward comply with the State requirements, or contribute $3,000 per dwelling unit, whichever is greater. Should a previous agreement exist between the Department of Education and the landowner, this condition shall prevail.

Transportation

10. The developer shall provide pedestrian and bicycle access ways within the roadways throughout and fronting the Makena Resort Area. A schematic plan for pedestrian and bicycle access ways throughout and fronting the Makena Resort Area shall be submitted to the Department of Planning for consideration by the Maui Planning Commission in conjunction with SMA permit applications.

11. The developer shall make a contribution to the County for traffic improvements in an amount equal to $5,000 per unit. The contribution shall be paid to the County prior to issuance of the initial building permit. Upon adoption of a traffic impact fee ordinance, the developer shall comply with the ordinance in lieu of this voluntary contribution. Should a traffic impact fee ordinance be adopted prior to the collection of this contribution, the applicable amount shall be the greater of the two. Such contributions or fees shall not be counted towards Condition No. 12 below.

12. Upon commencement of the first phase of construction, the developer shall pay its pro-rata share to upgrade Piilani Highway from Kilohana Drive to Wailea Ike Drive to four lanes of traffic, and shall cooperate with the State Department of Transportation and other area

developers to implement such improvements concurrent with development.

13. The developer shall provide construction access roads from Piilani Highway to the construction sites. Construction traffic shall be prohibited on Kilohana Drive, Wailea Ike Drive, Wailea Alanui Drive, and Makena Alanui Drive to the extent practicable.

14. The developer shall develop and submit a Transportation Management Plan ("TMP"), to be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation. The purpose of the TMP shall be to reduce traffic generated by construction activity related to the Makena Resort Area. The TMP shall provide for programs such as park and ride, shuttles, and/or restrictions on worker access to ongoing construction activity during peak hour traffic. Upon approval, project contractors shall implement the TMP during construction activities. The developer shall submit an annual report to the State Department of Transportation, the County Department of Public Works, the County Department of Transportation, and the Maui County Council to document the success of the TMP in meeting its benchmarks of reducing traffic during project construction.

    The TMP shall be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation prior to issuance of each SMA permit within the Makena Resort Area.

15. As part of the first SMA application, the developer shall submit a TMP to reduce the dependency on individual vehicular transportation modes. The TMP shall be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation to address post-construction traffic issues.

Civil Defense

16. The developer shall participate in the pro rata funding

and construction of adequate civil defense measures as determined by the State and County civil defense agencies.

Historical and Cultural Resources

17. Should any human burials or any historic sites such as artifacts, charcoal deposits, stone platforms, pavings, or walls be found, the developer shall stop construction work in the immediate vicinity and notify the State Historic Preservation Division (SHPD), the Maui/Lanai Island Burial Council (MLIBC), and the Maui County Cultural Resources Commission (CRC).

18. The developer, its successors and permitted assigns, shall provide a comprehensive preservation/mitigation plan pursuant to Chapter 6E, Hawaii Revised Statutes, that has been approved by the State Historic Preservation Division, Department of Land and Natural Resources, and the Office of Hawaiian Affairs prior to any grading within the project area.

Nearshore Water Quality

19. Marine monitoring programs shall be conducted which include monitoring and assessment of coastal water resources (groundwater and surface water) that receive surface water or groundwater discharges from the hydrologic unit where the project is located. Monitoring programs shall include both water quality and ecological monitoring.

    Water Quality Monitoring shall provide water quality data adequate to assess compliance with applicable State water quality standards at Hawaii Administrative Rules Chapter 11-54. Assessment procedures shall be in accordance with the current Hawaii Department of Health ("HIDOH") methodology for Clean Water Act Section 305(b) water quality assessment, including use of approved analytical methods and quality control/quality assurance measures. The water quality data shall be submitted biannually, or every six months, to HIDOH for use in the State's Integrated Report of Assessed Waters prepared under Clean Water Act Sections 303(d) and 305(b). If this report lists the receiving waters as

impaired and requiring a Total Maximum Daily Load ("TMDL") study, then the monitoring program shall be amended to evaluate land-based pollutants, including: (1) monitoring of surface water and groundwater quality for the pollutants identified as the source of the impairment; and (2) providing estimates of total mass discharge of those pollutants on a daily and annual basis from all sources, including infiltration, injection, and runoff. The results of the land-based pollution water quality monitoring and loading estimate shall be submitted to the HIDOH Environmental Planning Office, TMDL Program.

    The ecological monitoring shall include ecological assessment in accordance with the Coral Reef Assessment and Monitoring Program protocols used by the Department of Land and Natural Resources. The initial assessment shall use the full protocol. Subsequent biannual assessments can use the Rapid Assessment Techniques. Results shall be reported biannually to the Aquatic Resources Division, Department of Land and Natural Resources.

    The monitoring and assessments shall be conducted by degreed scientists experienced with Clean Water Act programs, water quality monitoring, water quality assessment, water quality-based permitting, water quality modeling, watershed planning, and TMDL. Study design should be made available for both public review and peer review by the State Department of Health, Department of Aquatic Resources, and the University of Hawaii researchers. Results of monitoring shall be published and publicly available online.

20. The developer shall implement efficient soil-erosion and dust-control measures during and after development to the satisfaction of DOH and the County.

Transfer of Ownership

21. The developer shall give notice to the Department of Planning and the Council of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Makena Resort Area, prior to any development.

Compliance with Conditions

22. The developer shall provide timely annual compliance reports to the Planning Director and the Council. The compliance reports shall include: (a) the status of the developer's compliance with each of these conditions; and (b) a reasonable estimate of the time needed for full compliance.

23. Failure to fulfill any condition may result in a reversion to former or more appropriate zoning or community plan designations or other remedies.

24. If any of the property subject to this Change in Zoning is consolidated with other property for purposes of an SMA permit application, these conditions shall apply to the entirety of the consolidated property.

Residential Workforce Housing

25. The developer shall comply with the County's Residential Workforce Housing Policy as provided in Chapter 2.96, Maui County Code.

Water

26. The developer shall comply with all applicable County water ordinances.

    The water rates for the residential workforce housing units shall be no higher than the general water consumer rates set by the County in its annual budget, for as long as the units are subject to Chapter 2.96, Maui County Code.

27. The developer shall provide a water conservation plan for the Makena Resort Area, approved by the Department

of Water Supply, prior to the issuance of any SMA permits. For each project, the developer shall construct a dual waterline system to accommodate the use of non-potable water for landscaping and irrigation purposes prior to the issuance of any building permits.

Energy

28. All energy systems for all residential, commercial, and hotel units shall be designed and constructed to meet all applicable Energy Star® requirements established by the Climate Protection Division of the United States Environmental Protection Agency in effect at the time of construction. For purposes of this condition, energy systems shall include all hot-water systems, roof and attic areas, outside walls, windows, air-cooling systems, and heating systems.

29. All residential, commercial, and hotel units shall comply with Chapter 16.16, Maui County Code.

30. All air-cooling systems and all heating systems for laundry facilities, swimming pools, and spa areas shall make maximum use of energy-efficient construction and technology.

Access for Parks and Recreation

31. The developer shall construct a minimum of 60 new parking stalls at Maluaka Beach, including at least 10 at the north end, within one year of the issuance to the developer of any SMA permit by the Maui Planning Commission relating to a parcel or a portion thereof that is a subject of this Change in Zoning. Unless necessary to protect public safety or to comply with State or Federal law, the required parking stalls need not be asphalt surfaced. Development costs and land shall not satisfy park dedication requirements.

32. The developer shall develop an expansion of the beach park at the south end of Maluaka Beach, such that the beach park shall comprise at least 1.5 acres of land area for public use and beach access. The developer shall submit the necessary applications required for the expansion within six months of the approval of this

Change in Zoning. The land area of the expansion of the existing park shall be applied as credit toward satisfying a portion of any applicable park dedication requirements.

33. To the extent practicable, the developer shall provide, in perpetuity, traversable lateral shoreline access in the area between the shoreward boundary and the mauka boundary of the Makena Resort Area. Costs associated with this condition shall not satisfy park dedication requirements.

34. Within one year of the approval of this Change in Zoning, the developer shall initiate and fund a plan for the development of the State Park at Makena for the State Department of Land and Natural Resources and the Department of Parks and Recreation, soliciting and taking into consideration the comments of various user groups, including Surfrider Foundation, Savemakena.org, Maui Tomorrow, the Kihei Community Association, and the Makena Homeowner's Association. The plan shall incorporate recreational, landscaping, parking, and facility concepts as a guide for future development of the park. Costs associated with this condition shall not satisfy park dedication requirements.

35. The developer shall renovate and beautify Makena Landing (TMK: 2-1-007:094), see attached map, in coordination with the Department of Parks and Recreation and the State Department of Land and Natural Resources. Costs associated with this condition shall not satisfy park dedication requirements.

36. The developer shall maintain Makena Landing (TMK: 2-1-007:094), North Maluaka (TMK: 2-1-007:068), and South Maluaka (TMK: 2-1-005:124), see attached map, and all future parklands within the Makena Resort Area.

Hawaiian Island Architecture

37. To exhibit respect for the Hawaiian culture and a Hawaiian sense of place, structures within the Makena Resort Area shall be based on or inspired by principles of Hawaiian island architecture in design and construction.

Native Forests and Species

38. The developer shall provide a baseline study survey of flora and fauna as part of each SMA permit application within the Makena Resort Area; the study shall be conducted by recognized independent experts on Hawaiian flora and fauna and list all endemic, indigenous, and endangered species, their distribution in the Makena Resort Area and adjacent shorelines. This study shall also include a preservation/mitigation plan and comments from the State Department of Land and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Corps of Engineers, and the Maui representative of the Hawaii Wildlife Fund and The Nature Conservancy.

Transient Vacation Rentals/Time Shares

39. No transient vacation rentals or time shares shall be allowed within this Makena Resort rezoning application area; and further, no special use permit or conditional permit for such accommodations shall be accepted by the Department of Planning.

Hotel Limitation

40. A second hotel shall not be constructed within the Makena Resort Area.

LEED Certified Buildings

41. All buildings constructed within the Makena Resort Area shall be LEED (Leadership in Energy and Environmental Design) certified if they are 500 square feet or larger.

Dwelling Units

42. New dwelling units shall not exceed 800, excluding residential workforce housing.

Police

43. The developer, its successors and permitted assigns, shall contribute $1,000 per market-priced unit, collected at issuance of building permit, to the County, for the development and maintenance of a police station in South Maui.

Emergency Evacuation

44. The developer shall provide Driveway "D" from Makena Alanui Road to Makena Resort Sewage Treatment Plant and beyond as an emergency evacuation route for the area.

lu:misc:Makena conditions (12-10-08)

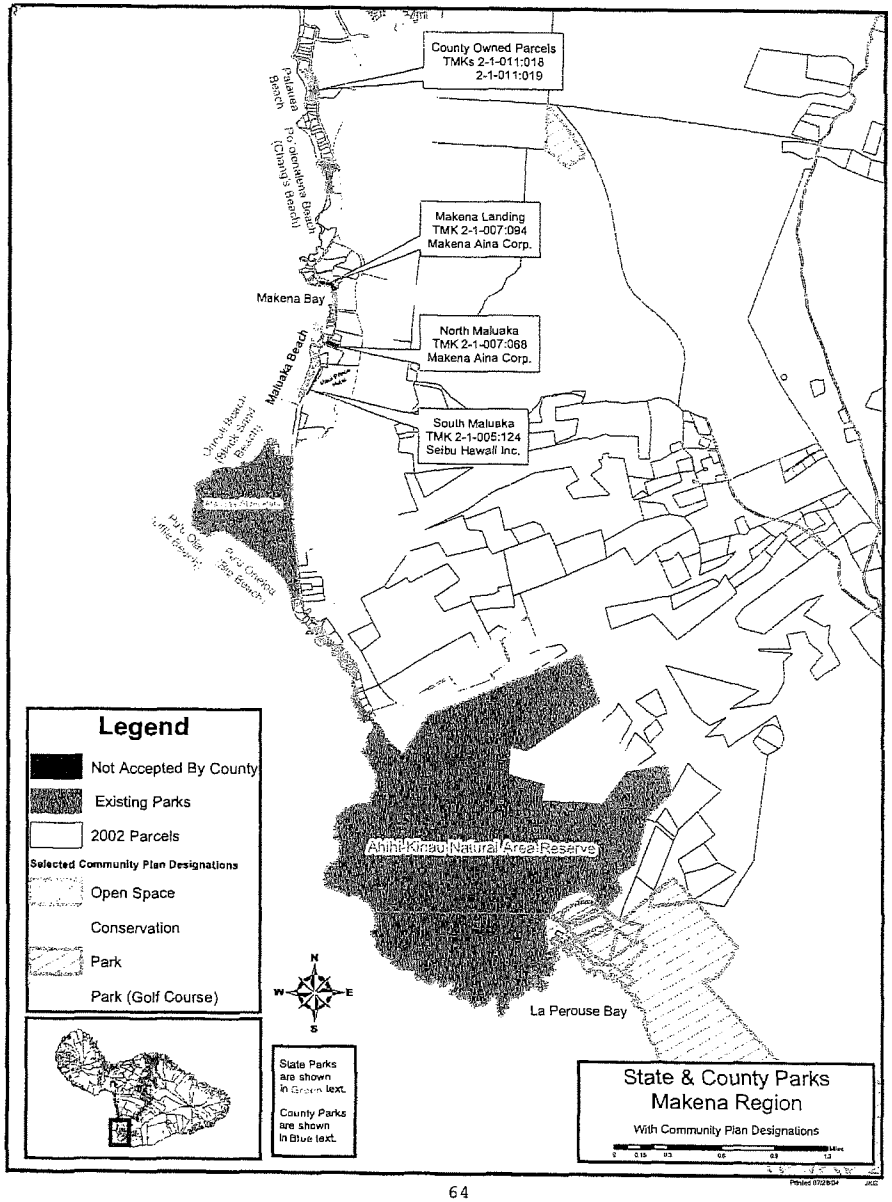

EXHIBIT "D"

LOT 2-B

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, same being the northwest corner of Lot 2-A, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 7557.74 feet North and 5232.55 feet East, and thence running by azimuths measured clockwise from True South:

1. 347° 40' 598.39 feet;
2. 36° 12' 27.28 feet;
3. Thence on a curve to the left with a radius of 770.00 feet, the chord azimuth and distance being: 19° 14' 05" 449.36 feet;
4. 148° 06' 427.44 feet;
5. Thence on a curve to the left with a radius of 400.00 feet, the chord azimuth and distance being: 115° 28' 431.41 feet;
6. 82° 50' 139.91 feet;
7. 172° 54' 447.59 feet;
8. 266° 13' 36" 847.68 feet to the point of beginning and containing an area of 12.414 Acres.

R. M. TOWILL CORPORATION
CIVIL ENGINEERS • SURVEYORS
420 WAIAKAMILO ROAD #411 • HONOLULU, HAWAII 96817-4941

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

R. M. TOWILL CORPORATION

Description Prepared by:

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420 WAIAKAMILO ROAD #411 • HONOLULU, HAWAII 96817-4941

EXHIBIT "D"

LOT 3

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 6700.16 feet North and 2692.32 feet East and running by azimuths measured clockwise from True South:

1.	149°	59'		48.08	feet;
2.	184°	55'		49.28	feet;
3.	194°	07'	40"	32.24	feet;
4.	204°	39'		133.14	feet;
5.	204°	38'	56"	41.06	feet;
6.	253°	50'	56"	136.00	feet;
7.	211°	35'	56"	37.00	feet;
8.	271°	20'	56"	117.00	feet;
9.	217°	35'	56"	75.00	feet;
10.	205°	35'	56"	95.00	feet;
11.	192°	30'	56"	75.00	feet;
12.	216°	35'	56"	148.00	feet;
13.	269°	00'	56"	52.00	feet;
14.	205°	40'	56"	49.00	feet;

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15. Thence on a curve to the right with a radius of 420.00 feet, the chord azimuth and distance being:
337° 34' 36" 593.97 feet;

16.	22°	34'	36"	242.10	feet;

17. Thence on a curve to the left with a radius of 830.00 feet, the chord azimuth and distance being:
9° 16' 36" 381.88 feet;

18.	355°	58'	36"	572.95	feet;

19. Thence on a curve to the right with a radius of 30.00 feet; the chord azimuth and distance being:
40° 58' 36" 42.43 feet;

20.	85°	58'	36"	103.79	feet;

21. Thence on a curve to the right with a radius of 470.00 feet, the chord azimuth and distance being:
94° 38' 36" 141.65 feet;

22.	103°	18'	36"	91.40	feet;

23. Thence on a curve to the left with a radius of 530.00 feet, the chord azimuth and distance being:
96° 23' 36" 127.65 feet;

24.	89°	28'	36"	89.29	feet;

25. Thence on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being:
134° 28' 36" 28.28 feet;

26.	179°	28'	36"	110.34	feet;
27.	182°	58'	36"	381.81	feet;
28.	176°	42'	36"	76.58	feet;
29.	176°	42'	40"	43.77	feet;
30.	134°	18'	40"	150.22	feet;

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31.	120°	28'	40"	50.86	feet;
32.	267°	30'		83.24	feet;
33.	275°	23'		76.45	feet;
34.	309°	00'		48.00	feet;
35.	241°	56'		34.37	feet;
36.	241°	55'	56"	86.88	feet;
37.	151°	23'	56"	58.95	feet;
38.	175°	09'	56"	9.65	feet;
39.	175°	10'		26.75	feet;
40.	135°	57'		71.93	feet;
41.	106°	04'		101.15	feet;
42.	85°	04'		68.30	feet;
43.	161°	55'		24.33	feet;
44.	131°	26'		22.27	feet to the point of beginning and containing an area of 22.108 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared by:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 8-B

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, same being the northwest corner of Lot 6, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5935.17 feet North and 5255.58 feet East, and thence running by azimuths measured clockwise from True South:

1.	357°	20'		29.90	feet;
2.	Thence on a curve to the left with a radius of 170.000 feet, the chord azimuth and distance being: 349° 17'			47.61	feet;
3.	341°	14'		336.04	feet;
4.	Thence on a curve to the right with a radius of 800.00 feet, the chord azimuth and distance being: 33° 29' 12"			107.34	feet;
5.	37°	20'		464.61	feet;
6.	Thence on a curve to the left with a radius of 800.00 feet, the chord azimuth and distance being: 12° 01'			684.19	feet;
7.	346°	42'		308.18	feet;
8.	5°	35'		461.50	feet;
9.	19°	35'		45.94	feet;
10.	88°	25'		387.00	feet;
11.	181°	23'		101.39	feet;

12. 180° 00' 218.30 feet;

13. Thence on a curve to the left with a radius of 800.00 feet, the chord azimuth and distance being:
156° 11' 11" 646.02 feet;

14. 184° 16' 61.82 feet;

15. 214° 32' 200.78 feet;

16. 153° 18' 306.94 feet;

17. 183° 56' 605.61 feet;

18. 266° 17' 183.77 feet;

19. 244° 06' 739.18 feet;

20. 273° 13' 68.47 feet;

21. 280° 08' 61.96 feet to the point of beginning and containing an area of 33.552 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared By:

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Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 8-D

CHANGE IN ZONING - MAKENA

Beginning at the northwest corner of this piece of land, same being the south corner of Lot 20, the coordinate of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 1102.56 feet North and 4196.06 feet East, and thence running by azimuths measured clockwise from True South:

1. 273° 30' 182.85 feet;

2. Thence on a curve to the right with a radius of 4300.00 feet, the chord azimuth and distance being:
18° 20' 01" 1201.65 feet;

3. 153° 56' 62.13 feet;

4. 188° 41' 825.97 feet;

5. 199° 20' 296.21 feet to the point of beginning and containing an area of 4.220 Acres.

R. M. TOWILL CORPORATION

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420 Waiakamilo Rd., #411
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March 6, 2000

EXHIBIT "D"

LOT 7

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 5784.82 feet North and 2758.52 feet East and running by azimuths measured clockwise from True South:

1.	359°	28'	36"	137.54	feet;
2.	94°	31'	26"	130.00	feet;
3.	193°	28'	36"	82.00	feet;
4.	114°	58'	36"	85.00	feet;
5.	204°	58'	36"	35.00	feet;
6.	281°	58'	36"	100.00	feet;
7.	269°	28'	36"	73.68	feet to the point of beginning and containing an area of 0.420 Acre.

R. M. TOWILL CORPORATION

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420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 9

CHANGE IN ZONING - MAKENA

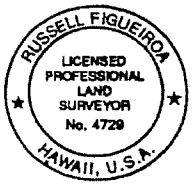
Beginning at the southeast corner of this piece of land, same being also the southwest corner of Lot 10, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4858.47 feet North and 2870.09 feet East and running by azimuths measured clockwise from True South:

1.	110°	00'		239.21	feet;
2.	198°	58'	40"	157.28	feet;
3.	Thence on a curve to the left with a radius of 228.00 feet, the chord azimuth and distance being: 197° 41' 07" 10.29 feet;				
4.	102°	28'	06"	6.90	feet;
5.	198°	58'	36"	32.13	feet;
6.	176°	58'	36"	117.12	feet;
7.	196°	28'	36"	227.31	feet;
8.	167°	36'	56"	140.09	feet;
9.	179°	28'	36"	17.65	feet;
10.	Thence on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being: 224° 28' 36" 28.28 feet;				
11.	269°	28'	36"	89.29	feet;

12. Thence on a curve to the right with a radius of 470.00 feet, the chord azimuth and distance being:
274° 08' 37.5" 76.48 feet;

13. 7° 33' 352.37 feet;

14. 0° 03' 427.79 feet to the point of beginning and containing an area of 2.918 Acres.



R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 10
CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northeast corner of Lot 11-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 4652.68 feet North and 3542.49 feet East and running by azimuths measured clockwise from True South:

1. 72° 47' 315.75 feet;

2. 112° 06' 367.35 feet;

3. 110° 00' 24.28 feet;

4. 200° 00' 178.00 feet;

5. 180° 03' 427.79 feet;

6. 187° 33' 352.37 feet;

7. Thence on a curve to the right with a radius of 470.00 feet, the chord azimuth and distance being:
281° 03' 37.5" 36.90 feet;

8. 283° 18' 36" 91.40 feet;

9. Thence on a curve to the left with a radius of 530.00 feet, the chord azimuth and distance being:
274° 38' 36" 159.73 feet;

10. 265° 58' 36" 105.89 feet;

11. Thence on a curve to the right with a radius of 30.00 feet, the chord azimuth and distance being:
308° 58' 35" 40.92 feet;

12. Thence still on a curve to the left with a radius of 830.00 feet, the chord azimuth and distance being:
343° 58' 35" 231.02 feet;

13. 335° 58' 36" 174.49 feet;

14. Thence on a curve to the right with a radius of 570.00 feet, the chord azimuth and distance being:
353° 01' 36" 334.26 feet;

15. 10° 04' 36" 228.38 feet to the point of beginning and containing an area of 13.526 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

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Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

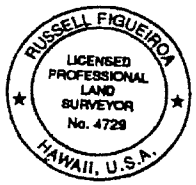
LOT 11-A

CHANGE IN ZONING - MAKENA

Beginning at the southeast corner of this piece of land, same being also the northeast corner of Lot 15-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 3978.85 feet North and 3422.75 feet East and running by azimuths measured clockwise from True South:

1. 94° 44' 640.58 feet;
2. 210° 40' 337.40 feet;
3. 180° 00' 99.77 feet;
4. 110° 00' 596.17 feet;
5. 236° 53' 50.01 feet;
6. 290° 00' 351.76 feet;
7. 200° 00' 119.98 feet;
8. 290° 00' 43.27 feet;
9. 20° 00' 119.98 feet;
10. 290° 00' 24.28 feet;
11. 200° 00' 199.98 feet;
12. 292° 06' 367.35 feet;
13. 252° 47' 315.75 feet;

14. 10° 04' 36" 684.39 feet to the point of beginning and containing an area of 9.062 Acres.



R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 15-A

Beginning at the northeast corner of this piece of land, same being also the southeast corner of Lot 11-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 3978.85 feet North and 3422.75 feet East and running by azimuths measured clockwise from True South:

1. 10° 04' 36" 815.32 feet;
2. Thence on a curve to the right with a radius of 520.00 feet, the chord azimuth and distance being: 17° 40' 37.5" 137.55 feet;
3. 110° 26' 441.91 feet;
4. 90° 00' 339.85 feet;
5. 78° 14' 590.87 feet;
6. 27° 52' 44" 90.02 feet;
7. 25° 07' 153.25 feet;
8. 17° 07' 03" 32.00 feet;
9. Thence on a curve to the left with a radius of 45.00 feet, the chord azimuth and distance being: 153° 25' 19" 62.17 feet;
10. Still on a curve to the left with a radius of 46.00 feet, the chord azimuth and distance being: 64° 48' 33" 68.68 feet;
11. 90° 45' 4.59 feet;
12. 8° 15' 650.10 feet;

13. 8° 00' 360.00 feet;

14. 112° 00' 503.50 feet;

15. 196° 30' 708.56 feet;

16. 220° 00' 285.81 feet;

17. 227° 49' 278.45 feet;

18. 256° 00' 49.00 feet;

19. 317° 57' 13.00 feet;

20. 219° 40' 16.00 feet;

21. 125° 15' 9.00 feet;

22. 219° 15' 20.00 feet;

23. Thence on a curve to the right with a radius of 25.00 feet, the chord azimuth and distance being:
245° 13' 30" 21.90 feet;

24. 271° 12' 6.00 feet;

25. 281° 04' 28.00 feet;

26. 304° 42' 107.24 feet;

27. 209° 20' 124.40 feet;

28. 131° 36' 15" 139.84 feet;

29. 200° 43' 112.00 feet;

30. 217° 57' 130.00 feet;

31. 205° 57' 158.00 feet;

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32. 196° 34' 160.00 feet;

33. 203° 26' 105.00 feet;

34. 182° 36' 123.00 feet;

35. 198° 59' 141.00 feet;

36. 180° 48' 52.16 feet;

37. 260° 37' 62.31 feet;

38. 350° 37' 189.03 feet;

39. Thence on a curve to the right with a radius of 272.00 feet, the chord azimuth and distance being:
354° 48' 30" 39.76 feet;

40. 359° 00' 15.07 feet;

41. Thence on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being:
22° 21' 15" 15.86 feet;

42. Thence still on a curve to the left with a radius of 50.00 feet, the chord azimuth and distance being:
3° 06' 10" 67.69 feet;

43. Thence still on a curve to the left with a radius of 50.00 feet, the chord azimuth and distance being:
265° 56' 47" 81.46 feet;

44. 278° 40' 13.16 feet;

45. 159° 26' 19.13 feet;

46. Thence on a curve to the left with a radius of 50.00 feet, the chord azimuth and distance being:
161° 58' 55" 49.53 feet;

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47. Thence still on a curve to the right with a radius of 20.00 feet, the chord azimuth and distance being:
155° 38' 45" 15.86 feet;

48.	179°	00'	3.05	feet;
49.	282°	45'	48.60	feet;
50.	207°	35'	10.00	feet;
51.	340°	05"	12.00	feet;
52.	287°	59'	125.00	feet;
53.	178°	50'	104.20	feet;
54.	92°	25'	94.80	feet;
55.	138°	59'	24.00	feet;
56.	274°	44'	1037.97	feet to the point of beginning and containing an area of 38.262 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 21-A

CHANGE IN ZONING - MAKENA

Beginning at the southwest corner of this piece of land, same being also the northwest corner of Lot 21-B, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 621.97 feet South and 2447.61 feet East and running by azimuths measured clockwise from True South:

1.	207°	00'	95.11	feet;
2.	192°	00'	535.00	feet;
3.	170°	00'	200.00	feet;
4.	262°	00	290.00	feet;
5.	225°	00'	545.00	feet;
6.	277°	00'	49.54	feet;
7.	357°	00'	130.83	feet;
8.	23°	00'	904.81	feet;
9.	355°	00'	188.10	feet;
10.	46°	00'	60.76	feet;

11. Thence on a curve to the left with a radius of 330.00 feet, the chord azimuth and distance being:
44° 06' 48" 299.41 feet;

12.	125°	18'	317.33	feet to the point of beginning and containing an containing an area of 11.808 Acres.

RUSSELL FIGUEIROA
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Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

EXHIBIT "D"

LOT 22-B

CHANGE IN ZONING - MAKENA

Beginning at the northeast corner of this piece of land, same being also the southeast corner of Lot 22-A, the coordinates of said point of beginning referred to Government Survey Triangulation Station "PUU OLAI" being 906.70 feet South and 2849.74 feet East and running by azimuths measured clockwise from True South:

1. 356° 00' 173.67 feet;
2. 18° 00' 725.57 feet;
3. 132° 41' 129.27 feet;
4. 172° 12' 359.21 feet;
5. Thence on a curve to the left with a radius of 500.00 feet, the chord azimuth and distance being: 210° 19' 22" 308.29 feet;
6. 192° 22' 233.89 feet;
7. Thence on a curve to the left with a radius of 330.00 feet, the chord azimuth and distance being: 194° 45' 03" 27.46 feet;
8. 305° 18' 175.40 feet to the point of beginning and containing an area of 4.096 Acres.

RUSSELL FIGUEIROA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 4729
HAWAII, U.S.A.

R. M. TOWILL CORPORATION

Description Prepared By:

Russell Figueiroa
Licensed Professional Land Surveyor
Certificate Number 4729

420 Waiakamilo Rd., #411
Honolulu, Hawaii 96817-4941
March 6, 2000

WE HEREBY CERTIFY that the foregoing BILL NO. 117 (2008)

1. Passed FINAL READING at the meeting of the Council of the County of Maui, State of Hawaii, held on the 19th day of December, 2008, by the following vote:

G. Riki HOKAMA Chair	Dennis A. MATEO Vice-Chair	Michelle ANDERSON	Gladys C. BAISA	Jo Anne JOHNSON	William J. MEDEIROS	Michael J. MOLINA	Joseph PONTANILLA	Michael P. VICTORINO
Aye	No	No	Excused	No	Aye	Aye	Aye	Aye

2. Was transmitted to the Mayor of the County of Maui, State of Hawaii, on the 22nd day of December, 2008.

DATED AT WAILUKU, MAUI, HAWAII, this 19th day of December, 2008.

RECEIVED
2008 DEC 22 AM 10:25
OFFICE OF THE COUNTY CLERK

G. RIKI HOKAMA, CHAIR
Council of the County of Maui

ROY T. HIRAGA, COUNTY CLERK
County of Maui

THE FOREGOING BILL IS HEREBY APPROVED THIS 7th DAY OF January, 2009.

CHARMAINE TAVARES, MAYOR
County of Maui

I HEREBY CERTIFY that upon approval of the foregoing BILL by the Mayor of the County of Maui, the said BILL was designated as ORDINANCE NO. 3613 of the County of Maui, State of Hawaii.

ROY T. HIRAGA, COUNTY CLERK
County of Maui

Passed First Reading on December 10, 2008.
Effective date of Ordinance January 7, 2009.

RECEIVED
2009 JAN -7 PM 2:05
OFFICE OF THE COUNTY CLERK

I HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. 3613, the original of which is on file in the Office of the County Clerk, County of Maui, State of Hawaii.

Dated at Wailuku, Hawaii, on

2019 ANNUAL COMPLIANCE REPORT FOR ORDINANCE NO. 3613

APPENDIX

B-1

MAR 25 2019

MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

March 21, 2019

Ms. Yukino Uchiyama, Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Uchiyama:

SUBJECT: ANNUAL COMPLIANCE REPORT PURSUANT TO CONDITION NO. 22 OF THE CHANGE IN ZONING (ORDINANCE NO. 3613) FOR PARCEL H-2 (LOT 19), MAKENA RESORT, MAKENA, ISLAND OF MAUI, HAWAII; TMK: (2) 2-1-005:085 (CIZ 99/0015)

The Department of Planning (Department) is in receipt of the Annual Compliance Report (Report) dated December 27, 2018, for the above Conditional Zoning for Makena Resort. The report is being submitted pursuant to Condition No. 22 of Ordinance 3613. Of the 603.303 acres covered in Ordinance 3613, H2R, LLC has ownership of Parcel H-2 (Lot 19). The compliance report will be kept on file.

We understand that pursuant to Condition No. 22, the Report was also transmitted to the County Council.

Thank you for your attention to this matter. Should you require furthe clarification, please contact Current Planning Supervisor Ann Cua by email at ann.cua@mauicounty.gov or by phone at (808) 270-7521.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for MICHELE MCLEAN, AICP
Planning Director

xc: Ann T. Cua, Current Planning Supervisor (PDF)
Project File
MM:CIY:ATC:rma
K:\WP_DOCS\PLANNING\CIZ\1999\15_MakenaResort\2019\2019AnnualRptH2RllcParcelH2Approval.doc

Change in Zoning Annual Compliance Report

for

PARCEL H-2 (LOT 19)
(TMK No. (2)2-1-005:085)

Prepared by
H2R, LLC

December 27, 2018

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I. BACKGROUND AND CONTEXT ..... Page 1

II. REPORT ON COMPLIANCE WITH CONDITIONS OF ZONING ..... Page 2
K:\DATA\H2R LLC\Makena H-2 DBA CIZ Compliance\Applications\Annual Compliance\2018.docx

LIST OF EXHIBITS

Exhibit A. State Historic Preservation Division Acceptance Letters Regarding Archaeological Preservation Plan and Archaeological Monitoring Plan for H2R Parcel

I. BACKGROUND AND CONTEXT

As background, Ordinance No. 3613, entitled "A BILL FOR AN ORDINANCE TO AMEND PORTIONS OF LAND ZONING MAP NOS. 5 AND 514 TO ESTABLISH A-2 APARTMENT DISTRICT, B-2 COMMUNITY BUSINESS DISTRICT, B-R RESORT COMMERCIAL DISTRICT, H-M HOTEL DISTRICT, PK-1 NEIGHBORHOOD PARK DISTRICT, PK-4 GOLF COURSE PARK DISTRICT, R-1 AND R-3 RESIDENTIAL DISTRICT ZONING (CONDITIONAL ZONING) FOR LANDS SITUATED AT MAKENA, MAUI, HAWAII", authorized a Change in Zoning for parcels of land located in Makena, Maui, Hawaii. Lands subject to the Change in Zoning action comprised approximately 603.303 acres, and are hereinafter referred to as "Zoned Parcels". Of the Zoned Parcels, H2R, LLC (H2R) has ownership of Parcel H-2 (Lot 19), which is identified as Tax Map Key (TMK) No. (2)2-1-005:085.

The Change in Zoning for the Zoned Parcels was issued subject to 44 conditions. Condition No. 22 stipulates the following:

> *The developer shall provide timely annual compliance reports to the Planning Director and the Council. The compliance reports shall include: (a) the status of the developer's compliance with each of these conditions; and (b) a reasonable estimate of the time needed for full compliance.*

Pursuant to Condition No. 22, this Annual Compliance Report is hereby being submitted by H2R, LLC, as owner of Parcel H-2 (Lot 19) to document compliance with applicable conditions of zoning for Parcel H-2 (Lot 19).

II. REPORT ON COMPLIANCE WITH CONDITIONS OF ZONING

As required pursuant to Condition No. 22, the following information is provided to report on compliance with the applicable conditions of Ordinance No. 3613 for Lot 19 (hereinafter referred to as the "H2R Parcel"). Specifically, this report includes (a) the status of compliance, with each of the 44 conditions and (b) a reasonable estimate of the time needed for full compliance.

Condition No. 1.: *In the R-1, R-2, and R-3 Residential District zoned areas, the density shall not exceed 2.5 single-family dwelling units per acre.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

Condition No. 2.: *In the A-2 Apartment District zoned areas, the density shall not exceed eight units per acre, and the building height shall not exceed 45 feet. Height shall be measured from the natural or finish grade, whichever is lower.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

Condition No. 3.: *In the B-2 Community Business District zoned areas, the gross floor area of each building shall not exceed 60 percent of the total lot area.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

Condition No. 4.: *On Lot 19 (H-M Hotel District), the building height shall not exceed 45 feet and shall be consistent with the Urban Design Standards for Building Form in the Kihei-Makena Community Plan; no more than 89 units shall be developed; and no lockout units shall be allowed. Height shall be measured from the natural or finish grade, whichever is lower.*

Status of Compliance: H2R is the owner of Lot 19. H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue throughout the life of the project.

Condition No. 5.: *The developer shall preserve Makena's significant views of the Pacific Ocean and the broad vista to the Central Maui and Upcountry regions. The use of walls higher than four feet in front yard setbacks shall be prohibited.*

Status of Compliance: H2R will comply with the provisions of said condition.

Estimate of Time for Compliance: This condition will continue throughout the life of the project.

Condition No. 6.: *In the B-2 Community Business District zoned areas, the following permitted uses shall incorporate acoustical measures into the facility to mitigate potential noise impacts: amusement enterprises, including billiard and pool halls; auditoriums and theaters; baseball and football stadiums and other sport activities and amusements; bowling alleys; dancing and hula studios; gymnasiums; miniature golf courses; music conservatories and music studios; physical-culture studios; and printing, lithography, and publishing shops.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

Condition No. 7.: *All exterior lighting shall be shielded from adjacent residential properties and nearshore waters, and shall be fully shielded to prevent uplight. Lighting requirements in force at the time of building permit application shall be applied.*

Status of Compliance: H2R will comply with the provisions of said condition.

Estimate of Time for Compliance: This condition will continue throughout the life of the project.

Condition No. 8.: *In the B-2 Community Business District zoned areas, merchandise, equipment, and supplies shall be stored within enclosed buildings or enclosed areas that are appropriately screened with fencing and landscape planting for the following permitted uses: equipment rental and sales yards; hardware and garden supply stores; parcel delivery stations; and printing, lithography, and publishing shops.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

Condition No. 9.: *The developer, its successors and permitted assigns shall pay the Department of Education, $3,000 per dwelling unit upon issuance of each building permit to be used, to the extent possible, for schools serving the Kihei-Makena Community Plan area; provided that, should the State pass legislation imposing school impact fees that apply to the Makena Resort Area, the developer, its successors and permitted assigns, shall from that point forward comply with the State requirements, or contribute $3,000 per dwelling unit, whichever is greater. Should a previous agreement exist between the Department of Education and the landowner, this condition shall prevail.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: Upon issuance of each building permit for a new dwelling unit during the life of the project.

Condition No. 10.: *The developer shall provide pedestrian and bicycle access ways within the roadways throughout and fronting the Makena Resort Area. A schematic plan for pedestrian and bicycle access ways throughout and fronting the Makena Resort Area shall be submitted to the Department of Planning for consideration by the Maui Planning Commission in conjunction with SMA permit applications.*

Status of Compliance: The 2010 Annual Compliance Report submitted by ATC Makena Holdings, LLC (ATC Makena), the owner of the majority of the Zoned Parcels, included the schematic plan prepared by Miyabara & Associates for pedestrian, bicycle, and cart access ways throughout the Makena Resort area.

Estimate of Time for Compliance: This condition was satisfied with the submittal of the aforementioned, a Schematic Plan by ATC Makena.

Condition No. 11.: *The developer shall make a contribution to the County for traffic improvements in an amount equal to $5,000 per unit. The contribution shall be paid to the County prior to issuance of the initial building permit. Upon adoption of a traffic impact fee ordinance, the developer shall comply with the ordinance in lieu of this voluntary contribution. Should a traffic impact fee ordinance be adopted prior to the collection of this contribution, the applicable amount shall be the greater of the two. Such contributions or fees shall not be counted towards Condition No. 12 below.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: The contribution will be paid prior to issuance of the initial building permit and will continue with the issuance of additional building permits as the H2R Parcel is developed.

Condition No. 12.: *Upon commencement of the first phase of construction, the developer shall pay its pro-rata share to upgrade Pi'ilani Highway from Kilohana Drive to Wailea Ike Drive to four lanes of traffic, and shall cooperate with the State Department of Transportation and other area developers to implement such improvements concurrent with development.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: H2R anticipates having an agreement with the State Department of Transportation (DOT) in place prior to development of the H2R Parcel.

Condition No. 13.: *The developer shall provide construction access roads from Pi'ilani Highway to the construction sites. Construction traffic shall be prohibited on Kilohana Drive, Wailea Ike Drive, Wailea Alanui Drive, and Makena Alanui Drive to the extent practicable.*

Status of Compliance: H2R does not own the right-of-way for a construction access road from Piilani Highway to the H2R Parcel. H2R will coordinate with adjacent landowners, should construction access for the future development of Parcel H2R be warranted and practicable.

Estimate of Time for Compliance: At the time of construction on the H2R Parcel, as applicable.

Condition No. 14.: *The developer shall develop and submit a Transportation Management Plan ("TMP"), to be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation. The purpose of the TMP shall be to reduce traffic generated by construction activity related to the Makena Resort Area. The TMP shall provide for programs such as park and ride, shuttles, and/or restrictions on worker access to ongoing construction activity during peak hour traffic. Upon approval, project contractors shall implement the TMP during construction activities. The developer shall submit an annual report to the State Department of Transportation, the County Department of Public Works, the County Department of Transportation, and the Maui County Council to document the success of the TMP in meeting its benchmarks of reducing traffic during project construction.*

The TMP shall be reviewed and approved by the State Department of Transportation, the County Department of Public Works, and the County Department of Transportation prior to issuance of each SMA permit within the Makena Resort Area.

Status of Compliance: As discussed in the 2018 Annual Compliance Report submitted by ATC Makena, a Construction Transportation Management Plan (CTMP) for the Makena Resort area was submitted to the SDOT, the County Department of Public Works (DPW), and the County Department of Transportation (CDOT) on July 13, 2009. This CTMP was included in the 2010 Annual Compliance Report submitted by ATC Makena. As noted in ATC Makena's 2018 Annual Compliance Report, ATC Makena will work with applicable reviewing agencies to obtain approval of the CTMP.

Estimate of Time for Compliance: An approved CTMP will be in place prior to issuance of the first SMA Use Permit for development within the Zoned Parcels.

Condition No. 15.: *As part of the first SMA application, the developer shall submit a TMP to reduce the dependency on individual vehicular transportation modes. The TMP shall be reviewed and approved by the State Department of Transportation, the County*

Department of Public Works, and the County Department of Transportation to address post-construction traffic issues.

Status of Compliance: As discussed in the 2018 Annual Compliance Report submitted by ATC Makena, a Transportation Management Plan (TMP) for post-construction operations for the Makena Resort area was submitted to the SDOT, the DPW, and the CDOT on July 13, 2009. By letter dated August 19, 2009, the SDOT approved the TMP. The TMP was included in ATC Makena's 2010 Annual Compliance Report.

Estimate of Time for Compliance: An approved TMP for post-construction operations will be in place prior to construction being completed for the first project within the Zoned Parcels.

Condition No. 16.: *The developer shall participate in the pro rata funding and construction of adequate civil defense measures as determined by the State and County civil defense agencies.*

Status of Compliance: As discussed in the 2018 Annual Compliance Report submitted by ATC Makena, ATC Makena agreed to the two (2) locations for emergency sirens at the Makena Resort Wastewater Treatment Plant (WWTP) and near Makena State Park. Final Right-Of-Entry and Non-Exclusive License Agreements for two (2) new emergency sirens dated May 25, 2012 between ATC Makena and the State of Hawaii, Department of Defense (DOD) were included in the ATC Makena's 2012 Annual Compliance Report. ATC Makena was informed by DOD in December 2016 that the two (2) sirens would be located at Makena State Park and ATC Makena's WWTP.

Estimate of Time for Compliance: Compliance with this condition has been satisfied. The State DOD installed the siren at the Makena Resort WWTP in 2017.

Condition No. 17.: *Should any human burials or any historic sites such as artifacts, charcoal deposits, stone platforms, pavings, or walls be found, the developer shall stop construction work in the immediate vicinity and notify the State Historic Preservation Division (SHPD), the Maui/Lanai Island Burial Council (MLIBC), and the Maui County Cultural Resources Commission (CRC).*

Status of Compliance: H2R will comply with the provisions of said condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 18.: *The developer, its successors and permitted assigns, shall provide a comprehensive preservation/mitigation plan pursuant to Chapter 6E, Hawaii Revised Statutes, that has been approved by the State Historic Preservation Division, Department of Land and Natural Resources, and the Office of Hawaiian Affairs prior to any grading within the project area.*

Status of Compliance: An Archaeological Preservation Plan (APP) and an Archaeological Monitoring Plan (AMP) for the H2R Parcel were prepared in compliance with the requirements Chapter 6E, HRS, consistent with the findings of Archaeological Inventory Surveys (AIS) for the parcel which were accepted by the State Historic Preservation Division (SHPD) in July 2008. Both APP and AMP were accepted by the SHPD in July 2009, the acceptance letters for which are presented herein as **Exhibit** "A".

Estimate of Time for Compliance: Given the foregoing, it is H2R's understanding that compliance with this condition has been satisfied for the H2R Parcel.

Condition No. 19.: *Marine monitoring programs shall be conducted which include monitoring and assessment of coastal water resources (groundwater and surface water) that receive surface water or groundwater discharges from the hydrologic unit where the project is located. Monitoring programs shall include both water quality and ecological monitoring.*

Water Quality Monitoring shall provide water quality data adequate to assess compliance with applicable State water quality standards at Hawaii Administrative Rules Chapter 11-54. Assessment procedures shall be in accordance with the current Hawaii

Department of Health ("HIDOH") methodology for Clean Water Act Section 305(b) water quality assessment, including use of approved analytical methods and quality control/quality assurance measures. The water quality data shall be submitted biannually, or every six months, to HIDOH for use in the State's Integrated Report of Assessed Waters prepared under Clean Water Act Sections 303(d) and 305(b). If this report lists the receiving waters as impaired and requiring a Total Maximum Daily Load ("TMDL") study, then the monitoring program shall be amended to evaluate land-based pollutants, including: (1) monitoring of surface water and groundwater quality for the pollutants identified as the source of the impairment; and (2) providing estimates of total mass discharge of those pollutants on a daily and annual basis from all sources, including infiltration, injection, and runoff. The results of the land-based pollution water quality monitoring and loading estimate shall be submitted to the HIDOH Environmental Planning Office, TMDL Program.

The ecological monitoring shall include ecological assessment in accordance with the Coral Reef Assessment and Monitoring Program protocols used by the Department of Land and Natural Resources. The initial assessment shall use the full protocol. Subsequent biannual assessments can use the Rapid Assessment Techniques. Results shall be reported biannually to the Aquatic Resources Division, Department of Land and Natural Resources.

The monitoring and assessments shall be conducted by degreed scientists experienced with Clean Water Act programs, water quality monitoring, water quality assessment, water quality-based permitting, water quality modeling, watershed planning, and TMDL. Study design should be made available for both public review and peer review by the State Department of Health, Department of Aquatic Resources, and the University of Hawaii researchers. Results of monitoring shall be published and publicly available online.

Status of Compliance: ATC Makena, as the owner of Makena Resort (and the majority of the Zoned Parcels), conducts the bi-annual marine monitoring program required by this condition. The most recent monitoring reports are submitted each year as part of ATC Makena's Annual Compliance Report. These reports are also transmitted to the State DOH.

Estimate of Time for Compliance: Water quality monitoring and assessment for the Zoned Parcels will continue to be conducted twice a year by the ATC Makena in compliance with the provisions of said condition.

Condition No. 20.: *The developer shall implement efficient soil-erosion and dust-control measures during and after development to the satisfaction of DOH and the County.*

Status of Compliance: H2R will comply with the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 21.: *The developer shall give notice to the Department of Planning and the Council of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Makena Resort Area, prior to any development.*

Status of Compliance: H2R will comply with this condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 22.: *The developer shall provide timely annual compliance reports to the Planning Director and the Council. The compliance reports shall include: (a) the status of the developer's compliance with each of these conditions; and (b) a reasonable estimate of the time needed for full compliance.*

Status of Compliance: In compliance with Condition No. 22, this Annual Compliance Report is being submitted by H2R for the H2R Parcel.

Estimate of Time for Compliance: This condition will continue annually in January during the life of the project.

Condition No. 23.: *Failure to fulfill any condition may result in a reversion to former or more appropriate zoning or community plan designations or other remedies.*

Status of Compliance: H2R acknowledges the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 24.: *If any of the property subject to this Change in Zoning is consolidated with other property for purposes of an SMA permit application, these conditions shall apply to the entirety of the consolidated property.*

Status of Compliance: H2R acknowledges the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 25.: *The developer shall comply with the County's Residential Workforce Housing Policy as provided in Chapter 2.96, Maui County Code.*

Status of Compliance: H2R will comply with the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 26.: *The developer shall comply with all applicable County water ordinances. The water rates for the residential workforce housing units shall be no higher than the general water consumer rates set by the County in its annual budget, for as long as the units are subject to Chapter 2.96, Maui County Code.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 27. *The developer shall provide a water conservation plan for the Makena Resort Area, approved by the Department of Water Supply, prior to the issuance of any SMA permits. For each project, the developer shall construct a dual waterline system to accommodate the use of non-potable water for landscaping and irrigation purposes prior to the issuance of any building permits.*

Status of Compliance: A Water Conservation Plan (WCP) for the Makena Resort area was approved by the County Department of Water Supply (DWS) on July 27, 2009. This report is included in the 2010 Annual Compliance Report submitted by ATC Makena.

Estimate of Time for Compliance: As discussed above, the WCP for the Makena Resort area was submitted with the ATC Makena's Annual Compliance Report in 2010. H2R will comply with applicable water conservation requirements prior to the issuance of any building permits for development within the H2R Parcel.

Condition No. 28.: *All energy systems for all residential, commercial, and hotel units shall be designed and constructed to meet all applicable Energy Star® requirements established by the Climate Protection Division of the United States Environmental Protection Agency in effect at the time of construction. For purposes of this condition, energy systems shall include all hot-water systems, roof and attic areas, outside walls, windows, air-cooling systems, and heating systems.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 29.: *All residential, commercial, and hotel units shall comply with Chapter 16.16, Maui County Code.*

Status of Compliance: H2R will comply with the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 30.: *All air-cooling systems and all heating systems for laundry facilities, swimming pools, and spa areas shall make maximum use of energy-efficient construction and technology.*

Status of Compliance: H2R will comply with the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 31. *The developer shall construct a minimum of 60 new parking stalls at Maluaka Beach, including at least 10 at the north end, within one year of the issuance to the developer of any SMA permit by the Maui Planning Commission relating to a parcel or a portion thereof that is a subject of this Change in Zoning. Unless necessary to protect public safety or to comply with State or Federal law, the required parking stalls need not be asphalt surfaced. Development costs and land shall not satisfy park dedication requirements.*

Status of Compliance: H2R will comply with the provisions of said condition.

Estimate of Time for Compliance: Within one year of issuance of any SMA permit relating to the Zoned Parcels. H2R and ATC Makena will cooperate towards satisfying this requirement.

Condition No. 32.: *The developer shall develop an expansion of the beach park at the south end of Maluaka Beach, such that the beach park shall comprise at least 1.5 acres of land area for public use and beach access. The developer shall submit the necessary applications required for the expansion within six months of the approval of this Change in Zoning. The land area of the expansion of the existing park shall be applied as credit toward satisfying a portion of any applicable park dedication requirements.*

Status of Compliance: This condition has been satisfied. As discussed in ATC Makena's 2018 Annual Compliance Report, ATC Makena, in coordinating with Discovery Land Company, the Makena Cultural Focus Group, the Makena Community Advisory Group, and the Department of Parks and Recreation, implemented an expansion location acceptable to all parties to the south end of the existing Maluaka Beach Park. The expansion area is approximately 0.66 acres in size bringing the combined existing and proposed park up to 1.5 acres. ATC Makena formalized and documented the expansion in compliance with all County, State and Federal rules and regulations through the recordation of a Declaration of Restrictive Covenants for Park Purposes with the Bureau of Conveyances. A copy of the declaration and agreement was included in ATC Makena's 2018 Annual Compliance Report.

Estimate of Time for Compliance: This condition has been satisfied by ATC Makena.

Condition No. 33.: *To the extent practicable, the developer shall provide, in perpetuity, traversable lateral shoreline access in the area between the shoreward boundary and the mauka boundary of the Makena Resort Area. Costs associated with this condition shall not satisfy park dedication requirements.*

Status of Compliance: The H2R Parcel is not a shoreline adjacent property and thereby is not subject to this condition. In regards to the remainder of the Zoned Parcels, which are owned by ATC Makena, a schematic plan for pedestrian and bicycle access ways throughout the entire Makena Resort area was submitted as part of ATC Makena's 2010 Annual Compliance Report.

Estimate of Time for Compliance: Not applicable.

Condition No. 34.: *Within one year of the approval of this Change in Zoning, the developer shall initiate and fund a plan for the development of the State Park at Makena for the State Department of Land and Natural Resources and the Department of Parks and Recreation, soliciting and taking into consideration the comments of various user groups, including Surfrider Foundation, Savemakena.org, Maui Tomorrow, the Kihei Community Association, and the Makena Homeowner's Association. The plan shall incorporate recreational, landscaping, parking, and facility concepts as a guide for future development of the park. Costs associated with this condition shall not satisfy park dedication requirements.*

Status of Compliance: Compliance with this condition has been satisfied. As discussed in ATC Makena's 2018 Annual Compliance Report, ATC Makena submitted the final Makena State Park Plan dated February 2013 to the State Department of Land and Natural Resources, the County Department of Parks and Recreation and the Oneloa Coalition in March 2013. The final plan document and associated transmittals were submitted to the County of Maui Planning Department in March, 2013 in compliance with this condition. The County Department of Planning issued a letter of condition fulfillment dated June 3, 2013. These documents

were included in ATC Makena's 2014 Annual Compliance Report.

Estimate of Time for Compliance: Compliance with this condition has been satisfied by ATC Makena.

Condition No. 35.: *The developer shall renovate and beautify Makena Landing (TMK: 2-1-007:094), see attached map, in coordination with the Department of Parks and Recreation and the State Department of Land and Natural Resources. Costs associated with this condition shall not satisfy park dedication requirements.*

Status of Compliance: As owners of Makena Landing, ATC Makena is responsible for compliance with this condition. As discussed in ATC Makena's 2018 Annual Compliance Report, a Shoreline Setback Determination (SSD) for the Makena Landing beach park property was issued by the Department of Planning on May 20, 2013. In addition, a Special Management Area Minor Permit and Shoreline Setback Approval (SSA) for the proposed renovation and beautification work at the park were issued by the Department of Planning on October 1, 2013. Copies of these approvals were provided in ATC Makena's 2014 Annual Compliance Report.

In coordination with the Department of Parks and Recreation, ATC Makena has made various adjustments to the 2013 site plan to reflect input received from the Makena Community Advisory Group and the Makena Cultural Focus Group. A request to amend the 2013 permits has been granted by the Department of Planning.

Estimate of Time for Compliance: Not applicable.

Condition No. 36.: *The developer shall maintain Makena Landing (TMK: 2-1-007:094), North Maluaka (TMK: 2-1-007:068), and South Maluaka (TMK: 2-1-005:124), see attached map, and all future parklands within the Makena Resort Area.*

Status of Compliance: As owners of these three (3) park areas, ATC Makena is responsible for compliance with this condition. As discussed in the 2018 Annual Compliance Report submitted by ATC Makena, a Unilateral Agreement was submitted to County of Maui, Department of Parks and Recreation by ATC Makena for approval on June 26, 2009. After working with the Department of Parks and Recreation to revise the agreement and update the obligations for maintenance to reflect the expansion to Maluaka Beach Park discussed above in Condition No. 32, the Unilateral Maintenance Agreement was finalized and recorded with the Bureau of Conveyances. A copy of the agreement was also included in ATC Makena's 2018 Annual Compliance Report.

H2R's understanding is that ATC Makena will continue to maintain Makena Landing, North Maluaka, and South Maluaka as well as all future parklands within the Makena Resort Area.

Estimate of Time for Compliance: Not applicable.

Condition No. 37.: *To exhibit respect for the Hawaiian culture and a Hawaiian sense of place, structures within the Makena Resort Area shall be based on or inspired by principles of Hawaiian island architecture in design and construction.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 38.: *The developer shall provide a baseline study survey of flora and fauna as part of each SMA permit application within the Makena Resort Area; the study shall be conducted by recognized independent experts on Hawaiian flora and fauna and list all endemic, indigenous, and endangered species, their distribution in the Makena Resort Area and adjacent shorelines. This study shall also include a preservation/mitigation plan and comments from the State Department of Land and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Corps of Engineers, and the Maui representative of the Hawaii Wildlife Fund and The Nature Conservancy.*

Status of Compliance: As discussed in ATC Makena's 2018 Annual Compliance Report, Robert Hobdy prepared a baseline flora and fauna study of Makena's coastal lands. The study was circulated to the State Department of Land and Natural Resources, the U.S. Fish and Wildlife Service, U.S. Corps of Engineers, the Maui representative of the Hawaii Wildlife Fund, and The Nature Conservancy for review and comment. A copy of the flora and fauna study was submitted as part of the ATC Makena's 2010 Annual Report. A biological resources survey for Parcel H2R will be prepared prior to the development of this parcel.

Estimate of Time for Compliance: H2R will continue to comply with this condition.

Condition No. 39.: *No transient vacation rentals or time shares shall be allowed within this Makena Resort rezoning application area; and further, no special use permit or conditional permit for such accommodations shall be accepted by the Department of Planning.*

Status of Compliance: H2R acknowledges the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 40.: *A second hotel shall not be constructed within the Makena Resort Area.*

Status of Compliance: H2R acknowledges the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 41.: *All buildings constructed within the Makena Resort Area shall be LEED (Leadership in Energy and Environmental Design) certified if they are 500 square feet or larger.*

Status of Compliance: H2R will comply with the provisions of the aforementioned condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 42.: *New dwelling units shall not exceed 800, excluding residential workforce housing.*

Status of Compliance: H2R acknowledges the provisions of the above-noted condition.

Estimate of Time for Compliance: This condition will continue for the duration of the project.

Condition No. 43.: *The developer, its successors and permitted assigns, shall contribute $1,000 per market-priced unit, collected at issuance of building permit, to the County, for the development and maintenance of a police station in South Maui.*

Status of Compliance: H2R will comply with the provisions of the above-noted condition.

Estimate of Time for Compliance: Upon issuance of each initial building permit for market-priced units within the H2R Parcel.

Condition No. 44.: *The developer shall provide Driveway "D" from Makena Alanui Road to Makena Resort Sewage Treatment Plant and beyond as an emergency evacuation route for the area.*

Status of Compliance: The H2R Parcel is not subject to the provisions of this condition.

Estimate of Time for Compliance: Not applicable.

EXHIBIT A.

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

July 21, 2009

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793
lisa@ashmaui.com

LOG NO: 2009.2918
DOC NO: 0907PC53
Archaeology

SUBJECT: **Chapter 6E-42 Historic Preservation Review – REVISED Archaeological Preservation Plan for SIHP #50-50-14-6371, -6373, -6374, -6377, -6378 and -6379**
Maluaka Ahupua'a, Makawao District, Island of Maui, Hawai'i
TMK: (2) 2-1-005:085 and (2) 2-1-005:108 por.

Thank you for the opportunity to again review this plan, which our staff received in PDF format on July 14 of 2009 (Rotunno-Hazuka and Pantaleo 2009): *Archaeological Preservation Plan for Sites 50-50-14-6371, -6373, -6374 Feature 1, -6377, -6378 and -6379*...Archaeological Services Hawai'i, LLC.

The plan was reviewed by SHPD staff on June 17 (SHPD LOG NO: 2008.5257; DOC NO: 0906PC32) and again on July 6 of 2009 (SHPD LOG NO: 2009.2892; DOC NO: 0907PC04), resulting in several requested revisions.

The preservation plan now contains the required information as specified in HAR §13-277-3 regarding the contents of preservation plans in general and is acceptable. An associated monitoring plan, received in July of 2008, was held pending acceptance of the preservation plan and will now be reviewed under separate cover.

Now that the plan has been accepted pursuant to HAR §13-277, please send one hardcopy of the *revised* document clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF file on CD to the attention of "**SHPD Library**" at the Kapolei SHPD office.

If you have any questions or comments regarding this letter, please contact the SHPD's Lead Maui Archaeologist, Ms. Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, FAX (808) 270-7634
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

July 21, 2009

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793
lisa@ashmaui.com

LOG NO: 2008.3045
DOC NO: 0907PC54
Archaeology

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Monitoring Plan for Parcel H-2
Maluaka Ahupua'a, Makawao District, Island of Maui, Hawai'i
TMK: (2) 2-1-005:085; (2) 2-1-005:108; (2) 2-1-005:120 por.

Thank you for the opportunity to review this plan, which although originally submitted in 2008 was not subject to formal SHPD review until now. The plan (Rotunno-Hazuka and Pantaleo 2008): *Archaeological Monitoring Plan for Parcel H-2*...Archaeological Services Hawai'i, LLC, was received by our staff in hardcopy format on July 23 of 2008 but held pending acceptance of an archaeological inventory survey report and associated site preservation plan.

The plan was proactively prepared by your firm as a result of a long-standing archaeological consultant commitment between your firm and the project developer. Precautionary archaeological monitoring for all ground altering disturbance in the project area was recommended upon completion of at least two prior archaeological inventory surveys within the bounds of the current subject parcels, during which several culturally and historically significant sites have been identified (SHPD LOG NO: 2008.3048; DOC NO: 0807PC41 and SHPD LOG NO: 2008.4506; DOC NO: 0810PC21). Those known to be in the immediate vicinity of the proposed project include SIHP #50-50-14-6366 [post-Contact period walls/wall segments, wooden house remnant, concrete slab foundations, surface *'ili 'ili* and refuse scatters, mounds], -6367 [late pre-Contact to early post-Contact L- and U-shaped enclosures], -6371 [pre-Contact habitation platform and five walled pits], -6372 [mid 19th century habitation midden scatter and wooden shack], -6373 [pre-Contact habitation enclosures and platform] -6374 [four boundary walls and a modified outcrop wall, all post-Contact in origin], -6376 [pre-Contact to early post-Contact habitation and agricultural features], -6377 [pre-Contact habitation U-shape and circular walled pit probably used for agriculture], -6378 [pre-Contact habitation square enclosure and modified outcrop with constructed pits and a natural cupboard] and -6379 [two rectangular pre-Contact habitation enclosures and platforms].

Feature 1 of -6374 and five other sites (-6371, -6373, -6377, -6378 and -6379) are subject to archaeological site preservation commitments (SHPD LOG NO: 2008.5257/DOC NO: 0906PC32; SHPD LOG NO: 2009.2892/DOC NO: 0907PC04; SHPD LOG NO: 2009.2918/DOC NO: 0907PC53). *Please note, we expect to receive written and photographic verification that short-term preservation measures are in place prior to the onset of ground altering activity within the subject parcels.*

As specified in the monitoring plan, there will be one archaeological monitor on site for each piece of ground altering machinery in operation during the proposed project. A coordination meeting with the construction crew and all other pertinent parties to explain monitoring procedures and that the monitoring archaeologist has the authority to halt work in the vicinity of a culturally significant find will be undertaken, and should anything of cultural significance be identified, the SHPD will be consulted for mitigation recommendations. The plan further states that in the event human remains are inadvertently exposed, both the SHPD and Maui/Lana'i Islands Burial Council (MLIBC) will be notified and appropriate burial protocol followed once jurisdictional determination has been made. *No human remains will be collected or removed from the project area unless specifically authorized by the SHPD.* A report detailing the findings of the monitoring activity will be prepared and submitted to our office for review within 180 days after the completion of the project.

The plan contains the required information as specified in HAR §13-279-4(a) regarding monitoring plans in general and is acceptable.

Now that the monitoring plan has been accepted pursuant to HAR §13-279, please send one hardcopy, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF file on CD to the attention of "SHPD Library" at the Kapolei SHPD office.

If you have any questions or comments regarding this letter, please contact the SHPD's Lead Maui Archaeologist, Ms. Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

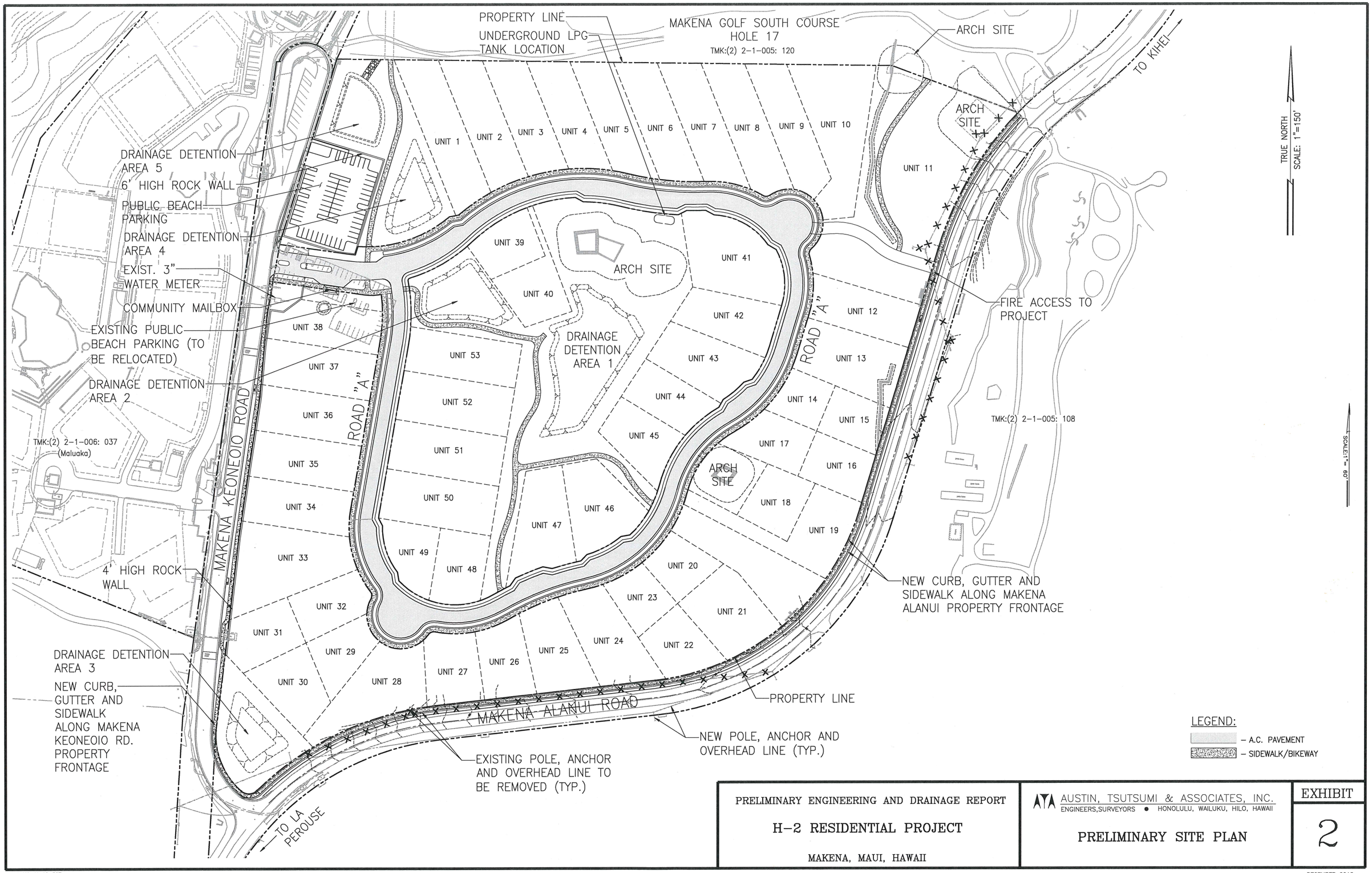
Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, FAX (808) 270-7634
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

PRELIMINARY DEVELOPMENT PLANS AND DESIGN GUIDELINES

APPENDIX C



PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

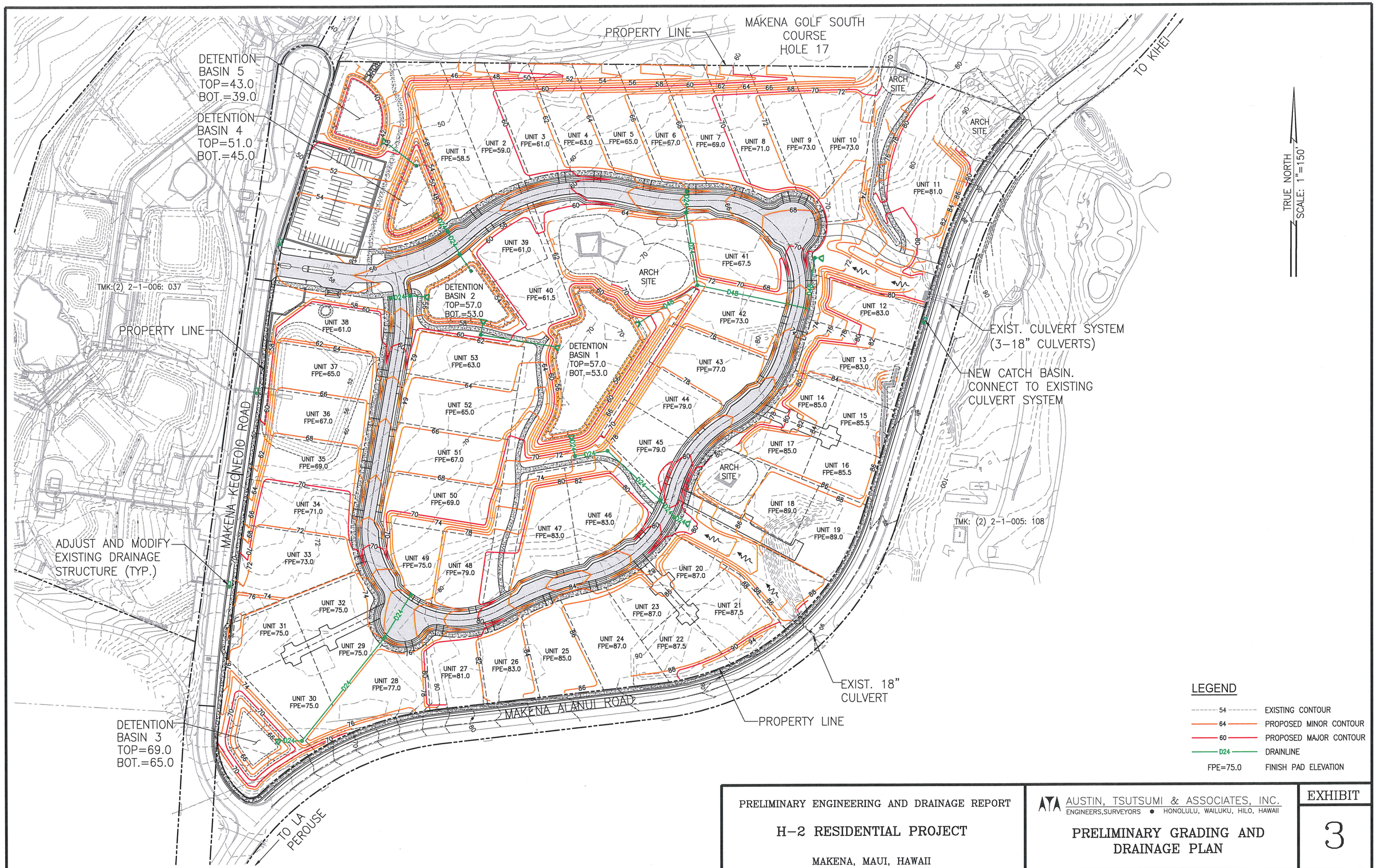
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY SITE PLAN

EXHIBIT 2

JOB NO. M-18-527
Z:\2018\18-527\ENGINEERING\Reports\PER\EXHIBITS\EXH 2 – GENERAL SITE PLAN.dwg

DECEMBER 2018



PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

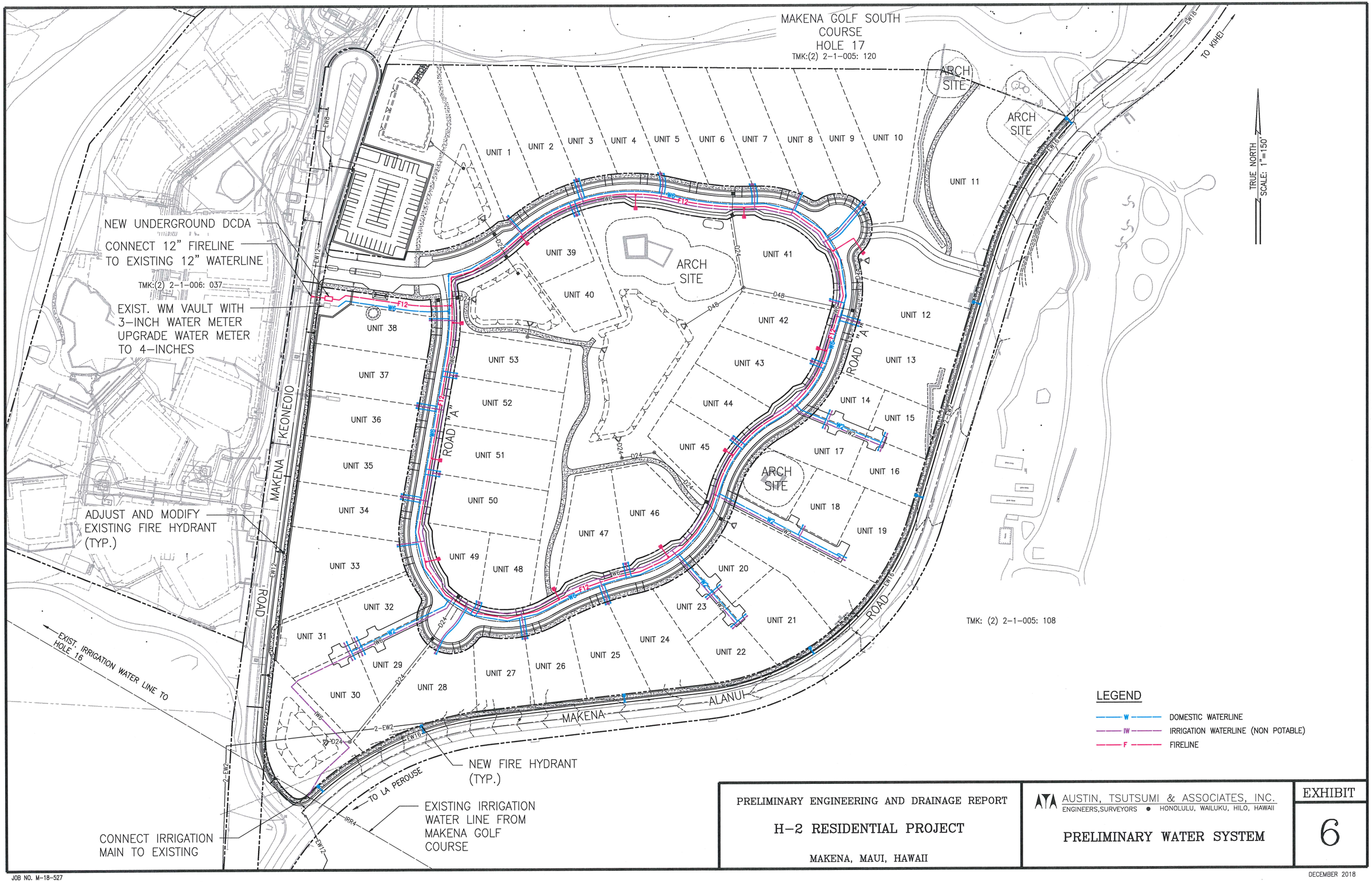
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY GRADING AND DRAINAGE PLAN

EXHIBIT 3

JOB NO. M-18-527
Z:\2018\18-527\ENGINEERING\Reports\PER\EXHIBITS\EXH 3 - GENERAL GRADING PLAN.dwg

DECEMBER 2018



PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

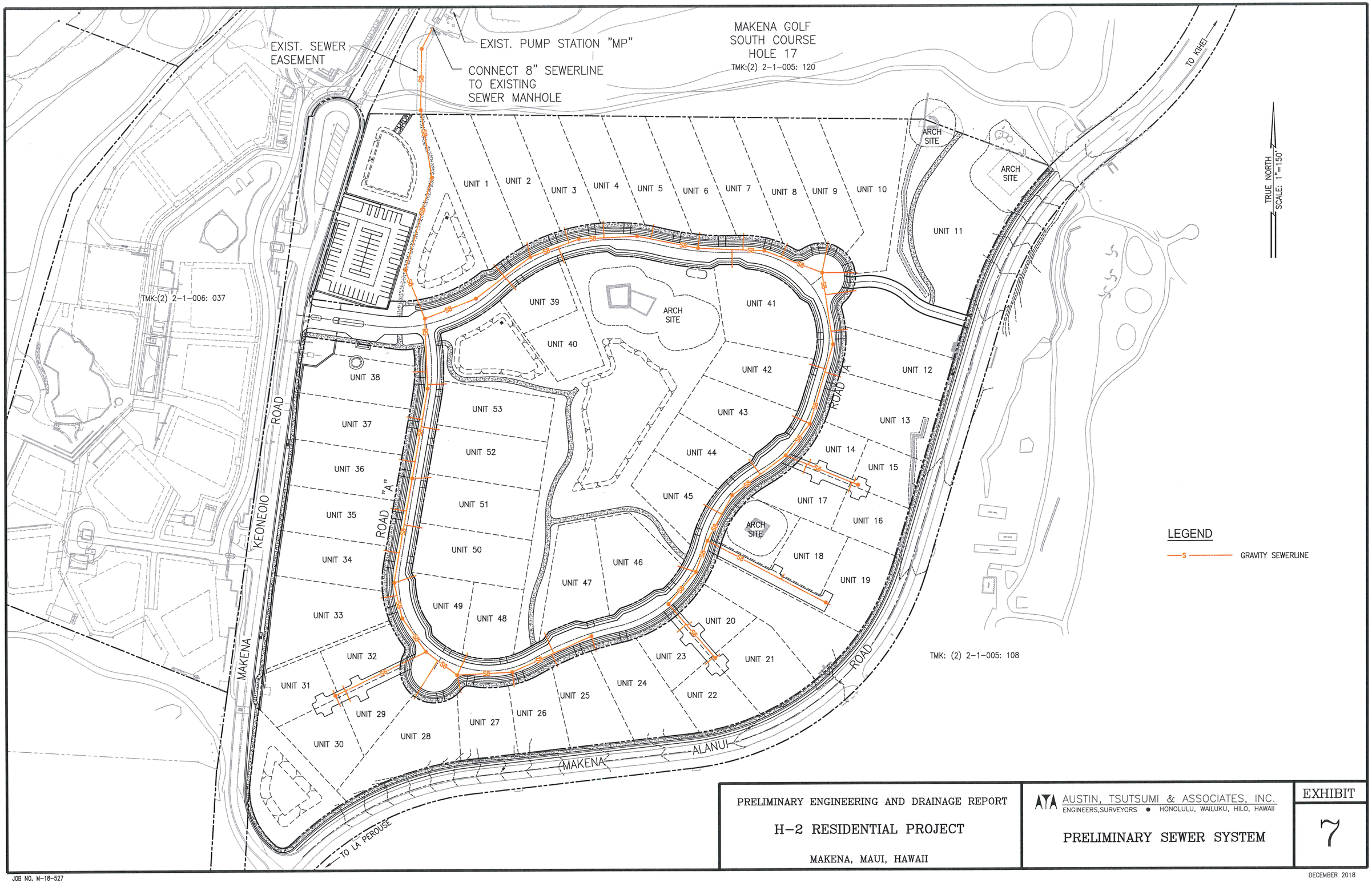
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY WATER SYSTEM

EXHIBIT 6

DECEMBER 2018

JOB NO. M-18-527
Z:\2018\18-527\ENGINEERING\Reports\PER\EXHIBITS\EXH 6 - WATER SYSTEM.dwg



PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY SEWER SYSTEM

EXHIBIT 7

JOB NO. M-18-527

Z:\2018\18-527\ENGINEERING\Reports\PER\EXHIBITS\EXH 7 - SEWER SYSTEM.dwg

DECEMBER 2018

Golf Course

Archaeological Site

Connect to existing golf cart path

Archaeological Site

Retention Basin-5

Retention Basin-4

Naturalized Areas

SEE ENLARGEMENT

Archaeological Site

Retention Basin-2

Shrubs and Ground Covers (See Plant List and Images)

Retention Basin-1

Trees and Palms (See Plant List and Images)

Street Trees (See Plant List and Images)

Grass (Typ.)

Archaeological Site

Archaeological Site

MAKENA KEONEOIO ROAD

Drainage Corridors

Off-Site Improvements

Retention Basin-3

Rock Walls

MAKENA ALANUI ROAD

5' Landscape Easement (Makena Alanui)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53

Note: All permanently planted landscaped areas to be irrigated via automatically-controlled sprinkler systems.

0 75' 150' 300' 450'

SCALE: 1"=150'

NORTH

SCHEMATIC LANDSCAPE PLAN

Scale: 1" = 150'

H2 RESIDENTIAL PROJECT

H2R, LLC
Makena, Maui, Hawaii

miyabara *associates llc*
Landscape Architects & Planners

TREES AND PALMS

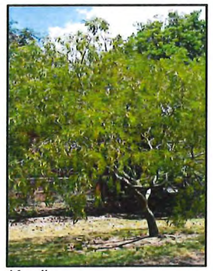
Milo
(Thespesia populnea)

Hala
(Pandanus tectorius)

Loulu Palm
(Pritchardia spp.)

Wiliwili
(Erythrina sandwicensis)

Alahe'e
(Psydrax odorata)


Koai'a
(Acacia koaia)

Milo
(Thespesia populnea)

Lonomea
(Sapindus oahuensis)

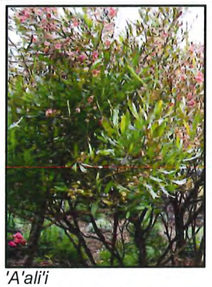
'Ohia Lehua
(Metrosideros polymorpha)

STREET TREES

Kou
(Cordia subcordata)

White Tecoma
(Tabebuia Sp.)

SHRUBS AND GROUND COVERS


'A'ali'i
(Dodonea viscosa)

Na'u
(Gardenia brighamil)

Ewa Hinahina
(Achyranthes splendens)

Akia
(Wikstroemia uva-ursi)

'Ulei
(Osteomeles anthyllidifolia)

Pohinahina
(Vitex rotundifolia)

Ma'o
(Gossypium tomentosum)

Spider Lily
(Crinum sp.)

Native Hibiscus
(Hibiscus waimeae)

Beach Naupaka
(Scaevola sericea)

Kulu'i
(Nototrichium sandwicense)

'Ilima Papa
(Sida fallax)

Naio Papa
(Myoporum sandwicense)

'Uki 'Uki
(Dianella sandwicensis)

'Ohai
(Sesbania tomentosa)

Pa'u o Hi'iaka
(Jacquemontia sandwicensis)

Pili Grass
(Heteropogon contortus)

Carex
(Carex wahuensis)

PLANT LIST AND IMAGES

H2 RESIDENTIAL PROJECT

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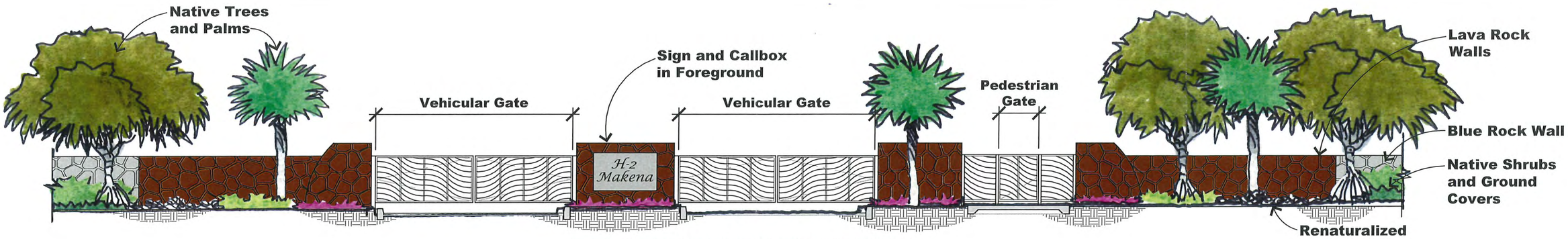
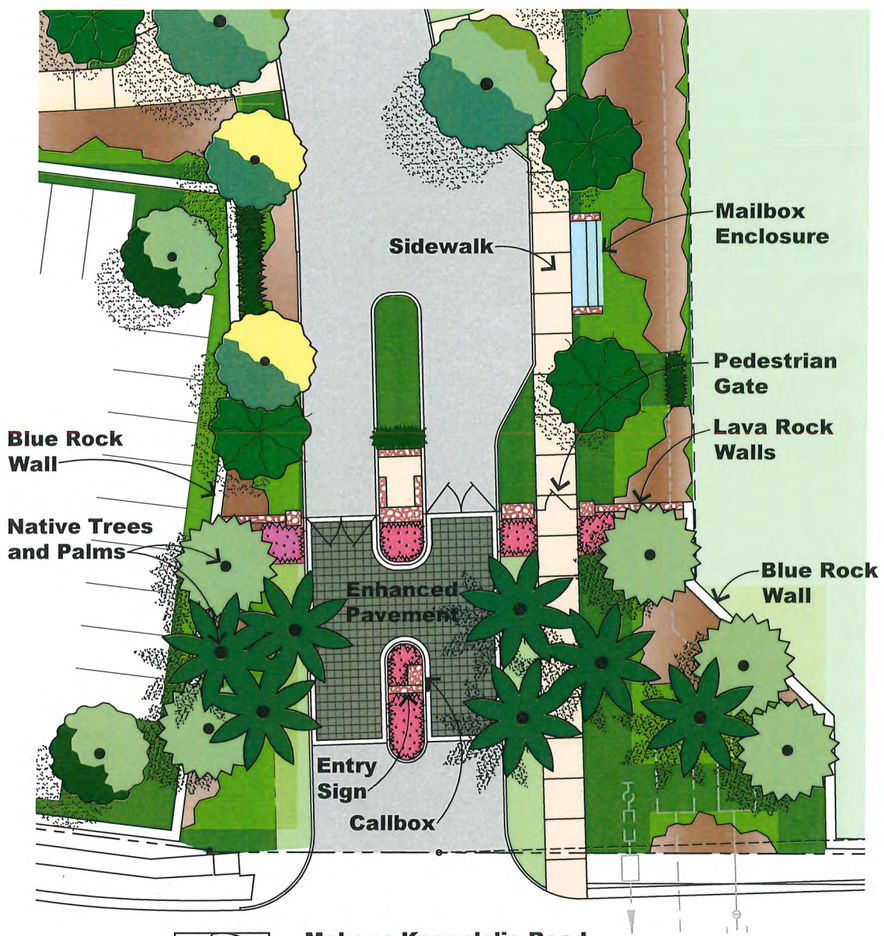
Makena, Maui, Hawaii

miyabara associates llc
Landscape Architects & Planners



PROJECT ENTRY ELEVATION

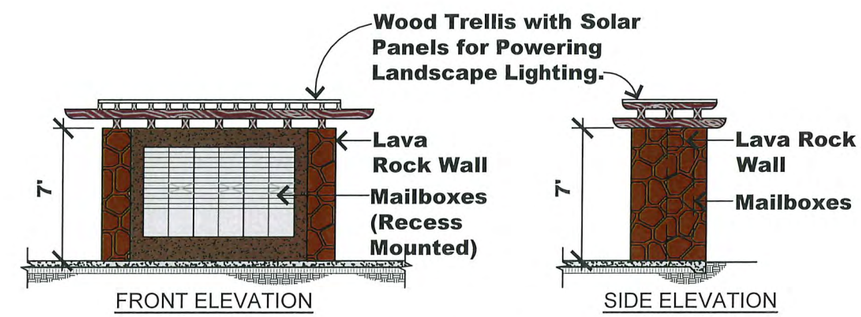
Scale: 1/8" = 1'-0"



NORTH

PROJECT ENTRY

Scale: 1" = 30'



MAILBOX ENCLOSURE

Scale: 1/8" = 1'-0"

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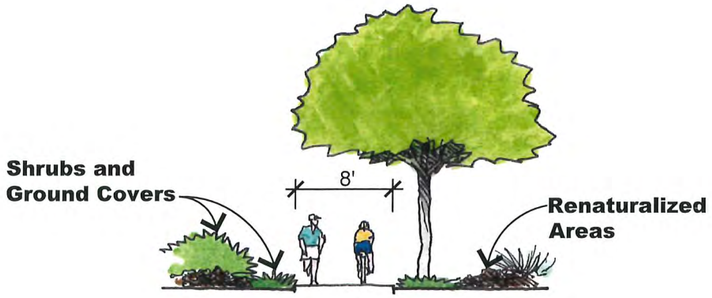
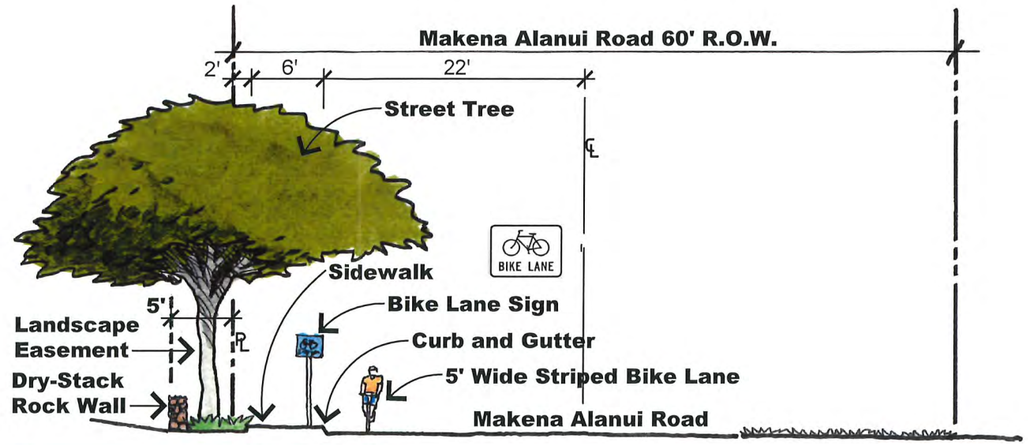
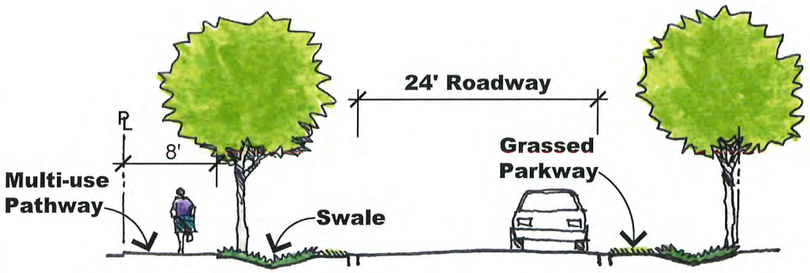


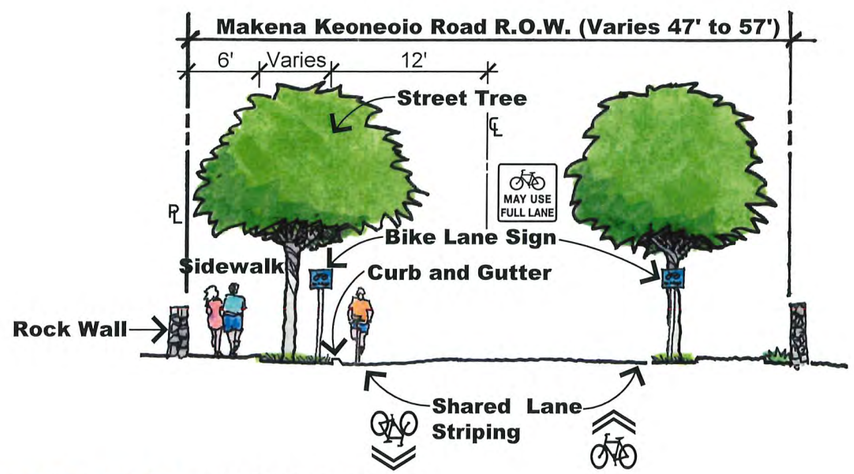
MULTI-USE COMMUNITY TRAIL



BIKE ROUTE -
MAKENA ALANUI ROAD



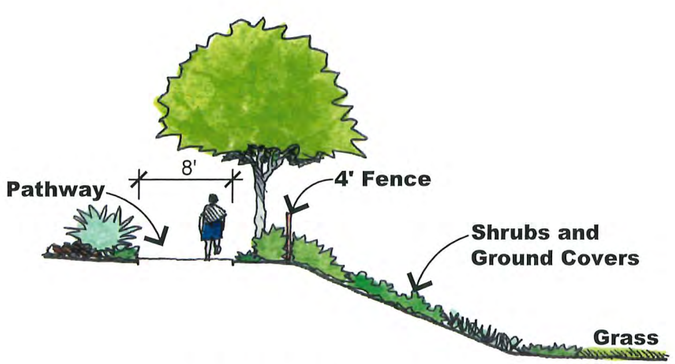
TYPICAL ROADWAY SECTION



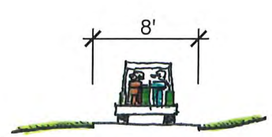
SHARED ROAD -
MAKENA KEONEOIO ROAD

NORTH

TRAIL MAP
NTS



RETENTION BASIN



GOLF CART PATH

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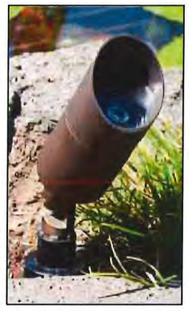
Landscape Architects & Planners

Bollard Light
Brass, MB-5 Series by Beachside Lighting Finish to be selected.



Sign Light
Brass directional lights. RXD-08-TAC series, by Beachside Lighting. Finish to be selected.

NORTH

SCHEMATIC LIGHTING PLAN

NTS

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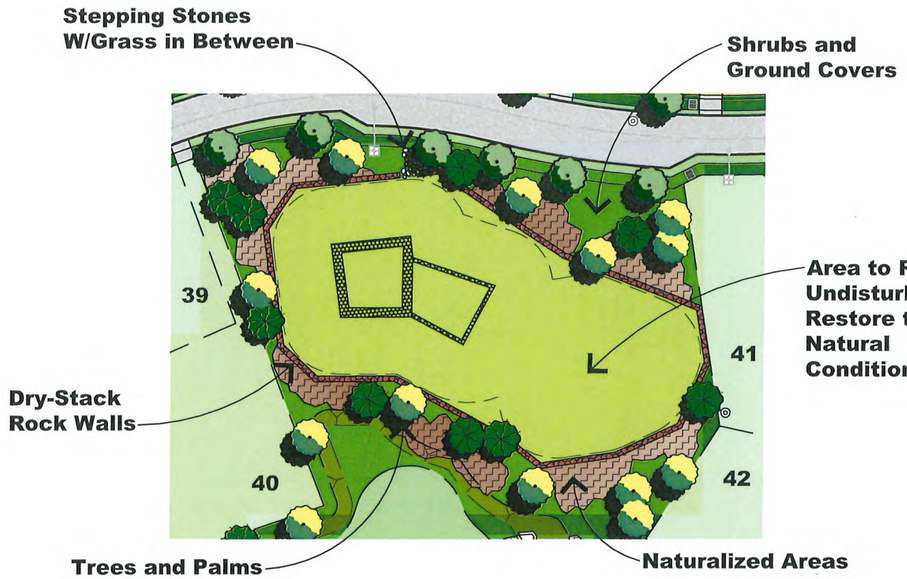
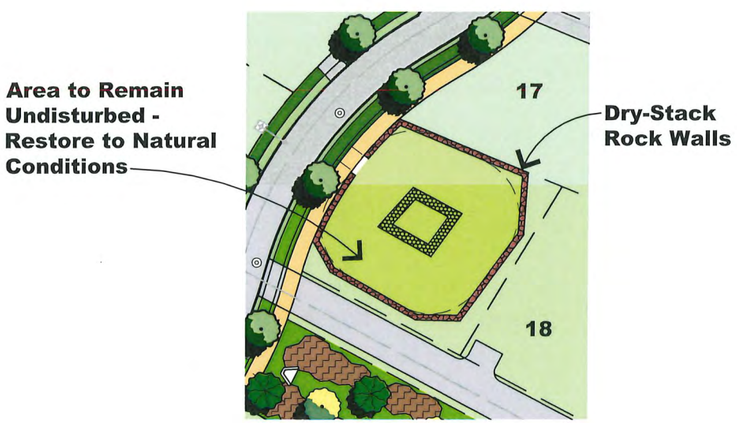
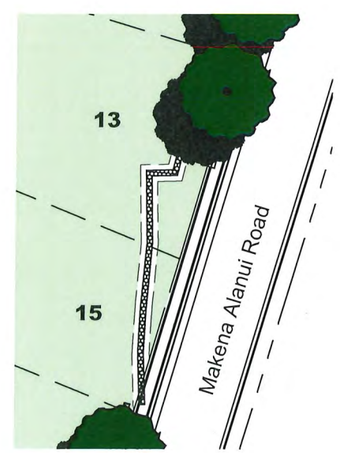


ARCHAEOLOGICAL SITE - 6373 AND 6379

ARCHAEOLOGICAL SITE - 6371, 6374 AND 6377



ARCHAEOLOGICAL SITE - 6378



NORTH

ARCHAEOLOGICAL SITES

Scale: 1" = 80'

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Makena, Maui, Hawaii

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Landscape Architects & Planners

DESIGN GUIDELINES

Laule'a at Mākena

MĀKENA

GOLF & BEACH CLUB

DESIGN GUIDELINES

Laule'a at Mākena

MĀKENA
GOLF & BEACH CLUB

July 2019

H2R, LLC

Authors

GAGE DAVIS & ASSOCIATES
Original Authors

VITA
Planning & Landscape Architecture
January 20, 2014 & March 18, 2015 Revisions

H2R, LLC
July 2019 Additional Revisions

PREFACE

These Design Guidelines are intended to provide guidance for all Homeowner residential development and construction—new buildings, building additions, site work and landscaping— as well as any subsequent changes or alterations to previously approved plans or existing homes. The Guidelines will be administered and enforced by the Laule'a at Mākena Design Review Committee (DRC) in accordance with procedures set forth in the Laule'a at Mākena Declaration of Covenants, Conditions and Restrictions (CC&R's) and/or CPR recorded with the State of Hawaii, and as may be amended thereafter. In the event of any conflict between Design Guidelines and CC&R's and/or CPR, the CC&R's and/or CPR shall govern and control.

The Guidelines may be amended from time to time by the DRC. It is the Homeowner's responsibility to be sure that they have current Guidelines and have carefully reviewed all applicable sections of the CC&R's and/or CPR, project approval documents, and/or other governing ordinances or regulations that may affect their Improvements. Any such conflicts identified by the Homeowner or their Consultants shall be immediately brought to the attention of the DRC. In general, where regulations or Guidelines conflict with one another, the more restrictive regulations or requirements shall apply.

The illustrations in this document are intended to convey a concept and not to portray specific plans for construction. The intent of these Guidelines is not to create look-alike structures or other Improvements but to provide a framework that Homeowners and their design team may use to create homes that further the goal of the Laule'a at Mākena Community Plan. To that end, the DRC reserves the right to require design modifications or additions that, though not specifically contained in the Guidelines' text or illustrations, are within the spirit and intent of the Guidelines and the design objectives of the Community.

These Guidelines are binding on any persons, company or firm that intends to construct, reconstruct or modify any permanent or temporary Improvements in the Community. The DRC evaluates all development proposals on the basis of these Design Guidelines. Some of the Guidelines are written as broad standards and the interpretation of these standards is left up to the discretion of the DRC. Other Guidelines, such as Building Height or setbacks, are more definitive, or absolute, design parameters and in many cases parallel County and building code requirements or project approval documents. It is the intention of these Guidelines that all Improvements comply with these absolute standards. In the event of a conflict between these Guidelines and any local, state, or federal building or zoning code or project approval document, the more restrictive local, state or federal building or zoning code or project approval document shall govern. It is the responsibility of the Homeowner and their Consultants to familiarize themselves with those approvals that affect their proposed Improvements.

The Laule'a at Mākena Community may be constructed in phases. These Guidelines address residential Improvements in all proposed phases. Owners shall refer to appropriate sections in these Guidelines for conditions governing Improvements within their Unit.

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1.0 INTRODUCTION

Laule'a at Mākena is located within the community of Mākena. The Hawaiian word Laule'a means happiness.

Figure 1.1 - Laule'a at Mākena Location Map

Laule'a at Mākena will be enjoyed by fifty-three families where their homes will be integrated into this tranquil environment while embracing an elegant and gracious Island lifestyle. In the distance of this secluded community lie the neighboring islands of Kahoolawe, Lana'i and Molokai and the dramatic West Maui Mountains. See Figure 1.1 - Laule'a at Mākena Location Map and Figure 1.2 - The Mākena Community.

The community is nestled near the rugged lava shoreline where the southwestern slop of Haleakalā meets the Pacific Ocean. To the south rises the ancient cinder cone Pu'u Olai from the dramatic black-sand beach of One'uli. This residential enclave offers the ideal opportunity to experience life on a deeper level in its connection to the land and sea.

Recognizing the unique quality of this land, Laule'a at Mākena gracefully expresses the Mākena philosophy of establishing a strong Hawaiian sense of community through design excellence based on an unparalleled commitment to creating an environmentally sensitive community.

Figure 1.2 - The Mākena Community

2.0 COMMUNITY DESIGN FEATURES

A place of great historical significance, the lands of Mākena were inhabited until the early 19th Century by thriving Hawaiian villages. These early residents flourished along the shoreline gathering fish, constructing places of worship and living off the land's rich bounty, completely "in tune" with the natural environment.

For many people today, the sea, the sun-drenched bays and uplands of Mākena offer a similar opportunity to rejuvenate and reconnect with friends, family, and what is important in our lives. Laule'a at Mākena – a community with a world-class private club, unparalleled golf, and seamless connection to the sea – will be such a place.

2.1 Community

Laule'a at Mākena is an exclusive community of 53 custom Homesites. The vision for Laule'a at Mākena is a place of peace and contentment where the soul and spirit are nourished and renewed. The stewardship of this very special environment is the guiding principle of this unique community. See Figure 2.1 - The Laule'a at Mākena Neighborhood.

2.2 Design Philosophy

Several neighborhoods and communities throughout the Hawaiian Islands and Maui have developed with their own distinctive and appealing "sense of place." This quality is established not through a single residence but by the entirety of the neighborhood. The design philosophy for Laule'a at Mākena follows the traditions of these special places and will focus on elements that enhance the natural integrity of this unique community.

These guidelines are meant to define how each element within the community will complement its surroundings. The composition of materials and their application are integral in creating a residence that responds to criteria of style and balance as described within these Guidelines.

The following guidelines establish a unified design philosophy for Laule'a at Mākena within Mākena. These guidelines are not intended to suggest all homes in Laule'a at Mākena be designed to look the same or use the same identical materials. They are written to encourage harmony between Homesites. This document contains relatively few absolute standards as most design concepts are expressed in broad terms. The intent is to allow flexibility for self-expression and the latitude to create the high quality home of each owner's choice. Inherent in this concept is the understanding that all homes must be designed within the parameters of these Guidelines in order to maintain design compatibility throughout the community, integrate with the Laule'a at Mākena design philosophy, and achieve the highest architectural and landscaping quality for the community.

2.3 Sustainability

Malama ka 'aina is Hawaiian for "take care of the land and the land will take care of you." Embracing this old Hawaiian philosophy requires responsible building practices that foster a pro-environmental lifestyle. This lifestyle calls for a commitment to living lightly on the land while minimizing ones carbon footprint and implementing an organic way of living without sacrificing beauty or luxury.

Acceptance of the Hawaiian tradition of kahu o ka 'aina or "stewards of the land" fosters a whole new sustainable lifestyle that entails both green building practices along with a landscape that celebrates the native plant material of Mākena.

These guidelines incorporate sustainable and environmentally sensitive design and implementation practices. They address design elements related to site planning, architecture, and landscape architecture.

2.4 Sustainability and Green Home Design

Homes within Laule'a at Mākena shall be designed to meet accepted, advanced standards for green home design and construction. A green home uses less energy, water, and natural resources; creates less waste, and is healthier and more comfortable for the occupants. Benefits of a green home include: lower operating costs for energy and water, less potential for mold and mildew growth, healthier interiors for occupants, and lower environmental impacts including reduced greenhouse gas emissions per square foot.

As energy use plays a significant role in Hawaii's environmental footprint, design of homes at Laule'a at Mākena will require specific attention to energy demand reduction and then addition of renewable energy production to offset remaining demand. As part of the design and review process, early stage energy models that evaluate different building massing, fenestration, wall section and lighting and cooling approaches will be required for submission to the Design Review Board. Due to the anticipated size of homes at Laule'a at Mākena, the use of a parametric energy model in the early concept design stage will be of great value to green certification and helping to attain Laule'a at Mākena's net zero energy target.

Green Design and Construction Programs:
A number of green certification programs are now available to guide residential design and construction. One widely recognized program is the Leadership in Energy and Environmental Design for Homes certified under the US Green Building Council (USGBC).

LEED for Homes measures green home building performance based on eight categories. Within each of these areas, projects earn points toward certification on four different levels.

- Location and Transportation: The placement of homes in socially and environmentally responsible ways in relation to the larger community.
- Sustainable Sites: The use of the entire property so as to minimize the project's impact on the site.
- Water Efficiency: Water conservation practices, both indoor and outdoor.
- Energy & Atmosphere: Energy efficiency, particularly the building envelope, lighting, and heating and cooling. Equipment inside the home must meet Energy Star efficiency requirements and the home must operate below the Energy Star reference home.
- Materials & Resources: Efficient utilization of sustainable and durable materials, selections of environmentally friendly materials, and minimization of waste during construction.
- Indoor Environmental Quality: Improvement of indoor air quality by reducing the creation of and exposure to pollutants.
- Innovation: Implementing innovative new technologies or building practices that could be unique to the area that go above and beyond in impactful categories.
- Regional Priority: Special design methods and unique region specific credits or measures not currently addressed in the Rating System.

The LEED for Homes Rating System works by requiring a minimum level of performance through prerequisites and rewarding improved performance through credit points in each of the eight categories listed above. The level of performance is indicated by four performance tiers according to the number of credit points earned. The four levels of certification are Certified, Silver, Gold, and Platinum with Platinum representing the highest level of achievement. A "Silver Certified" level rating is the minimum requirement for homes built in the Laule'a at Mākena Community. The LEED for Homes Rating System and Checklist, which outlines the prerequisites and credit points in more detail, can be downloaded from https://new.usgbc.org/leed/rating-systems/residential. A sample Checklist is located in Appendix B.

Figure 2.1 - The Laule'a at Mākena Neighborhood

Process for Achieving Green Certification

Steps to certifying your home are as follows:

- Connect with certified professional (architect or contractor) of your choice that is experienced with LEED. They will walk through the checklist with you so that you can see how the program applies to your project. Your professional should also help you identify an energy modeler and HERS rater to submit for certification.
- Set your green goals and choose which credits are aligned with your project's green goals. Your goals should include targeting an appropriate level of certification—Silver, Gold, or Platinum.
- Register your project. You can register your project online and fees apply.
- Document and verify. Working with your Provider. You will need to complete a HERS rating (if necessary) and on-site inspection of the project to document that you have met the credit requirements that reflect your green goals.
- Certification Submittal: Once your project is complete and your documentation is ready, your professional will submit your final checklists for certification. Following a rigorous review, your project will be awarded its final certification.

2.5 Net Zero

A goal for Laule'a at Mākena is to achieve net-zero electric energy consumption—meaning that the annual aggregated electricity demand for all homes is offset by site generated renewable energy. Through the green building requirements of these standards, overall energy use per home should be reduced against standard homes not following these standards. Therefore achieving net-zero should be more attainable because the amount of renewable energy each home has to generate should be less than in conventional developments.

To achieve Laule'a at Mākena's Net-Zero goal, building integrated photovoltaic solar panels are required to be installed on all homes and associated buildings to offset

at least 30% of the homes modeled electricity usage.

Furthermore, all domestic hot water demands must be met via solar thermal arrays or an acceptable substitute. If insufficient roof space does not allow the Homeowner to meet the 30% goal, the Homeowner should install as much building integrated photovoltaic systems as roof space permits on east, west, and south facing roof areas and/or in DRC approved ground mount locations that minimize visual impacts to neighboring homes and common areas.

2.6 *Site Coverage and Building Area*

Laule'a at Mākena is a private community. In no case shall Building Coverage, exclusive of driveways, decks, or overhangs, exceed 50% of the total lot. Although these Guidelines do not set an exact Maximum Floor Area, it is required that the size of the house be in scale to the size of the lot.

2.7 *Vehicular Access*

A gated private roadway provides primary access to Laule'a at Mākena Homesites.

3.0 HOMESITE PLANNING STANDARDS

The following chapter outlines design strategies that promote protection of this unique environment. These include standards for all site work relating to the Homesite including grading, siting of structures, design of outdoor areas and preservation and enhancement of the landscape.

3.1 *Objectives*

The following are the main objectives for site and landscape design at Laule'a at Mākena:

- To locate new buildings so that buildings are sited graciously on the land.
- To establish appropriate tropical or semi-arid landscapes that envelop buildings and blend them into the surrounding site.
- To design and landscape outdoor spaces that are natural extensions of indoor spaces so that the boundary between indoors and outdoors is blurred.
- To utilize an architectural approach plants, landscape structures and details that draw upon the vernacular landscape and building traditions of Hawaii.

3.2 *Unit Homesites*

In response to the unique environment and cultural qualities of Laule'a at Mākena, homesite locations will be determined based on the specific characteristics of each Lot, zoning setback criteria and on the planning and design objectives for Laule'a at Mākena, specifically:

- Minimizing grading;
- Optimizing views from the Residence while maintaining privacy;
- Maximizing golf and ocean views from neighboring Lots and/or Common Areas;
- Preserving mauka views from the shoreline;
- Protecting and utilizing distinctive natural features— such as lava flows and topography;
- Avoiding highly prominent landforms and skylines and overall, preserving the dominance of the natural setting by siting buildings where they will blend into the site.

3.3. *Combining Lots*

In cases where the Owner purchases two or more contiguous Lots and wants to combine them into a single Lot, the Owner must receive the consent of the DRC and local authorities. The total dimension of the side yard setback of the revised Building Envelope will be equal to or greater than the sum of the side yard setbacks of the uncombined Lots. Additionally, the new Building Envelope area resulting from combining the Lots shall not exceed the sum of the Building Envelope areas of the uncombined Lots. The revised Building Envelope shall be approved by the DRC prior to submitting the preliminary submittal to the appropriate jurisdictional authorities. Following approval by the DRC, any required regulatory approvals will be the responsibility of the Owner.

The DRC will carefully review issues relating to building mass and scale when reviewing a Residence on combined Lots. Homeowners and their design team are encouraged to be sensitive to these important issues when preparing their applications.

3.4. *Site Grading*

Finish grading on each Homesite must adhere to the following requirements:

- No grading is permitted outside property lines without special permission from the adjacent property owner and the DRC.
- Final on-site grades must be compatible with and include smooth transitions to adjacent street frontages, community landscape areas and adjacent unit property line grades or transitioned by DRC approved walls.
- Graded slopes must be feathered for a natural appearance to avoid artificial angles and edges wherever possible.
- Final Finished Floor Elevation will be reviewed with each DRC submittal. Final Finished Floor Elevations shall be compatible with adjacent Homesites.
- Cut and Fill slopes are to be re-vegetated with plantings appropriate to the site or with re-naturalized lava to blend them into the surrounding environment.
- In landscaping of slopes, a combination of planting and naturalistic placement of lava rocks in a variety of sizes and groupings is encouraged.
- In general, Cut and Fill quantities from grading operations shall balance on site. As part of the Design Review Process, a grading plan shall be reviewed by the DRC. Excessive grading is discouraged.

3.5. *Site Drainage*

The objective of drainage design shall be to maintain, to the greatest extent possible, the natural drainage patterns and encourage percolation.

- On-site water and irrigation drainage must be designed to prevent erosion and uncontrolled flows off-site.
- Buildings, pools and patios are not allowed on any designated drainage easement.
- During construction, measures must be taken to provide on-site soil erosion control and to avoid runoff onto neighboring properties and drainage systems.
- Rainfall drainage or swimming pools are not allowed to be connected to the community sewage collection system.
- Pool filter backwash are not allowed to discharge into drainage or sewage collection systems.
- Increased water flow off of the Homesite is to be managed to the greatest extent possible within the Homesite by systems that retain water and encourage percolation.
- When appropriate, gutters and downspouts will direct drainage from the roofs to on-site drainage collection areas. In no event shall gutters and/or downspouts drain onto adjoining Lots.
- Drainage swales or patterns within the road right-of- way shall be maintained. Where driveways connect to the Community roads, the Owner shall be responsible for maintaining drainage during construction and restoring any disturbed areas to their pre-existing condition.

3.6. *Walls and Fences*

To enhance the identity of Laule'a at Mākena all walls and fences facing streets or shared unit property line frontages must adhere to the design criteria given in the following section.

3.6.1. *Streetscape Wall and Walls along Makena Alanui*

A Streetscape wall may be installed in the front yard. This wall may be utilized to screen an auto court or serve as an entry element or portal. The design and location of this wall may vary according to the following criteria:

- Maximum total wall height is 4 feet above Finished Grade unless otherwise approved.
- Only native lava rock is acceptable for streetscape walls.
- Retaining walls must be designed according to the criteria given in Sections 3.6.3.

3.6.2. *Side Yard Walls and Fences*

- In general, walls are limited to a maximum height of four feet above approved Finished Grade.
- Privacy walls may be 6' above approved Finish Grade provided they are limited to areas adjacent to bedrooms or surrounding outdoor shower areas.
- House pet enclosures shall be constructed with the same materials as the primary structure and shall be attached to the primary structure unless approved otherwise. House pet structures shall be compatible and integrated into the site and architectural design.
- Walls must be finished in either lava rock, blue rock, or dark colored and textured plaster/stucco.

3.6.3. *Retaining Walls*

Retaining walls are limited to the following design criteria:

- Maximum height is four feet above grade, but may extend to 6' if the applicant demonstrates this to be a superior site solution and there are no adverse impacts to adjacent Lots or Common Areas.
- Retained slopes greater than four feet in height are to be treated with multiple retaining walls separated by a planter strip of at least two feet, measured between the faces of the walls.
- Retaining walls visible along the street frontages or adjacent to a Homesite must be faced with lava rock. Other on-site retaining walls may be faced with blue rock, stone, or a plaster finish compatible with adjacent building walls.
- Exposed concrete, concrete masonry or adobe brick are not acceptable.
- Retaining walls close to property lines may not adversely affect grades, walls, drainage, views or privacy of adjacent parcels or Common Areas.
- All retaining walls shall be designed and stamped by a Hawaii licensed civil or structural engineer or Architect.
- Lava rock or block faced with lava rock is to be used for all retaining walls visible from other Lots, Common Areas or the shoreline. A dry stack pattern, structural in appearance and drawing upon the regional rock wall is required. Other wall materials are acceptable provided they are not visible from Common Areas or adjacent Lots.
- Rock retaining walls are to be designed with a 1:12 batter on the face.
- The top of walls are to be shaped to blend with natural contours. Ends of walls shall not be abrupt, but are to be designed to create natural looking transitions with the existing land forms and vegetation.
- In general, retaining walls visible from Common Areas or the golf course may not delineate or property lines for long distances. Walls shall utilize multiple offsets that respond to the site's topography and Residence design.

3.7. *Driveways*

Driveways for each Homesite shall meet the following criteria:

- Driveway access is permitted only from the street frontage for each Homesite.
- No more than one driveway street access point is allowed per Homesite.
- Maximum driveway width in the street frontage is 10 feet.
- Driveways and auto courts shall be paved with one of the following:
  1. Natural stone or cobble stone.
  2. High quality concrete pavers, colored and textured concrete to emulate lava slabs, or grass pavers.
  3. Flagstone or lava stone with turf joints.
- Crushed coral, cinder or decomposed granite.
- Plain concrete and asphalt paving are not acceptable.
- Driveways that are parallel to the street require special permissions. They are not recommended.
- Open grid pavement systems and paving materials with a Solar Reflectance Index (SRI) of at least 29 are preferred.
- Driveways must be dust free. Loose surfaces, such as crushed cinder or coral, must be installed with a stabilizer or binder coat and maintained to eliminate dust. Coloring and texturing of concrete is required. Colors of finish paving materials shall complement

proposed buildings and integrate well with the surrounding landscape or lava colors.

- The use of ribbon driveways, which permit planting of vegetation between the wheel strips, is strongly encouraged.

3.8. *Parking*

- Two on-site parking spaces are required in an enclosed garage, plus space for two more vehicles in the driveway or auto court.
- Where possible, garage doors shall be oriented away from the street frontage.
- Guest parking shall be provided off the street and only on the driveway or within the garage and shall be indicated on the plans.
- Garages must be sited and located so that visibility from the street is minimized. Side loading is required for all Lots where possible.
- Garage doors shall not exceed 9 feet in width.
- Recessed garage doors (minimum of 12 inches) is required.
- On-street parking is prohibited on any street in Laule'a at Mākena.

3.9. *Entry Gates*

Driveway and walkway entry gates require special permission. If used, recommended designs are simple and designed in a traditional Polynesian pattern and scale. Oversized or overly elaborate gates are not acceptable. Other designs require special permission.

Pilasters for gates at driveway and walkway openings in the Streetscape wall are to be simple in design and compatible in scale and finish with the architecture and project character.

- Maximum distance between pilasters is:
  - 16 feet for driveway pilasters.
  - 4 feet for walkway pilasters.
- Maximum pilaster dimensions are:
  - 6 feet high above grade.
  - 3 feet wide.
- Allowable pilaster finishes include natural lava rock.

3.10. *Utilities*

All utility systems are to be placed underground and connections screened from street or adjacent lot views. Utility pedestals and transformers shall be screened to the maximum extent practicable.

3.10.1. *Water Requirements*

- Water connections and meters are to be located in underground vaults flush to grade or within a wall enclosure provided they are accessible, but not in full view, from the street.
- Water conservation techniques are required for all fixtures and irrigation equipment. This includes flow restrictors at all shower heads and faucets, low flow toilets and low-flow irrigation heads.
- Cartridge-type pool filter systems are required for swimming pools. No back flushing of diatomaceous earth filters into the sewer line or storm drain system is permitted.
- Plumbing fixture specifications shall be included in the construction drawings.
- High-efficiency fixtures and fittings must meet the following requirements:
  1. The average flow rate of all lavatory faucets must be 1.5 gpm.
  2. The average flow rate of all showerheads must be 2.0 gpm.
  3. The average flow rate of all toilets must be 1.3 gpm or toilets must be dual-flush.

3.10.2. *Telephone*

Telephone connections are to be located in underground vaults flush to grade.

3.11. *Service Areas*

All mechanical equipment, service areas, and noise generating equipment shall be screened from adjacent Homesites and Common Areas. All service areas and exterior mechanical equipment must be screened from horizontal off-site view by walls or opaque landscaping, including:

1. Air condition units.
2. Fuel tanks and water tanks.
3. Water purifiers, pool pumps and pumping equipment.
4. Irrigation controllers and backflow preventers.
5. Clothes lines or outdoor work areas.
6. Trash and recyclable collection and outdoor storage areas.

- All exterior generators of sound, including air conditioning compressors and outdoor speakers, must be shielded to prevent disturbing neighbors.
- Air conditioning compressors are not allowed on roofs that are exposed to upper units.
- Wall or window-mounted air conditioning units are not allowed.
- Mechanical equipment for pools shall be screened and or covered for noise control.

- Trash disposal areas, outdoor work areas and outside equipment (including antennae and satellite dishes) are to be completely screened from off-site views by the use of architectural features or plant materials. Satellite dishes are to be treated with compatible paint to blend in with exterior surroundings. Where feasible, these areas shall be integrated into the service areas. Radio and TV antennas may not be attached to any building.
- Trash container storage areas shall be located so that they are easily accessible to service personnel and smells are contained.
- All noise levels shall be in compliance with the State of Hawaii Department of Health (HDOH) noise level requirements. Solid noise absorbing covers for equipment may be required after installation if it is discovered that the equipment is audible from adjacent properties.

3.12. *Playground Equipment*

- Playground equipment shall be screened from adjacent Homesites and from off-site views.

3.13. *Address Markers*

Address Monuments shall include the same materials and general forms utilized on the primary structure and shall be approved by the DRC and in compliance with the Laule'a at Mākena Signage Program and Provisions.

4.0 ARCHITECTURAL STANDARDS

The following architectural standards have been developed to achieve the environmental, Community and aesthetic objectives for Laule'a at Mākena. The intent of these Guidelines is to encourage a diversity of design solutions within the context of an overall architectural vernacular while at the same time producing a unified design aesthetic for the Community that is appropriate to this spectacular ocean island setting.

4.1. Architectural Character & Objectives

Laule'a at Mākena is planned to include a collection of fifty-three unique and distinctive homes. Each home will be required to maintain a delicate balance between individual expression and the need to blend comfortably into the context of the community.

These Design Guidelines have been developed with attention toward general goals and concepts and less attention toward individual styles in order to allow personal expression within a visually cohesive community. Each home shall establish its own identity without dominating other structures within the community. The Laule'a at Mākena DRC will consider submittals within this context and encourage overall high quality designs with well-conceived and balanced proportion and detailing.

The architecture of each home needs to be integrated with its site and landscaping. Qualities of certain architectural styles will need to be balanced by the ability of the selected site to provide the proper context for that style. Some sites will be able to accommodate certain styles that may be deemed inappropriate on another site.

The following are the main objectives for architectural design at Laule'a at Mākena:

- To create buildings appropriate to a casual, outdoor tropical lifestyle.
- To design buildings that seem to "grow out" of the site by responding to the climate, landforms, landscape and site elements.
- To create buildings which have a strong indoor/outdoor relationship.
- To create buildings that, through their design, massing and materials, covey a sense of timelessness, permanence and quality.

4.1.1. Acceptable Characteristics

The key components of each home design may include the following characteristics:

- Use of design elements associated with historic Hawaiian and Polynesian architecture.
- Building forms shall be designed to address three elements in common to all structures: the foundation, building walls and roof forms, though the roof form should dominate the massing composition.
- Horizontal, rectilinear massing and proportions.
- Lava rock or natural stone foundations and retaining walls.

4.1.2. Unacceptable Characteristics

Architectural design characteristics that are not acceptable in Laule'a at Mākena include neo-classical styles or styles not germane to Hawaii.

4.2. Building Height and Setback Limitations

- The maximum allowable Building Height is 45 feet in Laule'a at Mākena.
- The height is the vertical distance measured from the highest point of the roof to a corresponding point directly below on the natural or finish grade, whichever is lower.
- There will be a front yard setback of 15 feet, side yard setback of 6 feet, and rear yard setback of 6 feet.
- Side and rear yard setbacks for two-story homes will be 10 feet.
- The homesites along the perimeter of the community will have a minimum rear yard setback of 15 feet.

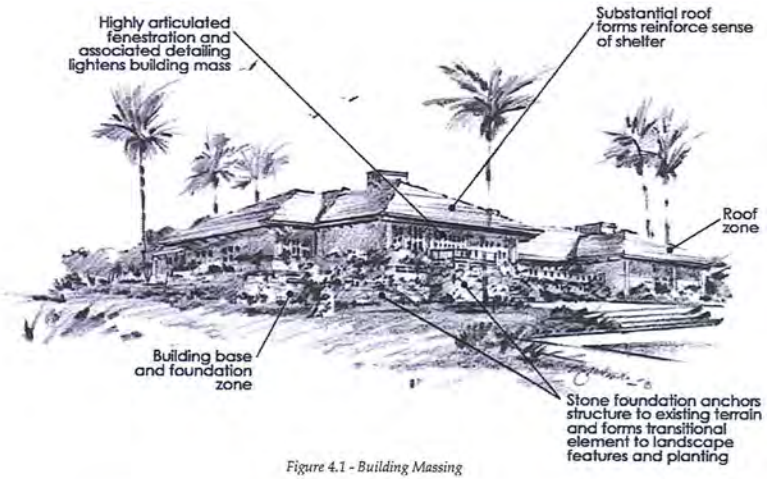

Figure 4.1 - Building Massing

4.3. Massing and Building Organization

In reviewing the forms of a proposed building, careful scrutiny will be given to the massing, proportions, and overall scale of the building in relation to the specific characteristics of the subject and adjacent Homesites. The DRC will encourage designs that achieve a delicate balance between distinctive form and compatibility with the surrounding neighborhood and land form. See Figure 4.1 - Building Massing

Architectural massing and forms shall be utilized to blend traditional Hawaiian architectural forms and materials in new ways. Low lying and understated building profiles and forms are more compatible with the site. Sensitive and careful articulation of the home's massing shall reinforce the concept that the home is part of the terrain.

4.3.1. Building Scale

Buildings must have an intimate, residential, and human scale.

Acceptable building scale treatments include:

- Horizontal building elements.
- Large surface areas broken by openings, projections, recesses, changes in plan, or building details. Terracing of architectural elements will also contribute to the creation of human-scaled building masses and spaces. See Figure 4.2 - Building Scale
- Covered walkways, stairs, structural elements and building details in proper proportions to height and width.
- Building entries shall be designed to provide an inviting human scale presentation to the community. The scale and massing of the entry is very important, but shall not be overstated.

Unacceptable building scale treatments include:

- Vertical proportions that are over scaled.
- Large, plain, building surfaces and glazing.
- Exaggerated towers and gateways.
- Oversized or undersized doors, structural elements, stairs or building details.

4.3.2. *Building Massing*

Building massing shall be simple in form and, where possible, composed of several smaller masses.

Acceptable building design elements include:

- Variation in wall plane.
- Variation in roofline height.
- Compositions of simple, rectilinear shapes.
- Utilize gracious roof overhangs to convey a sense of shelter and connectivity between indoor and outdoor spaces.
- Stepping of building forms.
- Use of interior courtyards
- Massing shall reflect room size volumes or groups of masses rather than one dominant mass. If an architectural style or design that relies upon a single, dominant mass is proposed, the applicant must demonstrate that the mass is not visually dominant when viewed from neighboring Lots, Common Areas, or the golf course and supports the aesthetic objectives of the Community.
- Massing designs that are based on vernacular island architecture are encouraged. In general, these designs employ groups of distinct and simple geometric forms emphasizing a low profile and roof, rather than wall, compositions.
- The play of light and shadow between Building Masses shall be carefully formulated to articulate masses, accentuate entries and/or building levels and to create texture.
- Buildings shall be designed to be viewed from all sides. Screening and/or designing service areas as integral parts of the overall architectural composition is required.
- Building masses shall have a strong indoor-outdoor relationship by incorporating courtyards, breezeways and Lanais.
- Entries shall be recessed and articulated with overhangs, Lanais and/or courtyards. Entry elements shall be in scale with the home. Dominant or overly stylized entries shall be avoided.
- Detached garages which incorporate pergolas or trellises to connect to the main Residence are encouraged to avoid large bulky forms.

Unacceptable building forms include:

- Large boxy shapes.
- Large flat, plain surfaces.
- Large unbroken rooflines.
- Arbitrary use of curves and unusual forms.

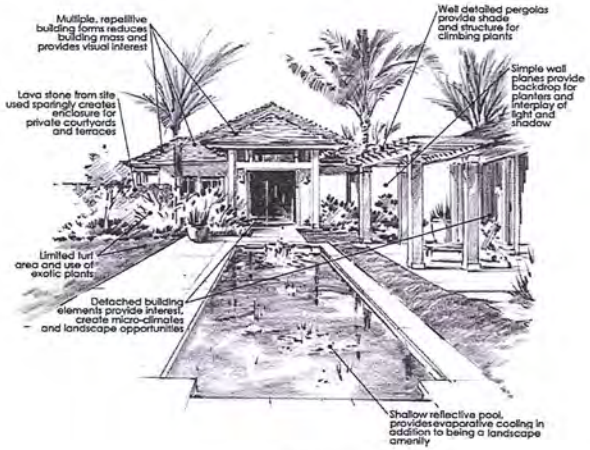

Figure 4.2 - Building Scale

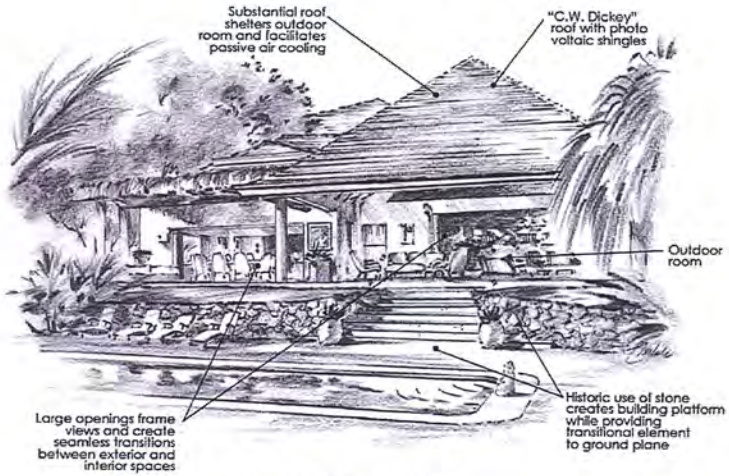

Figure 4.3 - Building Articulation

4.3.3. *Building Structure*

Buildings must have a solid structural appearance.

Acceptable building structure design includes:

- A solid, thick, wall appearance.
- Use of columns, pilasters and covered lanai.
- Solid, enclosed, building foundations.
- Simple structural forms and details.

Unacceptable structural expression includes:

- Oversized or undersized columns.
- Arches on slender supports or buildings supported by exposed foundation posts or columns instead of solid foundation walls.

4.4. *Building Articulation & Shadow Lines*

In order to generate a strong visual impression, homes in Laule'a at Mākena shall develop significant "shadow space" by allowing the building to shape and cover exterior areas. The building/ ground relationship shall develop significant shadow lines that add scale and character to the home. Notable areas of the exterior perimeter must be developed as covered, outdoor space. Integrated covered patios and lanais are required and shall be at least 50% of the linear frontage of the makai facing elevation. See Figure 4.3 - Building Articulation

4.5. *Lanai's and Pergolas*

Pergolas, lanais and terraces are strongly encouraged at building entries and along building walls facing ocean views or with strong sunlight exposure. They provide shaded outdoor spaces, protect glazing from solar heating and create a transition from outdoor to indoor spaces.

Acceptable design of lanais and pergolas includes:

- Proper horizontal proportions of height to width.
- Use of simple round or square columns with simple capitals and bases.

Unacceptable examples of lanais and pergolas include:

- Parabolic arches.
- Exaggerated or stylized columns and decorations.
- Inappropriately scaled elements.

4.6. *Building Facades*

Building facades shall reflect the design elements listed below.

Acceptable facade design includes:

- Building elements shall "frame" views. Where possible, they shall be open in character to facilitate passive cooling and a more effective transition between indoor and outdoor spaces.
- Proper horizontal proportions.
- Variation in wall plane.
- Expression of structure.
- Use of covered lanais, cantilevers, or covered walkways.
- Use of shadows to create a sense of depth.
- Use of overhangs, projections and recesses.
- Simple decoration.

Unacceptable façade design includes:

- Bright exterior wall colors in excess of a 50 LRV.
- Vertical proportions.
- Large, unbroken wall surfaces.
- Walls extending above pitched roof lines.
- Heavy texture or swirled plaster finishes.
- Arbitrary or exaggerated decoration.
- Extended horizontal parapets.

4.7. *Doors and Windows*

Doors and windows are significant elements that contribute to the character of each home. As such, designs for each door (including garage doors and particularly front doors) must be unique and coordinated for each home. The designs shall be consistent with the style of a home, be clearly defined, and inviting.

All openings for doors and windows are to be appropriately sized to the structural expression of the building. Glass areas shall be recessed a minimum of 2 inches. Greater recesses may be required to scale properly with the glass size. Projecting roof overhangs, balconies, or Lanais may be utilized to minimize visibility of and reflections from glass when viewed from off site. The proportional relationship between overhang depth and window height shall be a minimum of 1:1. Window and door recesses shall create a pattern of light and shadow that lends a sense of thickness to the walls. The size, number, placement and rhythm of windows and doors in relation to the building mass and exterior surfaces shall create a balanced, generally asymmetrical composition. The number and arrangement of arched openings, if any, shall be limited to emphasize important living spaces within the house. Stacking of arched windows, doors and openings is to be avoided.

All doors or windows adjacent to the golf course must utilize safety impact glass.

4.7.1. *Doors*

Acceptable door designs include:

- Protected, shaded, door locations.
- Clear sequence of entry area spaces.
- Integration with overall building form.
- Doorway openings expressed as a deep recess in a thick wall.

Unacceptable door designs include:

- Abrupt entry space arrangements.
- Doorways that are flush with wall surface.
- Tacked-on entry alcoves.
- Plain, unarticulated door surfaces.
- Exaggerated forms and colors.
- Solid, plain, non-descriptive surfaces.
- Metal garage doors with non-insulated panels.
- Large glass panels

Front Entry Doors: Doors may be single or double units, recessed 4 inch minimum, paneled, naturally stained wood and/or multi-paned glass. Wood doors may be carved and/or have a rough-sawn appearance. All door glazing must utilize true divided lites. Front entryways shall be scaled appropriately to the building mass and not be overly stylized or "make a statement." Door designs shall be consistent with each other, utilizing similar jamb, head and panel designs around the entire exterior of the house. Where vents are required for exterior mechanical room doors, full height louvers shall be used.

4.7.2. *Windows*

Windows: Window types shall consist of vertical casement and/or double hung configurations. Window forms may utilize square or vertical shapes, reserving circular, oval, or shallow arched shapes for limited applications of accent windows. Divided lite windows shall utilize true or applied lights with in-glass spacers. Butt-joint glass windows are not acceptable. Traditional divided lite patterns of 4, 6, 8, or 9 over 1 for double hung windows and 3, 4, 6 or 8 lite patterns for casement windows are strongly encouraged. Window frames must project beyond recessed glass surfaces.

Large window surfaces are to be subdivided with structural members or integral muntins. Large (such as 4 feet x 8 feet) single panes are acceptable provided they are well recessed, shaded and incorporated into a window composition that uses large scale vertical and horizontal structural members and includes multiple smaller sized panes. Such applications must be true to the architectural style of the Residence and approved by the DRC.

Glass block visible from Common Areas or the golf course is prohibited.

Acceptable window designs include:

- Balance of wall and window surface areas.
- Coordination of head or sill heights with floor levels.
- Wood or aluminum frames with appropriate stained, painted, or anodized coatings.
- Clear, gray or bronze glazing.
- Integrated fittings for storm coverings.
- Awnings require special permission.
- Utilizing window films, high performance glazing, exterior shading devices (side fins, overhangs), and interior shading devices to control heat gain through glazing.

Unacceptable window designs include:

- Arbitrary window sizes and locations.
- Frames flush with exterior wall surface.
- Ferrous metal and natural aluminum frames.
- Sloped glazing and greenhouse shapes.
- Reflective glazing.
- Black, rose, gold, copper, azure, or blue-green tinting.
- Exaggerated or highly stylized forms and decoration.
- False mullions and muntins.

Window and Door Materials and Colors: The use of wood or wood clad windows and doors is recommended, but high quality metal or other treatments may be allowed with DRC approval. Doors, windows and frames may be painted or stained, with their colors and related trim colors selected from the darker shades of red, green, brown or other colors found in the natural onsite materials. Brighter accent colors are acceptable provided they are consistent with the architectural style.

Accent Trim: Wood, decorative tile and/or stone accent materials shall be used in a consistent manner around the structure. Bright accent colors may be used if employed with constraint.

Shutters: Shutters may be operable or non-operable, constructed of wood and naturally stained or painted in appropriate designs that borrow from regional vernaculars. Double shuttered windows shall be full sash height and half sash width for the window they adjoin. Single shuttered openings shall be full sash height and width for the window they adjoin. Shutters shall be set a minimum of 2 inches from the wall surface to create a distinct shadow. Shutters are discouraged from being applied solely as decorative elements to only a limited number of windows. If used, shutters and their hardware shall be uniformly applied as an architectural feature and appear functional.

Lintels: Cut or rough stone, board formed stained concrete, decorative tile, cast stone and/or rustic, stained, rough sawn or refined wood.

Glazing and Glass: All glazing shall meet energy codes. Glass may be coated or tinted to control solar heat gain, but a reflective, mirrored appearance is not permitted.

Hardware: Hardware shall be appropriate to the scale and style of the windows and doors and have a handcrafted appearance. Acceptable finishes include black iron, bronze or other distressed, rusticated or natural metal finishes. Protected, shiny brass or other metals are not acceptable.

4.8. *Roofs*

Since roofs will form an important part of the visual environment, all roofs shall be carefully designed in color, material and shape so that they help to integrate the structure with the site and neighboring buildings and minimize the overall building massing. Roof structures are to be designed to express traditional timber construction. Traditional trusses, braces, brackets and column spacing are to be used where they are needed to keep the appearance of timber framed cantilevers and/ or unsupported spans. Trellises and outdoor covered areas may be incorporated into the overall massing but must avoid a "tacked on" appearance.

Acceptable roof design includes:

- Roof forms shall be substantial and in the style of "C.W. Dickey" with respect to pitch, form and shape.
- Varying plate and ridgeline heights.
- Exposed rafter tails.
- Building integrated photovoltaic roof tiles that are required to meet the net-zero energy requirements outlined in section 2.5
- Balconies, skylights and mechanical screens that are integrated into roof design.
- Solar hot water systems must be concealed to preserve views.
- Light tubes shall be accepted.

Dormers: Dormers may be employed to provide a large scale "texture" to roof forms. Acceptable dormer forms are low pitched gable, hip or shed. Dormers must be properly proportioned to the roof. The inside of all dormers must be finished with paint or other suitably finished surfaces.

Eave Depths: Eaves shall be incorporated, where appropriate, to an 18 inch minimum on the rake end of gables and 24 inches at the rafter overhangs. Larger rafter overhangs are encouraged for 3:12 and 4:12 roof pitches. All eaves are to be left open except upon approval of the DRC. Simple, decorative rafter tails are encouraged.

Fascias: In general, pitched roof fascias shall be 5 inches maximum, being of sufficient size to support a gutter. Large, plain stucco or metal fascias are unacceptable. Open eaves that express the roof 's structural elements are strongly encouraged.

Gutters and Downspouts: Gutters, in general, shall be incorporated into the overall design of the house and shall not appear as if they were "tacked" on. The use of copper or lead coated copper is encouraged. Integral gutters with concealed downspouts and drains are encouraged at long overhangs. Exposed downspouts are to be located to avoid long return sections from the eave to the wall. Integrating downspouts with vertical elements, such as structural columns or trim, is encouraged.

Roof Materials and Color: Materials for roofs are to be wood shingle, unglazed flat tile or high quality standing seam or metal shingles. If metal is used, it shall be uncoated copper left to weather. Roof tiles shall utilize a minimum of four different muted, earth tone, complimentary colors, or diluted factory blends that create a subtle, multi-color surface. The overall color impression of the roof shall be dark, blending with the colors of the adjacent lava fields and vegetation. Roofs must be surfaced with a material of a color that harmonizes with the natural landscape and has a LRV of less than 26. Flat roofs shall be surfaced in a dark color or material (LRV of 20 or less). Metal materials that weather are allowed, but they cannot be reflective and must be left unsealed so that they may weather. All roof materials must be fire resistant.

Acceptable roof design includes:

- Roof materials shall be consistent with LEED requirements.
- Flat roofs, green roofs, domes, vaults, metal roofing, skylights and solar panels are to be fully integrated and shall be reviewed on a case by case basis.

Unacceptable roof design includes:

- Corrugated metal roofing.
- Exposed rolled or built-up roofing.
- Mansard, gambrel and composite roof forms.
- Roof materials shall not produce glare or have reflective qualities.
- Asphalt shingles, barrel tiles, or metal roofs other than copper.
- Refer to Section 9.0 Appendix G for exceptions.

4.9. *Skylights*

Skylights must be fully integrated with the roof and building design. The primary aesthetic concerns regarding skylights is reflecting glare during the day or light glare at night. Accordingly, they shall be located to minimize their visibility from off-site and there shall be a maximum of 40-square feet of skylights on any Residence. Skylights must be integrally designed into the roof structure. Skylight glazing shall not be back-lit or manufactured of reflective material. Skylight framing and glazing shall be colored or coated to match adjacent materials. Light emanating from the interior through a skylight is subject to the same controls as light emanating from a window as described in Section 6 Lighting. Skylight glazing must be clear, white or non-reflective solar bronze in color.

4.10. *Solar Energy*

Solar power-generating and/or photovoltaic ("PV") equipment is required and shall integrate with the architectural design of the roof structure or be ground mounted. All solar designs must be reviewed and approved by the DRC to ensure that aesthetic considerations are properly addressed. A recessed roof is encouraged to accept PV arrays in order to reduce the visibility of the PV system. The DRC may require modifications to a design or installed system in order to reduce or eliminate the visual impact of PV systems.

4.11. *Outdoor Living*

The beautiful location of this community and Maui's mild weather create ideal conditions for robust outdoor living. Each home design shall include opportunities to make use of this outdoor life style. Outdoor spaces allow for dining, family gathering, and private introspection. Recreation, or entertaining, accommodating many of the activities normally included within each home. These areas shall be carefully planned during the design of the home to make use of both the natural assets of each site as well as having a direct relation to its counterpart within the home. See Figure 4.4 - Outdoor Living

Courtyards and Lanais:

Courtyards and lanais are encouraged in a manner that reflects the close relationship between indoor and outdoor space in building design.

Courtyards and lanais exposed to public view must employ traditional Hawaiian style design characteristics. Private, internal courtyards may be more flexible in design.

Acceptable courtyard design includes:

- Courtyards that are enclosed on a minimum of two sides by adjacent building forms.
- A covered open space, or galleria, created by extending the building roof over open columns on at least one side of the courtyard,

Acceptable lanai design includes:

- An extended roof overhang over a lanai, terrace or balcony.
- Use of simple columns to support the roof.

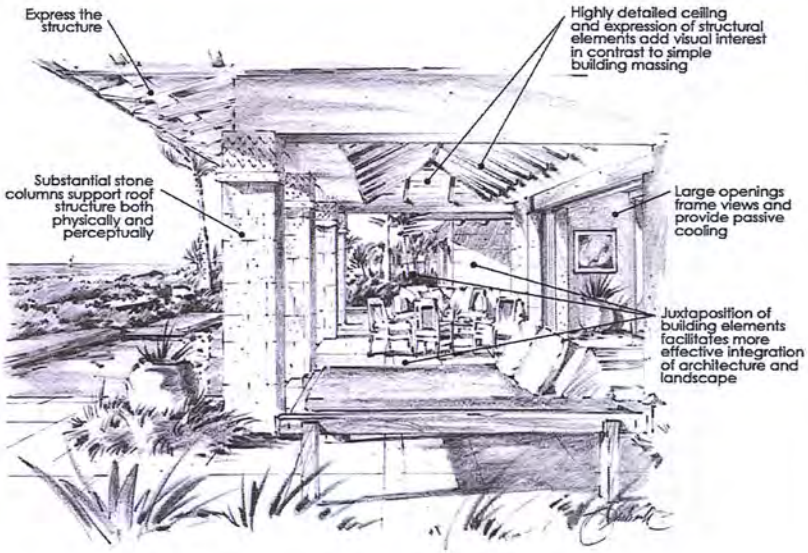

Figure 4.4 - Outdoor Living

4.12. *Exterior Walls and Materials*

In general, the exterior wall design of all Residences and Improvements shall incorporate the use of at least two different complementary materials in order to create subtle textural changes and to further articulate masses. Exterior walls composed of a single building material are acceptable provided they support the thematic expression of the Residence. The use of sustainable materials shall be considered in all aspects of design including the use of recycled materials or other green building materials. See Figure 4.5 - Exterior Finish Design

Exterior Wall Design: The minimum exterior wall thickness shall be sufficient to allow windows to be recessed a minimum of 2 inches. Walls shall be simple, refined compositions of one or two materials in a logical structural relationship and consistent in material use with the architectural design.

Exterior Wall Height: In general, the exterior wall height from finish floor to top of wall plate shall be 10 feet for the first floor and 9 feet for the second floor. In no case shall an unbroken vertical plane be more than 12 feet in height. The DRC will consider, on a case- by-case basis, exceptions for details, such as gable end walls, if the exceptions are demonstrated to be part of the architecture style and are in scale with the overall Community.

Acceptable Materials: Natural stone, vertical wood siding, wood shingles, clapboard with a maximum 6 inches exposure, board and batten, highly detailed architectural concrete (similar to the Outrigger Canoe Club in Honolulu), and stucco with architectural accent elements such as fascias, beams, window and door treatments and/or trim utilizing wood, stone, tile and/or ornamental metal.

Stone Masonry: Stone may be used in the following manner:

- As a foundation element with plaster/stucco or wood walls above.
- As full height walls when used as the predominant wall material or;
- As an accent in a cut pattern surrounding doors, windows or openings.

Preferred styles are either a dry-laid, semi-coursed application that is structural in appearance or uncoursed stone with minimal grout showing. Other styles must be submitted for review by the DRC. Stone must have a structural appearance, giving the impression that the wall could stand without mortar. Thin stone veneers applied in geometric or random patterns that are not structural in appearance are not permitted. Where stone veneer is used, it must simulate the use of stone laid in a structural manner.

The stone shall wrap elevations and return into walls and window openings with a preferred minimum return wall depth of 4 feet. The use of faux or cultured stone is not allowed. The use of lava rock is strongly encouraged.

Exterior Plaster and/or Stucco: Stucco may be utilized for foundation elements or full height walls as discussed above in Stone Masonry. Walls shall have a "handcrafted" appearance utilizing wavy textures or troweled patterns in a light to medium texture. Heavily textured stucco patterns will not be permitted.

Wood Shingles, Vertical Wood Siding, Clapboard or Board and Batten: Wood surfaces may be used to express load bearing walls or as in-fill panels within frame or stone structures. Generally, wood structures shall rest on a stone base.

Battens must be of sufficient depth to create a distinct shadow pattern, generally 1 inch by 2 inches. Battens applied over exterior grade plywood may be acceptable if batten spacing and size provide the impression of a true board and batten wall. Plywood with noticeable "footballs" or other imperfections is unacceptable.

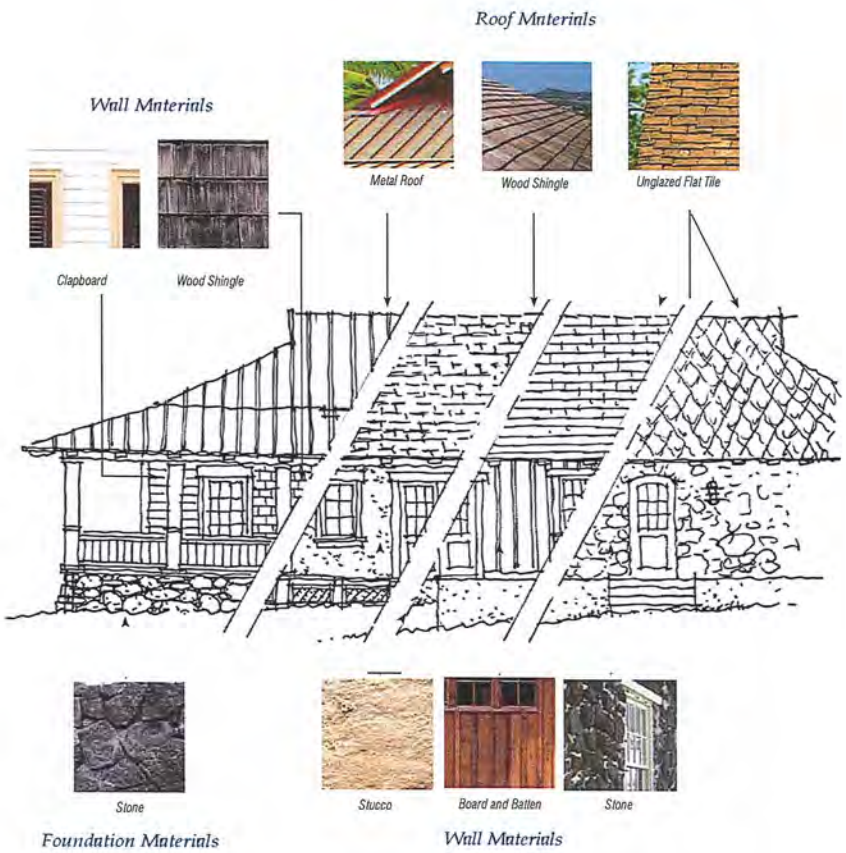

Figure 4.5 – Exterior Finish Design

4.13. *Exterior Colors*

The color palette for Residences at Laule'a at Mākena will use muted and recessive colors that will allow the natural colors of the islands to predominate, complementing rather than contrasting with the setting. This palette is based on the colors and hues of the surrounding geology and landscape. See Figure 4.6 – Color Design. In general, this will require adhering to the following basic color concepts:

Earth Tones: Earth tone colors with organic origins are to be used for the primary color composition.

Recessive Colors: Colors that recede, rather than advance, shall be used. Generally, these are darker colors. A wide variety of colors may be used but a Light Reflective Value (LRV) of 60 or lower is required. All paint manufacturers categorize their products by LRV and this information is readily available if not indicated directly on color swatches. Light or bright colors generally have an LRV greater than 60.

Multi-hued: Large areas of monochromatic surfaces tend to stand out in the bright Hawaiian sunshine. As a result, colors which have a "tonal complexity" shall be employed. With certain materials, such as stucco, this multi-hued quality may be achieved through surface texture and quality.

Color Review: The DRC will consider color in the context of the entire Community as well as the individual.

Residence for submission: The Committee will review and approve colors and textures in a three-step process. During the Concept Design phase, the applicant may describe the color palette and indicate those colors on the exterior elevations. In the Preliminary Design and Final Design Submissions the applicant will submit actual color and material samples. Based on these, the applicant will, during the construction phase, then be required to provide a 48 square foot panel on site of the intended colors, materials and textures of the major building elements for final approval.

The palette and following guidelines apply to all exterior surfaces of the house, including walls, parapets, roofs and all related fences and walls:

- No exterior materials used shall have a high gloss, glare, or reflective "mirror" type finish.
- Color and application shall be used consistently throughout each home for all the building(s) and related outdoor areas and/or structures.
- Colors for large field application shall be a combination or layering of two to three colors to achieve a "multi-hued" quality, which changes with light and shadow, rather than a "flat" appearance. Large, monochromatic surfaces are not acceptable.
- Colors for large field application shall be recessive in value, while accent color, used in limited areas, may "advance" towards the viewer.
- Exterior hardscape colors shall be complementary to exterior home colors.
- Changes in exterior wall color shall be made at "interior" intersections of walls.

Roofs: In general, colors for roofing shall be darker in color or hue than the building's exterior walls. Medium to dark browns and grays with an LRV of 26 or lower are acceptable.

Walls: Natural earth tones are recommended. Large areas of monochromatic surfaces shall be minimized. Wall surfaces shall utilize texture and/or multi-layered applications of color where possible to achieve subtle color variation on walls. Walls shall have an LRV value range of 60 or lower. Wall colors with a higher (brighter) LRV of 60 will be considered when a substantial portion of the exterior wall surfaces utilize a darker stone.

Trim and Accent Colors: Accent colors shall be carefully considered for front doors, window sashes and other architectural elements so that they do not dominate or overwhelm the overall color composition. Accent areas shall have an LRV value of 65 or lower.

The colors of Hawai'i as inspiration for architectural color palettes

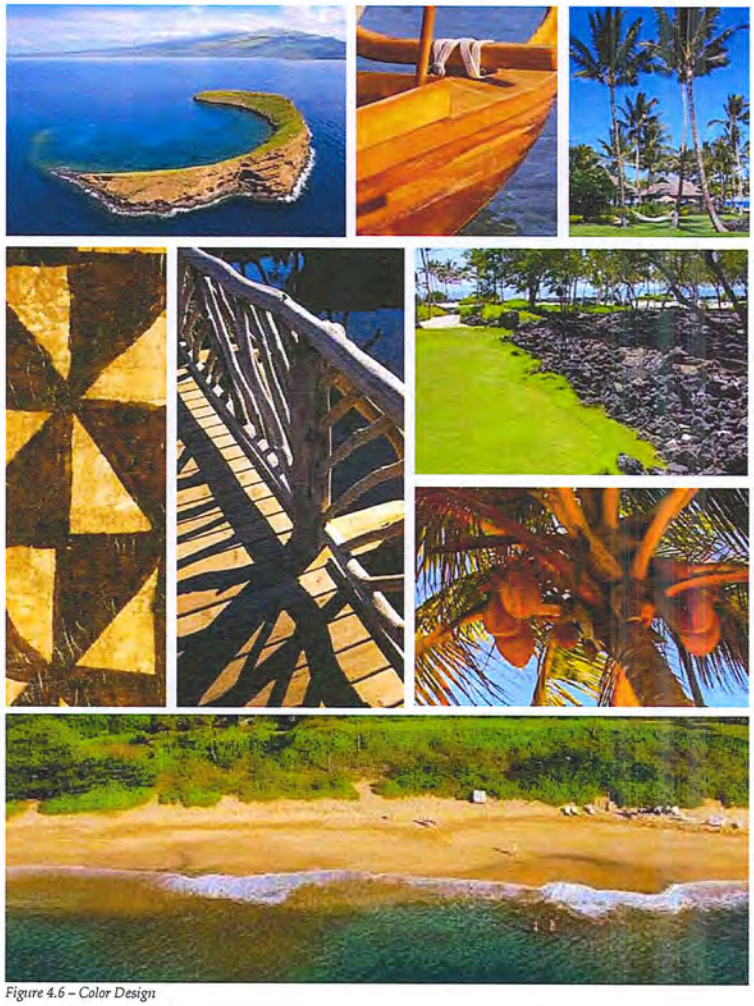

Figure 4.6 – Color Design

4.14. *Design Details:*

Design details on buildings shall reinforce the architectural style that is proposed for each Homesite. In general, decorative elements shall draw upon the earlier Hawaiian, Pacific Rim, European and Craftsman motifs and influences.

Sources: Craftsman wood and iron details and Hawaiian and/ or Asian indigenous artifacts, ceramics, stoneware, sculpture and carvings.

Materials: Unadorned and rustic woods and weathered metal.

Ornamental Metal Accent Elements: Metal may be used for railings, decorative window grilles, and/or gates provided that the design draws upon the indigenous patterns and styles of the region, is not reflective and has the appearance of iron, weathered bronze, brass or copper

Acceptable design details include:

- Limited use of decorative cornices and moldings.
- Clean roof eaves and fascias.
- Stone, wood or plaster trim on columns, doors, windows, stairs and balconies.
- Gutters, downspouts, vents, stacks, pipes must be designed to be consistent with the architectural style.
- Balcony metal railings require special permission.

Unacceptable design detailing includes:

- Exaggerated detailing.
- Clumsy plaster or stucco moldings and cornices.
- Inadequate treatment of construction joints and connections.

4.15. *Building Projections*

The use of architectural extensions to provide shade and shadow, protect buildings from the intense sun and create a strong indoor/outdoor relationship are outlined below. The style and details of these architectural elements shall borrow from regional building traditions and be consistent with the architectural design of the main Residence. All building projections must be located within the Vertical Construction Area.

Trellises/Breezeways/Lanais: Covered areas that connect separate Building Masses, extend the roofline and/ or are freestanding are strongly encouraged.

Entry and/or Side Lanais: Lanais that provide shelter from the sun and accentuate entry areas shall be a minimum of 6 feet in depth. Flooring materials are to be natural stone, wood, tile, colored concrete and/or colored concrete with stone and/ or tile bands. In general, the flooring shall be an extension or natural complement to the flooring used in the interior of the building.

Railings: Decorative iron or wood carved railing details shall borrow from regional building traditions and be consistent with the architectural style of the Residence.

Mechanical Equipment, Vents and Flues: Roof mounted mechanical equipment, vents and flues must not be visible from adjacent Lots or Common Areas. On sloping roofs, these elements must be concealed within architectural structures (i.e., chimneys). Small vents or flues may be painted to match the roof color. Ganging of vents/flues is required to minimize the number of projections. Roof mounted mechanical equipment is prohibited on sloping roofs.

Miscellaneous Projections: All projections, including but not limited to, chimneys, chimney caps, vents, gutters, down spouts, utility boxes, services, etc. must be incorporated into the overall design. These items must be included on the submittals and reviewed by the DRC for approval.

Awnings: Canvas or similar type awnings over windows or doors are strongly discouraged and will be allowed only if not visible from Common Areas, the golf course or adjacent Lots and must be a subdued, earth tone color.

5.0 LANDSCAPING STANDARDS

The following landscape standards respond to the unique climate and ocean front setting of the community and create a consistent landscape vision for Laule'a at Mākena.

5.1. *Landscape Character*

Landscaping in Laule'a at Mākena is designed to celebrate the natural characteristics of Mākena and encourage comfortable outdoor living opportunities. The landscape concept shall also establish a unified neighborhood environment that also preserves views.

5.2. *Community Streetscape*

The Developer has installed landscape and other related Improvements along selected streets, drainages, and slopes. These areas will be maintained by the Association. Owners are required to protect this landscape during their Residence construction. This vegetation shall not be removed, except for driveways, utility connections and minor grade tie-ins and shall be incorporated into the overall design of the Lot. If vegetation is removed for driveways or other Improvements, it shall be replaced at Lot Owner's expense with vegetation of similar quantity, size and species in an area approved by the DRC.

5.3. *Landscaping*

Laule'a at Mākena lies within the Dry Coastal Zone of Mākena. Laule'a at Mākena is comprised of two primary landscape zones as outlined below. These two zones have been created to accommodate specific functions while maintaining the overall character of Mākena.

- The Community Landscape Zone - The Community Landscape Zone consists of those Lot areas that are outside the planting within the Homesite area. Landscaping within this zone shall utilize either the Dry Coastal Zone Plant Palette (Appendix C1) or the Community Zone Plant Palette (Appendix C3). Owners are strongly encouraged to use species from the Dry Coastal Zone Plant Palette along the makai edges of their lots, or in areas that abutt the golf course or undisturbed native landscapes to achieve a gradual transition from these more naturalistic landcapes to the more ornamental planting within the Homesite.
- The Residential Zone - The Residential Zone shall be utilized within the interior portion of the Homesite where more intense and/or active outdoor functions are contemplated. This area is to be designed to include landscape and hardscape elements that will provide attractive and comfortable outdoor living environments.

5.4. *General Homesite Landscaping Criteria*

On-site landscaping design in Laule'a at Mākena must incorporate the landscape zone attributes described above. To establish the landscape environment planned for Laule'a at Mākena and to protect the quality of views, slopes, and natural areas, the following landscaping criteria shall be incorporated into each Homesite:

- All land areas within a Homesite that are not included in any area covered by structures, hardscape or enclosed service courts must be landscaped.
- Landscaping shall be used to frame views, articulate outdoor space and soften architecture.
- Landscaping must be maintained at a height that minimizes blocking of views for nearby neighbors.
- Clearing or cutting of native plants off-site to enhance views is not permitted.
- Utilities, trash containers, pumps, tanks and other mechanical equipment and service areas must be screened from off-site views by walls or dense landscaping.
- All on-site plant materials must be selected from the plant palettes that have been prepared for each landscape zone.
- Plant sizes must be adequate to provide a finished landscape appearance, while allowing for growth.
- Plant selection and irrigation systems must maximize water conservation.
- Use of native and drought tolerant plants to reduce water use for landscape irrigation is encouraged.

5.5. *Front Yard Landscaping*

The landscape concept developed for front yards shall provide a seamless transition between the Developer installed Community Streetscape and the more intense Landscape within the Homesite area. Planting in this area shall meet the following guidelines:

Trees:

- Trees specified on the approved plant palette shall be planted in informal and irregular groupings.
- Trees must reflect the organic character of Mākena.
- The number of existing trees and proposed trees shall be equal to the average of three trees for every 30 linear feet of street frontage.
- Trees may not be planted in a uniform row or in groupings, so that blocking of views from other Homesites is minimized.

Shrubs

- Shrub species shall be limited to 6-8 varieties.
- Informal plantings in front of a streetscape wall or structure.

Groundcovers

- A maximum of three types of continuous ground cover between the home and Community Streetscape.

Plant Palette

- All proposed plant materials must be selected from the Laule'a at Mākena plant palettes located in Appendix C1 or C3.

5.6. *Side and Rear Yard Landscaping*

The landscape concept developed for the side and rear yards that do not directly face streets shall provide a seamless transition between the perimeter landscaping zone and the outdoor living areas associated with and adjacent to the home.

Planting in side and rear yards shall meet the following guidelines:

- All side and rear yard areas outside the building footprint must be covered with landscaping including:
  - Walkways
  - Terraces, patios, decks.
  - Pools and spas.
- Existing trees shall be integrated into the landscape concept and preserved to the maximum extent possible.

Trees:

- 5 trees, minimum 14'-16' in height.
- Owners are encouraged to use multi-trunked trees planted in informal groupings.

Shrubs:

- 10 shrubs minimum (5 gallon minimum size) per 500 square feet of planter area within Homesite.
- Side and rear yard plant materials must be selected from the Residential Zone plant palette located in Appendix C2.

5.7. *Organic Landscape Maintenance*

The goal of utilizing organic landscape maintenance techniques for the Laule'a at Mākena development is to ensure the long-term visibility of the landscape and to minimize any environmental impacts to the site and surrounding areas. The following are key elements of the plan: concepts in utilizing organic maintenance techniques.

5.7.1. *Landscape Design Concepts*

Use of Native Hawaiian and Polynesian Introduced Plants

- Appropriate native plants that are site adaptive to the region enhance the sense of place.
- Native plants require less fertilization and watering.
- A minimum of 50% of non-turf planting areas shall be native plants.

Reduce the amount of turf area.

- Reducing turf areas reduces irrigation requirements.
- Minimize lawn areas so that turf is no more than approximately 25% of the total landscaped area within the lot.

Efficient irrigation design.

- Reduce watering via use of efficient equipment.
- Incorporate devices such as rain and moisture sensors.
- Incorporate drip irrigation wherever possible.
- Use mulch to retain moisture and reduce loss.
- Use of non-potable water as available.

Select and locate low maintenance plant material.

- Use plants that require minimal trimming, pruning, and litter removal.
- Use plants that are pest and disease resistant.
- Use drought-tolerant plants.
- Locate and space plants to allow for natural growth and form.

5.7.2. *Construction and Maintenance Considerations*

Topsoil

- Stockpile existing soil and re-use after grading operations.
- Use organic, biodegradable soil amendments such as decomposed wood products and compost, to improve the nutrient levels of the planting areas.

Fertilizers and Amendments

- If practicable, perform soil testing on a regular basis to determine actual soil composition and amendment requirements.
- Use non-chemical fertilizers such as compost, decomposed manure, and other organic materials exclusively.
- Products shall contain no synthetic chemicals, animal components or sewage sludge and shall be produced in accordance with the National Organic Standards Board guidelines.

Lawn Care and Landscape Maintenance Programs

- Promote healthy lawns to prevent weeds and pests.
- Deep-water lawns weekly to promote healthy root growth.
- Mow lawn at a height to preserve shade at ground level to discourage weed seed germination. Recommended minimum height is 1-1/2 inch.
- Put green waste, e.g. grass clippings, back on lawns in addition to composting.
- Aerate the soil on a regular basis to promote healthy lawn growth.
- Use mulches and compost for shrub and ground cover areas to retain moisture and nutrients, promote micro-organism activity, and discourage weeds.

Utilize Integrated Pest Management (IPM)

- Requires diligent monitoring of the plants to detect infestation and identify the cause.
- Use organic and biodegradable products exclusively.

6.0 LIGHTING AND SIGNING STANDARDS

The lighting and signage throughout Laule'a at Mākena shall adhere to the standards outlined in the following chapter, establishing a subtle, dramatic, and unifying character for the community.

6.1. *Lighting*

Exterior lighting in Laule'a at Mākena is intended to provide safety and security while reducing light glare/pollution. Light shall be soft, indirect illumination concealed behind landscaping or placed in recessed lighting alcoves or lanterns. Exterior building lighting, either attached to or as part of the building, shall be the minimum needed to provide for general illumination and security of entries, patios and outdoor spaces.

Acceptable on-site lighting design includes:

- Indirect and shielded lighting to prevent spillover onto adjacent Homesites, streets, walkways, and natural areas.
- Varying light intensities to provide a soft glow at entries and outdoor living areas, and to accent landscaping and architectural features.
- Indirect driveway and parking area lighting in concealed fixtures.
- Walkway and patio lighting mounted at a low level in shielded/downcast fixtures or stair treads.
- Wall-wash, soffit or down-light architectural lighting.
- Landscape lighting concealed behind landscape walls or plant materials.
- Warm-white fluorescent or incandescent light sources.
- Exterior site lighting must be directed onto vegetation or prominent site features, such as boulders or planting, and not upon the building.
- Light source should not be visible from adjacent Lots.
- Lighting of plant materials shall be achieved with hidden light sources. This can be achieved by utilizing lamps with shields or hidden by plant materials or walls.
- To preserve the dark sky no uplighting is allowed.
- Only low voltage, maximum 25 watt incandescent or LED lamps (in equal lumens) may be used for all exterior lighting applications. Owners are encouraged to install underwater pool, spa and water feature lights with rheostats so that they may be easily dimmed if it is determined that spillover light from these sources is a nuisance to neighboring Lots or Common Areas, or is adversely affecting the nighttime dark sky.
- All exterior lighting is subject to the County of Maui Ordinance #3430.
- To preserve the nighttime dark sky, lighting emanating from the Residence's interior is also subject to DRC control. Interior lighting shall be concentrated at activity areas and minimized next to windows. Built-in lighting adjacent to windows shall be directed toward the Residence's interior. Architectural or decorative elements, such as louvers or scrims, shall be employed to minimize the quantity of light escaping through the windows. The maximum level of footcandles 20 feet from the building face shall be 0.01 footcandles.
- With the exception of driveway lights, all lighting must occur within the Homesite area. Subtle lighting of the driveway entry or address numbers is allowed. Lighting clearly articulating the driveway alignment will not be approved.

Unacceptable on-site lighting design includes:

- Uniform high intensity flood lighting.
- Concentrate, high glare security lighting.
- Pole-mounted "shoebox" or "cobra head" light fixtures.
- Exposed bulbs, spot lights, flood lights, fluorescent lamps and reflectors.
- Up lighting of any type to avoid light pollution.
- Flashing, moving, or colored lighting.
- Exposed light fixtures mounted on roofs or walls.
- Visible light sources.
- Light poles are not permitted.

6.2. *Signage*

All signs, address markers, construction and temporary signs, must be designed, approved and built as part of a fully integrated sign system for Laule'a at Mākena.

One standard broker's type "for sale" sign per unit is allowed in connection with resale of said unit not to exceed 6 sq. ft. One contractor sign allowed for each contractor working on a unit shall not to exceed 6 square feet.

7.0 DESIGN REVIEW SUBMITTAL PROCEDURES

This section provides a guide for the Design Review Process for Laule'a at Mākena. The process involves a series of meetings between the Owner, their design team and the DRC. The process begins with an informal introductory meeting and concludes with the completion of construction. Along the way are a series of meetings designed to ensure a smooth and efficient review of the building and site design. The DRC is committed to assisting Owners through the Design Review Process and shall be thought of as a member of the Owner's design team as opposed to a regulatory review agency.

7.1. *Overview of Design Review Process*

Improvement plans will be carefully reviewed by the DRC to ensure that the proposed design is compatible with the design intent at Laule'a at Mākena. This Design Review Process must be followed for any of the following Improvements:

- Construction of all new buildings;
- The renovation, expansion or refinishing of the exterior of an existing building;
- Major site and/or landscape Improvements (including pools, driveways and/or culverts); and
- Construction of, or additions to, fences or enclosure structures.

The DRC evaluates all development proposals on the basis of these Design Guidelines. Some of the Guide- lines are written as broad standards and the interpretation of these standards is left up to the discretion of the DRC. Other Guidelines, such as Building Height or setbacks, are more definitive, or absolute, design parameters and in many cases parallel County and building code requirements or project approval documents. It is the intention of this Design Review Process that all Improvements comply with these absolute standards. In the event of a conflict between these Guidelines and any local, state or federal building or zoning code or project approval documents, the local, state, or federal building or zoning code or project approval documents shall govern.

Laule'a at Mākena's Design Review Process takes place in four steps (See Figure 7.1 - Design Review Process):

1. Pre-Design Conference & Concept Design
2. Preliminary Design Review
3. Final Design Review
4. Construction Observation

Any Improvement as described above will require, and be preceded by, the submission of plans and specifications describing the proposed Improvements accompanied by an application fee.

- The Homeowner shall retain competent assistance from a licensed Architect, Civil Engineer, Landscape Architect, Soils Engineer and a licensed and bonded Contractor (Consultants) as appropriate. The Homeowner and Consultant(s) shall carefully review the CC&R's and/or CPR and these Design Guidelines prior to commencing with the Design Review Process.
- Having secured Final Design approval from the DRC, the Homeowner is also required to meet all the submittal and approval requirements of the County of Maui Planning and Building Department to obtain design approvals or any other discretionary permits and a building permit.
- The Homeowner is to commence construction within three years of the Final Design approval. If construction does not commence within this timeframe, the design approval will expire, requiring resubmission of the application and payment of all associated fees.

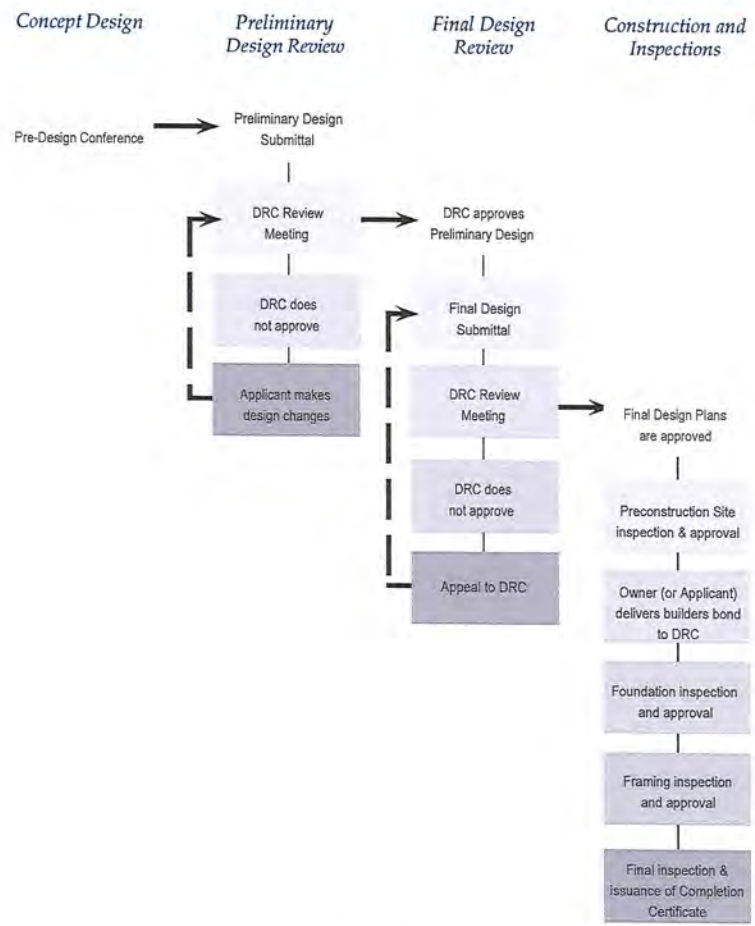

Figure 7.1 - Design Review Process

7.2. *Recommended Design Professionals*

- The DRC may create a list of recommended design professionals to design all Residences and landscapes at Laule'a at Mākena. These professionals have demonstrated their ability and sensitivity toward implementing the established design objectives. Homeowners may choose a design professional from this list or elect to choose a non-listed professional to design their Residence at Laule'a at Mākena. Although professionals not on this list may be employed, it is recommended that an approved design professional be considered because of their familiarity with these Guidelines and County codes.
- If the Homeowner picks a design professional that is not on the list, the Homeowner must submit their qualifications to the DRC prior to moving forward for approval. Contact the DRC for a list of recommended design professionals.

7.3. *Pre-Design Conference*

- Prior to the preparation of any materials for formal DRC review, the Homeowner and/or the Consultant(s) are required to meet with representatives of the DRC for a Pre-Design Conference. An explanatory Pre- Design Conference package that includes a current copy of the Design Guidelines and a conference request form is available from the DRC Office. The purpose of this meeting will be for the DRC to answer any questions the Homeowners and/ or Consultant(s) may have and to offer guidance on the following subjects:
- The particular characteristics and restrictions on the Lot to be provided by the DRC;
- Optimal orientation of buildings and outdoor spaces;
- Additional survey information requirements;
- Preliminary building and site development program ideas and requirements;
- Clarification and review of Design Guideline objectives;
- The requirements, fees, and schedule of the Design Review Process.

7.4. *Concept Design*

After or during the Pre-Design Conference, the Applicant shall submit to the DRC a written application and appropriate fee for Concept Design Review together with the Concept Design Review submission materials as described below:

1. Concept Design Review Application Form (Sample in Appendix).
2. Design Review Application Fee.
3. Concept Site Plan: (1"= 20 feet, 16 feet or 8 feet) indicating property lines and Lot Diagram areas, building location/footprint, driveways, pools, water features, and other major hardscape elements and basic grading concepts. The Applicant shall confirm and verify the field location of all utility connections to the Lot at this time to ensure that no conflicts exist with the proposed Improvements.
4. Concept Floor Plan: (1 inch=20 feet, 16 feet, or 8 feet) showing general room layout and circulation. This may be combined with the Concept Site Plan.
5. Concept Elevations: (1 inch = 16 feet or 8 feet) of the street and view sides of the building showing general massing, roof forms, Building Height and materials.
6. A brief description of the proposed architectural style, including regional historic precedents (if any).
7. The purpose of this submittal is to confirm that the design professionals are headed in the right direction, are correctly interpreting the Guidelines and that the Owner's program can be accommodated on the Lot. This submittal may be combined with the Pre-Design Conference.

7.5. *Preliminary Design Review*

After the Pre-Design Conference and Concept Design, the Owner shall submit a written application for Preliminary Design Review together with Preliminary Design Review submission materials, described in Section 7.5.1 below.

7.5.1. *Preliminary Design Review Submission Materials*

Within this step, the applicant shall prepare and submit to the DRC for review and approval a Preliminary Design Review package which shall adequately convey existing site conditions, constraints, building orientation and design, vehicular and pedestrian access, the proposed use of exterior materials and colors and conceptual landscape design. The package shall include two full-size sets, two half-size sets and electronic PDF version of the following drawings and/or materials:

1. Preliminary Design Review Application Form (Sample in Appendix)
2. Location Map - indicating location of parcel within Laule'a at Mākena.
3. Parcel Survey - a property survey (minimum scale: 1 inch = 20 feet) prepared by a licensed surveyor indicating property boundaries, the area of the property, all easements of record, utilities, 100-year flood plain, one-foot contours, any significant natural features such as existing trees, or any significant drainages as applicable. See Appendix D - Lot Survey Requirements.
4. Preliminary Site Plan - 1 inch = 20 feet minimum, showing existing topography and proposed grading and drainage (1-foot contour interval), existing off- site elements (buildings, walls, trees, utility connections and facilities, etc.) within 20 feet of the property boundary, building footprint with finished floor grades, setbacks, Building Envelope and other zones, driveway, parking area, turnarounds, drainage, fences/walls, roofs, patios, decks, pools, and any other site amenities.
5. Preliminary Floor and Roof Plans - minimum 1/8 inch = 1 foot-0 inches, including all proposed uses, proposed walls, door and window locations and location of mechanical and electrical systems.
6. Preliminary Elevations - minimum 1/8 inch = 1 foot-0 inches, including roof heights, existing and finish grades, Building Heights and notation of exterior materials. Two sets of elevations; one set shall be rendered in color. Minimum front and rear elevations rendered.
7. Site Sections - minimum scale 1 inch = 20 feet, showing proposed buildings, Building Heights, elevations and existing and finished grades in relation to surrounding site, including adjacent Residences and roads as may be required by the DRC.
8. Conceptual Landscape Plan (may be combined with Preliminary Site Plan)—A conceptual plan at 1/8 inch = 1 foot-0 inches minimum, showing irrigated areas, areas of planting, turf areas, preliminary plant list, Building Envelope and other zones, water features, pools, patios, decks, and any other significant design elements. This may be combined with the Site Plan. Adjacent (15 feet min) hardscape and planting (Lots and golf course 20 feet min) to be shown.
9. Study Model – minimum scale 1 inch = 20 feet, illustrating the relationship between proposed building forms and topography, tree heights and prevailing site conditions. This need not be an expensively detailed model, but simply adequate to communicate basic three-dimensional massing concepts. Computer drafted 3D modeling and color renderings may be submitted as a substitute for a built model.
10. Material Samples – on 8-1/2 inch x 11 inch or 11 inch x 17 inch boards showing:
    - Roof material and color;
    - Wall material and color;
    - Exterior trim material and color;
    - Stone/rock materials;
    - Window/door materials and color;
    - Fence/wall materials and color; and
    - Paving materials and color.

7.5.2 *Staking*

The Owner may be required to stake the corner locations of the proposed buildings and all other major Improvements upon submittal of Preliminary Design Review documents. In some instances, the DRC may require that ridgeline flagging be erected to indicate proposed Building Heights.

7.5.3 Preliminary Design Review Meeting

Upon receipt of the required documents and staking of the property (if required), the DRC will notify the Owner of the scheduled meeting date to review the Preliminary Design documents. The DRC will review and comment on the application at the meeting, allow time for discussion with the Owner and/or Consultant(s) (if present) and subsequently provide the Owner with the conclusions of the meeting in writing.

The comments of the DRC on the Preliminary Design submittal shall be advisory only, and shall not be binding upon either the Owner or the DRC. A second review meeting may be necessary to review corrected and/or new materials. Corrected materials will be provided to the DRC a minimum of five working days prior to the next regularly scheduled meeting. An itemized letter from the Owner shall accompany any resubmittal noting all DRC comments and how each comment has been addressed in the resubmittal.

7.6. Final Design Review

Within one year of Preliminary Design Review approval the Owner shall initiate Final Design Review by submitting required Final Design documents. Required Final Design documents and procedures are described in Section 7.6.1 below.

7.6.1 Final Design Review Submission Materials

The Applicant shall provide all information necessary to reflect the design of the proposed building(s), landscape or other features requiring the approval of the DRC. Final Design documents shall generally conform to the approved Preliminary Design Review documents. All architectural plans are to be prepared by a licensed Architect. All landscape architectural plans are to be prepared by a licensed Landscape Architect. The Final Design Review Documents shall be Construction Document level drawings. Submit two full size sets, two half-size sets, and electronic PDF version of final plans that include the following:

1. Final Design Review Application Form.
2. Site Plan - 1 inch = 20 feet minimum, showing existing topography and proposed grading (1-foot con- tour interval), building footprint with finished floor grades, Building Envelope and other zones, driveway, parking area, turnarounds, fences/walls, patios, decks, utility connections and pad locations, pools and any other site amenities. Site plan shall include 20 feet beyond Owner's property line in order to depict relationship to adjacent Lots, the golf course and Common Areas.
3. Grading, Drainage and Erosion Control Plans: 1inch = 20 feet minimum, showing existing and proposed grading (1-foot contour interval), drainage elements and erosion control methods. Site plan shall include 20 feet beyond Owner's property line in order to depict relationship to adjacent Lots and Common Areas.
4. Floor and Roof Plans - 1/4 inch= 1 foot-0 feet, indicate all room dimensions, door and window locations and sizes, location of mechanical and electrical systems and fire sprinkler and monitoring systems. Indicate the location and type of all exterior lighting fixtures, proposed fireplaces, and kitchen appliances. Provide floor plans of all Accessory Structures.
5. Elevations - 1/4 inch = 1 foot-0 feet, illustrate the exterior appearance of all views labeled in accordance with the site plan. Indicate the highest ridge of the roof, the elevation of each floor, and existing and finished grades for each elevation. Describe all exterior materials, colors, and finishes (walls, roofs, trim vents, windows, doors, etc.) and locate all exterior lighting fixtures. Indicate proposed Building Height. Provide one set of colored elevations.
6. Sections - indicate building walls, floors, interior relationships, finished exterior grades and any other information to clearly describe the interior/exterior relationships of the building as well as the building's relationship to the site.
7. Landscape Plans - 1/8 inch= 1 foot-0 inches minimum, including a planting plan, layout plan, irrigation plan, lighting plan, and any site details including retaining walls, landscape structures, pools, patios, fences and or gates. Call out all hardscape materials.
8. Sample Board - on 11 inch x 17 inch boards as needed showing:
   - roof material and color;
   - wall materials and colors;
   - exterior trim material and color;
   - window material and color;
   - exterior door material and color;
   - stone/rock materials;
   - fence/wall materials; and
   - Exterior rails and paving materials.

The DRC will review and comment on the sample board at the Final Design Review. Final approval is contingent upon field mock-ups of all colors and materials at the appropriate time in the construction process and in sizes / context that will allow a clear understanding of the final product. Regardless of previous approvals, the DRC reserves the right to require changes to the field mock-ups if they do not meet the objectives of the Design Guidelines.

9. Grading, Drainage, and Erosion Control Plans—Minimum scale 1/8 inch = 1 foot – 0 inches, showing existing and proposed grading (1 foot contour interval), drainage elements and erosion control methods. Site plan shall include 20 feet beyond Homeowner's property line in order to depict relationship to adjacent Lots and Common Areas.
10. Construction Schedule - include start and completion dates for both building and landscape construction. All construction shall be started within three years of Final Design approval and shall be diligently completed within a reasonable amount of time (24 months maximum) from start of construction. Extensions may be granted by the DRC if the Owner has been proceeding with construction in good faith and/or can demonstrate hardship.

7.6.2 Final Design Review Meeting

Upon receipt of the required documents, the DRC will notify the Owner of the scheduled meeting date to review the Final Design documents. In some instances, the DRC may request a final staking of the location of all corners of proposed buildings if the Final Design documents vary substantially from approved Preliminary Design documents.

Attendance at the meeting by the Owner and/or Consultant(s) is not mandatory. The DRC will review and comment on the application at the meeting, allow time for discussion with the Owner and/or Consultant(s) (if present), and subsequently provide the Owner with an approval (see Section 5.6.3 below) or conclusive recommendations in writing for refinements to the design. A second review meeting may be necessary to review refinements, revisions and/or new materials. These materials will be provided to the DRC a minimum of five working days prior to the next regularly scheduled meeting.

7.6.3 Final Design Approval

The DRC will issue Final Design approval in writing within ten working days of a vote for approval at a Final Design Review meeting. If the decision of the DRC is to disapprove the proposal, the DRC shall provide the Owner with a written statement of the basis for such disapproval to assist the Owner in redesigning the project so as to obtain the approval of the DRC.

7.7 Resubmittal of Plans

When a DRC approval has expired and a resubmission is necessary, the Owner will follow the same procedures for a resubmission as for original submittals. An itemized letter from the Owner shall accompany any resubmittal noting all DRC comments and how each comment has been addressed in the resubmittal. An additional Design Review fee must accompany each resubmission as required by the DRC.

It is possible that the County of Maui may, from time to time, amend its regulations such that they conflict with these Guidelines. It is the Applicant's responsibility to confirm plan consistency with the County and the DRC assumes no responsibility for changes that may be implemented as a result.

In order to be considered for the next scheduled DRC meeting date, plans must be submitted no later than 5pm, seven calendar days in advance of the meeting date. The DRC will not generally meet to review comments outside the regular meeting schedule and any decision to do so must be based on compelling extenuating circumstances.

7.8 County of Maui Approvals and Other Agencies

The Owner shall apply for all applicable building permits from the County of Maui – Planning and Building Department and any other governing agencies after receiving Final Design approval from the DRC. Any adjustments to DRC-approved plans required by County review must be resubmitted to the DRC for review and approval prior to commencing construction. The issuance of any approvals by the DRC implies no corresponding compliance with the legally required demands of other agencies. Nothing herein removes or otherwise affects the responsibility of each Owner and its Contractor for satisfying all applicable laws. Codes and ordinances and for obtaining all permits and approvals required by law. Shall a conflict arise between any of the provisions of the Design Guidelines, any law, code or ordinance, or any permit or approval condition the stricter provision will prevail. Any violation may be considered a violation of the CPR.

7.9 Subsequent Changes

Subsequent construction, landscaping or other changes in the intended Improvements that differ from approved Final Design documents must be submitted in writing to the DRC for review and approval prior to making changes.

7.10 Work in Progress Observations

During construction, the DRC will reserve the right to check construction to ensure compliance with approved Final Design documents. If changes or alterations are found that have not been approved, the DRC will issue a Notice to Comply.

7.11 Notice to Comply

When, as a result of a construction observation, the DRC finds changes and/or alterations that have not been approved, the DRC will issue a Notice to Comply within three working days of the observation. The DRC will describe the specific instances of non-compliance and will require the Homeowner to comply or resolve the discrepancies.

7.12 Notice of Completion

The Owner will provide the DRC with a Notice of Completion of any Improvement(s) given Final Design approval by the DRC. The DRC will make a final inspection of the property within seven working days of notification. The DRC will issue in writing a Notice of Completion within seven working days of observation. If it is found that the work was not done in compliance with the approved Final Design documents, the DRC will issue a Notice to Comply within three working days of observation.

7.13 Right of Waiver

The DRC recognizes that each parcel has its own characteristics and that each Owner has their own individual needs and desires. For this reason, the DRC has the authority to approve deviations from any of the Design Guidelines or regulations contained within this document. It shall be understood, however, that any request to deviate from these Design Guidelines will be evaluated at the sole discretion of the DRC, and that the approval of deviations will be limited to only the most creative design solutions to unique situations. Prior to the DRC approving any deviation from the Design Guidelines, it must be demonstrated that the proposal is consistent with the overall objectives of these Design Guidelines and that the deviation will not adversely affect adjoining parcels or the Community of Laule'a at Mākena as a whole. Approval of any deviation from the Design Guidelines shall not set a precedent for other applicants to seek a similar deviation and shall not be used as justification in requesting a variance from the Design Guidelines. Rather, the request must stand on its own merits and present justification based on unique circumstances and creative design solutions.

The DRC also reserves the right to waive any of the procedural steps outlined in this Design Guidelines document provided that the Homeowner demonstrates there is good cause.

7.14 Non-Liability

Neither the DRC nor any member, employee or agent will be liable to any party for any action, or failure to act with respect to any matter.

7.15 Design Review Schedule

The DRC will make every reasonable effort to comply with the time schedule for Design Review. However the DRC will not be liable for delays that are caused by circumstances beyond their control, including activity levels which burden the resources of the DRC to review plans and provide comments within a prescribed timeframe. The DRC will provide Design Review according to the following schedule:

1. Pre-Design Conference & Concept Design Review: Meeting scheduled within 14 working days of receipt of Pre-Design Conference request form.
2. Preliminary Design Review
   - Application documents to be submitted 14 working days prior to the next scheduled DRC meeting.
   - Written comments from DRC meeting provided to Homeowner within seven working days.
   - A second review meeting may be necessary to review corrected and/or new materials. Corrected materials will be provided to the DRC a minimum of five working days prior to the next regularly scheduled meeting.
3. Final Design Review
   - Application documents to be submitted 14 working days prior to the next scheduled DRC meeting, and within one year of Preliminary Design approval.
   - Written comments from DRC meeting and/or written notice of Final Design approval provided to Homeowner within seven working days.
   - A second review meeting may be necessary to review refinements, revisions and/or new materials. These materials will be provided to the DRC a minimum of five working days prior to the next regularly scheduled meeting.
4. Building Permits
   - Owner applies to the County of Maui for all applicable building and use permits.
5. Construction Observation
   - Site observation with the Owner prior to any site disturbance, and within seven working days of receipt of written request.
   - Foundation staking observation within seven working days of receipt of written request. Property line and Building Envelope must be staked for this inspection.
   - Framing observation within seven working days of receipt of written request. Final observation within seven working days of receipt of written request and prior to request for a Certificate of Occupancy from the County of Maui.
   - Notice of Completion issued within seven working days of observation.

7.16 Application Fees

In order to defray the expense of reviewing plans, monitoring construction and related data, and to compensate consulting Architects, Landscape Architects and other professionals, these Guidelines establish a total fee of $2,500 payable upon submittal of the application for the Pre-Design Conference. Fees will be paid by Applicants upon submission of the plans for approval. No documents shall be reviewed in whole or in part prior to the payment of fees by the Applicant. This fee is subject to revision annually.

All fees and other charges and expenses incurred in applying for and obtaining approvals from the DRC. LEED for Home Provider or from any governmental agency shall be paid by the Applicant. The Declarant and/or the DRC shall have no liability for payment of fees.

7.17 Application Format

An application and information package is available from the DRC for each submission. Each submission must be accompanied by the required information, as specified in the application package instructions and these Guidelines in order to be scheduled for review.

Incomplete submissions or remodels will not be reviewed and may be returned to the applicant for resubmission. To expedite the Design Review Process, applications must be complete in order to submit. Applicants will be refunded 50% of the Design Review fee if the DRC does not issue a written approval or disapproval within ten working days of the date the application is reviewed by the DRC.

7.18 Unauthorized Improvements

Changes or modifications to the exterior of a home or its landscape and/or hardscape without the prior review and approval of the DRC pursuant to these Guidelines, is prohibited. Homeowners may be subject to fines at the discretion of the DRC as approved by the Board of Directors of the Laule'a at Mākena Association for unauthorized Improvements. The Homeowner may apply to the DRC to review and approve the modifications, which the DRC may allow or disallow at its sole discretion subject to these Guidelines. In the event the Improvements are disallowed, the Homeowner shall be required to remove them and restore the property to the pre-existing condition as it was originally approved by the DRC or as subsequently modified.

7.19 Start of Construction and Stopping of Construction

All construction plans approved by the DRC must be commenced within two (2) years of written DRC approval. If construction is not commenced within two (2) years, the Owner must resubmit its request for approval to the DRC and comply with the Design Guidelines, as may be amended from time to time.

All Improvements commenced on a Lot shall be completed within 18 months after commencement according to approved Final Design Review plans unless an exception is granted in writing by the DRC. If an Improvement is commenced and construction is then abandoned for more than 90 days, or if construction is not completed within the required 18-month period, the association may impose a fine of not less than $250 per day (or such other reasonable amount as the Association may set) to be charged against the Owner's Lot until construction is resumed or the Improvement is completed, as applicable, unless the Owner can prove to the satisfaction of the board that such abandonment is for circumstances beyond the Owner's control.

7.20. On-Site Mock Up Requirements

A full material and detail mockup constructed on site may be required for each Homesite in Laule'a at Mākena. This mockup will give the DRC the opportunity to review materials, colors, and textures. This mockup must include 50 square feet of the primary masonry field showing the specific character desired for the masonry including proposed stone, mortars/ joint treatment, and other pertinent detailing. The mockup must also include a window detail, fascia and soffit, roofing, secondary materials, and character elements.

7.21 Special Management Area Permit

A Special Management Area Permit (SMA) has been approved by the County of Maui for Laule'a at Mākena on _____. Owners may request a copy of the SMA and any amendments from the Declarant and/or the DRC. Owners shall comply with any SMA requirements imposed by the County of Maui.

7.22. Completion of Construction

All construction approved by the DRC must be completed within eighteen (18) months of Commencement of Construction unless an extension is granted by the DRC.

7.23 Waiver and Amendment

Non-Liability: Provided that DRC members act in good faith, neither the DRC nor any member of the DRC will be liable to the Association, any Owner or any other person for any damage, loss or prejudice suffered or claimed on account of 1) approving or disapproving any plans, specifications and other materials, whether or not defective, 2) constructing or performing any work, whether or not pursuant to approved plans, specifications and other materials, 3) the development or manner of development of any land within [Laule'a at Mākena], 4) executing and recording a form of approval or disapproval, whether or not the facts stated therein are correct, 5) performing any other function pursuant to the provisions of the Design Guidelines.

Amendment: the DRC may, from time to time, with the approval of the Board, adopt, amend and repeal rules and regulations to be incorporated into, or amendments of, the Design Guidelines, which, among other things, interpret, supplement or implement the provisions of the Design Guidelines. All such rules and regulations or amendments, as they may, from time to time be adopted, amended or repealed, will be appended to and made a part of the Design Guidelines. Each Owner is responsible for obtaining from the DRC a copy of the most recently revised Design Guidelines.

8.0 CONSTRUCTION PRACTICE

All construction and service personnel working within Laule'a at Mākena must comply with the following general rules along with the Rules and Regulations as adopted by the association of unit Owners of Laule'a at Mākena as updated from time to time.

8.1. Pre-Construction Documents

Prior to commencing construction final construction documents must be submitted to the Design Review Committee. Any modifications to the approved final drawing must be noted in the transmittal of the final construction documents and are subject to the review and approval or disapproval by the Design Committee. The Builder must meet with an authorized representative of the DRC to review the approved final construction documents, the Construction Area Plan, the Construction Regulations and to coordinate scheduling and construction activities with the DRC. At this meeting, the Builder or Owner must bring a copy of the Building Permit issued and any related use permit from the County of Maui Building Department.

8.2. Construction Area

Prior to the commencement of any Construction Activity the Builder will provide the DRC, for its approval, with a detailed site plan of the proposed construction area showing the area in which all Construction Activities will be confined, and how the remaining portions of the Lot will be protected.

This Construction Area Plan will designate the location and size of the construction material storage and parking areas, and the locations of the chemical toilet, temporary trailer/ structure, dumpster, debris storage, fire fighting equipment, utility trenching, and the limits of excavation. The Plan should clearly identify the methods for the protection of adjacent areas, such as fencing, flagging, rope, barricades or other means to be set up prior to construction. Care must be taken to avoid, or if unavoidable, minimize the visual impact of the Construction Area on neighboring Lots, public areas and roads.

8.2.1. Access to Construction Area

Laule'a at Mākena requires all Builders to comply with the following:

1. Restrict access to the Construction Area only through the specified access route.
2. Identify all vehicles entering Laule'a at Mākena with the Builder's name and job site.
3. Enforce hours of access, speed limit and route of travel on the Laule'a at Mākena road system as specified by the DRC.
4. Consolidate all deliveries of materials and equipment to the extent feasible.

8.2.2. Fencing Requirements

The Plan shall identify the area to be fenced with chain link covered in dark green shade screen fencing or similar methods acceptable to the DRC for the protection of existing landscaped areas, to screen Construction Activities and to control dust. Such fence or screening material shall be maintained in good condition during the course of construction of the Residence and related Improvements. One entrance into the fenced enclosure shall be located at the driveway entry. Care must be taken to avoid, or if unavoidable, minimize the visual impact of the Construction Area on neighboring Lots, Common Areas and roads. Prior to construction, all golf course planting, side yard planting and streetscape elements will be photographed by DRC to record existing site features.

8.3. Security Deposit

After the DRC approves an Owner's Final Design as described in Section 7.6, and prior to commencing any Construction Activity, a Security Deposit shall be delivered to the DRC on behalf of the Association, as security for the project's full and faithful performance of its Construction Activity in accordance with its approved final plans.

The amount of the Security Deposit shall be $10,000 or such greater amount as determined by the DRC for all Lots within Laule'a at Mākena. This amount may be adjusted annually by the DRC.

The DRC may use, apply or retain any part of a Security Deposit to the extent required to reimburse the DRC for any cost that the DRC may include on behalf of the project's Construction Activity.

Any monies shall be reimbursed to the DRC for any fees incurred by the DRC to restore the Security Deposit to its original amount. Construction Activity shall be halted until the Security Deposit is brought up to the original amount.

The DRC shall return the Security Deposit to the Owner within fifteen (15) working days after the issuance of a Notice of Completion from the DRC.

8.4. *Vehicles and Parking Areas*

Only vehicles, equipment and machinery that are essential to any Construction Activity, may park within the Construction Area or such other specific are designated by the DRC so as to minimize potential damage to existing vegetation, landscape, or lava.

8.5. *Storage of Materials and Equipment*

All construction materials, equipment and vehicles will be stored within the fenced boundary of the DRC-approved Construction Area, and outside any resource protection areas within the approved Construction Area. All construction materials must be kept within the property lines, maintaining a clear roadway. Materials should be stored in an inconspicuous area of the site and should be laid out neat and orderly. The use of adjoining properties for access or storage of material is prohibited without written permission from adjacent Owner/s. Equipment and machinery will be stored on-site only while needed.

8.6. *Construction Activity Times*

The time of construction will be limited to the period from 7:30 am until 5:30 pm Monday through Friday, and 9 am until 5 pm on Saturday. Construction on Sunday and the following holidays is not permitted: New Year's Day, Thanksgiving Day and Christmas Day. Essentially quiet activities that do not involve heavy equipment or machinery may occur at other times subject to the review and approval of the DRC. No personnel are to remain at the construction site after working hours. No alcohol consumption or pau hana parties shall be allowed at the construction site or street side within the Laule'a at Mākena development at any time.

8.7. *Construction Trailers and/or Temporary Structures*

Any Owner or Builder who desires to bring a construction trailer or the like to Laule'a at Mākena must obtain written approval from the DRC. The DRC will work closely with the Owner and/ or Builder to site the trailer in the best possible location to minimize impacts to the site and to adjacent parcel Owners. All such facilities will be removed from the Lot prior to issuance of a Certificate of Occupancy.

Temporary living quarters for the Owner, Builder or their employees on the Lot will not be permitted.

8.8. *Sanitary Facilities*

Sanitary facilities, including potable water, must be provided for construction personnel on-site in a location approved by the DRC. The facility must be screened from view from adjacent Residences and roads, and maintained regularly.

8.9. *Debris and Trash Removal*

Contractors must clean up all trash and debris on the Construction Site at the end of each day. Trash and debris must be removed from each Construction Site at least once a week and transported to an authorized disposal site. Lightweight material, packaging and other items, must be covered or weighted down to prevent wind from blowing such materials off the Construction Area. Contractors are prohibited from dumping, burying or burning trash anywhere on the Lot or in Laule'a at Mākena except in areas, if any, expressly designated by the DRC. During the construction period, each Construction Area must be kept neat and tidy to prevent it from becoming a public eyesore, or affecting adjacent Lots. Dirt, mud or debris resulting from activity on each Construction Site must be promptly removed from roads, open spaces and driveways, or other portions of Laule'a at Mākena. Any clean up costs incurred by the DRC or the Association in enforcing these requirements will be taken out of the Builder's Security Deposit or billed to the Owner as needed.

8.10. *Hazardous Waste Management*

In order to be able to respond and monitor hazardous material use and/or spills, the Contractor shall comply with the following criteria listed below:

1. The Contractor shall provide a contact person and telephone number for a company experienced in emergency response for vacuuming and containing spills for oil or other petroleum products.
2. Absorbent sheets will be used for spill prevention and clean up. Several boxes shall be located at fuel trucks, storage areas and in maintenance vehicles. Inventories must be maintained as necessary.
3. A reportable spill is defined as a spill of one or more gallons and a significant spill is defined as more than ten gallons.
4. The Contractor shall maintain a list of product names and a Materials Safety Data Sheet (MSDS) for all hazardous material products used or located on site.
5. Before a hazardous material is stored, the Contractor shall check to ensure that:
   - Material is stored in an approved container;
   - Container is tightly closed;
   - Container has the proper warning label; and
   - Container is inspected for leaks.
   - Any contractor determined to be introducing hazardous materials into the sanitary sewer or storm drain system will be removed from the site.

8.11. *Excavation, Grading and Lava Preservation*

Every effort must be made to avoid compaction and/ or disturbance near existing landscape or lava restoration areas.

Blowing dust resulting from grading and construction operations must be controlled by watering. During construction, erosion must be minimized on exposed cut and/ or fill slopes through proper soil stabilization, water control and revegetation.

The Contractor is responsible for the implementation of erosion control techniques. Grading operations may be suspended by the DRC during periods of heavy rains or high winds.

All topsoil disturbed by grading operations must be stockpiled and covered to minimize blowing dust within the Construction Area and reused as part of the site restoration/landscaping plans.
Fill or top soil material brought to the site by Owner shall be free of termites and deleterious matter.

8.12. *Foundations*

The Owner and the Owner's Architect, Engineer and Contractor shall give due consideration to the design of the foundation systems of all structures. Owner is encouraged to seek the assistance of a licensed Soils Engineer to examine and test soils conditions on his Lot prior to undertaking any design or construction. Declarant makes no representations or warranties express or implied, as to the soil conditions.

- Undetected lava tubes may occur below the surface.
- Portions of Laule'a at Mākena have been filled. Ground may settle in filled areas.
- It is the Owner's responsibility to conduct an independent soils engineering investigation to determine the suitability and feasibility of any Lot for construction of the intended Improvement.

8.13. *Ground Termite Standards*

Chemical termite treatment shall not be used. The builder shall use approved physical barriers such as steel mesh or granulated work. The barriers shall be guaranteed in writing by said company against termite infestation for a period of at least three (3) years. The guarantee shall include annual inspection and replacement of barrier at the infested areas.

8.14. *Lot Survey*

Prior to commencement of design, it is the responsibility of the Lot owner to obtain a survey by a Surveyor licensed in the State of Hawaii to confirm pad grades, tops and toes of slope, edges of existing lava areas or ponds and any other features or Lot attributes that would affect the design of any Lot Improvement. Please see Appendix F, Lot Survey Requirements.

8.15. *Dust Control and Landscape Prior to Construction*

For aesthetic and dust control reasons, the DRC may request Lot Owners who, in the DRC's opinion, are not diligently pursuing construction to stabilize, landscape and/or maintain the surface of their Lot at the Owner's sole expense.

8.16. *Damage Repair and Restoration*

Damage and scarring to other property, including open space, adjacent Parcels, roads, driveways, irrigation and/or other Improvements will not be permitted. If any such damage occurs, it must be repaired and/or restored promptly at the expense of the person causing the damage or the Owner of the Parcel.

Repair will consist of, but not be limited to:

- To the DRC's satisfaction, re-vegetate the area disturbed immediately and maintain said vegetation until established; and,
- Pay any fines imposed by the AOUO and Maui County or other governmental agencies, as a result of said violation.

8.17. *Project Completion and Close-out*

Upon completion of construction, each Owner and Builder will be responsible for cleaning up the Construction Site and for the repair of all property that was damaged, including, but not limited to, restoring grades, planting shrubs and trees as approved or required by the DRC, and repair of streets, driveways, pathways, drains, culverts, ditches, signs, lighting and fencing. Any property repair costs as mentioned above, incurred by the DRC or the Association, will be taken out of the Security Deposit or billed to the Owner.

8.18. *Construction Observations*

In addition to the building inspections required by the County of Maui, the following construction observations must be scheduled with the DRC.

1. Site Observation – This observation includes review of staking of the Construction Area including all corners of proposed buildings, driveways and extent of grading. In addition, flagging of all areas to be protected will be reviewed. An on-site mock-up for color and materials shall be constructed for approval by the DRC. A full-scale mock-up (minimum 4-feet by 8-feet) shall be constructed which accurately conveys all proposed exterior materials, colors, and detailing, including window, corner and trim details and/or details of areas where one material changes to another. This observation must be approved by the DRC prior to the framing observation.
2. Framing Observation – This observation must be done prior to enclosure of exterior walls and roof. Final approval is contingent upon field mock-ups of all colors and materials at the appropriate time in the construction process and in sizes / context that will allow a clear understanding of the final product.
3. Final Observation – This observation must be done prior to the Certificate of Occupancy issued by Maui County and may be scheduled when all Improvements, including all structures, landscaping and grading, have been completed.

8.19. Construction Signs

Temporary construction signage will be limited to one sign per Lot. The sign shall not exceed 6-square feet of total area, and shall be located within 10-feet of the Construction Site entrance. The standard construction sign specifications will be issued at the pre- construction meeting. All construction signs must be reviewed and approved by the DRC prior to installation. Layout for the sign must be submitted to the DRC ten working days prior to a regularly scheduled meeting. Alternatively, the DRC may require the contractor to construct a standardized construction sign. The contractor shall contact the DRC prior to sign fabrication to confirm the required sign type.

8.20. No Pets

Construction personnel are prohibited from bringing pets, particularly dogs, into Laule'a at Mākena.

8.21. Security

Security precautions at the Construction Site may include temporary fencing approved by the DRC. Security lights, audible alarms and guard animals will not be permitted.

8.22. Noise

Builder will make every effort to keep noise to a minimum. Radios will not be allowed in order to minimize disturbance to neighbors, golf and wildlife.

8.23. No Smoking

Smoking is only allowed in enclosed vehicles. Fines of up to $1,000 will be taken out of the Builder's Deposit or billed to the Owner in the event that smoking occurs out of vehicles on a Construction Site. Warning signs such as "No Smoking or Open Flame Allowed" must be posted at the Construction Site.

8.24. No Firearms

No firearms are allowed in Laule'a at Mākena.

8.25. No Alcohol/Drugs

No alcohol or illegal drugs are allowed on the property at anytime.

8.26. Construction Personnel Conduct

Offensive, loud or unmannerly behavior exhibited by the Builder, its employees or subcontractors is not allowed and will not be tolerated. Builder shall be responsible for the behavior of his employees and subcontractors.

8.27. Fire Protection

At least one full and operable 10 pound ABC rated dry chemical fire extinguisher shall be present and available in a conspicuous place on the Construction Site at all times. Absence of such a device may result in fines against the Builder or the Builder being denied access to the Construction Site.

8.28. Invasive Species

Contractors are responsible for ensuring that construction and landscaping materials are free from coquis frogs and plant species that are listed as invasive by the State of Hawaii. The DRC reserves the right to impose a $500 fine upon contractors who are found responsible for importing these undesirable species into Laule'a at Mākena.

8.29. Violation

Owner, Association and Declarant shall have the right to enforce these regulations in accordance with the CPR. Notification of violation will be sent to the responsible party and/or Owner defining those items not in compliance with the rules and regulations. Upon receipt of the notification, the involved parties have ten (10) calendar days to correct the situation or the Association or DRC will take the necessary actions to correct the violation. Those actions may include but shall not necessarily be limited to charging the Owner for the corrections performed, or denying entry to contractors or personnel thereby preventing work within Laule'a at Mākena. Neither the Association nor the Declarant shall be held responsible for any damages which may arise in conjunction with the good faith enforcement of the provisions of these regulations.

8.30. Licensed Contractors

All contractors performing services within Laule'a at Mākena shall be licensed and in good standing in the State of Hawaii unless exempt by law.

8.31. Applicable Ordinances

All activities within and associated with the project shall comply with all laws, statues, ordinances and rules of the federal, state and county governments applicable to Laule'a at Mākena for lot improvement. Should a conflict arise between any of the provisions of the CPR's, any law, code or ordinance, or any permit or approval condition, the stricter provision shall prevail.

8.32. Erosion Control

Proper erosion control is the responsibility of the Owner, Applicant, and their contractors. Dust and silt fencing is required at the entire site and must be properly installed and maintained. Streets shall be kept free of mud, silt and debris from erosion and construction traffic and dust must be kept to a minimum. A Best Management Practice plan must be provided for the aforementioned.

8.33. Truck Washing

Washing any truck or vehicle on the street is not permitted. Any washing of concrete delivery trucks must be on the construction site in accordance with applicable Federal, State, or County rules or regulations.

8.34. Construction Rules and Regulations Agreement

Prior to starting construction, the Construction Rules and Regulations Agreement EXHIBIT F must be signed.

8.35. Insurance Requirements

Owner and/or Contractor shall maintain adequate liability and builder's risk insurance. ATC Mākena Management Services Corp, ATC Mākena Holdings, LLC; AREA Property Partners; Trinity Investments, LLC; Stanford Carr Development, LLC; Discovery Mākena Management, LLC; ATC Mākena N Golf LLC; ATC Mākena S Golf LLC; ATC Mākena Land SF1 LLC; ATC Mākena Land MF1 LLC; ATC Mākena Land MF2 LLC; ATC Mākena Land MF3 LLC; ATC Mākena Land C1 LLC; ATC Mākena Land U1 LLC; ATC Mākena Land B1 LLC; ATC Mākena Land MF4 LLC; ATC Mākena Land SF2 LLC; ATC Mākena Land AH1 LLC; ATC Mākena Services, LLC; H2R, LLC; H2R AOUO shall be named as additional insured on such policies. Prior to commencing construction, a copy of the policy or certificate thereof shall be delivered to the Developer and the Association.

8.36. Authority to Start Work

If any of the Construction practices given in Section 8.0 are not followed by the Contractor, AOUO Board of Directors and Designated Officers and/or the DRC and Association have the authority to stop work until all procedures are in order.

8.37. Work Area Utilities

The Lot Owner, or his contractor, is responsible for arranging with local agencies and AOUO Board of Directors and Designated Officers for the following utilities services:

- Water meter permit and connection.
- Temporary and permanent power connection.
- Sewage system connection.
- Telephone connections.

The contractor must obtain permission from AOUO Board of Directors and Designated Officers for the use of and connections to existing utilities and cable TV serving the site.

9.0 APPENDICES

Appendix A: Definitions

Administrator: The entity responsible for managing and maintaining common facilities within the Mākena Community.

As-Built Drawings: Final drawings prepared to scale, that show all constructed improvements including, but not limited to: architecture, site improvements, and landscape architecture.

Basement: That portion of a building between floor and ceiling, which is partly below and partly above grade, but so located that the vertical distance from the grade to the floor below is more than the vertical distance from grade to ceiling.

Building Elevation: The two-dimensional view of a building façade.

Building Height Reference Elevation: A specific datum level with respect to the sea level that is predetermined by the Design Review Committee for each lot and from which all building height calculations are measured.

Building Section: A drawing showing a vertical slice through the interior of a building.

Common Area: All real and personal property, including easements which the Association owns, leases, or otherwise hold possessory or use rights for the common use and enjoyment of the Owners including, without limitation, the Landscape Maintenance Easement Area.

Conceptual Plans: Informal drawings showing initial ideas, organization and relationships of project planning and design.

Construction Documents: All final drawings, specifications, material samples, surveys, and other documents from which a project is constructed.

Cut and Fill: Any grading which lowers or raises the natural ground level of a Homesite.

Declarant: Refer to the CC&R's and/or CPR for definition.

Declaration of Condominium Property Regime (CPR): The recorded Declaration of Condominium Property Regime, Bylaws and/or House Rules for the Laule'a at Mākena Community, that govern the design, construction, maintenance, care, use, and management of the property.

Design Review Committee (DRC): The entity responsible for managing and implementing the construction of all common areas within Laule'a at Mākena and ensuring that construction of individual projects within Laule'a at Mākena are consistent with the standards set forth in this document.

Design Guidelines: Standards established for the exterior design of all new buildings, building additions, landscaping, driveways, walkways, lanai, pools, utilities, mechanical equipment, lighting, signage, and any other exterior development changes, additions, and maintenance that can be seen from, or may create an impact on, the outside of the Homesite of the neighborhood.

Laule'a at Mākena Developer: H2R, LLC

Easement: A defined land area that is limited to a particular use.

Finished Floor Elevation: Height of floor level above grade, mean sea level or Building Height Reference Elevation.

Hardscape: Driveways, walkways, lanai, terraces, walls, steps, planter boxes, fountains or non-building, inorganic construction in a landscaped area.

HERS Home Energy Rating System: A home energy rating involves an analysis of a home's construction plans and on- site inspections. Based on the home's plans, the Home Energy Rater uses an energy efficiency software package to perform an energy analysis of the home's design. This analysis yields a projected, pre-constructed HERS Index. Upon completion of the plan review, the rater will work with the builder to identify the energy efficiency improvements needed to ensure the house will meet ENERGY STAR performance guidelines. The rater then conducts ensile inspections, typically including a blower door test (to test the leakiness of the house) and a duct test (to test the leakiness of the ducts). Results of these tests, along with inputs derived from the plan review, are used to generate the HERS Index score for the home.

Homeowner/Owner: One or more persons, including natural persons, corporations, partnerships, trustee or any other legal entities, who hold the record title to any Lot, but excluding in all cases any party holding an interest merely as security for the performance of an obligation.

Homesite: A lot or building site, defined by established property lines that is zoned for residential development.

LEED: Leadership in Energy and Environmental Design (LEED) is a third-party certification program and the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

LEED for Homes Provider: Organizations selected by the U.S. Green Building Council to provide green home rating support services to homebuilders.

Lot: The term "Lot" means that parcel of land, described in the purchaser's purchase contract, and illustrated by the Lot Diagram, on which the purchaser intends to construct Improvements.

Rough Grade: The initial, natural, or roughly graded, ground level of a Homesite.

Setback: Restricted land area or zone defined by a measured distance from a street property line, building edge, or other significant feature.

Softscape: All plant materials in a landscape zone.

U.S. Green Building Council: The U.S. Green Building Council is a 501 (c)(3) non-profit organization dedicated to transforming the way buildings and communities are designed, built, and operated.

Working Drawings: Final construction drawings prepared to scale, which show the completed design of a project with all of its details.

Appendix B: LEED Sample Checklist

SAMPLE ONLY - SUBJECT TO CHANGE. Download current Checklist at https://new.usgbc.org/leed/rating-systems/residential

Y	?	N			
			Credit	Integrative Process	2
0	0	0		**Location and Transportation**	**15**
Y			Prereq	Floodplain Avoidance	Required
				PERFORMANCE PATH	
			Credit	LEED for Neighborhood Development Location	15
				PRESCRIPTIVE PATH	
			Credit	Site Selection	8
			Credit	Compact Development	3
			Credit	Community Resources	2
			Credit	Access to Transit	2
0	0	0		**Sustainable Sites**	**7**
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
			Credit	Heat Island Reduction	2
			Credit	Rainwater Management	3
			Credit	Non-Toxic Pest Control	2
0	0	0		**Water Efficiency**	**12**
Y			Prereq	Water Metering	Required
				PERFORMANCE PATH	
			Credit	Total Water Use	12
				PRESCRIPTIVE PATH	
			Credit	Indoor Water Use	6
			Credit	Outdoor Water Use	4
0	0	0		**Energy and Atmosphere**	**38**
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
				PERFORMANCE PATH	
			Credit	Annual Energy Use	29
				BOTH PATHS	
			Credit	Efficient Hot Water Distribution System	5
			Credit	Advanced Utility Tracking	2
			Credit	Active Solar Ready Design	1
			Credit	HVAC Start-Up Credentialing	1
				PRESCRIPTIVE PATH	
Y			Prereq	Home Size	Required
			Credit	Building Orientation for Passive Solar	3
			Credit	Air Infiltration	2
			Credit	Envelope Insulation	2
			Credit	Windows	3
			Credit	Space Heating & Cooling Equipment	4

Appendix B: LEED Sample Checklist - Continued

SAMPLE ONLY - SUBJECT TO CHANGE. Download current Checklist at whttps://new.usgbc.org/leed/rating-systems/residential

				EA PRESCRIPTIVE PATH (continued)	
			Credit	Heating & Cooling Distribution Systems	3
			Credit	Efficient Domestic Hot Water Equipment	3
			Credit	Lighting	2
			Credit	High Efficiency Appliances	2
			Credit	Renewable Energy	4
0	0	0		**Materials and Resources**	**10**
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
			Credit	Durability Management Verification	1
			Credit	Environmentally Preferable Products	4
			Credit	Construction Waste Management	3
			Credit	Material Efficient Framing	2
0	0	0		**Indoor Environmental Quality**	**16**
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air Filtering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
			Credit	Enhanced Ventilation	3
			Credit	Contaminant Control	2
			Credit	Balancing of Heating and Cooling Distribution Systems	3
			Credit	Enhanced Compartmentalization	1
			Credit	Enhanced Combustion Venting	2
			Credit	Enhanced Garage Pollutant Protection	2
			Credit	Low Emitting Products	3
0	0	0		**Innovation**	**6**
Y			Prereq	Preliminary Rating	Required
			Credit	Innovation	5
			Credit	LEED AP Homes	1
0	0	0		**Regional Priority**	**4**
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
0	0	0		**TOTALS**	Possible Points: **110**

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

Appendix B: LEED Sample Checklist - Continued

SAMPLE ONLY - SUBJECT TO CHANGE. Download current Checklist at https://new.usgbc.org/leed/rating-systems/residential

Notes:

The LEED for Homes rating system works by requiring a minimum level of performance through mandatory prerequisites and rewarding improved performance through credit points in each of the above categories. The level of performance is indicated by four performance tiers according to the number of credit points earned. The four levels of certification are Certified, Silver, Gold, and Platinum. A "Silver" level rating is the minimum requirement for homes built within the Mākena Community unless exempted. The LEED for Homes Rating System and Checklist which outlines the prerequisites and credit points in more detail can be downloaded from https://new.usgbc.org/leed/rating-systems/residential.

This sample Checklist is subject to change.

Appendix C: Landscape Plant Palette

Appendix C1: Dry Coastal Zone Plant Palette

Trees

Latin Name	*Common Name*	*Drought tolerant*	*Native*
Hibiscus tiliaceus	Hau	Moderate	X
Pandanus tectorius	Hala	Moderate	X
Thespesia populnea	Milo	High	X
Myoporum sandwicense	Naio	High	X

Shrubs

Scientific Name	*Common Name*	*Drought tolerant*	*Native*
Dodonea viscosa	'A'ali'i	High	X
Mariscus javanicus	'Ahu'awa	Moderate	X
Wikstromeia uva-ursi	'Akia	High	X
Sida fallax	'Ilima	High	X
Capparis sandwichiana	Maiapilo	High	X
Gossypium tomentosa	Ma'o		X
Sesbania tomentosa	'Ohai	High	X

Groundcover

Scientific Name	*Common Name*	*Drought tolerant*	*Native*
Sporobolus virginicus	'Aki'aki	Moderate	X
Portulaca molokiniensis	'Ihi		X
Scaevola coriaceae	Dwarf Naupaka		X
Sida fallax	'Ilima papa	High	X
Myoporum sandwicense	Naio papa	High	X
Lipochaeta sp	Nehe		X
Jacquemontia ovalifolia	Pa'uohi'laka	High	X
Vitex rotundifolia	Pohinahina	High	X
Osteomoles anthyllidifolia	'Ulei	High	X

Appendix C2: Residential Zone Plant Palette

Trees

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Acacia koaia	Koai'a	High	X
Aleurite moluccana	Kukui	Moderate	
Bauhinia blakeana	Hong Kong Orchid	Moderate	
Callistemon rigidus	Stiff Bottle Brush	Moderate	
Coccoloba uvifera	Sea Grape	Moderate	
Conocarpus erectus	Silver ButtonWood	Moderate	
Cordia sebestena	Geiger Tree	Moderate	
Delonix regia	Royal Poinciana	Moderate	
Diospyros sandwicensis	Lama	High	X
Fagraea berteriana	Puakenikeni	Moderate	
Hibiscus tiliaceus 'Variegata'	Variegated Hau	Moderate	
Metrosideros polymorpha	'Ohi'a Lehua	Moderate	X
Pandanus tectorius	Screw Pine / Hala	Moderate	X
Podocarpus macrophyllus	Podocarpus	Moderate	
Sapindus saponaria	Manele	High	X
Tabebuia argentea	Silver Trumpet Tree	Moderate	
Thespesia populnea	Milo	High	X
Tournefortia argentea	Tree Heliotrope	High	
Plumeria obtusa	Singapore Plumeria	Moderate	
Plumeria rubra	Plumeria	Moderate	
Santalum haleakalae	Iliahi	Moderate	X

Palm Trees (and Palm-like Shrubs)

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Caryota mitis	Clumping Fishtail Palm	Moderate	
Chrysalidocarpus lutescen	Areca Palm	Moderate	
Cycas revoluta	Sago Palm	Moderate	
Hyophorbe lagenicaulis	Bottle Palm	Moderate	
Latania loddigesii	Blue Latan Palm	Moderate	
Phoenix roebelenii	Pygmy Date Palm	Moderate	
Pritchardia pacifica	Fiji Fan Palm	Moderate	
Pritchardia sp.	Native Loulu	Varies	X
Ptychosperma macarthruii	Macarthur Palm	Moderate	
Ravenala madagascariensis	Traveller's Tree	Moderate	
Rhapis excelsa	Rhapis Palm	Moderate	
Strelitzia nicolai	Giant Bird of Paradise	Moderate	
Veitchia joannis	Joannis Palm	Moderate	
Veitchia merrilli	Manila Palm	Moderate	
Wodyetia bifurcata	Foxtail Palm	Moderate	

Appendix C2: Residential Zone Plant Palette - Continued

Shrubs and Groundcovers

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Acalypha wilkesiana	Beeksteak Plant	Moderate	
Alpinia purpurata	Red Ginger	Low	
Breynia nirvosa	Snowbush	Moderate	
Brugmansia	Angel's Trumpet	Moderate	
Canna indica	Indian Shot	Moderate	
Caesalpinia pulcherrima	Dwarf Poinciana	Moderate	
Chlorophytum comosum	Spider Plant	Varies	
Codiaeum variegatum	Croton	Moderate	
Cordyline fruticosa	Green Ti	Moderate	
Cordyline fruticosa Cv.	Colored Ti	Moderate	
Crinum asiaticum	Spider Lily	Moderate	
Crinum augustum	Queen Emma Spider Lily	Moderate	
Dianella sandwicensis	'Uki'Uki	Moderate	X
Dodonea viscosa	'A'ali'i	High	X
Epipremnum pinnatum	Pothos	Low	
Ficus microcapra Var. crassifolia	Wax Leaf Ficus	Moderate	
Gardenia jasminoides	Gardenia	Moderate	
Gardenia brighamii 'lau nui'	Nanu Gardenia	Moderate	X
Graptophyllum pictum	Caricature Plant	Moderate	
Heliconia sp.	Heliconia Var.	Low	
Hemerocallis sp.	Daylily	Moderate	
Hibiscus sp.	Hibiscus Var.	Varies	
Ixora sp.	Ixora Var.	Moderate	
Lipochaeta sp	Nehe	Moderate	X
Liriope muscari	Liriope	Moderate	
Microlepia strigosa	Palapalai	Low	X
Microsorium diversifolia	Kangaroo Paw Fern	Moderate	
Microsorium scolopendria	Laua'e Fern	Moderate	
Microsorium scolopendrium 'laua'e iki'	Laua'e Iki (Dwarf Laua'e Fern)	Moderate	
Moraea irioides	African Iris	Moderate	
Murraya paniculata	Mock Orange	Moderate	
Myoporum sandwicense	Naio (upright)	High	X
Myoporum sandwicense	Naio papa (prostrate)	High	X
Nephrolepis cordifolia	Kupukupu Fern	Low	X
Nototrichium sandwicense	Kulu'i	High	X
Ophiopogon japonicus	Mondo Grass	Moderate	
Philodendron sp.	Philodendron Var.	Low	
Pittosporum tobira 'Wheeler's Dwarf'	Dwarf Pittosporum	Moderate	
Plumbago auriculata	Cape Plumbago	Moderate	

Appendix C2: Residential Zone Plant Palette - Continued

Shrubs and Groundcovers Continued

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Plumbago zeylanica	Ilie'e	Moderate	X
Pseuderanthemum reticulatum	Eldorado	Moderate	
Psydrax odorata	Alahe'e	Moderate	X
Rhapiolepis indica	Kokutan	Moderate	
Ruellia ciliosa	Pink Ruellia	Moderate	
Russellia equisetiformis	Firecracker Plant	Moderate	
Santalum freycinetiatanum	'Iliahi	High	X
Scaevola coriacea	Dwarf Naupaka	High	X
Scaevola sericea	Naupaka	High	X
Sida fallax	Ilima Papa	High	X
Strelitzia reginae	Bird of Paradise	Moderate	
Vaccinium reticulatum	Cranberry/ 'Ohelo	Moderate	X
Vitex rotundifolia	Pohinahina	High	X
Wikstroemia uva-ursi	Akia	High	X
Zingiber officinale	Gingers	Low	

Vines

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Alyxia oliviformis	Maile	Moderate	X
Allamanda cathartica	Alamanda	Moderate	
Bougainvillea Sp. Cv. 'Miss Manila'	Bougainvillea Var.	Moderate	
Epipremnum pinnatum	Pothos	Low	
Ipomoea pes-caprae subsp. Brasiliensis	Pohuehue (Beach Morning Glory)	High	X
Stephanotis floribunda	Madagascar Jasmine	Moderate	

Lawn / Sod

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Paspalum vaginatum	Seadwarf Paspalum	Moderate	

Appendix C3: Community Zone Plant Palette

Trees

Latin Name	*Common Name*	*Drought Tolerant*	*Native*
Acacia koaia	Koai'a	High	X
Coccoloba uvifera	Sea Grape	Moderate	
Cordia subcordata	Kou	Moderate	X
Delonix regia	Royal Poinciana	Moderate	
Hibiscus tiliaceus	Hau	Moderate	X
Prosopis pallida	Thornless Kiawe	High	
Thespesia populnea	Milo	High	X
Tournefortia argentea	Beach Heliotrope	High	

Shrubs and Groundcovers

Latin Name	*Common Name*	*Drought Tolerant*	*Native*
Achyranthes splendens	Ewa Hinahina	High	X
Chenopodium oahuense	'Aweoweo	High	X
Dodonea viscosa	'A'ali'i	High	X
Gossypium tomentosa	Ma'o	High	X
Hibiscus calyphyllus	Ma'o Hau Hele	High	X
Microsorium scolopendrium 'laua'e iki'	Laua'e Iki (Dwarf Laua'e Fern)	Moderate	
Myoporum sandwicense	Naio (upright)	High	X
Myoporum sandwicense	Naio papa (prostrate)	High	X
Nephrolepis cordifolia	Kupukupu Fern	Moderate	X
Osteomoles anthyllidifolia	'Ulei	High	X
Pittosporum glabrum	Ho'awa	Moderate	X
Plumbago zeylanica	Ilie'e	Moderate	X
Scaevola sericea	Beach Naupaka	High	X
Sida fallax	Ilima (Upright)	High	X
Sida fallax	Ilima Papa (Prostrate)	High	X
Vitex rotundifolia	Pohinahina	High	X
Wikstroemia uva-ursi	Akia	High	X

Appendix C3: Community Zone Plant Palette - Continued

Palm Trees (and Palm-like Shrubs)

Latin Name	*Common Name*	*Drought Tolerance*	*Native*
Chrysalidocarpus lutescen	Areca Palm	Moderate	
Cocos nucifera	Coconut	Moderate	
Latania loddigesii	Blue Latan Palm	Moderate	
Pritchardia pacifica	Fiji Fan Palm	Moderate	
Pritchardia species	Native Loulu	Varies	X
Roystonea regia	Royal Palm	Moderate	
Veitchia joannis	Joannis Palm	Moderate	

Vines

Latin Name	*Common Name*	*Drought Tolerant*	*Native*
Jacquemontia ovalifolia	Pa'uohi'iaka	High	X
Ipomoea pes-caprae subspecies Brasiliensis	Pohuehue (Beach Morning Glory)	High	X
Ipomoea imperati	Hunakai	High	X

Grass Species

Latin Name	*Common Name*	*Drought Tolerant*	*Native*
Heteropogon contortus	Pili	High	X
Sporobolus virginicus	Aki'aki	Moderate	X

Appendix D: Landscape Framework Plan

Landscape Vision

The three zones of the Ahupua'a, or settlement pattern of the native Hawaiian residents, also define the three over arching landscape zones. These settlement and activity zones /coastal, agricultural, and forest zones) are in direct response to the native ecosystems found on the island. Each of these zones supports its own unique native flora and fauna that respect and complement these ecosystems.

In keeping with the Mākena commitment to becoming a sustainable community, use of native plant material will serve as basis for each of the three landscape zone plant palettes. The majority of plant material utilized within the three landscape zones will be endemic or indigenous vegetation that is exclusive to the Hawaiian Islands. Tropical plants that compliment the native plant palette with be used sparingly in high use areas and within the residential outdoor living areas.

Utilizing native plant material reduces the community's impact on native resources while honoring native "Hawaiian's land stewardship practices. This will also assist in creating a unique environment that is distinct to the Mākena lifestyle. Honoring native Hawaiian's land stewardship practices complements the Mākena Legacy of balancing sustainability, culture, and an unparalleled lifestyle.

Dry Coastal Zone

The Mākena coast line is located on the leeward side of Maui which produces an arid landscape rather than a moist tropical environment. This Dry Coastal Zone exhibits plants that are not only drought tolerant but also tolerate heat, salt, full sun, and wind. Like the native Hawaiians this zone contains the highest use activity node along with the densest residential neighborhoods. The native/endemic plants that thrive in this eco-zone will be supplemented with compatible tropical/ Polynesian plant material where ever there is intense pedestrian use within the residential outdoor living areas.

Agricultural or Mesic Zone

The agricultural or Mesic Zone is a mix of the dry coastal and forest zone. This Mesic Zone exhibits plants that thrive in drier conditions and full sun; usually found at mid elevations on the leeward side of the island. Many plants of this zone have beautiful flowers including the bright orange blossoms of 'Ohai, and the large yellow blossoms of Hawaii's state flower, the Ma'o. These Mesic native/endemic plant materials are the foundation of the Agricultural Plant Pallet. Compatible tropical/Polynesian plant materials will be used sparingly in high pedestrian traffic areas and within residential outdoor living areas.

Dry Forest Zone

The Dry Forest or Montane Zone is dominated by tree and low brush genera that range from closed to open tree canopies. This Montane Zone is generally found at low elevations on the leeward side of the island and exhibits plants that thrive in full sun with low water requirement. The native/endemic plants that thrive in this eco-zone will be sparingly supplemented with compatible tropical/Polynesian plant material only where there is intense pedestrian use.

Appendix E: Design Review Committee Submittal Review

Design Review Application

Date_____

Homesite no._____Street Address_____

Owner(s)_____

Address_____

Telephone_____Email_____

Architect_____License No._____

Address_____

Telephone_____Email_____

DRC Use Only:	*Date Submitted*	*Date Reviewed*	*Action*
Design Review Fee			
Conceptual Design			
Preliminary Design			
Final Plan Review			

Appendix E: Design Review Submittal Checklist - Continued

Step 1 - Pre-Design Consultation Meeting (Optional)

- ☐ Site Plan with conceptual floor plan layout and height plane
- ☐ Grading plan
- ☐ Site section
- ☐ Four side building elevations

Step 2 - Preliminary Submittal and Review

- ☐ Design review application
- ☐ Design review fee
- ☐ Preliminary site plan
- ☐ Roof plan and floor plan
- ☐ Exterior elevations and site sections
- ☐ Exterior material samples
- ☐ View plane plans (cross sections)
- ☐ Net-Zero home energy model (Exhibit B)
- ☐ Preliminary landscape plan and lighting plan
- ☐ Signage and address monument plans
- ☐ LEED-Homes checklist

Step 3 - Preliminary Design Submittal and Approval

The DRC shall transmit to the applicant written approval or disapproval not more than forty five (45) days after submittal of the preliminary documents. If the preliminary plans are disapproved, the applicant must revise the documents and resubmit. Additional design review fee may be required.

Step 4 - Final Construction Document Submittal

- ☐ Final site plan
- ☐ Final grading and drainage plans and reports
- ☐ Building plans, elevations and details
- ☐ Net-Zero Home Energy Model
- ☐ Electrical and exterior lighting plans
- ☐ Materials and color samples
- ☐ Landscape planting and irrigation plans
- ☐ Fence and/or wall plans
- ☐ Signage and address monument plans
- ☐ Completed LEED - Homes checklist

Step 5 - Final Construction Document Approval

The DRC shall transmit to the applicant written approval or disapproval not more than forty five (45) days after submittal of the final documents. Should any governmental agency require changes to the DRC approved plans to obtain building, grading or other required permits, the applicant shall submit the plan revisions to the DRC for approval prior to commencing construction.

Appendix E: Pre-Construction Checklist and Requirements - Continued

Contractor_____License No._____

Address_____

Telephone_____Email_____

Emergency contact number for Contractor_____

Insurance Company_____

- ☐ Copy of the building permit and County stamped cover sheet of the permit set
- ☐ Construction deposit in the amount of $10,000.00.
- ☐ Certificate of insurance
- ☐ Construction Rules and Regulations Agreement (Exhibit F)
- ☐ Drainage Compliance Certificate (Exhibit D)

Pre-Vertical Construction Requirement

- ☐ Land Surveyor certification of finished floor elevation, grading and all utilities prior to construction (Exhibit E)

Post-Construction Checklist and Requirements

- ☐ One (1) complete set of "as-built" construction documents
- ☐ Validation of LEED certification and signed final LEED-Homes checklist
- ☐ Final inspection certificate issued by the County of Maui upon completion of construction and all required inspections
- ☐ After permanent power is connected and landscaping is complete the applicant may request final inspection by the DRC

DRC Use Only:	Date Submitted	Date Reviewed	Action
Construction Completion			
Final Inspection			
Certification of Completion			
LEED Certification			

Appendix E: Net-Zero Home Energy Model - Continued

Home Site No. _____

Name/Company Name of LEED for Homes Provider: _____

Address: _____

Phone Number: _____

Fax Number: _____

Email:

HERS Index:_____(N/A if using Hawaii Builder Option Package)

Targeting LEED (Circle One): Silver Gold Platinum

The home design includes building integrated photovoltaic (PV) panels which (Check One):

- ☐ Offset at least 30 percent of the home's estimated annual energy usage
- ☐ Cover all east, west, and south face roof areas that are suitable for photovoltaic energy systems

Complete preliminary LEED for Homes checklist demonstrating compliance with all prerequisites and targeted credits is attached to this form.

Signed: _____

Date: _____

Appendix E: Validation of LEED Certification - Continued

Home Site No. _____

Name/Company Name of LEED for Homes Provider: _____

Address: _____

_____

Phone: _____

Fax: _____

Email: _____

HERS Index:_____(N/A if using Hawaii Builder Option Package)

Targeting LEED (Circle One): Silver Gold Platinum

As the designated LEED for Homes Provider of this home, I have reviewed the completed and signed LEED for Homes checklist, the completed and signed Accountability Forms, and the completed and signed Durability Evaluation Form and durability inspection checklist, and affirm that all documentation is complete and ready for submission to the USGBC for final LEED certification.

A copy of the completed and signed final LEED for Homes checklist is attached to this form.

Signed: _____

Date: _____

Appendix E: Drainage Compliance Certificate - Continued

Home Site No. _____

I_____Registered Civil Engineer State of Hawaii No._____, have reviewed this plan for drainage adequacy. The surface drainage patterns and subsurface drainage facilities shown herein are required to be constructed in substantial conformance to the elevations and details delineated on these plans. It is the responsibility of the lot owner to insure compliance with these details and notify me should any deviations be proposed. This review covers ONLY the surface and subsurface drainage facilities shown herein.

Signed: _____ RCE: _____

Firm: _____ Stamp

Phone: _____

Address: _____

_____

Appendix E: Land Surveyor Certificate - Continued

Home Site No. _____

I_____Licensed Professional (LP) State of Hawaii License No. _____ _____, have surveyed the finished floor elevation for the above mentioned homesite. I hereby certify that the finished floor elevation and site grading conforms to the elevations as show on the plot plan provided to me by the owner.

Signed: _____

Print Name: _____

Company Name: _____

Address: _____

Phone Number: _____

Stamp

Appendix E: Construction Rules and Regulations Agreement - Continued

Home Site No. _____

The undersigned having read the Laule'a at Mākena Design Guidelines, and by execution hereby agree to comply with the terms and conditions set forth herein.

Owner: _____
(signature)

_____
(printed name)

Date: _____

Contractor: _____
(signature)

_____
(printed name)

Date: _____

Appendix E: Variance Request Application - Continued

Home Site No. _____

Owner _____

Address _____

_____

Phone _____

Fax _____

E-mail _____

Contact _____

Address _____

_____

Phone _____

Fax _____

E-mail _____

Variance Request Description

I (we) request a variance for the following (a description can be attached if more room is needed): _____

_____

_____

Owner's Signature(s): _____

DRC Use Only:	Date Submitted	Date Reviewed	Action
Site Plan Variance Request			
Landscape Plan Variance Request			
Architectural Plan Variance Request			
Other Design/Construction Variance Request			
Review Fee Received			

Appendix E: Application for Minor Modification to an Existing Residence or Landscape - Continued

Home Site No. _____

Owner _____

Address _____

_____

Phone _____

Fax _____

E-mail _____

Contact _____

Address _____

_____

Phone _____

Fax _____

E-mail _____

Modification Description: _____

_____

I (we) propose to construct: _____

DRC Use Only:	DRC Use Only:
Date Received _____	Review Fee Received _____
Reviewer's Remarks _____	Construction Deposit Received _____
_____	Construction Deposit Refund _____
_____	
_____	

Appendix F: Lot Survey Requirements

The following format and information shall be used in the compilation of each individual Laule'a at Mākena Homesite. These standards will allow for easier review and coordination of the designs within the entire project.

All drawings shall be delivered in AutoCAD version 2010 with the coordinate system and vertical datum conforming to the project engineer's coordinate system, which will be provided at the request of the surveyor. All AutoCAD entities (line types, colors, etc.) to be 'by layer'. All line type scales set at 1. Survey drawn at 1/1 formatted in Architectural units. The survey is to be plotted at 1"=20' for review purposes. X-refs shall be placed on individual specific layers (i.e. x-diagram).

The following items shall be shown on separate layers – property boundaries, building envelope and setback areas, easements, all utilities including but not limited to the following:

1. Electrical
2. Potable water
3. Drainage
4. Gas
5. Fiber Optics / Cable TV lines
6. Non-potable water service (irrigation), if applicable.

Utilities to show, where possible, depth of bury, location and points and sizes of service.
The following site elements are to be shown on the survey –

- Location of existing ponds with spot grades
- Lava outcrops with spot grades at base and high points.
- Existing vegetation with spot grades at trunk. Type of tree or palm to be shown with trunk diameter and approximate height and spread of canopy.
- Existing walls with TW and BW grades
- Notable features such as lava tubes, edges of crunched lava, etc.
- Edges of existing pavement

All Lots are to show grades drawn with polylines in the following manner – 1 foot contours and 10 foot contours shown on separate layers with zero width to polylines. Other information may be required by the permitting authorities, and it is the Lot Surveyor's responsibility to ensure that the survey meets those requirements.

Appendix G: Amended Guidelines

1. These Amended Guidelines supersede and replace the "Standards" which are attached to the Laule'a at Mākena CC&Rs.
2. Any amendment which results in a change in height restrictions or building envelope size shall require the unanimous approval of all Lot Owners eligible to vote.

MĀKENA

GOLF & BEACH CLUB

SUSTAINABILITY REPORT

APPENDIX D

H-2 RESIDENTIAL PROJECT

SUSTAINABILITY PLAN

Prepared for H2R, LLC
By Sustainable Pacific Consulting & Green Building Hawai'i
April 2019

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EXECUTIVE SUMMARY

H2R, LLC proposes to develop the H-2 Residential Project, a land area of approximately 28 acres that will consist of a community of 53 single-family condominium home sites with accompanying roadways and infrastructure. Additional site area project improvements include the preservation of six (6) archeological sites and relocation of the existing public parking lot that provides access to the Maluaka Beach area. This document provides the Sustainability Plan for the H-2 Residential Project.

The Sustainability Plan was facilitated by Maui-based sustainability consultants, Sustainable Pacific Consulting and Green Building Hawai'i. The foundation of the Plan is based on the Quadruple Bottom Line (QBL): achieving Environmental, Social, Cultural, and Economic balance. The overall goal of the Plan is to create a roadmap for creating a sustainable resort development.

The Plan used conservation, preservation, and innovative sustainability techniques to create six (6) sustainability goals that were identified as the most important for the project. The goals were developed using a sustainability framework that aligned with the United Nations Sustainable Development Goals (UNSDGs), Hawai'i's Aloha + Challenge, the Maui Island Plan, and the U.S. Green Building Council's LEED for Homes Certification. Strategies were developed for each goal to ensure the long-term success of the project.

The sustainability goals of the project include: 1) developing a smart sustainable community; 2) fostering cultural stewardship; 3) creating a clean energy community; 4) using best practices to manage water resources; 5) managing materials and resources efficiently; and 6) creating a positive economic impact for the project, local community, and Maui island.

The strategies for meeting these goals are outlined in this plan. They are aligned with global, state, and local sustainability goals, and use the most utilized and robust green building certification process in the U.S. Key strategies include improvements to the site parking and roadways, erosion control, native landscaping, pollutant reduction systems, preservation of archaeological sites, integration of the natural landscape, energy efficiency, renewable energy, water conservation, water efficiency, responsible resource use, increased jobs, and support of local vendors when possible.

PROJECT OVERVIEW

H2R, LLC proposes to develop a low density residential resort project and related improvements on approximately 28 acres of land at TMK (2) 2-1-005:085 and 120 (por.), Mākena, Maui, Hawai'i. The Sustainability Plan was developed through data collection, research, and facilitated sessions with members of the H-2 Residential Project team by Sustainable Pacific Consulting (SPC) and Green Building Hawai'i (GBH), both local Maui firms with extensive experience working on sustainability and green building certification projects in the State.

Sustainability planning for the H-2 Residential Project was intended to inform and assist the design, construction, and implementation processes of the site. The project team plans to create a positive residential experience for prospective homeowners based on sound sustainability practices.

Site Information

Project Name:	H-2 Residential Project
Location:	Mākena, HI
TMK:	(2) 2-1-005: 85 and 120 (por.)
Boundaries:	Mākena Alanui Road (East & South) Mākena Keone'o'io Road (West) Mākena Golf Course Hole 17 (North)
Total Area:	28 acres
Existing Use(s):	Vacant and undeveloped except for one (1) beach parking lot and a drainage basin
County Zoning:	H-M: Hotel
Moku:	Honua'ula
Ahupua'a:	Maluaka
Approvals Required:	Chapter 343 Environmental Assessment, Special Management Area and Construction permits
Proposed Improvements:	Fifty-three (53) single family home condominium lots and associated infrastructure. Public improvements include sidewalks along Mākena Alanui Road and Mākena-Keone'o'io Road and a relocated beach parking lot.

Site History

The H-2 Residential Project is located in Mākena, Maui on the makai side of the highway in an area called Honua'ula, located in the Maluaka ahupua'a. The early settlements and inhabitants of this area subsisted on fish and taro. Inhabitants used brackish water from shallow wells, which limited taro production to upland areas where the annual rainfall was higher.

Commercial sugarcane cultivation began in the area in 1841, but extreme drought conditions eventually forced the end of sugarcane production. This led to cattle ranching as the dominant commercial enterprise, which continued into the 1970s. Since then, the dominant economic land-uses for the Honua'ula area have been focused on tourism and residential development.

The area, once diverse with many native species, has experienced drastic reductions from browsing and grazing from an increased deer population, as well as areas of the property that have been burned over the last century. Most of the native species have been replaced by non-native plant species. Surveys of the H-2 Residential Project site recorded 31 plant species, with nearly 87 percent being non-native. The native species that are left on the site today include: the wiliwili tree, the koali 'awahia, 'ilima and 'uhaloa. None of the native species on the site are considered rare or protected species. The remaining 27 species are non-native plants and present no conservation concerns. Fauna survey methods identified two species of feral mammals, nine non-native species of birds, and 11 species of insects on the site.

Proposed Site Plan

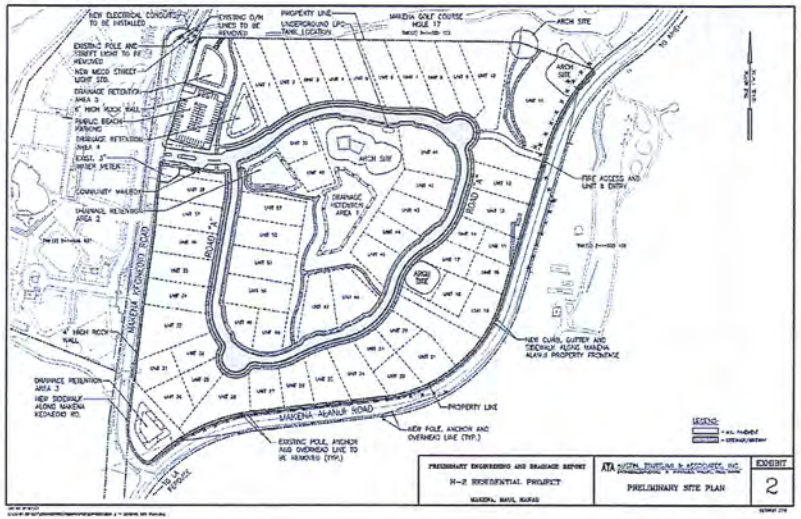

Figure 1: Proposed Site Plan

Utility Infrastructure Summary

One of the most important aspects of a Plan includes the development of sustainable methods or practices for infrastructure. The key infrastructure areas of the H-2 Residential Project are described below.

Energy System

- Electrical power will be provided by Maui Electric Company.
- All homes will be required to have photovoltaic systems.

Water System

- The project site has an existing 3-inch water meter that connects to the County of Maui, Department of Water Supply (DWS) 12-inch water line off of Mākena-Keone'o'io Road.

- Preliminary water demand is estimated at approximately 47,700 gallons per day for average daily domestic use (Refer to Preliminary Engineering and Drainage Report for the H-2 Residential Project, Appendix B for Preliminary Water Demand Calculations).
- Proposed improvements include:
  - Installation of domestic water, fire line, and non-potable irrigation systems.

Wastewater System

- The project site currently generates no wastewater flow, and there are no existing wastewater collection systems within Mākena Alanui Road or Mākena Keone'o'io Road. North of the project site is an existing, privately owned and operated wastewater pump station (WWPS) within the Mākena Beach and Golf Resort re-development site.
- Preliminary wastewater contribution is estimated at approximately 18,550 gallons per day for average daily flow (Refer to Preliminary Engineering and Drainage Report for the H-2 Residential Project, Appendix C for Preliminary Wastewater Contribution Calculations).
- Proposed improvements include:
  - Installation of an onsite wastewater collection system. Gravity wastewater lines would be connected to the existing wastewater pump station located north of the project site via an existing easement.

Drainage

- Storm water runoff at the existing site generally flows in a north westerly direction, and sheet flows to Mākena Keone'o'io or the Mākena South Golf Course 17th hole where it percolates into the ground.
- Proposed improvements include:
  - Implementation of grated inlets, manholes, drain-lines, vegetative swales and retention basins.
  - Rather than curb and gutters, grassed/landscaped swales on each side of roadways will channel surface runoff from the road and units into the drainage system.
  - The proposed drainage system will be designed to handle the 50-year, 1-hour storm runoff from both onsite and offsite drainage areas.

Roadways

- Mākena Alanui is a 24-foot wide asphalt concrete (a.c.) paved two-lane public road with 60-foot wide right-of-way. The section of Mākena Keone'o'io Road fronting the site is a 24-foot wide a.c. paved two-lane public road with a variable 47- to 77-foot wide right-of-way.
- Existing features of Mākena Keone'o'io Road include a six foot wide a.c. paved walking path, grated inlets, 24-inch drain line crossings, underground electric and telephone lines, an existing 12-inch water line, and a nine stall public parking lot.
- Proposed improvements include:
  - A main entrance from Mākena Keone'o'io Road will service the development and all units; and will have a 20-foot asphalt paved road with six foot wide grassed shoulders.

- Vegetative swales will be constructed adjacent to this road for storm water runoff collection.
- An eight-foot multi-modal pathway will run parallel to the main internal road.
- New curbs, gutters, bikeways, and sidewalks will be added to Mākena Alanui road along the Project's perimeter.
- A new sidewalk will be constructed along Mākena Keone'o'io Road along the property's frontage.

SUSTAINABILITY PLANNING STRATEGY

Planning Strategy

The H-2 Residential Project team participated in facilitated sessions with SPC and GBH to ensure sustainability measures would be implemented. Through this process, team members reviewed the key principles of sustainability and worked to integrate them into the project. The development of the Sustainability Plan for the H-2 Residential Project was anchored in five phases: 1) Data Collection & Review; 2) Gap Assessment; 3) Facilitated Project Team Workshops; 4) Goal Setting and Strategies; and 5) Broader Goal Alignment.

Data Collection & Review

In collaboration with the H-2 Residential Project team, SPC and GBH collected available data and documents that were developed for the project, including all supporting documents relating to environmental, economic, cultural, or community studies. These included, but were not limited to, the following reports: a Biological Resources Survey, 2018; an Economic and Fiscal Impacts report, 2018; a Preliminary Engineering and Drainage Report, 2019; a Schematic Landscape and Lighting Plan, 2018; Maluaka Design Guidelines, 2015; Archaeological Inventory Surveys, 2008; Archaeological Preservation Plan, 2009; and Cultural Impact Assessment, 2007.

Gap Assessment

Following collection and organization of available resources, a comprehensive review of the documents was conducted by SPC and GBH. The team used the data to assess the key features of the site and developed a sustainability framework that was aligned with the United Nations Sustainable Development Goals (UNSDGs), Aloha+ Challenge, Maui Island Plan, and LEED for Homes Certification requirements. These frameworks provided a guide for assessing gaps in data and areas requiring further clarification and planning. The results were compiled and used to inform the facilitated project team workshop phases of the process.

Facilitated Project Team Workshops

Based on the results of the data collection and gap assessment, SPC and GBH facilitated discussions with the H-2 Residential Project Team to develop a well-balanced sustainability plan that would meet the needs of the project and be aligned with broader sustainability goals. These sessions helped to determine the following components:

- Solidify the project's goals related to sustainability.
- Evaluate current sustainability strengths, challenges, opportunities, and threats.

- Increase knowledge and understanding of LEED certification for homes and align with global, state, and community sustainability goals.
- Develop sustainability strategies aligned with each goal.

Goal Setting

Sustainability goals were derived from the facilitated discussions and aligned with global, state, local, and international green building standards. Once the goals were determined, sustainability strategies were identified as part of the action plan.

Goal Alignment

Today organizational and governmental sustainability goals are often aligned with broader goals that support initiatives at higher levels. With projected challenges surrounding food, water, public health, energy, land use, and economic viability growing throughout the globe, sustainability is at the forefront of strategy and risk management for leaders across all sectors of public and private landscapes.

The following sustainability frameworks represent forward-focused strategies that span a broad spectrum of global, state, and county sustainability efforts, as well as standards for the best green building strategies. They include the UNSDGs, Aloha+ Challenge, Maui Island Plan, and the LEED Green Building Rating System.

The United Nations Sustainable Development Goals (UNSDGs)

The United Nations Member States agreed upon a shared blueprint for global prosperity in 2015. It includes 17 sustainable development goals that focus on creating environmental improvements, ending poverty, reducing inequalities, and promoting responsible economic growth. They were developed over decades of multilateral collaboration and international policy development. They provide a foundation and guiding force for advocacy, outreach, and cultivating broad ownership of sustainable practices and principles throughout the world. Figure 2 illustrates the 17 UNSDGs. The H-2 Residential Project is aligned with 7 of the 17 goals.

Figure 2: United National Sustainable Development Goals

Aloha+ Challenge

The Aloha+ Challenge was inspired by the 2015 Hawai'i Sustainability Plan. It is a statewide commitment to achieve Hawai'i's sustainability goals with six (6) target areas. The targets and associated indicators were identified through facilitated stakeholder meetings across the islands. They were aligned with the UNSDGs and based on the most significant areas of environmental needs in Hawai'i. They include:

- Clean Energy
- Local Food
- Natural Resource Management
- Waste Reduction
- Smart Sustainable Communities
- Green Workforce

Figure 3: Hawai'i's Aloha + Challenge Targets

Maui Island Plan

The Maui Island Plan was completed after five years of comprehensive community engagement. It represents a generational strategy for the management of Maui lands and communities. The key objectives of the Plan are as follows:

- Adoption of a directed growth plan
- Protection of Maui's small towns and rural character
- Affordable housing
- Protection of watersheds and coastal resources
- Identification of transit corridors
- Economic diversification
- Integration of land use and infrastructure planning

Leadership in Energy & Environmental Design (LEED)

LEED is the most recognized and widely used green building rating system in the world. Developed and unveiled by the U.S. Green Building Council (USGBC) in 2000, LEED has transformed into an international standard for environmentally sound building design, construction, operations and maintenance.

<u>How Does LEED work?</u>

The LEED rating system is based on prerequisites and credits that a project meets to earn a certification level. Projects pursuing LEED certification must meet all prerequisites and can earn points in various categories based on the design and construction practices used (see Appendix for LEED v4 for Homes Checklist). Projects are then certified using third party reviewers separate from the project team and achieve various LEED rating levels: Certified, Silver, Gold and Platinum, based on the number of points earned.

Figure 4: LEED Rating Levels

LEED rating systems are available for different types of building projects. Each system has the same foundational sustainability categories, but the individual credits within each category vary based on the building type. The H-2 Residential Project is aligned with the LEED for Homes rating system.

Figure 5: LEED Building Projects

The LEED Rating system is dynamic and is updated over time so that it continues to advance the performance and environmental impact of buildings.

LEED for Homes is available for single-family and multifamily home projects up to eight stories. LEED Homes focuses on creating residential buildings that are not only less impactful on the environment, but also healthier and better for occupants.

LEED for Homes v4 - Building Design and Construction: Homes and Multifamily Low-rise Categories

1. **Location and Transportation:** To promote proper site selection, this category focuses on the physical location of the home. It encourages projects to avoid sensitive areas, such as flood zones, endangered species habitat, prime farmland, etc. It also provides credits for projects that can minimize the need for vehicle use through alternative transportation and close proximity to community resources. Homes that earn credits in this category can help in maintaining the natural resources of the area as well as reducing carbon emissions from transportation.

2. **Sustainable Sites:** This section is focused on reducing the environmental impact of construction and ongoing operation of the home after completion. All projects are required to reduce construction impact on the environment through the implementation of construction Best Management Practices. Projects are rewarded for design elements that provide storm-water run off management, non-invasive landscaping, minimal chemical pesticide use, and a reduction in heat island effect. Projects that incorporate these elements in design and construction reduce the impact both during construction, but also long into the future once completed.

3. **Water Efficiency:** With a focus on both indoor and outdoor water use, this category creates a guideline to help design a water efficient home. The credits focus on water monitoring systems, using low flow fixtures, designing landscape irrigation for low water use, and maximizing the use of rain in the landscape design. The prerequisite requirements and credits of this category highlight the value of water as a precious resource that should be conserved.

4. **Energy and Atmosphere:** Each LEED home goes through a pre-build energy model that allows the architect and engineers to design the home to be as energy efficient as possible. In order to meet the requirements, the equipment inside the home must meet Energy Star efficiency requirements and the home must operate below the Energy Star reference home. Homes in similar locations have used high efficiency lighting and mechanical equipment combined with state-of-the-art controls to increase the efficiency of the home as well as installing photovoltaic systems to produce renewable energy on site. The energy use of a home typically has the most long-term environmental impacts, and thus this credit category has the most LEED points associated with it.

5. **Materials and Resources:** Homes can use sustainable and durable construction materials that have less environmental impact, as well as reduce construction waste through efficient design and material use. This section focuses on the use of these products to build homes that meet the intent of durable design to ensure resilience. Similar homes have used materials with recycled content, material efficient framing, and recycled leftover building materials. The use of environmentally friendly building materials can increase the availability of these materials for other projects as both suppliers and builders are exposed to them.

6. **Indoor Environmental Quality:** Sustainable construction also includes the comfort and quality of the living space when occupied. To ensure the highest indoor environmental quality this section provides best practices in materials purchasing, ventilation design, air filtration and contaminant control. Similar homes have increased air filtration, balanced the heating and cooling distribution systems, and used low VOC products during construction. Focusing on creating healthy and comfortable living spaces can reduce the need to make changes to the building in future and promotes the well being of the occupants.

7. **Regional Priority:** Based on the region where the LEED project is located, there are up to six points available for issues that are region specific. In Hawai'i, that may include exceeding waste reduction levels, minimizing water use, reducing rainwater runoff and exceeding the annual energy use reduction goals. Incentivizing these locally specific categories means that homes certified in that region are more likely to lessen impacts in critical areas.

8. **Innovation:** By implementing innovative new technologies or building practices during construction as well as performing better than a credit requires, the LEED team can apply for credits under the Innovation section. Some innovation credits examples include extremely efficient irrigation and water management systems, providing financial support to local conservation groups like the Hawai'i Island Land Trust, and controlling the home to minimize energy use when the home is not occupied. The LEED rating system encourages projects to go above and beyond in impactful categories and promotes new and innovative strategies that could be unique to the area.

SUSTAINABILITY GOALS & STRATEGIES

Sustainability Goals

The H-2 Residential Project set clear sustainability goals and associated strategies for the project. The goals capture the primary sustainability elements, are aligned with broader goals, and incorporate strategies that are aligned with LEED for Homes and best practices for sustainability. The goals are as follows:

1. Develop a Smart Sustainable Community
2. Foster Cultural Stewardship
3. Create a Clean Energy Community
4. Use Best Practice Strategies to Manage Water Resources
5. Manage Materials and Resources Efficiency
6. Create Positive Economic Growth

The goals and associated strategies for how each one will be implemented are described below.

Goal 1: Develop a Smart Sustainable Community

Develop a resilient resort community that coexists with its natural environment and incorporates low-impact, low-density planning concepts that permeate throughout the built environment and the daily lives of its residents. These goals focus on utilizing best practices during the construction of the site work, as well as the vertical construction of the homes. It includes implementing detailed design guidelines and requiring that all homes meet LEED Silver certification or better.

Sustainability Strategies

Parking and Roadway Improvements

- Support public beach access by relocating the existing public parking lot to closer to the beach.
- Design the parking lot so that stormwater runoff is directed towards drainage basins for infiltration.
- Establish an integrated network of roadways and walkways that provide safe freedom of movement.
- Provide sidewalk improvements along Mākena Alanui Road and Mākena-Keone'o'io Road to accommodate bicyclists and pedestrians.

Site Improvements

- During construction, implement erosion control plan measures to minimize soil loss and erosion hazards. Erosion control measures may include:

- Temporary sediment basins, temporary diversion beams and swales to intercept runoff, silt and dust fences, inlet and slope protection, stabilized construction entrances and truck wash-down areas.
- Improvements include grated drain inlets, manholes, underground drain lines, water quality treatment systems, and detention systems.

- Apply efficient run times for heavy equipment during construction operations to limit emissions.
- Implement periodic water spraying of loose soils to minimize air-borne dirt particles from reaching adjacent properties.
- Create a native landscape environment by seeking to reduce non-native species, continue growing current native species, and introducing new native plants.
- Implement pollutant reduction systems, including:
  - Grass swales and landscape areas to provide vegetative filtration and promote percolation into soil.
  - Detention and infiltration basins to reduce peak flows and provide significant pollutant removal through settling of suspended solids.
  - Development of maintenance plan for each system to properly remove accumulated debris, sediment, and dispose of at a County approved site.

Home Construction

- Develop 53 single-family condo home sites and require all homes to be LEED certified at the Silver level.
- Emphasize home sites that establish climate-appropriate and native landscape elements.
- Construct homes outside of floodplain and sea-level rise inundation areas.
- Direct stormwater runoff from homes towards infiltration features and minimize the use of hardscape surfaces.
- Encourage hardscape designs that reduce heat island effect.
- Require exterior lighting that reduces light pollution in the Design Guidelines.

Table 1: Goal 1 Sustainability Alignment

	Goal 1: Develop a Smart Sustainable Community
UNSDG	UNSDG Goal 11: Sustainable Cities and Communities
Aloha+	Smart Sustainable Communities: Increase livability and resilience in the built environment through planning and implementation at the state and county levels. Targets: • Land use impacts • Connection to place
Maui Island Plan	Population • Maui's people, values, and lifestyle thrive through strong, healthy, and vibrant island communities Economic Development • 4.1.2 Increase activities that support principles of sustainability Land Use • 7.3.2. Facilitate more self-sufficient and sustainable communities • 7.3.3 Strengthen the island's sense of place • 7.3.3.a Protect and enhance the unique architectural and landscape characteristics of each community • 7.3.3.b Encourage Hawai'ian architecture and tropical building designs • 7.3.3.d Strongly encourage the preservation of buildings, structures, and sites of historic significance
LEED	LT: Floodplain Avoidance LT: Site Selection SS: Construction Activity Pollution Prevention SS: No Invasive Plants SS: Heat Island Reduction SS: Rainwater Management SS: Nontoxic Pest Control EA: Lighting-exterior lighting

Goal 2: Foster Cultural Stewardship

Create an active preservation approach among owners and residents to ensure cultural sites are protected and cared for in perpetuity, while respectfully integrating sites and native landscape into design schema.

Sustainability Strategies

- Adopt Design Guidelines that promote home and community architectural design elements that embrace the Mākena region's history and cultural foundations, while integrating characteristics of the natural landscape into design themes and concepts.
- Inform owners of elements of cultural significance, as well as information on protected archeological sites within the community.
- Designate, preserve, and maintain six archaeological sites during and after development. Preserved sites include:
    - 6371, 6373, 6377, 6378, 6379, and 6374 (the latter of which was added at the request of public input).
- Ensure Monitoring and Preservation Plans, developed in collaboration with Archaeological Services Hawai'i, LLC (ASH) and the State Historic Preservation Division (SHPD), for sites 6371, 6373, 6374, 6377, 6378, and 6379 are executed as stated. Preservation Plan includes "Short-Term Measures" during periods prior to and during construction; and "Long-Term Measures" as ongoing methods for protection of these sites.

Figures 6 and 7 depict the six archaeological sites on the H-2 Residential Project site and their respective locations.

Figure 6: Overall Preservation Site Map

Figure 7: Archaeological Sites 6371, 6373, 6374, 6377, 6378, 6379

Table 2: Goal 2 Sustainability Alignment

	Goal 2: Foster Cultural Stewardship
UNSDG	UNSDG 11: Sustainable Cities and Communities
Aloha+	Smart Sustainable Communities: Increase livability and resilience in the built environment through planning and implementation at the state and county levels. Targets: • Land use impacts • Connection to place
Maui Island Plan	Heritage Resources • 2.2 A more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies • 2.1.2.a Ensure that the island has a comprehensive and up-to-date inventory of historic and archaeological resources, and their cultural significance • 2.1.2.c Ensure that cultural, historic, and archaeological resources are protected for the benefit of present and future generations. • 2.3 Enhance the island's historic, archaeological, and cultural resources
LEED	LT: Site Selection IN: Protect Cultural Sites in Perpetuity

Goal 3: Create a Clean Energy Community

Encourage new homeowners to embrace a net-zero[1] electric energy community by utilizing strategies outlined in the Leadership in Energy and Environmental Design (LEED) green building rating system. This includes designing for energy efficiency throughout the development process and requiring renewable energy technologies on homes.

Sustainability Strategies

- Require all new homeowners to achieve a "Silver Certified" LEED rating that includes energy efficiency and clean energy techniques. LEED requires that all elements of energy use of a home are analyzed and modeled for the creation of a low energy home.
- Require new homeowners to integrate photovoltaic solar panels to offset at least 30 percent of the modeled electricity usage.
- Construct common area electric areas as "solar ready" with required infrastructure included for easy addition of PV to offset loads.

What is a Net-Zero Building?

"A Zero energy building produces enough renewable energy to meet its own annual energy consumption requirements thereby reducing the use of nonrenewable energy in the building sector."

– Office of Energy Efficiency & Renewable Energy

[1] Definition of net-zero energy buildings: https://www.energy.gov/eere/buildings/downloads/common-definition-zero-energy-buildings

Table 3: Goal 3 Sustainability Alignment

	Goal 3: Create a Clean Energy Community
UNSDG	UNSDG #7: Affordable and Clean Energy
Aloha+	Clean Energy: 100% clean energy. Targets: • Electricity • Total energy use
Maui Island Plan	Economic Development • 4.1.2 Increase activities that support principles of sustainability • 4.4.2 Increase the development of renewable energy technologies that are supported by the local community Infrastructure & Public Utilities • 6.10.1 Reduce fossil fuel consumptions by 30% by 2030 • 6.10.1.a Support energy efficient systems, processes and methods • 6.10.2 Increase the minimum percentage of electricity obtained from clean, renewable energy sources; 25% by 2020; 40% by 2030
LEED	EA: Minimum Energy Performance EA: Energy Metering EA: Education of Homeowner, Tenant, or Building Manager EA: Annual Energy Use (energy modeling) EA: Efficient Hot Water Distribution System EA: Advanced Utility Tracking EA: HVAC Start-Up Credentialing

Goal 4: Use Best Practice Strategies to Manage Water Resources

Use techniques that minimize water use and enable water reuse. Minimize the burden on community water and wastewater resources through the use of efficiency techniques and private systems.

Sustainability Strategies

Water Conservation and Efficiency

- Incorporate native and adaptive plantings in common areas that require less water and minimize the use of lawn area in the landscape.
- Use high efficiency irrigation practices in common areas.
- Require that all homes meet minimum standards for water efficiency that address home water fixture flow rates, pool filters, and irrigation systems.
- Require homes to address water use in a comprehensive way by requiring LEED Silver for all homes.
- Utilize recycled water or non-potable water as often as feasible for construction operations.

Water Management and Distribution

- Provide separate water lines for domestic use (including a redundant main water line), fire suppression, and irrigation.
- Use a combination of non-potable water and well water to provide irrigation to the area. Wastewater at a private wastewater treatment plant is treated to R-1 standards.
- Design the site so that all stormwater is managed through infiltration basins that are designed to filter out pollutants and recharge the aquifer.

Table 4: Goal 4 Sustainability Alignment

	Goal 4: Use Best Practice Strategies to Manage Water Resources
UNSDG	UNSDG: #6: Clean water and sanitation UNSDG #14: Life below water
Aloha+	Natural Resource Management: Reverse the trend of natural resource loss mauka to makai by increasing freshwater security, watershed protection, community-based marine management, invasive species control, and restoration of native species. Targets: • Freshwater security • Native species restoration

	Goal 4: Use Best Practice Strategies to Manage Water Resources
Maui Island Plan	Infrastructure & Public Utilities • 6.2 Maui will have wastewater systems that comply with or exceed State and Federal regulations; meet levels-of-service needs; provide adequate capacity to accommodate projected demand; ensure efficient, effective, and environmentally sensitive operation; and maximize wastewater reuse where feasible • 6.2.1.b Focus the expansion of wastewater systems to accommodate planned growth consistent with the MIP Directed Growth Strategy • 6.2.2 Adequate levels of wastewater service with minimal environmental impacts • 6.2.2.a Meet or exceed all State and Federal standards regulating wastewater disposal or reuse • 6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system • 6.3.2 Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs
LEED	LT: Floodplain avoidance LT: Site Selection WE: Water Metering WE: Indoor Water Use WE: Outdoor Water Use SS: Construction Activity Pollution Prevention SS: Rainwater Management

Goal 5: Manage Materials and Resources Efficiently

The H-2 Residential Project will manage onsite construction materials and resources as efficiently as possible both during site construction, as well as through the build out process of future homes. Minimizing waste and materials helps lessen the burden on county landfills, as well as the number of trips required on county and state roads to and from the site.

Sustainability Strategies

- Mitigate any harmful effects to onsite and surrounding lands using proper waste disposal methods.
- Limit the amount of fill material imported and exported by designing a balanced import/export plan.
- Use onsite crushed aggregate for road base.
- Encourage home residents, operations staff, and community members to practice responsible waste disposal, recycling, and reuse methods throughout the development.
- When possible, utilize onsite kiawe harvesting for reuse as fence posts. Use kiawe for mulch and wood chips as a moisture barrier for landscaping.
- Compost green waste materials by hauling to offsite green waste sites.
- Enact precision quantity control of permanent materials, including concrete and ductile iron pipe.
- Utilize prefabricated form systems or molds to minimize excess materials.
- Reuse dust fence materials from previous projects and save materials, when applicable, for future use.
- Require homes to achieve LEED Silver, thereby promoting construction waste management and material efficient framing in the build out of the project.

Table 5: Goal 5 Sustainability Alignment

	Goal 5: Manage Materials and Resources Efficiently
UNSDG	UNSDGs: #12 Responsible Consumption and Protection.
Aloha+	Waste Reduction: Reduce the solid waste stream prior to disposal by 70% through source reduction, recycling, bioconversion, and landfill diversion methods.

	Goal 5: Manage Materials and Resources Efficiently
	Targets: • Total solid waste reduction • Total solid waste generation • Recycling • Reduce • Reuse
Maui Island Plan	Infrastructure & Public Utilities • 6.1.2 Divert at least 60 percent of solid waste from the island's landfills • 6.1.2.c Facilitate the reduction of solid waste generated by packaging, food service products, construction waste, etc.
LEED	MR: Durability Management MR: Environmentally Preferable Products MR: Construction Waste Management MR: Material-Efficient Framing

Goal 6: Create Positive Economic Impact

Generate positive economic returns and impacts for investors, construction workers, vendors, and community members.

Sustainability Strategies

- Hire locally when possible.
- Support local vendors, services, and opportunities for collaboration when possible.
- Create full-time and part-time construction jobs.
    - Based on the budgeted construction costs to develop all 53 lots, an estimated 194 full-time and part-time construction jobs would be created in the first two years.
    - As individual homes are built, additional construction jobs would be created. Based on the typical cost per home an estimated 705 construction jobs would be created.
    - After completion, ongoing maintenance and operations staff will be needed, which would create an additional 14 full-time and part-time jobs.
- Following project completion, establish ongoing operations and maintenance roles.
- Continue to support the Mākena Community Fund.
    - The Mākena Community Fund supports initiatives that benefit the greater Mākena area and local community. It provides grants and other funding mechanisms by funding one percent of resales. Funds can be allocated to support local community groups, education, culture, arts initiatives, and other community needs.

Table 6: Goal 6 Sustainability Alignment

	Goal 6: Create Positive Economic Impact
UNSDG	UNSDG #8: Decent Work and Economic Growth UNSDG #9: Industry, Innovation, and Infrastructure
Aloha+	Smart Sustainable Communities: Increase livability and resilience in the built environment through planning and implementation at the state and county levels. Targets: • Economic prosperity

	Goal 6: Create Positive Economic Impact
	Green Workforce & Education – Increase local green jobs and education to implement the Aloha+ Challenge sustainability goals Targets: • Economic diversity
Maui Island Plan	Economic Development: • 4.1.2.a Support industries that are sustainable, and culturally and environmentally sensitive • 4.1.2.b Encourage and support local business
LEED	LT: Community Resources (support local business) EA: HVAC Start-Up Credentialing (green workforce training local contractor) EA: Education of Homeowner, Tenant, or Building Manager MR: Environmentally Preferable Products (local products) IN: LEED Accredited Professional (local green jobs support)

SUSTAINABILITY PLAN SUMMARY

The H-2 Residential Project team is committed to the long-term sustainability of the site and Maui Island. The Sustainability Plan provides a roadmap for the team to adhere to and implement as the project moves forward. The Plan is grounded in stewardship and clear goals and strategies for the development and based on achieving Environmental, Social, Cultural, and Economic balance.

Environmental

The environmental elements of the Plan include clean energy, water conservation, water efficiency, and material and resource efficiency. They are all aligned with the UNSDGs, Aloha + Challenge, Maui Island Plan, and LEED for Homes. The Plan promotes proper stewardship of environmental resources to help create positive environmental impacts.

Social

The project is expected to provide positive social aspects. These include public parking access for the local beach and local jobs. The employment estimates from the project Economic and Fiscal Impact Report include the following findings:

- Based on the budgeted construction costs to develop the 53 lots, an estimated 194 full-time and part-time jobs will be generated within the first two years.
- As individual homes are built, an estimated 705 construction jobs will be created.
- As labor earnings from new construction jobs flow through the economy and increase employment in other sectors, an estimated 570 new jobs are projected.
- Following completion of the project and individual homes, ongoing operations and maintenance are estimated to generate approximately 14 new full-time and part-time jobs.

Cultural

Cultural Stewardship is a primary goal of the project and creating a sense of place that integrates the natural landscape is a top priority for the project team. The development will preserve six (6) archaeological sites and promote guidelines for homes that embrace the cultural foundations of the site.

Economic[2]

The economic impacts were identified in the project's Economic and Fiscal Impact Report. They include the following positive economic components for the community.

[2] 2018 Report: Economic and Fiscal Impacts for H2 Residential Project

Construction and Labor Income

- New construction is projected to generate labor earnings of approximately $106 million, with $61 million directed to the construction industry.
- Labor earnings from long-term operations and maintenance are projected to increase by approximately $940,000 annually after project completion. After considering indirect and induced income impacts, labor earnings are anticipated to reach approximately $2.6 million annually.

Indirect Impacts

- Direct construction expenditures are projected to generate sales in other industries estimated at $75 million.
- Direct and indirect expenditures are projected to induce further consumption expenditures estimated at $100 million.

Longer-Term Impacts

- Based on annual operating and maintenance costs, additional expenditures will flow through the economy and increase output in other industries at an estimated $3 million annually.

APPENDIX A: PROJECT LOCATION AND VICINITY MAP

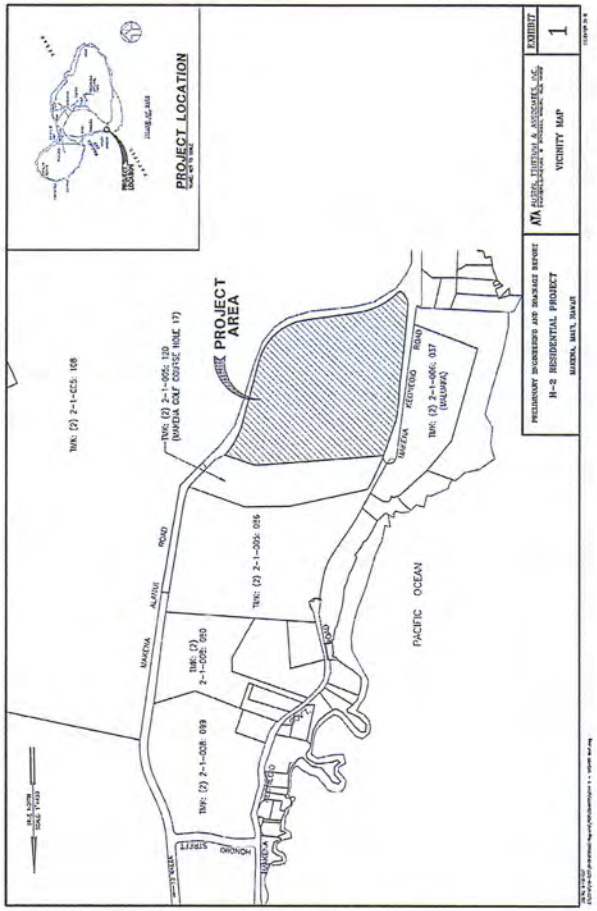

Figure 8: Vicinity Map
(Preliminary Engineering and Drainage Report, 2018)

APPENDIX B: FLOOD ZONE & SEA LEVEL RISE MAPS

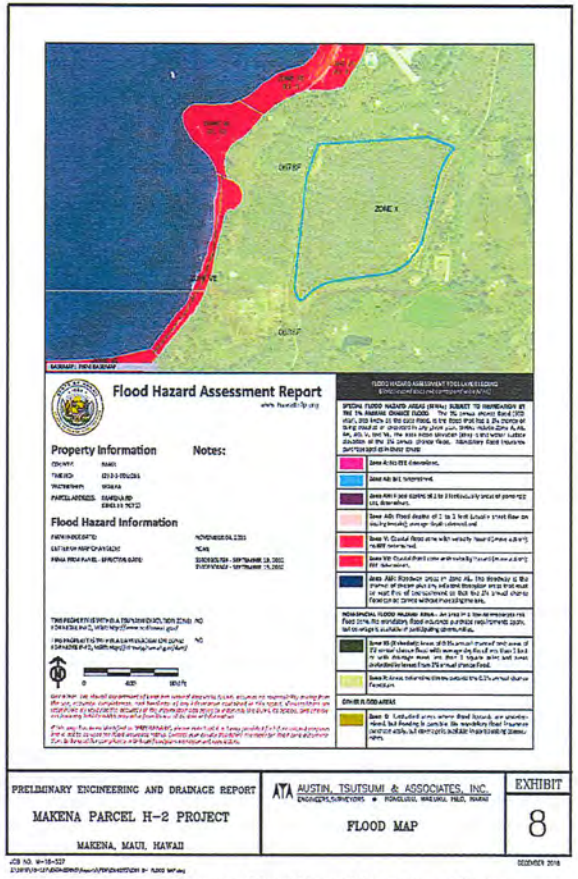

Figure 9: Flood Hazard Assessment Report
(Preliminary Engineering and Drainage Report, 2018)

APPENDIX B: CONTINUED...

Figure 10: Sea Level Rise Map (https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/)

APPENDIX C: DRAINAGE

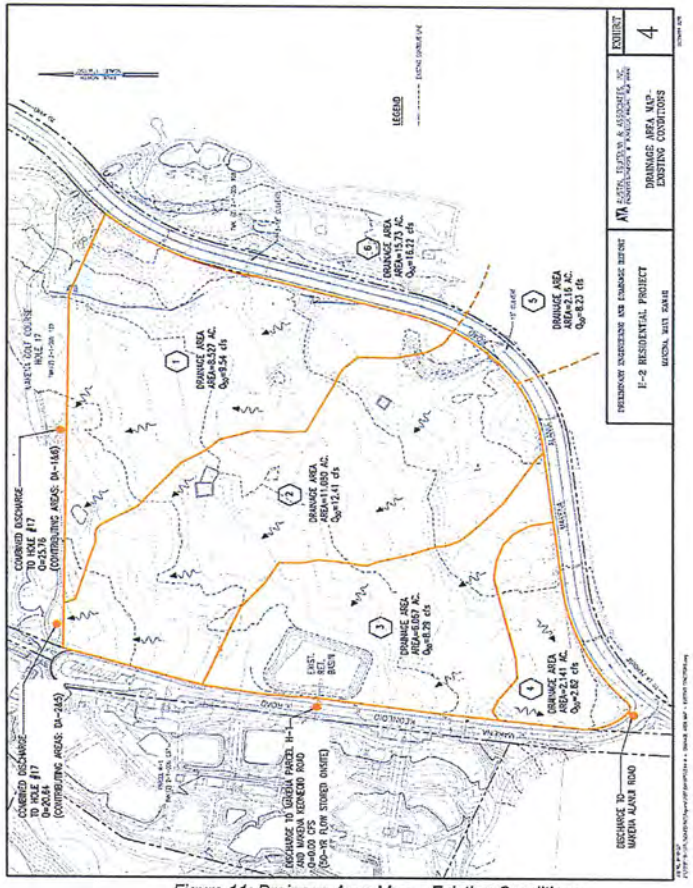

Figure 11: Drainage Area Map – Existing Conditions (Preliminary Engineering and Drainage Report, 2018)

APPENDIX D: LEED FOR HOME CREDITS

Y	?	N			
			Credit	Integrative Process	2
0	0	0		**Location and Transportation**	15
Y			Prereq	Floodplain Avoidance	Required
				PERFORMANCE PATH	
			Credit	LEED for Neighborhood Development Location	15
				PRESCRIPTIVE PATH	
			Credit	Site Selection	8
			Credit	Compact Development	3
			Credit	Community Resources	2
			Credit	Access to Transit	2
0	0	0		**Sustainable Sites**	7
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
			Credit	Heat Island Reduction	2
			Credit	Rainwater Management	3
			Credit	Non-Toxic Pest Control	2
0	0	0		**Water Efficiency**	12
Y			Prereq	Water Metering	Required
				PERFORMANCE PATH	
			Credit	Total Water Use	12
				PRESCRIPTIVE PATH	
			Credit	Indoor Water Use	6
			Credit	Outdoor Water Use	4
0	0	0		**Energy and Atmosphere**	38
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
				PERFORMANCE PATH	
			Credit	Annual Energy Use	29
				BOTH PATHS	
			Credit	Efficient Hot Water Distribution System	5
			Credit	Advanced Utility Tracking	2
			Credit	Active Solar Ready Design	1
			Credit	HVAC Start-Up Credentialing	1
				PRESCRIPTIVE PATH	
Y			Prereq	Home Size	Required
			Credit	Building Orientation for Passive Solar	3
			Credit	Air Infiltration	2
			Credit	Envelope Insulation	2
			Credit	Windows	3
			Credit	Space Heating & Cooling Equipment	4

APPENDIX D CONTINUED...

				EA PRESCRIPTIVE PATH (continued)	
			Credit	Heating & Cooling Distribution Systems	3
			Credit	Efficient Domestic Hot Water Equipment	3
			Credit	Lighting	2
			Credit	High Efficiency Appliances	2
			Credit	Renewable Energy	4
0	0	0		**Materials and Resources**	10
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
			Credit	Durability Management Verification	1
			Credit	Environmentally Preferable Products	4
			Credit	Construction Waste Management	3
			Credit	Material Efficient Framing	2
0	0	0		**Indoor Environmental Quality**	16
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air Filtering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
			Credit	Enhanced Ventilation	3
			Credit	Contaminant Control	2
			Credit	Balancing of Heating and Cooling Distribution Systems	3
			Credit	Enhanced Compartmentalization	1
			Credit	Enhanced Combustion Venting	2
			Credit	Enhanced Garage Pollutant Protection	2
			Credit	Low Emitting Products	3
0	0	0		**Innovation**	6
Y			Prereq	Preliminary Rating	Required
			Credit	Innovation	5
			Credit	LEED AP Homes	1
0	0	0		**Regional Priority**	4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
0	0	0		**TOTALS** Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

Prepared

by:

GREEN BUILDING HAWAI

SUSTAINABLE PACIFIC CONSULTING

PRELIMINARY ENGINEERING AND DRAINAGE REPORT

APPENDIX E

PRELIMINARY ENGINEERING AND DRAINAGE REPORT FOR THE PROPOSED H-2 RESIDENTIAL PROJECT

Makena, Maui, Hawai'i
TMK: (2) 2-1-005: 085 and 120 (Por.)

October 31, 2019

Prepared for:

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PRELIMINARY ENGINEERING AND DRAINAGE REPORT
FOR THE
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MAKENA, MAUI, HAWAII
TMK: (2) 2-1-005: 085 and 120 (Por.)

PREPARED FOR
H2R LLC.
2005 Main St.
Wailuku, HI 96793

BY
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

October 31, 2019

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PRELIMINARY ENGINEERING AND DRAINAGE REPORT FOR THE PROPOSED H-2 RESIDENTIAL PROJECT

I. INTRODUCTION

The purpose of this report is to provide an overview of the preliminary civil engineering design of the H-2 Residential Project. This report evaluates the existing onsite and offsite conditions and presents proposed onsite grading, drainage, water, wastewater, and roadway improvements.

II. PROPOSED PROJECT

A. LOCATION

The H-2 Residential Project is located in Makena, Maui, Hawaii within the Makena Resort area and has a Tax Map Key of (2) 2-1-005: 085 and 120 (por.). It is currently undeveloped and is bordered by Makena Alanui Road to the East and South, Makena Keoneoio Road to the West, and Makena South Golf Course hole number 17/Makena Golf and Beach Club (H-M) site to the North. The owner and developer for the project is H2R LLC. Refer to Exhibit 1 for Vicinity/Location Map.

B. PROJECT DESCRIPTION

The project site is approximately 28 acres and will involve construction of 53 single family condominium lots (units) ranging in size from approximately 7,450 to 23,280 square feet. The main access for the project will be provided from Makena Keoneoio Road with a secondary access coming off of Makena Alanui for fire access. From the main connection off of Makena Keoneoio Road, an interior loop road (privately owned and maintained) will provide access to each condominum lot as well as be a conduit path for the development's service utilities. An existing public beach 50-stall parking lot along the western boundary of the site will be relocated and reconstructed closer to the existing beach access.

III. EXISTING CONDITIONS

A. TOPOGRAPHY AND SOIL CONDITIONS

The project site consists mainly of overgrown brush, weeds, keawe trees, and widely spread outcrops of cactus and is currently undeveloped with the exception of the existing beach parking lot, an existing detention basin, construction staging areas for the Maluaka development.

The majority of the site slopes downward toward the north and west with a small portion sloping to the south. The topographic grade across the site ranges from 3 to 8 percent. Existing elevations onsite range from 42 to 100 feet mean sea level (msl).

The soil classification found on the project site is predominately classified as Makena loam, stony complex (MXC). MXC soil is typically found on 3 to 15 percent slopes, on the lower leeward slopes of Haleakala in the Makena and Kamaole region. This complex is a mixture of Makena loam and stony land. Type MXC soil is part of the Makena soil series and described as: well drained, having moderately rapid permeability, and slow to medium runoff with a slight erosion hazard. Soils classifications and descriptions are taken from the United States Department of Agriculture Soil Conservation Services publication entitled, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, dated 1972.

B. CLIMATE AND RAINFALL

The Makena area is generally warm and sunny throughout most of the year with average temperatures varying from a low of 63 degrees in the winter to a high of 88 degrees Fahrenheit in the summer. The Haleakala mountains occasionally block prevailing tradewinds coming from the northeast that occur mainly through the dry season months of April through September. Stronger winds are produced during the rainy season months of October through March. These stronger southerly winds are known as "Kona winds". Average annual rainfall amounts to approximately 14.6 inches, with most of the rainfall occurring in the winter months.

C. INFRASTRUCTURE

1. DRAINAGE

Existing storm water runoff generated onsite generally sheet flows in a north westerly direction to Makena Keoneoio or to the Makena South Golf Course hole number 17 where it percolates into the ground. Refer to Exhibit 4 for Existing Drainage Area Map.

Discharge to Makena Keoneoio Road and Maluaka: Onsite Drainage Area 3, 6.07 acres, drains toward Makena Keoneoio Road. Runoff first flows northwest off undeveloped brushy land and then flows into an existing onsite detention basin where it is designed to manage flows going to the Maluaka project and has capacity to completely store the 50-year, 1-hour storm runoff of the existing pre-development conditions of the H-2 Residential parcel. In the event of a storm larger than the design storm, the basin overflow structure will convey runoff to an existing 24-inch storm drain that crosses Makena Keoneoio Road and then traverses through the Maluaka development. The storm drain system then outlets to a second detention basin within the Maluaka development before outletting to the lower golf course area.

Pre-development runoff from Drainage Area 3 for the 50-year, 1-hour storm runoff is 8.29 cubic feet per second (cfs), however, none of this runoff leaves the site since it is completely retained within the existing onsite detention basin.

Discharge to Makena Golf Course to the north (Hole number 17 of the South Course): The following drainage areas contribute to runoff at this discharge point: onsite Drainage Areas 1 and 2 and offsite Drainage Areas 5 and 6. Drainage starts above Makena Alanui Road from a mix of golf course and undeveloped land within the Makena Golf Course property. Offsite drainage Area 5 flows northwest under Makena Alanui Road through an existing 18-inch culvert that discharges to the site. Offsite drainage Area 6 flows west under Makena Alanui Road through a triple 18-inch culvert system. Runoff from these offsite areas then flow overland through onsite Drainage Areas 1 and 2 in a northwesterly direction for approximately 1,000 feet before leaving the site at golf hole no. 17. The total existing conditions runoff from these areas for the 50-year 1-hour storm rainfall is 46.21 cfs.

Discharge to Makena Alanui Road: Runoff to this discharge point comes from Drainage Area 4 in the southern corner of the site and flows overland in a west and southwesterly direction to its discharge point at the Makena Keoneoio Road and Makena Alanui Road intersection. The total existing conditions runoff from this area is 2.62 cfs for the 50-year 1-hour storm rainfall.

The total pre-development flow, including offsite and onsite areas is calculated to be 61.80 cfs (50-year, 1-hour storm)

2. WATER

The project site currently has an existing 3-inch water meter which connects to the County of Maui Department of Water Supply (DWS) 12-inch water line off of Makena Keoneoio Road. This water line runs through the entire stretch of Makena Keoneoio Road and terminates at the end of the 9-stall beach parking area. There is one (1) existing fire hydrant along Makena Alanui and seven (7) along Makena Keoneoio Road for fire protection.

An existing non-potable irrigation water line which services the Makena Golf North Course starts above the golf course to the east and makes its way through Makena Alanui and the project site where it continues on to distribute water to golf course holes to the south and west of the Maluaka development. The irrigation water comes from nine existing wells situated mauka of the existing golf course.

The existing Makena potable water system is supplied by a 1.5 million gallon (MG) tank in Makena at elevation 265 feet msl, which is owned and operated by DWS. It has an overflow elevation of 285 feet msl and services users below elevation 140 feet msl. The tank has a 12-inch inlet line from DWS' Central Maui Water Source and an 18-inch outlet line to distribute water to the Makena area. The 18-inch line changes to a 16-inch distribution water line which is within Makena Alanui fronting the project site where it distributes potable water to other parts of Makena.

3. WASTEWATER

The site currently generates no wastewater flow and there are no existing wastewater collection systems within Makena Alanui Road or Makena Keoneoio

Road, however, an existing privately owned waste water pump station is located within the golf course just adjacent to the project site to the north.

The wastewater in Makena is treated at the privately owned Makena Waste Water Reclamation Facility (WWRF) which was designed for an average flow of 0.72 million gallons per day (mgd) and a peak flow of 2.78 mgd. Based on most recent information provided by the operators of the WWRF, the current existing average wastewater inflow to the WWRF is estimated to be very minimal and produces no effluent since the closure of the Maui Prince Hotel and most of the waste water is evaporated through the treatment process. Contributors to this area include the golf maintenance facility, Makena North Golf Course, neighboring residences, office, church and park. The WWRF is designed to treat waste water to "R-1" water quality.

4. ROADWAY

Makena Alanui is an asphalt concrete paved two-lane public road with a right-of-way width of 60 feet. Along the subject property's frontage, Makena Alanui has no existing curbs, gutters or sidewalks but contains two (2) culvert crossings and overhead electric and telephone lines.

The portion of Makena Keoneoio Road fronting the site is a 28-foot wide a.c. paved two-lane public road and runs within a variable 47 to 57-feet wide right-of-way. It has no curbs, gutters or sidewalks along the subject property's frontage except for portions at the end of the roadway near the cul-de-sac where existing curb and sidewalks are installed. The makai side of the road has been improved with landscaping and a sidewalk which was constructed as part of the Maluaka development.

5. ELECTRICAL

Existing power poles run along Makena Alanui which provide service to neighboring properties to the south. There are also existing electrical utilities within Makena Keoneoio Road which service the Maluaka development as well as the beach comfort station and neighboring pump station.

D. FLOOD ZONE

The proposed project site has a flood zone classification of Zone X. Zone X is characterized as an area of minimal flooding, specifically areas determined to be outside the 0.2 percent annual chance floodplain. Flood zone classification is based on the Flood Insurance Rate Map (FIRM) number 150003 0678E, effective September 19, 2012, as prepared by the Federal Emergency Management Agency. (See Exhibit 7 for the Flood Zone Map.)

E. SEA LEVEL RISE

The proposed project site falls outside of the sea level rise exposure area based on a 3.2 ft sea level rise scenario as determined by the Pacific Islands Ocean Observing System. See Exhibit 10 for the sea level rise exposure area relative to the project site.

IV. PROPOSED IMPROVEMENTS

A. GRADING PLAN

The project will involve excavation and embankment as required to install the roadways, detention basins and relatively flat, buildable areas for the proposed condominium lots. Overall, the site will be graded to maintain the existing drainage patterns with runoff collecting in detention basins and drainage systems throughout the site. Efforts were made to maintain a balance between excavation and embankment (cut and fill) quantities to reduce the import and/or export of earthwork materials.

B. DRAINAGE PLAN

The onsite proposed drainage system improvements will include grated inlets, manholes, drain lines, select Low Impact Development (LID) features such as vegetative swales, and detention basins where runoff will be collected by drain inlets or sheet flowed into vegetative swales located throughout the site and along the roadways. Instead of curb and gutters, there will be grassed/landscaped swales on each side of the internal roadway which will channel surface runoff from the road and units into the drainage system. The runoff will then be conveyed via underground piping through a series of connected detention basins where the water will be retained and percolate through the ground or allowed to evaporate. The proposed storm drain system will be designed to manage the 50-year, 1-hour storm runoff from onsite and offsite drainage

areas. The post-development onsite and offsite runoff is calculated to be approximately 102.21 cfs which will be fully retained onsite. Although County of Maui drainage standards require only the increase in runoff to be retained, the drainage system for the project will be designed to retain the full post development runoff of the project, exceeding County of Maui drainage standards requirements.

Table 1 – Drainage Area Summary

	Pre-Development Flow Q50 (Existing Conditions)	Post-Development Flow Q50
Offsite Areas (cfs)	28.93	31.15
Onsite Areas (cfs)	32.87	71.06
TOTAL (cfs)	61.80	102.21
Runoff Retained (cfs)	8.29	102.21
% Retained	13.4%	100.0%
Runoff Released Offsite (cfs)	53.51	0.00

(See appendix A for preliminary proposed drainage calculations and Exhibit 5 for proposed drainage information.)

C. EROSION CONTROL PLAN

Temporary erosion control measures will be incorporated during construction to minimize soil loss and erosion hazards. Best Management Practices may include temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, inlet protection, slope protection, stabilized construction entrances and truck wash-down areas. Periodic water spraying of loose soils will be implemented to minimize air-borne dirt particles from reaching adjacent properties. An application for a National Pollution Discharge Elimination System (NPDES) permit for construction will be submitted to the State Department of Health for review and approval prior to start of construction.

Permanent sediment control measures will be used once construction is completed. These practices are described in the "Stormwater Quality" section.

D. STORM WATER QUALITY

In addition to reducing peak flow rates, the proposed stormwater management system will provide water quality treatment and reduce the discharge of pollutants to meet County of Maui storm water quality standards. The focus is on treating the more common storms rather than just the infrequent peak events, since they contain most of the runoff pollutants. The project will incorporate natural best management practices to control stormwater quality which may include the following:

Grass Swales and Landscape Areas

The surface storm water runoff from roads and developed areas will be directed to grass and landscaped areas where possible to convey and provide vegetative filtration and allow percolation into the underlying soil.

Detention/Infiltration Basins

Storm water will enter the open basins by either overland flow or through the underground storm drain system. The basins are primarily used to reduce peak flow, but will also provide significant pollutant removal through settling of suspended solids. An area of "dead" storage will be provided at the bottom of the basin to promote sedimentation, infiltration and groundwater recharge. LEED design guidelines classify percolation as 100 percent effective in the removal of pollutants. A buried low-flow perforated pipe surrounded by filter fabric and a gravel jacket will provide a slow controlled release of stormwater for water above the dead storage level, and an overflow orifice will handle peak flow rates in excess of the design storm discharge.

An appropriate maintenance plan will be developed during the design phase of the project which will require debris and sediments accumulated within the stormwater filtration and detention systems to be removed during regular scheduled maintenance and disposed at a County approved disposal site.

E. POTABLE WATER SYSTEM PLAN

There are currently no existing water utilities on the site with the exception of an existing DWS 3-inch water meter and backflow preventer. Onsite water system improvements will include a domestic water system and fire system where it will follow the main interior road and will be looped. The existing 3-inch water meter is anticipated

to be upgraded to a 4-inch water meter to account for potential fixture units for the individual residences. An onsite double check detector assembly will be installed for fire protection along with fire hydrants spaced at specific intervals throughout the site per County standards. Refer to Exhibit 6 for Preliminary Water System Improvements.

The total domestic water demand for the project is estimated to be approximately 47,700 gallons per day (gpd). Refer to Appendix B for Preliminary Water Demand Calculations. The required fire flow within the project site based on land use is 1,000 gallons per minute (gpm) for duration of 2 hours and fire hydrants are required to be installed at a maximum of 350-foot intervals.

F. IRRIGATION SYSTEM PLAN

Most of the landscaped areas within the project will use non-potable irrigation water, coming from the Makena Golf course system. All common areas requiring irrigation will use non-potable water for irrigation, however, it is anticipated that a limited amount of areas within the private condominium lots may use potable water for irrigation to expand plant selection for individual homeowners.

The point of connection for the project's non-potable irrigation system will connect to an existing 4" irrigation water main which passes through the property's southernmost corner where it continues on to service Makena South Course holes 15 and 16. The non-potable irrigation water demand is estimated to be 66,400 gpd.

G. ELECTRICAL SYSTEM PLAN

The project will be serviced underground with primary electrical ties along Makena Keoneoio Road. A new utility switchgear will be required within the project. In addition to power, telephone, cable and DSL services will be provided. Existing overhead lines are currently located at the north western end of the property and along the eastern property line along Makena Alanui. The majority of the off-site overhead utility lines and associated poles along Makena Alanui are to be relocated across Makena Alanui with the exception of the existing riser poles servicing the Makena Golf and Beach Club (H-M) site and the Maluaka development which will remain.

The Developer will be responsible for the installation of all underground infrastructure including conduit, handhole, and equipment pads to MECO standards and requirements. MECO will be pulling cables and making terminations.

H. WASTEWATER SYSTEM PLAN

An onsite wastewater collection system will be installed to provide wastewater collection service to all condominium lots. The proposed gravity wastewater lines will be connected to the existing wastewater pump station "MP" (WWPS) located north of the project at the southeast corner of the Makena Golf and Beach Club (H-M) via an existing easement. The existing WWPS will convey the wastewater flows via an existing force main to a second existing pump station "MU" located to the northeast of the project site. The wastewater will be processed at the privately owned Makena Wastewater Treatment Plant. Refer to Exhibit 7 for Preliminary Wastewater Collection System Plan. Preliminary wastewater contributions are calculated at approximately 18,550 gpd (average daily demand). As mentioned previously, the existing WWTP has a capacity of 0.72 million gallons per day which has more than adequate capacity to treat the waste water flows generated from the project site. Any treated effluent generated from the WWTP due to contributions from the project will outlet into an existing storage pit on the WWTP facility where it can be used for irrigation. Refer to Appendix C for Preliminary Wastewater Contributions.

I. PROPOSED ROADWAYS

The proposed project will have one main entrance from Makena Keoneoio Road and will have a new 20-foot wide asphalt paved road with 6-foot wide grassed shoulders within the development to service all condominium lots. The new road will remain privately owned and maintained. Vegetative swales will be constructed adjacent to this road to collect storm water runoff throughout the development. An 8-foot wide multi-modal pathway will also be provided which will run parallel to the main internal road. Improvements that will be required along Makena Alanui may include new curbs, gutters, bike lane, fire hydrants, catch basins, and a sidewalk along the limits of the property's frontage to suffice County and project requirements. An access through condominium lot 11 of the proposed development will be provided from Makena Alanui for fire truck access. For Makena Keoneoio road, a new curb, gutter, sidewalk, and modifications to

existing drainage structures and fire hydrants will be provided along the property's frontage to fulfill County and project requirements. A shared bike path is proposed for Makena Keoneoio Road.

V. CONCLUSION

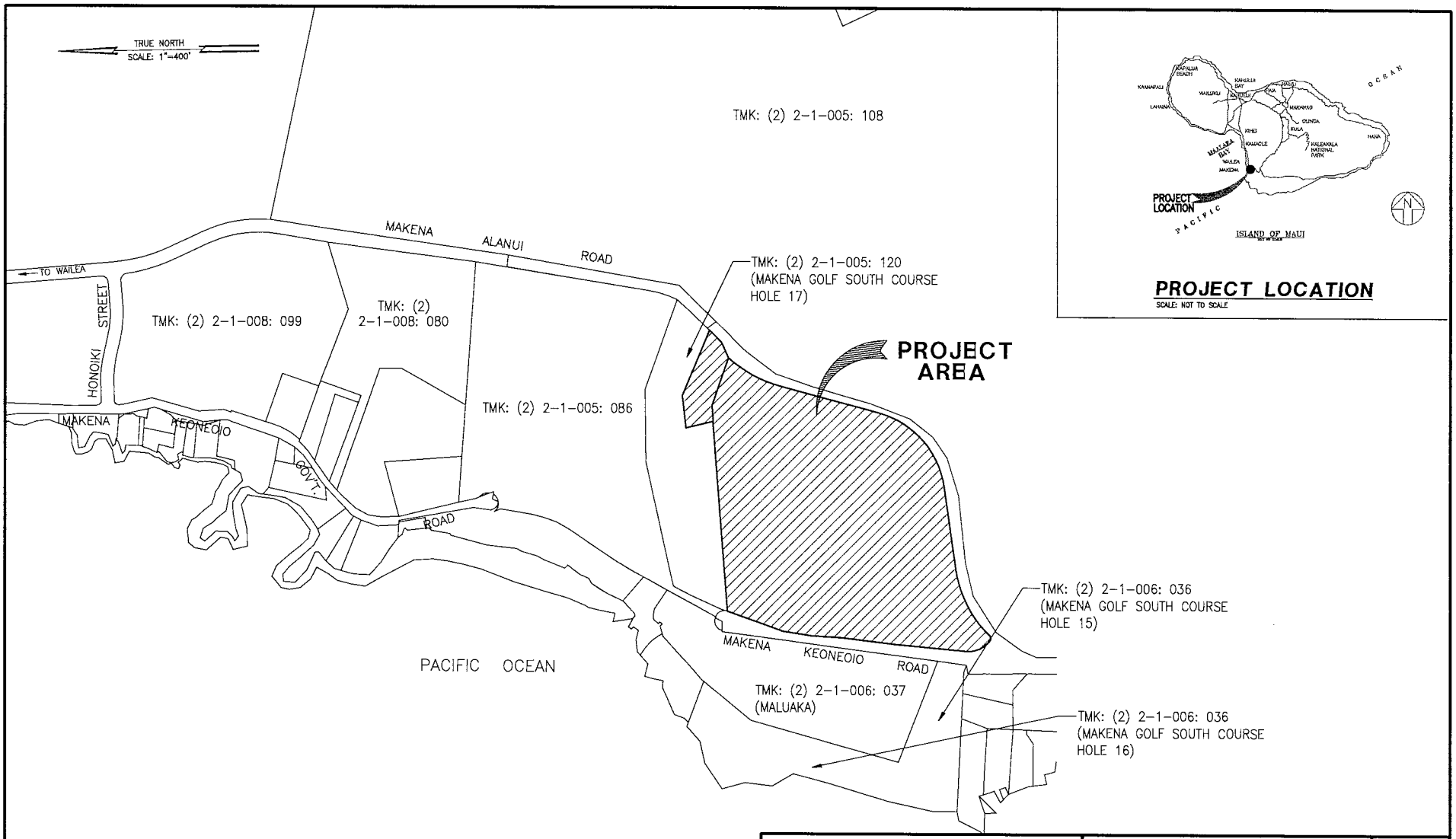
The proposed grading and drainage design for this project will impose no adverse effects from storm runoff to adjacent and downstream areas. Soil loss will be minimized during the construction period by implementing appropriate erosion control measures. The proposed stormwater management system will provide water quality treatment and reduce the discharge of pollutants to meet County of Maui, storm water quality standards.

The proposed improvements for this project will be designed in accordance with the applicable rules and regulations of the County of Maui. Based on the preceding information, the project is expected to have no adverse effects on existing facilities or the surrounding environment.

REFERENCES:

1. Department of Public Works & Waste Management, County of Maui, Chap.4, *Rules for the Design of Storm Drainage Facilities in the County of Maui*, November 1995.
2. Department of Public Works & Waste Management, County of Maui. (November 9, 2012). *Rules for the Design of Storm Water Treatment Best Management Practices*, Title MC-15, Subtitle 01, Chapter 111.
3. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed 03/24/2014.
4. USDA, Soil Conservation Service in Cooperation with the University of Hawaii Agricultural Experiment Station. (August 1972). *Soil Survey of Island of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.*
5. Federal Emergency Management Agency. (September 19, 2012). *Flood and Insurance Rate Map, Maui County, Hawaii.* Map Number 1500030351F.
6. County of Maui, Wastewater Reclamation Division, Wastewater Flow Standards, February 2, 2006.
7. Water System Standards, State of Hawaii, 2002.
8. Design Standards, Division of Wastewater Management, Vol. 1, February 1984.

EXHIBITS



PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

VICINITY MAP

EXHIBIT 1

JOB NO. M-18-527
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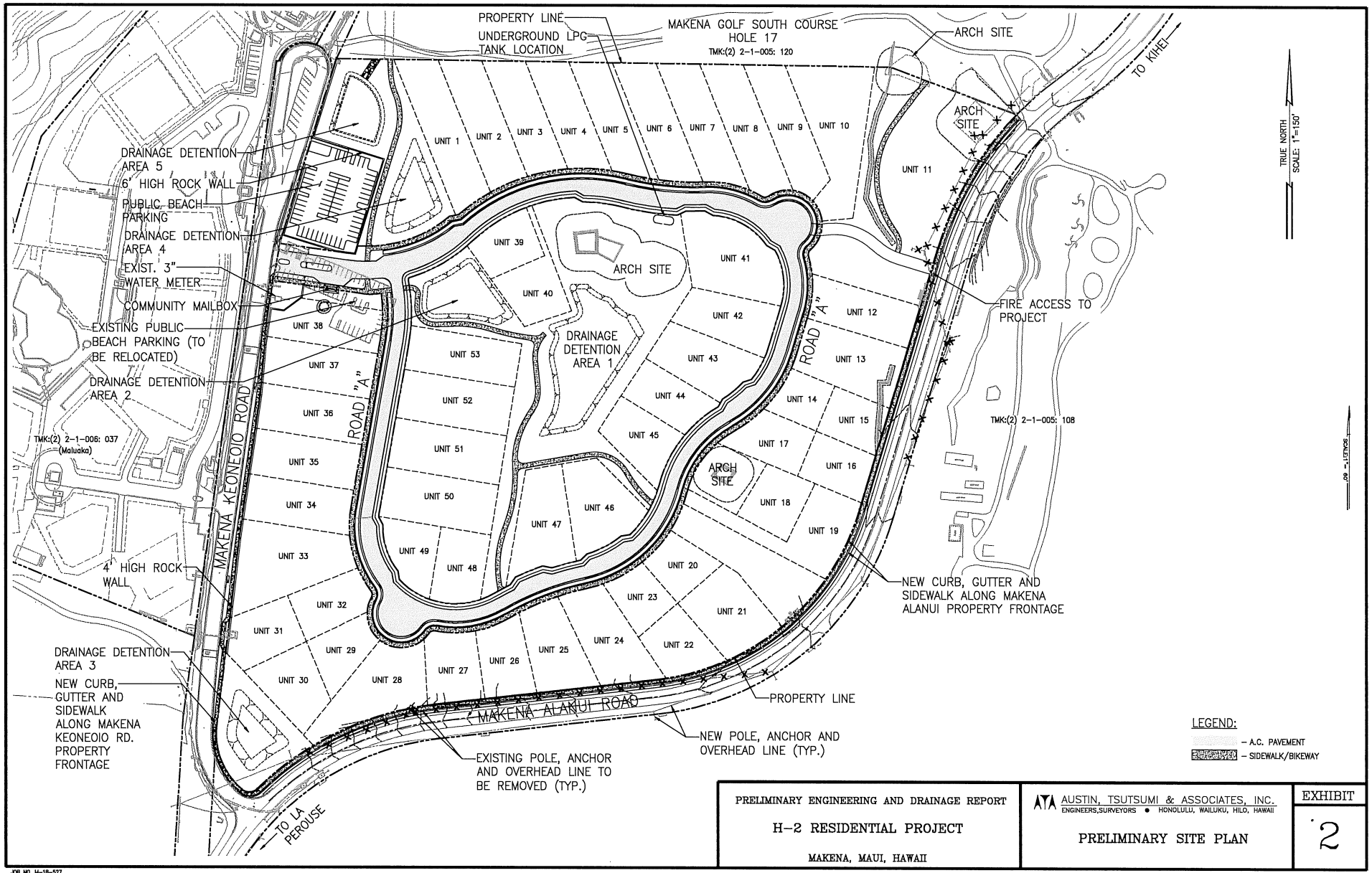

PRELIMINARY ENGINEERING AND DRAINAGE REPORT H-2 RESIDENTIAL PROJECT MAKENA, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII PRELIMINARY SITE PLAN	EXHIBIT 2

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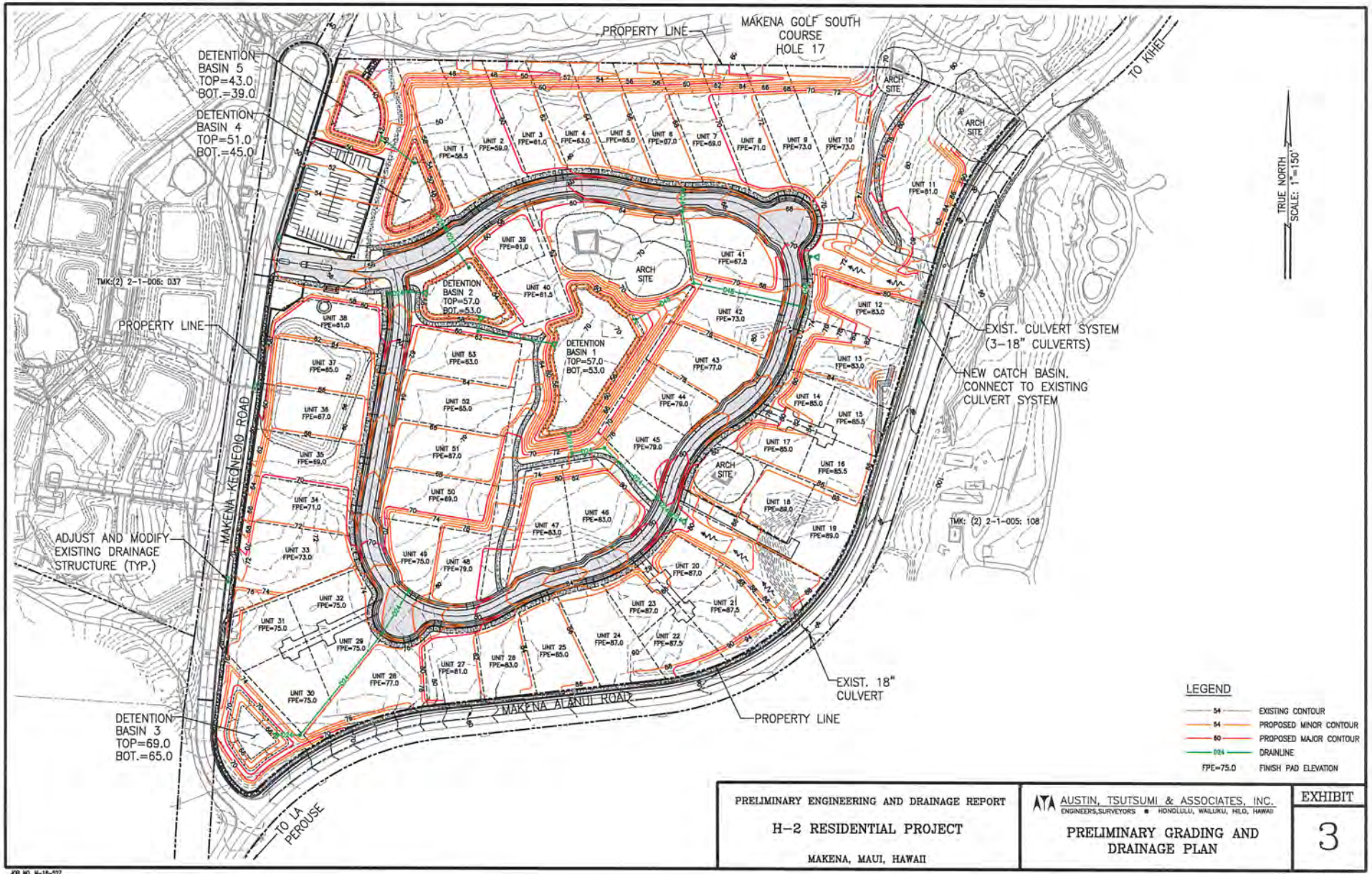

PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY GRADING AND DRAINAGE PLAN

EXHIBIT 3

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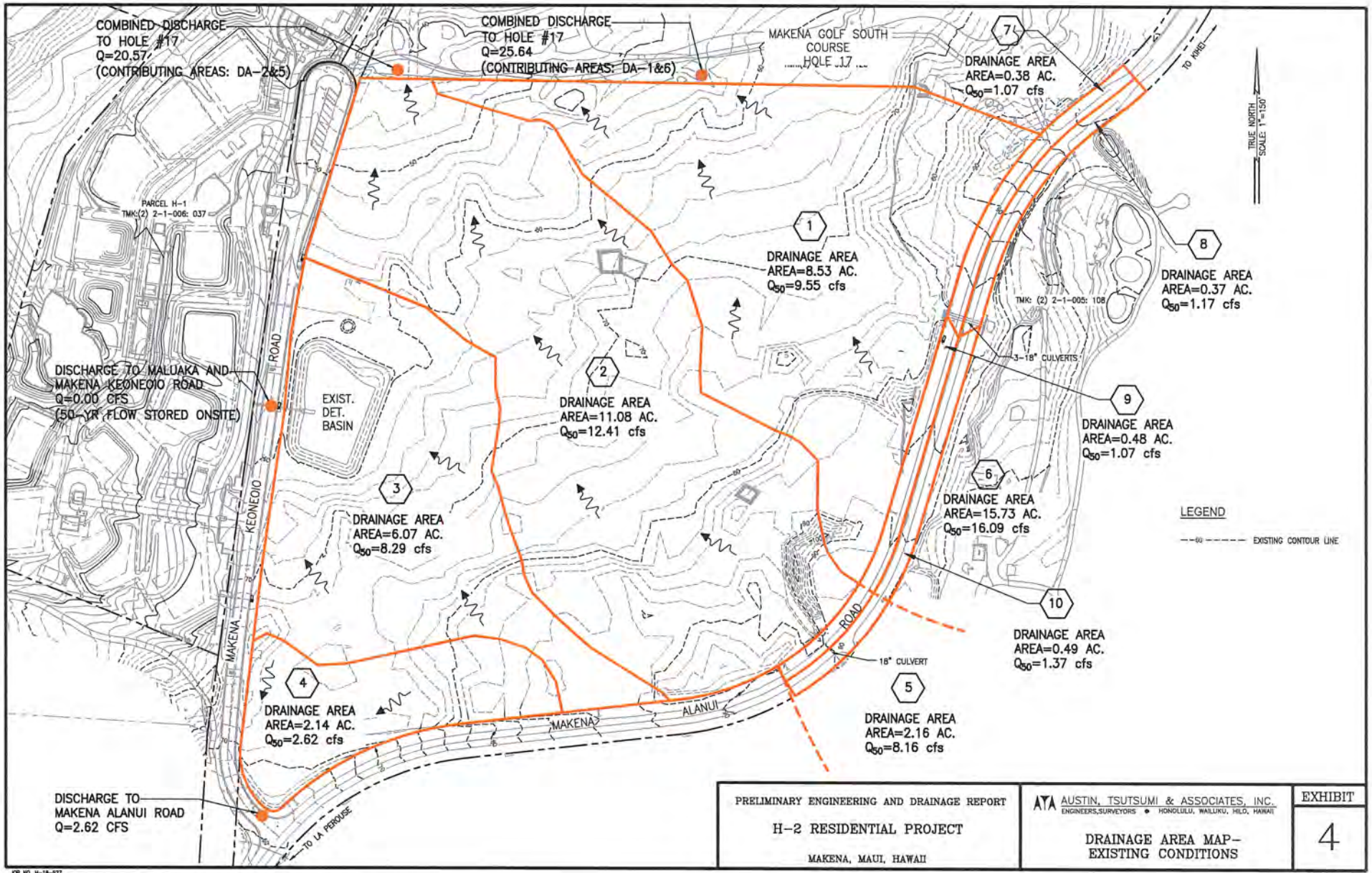

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H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

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ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

DRAINAGE AREA MAP-
EXISTING CONDITIONS

EXHIBIT 4

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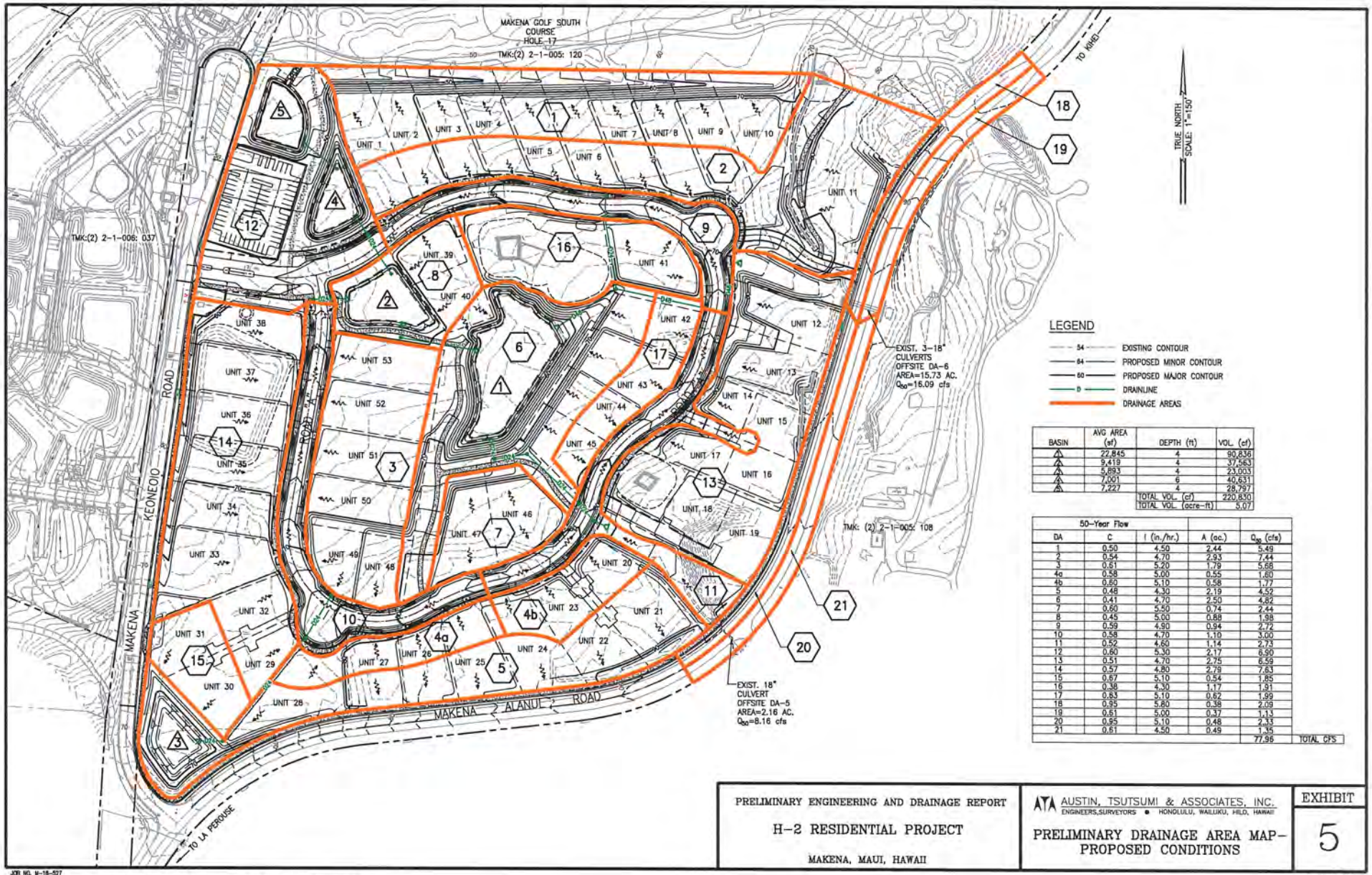

BASIN	AVG AREA (sf)	DEPTH (ft)	VOL. (cf)
1	22,845	4	90,836
2	9,419	4	37,563
3	5,893	4	23,003
4	7,001	6	40,631
5	7,227	4	28,797
		TOTAL VOL. (cf)	220,830
		TOTAL VOL. (acre-ft)	5.07

50-Year Flow					
DA	C	I (in./hr.)	A (ac.)	Q_{50} (cfs)	
1	0.50	4.50	2.44	5.49	
2	0.54	4.70	2.93	7.44	
3	0.51	5.20	1.79	5.68	
4a	0.58	5.00	0.55	1.60	
4b	0.60	5.10	0.58	1.77	
5	0.48	4.30	2.19	4.52	
6	0.41	4.70	2.50	4.82	
7	0.60	5.50	0.74	2.44	
8	0.45	5.00	0.88	1.98	
9	0.59	4.90	0.94	2.72	
10	0.58	4.70	1.10	3.00	
11	0.52	4.60	1.14	2.73	
12	0.60	5.30	2.17	6.90	
13	0.51	4.70	2.75	6.59	
14	0.57	4.80	2.79	7.63	
15	0.67	5.10	0.54	1.85	
16	0.38	4.30	1.17	1.91	
17	0.83	5.10	0.62	1.99	
18	0.95	5.80	0.38	2.09	
19	0.61	5.00	0.37	1.13	
20	0.95	5.10	0.48	2.33	
21	0.61	4.50	0.49	1.35	
				77.96	TOTAL CFS

PRELIMINARY ENGINEERING AND DRAINAGE REPORT

H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

PRELIMINARY DRAINAGE AREA MAP-PROPOSED CONDITIONS

EXHIBIT 5

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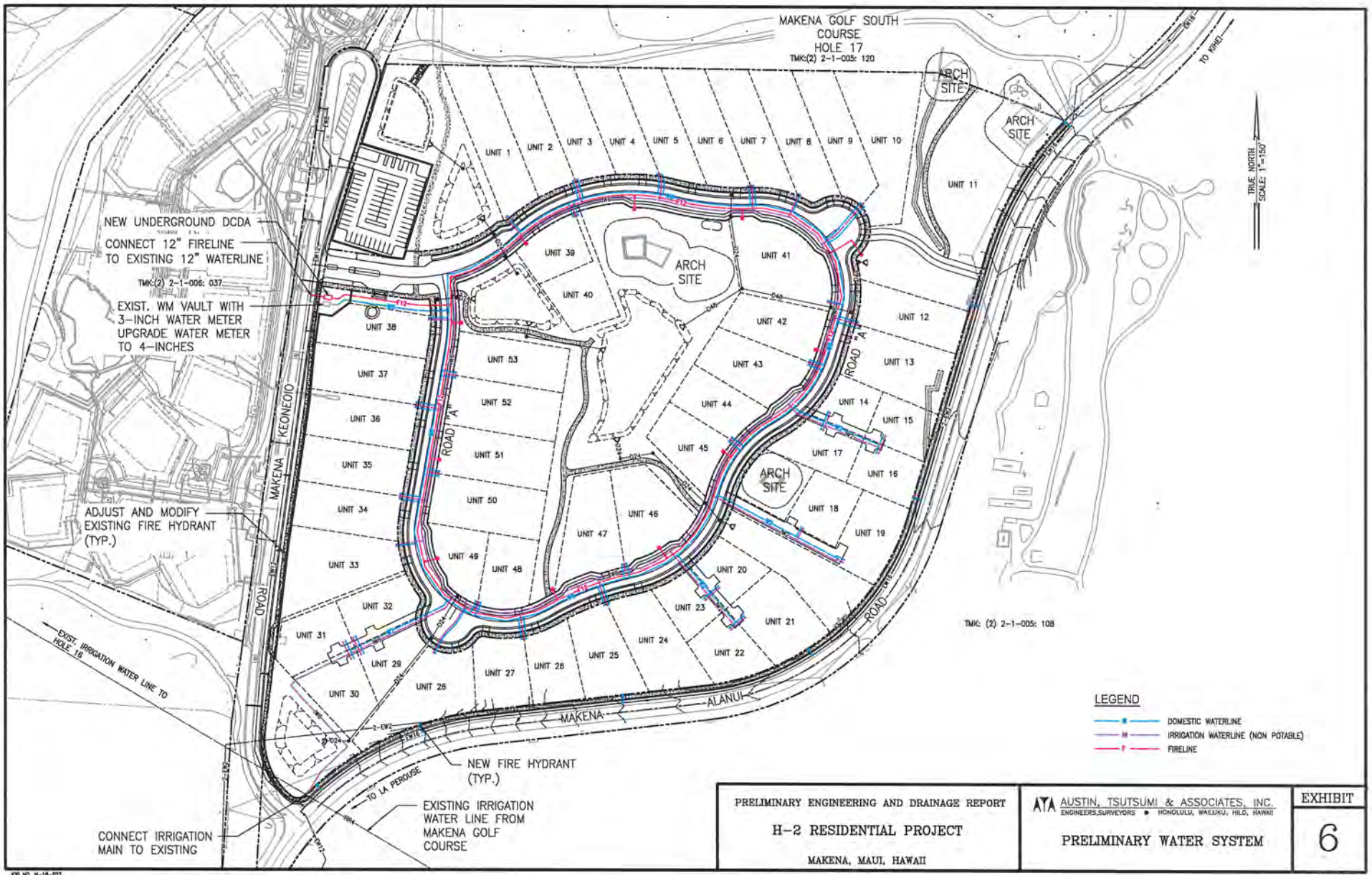

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H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

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PRELIMINARY WATER SYSTEM

EXHIBIT 6

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PRELIMINARY ENGINEERING AND DRAINAGE REPORT

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PRELIMINARY SEWER SYSTEM

EXHIBIT 7

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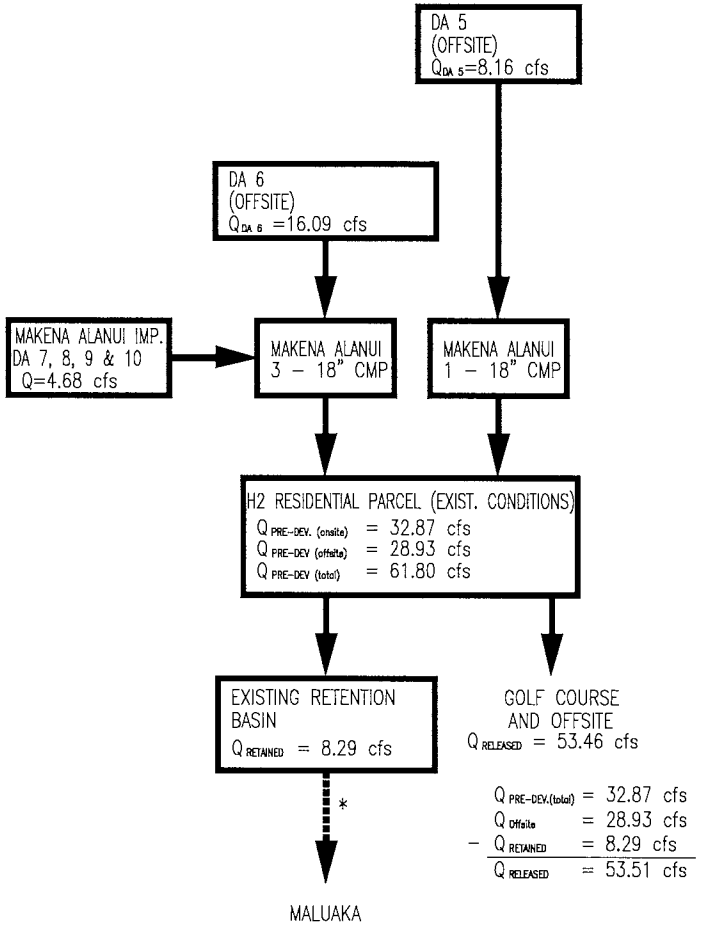
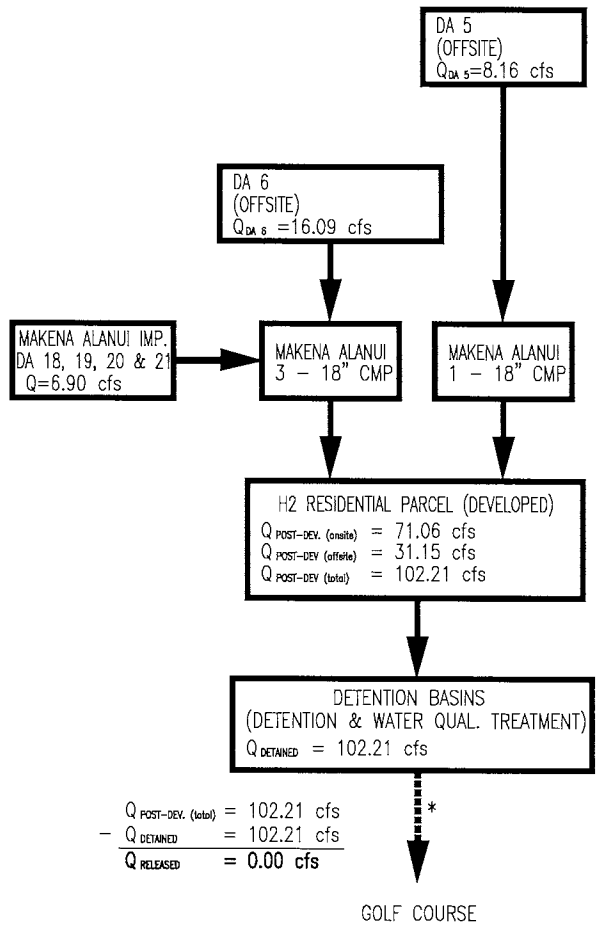
PRE-DEVELOPMENT FLOWS
50 YR-1 HR



$Q_{PRE-DEV.(total)}$ = 32.87 cfs
$Q_{Offsite}$ = 28.93 cfs
– $Q_{RETAINED}$ = 8.29 cfs
$Q_{RELEASED}$ = 53.51 cfs

POST-DEVELOPMENT FLOWS
50 YR-1 HR



$Q_{POST-DEV.\ (total)}$ = 102.21 cfs
– $Q_{DETAINED}$ = 102.21 cfs
$Q_{RELEASED}$ = **0.00 cfs**

*OVERFLOW OCCURS WHEN STORM EXCEEDS 50-YR, 1-HR STORM.

PRELIMINARY ENGINEERING AND DRAINAGE REPORT H-2 RESIDENTIAL PROJECT MAKENA, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII PRELIMINARY DRAINAGE FLOW CHART	EXHIBIT 8

JOB NO. W-18-527
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DECEMBER 2018

Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY: MAUI

TMK NO: (2) 2-1-005:085

WATERSHED: WAILEA

PARCEL ADDRESS: MAKENA RD
KIHEI, HI 96753

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL - EFFECTIVE DATE:	1500030678F - SEPTEMBER 19, 2012 1500030686F - SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnr.org.hawaii.gov/ram/

0 400 800 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as "PRELIMINARY", please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- Zone A: No BFE determined.
- Zone AE: BFE determined.
- Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
- Zone AE: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- Zone X5 (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- Zone D: Undrafted areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

Source: State of Hawaii, Dept. of Land and Natural Resources, Flood Hazard Assessment Tool

PRELIMINARY ENGINEERING AND DRAINAGE REPORT MAKENA PARCEL H-2 PROJECT MAKENA, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII FLOOD MAP	EXHIBIT 9

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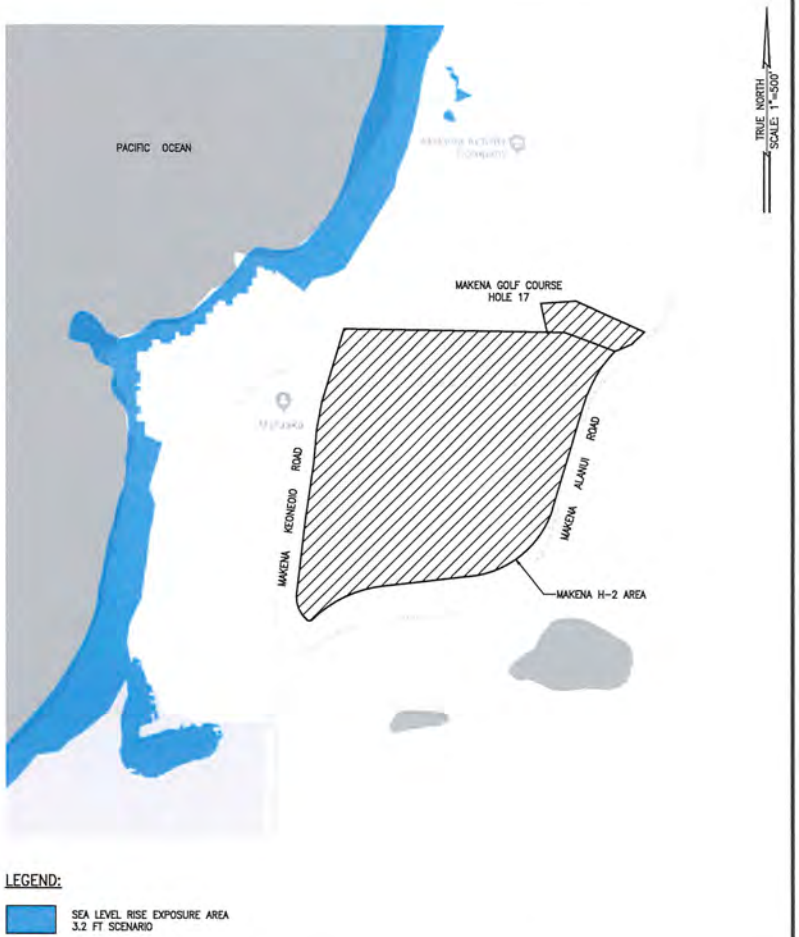

LEGEND:

SEA LEVEL RISE EXPOSURE AREA
3.2 FT SCENARIO

Source: Pacific Islands Ocean Observing System, Hawaii Sea Level Rise Viewer

PRELIMINARY ENGINEERING AND DRAINAGE REPORT MAKENA PARCEL H-2 PROJECT MAKENA, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII SEA LEVEL RISE MAP	EXHIBIT 10

JOB NO. M-18-527
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DECEMBER 2018

APPENDIX A

PROJECT: H-2 RESIDENTIAL
HYDROLOGY CALCULATIONS

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS • SURVEYORS • HONOLULU • WAILUKU • HILO

DRAINAGE STUDY
Project: H2 RESIDENTIAL
Hydrology Calculations
Summary of Procedures

References:

1. "Rules for the Design of Storm Drainage Facilities in the County of Maui", County of Maui, Department of Public Works and Waste Management.

Definitions:

1. Drainage Area, A:

   Areas delineated by relatively identical drainage patterns based on topographic information and a common point or system.

2. Recurrence Interval, Tm:

   The frequency of the occurrence of a particular design-storm. For example, a 100-year frequency storm has a 1% chance of occurring in any given year.

   The following criteria will be used in the analysis of the drainage systems:

   a. Drain Inlets on continuous grade: 10-year interval

   b. Drain Inlets in sump: 50-year interval

3. Intensity of 1-hour Rainfall value, I:

   The Rainfall Value is assumed constant over the watershed and uniformly distributed. The 10-year/1-hour rainfall value is 2.0 inches and the 50-year/1-hour rainfall value is 2.5 inches. (See Ref. 1, Plates 4 & 7).

Assumptions:

1. Minimum time of concentration, Tc, was assumed to be 5 minutes.
2. The rainfall frequency for the project area was assumed to be 2.0 inches for a 10 yr-1hr storm and 2.5 inches for a 50 yr-1hr storm.

Methodology:

Rational Method

A. Runoff Quantity, Q:

See Hydrology Calculations.

The equation for the Rational Method is:

Q = c i A where: Q = peak flow rate (cfs)

c = runoff coefficient

i = intensity of a 1-hour rainfall

A = drainage area (acres)

B. Runoff Coefficient, C:

The percentage of rain that appears as direct runoff.

1. Unimproved areas: Runoff coefficient = 0.30
2. Landscaped/Grassed areas: Runoff coefficient = 0.30
3. For streets, parking lots, and sidewalks: Runoff coefficient 0.95
4. A weighted average among runoff coefficients will be used for drainage areas containing a combination of streets, sidewalks, future dwellings, other hardscapes and grassy areas.

C. Time of Concentration, Tc (min.):

Time required for water to flow from the most remote point of a drainage area to the outlet point.

1. The Time of Concentration is determined from the nomograph (See Ref. 1, Plate 1). Data for the longest length of reach, ground character and ground slope are required to use this chart appropriately.

H-2 RESIDENTIAL
PRE-DEVELOPMENT
HYDROLOGY CALCULATIONS

Drainage Area	*Area, A, (sq ft.)	*Area, A, (acres)	Runoff Coeff, C	Rainfall Intensity, I (in/hr), 50-yr-1hr	Time of Conc, Tc, (min)	Initial Destination	Final Destination	Q50 (cfs)
1	371,436.12	8.53	0.35	3.2	34.0	-	Golf Course	9.55
2	482,644.80	11.08	0.35	3.2	35.0	-	Golf Course	12.41
3	264,278.52	6.07	0.35	3.9	22.0	Existing Ret.	Overflow to Makaka	8.29
4	93,261.96	2.14	0.35	3.5	30.0	-	Offsite	2.62
*5	94,069.60	2.16	0.59	6.4	5.0	Project Site	Golf Course	8.16
*6	685,198.80	15.73	0.31	3.3	35.0	Project Site	Golf Course	16.09
**7	16,613.90	0.38	0.55	5.1	10.0	Existing 3-18" Culverts	Golf Course	1.07
**8	16,125.07	0.37	0.61	5.2	9.5	Existing 3-18" Culverts	Golf Course	1.17
**9	20,777.28	0.48	0.52	4.3	18.5	Existing 3-18" Culverts	Golf Course	1.07
**10	21,427.38	0.49	0.62	4.5	16.0	Existing 3-18" Culverts	Golf Course	1.37
TOTAL	2,065,853.43	47.43					TOTAL:	61.80

* Drainage Areas 5 and 6 are Offsite drainage areas entering the project site from the east.
** Drainage Areas 7, 8, 9, 10 are existing offsite drainage areas entering the project site from Makena Alanui

1 HR RAINFALL = 2.50 50 YR 1-HR

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H-2 RESIDENTIAL
POST-DEVELOPMENT
HYDROLOGY CALCULATIONS

Drainage Area	*Area, A, (sq ft.)	*Area, A, (acres)	Runoff Coeff, C	Rainfall Intensity, I (in/hr), 50-yr-1hr	Time of Conc, Tc, (min)	Initial Destination	Final Destination	Q50 (cfs)
1	106,155.23	2.44	0.50	4.5	16.0	Swale	Basin 5	5.49
2	127,669.48	2.93	0.54	4.7	14.0	Rdwy Drainage Sys	Basin 2	7.44
3	77,902.40	1.79	0.61	5.2	9.5	Rdwy Drainage Sys	Basin 2	5.68
4A	24,046.73	0.55	0.58	5.0	11.0	Rdwy Drainage Sys	Basin 3	1.60
4B	25,104.84	0.58	0.60	5.1	10.0	Rdwy Drainage Sys	Basin 1	1.77
5	95,385.58	2.19	0.48	4.3	18.0	Swale	Basin 3	4.52
6	108,681.69	2.50	0.41	4.7	14.0	-	Basin 1	4.82
7	32,230.87	0.74	0.60	5.5	8.0	Rdwy Drainage Sys	Basin 1	2.44
8	38,192.35	0.88	0.45	5.0	11.0	-	Basin 2	1.98
9	40,960.57	0.94	0.59	4.9	12.0	Rdwy Drainage Sys	Basin 4	2.72
10	48,082.31	1.10	0.58	4.7	14.0	Rdwy Drainage Sys	Basin 1	3.00
11	49,822.00	1.14	0.52	4.6	15.0	Culvert	Basin 1	2.73
12	94,645.79	2.17	0.59	5.3	8.0	-	Basin 4 and 2	6.80
13	119,922.30	2.75	0.51	4.7	14.0	Rdwy Drainage Sys	Basin 1	6.59
14	121,502.51	2.79	0.57	4.6	13.0	Rdwy Drainage Sys	Basin 2	7.63
15	23,342.26	0.54	0.67	5.1	10.0	-	Basin 2	1.85
16	51,168.58	1.18	0.38	4.3	18.0	Rdwy Drainage Sys	Basin 2	1.91
17	27,150.95	0.62	0.63	5.1	10.0	Rdwy Drainage Sys	Basin 1	1.99
**18	16,613.90	0.38	0.95	5.8	7.0	MA Culvert	Basin 1	2.09
**19	16,125.07	0.37	0.61	5	11.0	MA Culvert	Basin 1	1.13
**20	20,777.28	0.48	0.95	5.1	10.0	MA Culvert	Basin 1	2.33
**21	21,427.38	0.49	0.61	4.5	16.0	MA Culvert	Basin 1	1.35
*DA-5	94,089.60	2.16	0.59	6.4	5.0	Project Site	Basin 1	8.16
*DA-6	685,198.80	15.73	0.31	3.3	35.0	Project Site	Basin 1	16.09
TOTAL	2,086,188.47	47.44					TOTAL RUNOFF:	102.21
							TOTAL RETENTION:	102.21
							TOTAL OFFSITE DISCHARGE:	0.00

* Drainage Areas DA-5 and DA-6 are Offsite drainage areas entering the project site from the east.

** Drainage Areas 18, 19, 20, 21 are offsite drainage areas entering the project site from Makena Alanui

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APPENDIX B

PROJECT: H-2 RESIDENTIAL
PRELIMINARY WATER DEMAND CALCULATIONS

PRELIMINARY WATER DEMAND CALCULATIONS

Project Site Description

Total Project Area	=	Approximately 28 acres
Area of landscape to be irrigated	=	Approximately 15 acres
Single Family Units	=	53

Average Daily Demand (Domestic Water Consumption)

53 units x *900 gallons/day/unit = 47,700 gallons per day

Irrigation Demand

Most of the landscape within the project will be irrigated by a non-potable water source. The irrigation demand from this water source is estimated to be approximately **66,400 gallons/day.

Total Water Demand

47,700 gpd (potable) + 66,400 gpd (non-potable) = 114,100 gallons per day

*Assumes a domestic water demand higher than the County of Maui, Department of Water Supply standard of 600 gallons per unit per day due to historically higher water demands in the Makena area.
**Irrigation demand provided by Miyabara Associates.

APPENDIX C

PROJECT: H-2 RESIDENTIAL PRELIMINARY WASTE WATER CONTRIBUTION CALCULATIONS

PRELIMINARY WASTE WATER CONTRIBUTION CALCULATIONS

Project Site Description

Single Family Units = 53

Average Waste Water Flow

(County of Maui, Wastewater Reclamation Division Flow Standards, 2006)

Residence, 350 gallons per unit per day

53 units x 350 gallons/day/unit = **18,550 gallons per day**

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MARINE WATER CHEMISTRY AND BIOTIC COMMUNITY STRUCTURE ASSESSMENT REPORT

APPENDIX F

ASSESSMENT OF MARINE WATER CHEMISTRY AND BIOTIC COMMUNITY STRUCTURE IN THE VICINITY OF THE PROPOSED MAKENA H-2 RESIDENTIAL PROJECT

MAKENA, MAUI, HAWAII

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May 2019

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I. INTRODUCTION AND PURPOSE

This report presents an assessment of the potential impact on the marine environment from the H-2 Residential Project proposed for development on a 28-acre site located in Makena on the southwestern coastline of the island of Maui, Hawaii (Figures 1 and 2). The development is planned to consist of 53 single family lots ranging in size from 0.17 to 0.53 acres, a public beach parking lot, drainage retention areas, and archaeological sites that would be preserved.

While all planning and construction activities will place a high priority on maintaining the existing relatively pristine nature of the marine environment, it is nevertheless important to address any potential impacts that may be associated with the planned project. None of the proposed land uses include any direct alteration of the coastal areas or nearshore waters. As a result, the only potential for any impacts to the ocean is through alteration of composition and volume of groundwater that flows beneath the project site. As all groundwater that could be affected by the project subsequently reaches the ocean, it is recognized that there is potential for the project to affect the marine environment. Therefore, the main question addressed in this report is centered on the potential impacts from constituents added to groundwater which could cause alterations to water quality and marine life.

In the interest of addressing these concerns and assuring maintenance of environmental quality, a baseline marine environmental assessment and potential impact analysis of the nearshore areas downslope of the Makena H-2 Residential site was conducted in October 2018.

The rationale of this assessment is threefold; 1) to determine the existing contributions of groundwater to the composition of nearshore marine waters before the commencement of any project construction activities; 2) to evaluate the effects that such input, as well as other natural "stressors," exerts on existing marine community structure; 3) to combine this information with estimates of changes in groundwater and surface water flow rates and chemical composition that could result from the project. These predicted changes in groundwater flow rates and composition have been supplied by Tom Nance Water Resource Engineering (TNWRE 2018). Results of the combining the results of the present survey with the evaluation of changes to groundwater flow will provide the information to quantify predicted changes to marine water chemistry offshore of the project site. Such quantification will indicate if, and to what degree, there is the potential for negative effects to the marine environments from the proposed project.

II. WATER CHEMISTRY

A. Methods

Water sampling was conducted along three transects that extended from the shoreline to the open coastal ocean beyond the fringing reef. Transect 1 was located off the southern boundary of the coastal area makai of the H-2 site while Transect 2 was located off the northern end of coastal area makai of the project site. Transect 3 served as a control and was located at the northern end of Maluaka Beach, approximately 500 meters (m) north of the project (Figure 3).

Water quality was evaluated along each transect by collecting samples at seven locations (0, 2, 5, 10, 50, 100, and 200 m from the shoreline). Sampling locations were determined by handheld GPS. The sampling scheme was designed to span the greatest range of salinity with respect to potential groundwater efflux at the shoreline. Sampling was also more concentrated in the nearshore zone because this area is most likely to show the effects of shoreline modification. At locations where water depth was less than one m, a single sample was collected within 10 centimeters (cm) of the air-water interface. At locations where water depth was greater than 1 m, a surface sample was collected within approximately 10 cm of the sea surface, and a bottom sample was collected within 10-20 cm of the sea floor.

In order to determine chemical concentrations in unaltered groundwater, samples were also collected from six irrigation wells located upslope from the project site and three monitoring wells located within or makai of the project site. These data are included in an accompanying report entitled "Potential Impact of the Makena H-2 Residential Project on Water Resources" prepared by Tom Nance Water Resources Engineering (TNWRE) in May 2019.

Water quality constituents evaluated included the ten specific criteria designated for open coastal waters in Chapter 11-54, Section 06 (Open Coastal waters) of the State of Hawaii Department of Health (DOH) Water Quality Standards. These criteria include: total nitrogen (TN), nitrate + nitrite nitrogen (NO_3^- + NO_2^-, hereafter referred to as NO_3^-), ammonium nitrogen (NH_4^+), total phosphorus (TP), Chlorophyll *a* (Chl *a*), turbidity, temperature, pH, and salinity. In addition, orthophosphate phosphorus (PO_4^{-3}) and silica (Si) were also reported because these parameters are sensitive indicators of biological activity and the degree of groundwater mixing.

All fieldwork was conducted on October 26, 2018, by investigators working from a small boat and from shore. All water samples were collected in 500-milliliter (ml), acid-washed, triple rinsed polyethylene bottles, and placed on ice as soon as possible. Samples within 10 m of the shoreline were collected by divers swimming from shore, while samples from

distances greater than 50 m from shore were collected from a small boat using a Niskin oceanographic sampling bottle. The bottle was lowered to the desired sampling depth with spring-loaded endcaps held open so water could freely through the bottle. At the desired sampling depth, a weighted messenger released from the surface triggered closure of the endcaps, isolating a volume of water. Upon retrieval, water from the Niskin bottle was poured into polyethylene bottles. Water samples were immediately stored on ice for transport to the analytical laboratory.

Analyses for Si, NH_4^+, PO_4^{3-}, and NO_3^- were performed with a Seal Analytical AutoAnalyzer 3 HR (AA3HR) using standard methods for seawater analysis (Strickland and Parsons 1968, Grasshoff 1983). TN and TP were analyzed in a similar fashion following digestion. Total organic nitrogen (TON) and total organic phosphorus (TOP) were calculated as the difference between TN and dissolved inorganic N and TP and dissolved inorganic P, respectively.

Water for other analyses was kept chilled until analysis. Chl *a* was measured by filtering 150 ml of sample through GFF/F glass-fiber filters then extracting pigments on filters with 90% acetone in the dark at -20 °C for 24 hours. Fluorescence of the extract was measured with a Turner Designs Trilogy Fluorometer model 7200-000 equipped with an extracted chlorophyll non-acidification module. Salinity was determined using a Mettler Toledo Seven Excellence Multi-parameter meter with an InLab 731-ISM conductivity probe, calibrated to a Hach Instruments traceable salinity standard of 35.00 ppt, 53.0 mS/cm, with a readability of 0.01 parts per thousand (‰ or ppt). Turbidity was determined using a Hanna Instruments Model #HI88703 Turbidimeter, and reported in nephelometric turbidity units (NTU) (precision of 0.01 NTU). *In situ* measurements of salinity, temperature, and dissolved oxygen were acquired using an RBR Concerto logger calibrated to factory standards. The CTD has a readability of 0.001°C, 0.001% saturation, and 0.001 parts per thousand (salinity).

EPA and Standard Methods (SM) methods that were employed for chemical analyses, as well as detection limits, are listed in the Code of Federal Regulations (CRF) Title 40, Chapter 1, Part 136, and are as follows:

NH_4^+ EPA 350.1, Rev. 2.0 or SM4500-NH3 G, detection limit 0.42 µg/L.
NO_3^- + NO_2^-, EPA 353.2, Rev. 2.0 or SM4500-NO3F, detection limit 0.28 µg/L
PO_4^{-3} EPA 365.5 or SM4500-P F, detection limit 0.31 µg/L.
Total P EPA 365.1, Rev. 2.0 or SM4500-P E J, detection limit 0.62 µg/L.
Total N SM 4500-N C., detection limit 5.60 µg/L.
Si, EPA 370.1 or SM 4500 SiO2 E, detection limit 5.32 µg/L.
Chlorophyll a, SM 10200, detection limit 0.006 µg/L.
pH, EPA 150.1 or SM4500H+B, detection limit 0.002 pH units.
Turbidity, EPA 180.1, Rev. 2.0 or SM2130 B, detection limit 0.008 NTU.

Temperature, SM 2550 B, detection limit 0.01 degrees centigrade.
Salinity, SM 2520, detection limit 0.001 ppt.
Dissolved Oxygen, SM4500 O G, and detection limit 0.01% sat.

All fieldwork was conducted by Dr. Steven Dollar and Ms. Andrea Millan. All laboratory analyses were conducted by Marine Consulting and Analytical Resources, LLC, located in Honolulu, HI.

B. Results

1. Gradients of Water Chemistry

Tables 1 and 2 show results of all water chemistry analyses for samples collected off the coastal area makai of the Makena H-2 Project site on October 26, 2018. Table 1 shows concentrations of dissolved nutrients in micromolar (μM) units; Table 2 shows concentrations in micrograms per liter (μg/L). Concentrations of eight dissolved nutrient constituents in surface and deep samples are plotted as functions of distance from the shoreline in Figure 4. Values of physical composition of water samples (salinity, turbidity, Chl *a*, pH, dissolved oxygen, and temperature) as functions of distance from shore are shown in Figure 5.

Several patterns of distribution are evident in Tables 1 and 2 and Figures 4 and 5. It can be seen in Figure 4 that the concentrations of dissolved nutrients Si, NO_3^-, TN, and PO_4^{3-} are distinctly elevated near the shoreline, particularly at Transect 2. Salinity shows a mirror image trend with lowest values near the shoreline (Figure 5).

The pattern of decreasing concentrations of inorganic nutrients (Si, NO_3^-, PO_4^{3-}, and TN) and increasing salinity with increasing distance is the result of input of groundwater to the ocean at the shoreline. Groundwater contains substantially higher concentrations of Si, NO_3^- and PO_4^{3-} compared to ocean water, and has a salinity of near zero compared to approximately 35‰ in ocean water. Following discharge at the shoreline, a narrow zone of mixing occurs where groundwater merges with ocean water. The extent of the mixing zone is proportional to both the magnitude of groundwater discharge and the intensity of physical mixing processes (primarily wave energy) in the nearshore region. The sampling on October 26, 2018, was conducted during a period of low tide and low wind shear, which resulted in relatively low mixing conditions in the nearshore area. Under these conditions, gradients from the shoreline to offshore ocean are more pronounced than during periods of high tide and more vigorous wind and wave mixing. The results from the October 2019 survey likely reflect the near optimal conditions for detecting groundwater input at the shoreline.

Concentrations NH_4^+ in surface waters did not show a consistent horizontal pattern relative to distance from shore (Figure 4, Tables 1 and 2). As NH_4^+ is not generally found in elevated concentrations in groundwater relative to coastal ocean water, any observed gradients would not likely be a result of groundwater discharge at the shoreline, but rather would be a result of biotic processes occurring in the nearshore area. For the most part, the magnitude of the NH_4^+ concentration among the three survey sites was similar, with the lowest values being detected at the sampling stations within 10 m of the shoreline. Beyond the nearshore zone, the concentrations of NH_4^+ do not prescribe any consistent pattern with respect to transect location or distance from shore (Figure 4).

Turbidity showed peak values in the samples collected within 5 m of the shoreline at all three transect sites (Figure 5, Tables 1 and 2). Such a pattern is likely a result of resuspension of bottom sediment from breaking waves. Measurements for turbidity were of similar magnitude at all three sites. Measurements of Chl *a* showed a trend of peak values near the shoreline at transects 1 and 2, with near constant values at farther offshore. As with turbidity, the overall values of Chl *a* beyond 10 m from the shoreline were similar at all three transect sites (Figure 5, Tables 1 and 2). Temperature ranged between 27.2° C and 27.8° C, and was generally lower near the shoreline and increased with distance offshore (Figure 5).

Tables 1 and 2 and Figures 4 and 5 also show concentrations of water chemistry constituents with respect to depth in the water column. Groundwater efflux in the nearshore zone often results in a surface lens with lower salinity and higher nutrient content relative to subsurface water. For the Makena H-2 data set, concentrations in the surface and deep waters were similar with no distinct surface layer of low salinity/high nutrient water. The lack of such vertical stratification indicates that groundwater discharge was not a dominant factor influencing marine waters in the Makena area beyond several meters of the shoreline.

2. Conservative Mixing Analysis

A useful treatment of water chemistry data for interpreting the extent of material input from land is application of a hydrographic mixing model. In the simplest form, such a model consists of plotting the concentration of a dissolved chemical species as a function of salinity (Officer 1979, Smith and Atkinson 1992, Dollar and Atkinson 1992). The concept of using such mixing models that scale nutrient concentrations to salinity has been recently used by the State of Hawaii Department of Health for establishing a unique set of water quality standards for the West Coast of the Island of Hawaii [Hawaii Administrative Rules, §11-54-06 (d)]. Unfortunately, similar standards have not be instituted for other areas of Hawaii, including Maui.

Comparison of the curves produced by the distribution of data with conservative mixing

lines provides an indication of the origin and fate of the material in question. If the constituent in question displays purely conservative behavior (i.e., no input or removal from any process other than physical mixing), data points should fall on, or near, the conservative mixing line. If, however, external material is added to the system through processes such as leaching of fertilizer nutrients to groundwater, data points will fall above the mixing line. If material is being removed from the system by processes such as biological uptake, data points will fall below the mixing line.

Figure 6 shows plots of the concentrations of Si, NO_3^-, PO_4^{3-}, and NH_4^+ as functions of salinity for the samples collected at each sampling transect off the Makena H-2 site in October 2018. Each graph also shows conservative mixing lines constructed by connecting the end-member concentrations of open ocean water, and average groundwater concentration from the six irrigation wells (Seibu 1-6) and two monitoring wells (SW-1 and SW-2). TNWRE [2019] provides descriptions of the irrigation and monitoring wells, as well as the water chemistry data.

Dissolved Si represents a check on the model as this material is present in high concentration in groundwater, but is not a major component of fertilizer. In addition, Si is not utilized rapidly within the nearshore environment by biological processes. It can be seen in Figure 6 that data points for Si in the marine samples fall in a linear array. Samples from Transect 1 form a tight cluster near the ocean end-point indicating that there is little groundwater input at this location. Data points from Transect 2 fall predominantly on the monitoring well mixing line, while samples from Transect 3 lie between the two mixing lines (Figure 6). Linear regression of the concentration of Si as a function of salinity indicates that for Transects 2 and 3, there is a highly significant R^2 value (proportion of variation explained) of greater than 0.98. These values of R^2 indicate that the concentration of Si in ocean water is nearly completely dependent on salinity. Such a result can be interpreted to show that the concentrations of Si are almost completely a result of groundwater input to the ocean.

The linear Y-intercept of the regression of Si as a function of salinity can be interpreted as the expected concentration of Si at a salinity of zero. As groundwater has salinity close to zero, the Y-intercept can be used to evaluate the relationship between upslope groundwater and groundwater that is entering the ocean at the shoreline. The average concentration of Si is 616 µM in the irrigation wells, and 734 µM in the monitoring wells (TNWRE 2019). The 95% confidence limits of the Y-intercepts of the regression lines of Si vs. salinity of ocean samples is 855-926 µM for Transect 2, and 638-811 µM for Transect 3. Hence, the Y-intercept for Makena Transect 2 are above the range encompassing the groundwater endpoint concentration for both the monitoring and irrigation wells. For Transect 3, the Y-intercept indicates that water on the sampling transect was within the range from monitoring wells, but not the irrigation wells. These Y-intercepts indicate that there is Si entering the ocean from other sources besides naturally occurring groundwater

from mauka of the project site.

Even though regression statistics indicate slight alteration in Si concentrations in the ocean relative to upslope groundwater, such a pattern still supports the conclusion that Si is behaving as a conservative tracer. Well water sampled from the upslope well is similar in composition to groundwater entering the ocean off the Makena H-2 site.

The plots of NO_3^- versus salinity show a somewhat similar pattern as Si. All of the data points from Transect 1 fall in a cluster near the ocean endpoint. Samples from Transect 2 lie in a straight line close to the monitoring well conservative mixing line. Samples from Transect 3 lie on the irrigation well mixing line. Linear regression of concentrations of NO_3^- versus salinity indicate significant R^2's of 0.99 and 0.98 for Transects 2 and 3, respectively. The upper and lower confidence limits of the Y-intercepts for the Transect 2 and Transect 3 samples are 333-356 µM, and 129-158 µM, respectively.

The difference between the average concentration of NO_3^- in the monitoring wells (372 µM) and the irrigation wells (135 µM) of 237 µM is the amount of NO_3^- that reaches groundwater as it flows beneath the project site and the existing Makena Golf Course. This result of the mixing analysis indicates that on Transect 2, the amount of NO_3^- reaching the ocean is similar to groundwater in the makai monitoring wells. In ocean samples from Transect 3 the concentrations of NO_3^- match input from groundwater in irrigation groundwater. As the golf course extends past the shoreline area that encompasses Transect 3, it is curious that there is no indication of input from the golf course at this location.

Phosphate phosphorus (PO_4^{3-}) is also a major component of fertilizer and sewage. However, PO_4^{-3} is usually not found to leach to groundwater to the extent of NO_3^-, owing to a high absorptive affinity of phosphorus in soils and rock. It can be seen in Figure 6 that the pattern of distribution of data points for PO_4^{-3} is similar to Si and NO_3^- in that the two data points from the inshore area of Transect 2 are anomalously high relative to the rest of the data. All of the data points from Transect 3 lie near the irrigation well mixing line, indicating that there are no subsidies of PO_4^{3-} entering the nearshore environment from sources other than naturally occurring groundwater.

NH_4^+, shows a different relationship than Si, NO_3^-, and PO_4^{-3}. Plots of concentrations of NH_4^+ versus salinity exhibit no distinct linear trends. Linear regression of concentrations of NH_4^+ vs. salinity show no significant relationship. The lack of a significant regression indicates that the source of most of the NH_4^+ in the ocean is not from the groundwater, but rather from biological processes occurring in the nearshore areas.

From 2005 to 2017, Marine Research Consultants, Inc., (MRCI) conducted water quality monitoring for compliance with a condition of the Land Use Commission District Boundary

Amendment for the Makena Resort Development. The monitoring program that MRCI developed included sampling on five transects that extended from the shoreline to open coastal waters. Two of the transects correspond to sampling Transects 1 and 2 in the present investigation. As a result, it is possible to look at the conditions of water chemistry over time to detect if there have been any variations that may be related to changes in land uses.

Figure 7 shows mixing plots of four nutrients as functions of salinity for the combined samplings at Transects 1 and 2 for the last seven years (2013 to 2018). Surveys were conducted twice per year (winter-summer) from 2013 to 2016, once in 2017, and once in 2018. Should input of dissolved nutrients change over the course of time, the curves prescribed by the data points would either increase in slope if more nutrients were added over time, or decrease in slope if less nutrients were added. Inspection of the mixing plot of Si indicates no variation in the slope of the linear arrays of data points for any year, although the magnitude of the input changed considerably over time.

The consistent linearity over the seven years of sampling indicates that the composition of groundwater Si to the ocean has been consistent over that period. The close agreement with the data curve and the monitoring and irrigation well mixing lines also indicates that there has not been any substantial addition of different sources of groundwater to the ocean other than what is sampled from wells. It is also evident that the most recent sampling in October 2018 resulted in one of the lower levels of groundwater input to the ocean. The peak concentration of Si in 2018 was 112 µM, compared with a maximum value of about 330 µM in 2013.

Plots of NO_3^- versus salinity provide similar results as Si (Figure 7). While the magnitude of the concentrations of NO_3^- vary substantially between years, the slopes of the lines prescribed by the data points are similar. Such a result indicates that the input source of NO_3^- to groundwater has not changed over the last seven years. As with Si, the concentrations in the nearshore ocean in 2018 were substantially lower than in previous years (Figure 7). Ammonium nitrogen (NH_4^+) also occurs in lower concentrations in 2018 relative to previous years (Figure 7).

PO_4^{3-}presents a slightly different picture than the other dissolved nutrients. Two values from samples collected in 2018 lie above the mixing line and above the data points from the other years (Figure 7). These points suggest that there is another external source of PO_4^{3-} to the ocean during the 2018 sampling that is not a component of naturally occurring groundwater.

3. Compliance with DOH Criteria

DOH Water Quality Standards include specific criteria for three situations; criteria that are not to be exceeded (NTE) 10% of the time, criteria that are NTE 2% of the time, and criteria that are not to be exceeded by the geometric mean value of samples. Comparing sample concentrations to these criteria provide an indication of whether water quality is near the stated specific criteria.

Noted in Tables 1 and 2 are samples that exceed DOH NTE 2% of the time water quality standards for open coastal waters under "wet" conditions. The criteria for wet conditions are applied to the Makena H-2 area based on evaluation by TNWRE (2019) that indicates that there are 3 million gallons per day (mgd) groundwater flow to the ocean per mile of shoreline.

Comparison of water chemistry results with DOH criteria reveals that during the October 2018 sampling, ten measurements of NO_3^- on Transect 2, and seven measurements on Transect 3, exceeded the NTE 2% wet standard. Two measurements of TN and TP exceeded the DOH standards at the shoreline of Transect 2. No measurements of NH_4^+ and Chl *a* exceeded the 2% DOH water quality standards.

All of the measurements of NO_3^- that exceeded the DOH limits were from samples collected at transect sites 2 and 3. As discussed above, concentrations of NO_3^- in the nearshore zone are a function of discharge of groundwater at the shoreline. Nearshore samples from Transect 3 contain concentrations of NO_3^- that can be attributed to naturally occurring groundwater discharge. Samples from Transect 2 contain a subsidy of NO_3^- that is added as groundwater passes under the Makena golf course. It is evident that input from both natural conditions as well as human activities can result in exceedances of DOH water quality standards.

The NTE 2% limit for turbidity was exceeded at two stations each on Transects 1 and 2, and at six stations on Transect 3. It is likely that the wave-induced turbulence that typifies the natural marine conditions of the nearshore region off the beach fronting Transect 3 continually resuspends fine sediments into the water column. Such resuspended sediments are the likely cause of the exceedance of the turbidity criteria.

III. PHYSICAL AND BIOTIC COMMUNITY STRUCTURE

A. Methods

Reef community composition was delineated using a method for ground truthing remote sensing data modified from Bainbridge and Reichelt (1988). Surveys were conducted by divers traversing the reef while being towed behind the survey boat, or by swimming in areas too shallow for boat transit. Traverses were conducted in a zig-zag fashion in the vicinity of the three survey transects that were utilized for water chemistry sampling. During

these surveys, the occurrence of species of coral, other macroinvertebrates, and reef fish were notated. Representative photographs of reef composition were taken along each of the survey transects.

B. Results

1. Physical Structure of the Marine Habitat

The shoreline and intertidal coastal area makai of the Makena H-2 Project area consists predominantly of a series of basaltic outcrops separating wide crescent-shaped sand beaches. The beaches are composed of fine white calcium carbonate sand, which extends seaward through the intertidal zone. In some areas, the beach sands continue seaward as gentle sloping plains that extend through the entire nearshore area.

Seaward of the intertidal zone, bottom composition varies between sand/rubble channels and raised limestone reef platform that slopes gradually with increasing distance from shore. The submerged portions of the basaltic headlands that separate the beaches consist of jagged, steep-sided rock fingers that terminate at the sand seafloor. While the tops of the outcrops are relatively flat, there are also numerous depressions and undercut ledges on the sides of the outcrops.

2. Coral Community Structure

As with all reef communities in Hawaii, composition of coral assemblages on the south shoreline of the Island of Maui are primarily determined by physical forces (primarily wave energy) that impact the area (Dollar 1982, Dollar and Tribble 1993, Fletcher et al. 2008, Grigg and Maragos 1974, Grigg 1983, Grigg 1988). As the Makena area is mostly an open coastal area directly exposed to long-period north and northwest swells during the winter months and southern swells during the summer months, the response to these forces is clearly reflected in physical composition and coral community structure.

The biotic zonation pattern of the nearshore marine environment off Makena is relatively homogeneous. Figure 8 shows bathymetric profiling of the nearshore area obtained from LIDAR (Light Detection and Ranging data). Examination of Figure 8 reveals a relatively consistent bathymetry of gently sloping bottom moving offshore along the entire length of the Makena Resort. Figure 9 shows the benthic habitat map produced by the supervised classification scheme created in 2005 by MRCI as part of the Makena Resort Monitoring Program. Spectral resolution of the image allowed for distinction of three bottom classifications described by biotic cover, including "high coral cover" (>60% bottom cover); "medium coral cover" (30-60% bottom cover), and "low coral cover" (<30% bottom cover). For habitats classified with low coral cover, the

remaining predominant bottom cover (pavement, rubble, sand) are also classified. Off the coastal area makai of the Makena H-2 site, coral cover is highest in the 5-10 m depth range (Figure 9).

The predominant taxa of benthos (bottom dwelling organisms) throughout the survey area were stony, or reef-building corals (Order Scleractinia). Table 3 shows the qualitative summary of coral occurrence on the three transects off the Makena H-2 Project site.

In total, eight species of coral were encountered on survey swims. *Porites lobata, Pocillopora meandrina, Montipora capitata,* and *Montipora patula* occurred on all three transects. Four other species of coral were observed in the area but did not appear on all transects. These species included *Pocillopora eydouxi, Pavona varians, Porites compressa, and Leptastrea bewickensis* (Table 3).

Figures 10-12 show representative photographs of the reef composition off the three survey transects. All three areas are located in similar habitats on the limestone reef platform. Inshore areas are characterized by near barren hard bottom owing to constant impacts from breaking waves (Figure 10). With increasing distance from shore, corals become common, with the dominant coral species on the reef platform consisting of large massive colonies of *Porites lobata*, and secondarily, mats of *Porites compressa* (Figures 10-12).

3. Other Macrobenthos

The predominant taxon of motile macrobenthos (benthos not attached to the bottom) throughout the survey area were echinoids (sea urchins). Table 3 shows the occurrence of urchins on the three transects off the Makena H-2 Project site. The most common species of sea urchin were *Echinometra matheai, Echinothrix diadema, Tripneustes gratilla*, and *Heterocentrotus mammilatus.* All of these were found on all three transects.

Echinometra matheai are small urchins that are generally found within interstitial spaces bored into basaltic and limestone substrata. *Tripneustes gratilla, Heterocentrotus mammillatus* and *Echinothrix diadema* occur as larger individuals (compared with *E. matheai*) and are generally found on the reef surface, rather than within interstitial spaces. Other species of macro-invertebrates observed on the reef platform were the sea cucumber *Holothuria* spp. and the black-lipped pearl oyster *Pinctada margaritifera.*

No dense aggregations of marine algae were observed in any of the reef survey areas. Macroalgae that were observed included *Asparagopsis taxiformis, Lyngbya* spp., *Neomaris* spp., and *Dictyota* spp. Encrusting calcareous algae was also relatively

common on the limestone reef surface. Meadows of *Halimeda* spp. were observed on the sand plains that extend seaward from the outer edge of the reef platform. *Ahnfeltia concinna* was observed to cover much of the rocky surfaces in the intertidal zone. There were no observations of substantial amounts of any of the algal species (*Hypnea* and *Cladophora*) that have been noted to occur as nuisance blooms in the past in the West Maui and Kihei areas.

4. Reef Fish Community Structure

Table 4 shows the occurrence of reef fish species at the three survey sites. Reef fish abundance was largely determined by the topography and the composition of the benthos. On the reef platform fish abundance was lower than in the vicinity of rocky outcrops. With respect to species occurrence, the small planktivorous damselfish *Chromis vanderbilti* was the most abundant species, as is common on many Hawaiian reefs. Mixed schools of Acanthurids were also prevalent, particularly on the rocky outcrop. Butterflyfish (Chaetodontidae) and wrasses (Labridae) constituted most of the other fishes seen on the reef platform and outcrop. On the flat open areas of the reef, the principle fishes were members of the triggerfish family (Balistidae). These fishes are adept at taking shelter in small crevices in the bottom.

5. Threatened and Endangered Species

Several species of marine animals that occur in Hawaiian waters have been declared threatened or endangered by Federal jurisdiction. The threatened green sea turtle (*Chelonia mydas*) occurs commonly throughout the Hawaiian Islands, and is frequently observed throughout Maui. The endangered hawksbill turtle (*Eretmochelys imbricata*) is known infrequently from Hawaiian waters.

Populations of the federally protected humpback whale (*Megaptera novaeangliae*) winter in the Hawaiian Islands from December to April. During the winter season, humpback whales, as well as other cetaceans, are common off the coastlines of Maui. The Hawaiian monk seal (*Monachus schauinslandi*) is an endangered earless seal that is endemic to the waters off the Hawaiian Islands. Monk seals commonly haul out of the water onto sandy beaches to rest and are often observed on Maui.

While these protected species may occur in the areas downslope from the project site, there are no factors associated with the Makena H-2 Project that could potentially affect their behavior.

IV. DISCUSSION and CONCLUSIONS

The purpose of this baseline survey is to provide information to make valid evaluations of the

potential for impact to the marine environments from the proposed Makena H-2 Project. The data collected in the present study, as well as data collected from the same area in the past, provides the basis to understand the processes that are presently operating in the nearshore ocean. Based on these data, it is possible to address concerns that might be raised in the planning process.

The proposed Makena H-2 Project does not include any plans for direct alteration of the shoreline or offshore areas. Therefore, potential impacts to the marine environment can only be considered from activities on land that may result in delivery of materials (fresh water, sediment, nutrients, and potentially toxic materials) to the ocean through infiltration to groundwater, surface runoff, and wind transport. The project is located upslope from the shoreline so it is not likely that wind transport will directly affect the marine environment.

TNWRE (2019) provides a comprehensive analysis of the quantity and composition of groundwater flowing beneath the H-2 Project Site. In addition, the TNWRE report provides the projected changes to groundwater quantity and composition that will result from the proposed project. A summary of these potential changes is presented below (see TNWRE 2019 for the full discussion).

Groundwater flowing under the Makena H-2 site will discharge along a 1,700-foot long segment of the shoreline downslope from the project site. The project has the potential to impact groundwater resources in the following ways:

(1) Use of Maui Dept. of Water Supply (MDWS) water for potable consumption and potentially some portion of the landscape irrigation;

(2) Use of brackish well water from the Makena golf course system for most of the landscape irrigation;

(3) Changes to surface runoff.

Changes to groundwater flowing beneath the H-2 project site, and ultimately discharging at the shoreline are as follows:

- An increase in the groundwater flow rate of about 16,600 GPD, a 2.4% increase over the present flowrate of 0.7 MGD;

- The addition of 0.145 pounds per day of total nitrogen (TN), which equates to an increase of 0.4% over existing conditions, and;

• The addition of 0.007 pounds per day of total phosphorus (TP), which equates to an increase of 0.7% over existing conditions.

Inspection of Table 1 and Figure 4 indicates that the peak concentration of TN at the point of groundwater discharge at the shoreline of the Transect 2 measured in October 2018 is about 64.93 µM, while the corresponding concentration of TP is about 2.47 µM. Increasing the concentration of TN at the shoreline by 0.4% from existing conditions would result in a maximum value of about 65.19 µM. Correspondingly, the increases in groundwater nutrients from the project would result in maximum values of TP at the shoreline of 2.49 µM. These small changes of 0.3 µM for TN and 0.02 µM for TP are within the natural variability of the groundwater discharge at the shoreline, and do not represent a significant, or even a detectable change in the composition of the discharge. In addition, if the maximum values of TN (345 µM) and TP (3.2 µM) measured in the ocean during seven years of monitoring are increased by 0.4 and 0.7%, respectively, the increases would be undetectable.

Another way to assess the effect of the magnitude of change to groundwater composition projected from the development is to compare the nutrient concentrations from the irrigation wells and monitoring wells. As the irrigation wells are located mauka, and the monitoring wells are makai of the existing Makena developments, the differences in nutrient concentrations can be assumed to be the quantities that are added to groundwater from percolation of applied fertilizers through the vadose zone. The average values of TN and TP from the irrigation wells are 150.3 µM and 3.7 µM, respectively. Average values in the shoreline monitoring wells are 447.3 µM and 6.5 µM, respectively (TNWRE 2019). These concentrations indicate that there are increases of about 297 µM of TN and 2.7 µM of TP in groundwater that is a result of percolation through the Makena Golf Course and other developed areas. In terms of percentages, there is about a 297% increase in TN and 173% increase in TP from existing uses. Comparing these increases to the projected increases of 0.4 and 0.7% for TN and TP, respectively, indicates that the effects of the proposed project will not be detectable. As such, there is no valid reason to assume that these changes to groundwater from the Makena H-2 Project will alter the existing conditions of marine water chemistry to any measureable extent.

An additional factor associated with the Makena H-2 Project that will affect groundwater composition is the generation, treatment, and disposal of domestic wastewater. The proposed disposal method of sewage generated by the project is through the Makena Wastewater Reclamation Facility (MWWRF) Disposal Pit. The MWWRF is located approximately 0.6 miles mauka of the shoreline, which is about three times further inland than the H-2 Project site. TNWRE (2019) estimates that this disposal will result in altered groundwater discharge along a 1,200-foot long segment of the shoreline downgradient from the disposal pit. Effluent from the proposed Makena H-2 project would add up to 18,550 GPD to the underlying groundwater (ignoring evaporative loss in the pit). Assuming

the 1,200-foot long downgradient shoreline segment is similar to the shoreline segment downgradient from the Makena H-2 project site, this addition would increase the shoreline groundwater volume discharge by about 3.8%. Nutrients in this addition would increase TN and TP levels by 0.1 and 0.5%, respectively. These changes are too small to be detectable relative to natural background variations. As a result, the effect of sewage disposal from the project is deemed to be of no significant consequence.

Plots of TN, NO_3^-, PO_4^{3-}, and TP as functions of distance from shore (Figure 4) reveal that the elevated concentrations emanating from groundwater discharge are restricted to a narrow zone less than 10 m from the shoreline. The steep decline in nutrient concentrations beyond the nearshore zone is the result of rapid mixing and dilution of the relatively small amount of groundwater discharging at the shoreline with large volumes of coastal ocean water. The small increases in groundwater nutrient concentrations attributable to the project would be mixed to background ocean levels in a narrow zone near the shoreline that is essentially devoid of benthic biota owing to other physical factors, primarily wave energy. With the observed horizontal gradients near the shoreline, the projected increases in nutrient concentrations in groundwater over existing conditions would be undetectable in the marine environment off the project site at distances from the shoreline where marine communities occur.

All of these conclusions indicate that the proposed Makena H-2 Project will not have a detectable effect on water quality in the coastal ocean downslope from the project. The small projected increases in nutrient concentrations would not alter the existing environment with respect to compliance with area specific DOH limits.

V. SUMMARY

1. The Makena H-2 Residential Project is proposed for development on a 28-acre site located mauka of the southwestern coastline of the island of Maui, Hawaii. The development is planned to consist of 53 single family lots ranging in size from 0.17 to 0.53 acres, a public beach parking lot, drainage retention areas, and archaeological sites that would be preserved. None of the proposed land uses include any direct alteration of the coastal areas or nearshore waters. As a result, the only potential for any impacts to the ocean is through alteration of composition and volume of groundwater that flows beneath the project site.

2. Evaluation of nearshore water chemistry off the proposed Makena H-2 Project was carried out in October 2018. Thirty-six water samples were collected along three transects that extended from the shoreline to open coastal waters. Water samples were collected at seven locations along each transect.

3. Dissolved nutrients (Si, NO_3^-, NH_4^+, PO_4^{3-}, TN and TP) in surface samples collected in along transects displayed distinct horizontal gradients with elevated values close to the shoreline. Correspondingly, salinity was lowest closest to the shoreline, and increased with distance from shore. These gradients are the result of discharge of naturally occurring groundwater which contains elevated nutrient concentrations and lower salinity that ocean water. The highest nutrient concentrations and lowest salinity were measured on Transect 2, located off the Makena Golf Course, and below the Makena H-2 site.

4. Scaling nutrient concentrations to salinity reveals that ocean water off Transect 1 contains minimal input of groundwater. Water on Transect 3 contains naturally occurring groundwater that flows to the ocean, while water on Transect 2 contains groundwater that has been augmented by nutrients from fertilization of the Makena Golf Course. While land above Transect 3 also consists of golf course, it is of interest that there is no indication of fertilizer nutrients at this site.

5. Comparing results from the 2018 survey to results from monitoring events at the same locations from 2013 to 2017 indicates no significant changes over time to inputs of nitrate nitrogen. The 2018 data set did indicate higher input of phosphate phosphorus off the golf course than in previous years. The causal factor for the apparent increase in phosphate is not apparent.

6. Qualitative investigations of the marine communities off the Makena H-2 project site showed that reef structure is similar, consisting of a limestone platform interspersed with sand and rubble channels. Coral and fish communities on the reefs contain typical assemblages found throughout Hawaiian reefs. The El Nino events of 2015-2016 likely affected the distribution of corals as it did throughout Hawaii. There are no indications that reef communities have been affected by activities on land.

7. TNWRE evaluated four aspects of the Makena H-2 Project development that have the potential to impact water resources: 1) use of potable water from MDWS system; 2) use of brackish well water from the Makena golf course system for most of the landscape irrigation, 3) changes to surface runoff generation, and 4), treatment, and disposal of domestic wastewater through a disposal pit at the Makena Wastewater Reclamation Facility.

8. Based on the conservative set of assumptions for the project's uses of water, the increase of nitrogen and phosphorus in groundwater discharging along a 1,700 foot -wide coastal section downslope from the project site would be no more than 0.4% for nitrogen and 0.7% for phosphorus. Applying these potential increases to the measured concentrations in marine waters indicate that the operation of the Makena H-2 Project would not result in any significant, and probably not even any detectable, alteration of existing ocean water quality.

9. The water quality study conducted for this report can serve as an initial baseline for the project.

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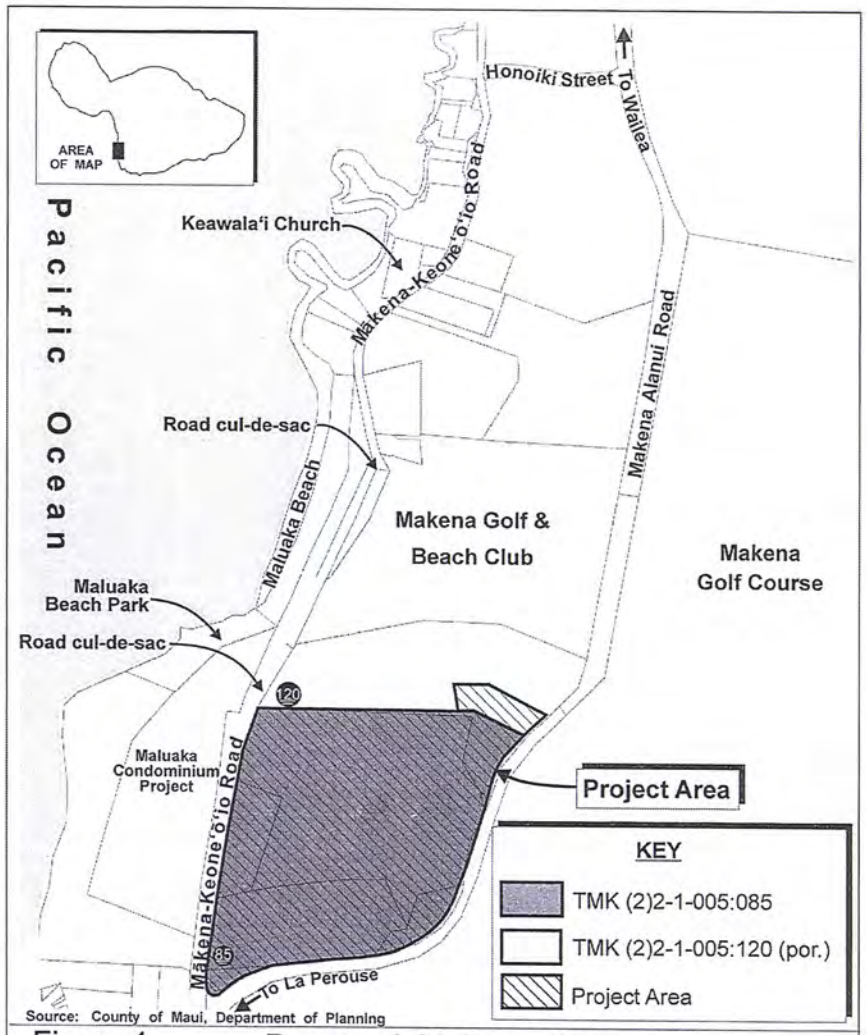

Figure 1

Proposed Makena H-2 Residential Project
Property Location Map

Prepared for: H2R, LLC

H2R LLC\H-2 Condominium\Applications\Figures\PropertyLocation

FIGURE 2. Aerial view of Makena Maui showing location of Makena H-2 project site shaded in light green.

FIGURE 3. Aerial view of coastal area makai of the Makena H-2 Residential Project site showing locations of three water chemistry sampling transects.

TABLE 1. Water chemistry measurements (with nutrients reported in micromolar units) from ocean water samples collected on October 26, 2018 in the vicinity of the Makena H-2 Project site. Nutrient concentrations are shown as micromoles (µM). Abbreviations as follows: DFS=distance from shore; TURB = turbidity; CHL a = chlorophyll a; TEMP = temperture; O2 = dissolved oxygen; S=surface; D=deep; BDL=below detection limit. Also shown are the State of Hawaii, Department of Health (DOH) "not to exceed (NTE) more than 10% of the time" and "not to exceed more than 2% of the time" water quality standards for open coastal waters under "dry" and "wet" conditions. Shaded values exceed DOH NTE 2% "wet" standards. For sampling site locations, see Figure 3.

SURVEY SITE	DFS (m)	DEPTH (m)	PO_4^{3-} (µM)	NO_3^- (µM)	NH_4^+ (µM)	SI (µM)	TOP (µM)	TON (µM)	TP (µM)	TN (µM)	TURB (NTU)	SALINITY (ppt)	CHL a (ug/L)	TEMP (deg.C)	pH (std.units)	O2 % Sat
TRANSECT 1	0 S	0.1	0.20	0.84	0.22	8.22	0.89	9.16	1.09	10.23	1.77	34.60	0.85	27.6	8.21	100.2
	2 S	0.1	0.12	0.83	0.13	5.56	0.88	7.17	1.00	8.22	1.30	34.68	0.89	27.6	8.21	101.3
	5 S	0.1	0.13	1.28	0.18	8.30	0.89	6.18	1.02	7.59	2.38	34.60	0.47	27.6	8.22	102.4
	5 D	0.7	0.13	0.83	0.16	6.37	0.65	6.19	0.78	7.19	2.80	34.56	0.55	27.6	8.22	102.4
	10 S	0.1	0.09	0.72	0.18	6.06	0.56	6.40	0.65	7.28	1.89	34.67	0.30	27.6	8.19	103.3
	10 D	1.6	0.11	0.80	0.21	4.90	0.57	5.81	0.68	6.79	1.21	34.56	0.33	27.6	8.21	103.1
	50 S	0.1	0.11	0.33	0.38	4.10	0.55	7.26	0.66	7.80	0.42	34.49	0.19	27.6	8.19	96.5
	50 D	5.1	0.11	0.49	0.52	5.03	0.58	7.45	0.69	8.32	0.37	34.52	0.18	27.5	8.15	90.7
	100 S	0.1	0.11	0.30	0.35	5.87	0.76	10.19	0.87	11.01	0.56	34.52	0.17	27.7	8.18	94.3
	100 D	6.8	0.11	0.48	0.18	2.80	0.73	6.51	0.84	7.17	1.00	34.60	0.12	27.4	8.14	88.8
	200 S	0.1	0.07	0.18	0.43	2.58	0.43	6.71	0.50	7.32	0.66	34.52	0.12	27.6	8.19	95.3
	200 D	6.2	0.08	0.24	0.37	2.47	0.33	7.44	0.41	8.05	0.35	34.60	0.11	27.5	8.21	95.2
TRANSECT 2	0 S	0.1	1.08	42.30	0.11	112.0	1.14	20.10	2.22	62.51	1.80	30.56	1.25	27.2	8.03	105.1
	2 S	0.1	1.35	37.63	0.15	99.00	1.12	27.15	2.47	64.93	2.21	30.75	0.86	27.4	8.06	104.0
	5 S	0.1	0.18	6.60	0.13	17.17	1.04	8.15	1.22	14.88	1.38	34.04	0.23	27.6	8.19	110.9
	5 D	1.1	0.19	7.25	0.20	20.77	1.09	6.94	1.28	14.38	1.15	34.00	0.20	27.6	8.19	111.4
	10 S	0.1	0.15	4.28	0.36	14.29	1.13	6.74	1.28	11.38	0.93	34.26	0.22	27.6	8.20	110.9
	10 D	1.2	0.18	4.36	0.20	13.69	1.20	7.34	1.38	11.90	1.04	34.22	0.19	27.6	8.23	110.9
	50 S	0.1	0.14	3.08	0.35	11.02	1.07	7.09	1.21	10.52	0.98	34.45	0.31	27.6	8.22	110.3
	50 D	2.1	0.13	2.18	0.40	8.98	0.94	7.46	1.07	10.04	2.32	34.45	0.23	27.5	8.19	106.6
	100 S	0.1	0.04	2.36	0.25	8.17	0.78	8.28	0.82	10.89	1.29	34.37	0.23	27.6	8.20	108.1
	100 D	4.2	0.13	0.85	0.16	4.81	0.64	7.64	0.77	8.65	1.60	34.56	0.12	27.5	8.15	104.9
	200 S	0.1	0.10	0.29	0.45	2.97	0.75	5.88	0.85	6.62	0.66	34.64	0.19	27.8	8.19	91.7
	200 D	7.1	0.11	0.34	0.23	3.93	0.80	5.80	0.91	6.59	0.79	34.64	0.16	27.5	8.20	95.2
TRANSECT 3	0 S	0.1	0.42	14.98	0.03	75.00	0.39	7.95	0.81	22.95	2.60	31.02	0.30	27.3	8.18	100.2
	2 S	0.1	0.44	12.59	0.17	67.51	0.42	11.02	0.86	23.78	3.01	31.82	0.31	27.4	8.19	101.0
	5 S	0.1	0.33	8.71	bdl	46.82	0.52	7.71	0.85	16.56	2.48	32.98	0.26	27.4	8.23	103.9
	5 D	0.7	0.29	6.31	0.20	36.86	0.59	7.64	0.88	14.15	2.19	33.27	0.19	27.4	8.24	104.0
	10 S	0.1	0.20	3.91	0.20	21.33	0.63	6.20	0.83	10.30	1.63	34.03	0.25	27.5	8.22	103.9
	10 D	1.2	0.20	3.29	0.52	19.07	0.64	5.85	0.84	9.66	2.25	33.94	0.29	27.5	8.20	103.8
	50 S	0.1	0.16	2.02	0.39	12.21	0.59	6.13	0.75	8.54	1.67	34.47	0.19	27.5	8.19	98.8
	50 D	3.0	0.10	0.42	0.13	3.56	0.68	5.85	0.78	6.40	2.49	34.92	0.17	27.5	8.19	93.6
	100 S	0.1	0.16	0.36	0.27	9.45	0.65	6.43	0.81	7.06	0.90	34.58	0.22	27.6	8.23	103.4
	100 D	4.6	0.10	0.22	0.16	1.64	0.42	5.80	0.52	6.18	1.65	34.72	0.58	27.5	8.18	91.0
	200 S	0.1	0.09	0.14	bdl	1.27	0.31	5.40	0.40	5.55	0.31	34.51	0.58	27.7	8.19	92.9
	200 D	7.3	0.07	0.15	0.15	1.95	0.21	5.27	0.28	5.57	1.14	34.55	0.15	27.5	8.22	92.8
DOH WQS		NTE 10%		1.00	0.61				1.29	17.85	1.25	*	0.90	**	***	****
WET		NTE 2%		1.78	1.07				1.93	25.00	2.00		1.75			

* Salinity shall not vary more than ten percent form natural or seasonal changes considering hydrologic input and oceanographic conditions.
** Temperature shall not vary by more than one degree C. from ambient conditions.
*** pH shall not deviate more than 0.5 units from a value of 8.1.

TABLE 2. Water chemistry measurements from ocean water samples collected on October 26, 2018 in the vicinity of the Makena H-2 Project site. Nutrient concentrations are shown in units of micrograms per liter (µg/L). Abbreviations as follows: DFS=distance from shore; TURB = turbidity; CHL a = chlorophyll a; TEMP = temperture; O2 = dissolved oxygen; S=surface; D=deep; BDL=below detection limit. Also shown are the State of Hawaii, Department of Health (DOH) "not to exceed (NTE) more than 10% of the time" and "not to exceed more than 2% of the time" water quality standards for open coastal waters under "dry" and "wet" conditions. Shaded values exceed DOH NTE 2% "wet" standards. For sampling site locations, see Figure 3.

SURVEY SITE	DFS (m)	DEPTH (m)	PO_4^{3-} (µg/L)	NO_3^- (µg/L)	NH_4^+ (µg/L)	SI (µg/L)	TOP (µg/L)	TON (µg/L)	TP (µg/L)	TN (µg/L)	TURB (NTU)	SALINITY (ppt)	CHL a (ug/L)	TEMP (deg.C)	pH (std.units)	O2 % Sat
TRANSECT 1	0 S	0.1	6.20	11.76	3.05	230.2	27.44	128.3	33.64	143.2	1.77	34.60	0.85	27.6	8.21	100.2
	2 S	0.1	3.72	11.62	1.81	155.7	27.13	100.4	30.85	115.1	1.30	34.68	0.89	27.6	8.21	101.3
	5 S	0.1	4.03	17.92	2.45	232.4	27.44	86.53	31.47	106.3	2.38	34.60	0.47	27.6	8.22	102.4
	5 D	0.7	4.03	11.62	2.18	178.4	20.00	86.59	24.03	100.7	2.80	34.56	0.55	27.6	8.22	102.4
	10 S	0.1	2.79	10.08	2.58	169.7	17.21	89.66	20.00	101.9	1.89	34.67	0.30	27.6	8.19	103.3
	10 D	1.6	3.41	11.20	2.93	137.2	17.52	81.28	20.93	95.06	1.21	34.56	0.33	27.6	8.21	103.1
	50 S	0.1	3.41	4.62	5.31	114.8	16.90	101.7	20.31	109.2	0.42	34.49	0.19	27.6	8.19	96.5
	50 D	5.1	3.41	6.86	7.22	140.8	17.83	104.3	21.24	116.5	0.37	34.52	0.18	27.5	8.15	90.7
	100 S	0.1	3.41	4.20	4.93	164.4	23.41	142.7	26.82	154.1	0.56	34.52	0.17	27.7	8.18	94.3
	100 D	6.8	3.41	6.72	2.49	78.40	22.48	91.17	25.89	100.4	1.00	34.60	0.12	27.4	8.14	88.8
	200 S	0.1	2.17	2.52	6.05	72.24	13.18	93.91	15.35	102.5	0.66	34.52	0.12	27.6	8.19	95.3
	200 D	6.2	2.48	3.36	5.18	69.16	10.08	104.2	12.56	112.7	0.35	34.60	0.11	27.5	8.21	95.2
TRANSECT 2	0 S	0.1	33.48	592.2	1.60	3136	35.19	281.3	68.67	875.1	1.80	30.56	1.25	27.2	8.03	105.1
	2 S	0.1	41.85	526.8	2.06	2772	34.57	380.1	76.42	909.0	2.21	30.75	0.86	27.4	8.06	104.0
	5 S	0.1	5.58	92.40	1.78	480.8	32.09	114.1	37.67	208.3	1.38	34.04	0.23	27.6	8.19	110.9
	5 D	1.1	5.89	101.5	2.73	581.6	33.64	97.09	39.53	201.3	1.15	34.00	0.20	27.6	8.19	111.4
	10 S	0.1	4.65	59.92	4.98	400.1	34.88	94.42	39.53	159.3	0.93	34.26	0.22	27.6	8.20	110.9
	10 D	1.2	5.58	61.04	2.80	383.3	37.05	102.8	42.63	166.6	1.04	34.22	0.19	27.6	8.23	110.9
	50 S	0.1	4.34	43.12	4.86	308.6	33.02	99.30	37.36	147.3	0.98	34.45	0.31	27.6	8.22	110.3
	50 D	2.1	4.03	30.52	5.59	251.4	28.99	104.5	33.02	140.6	2.32	34.45	0.23	27.5	8.19	106.6
	100 S	0.1	1.24	33.04	3.56	228.8	24.03	115.9	25.27	152.5	1.29	34.37	0.23	27.6	8.20	108.1
	100 D	4.2	4.03	11.90	2.24	134.7	19.69	107.0	23.72	121.1	1.60	34.56	0.12	27.5	8.15	104.9
	200 S	0.1	3.10	4.06	6.36	83.16	23.10	82.26	26.20	92.68	0.66	34.64	0.19	27.8	8.19	91.7
	200 D	7.1	3.41	4.76	3.21	110.0	24.65	81.14	28.06	92.26	0.79	34.64	0.16	27.5	8.20	95.2
TRANSECT 3	0 S	0.1	13.02	209.7	0.35	2100	11.94	111.2	24.96	321.3	2.60	31.02	0.30	27.3	8.18	100.2
	2 S	0.1	13.64	176.3	2.42	1890	12.87	154.2	26.51	332.9	3.01	31.82	0.31	27.4	8.19	101.0
	5 S	0.1	10.23	121.9	bdl	1311	15.97	107.9	26.20	231.8	2.48	32.98	0.26	27.4	8.23	103.9
	5 D	0.7	8.99	88.34	2.76	1032	18.14	107.0	27.13	198.1	2.19	33.27	0.19	27.4	8.24	104.0
	10 S	0.1	6.20	54.74	2.73	597.2	19.38	86.73	25.58	144.2	1.63	34.03	0.25	27.5	8.22	103.9
	10 D	1.2	6.20	46.06	7.22	534.0	19.69	81.96	25.89	135.2	2.25	33.94	0.29	27.5	8.20	103.8
	50 S	0.1	4.96	28.28	5.47	341.9	18.14	85.81	23.10	119.6	1.67	34.47	0.19	27.5	8.19	98.8
	50 D	3.0	3.10	5.88	1.76	99.68	20.93	81.96	24.03	89.60	2.49	34.92	0.17	27.5	8.19	93.6
	100 S	0.1	4.96	5.04	3.78	264.6	20.00	90.02	24.96	98.84	0.90	34.58	0.22	27.6	8.23	103.4
	100 D	4.6	3.10	3.08	2.23	45.92	12.87	81.21	15.97	86.52	1.68	34.72	0.58	27.5	8.18	91.0
	200 S	0.1	2.79	1.96	bdl	35.56	9.46	75.54	12.25	77.70	0.31	34.51	0.58	27.7	8.19	92.9
	200 D	7.3	2.17	2.10	2.10	54.60	6.36	73.78	8.53	77.98	1.14	34.55	0.15	27.5	8.22	92.8
DOH WQS		NTE 10%		14.00	8.50				40.00	250.00	1.25	*	0.90	**	***	****
WET		NTE 2%		25.00	15.00				60.00	350.00	2.00		1.75			

* Salinity shall not vary more than ten percent form natural or seasonal changes considering hydrologic input and oceanographic conditions.
** Temperature shall not vary by more than one degree C. from ambient conditions.
*** pH shall not deviate more than 0.5 units from a value of 8.1.
**** Dissolved Oxygen not to be below 75% saturation.

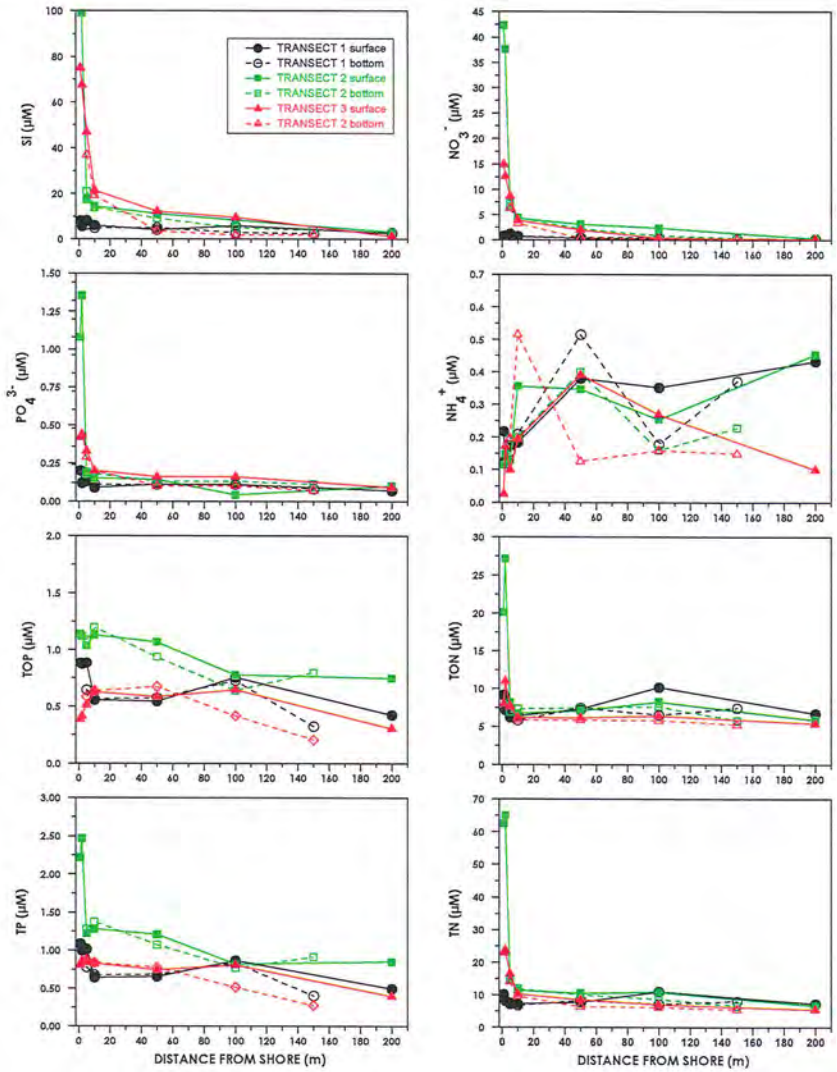

FIGURE 4. Plots of dissolved nutrients in surface and deep samples collected on October 26, 2018 as a function of distance from the shoreline along three transects downslope from the Makena H-2 Project site. For transect locations, see Figure 3.

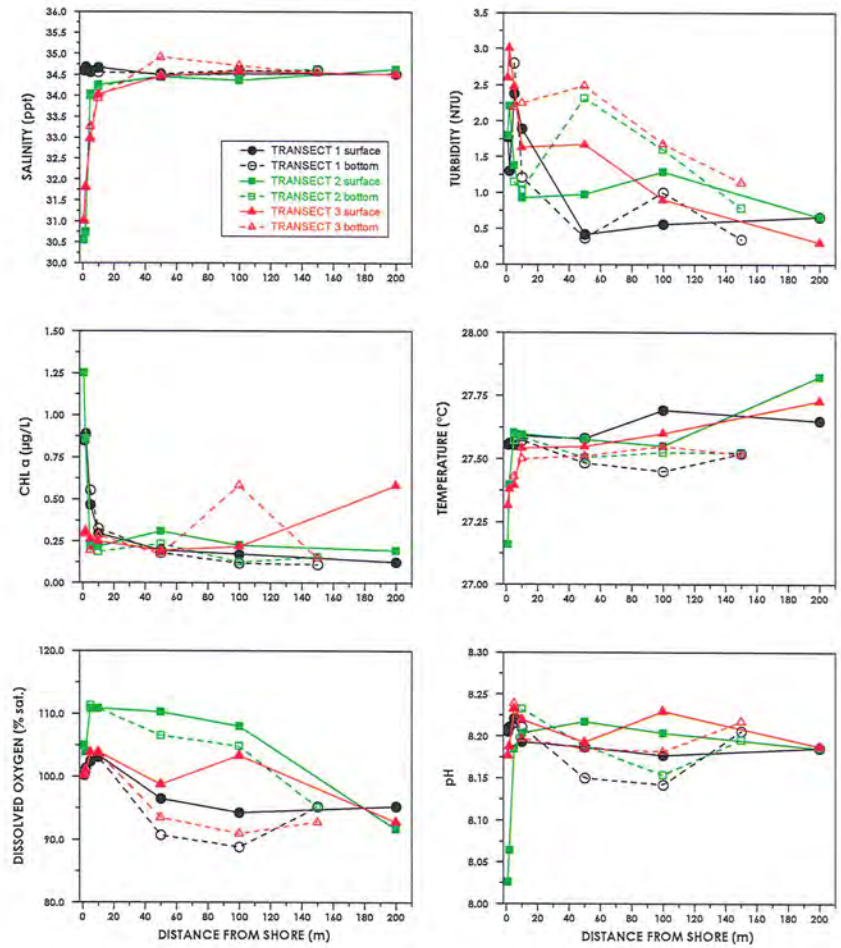

FIGURE 5. Plots of water chemistry constituents in surface and deep samples collected on October 26, 2018 along three transects downslope from the Makena H-2 Project site, as a function of distance from the shoreline. For transect locations, see Figure 1.

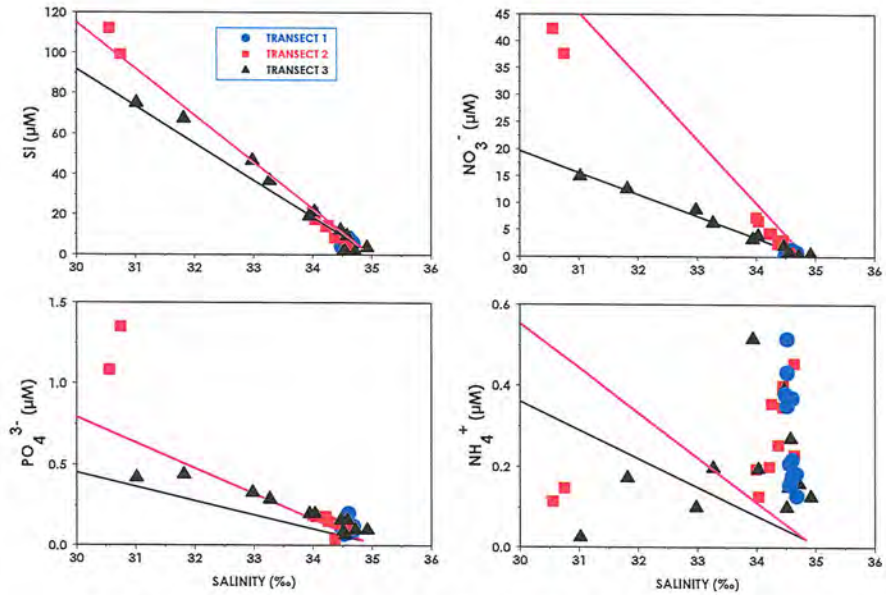

FIGURE 6. Mixing diagram showing concentration of dissolved nutrients as functions of salinity from samples collected in October 2018 in surface and bottom waters off the Makena H-2 Project site in South Maui. The straight black line in each plot is the conservative mixing lines constructed by connecting the concentrations in open ocean water with the average concentration measured in irrigation wells mauka of the project site; the magenta lines are conservative mixing lines constructed by connecting open ocean concentrations with the average values from monitoring wells located makai of the project site. For locations of sampling transects, see Figure 3.

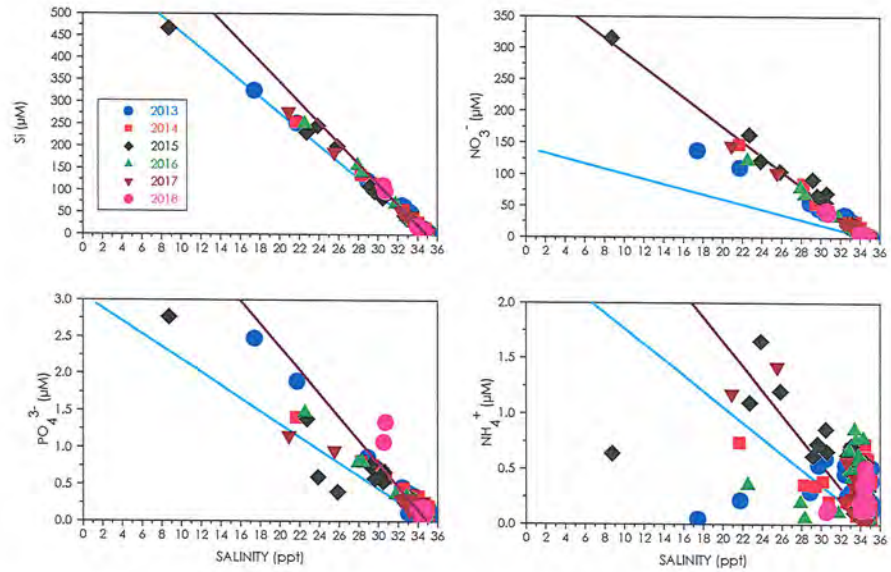

FIGURE 7. Plots of four dissolved nutrients as functions of salinity from water samples collected off the Makena H-2 Project site in South Maui. Data shows results from Transects 1 and 2 collected during monitoring surveys conducted in 2013 through 2017, as well as the present survey in 2018. Sampling was conducted twice per year from 2013 to 2016, and once per year in 2017 and 2018. Turquoise straight line in each plot is the conservative mixing line constructed by connecting the concentrations in open ocean water and average values from irrigation wells mauka of the project site; maroon straight line is conservative mixing line connecting open ocean water and average values from monitoring wells makai of the project site. For locations of transects, see Figure 3.

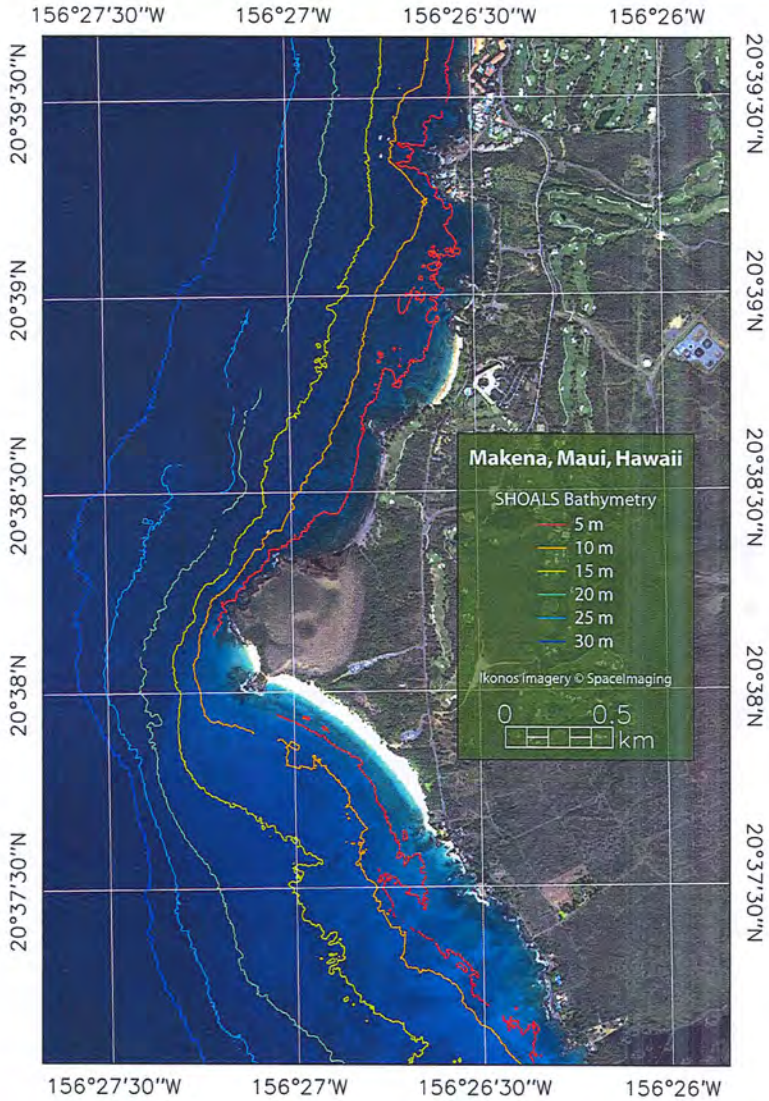

FIGURE 8. Depth contours off of the Makena Resort area created from LIDAR (Light Detection and Ranging) bathymetric data overlain on Ikonos satellite image.

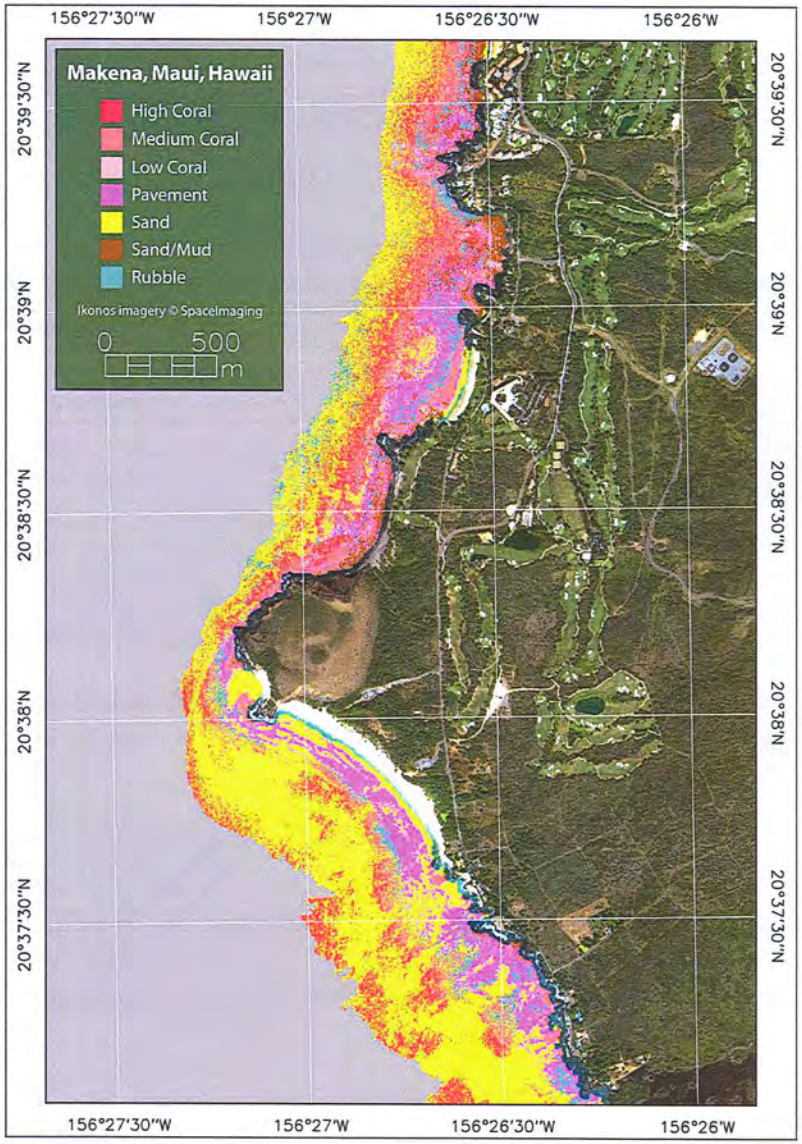

FIGURE 9. Benthic habitat map of Makena Resort area created from Ikonos satellite imagery.

TABLE 3. Benthic invertebrates observed on transects off the Makena H-2 project site.

	TRANSECT		
	1	2	3
CORAL			
Leptastrea bewickensis	X		X
Montipora capitata	X	X	X
M. patula	X	X	X
Palythoa tuberculosa	X	X	X
Pavona varians			X
Pocillopora eydouxi	X		
P. meandrina	X	X	X
Porites compressa	X	X	
P. lobata	X	X	X
SEA URCHINS			
Diadema spp	X	X	X
Echinothrix calamaris	X		
Echoinometra mathaei	X	X	X
Heterocentrotus mamillatus	X	X	X
Tripneustes gratilla	X	X	X
Linckia spp.(sea star)	X	X	X
Pinctada margaritifera (black-lipped pearl oyster)		X	

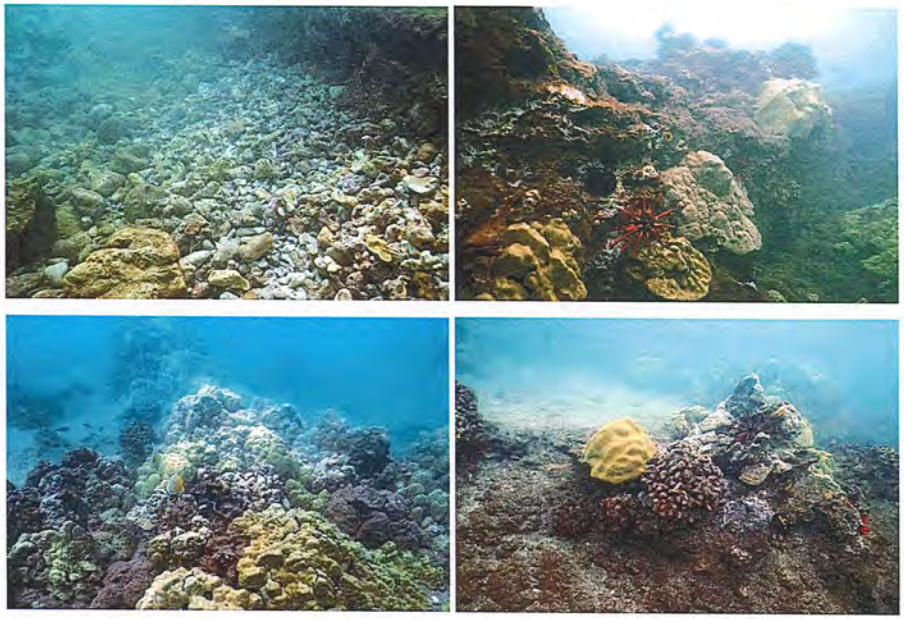

FIGURE 10. Views of nearshore reef in the vicinity of Transect 1 off the Makena H-2 site in South Maui. Top left photo shows nearshore eroded limestone platform. Bottom photos show colonies of *Porites* spp. growing on reef surface. For location of Transect 2, see Figure 3.

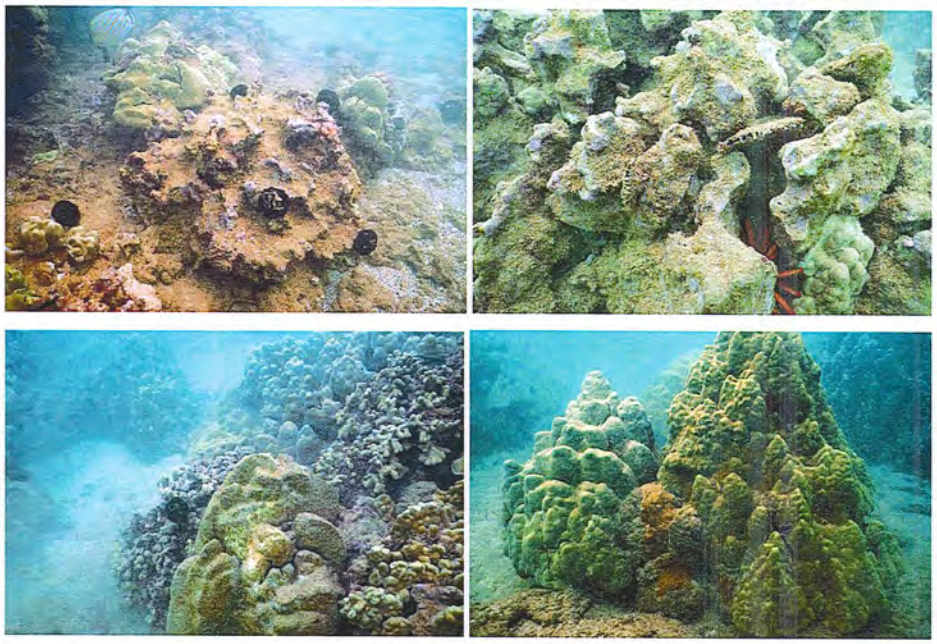

FIGURE 11. Views of nearshore reef in the vicinity of Transect 2 off the Makena H-2 site in South Maui. Top photos show nearshore eroded limestone platform colonized by the collector urchin *Tripneustes gratilla*. Photo at top right shows eroded limestone structure containing several black lipped pearl oysters (*Pinctada margaritifera*). Bottom photos show colonies of *Porites* spp. growing on reef surface. For location of Transect 2, see Figure 3.

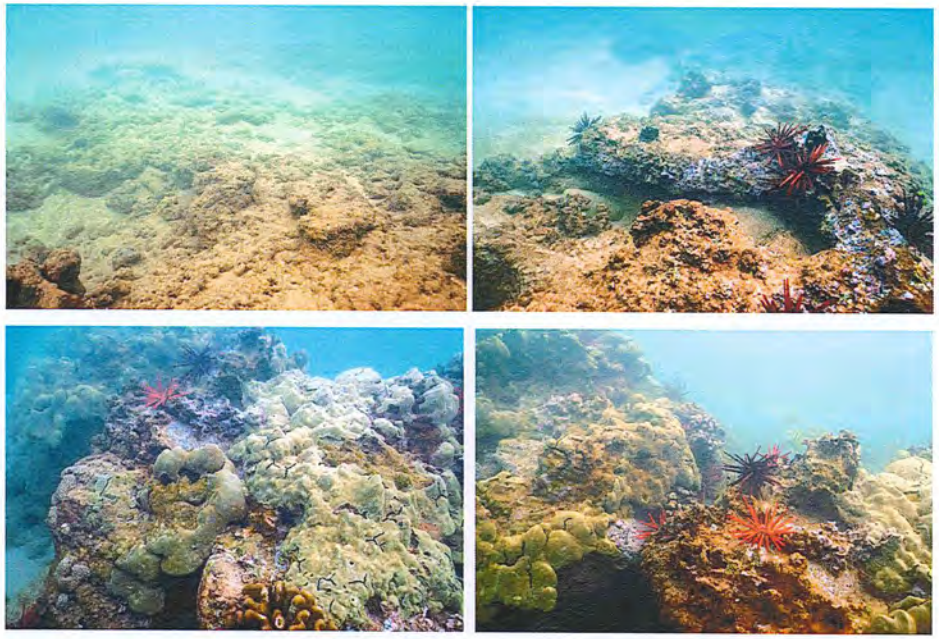

FIGURE 12. Views of nearshore reef in the vicinity of Transect 3 off the Makena H-2 site in South Maui. Top photos show nearshore limestone platform interspersed with sand pockets. Bottom photos show encrusting colonies of *Porites lobata* on elevated extensions of rock outcrops that extend offshore.

TABLE 4. Reef fish observed on transects off the Makena H-2 project site.

	TRANSECT		
FISH SPECIES	**1**	**2**	**3**
Acanthurus blochii		X	X
A. leucopareius	X		
A. nigrofuscus	X	X	X
A. nigrosis	X		
A. olivaceus	X	X	
A. triostegus			X
Canthigaster jactator	X	X	X
Chaetodon Auriga		X	
C. lunula	X		
C. lunulatus	X	X	
C. multicinctus	X		
C. ornatissimus	X		
C. quadrimaculatus	X		
C. strigosus	X		
C. unimaculatus	X		
Chromis vanderbilti	X	X	X
Fistularia commersonii	X		
Forcipiger spp	X		
Melichthys niger	X		
Mulloidichthys flavolineatus		X	X
M. vanicolensis	X		
Naso hexacanthus	X		
Ostracion meleagris		X	
Parupeneus multifasciatus	X	X	
P. pleurostigma	X		
Rhinecanthus rectangulus	X		
Stethojulis balteata	X		
Stegastes marginatus		X	
Thalassoma duperrey	X	X	X
T. trilobatum			X
Zanclus cornutus	X		
Zebrasoma flavescens	X		

Potential Impact of the Makena H-2 Residential Project on Water Resources

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May 2019

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Introduction

The proposed H-2 Residential Project would be developed on a 28-acre site located in Makena, Maui. Figure 1 shows its location. The property is also identified as TMKs (2) 2-1-005:085 and a portion of 120. Figure 2 is a preliminary site plan showing 53 single family lots ranging in size from 0.17 to 0.53 acres, a revised public parking lot, drainage retention areas, and archaeological sites that would be left undisturbed.

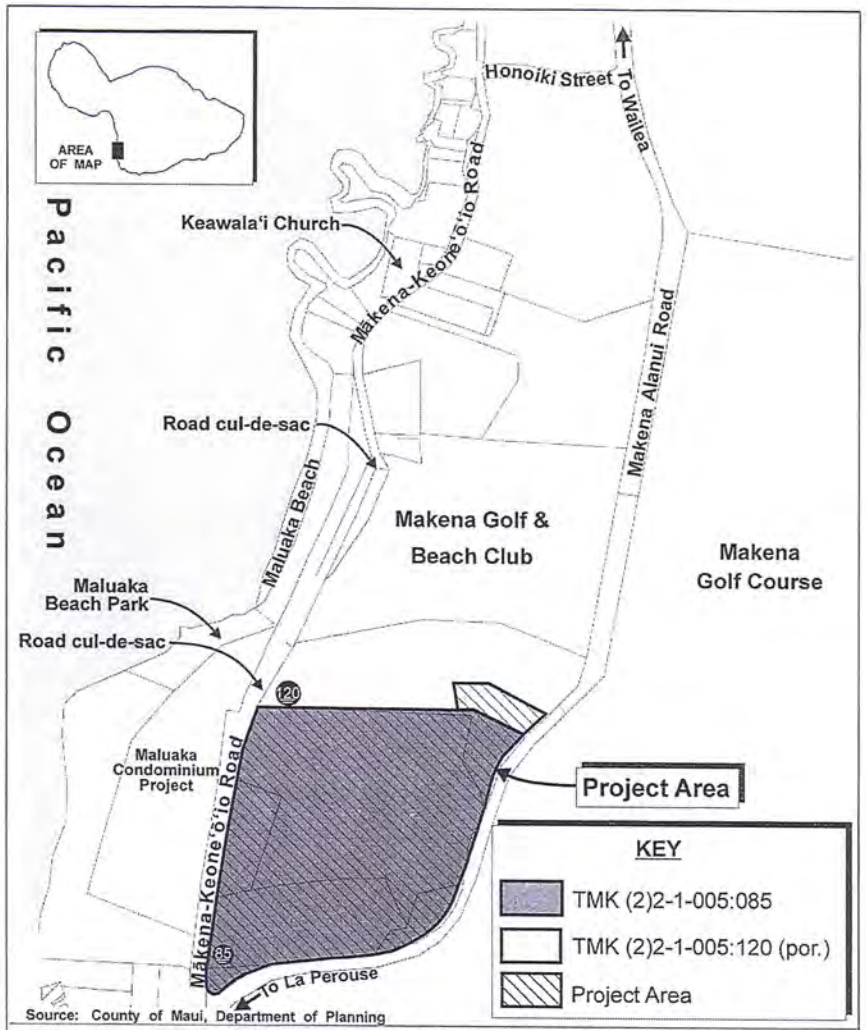
Construction and subsequent occupation of the project has the potential of impacting water resources in the following four ways: use of water from the Maui County Department of Water Supply (MDWS) system for potable use; use of brackish (non-potable) water from the Makena golf course system for landscape irrigation on the lots and common areas; generation of domestic wastewater, its treatment, and ultimate disposal or reuse; and the change in surface water runoff. Each of these is described and quantified in the sections following.

Potable Water Supplied from the MDWS System

The MDWS standard of 600 gallons per day (GPD) per single family residence includes domestic use within residences and landscape irrigation. Several factors regarding use of this design standard for the H-2 project need to be considered. First, most of the landscape irrigation for the H-2 project will be from a separate, non-potable system. Second, water from the non-potable system will be brackish, limiting the choice of plant materials. If lot owners want to have some flowering ornamentals, they would need to be irrigated with MDWS water. Third, historical use in the Wailea-Makena area has substantially exceeded MDWS standards, primarily due to landscape irrigation. Based on these considerations and to be conservative for the analysis of potential impacts on water resources, an average use of 900 GPD per lot from the MDWS system, equivalent to 47,700 GPD for the 53-lot project, has been assumed.

Brackish (Non-Potable) Water from the Makena Golf Course System for Landscape Irrigation

Based on an April 2005 agreement with the Makena Golf Corp., the project's developer may use up to 200,000 GPD of water from the golf courses irrigation system during construction and then subsequently for landscape irrigation. Use of the water is limited to between the hours of 6:00 AM to 6:00 PM, the hours when irrigation of the golf course is minimal or not occurring at all.

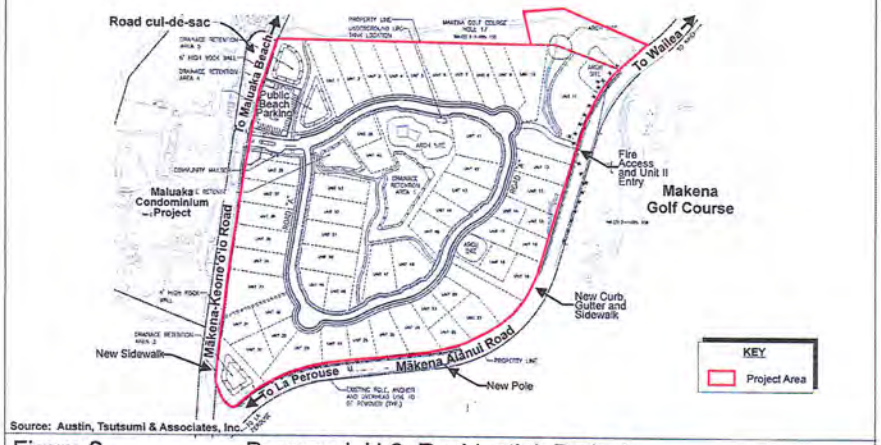


Source: County of Maui, Department of Planning

Figure 1 Proposed Makena H-2 Residential Project Property Location Map

Prepared for: H2R, LLC

MUNEKIYO HIRAGA



Source: Austin, Tsutsumi & Associates, Inc.

Figure 2 Proposed H-2 Residential Project
Conceptual Site Plan

NOT TO SCALE

Prepared for: H2R, LLC

MUNEKIYO HIRAGA

Based on calculations by the project's civil engineer and landscape consultant, landscape irrigation would occur on 4.87 acres of common areas (including landscaped roadway swales) and 10.09 acres of the 53 lots. Using the EPA WaterSense Water Budget Tool (V 1.02), the landscape consultant has calculated the irrigation use to be 11,600 GPD on the common areas and a total of 54,800 GPD on the 53 lots. The program's calculation is for the "peak watering month" (June) when evapotranspiration at the site averages 6.50 inches and rainfall averages 1.17 inches. It also accounts for the type of landscaping, which is why the irrigation rate on the lots, equivalent to 5400 GPD per acre, is far higher than the 2380 GPD per acre rate for the common areas. Actual irrigation has some inefficiencies and never perfectly matches calculated plant requirements. For this reason, the combined 66,400 GPD irrigation requirement is assumed to be a year-round average, not simply the average in the peak watering month.

Wastewater Generation, Treatment, and Disposal or Irrigation Reuse

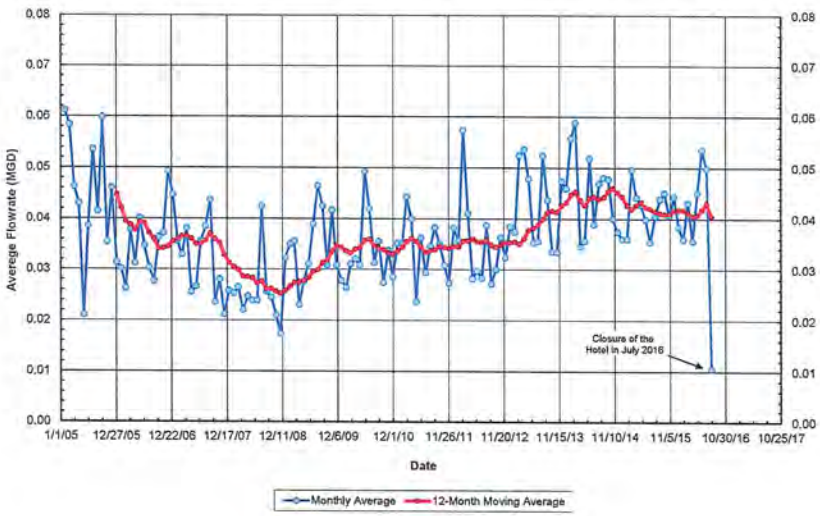
Using the Maui County design standard of 350 GPD of domestic wastewater generation per residence, ATA (2019) calculates the project's average wastewater generation to be 18,550 GPD. The wastewater would be pumped to the private Makena Wastewater Reclamation Facility (MWRF) for treatment and disposal or reuse. From 2005 to the closing of the Maui Prince Hotel in July 2016, the amount of wastewater processed at the MWRF averaged about 40,000 GPD (Figure 3). Since then, the wastewater delivered to the MWRF has been so minimal that it has been evaporated rather than treated. With completion of the hotel's redevelopment and completion of the H-1 and H-2 residential projects, it is anticipated that the amount of wastewater delivered to the MWRF will likely exceed the previous 40,000 GPD average.

Historically, the modest amount of treated wastewater has been disposed of in the large pit located on the north side of the MWRF. In the future when wastewater amounts warrant, it may be reused for golf course irrigation. However, for the purposes of this assessment, it will be assumed that disposal into the pit will be continued as its impact on groundwater would be greater than if reuse for golf course irrigation were to occur.

Changes in Surface Water Runoff

The discussion herein on surface runoff for existing conditions and as proposed for the H-2 project is drawn from ATA (2019). At present, drainage facilities on or near to the 28-acre project site include small culverts in Makena Alanui Road which convey runoff from 17.9 acres of mauka land onto

Figure 3. Monthly Average Amounts of Processed R-1 Effluent by the Makena Wastewater Reclamation Facility



the project site and an existing onsite retention basin which moderates the surface runoff from a portion of the site which crosses Makena Keoneoio Road onto the Maluaka project which is directly downgradient. These features are shown on Figure 4 along with calculated peak runoff rates for the 50-year, 1-hour storm event.

The project's preliminary drainage plan is shown on Figure 5. The existing retention basin would be removed, and five new retention basins would be installed with a total retention volume of 220,830 cubic feet. As presented in Appendix A of ATA (2019), the system is designed to retain onsite all runoff from a 50-year, 1-hour storm event from the 28-acre project site and the 17.9 acres which drain onto the site. During larger storm events, the sequential overflow of the basins as depicted on Figure 6 would occur.

Description of Groundwater Conditions in the Vicinity of the Makena H-2 Project Site

The project site is located near the south boundary of the Kamaole Aquifer System (Figure 7). The Kamaole Aquifer System is a 90 square mile triangular shaped area with its apex at the top of Haleakala and a 12-mile shoreline length from Waiakoa Gulch on the north end to the mountain's southwest rift zone on the south. The Commission on Water Resource Management's (CWRM) Groundwater Index lists 145 wells that have been developed in the Kamaole Aquifer System. Except for seven very high elevation wells which tap very modest sources of perched water, all of the other wells tap into basal groundwater which is underlain by saline groundwater and is in hydraulic contact with seawater at the shoreline. Results of the furthest inland drilled wells, along with the extensive geophysical surveys listed in the References at the end of this report, establish that the basal groundwater exists for at least five to seven miles in from the shoreline. No wells that have been drilled into the Kamaole Aquifer System have encountered high level groundwater.

In 1990, the CWRM initially established the Kamaole Aquifer System's sustainable yield at 11 million gallons per day (MGD) based on a computed recharge of 25 MGD and the assumption that 44 percent of the recharge could be safely pumped by wells on a continuous basis without impacting the viability of the aquifer system (George A. L. Yuen & Associates, 1990). A 2008 update of the CWRM's Water Resources Protection Plan continued the 11 MGD amount as the sustainable yield, again based on 25 MGD of recharge and 44 percent of the recharge being developable (Wilson Okamoto Corporation, 2008). More recent, far more sophisticated, and presumably more accurate calculations of the aquifer's recharge have been made by the U. S. Geological Survey (USGS). In USGS Scientific Investigations Report 2007-5103, recharge is calculated to be 37.5 MGD (Engott & Vana, 2007). In USGS Scientific Investigations Report 2014-5168, the calculated recharge is 33.9 MGD (Johnson, Engott, and Bassiouni,

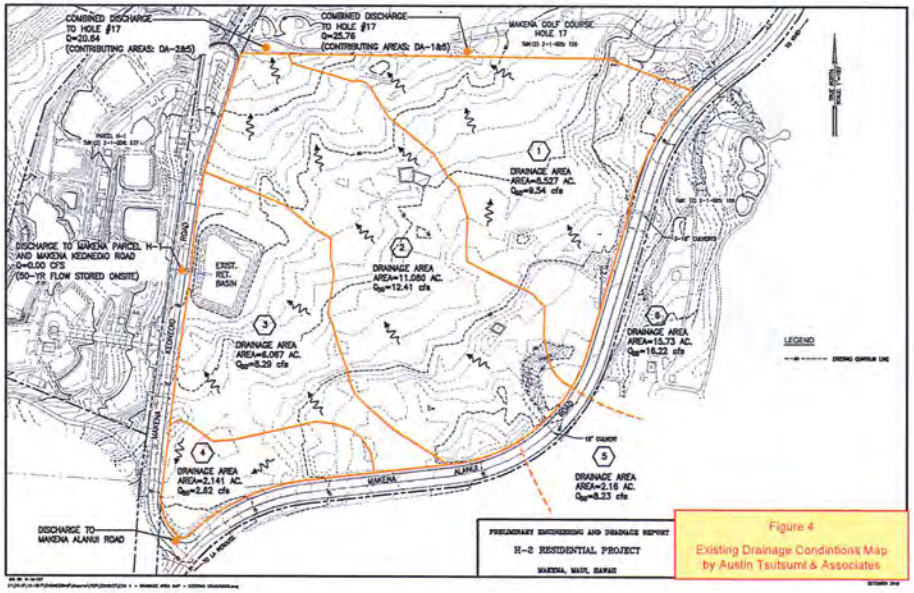


Figure 4
Existing Drainage Condintions Map
by Austin Tsutsumi & Associates

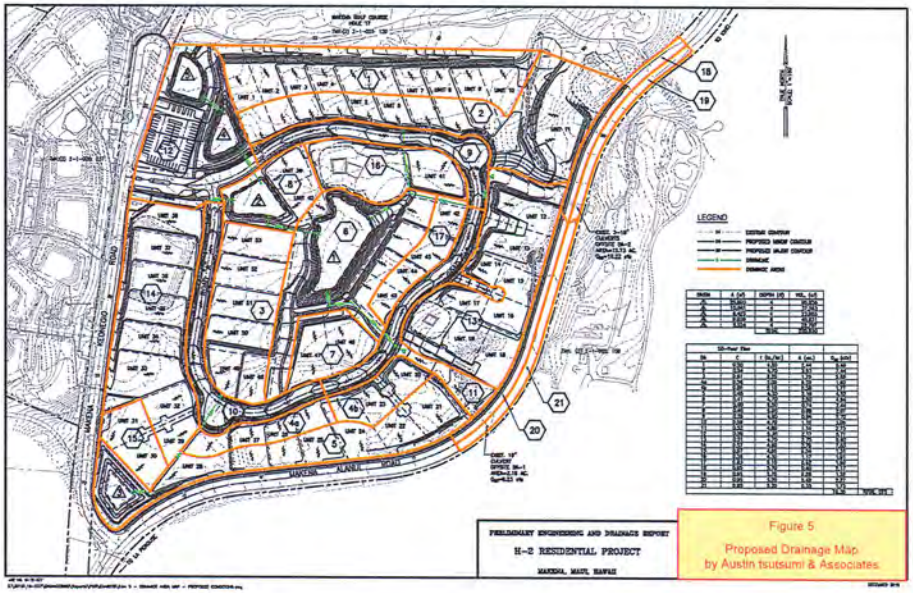


Figure 5
Proposed Drainage Map
by Austin tsutsumi & Associates

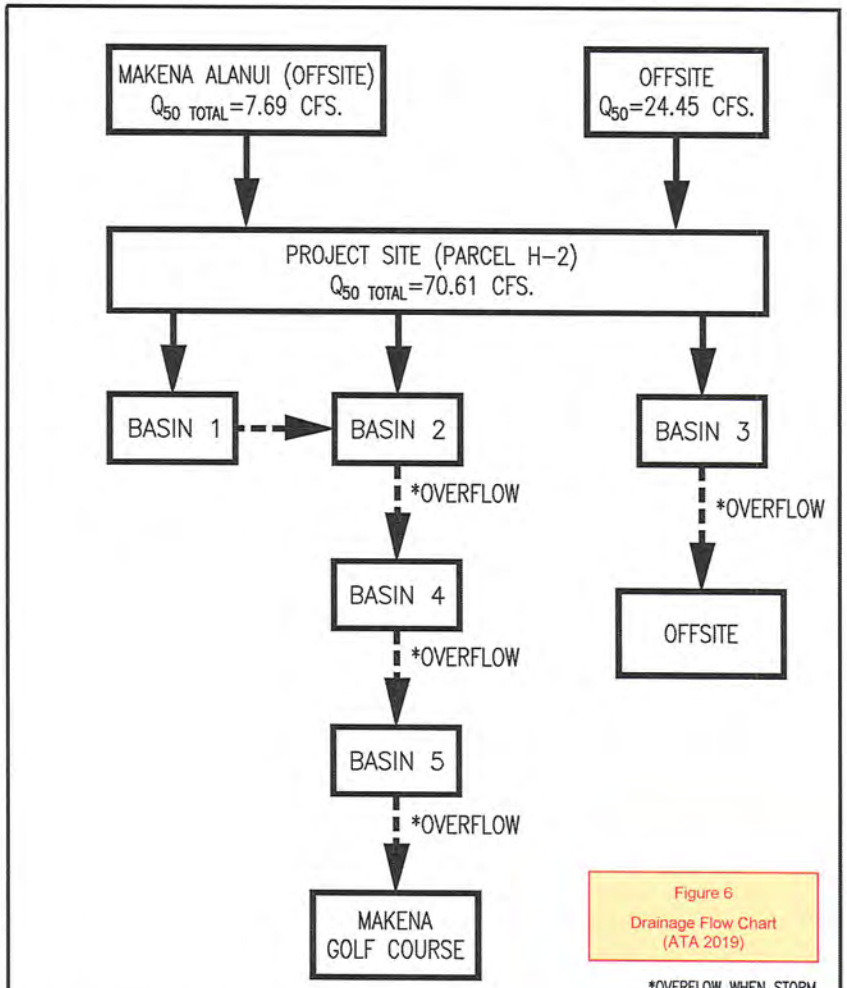


Figure 6
Drainage Flow Chart
(ATA 2019)

*OVERFLOW WHEN STORM EXCEED'S 50-YR, 1-HR.

PRELIMINARY ENGINEERING AND DRAINAGE REPORT MAKENA PARCEL H-2 PROJECT MAKENA, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII FLOW CHART	EXHIBIT

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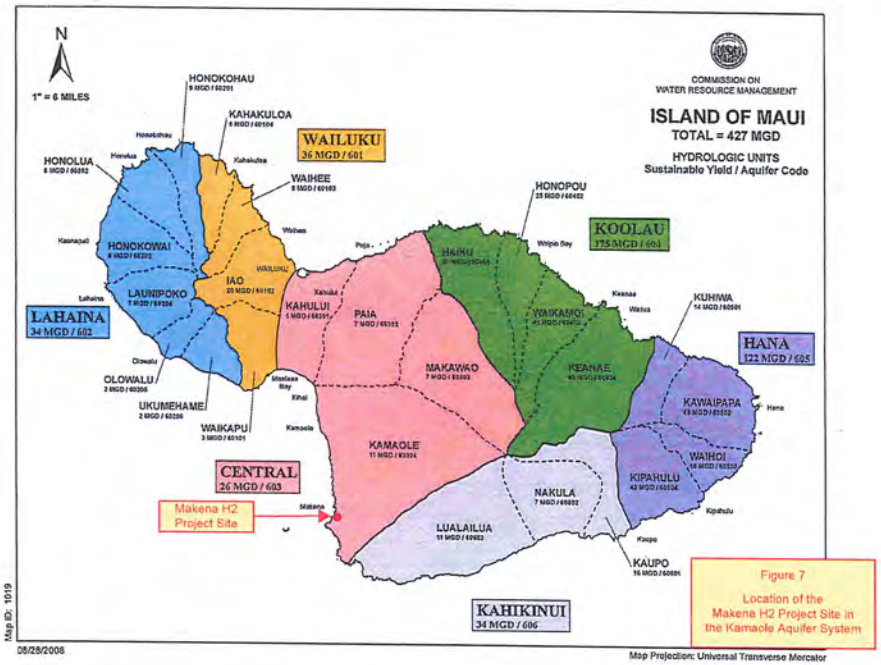


Figure 7
Location of the Makena H2 Project Site in the Kamaole Aquifer System

2014). These results are reasonably similar and greater than the recharge amount the sustainable yield of 11 MGD is based on.

About 35 wells in the Kamaole Aquifer System are currently active and their monthly pumpage amounts are being reported to the CWRM. Reported monthly pumpage of all active wells for the period from January 1991 through July 2018 is depicted graphically on Figure 8. Total reported use, expressed as a moving annual average, has been about three (3) MGD over the last five years. Most of this use has been by the irrigation wells of the Wailea and Makena Resort golf courses. The Wailea courses have 10 wells in active use. The Makena golf course has nine actively used wells.

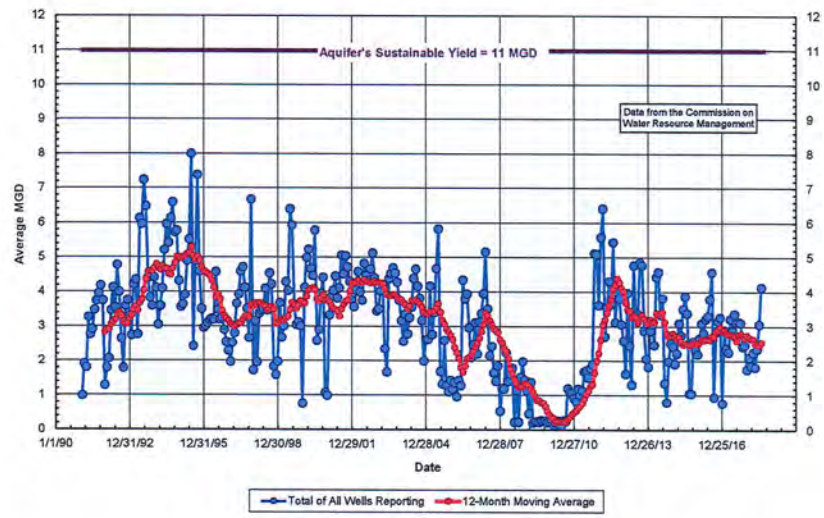
Locations of the Makena golf course wells in relation to the Makena H-2 project site are shown on Figure 9. Data on the dimensions, hydraulic performance, and installed pump capacities are compiled in Table 1. Their combined pumpage since January 2001 is shown on Figure 10. There are significant milestones to note during this 18-year period of use:

- The South Course was permanently closed in 2008. Prior to this time, the wells had been irrigating two 18-hole golf courses.
- In April 2013, the North Course was closed for renovation
- From August 2013 through December 2015, grow in proceeded sequentially on renovated holes of the North Course.
- In January 2016, the renovated North Course was re-opened for play.

Use by the Makena golf course wells is compared to total well pumpage in the Kamaole Aquifer System on Figure 11. Prior to closing the South Course in 2008, pumpage by the Makena golf course wells amounted to 40 to 45 percent of all well pumpage in the Aquifer. Since the North Course opened following its renovation in January 2016, the golf course well pumpage has been about 20 percent of total aquifer pumpage.

On October 9, 2018, sampling of six of the Makena golf course wells was completed and the water analyzed for salinity, silica, and forms of nitrogen and phosphorus. The other three normally used wells, Nos. 2, 10, and 11, were not in service due to pump, motor, and/or electrical issues and could not be sampled. The two monitor wells downgradient of the Makena H-2 project site, identified as SW-1 and SW-2 on Figure 9, were also sampled. On October 17, 2018, samples were collected from the SW-1, SW-2, and SW-3 monitor wells. All of the laboratory results for these two sampling events are presented in Table 2. The several aspects of particular relevance to this assessment of the potential impact of the H-2 project are as follows.

Figure 8. Total of Reported Well Pumpage in the Kamaole Aquifer System, January 1991 through July 2018



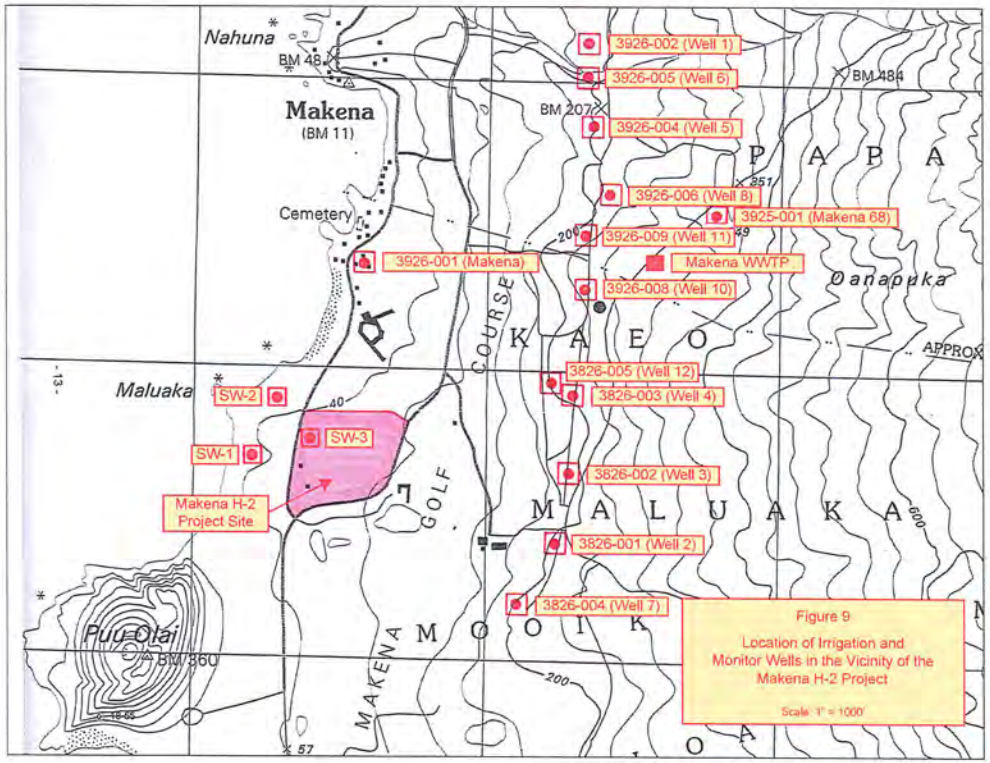


Table 1. Data on Wells in the Near Vicinity of the Makena H-2 Project

Well		Year Drilled	Casing Diameter (Inches)	Ground Elevation (Ft. MSL)	Well Depth (Feet)	Elevation at Bottom (Ft. MSL)	Static Water Level (Ft. MSL)	Initial Chlorides (MG/L)	Hydraulic Performance (Feet at GPM	Installed Pump (GPM)	Present Status
State Number	Name										
Makena Golf Course Irrigation Wells											
3926-002	Seibu 1	1976	12	179	208	-29	1.57	666	15 @ 400	350	In Use
3826-001	Seibu 2	1978	12	202	222	-19	2.21	1445	- - @ 300	400	In use
3826-002	Seibu 3	1978	12	199	220	-21	2.08	1500	- - @ 400	400	In use
3826-003	Seibu 4	1978	12	207	228	-21	1.58	1100	0.6 @ 400	400	In use
3926-004	Seibu 5	1984	12	212	230	-18	NA	1050	- - @ 500	400	In use
3926-005	Seibu 6	1984	12	203	224	-21	NA	668	0.5 @ 400	400	In use
3826-004	Seibu 7	1985	12	173	195	-22	NA	879	1.0 @ 250	150	Not in Use
3926-006	Seibu 8	1988	12	241	263	-22	1.00	1182	1.0 @ 300	300	In use
3926-007	Seibu 9	1988	12	220	242	-22	1.00	7030	6.3 @ 207	400	Not in Use
3926-008	Seibu 10	1988	12	268	290	-22	0.93	1485	1.0 @ 350	400	In use
3926-009	Seibu 11	1988	12	257	278	-21	2.00	1454	0.7 @ 250	300	In use
3826-005	Seibiu 12	1989	12	203	231	-28	2.57	1900	0.4 @ 350	None	Not in Use
Other Nearby Wells											
3926-001	Makena	1972	4							None	Not in Use
3925-001	Makena 68	1964	8	352	382	-30	0.8	600	0.8 @ 150	None	Not in Use

None: Data from the files of the Commission on Water Resource Management

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Figure 10. Reported Well Pumpage of All of the Nine Active Makena Golf Course Wells

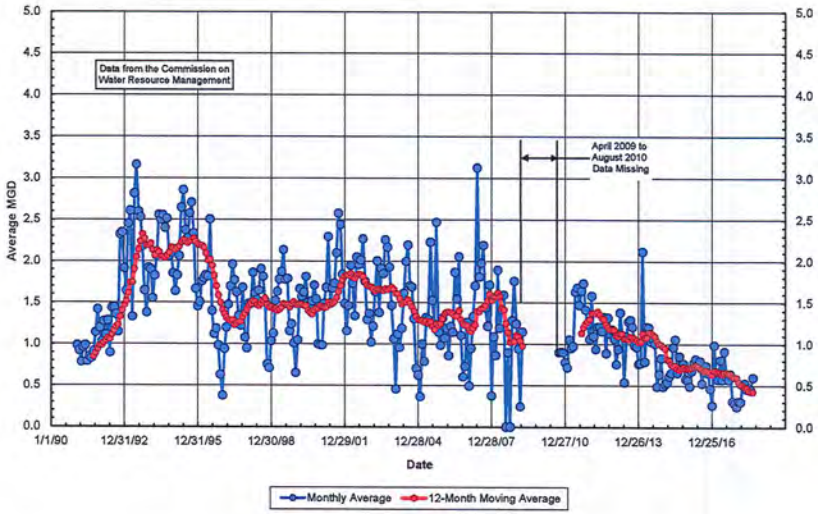

Figure 11. Comparison of Pumpage by the Makena Golf Course Wells and Total Reported Pumpage in the Kamaole Aquifer System, January 1991 through July 2018

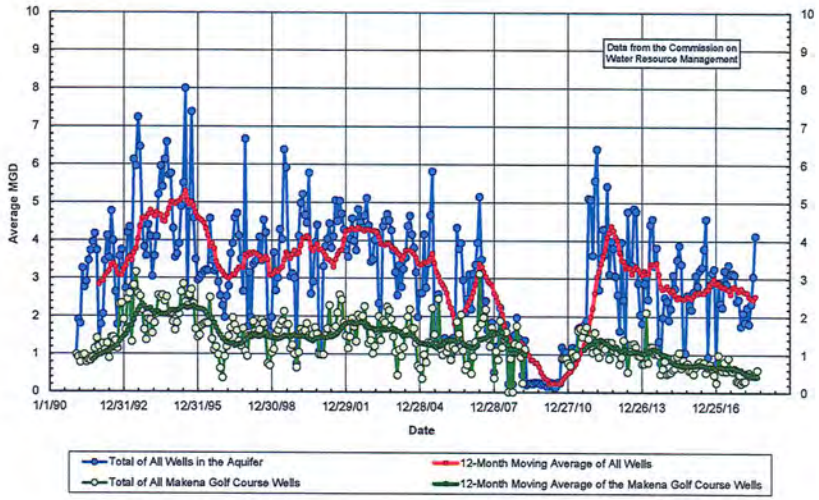

Table 2. Results of Sampling the Makena Golf Course Wells and the Three SW Monitor Wells

Well		Sample Date	Forms of Nitrogen (µM)				Forms of Phosphorus (µM)			Silica (µM)	Salinity (PPT)
Name	State Number		NO_3	HH_4	TON	Total N	PO_4	TOP	Total P		
Makena Golf Course Irrigation Wells											
Seibu 1	3926-002	10/09/18	133.39	4.65	18.88	156.92	2.32	0.01	2.33	540	1.04
Seibu 3	3826-002	10/09/18	123.49	2.56	17.32	143.37	3.55	1.70	5.25	728	1.60
Seibu 4	3826-003	10/09/18	117.36	0.87	2.77	121.00	3.21	1.48	4.69	685	1.57
Seibu 5	3926-004	10/09/18	189.23	1.82	20.02	211.07	2.70	0.48	3.18	566	1.26
Seibu 6	3926-005	10/09/18	146.52	3.74	13.28	163.54	2.66	0.70	3.36	543	1.18
Seibu 8	3926-006	10/09/18	105.16	0.62	0.20	105.98	3.25	0.46	3.71	638	1.58
SW Monitor Wells											
SW-1	--	10/09/18	433.05	3.91	67.22	504.18	5.77	0.14	5.91	723	4.12
	--	10/17/18	374.61	3.56	37.15	415.32	5.33	0.36	5.69	730	4.20
SW-2	--	10/09/18	331.75	4.06	132.98	468.79	4.30	5.33	9.63	737	2.35
	--	10/17/18	353.05	2.50	45.29	400.84	4.65	0.10	4.75	746	2.14
SW-3	--	10/17/18	6.67	1.30	4.77	12.74	0.23	0.30	0.53	68	0.71

None: 1. All samples collected by Tom Nance of Tom Nance Water Resource Engineering
2. All laboratory analyses by Marine Consulting and Analytical Resources, LLC.

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- The Seibu 3 and 4 wells are nominally upgradient from the H-2 project site and are inland of the irrigated golf course holes. Their results in Table 2 are taken to be representative of the quality of the ambient groundwater not impacted by the golf course or other development activities.
- The SW-1 and SW-2 monitor wells are downgradient of the H-2 project site and also downgradient of irrigated golf course holes. Their substantially higher nitrogen and phosphorus levels than in the upgradient Seibu 3 and 4 wells are attributed to percolation of irrigation water on the intervening golf course holes.
- The results of the SW-3 monitor well are clearly not reflective of basal groundwater quality. Construction details of the well are not known, but it appears that the annular space was not properly sealed, allowing rainwater to accumulate in the well.

The three SW monitor wells shown on Figure 9 were installed for the Makena H-1 project directly downgradient of the Makena H-2 project site. The locations of the SW-1 and SW-2 wells provide data of groundwater conditions beneath and downgradient of the Makena H-2 site. On October 17, 2018, salinity and temperature profiles were made through the water columns of all three wells (Figures 12, 13, and 14). Although their penetrations into groundwater are relatively modest (from 10.6 feet in the SW-2 Well to 16.6 feet in the SW-1 Well), the profiles clearly show the following characteristics of the basal lens in the nearshore area of the H-2 site:

- Over the relatively short distance toward the shoreline between the SW-3 and SW-1 wells, the profiles show a substantial salinity increase and a rapidly thinning basal lens (Figure 15).
- At the SW-3 well within the H-2 parcel, there is a sharp salinity increase beginning only about six (6) to seven (7) feet into groundwater (Figure H). Based on the sample results discussed above, only the lower portion of the curve is indicative of actual groundwater conditions.
- The anomalously warmer water in the SW-3 well (77°F) in comparison to the SW-1 and SW-2 wells (72° to 73°F) is indicative of the trapped rainwater being a possible explanation (Figure 16).

Based on the foregoing review of groundwater conditions, analysis of the project's potential impact on groundwater presented in sections following is based on the following assumptions:

- Using the two USGS studies cited previously, recharge in the Kamaole Aquifer System is about 36 MGD.
- The recharge is approximately evenly distributed over the Aquifer's 12 coastal miles, amounting to about 3.0 MGD per coastal mile.

Figure 12. Salinity and Temperature Profile through the Water Column of the SW-1 Monitor Well on October 17, 2018

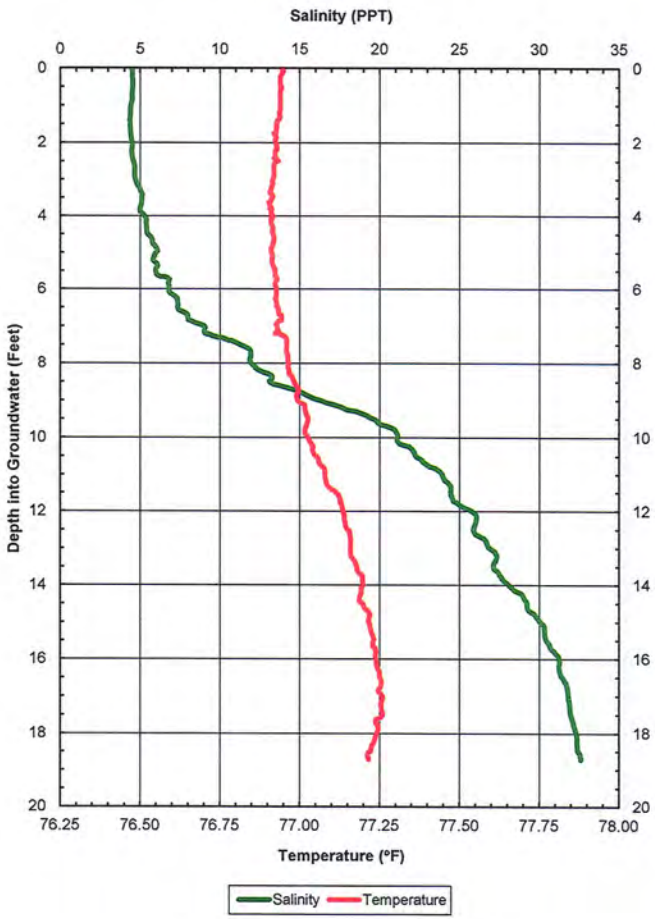


Figure 13. Salinity and Temperature Profile through the Water Column of the SW-2 Monitor Well on October 17, 2018

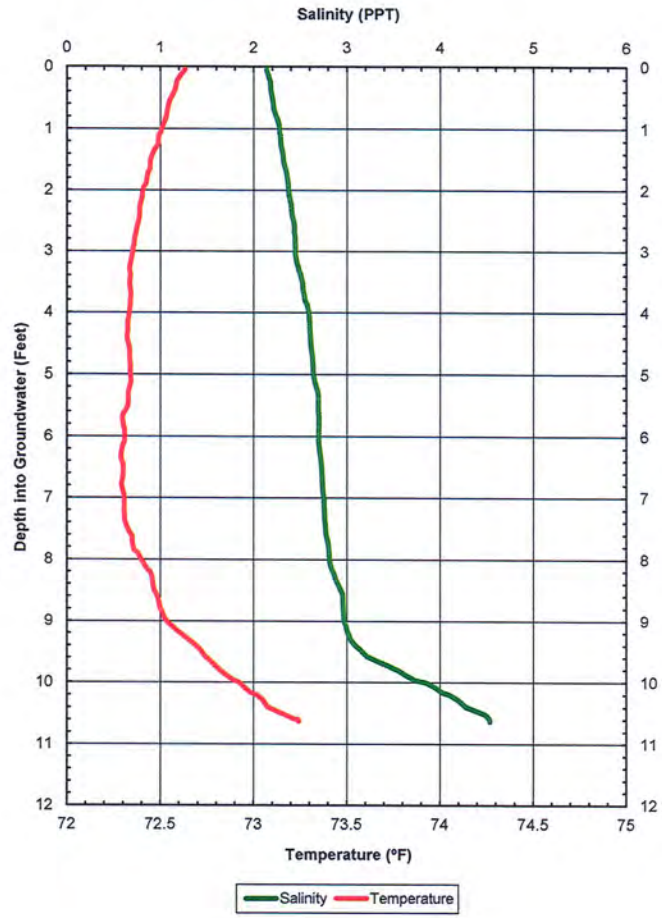


Figure 14. Salinity and Temperature Profile through the Water Column of the SW-3 Monitor Well on October 17, 2018

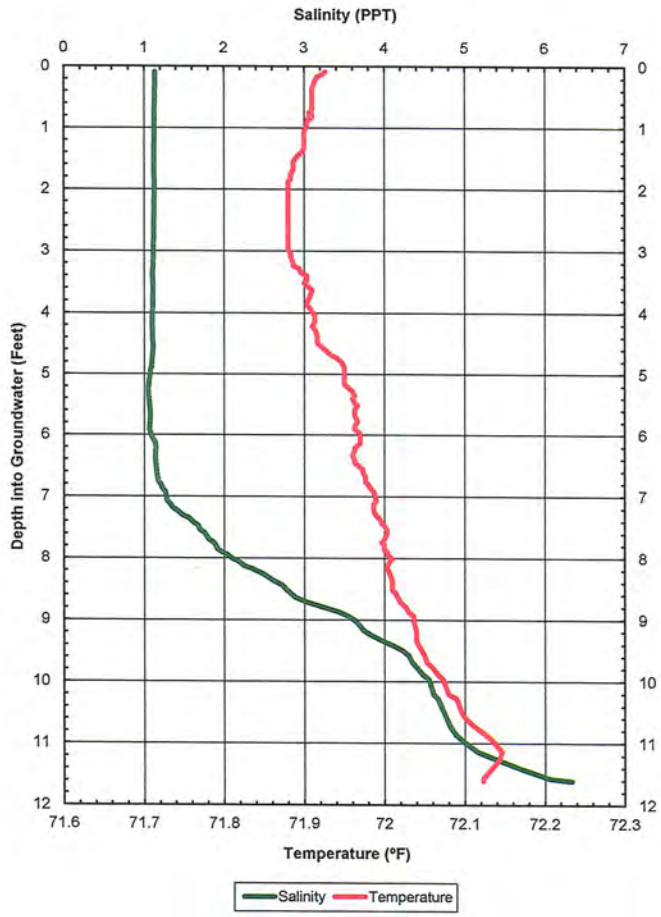


Figure 15. Comparative of the Salinity Profiles of the SW-1 and SW-3 Monitor Wells

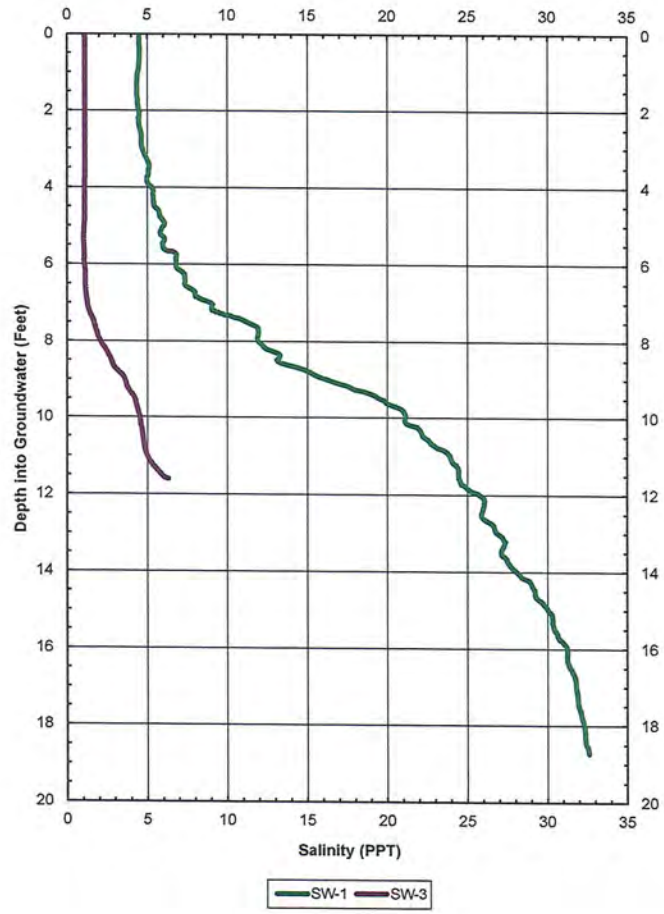
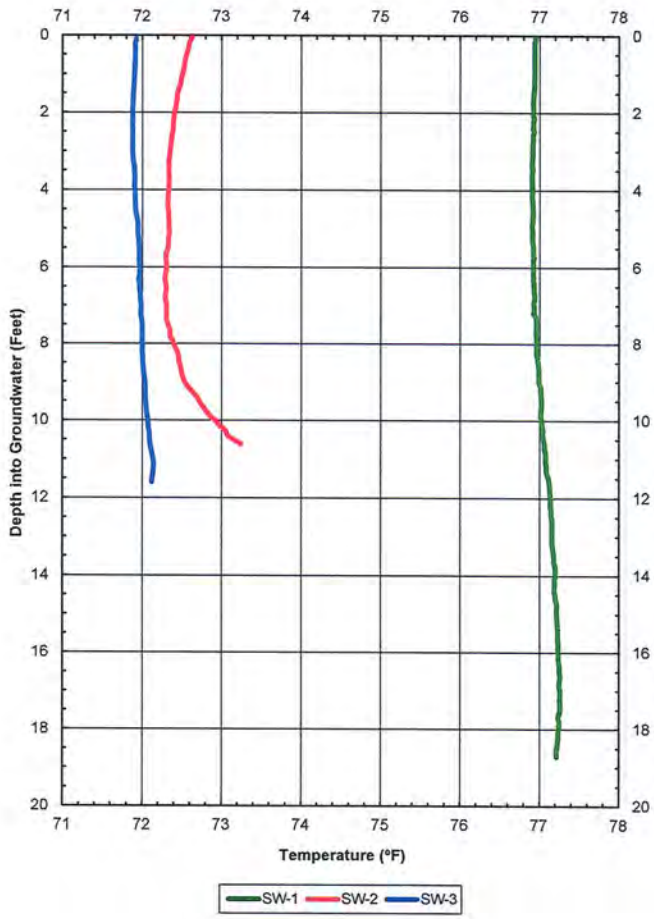


Figure 16. Comparison of Temperature Profiles in the SW Monitor Wells on October 17, 2018



- The three Makena golf course wells directly upgradient of the Makena H-2 site (Seibu Well 2, 3, & 4) span a coastal distance of 1700 feet (0.32 miles) and are currently pumping a combined 0.25 MGD (Figure 17).
- Over this 1700-foot wide coastal segment, the residual amount of groundwater not pumped by these three wells and ultimately discharging into the marine environment is approximately 0.7 MGD.
- There is an irrigated golf course hole between the SW-1 and SW-2 monitor wells, and the shoreline, suggesting that nitrogen and phosphorus levels in the groundwater discharged along the shoreline may be slightly higher than shown for these two wells in Table 2.
- Based on the water quality results of the SW-1 and SW-2 wells and the net of 0.7 MGD flowing beneath the H-2 site on its way to discharging into the marine environment, the groundwater is carrying 36.7 pounds per day of nitrogen and 1.04 pounds per day of phosphorus. This is likely increased by an unknown amount by percolation of irrigation water from the intervening golf hole.

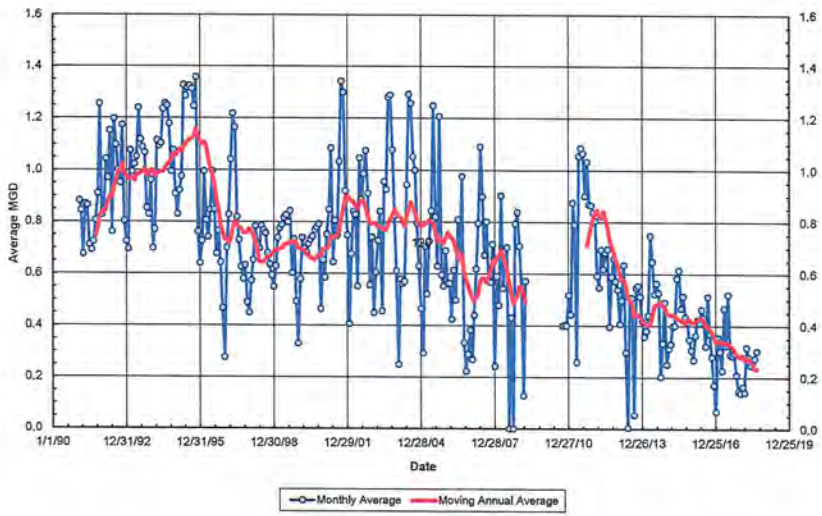
Quantification of the Project's Potential Impact on Water Resources

Overview. As stated previously, the H-2 project has the potential to impact water resources in the following four ways: (1) use of MDWS water for potable consumption and potentially some portion of the landscape irrigation; (2) use of brackish well water from the Makena golf course system for most of the landscape irrigation; (3) generation, treatment, and disposal of domestic wastewater; and (4) changes to surface runoff. Estimates of these impacts are presented in the sections following.

Use of Water from the MDWS System. Using an average of 900 GPD per lot, use of potable water from the MDWS system by the 53-lot project translates to a total of average supply 47,700 GPD. MDWS sources which will be providing this supply include wells in the Iao Aquifer, wells in the Waihee Aquifer to the north of Iao, and possibly a small amount from MDWS' Iao surface water treatment plant. The project's relatively modest supply requirement is well within the capacity of MDWS' system, particularly with completion of redistributing the draft from the southern half of the Iao Aquifer and when the expansion of the capacity of the Iao surface water treatment plant comes online. This additional use is not considered to have a significant impact on the MDWS system.

Percolation to Groundwater of Excess Landscape Irrigation. The project's irrigation consultant, using the EPA WaterSense program, established a total landscape irrigation supply on the order of 66,400 GPD. Most of this will be brackish water supplied by the Makena golf course system, but some may be from the MDWS system for less salt tolerant flowering plants. Some of this applied water will

Figure 17. Combined Pumpage of Makena Golf Course Wells 2, 3, and 4 Upgradient of the H-2 Project Site



pass below the root zone and ultimately enter into the basal groundwater below. As an order of magnitude estimate of its potential impact on groundwater, the following assumptions are made:

- 10 percent of the applied irrigation water or 6,640 GPD percolates to the groundwater below.
- The nitrogen and phosphorus levels in the percolate are twice as great as in the applied water as some of the applied fertilizer will be dissolved into the percolate. Total nitrogen is increased from 1.8 milligrams per liter (MG/L) to 3.6 MG/L. Total phosphorus is increased from 0.10 MG/L to 0.20 MG/L.
- As the percolates travel downward through the vadose zone and then laterally with the groundwater to discharge at the shoreline, nutrient levels are reduced naturally, on the order of 50 percent for nitrogen and 80 percent for phosphorus.
- Resulting increases of nitrogen and phosphorus discharged into the marine environment are 0.10 pounds per day of nitrogen and 0.002 pounds per day of phosphorus.

Generation, Treatment, and Disposal of Domestic Wastewater. Based on Appendix C of ATA (2019), an average of 350 GPD of domestic wastewater would be generated by each of the 53 lots, an average of 18,550 GPD of wastewater would be delivered to the MWRF for treatment and disposal. Treated wastewater would be delivered to the adjacent unlined sump and it would ultimately percolate to the basal groundwater below. The nutrient loading to groundwater by this method of disposal is approximated in the following steps:

- To be conservative, evaporative loss in the pit is ignored. All 18,550 GPD of treated wastewater percolates to the groundwater below.
- Nitrogen and phosphorus concentrations in the untreated wastewater are 50 and 10 MG/L, respectively.
- Removal rates of nitrogen and phosphorus in the treatment process are 80 and 60 percent, respectively. Resulting concentrations in the treated effluent are 10 and 4.0 MG/L, respectively.
- The disposal pit is at 300-foot elevation and it is approximately 3400 feet from the shoreline. Based on determinations by TNWRE of the removal rates of pit disposal by the Kealakehe Wastewater Treatment Plan on the Big Island (50-foot vertical drop through the vadose zone and 3400-foot travel to the upper end of Honokohau Harbor), natural removal rates for nitrogen and phosphorus are conservatively assumed to be 85 and 95 percent, respectively. That leaves residual concentrations of 1.5 and 0.2 MG/L, respectively.
- For the 18,550 GPD being disposed of in this manner, the nutrient loading amounts to 0.28 pounds per day of nitrogen and 0.004 pounds per day of phosphorus.

- Assuming lateral dispersion of 10 degrees along the 3400-foot long travel to the shoreline, this loading would occur over a 1200-foot long segment of the shoreline. This coastal segment is to the north of the H-2 project site. This additional nutrient loading would be an increase on the order of 0.1 percent for nitrogen and 0.5 percent for phosphorus to the ongoing nutrient loading along this coastal segment.

Change in Rainfall Runoff. Average annual rainfall at the H-2 project site is 15 inches. Over the 28-acre project site, this amounts to a year-round average of about 30,000 GPD. At the undeveloped site, this rainfall amount is roughly divided equally among surface runoff, percolation to groundwater, and evapotranspiration, each at an average of about 10,000 GPD. Development of the project site will definitely increase the amount of rainfall-runoff. Based on Appendix A of ATA (2019), for rainfall events equal to or less than the 50-year, 1-hour storm would be captured in the project's five retention basins and this captured runoff would percolate to the groundwater below. To provide an order of magnitude estimate of this potential, the following assumptions and calculations are made:

- The average of present percolation of groundwater to the basal lens of 10,000 GPD is increased to 20,000 GPD.
- Concentrations of total nitrogen and total phosphorus of the present percolate are 1.0 and 0.2 MG/L, respectively. After development due to the application of fertilizers, these concentrations in the post-development percolate are assumed to be doubled.
- As the percolate moves downward through the vadose zone and laterally with the groundwater to shoreline discharge, natural nutrient removal rates are 70 percent for nitrogen and 90 percent for phosphorus.
- Based on these concentrations and natural removal rates, increase of nutrients based on the site development would amount to 0.045 pounds per day of nitrogen and 0.005 pounds per day of phosphorus.

Summary of Potential Impacts to Water Resources

Changes to the Groundwater Flowing Beneath the H-2 Project Site. Changes to groundwater flowing beneath the H-2 project site and ultimately discharging at the shoreline along a 1700-foot long segment are listed in the three bullet points below. All of these increases are less than the natural seasonal variations in groundwater and are deemed to be of no significant consequence.

- An increase in the groundwater flow rate of about 16,600 GPD, a 2.4 percent increase over the present 0.7 MGD flowrate;

- The addition of 0.145 pounds per day of nitrogen, an increase of 0.4 percent, and
- The addition of 0.007 pounds per day of phosphorus, an increase of 0.7 percent.

Changes to Groundwater Discharging at the Shoreline Along a 1200-Foot Long Segment Downgradient of the MWRF's Disposal Pit. Treatment of domestic wastewater which is disposed of in the pit adjacent to the plant would add up to 18,550 GPD to the underlying groundwater (ignoring evaporative loss in the pit). Assuming the 1200-foot long downgradient shoreline segment is similar to the shoreline segment downgradient of the H-2 project site, this addition would increase the shoreline discharge by about 3.8 percent. Nutrients in this addition would increase nitrogen and phosphorus levels by 0.1 and 0.5 percent, respectively. These changes are too small to be detectable relative to natural background variations and are also deemed to be of no significant consequence.

Permanent Commitment of Potable Supply from the MDWS System. Potable water use provided by the MDWS system is projected to be about 48,000 GPD (Appendix B of ATA [2019]). This water would come from MDWS wells in the Iao and Waihee Aquifers and from MDWS' Iao surface water treatment plant. It would be delivered to the site via the Central Maui transmission system. MDWS sources of supply and transmission infrastructure can accommodate this additional supply commitment.

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BIOLOGICAL RESOURCES SURVEY

APPENDIX G

BIOLOGICAL RESOURCES SURVEY

for the

H – 2 RESIDENTIAL PROJECT

MĀKENA, MAUI, HAWAII

by

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ENVIRONMENTAL CONSULTANT
Kokomo, Maui
December 2018

Prepared for: H2R, LLC

BIOLOGICAL RESOURCES SURVEY
H – 2 RESIDENTIAL PROJECT
MĀKENA, MAUI

INTRODUCTION

The H – 2 Residential Project is located on approximately 28 acres in Maluaka, Mākena (see Figure 1), TMK (2) 2-1-005:085 & 120 (por.). The project area is bounded on the south and east by the Mākena Alanui Road, on the west by the Mākena-Keon'o'io Road and on the north by the Mākena Beach and Golf Club. This biological resource survey was initiated by the owners in fulfillment of environmental requirements of the planning process.

SITE DESCRIPTION

The terrain within the project area is gently to moderately sloping with many small lava outcrops. Elevations range from 35 feet on the lower boundary to 85 feet along the Mākena Alanui Road. The area could be characterized as a leeward dry forest with rainfall averaging 18-25 inches per year with most occurring during the winter months and with hot, dry summers (Armstrong, 1983). Soils are of the Mākena Loam Stony Complex Series, mildly alkaline and about 40 inches deep with many surface and subsurface stones (Foote et al, 1972). The property is presently undeveloped land.

BIOLOGICAL HISTORY

In pre-contact times this area would have supported a diverse dry forest/grassland with many species of native trees, shrubs, vines and grasses and a few seasonal herbs and ferns, as well as a complement of native birds and insects. We can still observe fragments of this diversity in relictual pockets of native vegetation in a few places between Kīhei and Mākena. This diversity of native species was drastically reduced by over a century of browsing and grazing by wild and domesticated herbivores and replaced by aggressive, non-native plant species. Charred stumps indicate that at least portions of the property have burned in the recent past, further reducing species diversity. The area now contains only some of the commoner native species and many non-native species that have proven to be stronger competitors and more resistant to disturbance.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the H–2 Residential Project in Mākena, Maui which was conducted during December 2018. The objectives of the survey were to:

1. Document what plant and animal species occur on the property or may likely occur in the existing habitat.

2. Document the status and abundance of each species.

3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.

4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method covering all portions of this property was used following routes to ensure complete coverage of the area. Areas most likely to harbor native or rare plants such as rocky outcroppings were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation in the project area can be described as a lowland dry forest. A total of 31 plant species were recorded in the survey during two site visits to the area. Two species were abundant throughout the project area: kiawe (*Prosopis pallida*) and sourgrass (*Digitaria insularis*). Also common were panini (*Opuntia ficus-indica*), inikō (*indigofera suffruticosa*), koa haole (*Leucaena leucocephala*), Brazilian nightshade (*Solanum seaforthianum*) and lantana (*Lantana camara*).

Four native plant species were recorded during the survey: the endemic wiliwili tree (*Erythrina sandwicensis*) and the indigenous koali awahia (*Ipomoea indica*), 'ilima (*Sida fallax*) and 'uhaloa (*Waltheria indica*). None of these are rare or protected species. All of the remaining twenty-seven species were non-native plants that are of no conservation concern.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area is predominantly non-native in character. There are, however, 4 native species that occur in modest numbers. These are 'ilima, koali awahia, wiliwili and 'uhaloa. These four species have persisted in significant numbers because they can handle disturbance and because they are inedible to the numerous deer that inhabit the area. Deer numbers have increased dramatically in the leeward dry forests in the past twenty years, especially in the Wailea and Mākena areas. Lush, irrigated landscapes here are like magnets to these herbivores especially during long, hot summers when feed is scarce. Native species diversity and numbers in this area are reduced as a result, and hardy weed species have proliferated in their place. None of the 4 endemic and indigenous native species recorded is listed as an Endangered or Threatened species (U.S. Fish and Wildlife Service, 2018), nor do any plants proposed for such status occur on the property.

Because the vegetation on the property is dominated by non-native plants and a few common native species, and because there are no Endangered or Threatened species within the project area, there is little of botanical concern with regard to this property. The development of the Mākena H – 2 Project is not expected to have a significant negative impact on the botanical resources in this part of Maui.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation

2. Common English or Hawaiian name.

3. Bio-geographical status. The following symbols are used:

   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

   Polynesian = those plants brought to the islands by the Hawaiians during their migrations.

   non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   abundant = forming a major part of the vegetation within the project area.

   common = widely scattered throughout the area or locally abundant within a portion of it.

   uncommon = scattered sparsely throughout the area or occurring in a few small patches.

   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
ASPHODELACEAE (Asphodel Family)			
Aloe vera (L.) N.L. Burman	common aloe	non-native	uncommon
ASPARAGACEAE (Asparagus Family)			
Furcraea foetida (L.) Haworth	Mauritius hemp	non-native	uncommon
POACEAE (Grass Family)			
Cenchrus ciliaris L.	buffelgrass	non-native	uncommon
Digitaria insularis (L.) Mez ex Ekman	sourgrass	non-native	abundant
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	rare
Melinis repens (Willd.) Zizka	Natal redtop	non-native	rare
DICOTS			
AMARANTHACEAE (Amaranth Family)			
Dysphania carinata (R.Br.) Mosyakin & Clemants	keeled goosefoot	non-native	rare
APOCYNACEAE (Dogbane Family)			
Thevetia peruviana (Persoon) K. Schumann	be-still tree	non-native	rare
ASTERACEAE (Sunflower Family)			
Ageratum conyzoides L.	maile hohono	non-native	rare
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	uncommon
Parthenium hysterophorus L.	Santa Maria	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
CACTACEAE (Cactus Family)			
Opuntia ficus-indica (L.) Mill.	panini	non-native	common
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea indica (J. Burm.) Merr.	koali awahia	indigenous	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
EUPHORBIACEAE (Spurge Family)			
Ricinus communis L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	rare
Erythrina sandwicensis Degener	wiliwili	endemic	uncommon
Indigofera suffruticosa Mill.	inikō	non-native	common
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	common
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	non-native	abundant
Vachellia farnesiana (L.) Wight & Arnott	klu	non-native	rare
MALVACEAE (Mallow Family)			
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	non-native	rare
Sida fallax Walpers	'ilima	indigenous	rare
Sida spinosa L.	prickly sida	non-native	rare
Waltheria indica L.	'uhaloa	indigenous	rare
SOLANACEAE (Nighshade Family)			
Nicotiana glauca R.C. Graham	tree tobacco	non-native	rare
Solanum linnaeanum Hepper & P. Jaeger	apple-of-Sodom	non-native	rare
Solanum seaforthianum Andr.	Brazilian nightshade	non-native	common
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	common

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition, an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Endangered Hawaiian hoary bat *(Lasiurus cinereus semotus)* in the area.

RESULTS

MAMMALS

Two species of mammals were observed in the project area during two site visits. Taxonomy and nomenclature follow Tomich (1986).

Axis deer *(Axis axis)* - Abundant deer sign was observed on all parts of the forested property where they often bed down for the day. These animals are nocturnally active, mobilizing around dusk to feed within the forested areas and within surrounding fairways and lush landscaped areas under cover of darkness. Numerous trails, tracks and scat were evident throughout the area as well as major signs of feeding, all attesting to their continuous use of the area.

'Ōpe'ape'a, Hawaiian hoary bat *(Lasiurus cinereus semotus)* - A special effort was made to look for the native Hawaiian hoary bat by making an evening survey at two locations in the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. One bat was seen in flight in this way. In addition, a bat detector device (Batbox IIID) was used, set to the frequency of 27,000 to 28,000 hertz that the Hawaiian bat uses in echolocation when pursuing nocturnal flying insects. Bat activity was detected at both locations with the use of this device.

Dense vegetation prevented good visibility of other ground dwelling animals, but a significant population of rats (*Rattus* spp.) and mice (*Mus domesticus*) would be expected as well as cats (*Felis catus*) and mongoose (*Herpestes auropunctatus*) that hunt for them.

BIRDS

Birdlife was moderate in number and diversity on this densely forested property. Nine non-native species of birds were recorded during two site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2018). Three species were common in the project area: zebra dove (*Geopelia striata*), gray francolin (*Francolinus pondicerianus*) and common myna (*Acridotheres tristis*). Two other birds were uncommon: The northern cardinal (*Cardinalis cardinalis*) and the African silverbill (*Lonchura cantans*). Four other species were rare.

INSECTS

Insect life was modest in the project area. A total of eleven species were recorded. Taxonomy and nomenclature follow Nishida, et al (1992). Three species were common: the sleepy orange butterfly (*Eurema niccipe*), the globe skimmer dragonfly (*Pantala flavescens*) and the big-headed ant (*Pheidole megacephala*). Just two native insects were seen, both of which are indigenous dragonflies: the globe skimmer dragonfly and the green darner dragonfly (*Anax junius*). Both of these are common throughout Hawaii. Nine non-native insect species were seen.

Although not found on the project site, one native Sphingid moth species, Blackburn's sphinx moth (*Manduca blackburni*), has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth occurs on Maui although it has not been found in this area. Its native host plants are species of 'aiea *(Nothocestrum)* and a non-native alternative host plant is tree tobacco *(Nicotiana glauca)*. There are no 'aiea on or near the project area but four small tree tobacco plants, one to three feet tall, were seen. Each of these plants was carefully examined but no Blackburn's sphinx moth or their eggs and larvae were observed.

MOLLUSKS

One mollusk was seen, the giant East African snail (*Achatina fulica*). This large non-native snail was common throughout the project area.

DISCUSSION AND RECOMMENDATIONS

The forested land in the project area is composed primarily of non-native plant species that supports an array of mostly non-native mammals, insects and mollusks that are of no special conservation concern. Just the endemic bat and two indigenous dragonflies were recorded.

The Endangered 'ōpe'ape'a or Hawaiian hoary bat was encountered both visually and electronically and was judged to be relatively common at the time of the survey. These bats are highly mobile and move around to take advantage of spikes in insect activity that provide the food that they depend upon. The project area and surrounding lands were being utilized at the time of the survey and are generally suitable habitat but shouldn't be considered as representing habitat that is critical for their survival. The U.S. Fish and Wildlife Service has federal jurisdiction over these bats under provisions of the Endangered Species Act. They will indicate what actions will be required regarding how to proceed with the project without harming the bats.

The indigenous globe skimmer and green darner dragonflies are both common throughout Hawaii and are widespread elsewhere as well. Neither of them is of any conservation concern.

The project area does not provide suitable habitat for any other protected native fauna such as nēnē, forest birds or water birds.

A further recommendation relates to seabirds. Some seabirds such as the Endangered dark rumped petrel (*Pterodroma phaeophygia sandwichensis*) and the commoner wedge-tailed shearwater (*Puffinus pacificus chlororhynchus*) nesting on the summit of Haleakala and the coastal sites of Wailea Point and Molokini respectively, leave their burrows before dawn and return after sunset. These birds can become attracted to and confused by bright lights, crash and be killed by vehicles or cats and dogs that find them. Young birds are especially vulnerable when they fledge in late fall and take their first tentative flights. It is recommended that all significant outdoor lighting in any future development be hooded to direct the light downward.

There are no other specific environmental concerns with reference to the fauna in this project area. Following the above recommendations, this project should be able to move forward without having any significant negative impacts on the fauna resources in this part of Maui.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within four groups: Mammals, Birds, Insects or Mollusks. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

   non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

   migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

   abundant = many flocks or individuals seen throughout the area at all times of day

   common = a few flocks or well scattered individuals throughout the area.

   uncommon = only one flock or several individuals seen within the project area.

   rare = only one or two seen within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MAMMALS			
CERVIDAE (Deer Family)			
Axis axis	Axis deer	non-native	common
VESPERTILIONIDAE (Common Bat Family)			
Lasiurus cinereus semotus W. Allen	ōpe'ape'a, Hawaiian hoary bat	endemic	common
BIRDS			
Cardinalis cardinalis L.	northern cardinal	non-native	uncommon
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	common
Zenaida macroura L.	mourning dove	non-native	rare
ESTRILDIDAE (Estrildid Finch Family)			
Lonchura cantans Gmelin	African silverbill	non-native	uncommon
Lonchura punctulata L.	nutmeg mannikin	non-native	rare
PASSERIDAE (House Sparrow Family)			
Passer domesticus L.	house sparrow	non-native	rare
PHASIANIDAE (Pheasant Family)			
Francolinus pondicerianus Gmelin	gray francolin	non-native	common
Gallus gallus L.	common chicken	non-native	rare
STURNIDAE (Starling Family)			
Acridotheres tristis L.	common myna	non-native	common
MOLLUSKS			
ACHATINIDE (Achatinid Snail Family)			
Achatina fulica Saussure	giant East African snail	non-native	common

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order ARANAE - true spiders			
ARANEIDAE (Orb Weaver Spider Family)			
Araneus diadematus Clerck	European garden spider	non-native	rare
Order DIPTERA - flies			
MUSCIDAE (House Fly Family)			
Musca domestica L.	house fly	non-native	rare
Order HYMENOPTERA - bees, wasps, ants			
APIDAE (Honey Bee Family)			
Apis mellifera L.	honey bee	non-native	uncommon
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	common
VESPIDAE (Vespid Wasp Family)			
Pachodynerus nasidens Latreille	keyhole wasp	non-native	rare
Polistes aurifer Saussure	golden paper wasp	non-native	rare
Order LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
Lampides boeticus L.	long-tailed blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
Danaus plexippus L.	monarch butterfly	non-native	rare
PIERIDAE (White and Sulphur Butterfly Family)			
Eurema niccipe Cramer	sleepy orange butterfly	non-native	common
Order ODONATA - dragonflies, damselflies			
AESHNIDAE (Hawker Dragonfly Family)			
Anax junius Drury	green darner dragonfly	indigenous	rare
LIBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer dragonfly	indigenous	common
Order ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oedaleus abruptus Thunberg	short-horned grasshopper	non-native	rare

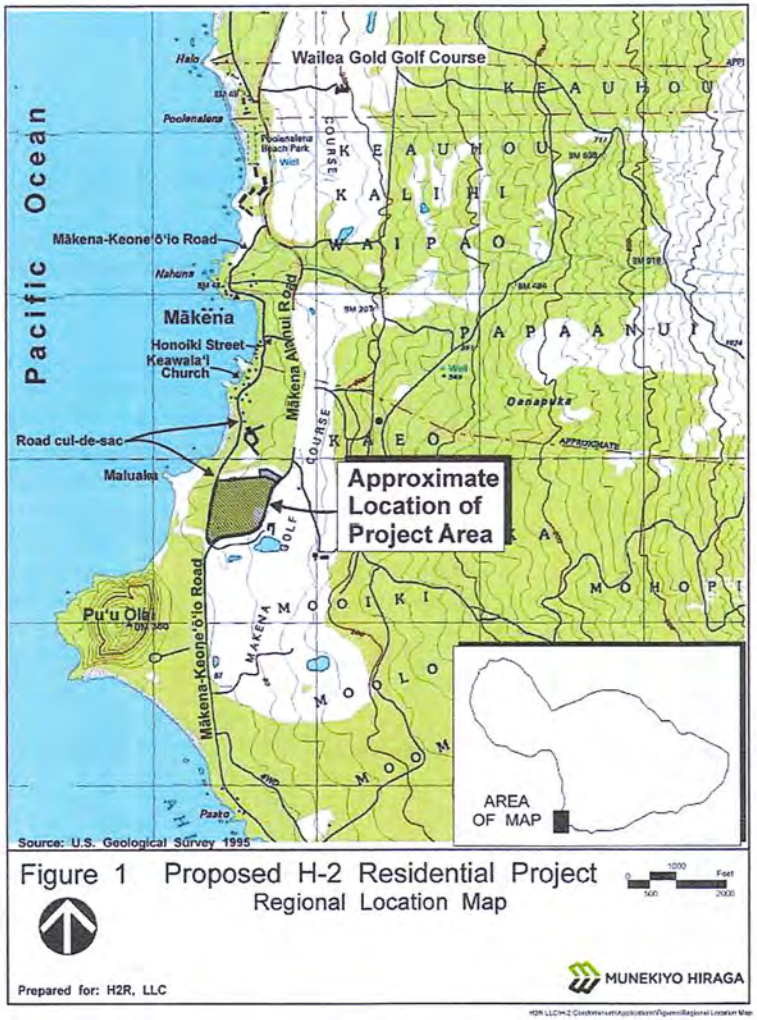

Figure 1. H-2 Residential Project Map

Figure 2. Typical vegetation in project area with kiawe and sourgrass.

Figure 3. Kiawe forest with sourgrass and panini cactus.

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APPENDIX

H

VIEW ANALYSIS

Source: Miyabara Associates, LLC

Proposed H-2 Residential Project

View Reference Map

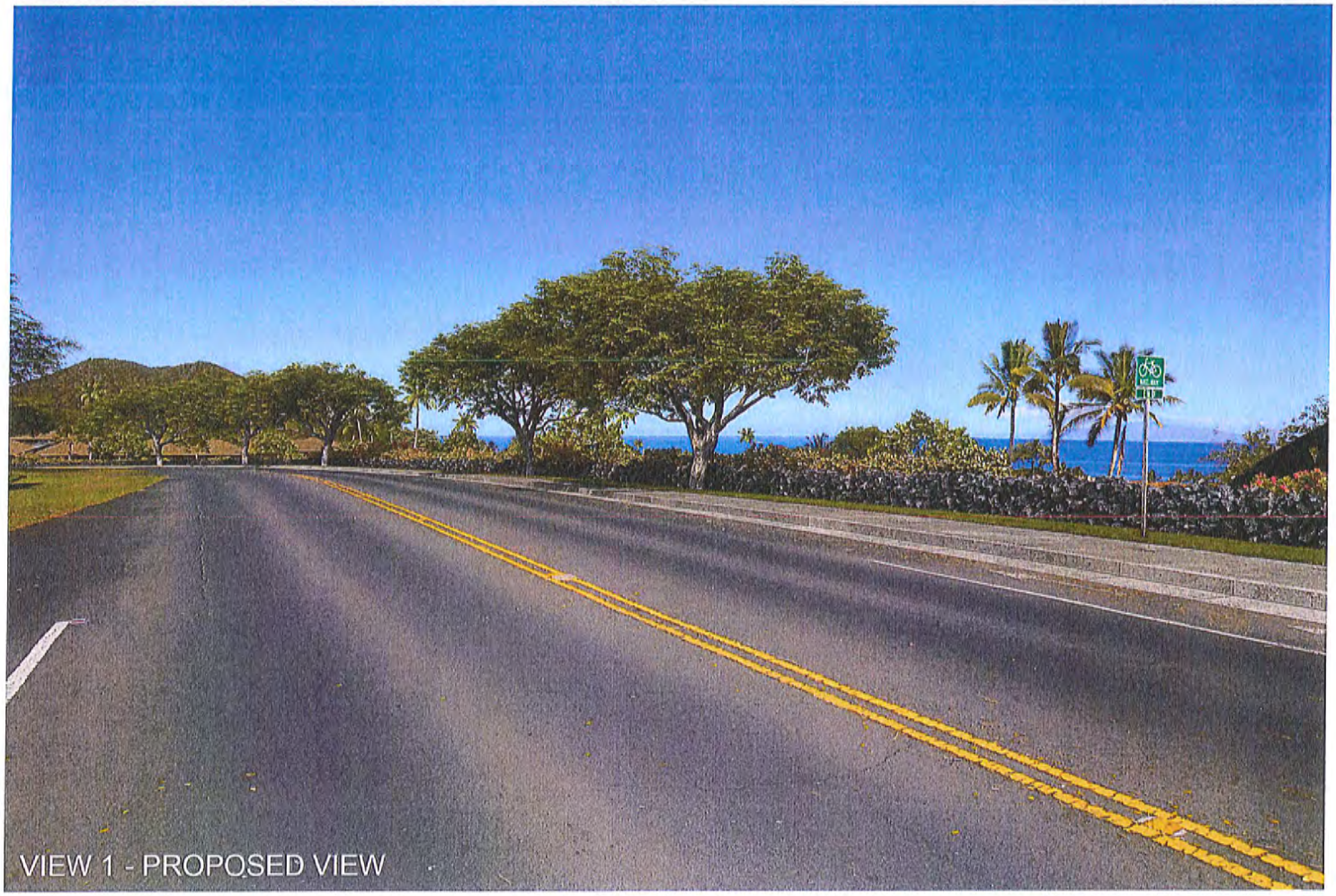
NOT TO SCALE

Prepared for: H2R, LLC

MUNEKIYO HIRAGA

H2R LLC\H-2 Condominium\Applications\Figures\View Reference

VIEW 1 - EXISTING CONDITIONS



VIEW 1 - PROPOSED VIEW

VIEW 2 - EXISTING CONDITIONS

VIEW 2 - PROPOSED VIEW

VIEW 3 - EXISTING CONDITIONS

VIEW 3 - PROPOSED VIEW

VIEW 4 - EXISTING CONDITIONS

VIEW 4 - PROPOSED VIEW

ARCHAEOLOGICAL INVENTORY SURVEY (TMKS 2-1-006:037, 056, AND 2-1-008:084)

APPENDIX

I

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY OF DEVELOPMENT PARCEL H-1 (TMK: [2] 2-1-05: 84; and 2-1-06: 37 & 56), MALUAKA and KA'EO AHUPUA'A, HONUA'ULA, MAUI

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April 2006

Management Summary

An archaeological inventory survey was conducted October 2005 - March 2006 of a 12.21-acre parcel located at TMK 2-1-05: 84 and 2-1-06: 37 and 56. The survey was conducted at the request of Keaka LLC, in connection with the development of condominiums and associated drainage control improvements. Fifteen historic properties comprising 80 component features were identified within the project area. Eleven of the sites (with 22 component features) were previously identified during prior archaeological studies of the area. Subsurface testing was conducted at 31 features located at 11 of the 15 identified sites. Subsurface midden materials were collected at 20 of the tested features, with individual feature collections ranging from single pieces of shell to 1,313 specimens. Forty-three traditional artifacts were collected at ten features, and 6,492 historic artifacts were collected from six features. Five charcoal samples were collected from four habitation features and submitted for radiocarbon analysis; dated samples range in age from AD 1400-1440 to AD 1680-1740.

Traditional functional categories represented among the identified features include agriculture (clearing piles, mounds, filled depressions, terraces, enclosures), habitation (enclosure, C-shaped wall, midden deposit, pavement), burial (platform), ceremonial (platform, terraces), and indeterminate (walls). Historic era activities represented include agriculture (clearing, terrace), boundary demarcation (walls), education (school site), habitation (structural remains), livestock management (walls, trough, enclosure), refuse disposal (mound, privy, cesspool, pits), transportation (road, trail), and indeterminate (walls, mound). The density and distribution of the historic era features indicates that the project area was intensively used during the twentieth century; this use has most likely resulted in the removal of pre-contact surface architecture and has contributed to the erosion of subsurface cultural deposits.

Among the fifteen sites located within the project area, eleven contain features that are significant under criterion "d"; two sites (5706, 5711) contain features that are significant under criteria "d" and "e"; one site (1007) contains features significant under criteria "a" and "d"; and one site (5795) is significant under criteria "c" and "d". Due to the rather extensive level of data collection conducted during this survey, no further work is recommended to mitigate adverse effects to sites or features significant under criterion "d". The recommended mitigation For Site 5706 Feature 11 and Site 5711 Features 1-3, 5, 6 and 8, significant under criteria "e", is preservation in place. Recommended mitigation of adverse effects for the Mākena School (Site 1007), significant under criterion "a", is further ethnographic work for the recovery of oral history information, and completion of an outstanding data recovery report. For Site 5795, significant under criterion "c", preservation is recommended if possible; or consultation with the SHPD Architectural Branch and Archaeological Branch is recommended to determine an appropriate level of documentation.

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1. INTRODUCTION

Project Background and Description

An archaeological inventory survey was conducted of a 12.21-acre project area located at Maluaka, Honua'ula, Maui (*Figures 1.1 and 1.2*). The survey was conducted by Akahele Archaeology and Archaeological Services Hawai'i, at the request of the property owner, Keaka L.L.C., in preparation for a Maui County Special Management Area Permit Application. The owner proposes to develop condominiums and an associated retention basin within the project area. Survey field work was conducted between October 3 and December 8, 2005 and February 27-March 14, 2006.

Fifteen historic properties comprising 80 component features were identified within the project area. Twenty-two of these features at eleven of the sites were previously identified prior to the current survey. The remaining 58 features and four sites are newly identified. Details regarding the previously recorded SIHP (State Inventory of Historic Places) site numbers and their re-assignment during the current survey is provided in Chapter 3 (see Site Documentation). In addition to recording verbal descriptions of all identified features, scaled plan maps were completed for all features, and subsurface testing was conducted at 31 features located at eleven different sites. Testing included excavation of 38 controlled 0.5-1.0 by 1.0-1.5 meter units and eight 0.5 by 0.5 meter shovel tests. Materials collected include five charcoal samples that were submitted for radiocarbon dating, 43 traditional Hawaiian artifacts from ten different features at six sites, 6,492 historic/modern era artifacts from seven features at six sites, and 9,880.10 grams of midden and other portable materials from 28 of the test units.

The project area consists of three separate parcels; the largest of which (TMK 2-1-06:37) consists of 9.2 acres (*Figure 1.1*). This parcel is located along the west side of the Mākena-Keone'ō'io Road and is bordered on the west by the Makena south golf course. The second parcel (TMK 2-1-06: 56) is adjacent to the north side of parcel 37, and consists of 1.01 acre. This parcel is bordered on the east by a public access walkway to Maluaka Beach, on the north by the Maluaka Beach public picnic area, and on the west by the golf course. The third parcel (TMK 2-1-05: 84) is located along the east side of Mākena-Keone'ō'io Road and consists of 2 acres. It is bordered on the north by the Maui Prince Hotel base yard, and on the east and south by undeveloped land. A paved public parking lot is present at the north end of parcel 84. The proposed retention basin is to be located within this parcel, with the condominiums to be located across Mākena Road on parcels 37 and 56.

With the exception of the parking lot in parcel 84, the three parcels are currently vacant; however, a (modern) private residence was present on parcel 56, and portions of at least one home site was present in parcel 84 prior to resort development in the area. All three parcels have been subjected to varied amounts of grubbing and grading, which occurred in connection with ranch activities, road improvements, and ressort construction. These impacts are discussed in greater detail in Chapter 2.

Scope of Work

The archaeological survey reported here conforms with the requirements for an inventory survey as defined in Hawai'i Administrative Rules (HAR) Title 13, Subtitle 13, Chapter 276. As stated in §13-276-4, the purpose of the inventory survey is to "...determine whether archaeological historic properties are present, and if so, to present their description, interpretation and location." HAR requires that "The entire surface of the project area shall be visually inspected, and any proposed deviations from this level of inspection shall be approved by SHPD prior to implementation."

Inventory survey includes a) evaluation of areas which have no visible historic properties, and b) test excavations at historic properties that have alternative functions, in order to help resolve the question of function. A number of features were identified that had no clearly identifiable function. Test excavations were conducted at these features in order to better define age and function. Full recordation of excavations and analysis of recovered materials is included in the report, as required in §13-276. A detailed outline of information that is required to be included in an inventory survey report is found in §13-276-5.

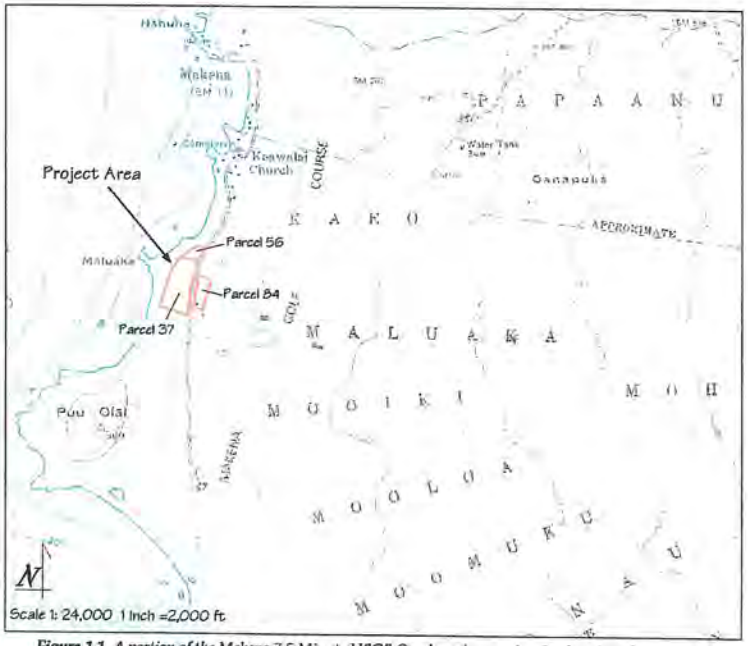


Figure 1.1 A portion of the Makena 7.5 Minute USGS Quadrangle map showing location of project area

Local Environment

Parcels 37 and 56 of the project area comprise a somewhat narrow strip that parallels the shoreline between One'uli Beach and Maluaka Beach. The northwestern edge of the project area is within 90 feet (27.4 meters) of the shoreline at the southern end of Maluaka Beach. The shoreline in this immediate area consisted of a cobble beach prior to construction of a concrete pad overlook area. The relatively narrow strip of land between the shoreline and the project area has been graded and landscaped for a golf course, and much of the original topography in this area is now gone.

General surface elevation within the project area ranges from 20 feet AMSL at the northwestern end of parcel 56 to 70 feet at the southeastern end of parcels 37 and 84. An amphitheater-shaped gulch is present in the south portion of parcel 37. This east-west gulch ranges from 10 feet AMSL at the west end to 60 feet at the eastern bank top. The portion the gulch to the west of the project area was filled during golf course construction, and fill over six feet in height is apparent in the gulch along the western edge of the project area. With the exception of the gulch and a low-lying area in the southwestern corner of parcel 37, the remainder of the project area is relatively level, with a mild gradient toward the west.

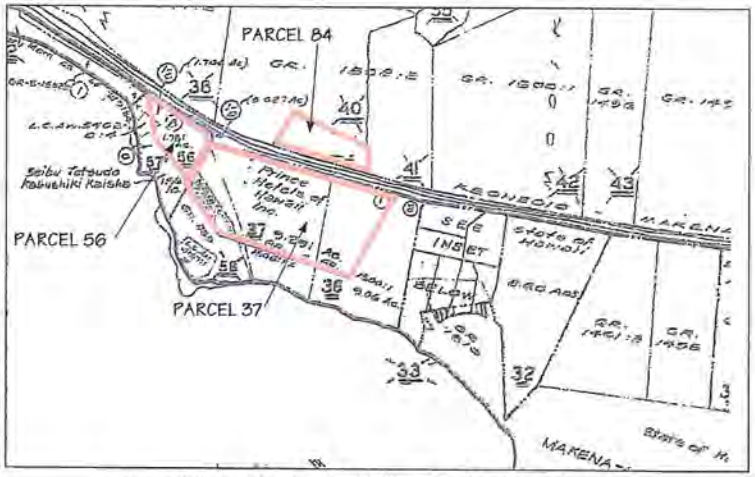


Figure 1.2 Portion of Tax Plat (2) 1-06 Showing Parcels within the Project Area

Minor topographic variation in the form of exposed *pahoehoe* ridges and outcrops are present throughout the project area. These are most apparent in the northern portion of Parcel 37. The central and southern portions of this parcel show exposed bedrock, however, the features are less abrupt in these areas. Areas of soil within the project area conform to the Makena loam, stony complex, as identified and described by the U. S. Department of Agriculture. This soil complex occurs on the lower leeward slopes of Haleakalā, between Mākena and Kama`ole (Foote et al. 1972:91). Stony land occurs on low lava ridges and comprises 30 to 60 per cent of the complex. Representative profiles of this soil exhibit a surface layer of very dark brown loam about 4 inches thick overlying dark grayish brown to dark yellowish brown silt loam subsoil. The substratum is dark yellowish brown cobbly silt loam (Foote et al. 1972:91). The subsoil and substratum soils generally developed in volcanic ash.

Most of the soil profiles within the project area exhibited a shallower surface layer of around 2 inches, over the dark yellowish brown silt loam subsoil. The substratum soil was encountered in relatively shallow contexts throughout most of the project area, and it is absent in some places where the subsoil is directly over solid bedrock. The percentage of stone within the three soil layers varies considerably within the project area, from 70% to less than 10%. Some of the soil deposits within site areas have been augmented by the removal of the cobble inclusions, which are found in piles on adjacent bedrock outcrops. A small area at the northern end of parcel 37, and the area of Site 1007 in parcel 84 includes a surface veneer of aeolian sand that has been transported inland from the coastal beaches. No sand dune formations are present within the project area.

Rainfall data for East Maui compiled by the University of Hawaii (1983) indicates that coastal Mākena receives 15 to 20 inches of rain annually. Lower annual averages of 10 inches or less occur in the coastal Kihei area to the north (UH 1983:62). Analysis of monthly rainfall rates by Gosser et al. (1996) indicate that coastal Makena receives 25% more rainfall than coastal Kihei or Wailea (Gosser et al. 1996:13). Their analysis also showed that Mākena exhibits no months of zero rainfall, whereas Kihei and Wailea have at

least two months (June, July) of little to no rain. Stearns and Macdonald (1942) have cautioned that "More rain may fall on the leeward coast during a single kona storm than during the rest of the year." (1942:32). They also indicate that rainfall varies widely from year to year. Rainfall in the upper elevations of Honua`ula (c. 2,000 ft AMSL) are generally double the coastal averages. Rainfall data for Ulupalakua Ranch indicates an annual rainfall range between 52 inches (1906) and 24 inches (1931), with an overall mean of 36.4 inches. (Stearns and Macdonald 1942:31).

The shoreline just west of the project area is dominated by Maluaka Point, which extends approximately 400 feet (122 meters) west from the northwest corner of parcel 37. This basalt point is comprised of mixed lavas from the post-Pleistocene Hana volcanic series (Macdonald et al. 1983:383, 394). The prominent cinder cone, Pu`u Ōla`i, is located 1,200 feet (366 meters) southwest from parcel 37. This cinder cone and the offshore islet of Molokini both date to the Hana volcanic series, which is the youngest identified series on Maui (Macdonald et al. 1983: 383).

The immediate offshore area along Maluaka and One`uli Beaches is classified as a lava apron reef shelf which extends 600 meters off Maluaka Beach and 400 meters off Maluaka Point. This shelf is comprised of solid rock bottom with areas of mixed limestone outcrops and sand pockets (AECOS 1979:59). Most of the shelf area is at depths of 30 feet or less, which provides a relatively extensive area for littoral zone fish and shellfish species. A number of reef fish inhabit this environment, including *kala* (Acanthuridae), *humuhumu* (Balistidae), *kikakapu* (Chaetodontidae), *`akilolo* (Labridae), *uhu* (Scaridae) and *hapu`u* (Serranidae). *Puhi* (eel) and *he`e* (octopus, squid) are also common in this zone. Coral growth in the area is dominated by cauliflower coral (*Pocillopora meandrina*), which provides a rich habitat for crabs, shrimp, various wrasses, surgeonfish, and echinoderms (Felding and Robinson 1987:21).

Groundwater in coastal Mākena derives from underground sources, as there are no surface perennial streams in Honua`ula. Fresh water outflows (freshlets) are common along the rocky shoreline, and they are directly dependent upon the amount of rainfall in upper elevations and the amount of water that soaks into the ground, as opposed to run off. Traditionally, wells were constructed along the shoreline in coastal Honua`ula to access the freshlets. Two wells are documented near the shoreline in Maluaka, immediately west of the project area (Haun 1978); these would have been available to area residents, in addition to other as yet unknown fresh water sources. A number of nineteenth century maps depict fishponds at three to four locations around the base of Pu`u Ōla`i; one of these was located just south of parcel 37. There are currently no wetlands or wetland vegetation stands within the project area.

Prior to the introduction of foreign plant species, coastal Mākena would have supported a variety of native plant species. The sandy beach areas exposed to salt spray was most likely dominated by one or more of the following plants: *naupaka kahakai (Scaevola sericea), pohuehue (Ipomoea pes-caprae), nanea (Vigna marina), pohinahina (Vitex retundifilia), `aki`aki (Sporobolus virginicus), pa`uohi`iaka (Jacquemontia ovalifolia), `ili`ahialo`e (Santalum ellipticum), `akoko (Chamaesyce skottsbergii), and `aweoweo (Chenopodium oahuense)* (Wagner et al. 1990:54). In the less sandy zones along the coast, *`ilima (Sida fallax)* and *ma`o (Gossypium)* were common plant species. In the more protected areas, shrublands dominated by *hinahina (Heliotropium anamalum* var. *argenteum)* and *kipukai (h. curassavicum)* would have most likely occurred. The inland boundary of the Native strand plant community was often dominated by *hala (Pandanus tectorius)*, with *nehe (Lipochaeta succlenta)* as a common understory plant. *`Akia (Wikstromia), `a`ali`i (Dondonaea visosa), `ulei (Osteomeles amthyllikifolia)* and *`akoko (Chamaesyce calastroides)* were probably also common in this environmental zone (Wagner et al. 1990:71).

The lowland forest zone in Honua`ula was probably a *wiliwili (Erythrina)* forest, with *lama (Diospyros sandwicensis), naio (Myoporum sandwicense), hala pepe (Pleomele), hao (Rauvolfia sandwicensis)* and *ilie`e (Plumbago zeylanica)* as common understory plants. Many of the native plant species that grew naturally in the lowlands of Honua`ula had important economic and medicinal value. Other economically important plants, such as *kukui, wauke, ulu*, coconut palm, and various sweet potato and dry taro species would have survived if watered.

The modern vegetation within the project area is primarily *koa haole (Lucaena leucocephala), kiawe (Prosopia pallida), hau (Hibiscus tiliaceus)*, lantana (*Lantana camara*), false thyme (*Lippia micromera*), and prickly pear cactus or *panini (Opuntia ficus-indica)* (Neal 1965). One of few Native plant species still

thriving is *'ilima (Sida Fallax) 'Ilima* plants are quite common in the project area; no *wiliwili* trees were observed in the project area; however they are present in other areas of coastal Honua'ula. The central portion of parcel 37 and most of parcel 84 is covered in a thicket of *panini*. This edible cactus was cultivated in the Mākena area during the middle nineteenth century, as indicated in the testimony of *kulena* claimants.

Previous Archaeological Studies

The first visit by an archaeologist to the Mākena region was in 1916 when J.F.G. Stokes of the Bishop museum conducted a two-week tour of *heiau* sites (Stokes 1918). Stokes began his tour at Keone'ō'io, where he identified three *heiau* sites - the *Ko'a* of Kaulana, Pa'alua, and Hala. One *heiau* was identified in Kanahena, Koula, which he did not see. Three *heiau* were mentioned for the Mākena area, and are described as follows:

> Heiau of (blank) on top of Puu Olai. Not seen.
>
> Heiau of Kalani, land of Kaeo, inland. Not seen. Said to have been a heiau for human sacrifices, and that the drums were heard at night.
>
> Heiau of Nanahu, land of Makena; on the point north of Makena Bay. This was a pavement of ala and coral, level with the surrounding ground and rocks, about 20 feet square. The only information to be gathered was that is was "a heiau for dead people." It was not a graveyard, and I do not understand nor could the local people explain to me the meaning of their description. (Stokes 1918)

Mākena was revisited in 1929 when Winslow Walker of the Bishop Museum passed through during his island-wide survey of *heiau* sites. Walker's survey results were never published; however, his manuscript is widely used in reference to *heiau* sites that were known to the local residents with whom Walker consulted. Walker also used information from Stokes (1918) prior work and from listed published by Thrum in the *Hawaiian Annual*. In addition to 230 enumerated sites, Walker made notes on fishing *ko'a*, fishponds, burials, village sites and artifacts of interest.

Walker's report included no new information on the *heiau* reported by Stokes atop Pu'u Ola'i, and it is not mentioned. He visited Koula Heiau (195) in Kanahena and Kalani Heiau (196) in Kaeo. Also recorded for the Mākena region was Pohakunahana Heiau (197), which was described as being "back of the store at the bottom of the hill beyond the pig-pen" (Walker 1931:269). Both the Kalani Heiau and the Pohakunahana Heiau are listed in the SIHP and have been subjected to additional studies in connection with modern development.

Regarding fishponds, Walker found that "Makena had a small fishpond, now totally destroyed by the surf" (Walker 1931:299). This description may have applied to the pond just north of Keawala'i Church, at Apuakehau Point.

In his discussion of fishermen's shrines, Walker indicates that he defined Ku'ula *Heiau* or *Ko'a* as the "smallest of the structures of worship, and are dedicated solely to the service of Kuula, the god of fishing" (Walker 1931:100). He states that they can have a variety of forms, but that "Most ko'as are under 20 feet square;" and "Coral is always associated with the true ko'a, the name itself being a contraction of the word ako'ako'a, which means, coral" (Walker 1931:100).

Walker described four *ko'a* the Honua'ula District, including Kaulana Ko'a at Keone'ō'io, a large *ko'a* at Pa'ako in Mo'omuku, and the *ko'a* at Nanahu, which he notes was previously reported (by Stokes) as a *heiau*. Walker's informants stated that this site was "a place to pray to the Fish God", so the earlier report...seems to be an error (Walker 1931:103). The fourth *ko'a* reported by Walker is described by Walker as follows:

> The ko'a at Onouli is located below the school about 100 feet back from the shore. It is a rough platform 13 by 14 feet and 5 feet high at the front. A low wall surrounds it on three sides. Blocks of Aa, iliili, and a few pebbles and coral fragments were found in its construction. (Walker 1931:103).

Assuming that Walker's "Onouli" is actually Oneuli, and that the school he refers to is Mākena School, this would potentially place the site within the south sector of the current project area. Recent surveys conducted *mauka* of Oneuli Beach to the south of the project area reported no feature that matches Walker's description (Rotunno-Hazuka et al. 2002); .likewise, early studies within the project area found no features with similar dimensions. It therefore seems likely that Site 5711, first identified in 2001 (Rotunno-Hazuka et al. 2005) and further studied during the current survey, is the structure described by Walker.

Information regarding the traditional Hawaiian settlement pattern and early twentieth century Hawaiian land use was gathered during the 1930s by Handy and Handy (1972). Their interests were primarily in agricultural practices, however, a good deal of information regarding current conditions in the 1930s, as well as traditional lore is presented in their study. Regarding the Mākena region, they made the following observation:

> On the south coast of East Maui, from Kula to 'Ulupalakua, a consistently dry and lava-strewn country, Makena and Ke'oneo'io were notable for good fishing; this brought many people to live by the shore and inland. There were some patches of upland taro, not irrigated; but this was a notable area for sweet potato, which, combined with the fishing, must have supported a sizable population although it cannot be counted as one of the chief centers. (Handy and Handy 1972:272).

When Handy and Handy visited Keone'ō'io in the 1930s, they observed that, "There are no people living there now. The modern fishing locality is Makena, a few miles beyond Keone'o'io" (Handy and Handy 1972:510).

During the early 1970s, the State of Hawai'i contracted with Bishop Museum to conduct a statewide field survey of previously identified sites as well as new findings of importance. Two inventories were generated - one for traditional Hawaiian sites and one for historic era structures. The two *heiau* previously recorded by Stokes and Walker were listed in the SHIP at this time, along with a large habitation complex referred to as the Makena Complex (SIHP Site 50-50-14-1266). The area of Site 1266 was recorded as rectangular area that encompasses 3,600 feet (1.9 km) of shoreline between the north base of Pu'u Ola'i and the north end of Maluaka Beach, and between the shoreline and Mākena-Keone'ō'io Road. All of parcels 37 and 56 within the project area, as well as additional lands to the north and south are within the boundaries of this complex (*Figure 1.3*). Scaled maps of the complex area were not produced at the time of this survey; rather formal feature types were enumerated as follows: walls (numerous, mostly associated with ranching, enclosures (16+), one burial in a wall, platforms (3+), and a pit.

Historic era sites recorded in the Mākena area during the 1971 SIHP survey by Wright include Kanahena Landing (50-50-14-1581), the John N. Makaiwa House (1582), the Pu'u Ola'i Slaughterhouse (1583), Keawala'i Church (1584), and Makena Landing (1585). The Pu'u Ola'i Slaughterhouse is the nearest to the current project area; it is located on the *mauka* side of Pu'u Ola'i, within the area of Mākena State Park.

The earliest archaeological survey of proposed development lands conducted in the Mākena area was in 1974. This survey of Seibu resort lands was conducted by Bishop Museum and encompassed 1000 acres of a 1300-acre project area that crossed ten *ahupua'a* of central Honua'ula (Clark 1974). During this survey, approximately 264 sites/features were noted, and Bishop Museum sites numbers were assigned to 114 sites.

The current project area is within Parcel I of the 1974 survey area, which consisted of 40 acres on both sides of Mākena-Keone'ō'io Road in Maluaka. Three sites were identified in the *makai* portion of Parcel 1 during the 1974 survey. These included a possible burial (Ma-B8-6), an enclosure and platform (Ma-B8-7), and a well (Ma-B8-8). They were described as follows:

> B8-6 Possible Burial
> An opening in a wall- -1 m in diameter- -exposed - a possible burial. A rib bone and a long bone can be seen from the opening. In addition there are pieces of wood, a rusted can, and shell fragments. This site should be excavated to determine if this is a human burial; if it is, the proper steps should be taken to relocate it.

B8-7 Enclosure and Platform
A platform- -10.5 by 6 and c. 0.2 to 0.4 m high- -is located within an enclosure which measures 31 by 28 m. The enclosure walls are 0.7 to 0.9 m high, 0.5 m wide, and constructed with multiple-stacked aa. The platform is paved with *'ili'ili*; porcelain, coral, and cowrie are also located on the surface. Historic artifacts include iron pots and pans, a lanterns, glass bottles, window glass, plastic, glass, and china dishes, and a snorkel. The site is in fair condition with moderate research potential.

B8-8 Well
A rectangular-shaped well has interior measurements of 3.6 by 1.4 m. The interior height ranges from 0.5 on the *makai* side- -to 1.6 m on the *mauka* side which is faced with basalt rocks. The well is in fair condition. (Clark 1974:11)

Site B8-6 as described by Clark corresponds with the "burial in a wall" that was found the previous year within the Mākena Complex. No records of further work at this site could be located. According to Clark's site map, it was situated near the center of Parcel 54 of the current project area. This parcel has been extensively bulldozed and remnants of a single wall were located during the current project, along the west boundary of the parcel. No evidence of skeletal remains were found within or near this wall remnant, or other walls that were found within Parcel 37.

Site B8-7 as recorded by Clark was located *makai* of the current project area, in the fairway of the 17th hole of the Seibu golf course. The site was mapped and excavated by Haun (1978) prior to its destruction. The Site B8-8 well is located along the shoreline, *makai* of the current project area. This site is close enough to the shore to escape destruction during golf course construction. It is still present, although the well area has been filled with storm-washed coral and basalt cobbles. The site has since been assigned SIHP Site number 50-50-14-1854.

Between March and April 1978, Bishop Museum archaeologists returned to Mākena to conduct the first increment of archaeological mitigation for the Seibu golf course in Mo'oiki and Maluaka (Haun 1978). The project area for this survey and excavation program included the area of the 17th hole along the shoreline at Maluaka Point; although the bulk of the fieldwork was concentrated in Mo'oiki, on the *mauka* side of Mākena-Keone'ō'io Road. Site Ma-B8-7 previously recorded by Clark was included in Haun's study. The 1978 work expanded the area of the site to include not only the habitation platform and enclosure, but ten additional features (seven walls, two enclosures, and a well). Portions of this complex as mapped by Haun extend into Parcel 37 of the current project area; these include Features 5, 6, 7, 8 and possibly 11. This complex was subsequently assigned SIHP Site number 50-50-14-1853. Further details on Haun's 1978 work and current findings at Site 1853 are found in Chapter 4.

In June of 1978, Bishop Museum undertook survey and excavations in the third increment area of the Seibu golf course, which consisted primarily of lands in Kaeo, north of the area examined by Haun (Cordy 1978). The two survey areas overlapped along the shoreline at Maluaka, and the later survey included the west and south portions of Parcel 37 (*Figure 1.3*).

Nine new sites were recorded in June 1978 within the *makai* section of the third increment area, in addition to the previously recorded B8-7. Four features that had been combined with B8-7 by Haun were given Bishop Museum Site numbers, along with two historic era house sites that had been previously mapped but not recorded. The Bishop Museum sites assigned during the June 1978 survey in Maluaka include four enclosures (Ma-B8-232, 233, 234, and 238), a midden scatter (235), remnants of two historic era dwellings (236, 237), and two walls (240, 241). Two of these sites (233 and 234) are entirely within Parcel 37 of the current project area; a portion of one site (240) are also within Parcel 37, and a portion of one site (237) is within Parcel 56. Further details on the 1978 survey of these sites and current findings are presented in Chapter 4.

Additional work was conducted in Parcel 37 in 1979, in connection with proposed hotel and residential areas (Rogers-Jourdane 1979). This survey area also included most of the land between Mākena-Keone'ō'io Road and Makena Alanui Road, from the north end of the current project area northward to Nahuna Point (c. 100 acres). Two wall sites were identified along the west side of Mākena-Keone'ō'io Road within Parcel 37 of the current survey area; these include Ma-B8-111 and 1112. These sites were subsequently assigned SIHP site numbers 590-50-14-1864 and 2272).

Additional fieldwork of the hotel development area was conducted later that same year, when Sites 1864 and 2272 were tested via excavation of single units at each site (Dennison 1979). Both of these sites were relocated during the current survey, and further details on the previous work at the sites is found in Chapter 4.

In 1987, Bishop Museum conducted a survey of a strip of land along the east side of Parcel 37, and all of Parcel 84, in connection with a proposed public parking lot and cul-de-sac along Mākena-Keone'ō'io Road (Cleghorn et al. 1988). No sites were identified in Parcel 37, and one site, the Mākena School Complex, was identified in Parcel 84. Five surface features were identified at this site, which was assigned Bishop Museum Site Ma-B8-252, and SIHP Site 50-50-14-1007. The features include two parcel boundary walls, two stone and wood platforms believed to be privies, and a cement-plastered cistern. Four of the five identified features were relocated within Parcel 84 of the current project area.

Data recovery excavations were conducted at the two identified privy features at Site 1007 in 1991 (Gwen Hurst letter to Roy Figueiroa 5 June 1991). Details on this and other previous work at Site 1077 are presented in Chapter 4.

One additional prior survey that included the current project area was conducted in 2001 by Archaeological Services Hawaii and Aki Sinoto Consulting. This survey included the three current survey parcels, as well as 23 acres immediately *mauka* (TMK .2-1-05: 83 and 85). In 2005, the three current survey parcels were separated from the larger survey area, and a report detailing the findings in these three parcels was prepared in 2005 (Rotunno-Hazuka et al. 2005).

The 2001 survey relocated previously identified Sites B8-233 and 234, and SIHP Site 1007; and six new sites were recorded (50-50-14-5706 through 5711) within Parcel 37 of the current project area. During the current survey, Sites 5706, 5707, 5709 and 5711 were expanded to include additional newly identified features. Sites 5710 and 5708 were reassigned to newly identified sites during the current survey, due to overlapping site areas (5708) and duplicated SIHP site numbers (5710). The specifics of these revisions are outlined in Chapters 3 and 4.

A number of surveys were conducted of Seibu resort lands and other private properties in Mākena during the 1990s and early 2000s, however none of these projects included the current project area. Findings of these surveys are summarized in a regional context in Chapter 2.

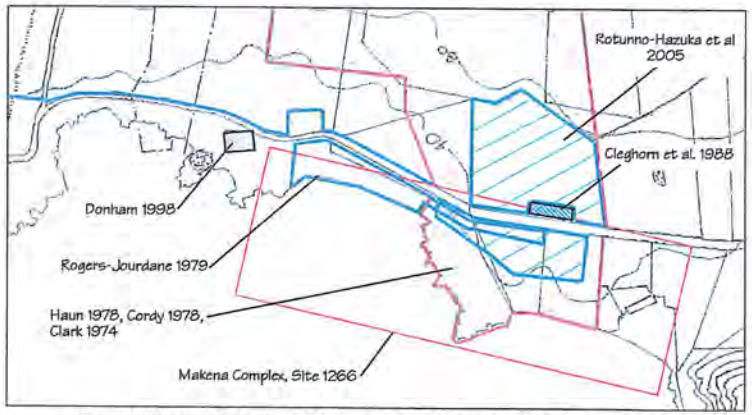


Figure 1.3 Previous Archaeological Studies and Recorded Complexes in Project Area Vicinity

2. SETTELEMENT PATTERN

Early Settlement

Information relating to the earliest settlements along the coast in Honua'ula are obtainable from dated cultural deposits that have been excavated in connection with modern shoreline development. There has been no research-oriented study of coastal Honua'ula designed specifically to identify early settlement. Thus, the available information may not be representative of the actual settlement that occurred in this district. The area of coastal Honua'ula that has a limited number of dated shoreline settlements is between the northern district boundary at Paeahu to the southern boundary of Onau at Kanahena. This area coincides with the Wailea and Mākena resort lands and the area of relatively intense private development.

Currently, there are only a handful of sites in Honua'ula that are documented with radiocarbon samples predating AD 1300-1350. These include three and possibly four shoreline sites, and four sites located short distances inland from the shoreline settlements (*Table 2.1*). The shoreline sites include Palauea Landing in Palauea (Site 2496), Po'olenalena in Keauhou, and Keawakapu in Ka'eo (Site 1584). The inland sites include BPBM Site B12/13, located inland from Wailea Point, Site 260, inland from Palauea Landing, Site 1361, inland from Po'olenalena, and Site 1941, inland from Keawakapu.

A shoreline site near Nahuna Point in Waipio (Site 1820) may also predate AD 1350. A radiocarbon sample recovered from a deeply buried subsurface hearth feature at Site 1820 returned a two sigma calendric range of AD 1104-1664 (Dobyns 1988:112). In discussing this date, Dobyns states that "..a date in the 1600's (near the upper temporal range based on two standard deviations) is a more probable date given other known occupations in Honua'ula" (Dobyns 1988:41). Given what is now known of the distribution of pre-AD 1400 coastal settlement in Houna'ula, it is expected that a habitation site dating to the 1300's or earlier would be present in Waipio. This site and the three sites with definitive early dates are all located at preferred landing sites, most of which were used well into the historic era. These early sites are also distributed in a regular fashion along the coast, with ample space between settlements. The spaces between certain settlements may of course fill in as additional information is gathered.

Based on her translation of oral history, Beckwith (1970) notes that the establishment of formalized land districts and *ahupua'a* on Maui was initiated by Kaka'alaneo, who lived in Lahaina sometime between AD 1420-1538 (based on Fornander's (1969) genealogy). Given this timeframe for the establishment of *ahupua'a*, it appears that these early shoreline settlements pre-dated the establishment of formalized *ahupua'a* boundaries in Honua'ula, and that *ahupua'a* boundaries were most likely established with these existing settlements in consideration.

Comparison of dates from the early sites indicates that the earliest known settlement is currently at the northern end of the district, at Palauea. This pattern, as well as the inferred sequencing of *ahupua'a* organization and settlement, conflicts with the settlement model made popular for Houa'ula by Cordy and Athens (1985), and recently summarized by Gosser as follows:

> The radiocarbon data indicate that coastal South Maui was probably occupied earliest at or near Makena around AD 1200, followed by settlements at Keauhou and Palauea approximately 100 to 150 years later. By AD 1650, there is evidence of increased settlement at Makena, Keauhou, and Palauea, as well as other locations along the coast. At Makena, the clustering of early sites within *ahupua`a* is not as visually apparent as at Keauhou or Palauea, and may be the result of longer and more intense occupation of the Makena area prior to formalized *ahupua`a* development. (Gosser et al. 1996:437)

Current information seems to support the idea that although the Ka'eo/Mākena area was a center of population during the late pre-contact and early historic era, there is currently no available evidence to support the conclusion that it was the first location settled, or that it was the only area settled prior to AD 1350. Furthermore, it appears that there were potentially a number of shoreline settlements (at least four or five) in existence in Houna'ula before political action was taken to subdivide the district into formal *ahupua'a*.

Beta or HRC No.	Site/Feature and Provenience	C-14 Age BP	1 ³ Calibrated Calendric Range	Report Reference
39488	Site 2496 Fea. E, TU-1, HF-1, -.80 m	1160+/-80	AD 730-890	Donham 1990: 26
H1273	Site 1941, Fea. 24, Layer II	950+/-80	AD 1014-1199	Gosser et al. 1996:353
86505	Site 2496, Fea. 10, TT2C,X, -1.00 m	750+/-80	AD 1120-1280	Fredericksen et al. 1996
87616	Site 2496, TU 3C/D, X-1, -1.45 m	750+/-60	AD 1140-1260	Fredericksen et al. 1996
111497	Site 1854, TU 56N 3E, -1.20 m	730+/-50	AD 1265-1295	Donham 1998:112
11496	Site 1854, TU 48N4E, -1.45 m	710+/-70	AD 1265-1310	Donham 1998:112
86507	Site 2496, Fea. 8, TU 3A, -1.46 m	690+/-80	AD 1180-1340	Fredericksen et al. 1996
87615	Site 2496, Fea. 17, TU 3D, -1.64 m	660+/-100	AD 1190-1390	Fredericksen et al. 1996*
53920	Site 260, Fea. 2, TU-1, Layer II-4	600+/-120	AD 1280-1420	Rotunno-Hazuka et al. 2000
2463	Site 1820, Fea. 6, TP-11	550+/-140	AD1244-1524	Dobyns 1988:112
H1325	Site 1361, Fea. 1, Unit 1, Layer IV	490+/-70	AD 1298-1344	Gosser et al. 1993
H1463	Site 1362, Fea. D, U20, Layer IV	460+/-80	AD 1280-1520	Gosser et al. 1993
10810	Site B12-12/13, Fea. F, TU-6, -.40 m	380+/-60	AD 1330-1430	Walker et al. 1985: 95

*Note: Not listed here are seven additional radiocarbon dates from Site 2496 that pre-date c. AD 1350; see Fredericksen et al. 1996.

Table 2.1 Summary of Pre-AD 1350 Radiocarbon dates from Honua'ula

The provenience of dated charcoal from the pre-AD 1350 era sites indicates that all of the sites with early dates also show evidence of later occupation, and that the surface architecture at these sites is associated with the later occupations. The later occupations are either superimposed over the buried early deposits, such as at Sites 2496 and 1584, or are in the form of surface features that were built directly on the previous midden deposits, with no additional accumulation of midden. Known cases of stratified sites with intact early deposits preserved beneath sterile sand or later cultural layers are limited in Honua'ula. They include Sites 1820, 1854 and 2496, where aeolian sand has accumulated along the shore. There are currently no known cases of an early deposit predating AD 1350 found beneath later occupations in a cave setting in Honua'ula. Stratified deposits have been found beneath the foundations of walls or platforms, or within walled enclosures, were the soil is protected from erosion and other forms of surface disturbances.

Available radiocarbon dates from Honua'ula show a definite increase in the number of dated sites for the period of AD 1350-1550, and a further increase between AD 1550-1750. Materials analyzed during a recent Seibu property data recovery project in Mākena include 61 wood charcoal samples from 18 sites located in the *ahupua`a* of Keahou, Kalihi, Waipio, Papaanui, and Mo`oiki. The dated features range in elevation from 100 to 480 ft AMSL and are located between 0.5 and one mile from the shoreline (Gosser et al. 1996). Over half (36, 59%) of the assayed charcoal samples returned calendric ranges which post dated AD 1650. The bulk of dates from Palauea and other Wailea *ahupua`a* are also around AD 1650. Eighteen of the 61 calendric ranges for Makena carbon samples were between AD 1400 and 1650 (Gosser et al. 1996:351). The distribution of dated features suggests an inland expansion of habitation and agricultural activities in the Mākena region after AD 1650. Gosser et al. characterize the permanent habitation sites of this period as being discreet complexes enclosed by walls. These complexes are seen to represent traditional *kauhale*, which Gosser infers did not occur in the region until c. AD 1650-1750. Given that the favored habitation areas were re-used and rebuilt rather continuously from AD 1100 and after, it would be difficult to actually date the beginning of walled *kauhale* compounds in Honua'ula. What is currently available for observation are the sites that were not re-occupied and redesigned for subsequent use. Accurate interpretation of the cultural sequence in Honua'ula requires full recognition of the limitations posed by the continued and rather intense land use that has occurred in this region.

Nineteenth Century Land Use

The privatization of land in Honua'ula was accelerated by the leasing of Crown Land for sugar and cattle production; and by the subdivision and fee simple sale of large tracts of Government Land at a relatively early date. A much smaller land area was claimed as *kuleana* and awarded to Native Hawaiians by the Land Commission.

In 1841, Kamehameha III leased approximately 4,073 acres of land in Waipio and Papa'anui to Nowlein and Burrows for sugar cane and livestock production (Thrum 1925 reproduced in Barrere 1975). This lease was subsequently sublet to L. L. Torbert in 1845 for the sum of $800 per year. In 1848, Torbert was appointed by the Minister of Interior to assist John Richardson in surveying lands in Houna'ula. The following year, he was issued Royal Patent 120, which granted him fee simple ownership of a 2,087-acre *mauka* portion of the Kamehameha III lease lands, for the sum of $1,600. In 1850, Torbert and Wilcox secured the remaining 1,986 acres of the original lease through Grant 234, for the sum of $1986 (Waihona 'Aina 2006). He also secured a corridor from "Torbertsville" at the mill site to the shoreline, for purposes of constructing a road and landing. Land Commission testimonies of local residents indicate that disputes over land tenure arose in connection with Torbert's fee simple acquisitions. Testimony indicates that Nawaiki, a local *konohiki*, had claims through descendancy to lands in five different Hounua'ula *ahupua'a*, and eleven different *apana* were described in the Native testimony (*Table* 2.1). As described by Nawaiki:

> I have entered a claim, which has been settled by S.K. Kamakau through witnesses, but when J. Richardson [went] to survey there was much disputing and I relinquished my claim and sold all my rights to Torbert, and I heard from J. Richardson that he was sent to survey by the Minister of the Interior and not by the Board of Land Commissioners. (Foreign Testimony 97v16)

Nawaiki was awarded four *apana* that were not located on Torbert's land, including a .2 acre houselot that is situated adjacent to and overlapping a portion of project area parcel 56 (5402B:4; see *Figure 1.2*). This houselot corresponds with the location of Site Ma-B8-237, which was described by Cordy (1978:9) as a midden scatter and concrete foundation. Site 5708 Feature 3 as identified during the current survey could also be within the boundary of this Land Commission Award.

Nawaiki's houselot and a second .5 acre houselot awarded to Kahaleokaia (5402B:4) are the only LCA shown on historic survey maps within or adjacent to the project area. Kahaleokaia's award is located at Malauaka Point and the awarded land is completely within the golf course area. In his testimony, Kahaleokaia named this location Papakahiula, and stated that four houses were present. Testimony by Hakaloa placed this houselot in Ka'eo. This location corresponds with the location of Site 1853 (Ma-B8-7) as identified by Clark (1974) and later by Haun (1978), and with Site Ma-B8-238 as described by Cordy (1978), which is within the area of Site 1853. The exact extent of the awarded LCA within the Site 1853 complex area is indeterminate at this time; however, given its small size it is not likely that extended as far *mauka* as Feature 5, which is still partially intact and within the project area. On the other hand, the actual area of the claimed houselot was probably over .5 acres, given that four houses were present, and given its size as depicted on Torbert's map (see *Figure 2.2* below).

LCA within Maluaka include a cluster of six awarded *kuleana* is shown at the 200 to 380 foot elevation range, and a small cluster of four *kuleana* is shown at the 600 to 750 foot elevation range. This latter cluster is at the *mauka* extent of Maluaka as shown on tax maps, and is at the interface between Maluaka and Mohopilo. Records of the two coastal Land Commission awards and the six claims located at the 200-380 foot elevation range (seven awards total) were acquired from the Waihona 'Aina database (2006) for analysis (*Table* 2.2). These claims were made between December 26, 1847 and January 13, 1848). The witness testimonies, as registered in the Native Testimonies, were not recorded until August 9, 1849, and the Royal Patents were issued *circa* 1850.

At least 40 different land parcels were claimed by the seven individuals who testified before the Commission; of these claims, 15 parcels were awarded (*Table* 2.2). Descriptions of claimed lands indicates that all of the claimants utilized parcels that were scattered among two or more *ahupua'a*, with as many as five enumerated. This rather scattered patterning of *apana* is apparent for many of the Honua'ula land claims, and it raises the question as to whether *ahupua'a* boundaries posed any constraints whatsoever on the economic activities of the residents.

Award	Claimant	Native Register Claims	Native Testimony 1849	Awarded
2401	Kohilae	Kaeo: 6 sections of grassland	Section 1 - Pasture in Palauea	Relinq..
(Dec 26, 1847)		Palauea: 4 Irish potato patches	Section 2 - Pasture in Keauhou	Relinq.
			Section 3 - Pasture, Ulupalakua, Kaeo	10.91 ac (2)
			Section 4 - Pasture, Ulupala., Mohopilo	12.96
			Section 5 - House lot, Ulupalakua, Kaeo	.
2427	Kanakahou	Mo'oiki: 4 sections of grassland	Sections 1-4, grassland, Mo'oiki	10.13 a. (2)
(Dec. 27, 1847)		Mo'oloa: 1 section of grassland		
		Kaeo: 5 Irish potato patches		
		Palauea: 1 Irish potato patch		
		Maluaka: edible cactus		
		No location specified: houselot, 2 houses		
2524	Moku	Two lots in Puehuehu	Sections 1-3 - pasture, Ulupalakua, Kaeo	Not
(Dec. 25, 1847)			Section 4 - pasture, Maluaka	Awarded
2581	Hualii	Kaeo: three sections of grassland	Section 1 - pasture, Ulupalakua, Kaeo	
(Aug. 9, 1849)		Maluaka: house site	Section 2, pasture, Ulupala., Mohopilo	10.16 a. (2).
2658	Kiniakau	Waipao: moku mau'u (total of 3)	Section 1 - pasture, Palauea	
(Dec. 26, 1847)		Papaanui/Keauhou 2: moku mau'u (2)	Section 2 - pasture, Palauea	
		Keauhou: potato mala (3)	Sections 3 & 5 - pasture, Keauhou	
			Section 4 - pasture, Waipao	7.1 ac. (2)
			Section 6 - pasture, Mohopilo	
			Section 7 - house lot, Waipoa	
4157	Kahaleokaia	Mo'oloa: taro *kihapai*, *'ili* of Paliuli	Sections 1 & 2 - pasture, Kaeo	
(Jan. 13, 1848)		Palauea: bananas, 7 Irish potato patches	Section 3 - taro, Paliuli, Mooloa	10.2 ac,
		Papakahiula: houselot with four houses	Sections 4-6 - pasture, paliuli, Mooiki	11.4 ac
			Section 7 - house lot, Kaeo (apana 1)	0.5 ac.
5402B	Nawaiki	Konohiki claims disputed, rights sold to Torbert 1848-49,	Section 1 - pasture, Paipili, Maluaka	
(nd)		Maluaka	Sections 2-5 - Irish potato, Paipili, Keahou	.6 ac.
		Mooiki	Section 6 - taro, I. Potato, Paipili, Maluaka	
		Kaeo	Section 7 - pasture, Laie, Maluaka	
		Makaalua	Section 8-10 - pasture, Mooiki	6.01 (2).
		Laaieiki	Section 11 - house lot, Kaeo	.2 ac.

Note. Number 2 in parentheses behind acreage awarded indicates that two *apana* were awarded and acreage given is total of both. Blank value in awarded column indicates that the section was not awarded

Table 2.2 Summary of Land Commission claims and awards, Malauaka and Ka'eo below 400 feet elevation

Discrepancies between the original land claims and the testimonies provided by witnesses pose some questions as to what the claims were actually used for at the time, or whether there were other fators at work that influenced the Native Testimonies. For example, the Native Register claims list 20 Irish potato patches, as compared to only three noted by witness testimonies. This is odd, given that the production and export of Irish potatoes increased dramatically on Maui between 1848 and 1849, and again in 1850 (Kleiger 1996:42). These data suggest that there should have been an increase in potato patches between 1847 and 1849, not a near disappearance of them. In general, the Native Testimony records tend to indicate a consistent pasture land use pattern, whereas the Native Register indicates a more diverse land use pattern with a range of crops including taro, bananas, and edible cactus as well as a considerable amount of Irish potato cultivation.

The Land Commission records indicate that Maluaka Point was not within the area defined as Maluaka *Ahupua'a*. Both of the awarded houselots at Maluaka Point are described in the Native Testimony as being in Ka'eo, and are within the area of Mahoe's *Ahupua'a* Grant 835, the extent of which is shown on Territorial Survey maps (*Figure* 2.1). The shoreline portion of Maluaka began just south of Mahoe's Grant and included the area behind One'uli Beach to the base of Pu'u Ōla'i. The land grants located along this section of the beach are referred to in grant documents as being within Maluaka Ahupua'a. Torbert's Grant 1441:3, which is located along the *mauka* side of Mākena-Keone'ō'io Road and inland of Maluaka Point, is also referred to in grant documents as being within Maluaka Ahupua'a.

After the *Māhele*, Government Lands within the *ahupua'a* of Maluaka, Mo'oiki, Mo'oloa and Mo'omuku were subdivided into parcels of various sizes and sold to private citizens. Chinen (1993) surmises that these sales were for purposes of offsetting government expense:

> Following the division of the lands into Crown, Government, and Konohiki Lands, from time to time portions of the Government Lands were sold as a means of obtaining revenue to meet the increasing costs of the Government. Purchasers of these lands were issued documents called "Grants" or "Royal Patent Grants". These differed from the Royal Patents issued upon Land Commission Awards. It was not necessary for the recipients of the Royal Patent Grants to obtain an award for their land from the Land Commission. (Chinen 1993: 28, 29)

In January 1853, the East Maui Government land agent John T. Gower was directed by the Interior Department to sell Maluaka, Mo'oiki, Mo'oloa and Mo'omuku Government lands for $1.00 per acre, or at a price that reflected the quality and situation of the land (Klieger 1996:38). In February 1853 L.L. Torbert submitted a survey map of these *ahupua'a* to the Interior Department, and land was opened for sale the following month, on April 3, 1853. During the next 10 years, approximately 72 parcels were sold to 49 different buyers in these *ahupua'a* between the shoreline and 800 feet in elevation. Additional grants were also sold in the upper elevations. Acreage of the parcels sold in the coastal region ranged from 0.97 acre to 69.1 acres. Several buyers purchased more than one parcel in more than one *ahupua'a*; these were designated as *apana* within a single grant.

The most *apana* purchased by a single individual was six, purchased by L.L. Torbert (Grant 1441). Torbert's acquisitions totaled 125.62 acres in the coastal zone (800 ft and below); his largest *apana* was 54.65 acres, and encompassed the crest and upper slopes of Pu'u Ōla'i (*Figure* 2.1). Torbert also bought two parcels between Pu'u Ōla'i and Mākena-Keone'ō'io Road, a shoreline parcel at the north base of the cinder cone, and a triangular parcel of 11.93 acres along the *mauka* side of the Mākena-Keone'ō'io Road and on the north side of Grant 1508 to Makahanohano. These grants, along with Torbert's large ranch holdings to the north, were sold at public auction in 1856, at which time they were acquired by Makee (Hurst 1996:47).

Most of the Crown and Government land in this region was sold as grants, and nearly all of the purchasers were Hawaiians, many of whom also owned Land Commission Awards. For example, Maluaka Point resident Kahaleokaia purchased three side-by-side grants in Maluaka totaling 46.4 acres. These are located just *mauka* of the *aupuni* wall, at an elevation range of 80 to 360 feet elevation (*Figure* 2.1). Kahaleokaia's neighbor Nawaiki purchased two grants in Mo'oiki along the *mauka* side of Mākena-Keone'ō'io Road, totaling 48.57 acres. In addition to Torbert, *haole* purchasers included J. Breman, H.O. Bucklin, S.P. Chapman, J.M. Painter and J. Brown. Torbert was the only *haole* to purchase a substantial amount of land in the coastal zone. Other *haole* purchases near the coast were small and somewhat

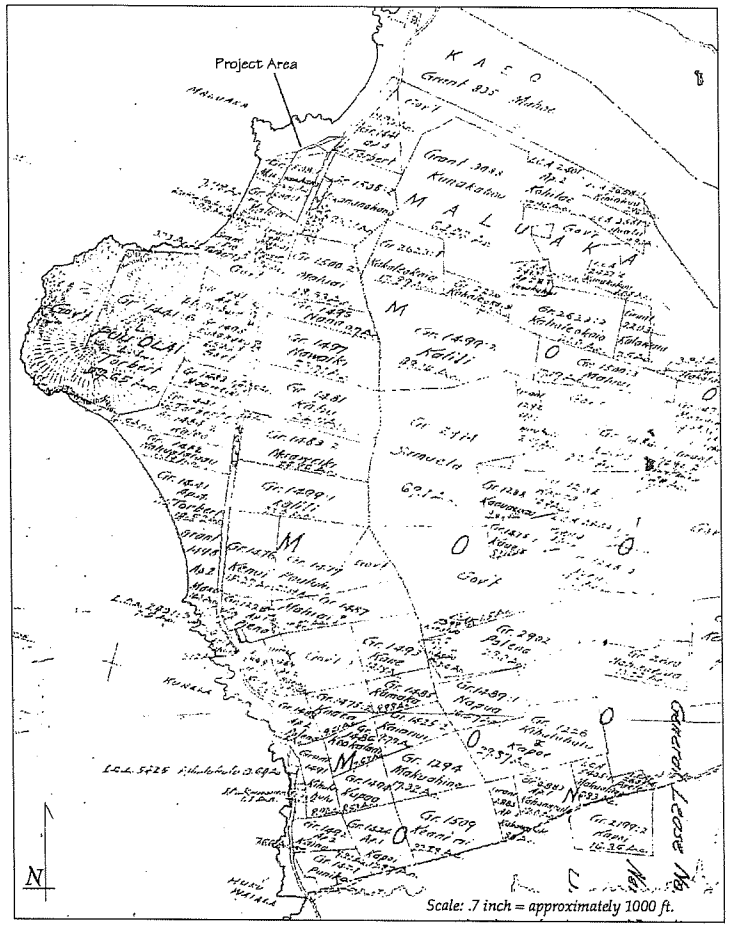


Figure 2.1 Coastal Portion of the Territorial survey map of Grant lands in Honua'ula (Reg. No. 1763), showing LCA and Grants. Approximate location of project area shown in orange.

clustered at the north base of Pu'u Ola'i, where Andrews, Sinclair, Burns and Brown all had adjacent parcels of one acre or less bordering Torbert's Grant 1510.

Parcel 84 of the current project area was subdivided from Grant 1508:2 to Makahanohano. This original grant was 23.21 acres in area and was bounded on the *makai* side by the Mākena-Keone'ō'io Road and the *mauka* side by the *Aupuni* (government) wall. As a result, the *mauka* boundary of this parcel (and others along the wall) was somewhat irregular as compared to the generally straight sides of other grants. A four-acre parcel (83) was later subdivided from the southern portion of Grant 1508:2. The north boundary of this parcel was defined by the same wall (Site 1007 Feature 7) that defined the southern edge of the Mākena School Lot (parcel 84).

As indicated in Cleghorn et al.'s study, the boundaries of the Mākena School Lot were added to the Territorial Survey Map in 1903. The lot was surveyed in 1917 when it was conveyed to the Territory of Hawai'i (Cleghorn et al. 1989:8). The lot was designated as TMK parcel 39 until the area was re-subdivided for resort planning purposes.

Project area parcel 37 as currently configured encompasses portions of four nineteenth century parcels. The northern edge of the parcel is within the area of Mahoe's Ka'eo *Ahupua'a* Grant 835. Adjacent to south is a strip of land that was retained as Government Land. The shape of this parcel suggests that it was planned as a road corridor to provide access to the shoreline at the south side of Maluaka Point. There is no available information to indicate that a government road was actually located within this corridor, and later tax maps show this corridor as part of Mahoe's Grant 835. The Site 1853 features that are intact within the project area are located within this former government corridor. The bulk of parcel 37 is within the area of Grant 1508:1 to Makahanohano. This was a 7.66 acre parcel that extended to the shoreline from Mākena-Keone'ō'io Road. Across the road was Makahanohano's larger parcel (Grant 1508:2). The southern portion of parcel 37 is within Grant 1500:1 to Maluai. This 7.78 acre parcel also extended to the shoreline; it was one of three parcel purchased by Maluai totaling 43.3 acres.

Project area parcel 56 is only 1.73 acres in area, however, it appears to encompass portions of three former land parcels. These include a corner of Nawaiki's houselot (LCA 5402B: 4), the former Government corridor that follows the southern boundary of Ka'eo, and a sliver of Mahoe's Grant 835. Thus, a small portion of parcel 56 is within Ka'eo *Ahupua'a*.

In addition to the Government survey maps, cartographic records of the nineteenth century include Torbert's Map (Reg. No. 1202), produced *circa* 1848-1856 (*Figure* 2.2). This map has been reproduced in numerous archaeological studies of the area, and in some cases, archaeological sites have been correlated with structures shown on this map. In this case, there are no structures or walls depicted within the current project area. Torbert's map does, however, depict Kahaleokaia's houselot (LCA 4157:1) which correlates with the Maluaka Point Complex (Site 1853). The map shows a walled compound with five structures inside. The area of this compound as depicted on the map appears to be greater than the area that was awarded to Kahaleokaia. The detail of Torbert's map is such that the large enclosure wall cannot be correlated with accuracy to specific walls mapped by Haun; however, it may well be represented by a rather long alignment of three wall sections that were not given feature numbers (see *Figure 4.5* below). The Feature 8 wall segments could conceivably be part of the larger enclosure as well.

The keyhole-shaped fishpond shown on Torbert's map to the south of the project area correlates with Site 5209, recently recorded by Rotunno-Hazuka et al. (2002), and the of cluster of structures adjacent to the fishpond are most likely represented by Site 5210, a rather extensive complex of terraces and interconnecting walls. Included within the Site 5210 complex is "a large clearing enclosed on three sides by freestanding and retaining walls" (Rotunno-Hazuka et al. 2002:57). This feature may correlate with the three-sided enclosure depicted on Torbert's map. This map also depicts the *Aupuni* wall that defined the *mauka* extent of land grants along the *mauka* side of the government road.

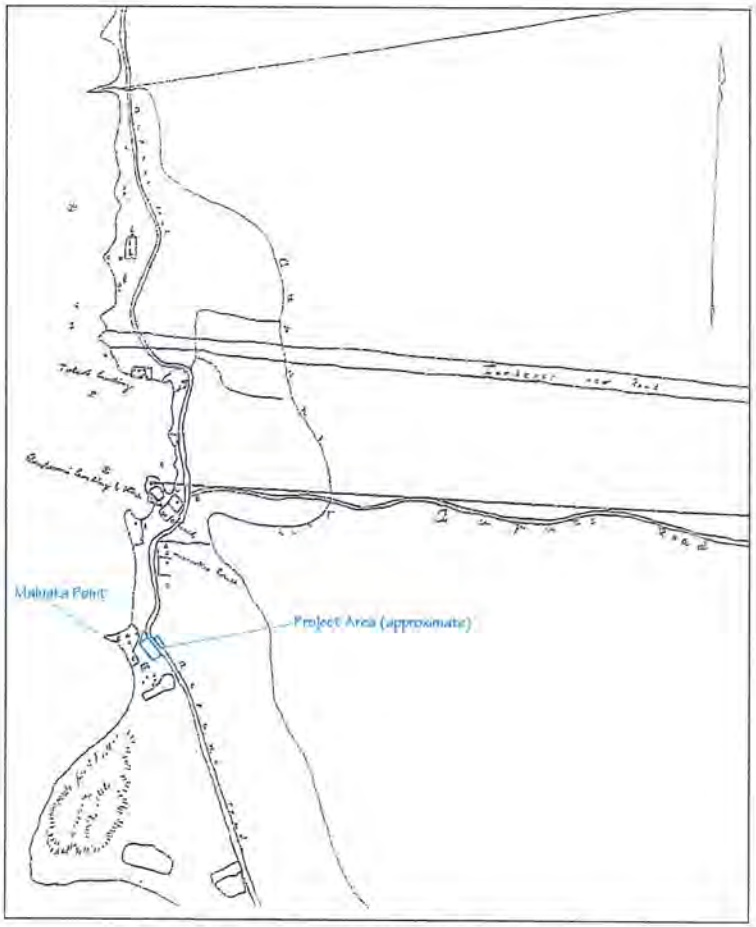


Figure 2.2 A portion of Torbert's Map (Reg. No. 1202); added text is in blue)

Twentieth Century and Current Conditions

At the beginning of the twentieth century, a small population was present in coastal Mākena, with a town center and post office located near Torbert's Landing (now Mākena Landing). The church at Keawakapu was rededicated 1908, following repairs to the church building and installation of a wooden floor (Dodge ms.). Around this same time, the school at Keawakapu was closed and a new school was established at the site of the Mākena School (Site 1007, parcel 84). In 1906, funding for a teacher's cottage at Mākena was included in a wish list for 51 new Department of public Instruction buildings in Maui County by the (Maui News 20 Jan. 1906). No follow-up stories could be found to document whether this cottage was ever constructed.

Published reports of school enrollment across Maui show that Mākena School was usually near the bottom of the list in terms of enrollment numbers. In 1914, Mākena School had 24 students, compared to 146 at Kēōkea, 82 at Kaupo, 71 at Kihei and 22 at Ulupalakua (Maui News 14 Nov 1914). Ten years later, Mākena School showed 22 students (smallest on Maui), compared to 143 at Kēōkea, 23 at Kula Sanitorium and 79 at Kihei. The largest single school enrollment at that time was 895 students, at Pā'ia School; ranked second was Pu'unene with 853 students (Maui News 15 Sept. 1926). The next available enrollment report was published in 1930; this report does not list Mākena School. It therefore appears that the school ceased operations some time between 1926 and 1930. Consolidation of school facilities had been a goal of the School Superintendent since 1920, when an article was published explaining that transporting student was cheaper than maintaining all the one-room school houses that were scattered across the island (Maui News 17 Sept 1920).

A number of Hawaiian families lived within or near the project area during the 20th century. These include the Lono, Kailipalauli and Lonokailua families to the south, and Poepoe family to the east (Rotunno-Hazuka et al. 2002). Identified sites 5798 and 5799 are most likely associated with the Poepoe family residence, which was located in parcel 83 to the south of the current project area parcel 84..

Current Conditions

The project area has been impacted to varying degrees by twentieth century activities such as cattle ranching, modern home construction, and resort development. The southeastern corner of parcel 37 has been impacted by grading, with subsequent dumping of construction debris and green waste (*Figure* 1.3). A band of varying width along the west and south boundary of parcel 37, and the west boundary of parcel 56 has been impacted by grading and bulldozer push-piles in connection with golf course development. Strips along Mākena-Keone'ō'io Road and the cul-de-sac have been affected by culvert construction, road widening and other activities. A graded swale was also cut across the southern portion of parcel 37, inland from the road, between two culvert outflow areas. This was probably done to decrease potential sheet wash onto the golf course.

Most of parcel 56 has been grubbed and graded, as evidenced by the presence of linear push piles on the parcel. The only unaffected portions of this parcel were found in a thin strip between the graded area and the edge of the golf course. Finally, the northwestern corner of parcel 84 has been impacted by the construction of a beach access parking lot. Evidence of mechanical activity is indicated in the area of the former school building and in a zone between the former building and Mākena-Keone'ō'io Road.

Expected Findings

Previous archaeological studies of the project area and surrounding lands have found a broad range of sites that span many centuries of intensive land use. It is known that this area was a location for permanent residency, as documented by archaeological deposits, nineteenth century land records, and former residents of twentieth century home sites. Previous surveys of the area have identified evidence of ceremonial use, as indicated by the *Ko'a* (Site 5711) and known cemeteries on the adjacent property to the south. It is therefore expectable that additional ceremonial or burial sites might occur. A number of walls attributable to ranching activities have been identified in parcel adjacent to the project area; these are therefore also expected to occur. As noted above, evidence of the earliest settlements in this area may be rather elusive, due to the extent of land use changes that occurred; however, it is possible that subsurface deposits dating to the period of early settlement (c. AD 1200-1400) may be identified.

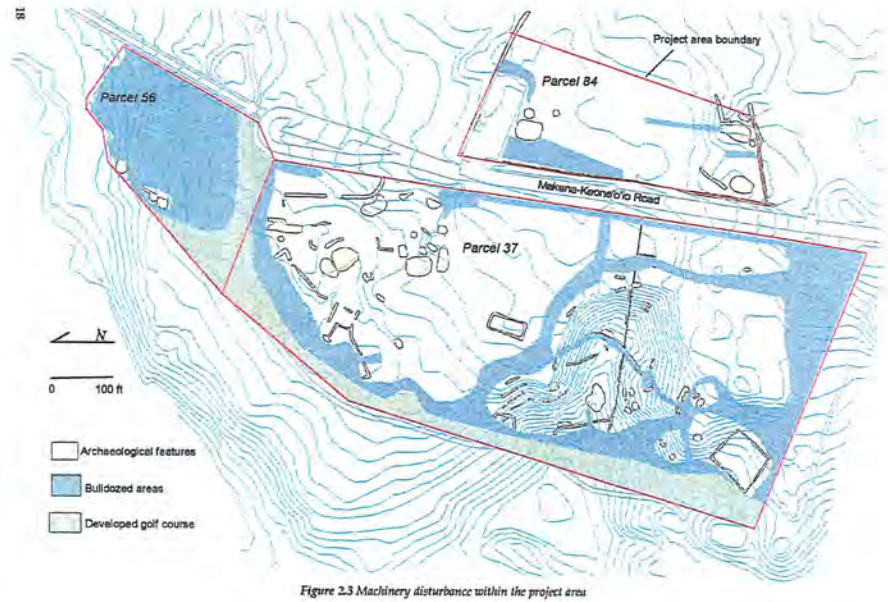


Figure 2.3 Machinery disturbance within the project area

3. FIELD AND LABORATORY PROCEDURES

Pedestrian Survey

A systematic pedestrian survey was conducted of the project area October 3 and 4 by a team of three persons, including the Principal Investigator Theresa K. Donham, and Field Archaeologists Koa Hodgins and Jenny O'Claray. The survey began at the northern end of parcel 37, with transects oriented along the short axis of the parcel, roughly east-west (70-250 degrees Az). Surveyors were spaced at 5-meter or less intervals and the southern edge of the transect was marked with yellow flagging tape. The northern edge of the first transect followed the parcel 37 boundary; each subsequent transect followed the flagged line of the preceding transect. Sixteen transects were completed in parcel 37. The team then proceeded to parcel 56, where transects were oriented roughly north-south, parallel with the western parcel boundary. Four transects were completed in this parcel. Parcel 84 was then surveyed, with transects oriented roughly north-south, parallel with the western parcel boundary. Six transects were completed in this parcel.

All surface features that were determined to be cultural or possibly cultural, regardless of estimated age, were flagged during the pedestrian survey. These features were numbered sequentially, beginning with FN (field number)-1. A total of 88 Field numbers were assigned to surface features, including 73 in Parcel 37 (FN-1 through 72 and 82); five in Parcel 56 (FN-73 through 77); and nine in Parcel 84 (FN-78 through 81 and 83 through 88). The identified surface features were flagged with one or more strips of bright orange flagging tape, marked with the Field Number and date identified.

After the pedestrian survey was completed, a clearing crew consisting of Goodfellow Brothers, Inc. employees was mobilized to clear surface vegetation from all the flagged features. Clearing was accomplished with weed trimmers and chain saws, under the supervision of the principal investigator and field archaeologists. The locations of the identified features were then plotted on a scaled topographic map of the project area (1 inch=100 feet), provided by Austin, Tsutsumi and Associates, Inc.

Site Documentation

Recordation and mapping of cultural features followed the same sequence as the pedestrian survey, with the same team of three archaeologists, along with field archaeologist Tracy Tam-Sing. A feature description record was completed for each of the flagged features. Information recorded included formal type and description, distance and angle to nearest identified feature(s), construction materials and techniques, dimensions, observed portable remains, condition and post-abandonment impacts, natural setting, and inferred function. Color photographs were taken, and a scaled plan map of the feature was drawn. In cases were several small features were in close proximity, these were mapped together. Scales used in field maps ranged from 1 inch=1.0 meter to 1 inch=5.0 meters. During recordation, the feature was assessed to determine if it was over 50 years in age, or potentially over 50 years. Those features determined to be the result of recent golf course construction, drainage improvements, or recent improvements to Mākena Road were identified as such and removed from the list of historic properties. After examination and documentation, eleven features were determined to be less than 50 years old; they are: FN-4, 31, 34, 35, 36, 37, 38, 64, 67, 68, and 72. Other features that appeared to be the result of mechanized earthmoving, but could not with confidence be determined to be less than 50 years in age, are not included in the above list.

Following documentation and mapping, those features determined to potentially be over 50 years in age were grouped into site complexes. Records of previously recorded sites and features were used to determine which features were within or near previously recorded sites. Complex boundaries were then drawn based on these prior surveys, as well as on the spatial association of the identified features.

Features representing ten previously recorded SIHP sites and three previously recorded Bishop Museum sites were identified among the recorded historic features. The ten previously assigned SIHP site numbers include SIHP 50-50-14-1007, 1853, 1864, 2272, and 5706 through 5711. Five new SIHP numbers (50-50-14-5795 through 5799) were requested and assigned to three previously recorded Bishop Museum Sites (Ma-B8-233, 234 and 240) and two previously unrecorded sites in Parcel 84.

The following changes were requested and have been approved by SHPD regarding the previously recorded SIHP sites:

1. Site 1007: originally recorded as Mākena School (Cleghorn et al. 1988), with five component features. Four of the five original features were identified within the project area during this survey and two additional features were added to the complex.
2. Site 1853: originally recorded as 12 features (Haun 1978). Five or possibly six of the previously documented features were identified within the project area, including one previously mapped but undesignated feature that was given a new feature number. One newly identified feature was also added to the complex.
3. Site 1864: originally recorded as a single feature (Rogers-Jourdane 1979). This site was identified within the project area; it was however given two feature designations.
4. Site 2272: originally recorded as a single feature (Rogers-Jourdane 1979). This feature was identified within the project area and three newly identified features were added to the complex.
5. Site 5706: originally recorded as a single feature (Rotunno-Hazuka et al. 2005). This feature was identified within the project area and 16 newly identified features were added to the complex.
6. Site 5707: originally recorded as a single feature (Rotunno-Hazuka et al. 2005). This feature was identified within the project area and three newly identified features were added to the complex. Also added to the complex was a single feature originally recorded as Site 5708.
7. Site 5708: originally recorded as a single feature (Rotunno-Hazuka et al. 2005). This feature was identified within the project area and was combined with Site 5707 due to the close proximity of associated features from Site 5707. The site number was re-assigned to a newly identified complex of three historic/modern era features within the project area.
8. Site 5709: originally recorded as a single feature (Rotunno-Hazuka et al. 2005). This feature was identified within the project area and a nearby newly identified feature was added to the complex.
9. Site 5710: originally assigned to previously recorded SIHP Site 2272. This number was therefore re-assigned to a complex of 13 newly-identified features within the project area.
10. Site 5711: originally recorded as a single feature (Rotunno-Hazuka et al. 2005). This feature was identified within the project area, and seven newly-identified features were added to the complex.

In summary, 23 previously identified features at ten previously recorded SIHP sites within the project area were relocated during the this survey. A possible exception is Site 1853 Feature 11, which is included in this count. Overlays of the prior survey area with the current survey area indicate that portions of this wall should be just inside the west boundary of Parcel 56. Traces of what appeared to be a bulldozed wall were located in the overlaid area of the feature; however, the remnants are currently too partial to verify that it was in fact the same wall mapped by Haun in 1978.

The total overall feature count for the project area is 80, 23 of which were previously recorded. The total number of sites is 15, of which 11 were previously recorded. The four newly-identified sites are 5708, 5710 (numbers reassigned), 5798, and 5799 (newly recorded and newly assigned).

The three previously identified Bishop Museum sites that did not have SIHP Site numbers were assigned new SIHP numbers and expanded as follows:

1. Site Ma-B8-233: originally recorded as a single feature (Cordy 1978). This feature was identified within the project area and assigned a new SIHP Site number, 50-50-14-5795. No newly identified features were added to the site.
2. Site Ma-B8-234: originally recorded as a single feature (Cordy 1978). This feature was identified within the project area and assigned a new SIHP site number, 50-50-14-5796. No new features were added to this site.
3. Site Ma-B8-240: originally recorded as a single feature (Cordy 1978). A portion of this feature was identified within the project area, and three additional features were added to the site; it was assigned a new SIHP site number, 50-50-14-5797.

Finally, two new SIHP site numbers were assigned to two newly-recorded complexes in Parcel 84. These two sites were noted by Cleghorn et al. (1988) but were not recorded. The new sites are as follows:

1. SIHP Site 50-50-14-5798: assigned to a complex of four features, all newly-identified.
2. SIHP Site 50-50-14-5799: assigned to a complex of two newly-identified features.

In total, fifteen historic properties comprising 80 component features were identified within the project area. Eleven of these sites comprising 23 component features were previously identified and recorded as either Bishop Museum or SIHP Sites. Two newly identified sites with six component features, and 51 newly identified features within existing or re-assigned SIHP site complex areas were also recorded. A breakdown of new and previously recorded features by site complex is found in Table 4.1 (below).

Subsurface Testing

Subsurface testing was conducted at 31 features (11 sites) within the project area. Work was conducted by Theresa K. Donham, Koa Hodgins, Jenny O'Claray, Tracy Tam-Sing, and Paul Titchenal. Testing consisted of one or more hand-excavated 1.0 x 1.0 meter square (or larger) test unit; or one or more hand-excavated 0.5 x 0.5 meter round shovel test. Multiple test units (2 to 4) were excavated at eight features, and shovel tests were conducted at four features. The subsurface testing program was designed to augment previous testing that was conducted during prior studies. Prior testing consisted of fourteen test units at six sites/features. A summary table of all prior and current test units is found in Chapter 5.

Decisions regarding the placement and number of test units were made based on the potential for subsurface deposits to provide important information regarding the age and function of the feature. In general, multiple test units were placed at features that were large enough to potentially have considerable spatial variation in the subsurface deposit.

Test units were excavated to various depths, depending upon the depth of bedrock or compacted and sterile subsoil. Excavation was conducted with trowels and followed observed soil layer changes. Stone fill that contained no soil was excavated as such and not given a soil Layer designation. Layers over 0.10 meter in thickness were excavated in 0.10 meter thick levels, which were numbered consecutively within each layer. Vertical control was maintained through use of line levels which were located at a stable point on or above the ground surface near each test unit.

Soil removed during excavation was screened in the field through nested 1/4" and 1/8" screens. In most cases, both the 1/4" and 1/8" size grade materials were separated from general soil matrix in the field. When unusual densities of cultural material were encountered, the unsorted matrix was collected from the screens and transported to the laboratory for sorting. Unsorted 1/4 inch collections were made in one case (Site 5708 Feature 3) , and unsorted 1/8" collections were made in five cases (Site 1853 Feature 8; Site 5706 Features 1, 2, and 5; Site 5707 Feature 2).

Materials collected from screened soil were placed in paper bags or foil which were labeled with the site, feature, and unit designation, layer, level, depth range, excavator, and date. Charcoal encountered during excavation or in the screen was packaged in aluminum foil. Fragile materials such as volcanic glass, small bones and fish scales were packaged in small paper or plastic bags. The charcoal and fragile materials were then placed in the master bag for the level after all screening was completed. Screen collections from each vertical provenience for each test unit was assigned a lot number, which was used to track materials.

As excavation proceeded, volume data was recorded for the excavated matrix prior to screening, and for the naturally occurring rough stones that were removed during screening. These measurements permit quantification of the actual soil volume that contained cultural materials, providing better control for comparisons between various levels and test units collections.

During test unit excavation, notes were maintained for each level, and plan drawings of the unit floor were recorded on graph paper, scaled 1"=20 cm. Profiles of one to two walls of each test unit were recorded after excavation was completed. Photographs were taken prior to and during excavation, and at the completion of the unit. Soil samples were collected from each layer and feature encountered, for purposes of comparison and soil description.

When human skeletal remains were encountered at Site 5706 Feature 11, work ceased immediately and the SHPD office on Maui was contacted. Following consultation with Dr. Melissa Kirkendall of SHPD and Dana Naone Hall of the Maui-Lana'i Islands Burial Council, it was decided that excavation should continue to the extent needed for confirmation of the number and disposition of the individual(s) represented. At that time, excavation was re-initiated, and was again halted after it was determined that the remains represent a single articulated individual in primary burial context.

Potential features identified during excavation of test units were numbered sequentially within the unit, beginning with HF-1. The test units located near areas of heavy pedestrian traffic were backfilled after all photographs and notes were completed. The remaining units will be backfilled after completion of the report, and project review.

Laboratory Procedures

At the completion of fieldwork, each ¼" screen collection was sorted into material categories which were packaged separately in ziplock plastic bags of the appropriate size. The material categories for midden include marine invertebrates, vertebrate fauna, charcoal, coral (weathered, waterworn). Each of these groups were packaged separately and identified with a standardized label which included all the provenience information from the lot bag, as well as the accession number and lot number.

The unsorted 1/8" size grade materials from Sites 1853-8, 5706-5, and 5707-2 were examined in the laboratory for the presence of artifacts such as coral and echinoid spine abraders, fishhook fragments, modified bone items, and volcanic glass or basalt flakes. Charcoal was removed from 1/8" unsorted matrix for dating samples from Sites 5706-5, 5707-2, and 5711-4. Non-diagnostic marine invertebrates and non-diagnostic vertebrate remains were not separated from the unsorted 1/8" matrix form these collections, and these materials are not included in the present analysis.

Each formed traditional artifact was given a unique accession number. The artifacts were grouped by material and form, and detailed information such as measurements, line drawings, and notes on condition and use wear were recorded for each item. The specific types of measurements and descriptive categories used for the artifacts are further discussed in the sections which are devoted to the various types of artifacts. Historic artifacts were given lot numbers by material category (i.e., metal, glass, ceramic, plastic, etc.) and provenience.

Analysis of the marine invertebrates included identification of each specimen to the species if possible, or to the family level. Identification was checked using Kay (1979). Counts and weights for each identified invertebrate group was recorded by provenience lot and tabulated for each test unit. The test unit tables are presented in Chapter 4, and summary data are presented in Chapter 5.

Vertebrate faunal remains were counted and weighed as lots from each collection provenience, and were sorted into the following general groups: fish bones, fish scales, bird/fowl, small mammals (mongoose), medium mammals (pig), and large mammals (bovine, deer). Specific identification of vertebrate remains was not conducted beyond the general groups, primarily because of the small volume of remains and the predominance of either historic/modern assemblages, or non-cultural introductions (deer, mongoose) in the collection.

Stratigraphic information was recorded on excavation record forms, and included standard descriptive categories as used in the USDA Soil Description Manual. Soil samples were collected from each soil layer of every test unit, in order to allow for comparisons of soils between sites, and to provide consistency in soil descriptions. All soil colors, textures and consistence were determined in the laboratory by the author, rather than in the field by five different individuals. Color identifications were made using the Munsell Soil Color Charts, and other descriptive information follows the format and terminology of the USDA National Soil Survey Handbook.

Artifacts and midden samples collected during this project are curated at the facilities of Archaeological Services Hawai'i, 1930A Vineyard Street, Wailuku.

4. SURVEY FINDINGS - SITE DESCRIPTIONS

Fifteen historic properties comprising 80 component features were identified during the current survey (*Tables 4.1 and 4.2; Figure 4.1*). Among the fifteen sites, two are single components (Site 5795 and 5796).; three sites consist of two component features (Site 1864, 5709 and 5799); four sites consist of three to four features (Sites 2272, 5708, 5797 and 5798); four sites consist of five to ten features (Sites 1007, 1853, 5707, and 5711), and two sites contain over 10 features (Sites 5706, 5710). Most of the identified sites (11) are within parcel 37; one is within parcel 56 and three are within parcel 86.

All four of the sites within parcels 56 and 86 are historic to modern in age, and represent either habitation (Sites 5708, 5798, 5799) or a school (Site 1007). Other historic era features located in parcel 37 include walls at Sites 1853, 1864, 5707, and 5797; and enclosures at Sites 5795 and 5796. Three Hawaiian sites (5706, 5707, and 5711) have been dated to the pre-contact era through radiocarbon analysis, and features at Sites 5706 and 5710 are associated with traditional Hawaiian material culture. Some of the landscaping features at these two sites could date to either the pre-contact or the historic era, and are assumed to have been constructed and used by the Hawaiian residents of the area. There are insufficient material remains at many of these features to determine period of construction and use.

As indicated below, the identified sites range from 140 to 2,660 square meters in area. The largest sites (5706 and 5710) are agricultural complexes that contain numerous land clearing features, planting terraces, and/or cleared planting areas. In addition to the Site 5797 fence line, small area sites are the two single-component enclosures (5795, 5796) and a C-shape with associated wall segments (5707).

This section provides descriptive information on the identified features, and the results of subsurface testing. The descriptions follow numeric ordering of the SIHP site number.

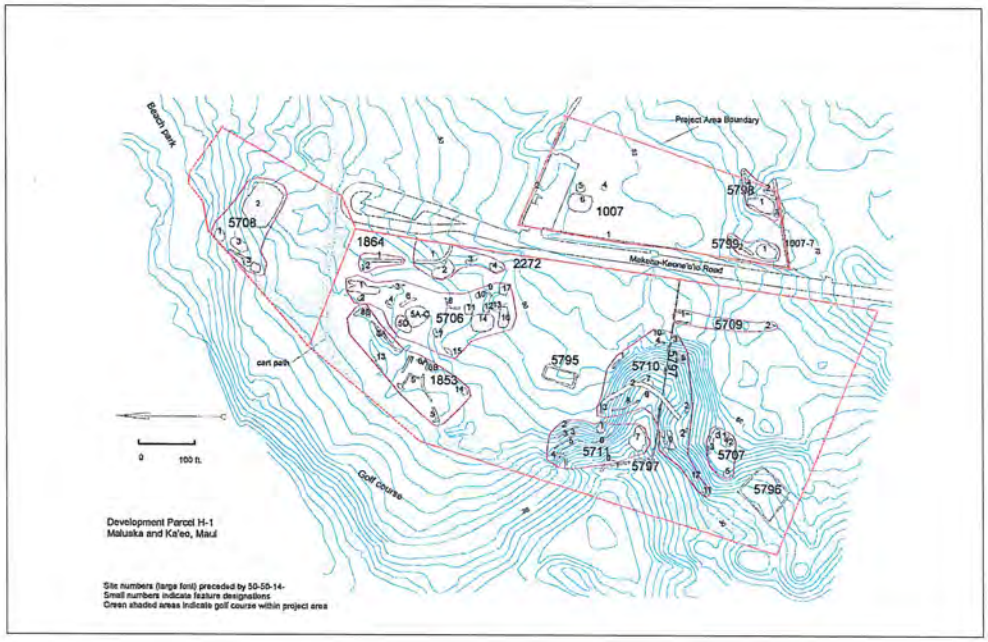
Site No.	Approx. Area*	Features	First Reported*	Parcel No.	COMMENTS
1007	697	6	1988	84	Mākena School Site; two features newly identified
1853	2,007	8	1974	37	Maluaka Point complex, two features newly identified
1864	237	2		37	Wall segments along Mākena Road, traditional and modern
2272	1,091	4		37	Wall and landscaping features, three features newly identified
5706	3,350	17	2005a	37	Habitation/agricultural complex, 16 features newly identified
5707	511	5	2005a	37	Habitation site with wall segments, three features newly ident.
5708	1,412	3	2005b	56	Historic/modern home site and historic/modern refuse areas
5709	441	2	2005a	37	Historic/modern land clearing features, machinery indicated
5710	2,660	13	2005b	37	Agricultural complex in gulch, affected by modern dozing
5711	1,420	8	2005a	37	Ceremonial complex in gulch, seven features newly identified
5795	211	1	1974	37	Historic era enclosure, storage/minimal activities indicated
5796	520	1	1974	37	Enclosure, most likely historic (garden/livestock)
5797	140	4	1978	37	Stone wall segments and wire cattle fencing, three features new
5798	446	4	2005b	84	Historic/modern home site with associated wall
5799	334	2	2005b	84	Historic/modern ancillary habitation site, associated wall

*NOTES: Area is given in square meters; First reported dates: 2205a is Rotunno-Hazuka et al.; 2005b is this survey report. See text for other date references

Table 4.1 Summary of Identified Sites

(See inserted map)

Figure 4.1 Project Area Map Showing Site and Feature Locations



SIHP Site	Fea.	New?	Description	FN	Dimensions	Tested	Function/Age/Affiliation
1007	1	N	Wall along Makena Road, west boundary of Makena School lot	78	1.3 x .50-.80	N	boundary marker; historic
	2	N	Wall along northern boundary of Makena School lot	80	1.1 x .50-1.1	N	boundary marker, historic
	4	N	Square platform with central depression and lumber	83	3.3 x 3.0 x	1989	privy for school, historic
	5	N	Cistern, cement plastered stone construction	79	4.5 m in diam.	N	water storage for school
	6	Y	Remnants of building foundation	79	12.0 x 12.0 x 0.15	Y	Makena school
	7	Y	Stone wall along south boundary of school lot	81	.80 x .50-.80	N	boundary marker, historic
1853	5	N	Enclosure remnant along edge of golf course	29, 30	46.4 x 0.65 x 0.80	Y	indeterminate, too partial
	6A	N	Bifaced, core-filled wall	27	4.6 x 1.0 x 0.80	Y	indeterminate
	6B	N	Unifaced/bifaced wall, a portion abuts pahoehoe ridge	28	10.0 x 1.0 x 0.70	Y	indeterminate
	7	N	Bifaced, core-filled wall, disturbed	14	12.2 x 1.4 x 0.50	Y	possibly historic
	8	N	Bifaced, core-filled wall in two sections, disturbed	3	42.0 x 1.5 x 0.70	N	partial enclosure, historic
	11	N	Unifaced/bifaced wall, a portion abuts bedrock formation, dist.	77	19.0 x 0.80 x 0.5	Y	indeterminate/historic
	13	N	Wooden trough, disturbed	9	3.5 x 0.35 x 0.47	N	livestock/historic
	14	Y	Filled depressions, stone piles abutting pahoehoe ridge	26	12.0 x 6.0 x 0.15	Y	clearing/historic
1864	1	N	Soil terrace with stone retaining wall	6	16.8 x 13.0 x 0.25	Y	agricultural?/Hawaiian
	2	N	Alignment/wall remnant	5	3.0 x 0.6 x 0.25	N	indeterminate/historic?
2272	1	N	Soil terrace with stone retaining wall	12	14.0 x 13.0 x 0.45	Y	agricultural?/Hawaiian
	2	Y	Stones piled on naturally fractured pahoehoe outcrop	16	10.5 x 8.0 x 0.25	N	clearing/Hawaiian
	3	Y	Soil terrace with stone retaining wall and rock filled depression	17	15.0 x 5.0 x 0.20	N	agricultural/Hawaiian
	4	Y	Stone fill placed on naturally fractured pahoehoe outcrop	18	4.3 x 3.5 x 0.40	Y	clearing/Hawaiian

Table 4.2 Summary of Identified Sites and Features within the Project Area

SIHP Site	Fea.	New?	Description	FN	Dimensions	Tested	Function/Age/Affiliation
5706	1	Y	Soil clearing and stone filled area along pahoehoe ridge	1	9.5 x 5.0 x 0.10	Y	habitation/Hawaiian
	2	Y	Pahoehoe excavation and stone-filled area along ridge	2	3.5 x 2.0 x 0.1	Y	agric., habitation/Hawaiian
	3	Y	Soil terrace with stones loosely piled on partially exposed outcrop	7	15.0 x 3.0 x 0.25	N	agriculture/Hawaiian
	4	Y	Soil clearing with adjacent crescent-shaped stone pile	8	2.5 x 1.5 x 0.30	N	agriculture/Hawaiian
	5	Y/N	Paved area, terraces and associated midden scatter	10	24.0 x 17.0 x 0.4	Y	habitation/Hawaiian
	6	Y	Linear stone pile	11	4.4 x 1.7 x 0.20	N	clearing/Hawaiian
	7	Y	Stone mound, alignment, filled depression and filled crevice	13	15.5 x 7.5 x 0.30	N	clearing/Hawaiian
	8	Y	L-shaped wall with associated soil clearing	15	11.5 x 4.7 x 0.20	Y	agricultural/Hawaiian
	9	Y	Boulder alignments, loosely piled boulders	19	6.6 x 3.5 x 0.4	N	clearing/Hawaiian
	10	Y	Stone-filled depression at base of pahoehoe outcrop	20	2.0 x 2.0 x 0.3	Y	clearing/Hawaiian
	11	Y	Stone-filled platform	21	5.0 x 3.4 x 0.6	Y	burial/Hawaiian
	12	Y	Stone-filled bedrock depression, boulder alignment	22	3.5 x 2.3 x -0.4	N	clearing/Hawaiian
	13	Y	Stone-filled bedrock area, L-shaped boulder alignment	23	6.0 x 2.4 x 0.30	N	clearing/Hawaiian
	14	Y	Surface midden and artifact scatter	24	18.0 x 16.0	Y	habitation/Hawaiian
	15	Y	Low wall across bedrock outcrop, no soil	25	5.6 x 0.65 x 0.35	N	indeterminate
	16	Y	Soil clearing with associated linear stone piles	32	11.2 x 6.0 x 0.30	N	agriculture/Hawaiian
	17	Y	Stone-filled terrace abutting pahoehoe ridge	33	3.1 x 2.9 x 0.30	Y	clearing/Hawaiian
5707	1	N	Bifaced wall segment (disturbed)	66	9.5 x 4.5 x 0.45	Y	indeterminate
	2	Y	C-shaped enclosure	66	5.2 x 6.0 x 0.64	Y	habitation/Hawaiian
	3	Y	Bifaced wall segment (disturbed)	66	10.5 x 4.0 x 0.35	N	indeterminate

SIHP Site	Fea.	New?	Description	FN	Dimensions	Tested	Function/Age/Affiliation
5708	1	Y	Stone-filled platform with historic artifacts throughout	75	10.2 x 4.2 x 0.90	Y	habitation/historic-modern
	2	Y	Circular cement cap, push-piles, wooden structural remains	73	4.6 diam. x 0.60	N	habitation/historic-modern
	3	Y	Surface/subsurface historic and modern artifacts	74,76	20.0 x 10.0	Y	habitation/historic-modern
5709	1	N	Parallel rubble walls/mounds	-	20.0 x 10.0	N	livestock/historic/modern
	2	Y	Oval stone mound, adjacent to bulldozed swale	65	3.2 x 2.1 x 0.35	N	clearing/probably historic
5710	1	Y	Stone-filled terrace with small clearing	39	13.0 x 5.0 x 0.60	N	agriculture/Hawaiian
	2	Y	Trail/roadway across gulch, bulldozed	45,61,62	66.0 x 4.2 x 0.20	N	transportation/historic
	3	Y	C-shaped wall at overhang with associated glass jugs	46	2.6 x 2.1 x 0.30	Y	agriculture/Hawaiian/modern.
	4	Y	Soil terrace with stone retaining wall with potting soil	47	6.0 x 3.2 x 0.60	Y	agriculture/Hawaiian/modern
	5	Y	Soil terraces with stone retaining walls	48,49	7.0 x 5.0 x 0.7	Y	agriculture/Hawaiian
	6	Y	Linear stone mound, adjacent to road	51	3.4 x 1.0 x 0.80	N	agricultural /Hawaiian
	7	Y	Four small soil clearings with associated stone terraces	52	13.5 x 9.0 x 0.40	N	agriculture/Hawaiian
	8	Y	Stone wall remnant, probable terrace face	54	10.0 x 1.5 x 0.50	N	agriculture/Hawaiian
	9	Y	Two soil clearings/terraces with three associated mounds	59,60	13.0 x 6.0 x 0.60	N	agriculture/Hawaiian
	10	Y	Collapsed stone terrace with cupboard and stone mound	63	14.0 x3.0 x 0.30	N	agriculture/Hawaiian
	11	Y	Stone terrace wall and stone mound	70	8.0 x 4.0 x 0.5	N	agriculture/Hawaiian
	12	Y	Stone terraces	71	9.5 x 5.0 x 0.50	N	agriculture/Hawaiian
	13	Y	Soil terrace with stone retaining wall	44	6.3 x 5.0 x 0.90	N	agriculture/Hawaiian
5711	1	N	Platform, portion walled	-	6.0 x 5.5 x 1.70	N	ceremonial/Hawaiian
	2	Y	Soil terrace with stone retaining wall, along slope	40	8.0 x 1.7 x 0.35	N	ceremonial/Hawaiian
	3	Y	Soil terrace with stone retaining wall, along slope	41	14.2 x 4.2 x 1.0	Y	habitation, ceremonial/Hawaiian
	4	Y	Partial enclosure with interior terraces and midden scatter	42	19.0 x 7.0 x 0.75	Y	habitation/Hawaiian

Table 4.2 Summary of Identified Sites and Features within the Project Area (Cont.)

SIHP Site	Fea.	New?	Description	FN	Dimensions	Tested	Function/Age
5711	5	Y	Soil terrace with stone retaining wall, along slope	43	12.0 x 2.5 x 0.33	N	habitation, ceremonial/Hawaiian
	6	Y	Soil terrace with stone retaining wall	44	6.3 x 5.0 x 0.26	N	agriculture, ceremonial/Hawaiian
	7	Y	Stone pavement/low platform with terraces	55	24.0 x 11.0 x 0.3	Y	possible ceremonial/Hawaiian
	8	Y	Stone-filled terraces	57	14.0 x 4.7 x 0.45	Y	ceremonial/Hawaiian
5795	-	N	Enclosure (Ma-B8-233)	-	17.8 x 8.0 x 1.0	Y	Habitation/storage/historic
5796	-	N	Enclosure (Ma-B8-234)	-	28.0 x 23.5 x 1.0	Y	garden or livestock enclosure
5797	1	N	Bifaced, core-filled stone wall across gulch (Ma-B8-240)	56, 58	46.1 x 0.7 x 0.90	N	poss. habitation enclosure
	2	Y	Stacked stone wall following wire fence line	50	15.0 x 0.6 x 0.35	N	livestock/historic
	3	Y	Stacked stone wall along wire fence line, with associated posts	53	30.5 x 0.6 x 0.45	N	livestock/historic
	4	Y	Two sections of stacked stone wall along wire fence line	46	13.0 x 0.8 x 0.70	N	livestock/historic
5798	1	Y	L-shaped wall, bifaced, core-filled	84	18.5 x 1.10 x 0.8	N	indeterminate/historic
	2	Y	Dimensional lumber structural remains, with round nails	85	2.3. X 2.2. X 0.20	N	habitation/historic
	3	Y	Stone pile with depression - *imu* type stones	85	2.7 x 2.5 x 0.30	N	habitation/historic
	4	Y	Refuse pit	86	1.5 m diameter	N	habitation/historic
5799	1	Y	Dimensional lumber structural remains, with round nails	87	8.0 x 6.0 x 0.40	N	habitation/historic
	2	Y	Stacked stone wall	88	18.0 x 2.0 x 0.30	N	indeterminate/historic

Table 4.2 Summary of Identified Sites and Features within the Project Area (Cont.)

Site 1007

Previous Investigations

Site 50-50-14-1007 was first recorded and listed in the State Inventory in 1988, following a reconnaissance survey of the Mākena Road cul-de-sac and public beach access parking lots (Cleghorn et al. 1988). At the time it was recorded, Site 1007 was named the Mākena School Parcel Historic Complex, and the designated site area encompassed the entire two-acre school parcel (Cleghorn et al. 1988:5). For the purposes of this survey, the school site area has been redefined to include the area of the school structures. Other non-related habitation structures within the school parcel have been given separate SIHP site numbers. The parcel 84 boundary walls recorded by Cleghorn et al. have been kept with the school site.

Five surface features were located within the complex during the 1988 reconnaissance survey. These included 1) a stone wall which follows the western boundary of the parcel; 2) a stone wall which follows the northern boundary of the parcel; 3) a roughly square platform divided in half by structural lumber, with a depression on one side; 4) a second platform similar to Feature 3; and 5) a cement lined cistern (Cleghorn et al. 1988:5, 7). Also noted, but not recorded was a concentration of modern material within the southern third of the parcel (*Figure 4.2*). This area has been recorded during the current survey as SIHP Sites 5798 and 5799.

Cleghorn et al. were not able to find documentation to verify the opening and closing dates of the school. Based on available information, they postulated that the school opened some time around or before 1917, when the parcel was deeded to the Territory of Hawai'i; and it was closed before 1930, when Handy and Handy visited the area (Cleghorn et al. 1988:8). Cleghorn et al.'s report includes a Territorial survey map of the school parcel dated 1936, which depicts a c. 20 foot E-W by 30 foot N-S structure adjacent to the west side of the Feature 5 cistern (*Figure 4.2*). Cleghorn et al. felt that the structure would have overlapped a portion of the cistern, and thus suggested that "...the cistern probably post-dates the abandonment of the school" (Cleghorn et al. 1988: 9). They also suggested that the two platforms (Features 3 and 4) could be remnants of two privies, however they noted that further work would be needed to substantiate their interpretation.

Further archaeological work (data recovery) was recommended for Feature 3, which was located within the area of the proposed parking lot. No further work was recommended for Features 1, 2, 4 and 5, which were not within the proposed construction area. Filling or covering of the cistern was recommended due to safety reasons.

Data recovery excavations were conducted at Features 3 and 4 in 1991 (Hurst 1991). A brief summary report was prepared for Seibu, however, a formal report of findings has not yet been completed.

Current Findings

Four of the five previously identified features (1, 2, 4, and 5) were located during the current survey, and two newly identified features (6 and 7) were added to the complex. Features 1, 2 and 7 are stone walls that define the north, west and south boundaries of the school lot. Features 4, 5 and 6 comprise the remains of the Makena School facility. Feature 3, one of the two postulated privies, is no longer present. We found that the cistern (Feature 5) had been filled, per prior recommendations.

Features 1, 2 & 7

The three stone walls associated with the school site area boundary walls that help define the two-acre parcel that was subdivided from Grant No. 1508:2 and designated as the school lot. The walls are shown on the 1936 Territorial survey map of the School parcel, which shows Features 1 and 2 extending east beyond the eastern boundary of the parcel (*Figure 4.2*). Feature 1, the western boundary wall, also continues south, beyond the juncture with Feature 7. The northern portion of Feature 1 has been impacted by the construction of the public parking lot that is now adjacent to the intact portion of the school site, and by the Prince Hotel landscaper's baseyard. It is therefore possible that Feature 1 extended northward and defined the west boundary of Grant 1508:2. In this case, the walls would have predated construction of the school. Feature 1 continues southward along Mākena Road, beyond the

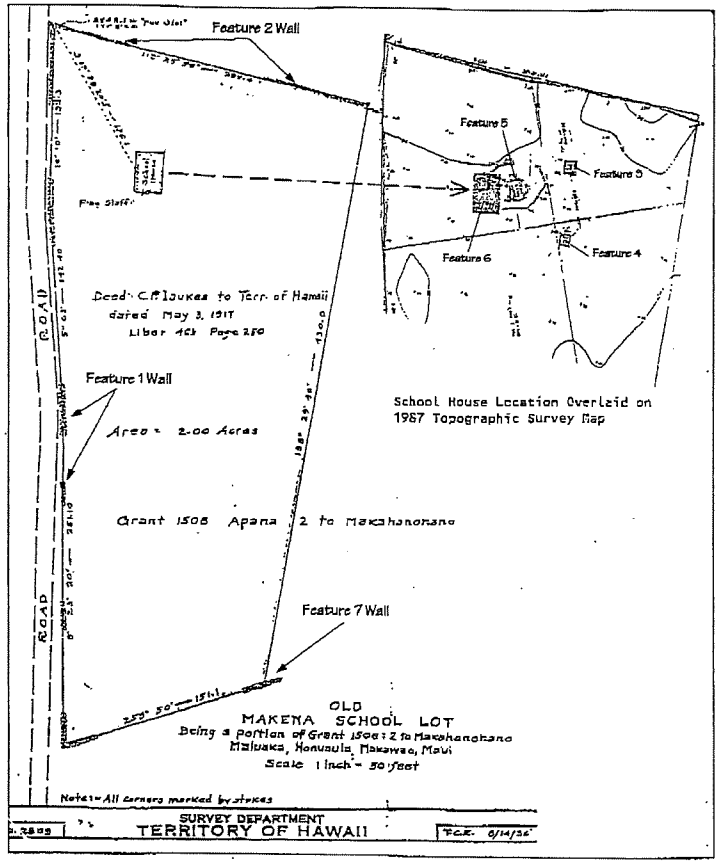


Figure 4.2 Territorial Survey map of the Mākena School lot showing building location and identified archaeological features (map from Cleghorn et al. 1988:6; feature numbers added)

juncture of the southern school lot boundary wall (Feature 7). Feature 2 continues eastward approximately 45 meters beyond the parcel 84 boundary; it then turns south and continues approximately 95 meters to a juncture with the Feature 7 wall. Feature 2 essentially encloses an area slightly under four acres; the western 2 acres comprises the school lot. The Feature 7 wall continues east from the east boundary of parcel 84 boundary for approximately 75 meters, where it junctures with the Feature 2 wall; from there, it continues approximately 105 meters east, then turns south for c. 80 meters and junctures with the Site 230 wall. The Site 230 wall corresponds with the *Aupuni* wall (described in Chapter 1) which also defines the *mauka* boundary of Grant 1508:2. The configuration of these walls beyond the current project area is shown in Rotunno-Hazuka et al. 2005:3).

Structurally, there is considerable variation between and within the three walls, some of which could be attributable to modern impacts and reconstruction work. Feature 1 shows a stacked construction; however, the best-preserved sections of the wall appear to have been rebuilt during the modern era. These sections are just south of the school parcel and are 1.3 m high by 0.5 to 0.8m wide. The west portion of Feature 2 appears to have been rebuilt as well, it is bifaced and core-filled, with neat vertical sides constructed from angular basalt boulders. The most intact portions of the wall are 0.4 meters high and 1.10 meters wide. To the east of the school parcel, this wall is 1.10 meter high and 0.5 to 0.6 meter wide. Feature 7 is in relatively poor condition at the west end, where it was probably affected by rock pillaging. The best-preserved sections are near the east edge of parcel 84, in the area of Site 5798. where the wall is 0.6 meter high and 0.9 to 1.0 meter wide. A section of Feature 7 was knocked out by machinery, apparently to allow installation of a water line. This wall is multiple-stacked, with boulders and cobbles of various sizes used throughout.

Feature 4

This feature was identified as a possible privy by Cleghorn et all (1988), and was mapped in detail and excavated in 1991 during data recovery activities (Hurst 1991). According to Hurst, a 1 by 1 meter unit was excavated to a depth of 1.41 meters at Feature 4. Hurst reported recovering 56 lots of artifacts from the two privies, as well as five fish bone samples. Materials include structural lumber and hardware, (presumably from the privies), slat, slate pencils, buttons, marbles, tin can sherds and soda bottles (Hurst 1991:2). The open excavation from the data recovery work is still visible in the eastern half of the Feature 4. The unexcavated portion of this feature remains in relatively good condition, despite the introduction of modern rubbish into the open excavation. Additional field work was not conducted at Feature 4 during this survey, pending the completion of the data recovery report. If this report is not completed, additional work will be needed to re-document the structure and perhaps excavate the remaining west half of the privy.

Feature 5

Feature 5 is a circular cistern constructed from angular basalt boulders and mortar. The interior and exposed exterior walls of the cistern appears to have been plastered with a fine-grained mortar, and the stones were laid with a coarser mortar. Currently, the feature is filled to just below the rim with soil and stones, and grass is now growing on the fill (*Photo 4.1*). Cleghorn et al. (1988) reported that it was 3.0 meters deep prior to filling. They also note that it is 4.5 meters in diameter; which is the interior diameter. The walls average 0.45-0.50 meter thick, resulting in an exterior diameter of 5.25-5.50 meters. The walls are currently 0.50 to 0.60 meter above ground surface and are generally vertical, with a slightly outward slope in places. This appears to be near the original wall height, as the exterior plaster extends to this current surface.

Imprints of dimensional lumber were observed by Cleghorn et al. along the top of the cistern walls; seven of these are still visible, although the plaster and mortar is beginning to crack and fall away from the stone in many places (*Figure 4.3*). The imprints were made after the surface plaster was applied. Average width of the imprints indicates 4" boards and one 5-6 inch board. All but one of the lumber imprints are 6 inches deep; one is 2 inches deep. The ends of some boards were angled, others were squared. As noted by Cleghorn et al., these most likely represent the notches for a wooden lid.

Two partially buried boulder alignments are present in a curved pattern along the north and south sides of the cistern (*Figure 4.3*). These may represent the edges of the original excavation for the cistern, and were used to stabilize the backfill as the cistern was buried.

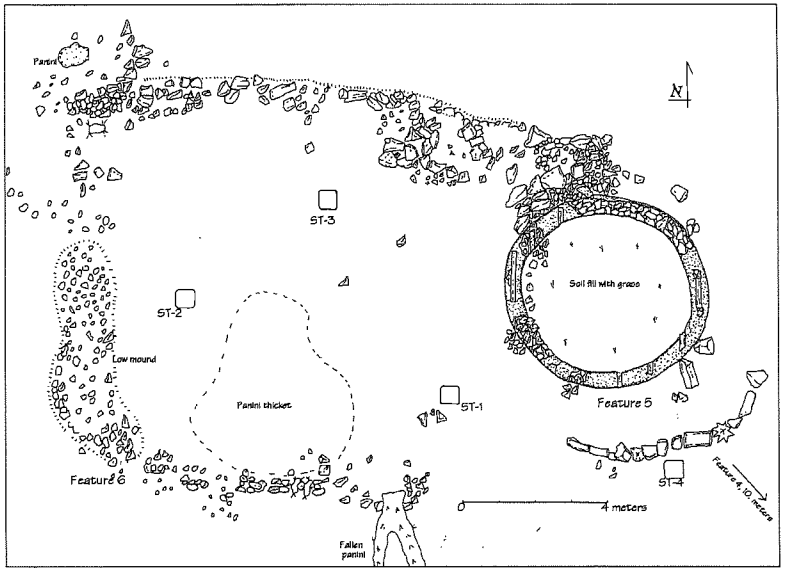


Figure 4.2 Scaled plan map, Site 1007 Features 5 and 6.

Feature 6

Feature 6 is a rectangular pattern of surface rubble and low berms that appear to represent the remnants of the school building foundation. This feature was not recorded by Cleghorn et al.; it is generally diffuse and the stones appear to have been dispersed outward from their original configuration, possibly by machinery. The north and south sides are defined by partially buried aligned boulders and cobbles and a surface scatter of loose stones. These two alignments are parallel and spaced an average of 10 meters apart. The north alignment of 9.8 meters long and the south alignment is 8.0 meters long. The west end of both alignments curve slightly to meet a mounded soil and rock berm that defines the west edge of the feature. The berm averages 0.80 meter wide and is 9.8 meters long. The overall area defined by these alignments and berm is 10.0 meters N-S by 8.0 to 8.5 meters E-W (c. 32 by 26 feet). This is relatively close to the dimensions of the school building as calculated from the territorial survey map; and the location correlates well with the location shown on the survey map.

Four 0.50 by 0.50 meter shovel tests were excavated in the area of Features 5 and 6, in order to determine the extent of disturbance to the immediate area of the structure, and to determine whether deposits predating the school might be present. Shovel Test (ST) 1 was located along the eastern perimeter of Feature 6; ST 2 and 3 were located inside the Feature 6 area, and ST 4 was located just outside the boulder alignment, to the south of Feature 5 (*Figure 4.3, Photos 4.3, 4.3*). All four of the tests showed a consistent soil stratigraphy consisting of three layers. Layer I is fine dark brown to strong brown loose loamy sand with *kiawe* duff; it varies from 0.04 to 0.10 meter in thickness (*Figure 4.4*). Layer II is loose, fine yellowish brown aeolian sand that varies in thickness from 0.10 to 0.15 meters. Layer III is yellowish brown very stony compact silty clay loam. This layer was encountered at 0.16 to 0.25 meter below surface and grades to an *in situ 'a'a* flow. Cultural materials were encountered in Layer I at all four shovel test locations. Layer II contained cultural material in all tests except ST-3, and Layer III was sterile in all units, with the exception of one piece of glass recovered from Layer III of ST-1 (*Table 4.3*).

A total of 397 artifacts were recovered during shovel testing. Of this total, nearly all (381, 96%) are associated with the school building and school activities, and are consistent with materials reported by Hurst from Feature 4. Among these items are 217 pieces of flat (window) glass, 100 pieces of painted and unpainted glaze (from windows), 20 small pieces of chalk, 11 nails (five square), 10 pieces of No. 2 pencil lead, 10 pieces of slate chalk board, six slate pencil fragments, and two metal eraser holders with portions of wooden No. 2 pencils.

Sixteen artifacts are modern and were introduced to the site after the school was closed. These include nine fragments of a single plastic CD and six beverage bottle sherds (one clear, four green). These items were confined to the relatively thin Layer I deposit at ST-1 and 4.

Overall, it appears that the subsurface deposits at the site accurately reflect the time frame of the school operation; although some degree of horizontal movement of materials is expected, given the condition of the foundation.

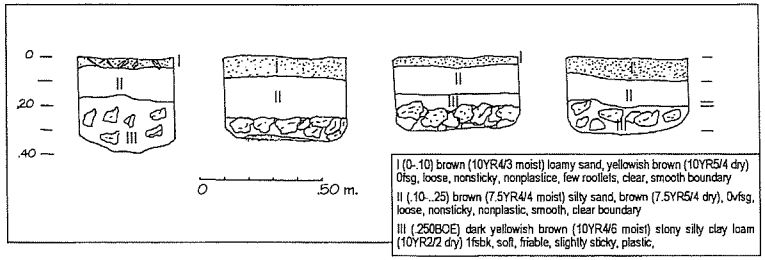


Figure 4.4 Site 1007 Features 5 and 6 Shovel Tests 1-4, Profiles

Absent from the artifact list is structural lumber, which would have been present if the building was demolished or left to crumble in place. The artifact assemblage suggests that the building may have been moved from the site, or all the lumber was carefully salvaged and removed with little or no breakage. The correct scenario can most likely be confirmed through oral interviews.

Midden was recovered from two shovel tests (ST-1 and 4), both of which are on the east side of Feature 6 (*Table 4.3*). The most concentrated occurrence of marine shell was found in Layer II at ST-4, and included one *Nerita picea*, two Echinoderm fragments, one *Patellidae (oiphi)* fragment, and four pieces of *Cypraeidae* shell. Six midden items were recovered from ST-1, including three small fish bones, two pieces of chicken egg shell, and one *Cypraeidae* shell fragment. All of the midden occurred with artifacts from the school activities and are assumed to be contemporaneous with the school.

Preliminary findings from the shovel tests suggest that artifacts and midden are more concentrated in the school yard area just outside the building on the east side, and just south of the cistern. This follows the pattern for expected material densities, given the presence of a post and pier wood frame structure with wood floors. It should be noted that the yard area to the north of the building is not available for testing, due to the presence of a paved parking area.

No surface or subsurface evidence of a later occupation was found at this site, and no information was recovered that supports Cleghorn et al's. conclusion that the cistern post-dates the school. In fact, the location of the cistern and the artifact deposit adjacent to the cistern supports the conclusion that the cistern was built for the school and used during the time the school was in use. The formal characteristics of this feature are consistent with early twentieth century design and construction.

SITE 1007 Fea. 6, ST-1	I	II	III	Total	ST-2	I	II	Total	ST-3	I	ST-4	I	II	Total	Site
Depth in cm BS	0-.04/5	.04/5-.16	.16-.30			0-.08	.08-.25			0-.05		0-.08/.10	.08/.10-.20		Total
CHALK	14	3		17		1	1	2					1	1	20
GLASS															
CLEAR															
Flat	130	44	2	176		13	4	17		2		2	20	22	217
Beverage bottle	1			1									1	1	2
BLUE - indeterminate	1			1											
GREEN - beverage												1	3	4	4
GLAZE															
PAINTED	23	2		25											25
UNPAINTED	59	15		74									1	1	75
LEAD															
NO. 2 PENCIL	6	2		8								1	1	2	10
METAL															
SCHOOL SUPPLIES															
Pencil eraser	1			1									1	1	2
TIN - can fragment												1		1	1
NAILS															
Round	5			5								1		1	6
Square	1			1		1		1		3 (1)					5
MORTAR	3	1		4								1		1	5
SLATE															
Chalk board	4	3		7									3	3	10
Slate pencil		4		4								1	1	2	6
PLASTIC															
CD	9			9											9
TOTAL ARTIFACTS	243	71	2	316		15	5	20		5		8	32	40	397
PORTABLE MATERIAL															
Coral													1	1	1
Waterworn basalt	1			1									1	1	2
Waterworn shell	1	1		2											2
MIDDEN															
Eggshell	2			2											2
Fishbone	2	1		3											3
Marine shell		1		1								1	8	9	10
SUBTOTAL	6	3		9								1	10	11	20
Total	249	74	2	325		15	5	20		5		9	42	49	417

Table 4.3 Recovered artifacts and midden, Site 1077 Feature 6, Shovel Tests 1-4

Site 1853 (Ma-B8-7)

Previous Investigations

Site 1853 was identified during Clark's 1,300-acre reconnaissance survey of Seibu lands, and was initially recorded as Bishop Museum Site 50-Ma B8-7. At that time, the site was identified as a 10.5 by 6.0 meter by .40 meter high rectangular paved platform inside a 31.0 by 28.0 meter enclosure (Clark 1974: 11). During subsequent survey and excavation field work (Haun 1978), the site area was expanded to include 17 mapped features, 12 of which were assigned feature numbers (*Figure 4.5*). Identified features included three enclosures (Features 1, 5 and 9), seven walls (Features 3, 4, 6-8, 11,12), a well (Feature 10) and a platform (Feature 2). Artifacts and midden were observed only on the Feature 2 platform and within the Feature 9 enclosure, which surrounded the platform (Haun 1978: 14). Features 2 and 9 as recorded by Haun correspond with the original Site 1853 as recorded by Clark.

Haun described the Feature 2 platform as being 7.8 by 5.5 meter by .40 meter high, with a thick pavement consisting of waterworn cobbles and boulders and pieces of coral. He also noted a stairway in the center of the *mauka* wall leading to the top of the structure. Haun (1978) excavated four one-by-one meter units within and adjacent to the platform, and concluded the following:

> The artifact assemblage yielded is almost completely historic -- nails, glass, ceramic fragments, pieces of slate, a Jew's harp, and a variety of metal objects. One piece of basaltic glass was the only possible evidence of prehistoric occupation, although this was associated with the historic materials. (Haun 1978:25)

At the time of Haun's visit (March/April 1978), portions of the Feature 9 enclosure had been broken through by bulldozers. No additional information was provided by Haun regarding the other mapped features within this complex, and only Feature 2 was excavated as part of the data recovery program.

In June of 1978, Bishop Museum staff revisited the complex during the third increment golf course survey, and assigned new Bishop Museum site numbers to two of the enclosures within the complex. The enclosure designated by Haun as Feature 5 of Site B8-7 was assigned BPBM Site B8-232; and Haun's Feature 1 was assigned B8-238 (Cordy 1978). In his discussion of findings, Cordy interpreted the Site B8-7 enclosed platform and the Site B8-238 enclosure as permanent historic era habitation sites. The Site B8-232 enclosure was interpreted as a historic era livestock-related enclosure (Cordy 1978:54).

The SIHP site number 50-50-14-1853 was subsequently assigned to the Site B8-7 complex as described by Haun (1978). SIHP numbers were not assigned to the Bishop Museum site numbers assigned by Cordy within the complex area. Therefore, the SIHP number (1853) applied to the B8-7 complex as described by Haun is used here.

Current Findings

Six of the twelve features enumerated by Haun within Site 1853 were removed during construction of the Seibu golf course (*Figure 4.5*). Portions of one enclosure (Feature 5) and three walls (Features 6-8), are within the current project area. A wooden trough that is shown on Haun's site map, but not enumerated in his report, is also present within the project area; it was recorded for this project as Feature 13. It is also possible that the remnants of the Feature 11 wall are within the project area. This wall is shown to the west of the project area when properties are overlaid, however, when measurements are taken from known features, the wall falls within parcel 56 (discussed below).

The Feature 12 wall and the Site B8-8 (SIHP Site 1854) well that is shown on Haun's site map are still present, however, they are outside the current project area. The wall was impacted by golf course construction, and is currently covered with landscaping vegetation. The Site B8-8 well has been impacted by high surf and is currently filled in with beach pebbles. The stairway and vertical wall facing around the well are still visible and conform with the description provided by Haun.

The features that were located and re-identified within the project area are described below, followed by a new feature (14) that was added to the complex due to its close proximity to previously recorded features.

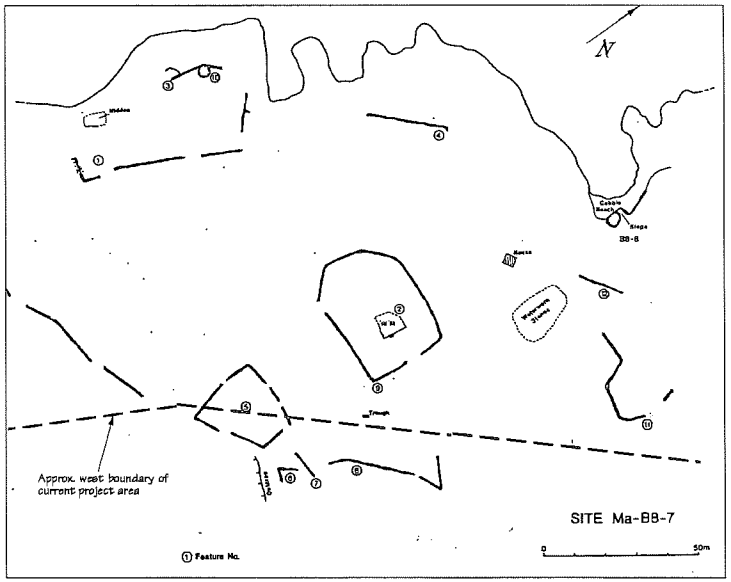


Figure 4.5 Site 1853 Plan Map from Haun 1978:21 (current project area boundaries added)

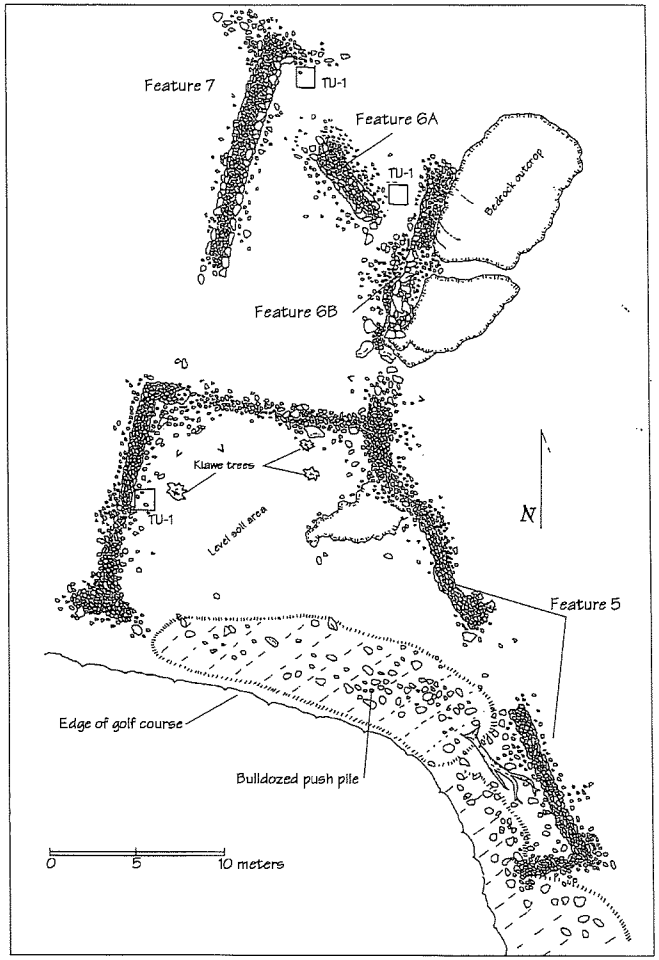


Figure 4.6 Scaled Plan Map, Site 1853 Features 5, 6 and 7

Site 1853 Feature 5 (50-Ma-B8-232)

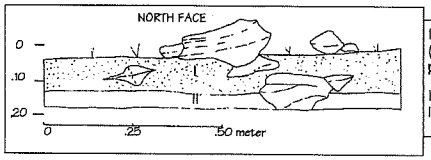
Feature 5 was mapped by Haun (1978), and described as an historic era enclosure (1978: 14). Dimensions of the enclosure were recorded as 24.2 by 22.4 meters, with a total area of 542 square meters. As depicted by Haun, the enclosure was four-sided, with sides measuring approximately as follows: north wall, 24 meters, west wall, 24 meters; south wall, 22 meters; and east wall, 12 meters. Five openings were mapped, including two in the north wall, one in the west wall, one in the south wall and one in the east wall, at the northern corner.

Cordy revisited the enclosure in 1978 and assigned it Bishop Museum site number 50-Ma-B8-232. He described it as being roughly rectangular with one long side, and measuring 22 by 24 meters, with a total exterior area of 528 square meters. Cordy noted two of the openings in the enclosure, both of which "seemed to be knocked down by bulldozers" (Cordy 1978:76). Cordy excavated a 1.0 by 1.0 meter test unit within the enclosure and identified a 0.05 to 0.10 meter thick cultural deposit (Cordy 1978:20). One sea urchin spine abrader was recovered from the surface of the feature (Cordy 1978:16). Twenty pieces of shellfish midden (15.2 grams) were recovered from the test unit. Varieties recovered included *Cellana exaratus* (2), Cypraeidae (13), *Drupa ricinus* (1), *E. mammillatus* (2), and *Nerita picea* (2). Cordy interpreted Feature 5 (Site 232) as being entirely historic in age (1978: 27), although no artifacts were recovered to provide an absolute historic date for the cultural layer (Cordy 1978: 30). Assigned function was as a livestock enclosure (1978: 48, 53).

During the current survey, a portion of Feature 5 was identified along the western boundary of the project area, adjacent to the edge of the golf course and a bulldozed push pile (*Figure 4.6*). Field numbers 29 and 30 were assigned to two identified wall sections; these were subsequently determined to be portions of the Feature 5 enclosure. The portion of the enclosure still remaining includes the eastern half (12.0 meters) of the north wall; the entire east wall (12.0 meters), the entire south wall (24 meters), and a small portion of the west wall (4.0 meters). One opening 4.5 meters wide was observed in the south wall. This opening corresponds with Haun's 1978 map; no opening was seen in the east wall, as indicated on Haun's map.

The Feature 5 wall shows a consistent construction technique of multiple-stacked subangular basalt cobbles and boulders (*Photo 4.4*). The intact portions of the wall are five to seven courses in height (0.45 to 1.00 meter), with disturbed sections at one to two courses (0.10 to 0.45 meter). Width ranges from 0.60 to 1.10 meter, with an average of 0.80 meter. The surface inside the enclosure remnant is flat to irregular, with kiawe, *koa haole*, *'ilima*, and grass present. An exposed *pahohoe* outcrop is present near the center along the south wall. A short wall (2.6 meters) extends east from the southeast exterior corner of the enclosure and abuts a second *pahoehoe* outcrop that is part of Feature 6. No artifacts, midden, or other portable materials (except golf balls) were observed within or adjacent to the enclosure remnant.

A 1.0 by 1.0 meter square test was excavated adjacent to the interior side of the north wall, near the center of the intact portion (*Figure 4.6*). Two soil layers were encountered; these include a very dark brown surface layer (I) of fine sandy loam to a depth of 0.12 meter below surface, and a subsoil layer (II) of dark brown compact silty clay loam from 0.12 to 0.17 meter below surface (*Figure 4.7*). A total of 270 liters of matrix was screened; both soil layers contained 50% small cobbles and pebbles by volume. No artifacts, midden, or other portable remains were recovered during excavation or soil screening. The cultural layer briefly described by Cordy for Feature 5 was not encountered in the test unit, and no new information was obtained to indicate former uses or period of construction.



I: (0-.12 m) very dark brown (10YR2/2 moist) sandy loam, (10YR2/2) dry, 0vfcr, loose, very friable, nonsticky, nonplastic, rootlets common, clear, wavy boundary

II: (.12-.17) dark brown (10YR3/4 moist and dry) silty clay loam, 2fsbk, hard, friable, slightly sticky, slightly plastic

Figure 4.7 Site 1853 Feature 5, TU-1 Profile

Site 1853 Feature 6

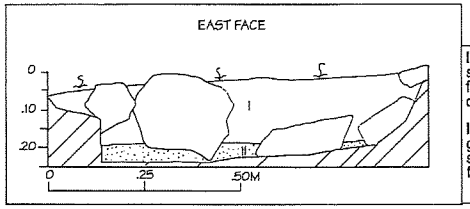
Feature 6 was mapped and described by Haun (1978:14) as an historic era wall. It is depicted as an L-shaped structure 10.5 meters long by 0.6 meter wide, located approximately 8.0 meters east from the Feature 5 enclosure. Current investigations indicate that Feature 6 is actually two discontinuous wall sections that are oriented at an oblique angle (*Figure 4.6*). The two sections have been designated as Features 6A and 6B. The southwestern end of Feature 6A is 2.00 meters northeast from the center of Feature 6B and the northeastern end of Feature 6A is 6.2 meters east from the south end of Feature 7 (*Figure 4.6*).

Feature 6A is a free-standing bifaced, core-filled wall constructed from basalt boulders and cobbles, with small cobbles and pebbles as fill (*Photo 4.5*). The wall is 4.60 meters long and oriented northeast-southwest. Portions of the wall are collapsed, however, there is no indication of extensive machinery or animal impacts. Height of the wall averages 0.65 meters, and width is consistent at 1.00 meter. The collapsed portion is 0.20 meter high and 1.3 meter wide. The wall was constructed on level ground with a soil deposit present.

Feature 6B is a unifaced core-filled wall constructed against the north face of an exposed *pahoehoe* outcrop (*Photo 4.6*). The wall is constructed with basalt boulders stacked two to four courses high, and smaller cobbles and pebbles that were used to fill between the stacked boulders and the outcrop. The western end of the wall consists of a single course of stacked boulders with no fill in place. This section appears to be either unfinished or partially dismantled. Overall length of Feature 6B is 10.0 meters; width is 1.00 meter and height varies from 0.50 to 0.90 meter. The western end of Feature 6B is in a collapsed condition; however, it appears that this wall section once abutted the southeast corner of the Feature 5 enclosure. Vegetation in the vicinity of Feature 6 consists of *koa haole*, kiawe, *'ilima*, and scattered grasses. No artifacts, midden or other portable remains were observed on the surface around these two wall sections.

A 1.0 by 1.0 meter test unit was excavated in a level soil area midway between the two Feature 6 wall sections (*Figure 4.6*). Two soil layers were encountered; the surface layer (I) consists of dark brown sandy loam with roots and some organic duff materials. The underlying subsoil (Layer II) consists of compact dark yellowish brown silty clay loam (*Figure 4.8*). Layer I extended to a maximum depth of 0.15 meter below surface and contained scattered boulders from wall fall as well as *in situ* cobbles. Layer II was excavated to 0.20 meter below surface. The test unit was terminated in sterile Layer II subsoil. Layer I soil contained roughly 16% stones by volume (15 liters stone in 95 liters screened matrix). No artifacts, midden, or other portable remains were found in the screened matrix. Layer II contained roughly 25% stones; no artifacts, midden or other portable remains were recovered from screened matrix.

Subsurface testing in the area of Feature 6 did not provide any new information to assist in determining the age of function of these wall sections. The positioning of Feature 6B indicates that it most likely post-dates the Feature 5 enclosure.



I: (0-.15) very dark brown (10YR2/2 moist) sandy loam (10YR3/3 dry), 0vfcr, loose, very friable, nonsticky, nonplastic, very fine roots common, clear, smooth boundary

II: (.15-.25) very dark brown (10YR2/2 moist) gravelly silty clay loam (10YR4/3 dry), 1fsbk, soft, friable, slightly sticky, slightly plastic, few fine roots and few coarse roots

Figure 4.8 Site 1853 Feature 6 Test Unit 1 Profile.

Site 1853 Feature 7

Feature 7 was mapped and described by Haun (1978: 14) as an historic era wall measuring 9.8 meters long by 0.70 meter wide, located between wall Features 6 and 8. The current survey identified the feature as a bifaced, core-filled wall that was impacted on the east end and possibly on the west end as well. the intact section of this wall is 12.2 meters long and 1.4 meter wide, with height ranging from 0.25 to 0.80 meter. The wall is constructed from large stacked boulders on the exterior sides and filled with small to medium cobbles (*Photo 4.7*). The sides are well-faced and the wall is generally wider than the nearby Feature 5 enclosure and Feature 6 and 8 walls. The western portion of the wall is lower than the eastern half, and it appears that stones were removed from this feature and perhaps used in construction of the adjacent walls. No artifacts or portable remains were observed on the surface in the near vicinity.

A 1.0 by 1.0 meter test unit was excavated on the south side of the wall, near the eastern end (*Figure 4.6*). Two soil layers were encountered; Layer I is the surface layer consisting of dark brown fine sandy loam, and Layer II is dark yellowish brown compact subsoil (*Figure 4.9, Photo 4.8*). Layer I averaged 0.10 meter in thickness and contained 10% stones by volume. Portable remains recovered from screened Layer I soil include 1 piece of a Cypraeidae shell (13.4 grams) and five small pieces of weathered coral (9.3 grams total). Layer II was excavated to a base depth of 0.28 meter below surface and contained 14% stones by volume. No artifacts, midden or other portable remains were observed in screened Layer II matrix.

Materials recovered from Test Unit 1 indicate a low level of activity in the area; however, it should be noted that the remains are heavily weathered, suggesting that they have been exposed to disturbances and surface erosion. Layer I at this location is interpreted as primarily a topsoil matrix that may be either a disturbed cultural layer, or may contain materials from a former cultural layer that has eroded away.

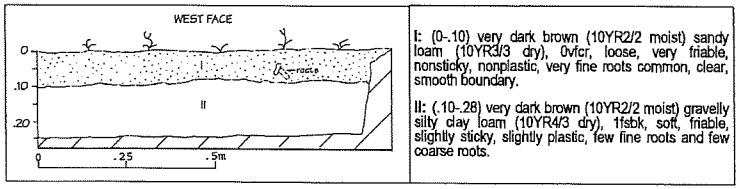


Figure 4.9 Site 1853 Feature 7, Test Unit 1 Profile

Site 1853 Feature 8

Feature 8 was mapped by Haun (1978: 14) and described as an historic era wall with an overall length of 47.4 meters and a width of 0.7 meter. Haun's site map depicts the wall as two sections; these were easily identified in the field during the current survey and designated as Feature 8A and 8B (*Photos 4.9 and 10*).

Feature 8A is a 28.0 meter-long straight to slightly curved wall oriented roughly northeast-southwest (40-220 degrees Az.). The southwestern end of this segment is 5.7 meter west from the Feature 7 wall; and the northeastern end is 1.8 meter from the end of Feature 8B (*Figure 4.10*). Feature 8A is constructed with basalt boulders and cobbles of various sizes. The intact portions show a bifaced, core-filled design, with an average width of 1.0 meter. Height of the intact portions range from 0.40 meter to 0.90 meter, with the highest face along the north side of the wall where three courses of exterior boulders are still intact. Three broken-down sections are present along the wall; these appear to be areas that were affected by animals. The north end of the wall is currently 1.8 meter south from the end of the Feature 8B wall. The break between these two wall sections may have been caused by animals; however, it is also possible that there was an original opening in the wall at this location. The southern end of the Feature 8A wall may have been impacted by bulldozing.

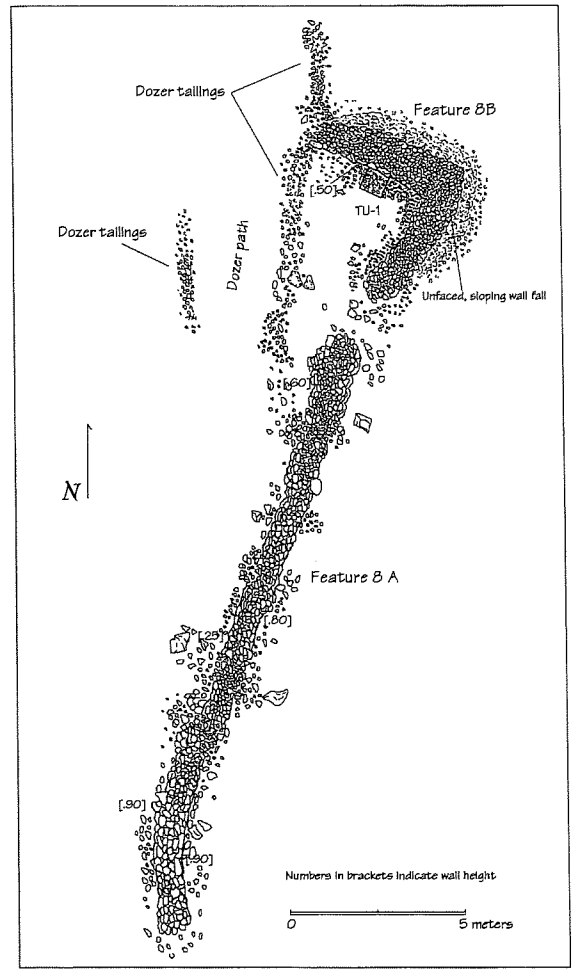


Figure 4.10 Site 1853 Feature 8, Plan Map

The wall follows along the crest of a low ridge formation that is surrounded by lower, flat terrain on the east and west sides; overall condition is fair to poor. No artifacts or portable remains were observed on the Feature 8A wall or on the surface in the near vicinity of the wall. Surface midden associated with Site 5606 feature 5 is present 5.0 meters east from the wall.

Feature 8B is a roughly V-shaped wall segment located 1.8 meter north from the north end of Feature 8A. This segment has an overall length of 14.0 meters, with each half at 7.0 meters. Width along the top, where discernible, is 1.4 to 1.8 meters, and height averages from 0.4 to 0.6 meters, with a maximum interior height of 0.90 meters. Currently, the Feature 8B segment shows facing only along the interior (west) side; the exterior side slopes outward, resulting in a base that is 0.80 to 1.00 meter wider than the top. A linear bulldozer tailing of boulders and cobbles is present to the north and south of the west end of this wall, indicating that it was directly impacted by machinery. This occurred prior to 1978, as the current wall segment correlates with Haun's (1978) map.

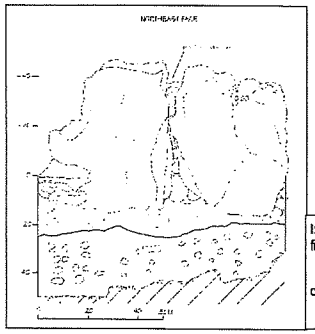
Portable materials observed on and near Feature 8B include a piece of weathered coral (0.07 m in diameter) on the wall, and a piece of weathered branch coral (0.15 by 0.13 by 0.07 m) on the ground surface inside the wall (*Figure 4.10*).

A 1.0 by 1.0 meter test unit was excavated along the inside of the northern portion of the wall, at the location of two upright boulders that formed the interior facing. The excavation encountered a surface layer of wall fall (140 liters) that averaged 0.10 meter in thickness, with a maximum of 0.25 meter near the wall. The uppermost soil layer (I) was 0.10 meter thick and consists of loose, dark brown silty loam with rootlets and *koa haole* duff (*Figure 4.11*). Layer I at this location is quite stony, with pebble to small cobble-sized stones representing 64% of the screened matrix by volume (66 of 103 liters).

A formed sandstone artifact fragment was recovered from Layer I, at 0.06 meter below soil surface. This item appears to be portion of a pestle handle or the stem of a large sinker (see Chapter 5). A piece of weathered branch coral was also found on the surface of Layer I, beneath the wall fall. Screened Layer I soil contained 9 pieces of marine shell, 27 small fragments of weathered coral, and one waterworn basalt pebble (*Table 4.4*). By volume, the density of marine shell in Layer I was 0.04 grams per liter of screen soil (1.40 grams/37 liters).

Layer II consisted of compact subsoil and tightly packed *in situ 'a'ā* clinkers. Stones comprised 60% of the matrix by volume (103 of 176 liters). A weathered irregular bedrock surface was encountered 0.20 meter below surface at the northeastern corner of the unit and at 0.32 meter below surface at the southwestern corner. Portable remains consisting of five pieces of Cypraeidae shell (4.40 grams) and 11 small pieces of weathered coral (4.70 grams) were recovered from the upper 0.05 meter of the layer. The base of the layer was sterile (*Photo 4.11*).

Findings from Test Unit 1 indicate that Layer I soil was in place at the time the wall was constructed at this location. The stones appears to have been set on the surface with little to no impacts to Layer I. It is therefore likely that the portable remains in Layers I and II were deposited prior to the construction of the wall.



I: (0-.10) very dark brown (10YR2/2 moist) loam (10YR3/3 dry), 1fcr, loose, friable, nonsticky, nonplastic, very fine roots common, clear smooth boundary.

II: (.10-.32) yvery dark brown (10YR2/2 moist) gravelly silty clay loam (10YR3/4 dry). 1fsbk, slightly hard, firm, slightly sitcky, plastic, few fine to coarse roots.

Figure 4.11 Site 1853 Feature 8B, Test Unit 1 Profile

Site 1853 Feature 11

As described and mapped by Haun (1978:14), Feature 11 consisted of 41.0 meter long by 0.9 meter wide historic era stone wall. The wall is depicted as having a general east-west orientation, with three bends. The eastern section of the wall is 20.0 meters long and is oriented generally north-south. A gap approximately 7.0 meters wide is shown in this section of the wall on Haun's map.

SITE 1853 Feature 8						
TU-1	I-1		II-1		Total	
Depth	.50-.60		.60-.70			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Cypraeidae	1	0.90	5	4.40	6	5.30
Hipponix imbricatus	1	0.05			1	0.05
Patellidae	2	0.20			2	0.20
Bivalves						
Isognomonidae	5	0.25			5	0.25
TOTAL SHELL	**9**	**1.40**	**5**	**4.40**	**14**	**5.80**
Coral						
Weathered Frags.	27	25.50	11	4.70	38	30.20
Basalt						
Waterworn pebbles	1	5.20			1	5.20
TOTAL	**37**	**32.10**	**16**	**9.10**	**53**	**41.20**

Table 4.4 Recovered Materials, Site 1853 Feature 8B

The location of this wall in relation to the current project area was interpolated by measuring the angle and distances of Feature 11 from the corner point of Feature 8 on Haun's map and plotting this location on the project area topographic map. It was checked by measuring the distance from the Site Ma-B8-8 well, which is plotted on Haun's map and is still present along the shoreline.

A surface feature was located at the projected location of Feature 11. The feature is situated adjacent to the edge of the golf course in an area that was affected by bulldozing. It consists of a 4.0 meter long section of intact wall oriented north-south, and an 8.0 meters long section of what appears to be a bulldozed wall or similar type of feature. A 7.0 meter long *pahoehoe* rock face is located between the two wall sections, resulting in a 19.0 meter long wall-like formation. The intact wall section is 1.0 to 0.80 meter wide and 1.0 to 0.5 meter high. Bulldozer disturbance has affected the southern portion of this wall section, and all areas to the west of the wall. A swale has been created along the west side of the remainder of this feature.

If the subject feature is in fact Feature 11, we must assume that the gap shown on Haun's map was not an opening, but a section of natural bedrock. Normally, when these types of formations are incorporated into a wall, the feature is depicted as being continuous. Thus, there is a degree of uncertainty as to whether this wall segment is in fact the same wall mapped by Haun.

Subsurface testing along the west side of the wall uncovered an historic/modern era refuse deposit that appears to be associated with the adjacent historic/modern era Site 5708. A number of surface artifacts consisting of bottles, cans and modern camping debris is also present. It was therefore determined that the cultural deposit should be part of Site 5708, with the understanding that the disturbed possible wall could be the Site 1853 wall. The intact wall segment and the disturbed stone feature are depicted on the Site 5708 Feature 3 map (*Figure 4.49*).

Site 1853 Feature 13

This newly assigned feature was depicted on Haun's (1978) map of Site 1853 as a trough, located approximately 14.0 meters west from the Feature 8 wall. The feature was relocated in the same general location, approximately 10.0 meters west from the Feature 8 wall. It was overturned and partially buried under bulldozer push. It appears to have been moved eastward approximately 2-4 meters.

The trough is constructed from milled lumber planks, 2 inches thick. The base is a single 2x16 inch plank and the sides are single 2x18 inch planks. Hardware consists of round (c. 20d) nails and metal bands on the ends (*Photo 4.12*). Short Kiawe posts are located nearby and on top of the trough; these were probably used to secure the trough to the ground.

The condition and materials used in the feature indicate a likely twentieth century construction, *circa* 1920-1940..

Site 1853 Feature 14

This newly identified feature was located 18.0 meters southeast from the Feature 5 enclosure remnant. It consists of three filled depressions (components A-C) and a low stone alignment (component D) along the base of an exposed *pahoehoe* outcrop (*Figure 4.12*). The modifications are within an area of 13.0 meters northwest-southeast by 6.0 meters northeast by southwest. The filled depressions are 1.0 to 1.5 meter in diameter and consist of small to large subangular basalt cobbles that were placed in natural depressions along the base of the outcrop. The surfaces of the deposits are generally level to slightly above surrounding ground surface.

The alignment is located 5.0 meters east from the filled depressions and is constructed from loosely piled (unfaced) basalt cobbles, one to three coursed high. It appears to have functioned as an informal terrace face, as the height varies from 0.10 meter on the upslope side to 0.25 meter on the downslope side. The alignment is 2.5 meter long by 0.55 meter wide and oriented east-west.

One surface artifact consisting of a broken modern glass bottle was observed on the surface, adjacent to Feature 14A. A thin soil deposit is present in areas outside the filled depressions, which contain no soil. Vegetation is sparse and includes *panini* cactus, lantana, *'ilima*, and grass.

A 1.0 by 1.0 meter test unit was excavated over the largest of the three filled depressions (14A) in order to aid in determining the function and age of the feature. The surface of the test unit consisted of informally placed angular cobbles against the west face of a 1.15 meter high *pahoehoe* face. The stones (340 total count) were removed to expose a former duff-covered surface. This surface consisted of naturally fractured *in situ pahoehoe* and a natural crevice 0.20 meter long by 0.09 meter wide. The sloping surface beneath the stone fill varied from 0.02 meter below surface at the southeast corner to 0.52 meter below surface at the center along the north wall of the unit. This was the deepest excavated point within the crevice, which appeared to continue slightly deeper.

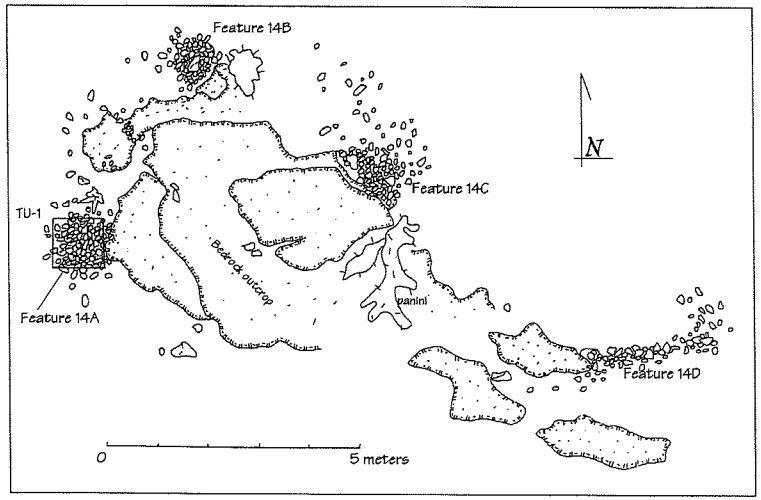
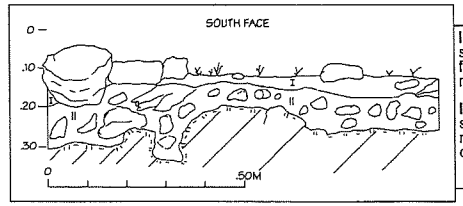


Figure 4.12 Site 1853 Feature 14, Plan Map

A small amount of soil was recovered from the Layer I deposit found beneath the rock fill. This thin deposit consisted of loose, dark brown sandy loam with rootlets and duff (*Figure 4.13*). One small piece of weathered coral was found on the surface, beneath the stone fill. No additional portable remains were found in the screened Layer I soil.

Layer II consisted of naturally fractured bedrock with soil that had filtered down from the surface. This was excavated to expose a very irregular bedrock base. The soil in this layer was similar in color and texture to Layer I. Two small pieces of decayed metal were found in soil near the base of Layer II. No other portable remains were recovered from the screened Layer II matrix. Overall, the excavation contained only 40% soil by volume (38 of 91 liters).

Subsurface findings suggest that the stone fill was tossed into an existing opening in the *pahoehoe* surface for purposes of sealing the underlying crevice. The crevice was not particularly large, however, it would have posed a trip hazard to cattle. The presence of metal near the base of excavation suggests that this material filtered down into the crevice prior to the time it was sealed. The stone fill would therefore be historic in age. The two other filled depressions at Feature 14 are also most likely contemporaneous with Feature 14A and are assumed to have served a similar function.



I: (0-.05) very dark brown (10YR2/2 moist) sandy loam (10YR3/3 dry), 0vfgr, loose, very friable, nonsticky, nonplastic, fine to very fine roots common, smooth, wavy boundary

II: (.05-.35) very dark gray (10YR3/1 moist) stony silt loam, 2msbk, slightly hard, very friable, nonsticky, nonplastic, fine to coarse roots common.

Figure 4.13 Site 1853 Feature 14, Test Unit 1 Profile

Site 1864 (50-Ma-B8-111)

Previous Investigations

Site Ma-B8-111 was initially recorded in March 1979 during a Bishop Museum reconnaissance and partial Phase I survey of the proposed Seibu resort area (Rogers-Jourdane 1979: 18). Parcel 37 of the current project area was included in the survey, along with an additional 91 acres on the *makai* side of Makena Alanui Road. Sites 111 and 112 (discussed below) were the only two sites identified in Parcel 37 during the 1979 reconnaissance survey. SHIP Site number 1864 was subsequently assigned to the site in the early 1990's by SHPD.

Site 1864 was described by Rogers-Jourdane as follows:

> This site is a discontinuous L-shaped wall. The main wall is 9.3 meter long, running in a N-S direction. The shorter wall segment starts c. 1.0 meter W of the main wall and extends for c. 3.5 meters in an E-W direction. Both wall segments are low-lying, averaging 0.3 meter in height and constructed of stacked aa. Wall widths average 0.40 meter in the shorter wall segment and 0.65 meter in the main wall. Site function is undetermined, but the site appears to be a remnant enclosure or wall. (Rogers-Jourdane 1979:18)

In June of 1979, Bishop Museum staff returned to the proposed Seibu resort for "Phase II salvage" of identified sites (Denison 1979). At that time, the feature was described as "...at most a low rubble wall, and probably not a wall at all" (Denison 1979:18). Denison surmised that the linear rubble line was the result of recent activity in the area, although he was not able to verify this based on the surrounding terrain. Denison noted that the short section of the feature "...does in fact appear to be a constructed feature" (Denison 1979:18).

A test unit was excavated at site 1864, and two soil layers were encountered; these were described by Denison as being "essentially identical" to the soil deposits at the nearby Site 2272. No midden or artifacts were recovered during the excavation. A specific age or function was not offered for this site, and no further work was recommended (Denison 1979:21).

Current Findings

Site 1864 was relocated in the field using Denison's site map and his verbal description. As noted by Denison, Site 1864 is located "very near Site B8-112", which is described below. It appeared that Site 1864 has undergone little to no changes since 1979. The site is located 17.0 meters west from the sidewalk that borders the east edge of Parcel 37. The long section of the wall remnant (Feature 1) is currently 16.8 meters long, oriented N-S (*Figure 4.14*). The north and south ends of this wall remnant consist of a single layer of disturbed stones; a 6.0 meter-long section in the center is still loosely stacked up to three courses high, with a maximum height of 0.35 meters. The entire feature is in a disturbed state, and possible dozer paths were noted at both ends. The location of the wall remnant in relation to surrounding topography indicates that it served as a retaining wall for soil. The surface on the west side is level and averages 0.30 to 0.40 meters above the ground surface to the east side of the wall. In addition, the location and orientation of this remnant in relation to the nearby Site 2272 wall suggests that they were once connected to form a single large enclosure. Currently, the north end of the Site 2272 wall is 6.0 meters south from the end of Site 1864; the area between these walls contains scattered stones and may have been impacted by bulldozing in the past. These impacts to the walls predated the 1979 survey.

The shorter E-W segment of this site (Feature 2) is located 4.3 meters north from the relatively intact section of the wall, although scattered stones are present in the area between the two sections. As noted by Denison, this section is in better condition and appears to have been constructed more recently, and probably after the bulldozer disturbance. It is 3.2 meters long and 0.5 to 0.7 meters wide; height ranges from 0.15 to 0.35 meter, with and average of 0.25 meter. It is suspected that this section is not functionally or temporally related to the longer section. A modern beverage bottle is located adjacent to the east end of this section (*Photo 4.13*).

Surface materials observed on the soil flat near the long section of the wall include pieces of unfinished mortar and a modern beverage bottle, near the sidewalk. Also found and collected was a ground cobble tool comprised of dense igneous stone (possibly Hawaiite). This item was partially buried, with the rounded side visible from the surface (see Chapter 5).

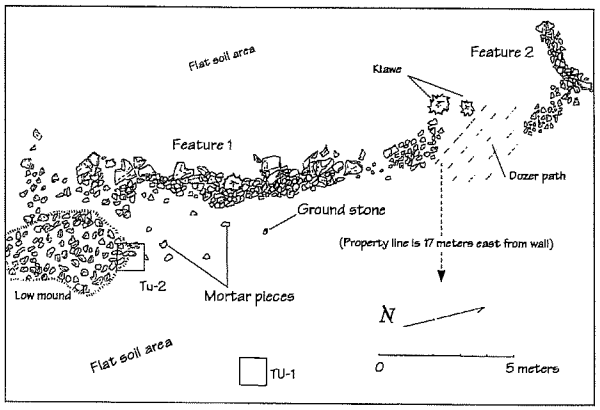


Figure 4.14 Scaled Plan Map, Site 1864

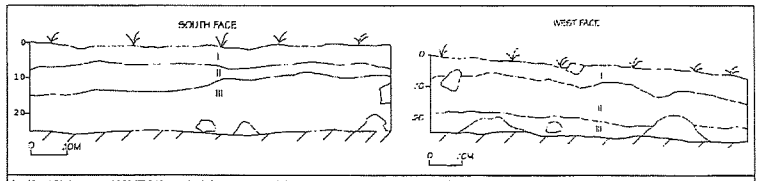
Two 1.0 by 1.0 meter test units were excavated at Site 1864; Test Unit 1 was located near the center of the level soil flat and Test Unit 2 was located over a low stone-filled rise near the southern end of the wall (*Figure 4.14*). The origin of this rise was indeterminate based on surface examination; possible functions included an eroded platform or an eroded machinery push pile. Both units were excavated to a base depth of 0.25 meter below surface, and the soil stratigraphy encountered in both test units was similar.

In Test Unit 1, Layer I was 0.08 meter thick and consisted of very loose brown (moist and dry) loamy sand with *kiawe* duff and very few stones (*Figure 4.15*). Layer II was 0.07 meter thick and consisted of loose brown (7.5YR5/4) loamy sand with less than 1% stones by volume. Layer III was 0.10 to 0.15 meter thick to the base of excavation and consisted of compact dark yellowish brown (10YR4/4) silty clay loam with 7% stones by volume. No artifacts, midden or other portable remains were located in screened matrix from Test Unit 1 (*Photo 4.14*).

Layer I in Test Unit 2 consisted of brown loamy sand with duff and small cobble-sized stones (25% by volume). Layer II was 0.10 meter thick and consisted of loose dark yellowish brown sand with 14% stones by volume (*Figure 4.15*). Layer III averaged 0.05 meter thick and consisted of loose dark brown silty clay loam with 55% stones by volume. This layer rested on an irregular surface of decomposing bedrock. No artifacts, midden or other portable remains were located in screened matrix from Test Unit 2.

The negative findings of subsurface testing during the current survey are consistent with the 1979 testing results. Given the poor condition of the wall and its partial nature, it is difficult to determine the age or use of the site. If it was part of an enclosure and connected with Site 2272, the western portion was destroyed in the early twentieth century when Makena Road was first improved. Additional impacts occurred when the cul-de-sac and sidewalk were built in the early 1980s.

Subsurface testing did indicate that the area within the former enclosure contained a relatively deep deposit of loose sandy soil, which is not common elsewhere in the project area. The presence of relatively deep loose sandy soil with few rocks suggests a former use as a garden enclosure. This would collaborate with the traditional artifact that was found on the site surface. If the area had been used as a cattle enclosure, we would expect a more eroded and deflated soil deposit, with more loose stones scattered in the soil layers.



I: (0-.12) brown (10YR3/2 moist) loamy sand (10YR5/3-4/2 dry), structureless, fine, single grain, loose, nonsticky, nonplastic, very fine to fine roots common, clear, smooth boundary.

II: (.12-.25) dark yellowish brown (10YR4/4 moist) sand (10YR6/4 dry), structureless, fine, single grain, loose, nonsticky, nonplastice, few fine to coasrse roots, clear, smooth boundary.

III: (.25-.30) dark brown (7.5YR3/4 moist) gravelly silty clay loam (7.5YR4/6 dry), moderate, fine, granular, soft, friable, slightly sticky, slightly plastic, grades to aa flow, few coarse roots.

Figure 4.15 Site 1864, Test Units 1 and 2 Profiles

Site 2272 (50-Ma-B8-112)

Previous Investigations

This site was recorded by Bishop Museum in 1979, in conjunction with Site B8-111. It was described by Rogers-Jourdane as follows:

> This site is a semi-circular wall with a total length of c. 32 meters. Construction is multiple-stacked aa, except for a 9.0 meter-log section near the E terminus, which appeared to have been double-faced originally. Much of the wall in this section has been extensively disturbed and only aa-boulder basal uprights still remain intact. Wall widths range from 0.46 to 1.0 meter and heights from 0.10 to 0.5 meter. (Rogers-Jourdane 1979:19).

Subsurface testing (a 1.0 by 1.0 meter unit) was conducted at Site B8-112 in 1979, and no evidence of artifacts or midden were observed (Denison 1979:19). Denison noted at the time that, "This wall functioned partially as a retaining wall, as indicated by the fact that the ground surface is substantially higher on its E side" (1979:19). No specific function or estimated age was indicated for the site, and no further work was recommended. SIHP site number 2272 was later assigned to the site by SHPD.

Current Findings

The Site 2272 wall was relocated in the field through use of Denison's site location map and Rogers-Jourdane's description. This wall and soil terrace was designated as Feature 1; three additional features were added to the site complex, due to their proximity to the wall and apparent functional/temporal similarities. These include two clearing piles (Features 2 and 4) and a soil terrace with associated clearing pile (Feature 3).

Site 2272 Feature 1

Feature 1 is described here as a soil terrace with a retaining wall (*Figure 4.16, Photo 4.15*). The overall length of the wall has been reduced from 32.0 meters as noted in 1979, to 24.8 meters, due to the removal of the southeastern end of the wall during construction of the Mākena Road cul-de-sac and sidewalk. The southern end of the wall is currently adjacent to the sidewalk that runs along the eastern boundary of Parcel 37. The northern end of the wall is 13.8 meters west from the sidewalk and as noted above, is 6.0 meters south from the south end of the Site 1864 wall, which continues along the same topographic contour in line with this wall. These two wall segments would have been designated as features within the same site if they did not already have separate SIHP site numbers.

As noted in the prior studies, the wall is not core-filled; however, much of the base is constructed from parallel boulders that were set on edge and filled with smaller cobbles. The upper courses of the wall are multiple stacked, with two to five coursed intact. Height ranges from 0.20 to 0.90 meter, with an average of 0.45 meter. The soil deposit behind the wall along the east side is continuous with the soil flat behind the Site 1984 wall. Surface artifacts observed at Site 2272 were limited to modern rubbish (plastic bags, clear bottle glass) that was thrown into the area from the sidewalk.

Two 1.0 by 1.0 meter test units were excavated at Feature 1. Test Unit 1 was located adjacent to the east (uphill) side of the wall, and was excavated to determine the base depth of the wall as well as to recover information regarding the age and function of the feature. This excavation encountered a 0.05 meter thick layer (I) of surface duff mixed with loose very pale brown and brown loamy sand. Layer I contained basalt cobble wall fall (40% by volume), which was concentrated in the west half of the unit, against the wall (*Figure 4.17*).

Layer II was 0.10 to 0.15 meter thick and consisted of very pale brown sand with 11% stone content by volume. The base of the Feature 1 wall was encountered at the base of this layer, and stones present were large pebble-size pieces of decomposing bedrock. Layer III consisted of thin pockets of dark brown (dry) silty clay loam that occurred in natural bedrock crevice. Only 40 liters of this layer was collected from Test Unit 1, and most of the matrix (88%) was comprised of *in situ* cobbles and pieces of decomposing bedrock. Solid *pahoehoe* bedrock was encountered at a depth range of 0.30 to 0.55 meter below surface. No artifacts, midden, or other portable remains were encountered in Test Unit 1.

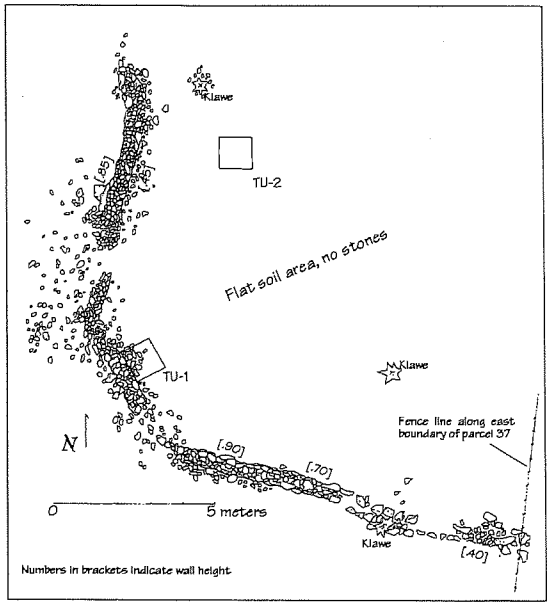
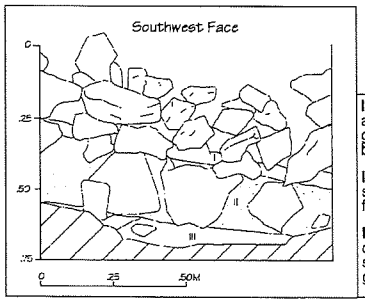


Figure 4.16 Scaled Plan Map, Site 2272 Feature 1



I: (0-.05) pale brown and very dark brown (10YR6/3 and 2/2 moist and dry) loamy sand with duff, structureless, very fine, single grain, loose, nonsticky, nonplastic, fine roots common, diffuse, broken boundary.

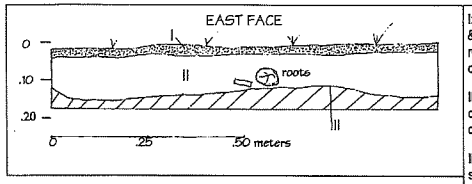
II: (.05-.20) very pale brown (10YR7/3 moist and dry) sand, structureless, very fine, single grain, loose, nonsticky, nonplastic, few coarse roots, clear, smooth boundary

III: (.20-.25) very dark grayish brown (7.5YR3/2 moist) stony silty clay loam (7.5YR3/4 dry), moderate, medium, subangular blocky, slightly hard, firm, slightly sticky, nonplastic, few coarse roots, grades to aa flow

Figure 4.17 Site 2272 Feature 1, Test Unit 1 Profile

Test Unit 2 was located 2.5 meters east from the Feature 1 wall, near the northern end of the feature. It was located in a level, soil-filled area of the site with no surface stones present. Two soil layers were encountered in this excavation, which was terminated at solid bedrock 0.10 to 0.15 meter below surface (*Photo 4.16*). The surface layer (I) was a thin (0.03 meter) deposit of organic duff with very pale brown sand (*Figure 4.18*). Layer II averaged 10 cm in thickness and consisted of very pale brown sand over an irregular bedrock surface. Excavated Layer II soil contained 6% stones by volume (5 of 80 liters screened). No artifacts, midden, or other portable remains were recovered from screened soil at this test unit.

The subsurface testing results at Feature 1 are consistent with the 1979 testing results, which also found no cultural materials. The findings are also consistent with the Site 1864 results, which showed sandy soil deposits with relatively few stones. Testing along the base of the wall indicates that most of the soil accumulated after the wall was in place, or the wall was built in a shallow trench that was dug to the solid bedrock surface.



I: (0-.03) pale brown and very dark brown (10YR6/3 & 2/2 moist and dry) sand with duff, 0vfsg, loose, nonsticky, nonplastic, vf roots common, smooth, clear soundary.

II: (.03-.13) very pale brown (10YR7/3 moist and dry) sand, 0vfsg, loose, nonsticky, nonplastic, coarse roots common, clear, wavy boundary.

III: (.13-.15) very dark grayish brown (7.5YR3/2) silty clay loam (7.5YR3/4 dry), 2msbk, slightly hard, firm, slightly sticky, nonplastic, grades to aa flow.

Figure 4.18 Site 2272 Feature 1, Test Unit 2 Profile

Site 2272 Features 2 and 3

Feature 2 is located 2.2 meters southwest from the western bend in the Feature 1 wall. It consists of an informal concentration of loose stones that were placed on an exposed knoll-like *pahoehoe* outcrop (*Figure 4.19*). The stones are primarily medium to small cobbles that are scattered among naturally fractured *pahoehoe* blocks, and set into natural crevices in the *pahoehoe*. Overall area of the concentration is 10.5 meters N-S by 8.0 meters E-W. The height of the outcrop area ranges from 0.15 to 0.55 meters above surrounding ground surface. The cobbles are generally one layer thick, and there is no indication of a formally constructed feature. The concentration appears to be the result of clearing, possibly of the adjacent Feature 1 terrace. No soil deposits or surface materials were observed on Feature 2.

Feature 3 is located 5.6 meters south from Feature 2, along the same contour and bedrock outcrop formation. It consists of a small soil terrace with a stone-filled face and two informal stone concentrations (*Figure 4.19*). The stone-filled terrace face is 3.9 meters N-S by 0.80 to 1.50 meter wide. The informally arranged (not stacked) face slopes toward the east and has a maximum height of 0.60 meters. A small soil flat 3.0 by 2.5 meters occurs on the east side of the face. A concentration of small to medium cobbles is located 2.5 meters north from the small terrace. This surface feature is 2.8 meters N-S by 4.4 meters E-W and is raised 0.15 meter above surrounding ground surface, which is the average thickness of a single course of stones. This concentration appears to have resulted from ground clearing in the immediate area. Also associated with Features 2 and 3 is a small concentration of large to medium cobbles that was placed against the east side of a *pahoehoe* outcrop, 3.0 meters south from the Feature 2 area. This informal stone pile is 1.7 meters NE-SW by 0.90 meter NW-SE and three courses high in the center.

Features 2 and 3 are interpreted as reflecting agricultural activities, specifically the clearing of stones from soil area in order to plant. They are assumed to be temporally and functionally related to the larger planting enclosure represented by Site 1864 and Site 2272 Feature 1.

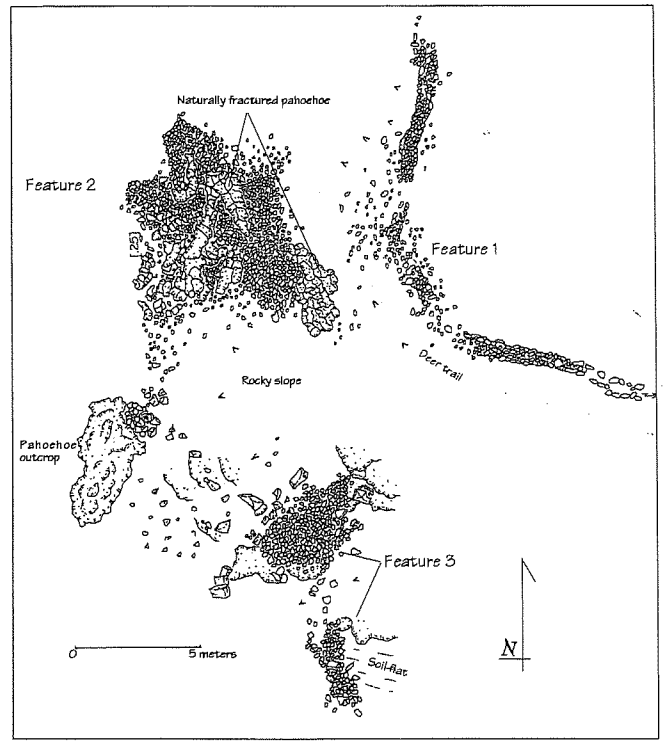


Figure 4.19 Scaled Plan Map, Site 2272 Features 2 and 3

Site 2272 Feature 4

This newly-identified feature is an unpaved stone-filled terrace constructed on a natural bedrock outcrop (*Figure 4.20*). It is located 5.3 meters south from Feature 3, along the same bedrock ridge formation. The terrace is constructed with medium to large angular cobbles and small boulders that were loosely piled against a natural outcrop. The edge of the feature is not formally faced; however, it is distinct due to the natural formation. The interior area is flat to slightly depressed. Overall dimensions are 4.3 meters N-S by 3.5 meters E-W. Heights along the west (downhill) edge range from 0.25 to 0.50 meter. The uphill (east) side of the terrace is defined by a 0.50 meter high bedrock face. No artifacts or other portable remains were observed on the surface of the terrace. Evidence of ground disturbance is present 3.0 meters to the east of this feature, however it appears to be undisturbed and in fair to good condition.

Due to the uncertainty of its function, a 1.0 by 1.0 meter test unit was excavated at the center of the filled area at Feature 4. Test Unit 1 encountered a 0.20 meter-thick layer of stone fill at the surface (*Figure 4.21, Photo 4.17*). The fill consisted of medium to small cobbles loosely placed over and between larger cobbles. The larger cobbles were *in situ* pieces of the naturally fracture bedrock outcrop, whereas the smaller stones were introduced. No soil was present in this fill layer, however some duff was encountered in the air pockets between the stones. Layer I was encountered at 0.20 meter below surface and consisted of very stony sandy loam that had accumulated primarily in natural crevices in the bedrock. This soil contained 50% stones by volume and no cultural materials. The base of Layer I was solid, sloping bedrock at 0.37 to 0.62 meter below surface. The deeper areas of soil in crevices overlaid Layer II, which was a dark brown compact gravelly and stony silty clay loam, with 50% stones by volume. This subsoil was also culturally sterile.

Subsurface testing at Feature 4 verified that it was a predominantly natural bedrock terrace upon which stones had been tossed, most likely during soil clearing.

A cleared soil area is present immediately to the west of this feature. The absence of any artifacts, midden, or other cultural materials indicates little to no other activities at this location.

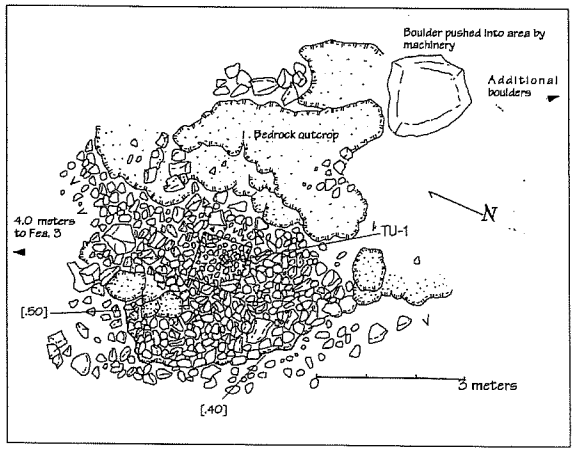
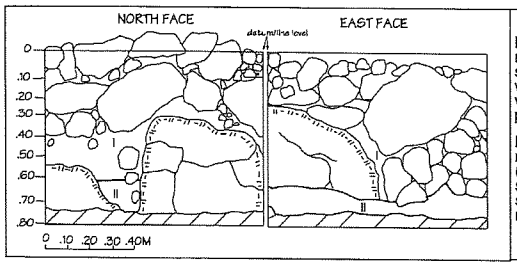


Figure 4.20 Scaled Plan Map, Site 2272 Feature 4



I: (.20-.62) very dark brown (10YR2/2 moist) sandy loam (10YR3/3 dry), structureless, very fine, crumb, loose, very friable, nonsticky, nonplastic, very fine to fine roots common, duff present, clear, smooth boundary

II: (.62-.75) very dark gray (7.5YR3/2 moist) very gravelly silty clay loam (7.5YR3/4 dry), moderate, medium, subangular blocky, slightly hard, firm, slightly sticky, nonplastic, few coarse roots.

Figure 4.21 Site 2272 Feature 4, Test Unit 1 Profiles

SITE 5706

Previous Investigations

Site 5706 was identified in 2001 and first reported as a single feature consisting of a low-walled C-shape. The structure was reported to be in a disturbed state, with possible functions as a temporary shelter or as a special use area within a larger permanent complex (Rotunno-Hazuka et al. 2005:31). A 0.50 by 0.50 meter test unit was excavated in the interior of the C-shape in 2001; no cultural materials were found in screened soil (Rotunno-Hazuka et al. 2005:31). Additional details on this feature are included below in the discussion of Feature 5.

Current Findings

The feature identified in 2001 as Site 5706 was relocated with certainty through use of project area maps and on-site evidence of prior testing. The site was found to be in close proximity to a number of other features, some of which were directly associated through shared walls or surface midden scatter. Due to this close proximity, it seemed that all the features should be within a single complex; since an SIHP number had been assigned to one feature, it was decided to use this number and expand the site boundaries to include the additional features. The previously identified C-shape was incorporated into the Feature 5 area.

Site 5706 as currently defined is a multiple use (habitation/burial/agricultural) complex comprised of 17 features, within an area approximately 100 meters N-S by 33.5 meters E-W (3,350 sq. meters). The site perimeters are defined by developed/disturbed land on the north; by previously recorded sites 1864 and 2272 on the east; and by previously recorded Site 1853 on the west. The southern perimeter is defined by an absence of identified cultural features. The identified features are numbered in a generally north-south order, following the order of assigned field numbers.

Site 5706 Feature 1

Feature 1 is a newly-identified feature located adjacent to bulldozer push piles along the northern boundary of Parcel 37. It most likely represents the remnant of a larger feature that was impacted during golf course construction. Currently, the feature consists of a low stone-filled pavement with an associated clearing. Formally, the feature is similar to the original Site 5706 C-shape that was identified in 2001. However, there is no evidence at either of these features that they were built as actual C-shaped walls. Rather, they appear to be clearings in what were natural scatters of broken *pahoehoe* bedrock. The low pavement-like area at Feature 1 abuts the east side of an exposed *pahoehoe* lava ridge, and is comprised predominantly of naturally occurring stone with a discontinuous layer of loose imported stones, a few pieces of coral and a few waterworn basalt cobbles (*Figure 4.22*). The northern edges of the feature have been impacted by golf course grading; the remainder of the feature appears to be in good to fair preservation, with the exception of a deer path that cuts through the southern end of the filled area. Feature 2 is located 3.5 meters to the west of Feature 1, along the opposite side of the same exposed *pahoehoe* lava ridge. Feature 7, a similar type of rock-filled area, is located 6.0 meters to the south.

Overall area of Feature 1 is 26.72 sq meters; the major axes are 9.5 meters N-S by 5.0 meters E-W. The cleared area is within a U-shaped opening in the rock fill; it is located a the north end of the filled area, and is 2.0 meters N-S by 2.6 meters E-W. The location of the clearing raises suspicions as to whether it was made by machines. However, testing did indicate the presence of a midden deposit at this location. The edges of the fill around this clearing are 0.30 to 0.12 meters high. Other edges of the rock fill vary from 0.50 to 0.10 meter. The edges of the exposed bedrock outcrop that forms the west edge of the fill range from 0.80 to 0.13 meters in height.

A shallow circular depression is located at the south end of the filled area, against the exposed rock outcrop. This depression is most likely natural' it has a maximum depth of 0.20 meter below surrounding fill surface, and is 1.2 meters is diameter. Two weathered fragments of branch coral were located on the surface inside this depression. An additional piece of a weathered coral cobble is located near the center of the rock fill, to the south of the cleared area. In addition to three pieces of weathered coral, surface remains include modern beverage bottles and bottle glass sherds. No surface midden was observed.

A 1.0 by-1.0 meter test unit was excavated in the cleared area of the feature, in order to help ascertain feature function and age. Three soil layers were encountered at this location. The surface layer (I) consisted of very dark brown sandy loam with decomposing organics and duff; it ranged from 0.08 to 0.12 meter thick and contained 54% stones by volume. A discontinuous lens of loose light gray sandy loam with concentrated amounts of midden was present at the base of Layer I. This lens was rather thin (.05 meter) where it occurred and contained the same stone and midden volume as did Layer I. Layer II was a compact layer of dark yellowish brown (dry) gravelly silty clay loam 0.14 to 0.20 meter thick over decomposing and *in situ 'a'ā* (*Figure 4.23, Photo 4.18*).

Marine shell midden representing six varieties of gastropods, one bivalve family (*Isognomonidae*), and *Echinoidea* was recovered from screened soil (*Table 4.5*). Gastropods were predominantly *Cypraeidae* (42.8 grams), *N. picea* (7.62 grams) and *Conidae* (4.8 grams). Most of the remains were found in Layer II, which appears to be an intact remnant of a cultural layer. Nine small pieces of weathered coral were recovered; three from each of the three layers. Small water worn basalt pebbles were also found in all three layers.

It appears that Feature 1 is associated with a habitation site; however, due to the disturbed nature of the feature, its specific function is not certain. The rock-fill that was placed over the naturally fractured outcrop area would have allowed for safer and easier passage over the lava flow, and would also allow for a variety of functional uses of the area.

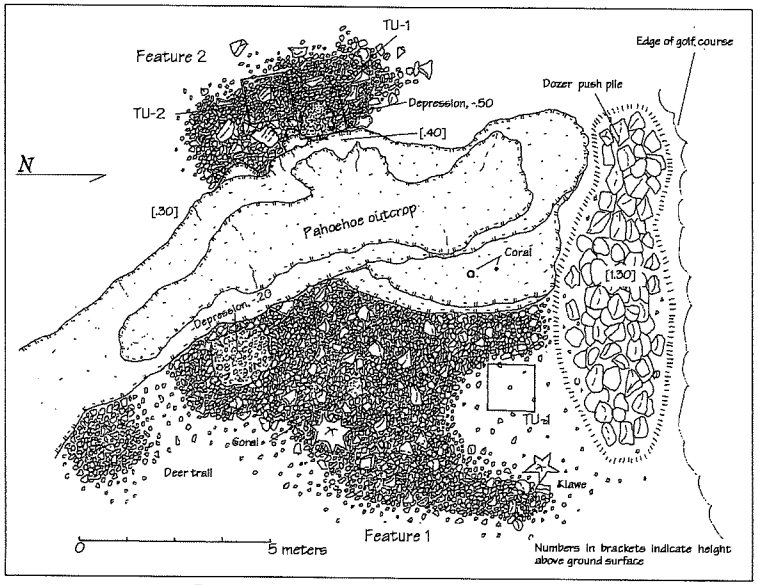
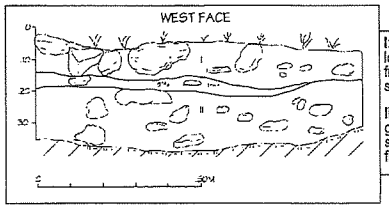


Figure 4.22 Scaled Plan Map, Site 5706 Features 1 and 2



I: (0-.12) very dark brown (10YR2/2 moist and dry) sandy loam, weak very fine, single grain and crumb, loose, very friable, nonsticky, nonplastic, very fine roots common, clear, smooth boundary; introduced stones, midden.

II: (.12-.35) very dark grayish brown (7.5YR3/2 moist) gravelly silty clay loam (10YR4/6 dry), strong, medium, subangular blocky, hard, firm, slightly sticky, slightly plastic, fine to coarse roots common, grades to aa flow

Figure 4.23 Site 5706 Feature 1, Test Unit 1 Profile

Site 5706 Feature 2

This newly-identified feature is a filled *pahoehoe* excavation and an associated rock filled area. It is located along the west side of the exposed *pahoehoe* lava ridge that was modified at Feature 1 (*Figure 4.22*). The corner of the Site 1853 Feature 8 wall is located 4.5 meters to the west. The excavation appeared from the surface as a roughly circular opening (0.80 by 1.0 meter) against the rock face of the outcrop, which rises 0.90 meter above the feature at this location (*Photo 4.19*). The opening had been filled to within 0.50 to 0.20 meters from the top surface with fill material consisting of small angular cobble and pebbles, and some weather *'a'a* cobbles and pebbles. The perimeters of the opening were defined by larger angular *pahoehoe* cobbles, of the type that would have been removed in order to excavate the hole. The area surrounding the excavation was filled with angular to weathered lava cobbles and pebbles. The filled area is 4.5 meters NW-SE by 1.50 to 2.00 meters NE-SW. The long axis of the fill follows the orientation of the exposed lava outcrop. Some of the stones in the filled area appeared to have been removed from the excavation (due to inconsistent exposure discoloration).

SITE 5706 Feature 1								
TU-1	I-1		II-1		III-1		Total	
Depth	4/15-12/20		18/24-23/29		23/29-35/42			
	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Gastropods								
Conidae			3	4.80			3	4.80
Cypraeidae	13	14.00	20	23.10	9	5.70	42	42.80
Littorina Pintado			1	0.25			1	0.25
Nerita picea	7	1.05	26	5.10	11	1.50	44	7.65
Patellidae			2	1.05			2	1.05
Thaididae			1	2.40	2	0.50	3	2.90
Unidentifiable			4	0.60	2	0.05	6	0.65
Bivalves								
Isognomonidae			4	1.35			4	1.35
Echinoidea								
Mouth					2	0.15	2	0.15
Shell			3	0.30	8	0.50	11	0.80
Spine					3	0.25	3	0.25
Total Shellfish	20	15.05	64	38.95	37	9.15	121	63.15
Vertebrates								
Rodent			1	0.15			1	0.15
Coral								
Waterworn								
Weathered Frags.	3	3.70	3	4.50	3	0.45	9	8.65
Other								
Pummice			5	0.30	7	0.10	12	0.40
Waterworn basalt	2	22.00	7	24.00	1	2.80	10	48.80
Waterworn shell								
TOTAL	25	40.75	80	67.90	48	12.50	153	121.15

Table 4.5 Site 5706 Feature 1, Recovered Materials

No surface remains were observed on or near the Feature 2 area. Two one-by-one meter test units were excavated at Feature 2, in order to better determine the age and function of the feature. Test Unit 1 was placed over the lava excavation, and Test Unit 2 was placed over the filled area, adjacent to the excavation. In Test Unit 1, the upper 0.13 meter of fill within the excavation was comprised of large pebbles and small cobbles, with no soil present. Portable remains found in this rock fill included a waterworn basalt pebble and four pebble-size pieces of weathered coral. No midden was encountered. Loose Layer I soil with duff was encountered at 0.12 to 0.13 meter below the surrounding surface. This very dark brown sandy loam appeared to have blown into the hole after it was filled, as it was sparingly scattered among the rock fill and filtered downward as stones were removed. Only two liters of Layer I soil was recovered after removing 127 liters of stones.

The *in situ* soil layer (Layer II) was encountered at 0.43 to 0.48 meter below surrounding surface. This layer is comprised of dark yellowish brown (dry) silty clay loam with *'a'a* pebbles and cobbles. This soil appeared to be previously disturbed, as it was quite loose. Portable remains found in this layer appear to include materials that had filtered down from the surface, such as a small bird bone, a rat or mouse bone, and a deer incisor. A few pieces of marine shell midden, including *Cypraeidae* and *Neritidae*, and additional pebble-sized pieces of weathered coral were also found in this layer (*Table 4.6*).

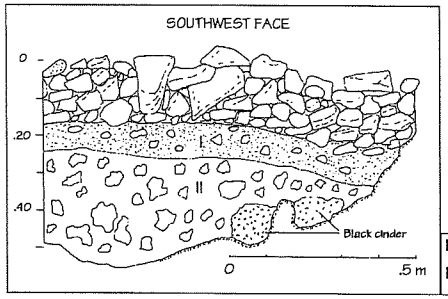
Evidence of prior breaks in the bedrock surface were detected at or just below the top of Layer III (.55 to .60 meter below surface). These appeared to be from human agency, although it might be possible that a tree could have also caused this type of disturbance. The base of the original excavation was probably at or near this point. If the excavation was made in order to plant something, it is possible that a tree was planted that subsequently caused further breakage of the lava substrate. Broken pieces of mixed lava with intermixed Layer III soil were removed to a final base depth of 0.40 to 0.60 meter below surrounding surface (*Photo 4.20*).

Test Unit 2 was excavated in order to follow out the full extent of the excavation and to ensure that it did not represent a burial feature. The unit was located adjacent to the south side of Test Unit 1, over the remainder of the former excavation and the rock fill area. A 0.16 to 0.20 meter-thick layer of stone fill was encountered from the surface of the excavation. The fill was comprised of small to medium sized weathered cobbles that had been placed on the former soil surface (Layer I). The stone fill contained several portable items, including eight small pieces of weathered coral, one weathered coral cobble and a Cypraeidae shell fragment (6.2 grams). No soil was present in this stone layer.

Layer I in Test Unit 2 was a former topsoil layer that had been sealed beneath the stone fill. The layer was 0.10 meter thick and consisted of loose dark brown very stony sandy loam with lenses of black sand. The soil contained 83% stones by volume (99 of 119 liters screened). A small but highly varied collection of marine midden was collected from the 20 liters of soil that was screened as Layer I. These included six shellfish families, *Echinoidea*, and fish bone (*Table 4.6*). Also recovered from this layer were 48 waterworn basalt pebbles, five waterworn coral pebbles and two waterworn shells, all of which are components in *'ili'ili* paving. Nine small fragments of weathered coral were also recovered from Layer I.

Layer II in Test Unit 2 consisted of a very stony yellowish brown silty loam with 67% stones by volume. Two levels were excavated in this layer, which overlaid an irregular bedrock surface (*Figure 4.24*). The uppermost level of screened Layer II soil (17 liters) contained a highly varied but rather small collection of marine midden, with eight shellfish families and Echinoidea represented in the 2.73 grams of recovered remains (*Table 4.6*). Waterworn basalt pebbles were also present, at roughly half the quantity found in Layer I. The second level of Layer II showed a substantial decrease in midden, with 0.86 grams of shellfish and six waterworn basalt pebbles recovered from the 10 liters of screened soil.

Results of testing at feature 2 indicate that the *pahoehoe* excavation and associated fill area post-dated a habitation deposit that may represent the periphery area of a permanent house site. Due to the lack of midden and *'ili'ili* in the stone fill layer, and the higher densities of these materials in a former surface soil layer, it appears that these materials were deposited prior to deposition of the stone fill. The specific function of the excavation was not determined. Possible purposes may have been for lithic material mining, or for planting. The pre-existing habitation component is rather sparse compared to the deposit at Feature 1; midden density for Layers I and II-1 at Feature 2 is 0.25 grams per liter screened soil, compared to 1.9 grams for Layer II at feature 1. This may be partly attributed to disturbances resulting from the later excavation, or due to the fact that the Feature 2 area was peripheral to a more intensively used habitation site that was within the golf course area.



I: (.20-.35) same as described in Figure 4.23.

II: (.35-.55) same as described in Figure 4.23.

Figure 4.24 Site 5706 Feature 2, Test Unit 2 Profile

SITE 5706 Feature 2

TU-1	I-1		II-1		III-1		TU-1 Total		TU-2	I-1		II-1		III-1		III-2		TU-2 Total		Grand Total	
Depth	50/72-78/83		78/83-90/95		90/95-110					.40-.50		.50-.60		.60-.70		.70-.80					
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.		Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Columbellidae														1	0.02			1	0.02	1	0.02
Conidae			3	2.20			3	2.20						2	0.30			2	0.30	5	2.50
Cypraeidae			2	0.60			2	0.60		1	6.20	5	1.10	2	0.75			9	8.05	11	8.65
Nerita picea			2	0.20			2	0.20				3	0.15	8	0.65			11	0.80	13	1.00
Patellidae												2	6.70	2	0.05	2	0.85	6	7.60	6	7.60
Planaxis labiosa														1	0.02			1	0.02	1	0.02
Thaididae			1	0.40			1	0.40				1	0.15					1	0.15	2	0.55
Strombidae												1	0.05					1	0.05	1	0.05
Unidentifiable			6	0.10	1	0.10	7	0.20				4	0.25	4	0.30			8	0.55	15	0.75
Bivalves																					
Isognomonidae												6	0.05					6	0.05	6	0.05
Mytiliedae														1	0.02			1	0.02	1	0.02
Spondylidae			1	1.40			1	1.40						1	0.05			1	0.05	2	1.45
Echinoidea																					
Shell												4	0.05	1	0.05	1	0.01	6	0.11	6	0.11
Spine														2	0.50			2	0.50	2	0.50
Total Shellfish			15	4.90	1	0.10	16	5.00		1	6.20	27	8.50	25	2.61	3	0.86	56	18.17	72	23.17
Vertebrates																					
Fish												1	0.05					1	0.05	1	0.05
Large mammal			1	3.40			1	3.40												1	3.40
Small mammal			2	3.10	1	0.60	3	3.70						1	0.10			1	0.10	4	3.80
Rodent			1	0.05			1	0.05				1	tr.	1	0.02			2	0.02	3	0.07
Total Vertebrates			4	6.55	1	0.60	5	7.15				2	0.05	2	0.12			4	0.17	9	7.32
Coral																					
Waterworn	2	146.50	3	1.60			5	148.10		2	13.80	5	15.00					7	28.80	12	176.90
Weathered Frags.	1	2.10	2	23.40	1	1.10	4	26.60		7	218.50	9	3.50	1	0.40			17	222.40	21	249.00
Other																					
Waterworn basalt	1	16.20	2	12.40			3	28.60				48	165.80	25	155.20	6	10.50	79	331.50	82	360.10
Waterworn shell												2	13.00					2	13.00	2	13.00
TOTAL	4	164.80	26	48.85	3	1.80	33	215.45		10	238.50	93	205.85	53	158.33	9	11.36	155	614.04	188	945.54

Table 4.4 Site 5706 Feature 2, Recovered Materials from Test Units 1 and 2.

Site 5706 Features 3, 4 and 6

These newly-identified features are located 5.5 meters south from Feature 1 and 2, with Feature 3 situated along the base of the same *pahoehoe* outcrop. The features border a cleared soil area that measures 18.0 meters N-S by 8.0 meters E-W (*Figure 4.25*).

Feature 3 is a linear clearing pile located along the surface of an exposed bedrock outcrop. The natural outcrop has a terrace-like appearance, which has been enhanced by the deposition of small to medium-sized cobbles along the fractured bedrock surface. The feature has an overall length of 16.0 meters N-S, and is 0.80 meters wide at the two ends. A 8.0 meter-long section in the center is 3.0 meters wide; this area is predominantly natural bedrock that has fractured *in situ*. The loosely piles stones are two to three courses thick and show an average height of 0.20 meters along the east (downhill) side. No artifacts, midden or other portable remains were observed on the surface at or near Feature 3.

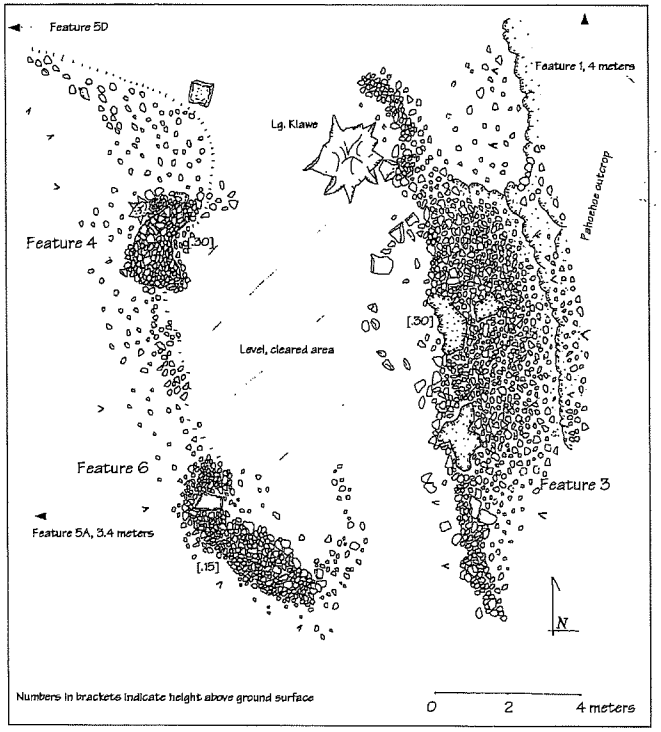


Figure 4.25 Scaled Plan Map, Site 5706 Features 3, 4 and 6

Feature 4 is a crescent-shaped clearing pile located 6.0 meters west from the north end of Feature 3. The pile is 2.5 meters N-S by 1.45 meters E-W and has a maximum height of 0.30 meters. The pile is loosely constructed from weathered *'a'a* cobbles and angular pieces of weathered *pahoehoe* that were probably cleared from the adjacent soil flat. No faced edges are present, and the ground surface is visible through the center of the pile. One waterworn basalt cobble was noted among the piled stones.

Feature 6 is a linear clearing pile located 2.5 meters south from Feature 4, along the same contour elevation. The northern edge of the Feature 10A pavement is 3.4 meters to the southwest and upslope from Feature 6. This pile is similar to Feature 3 in that it is situated on top of an exposed naturally fractured bedrock outcrop. It is 4.7 meters long and 0.80 to 1.7 meters wide; height averages 0.15 meter above ground surface. This loose pile is one to three courses of small to large basalt cobbles, with no artifacts or other cultural remains observed.

All three of these features are assumed to be contemporaneous and functionally related to agricultural activities within the Site 5706 area. They are also assumed to be contemporaneous with Features 1, 2, 5, and other features to the south, within the Site 5706 complex area.

Site 5706 Feature 5

Feature 5 is comprised of four components, including an informal cobble pavement (5A), two informal terraces (5B, 5C) and an a surface midden scatter (5D). One of the terraces (5B) includes the area of the previously recorded Site 5706. Current investigations determined that this previously recorded feature is not a C-shape shelter; rather it is a portion of a natural bedrock terrace that has been modified with the addition of stones. The four components are within an overall area of 26.0 m N-S by 12.0 meters E-W (*Figure 4.26*). The principal component, Feature 5A is situated on the crest of a low knoll; Features B and C are located around the base of the knoll, and Feature D is on a flat area to the north side of the knoll.

Feature 5A is situated over a partially exposed bedrock outcrop that has been augmented with large to small *'a'a* cobbles and some boulders to form a bi-leveled rough pavement. The overall surface area of the pavement is 8.0 meters N-S by 5.0 to 6.5 meters E-W. The perimeter is generally irregular with scattered boulders present, but no faced or formally set alignments. The surface is generally level, but is rough and is not paved with small cobbles and pebbles. The upper level area of the pavement comprises the eastern half of the structure and is 3.0 to 5.0 meters N-S by 6.5 meters E-W. This area is raised an average of 0.20 meter above surrounding ground surface. The lower level is 3.5 meter N-S by 5.0 meters E-W and is raised an average of 0.10 meter above ground surface. Feature 5B abuts the western side of this lower pavement (*Photo 4.21*).

One traditional artifact was observed on the surface of Feature 5A. A complete breadloaf sinker made from red siltstone was found next to a natural bedrock boulder near the center of the pavement, along the western edge of the upper level (see Chapter 5). No midden or other portable remains were observed on the surface of the rough pavement. A 1.0 by 1.0 meter test unit (TU-2) was excavated into the pavement at the location of the surface find. The excavation encountered a surface layer of loosely placed cobbles intermixed with naturally fractured bedrock. This layer was 0.45 to 0.47 meter thick and included a sparse amount of filtered humus and duff. No cultural material was recovered from among the stones. Layer I was 0.02 to 0.05 meter thick and consisted of very dark brown sandy loam topsoil that occurred between *in situ* bedrock boulders (*Figure 4.27*). No cultural material were found in the 11 liters of Layer I soil that was screened. Layer II had a thickness of 0.15 meter and consisted of dark yellowish brown (dry) very stony silty clay loam with 60% stones by volume. No cultural material was found in the 40 liters of soil screened from this natural subsoil layer. It overlaid a very stony and compact layer of decomposing bedrock (Layer III) with yellowish brown (dry) silty clay. Layer III was excavated to a base depth of 0.67 meters, and contained no cultural material.

A second 1.0 by 1.0 meter test unit (TU-4) was excavated in north-central portion of the lower level of the pavement, 1.6 meter west from Test Unit 2. This unit encountered the same stratigraphy noted in Test Unit 2. A 0.40 to 0.50 meter thick layer of stone fill with no soil was encountered overlying a former topsoil layer (I), which was 0.03 to 0.04 meter thick. The thin topsoil overlaid dark yellowish brown silty loam subsoil (Layer II) that averaged 0.20 to 0.25 meter thick. The naturally decomposing bedrock (Layer III) with yellowish brown silty clay was encountered 0.70 to 0.75 meter below surface (*Figure 4.27, Photo 4.22*).

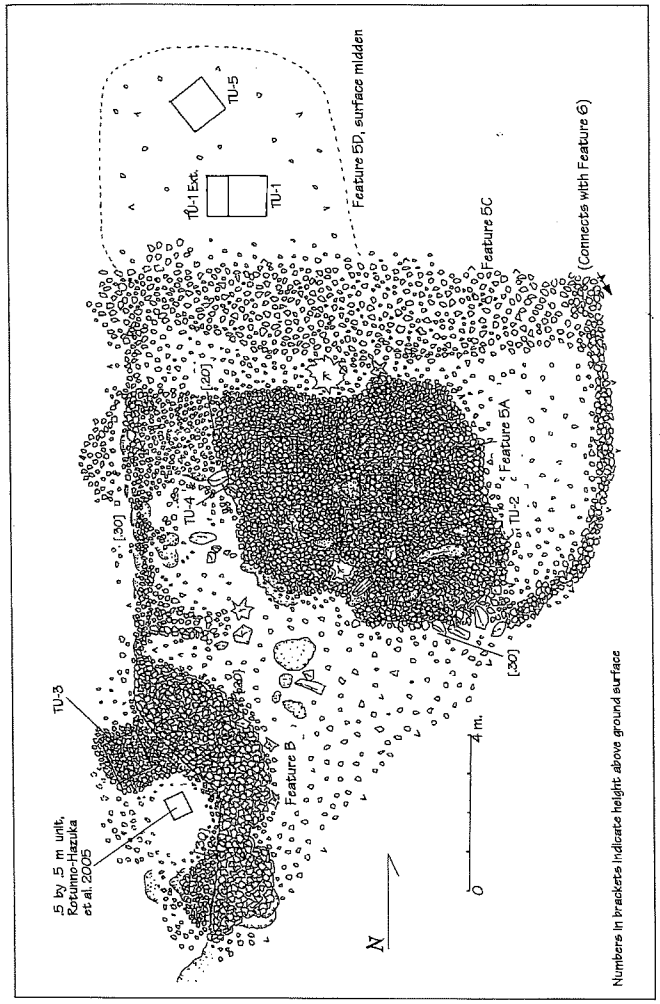
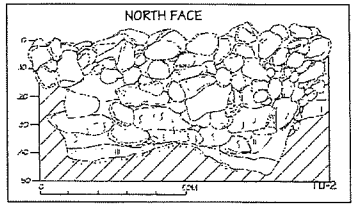


Figure 4.26 Scaled Plan Map, Site 5706 Feature 5

Sparse amounts of marine shell midden were recovered from Layers I and II, with a total of nine pieces (2.4 grams) representing three shellfish families (Cypraeidae, Neritidae, Patellidae). Also recovered were two waterworn basalt pebbles and 2.90 grams of charcoal. The charcoal was found to consist primarily of charred *panini* roots (*Table 4.7*).



I: (.45-.50) very dark brown (10YR2/2 moist and dry) sandy loam, 1vfcr/sg, loose, very friable, nonsticky, nonplastic, vf roots common, diffuse, broken boundary.

II: (.50-.65) very dark brown (10YR2/2 moist) silty loam (10YR3 4 dry), 1fsbk, soft, friable, nonsticky, nonplastic, fine roots common, gradual, wavy boundary.

III: (.65-.68) dark yellowish brown (10YR3/4 moist) gravelly silty loam (10YR5/4 dry), 1vfcr, soft, friable, nonsticky, nonplastic, few medium to coarse roots.

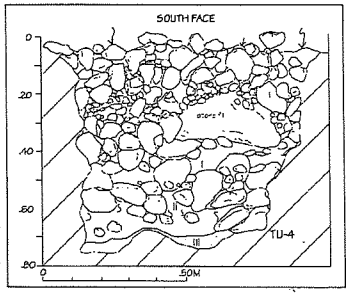


Figure 4.27 Site 5706 Feature 5A, Test Unit 2 and 4 Profiles

SITE 5706 Feature 5																		
TU-3			TU-4	II-1		III-1		TU-5	I-1		II-1		II-2		TU-5	
Depth	.24 in situ			.33/.43-.36/.45		.36/.45-.55			.03/.12-.08/.14		0.8/.14-.20		.20-.30		TOTAL	
	Cnt.	Wt.		Cnt	Wt.	Cnt.	Wt.		Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Gastropods																
Conidae									8	8.20	3	2.10			11	10.30
Cypraeidae				2	0.40	3	0 50		44	37.20	40	14.00	1	0.01	85	51.21
Littorina Pintado									4	1.00	4	0.45			8	1.45
Nerita picea						3	0.50		20	6.10	30	5 20	1	0.04	51	11.34
Patellidae						3	1.40		1	0.20					1	0.20
Planaxis labiosa									1	0.15			2	0.15	3	0.30
Strombidae											2	0.20			2	0.20
Thaididae																
Morula uva									18	11.70	14	6.60	2	0.05	34	18.35
Drupa morum									1	6 90	2	3.30			3	10.20
Unidentifiable									1	0.01	1	0.05			2	0.06
Bivalves																
Isognomonidae									1	0 30					1	0.30
Echinoidea																
Mouth											2	0.05	1	0.05	3	0.10
Shell											18	0.40	2	0.10	20	0.50
Total Shellfish				2	0.40	9	2.40		99	71.76	116	32.35	9	0.40	224	104.51
Vertebrates																
Rodent													1	0.10	1	0.10
Fowl									1	0 10					1	0.10
Lg. Mammal	1	5 20														
Coral																
Unweathered branch																
Waterworn																
Weathered Frags.									10	16.45	15	5.15			25	21.60
Other																
Charcoal							2 90					0.10	trace			3.90
Kukui nut shell									1	0.50					1	0.50
Waterworn basalt				1	4.15	1	1.30		2	5 25	1	0 60			3	6.75
Waterworn shell																
TOTAL	1	5.20		3	4.55	10	6.60		113	94.06	132	38.20	10	0.50	225	132.76

Table 4.7 Midden and Portable Materials, Site 5706 Feature 5, Test Units 3, 4 and 5

Subsurface testing results for Feature 5A did not provide substantive information regarding its age and function. Recovery of sparse amounts of midden beneath the lower level of the pavement might indicate limited use of the feature for habitation, with perhaps separate uses for the two levels. For example, the upper level may have been used as a sleeping area while the lower level served a more general purpose. In general, the pavement is much courser and more irregular than what is normally indicated for a sleeping *hale*. This functional interpretation is therefore not fully satisfactory. Structurally, the feature most resembles the Feature 11 burial platform. This raises the possibility that although no burials were found during testing, they could be present beneath the stone fill.

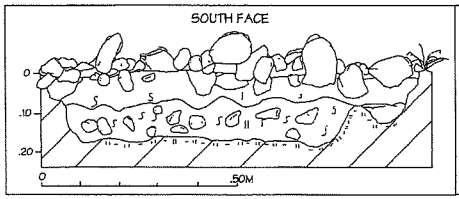
Feature 5B is a partially exposed natural bedrock formation that has been augmented with cobble fill. The linear feature has a terrace-like appearance, and it serves to define the western base of the knoll on which Feature 5A is located. The feature is oriented N-S and has an overall length of 14.50 meters; width varies from 1.5 to 2.5 meters. Average height along the western (downslope) side is 0.30 meter; height along the uphill side averages 0.10 meter. The terrace is generally straight, except at the south end, where it curves around a 2.50 by 2.00 meter clearing. The clearing is defined on the south and west sides by the terrace, and on the north side by a 1.8 by 1.5 meter area of stone fill (*Figure 4.26*). This clearing was identified in 2001 as a C-shape shelter and was tested by excavation of a 0.5 by 0.5 meter test unit. No cultural material was found in the prior test unit excavated in the cleared area (Rotunno-Hazuka et al. 2005:31).

During the current survey, an additional 1.0 by 1.0 meter test unit (TU-3) was excavated in the area of stone fill that defines the north boundary of the clearing. The purpose of the excavation was to assist in determining the function and age of the terrace.

Test Unit 3 encountered a thin surface layer of stones comprised of small cobbles and large pebbles, one to two courses thick. Layer I soil was encountered beneath the first course of stone fill and was intermixed with the lower course. The layer was 0.06 to 0.08 meter thick and consisted of very stony dark brown (dry) sandy loam with organic debris and duff (*Figure 4.28*). A fragment of large mammal bone (deer) was recovered from Layer I, 0.04 meter below the top of the layer. No midden or other cultural material was recovered. Layer II consisted of very stony dark brown (dry) gravelly silt loam with 50% stones by volume. This layer was excavated to a base depth of 0.40 meter below surface; no cultural material was recovered (*Photo 4.23*).

Results of subsurface testing at Feature 5B indicate that it most likely served as an area of stone accumulation in connection with the clearing of adjacent soil areas. The roughly rectangular stone fill area tested may well have resulted from the clearing of the area immediately to the south, which was tested in 2001 and found to contain no cultural material. Thus, both the clearing and the linear rock-filled area appear to have agricultural functions.

Feature 5C is a linear formation of surface stones oriented E-W and located 1.5 meter north from Feature 5A. This component defines the south edge of The Feature 5D surface midden scatter. Feature 5C is situated along the base and gradual slope of the Feature 5 knoll; the east end of the surface stones nearly connects with Feature 6, as described above. This component has an overall length of 11.0 meters and varies in width from 2.0 to 3.0 meters, with the widest portion in the center. No indications of formal construction were observed; however, the extent of prior disturbances to this feature are indeterminate. Minimally, there have been impacts from cattle and deer.



I (.02-.10) black (10YR2/1 moist) sandy loam (10YR3/3 dry), weak, fine, crumb, loose, nonsticky, nonplastic, very fine roots common, clear, wavy boundary

II: very dark grayish brown (10YR3/2 moist) silt loam (10YR3/4 dry), moderate, medium subangular blocky, slightly hard, firm, slightly sticky, nonplastic, few fine to coarse roots, grades to aa flow

Figure 4.28 *Site 5706 Feature 5B, Test Unit 3 Profile*

In it current state Feature 5C appears to be an area where stones were tossed during soil clearing. Cleared soil is present to the north of this rocky area.

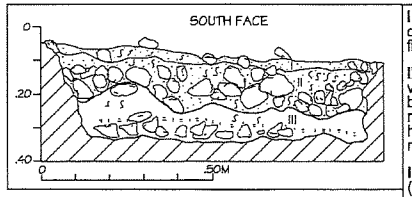
Feature 5D is an area of surface midden scatter which was observed in the cleared soil area to the north of Feature 5C. The surface midden area is 7.0 meters N-S by 7.5 meters E-W. The northern edge of the scatter is within 5.0 meters of the Site 1853 Feature 8 wall. Shellfish families observed on the surface within the Feature 5D area include *Cypraeidae, Neritidae, Patellidae,* and *Thaididae*. Also observed were waterworn pebbles and weathered coral fragments.

Two 1.0 by 1.0 meter test units (TU-1 and TU-5) were excavated near the center of the midden scatter in order to determine the integrity and age of the cultural deposit (*Figure 4.26*). A 0.5 by 0.5 meter extension unit was also added to the west side of TU-1 in order to better determine whether *in situ* cultural features might be present. Three soil layers were encountered in the excavations, all of which were predominated by naturally occurring stone (*Figure 4.29*). Layer I was a 0.02 to 0.08 meter-thick very dark brown (dry) sandy loam topsoil with organic debris and duff. Average thickness was 0.05 meter. Only 15 liters of soil was screened from this Layer, in Test Unit 1, however, 66 pieces (47.3 grams) of shellfish representing five families were recovered, along with seven pieces of weathered coral and a waterworn basalt pebble (*Table 4. 8*). In Test Unit 5, a greater variation of shellfish was recovered, with eight families represented among the 99 shell specimens (*Table 4.7*).

Layer II in TU-1 was a very stony very dark brown (dry) silt loam deposit with significant *kiawe* root intrusion and 57% stones by volume. This layer showed a quantitative increase in cultural material, although the actual density per volume of screened soil decreased from 3.1 grams per liter for Layer I to 1.9 grams per liter for Layer II. The combined shell midden density for both layers in TU-1 is 2.3 grams per liter. Eight shellfish families and Echinoidea remains are represented in the Layer II midden collection for TU-1. Test Unit 5 shows a similar decrease in shell density per volume of excavated soil as compared to Layer I. Vertebrates recovered from Layer II include one fish scale and a deer bone from TU-1, and one bird bone fragment from TU-5. Layer II in TU-1 exhibited patches of darker mottling and sandy lenses; none of these soil features could be attributed to cultural features due to the extensive disturbance caused by *kiawe* roots. This type of mottling was not observed in TU-5 or in the TU-1 extension. Cultural materials continued into Layer III, although the decrease was significant and material was limited to the upper portion of the layer.

Layer III consisted of yellowish brown (dry) very stony silt loam with decomposing bedrock. The base of this layer was not encountered in the excavations, although it became increasingly stonier as depth increased. Thirty-one shellfish pieces (10.5 grams) representing four families were recovered from the upper level of Layer III in TU-1; no cultural materials were recovered from Layer II in TU-5. Also recovered from TU-1 was one piece of waterworn coral. These materials are presumed to have been introduced into Layer III by natural processes, as the Layer is natural subsoil and bedrock.

Results of testing at Feature 5D indicate that the surface scatter reflects a subsurface deposit reflecting habitation activities. No artifacts were recovered in this test unit to aid in determining specific activities conducted. Shellfish midden density is higher at this location than any other tested areas within the



I (0-.08) black (10YR2/1 moist) sandy loam (10YR3/3 dry), weak, fine, crumb, loose, nonsticky, nonplastic, very fine roots common, clear, wavy boundary

II: (.08-.25) very dark grayish brown (10YR3/2 moist) very stony silt loam (10YR3/4 dry) with dark yellowish brown (10YR4/6) sand lenses and black (10YR2/2) mottling, moderate, medium subangular blocky, slightly hard, firm, slightly sticky, nonplastic, many fine to coarse roots , diffuse, wavy boundary

III: (.35-.40) brown (10YR3/4 moist) very stony silty loam (10YR5/4 dry), weak, fine, crumb, soft, very friable, nonsticky, nonplastic, fine to coarse roots common, grades to aa flow

Figure 4.29 *Site 5706 Feature 5D, Test Unit 1 Profile*

project area. No charcoal was present in the area of Test Unit 1, so we were not able to obtain materials for age determination.

The Feature 5 area is interpreted as a habitation and agricultural location; however, the current surface features do no have characteristics of permanent habitation structures. The paved area (Feature 5A) is generally too rough and lacks the *'ili'ili* or *ala* pavement found at habitation sites. The predominant activity indicated by surface features is stone clearing, presumably for planting purposes.

SITE 5706 Feature 5																						
TU-1	I-1		II-1		III-1		TU-I Total			TU-1	I-1		II-1		II-2		EXT. TOTAL		FINAL TOTAL	
Depth	.05-.13		.09/.13-.19/.28		.19/28-.30					ext.	03/05-07/10		07/13-.20/23		20/30-.33/.40					
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.			Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae			2	0.45			2	0.45			2	1.40					2	1.40	4	1.85
Cypraeidae	18	25.40	39	30.80	2	3.00	59	59.20			34	37.70	4	1.10	1	0.20	39	39.00	98	98.20
Littorina Pintado	5	1.30	20	6.20	3	0.60	28	8.10			14	4.30	1	0.10			15	4.40	43	12.50
Nerita picea	34	9.10	192	54.90	23	5.10	249	69.10			149	44.20	21	6.20	5	0.30	175	50.70	424	119.80
Patellidae	2	1.10	7	5.40			9	6.50			3	0.50	1	0.20			4	0.70	13	7.20
Thaididae	7	10.40	10	15.00	2	1.60	19	27.00			9	4.00			2	1.50	11	5.50	30	32.60
Drupa rubusidaeus			12	9.05	1	0.20	13	9.25			1	0.70					1	0.70	14	9.95
Neothais harpa			1	0.30			1	0.30			1	0.50	1	0.80			2	1.30	3	1.60
Trochidae			1	0.40			1	0.40											1	0.48
Unidentifiable			3	0.30			3	0.30											3	0.30
Bivalves																				
Brachiodontes c.											1	0.10					1	0.10	1	0.10
Isognomonidae			2	0.40			2	0.40			1	0.10	2	0.85			3	0.95	5	1.35
Echinoidea																				
Mouth			4	0.30			4	0.30			1	0.20			7	0.40	8	0.60	12	0.90
Shell			7	1.20			7	1.20			5	0.65	3	0.30	4	0.20	12	1.15	19	2.35
Total Shellfish	66	47.30	300	122.80	31	10.50	397	182.50			221	94.35	33	9.55	19	2.60	273	106.50	670	289.00
Vertebrates																				
Fish (scale)			1	tr.			1	tr.											1	tr.
Lg. Mammal	1	1.65					1	1.65											1	1.65
Coral																				
Unweathered branch											1	7.60					1	7.60	1	7.60
Waterworn					1	1.90	1	1.90			1	0.50					1	0.50	2	2.40
Weathered Frags.	7	8.60	17	49.00			24	57.60			3	3.40	1	1.10			4	4.50	28	62.10
Other																				
Waterworn basalt	1	11.80					1	11.80											1	11.80
Waterworn shell	1	2.30					1	2.30			4	3.50	2	1.50			6	5.00	7	7.30
TOTAL	76	71.65	318	171.80	32	12.40	426	257.75			230	109.65	36	12.15	19	2.60	286	124.30	711	382.05

Table 4.8 Midden and Portable Materials, Site 5706 Feature 5D, Test Unit 1 and Extension

Site 5706 Feature 7

This newly identified feature is located 3.4 meters southwest from Feature 5B, along the north-facing edge of an exposed *pahoehoe* outcrop. The feature consists of three stone mounds and two areas of stone fill, within an overall area of 10.0 meters N-S by 14.0 meters E-W (*Figure 4.30*).

Feature 7A is an oval mound constructed primarily from angular *pahoehoe* boulders and large cobbles. It is 4.8 meters N-S by 2.3 meters E-W at the center and ranges in height from 0.30 meters along the west (uphill) side to 0.76 meters along the east side. The mound shows no evidence of formal facing along the edges and is irregular on the surface. It is generally of loose construction, suggesting that it was put together during land clearing.

Feature 7B is a linear wall-like stone mound located to the west of Feature 7A. It is oriented roughly E-W along the slope of the outcrop. The mound is 5.2 meters long by 0.8 to 1.2 meters wide and 0.15 to 0.30 meters high. No indications of faced sides are present. The mound forms the south boundary of a small (3.0 by 2.0 meters) soil clearing at the base of the outcrop. It appears that these stones were probably moved from the area that is now cleared.

Feature 7C is a roughly triangular area of loose stone fill on a naturally fractured *pahoehoe* outcrop area. It measures 3.0 meters N-S by 4.0 meters E-W and ranges from 0.20 to 0.45 meters in height. Stones in this area are angular *pahoehoe* cobbles that were loosely placed on similar naturally-occurring materials. This pile also appears to have originated from adjacent cleared soil.

Feature 7D is a filled and leveled area against two exposed outcrop faces. This roughly oval area is 2.7 meters N-S by 3.3 meters E-W; the surface is below surrounding bedrock surfaces on all sides except the north, where it is 0.2 to 0.3 meters above the surrounding soil surface. Stones in this area are generally medium to small cobbles.

Feature 7E is a stone-filled bedrock crevice located just north of Feature 5D. It is 2.2 meter N-S by 0.7 meter E-W. The fill is below surrounding bedrock surfaces on two sides; it is level with the ground surface on the east side and 0.20 meters above ground surface on the north side. It is also presumed to be the result of land clearing.

Feature 7 is interpreted as an agricultural feature with a specific function of land clearing. The informal attributes of these stone piles do not warrant testing or further examination, as the natural land and bedrock surface below the mounds is visible through the loosely piled stones.

Site 5706 Feature 8

This newly-identified feature is an L-shaped wall remnant located near the center of Site 5706. The long axis of the wall is oriented N-S and is 11.0 meters long; the short axis is at the north end of the long section and is 6.0 meters long (*Figure 4.33*). The wall is constructed from various-sized basalt cobbles and

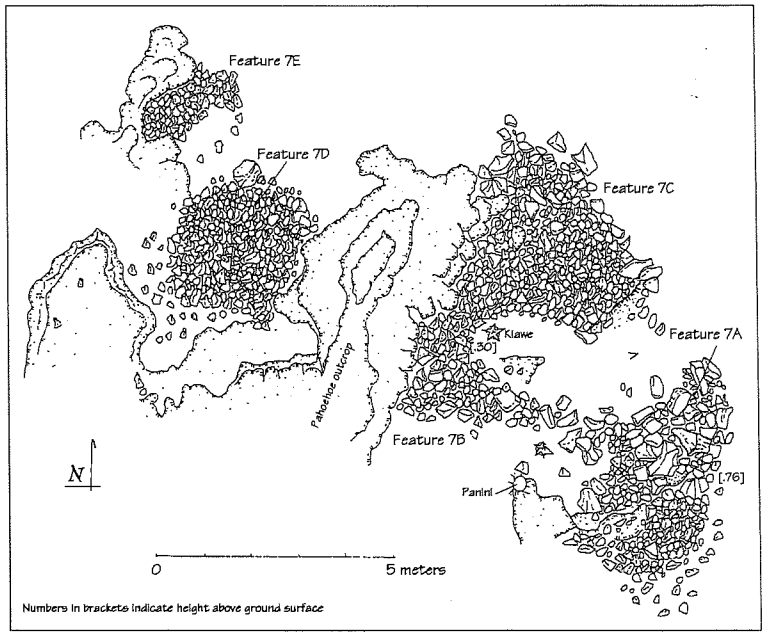


Figure 4.30 Scaled Plan Map, Site 5706 Feature 7

boulders that are multiple-stacked up to two courses high. Currently, the wall has a maximum height of 0.35 meter, with an average of 0.20 meter. The wall is in poor condition and it appears that much of the structural materials have been removed for use elsewhere. The area surrounding the wall is generally level soil that is clear of surface stones; the surface to the east side sloped slightly from east to west. One piece of weathered coral was observed on the surface 1.4 meters east from the wall (*Figure 4.31*).

A 1.0 by 1.0 meter test unit was excavated inside the corner of the wall, in order to determine the presence or absence of an associated cultural deposit. Two soil layers were encountered in the excavation, both of which were culturally sterile.

Layer I was 0.05 meter thick and consisted of loose dark brown (dry) sandy loam with organic duff and 50% stones by volume (*Figure 4.32*).

Layer II was 0.15 meter thick and consisted of dark yellowish brown (dry) gravelly silty clay loam intermixed with decomposing bedrock and *in situ* boulders.

Total volume of screened soil from Test Unit 1 was 150 liters. No artifacts, midden, or other portable remains were recovered. The soil deposit was found to be rather thin in this area as compared to other locations that showed indications of stone clearing. A specific function or age could not be determined for this feature. It could be placed in the pre-contact era by association with surrounding features, and a nearby dated feature (11). However, the absence of subsurface cultural material and the superficial nature of the feature could also indicate more recent construction, or possibly machinery activity in this area.

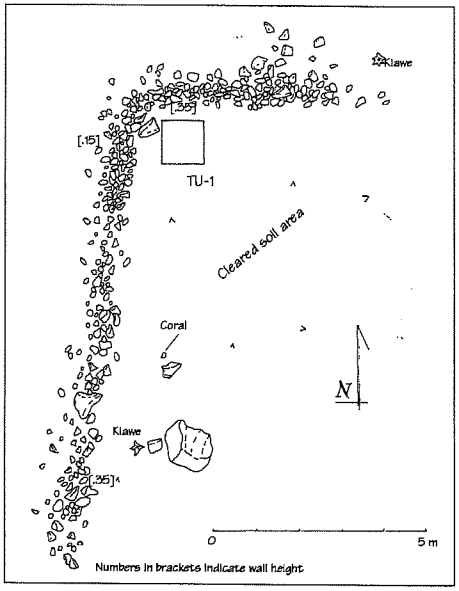
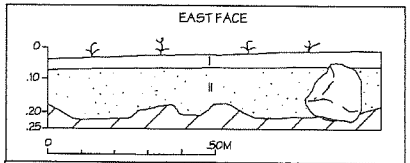


Figure 4.30 Scaled Plan Map, Site 5706 Feature 8



I: (0-.05) black (10YR2/1 moist) stony sandy loam (10YR3/3 dry), 1fcr, loose, nonsticky, nonplastic, many fine roots, clear smooth boundary

II: (.5-.20) very dark grayish brown (7.5YR3/2 moist) gravelly silty clay loam (10YR4/4 dry), 1fcr, soft, friable, slightly sticky, plastic, fine roots common

Figure 4.32 Site 5706 Feature 8 Test Unit 1 Profile

Site 5706 Feature 9

This newly-identified feature consists of two boulder alignments that are located along the base and east slope of a prominent *pahoehoe* ridge. Several other features (10, 12, 13, 15, 16 and 17) were also found at various locations along this ridge formation (*Figure 4.33, Photo 4.24*). Feature 9A is an alignment of large boulders 3.8 meters long, oriented N-S on exposed bedrock. The alignment is a single course of angular boulders with an average height of 0.30 meter. One small piece of weathered coral was observed at the southern end of the alignment, where it abuts with Feature 9B, a linear pile of boulders. The linear pile is oriented E-W and is 2.4 meters long by 0.8 meter wide by 0.50 meter high. Boulders in this pile are loosely stacked two courses high on exposed bedrock. The feature appears to be the result of land clearing.

Site 5706 Feature 10

Feature 10 is located 11.0 meters north from Feature 9, at the base of the same *pahoehoe* ridge formation. Feature 11, which was found to contain a human burial, is located 4.0 meters to the north. This newly-identified feature is a circular stone-filled depression measuring 2.0 meters in diameter. The fill consists of generally uniform-sized medium to small cobbles that are smaller than stones observed in nearby features. At least three layers of cobbles were observed beneath the level surface of this feature, which is 0.30 meter below the bedrock surface that defines the southern edge of the depression. One piece of weathered sandstone was found on the surface of the stone fill. No artifacts or other portable remains were observed on or near the feature.

A 1.0 by 1.0 meter test unit was excavated in the center of Feature 10 in order to better determine its function and age. The excavation encountered a 0.30 meter-thick layer of stone fill with no soil, over a 0.10 meter-thick layer (I) of dark yellowish brown (dry) stony silt loam (*Figure 4.34*). Layer I contained 50% stones by volume and four small fragments of weathered coral (0.55 grams total). Also recovered from screened Layer I soil were three small mammal bones believed to represent a mongoose (*Table 4.9*).

Layer II was encountered at 0.50 meter below surface and consisted of dark yellowish brown (dry) silty clay loam with 50% stones by volume. This natural subsoil was excavated to a base depth of 0.56 meter below surface, or 1.06 meter below the bedrock surface along the south side of the excavation. No portable remains were recovered from screened Layer II soil. The underlying bedrock surface was highly irregular and it appeared that the fill was placed in a natural rather than artificially created depression.

The function of Feature 10 appears to be similar to that of Site 1853 Feature 14, although the age of these two filled depressions may not be consistent. Feature 10 at Site 5706 is among pre-contact era features and may be of a similar age. The filled depression at Site 1853 contained metal fragments at a fairly deep provenience, suggesting an historic period date for that feature.

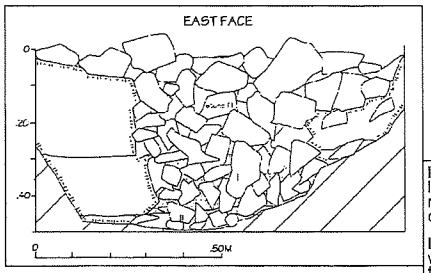


Figure 4.34 Site 5706 Feature 10, Test Unit 1 Profile

SITE 5706 Feature 10				
TU-1	Surface		I-1	
Depth	0		.30-.40	
Vertebrates	Cnt.	Wt.	Cnt.	Wt.
Small mammal			3	0.40
Coral				
Weathered Frags.			4	0.55
Sandstone				
Weathered Frags.	1	12.20		
TOTAL	1	12.20	7	0.95

Table 4.9 Recovered Materials, Site 5706 Feature 10

I: (.30-.40) dark brown (10YR3/3 moist) stony silt loam (10YR3/4 dry), weak, fine, crumb, soft, firable, nonsticky, nonplastic, many fine to very fine roots, diffuse, broken boundary

II: (.40-.56) dark yellowish brown (10YR3/4 moist) very stony silty clay loam (10YR4/6 dry), moderate, fine, crumb, slightly hard, firm, slightly sticky, slightly plastic, few coarse roots, grades to bedrock

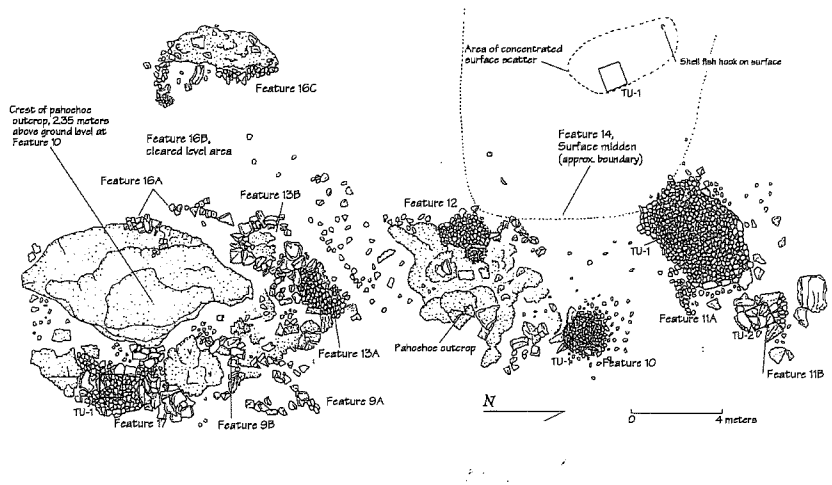


Figure 4.33 Scaled Plan Map, Site 5706 Features 9 through 14, 16 and 17

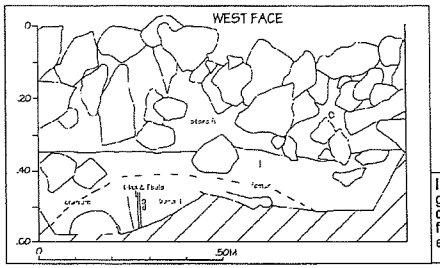
Site 5706 Feature 11

This newly-identified feature is located 2.7 meters south from the south end of the Feature 8 wall and is adjacent to the east end of the Feature 14 surface midden scatter. As noted above, Feature 10 is 4.0 meters to the south (*Figure 4.33*). Feature 11 is an informal stone-filled platform that is roughly rectangular in plan, although the corners are not fully square (*Photo 4.25*). Major axis of the platform is 5.0 meters NE (25 degrees Az) and minor axis is 3.4 meters in the center. The east end is 2.4 meters wide and the west end is 3.0 meters wide. Height above surrounding ground surface is 0.20 to 0.30 meter. The surrounding surface is generally cleared soil, with one area of exposed bedrock at the northeast corner of the platform. The feature is constructed with subangular cobbles and small boulders, with some areas of naturally occurring bedrock exposed in the fill. The edges are well-defined, with boulders aligned along portions of the perimeter, and bedrock used to define the edges in some places. There are indications of disturbance along the southern perimeter, where stones have been moved or kicked away form the feature, most likely by animals. The surface of the platform is generally level, except that the western half is slightly higher than the east half. There is no formal separation of the two portions of the platform; the surface area exhibits a gradual slope from west to east. There is no evidence of a formal paving, such as pebbles or *'ili'ili* on the surface of the platform. One weathered coral cobble was observed on the surface of the platform, in the west half. A stoneware crockery rim sherd from a bowl was found at the west edge of the platform. As noted above, a surface midden scatter is also present to the west of the platform; no midden was seen on the platform or along the other three sides.

A 1.0 by 1.0 meter test unit was excavated in the west portion of the feature, in order to help determine age and function of this feature. The excavation encountered a 0.35 meter-thick layer of stone fill that contained no soil or other portable materials (*Figure 4.35*). Very dark grayish brown (dry) silt loam was encountered near the base of the stone fill, intermixed with introduced stones. The upper level of this soil (0.35 to 0.45 meter below surface) contained 70% stone fill by volume. Level 1 also contained 10 pieces of marine shell (2.95 grams) and six weathered coral fragments (*Table 4.10*). Shellfish families represented include *Cypraeidae, Neritidae* and *Isognomonidae.*

Level 2 of the soil deposit showed an increase in midden, with 79 shellfish pieces (28.75 grams) recovered from 40 liters of screened soil. Also recovered from level 2 were 20 pieces of weathered coral and 17.8 grams of charcoal. The charcoal was submitted to Beta Analytic Laboratory for radiocarbon dating, and returned a conventional radiocarbon age of 290+/-40 BP (AD 1660 +/-40). This date was calibrated to a range of AD1490 - 1660, with an intercept of AD 1640 (Beta-212865; see Chapter 5 for more information).

Portions of an *in situ* human burial were encountered during excavation of level-2. The proximal epiphysis of a left femur was uncovered near the west wall of the unit at 0.48 meter below platform surface. The articular dish of the left acetabulum and a portion of the pubis was found just beneath the surface near the femur. The cranium was encountered at 0.54 meter below platform surface near the southwest corner of the unit.



After consultation with SHPD and the Maui-Lana'i Islands Burial Council representatives, additional excavation was conducted to verify the number of individuals represented and whether or not the burial was in a primary context.

I (pit fill): (.35-.56) very dark brown (10YR2/2 moist) gravelly silt loam (10YR3/2 dry), weak, very fine, crumb, soft, very friable, nonsticky, nonplastic, very fine to fine roots common, no boundary encountered.

Figure 4.35 Site 5706 Feature 11, Test Unit 1 Profile

Additional excavation partially exposed an articulated left tibia and fibula and left foot bones (*Figure 4.36*). Articulated hand bones were found near the cranium, and additional foot bones were found near the hip. Excavation was stopped when it was determined that all of the remains were from a single articulated individual. Some disturbance of extremities was noted; this was attributed to root disturbance and minor disturbance during excavation.

The individual was determined to be positioned on the right side, facing north to northeast. The left hip is tightly flexed with the leg oriented outward from the torso, with the left foot near the chest area. Bone morphology indicates a young, gracile adult, possibly a female. Diagnostic elements such as the mandible and pubic symphysis were not fully exposed for purposes of determining sex. The extent of epiphesial suture closure noted on the femur indicates adult age (over 20 years, Bass 1971:166).

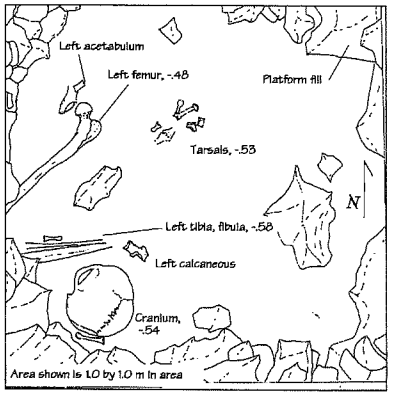


Figure 4.36 Site 5706 Feature 11, Burial Plan View

During excavation to determine the disposition of the burial, three skeletal elements were found in screened soil. These include the right navicular, a proximal foot phalanx, and minute fragments from the pelvis. These pieces were turned over to Leslie Kululoio of the Maui-Lana'i Islands Burial Council for wrapping, and they were reburied by Council representatives Leslie Kululoio and Dana Naone Hall with the articulated remains. The platform was reconstructed over the burial to ensure its preservation during the interim between discovery and approval of a burial preservation plan.

The overall composition and thickness of the soil beneath the platform indicates that it is not a natural soil layer. As indicated in all other test units within the project area, Layer 1 rarely exceeds 0.15 meter in thickness. At Feature 11, there was no evidence of a Layer 1 topsoil with duff and organic material; at this location, the soil appears to be disturbed pit fill, associated directly with the *in situ* burial. The burial pit was apparently excavated into a pre-existing cultural deposit that was contiguous with the deposit observed at Feature 14. Due to the location of the test unit in relation to the burial, all soil removed from the unit was from within the burial pit; no edges of the pit were discernible in the unit floor.

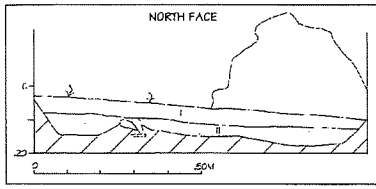
SITE 5706 Feature 11						
TU-1	Pit Fill-1		Pit Fill-2		Total	
Depth	.35-.45		.45-.55			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Cypraeidae	4	2.30	28	23.70	32	26.00
Nerita Picea	5	0.50	18	1.50	23	2.00
Patellidae			3	0.30	3	0.30
Planaxis labiosa			11	0.50	11	0.50
Thaididae			2	0.95	2	0.95
Unidentifiable			7	0.40	7	0.40
Bivalves						
Isognomonidae	1	0.15	3	0.25	4	0.40
Echinoidea						
Spines			7	1.15	7	1.15
TOTAL INVERTS.	10	2.95	79	28.75	89	31.70
Coral						
Weathered Frags.	6	2.95	20	35.80	26	38.75
Other						
Charcoal				17.80		17.80
TOTAL	16	5.90	99	82.35	115	88.25

Table 4. 10 Recovered material, Site 5706 Feature 11

Currently available information from the Feature 11 testing suggests that the cultural deposit dated to *circa* AD 1640 was in place prior to the placement of the burial and the platform, which was most likely constructed as a burial monument/marker. The specific time frame for the burial is therefore sometime after the estimated time range for the cultural deposit. It is not known whether the stoneware sherd found at Feature 11 is associated with the burial; however, it is possible that the burial was known during the timeframe indicated by the sherd, which is late 19th to early twentieth century.

The size of the platform suggests that at least one additional burial may be present at this location.

A second test unit was excavated in a bedrock outcrop located immediately east of the Feature 11 platform, in order to verify the presence or absence of additional burials at this location (*Figure 4.33*). The test unit was located in center of the outcrop, where several boulders had been loosely piled in a depression between *in situ* boulders. The loosely piled boulders were removed to expose a thin (0.04-0.06 meter) Layer 1 topsoil of dark brown (dry) gravelly sandy loam with organic duff (*Figure 4.37*). This topsoil overlaid a compact stony dark grayish brown (dry) silty clay loam with decomposing bedrock and *in situ* boulders. Solid bedrock was reached at 0.15-0.18 meter below surface. No cultural material was recovered from the 80 liters of soil screened form Layers 1 and II. Testing confirmed that there was no subsurface feature beneath the boulder pile. This would indicate a probable function as a clearing pile.



I: (0-.06) very dark brown (10YR2/2 moist) gravelly sandy loam (10YR3/3 dry), structureless, very fine, crumb, loose, nonsticky, nonplastic, fine roots common, clear, smooth boundary

II: (.06-.18) dark yellowish brown (10YR3/4 moist) very stony silty clay loam (10YR4/6 dry), moderate, fine, crumb, slightly hard, firm, slightly sticky, slightly plastic, few coarse roots, grades to bedrock

Figure 4.37 Site 5706 Feature 11, Test Unit 2 Profile

Site 5706 Feature 12 and 13

These newly-identified features are located along the western base of the prominent *pahoehoe* ridge associated with Features 9 and 10. Feature 12 is 6.0 meters south from Feature 11, and Feature 13 is 5.5 meters south from Feature 12. A surface midden scatter (Feature 14) is within 2.0 meters west from Feature 12. Both of these features (12 and 13) are stone-filled depressions, similar in form to Feature 10 (*Figure 4.33*). They are interpreted as having functioned as clearing piles, and are most likely associated with the Feature 14 area immediately to the west.

Feature 12 consists of angular boulders and cobbles that are loosely piled on naturally fractured bedrock at the base of the outcrop. The filled area is 3.5 meters N-S by 2.3 meters E-W; the surface is level and is 0.4 meter below the top of the bedrock face along the eastern side. A small square hole in the bedrock is present along the east side of the filled area. This hole has been partially filled with small cobbles. An informal alignment of boulders is present to the west of the filled area. This appears to have been a fortuitous result of animal traffic; a deer skeleton is present on the surface adjacent to these boulders. No cultural material is present in the immediate area of Feature 12; surface midden associated with Feature 14 is within 2.0 meters of the this feature.

Feature 13A is a filled depression and small circular clearing, located along the northwestern slope of the *pahoehoe* outcrop. The filled area consists of angular cobbles and boulders that are loosely placed on naturally fractured bedrock. The filled area is 3.0 meters NE-SW by 2.3 meters. The fill is 0.2 to 0.3 meters above surrounding bedrock on the downhill side and level with the surface on the uphill side. The southwestern perimeter of the filled area is defined by several naturally up-thrusted boulders, which were incorporated into a roughly circular enclosure wall (13B). A coral cobble (.0.2 by 0.2 meter) was located on the surface among scattered stones immediately upslope from the filled area.

Feature 13B is a loosely constructed L-shaped wall that abuts natural boulders to form a small enclosure. It is located adjacent to the southwest side of Feature 13A and is situated along the slope of the *pahoehoe* ridge. The long section of the wall is 2.4 meters and the short section is 1.3 meters. The wall is constructed from angular boulders, some of which are single course and set on end. Smaller cobbles have been used to fill gaps between the boulders along the inside of the wall. Height ranges from 0.25 to 0.40 meters. The small enclosed area is 1.8 meter E-W by 1.4 meter N-S and has sloping rock surface. No soil or portable remains were found inside the small area. It may have been used for temporary storage.

Site 5706 Feature 14

Feature 14 is a surface midden and artifact scatter that occurs in an area of stone-free soil immediately west of Features 11, 12, and 13. Feature 16, a third clearing pile feature, is present on the east and west sides of the scatter. Overall surface area is 16.0 meters N-S by 18.0 meters E-W. The edges of the surface midden correspond with the edges of cleared soil and are defined by either natural bedrock outcrops or constructed clearing piles. The cleared area has become a well-worn deer access route, and surface erosion is apparent. Shellfish varieties observed on the surface include *Cypraeidae, Neritidae, Thaididae,* and *Spondylidae*. Densities noted were not particularly high, however, more remains were visible in the deer trail. An area of relative concentration along the trail showed roughly two to three shell pieces per square meter of surface area. Also found in the concentrated area was the fragment of a shell fishhook (*Figure 4.33*).

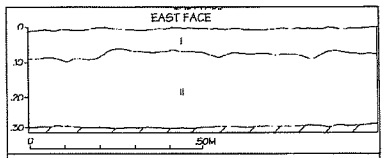
A 1.0 by 1.0 meter test unit was excavated within the area of relatively concentrated midden. Two soil layers were encountered, both of which contained cultural material. Layer I was 0.06 to 0.09 meters thick and consisted of very loose dark yellowish brown (dry and moist) silt loam with a small amount (5%) of *kiawe* duff intermixed (*Figure 4.38*). An intact topsoil/duff surface was not present at this location. A few loose cobbles were present on the surface, however, no additional stone were encountered during excavation of Layer I. A total of 39 shell fragments (18.85 grams) was recovered from screened Layer I soil, with four shellfish families represented (*Cypraeidea, Conidae, Neritidae* and *Thaididea*). All of the shell pieces were heavily weathered and in poor preservation. The shell density value for Layer I is 0.25 grams per liter of screened soil (*Table 4.11*). Also recovered from Layer I was an unmodified sandstone (beach conglomerate) cobble.

Layer II consisted of compact yellowish brown (dry) silty clay loam with less than .5% stones per volume in level 1, and no stones in level 2 (.5 liter per 100.5 liter excavated in level 1). Cultural material was found only in the upper level of Layer II, to a base depth of 0.20 meter below surface. A slight decrease in shell count was found, with 22 fragments (15.9 grams) and three identifiable shellfish families represented. Density for this level was markedly lower (0.15 gram per liter) , due to the higher volume of screened soil (100 liters). Also recovered from Layer II-1 were two basalt flakes. The second level of Layer II showed an increase in compaction, but no change in soil color or texture. No cultural material was recovered from this level and the excavation was terminated at 0.30 meter below surface.

The cultural deposit represented at Feature 14 appears to have been severely affected by erosion, most of which was probably brought about by recent deer traffic. Prior activities may have also affected the deposit, which is now in a disturbed and secondary state. Although it is clear that activities related to habitation took place at this location, the specifics of these activities are not clear. Due to the fact that Feature 14 is adjacent to Feature 11, it is safe to assume that the cultural layer found beneath the platform and disturbed by the burial pit is contemporaneous with the disturbed deposit at Feature 14. Thus, the date of *circa* AD 1640 is likely for this Feature. The artifacts found at this feature, including a shell fishhook fragment and basalt flakes collaborate with this date.

SITE 5706 Feature 14						
TU-1	I-1		II-1		Total	
Depth	0/.06/.10		.06/.10-.20			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Cassididae			1	7.00	1	7.00
Conidae	1	0.60			1	0.60
Cypraeidae	17	12.00	8	6.40	25	18.40
Nerita picea	7	1.85	1	1.50	8	3.35
Thaididae	3	0.65			3	0.65
Unidentifiable	11	3.75	12	1.00	23	4.75
Total Shellfish	**39**	**18.85**	**22**	**15.90**	**61**	**34.75**
Other						
Beach Congolm.	1	222.60			1	222.60
TOTAL	**40**	**241.45**	**22**	**15.90**	**62**	**257.35**

Table 4.11 Recovered Materials, Site 5706 Feature 14



I: (0-.18) dark yellowish brown (10YR4/6 moist and dry) silt loam, 1vfgr, loose, nonsticky, nonplastic, gradual, wavy boundary

II: (.18-.30) dark yellowish brown (10YR3/6 moist) silty clay loam (10YR5/8 dry), 1msbk, slightly hard, firm, slightly sticky, plastic, few fine to medium roots

Figure 4.38 Site 5706 Feature 14, Test Unit 1 Profile

Site 5706 Features 15 and 16

These two newly –identified features are located in the vicinity of the aforementioned Features 7, 9, 10, 12, and 13. Feature 15 is located 10.5 meters west from Feature 7, on the same outcrop area. Feature 16 is located to the south and west of Feature 13 (*Figure 4.35*).

Feature 15 is a low stacked wall constructed from angular basalt boulders and large cobbles. It is situated along the top of a low *pahoehoe* ridge, oriented perpendicular to the major axis of the ridge. The wall is 5.6 meter long by 0.65 meter wide and ranges in height from 0..2 to 0.45 meter. Construction is generally loose, with no formally faced sides (*Figure 4.39*). No portable remains were observed near the wall or in the vicinity. There is no soil deposit associated with this feature, and its specific function is indeterminate.

Feature 16 consists of three stone clearing piles and an associated soil clearing. Two of the piles are linear in form and consist of loosely piles angular bounders and cobbles. set along the east and west sides of the soil area. The third pile is concentrated against the east face of a low *pahoehoe* outcrop, at the west side of the clearing (*Figure 4.33*).

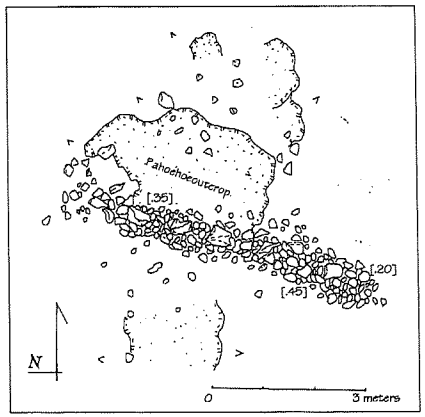


Figure 4.39 Scaled Plan Map, Site 5706 Feature 15

The soil clearing is 4.0 meters N-S by 5.0 meters E-W. The northern end of this soil clearing is adjacent to the southern-most extent of Feature 14. No portable remains or cultural materials were observed on the surface within this cleared area.

The stone pile along the east side of the clearing is 4.0 meters long (N-S) and consists of a linear string of single boulders. The linear pile along the southwest side of the clearing is 3.0 meters long and oriented N-S. The third more compact pile is at the west edge of the clearing and is 2.8 meters N-S by 0.8 meter W-E. This pile is comprised primarily of cobbles and is over one course in thickness. No portable remains were found in association with the clearing piles. They are assumed to be contemporaneous with the other clearing features located nearby.

Site 5706 Feature 17

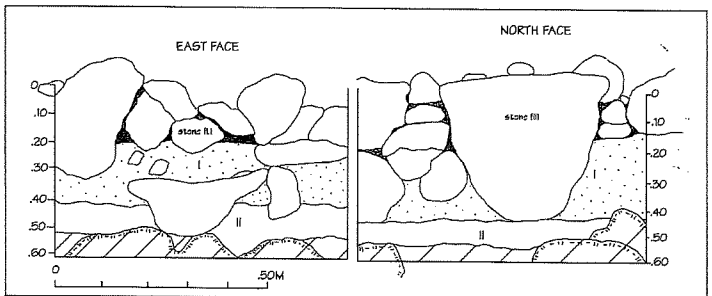
This newly-identified feature is an area of stone fill atop a natural *pahoehoe* terrace. It is located 2.5 meters south from Feature 9, along the east-facing slope of the major *pahoehoe* ridge formation (*Figure 4.33*). The feature appeared to be distinct from the nearby clearing piles, due to the more formal appearance and the presence of four coral cobbles and one coral pebble on the surface of the stone fill. The filled surface area measures 3.1 meters N-S by 2.9 meters E-w, and it has a roughly D-shape in plan view. The height of the filled surface is 0.20 to 0.40 meter along the east face. Along the west side, the bedrock face rises 0.90 meter above the filled surface. Materials used include angular boulders and cobbles; there is no formal paving of smaller stones; however, the surface is generally level.

A 1.0 by 1.0 meter test unit was excavated in the center of the terrace in order to help determine age and function. A 0.20 meter-thick layer of stone fill with no soil was encountered overlying a very stony layer of loose dark brown sandy loam with organic duff and 65% stones by volume (*Figure 4.42, Photo 4.26*). A single piece of *Cypraeidae* shell (0.2 grams) was recovered from the 25 liters of screened Layer I, level 1 soil. Also recovered from the screen for Layer I-1 were five small fragments of weathered coral.

No portable remains were recovered from the second level of Layer I, which extended from 0.30 to 0.40 meter below surface.

Layer II was encountered at 0.40 meter below surface and consisted of dark yellowish brown (dry) silty loam that had accumulated in crevices between *in situ* bedrock boulders. This sterile subsoil layer continued to 0.52 meter below surface, which is where the unit was terminated. Small pockets of the soil continued in crevices beyond this depth. No cultural materials or portable remains were recovered from Layer II soil.

Results of the testing indicated that the feature was a relatively thin veneer of stone fill that had been placed over a natural bedrock formation. A concentration of coral was found on the surface at this feature; it consisted of weathered brain coral cobbles and pebbles, none of which was branch coral. It is therefore difficult to assign a ceremonial function to this modified outcrop terrace, although the possibility should not be ruled out.



I: (.20-.40) black (10YR2/1 moist) stony sandy loam (10YR3/3 dry), 1fcr, loose, nonsticky, nonplastic, fine roots common, gradual broken boundary
II: (.40-.60) dark brown (7.5YR3/2 moist) silt loam (10YR3/4 dry), 1fcr, soft, friable, nonsticky, nonplastic, few fine roots, grades to bedrock

Figure 4.40 Site 5706 Feature 17, Test Unit 1 Profiles

In summary, investigations at Site 5706 found that probably most of the features in this complex are pre-contact in age and includes indicators of habitation, gardening or farming, and burial. At this time, it is assumed that the habitation features (5, 11, and 14) are contemporaneous and date to *circa* AD 1640. The agricultural features are closely associated with the habitation features, and there was no evidence found that these are historic in age. However, this should not rule out the possibility that some of the agricultural features could date to the historic period, when several families were living directly *makai* of this site. It is therefore assumed that the agricultural features represent landscaping connected with farming or gardening that could have occurred any time that folks were living in the area. The burial is traditional Hawaiian and could have been placed at the site anytime in the late seventeenth through eighteenth centuries.

The fact that Site 5706 is bounded on the north, east and west by either the golf course or by sites that are probably later, indicates that what we recorded may not represent the original full extent of the site. Midden deposits found in soil beneath the Site 1853 Feature 8 wall and Site 5706 Features 1 and 2 may reflect activities contemporaneous with one of the earlier occupations of the Site 5706 area, rather than with the surface structures or stone formations.

Site 5707

Previous Investigations

Site 5707 was identified and recorded in 2001 during a survey of the 35-acre Four Seasons Hotel project area. At that time, a single feature was identified as a modified outcrop constructed of stacked and piled basalt cobbles and boulders. The feature was mapped as being roughly D-shaped in plan and measuring 7.7 by 7.2 meters (Rotunno-Hazuka et al. 2005:34). A 0.5 by 0.5 meter test unit was excavated into the feature, and two soil layers were encountered beneath a 0.10 meter-thick layer of stones. No cultural materials were encountered. The site was summarized as follows:

> Due to the extent of disturbances of this site and the paucity of subsurface remains, function and age are difficult to determine; however due to the presence of one faced wall, it was probably a bulldozed ranch wall. No further work is recommended for this feature beyond construction monitoring during grading activities. (Rotunno-Hazuka et al. 2005:34)

Current Findings

Site 5707 was relocated through use of project area maps and the presence of the former test unit. Upon site relocation, it was determined that additional features were present, and the site area was expanded to include four additional features (*Figure 4.41*). These include a C-shaped enclosure (Feature 2), a bifaced wall remnant (Feature 3), a stone alignment and soil terrace (Feature 4), and a small planting enclosure that could be modern (Feature 5). This last feature was previously recorded as Site 5708; however, due to its proximity to the newly identified features, it was decided to include this feature with the Site 5707 complex. Previous work at Feature 5 is discussed below. The Site 5707 area was found to be in an extremely disturbed state; clearly identified bulldozer trails were observed which affected all of the features except Feature 5 (*Figure 4.41*).

Site 5707 Feature 1

Feature 1 was previously recorded as a modified outcrop, and interpreted as a probable bulldozed ranch wall. Vegetation clearing and additional investigations determined that this feature is the remnant of a bifaced core-filled wall that has been truncated at both ends by bulldozers. The current length of the wall is 8.6 meters and it is oriented NE-SW. Width of the wall ranges from 1.6 to 1.8 meters, and height along the east side averages 0.45 meter. The base of the wall is constructed from large subangular to rounded boulders set in parallel rows and filled with smaller cobbles. Portions of the wall base incorporate *in situ* bedrock boulders. Parallel single courses of the base stones remain along most of the wall, with some remnants of a second course present. A linear pile of pushed stones is present against the west face of the wall. This material was pushed in at an oblique angle to the wall, resulting in a V-shaped configuration. The previous test unit was excavated into the pushed material, against the west face of the wall. It appears that the northern end of Feature 1 probably continued north and connected with the Feature 3 wall. Both walls are of similar construction technique, although the base of Feature 1 is somewhat wider than that of Feature 3. The extent of Feature 1 to the south is indeterminate; it may have continued to connect with Feature 2; however, there is no clear indication that the area between these two features was impacted by machinery.

Site 5707 Feature 2

This newly identified feature is located 4.0 meters south from the south end of the Feature 1 wall. It consists of a substantially constructed C-shaped enclosure with the opening oriented toward the west. The front (west) side of the enclosure was impacted by machinery and the west ends of both walls were taken out to the base level. Pushed stones occur along the front of the north wall and the entrance. The eastern (back) wall of the enclosure appears to be relatively undisturbed (*Photo 4.27*).

Overall area of the enclosure wall from the exterior sides is 5.0 meters N-S by 6.0 meters E-W. The intact portion of the south wall is 1.2 meters wide and shows a bifaced core-filled construction. The east (back) wall is 2.8 meters wide and shows a stacked boulder face on the west (interior) side. The exterior side is currently stacked and slopes downward from the west to east. Maximum height of the east wall is 0.75 meter above surrounding ground surface. The faced wall height along the interior is 0.64 meter. The entrance of the shelter has been disturbed; estimated original width is 1.0 to 1.1 meters. A small

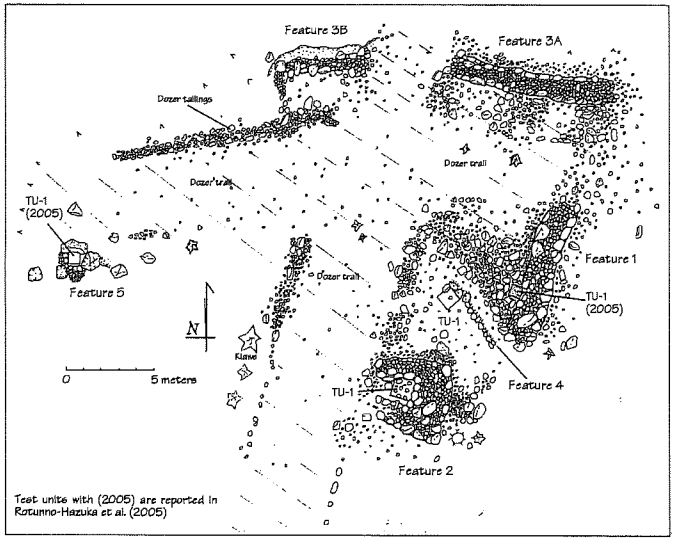


Figure 4.41 Scaled Plan Map, Site 5707

weathered coral pebble was observed on the west end of the southern wall, and a waterworn basalt cobble was observed among the disturbed stones at the entrance. Also observed on the surface was a single piece of *Cypraeidae* shell.

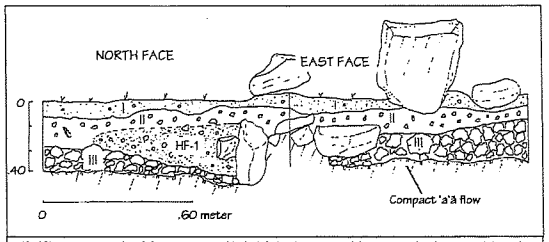
The interior area of Feature 2 is square in plan, at 1.5 by 1.5 meters. The interior surface is level and contains a soil deposit; several stones that fell from the walls were also present inside the enclosure. A large *Panini* was growing in the center of this feature at the time of the current investigations. This cactus had to be removed in order to access the feature for subsurface testing. The root system of the cactus caused a considerable amount of disturbance to the soil deposits inside the structure.

A 1.0 by 1.0 meter test unit was excavated in the interior of the shelter in order to help determine age and function of the feature. This unit was subsequently expanded to 1.3 meters N-S by 1.0 meter E-W in order to examine a possible hearth area and obtain additional charcoal for a dating sample. The expanded unit removed the bulk of the soil deposit that was present inside the shelter (*Photo 4.28*).

Three soil layers were encountered during excavation, and one possible hearth area was observed (*Figure 4.42*). Layer I was a thin (0.08 meter) deposit of very loose dark brown sandy loam with pebble and small cobble sized stones throughout (32% by volume). Cactus roots, most of which were rotten, occurred throughout this topsoil layer. A total of 28 shell pieces (15.95 grams) were recovered from screened soil, with four shellfish families represented (*Table 4.12*). Also recovered from Layer I were seven waterworn coral pebbles, four weathered coral pieces, and a rectangular piece of cut shell.

Layer II was .012 to 0.36 meter thick and was excavated in two levels. This layer consisted of very stony dark brown silty loam with 50% stones by volume. The layer showed considerable root disturbance throughout the unit. This soil feature was in a severely disturbed state due to cactus root intrusion, and had no clearly definable edges; further examination by expansion of the unit indicated that it was possibly a hearth remnant that contained sufficient charcoal for a dating sample. Layer II showed an increase in shell midden weight density, from .40 grams per liter in Layer I to .78 grams per liter in Layer II-1. The actual shell count did not change significantly, however. Most of the difference was due to one large piece of unidentifiable shell recovered from Layer II-1 (*Table 4.12*). Artifacts recovered from Layer II-1 includes a coral abrader, two basalt flakes, two volcanic glass flakes, and a fragment of a square nail. Twelve charcoal fragments (0.30 grams) were recovered from this level, most of which were from charred cactus root.

A second level of Layer II was present in the northern half of the test unit, where the remnant of a subsurface feature was discernible in the north wall of the original excavation (*Figure 4.42*). When the unit was expanded to the north, the northern portion of a circular ash deposit was observed at 0.33 meter below surface, at the interface of Layers II and III. The feature (HF-1) was located in the northeastern corner of the interior, and consisted of fine gray to dark gray ashy silt mixed with decayed material from cactus roots. All of the midden and artifacts recovered from Layer II-2 were within the area of HF-1. Artifacts include two basalt flakes and seven volcanic glass flakes. A 6.2 gram sample of non-cactus charcoal from HF-1 was submitted to Beta Analytic Laboratory for radiocarbon dating. The sample returned a conventional radiocarbon age of 240+/-60 BP, which was calibrated to three alternative ranges at two sigma (AD 1500-1690; AD 1730-1810; and AD1920-1950). The intercept of the conventional age with the calibration curve is AD 1660. At one sigma, the calibrated range corresponding with this intercept is AD 1640-1670.



I: (0-.08) dark brown (10YR3/3) sandy loam with duff, 0vfsg, loose, nonsticky, nonplastic, clear smooth bound.
II: (.08-.36) very dark brown silty loam (10YR2/2 moist) silt loam (10YR3/3 dry), 1msbk, soft, very friable, nonsticky, nonplastic, clear, smooth boundary; HF-1 is dark grayish brown ashy cultural feature.
III: (.36-.45) dark yellowish brown (10YR3/4 moist) gravelly silty clay loam (10YR5.6 dry), 1msbk, hard, firm, slightly sticky, plastic, grades to aa flow

Figure 4.42 Site 5707 Feature 2, Test Unit 1 Profile

SITE 5707 Feature 2										
TU-1	I-1		II-1		HF-1		III-1		Total	
Depth	.05/.11-.14/.17		.14/.17-.24/.27		.24/.27-.35/.39		.24/.27-.34/.40			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae										
Cypraeidae	4	3.80	8	7.10	2	1.70	1	2.60	15	15.20
Nerita picea	5	7.50	18	1.90	1	0.10			25	9.50
Patellidae	5	1.20	1	6.00	3	0.10	1	0.05	10	7.35
Thaididae	2	9.50	2	9.40			1	1.00	5	19.90
Unidentifiable	9	0.80	4	38.45	1	0.70			14	39.95
Total Shellfish	**25**	**15.95**	**31**	**62.85**	**7**	**2.60**	**3**	**3.85**	**69**	**91.95**
Vertebrates										
Large Mammal	2	2.50							2	2.50
Medium Mammal	1	1.20							1	1.20
Indeterminate			2	0.20					1	0.10
Coral										
Waterworn	7	109.35	13	120.30	2	20.30			22	249.95
Weathered Frags.	4	34.90	32	336.10	17	32.60	5	66.50	32	367.80
Other										
Charcoal			12	0.30		6.2			12	0.30
Firecracked Basalt			1	12.05					1	12.05
TOTAL	**42**	**147.95**	**91**	**533.38**	**26**	**61.70**	**8**	**70.15**	**139**	**728.58**

Table 4.12 Midden and Portable Material, Site 5707 Feature 2

Layer III was encountered at a varied depth of 0.10 to 0.37 meter below surface, with the deepest surface located beneath HF-1. This layer was a very stony dark yellowish brown silty clay loam subsoil with 70% stones by volume. Three pieces of marine shell were recovered from the 31 liters of screened soil. Also recovered were five pieces of weathered coral and a spall from a ground cobble. These materials are presumed to be intrusive from the upper Layer, as Layer III is essentially sterile subsoil.

Results of testing at Feature 2 indicated that the Layer I soil deposit post-dates the wall, which was constructed into the surface of Layer II. Thus, cultural material present in Layer I probably got there due to roots or other types of natural perturbation. The dated charcoal from HF-1 suggests a construction and use date that is roughly contemporaneous with the cultural deposit at Site 5706. Later uses of Feature 2 or the Site 5707 area are suggested by the presence of a single square nail fragment that was found inside the C-shape. The relatively small size of this shelter (2.25 square meters) precludes its use for long-term habitation; it most likely functioned as a short-term activity area that would not have been suitable for sleeping. It is possible that Feature 2 was a component of a larger habitation compound; however, the relationship of this C-shape with the nearby wall remnants is very unclear due to modern machinery disturbances.

Site 5707 Feature 3

Feature 3 is the remains of a bifaced core-filled wall that was oriented E-W along the south edge of the Parcel 37 gulch. Two sections of the wall were identified, these are separated by a 3.6-4.0 meter wide bulldozer path. The eastern section (Feature 3A) is the longest and best preserved; it is 9.0 meters long and 1.2 to 1.6 meters wide. Height of the wall ranges from 0.48 to 0.30 meter, with the highest section along the north side. The wall is constructed with subangular boulders set in parallel rows and filled with smaller cobbles and pebbles. In general, only one course of the wall is still intact, and both ends have been truncated by bulldozers. Three piles of stones are pushed against the south side of the wall; these stone could have originated from either the Feature 1 or Feature 3 wall. There is no remnant of a corner at the east end of this longer section, so it cannot be determined if the wall turned to connect with Feature 1.

The western wall section (Feature 3B) is aligned with the eastern section, and it is presumed that these sections were once continuous. This section is 6.6 meters long and 0.8 to 1.2 meter wide. The southern row of base stones is present, however most of the stones from the northern side have been displaced or removed. Only a single course remains of the wall section, with heights ranging from 0.50 to 0.76 meter for single basal boulders. A linear tailing of stones is spread westward from the wall segment for 13.0 meters; these stones most likely originated from the wall. Additional tailing lines occur to the west, down the hill toward the golf course. No artifacts or portable remains were observed on the surface in the area of Feature 3.

Site 5707 Feature 4

This newly-identified feature is a partially buried boulder alignment that forms a low terrace. It is located between Feature 1 and 2 and is oriented NW-SE, roughly parallel with the disturbed portion of Feature 1 (*Figure 4.41*). The alignment is comprised of 14 boulders and is 4.4 meters long. The stones are buried to roughly half their height, and protrude an average of 0.35 meters above ground surface. The west end of the alignment is marked by a single boulder that is turned perpendicular to the other stones. The ground on the south side of the alignment is raised 0.20 above the level to the north side. This forms a terrace-like area that continues southward for 4.0 meters to the Feature 2 C-shape. It appears as though machinery has driven over Feature 4, however, a distinct trail could not be discerned.

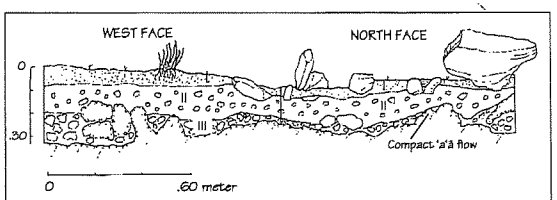
A 1.0 by 1.0 meter test unit was excavated at the west end of the alignment, on the south (raised) side in order to help determine function and age. Three soil layers were encountered, including a thin (0.02-0.05 meter-thick topsoil consisting of dark brown loose sandy loam with deer scat and duff (*Figure 4.43, Photo 4.29*). No artifacts or cultural material was recovered from Layer I soil.

Site 5707 Fea. 4	II-1		II-2		TOTAL	
Depth	0.8/.18-.20/.28		.20/.28-.34/.40			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae	2	0.70			2	0.70
Cypraeidae	5	13.20			5	13.20
Total Shellfish	**7**	**13.90**			**7**	**13.90**
Coral						
Weathered Frags.	10	39.20	2	1.80	12	41.00
Other						
Charcoal	nd	0.75	nd	0.20	nd	0.95
TOTAL	**17**	**53.85**	**2**	**1.82**	**19**	**55.67**

Table 4.13 Midden and Portable Materials, Site 5707 Feature 4

Layer II was excavated in two levels and consisted of very dark brown stony silty clay loam with pockets of windblown beach sand. Seven shell fragments (*Conidae* and *Cypraeidae*) were recovered from level 1, as well as 10 small pieces of weathered coral, one small volcanic glass flake, and 0.75 grams of charcoal (*Table 4.13*). The second level of Layer II contained no shellfish remains; 12 small coral fragments, one small volcanic glass flake, and 0.20 grams of charcoal were, however recovered.

Layer III consisted of a yellowish brown (dry) gravelly silty clay loam. No artifacts, midden, or other portable remains were found in this subsoil layer. Results of testing at Feature 4 suggested that the feature was part of a larger habitation complex that probably included Feature 2 and *possibly* was inside an enclosure (Feature 1 and 3). The rather sparse midden deposit at Feature 4 may be attributed to post-abandonment disturbances and erosion.



I: (0-.10) dark brown (10YR3/3 moist and dry) sandy loam, 1vfsbk, friable, non-slicky, non-plastic, many fine roots, clear smooth boundary
II: (.10-.25) very dark brown (10YR2/2 moist) gravelly silt loam (10YR4/4 dry), 2fskb, friable, slightly sticky, slightly plastic, fine to coarse roots common, diffuse wavy boundary.
III: (25-.33) dark yellowish brown (10YR3/4 moist) gravelly silty clay loam (10YR5.6 dry), 2msbk, hard, firm, slightly slicky, plastic, few coarse roots, grades to aa flow

Figure 4.43 Site 5707 Feature 4, Test Unit 1 Profile

Site 5707 Feature 5

This previously identified feature was recorded as Site 5708 in 2001, and was described as follows:

> It consists of a semi-circular wall, built against the edge of a basalt outcrop, measuring 1.25 [meter] in diameter, forming a small circular enclosure which bounds a level soil area. The wall is constructed of stacked basalt cobbles and boulders, 2-4 courses high, and retains soil. The wall encloses the southern side and the outcrop defines the rest of this feature. The wall measures about 2 m in total length, .50 m wide and .50 m in height on the exterior and .30 m on the interior side. The outcrop measures .80 m high on the eastern and western sides and 1.0 m high on the northern side. (Rotunno-Hazuka et al. 2005:38)

A 0.50 by 0.50 meter test unit was excavated inside the small enclosure in 2001, and three soil layers were encountered. One piece of Cypraeidae shell (0.4 gram) and one piece of weathered coral (1.2 grams) was recovered from screened Layer II soil The feature was interpreted as a planting shelter or possibly a storage area, with no age determinable. Further examination of the structure suggests that it could be relatively recent, based on the construction technique and the very good condition of the stacked wall in relation to the surrounding bulldozer-disturbed area (*Photo 4.30*).

The prior excavation removed essentially all of the soil deposit within the small feature, so it was not possible to conduct further testing. It would appear that the shell and coral fragments were in the soil deposit prior to construction of the narrow wall. This feature is similar in style to other obviously modern planting areas that were identified in the gulch adjacent to Site 5707. The modern features are intermixed with what appear to be older pre-contact features and may represent re-use of existing features (see discussion for Site 5710).

Features 1 and 3 at Site 5707 are assumed to be contemporaneous and may have been connected at one time. Features 2 and 4 appear to be contemporaneous and reflect habitation activities at the site during the middle seventeenth century. It was not possible to clearly associate the two wall features with Features 2 and 4, due to extensive machinery disturbance of the site. It does appear, however, that the bulldozing that disturbed the site was conducted prior to golf course construction and is associated with a graded road (Site 5710 Feature 2) that enters and crosses the gulch in this area. This road is assumed to be from ranching activities, and may be connected with use of the Site 5795 enclosure across the gulch. Thus, it appears that the Feature 1 and 3 walls were not functional ranch walls at that time the road was made (early-middle twentieth century). There is a possibility that the walls are contemporaneous with and functionally associated with the C-shape enclosure and terrace. Their construction technique is consistent with traditional Hawaiian wall design.

Site 5708

As noted above, this site number was originally assigned to what is now Feature 5 of Site 5707. The number has been re-assigned to a historic/modern era habitation site located in Parcel 56. The site consists of three features - a stone-filled platform (Feature 1), a house site (Feature 2), and a surface artifact/midden scatter with an associated subsurface refuse concentration (Feature 3). The overall site area is 41.5 meters N-S by 49.0 meters E-W.

Feature 1

This newly-identified feature is located along the northwestern boundary of Parcel 56, immediately south of a modern retaining wall that defines the public beach park. The feature has been impacted by earthmoving in connection with the wall construction and with grading in the Parcel 56 area. The east and west ends of the platform are disturbed, and it appears that a retaining wall may have extended west from the original platform (*Figure 4.44*). Currently the structural remnants are 10.2 meters E-W by 4.2 meters N-S. The platform area is oriented NE-SW with a major axis of 5.0 meters and minor axis of 2.8 meters. The north side of the platform shows a faced edge of stacked boulders, to a height of 0.90 meter. The south side is 0.42 meter high and also shows remnants of a formerly faced perimeter wall. The surface of the platform is level and paved with small cobbles and pebbles of weathered *'a'a*. Artifacts observed on the surface of the platform include historic/modern structural debris and rubbish, including metal water pipes, rusted iron fragments, broken bottle glass, iron stove parts, earthenware flower pots, copper flashing, and whiteware dish sherds. Also observed on the surface was one fragment of branch coral.

A 1.0 by 1.0 meter test unit was excavated in the center of the platform to verify its age and function. The excavation encountered a 0.15 meter-thick layer of stone fill that contained no soil or portable remains. Beneath this layer were seven 0.10 meter-thick levels of stone and soil fill (*Figure 4.45, Photo 4.31*). The soil consisted of dark brown gravelly loamy sand with ash mottling and relatively high amounts of charcoal.

Historic/modern debris (933 items) was found throughout the platform fill, with the highest concentration in the uppermost level of the soil mix (level 1). Fourteen ceramic sherds were recovered, including seven earthenware flower pot fragments and seven porcelain fragments, all of which are less than 50 years in age. Most of the 125 recovered glass sherd are clear (118) and include beverage bottles, condiment bottles, medicine bottles, kitchenware and flat glass. Sixty-four pieces of leather, including 63 fragments of a leather boot were recovered; the boot was located at the base of the platform. A total of 705 pieces of metal were recovered, with nearly all of this material in levels 1-3. Also recovered were 22 pieces of brick or mortar and five pieces of plastic, including comb fragments, buttons and plastic wrapping material. A more in-depth discussion and itemized listing of the artifacts is found in Chapter 5. All of the recovered artifacts appear to be from the twentieth century, *circa* 1940-1980.

Food remains consisting of shellfish and vertebrate bones were found throughout the platform fill; these materials included six varieties of shellfish and Echinoidea (135 items total), 87 fish bones and 71 bones representing various mammals, including cow and pig (*Table 4.14*). Most of the large and medium animal bones showed evidence of butchering with a fine-toothed saw. Also recovered from the fill was 1,022.60 grams of charred wood pieces, many of which were from milled lumber.

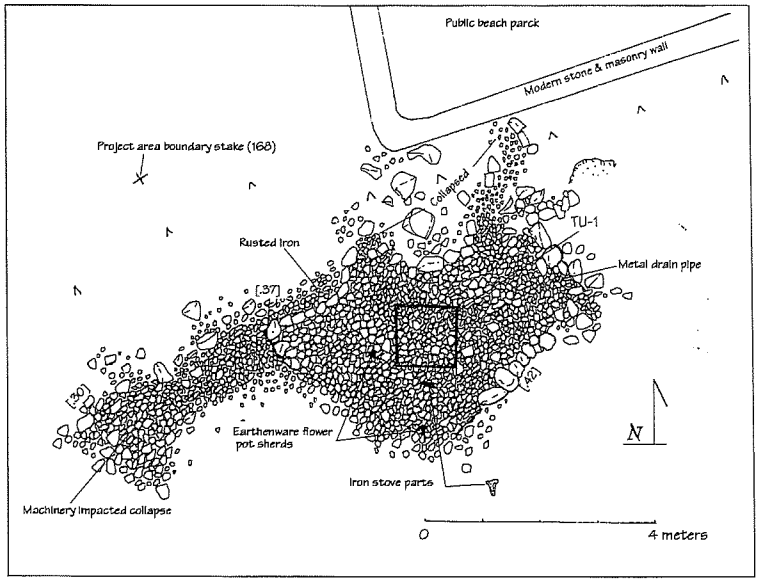


Figure 4.44 Scaled Plan Map, Site 5708 Feature 1

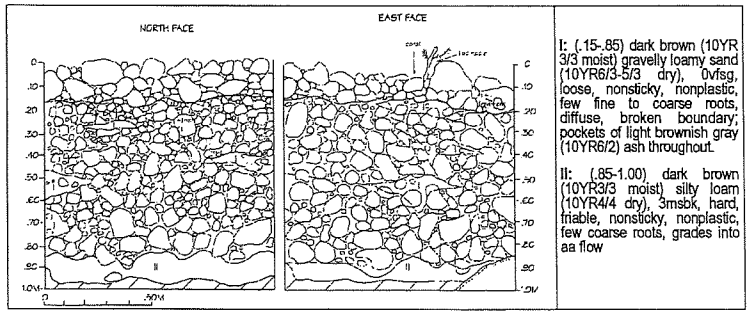


Figure 4.45 Site 5708 Feature 1, Test Unit 1 Profiles

SITE 5708 Feature 1																
TU-1	Level 1		Level 2		Level 3		Level 4		Level 5		Level 6		Level 7		Total	
Depth	.15-.25		.25-.35		.35-.45		.45-.55		.55-.65		.65-.75		.75-.85			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae	4	18.60			2	2.60					2	3.00			8	24.10
Cypraeidae	5	3.65	3	3.80	5	5.50			4	7.70	1	2.70	2	2.30	20	25.65
Nerita picea	2	1.10	4	1.50	4	1.00	9	2.80	11	3.10	1	0.30	1	0.20	32	10.00
Patellidae	1	2.50													1	2.50
Unidentifiable	1	0.10							2	0.30					3	0.40
Bivalves																
Spondylidae									2	0.50					2	0.50
Tellinidae			1	0.70											1	0.70
Echinoidea																
Mouth									1	0.10					1	0.10
Spine							1	0.20							1	0.20
Shell	60	7.30	2	0.20			1	0.10							63	7.60
Crustacea									3	0.80					3	0.80
Total Shellfish	**73**	**33.15**	**10**	**6.20**	**11**	**9.10**	**11**	**3.10**	**23**	**12.60**	**4**	**6.00**	**3**	**2.60**	**135**	**72.55**
Vertebrates																
Fish	17	1.30	10	0.40	3	0.05	19	2.32	19	0.60	13	1.10	6	0.70	87	6.47
Rodent											1	0.10			1	0.10
Indet. Mammal	14	1.10	5	7.75			3	0.20							22	9.05
Small Mammal											1	0.10			1	0.10
Med. Mammal	12	6.90	1	0.70											13	7.60
Lg. Mammal	28	44.50	1	1.30	1	8.30	3	2.50			2	1.90			35	58.50
Total Vertebrates	**71**	**53.80**	**17**	**10.15**	**4**	**8.35**	**25**	**5.02**	**19**	**0.60**	**17**	**3.20**	**6**	**0.70**	**159**	**81.82**
Coral																
Waterworn	3	8.30													3	8.30
Weathered Frags.	1	8.90													1	8.90
Other																
Waterworn basalt	7	42.80			1	1.60									8	44.40
Waterworn shell			1	7.50											1	7.50
TOTAL	**155**	**148.95**	**28**	**23.85**	**16**	**19.05**	**36**	**8.12**	**42**	**13.10**	**21**	**9.20**	**9**	**3.20**	**307**	**223.47**
Charcoal		517.70		153.00		181.30		83.40		45.50		20.20		41.50		1022.60

Table 4.14 Midden and Portable Materials, Site 5708 Feature 1, Test Unit 1

Modern artifacts and debris was present through all levels of the platform fill, which terminated on sterile silty clay loam subsoil. This feature was therefore determined to be modern in construction and use and appears to represent a rubbish burning/disposal area that was located away from the house (Feature 2) area. The residents apparently built the platform up as the rubbish accumulated, resulting in a nicely contained disposal area.

Site 5708 Feature 2

Feature 2 is a former dwelling site that was razed, most likely during development of the Prince Hotel and beach park. The Feature consists of two linear push-piles (Features 2A and B), a pile of structural lumber, and a circular concrete-capped cesspool (Feature 2C; *Figure 4.46*). Overall area of the feature is 36.0 meters E-W by 12.0 metes N-S. The two push-piles are located to the west of the cesspool, and may correspond with locations of former retaining walls that served as a base for the dwelling foundation. The piles consist of various-sized boulders and cobbles with waterworn cobbles and pebbles intermixed (*Photo 4.32*). Pieces of rusted iron, hog wire fencing, copper flashing, window screen, and cookware are intermixed with the pushed stones. The structural lumber is located immediately north of the cesspool cap; it is mixed with pieces of window screen and round wire nails. This appears to represent a small out- building or shed.

The cesspool cap is 4.6 meters in diameter and is currently 0.60 meter above surrounding ground surface (*Photo 4.33*). A mound of broken stone and soil is present adjacent to the east sides of the concrete structure. This appears to be material that was removed during excavation for the cesspool. Construction material, structural remains and artifacts observed at Feature 2 are consistent with the modern age associated with Feature 1. It is likely that this house was built *circa* 1940-50 and was occupied until the early to middle 1980s. This home had piped-in water, as indicated by a surface metal water line that is still present along the west side of Mākena-Keone'ō'io Road.

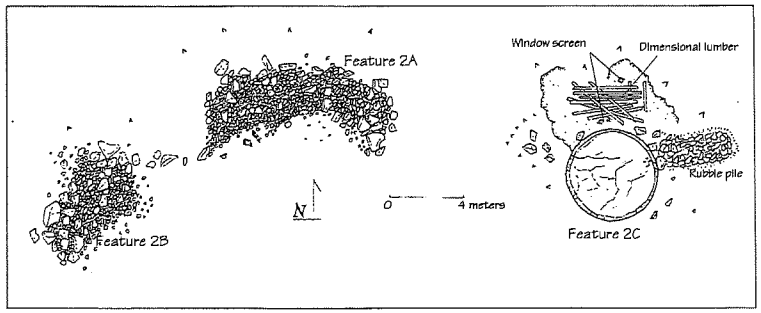


Figure 4.46 Scaled Plan Map, Site 5708 Feature 2

Site 5708 Feature 3

This artifact and midden concentration is located 12.0 meters west from Feature 1, and is situated along the western edge of Parcel 56. The area of the feature has been impacted by bulldozing and grading associated with golf course construction. The disturbed remains of what may be a former wall are located within the area of this feature, which is 21.0 meters N-S by 8.0 meters E-W (*Figure 4.47*).

The surface within the feature area is littered with broken bottle glass sherds, metal artifacts such as metal water pipes and window screen, and plastic and cloth items from recent camping episodes. One area of interest within the feature appeared to be a natural overhang shelter with a soil deposit (*Photo 4.34*). This area is located along the west face of a tall boulder outcrop formation that was incorporated into the wall. A small area roughly 2.0 meters in diameter was present between the edge of pushed boulders and the outcrop face, and a small section of this area was beneath a small rock ledge. The sheltered area showed evidence of recent camping and the surface was scattered with plastic bags, and clothing (adult female and child). Also present was a hair dryer, several small bottles of shampoo and lotion, cassette tapes and two gym bags. This material was cleared from the surface and a 1.0 by 1.0 meter unit was excavated to determine whether the sheltered area had evidence of prior use. The southern 0.5 to 0.25 meter of the test unit was located beneath the rock overhang and the remainder of the unit was in open air.

The ground surface prior to excavation was level black loamy topsoil that showed no evidence of prior disturbance. This appearance proved to be quite deceiving; as the excavation proceeded, it became clear that a highly concentrated secondary deposit of rubbish was present. Three soil layers were discernible, however, the upper two levels did not correlate with changes in portable remains (*Figure 4.48*).

Layer I was 0.10 meter thick and consisted of very dark brown loamy sand with a high concentration of historic/modern rubbish and midden. Two levels of this soil layer were excavated, both of which exhibited high concentrations of material. A total of 1,146 items, including 450 pieces of glass, 647 pieces of metal, mortar, plastic, rubber, wood and shell were recovered from the upper 0.10 meter-thick level of Layer I. In addition, 242.85 grams of marine shellfish, 120.50 grams of vertebrate bones and 1,170.4 grams of waterworn basalt pebbles were collected (*Table 4.15*). Level 2 showed similar quantities of all materials, except metal, which increased in frequency. A total of 1,481 items were recovered from this 0.10 meter-thick level. Most of this material (74%) is metal, of which 769 items were complete or partial food cans. These included tall (No. 303) cans as well as tuna, sardine, and Spam cans. Intermixed with the twentieth century debris were a few hand-stamped ceramic sherds and bone buttons which could date to the nineteenth century.

Layer II soil consisted of compact black stony sandy loam with ash mottling and an increased amount of charcoal. The predominant charred material in in this and all other excavations levels consisted of

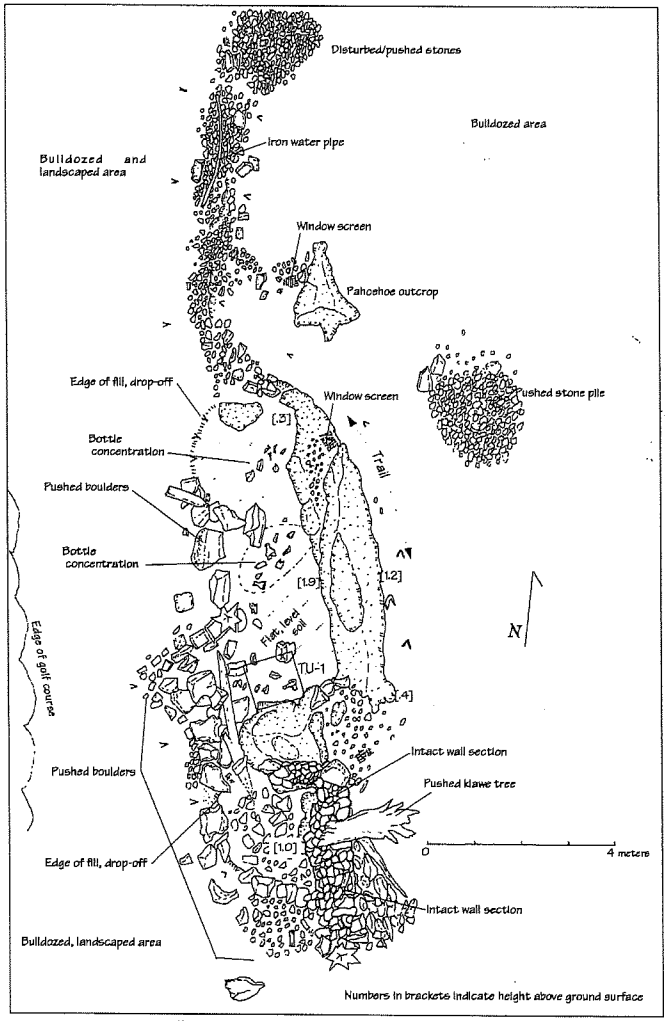


Figure 4.47 Scaled Plan Map, Site 5708 Feature 3

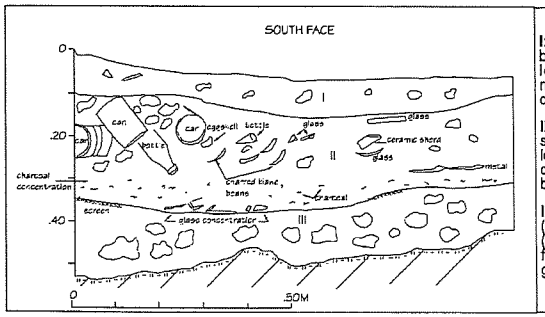
kiawe beans. These items were not retained for weighing, and the charcoal weights reported here reflect charred wood. Two levels of Layer II were excavated; the first level showed frequencies of modern debris similar to I-2, while the lower level showed a decrease in all material categories except ceramics and mortar. A total of 2,284 items were collected from Layer II, most of which (63%) occurred in II-1. Midden frequencies were similar for both of the Layer II levels, which showed a decrease from the Layer I concentrations (*Table 4.15*).

The base of the debris deposit was at the base of Layer II, and was defined by a metal window screen that had been placed over the former surface at this location. Layer III soil below the screen was brown (dry) gravelly silty loam with a sparse amount of marine midden and no artifacts (*Photo 4.35*).

The window screen is identical to other pieces that are laying about on the surface at Feature 3, which were probably set at this location in the 1970's of 80's. The screen appears to be the only subsurface artifact that was in a primary context. All the other material was apparently either pushed into the overhang from the golf course area, or tossed in over the rock face from the east side. The presence of the high bedrock face along the east side of the deposit would have prohibited it being pushed by machinery from the Feature 1 area. The compacted and mixed nature of the deposit tends to support an interpretation that the material was pushed from the west side. Thus, it could have originated from Site Ma-B8-237, one of two historic/modern house sites that were extant in the golf course area in 1978 (Haun 1978, Cordy 1978). The location of Feature 3 is also near the inland extent of Nawaiki's houselot (LCA 5402B:4).

Results of testing indicated that the artifact and midden deposit at Feature 3 is secondary and mixed. In addition to the historic/modern materials, traditional Hawaiian artifacts including two volcanic glass flakes, a ground stone fragment and a basalt flake were recovered from Layer I. The presence of these items, as well as the nineteenth century artifacts in Layer I suggests a reverse stratigraphy which would have resulted if materials were pushed into the feature area rather than deposited or accumulated gradually over time.

The Feature 3 deposit appears to be mostly contemporaneous with the deposits at Feature 1 and 2; however, it appears that the Feature 3 originated from a different habitation area. For example, the Feature 1 artifact collection included no shell or bone buttons, whereas the Feature 3 collection included 15 shell buttons and two bone buttons. Also, Feature 3 contained 154 crown bottle caps, whereas Feature 1 had only eight. No whiteware was found at Feature 1, while nine whiteware sherds were recovered from Feature 3. It also appears that the Feature 3 artifact collection contains some twentieth century items that pre-date 1940. There are also differences between the faunal collections from Features 1 and 3; these are discussed in Chapter 5.



I: (0-.15) pale brown and very dark brown (10YR6/3, 2/2 moist and dry) loamy sand, 0vfsg, loose, nonsticky, nonplastic, fine roots common, diffuse, broken boundary.

II: (.15-.43) black (10YR2/1 moist) sandy loam (10YR2/2 dry), 0vfsg, loose, nonsticky, nonplastic, few coarse roots, clear, smooth boundary.

III: (.43-.55) very dark brown (10YR2/2 moist) gravelly silt loam (10YR4/3 dry), 1fsg/cr, soft, very friable, nonsticky, nonplastic, grades into aa flow.

Figure 4.48 Site 5708 Feature 3, Test Unit 1 Profile

SITE 5708 Feature 3

TU-1	I-1		I-2		II-1		II-2		III-1		Total	
Depth	0/.08-.15		.15-.20/.23		.20/.23-.30		.30-.40/.43		.40-.43/.55			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae	1	2.40	2	1.10	4	1.80	3	6.40			10	11.70
Cypraeidae	104	83.10	40	33.40	45	54.60	31	22.80	6	1.20	226	195.10
Euplica turturina	1	0.40	1	0.30							2	0.70
Litorina pintado	1	0.10	3	1.40							4	1.50
Nerita picea	324	108.30	209	59.80	78	23.20	38	10.60	1	0.2	650	202.10
Patellidae	96	40.80	55	21.40	44	8.60	37	8.40			232	79.20
Planaxis labiosa	3	0.10									3	0.10
Thaididae			1	0.20	3	10.60	8	13.40	1	0.3	13	24.50
Drupa morum	1	3.70			2	5.20					3	8.90
Drupa rubusidaeus	2	2.80									2	2.80
Morula granulata	1	1.30									1	1.30
Neothais harpa					1	0.50					1	0.50
Unidentifiable	2	0.35					1	0.40			3	0.75
Bivalves			1	0.20							1	0.20
Isognominidae	2	0.40	3	0.20			1	0.30	1	0.20	7	1.10
Echinoidea												
Mouth			1	0.30							1	0.30
Spine	2	0.40	3	0.50	6	1.20	8	3.25			19	5.35
Shell	3	0.40	30	1.80	1	0.20	2	1.50			36	3.90
Crustacea					2	0.60					2	0.60
Total Shellfish	**543**	**242.85**	**349**	**120.60**	**106**	**106.50**	**129**	**67.05**	**9**	**1.90**	**1216**	**540.60**
Vertebrates												
Fish	7	0.50	11	1.30	9	1.80	4	0.10			31	3.70
Fowl			7	1.00	2	0.30	6	0.90			15	2.20
Fowl-eggshell	3	0.10	2	0.10	7	0.25	12	0.50	1	0.10	25	1.06
Indet. Mammal	6	1.60									6	1.60
Small Mammal	2	1.20									2	1.20
Med. Mammal	30	10.10	42	12.50	49	18.00	42	13.30			163	53.90
Lg. Mammal	36	107.00	35	72.30	12	11.20	27	122.60	2	4.90	112	318.00
Total Vertebrates	**84**	**120.50**	**97**	**87.10**	**79**	**31.55**	**91**	**137.40**	**3**	**5.00**	**354**	**381.66**
Coral												
Burned	3	2.30									3	2.30
Waterworn	8	40.00	7	7.30	7	10.50	3	0.80			25	58.60
Weathered Frags.	6	37.20			6	8.00	8	6.80			20	52.00
Other												
Charcoal	15	7.50		47.20		32.60		39.80		2.00		129.10
Kukui Nut - unburned	1	0.40									1	0.40
Waterworn basalt	224	1170.40	72	240.00	68	182.00	40	127.00	7	33.50	411	1752.90
Waterworn shell	4	1.60	5	4.80	8	17.40	9	7.10			26	30.90
TOTAL	**892**	**1622.75**	**530**	**507.00**	**274**	**388.55**	**280**	**385.95**	**19**	**42.40**	**2056**	**2948.48**

Table 4.15 Midden and Portable Materials, Site 5708 Feature 3

Site 5709

Site 5709 was recorded in 2001 and was identified as a set of two parallel wall features that "..have been bulldozed such that the original length of these walls (*sic*) segments is inconclusive" (Rotunno-Hazuka et al. 2005:41). The area of Site 5709 was re-examined and four additional stone features were identified along a bulldozed swale that had apparently been constructed as part of drainage improvements for Makena-Keone'ō'io Road. The path of the swale is shown in Figure 2.3. The two wall segments originally identified as Site 5709 are situated along opposite banks of the swale, which is 4.6 to 5.0 meters wide at this feature, which has been designated as Feature 1 (*Figure 4.49*). Two linear rock piles are situated along the east side of the swale and were found to be bulldozer tailings. One oval mound situated above and to the west of the swale may predate the swale construction. It is described here as Feature 2.

Feature 1 represents the remnants of some type of stone construction that was directly impacted by machinery (*Photo 4.36*). The two wall-like features are possibly remnants of a larger structure that was cut through the center, pushing boulders and cobbles to both sides in a linear formation. Presently, the western formation is 9.6 meters long, 0.60 to 1.10 meter wide, and 0.3 to 0.55 meter high. The eastern formation is 8.5 meters long, 0.7 to 1.2 meters wide, and 0.35 to 0.40 meter high. The remnants of a wire fence line and downed fencepost are present in the swale at the north edge of Feature 1. This fence line is part of Site 5797, which runs E-W from across Parcel 37. The wire and post fence runs along the entire length of Site 5797, and portions of the fence line are defined by stone walls. It is possible that a stone wall was present in this area of Site 5797 and was pushed aside as the swale was cut. Remnants of a wall are present along the fence line to the northeast of the eastern formation. Portable remains observed on the surface include broken clear bottle glass.

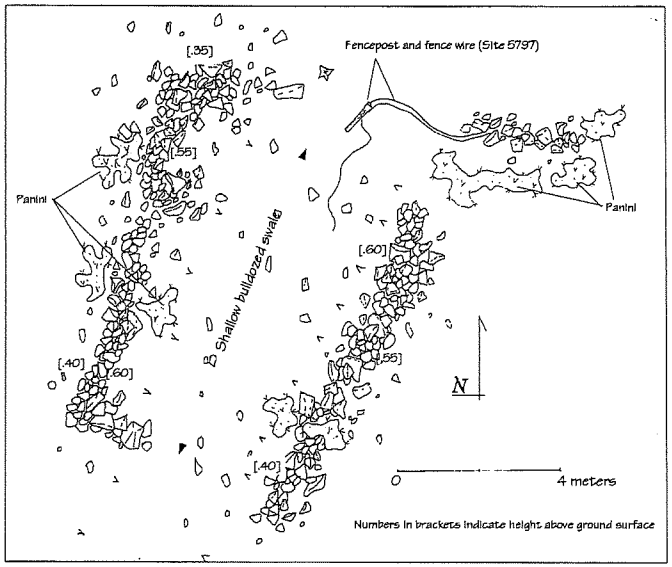


Figure 4.49 Scaled Plan Map, Site 5709 Feature 1

Site 5709 Feature 2

This newly identified oval stone mound is located 42.0 meters south from Feature 1 and 3.0 meters south from the east bank of the bulldozed drainage swale that bisects Feature 1. This mound appears to have been constructed by hand; however, it is within the area that was impacted by the swale construction. A linear stone mound that is an obvious bulldozer tailing is 16.0 meters to the northeast, at the same elevation contour.

Feature 2 is situated on a low bedrock knoll and is surrounded by generally rocky terrain with little to no soil accumulation indicated. It was constructed from loosely stacked and piled boulders and cobbles, with no formal perimeter definition or facing (*Figure 4.50*). The mound is 3.2 meter NE-SW by 2.1 meters NW-SE and has a maximum height of 0.46 meter in the center, where it is a maximum of three courses high. The sides of the mound show one to two courses of boulders or cobbles. There is no indication of soil or subsurface deposits beneath the mound. No portable remains or artifacts were observed on the surface near this feature.

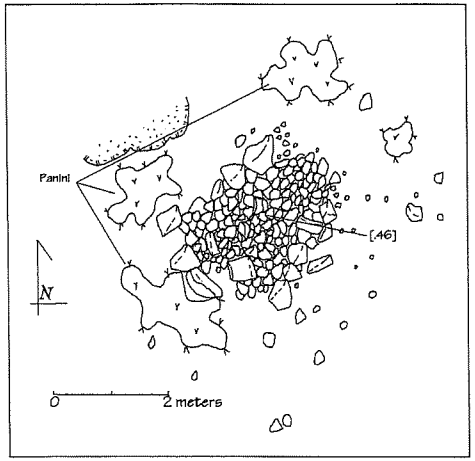


Figure 4.50 Scaled Plan Map, Site 5709 Feature 2

A general functional interpretation would be that Feature 2 is the byproduct of land clearing. In this case, the clearing could have been in connection with ranching or the drainage swale construction. Agricultural clearing is less likely for this location, due to the paucity of soil in the area of the mound, and the absence of other agricultural clearing mounds.

Age is likely to be either historic, if associated with ranching; or modern, if associated with swale construction. It is not likely that subsurface testing will result in new information; the natural bedrock surface is visible beneath the mound.

Site 5710

This site number was originally assigned to the Site 2272 Feature 1 wall (Rotunno-Hazuka et al. 2005). During the current survey, the number was re-assigned to an agricultural complex located within the Parcel 37 gulch (*Figure 4.1*). This complex is comprised of 13 features, all of which are newly-identified. The overall area of Site 5710 is 91.0 meters NE-SW by 64.0 meters NW-SE. Much of the site area consists of relatively steep gulch slopes (*Figure 4.1*).

Feature 1 is a stone-filled terrace located along the top of the south-facing gulch bank, 13.0 meters east from the north end of Feature 2. It is constructed along a narrow natural flat area formed by exposed bedrock (*Figure 4.51*). The upper (north) side of the terrace is a natural vertical face, against which small to large cobbles were collected. The western end of the cobble area exhibits a U-shaped clearing with exposed soil. Overall length of the filled area is 13.0 meters NW-SE by 1.0 to 3.0 meters. The clearing is 2.0 meters NE-SW by 1.4 meters. The vertical face along the uphill side of the terrace is 1.0 meters high at the east end and 0.40 meter high at the west end. The surface of the filled area drops off 0.50-0.80 meter along the downhill side.

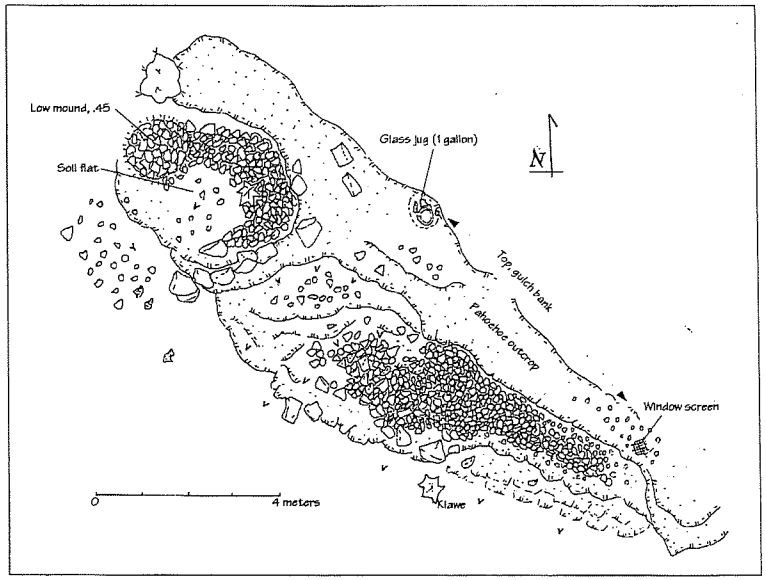


Figure 4.51 Scaled Plan Map, Site 5710 Feature 1

Three weathered coral fragments were observed on the surface immediately downslope from the cleared soil area. Other artifacts found on the surface include a broken clear glass jar along the uphill side, a piece of metal window screen at the east end of the terrace, and a piece of saw-cut wood near the broken jar. These latter items probably represent limited use of the area by modern planters.

Site 5710 Feature 2 is a field road that crosses the gulch in a generally N-S direction (*Photo 4.37*). The south end of the road is discernible at the Site 5707 area, where evidence of bulldozing is apparent. The north end is apparent at the upper edge of the gulch, where it connects with a larger bulldozed area along the top of the gulch bank. The section of the road that has associated stone piles and tailings in the gulch is 66.0 meters long and has a surface width of 2.0 to 2.6 meters. Average width of the trail from the outer edges of pushed rubble is 4.2 meters. The edges are defined by loosely piled boulders and cobbles which have been pushed to the sides by machinery. The road is slightly elevated (filled) across the lowest points in the gulch, and indications of bulldozing outside the road corridor are present in this area (*Figure 4. 52*). The surface is currently eroded, as is it being rather intensively used by deer. The overall structure of the road suggests that it was cut by a relatively small dozer, rather than the type commonly used for modern mass grading projects such as the golf course. It is therefore possible that this feature was built by the ranch and could be over 50 years in age.

Site 5710 Feature 3 is located along the upper slope, at the eastern end of the gulch, 2.0 meters south from the Site 5797 fence line. It consists of a small enclosure that was formed by construction of a curved wall against a bedrock face and shallow overhang (*Figure 4. 53, Photo 4.38*). The wall has an overall length of 4.8 meters and it encloses an area 1.6 meters in diameter, with the eastern 0.35 meters located beneath a 0.85 meter-high overhang. The wall averages 0.45 meter wide and height ranges from 0.10 to

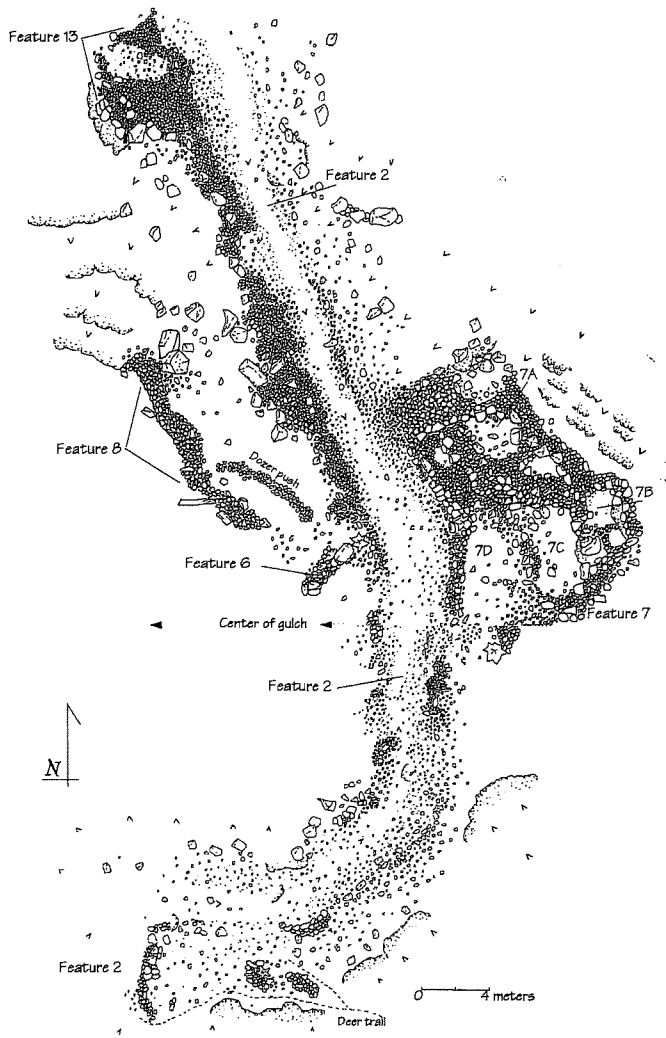


Figure 4.52 Scaled Plan Map, Site 5710 Features 2, 6-8, and 13

0.55 meter. Construction is simple stacking, with subangular boulders and cobbles stacked one to three courses high and one to two stones wide. The interior area is level and has a soil surface. A rusted tin can was observed on the surface inside the wall, and two broken clear glass gallon jugs are present just outside the wall to the west.

A 1.0 by 1.0 meter test unit was excavated inside the enclosure in order to better determine its age and function. One thin soil layer was present, which extended to a varied depth of 0.06 to 0.09 meters below surface. This soil was dark brown (10YR3/3) loam with organic duff and rootlets, over the solid bedrock surface. Artifacts recovered during testing include 156 pieces of a single tin can (3 lb coffee can) that were scattered on the surface and in Layer I soil. Other portable materials include a single *Nerita picea* shell, one unidentifiable shell, two waterworn coral pebbles and one tiny piece (0.15 gram) of weathered coral.

The artifacts associated with Feature 3 indicate its use during the modern era, most likely for specialized planting. The wall construction and condition is such that it too could be modern. The portable remains were probably present in the soil prior to the construction of the wall. The soil may well have been imported to this location, as it does not conform with the naturally occurring Layer II stony silty clay loam that generally overlies bedrock in this area. A possible source is the bag of potting soil at Feature 4.

Site 5710 Feature 4

This soil-filled terrace is located 7.0 meters north from Feature 3, at the same elevation contour along the upper slope of the gulch. The terrace is defined along the eastern (upslope) side by the vertical face of an exposed bedrock ledge. The west side is defined by a modified bedrock ledge that forms a retaining wall for the soil. Overall area of the terrace is 6.0 meters N-S by 3.2 meters E-W; the level soil deposit is 4.0 meters N-S by 2.0 meters E-W. The constructed portion of the retaining wall is 6.0 meters long (N-S) and 0.8 to 1.5 meters wide. The interior side of the wall is 0.15 meter high to level with the terrace surface; the exterior side is 0.90 to 1.30 meters high. A large plastic bag containing potting soil is located on the soil flat, inside the retaining wall.

A 0.5 by 0.5 meter shovel test was excavated in the soil deposit of Feature 4 in order to better determine age and function (*Figure 4.53*). Two soil layers were encountered - Layer I consisted of dark brown (moist and dry) silty loam with few stones, and Layer II consisted of dark yellowish brown (dry) silty clay loam over solid bedrock. Two levels were excavated in Layer I, which extended to 0.18 meter below surface. One *Patellidae* shell fragment was found in Layer I-2, and charcoal fragments were found in both levels (*Table 4. 16*). No portable remains were found in Layer II, which was 0.10 meter thick.

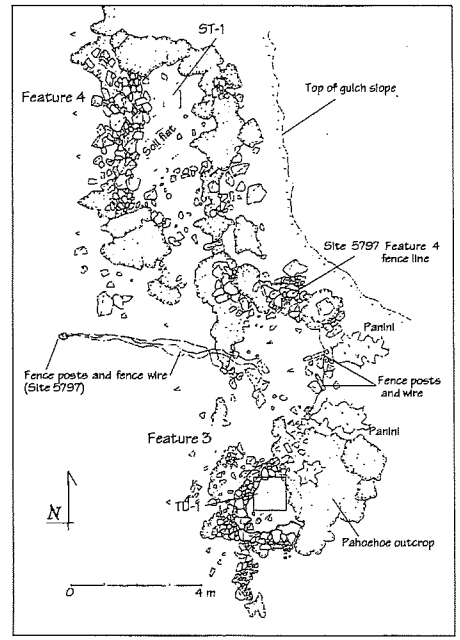


Figure 4.53 Scaled Plan Map, Site 5710 Features 3 and 4

The soil deposit at Feature 4 appeared to have developed *in situ*, and although evidence of use during the modern era is apparent, there is no overwhelming indication that this terrace was recently constructed. It may therefore represent a case of reuse.

SITE 5710 Feature 4				
ST-1	I-1		I-2	
Depth	0-.10		.10-.18	
Gastropods	Cnt.	Wt.	Cnt.	Wt.
Patellidae			1	1.90
Other				
Charcoal	16	1.80	48	3.00
TOTAL	16	1.80	49	4.90

Table 4.16 Portable material, Site 5710 Feature 4, Shovel Test 1

Site 5710 Feature 5

Feature 5 is located roughly midway along the southeastern slope of the gulch, downhill from Features 3 and 4, and 2.0 meters south of the Site 5797 fence line and a stone wall section. Two soil terraces (5A and 5B) with stone retaining walls are present at this location (*Figure 4. 54*). **Feature 5A** is located just upslope from Feature 5B. It consists of a terrace wall constructed from stacked basalt cobbles and boulders that incorporates an existing natural bedrock step. The wall is 5.2 meters long, oriented NE-SW, and 1.8 meters wide. Two to three courses of stones are stacked to a maximum height of 1.10 meter along the downhill side of the wall, and 0.15 meter along the uphill side. A level soil area is present behind the wall on the uphill side; it is 3.8 meters long and has a maximum width of 2.0 meters. No portable remains were observed on or near this terrace.

Feature 5B is located 1.6 to 3.0 meters west of 5A, downslope. It is a soil terrace with a stone-retaining wall along one (west) side. The wall is 5.2 meters long by 0.65 to 1.0 meter wide. Height along the downslope side is 0.50 to 0.70 meters, and along the uphill side is 0.15 to 0.30 meter. The wall is constructed from two to three courses angular boulders and cobbles, with smaller cobbles along the top of the wall. No portable remains were observed on or near this terrace.

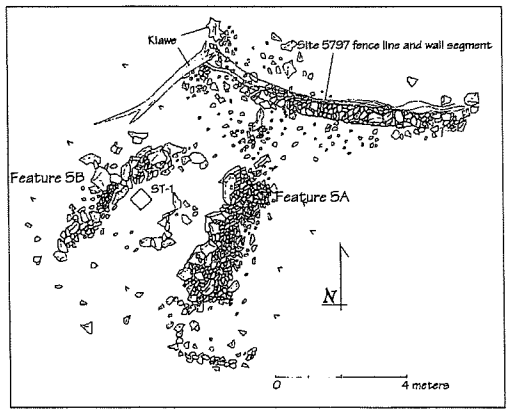


Figure 4.54 Scaled Plan Map, Site 5710 Feature 5

A 0.50 by 0.50 meter shovel test was excavated in the soil at Feature 5B. One layer of dark brown (10YR3/3) silty loam was encountered to a depth of 0.15 meter. No portable remains were recovered from the screened soil. Layer I rested on solid bedrock, and the shovel test was terminated at 0.15 meter below surface.

Both of the terraces at Feature 5 are agricultural in function. No clear evidence indicating age was found at the feature, which could represent traditional Hawaiian or more recent specialized planting activities.

Site 5710 Feature 6

This linear mound feature is located in the center of the gulch, adjacent to the west side of the Feature 2 trail (*Figure 4.52, Photo 4.39*). It is constructed against a bedrock boulder and consists of loosely stacked subangular boulders and cobbles. The perimeters of the mound are informal, and there are no indication of former faced sides. It is oriented NE-SW and is 3.5 meter long by 1.0 meter wide. Maximum height in the center is 0.88 meter. A large *kiawe* tree is located at the eastern end of the mound and has somewhat affected its general configuration. Evidence of bulldozer activity is apparent to the east (Feature 2) and to the north of the mound, where a linear tailing formation occurs. It is uncertain whether Feature 6 was affected by machinery; however, given its location, it is likely that it was affected.

An isolated weathered coral cobble is present 1.0 meter south of the mound; no additional portable remains were observed on the surface.

Feature 6 is probably associated functionally with Feature 7, located immediately across the Feature 2 trail/road. The road may have removed additional features that were located between these two areas. General function of Features 6 and 7 is agricultural, most likely traditional Hawaiian.

Site 5710 Feature 7

Feature 7 is an area of modified bedrock outcrops and small clearings located in the center of the gulch, adjacent to the east side of Feature 2 (*Figure 4.52, Photo 4.40*). Three informal terraces are stair-stepped from north to south, and each has a small cleared planting area. Overall area of the feature is 16.0 meters NW-SE by 10.0 meters.

Feature 7A, the uppermost terrace, is primarily a natural ledge that has been modified along the front with aligned to stacked boulders. The northwestern end of the terrace abuts the Feature 2 trail and was probably impacted during trail construction. It is presently in poor condition and much of the front retaining wall has collapsed. Exterior dimensions are 6.2 meters NW-SE by 4.2 meters. The interior area is 5.0 by 2.0 meter. Maximum height of the front face is currently 0.45 meter, with an average of 0.25 meter. Much of the stone material on this terrace is naturally fractured bedrock. The soil clearing is situated against the back, which is formed by a bedrock ledge averaging 0.50 meter high. The clearing is roughly circular, at 2.0 to 1.8 meters in diameter. No portable remains were observed on this terrace.

Feature 7B is adjacent to the south end of Feature 7A, with the front facing west. It is of similar construction, with informal modification of existing bedrock formations. The overall terrace area is 4.3 meters N-S by 3.0 meters E-W, and the interior area is 4.0 meters by 1.0 meter. The soil clearing in the center of the terrace is 2.0 meters N-S by 1.0 meter. The front face consists of a single course of small boulders and has a maximum height of 0.37 meters. This terrace is also in a collapsed state, and no portable remains were observed on the surface.

Feature 7C is immediately downslope and adjacent to the west side of Feature 7B. It is a poorly defined soil clearing on a natural bedrock ledge that is defined by cleared stones that are informally placed along the edges. The southern edge is defined by a natural bedrock formation. Overall area is 5.5 meters N-S by 3.0 meters E-W, and the interior is 4.0 by 2.0 meters. The front is presently collapsed and is currently one course high, with an average of 0.35 meter. No portable remains were observed on the surface of this terrace.

Feature 7D is immediately downslope and adjacent to the west side of Feature 7C. It also abuts the south side of Feature 7A, which forms the upslope perimeter of this terrace. The western edge of Feature 7D was impacted by the Feature 2 trail, and the edge of the trail currently defines the west side of this terrace. Overall area is 10.0 meters N-S by 3.8 meters E-W, and the interior area is 8.5 meters N-S by 1.5-2.0 meters. The south side of this terrace is very ill defined, and it was probably also impacted by the trail. No portable remains were observed on the surface.

All of the terraces at Feature 7 are in poor condition, suggesting that they are not of recent construction.

Site 5710 Feature 8

Feature 8 is a disturbed and poorly-preserved wall located along the lower north slope of the gulch, 4.0 to 5.0 meters west from the Feature 2 trail (*Figure 4. 52*). Overall length of the wall is 10.0 meters NW-SE, and the undisturbed portion at the north end is 3.5 meters long. Apparently, this wall once functioned as a terrace face; the undisturbed portion is 1.0 meter wide and it retains an area of stone fill 2.0 meters wide on the east (uphill) side. The base course of the wall at the north end is on a bedrock outcrop, where it is three courses (0.50 meter) high. A soil clearing is present to the north and west, which was probably the source area for the stone fill behind the wall.

Large boulders that were pushed from the trail corridor are adjacent to the north end of the wall, and a linear bulldozer tailing pile is parallel to the south portion. The south end of the disturbed wall section is 3.2 meters north from Feature 6, and the area between the two features is scattered with loose surface cobbles.

The original configuration of this wall is indeterminate, although it may have followed an alignment similar to its current position. No portable materials were observed on or near the feature. General function is believed to be agricultural, and it is most likely a traditional Hawaiian construction.

Site 5710 Feature 9

The Feature 9 area encompasses three small mounds and two informal terraces. It is located along the lower south slope of the gulch, adjacent to the north side of the Feature 2 road (*Figure 4.55, Photo 4.41*). Overall area of the feature is 14.0 meters E-W by 7.0 meters N-S. The components of this feature are in poor preservation and have been impacted by road construction, cattle, and deer.

Feature 9A is a stone mound located at the western end of the Feature 9 area. The mound is of loose construction and is situated on an exposed bedrock surface. It is comprised of small to large cobbles and pebbles, with no formal perimeter edges of faced sides. It measures 2.5 meters E-W by 1.1 meter and has a maximum height of 0.56 meter. No portable remains were observed on or around this mound.

Feature 9B is a terrace located at the eastern end of the feature area, adjacent to the Feature 2 trail. The front face of the terrace is constructed with aligned large cobbles and the back is defined by an exposed bedrock outcrop. The western half of the terrace was impacted by bulldozing during construction of Feature 2. Currently it is 4.1 meters E-W by 2.2 meters N-S overall, with an interior area of 2.8 by 1.1 meters. Maximum height along the front is 0.77 meter, with an average height of 0.45 meter. No soil clearing is present at this time; much of the stones inside the terrace appear to have been disturbed.

Feature 9C is a small stone mound located 1.0 meter downslope from Feature 9A. It is similar in construction to Feature 9A, with small to medium cobbles and pebbles informally piled on an exposed rock surface. The mound measures 1.6 meters E-W by 0.90 meter N-S and has a maximum height of 0.70 meter in the center. The south side is supported by a bedrock face. No portable remains were observed in the area of this mound.

Feature 9D is a small linear mound located 2.0 meters west of Feature 9C and slightly uphill. It is loosely constructed from cobbles and pebbles, and sits on an expose rock surface. It measures 1.5 meters E-W by 0.60 meter N-S and has a maximum height of 0.39 meter. Most of the mound is in a collapsed state and it appears to have been impacted by deer traffic. No portable remains were observed in the immediate area.

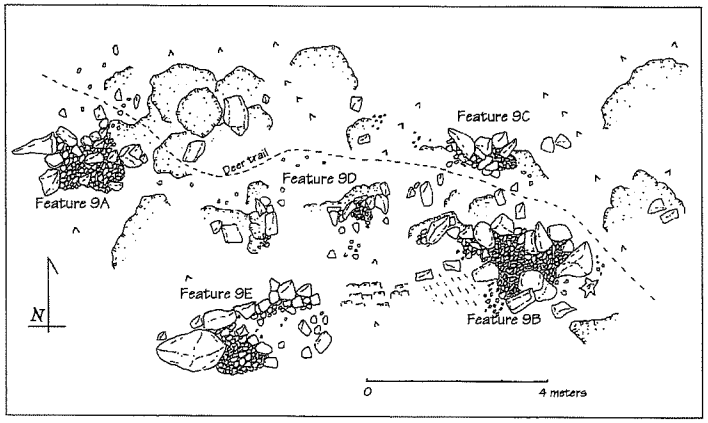


Figure 4.55 Scaled Plan Map, Site 5710 Feature 9

Feature 9E is an informal terrace located 1.6 meter south uphill from Feature 9D. It is defined by an alignment of small boulders along the front and an exposed bedrock face along the back. The surface of the terrace is generally cleared of stones, which have been concentrated to the west side of the clearing. Overall area is 2.6 meters E-W by 1.6 meters, and the interior area is 2.0 by 1.1 meter. The front facing is 0.55 to 0.40 meters high along the outside of the alignment. No portable remains were observed on or around this terrace.

Site 5710 Feature 10

Feature 10 is located at the top of the gulch along the back (east-facing) side, 11.0 meters upslope from Feature 3. It consists of a small cupboard, a terrace and a mound, within an overall area of 10.0 meters NE-SW by 4.0 meters (*Figure 4.56, Photo 4.42*).

Feature 10A, a small cupboard, is located at the eastern end of the feature area. It consists of a natural opening in a 1.5 meter-high bedrock face across which cobbles have been stacked two courses high to form a closed *puka*. The stacked cobbles are 0.37 meter high and 0.55 meter wide. The resulting cupboard is 0.60 meter square and 0.56 meter deep. A shallow soil deposit is present inside the cupboard, which is in relatively good condition. No portable materials were observed in or around the cupboard.

Feature 10B is a terrace constructed against the vertical face of an exposed bedrock outcrop. The front of the terrace is defined by aligned and stacked boulders and cobbles; it is 6.5 meter E/W by 1.3 meter wide, and the front has a maximum height of 0.56 meter, with an average of 0.35 meter. The front of the terrace is partially toppled, and no portable remains were observed on or around the feature.

Feature 10C is a small stone mound located at the eastern end of the Feature 10B terrace. The mound consists of various-sized cobbles that were informally set on and around naturally occurring bedrock boulders; it is 1.3 by 1.0 meter at the base and has a maximum height of 0.70 meter. It is probably associated with clearing and construction of the terrace.

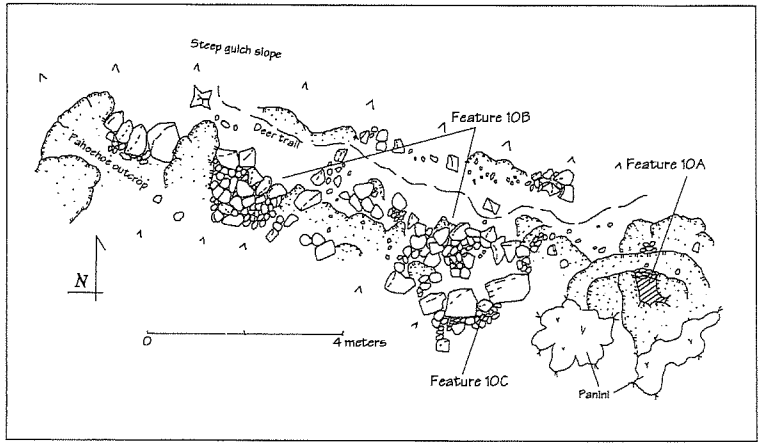


Figure 4.56 Scaled Plan Map, Site 5710, Feature 10

Site 5710 Features 11 and 12

Features 11 and 12 are located along the lower south slope of the gulch, within 8.0 meters of the edge of graded golf course area. Feature 11 is closest to the golf course and has probably been affected by bulldozing. A discernible bulldozer path runs downslope adjacent to Feature 11B (*Figure 4.57*).

Feature 11A is a low stone filled terrace formed by modification of an existing bedrock formation. The front of the terrace is defined by an alignment of large cobbles and the surface is filled with small pebbles. The front alignment faces north and has an average height of 0.40 meters. The terrace is 4.2 meters E-W by 1.5 meter wide overall, with an interior area of 3.5 by 1.0 meters. One waterworn coral cobble is present on the terrace, at the western end. This feature has been impacted by deer traffic; a well-worn trail crosses over the west and south sides (*Photo 4.43*).

Feature 11B is a stone mound located 1.2 meters west from Feature 11A. The mound is informal in construction, with medium to small cobbles loosely placed on an exposed bedrock surface. It measures 2.7 meters E-W by 1.0 meter N-S and has a maximum height of 0.64 meter in the center. Most of the mound is only two coursed high. No portable materials were observed on or near the mound.

Feature 12A is a stone-filled terrace located 6.0 meters north and downslope from Feature 11A. It is formed by modification of a natural outcrop ledge with a front retaining alignment of boulders and large cobbles. Small cobbles and pebbles were placed behind the retaining wall, resulting in a level filled surface. The terrace is 8.5 meters NW-SE by 2.2 meters, with an interior area of 6.5 by 1.2 meters. Maximum height along the outside (north side) of the aligned retaining wall is 0.47 meters. The terrace has been impacted by deer traffic; no portable remains were identified on the surface (*Photo 4.44*).

Feature 12 B is a small terrace located immediately south and upslope from Feature 12 A. It was formed by construction of a boulder alignment across a natural dip, and placement of cobble fill behind the alignment. No exposed bedrock surface were used or modified for this particular terrace. It is 3.0 meters E-W by 1.0 meter N-S, with an interior area of 2.2 by 0.60 meters. The front of the retaining alignment is 0.56 meter high on the north side. The feature is in a generally eroded state, and no portable remains were observed on the surface.

Site 5710 Feature 13

This soil and stone terrace is located along the upper north slope of the gulch, adjacent to the north end of the Feature 2 trail (*Figure 4.52, Photo 4.45*). It is a mostly natural formation that has been augmented by the re-arrangement of stones to expose a soil flat. The terrace is 6.3 meter N-S by 5.0 meters N-S; the interior soil area is 3.0 meters N-S by 2.0 meters E-W. A single piece of branch coral was observed outside the terrace to the north. This item may be associated with Site 5711 Feature 1, located nearby. The soil deposit was probed and found to by quite shallow.

In summary, the Site 5710 complex is viewed as an agricultural area that encompasses most of the gulch within Parcel 37. It is likely that additional terraces and clearing mounds were once present along the slopes of the gulch.

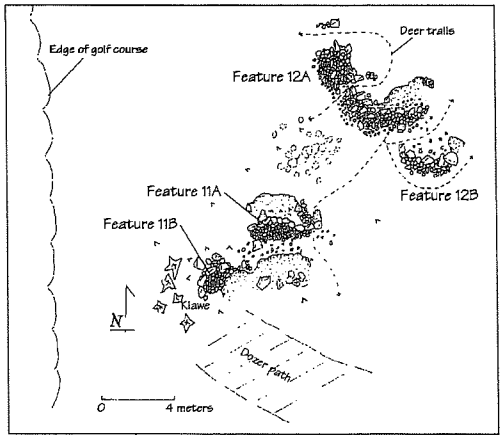


Figure 4.57 Scaled Plan Map, Site 5710 Features 11 and 12

Recent impacts from machinery and animals are evident at many of the identified features and have no doubt caused the removal of others. The historic/modern road that was cut by machines across the gulch probably caused the most impacts to the complex. This road post-dates the features in the gulch, as they show evidence of post-abandonment alteration caused by the machinery. Three of the agricultural features (1, 3, and 4) have portable remains indicative of use during modern times; however, only one of these has formal attributes suggestive of recent construction. All other agricultural features appear to be traditional and may be contemporaneous with the terraces or the Feature 4 enclosure at Site 5711.

Site 5711

Site 5711 was recorded in 2001 as a single feature consisting of a rectangular platform or a badly disturbed enclosure (Rotunno-Hazuka et al. 2005: 41). The structure was mapped and interpreted as a possible fishing shrine or *ko'a*, based on the presence of branch coral and the shape of the structure. The site was recommended for preservation.

The Site 5711 structure was easily relocated during the current survey using project area maps, and due to the unique aspects of the platform. This structure was designated as Feature 1, and seven additional features were identified in proximity to the platform that were added to the complex. The overall site area is 58.0 meters N-S by 27.5 meters E-W. The complex encompasses the west-facing slope along the north side of the gulch, and the center of the gulch at the west edge of the project area (*Figure 4.1*). Much of the site area was essentially buried beneath fallen *kiawe* trees and branches, and was only accessible for recording after extensive clearing with chain-saws.

Site 5711 Feature 1

Feature 1 was remapped and re-measured during the current survey, after it was cleared of large *kiawe* branches. The structure was found to be a partially enclosed platform situated on the top and upper west-facing slope of the gulch. The platform is currently somewhat D-shaped in plan, and may have been rectangular prior to erosion and wall-fall. It is constructed from weathered basalt boulders and cobbles, with some large coral cobbles incorporated (*Figure 4.57, Photo 4.46*). It is formally faced and raised on all sides, with the wall heights varied according to the slope of the land. The surface area is 6.0 meters N-S by 5.5 meters E-W. Wall heights are 0.70 to 0.80 meter along the east side, which is at the top of the slope. The north and south sides range from 0.75 to 1.05 meters in height along the slope, and the west wall is 1.70 meters high from ground surface in front of the platform. The corners along the west wall and the western portion of the platform are in a partially collapsed state, as are other sections along the outer walls of the platform. The top of the platform (where intact) is level and paved with smaller cobbles and pebbles.

Remnants of an enclosure wall are present on top of the platform, along the north , east and south sides. The wall is broken down along the north side and along a portion of the south side. It is currently 0.30 to 0.55 meter high and 1.60 meters wide. An area 1.5 by 1.0 meters inside the wall has a noticeable concentration of *ala* pavement pebbles and branch coral.

At least 14 pieces of unweathered branch coral were observed on the surface of the platform, and additional pieces were seen mixed with collapsed stones from wall fall. Branch coral (3-4 pieces) was also found on the ground surface to the south and west of the platform. This area has been subjected to surface erosion due to the presence of a deer trail.

A small terrace alignment is present along the slope, 1.0 to 2.0 meters from the southeast corner of the platform. The alignment abuts existing bedrock outcrops and apparently served to help stabilize the slope around the platform base. It is 2.2 meters long and 0.25 to 0.50 meter high along the downslope side. Three large terraces (Features 2, 3 and 5) are located c. 15.0 meters to the west of the platform, and a fifth terrace (Feature 6) is located downslope from the platform, 7.3 meters west from the western wall. These nearby terraces all show surface scatters of midden and weathered coral, and are believed to be functionally and temporally related to the platform.

Current findings and background research confirm the prior interpretation that Feature 1 is a *ko'a* or *heiau*. The extent of the overall complex associated with this feature suggests that the term *heiau* might be more appropriate.

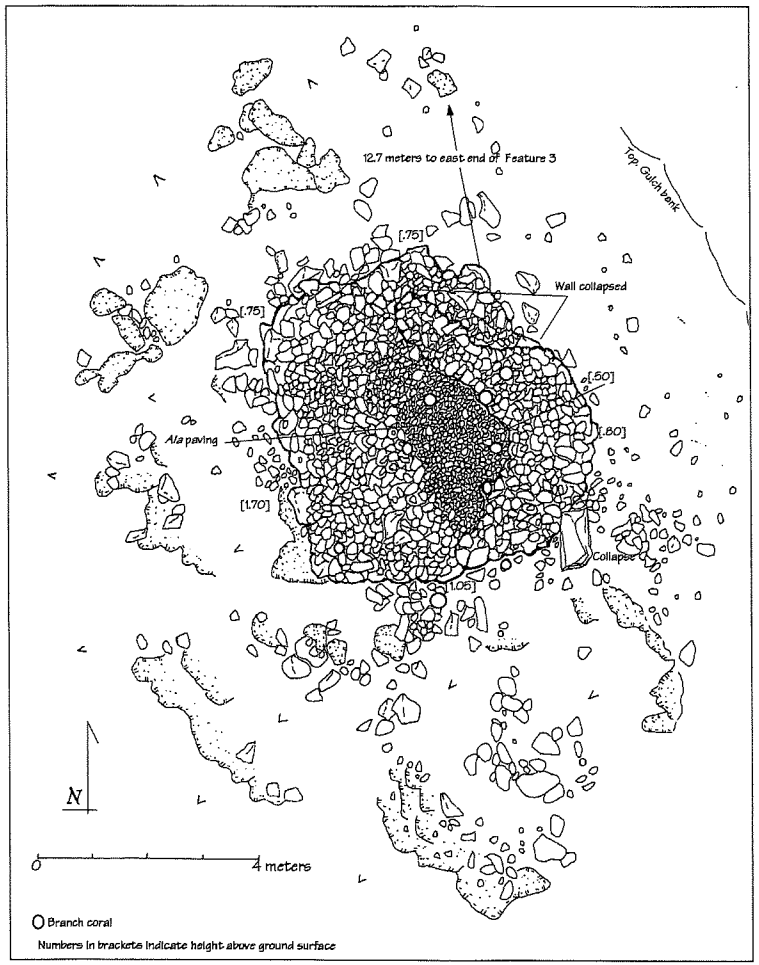


Figure 4. 59 Scaled Plan Map, Site 5711, Feature 1

Site 5711 Feature 2

Feature 2 is located 15.0 meters north from Feature 1 and is the uppermost and smallest of four stepped terraces that follow contours along the west-facing slope of the gulch (*Figure 4.60*). It is constructed with aligned and stacked boulders and large cobbles that augment an exposed natural bedrock ledge. The terrace is oriented NE-SW along the top edge of the gulch. Overall length is 8.0 meters by 1.70 meters wide; the interior area is 7.6 by 1.3 meters. Average height of the front face is currently 0.35 meters. The retaining wall is in poor preservation and many of the set boulders have fallen out of place. Some of the collapse is due to deer traffic up and down the gulch slope. The interior surface of the terrace is relatively level soil with scattered small cobbles. Portable materials observed on the surface of the terrace include two pieces of weathered coral and a *Cypraeidae* shell fragment.

Site 5711 Feature 3

This terrace is located immediately downslope of Feature 2, and is oriented along the contour, parallel to the upper terrace (*Figure 4.59, Photo 4.47*) It is of similar construction, with boulders and large cobbles stacked or aligned along a natural outcrop ledge. The retaining wall for Feature 3 is in slightly better preservation, an has an overall length of 14.2 meters. The terrace is 4.2 meters wide overall , with an interior width of 2.2 meters. The level soil area within the terrace ranges in width from 1.0 to 1.8 meters, and is currently being used as a deer trail. The retaining wall has a maximum height of 1.0 meter, and an average height of 0.60 meter where the face has not collapsed. Portable remains observed on the terrace include a weathered coral fragment and two pieces of *Cypraeidae* shell.

A 1.0 by 1.0 meter test unit was excavated in the soil flat in order to better determine the age and function of this terrace. Two soil layers were encountered, both of which contained cultural materials (*Figure 4. 60*). Layer I extended from the generally bare, eroded surface to a depth of 0.38 meter below surface; it consisted of fine dark brown loam with 30-40% stones by volume.

Four levels were excavated in Layer I, and level 3 (0.20-0.30 meter) showed the highest frequency of midden remains and artifacts (*Table 4.17*). A total of 131 shellfish fragments (97.95 grams) representing six shellfish families and Echinoidea were recovered, along with four fish bones, 2.5 grams of charcoal, weathered coral fragments and four volcanic glass flakes. A total of 219.72 grams of shellfish was recovered form all four levels of Layer I, which translates to a density value of 1.9 grams per liter of screened soil. Other artifacts recovered from Layer I include four volcanic glass flakes from level 2 and one volcanic glass flake from level 1.

Charcoal collected from Layer I-3 and I-4 was combined and submitted to Beta Analytic Laboratories for radiocarbon age determination. The sample (Beta 212867) returned a conventional radiocarbon age of AD 1440+/-60 BP.

TU-1	I-1		I-2		I-3		I-4		II-1		Total	
Depth	0-.10		.10-.20		.20-.30		.30-.38		.38-.48			
Gastropods	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Conidae	4	3.20	2	1.80	5	2.50	3	1.20			14	8.70
Cypraeidae	48	51.15	38	30.00	51	78.60	4	6.95			142	164.70
Litorina Pintado					7	1.10	1	0.15	1	0.35	9	1.60
Lucinidae					1	0.10					1	0.10
Nerita picea	11	0.80	10	0.40	12	1.35	10	1.80	3	0.20	46	4.35
Planaxix labiosa			1	0.01			1	0.10			2	0.11
Terebridae	2	1.50									2	1.50
Thaididae	3	0.50	5	6.00	9	9.60	5	2.50	1	0.40	23	19.00
Drupa rubusidaeus			5	0.60	2	0.60					7	1.20
Neothais harpa	1	0.85	1	1.20							2	2.05
Unidentifiable	23	2.40	31	2.80	27	3.60	7	0.55			88	9.35
Bivalves												
Isognomonidae			1	0.01							1	0.01
Echinoidea												
Mouth					2	0.20	1	0.05			3	0.25
Shell	2	0.20	1	0.10	1	0.30					4	0.60
Spine			18	5.10	14	2.00	1	0.05			33	7.15
Total Shellfish	**95**	**60.40**	**113**	**48.02**	**131**	**97.95**	**33**	**13.35**	**5**	**0.95**	**377**	**220.67**
Vertebrates												
Fish			3	1.00	4	0.95	5	0.80			12	2.75
Large Mammal	1	1.00			1	11.40					2	12.40
Coral												
Weathered Frags.	7	2.10	16	5.70	9	4.00	2	0.50			34	12.30
Other												
Beach Conglom.	2	7.40	1	0.70	2	0.20	1	0.50			6	8.80
Charcoal					55	2.50	32	0.90	5	0.30	92	3.70
Unburned kukui nut			1	4.60	1	1.10						
Waterworn basalt												
Waterworn shell	2	7.80									2	7.80
TOTAL	**107**	**78.70**	**134**	**60.02**	**203**	**118.10**	**73**	**16.05**	**10**	**1.25**	**525**	**268.42**

Table 4.17 Midden and Portable Materials, Site 5711 Feature 3, Test Unit 1

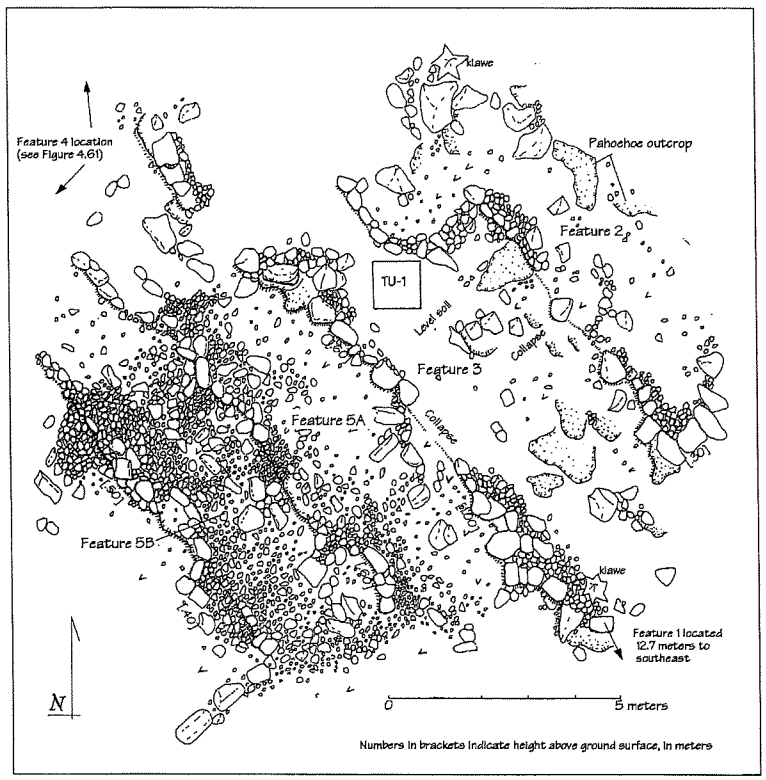
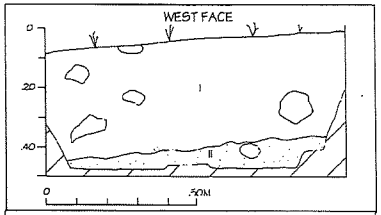


Figure 4.59 Scaled Plan Map, Site 5711 Features 2, 3 and 5

The calibrated calendric range at two sigma is AD 1310 to 1370 and AD 1380 to 1470. The intercept of the calibration curve with the conventional age is AD 1420, and the 1 sigma calibrated range is AD 1400 to 1440. This date suggests that the Site 5711 terraces predate other dated habitation sites in the project area by at least two centuries.

Layer II at Feature 3 consisted of dark yellowish brown (10YR3/4) compact silty clay loam with 60% stones by volume. Decomposing bedrock with sterile soil was encountered at 0.48 meter below surface, and excavation was terminated at the base of a single level. Layer II contained only five shell fragments and a few pieces of charcoal (*Table 4.14*) in the upper portions. This material is assumed to have filtered down from Layer I, as Layer II was essentially sterile.



I: (0-.38) black (10YR2/1 moist) loam (10YR3/1 dry) 1fcr, soft, very friable, nonsticky, nonplastic, fine to coarse roots common, clear, smooth boundary.

II: (.38-.48) dark brown (7.5YR3/2 moist) gravelly silty clay loam (10YR4/6 dry), 2msbk, hard, friable, slightly sticky, slightly plastic.

Figure 4.60 Site 5711 Feature 3, Test Unit 1 Profile

The high midden density at feature 3 is interesting, as this feature was assumed to be agricultural in function, and is too narrow to be considered a habitation area. It is wide enough for short-term, specialized use, possibly of a ceremonial nature.

Site 5711 Feature 4

Feature 4 is located adjacent to the west side of the Feature 2, 3, and 5 terraces, along the same southwest-facing slope of the gulch. It consists of three enclosed terraces that have been directly impacted by grading and filling for the golf course (*Figure 4.61, Photo 4.48*). Overall area of the feature is 18.0 meters NE-SW by 6.0 meters in the center. The intact enclosure wall currently includes a portion of the upper E-W wall, the entire east side, and a portion of the lower wall. It is not possible to estimate the original width (E-W axis) of the enclosure, given current conditions.

The wall defining the east side of the enclosure is constructed from stacked boulders and large cobbles, and incorporates several large *in situ* bedrock boulders. The constructed portions of the wall are bifaced and have an average height of 1.0 meter along the exterior side. The interior sides are lower, due to terrace leveling inside, and range from 0.15 to 0.70 meters. The interior areas of the three terraces are predominantly soil; however, exposed bedrock outcrops are present in some areas, especially in the uppermost terrace.

The upper level terrace (**Feature 4A**) has a current interior area of 5.5 meters N-S by 4.0 meters E-W and exhibits a slightly sloping surface. The retaining wall defining the south side of this terrace is constructed from boulders and cobbles stacked between exposed bedrock faces that are up to 1.10 meter high from the downhill side. The original size and configuration of this upper terrace is indeterminate. Several surface boulders are also present inside this feature; these are from golf course bulldozing activity, although they may have originated from the western walls of the enclosure.

A shovel test consisting of 0.50 by 0.50 meter was excavated at Feature 4A in order to aid in determining function and age. Shovel test (ST) 1 was located on the soil flat where probing indicated the greatest soil depth. The excavation encountered two soil Layers overlying a decomposing bedrock substrate. Layer I occurred from the surface to 0.18 meter below surface. This layer consisted of black silty loam with ash mottling and a relatively large quantity of charcoal (6.3 grams). Also recovered were three pieces of weathered coral and minute traces of marine shell (*Table 4. 18*). Layer II at ST-1 consisted of dark yellowish brown (dry) stony silty clay loam intermixed with decomposing bedrock. This layer was sterile.

Findings of ST-1 at Feature 4A indicated that additional excavation was warranted to better determine the nature of the subsurface ash deposit and to obtain additional charcoal for dating purposes. Test Unit 1, a .50 by 1.5-meter unit, was therefore situated over the area of ST-1, and extended north along the eastern portion of the terrace.

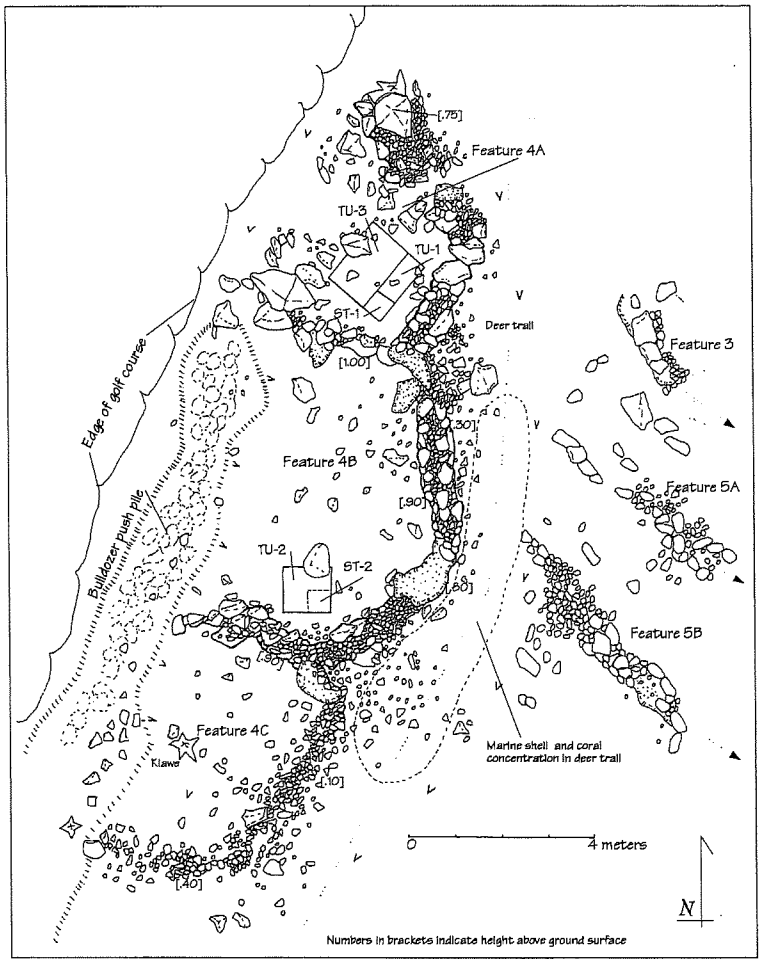


Figure 4.61 Scaled Plan Map, Site 5711 Feature 4

A relatively deep and unstratified cultural deposit was encountered in TU-1. This deposit (Layer I) began at the surface and continued to 0.55 meter below surface. Six excavation levels were screened, and cultural material was found in all levels (*Table 4.19*). Shellfish remains were concentrated in levels 1 and 2, where 508 specimens (322.02 grams) were collected from the 1/4 inch screen. Thirteen shellfish families, as well as *Echinoidea* and *Crustacea* were recovered from these two levels. The remaining levels showed a gradual decrease in shellfish to 20 specimens for level 6.

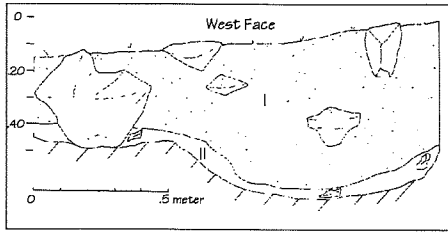
SITE 5711 Feature 4								
ST-1	I-1		ST-2	I-1		Total	
Depth	0-.18			0-.13			
	Cnt	Wt.		Cnt.	Wt.		
Coral							
Weathered frags	3	0.50		27	8.70	30	9.20
Other							
Beach conglom.				3	2.20	3	2.20
Charcoal		6.30			0.50		
TOTAL	3	6.80		30	11.40	33	18.20

Table 4.18 Portable Materials, Site 5711 Feature 4 Shovel Tests 1 and 2

Charcoal densities indicated in ST-1 continued in Test Unit 1, where total of 195.46 grams of charcoal was recovered from the six excavation levels. Charcoal was most dense in level 3, where 60.75 grams were recovered from the 1/4 and 1/8 inch screens. Charcoal from level 3 and the combined charcoal from levels 5 and 6 (47.9 grams) was submitted as two samples to Beta Analytic Laboratory for age determination (Beta-215909 and 215910). The results of the analysis were less than absolute, and indicate likely contamination with modern charcoal. The sample from level 3 (Beta 215909) returned a conventional radiocarbon age of 20-+/-60 BP, and three alternative calibrated calendric ranges: AD 1680 to 1730; AD 1810 to 1930; and AD 1950 to beyond 1960. The sample from levels 5 and 6 (Beta 215910) returned a conventional radiocarbon age of 90+/-70 BP, and three alternative calibrated calendric ranges: AD 1680-1740; AD 1800 to 1930; and AD 1950 to 1950. The similarities between these two samples indicates that they are from essentially the same charcoal deposit. The earliest range for both samples is AD 1680-1740, which is most consistent with the midden and artifact deposit from Feature 4, although it should be noted that no artifacts were recovered from Test Unit 1.

The relatively thick and unstratified nature of the cultural deposit observed in Test Unit 1 suggests that it might be pit fill, or a secondary deposit that was moved into the feature during golf course construction (*Figure 4.62, Photo 4.49*). In the latter case, the materials most likely originated from the western portion of the enclosure, which was destroyed during golf course construction. This would explain the homogenous nature of the soil and the cultural material. A second test unit (TU-3) was excavated adjacent to the west side of TU-1, in order to better determine the nature of the deposit. This unit confirmed that the surface boulders within Feature 4A were deposited by bulldozers. The 1.0 by 1.5-meter unit was not able to define an edge to the subsurface deposit that would indicate pit fill. This finding, together with the rather uncertain dates from charcoal, tend to suggest some type of disturbance or mixing of this deposit.

Feature 4B is the largest of the three enclosed terrace remnants; it is 6.8 meters N-S by 5.0 meters and its retaining wall on the south side is 0.90 meter high along the outside. The surface inside this terrace is mostly soil and is generally level to slightly sloping. A concentration of surface midden was observed in a deer trail along the slope, just outside the eastern perimeter wall of this terrace. The scatter includes *Conidae, Cypraeidae,* and *Patellidae* shell fragments, as well as weathered coral fragments.



I: (0-.55) black (10YR2/1 moist and dry) silty loam, moderate, fine, subangular blocky, slightly hard, friable, slightly sticky, slightly plastic, many five roots, clear, wavy boundary

II: (.55-.65) dark brown (7.5YR3/2 moist) very stony silty clay loam, moderate, medium, subangular blocky, hard, friable, slightly sticky, slightly plastic, fine to coarse roots common, grades to bedrock.

Figure 4.62 Site 5711 Feature 4A, Test Unit 1 Profile

| SITE 5711 Feature 4 | TU-1 | | |

Portable remains observed on both levels of Feature 5 include *Conidae* and *Cypraeidae* shell fragments, and one small waterworn pebble on the upper level. The upper level exhibits a slightly higher concentration of shells, with about ten pieces observed, compared to around five pieces for the lower level.

Site 5711 Feature 6

Feature 6 is a natural outcrop face that has been augmented with boulders and cobbles to form a terrace wall along the lower edge of the gulch slope. It is located 7.3 meters downslope from the southeastern corner of the Feature 1 platform, and approximately 4.0 meters east from Feature 5. This terrace is along the same slope contour as Feature 5 and it is likely that the two sections once connected. The area between the intact wall portions has been impacted by large *kiawe* trees.

Feature 6 has an overall length of 14.0 meters and the constructed portions are 1.0 meter wide. The height of the outcrop face from the west (downhill) side is 1.20 to 1.90 meters along the south portion and 0.7 to 0.80 meter along the north portion. The constructed sections are 0.70 to 0.80 meters high. The surface immediately behind the terrace face is mostly exposed bedrock, with small soil pockets in crevice areas only. A trail of large cobbles and boulders is evident along the slope between the platform and the terrace; these stones originated from the Feature 1 platform.

The largest constructed section of this terrace is at the south end, and is 2.5 meters long. A deer trail defines the south end of this wall, so it is possible that it once extended further south. A narrow soil ledge is present along the slope at the base of the terrace face. Material observed along this trail includes *Cypraeidae* shell fragments, three pieces of weathered coral, and a piece of beach conglomerate sandstone.

Site 5711 Feature 7

Feature 7 is a roughly rectangular cobble pavement and associated terraces located in the center of the gulch, against the south base of the slope, 7.3 meters south and downslope from the Feature 6 terrace (*Figure 4.63, Photo 4.50*). The water flow channel through the gulch forms the north perimeter of the pavement and a bedrock shelf along the lower south slope forms the south perimeter. The east perimeter is defined by a bedrock shelf that has been augmented with cobbles to form two terrace-like retaining walls that are oriented at right angles to form the northeast corner. The terrace that defines the north side of this corner is stepped along the north gulch slope. The west perimeter of the pavement was impacted by machinery, and it is not certain if it was faced or informal. Intact portions of the west perimeter are currently informal and show one to two courses of cobbles or small boulders that were used as fill.

Overall area of Feature 7 is 24.0 meters NW-SE by 11.0 meters NE-SW. The pavement measures 10.0 meters NW-SE by 5.5 to 7.5 meters NE-SW, with the wider section at the west end. Average height is 0.10 to 0.20 meter along the outer edge, which represents a single course of cobbles. The terrace that defines the east side of the pavement is 8.0 meters NE-SW by 1.5 to 2.0 meters wide and 0.20 to 0.30 meters high. It is constructed from stacked cobbles that were set between exposed bedrock boulders. The slope at this location is along the center of the gulch, east to west. The terrace forming the northeastern corner of the pavement is 3.0 meters NW-SE by 0.9 meter wide and 0.40 meter high. A low step 4.0 meter long and 0.25 meter high is present parallel to and just below this terrace, providing further definition to the edge of the pavement.

The southwest corner of the pavement contains a low raised area that shows a uniform paving of small cobbles and pebbles. This area is 4.0 meters square and is the only section of the pavement that exhibits a somewhat formal paved surface. This area is raised 0.20 meter above the surrounding pavement surface.

No portable materials were observed on the pavement surface; one piece of weathered coral was found on the upper level terrace above the northeastern corner of the pavement. A 1.0 by 1.0 meter unit was excavated in the area of formal pavement in order to better determine function and age of the feature. Two stone fill layers were identified over two to three soil layers and a solid but irregular bedrock surface which was encountered at 0.26 to 0.80 meter below surface. The upper stone fill layer was comprised of uniformly-sized large to medium weathered *'a'a* pebbles with a few small cobbles and

recent leaf litter. This layer extended to a maximum depth of 0.20 meter below surface, with an average depth of 0.12 meter. The smaller fill was directly over an irregular surface of larger cobble fill that was consistent with the larger pavement area. This cobble fill was an average of two courses thick, with three courses in some areas. Filtered duff was scattered between the fill stones, however no soil was present (*Figure 4.64*).

A dense basalt hammerstone was located beneath the small pavement stones, on the surface of the cobble fill layer, 0.10 to 0.20 meter below surface. The hammerstone shows evidence of use for a variety of purposes, with pecking, grinding and battering indicated. Its location within the stone fill, beneath the smaller pavement suggests that it was either left at the location of its use prior to the introduction of the smaller pavement; or it was used as fill and is in a secondary context rather than left at the location of use.

Layer 1 was encountered 0.35 to 0.40 meter below surface and was defined by a fairly level old surface duff deposit over a very stony silty loam, 0.10 to 0.18 meter thick. A single waterworn basalt pebble was present on the surface of the soil deposit, and one small *Isognomonidae* shell fragment was found in the

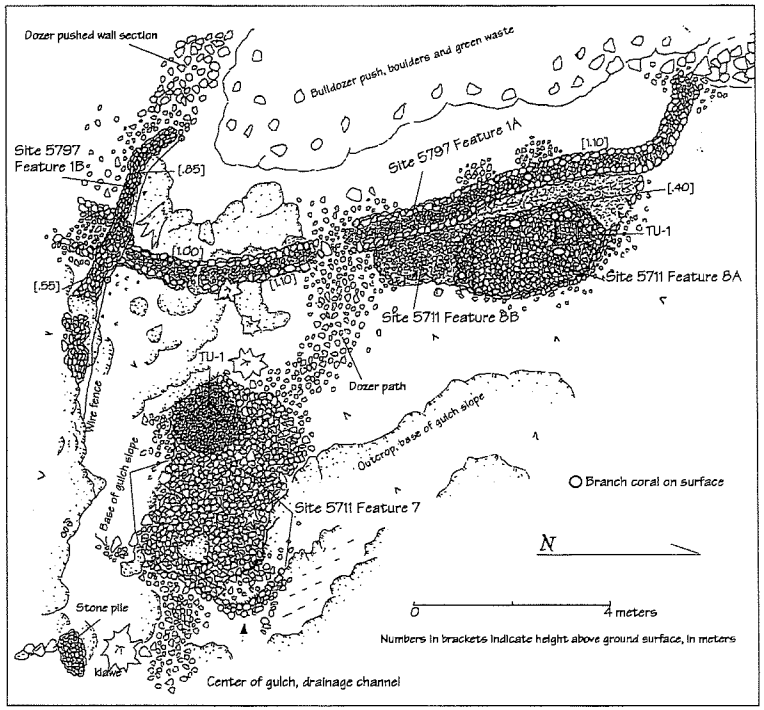


Figure 4.63 Scaled Plan Map, Site 5711 Features 7 and 8, and Site 5797 Feature 1

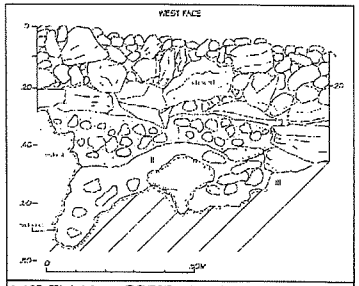


Figure 6.64 Site 5711 Feature 7, Test Unit 1 Profile

duff just below the Layer I surface. No other portable remains were found in screened Layer I soil.

Layer II consisted of dark yellowish brown (dry) silty clay loam subsoil intermixed with decomposing bedrock boulders and cobbles. This layer averaged 0.22 meter thick, with one deeper area that showed evidence of root intrusion. The soil in the root cast was looser and less compact than surrounding Layer II soil, and it contained two small pieces of *Cypraeidea* shell. No other portable remains were recovered from screened Layer II soil. Layer II was situated directly on bedrock throughout most of the test unit; however, pockets of Layer III soil were present beneath movable decomposing bedrock stones. This subsoil consisted of very compact yellowish brown silty clay; less than one liter was recovered for screening and the layer was culturally sterile (*Photo 4.51*).

The absence of a distinct cultural deposit at Feature 7 and the general lack of artifacts suggests that this pavement was not used for general habitation purposes. It is possible that the pavement once formed the base for a soil terrace, which has since washed away; or that it helped channel surface water; or that it had some specialized purpose in connection with the nearby Feature 8.

Site 5711 Feature 8

This feature consists of two stone-filled terraces located in the center of the gulch, 10.0 meters northwest from Feature 7. The west perimeter of the Feature 8 area is defined by the Site 5797 wall, which post-dates this feature (*Figure 4.63*). **Feature 8A** is the larger of the two terraces; it is D-shaped in plan and oriented with the major axis at 6.5 meters N-S by 4.0 meters E-W. It is constructed from subangular basalt boulders and cobbles, and coral boulders, with faced perimeters along the north, west and south sides (*Photo 4.52*). The east side is defined by a natural outcrop ledge that has been augmented with aligned or stacked cobbles and boulders. This edge is 0.50 meter above the terrace surface. The faced sides of the terrace are 0.30 to 0.40 meters high, with two to three courses of stones indicated. The perimeter stones do not exceed the height of the terrace surface. The surface is informally paved with cobble-sized stones and coral cobbles, resulting in an uneven interior area. Several pieces of unweathered branch coral were observed on the surface of the terrace. In addition, relatively large weathered coral cobbles were incorporated into the terrace surface.

The Site 5797 wall runs parallel to the west side of the terrace, within 0.50 meter of the southwestern corner. It is uncertain whether this wall construction actually affected the terrace. If stones were removed to construct the wall, care was taken to leave the remaining portions intact and to reface the perimeter.

A 1.0 by 1.0 meter test unit was excavated in the northwest portion of the terrace in order to better determine its age and function. The test unit was adjacent to a large coral cobble paving stone, and two surface pieces of unweathered branch coral. The stone fill layer was 0.15-0.25 meter thick and consisted of mixed basalt boulders, cobbles and pebbles, with no soil. Portable items found within the fill layer included six pieces of unweathered branch coral (234.6 grams) and one waterworn siltstone cobble (*Table 4.20*).

Layer I was encountered 0.30-0.45 meter below the terrace surface and consisted of very fine dark brown gravelly silty loam with organic duff and a high percentage of angular basalt cobbles that were introduced as terrace fill. This layer was 0.18-0.23 meter thick and followed a natural east-west slope. Recovered portable material included two gastropod shell fragments (0.7 grams), three pieces of unweathered branch coral (147.7 grams), 14 weathered coral pieces (38.3 grams) and a waterworn basalt

cobble. Also observed and left *in situ* was a large piece of unweathered branch coral. This item extended into the north wall of the unit at the interface of Layers I and II (*Figure 4.65, Photo 4.53*).

Layer II consisted of dark yellowish brown (dry) very stony silty clay loam with naturally occurring gravel, stones, and decomposing bedrock fragments. One piece of unweathered branch coral was recovered from screened Layer II soil. Layer II was situated on solid bedrock throughout most of the unit; with Layer III soil present only in bedrock crevices. This culturally sterile subsoil was not excavated for screening, as the overlying Layer II was found to be essentially sterile.

Subsurface findings at Feature 8A verified that the primary function of this terrace was ceremonial, based on the high frequency of unweathered branch coral throughout the stone fill and soil layers, and on the absence of artifacts or midden that would indicate other uses. Material present on the surface of the terrace support this interpretation as well. It is notable that Feature 8 is directly downslope from the Feature 1 platform and aligns with the orientation of the platform. Due to this association, it was determined that both features are components of a single large ceremonial complex.

SITE 5711 Feature 8								
TU-1	Stone Fill		I-1		II-1		Total	
Depth	.08-.21		.21-.48					
	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
Gastropods								
Cypraeidae			1	0.20			1	0.20
Patellidae			1	0.50			1	0.50
Coral								
Branch-unweathered	6	234.60	3	147.40	1	7.70	10	389.70
Waterworn								
Weathered Frags.			14	38.30			14	38.30
Other								
Waterorn basalt	1	305.40	1	514.90			2	820.30
TOTAL	7	540.00	20	701.30	1	7.70	28	1249.00

Table 4.20 Midden and Portable Material, Site 5711 Feature 8

Feature 8B is a second lower terrace located adjacent to the south side of Feature 8A. It is constructed in a similar fashion, with large cobbles and some boulders used as fill material. No surface paving is present, and the surface is somewhat irregular. This terrace was impacted by the construction of the Site 5797 wall, and the western perimeter is currently defined by the wall. It is likely that some stones were removed from this the interior of this structure as well during wall construction. The current configuration of the terrace is D-shaped, with the major axis at 4.5 meters N-S by 2.5-3.5 meters. The terrace is slightly raised 0.10 meter along the south side only. Along the north side, the Feature 8A terrace perimeter is 0.30 meter above the surface of this terrace, and along the east side, the natural outcrop ledge is 0.25 to 0.40 meters above the terrace surface. It is possible that Feature 8B is the remnant of a larger terrace upon which Feature 8A was built. Remnants of this larger terrace are indicated to the northwest side of Feature 8A, where stone fill is present between the terrace and the wall.

Due to the disturbances indicated from the wall, it is not possible to determine the former extent of Feature 8B. At this time, it is interpreted as an integral component of Feature 8.

In summary, Site 5711 is interpreted as primarily a ceremonial complex, with Feature 1 as the major structure and Feature 8 as an ancillary structure. The temporal relationship between these two structures and the adjacent terraces is not verified; however, their close association would indicate that their purpose was to enhance the appearance and grandeur of the complex, particularly when viewed from the ocean and shoreline. The terraces are dated to AD 1400-1440, which is not an unreasonable date to expect for the construction of Feature 1 and 8. The relationship of Feature 7 to these structures is uncertain; it exhibits no outward signs of ceremonial use, if it was a landscaping

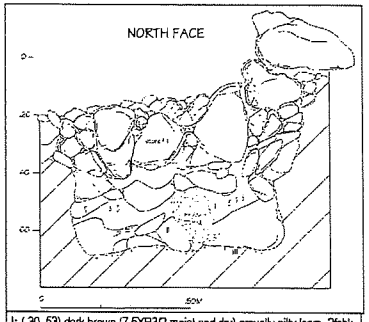


Figure 4.65 Site 5711 Feature 8, Test unit 1 Profile

feature, this would tie it into the complex by virtue of spatial association only. Feature 4 appears to post-date the earliest use of the complex, but its presence indicates a likely continuation of activities at this site. This feature is not ceremonial *per se*, however, it could have certainly provided temporary shelter for persons conducting ceremonial activities, or maintenance of the site.

Site 5795 (Ma-B8-233)

Previous Investigations

Site 5795 is one of four sites within the current project area that was recorded and described in 1978 during a Bishop Museum survey of the Seibu golf course third increment (Cordy 1978). The details of this survey are discussed in Chapter 3. Cordy's description of this site is as follows:

> This is a large rectangular enclosure near a large coastal gulch at hole 17. The structure is 17.8 by 8.0 meters (142m^2) with a high, wide wall (1.4 to 1.6 meters high, 1.0 meter wide) and no entrances. No midden was present, but historic artifacts were found. One excavation square was dug inside the structure. (Cordy 1978:76)

Cordy's field map of the enclosure indicates a "possible former entry, sealed" in the center of the west wall. This possible entry was apparently opened during the 1978 survey for access to the interior of the enclosure, and it was found in an open condition during a subsequent 2005 survey (*Figure 4.67*). The excavation square described by Cordy was located against the south wall, near the southwest corner, and was 1.5 meters E-W by 0.5 meter N-S. The excavation encountered a 0.03 meter-thick layer of humus over a brown Layer II soil and a rock outcrop (Cordy field notes 1978). The excavation was terminated at 0.09-0.10 meter below surface.

Cordy's notes do not indicate that midden was observed or collected; however, he listed this site (233) as having a cultural layer (II) at 0.05-0.10 meter below surface (Cordy 1978:20). This was apparently determined on the basis of soil color and texture, rather than on the presence or absence of cultural material (Cordy 1978:20). There is no record in the report or in field notes that indicates the recovery of midden at this site during the 1978 field work.

Nine historic/modern artifacts were collected from the surface of the site area in 1978; these items included a Coca Cola bottle, a glass bottle sherd, a leather glove, a metal hoop, a metal meat hook, a tin mess cup (1940s military issue, Carter in Cordy 1978:101), a metal spool, round wire nail(s), and unidentified metal fragments (Cordy 1978:17). Also noted in the field were pieces of barbed wire and sawn wood planks with round nails. The metal hoop, the glove and unidentified metal fragments were found inside the enclosure. All other items were found outside, with a concentration of material 5.0 meters southeast from the southeast corner of the enclosure. The barbed wire was found fastened to *kiawe* trees in a pattern suggesting that a fence may have surrounded the enclosure at one time. The lumber was found with the above concentration and in an area approximately 5.0 meters northeast from the northeast corner of the enclosure. The time frame indicated by surface artifacts was 1945-1950 (Cordy 1978:30), and the structure was interpreted as being "entirely historic" (Cordy 1978:27). Suggested site function was as a storage facility (Cordy 1978:48).

Additional field work was conducted at Site 5795 in August 2005 and reported in Rotunno-Hazuka et al. 2005. At that time, a scaled plan map was completed and three additional test units were excavated. Two 1.0 by 1.0 meter units were located inside the enclosure, and one 2.0 by 1.0 meter unit was excavated through the west wall. Just north of the possible former entry that was opened in 1978.

Test Unit 1 was located in the center of the south half of the enclosure at was excavated to a base depth of 0.27 meter below surface (*Figure 4.66*). Two soil layers were identified, including a thin very dark grayish brown (10YR2/2) humic layer (I) over dark yellowish brown (10YR3/6) stony silty clay loam. One glass marble fragment was found at the base of Layer I, 0.05 meter below surface. This item is generally contemporaneous with the mid-twentieth century artifacts recovered by Cordy. No midden or other portable materials were recovered at this location.

Test Unit 2 was located inside the east wall, near the southeast corner of the enclosure. The unit was excavated to a base depth of 0.30 meter below surface, and revealed the same soil stratigraphy indicated

in Test Unit 1. The excavation indicated that the wall foundation base was only 0.05 meter below current ground surface, and that the thin Layer I soil was also present beneath the core fill of the wall. No artifacts, midden or other portable materials were recovered from Test Unit 2.

Test Unit 3 was excavated through the west wall, which was 1.40 meter wide at the location. The excavation confirmed that the wall base was quite shallow and was situated on natural bedrock outcrops in places. The wall also appeared to have been built in one episode, with well-faced stacked sides and smaller core filling. The larger base stones along the sides appeared to penetrate through the Layer I soil, however the smaller core filling was situated on top of a relatively undisturbed Layer I deposit (*Figure 4.66*). No artifacts, midden or other portable materials were recovered from Test Unit 3.

The findings of the August 2005 testing found no new information that would alter or revise Cordy's interpretation of the enclosure as a storage facility related to ranching. The height of the walls and the relatively narrow entrance were referenced as indicators of a storage area as opposed to some type of animal enclosure. The period of construction as historic era was maintained, given the relatively good preservation of the walls, construction technique, and the presence of historic era artifacts.

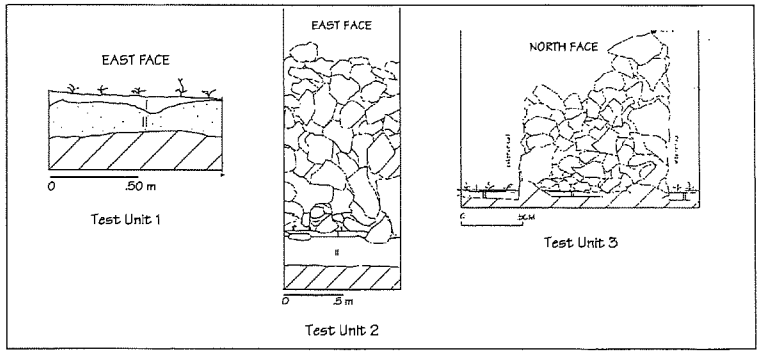


Figure 4.66 Site 5795, Test Units 1-3 (August 2005) Profiles

Current Findings

During the current survey, the SIHP site number was assigned to this site, and two additional test units were excavated inside the Site 5795 enclosure (*Figure 4.68, Photo 4.54*). Test Unit 4 was located in the center of the enclosure, across from the entrance. Two soil layers were encountered in the excavation, which terminated at 0.25 meter below surface at the interface of Layers II and III. Layer I at Test Unit 4 was 0.06 meter thick and consisted of loose brown silty loam with duff and roughly 50% stones by volume (*Figure 4.67*). Two pieces of marine shell were recovered from screened Layer I soil, including a *Cypraeidae* shell fragment (1.2 grams) and a *Muricodrupa funiculus* fragment (0.1 gram). Layer II at Test Unit 4 was yellowish brown silty clay loam with a minimal amount of stone. No midden or artifacts were recovered from this layer.

Test Unit 5 was located at the north end of the enclosure, near the center. This excavation encountered a 0.08 meter-thick deposit of Layer I soil atop solid *pahoehoe* bedrock. Further probing in the vicinity indicated that the northern 1/3 of the enclosure floor was solid bedrock. No artifacts, midden or other portable materials were recovered from the 18 liters of soil that was screened from this test unit.

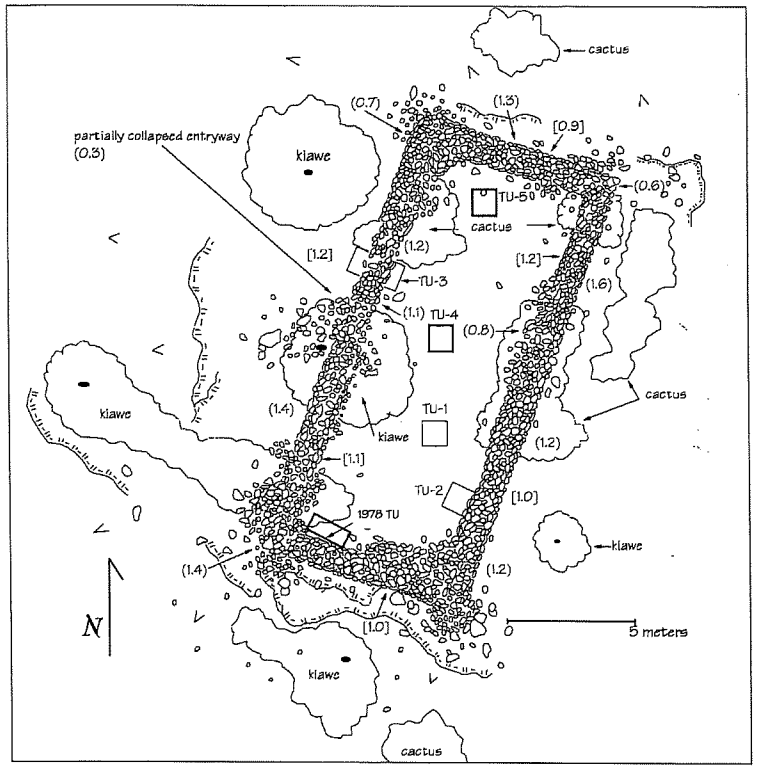


Figure 4.67 Scaled Plan Map of Site 5795, completed in August 2005 (with recent test units (4 and 5) added)

In summary, recent testing inside the Site 5795 enclosure further substantiated prior findings that this enclosure is of historic construction and was most likely used for storage. The findings of a rock surface in the northern portion further supports use for non-habitation activities, as this surface would have been somewhat irregular and in need of paving if the enclosure was a habitation area. The shallow soil deposits elsewhere preclude its use for purposes that would have required subsurface excavation.

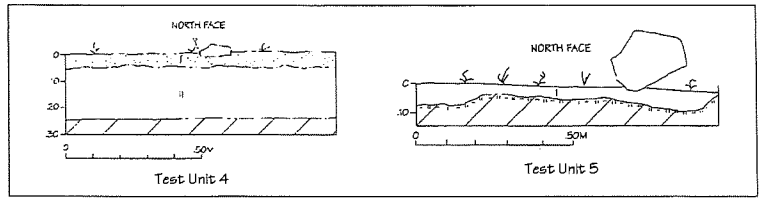


Figure 4.68 Site 5795, Test Units 4 and 5 Profiles (Note: soil layers same as Figure 4.67)

Site 5796 (Ma-B8-234)

Previous Investigations

Site 5796 was first recorded during the Bishop Museum survey of the Seibu golf course third increment (Cordy 1978), at which time it was described as follows:

> This site is south of the major gulch at hole 17. It is 20.3 by 26.8 meters (544m^2) with an opening in the south wall. Walls are 0.7 to 0.8 meter high and 0.5 to 0.8 meter wide. A wood post with square nails is in the center of the structure. No midden was visible. Two excavation squares were dug, and a soil sample was taken. (Cordy 1978: 77)

Two 1.0 by 1.0 meter test units were excavated at Site 5796 during the 1978 survey, and two categories of midden - bird bone and Cypraeidae shell - were reported as being recovered (Cordy 1978:24). No cultural layer was identified at this site (Cordy 1978:20), and field notes provide no information on the soil stratigraphy, base depth of excavations, or specific recovered materials . One beverage bottle with a crown type closure was recovered from the surface inside the enclosure; this item was dated to 1920-present (Carter in Cordy 1978:100). The 1978 survey report identifies Site 5796 as being "entirely historic" and it is interpreted as a livestock enclosure (Cordy 1978:27, 48). That was utilized during the early to middle twentieth century.

Site 5796 was revisited in August of 2005, when a scaled plan map was completed and three additional test units were excavated (*Figure 4.69*). This field work resulted in revised dimensions for the enclosure:

> The enclosure site measures 28.0 (e/w) by 23.5 (n/s) with intact walls ranging in height from .8-1.4 meters and .7-1.0 meters in width. The interior floor area measuring 25.5 meters long by 21.5 meters wide is level and is comprised of soil areas and scattered cobbles. The interior floor slopes gently west to east towards a steep hillside. (Rotunno-Hazuka et al. 2005:24)

Test Unit 1 was a 1.0 by 1.0 meter unit located in the south-central portion of the enclosure, in an area of soil with loose surface cobbles. Two soil layers were encountered, including a thin (0.05 meter) Layer I very dark grayish brown loose humic loam with duff and 10% stones by volume. Layer II consisted of dark yellowish brown silty clay which extended to the base of excavation at 0.27 meter below surface. Three small fragments of *Cypraeidae* shell were recovered from screened Layer II soil, between 0.05 and 0.10 meter below surface.

Test Unit 2 was a 1.0 by 1.0 meter unit located against the interior side of the northeast wall; excavation here encountered the same two soil layers, and no midden or artifacts. The base of the wall was found to be rather shallow, resting on or just beneath the this Layer I topsoil (*Figure 4.70*).

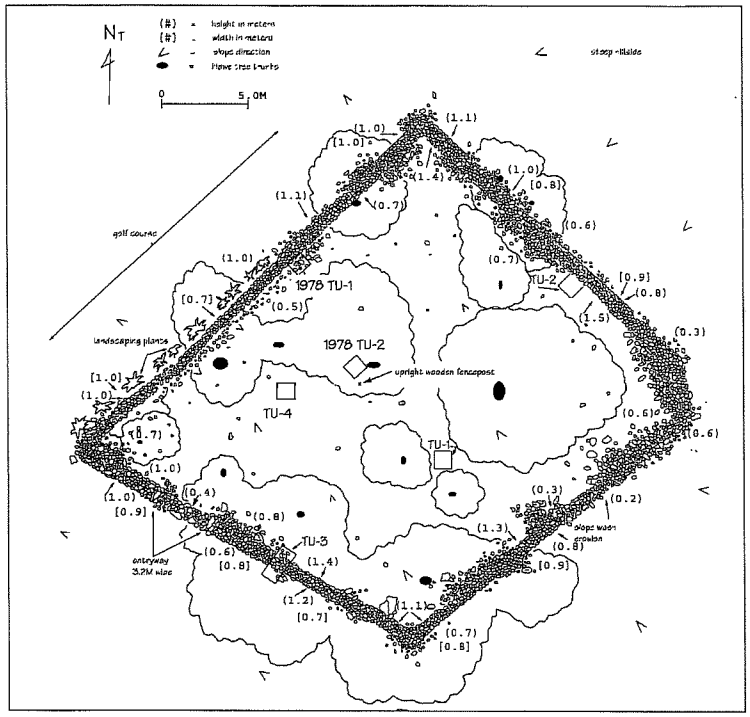


Figure 4.69 Scaled Plan Map, Site 5796, completed August 2005 (recent and 1978 test units added)

Test Unit 3 was a 1.0 by 2.0 meter unit excavated through the southwestern wall of the enclosure. Clear bottle glass fragments were present on the surface against the inside wall at this location, and two pieces were recovered from the surface inside the test unit. Layers I and II were found to be the same as indicated in Test Units 1 and 2. One piece of marine shell and four small pieces of weathered coral were recovered from the upper portion of Layer II, between 0.05 and 0.10 meter below surface.

Additional work at Site 5797 found no new information to revise or alter the 1978 interpretation of this enclosure was a cattle pen:

> A large collapsed or closed off entryway was noted in the south wall, and due to the width of this entrance coupled with the presence of a wooden post in the center, as well as the enclosure shape and size, this feature probably was utilized as a holding pen for cattle either being imported or exported. (Rotunno-Hazuka et al. 2005:25)

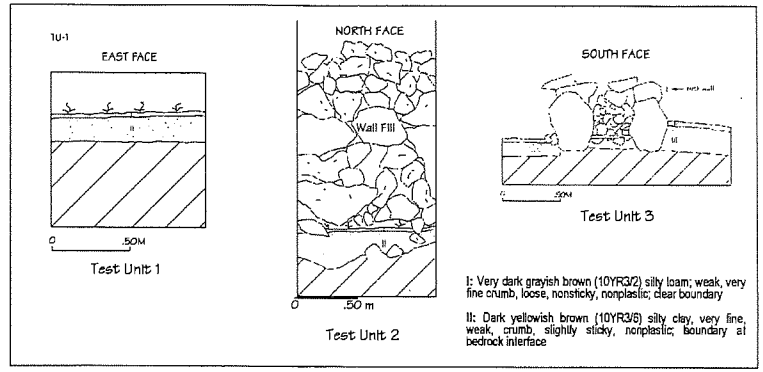


Figure 4.70 Site 5796, Test Unit 1-3 Profiles (August 2005)

Current Findings

During the current survey, one additional test unit (TU-4) was excavated inside the enclosure, and the SIHP site number was assigned. The location of the unit was determined by conducting soil probes across the interior soil deposits and locating an area of relatively deep soil, or where surface midden was observed. The unit was placed in the western quarter of the enclosure, where soil deposits were found to be 0.25 meter thick over bedrock (*Figures 4.69 and 4.71, Photo 4.55*). Layer I at this location was 0.06 to 0.09 meter thick and consisted of the same dark grayish brown silty loam as described above. One waterworn fragment of a *Conidae* shell (6.3 grams) was recovered from screened Layer I soil, along with two pieces of weathered coral (15.4 grams).

Layer II consisted of gravely silty clay loam subsoil that showed some mottling indicative of prior disturbance. No midden, artifact, or other materials were recovered from the 65 liters of soil screened from Layer II. The unit was terminated at very compact subsoil with decomposing bedrock.

Results from subsurface testing during three different surveys showed a very sparse occurrence of marine shell and weathered coral fragments. These materials may represent the remnants of a deposit that pre-dated the enclosure. No new information was recovered during the current survey that would cause the age of the enclosure to be questioned. An alternative function as a garden enclosure, as opposed to animal enclosure, is however feasible. In general, the ground level inside the enclosure is above the ground level on the outside, and the wall heights along the interior sides are lower than the exterior sides. In some cases, the interior wall height of intact sections is 0.5 meter or less, which would not appear to be the ideal height for a cattle enclosure. The exterior sides of the walls are 0.90 meters and greater along intact sections. This would suggest that the walls could have functioned to keep cattle out. A third possibility is that the enclosure was built as a garden area and later converted to a cattle pen.

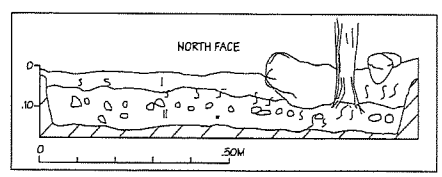


Figure 4.71 Site 5796, Test Unit 4 Profile (soils same as Fig. 4.70)

If the enclosure was used as a garden area, the midden and coral could date to that period of use, which would have been during the cattle era (hence the need for walls).

Site 5797 (Ma-B8-240)

Previous Investigations

This wall was first recorded during the 1978 Bishop museum survey of the Seibu golf course third increment (Cordy 1978). The full description of the site as found in the 1978 report is as follows:

> This site bounds an area within the coastal end of the major gulch at hole 17. It runs on both sides of the gulch and crosses it near the beach and Site 233. The wall is 0.5 to 0.7 meter wide and 1.0 meter high. No excavation was done. (Cordy 1978:77)

The site map published in this report depicts Site 5797 as an L-shaped wall (Cordy 1978:9), however, it is described as occurring on both sides of the gulch, and on the map of historic era sites, parallel walls are shown extending along the gulch *mauka* of Site 233 (Cordy 1978:53). The site was interpreted as an historic era livestock enclosure.

Current Findings

Remnants of Site 5797 were identified at the western end of the gulch, adjacent to the edge of the golf course impact zone. This is the location "near Site 233" where the wall crosses the gulch and continued *makai* toward the beach along both side of the gulch (*Figure 4.63*). This portion of the wall was designated Feature 1. Additional wall sections (Features 2-4) were observed along a straight alignment extending *mauka* from the southern corner of Feature 1. These wall sections were associated with wooden fence posts and heavy gauge straight fence wire that continued eastward through the gulch to Mākena-Keone'ō'io Road (*Figure 4.1*).

Site 5797 Feature 1 is comprised of two construction components, the largest of which includes the remnant wall section that crosses the gulch (Feature 1A). This wall segment is 35.5 meters long and oriented generally N-S, with gradual bends at 5.0 meters from the existing ends of the wall (*Photo 4.56*). It is constructed from subangular boulders and cobbles with a bifaced core-filled design. Smaller cobbles and pebbles are used to fill the center of the wall area between two aligned rows of stacked boulders and large cobbles. Width of the wall ranges from 0.60 to 1.10 meters, with the wider portions along the northern half of the segment. Heights of the wall are greater on the west (downhill) side and range from 0.50 to 1.10 meters, with an average of 1.0 meter where the wall is intact. On the east side, heights range from 0.50 to 1.10 meter, with an average of 0. 70 meter. A 2.5 meter-wide section of the wall has been breached by machinery; this section is in the center of the gulch.

The northern end of the wall is at a berm of pushed fill and boulders from the golf course. The southern end of the wall abuts Feature 1B, which is oriented E-W along the base of the gulch slope. Feature 1A forms the western perimeter of Site 5706 Feature 8B. Some of the stones from this terrace may have been used in the wall construction, and two pieces of branch coral are present atop the wall adjacent to the terrace. Other portable remains observed in the immediate area include marine shell fragments and pieces of weathered coral, all of which were seen in bulldozer disturbed areas to the west of the wall and in the wall breach.

Feature 1B extends to the east and west of its corner with Feature 1A. This wall segment shows a distinctly different construction design; it is narrower, lower, and of multiple-stacked rather than bifaced construction. A 16.0 meter-long section of the wall is still intact. The eastern end has been impacted by golf course construction and the western end abuts a vertical bedrock face, where the wall temporarily terminates. A heavy gauge straight wire fence with posts runs along the north side of the wall, and continues east, beyond the end of the stone construction. This wall segment is 0.60 to 0.80 meter wide and shows varying heights along the north and south sides. The north (downhill) side ranges from 0.50 to 1.10 meter, with an average of 0.70 meter; the south side ranges from 0.40 to 0.80 meter, with an average of 0.50 meter. This wall section utilizes bedrock ledges in its construction and consists primarily of large to medium cobble-sized stones with no core fill.

Remnants of what appear to be a bifaced wall extend southward approximately 3.0 meters from the juncture of Features 1A and 1B. It is possible that the Feature 1A section originally continued south up the south slope of the gulch, and was truncated in order readjust the wall configuration. Feature 1B could have been constructed when the fence posts were installed. Based on the 1978 survey, it can be assumed that these two walls formed an enclosure that extended westward nearly to the beach.

Site 5797 Features 2-4

Three additional constructed wall segments were identified along the fence line that continued eastward from Feature 1. This line does not follow the top of the gulch; rather it is oriented in a straight line that runs along the base of the south slope and up the east (back) slope (*Figure 4.1*). The fence line and constructed wall sections are near or intersect with a number of the Site 5706 features, and with Site 5709 Feature 1.

Feature 2 is located 12.0 meters east from the east end of Feature 1B. It is a 30.5 meter-long section of constructed stone wall that is aligned along a wire fence line. This wall section ends at the Site 5706 Feature 2 trail, which appears to have taken out a portion of this fence line and wall. This wall section is situated along the lower south slope of the gulch, just above the base, and is at a higher elevation than Feature 1. It consists of single to multiple-stacked cobbles and boulders, two to four courses high and one to three courses wide. Height of this section ranges from 0.15 to 0.60 meter and width ranges from 0.50 to 0.65 meter. This feature is in a poor condition due to slope erosion and probable animal traffic (*Photo 4.57*).

Feature 3 is located 18.2 meters east from the east end of Feature 2, along the same straight fence line. This wall section is 15.0 meters long and shows the same construction technique as Feature 2, with simple to multiple-stacked boulders and cobbles, two to four courses high. Widths here range from 0.60 to 1.00 meter and heights from 0.25 to 0.40 meter. This section shows upright and fallen fence posts with up to three strands of heavy gauge straight wire attached.

Feature 4 is located 7.6 meters east from the east end of Feature 3. This wall section is 4.5 meters long and incorporates exposed bedrock. This section is 1.0 meter wide and 0.9 to 1.65 meter high, with the higher sections being at natural rock faces. Feature 4 extends between Site 5710 Features 3 and 4, although it does not appear to have impacted these features (*Figure 4.53*). This location is along the upper east slope of the gulch, just below the top of the bank. The fence line continues east from this location and crosses Site 5709 Feature 1, where a fourth wall remnant was identified.

It appears that Features 1B through 4 are contemporaneous, and clearly associated with livestock management. Feature 1A is most likely an earlier component that was altered for use in conjunction with the later wall. The original configuration of Feature 1A is indeterminate, and it cannot be stated with certainty that this wall was originally intended as a cattle enclosure. It does appear to post-date Site 5711 Feature 8, which potentially dates to the 15th century. Feature 1A could have been part of the large enclosure that was present around Kahaleokaia's houselot (LCA 5147:7) that is depicted on Torbert's map (see Chapter 2).

Site 5798

This historic/modern habitation site is located in the southeastern corner of Parcel 84, the Mākena School lot. It was briefly noted in Bishop Museum's reconnaissance survey report of the Mākena School Site, where it was referred to as one of two "concentrations of modern material, ...one located just beyond the northeastern corner of the parcel and the other located within the southern third of the parcel" Cleghorn et al. 1988:7). Cleghorn et al. assigned SIHP Site number 1007 to the entire two-acre school lot parcel; however, this site and Site 5799 are functionally and temporally distinct from the school, and it seems that separate site numbers are warranted.

Four features were identified at this site during the current survey, including an L-shaped stone wall (Feature 1), wooden structural remnants (Feature 2), a concentration of *imu* stones (Feature 3), and a refuse pit (Feature 4). Overall area of the site is 30.0 meters E-W by 19.0 meters N-S (*Figure 4.72*). The site is situated on a low knoll, and the southern perimeter is defined by the Site 1007 Feature 7 boundary wall, which is also the project area boundary.

Feature 1 is an L-shaped wall that appears to have been part of a larger boundary or enclosure wall (*Photo 4.58*). The long axis is 14.0 meters long and oriented NE-SW, at a slight angle to the Parcel 84 south boundary wall. The corner is at the west end of the long section, with the short section turning to the south; this section is 4.5 meters long. The eastern end of the wall shows evidence that it continued eastward, beyond the eastern boundary of Parcel 84. Rubble remnants are apparent for at least another

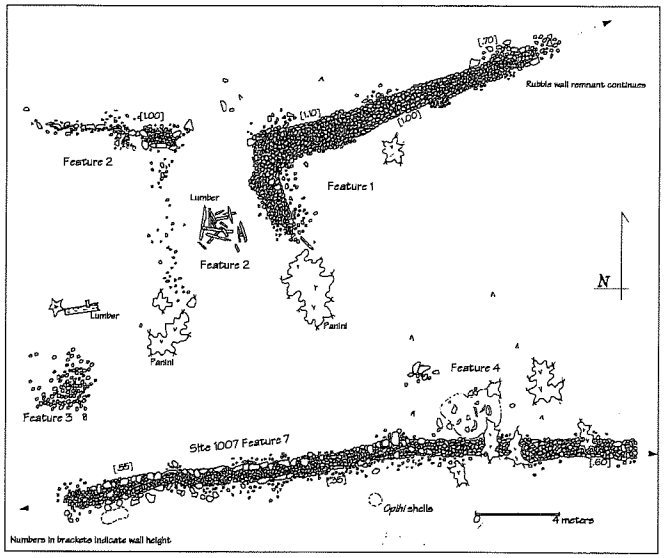


Figure 4.72 Scaled Plan Map, Site 5798 Features 1-4

30.0 meters. Likewise, the west end of the wall was truncated, and an unknown length was removed, although there are no remains to suggest the extent of the wall toward the south. The wall is bifaced and core-filled, with the outer side defined by large stacked boulders and the interior filled with small cobbles and pebbles. Width of the wall ranges from 0.90 to 1.30 meters, and heights of intact portions range from 0.65 to 1.10 meters. The relationship between this wall section and the dwelling is uncertain, although it appears that the dwelling was uphill and to the south of the wall, which may have pre-dated the house.

Fragments of glass and metal are scattered on the ground along both sides of the wall, and on top of the wall. These materials are generally middle 20th century in age.

Site 5798 Feature 2

This feature includes two areas of structural lumber and remnants of a stone retaining wall, adjacent to the west side of Feature 1 (*Photo 4.59*). Overall area of the feature is 10.0 by 10.0 meters. The primary lumber concentration is 1.0 meter west of the Feature 1 wall. It consists of a concentration of dimensional lumber with round (16D) nails in place. The lumber is within an area 2.2 by 2.3 meters and appears to represent a structural item that rotted in place, rather than a pile of relocated materials. The longest board present is 1.6 meters (5 feet) and dimensions are 1 by 6 inches. The size and amount of lumber present suggests a structure similar to a chicken coup or small animal shelter, or a platform of some sort.

A second area of lumber is located 6.0 meters to the southwest. Two heavy dimensional lumber planks and a concrete block are present at the base of a *kiawe* tree trunk. These items appear to be in secondary context. Remnants of a stone retaining wall are present 3.0 meters west of Feature 1 and 3.0 meters north of the lumber concentration. This wall remnant is 7.0 meters long, with approximately 2.0 meters still intact at the eastern end. It is 1.0 meter wide where intact; height along the north (downhill) side is 1.0 meter, and height along the uphill side is 0.34 meter. The wall may have originally been bifaced; however, it is now generally rubble with one faced side at the east end. Broken glass and metal fragments are scattered on the ground in the general area of this feature; it appears that the area was impacted by machinery.

Site 5798 Feature 3

Feature 3 is located at the western edge of the Feature 2 area and 3.8 meters north from the Site 1007 south boundary wall. It consists of a concentration of rounded vesicular basalt cobbles, of the classic *imu* type, surrounding a depression in the ground that resembles an *imu*, or earth oven. The overall area of the concentration is 2.7 meters N-S by 2.5 meters E-W, and individual cobbles range in size from 0.10 to 0.25 meter in diameter. The stones are loosely piles one to three high in a roughly oval formation around a shallow depression in the soil that looks like an *imu* pit. The terrain at this feature is generally level, with a very gently slope to the northwest. No artifacts or portable remains other than the stones were observed in the immediate area of this feature.

Site 5798 Feature 4

Feature 4 is located at the southeastern corner of the site, against the north side of the Site 1007 south boundary wall (Feature 7). It consists of an excavated pit that contains modern era household refuse, including enamelware dishes and kettles, glass bottles, glass kitchenware, tin cans, porcelain tableware, and miscellaneous metal items. The refuse pit is 1.5 meters in diameter, and is filled to within 0.30 meters below surrounding ground surface. Refuse material is scattered from the pit to the north and east, down a gentle natural slope. There are indications that someone searched through the pit in the not too distant past; perhaps the Bishop Museum staff took a look at the material in 1988, or a bottle hunter did some digging. All observed items date to the modern era, *circa* 1940-1970.

The nature and distribution of structural remains and artifacts at Site 5798 suggests that the main dwelling may have been located to the south side of the parcel boundary wall, and outside of the project area. This location conforms with the location of a structure shown on the 1956 and 1983 USGS Makena Quadrangle maps, and with the home of the Poepoe family.

Site 5799

This site is located along the western boundary wall of the Mākena School parcel, 23.5 meters northeast from the southwestern corner of the school parcel. It consists of two features, a concentration of structural lumber (Feature 1) and stone wall remnant (Feature 2). The overall site area is 24.0 meters NE-SW by 14.0 meters (*Figure 4.73, Photo 4.60*).

Feature 1 consists of a roughly rectangular (8.0 by 6.0 meters) area of dimensional lumber and in place wire nails of various sizes. The structural remains appear to have deteriorated *in situ*, and they appear to represent a small shack. (c. 8 by 10 feet). No electrical components or plumbing was observed in the immediate area. Artifacts observed include clear bottle glass and ceramic sherds dating to the middle twentieth century (*circa* 1940-1970).

Feature 2 is located 3.6 meters west from Feature 1 and within 3.0 meters east of the Site 1007 Feature 1 west boundary wall. It includes a bulldozed section and an intact section of a stone retaining wall. The overall length indicated is 18.0 meters NE-SW, with the southern 8.0 meters in a disturbed condition. This southern portion includes a 3.0 meter-wide break and a 5.0 meter-long section of stones that were pushed onto the existing wall. This pushed section of the wall is 3.0 meters wide and mounded up to 0.62 meter high.

The 9.0 meter-long intact section of the wall is 0.50 to 0.70 meter wide and ranges in height from 0.35 to 0.42 meters along the north (downhill) side. The south side of the wall is generally level with to just above ground surface. There are indications that this wall may have turned to the southeast, based on a linear pattern of boulders and cobbles. If so, it may have connected with the remnant retaining wall at Feature 2, Site 5798.

In addition to bottles and dishes, surface material observed in the vicinity of the feature include 55 gallon oil drums and metal debris.

Artifacts and structural remains found at Site 5799 indicate that it is contemporaneous with Site 5798, and was most likely utilized by the same family. One informant indicated that the shack at Site 5799 was used primarily by men for recreational activities.

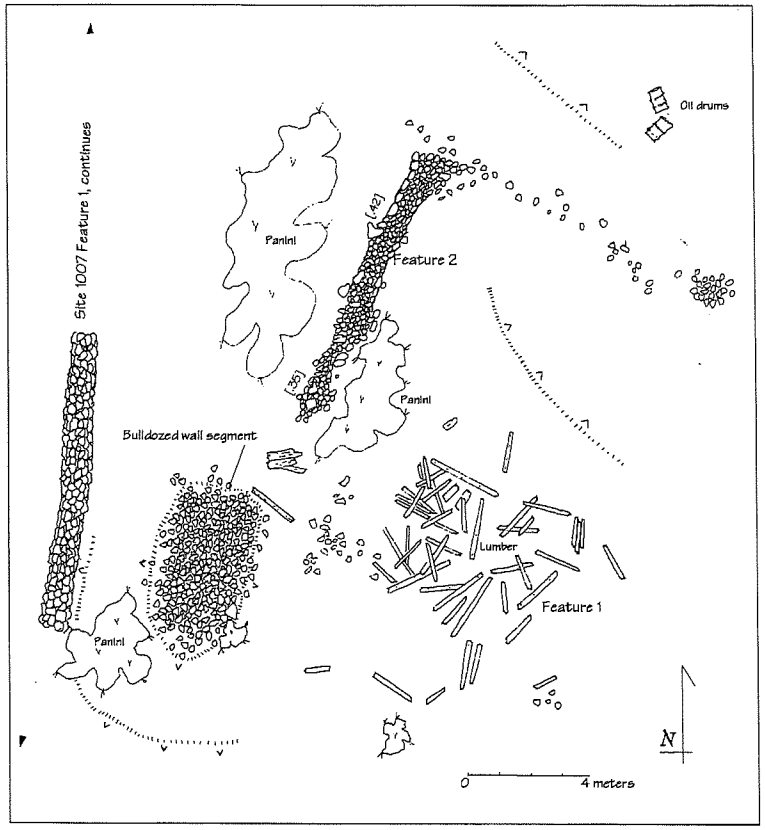


Figure 4.73 Scaled Plan Map, Site 5799

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Photo 4.1 *Site 1007 Feature 1, view to east*

Photo 4.2 *Site 1007 Feature 5 Cistern, view to northeast*

***Photo 4.4** Site 1853 Feature 5, view to east*

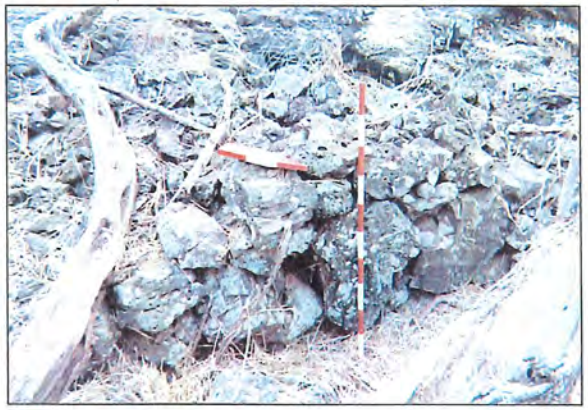

***Photo 4.5** Site 1853 Feature 6B, view to southwest*

***Photo 4.7** Site 1853 Feature 7, view to north*

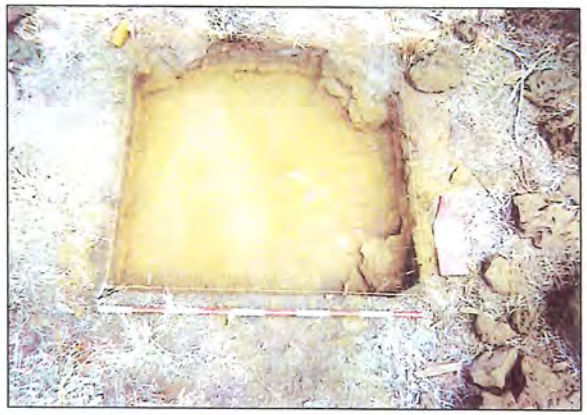

***Photo 4.8** Site 1853 Feature 7, Test Unit 1, base of excavation*

Photo 4.9 *Site 1853 Feature 8A, view to east*

Photo 4.10 *Site 1853 Feature 8B, view to east*

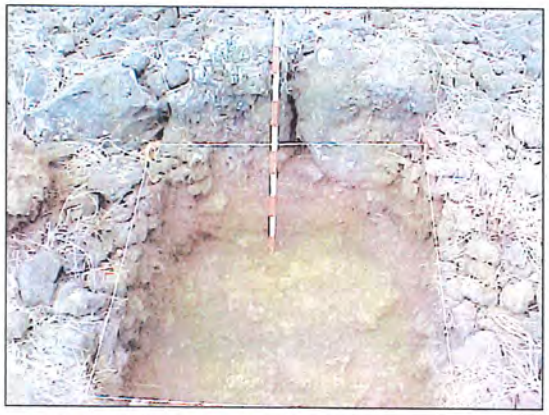

Photo 4.11 *Site 1853 Feature 8B, Test Unit 1, base of excavation, east face*

Photo 4. 12 *Site 1853 Feature 13, view to west*

Photo 4.13 *Site 1864 Feature 2, view to north*

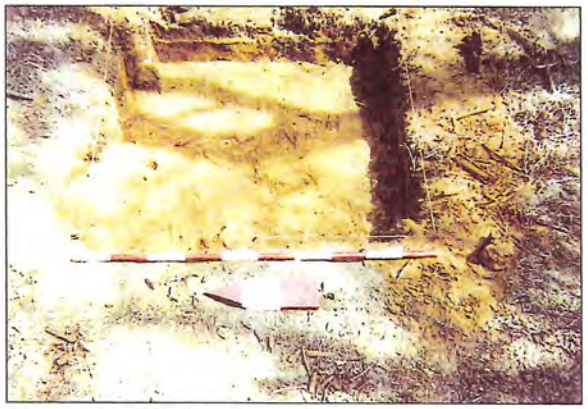

Photo 4.14 *Site 1864 Feature 1, Test Unit 1, base of excavation*

Photo 4.15 *Site 2272 Feature 1, view to north*

Photo 4.16 *Site 2272 Feature 1, Test Unit 2, base of excavation*

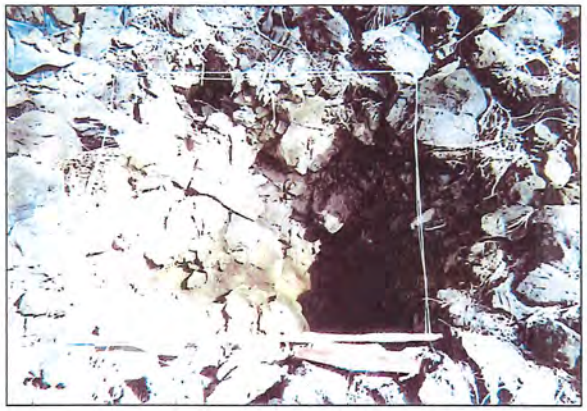

Photo 4.17 *Site 2272 Feature 4, Test Unit 1, base of excavation*

Photo 4.18 *Site 5706 Feature 1, Test Unit 1, base of excavation, north face*

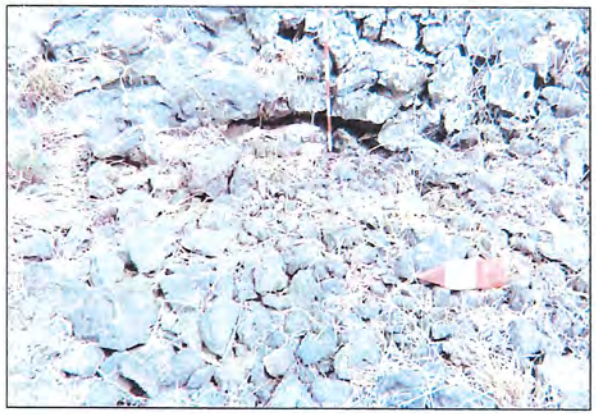

Figure 4.19 *Site 5706 Feature 2, view to east*

Photo 4.20 *Site 5706 Feature 2, Test Unit 2, base of excavation, east view*

Photo 4.21 *Site 5706 Feature 5A, view to northeast*

Photo 4.22 *Site 5706 Feature 5A, Test Unit 2, base of excavation*

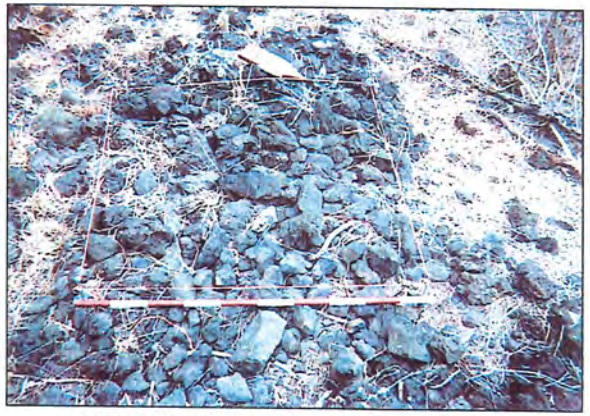

Photo 4.23 *Site 5706 Feature 5B, Test Unit 3 prior to excavation*

Photo 4.24 *Site 5706, outcrop area with Features 9-14, view to south*

Photo 4.25 *Site 5706 Feature 11, view to north*

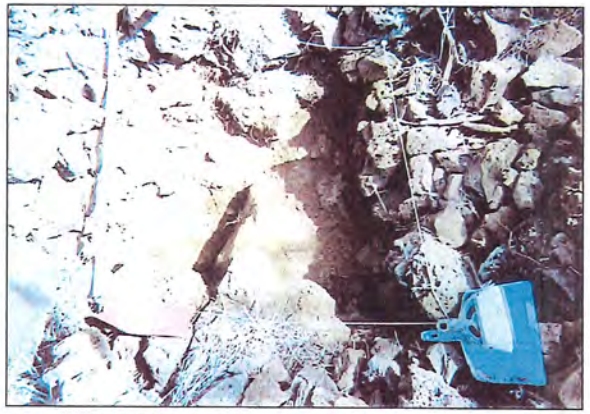

Photo 4.26 *Site 5706 Feature 17, Test Unit 1, base of excavation*

Photo 4.27 *Site 5707 Feature 2, view to northeast*

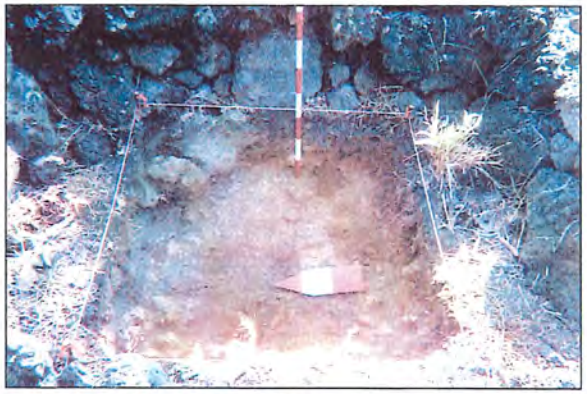

Photo 4.28 *Site 5707 Feature 2, Test Unit 1, base of excavation (prior to expansion)*

Photo 4.29 *Site 5707 Feature 4, Test Unit 1, base of excavation, view to north*

Photo 5.30 *Site 5707 Feature 5, view to west*

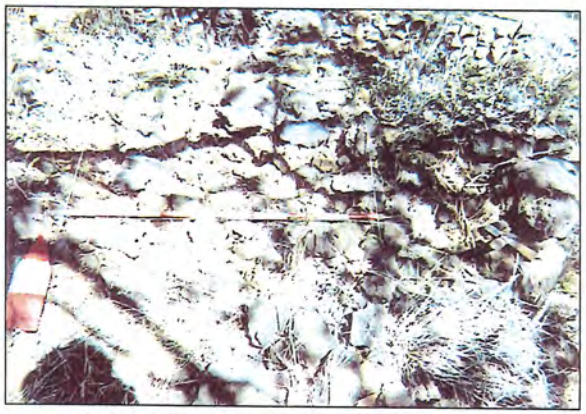

Photo 4.31a *Site 5708 Feature 1, Test Unit 1, prior to excavation*

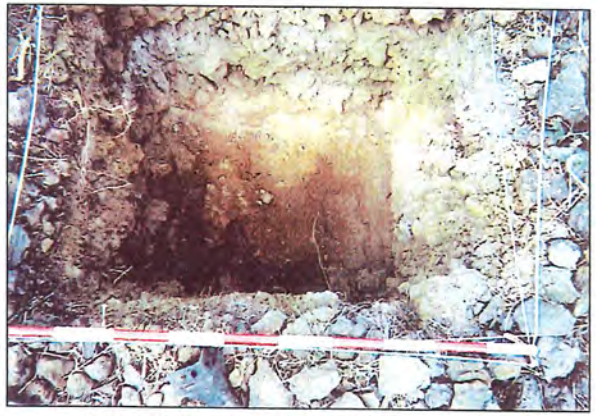

Photo 4.31b *Site 5708 Feature 1, Test Unit 1, base of excavation*

Photo 4.32 *Site 5708 Feature 2A, view to northeast*

Photo 4.33 *Site 5708 Feature 2C, view to north*

Photo 4.34 *Site 5708 Feature 3 overhang prior to excavation*

Photo 4.35 *Site 5708 Feature 3, Test Unit 1, base of excavation, south face*

Photo 4.36 *Site 5709 Feature 1, view to east*

Photo 3.37 *Site 5710 Feature 2, view to north from south side of gulch*

Photo 4.38 *Site 5710 Feature 3*

Photo 4.39 *Site 5710 Feature 6, view to south*

Photo 4.40 *Site 5710 Feature 7A, view to north*

Photo 4.41 *Site 5710 Feature 9, view to south*

Photo 4.42 *Site 5710 Feature 10, view to south*

Photo 4.43 *Site 5710 Feature 11, view to south*

Photo 4.44 *Site 5710 Feature 12A, view to south*

Photo 4.45 *Site 5710 Feature 13, view to north*

Photo 4.46 *Site 5711 Feature 1, south portion of platform with wall remnant, view to west*

Photo 4.47 *Site 5711 Feature 3, view to east*

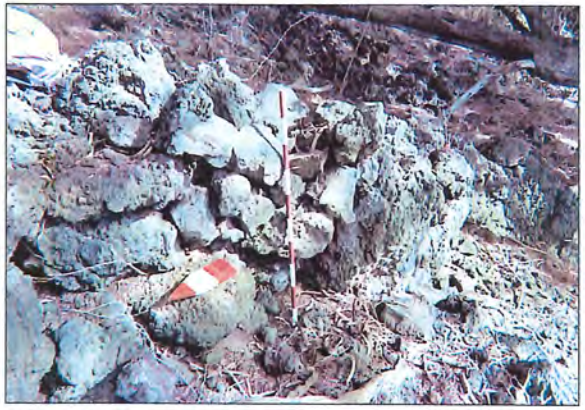

Photo 4.48 Site 5711 Feature 4, close-up of east wall from interior, view to southeast

Photo 4.49 Site 5711 Feature 4, Test Unit 1, base of excavation, west face

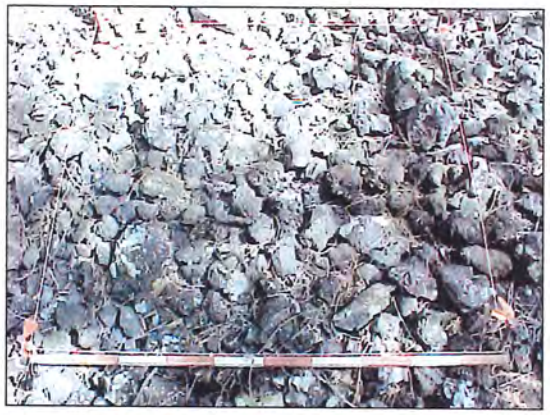

Photo 4.50 Site 5711 Feature 7 paved are prior to excavation

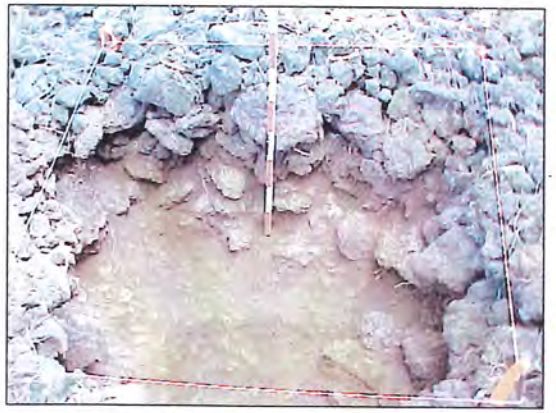

Photo 4.51 Site 5711 Feature 7, Test Unit 1, base of excavation, north face

Photo 4.52 Site 5711 Feature 8A, close-up of coral in terrace fill, view to south

Photo 4.53 Site 5711, Feature 8A, Test Unit 1, base of excavation, west face

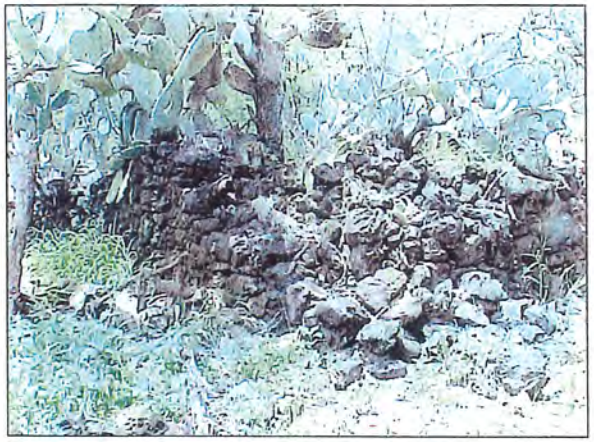

Photo 4.54 Site 5795, northeastern corner of enclosure, view to southwest

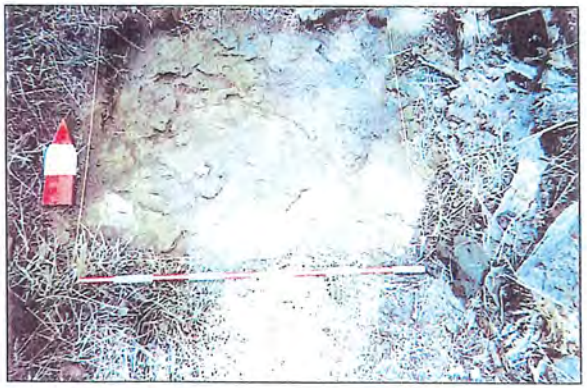

Photo 4.55 Site 5795 Test Unit 5, base of excavation at bedrock surface

Photo 4.56 *Site 5796, north wall from inside enclosure, view to west*

Photo 4.57 *Site 5797 Feature 1A, view to southwest*

Photo 4.58 *Site 5797 Feature 2, view to east*

Photo 4.59 *Site 5798 Feature 1, view to east*

Photo 4.60 Site 5798 Feature 3, view to north

Photo 4.61 Site 5799 Feature 1, view to north

5. MATERIAL ANALYSIS

Summary of Recovered Materials

Materials recovered during survey and testing include 43 traditional artifacts, 6,492 historic/modern artifacts, 5,256 shellfish specimens (3,142.63 grams), 549 vertebrate specimens (498.46 grams) , 363 pieces of weathered coral, 65 pieces of waterworn coral, 524 waterworn basalt pebbles, 17 pieces of unmodified beach conglomerate sandstone, and 1,432.01 .grams of charcoal. All of these materials, with the exception of four artifacts, were collected during subsurface testing. Four artifacts were recovered from surface contexts at two sites within the project area. These include two formed ground stone items (Site 1864 and 5706-5), a shell fishhook fragment (Site 5706-14) and a crockery sherd (Site 5706-11).

The subsurface materials were recovered from 25 of the 38 test units excavated during this project, and from six of the eight shovel tests. Shellfish collections were recovered from 23 of the 38 excavation units; artifacts were recovered from 10 test units, and other types of portable remains were recovered from 24 test units and three shovel tests (*Table 5.1*). No materials whatsoever were collected from eleven test units and two shovel tests.

During previous subsurface testing within the project area, materials were collected from six units at three sites (5705, 5795 and 5796). Previously recovered artifacts include a glass marble fragment from Site 5795 and bottle sherds from Site 5796 (Rotunno-Hazuka et al. 2005). Midden was collected from one prior excavation at Site 5707 Feature 5 (formerly 5708) and four prior excavations at Site 5795 (Cordy 1978, Rotunno-Hazuka et al. 2005); and coral was collected from excavations at Sites 5707 and 5796 (Rotunno-Hazuka et al. 2005). Prior excavations at Sites 1864, 2272, 5706, 5707, 5795 and 5796 (eight units) resulted in no collected materials (Cordy 1978; Denison 1979; Rotunno-Hazuka et al. 2005).

Prior excavations conducted in 1978, 1979, 2001 and 2005 are listed by site in Table 5.1. Units indicated as "Prior-1" in the table were excavated in August 2005; those excavated in 1978, 1979, and 2001 are indicated by the respective years.

Subsurface soil deposits identifiable as cultural layers were found in 17 excavations at eleven features within the project area (*Table 5.1*). These deposits were defined primarily on the basis of the presence of cultural material, rather than on any intrinsic qualities of the soil deposit. With the exception of the deposits at Sites 5706-5, 5706-11, 5707-2, Site 5708, and 5711-4 cultural deposits are not distinct from the naturally occurring soil layers. In other words, with the exception of the above cases, soil stratigraphy throughout the project area follows natural layers, some of which contain cultural material.

Two intact subsurface features were encountered at two sites within the project area. At Site 5706-11, the excavation encountered an *in situ* burial feature that contained cultural material in the re-deposited burial pit fill. At Site 5707-2, a possible hearth area was encountered in an area of extreme root disturbance. Two areas of secondary refuse deposition were also encountered during testing. These were both at Site 5708 (Features 1 and 3); they consisted of secondary refuse deposits that overlaid natural, sterile soil.

In all cases where cultural material was present in test units, it occurred either in a single layer (usually I), or as a continuous deposit (I/II), with no sterile zones between cultural layers. It was therefore not possible to identify temporally discreet cultural deposits within individual test units. This condition is believed to be the result of post-use disturbances at most of the sites. The primary disturbances include cattle and deer trampling, machinery, *panini* thickets and wind erosion, all of which cause mixing of vertical soil units and contribute to surface deflation. Continued use of the area by local residents throughout the historic and modern eras has also contributed to vertical mixing of deposits and surface deflation.

Due to the lack of stratigraphic differentiation, and given the generally low volume of recovered materials at most sites, vertical provenience collections are combined here, and occurrences of cultural material between features and sites are compared, rather than comparing layers or arbitrary levels within test units. Detailed tables on the vertical distribution of recovered materials are provided for each test unit in Chapter 4.

Site	Fea.	Unit	Size (m)	B.O.E.	Cult. Layer	Shell Midden	Artifacts	Other
1853	5	TU-1	1 x 1	0.25 m	-	-	-	-
	6	TU-1	1 x 1	0.20 m	-	-	-	-
	7	TU-1	1 x 1	0.28 m	I (disturbed)	1 shell frag.	-	weathered coral
	8	TU-1	1 x 1	0.35 m	I	1.4 grams	1 ground stone	weathered coral
	14	TU-1	1 x 1	0.56 m	-	-	decayed metal	
1864	1	TU-1	1 x 1	0.25 m	-	-	-	-
	1	TU-2	1 x 1	0.25 m	-	-	-	-
	1	(1979)	1 x 1	0.25 m	-	-	-	-
2272	1	TU-1	1 x 1	0.55 m	-	-	-	-
	1	TU-2	1 x 1	0.72 m	-	-	-	-
	1	(1979)	1 x 1	0.25 m	-	-	-	-
	4	TU-1	1 x 1	0.72 m	-	-	-	-
5706	1	TU-1	1 x 1	0.35 m	II	63.15 grams	-	weathered coral
	2	TU-1	1 x 1	1.10 m	-	5.00 grams	-	coral, 'ili'ili
	2	TU-2	1 x 1	0.80 m	I/II	23.17 grams		coral, 'ili'ili
	5D	TU-1	1.5 x 1	0.38 m	I/II	182.5 grams		coral, 'ili'ili
	5A	TU-2	1 x 1	0.67	-	-	sinker (surface)	-
	5B	TU-3	1 x 1	0.40	-	-	-	-
	5A	TU-4	1 x 1	0.75	I/II	2.40 grams	-	'ili'ili
	5D	TU-5	1 x 1	0.40	I	104.71 grams		weathered coral
	5B	(2001)	.50 x .50	0.35	-	-	-	-
	8	TU-1	1 x 1	0.20	-	-	-	-
	10	TU-1	1 x 1	0.50 m	-	-	-	weathered coral
	11	TU-1	1 x 1	0.58 m	Burial pit fill	31.7 grams	-	coral, charcoal
	11	TU-2	1 x 1	0.14 m	-	-	-	-
	14	TU-1	1 x 1	0.30 m	I/II	34.75 grams	2 basalt flakes	sandstone
	17	TU-1	1 x 1	0.52 m	-	1 shell frag.	-	weathered coral
5707	1	prior	.50 x .50	0.35 m	-	-	-	-
	2	TU-1	1.3 x 1	0.44 m	I/II	91.9 grams	vol. glass, other	coral, charcoal
	4	TU-1	1 x 1	0.40 m	II-1	13.9 grams	-	weathered coral
	5	prior	.50 x .50	0.44	-	1 shell frag.	-	weathered coral
5708	1	TU-1	1 x 1	0.97 m	fill	72.55 grams	modern refuse	coral, vertebrates
	3	TU-1	1 x 1	0.55 m	I/II	540.60 grams	hist/mod refuse	coral, 'ili'ili, verts.
5710	3	TU-1	1 x 1	0.12 m	-	0.30	-	weathered coral
	4	ST-1	.50 x .50	0.28 m	-	-	-	-
	5	ST-1	.50 x .50	0.15 m	-	-	-	-

Table 5.1 Summary of Subsurface Testing

Site	Fea.	Unit	Size	B.O.E.	Cultural Layer	Midden	Artifacts	Other
5711	3	TU-1	1 x 1	0.48 m	I	220.67 grams	9 volcanic glass	coral, charcoal
	4	ST-1	.50 x .50	0.27 m	I	-	-	coral, charcoal
	4	ST-2	.50 x .50	0.23 m	I	-	6 volcanic glass	coral, charcoal
	4	TU-1	1.50 x .50	0.67	I	450.62 grams	-	coral, charcoal
	4	TU-2	1 x 1	0.40	I	243.70 grams	1 volcanic glass	coral, charcoal
	4	TU-3	1.50 x 1	0.30	I	226.62 grams		coral, charcoal
	7	TU-1	1 x 1	0.80 m	-	1.70 grams	hammerstone	
	8	TU-1	1 x 1	0.73	-	0.70 gram	-	branch coral
5795	-	TU-4	1 x 1	0.25 m	-	1.3 grams	-	-
		TU-5	1 x 1	0.15 m	-	-	-	-
		Prior-1	1 x 1	0.27 m	-	-	glass marble frag.	-
		Prior-2	1 x 1	0.30 m	-	-	-	-
		Prior-3	2 x 1	0.15 m	-	-	-	-
		(1978)	1.5 x .5	0.10 m	0.05-0.10 m	-	-	-
5796	-	TU-4	1 x 1	0.25 m	-	1 waterworn frag.	-	2 coral pcs.
		Prior-1	1 x1	0.20 m	-	3 shell fragments	-	-
		Prior-2	1 x 1	0.27 m	-	-	-	-
		Prior-3	1 x 2	0.25 m	-	1 shell fragment	glass bottle sherds	4 coral pcs.
		1978-1	1 x 1	ND	-	Bird bone (?)	-	-
		1978-2	1 x 1	ND	-	Cypraeidae (?)	-	-
1007	6	ST-1	.50 x .50	0.35 m	I/II	eggshell, fishbone	structural, slate	
		ST-2	.50 x .50	0.30	I/II	-	flat glass, nails	
		ST-3	.50 x .50	0.30	I	-	flat glass, nails	
		ST-4	.50 x .50	0.30	I/II	-	structural, slate	coral, basalt

Table 5.1. Summary of Subsurface Testing (cont.)

Faunal Remains

Faunal remains representing either marine shellfish or vertebrates were recovered from 20 features at eight sites within the project area (*Table 5.2*). Marine shellfish collections range from one to 1,261 specimens at nineteen features, for a total of 2,329 specimens (1,230.45 grams). Vertebrate collections range from one to 354 specimens at eight features, with a total of 547 specimens (498.26 grams). Both of these faunal assemblages are dominated by the collection from Site 5708-3, which accounts for 52% of the marine shellfish (44% by weight) and 65% of the vertebrates (77% by weight). This collection, together with the collection from 5708-1, stand out as having high counts for both invertebrates and vertebrates, reflecting both the nature and time frame of these two collections, which are from areas of permanent historic/modern habitation. The vertebrate collections from the two features at Site 5708 reflect cultural behavior and represent dietary components such as pork (medium mammal), beef (large mammal) and chicken (fowl and eggshell). In comparing these two collections, we find a greater amount of fish remains at Feature 1, with no chicken and markedly lower relative frequencies of pork and beef as compared to the Feature 3 collection. These differences support the hypothesis that these collections derived from different households.

In contrast, the vertebrate collections from the other six features within the project area are predominantly non-cultural introductions such as deer, rodents, and mongoose. The largest vertebrate

Site/Feature	1853-7		1853-8		5706-1		5706-2		5706-5		5706-10		5706-11		5706-16		5706-17		5707-2		5707-4		5709-1		5709-3		5710-3		5711-3		5711-4		5711-7		5711-8		5719		5720		TOTAL	
	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt	Ct	Wt
Gastropoda																																										
Cerithidea															1	1.00																									1	1.00
Littorinopsis							1	0.02																																	1	0.02
Cypraeidae					3	4.60	5	7.50	19	11.65					1	0.60					1	0.70	9	8.50	12	11.70			44	9.70	99	103.10					1	0.20	183	161.45
Cerithidae	1	13.80	6	5.70	42	42.50	11	4.65	193	149.47			37	25.40	26	13.40	1	0.20	15	10.20	5	15.20	27	25.40	279	185.90			132	104.70	664	501.15	3	1.70	3	2.20	3	1.70			1053	817.75
Euplica turturina																									2	0.90															2	0.90
Hydrobia ulvae		1	0.65																																						1	0.65
Littorina pintado					1	0.75			51	12.05													4	1.60			9	1.60			17	3.45									82	22.35
Nerita picea																											1	0.50													1	0.50
Nerita polita					44	7.05	12	1.80	475	131.16			22	2.70	6	0.95			25	3.60			22	17.05	652	202.90	1	0.20	42	6.20	189	51.60									1049	347.46
Neritina granulata																															2	0.20									2	0.20
Neritina vespertina																															1	0.25									1	0.25
Morula granulata																															4	1.10									4	1.10
Thaididae		2	0.70	2	1.40	5	1.40	14	7.40			2	0.50				10	2.50			1	2.40	2.5	7.20	5	1.50					30	7.00		1	0.50					50	19.40
Planaxis sulcatus							1	0.02	5	0.30			11	0.70											1	0.10			2	0.50	3	0.70									23	3.30
Tectarius																													2	1.90											2	1.90
Thaididae				3	2.90	2	1.50	16	10.90			2	0.60	3	1.00		5	13.90					15	26.50			23	19.00	54	39.30									126	140.10
Drupa morum								5	14.20														3	5.90																	8	20.10
Drupa rubusidaeus								14	7.95														2	2.80			7	1.20													23	12.95
Morula uniserialis																							1	1.30							7	6.70									8	8.00
Thais lamellosa								24	10.30																																24	10.30
Thaisalvinia kiosta								2	1.10														1	0.50			2	2.00	1	0.90											7	4.50
Strombidae							1	0.05	2	0.90																															3	0.95
Terebralia								1	0.40																						2	1.40									3	1.80
Unidentified				6	0.60	15	5.75	6	0.70			7	0.40	23	4.25		34	29.95			3	0.40	5	0.75	3	0.30	84	4.20	26	3.50									300	57.85
Bivalves																																										
Isognomon californicum		5	0.25	4	1.05	5	1.05	6	1.95			4	0.40										7	1.90			1	0.05	7	1.90									40	9.75
Malleodes						1	0.05	1	0.10																				54	1.85									96	1.95
Spondylus						2	1.85												2	0.30									4	2.45									8	2.55
Tellinidae																			1	0.20																			1	0.20
Unidentified																									1	0.20													1	0.20
Echinoids																																										
Mauia				2	0.15			15	1.05												5	0.30	1	0.30			3	0.25	12	3.35									39	5.95
Shell				11	0.80	8	0.15	26	2.85												53	7.40	30	3.65			8	0.80	583	21.65									712	37.40
Spine				5	0.25	4	0.20					7	3.35								1	0.70	15	3.25			50	7.35	2	0.25									102	22.80
Crustacea																					1	0.00	2	0.00					54	12.00									59	14.00
Total Shellfish	1	13.40	14	5.60	121	63.15	72	23.17	894	393.21	0	0.00	93	37.70	61	22.60	1	0.20	50	31.80	7	13.90	135	72.85	1245	448.60	3	3.30	377	59.60	1286	614.65	2	1.70	3	0.70	3	1.50	1	0.30	4260	1914.60
Vertebrates																																										
Fish						1	0.05																30	8.40	33	3.70			12	2.35	43	1.90									121	17.40
Fish scale																																									1	0.[illegible]
Frog																									15	2.20															15	2.20
Amphibian/reptile																									26	1.60															26	1.60
Small Mammal						4	2.60				3	3.40											1	0.10	2	1.20															10	5.40
Rattus																			3	1.20			12	3.50	165	50.50					9	3.20									177	62.70
Large Mammal						3	3.40	2	0.95										2	2.80			29	58.80	117	370.60			2	12.40											154	461.00
Rodent					1	0.10	3	0.01	1	0.10													1	0.00																	6	0.00
Adult Mammal																			1	0.10			27	9.05	6	1.50					2	1.00									36	10.75
Total Vertebrates	0	0.00	0	0.00	1	0.10	9	2.20	3	1.05	3	0.40	0	0.00	0	0.00	0	0.00	4	3.80	0	0.00	100	31.67	364	58.10	0	0.00	14	15.15	57	6.20	0	0.00	0	0.00	0	0.00	0	0.00	543	108.10
Total Faunal	1	13.40	14	5.60	122	63.25	81	25.48	897	400.26	3	0.40	93	37.70	61	22.60	1	0.20	54	35.60	7	13.90	235	104.52	1610	506.70	3	3.30	391	73.75	1343	620.85	2	1.70	3	0.70	3	1.50	1	0.30	4803	2022.70

Table 5.2 Summary of Recovered Faunal Remains

collection among these six is from Site 5711-3, which shows 14 specimens at 15.15 grams. Two of the specimens from this collection (82% of the total weight at 12.40 grams) are deer bones that were introduced to the deposit by natural processes. The 12 fish bones found at 5711-3 do, however, reflect cultural behavior, and this fish bone collection is the largest (both in count and in size of fish represented) among the six traditional Hawaiian vertebrate collections (*Table 5.2*). The second-largest vertebrate collection from a traditional component (5706-2), includes rodent, deer and mongoose remains, all of which are non-cultural introductions. The only vertebrate element from this feature that reflects cultural behavior is the single fish bone.

Traditional vertebrate collections that reflect cultural behavior include fish specimens from 5606-2, 5706-5, 5711-4, and 5711-3. In comparing these four collections, it is clear that the two Site 5711 features show a markedly higher occurrence rate of fish remains, as compared to the Site 5706 features. This may reflect its use in relationship to the nearby *ko'a*, as a place where fish and other food items were left as offerings. Preservation is also a factor; the area of Site 5711 appears to have been less impacted by reuse. In comparing the invertebrate collections, it is apparent that the Site 5708-3 collection is both the largest and has the greatest variety, with 13 identifiable families or species represented. Species that occur only in this collection include *Euplica turturina*, *Drupa morum*, and *Morula granulata*. The occurrence of the two *Thaididae* species may be a reflection of better preservation, which allowed recognition of these specimens.

The other historic era invertebrate collection from 5708-1 contrasts with the Feature 3 collection in both its relatively small numbers and very low variety. Only six shellfish families are represented at 5708-1, which is less than five of the fifteen non-historic collections. Again, this points to dietary differences between the two feature collections from Site 5708. One trait held in common to both collections is a small amount of *Crustacea* shell, which was found only in these two historic/modern collections.

The invertebrate collection from Site 5711 Feature 4 is the largest by count among the traditional components, with 1,286 specimens (914.69 grams) representing 17 shellfish families or species, and *Echinoidea*. Other relatively large collections were obtained from Site 5706 Feature 5D and 5711 Feature 3. The latter collection consists of 377 specimens (220.67 grams) representing 11 species or families and Echinoidea, and the Site 5706 Feature 5D collection shows 894 specimens at 393.21 grams. A comparison of the shellfish densities per liter of screened soil shows a higher density for 5706-5D (2.3 grams per liter) as opposed to 5711-3 (1.9 grams per liter).

In comparing the shellfish collections, we find clear differences in the frequencies of key shellfish, such as *Nerita picea*, which shows 475 specimens at 5706-5D (53%), as compared to 46 specimens (12%) at 5711-3, and 189 (15%) at Site 5711 Feature 4. Likewise, *Litorina pintado* shows 51 specimens (6%) at 5706-5D compared to 9 (2%) at 5711-3 and 17 (1%) at 5711-4. *Cypraeidae* show 183 specimens (20%) at 5706-5D, compared to 142 (38%) at 5711-3 and 664 (52%) at 5711-4. Both of the Site 5711 collections also shows considerably more *Echinoidea* than does the 5706-5D collection. These differences may well reflect both temporal and functional distinctions between the two sites. The 5711-3 collection dates to AD 1400-1440; whereas the 5706-5D and 5711-4 collections could date to the middle seventeenth century. Functionally, Feature 5706-5D is a habitation component represented by a midden scatter with no clearly associated surface structure. The features at Site 5711 include a terrace and partial enclosure that are believed to have some level of ceremonial function, due to the size of the terrace (it is too small for a habitation area) and association with the Site 5711-1 *ko'a* platform and the 5711-8 *ko'a* terrace.

The fourth and only other traditional faunal collection to contain over 100 specimens is from Site 5706 Feature 1, located at the northern edge of Parcel 37. This collection includes 121 shellfish specimens (63.15 grams) and no vertebrate remains that reflect cultural behavior. This collection is predominantly *Cypraeidae* (42) and *Nerita picea* (44), with the remaining 42% represented by five shellfish families and *Echinoidea*. *Cypraeidea* predominates in both count and/or weight across 11 the remaining 13 traditional era shellfish collections. The only two collections that contained shellfish, but no *Cypraeidea*, were recovered from Site 5710 (Features 3 and 4). Three collections consist of only *Cypraeidea* (one or two specimens) these occur at 1853-7, 5706-17, and 5711-7. By weight, this family is the most common across the project area, and it accounts for 48% of all invertebrates collected. None of the *Cypraeidea* specimens collected were complete, and none were of sufficient size or preservation to determine species. By count, *Nerita picea* is the most frequently occurring species, with 594 specimens collected (26% of total). Nearly all of these specimens represent a complete shell or a single individual.

Site-Feature	Basalt Flakes	Coral	Ground Stone	Sandstone (formed)	Shell	Volcanic Glass	TOTAL
1853-8				1 knob			1
1864-1			1 cobble				1
5706-5A			1 sinker				1
5706-14	2				1 hook frag.		3
5707-2	6	1 abrader	1 fragment		1 cut blank	7	16
5707-4						2	2
5708-3	1		1 fragment			2	4
5711-3						9	9
5711-4						5	5
5711-7			1 hammerstone				1
Total	**9**	**1**	**5**	**1**	**2**	**25**	**43**

Table 5.3 Summary of Recovered Traditional Artifacts

Artifacts

A total of 43 traditional artifacts were recovered from ten features at six sites during the current survey, including four items from the surface and 34 from subsurface contexts. Material categories represented include coral (1), shell (2), ground stone (5), fine-grained basalt (9), beach conglomerate sandstone (1) and volcanic glass (25). Nearly half (4) of the features with traditional artifacts show a single item recovered. In two of these cases, the artifacts are of ground stone and were recovered from the surface (1864 and 5706-5A), and in two cases the artifacts were of ground stone found in stone fill (5711-7) or on a former surface beneath wall fall (1853-8). The largest traditional artifact collection is from Site 5707 Feature 2, which has 16 items in five different material categories (*Table 5.3*). The second-ranked collection size (nine items) is from Site 5711-3; all of these artifacts are volcanic glass flakes. The artifacts are described here by material category

Basalt Flakes

All seven of the recovered basalt flakes are tertiary reduction flakes that show no remnants of the original stone cortex. They are all complete or nearly complete, and they show no evidence of use modification or wear. Two general size groups are represented; two large flakes (13.8 and 13.3 grams) were recovered from Sites 5707 and 5708; and five small flakes (0.5 to 0.9 grams) were recovered from sites 5706 (2) and 5707 (3). The basalt is dark gray (10YR4/1), with the Site 5708 specimen a very dark gray (10YR3/1). No vesicles or inclusions were seen in any of these flakes. The Site 5708 specimen shows a finer grain than do the other six specimens.

Coral

The single coral artifact was recovered from the north wall of Test Unit 1 at Site 5707 Feature 2. The artifact was situated within Layer II-1, at 0.20 meter below surface. It appears to be relatively complete, although it is weathered. Overall shape is file-like, with one utilized filing edge along the length of the item (*Photo 5.1*). It is asymmetric in cross-section, with one broad lateral edge and one thin lateral edge. The tip exhibits a blunt point. The abrader is 30.28 mm long by 12.28 mm wide at the proximal end and 6.00 mm at the distal end. Maximum thickness is along the dorsal (unused) edge, at 6.30 mm; the sawing or filing edge is 2.00 mm thick or less. Weight is 2.3 grams.

Shell

Two shell items were recovered, including a fishhook fragment from the surface at Site 5706 Feature 14 and a piece of cut shell from Site 5707 Feature 2 The fishhook fragment represents approximately 25% of a one-piece jabbing type hook, with the tip of the hook and the shank missing (*Photo 5.2*). The item measures 12.4 mm from the two broken ends to the base, and has a maximum width of 16.8 mm at the broken ends. Thickness is 4. 2 mm and weight is 1.1 gram. The artifact was found in a deer trail on the

surface of a midden scatter feature; structural features are not immediately associated with the scatter; however Feature 5706-11, a stone platform with at least one *in situ* burial is nearby.

The second shell artifact was recovered during excavation of the test unit at Site 5707 Feature 2, from Layer II-1 (0.20 meter below surface). This is a roughly rectangular piece of shell that exhibits cut edges along the two short sides (*Photo 5.2*). The item is 18.4 to 20. 3 mm long by 10.2 to 12.6 mm wide and 1.9 to 3.6 mm thick. Weight is 1.4 grams. The item is beveled along the major axis, however it is too weathered to determine if this is the result of use or natural causes. Both long edges show flaking and wear that reflect natural weathering. The surfaces of both sides are also quite weathered and there is no natural sheen left on the dorsal side of the piece. This item may have been either a hook tab or a shell scraper.

Ground Stone

Two complete formed ground stone artifacts were recovered from surface contexts during the survey. These include a breadloaf sinker and a unifacially ground cobble. The sinker was found on the surface of the Site 5706 Feature 5A pavement, near the center of the structure (*Photo 5.3*). It is made from red (7.5R4/6) siltstone that has black (7.5R2.5/0) and yellow (10YR7/6) inclusions. No crystalline inclusions are present, however, the stone show numerous vesicles where other inclusions have fallen out. It is a relatively soft stone and it shows evidence of battering on the dorsal and lateral sides. The item is 62.4 mm long by 33.1 mm wide at the dorsal side and 25.9 mm wide at the ventral side. Thickness is 35.5 mm a the center and 24.8 at the ends. The is one continuous groove around the sinker, 9.2 mm from the ventral side; this groove is 3.4 to 4.4 mm wide and 1.8 mm deep. A second groove is present down the center of the ventral side; this groove is 4.3 mm wide and 1.5 to 1.8 mm deep. The sinker weighs 99.3 grams.

This sinker is relatively small in comparison to a sample of 10 breadloaf sinkers recovered form an underwater site offshore from Maluaka Point at a depth of 85 feet (Donham and Severns 1994). The size range within that collection was 256.0 to 632.7 grams. Among a total of 38 sinkers of various forms recovered from underwater contexts in Mākena Bay, the smallest weighed 163 grams (Donham and Severns 1994:6). A significant correlation was found between the size and weight of these sinkers and the depth of water where they used and later found; thus there is some basis for inferring that the small sinker found at site 5706 was most likely used in waters less than 80 feet deep.

The second ground stone specimen was recovered from the surface at Site 1864 Feature 1. This item is composed of dense andesitic stone (Hawaiite or Mugearite) with medium to small olivine crystal inclusions. The stone is dark reddish brown (5YR3/20 with small pinkish gray (5YR7/2) inclusions and crystalline glittering throughout (*Photo 5.4*). One face of the stone (the ventral side) has been ground flat; the remaining faces are smoothly rounded, probably from grinding. There is evidence of pecking in the center of the dorsal side, and to a limited extent on the lateral sides. The stone is 99.6 mm long by 70.0 mm wide and 58.6 mm thick in the center. The ground surface has the same length and width as the overall stone dimensions. Weight of the item is 795.4 grams. The very hard and rather gritty texture of this stone would have served well for purposes of smoothing materials such as wood. The stone apparently also served in some capacity as a hammering tool. Oddly, no other artifacts or midden materials were found at Site 1864.

One complete unformed ground stone tool was recovered from the project area. This item is a basalt cobble that exhibits one ground face in addition to numerous pounding and pecking scars. This item was found in the stone fill layer of the Site 5711 Feature 7 pavement (*Photo 5.5*). The cobble is 110.6 by 82.0 by 77.8 mm and weighs 989.4 grams. The ground surface is on a lateral side and is 65.0 mm in diameter and has a maximum depression in the center of 1.0 mm. There are three large flake scars at corner points on the stone; these appear to be the result of striking a sharp item with force. The dorsal surface of the stone is heavily scared with pecking marks, and there are two other small localizations of pecking scars along margins. Overall, the stone shows evidence of varied use, either extensively over time or intensively within a short time period. The tool was found in a secondary context, among other stones that were introduced into the feature from (probably) the surrounding areas. No other artifacts and only traces of midden were found at Feature 7.

Two fragments of ground stone tools were recovered; the largest is a flake from a dense fine-grained dark gray (10YR4/1) basalt stone that shows a flat ground surface and a ground margin. The flake was recovered from the upper level of Layer I at Site 5708 Feature 3, within a concentration of historic and modern debris. The flake has been exposed to heating with metallic debris, and some of this material adheres to the ground surface. Overall dimensions are 59.0 by 31.6 by 8.3 mm. Weight is 14.1 grams. The original size and shape of this item is difficult to estimate; the arc of the ground margin suggests that the stone was at least as large as the complete item found at Site 1864. This artifact was clearly in a secondary context, as were all the other artifacts recovered at this refuse concentration.

The second fragmentary ground stone was recovered from Layer III-1 at Site 5707 Feature 2. It is the fragment of a black (2.5YR2.5/0) vesicular basalt stone that shows olivine and light reddish brown (2.5YR4/8) hematite inclusions. The item shows evidence of use after it was broken from a larger stone. It is multifaceted, with dimensions of 19.8 by 18.9 by 12.9 mm, and weighs 5.05 grams. Three facets on the original break edge show evidence of grinding. The largest of these areas in roughly oval (14.0 by 12.0 mm) and the smallest is triangular (10.0 by 10.0 mm). These surfaces are flat to slightly concave. The tool appears to have been used for specialized grinding or polishing of small items. It was found in a primary context with a number of other traditional artifacts, including basalt flakes, a coral abrader, cut shell and volcanic glass flakes.

Sandstone

A single formed sandstone artifact was recovered from the surface of Layer I-1 at Site 1853 Feature 8B. This item is made from black and white (10YR 2/1 and 8/1) beach conglomerate sandstone with small olivine crystal inclusions (*Photo 5.6*). This item appears to be the knob end of a grinding pestle or the knob of a large plummet-type sinker. It is round in cross section and concave-sided in profile, with a length of 37.0 mm. The top end is nearly complete and is convex, with a diameter of 26.0 mm. The stem constricts to a diameter of 22.0 mm, and the broken end expands to a diameter of 26.9 mm. Weight is 40.1 grams. The exterior surface of the item is rough due to exfoliation of sand particles.

This stone is relatively soft, and if it was used for grinding, it would have been applied to soft materials, such as *noni*, *awa* root , charcoal, or *kukui* nut meat. The likely form would have been relatively long and narrow, with a gradually expanding diameter. Several such pestles with knobs similar to this artifact are depicted in Brigham's compendium of artifacts from the Bishop Museum (Brigham 1902: 361-363, Plates XLI, XLII). According to Brigham, at the turn of the century, this type of pestle was referred to as a "*noni* pounder" (Brigham 1902:362).

Knob-type tyeing ends also occur on plummet type sinkers, however, in most cases the knob has a much shorter axis and a marked expansion at the top, so as the keep a line secure (Brigham 1902:406). The item found here does not exhibit these traits.

Volcanic Glass

A total of 25 volcanic glass flakes were recovered from five locations within the project area (*Table 5.3*), with the largest single collection (9 flakes) from Site 5711 Feature 3. These nine items were recovered from three levels within Layer I of Test Unit 1. A single flake in level 1, and four pieces were found in each of levels 2 and 3. One of the items in this collection, from I-2, is a natural glass nodule (1.35 grams) with weathered facets that has no evidence of use or flaking. Two items are primary core reduction chunks that exhibit cortex on the entire dorsal surface as well as on lateral sides. These items weigh 4.0 and 1.3 grams and were recovered from I-1 and I-3 respectively. Three of the items are primary core reduction flakes, with entire dorsal surfaces of cortex; they range from 0.25 to 0.9 grams in weight. Two of the items are secondary reduction flakes, at 0.3 and 0.5 grams each; and there is one complete tertiary flake at 0.5 grams. Also recovered from Site 5711 (Feature 4, Layer I) were five volcanic glass items, including one primary core reduction chunk (0.8 grams) one tertiary chunk with a mineral inclusion (0.1 gram) and three minute tertiary flakes at less than 0.1 gram each.

The volcanic glass collection from Site 5707 Feature 2 has the second-highest count with seven items. These include one relatively large (4.0 grams) primary core reduction chunk and four tertiary flakes (0.1 to 0.4 grams). The core reduction chunk is predominantly cortex, and the minute tertiary flakes show no evidence of use. Also recovered from Site 5707 (Feature 4) were two small tertiary flakes (0.1 gram each)

from Layer II-1 of the test unit. Naturally formed volcanic glass crystals were present in the soil at this feature as well, with eight crystals recovered from 1/8 inch screened soil.

The final volcanic glass item was recovered from Site 5708 Feature 3, Layer I-1 and consists of a secondary reduction flake (0.45 grams) with no evidence of use. None of the 22 volcanic glass items show evidence of use modification or use wear. These artifacts have not, however, been subjected to microscopic examination to determine whether minute wear scars are present.

Historic/Modern Artifacts

Artifacts dating to the nineteenth and twentieth centuries were recovered from six sites within the project area - 1007, 1853, 5706, 5707, 5708 and 5710. The collection from two features at Site 5708 is comprised of 6,090 items; the Site 1007 collection (from four shovel tests) consists of 397 items; and the other four collections consist of single lots or single items only. These smaller collections will be discussed first.

Two small pieces of decomposed metal were recovered from the base of a stone fill deposit at Site 1853 Feature 14. These small flake-like pieces could not be further identified.

One historic artifact was recovered from the surface at Site 5706 Feature 11. This is the rim section of a stoneware crockery bowl (*Photo 5.7*). The paste is quite hard and shows no granular inclusions; the glaze is lead on the exterior with clear salt glaze on the top of the rim and clear salt glaze over white paste on the interior. The execution of the glaze, overall form and paste quality suggests twentieth century factory production.

The historic artifact recovered from Site 5707 consists of the mid-shaft portion of a square nail, in five pieces. The item was recovered from Layer II-1 of the test unit at Feature 2.

A metal item represented by 156 fragments was recovered from the upper level of the excavation unit at Site 5710 Feature 3. This item was partially buried and visible from the surface prior to excavation; it appears to be a 3-pound size coffee can. It is likely that this item was brought into the site along with other planting paraphernalia such as potting soil that was seen in the general area. The artifact is taken to reflect modern reuse of the site for planting.

The historic/modern collection from Site 5708 Feature 1 consists of 933 items, most of which (710, 76%) are pieces of metal. All of the metal items appear to be modern is age and most appear to date from the 1960s or 1970s. These include such items as paint cans, crown bottle caps, food cans, window and hardware screen, tarp grommets, and pieces of barbed wire (*Table 5.4*). Glass is the second highest in frequency, with 125 items collected. Clear glass is the most common, representing 95% of the glass collection. All items in this category also appear to be modern and most likely date to c. 1960 or later. The brown beverage bottles are crown cap disposable "stubby" beer bottles, of the style common in the 1960s and 70s. The bottles are embossed with "no deposit no return" and "not to be refilled".

Ceramic items recovered from Site 5708 Feature 1 include seven sherds from an unglazed modern earthenware flower pot and seven porcelain sherds, four of which represent an single saucer. The porcelain sherds are all white glazed with no decoration present. Other recovered items include the remnants of a leather boot, found at the base of the deposit, and 5 plastic items, including two buttons, a piece of a comb, and two fragments of plastic food (i.e., Saran) wrap. All of the materials recovered from Feature 1 are most likely less than 50 years in age, although some items could date to the 1940s or 1950s.

The artifact collection from Site 5708 Feature 3 is considerably larger than the Feature 1 collection, with at total of 5,157 items collected (*Table 5.5*). As with Feature 1, the predominant material category is metal, with 3,092 items (60%). Over half of the metal items at Feature 3 are tin food cans and pieces (62%), compared to 22% at Feature 1. These cans are middle to late twentieth century manufacture. Shapes include flat cans normally used for sardines and other fish products, rectangular cans normally used for meats, such as *Spam*, and round cans normally used for fruits and vegetables. Also recovered were metal keys used to open sardine cans. Metal from Feature 3 also showed the presence of at least one large container, as did Feature 1. These items were most likely 55 gallon drums that were used to burn trash. The pieces of this container at feature 3 had been exposed to heat, and several are adhering to melted glass or other materials.

SITE 5708 FEA 1, TU-1	II-1	II-2	II-3	II-4	II-5	II-6	II-7	TOTAL
Depth in cm BG	15-20	20-25	25-30	30-35	35-40	40-45	45-50	
CERAMIC								
EARTHENWARE	7							7
PORCELAIN	4 (1)	1	1		1			7
TOTAL CERAMIC	11	1	1	0	1	0	0	14
GLASS								
CLEAR								
Bottle, beverage	11							11
Bottle, condiment	7							7
Jar, food	13 (1)							13
Medicinal bottle/vial	17 (2)							17
Curved (bottle/jar)	7			2				9
Kitchenware	28							28
Light bulb				1				1
Flat glass	41	4						45
SUBTOTAL CLEAR	111	4	0	3	0	0	0	118
BROWN, bottle, beverage	5 (2)							5
GREEN, bottle/jar	2							2
TOTAL GLASS	118	4	0	3	0	0	0	125
LEATHER								
Belt/strap	1							1
Shoe/boot					5	24	14	63
METAL								
TIN/STEEL								
Band							5	5
Bolt	1							1
Can, food		9	3		39	113		166
Can, paint			18					76
Cap, crown	6		1		1			8
Chain			1			16	21	37
Fishhook						2		2
Flat steel, large container	173	48						221
Gear, small	1							1
Grommet	1	2						3
Hoe						3		3
Horseshoe						1		1
Key, can opener	11							11
Nail, wire	43	31	22		6	4	6	111
Plumbing	1							1
Screen, hardware cl.	4							4
Screen, filler slate	2							2
Screw	1							1
Snap	1							1
Spike			2			4		6
Staple (fencing)	2	2						4
Utensil					1			1
Wing Nut			1					1
Wire, smooth	1	1				1		3
Wire, barbed	1							1
Wire, braided	1	1	3		1			6
Indeterminate	12	12	7					31
SUBTOTAL TIN/STEEL	262	106	118	0	39	144	31	700
COPPER								
Indeterminate	1							1
ALUMINUM								
Cannister top	1							1
LEAD								
Window sealant	1							1
Melted drop	1							1
MIXED MATERIALS								
Battery, D-cell	1							1
SUBTOTAL OTHER METAL	5							5
TOTAL METAL	267	106	118	0	0	0	0	710
MORTAR								
Brick	1							1
Unfinished	17	1	3					21
TOTAL MORTAR	18	1	3					22
PLASTIC								
Button	1		1					2
Comb						1		1
Sheathing				2				2
TOTAL PLASTIC	1	0	1	2	0	1	0	5
GRAND TOTAL	414	112	123	5	45	169	69	933

Table 5.4 Summary of Recovered Artifacts, Site 5708 Feature 1, Test Unit 1

SITE 5708 FEA 3, TU-1	I-1	I-2	II-1	II-2	III-1	TOTAL
Depth in cm BG	0/8-10/15	10/15-20/23	20/23-30	30-40/43	40/43-55	
BONE						
Button	1	1				2
CERAMIC						
EARTHENWARE				2		2
WHITEWARE						
Bowl	1	1				2
Handle (chamber pot)	1					1
Plate/saucer	1		1			2
TRANSFER PRINT	1	2		1		4
STAMPED/PAINTED		2				2
PORCELAIN	1	1		2		4
TOTAL CERAMIC	6	7	1	4	0	17
FILM						
Cellophane, film			1	1		2
GLASS						
CLEAR						
Bottle, beverage	16	15	1	54 (6)		88
Bottle, condiment		1	8	12 (3)		21
Clock face				1		1
Eyeglass lens			1			1
Glass, beverage				10 (3)		10
Ink bottle				1 (1)		1
Jar, food	46	20 (1)	38	21		125
Medicinal bottle/vial	1	1	2	1		5
Medicinal bottle/panel		3				3
Curved (bottle/jar)	225	134	22	118		499
Kitchenware	7		3	1		11
Lamp chimney		18	43	36		97
Light bulb	3	8	11	4		26
Flat glass	2		2	4		8
Melted glob	2	1	7	1		11
SUBTOTAL CLEAR	304	201	139	263		905
AMBER-bottle/jar		1				1
BLACK-button		1				1
BROWN						
Bottle, beverage	124	125	344 (16)	279 (21)		872
Bottle, bleach			12 (1)			12
GREEN-bottle/jar	5	2	26 (3)			33
LIGHT GREEN-bottle			7	8 (1)		15
BLUE-indeterminate	1	1				2
AQUA-bottle/jar	2	1	7 (1)	8 (2)		18
AQUA-coke bottle				9 (1)		9
OLIVE			1	2		3
WHITE						
Button	1	1				2
Houseware	3		1	1		5
SUBTOTAL OTHER GLASS	136	132	396	307	0	973
MIXED MELTDOWN	10					10
TOTAL GLASS	450	332	537	570	0	1888

Table 5.5 Summary of Recovered Artifacts, Site 5708 Feature 3, Test Unit 1

SITE 5708 FEA 3, TU-1	I-1	I-2	II-1	II-2	III-1	TOTAL
Depth in cm BD	0/8-10/15	10/15-20/23	20/23-30	30-40/43	40/43-55	
LEATHER						
Strap or belt fragment	2					2
METAL						
TIN/STEEL						
Band				6		6
Bolt			1			1
Buckle	4 (1)		1			5
Button	1	3	1			5
Cable, automotive		3				3
Can, food	41	759	571	488	2	1869
Cap, crown	45	46	25	38		154
Chain	1					1
Disc				1		1
Fastener			3	4		7
Fencing, barbed wire		1		13		14
Fencing, chicken wire	71	39	96	124		329
File			1			1
Flat sled (large container)	297	67	81	27		472
Eyelet (boot lace)	1	4	2	1		8
Handle, drawer		1		1		2
Harness ring	7	2				9
Hinge	1					1
Horse shoe				1		1
Key, can opener	2	1				3
Nail, wire	105	115	61	148		432
Plumbing	1					1
Screen, hardware cl.	2		3	15		20
Screw		1	1	2		4
Scissors				1		1
Snap	1	3	1	2		7
Spike	1		1			2
Staple (fencing)	5	2	1	3		11
Spur	2 (1)					2
Tack			3			3
Toy, car wheel		1				1
Utensil, serving spoon		1				1
Window shade hardware		2				2
Wire, smooth	3	5	3	1		13
Indeterminate	24	5	12	20		61
SUBTOTAL TIN/STEEL	616	1074	887	492	2	3013
COPPER						
Flashing	2	1	1	2		6
Household hardware		1				1
Light bulb base			2			2
Pipe			1			1
Wire, insulated	6	3		3		12
Wire, uninsulated	1		3			4
Tube				1		1
BRASS						
Button or stud		1				1
Casing-ammunition	3					3
Household hardware		1				1
Injector plug-diesel	2					3
Pencil eraser band		1				1
Stud, saddle/harness		5				5
Tack-roofing	4		1			5
ALUMINUM						
Crown cap liner	2	1				3
Foil	6	8	5	2		21
Opener strip (bottle)	1					1
LEAD						
Molten drop	1			2		3
MIXED MATERIALS						
Battery, D Cell	1					1
SUBTOTAL OTHER METAL	29	27	13	10		79
TOTAL METAL	647	1101	880	462	2	3092

Table 5.5 Summary of Recovered Artifacts, Site 5708 Feature 3, Test Unit 1 (Cont.)

SITE 5708 FEA 3, TU-1	I-1	I-2	II-1	II-2	III-1	TOTAL
Depth in cm BD	0/8-10/15	10/15-20/23	20/23-30	30-40/43	40/43-55	
CALKING -window		1	3	1		5
MICA- thin sheet			5			5
MORTAR						
Finished surface	3	9	4	12		28
Unfinished	8	32	9	24		73
Painted				2		2
TOTAL MORTAR	11	41	13	38		103
PLASTIC						
Bag	1					1
Bottle	2					2
Cap-screw type			1	1		2
Case	3					3
Comb-tooth			2			2
Sheet/wrap	7	1				8
Indeterminate			1			1
TOTAL PLASTIC	13	1	4	1		19
ROOFING -Mineral Surface		1				1
RUBBER						
Machinery belt			3			3
Button	1	2 (1)				3
Washer	1					1
SHELL						
Button	1	1	3 (3)	5		15
WOOD						
Round post cap						1
GRAND TOTAL	1132	1486	1464	1083	2	5157

Table 5.5 Summary of Recovered Artifacts, Site 5708 Feature 3 (Cont.)

The Feature 3 metal collection contained a greater proportion of copper, brass, and aluminum items as compared to Feature 1. A variety of items are represented in these categories, including household hardware and plumbing, personal possessions, clothing, automotive, and outdoor activities (ammunition, animal harness hardware). Items such as D-cell batteries, pieces of aluminum foil, and electric light bulb bases are clearly modern in age, and it is likely that most of the metal materials are less than 50 years in age; however, the presence of a few historic era glass and ceramic items suggests that some of the metal items could also be historic in age.

Ceramics recovered from Feature 3 include whiteware and porcelain. Among the whiteware items are six decorated body sherds from flatware items, and five undecorated sherds representing a bowl, a plate, a handle (chamber pot) and two flatware items. The decorated whiteware is transfer print, stamped (possibly sponge), and painted (*Photo 5.8*). These decorated ceramic sherds are generally assigned a manufacturer's date range of c. 1850-1920, which places them in an earlier time frame than most of the Feature 3 artifacts. The sherds could represent heirloom kitchenware that was present in a modern home, or could reflect evidence of mixing with an earlier historic era component that was probably just west of the Feature 3 location (i.e., Site Ma-B8-237).

Other artifacts that could represent an earlier component include two bone buttons, some of the 15 shell buttons that were recovered (*Photo 5.9*), a fragmentary metal spur, a horseshoe, and two olive bottle glass sherds. As indicated in the feature description, the deposit at Feature 3 was mixed and appeared to be re-deposited at the feature from a prior refuse dump location. It therefore seems likely that both the artifacts and midden deposit could represent more than one temporal component; however, the composition and design of the vast majority of the Feature 3 artifacts are modern and post-date *circa* 1940. A broad spectrum of domestic and outdoor activities, reflecting one or more permanent home sites, are represented among the over 5,000 items that were collected from a single test unit at Feature 3.

The final historic artifact collection was recovered from Site 1007 Feature 6, which is the site of the Mākena School building. A total of 397 artifacts were recovered from four shovel test units within and adjacent to the postulated footprint of the former building. These items are tabulated and discussed in Chapter 4. As indicated above, the bulk of recovered artifacts are structural in nature, representing window glass (217 items) and window glaze material (100 pieces). Less frequent are nails (6 round and 5 square) and pieces of structural lumber (none). Artifacts that reflect the specialized nature of the site include pieces of slate chalk board (10), six slate pencil fragments, 20 fragments of chalk, 10 pieces of no. 2 pencil lead, and two metal pencil eraser bands with portions of a wood pencil (*Photo 5.10*). The composition of the artifact collection from Site 1007 indicates that there has not been substantial subsurface disturbance of the deposit that dates to the time of school use. There is some modern rubbish on the site surface, however, this material is rather sparse to absent in subsurface contexts.

Portable Materials

Portable materials described here include unmodified pieces of coral, unmodified water worn basalt pebbles or small cobbles, and unmodified pieces of beach conglomerate sandstone. A total of 931 such items were recovered at 18 locations within the project area. These include 354 pieces of coral, 519 waterworn basalt pebbles, 34 waterworn marine shells, 11 pieces of unmodified sandstone, 12 pieces of pumice, and one piece of fire-cracked basalt (*Table 5.6*).

Site-Feature	Weathered Coral		Waterworn Coral		Branch Coral		Waterworn Basalt		Unmodified Sandstone		Other*	
	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.	Cnt.	Wt.
1007-6	1	1.0					2	6.0			2	1.0
1853-7	5	9.3										
1853-8	38	30.2					1	5.2				
5706-1	9	8.6					10	48.8			12	0.4
5706-2	21	249.0	12	176.9			82	360.1			2	0.5
5706-5	24	57.6	1	1.9			3	17.3			1	2.3
5706-10	4	0.6							1	12.2		
5706-11	26	38.7										
5706-14									1	222.6		
5706-17	5	9.0										
5707-2	32	367.8	22	250.0							1	12.1
5707-4	12	41.0										
5708-1	1	8.9	3	8.3			8	44.4			1	7.5
5708-3	20	52.0	25	58.6			411	1752.9			26	30.9
5710-3	1	0.2	2	9.5								
5711-3	34	12.3							6	8.8	2	7.8
5711-4	30	9.2							3	2.2		
5711-8	14	38.3			10	389.7	2	820.3				
5796	2	15.4										

*Other: 5706-1, pumice; 5707-2, fire-cracked basalt; all others, waterworn shell

Table 5.6 Summary of Recovered Portable Materials

Coral

Three types of unmodified coral are present within the project area; waterworn coral, weathered coral, and unweathered branch coral. Items classified as waterworn coral are rounded, pebble-sized pieces that exhibit a glossy, hard surface. These pieces are often found within *'ili'ili* pavement. Weathered coral is also waterworn, however it is has a rough exfoliated surface and is soft and friable; it can be broken with pressure between the fingers. Some of these items may represent remnants of former tools; however, their presence at some locations is not readily explainable. Unweathered branch coral is material that was removed live or recently dead from the ocean and taken to a designated location. These items are assumed to be offerings, and they were collected at only one tested location within the project area - Site 5711-8 - which is interpreted to be a *ko'a*. The branch coral and other portable materials collected from Site 5711 Feature 8 will be returned to its original location, as this feature will be preserved in place.

Basalt and Sandstone

Waterworn basalt pebbles and cobbles were recovered from subsurface contexts at eight features within the project area. Nearly all of the recovered items are small pebbles, of the size range found in *'ili'ili* paving. A few larger pebbles or cobbles were recovered; these items showed no indications of use; however, limited use for rubbing or similar purposes would not necessarily leave traces of the use. Significant amounts of these stones (over 50) were recovered from two locations, Site 5706 Feature 2 and Site 5708 Feature 3. At Site 5706 Feature 2, the pebbles were intermixed with *'a'ā* pebbles and cobbles that were used to fill a natural lava depression. They could represent a former pavement layer that got disturbed and displaced during subsequent activities at this location. The basalt pebbles at Site 5708 Feature 3 were clearly in a secondary context, as they were intermixed with a high concentration of mostly modern rubbish that had been deposited at the site along with the *'ili'ili* stones, some traditional artifacts, and a considerable amount of midden.

Unmodified sandstone was recovered from four features at two sites (5706 and 5711) within the project area. This material would have been transported to the site areas from the beach, and was apparently used for a number of utilitarian purposes, as well as for the manufacture of specific types of tools. All of the recovered pieces show a consistent grain and quality, which is the same as found in the formed knob item shown in photo 5.6. It appears that there was a good source area for this material nearby, as it is somewhat unique to find this type of lithic material at various sites within a given area. The presence of a formed sandstone item at Site 1853 indicates that the material was being formed into artifacts within the project area.

Charcoal and Dating Samples

Charcoal was collected from test units at nine features (four sites) within the project area (*Table 5.7*). Relatively large collections were recovered from the two historic/modern refuse features (5708-1 and 3). Charred material at both of these features included wood charcoal with melted glass and fabric, as well as burned metal and other materials. Due to the clear association of the charcoal with modern artifacts, and the presence of large amounts of charred *kiawe* beans in Feature 3, it was determined that radiocarbon dating is not necessary to verify the age of the charcoal and the deposits.

An unusually large amount of charcoal (243.66 grams) was also recovered from excavations at Site 5711 Feature 4. This feature did not exhibit clear evidence of subsurface disturbance, however, it was located adjacent to the golf course and is in an area that could have been impacted by modern burning. Unfortunately, there was not sufficient time to submit samples of this charcoal for species identification prior to submittal for age determination. The results (see below) suggest that mixing of various-aged woods probably occurred.

A total of 43.45 grams of charcoal was recovered from the six remaining features that contained charcoal. In only one case, 5706-11, was the amount greater than 10 grams. Samples recovered from Sites 5706-5A and 5710-4 were determined to be highly susceptible to contamination by modern or historically burned roots. In these cases, intact pieces of *panini* rootlets were observed in the charcoal. These roots were also seen in the charcoal from 5707-2; however, a substantial amount of other woody material was present after the removal of the cactus rootlets.

Site-Feature	Charcoal (grams)	Beta Analytic Sample No.
5706-5A	2.9	
5706-11	17.8	212865
5707-2	6.5	212866
5707-4	0.95	
5708-1	1,022.6	
5708-3	129.1	
5710-4	4.8	
5711-3	3.7	212867
5711-4	243.66	215909, 215910

Table 5.7 Summary of Recovered Charcoal

Sufficient amounts of uncontaminated charcoal for dating was collected from three test units at three sites (5706-11, 5707-2, and 5711-3) within the project area. Two additional samples were prepared from the Site 5711 Feature 4 collection, even though the integrity of the samples was unsure. Specific information on the context of the samples and the dating results are presented below. Detailed reports on each sample and on Beta Analytic's processing procedures are presented in the Appendix.

Beta 212865: Measured radiocarbon age: 220+/-40 BP; conventional radiocarbon age: 290+/-40 BP; 2 Sigma calibration result: AD 1490 to 1660; intercept of radiocarbon age with calibration curve: AD 1640; 1 Sigma calibrated results: AD 1520 to 1580 and AD 1630 to 1650. Selected calibrated calendric range, **AD 1630 to 1650**, which brackets the intercept.

This sample was collected from the second excavation level of burial pit backfill, beneath the a layer of loose stone platform fill at Site 5706 Feature 11(0.45-0.55 meter below platform surface). The charcoal was scattered throughout a cultural deposit that had been disturbed during the excavation of a shallow pit for the Feature 11 burial. There was no indication of natural or cultural soil layers within the area of the test unit, as all of the excavated soil was from within the area of the burial pit. It is assumed that the cultural deposit found beneath this platform was continuous with the deposit found on the surface and subsurface at Feature 14, which is adjacent to the west side of Feature 11. The sample was collected from screened soil and placed in foil in the field. It was later examined in the laboratory and found to contain no intrusive cactus roots. The collection was weighed, and the entire amount was sent to Beta Analytic Laboratories, where it was processed using the standard radiocarbon dating analysis.

Beta 212866: Measured radiocarbon age: 240+/-60 BP; conventional radiocarbon age: 240+/-60 BP; 2 Sigma calibrated results: AD 1500 to 1690; AD 1730 to 1810 and AD 1920 to 1950; intercept of radiocarbon age with calibration curve: AD 1660; 1 Sigma calibrated results: AD 1640 to 1670, AD 1770 to 1800 and AD 1940 to 1950. Selected calibrated calendric range, **AD 1640 to 1670**, which brackets the intercept.

This sample (6.2 grams) was collected from Layer II, level 2 of the test unit extension at Site 5707 Feature 2 (0.24 to 0.33 meter below surface datum). The test unit extension was a 0.30 meter by 1.0 meter area to the north of test unit 1, and was located over a possible hearth area (HF-1). During excavation of the extension, it was determined that HF-1 was a hearth that had been disturbed by cactus and other roots; however, the boundaries of the feature were still discernible. The charcoal was determined to be from within this disturbed hearth area; it was collected from 1/4 inch screened soil in the field and from a bulk sample of feature matrix that was sorted in the laboratory. An additional .3 gram of charcoal was recovered from Layer II-1, however this was not combined with the charcoal from HF-1 in hopes of maintaining sample integrity. Some pieces of charred cactus root were removed from the collected charcoal prior to weighing and shipping to Beta Analytic.

Beta 212867: Measured radiocarbon age: 510+/-60 BP; 2 Sigma calibrated results: AD 1310 to 1370 and AD 1380 to 1470; intercept of radiocarbon age with calibration curve: AD 1420; 1 Sigma calibrated results: AD 1400 to 1440. Selected calibrated calendric range: **AD 1400 to 1440**, which brackets the intercept.

This sample was recovered from Layer I, levels 3 and 4 (0.20-0.38 meter below surface) at Test Unit 1, Site 5711 Feature 3. It consisted of 3.4 grams of charcoal that was collected in the filed from 1/4 inch and 1/8 inch screened soil. The charred material was placed in foil in the field and repackaged in foil following preliminary cleaning and weighing in the laboratory. After further cleaning at the Beta Analytic Laboratory, the sample size was such that extended counting was recommended and implemented.

Beta 215909: Measured radiocarbon age: 30+/-60 BP; conventional radiocarbon age: 20+/-60 BP; 2 Sigma calibrated results: AD 1680 to 1730 and AD 1810 to 1930 and AD 1950 to beyond 1960; intercept of radiocarbon age with calibration curve: AD 1950; 1 Sigma calibrated results: AD 1950 to beyond 1960.

Beta 215910: Measured radiocarbon age: 10+/-70 BP; conventional radiocarbon age: 90+/-70 BP; 2 Sigma calibrated results: AD 1660 to beyond 1960; intercepts of radiocarbon age with calibration curve: AD 1890, AD 1910, AD 1950; 1 Sigma calibrated results: AD 1680 to 1740 and AD 1800 to 1930 and AD 1950 to 1950.

The above two samples were recovered from Test Unit 2 at Site 5711 Feature 4. Beta 215909 was recovered from Layer I, level 3 (0.20 to 0.30 meters below surface) and weighed 60.7 grams. Beta 215910 was collected from Layer I, levels 5 and 6 (0.40 to 0.55 meters below surface) and weighed 47.9 grams. Nearly all of the charcoal comprising these samples was collected from the 1/8 inch screen material, which was collected as bulk unsorted material in the field and sorted in the laboratory. Charcoal was collected through floatation recovery and allowed to dry in a controlled environment for two days. The dating results are mixed, and probably signify mixing of charred wood material from various time periods. Both samples produced alternate ranges at 2 Sigma that bracket **AD 1680 to 1740**, which is the timeframe selected to reflect the earliest occupation phase of the site. This date is accepted with the caveat that the samples are not particularly reliable. Species identification analysis of the remaining charcoal from this feature would clarify whether the samples were in fact contaminated with exotic wood.

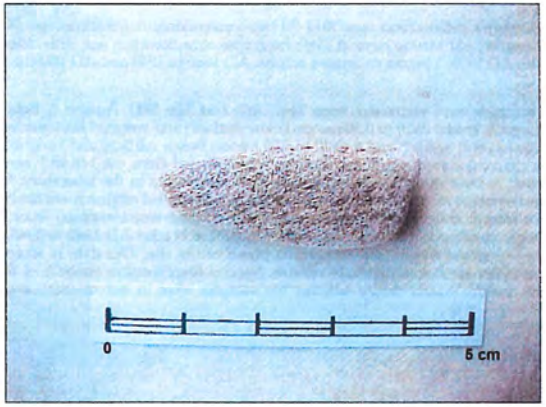

Photo 5.1 *Coral abrader, Site 5707 Feature 2, TU-1*

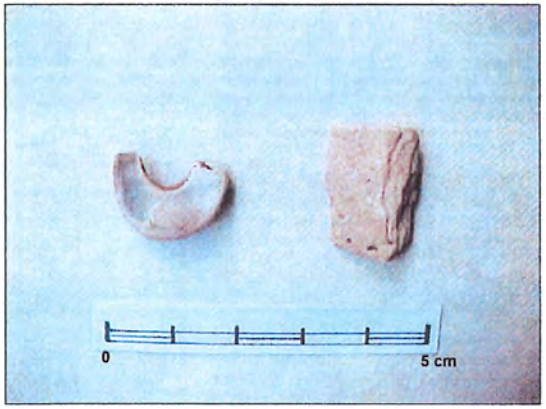

Photo 5.2 ***a)*** *Shell fishhook, Site 5706 Feature 14, surface*
b) *Cut shell, Site 5707 Feature 2, TU- 1*

Photo 5.3 *Breadloaf sinker, Site 5706 Feature 5A, surface*

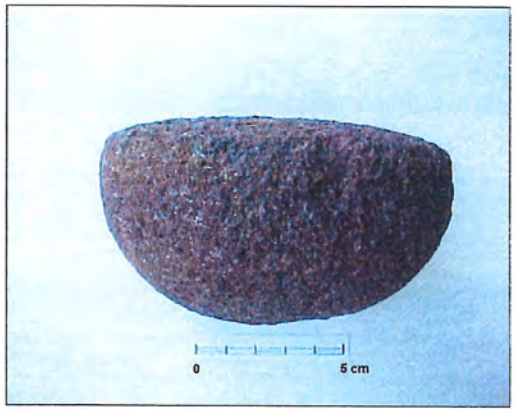

Photo 5.4 *Groundstone cobble tool, Site 1864 Feature 1, surface*

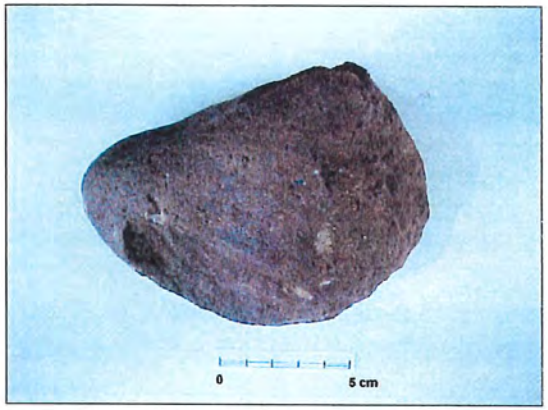

Photo 5.5 Basalt Hammerstone, Site 5711 Feature 7, TU-1

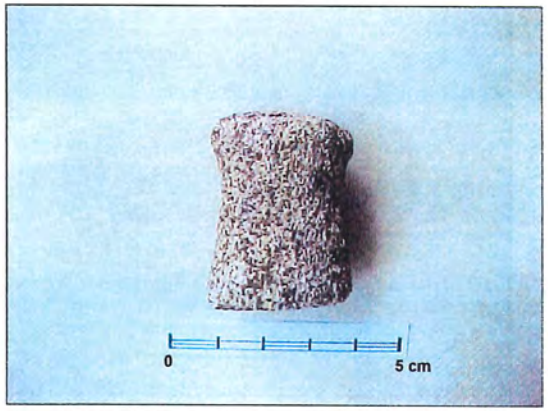

Photo 5.6 Formed sandstone knob, Site 1853 Feature 8, TU-1

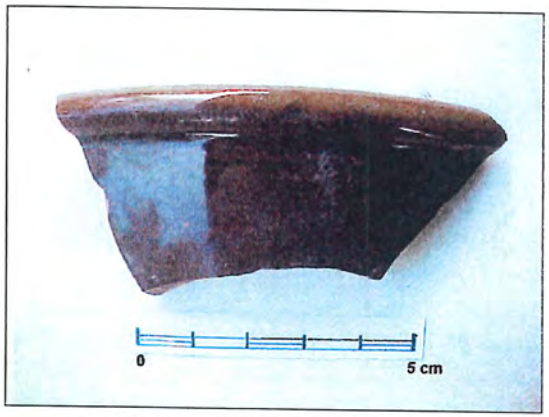

Photo 5.7 Stoneware rim sherd, Site 5706 Feature 11, surface

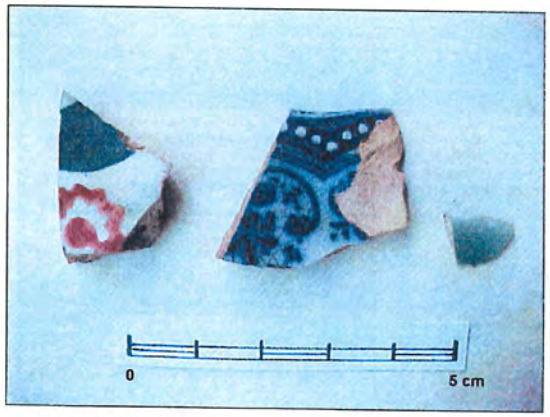

Photo 5.8 Decorated whiteware sherds, Site 5708 Feature 3, Test Unit 1

Photo 5.9 Bone (a, b) and shell (c, d) buttons, Site 5708 Feature 3, TU-1

Photo 5.10 Lead pencil parts (a-c) and slate pencils (d, e), Site 1007 Feature 6

6. CONCLUSION

Discussion

A relatively broad range of functional categories are represented among the 80 identified features within the project area. The traditional features represent five general functional groups, and the identified historic/modern era features represent nine general functional groups. Subdivisions within the functional groups are apparent, based on the formal characteristics of the features. These subgroups are taken to represent functional differences within the overall category. For example, traditional habitation features are subdivided into surface midden, paving, enclosure, and C-shape shelter. Each of these formal variants reflects functional differences between the habitation features in terms of permanence, number of occupants, and types of activities conducted.

The functional groups and formal subgroups for the traditional sites are as follows:

Agriculture-loose stone clearing pile on outcrop: 2272-2, 2272-4, 5706-3, 5706-4, 5706-5B&C, 5706-6, 5706-7, 5706-9, 5706-12, 5706-16, 5706-17, 5710-11, 5710-12
Agriculture-stone clearing mound: 5706-13, 5706-16, 5710-6, 5710-9, 5710-10, 5710-11
Agriculture-stone-filled depression: 5706-2, 5706-10, 5706-13
Agriculture-modified outcrop with soil flat: , 5710-7, 5700-9
Agriculture-soil terrace with stone retaining wall: 1864-1, 2272-1, 2272-3, 5710-1, 5710-3, 5710-4, 5710-5, 5710-10
Agriculture-soil flat with wall: 5706-8
Agriculture-garden enclosure: 5796
Burial-platform: 5706-11
Ceremonial-platform or terrace: 5711-1, 5711-8
Ceremonial and agricultural-terrace: 5711-2, 5711-3, 5711-5, 5711-6
Habitation-enclosure: 5711-4
Habitation-walled C-shape shelter: 5707-2
Habitation-pavement: 5706-5A (tentative)
Habitation-midden deposit: 1853-8, 5706-1, 5706-2, 5706-5D, 5706-14
Indeterminate-wall: 1853-7, 5706-15, 5707-1, 5707-3, 5710-8
Water management?-fill & terraces: 5711-7

Among the historic/modern era features, the functional categories and formal subcategories, and their occurrences are as follows:

Agriculture-modified outcrop with soil flat: 5707-5
Agriculture-soil terrace with stone retaining wall: 5710-3, 5710-4
Boundary demarcation-wall: 1007-1, 1007-2, 1007-7
Livestock management-enclosure: 1853-5 (?), 5796
Livestock management-wall: 5709-1 (tentative) 5797-1, 5797-2, 5797-3, 5797-4
Livestock management-filled depression: 1853-14
Livestock management-trough: 1853-13
Education/school site: 1007-6
Habitation-houselot perimeter wall: 1853-8, 5797-1 (tentative)
Habitation-*Imu:* 5798-3
Habitation-structural lumber: 5708-2, 5798-2, 5799-1
Indeterminate-mound: 5709-2
Indeterminate-wall: 1853-6, 1864-2, 5707-1, 5798-1, 5799-2
Refuse disposal-pit: 5708-1, 5708-3, 5798-4
Refuse disposal-privy: 1007-4
Refuse disposal-cesspool: 5708-2
Storage-enclosure: 5795
Transportation-road: 5710-2
Water management-cistern: 1007-5

Certain features are listed above under more than one functional category, indicating alternative uses or multiple uses over time. It should be noted that the traditional agricultural sites are not assumed to be strictly pre-contact in age. The age of many agricultural features is not determinable due to a lack of

diagnostic artifacts and dating materials. Given the fact that the area was intensively occupied by Hawaiians from at least AD 1400 through the late twentieth century, there is no basis for assuming that all agricultural activities in the area are pre-contact. Some of the agricultural features reflect both traditional Hawaiian construction and modern reuse, and it is possible/probable that some, if not most, of the extant agricultural features were constructed during the nineteenth or early twentieth century. These features are included in the "traditional" list because they show no evidence of modern/historic building materials and they contained no diagnostically historic or modern artifacts. For the purposes of this study, "historic" refers to artifacts or structures that are over 50 years in age. "Modern" refers to artifacts or structures that post-date 1940. Thus, modern sites are "historic" when they date to 1940-1955. The modern habitation sites and other components within the project area generally span a period of c. 1940-1980, which means that they include historic materials and structures.

Agricultural Features: The largest formal/functional category within the agricultural group is the loose stone clearing pile on an exposed outcrop. Fourteen of these features were identified at three sites - 2272, 5706 and 5710 - with most of them (10) located at Site 5706. Sites 2272 and 5706 are located adjacent to one another and reflect a single general agricultural zone. This section of the project area is characterized by soil pockets between *pahoehoe* ridges that run in a generally north-south orientation. Most of the *pahoehoe* ridges in this area show evidence of *in situ* fracturing of the surface rock layer, and in some locations, these fractured chunks are gathered up into piles, or set in alignments or informal mounds. Other loose piles appear to be stones that were cleared from adjacent soil areas and generally tossed onto the rock surface. The purpose of the clearing the stones would be to provide soil areas for garden plots that were associated with the dwellings at Maluaka Point.

The second most common agricultural feature is the soil terrace with stone retaining wall. Eight of these features were identified at three sites (1864, 2272, and 5710), with most (5) found at Site 5710. This occurrence pattern reflects the topographic setting of Site 5710, which is along the relatively steep slopes of a gulch. The soil terraces at Sites 1864 and 2272 may have been connected at one time, and are interpreted as agricultural due to the absence of midden and artifacts that normally signal former habitation sites.

Habitation features: The five habitation features included in the traditional list include three that are known to be pre-contact in age, based on radiocarbon dating results. These include the C-shape enclosure (Feature 2) at Site 5707, the midden scatter (Features 11/14) at Site 5706, and the enclosure (Feature 4) at Site 5711. The C-shape shelter reflects a specialized use area that was occupied during the middle to late seventeenth century (AD 1640-1670), and possibly again in the nineteenth century. This shelter is too small for any form of permanent occupation; however, it is part of a larger complex that is now mostly destroyed. The age of the two partial walls and a partially buried alignment/terrace have not been verified, although the alignment/terrace is very likely contemporaneous with Feature 2.

The midden scatter at Site 5706 has been severely impacted by erosion, but more intact portions of the feature beneath Feature 11 reflect the former presence of a possible permanent dwelling in the immediate vicinity, *circa* AD 1630-1650. Structural remains of a former dwelling are no longer identifiable, and the site now shows a later phase of use as a garden area, with special use for burial. The burial post-dates the mid-seventeenth century habitation deposit, and it may predate some or all of the nearby agricultural/landscaping features. A second nearby habitation feature (5) at Site 5706 is probably contemporaneous with Features 11/14; this traditional pavement and midden scatter showed no indications of historic era use, although such use should not be ruled out based solely on an absence of historic artifacts. The final habitation enclosure (Site 5711 Feature 4) has been severely compromised by golf course construction; remnant deposits suggest somewhat intensive and specialized use (possibly in connection with the *Ko'a* complex) during a limited time period *circa* AD 1680-1740.

The four habitation features listed as historic/modern are distinguished on the basis of clearly modern/historic artifacts and building materials; or in the case of the *imu*, association with features that are clearly modern. All of the habitation and agricultural sites are assumed to be Hawaiian, based on available information and oral histories provided by the local residents of the area. The livestock management features and historic era enclosures are also assumed to be constructed primarily by Hawaiians who were employed by Ulupalakua Ranch.

Ceremonial Features: This category includes the rather impressive One'uli *Ko'a* and associated lower level terrace/platform. The *Ko'a* is in an eroded condition, but its original size and height are nevertheless determinable. This platform is situated so as to command a broad visual seascape, and it is situated so as to be visible from the offshore area along the north side of Pu'u Ōla'i. The platform exhibits all the classic traits of a fishing *ko'a*. A unique aspect of this site is the associated structures, which essentially create a relatively large complex area that apparently was devoted to Ku'ula Kai, a widely recognized fishing deity. According to Beckwith, Ku'ula Kai supplies reproductive energy to all things of the sea; his worship is associated with various specialized fishing techniques, as well as the construction of Ku'ula shrines, as taught throughout Hawai'i by 'Aiai, son of the human Ku'ula (Beckwith 1971: 20). According to Beckwith

> It is the old fishing technique, still practised, both in its practical and its religious aspect, which is referring to Kuula's teachings. All the places named in the legend of Aiai remain as authentic fishing grounds and stations for fisherman in island waters. Nor is the old practice of offering fish from the first catch to the god upon the fish altar entirely forgotten (Beckwith 1971:20).

According to oral histories recorded by Thrum, Aiai constructed a *ko'a* in Honua'ula during his travels around the archipelago. This particular *ko'a* was however reportedly covered by lava. The *Ko'a* at One'uli was not covered by lava, but it was certainly covered by massive *kiawe* trees, leaving it essentially undetectable from land or water. It appears that the site was undetectable at least 30 years ago when Bishop Museum surveys were being conducted in the immediate area.

Significance Assessments and Recommendations

Initial significance assessment of the identified historic properties follows the procedures and guidelines stipulated in Hawai'i Administrative Rule §13-284-6, as stated:

> Evaluation of significance. (a) Once a historic property is identified, then an assessment of significance shall occur. The person shall make this initial assessment or delegate this assessment, in writing, to the SHPD. This information shall be submitted concurrently with the survey report it historic properties were found in the survey.
>
> (b) To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criterion:
>
> (1) Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
> (2) Criterion "b". Be associated with the lives of persons important in our past;
> (3) Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
> (4) Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; or
> (5) Criterion "e". Have an important value to the native Hawaiian people or to another ethnic group of the state due to association with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts- -these associations being important to the group's history and cultural identity. (HAR §13-284-6)

Initial significance evaluations and recommended further work for each of the 80 identified features is presented in Table 6.1. Summaries of these recommendations are provided in the following site-specific discussions.

Site 1007

The Mākena School complex consists of seven features, including three walls and the remains of a privy, a cistern, and a disturbed area where the school building once stood. Subsurface testing was conducted in the area in 1989, and data recovery excavations were conducted at two privies in 1991. One of the privies has since been destroyed by a parking lot. Available documentary information obtained from Bishop Museum and SHPD indicates that a data recovery report was never submitted to SHPD for review and approval. Thus, the data recovery that was recommended for this site in 1989 was never completed. A summary report of the data recovery work is available; however, it does not provide information on recovered artifacts, and it does not include reference to information obtained from local residents and/or family members of those who attended the school. Limited historic data was collected during this survey to provide a general timeframe for the school operation (c. 1900-1929), however, the exact dates of opening and closure could not be determined.

The Mākena School site is significant for its information relating to the early twentieth century in Mākena and South Maui. The significant archaeological information has been recovered, however, the recovered information has not been reported. In addition, significant historical information regarding the school and activities conducted at the site has not been collected from local residents knowledgeable about the site. Recommended mitigation does not involve additional archaeological work; it does, however involve a resolution of the incomplete data recovery report and conducting interviews of knowledgeable informants. The oral history information could be combined with the data recovery report.

Site 1853

This site was recorded in 1978 as an historic period habitation complex with associated ranch-related walls and enclosures. Data recovery was conducted at the primary habitation (Feature 2), and its period of occupation was estimated at the late 1700s to middle 1800s (Haun 1978:78). Six of twelve features enumerated for Site 1853 were removed during construction of the Seibu golf course. Portions of one enclosure (Feature 5), three wall features (6, 7, 8) and possibly portions of a fourth wall (Feature 11) are within the current project area, along with a wooden trough (Feature 13) and a newly-identified filled depression (Feature 14). Testing was conducted at Features 5, 6, 7, 8, and 14 during the current project. Excavations at Features 5, 6 and 7 provided no information to assist in determining the age and function of these features. Excavation at Feature 14 indicated that it probably dates to the historic era, given the presence of metal at the base of the filled depression.

Information collected at Feature 8 indicates that this wall post-dates a pre-existing midden deposit that represents a diffuse artifact/midden scatter similar to that found at the adjacent Site 5706. Given the lack of associated habitation deposits at these walls, a functional interpretation at this time is tentative. Possibilities include its use as a portion of the main enclosure wall around Kahaleokaia's houselot at Maluaka Point, or livestock management. The partial condition of the features at this site limit their interpretive and educational value, and there does not appear to be additional information in subsurface contexts associated with these features. No further work is recommended at this site.

Site 1864

This site was recorded in 1979, and after testing was assessed as requiring no further archeological work (Denison 1979). Additional testing was conducted at the site during the current survey, and one traditional Hawaiian artifact was found on the site surface. No information was obtained from subsurface contexts. The formal characteristics of this site suggest that it was an enclosed agricultural terrace, and was probably contiguous with Site 2272 Feature 1. It is currently in a partial state and as such has limited interpretive or educational value. Testing indicates that there is little to no potential for new information to occur in subsurface contexts. No further work is recommended at this site.

Site 2272

The primary feature at this site was recorded and tested in 1979, at which time it was determined that no further archaeological work was warranted (Denison 1979). An age and function were not determined at that time, and additional testing at Feature 1 resulted in no cultural material to assist in this endeavor. The formal attributes of this feature, together with its association with Site 1864, suggest that it was an

SITE	FEA.	Function/Age	Significance Criterion	Mitigation Completed	Mitigation Recommended
1007	1, 2	Boundary wall, historic	d	Documented*	No further work
	4	Privy, Mākena School	d	Data recovered, documented	Complete DR report
	5	Cistern. Mākena School	d	Documented	No further work
	6	School building site	a, d	Tested#, documented	Oral interviews
	7	Boundary wall, historic	d	Documented	No further work
1853	5	Enclosure, historic likely.	d	Tested, documented	No further work
	6A	Wall, indeterminate	d	Tested, documented	No further work
	6B	Wall, historic likely	d	Tested, documented	No further work
	7	Wall, possibly traditional	d	Tested, documented	No further work
	8	Wall, possibly historic	d	Tested, documented	No further work
	11	Wall remnant, indeterm.	d	Documented	No further work
	13	Wooden trough	d	Documented	No further work
	14	Clearing, historic	d	Tested, documented	No further work
1864	1	Agricultural	d	Tested, documented	No further work
	2	Wall, historic/modern	d	Documented	No further work
2272	1	Agricultural	d	Tested, documented	No further work
	2, 3	Agricultural	d	Documented	No further work
	4	Agricultural	d	Tested, documented	No further work
5706	1	Habitation, traditional	d	Tested, documented	No further work
	2	Clearing	d	Tested, documented	No further work
	3, 4	Agricultural	d	Documented	No further work
	5	Habitation, traditional	d	Tested, documented	No further work
	6, 7	Clearing	d	Documented	No further work
	8	Agricultural	d	Tested, documented	No further work
	9	Clearing	d	Documented	No further work
	10	Clearing	d	Data recovered, documented	No further work
	11	Burial, Hawaiian	e	Tested, documented	Preserve in place
	12, 13	Clearing	d	Documented	No further work
	14	Habitation, pre-contact	d	Tested, documented	No further work
	15	Clearing	d	Documented	No further work
	16	Agricultural	d	Documented	No further work
	17	Clearing	d	Tested, documented	No further work

*Documentation includes recorded verbal description, scaled plan map, location on project map, photographs
#Testing consists of subsurface testing to determine extent and nature of deposits
"Data recovered" as used here means that all significant subsurface deposits have been excavated

Table 6.1 Summary of Significance Evaluations and Recommended Further Work

SITE	FEA.	Function/Age	Significance Criterion	Mitigation Completed	Mitigation Recommended
5707	1	Wall segment, indeterminate	d	Tested#, documented*	No further work
	2	Habitation, pre-contact	d	Data recovered#, documented	No further work
	3	Wall segment, indeterminate	d	Documented	No further work
	4	Habitation, pre-contact	d	Tested, Documented	No further work
	5	Agriculture, modern	d	Data recovered, documented	No further work
5708	1	Habitation, modern	d	Tested, documented	No further work
	2	Habitation, modern	d	Documented	No further work
	3	Habitation, historic/modern	d	Tested, documented	No further work
5709	1	Livestock, clearing, modern	d	Documented	No further work
	2	Clearing, indeterminate	d	Documented	No further work
5710	1	Agriculture	d	Documented	No further work
	2	Transportation, historic/mod.	d	Documented	No further work
	3	Agriculture, possibly <50 yrs.	d	Tested, documented	No further work
	4	Agriculture, possibly <50 yrs	d	Tested, documented	No further work
	5	Agriculture	d	Tested, documented	No further work
	6-13	Agriculture	d	Documented	No further work
5711	1	Ceremonial (*Ko'a*), pre-contact	d, e	Documented	**Preserve in place**
	2	Ceremonial, pre-contact	d, e	Documented	**Preserve in place**
	3	Ceremonial, pre-contact	d, e	Tested, documented	**Preserve in place**
	4	Habitation, pre-contact (partial enclosure)	d, e	Tested, documented	**Preserve in place or data recovery**
	5, 6	Ceremonial, pre-contact	d, e	Documented	**Preserve in place**
	7	Water control	d	Documented	No further work
	8	Ceremonial (*Ko'a*), pre-contact	d, e	Tested, documented	**Preserve in place**
5795	-	Storage enclosure, historic	c, d	Tested, documented	**Preserve or architectural documentation**
5796	-	Enclosure, Hawaiian/historic	d	Tested, documented	No further work
5797	1-4	Livestock wall/fence, historic	d	Documented	No further work
5798	1	Livestock wall, historic	d	Documented	No further work
	2-4	Habitation, historic/modern	d	Documented	No further work
5799	1	Habitation, historic/modern	d	Documented	No further work
	2	Wall, historic	d	Documented	No further work

*Documentation includes recorded verbal description, scaled plan map, location on project map, photographs
#Testing consists of subsurface testing to determine extent and nature of deposits
"Data recovery" as used here means that all significant subsurface deposits have been excavated

Table 6.1 Summary of Significance Evaluations and Recommended Further Work (Cont.)

agricultural terrace. Three additional features were documented at Site 2272 during the current survey, and one of these (Feature 4) was tested. All thee of the newly identified features were confirmed to be informal stone clearing piles situated atop naturally fractured bedrock outcrops. The clearing piles are probably associated with the cleared terrace of Feature 1. Testing at this site indicates that there is little to no potential for new information to occur in subsurface contexts. The site has been impacted by improvements to Mākena-Keone'ō'io Road and it is therefore of limited value in an interpretive or educational sense. No further work is recommended at this site.

Site 5706

This site is a multiple-use complex with 17 features reflecting habitation (3), agriculture (13), and burial (1). Among the 13 agricultural features are nine clearing piles or filled depressions, and four soil areas with associated clearing piles. Three of the clearing features were tested (Features 2, 10, and 17), and one of these (Feature 10) was completely excavated. These features showed sparse amounts of marine shell and portable materials that had filtered down through the stone fill, presumably after the stones were in place. The presence of this material suggests that the clearing piles were traditional Hawaiian in origin, although the time frame of construction is uncertain. One of the agricultural soil clearings (Feature 8) was tested and found to be devoid of cultural material.

All three of the habitation features (1, 5D and 14) were tested, and were found to contain sparse to moderately dense subsurface deposits of marine shell midden. These three features were definable prior to testing based on the presence of marine shell midden on the surface. In two cases, (Features 5D and 14) traditional artifacts were also found on the surface (one at each feature). Subsurface artifacts, consisting of two basalt flakes, were found only at Feature 14. No evidence of subsurface features or intact cultural layers were observed during testing at Features 1 and 14. It appears that the focal area of Feature 1 was previously impacted by golf course construction and the remaining feature area shows sparse midden in an undifferentiated natural soil layer. It does not appear likely that additional excavation would yield new information at this feature.

The Feature 5 area includes a stone pavement, stone-filled outcrop slopes, and a surface midden scatter. A total of five test units were excavated within the feature area, including one unit excavated during a prior survey (Rotumno-Hazuka et al. 2005). Three of the five test units found no cultural material, one found very sparse amounts of shell midden, and one unit (Test Unit 1) found relatively high amounts of shell midden (highest weigh per liter of soil within the project area). No subsurface artifacts or features were found during the testing at Feature 5. The lack of midden and artifacts within the paved area at Feature 5A suggest that it may have served some sort of special purpose, however, the pavement is too irregular for use as a sleeping house (*hale moe*) or similar type of specialized structure. It is not certain whether additional excavation would be able to clarify the function of this feature; however, current testing has sampled roughly 4% of the surface area of this structure (2 sq. meters of 48 square meters).

The excavation at Feature 5D encountered a somewhat disturbed cultural layer in Layer I topsoil and Layer II soil. Two test units and one expansion unit were excavated in this are to ensure that sufficient information was obtained to assess its integrity. The deposit appears to be traditional Hawaiian, however, it is lacking in diagnostic artifacts. Marine midden and vertebrate remains are also very common at historic era sites. On the other hand, this deposit could predate the surface features at Site 5706. Unfortunately, no charcoal suitable for dating was recovered from excavations; in general the midden materials are weathered and bleached, indicative of a disturbed and secondary deposit. Given the interpretive limitations of the deposit at Feature 5D, no further work is recommended at this time.

The third habitation feature at Site 5706 (Feature 14) is a midden scatter that was found to be generally deflated and eroded, with the bulk of the cultural material within and just beneath the present ground surface. This features has been exposed to intensive deer traffic in the recent past and present, and no doubt to cattle in the past. It does not appear likely that intact cultural layers or features are present, or that new information detailing specific uses or period of use is present at this feature. Due to its proximity to and continuity with Feature 11, the Feature 14 midden scatter is believed to be contemporaneous with the dated cultural material found in the burial pit fill beneath the platform at Feature 11. No further work is recommended at Feature 14. A portion of the Feature 14 midden deposit is within the setback buffer zone for Feature 11, and will be preserved in place along with the platform.

Feature 11 at Site 5706 was found to contain an *in situ* human burial that was placed in a shallow pit beneath an informal stone platform/pavement. The burial pit fill that was screened prior to discovery of human remains was found to contain marine shell midden and sufficient charcoal to provide a radiocarbon date of AD 1490-1660 (two sigma). The burial was determined to be Native Hawaiian based on the method of interment, the structural attributes of the burial feature, and context of the burial feature within a Native Hawaiian habitation/agricultural complex. The burial feature has been stabilized pending a determination by the Maui/Lana'i Islands Burial Council. A plan to preserve the burial feature in place will be prepared and submitted to the Burial Council for approval.

Site 5707

This site consists of five features, four of which (Features 1-4) have been directly impacted by machinery. The wall features (1 and 3) were severely impacted to the extent that their original configuration and relationship is indeterminate. The walls were breached at several locations and the disturbed stones were then pushed against the sides of the walls, further affecting the soil deposits in the immediate vicinity. Testing was conducted at Feature 1 during a prior study, and no cultural material to aid in determining the age of the wall was recovered. Feature 2 at this site represents the most intact traditional Hawaiian habitation feature identified, as well as the largest and most varied traditional artifact collection from a single feature (16 items from 5 material categories). This small C-shaped enclosure was impacted by machinery along the west (open) end, but otherwise survived intact. The interior deposit was protected by the walls; however, it was adversely affected by a large *panini* plant that covered the interior floor area. Remnants of what appeared to be a small hearth in the corner of the shelter were found during excavation, and the test unit was expanded to collect all the material from this subsurface feature. Sufficient charcoal was collected to provide a radiocarbon date of AD 1500-1690 (two sigma).

Due to the small size of this feature, the testing that was conducted removed over 75% of the entire interior area and 100% of the north portion, which showed greater depth and a much higher concentration of materials than the south portion. If the interior of this structure were larger, further work in the form of data recovery would be recommended; however, in this case, it is fairly certain that adequate data recovery has been completed, and no further work is warranted at this feature.

Feature 4, a partially buried stone alignment, may have been functionally related to Feature 2, however, it is presently in a deteriorated state and subsurface deposits have been compromised. It appears that machinery drove over this alignment, scraping soil away at the time. A small amount of midden is present, however, there does not appear to be much potential for intact cultural deposits or features.

Prior testing at Feature 5, which could be a modern planting feature, removed nearly 100% of the interior area of the feature, precluding the need to conduct further work. This feature contained only one piece of marine shell, which was probably in the soil prior to construction of the small walled planting area. No further work is warranted at this feature.

Site 5708

Sufficient information has been collected at Site 5708-1 to determine that it represents a modern habitation site. The location of the dwelling at this site is shown on the USGS Makena Quadrangle map dated 1956, and it is not shown on the 1983 map. Thus, the dwelling was present in 1956, which would make it at least 50 years in age. Feature 1 represents a refuse disposal and reduction area where rubbish was burned. A large sample of metal, glass, plastic and other materials was recovered at this feature; all materials appear to date to *circa*. 1940-1980, with the bulk of material being less than 50 years in age.

Feature 2 identifies the location of a former structure. The site has been bulldozed and all structural remains have been pushed into linear piles. The intact cap over what appears to be a cesspool is present at this modern feature. It has been documented and no further work is recommended.

Feature 3 represents a secondary deposit of refuse from both historic and modern eras. This feature is located adjacent to the edge of the golf course, against the west face of a high natural bedrock face. After testing the location, it was determined that debris was pushed against this rock face from a nearby location within the golf course area. The deposit is extremely concentrated metal and glass rubbish, some of which has been burned. Materials found that appear to date to the late nineteenth/early twentieth century include decorated whiteware sherds, bottle glass, and possibly shell and bone buttons.

Some of the metal items, such as a spur and horse shoe, could also date to the historic era. Traditional Hawaiian artifacts, including basalt flakes, ground stone, and volcanic glass were also found within the deposit. There are indications of reverse stratigraphy within the deposit, with the earlier items at upper levels. This would be expected if materials were pushed in episodes. The historic materials are believed to have originated from the Site Ma-B8-237, identified by Cordy (1978) as a midden scatter and a concrete foundation. The modern materials could have originated from the Site 5708 Feature 2 area, or from Site Ma-B8-237. No further work appears warranted at this feature.

Site 5709

This site, previously identified as a set of parallel walls, was reexamined and found to most likely be the result of heavy machinery. The two linear rubble piles are situated along the sides of an artificial swale that was cut across the project area in conjunction with drainage improvements along Mākena Road. The original disposition of the stone at this location is not known; however, they could have originated from the area of Site 5797, which is a wall and fence that runs through the project area in an east-west orientation. This feature, and a second stone pile along the same swale, have been documented, and no further work is recommended.

Site 5710

Site 5710 is a traditional agricultural complex consisting of twelve features, and one intrusive historic/modern road or trail. The features are located along the top edges, slopes, and bottom of a large gulch. Most of the features consist of small soil clearings with associated stone constructions such as informal retaining walls or stone-filled outcrop areas. Three of the larger terraces were tested and found to contain sparse amounts of marine shell and weathered coral. In general, the features are in poor preservation, having been impacted by slope-wash erosion, cattle, and recently by deer. Two of the features show evidence of possible reconstruction and reuse during the modern era; these are in the best condition. Most of the features along the central slope and bottom of the gulch were impacted during bulldozing of a road that entered and crossed the gulch. The age of this road is uncertain; however, it does not appear to be related to recent golf course construction. Given the relatively poor condition of this complex, it would have interpretive potential only after extensive reconstruction and stabilization. The terraces at Site 5711 to the west are in better condition, and if preserved would provide a good representation of the extent of landscaping that was once present in this gulch. No further work is recommended at Site 5710.

Site 5711

This site includes what is thought to be the *Ko'a* at *One'uli* previously described by Walker (1930), as well as six or seven additional features that appear to have ceremonial functions. Principal among these is Feature 8, a stone and coral-filled terrace located at the bottom of the gulch, in line with the *ko'a* at the top of the gulch. Testing at Feature 8 confirmed its function as a second *ko'a*. Along the slope between these two *ko'a* are a series of four stepped terraces that show surface scatters of coral, branch coral, and marine midden. A test unit at one of the terraces (Feature 3) recovered nine pieces of volcanic glass, 220.67 grams of marine shell midden, and fish remains. Charcoal from this excavation was dated to AD 1044-1440, which is the earliest date obtained within the project area. Preservation is recommended for Features 1, 2, 3, 5 and 8.

Feature 4 is a terraced enclosure located immediately west of the terraces. This partial enclosure has been impacted by the golf course; however, test units within the enclosure indicate that it contains cultural deposits rich in midden, and that it has the potential to contain in tact subsurface features. Due to its proximity to the ceremonial features, and its possible ceremonial function, preservation of this feature is also recommended. Given that a ceremonial function cannot be verified for Feature 4 at this time, data recovery is recommended if preservation is not selected as the preferred mitigation measure.

The final feature within Site 5711 is a stone pavement at the bottom of the gulch, to the east of Feature 8. No surface remains were observed at this cobble-filled area to indicate its use in a ceremonial context, and testing resulted in no findings that would support this interpretation. At this time, the most feasible functional use of this feature is that it served to channel stream flow toward the north side of the gulch. Current information does not support its inclusion with the ceremonial components of the site. Therefore, it cannot be recommended for preservation on that basis. No further work is recommended for Feature 7 at this time.

Site 5795

This historic era enclosure was recorded as Site Ma-B8-233 in 1978, when it was interpreted as an historic era storage structure. It was re-examined twice, and a total of six test units have been excavated within the enclosure. No new information has been recovered that conflicts with the 1978 interpretation as a storage structure. All artifacts recovered from this site are historic or modern in age, and include glass, metal and leather materials. An associated fence line found around the outside of the structure supports the idea that this structure housed materials that were used in ranch operations, and the fence served to keep cattle out of the structure. Only trace amounts of midden (2 pieces of shell) were recovered from one of the six excavations, further suggesting a lack of human domestic activities within the enclosure. Testing also indicates that he southern half of the floor area was solid rock, a preferred attribute of storage areas. It appears that there is not likely to be new information present in subsurface deposits at this site, and no further excavation is recommended.

The Site 5795 enclosure is in good condition, with minor areas of wall fall at the corners and along the west wall. Architecturally, it is a good example of dry-laid stone work. The walls are tall and straight; in fact, the walls may be the tallest recorded for any enclosure in the region. Data from 40 enclosures recorded by Cordy in 1978 within, *makai* and *mauka* of the project area show that six enclosures had walls over 1.0 meter in height, but no enclosure except Site 5795 had walls heights of 1.6 meter. This points to the site as a somewhat unique architectural feature, in addition to being a good example of a ranching era special use structure. It is therefore assessed as being significant under criteria "c" and "d". The impacts to the information value of the site have been mitigated; however, excavation does not mitigate criterion "c" value. Preservation is recommended here as the preferred mitigation measure. If this is not feasible, then architectural mitigation should be conducted, following recommendations from the SHPD Architecture Branch.

Site 5796

This enclosure was recorded as Ma-B8-234 in 1978 and interpreted as a cattle pen. Six units have been excavated at the site since 1978, and no information has been recovered that conflicts with this interpretation. Recent investigations have, however suggested that it could have served as a garden enclosure as well, given the relatively low height of walls from the interior. Only sparse amounts of marine shell and no traditional artifacts were recovered during any of the testing procedures. This enclosure is not particularly well-preserved, and it is not unique relative to a number of other enclosures that have been documented in the region. Testing by three different archaeologists has indicated that there is little to no potential for subsurface deposits to be present at this site. Therefore, no further work is recommended.

Site 5797

This wall and fence line was first recorded in 1978 as Site Ma-B8-240, when it was interpreted as a ranch wall. Most of the wall recorded in 1978 is now gone, with only the eastern portion remaining. Examination of this portion indicates that there were two building sequences, the first of which could have been for non-ranching purposes. This early component is presently too fragmented to determine original function; however, it may have been part of a large houselot enclosure that was present at Maluaka Point. The added wall sections include an east-west fence line with associated stone wall segments. This fence and wall continued west into the golf course area, and east at least to Makena Road. The fence is currently in a broken down and non-functional state. Its condition indicates an age of at least 50 years or more. The wall and fence have been sufficiently documented and no further work is recommended at the site.

Site 5798

This historic/modern habitation site is located at the southern edge of Parcel 84, and it includes a wall (Feature 1) that most likely pre-dates the dwelling, a concentration of structural lumber (Feature 2), an *imu* pit (Feature 3) and a refuse pit (Feature 4). The primary dwelling may have been located to the south side of the Parcel 84 boundary wall, at a location shown on the 1956 and 1983 USGS Makena Quadrangle maps. The site is the former home of the Poepoe family. A sufficient level of documentation has been completed at this site, and no further work is recommended.

Site 5799

This site is interpreted as an accessory structure to the Site 5798 habitation complex. It consists of the wooden remains of a small shack and modern artifacts (Feature 1). Also associated is a retaining wall segment (Feature 2) that appears to predate the structure. The location of this site conforms with the mapped location of a structure shown on the 1956 and 1983 USGS Makena Quadrangle maps. The site has been documented to a sufficient level and no further work is recommended.

Summary

Among the fifteen sites located within the project area, 11 contain features that are significant solely under criterion "d", which refers to the information value of the site in furthering the understanding of history or prehistory. Sites in this group include 1853, 1864, 2272, 5707, 5708, 5709, 5710, 5796, 5797, 5798 and 5799. No further work is recommended at these sites.

Two sites contain features that are significant under criteria "d" and "e". These include Site 5706 and 5711. At Site 5706, one feature (11) significant under criterion "e" and 16 features significant under criterion "d". Preservation in place is recommended for Site 5706 Feature 11, due to its cultural significance as a burial location. At Site 5711, seven of eight features are assessed as significant under criteria "d" and "e". Preservation in place is recommended for six of these features (1, 2, 3, 5, 6, and 8), and either preservation in place or data recovery is recommended for one feature (4).

Site 1007 has a feature (6) that is assessed as significant under criteria "a" and "d", and five features assessed as significant under criterion "d". Data recovery excavations have been completed at these latter features, however the report has not been completed. Thus, recommended mitigation for these features is completion of the data recovery report. If the materials and information is no longer available to complete this report, then additional data recovery field should be conducted at the intact portion of Feature 4. In addition, the full significance of Feature 6 has not been mitigated through archaeological field work. Additional mitigation in the form of oral history compilation, is recommended for the Makena School Site. This information could be included in the data recovery report, or could be conducted as a separate study. It is recommended that the oral history study be completed by an individual who is formally trained in conducting oral interviews.

Finally, one site (5795) is assessed as significant under criteria "c" and "d". Preservation is recommended for this site; if preservation is not possible, consultation with the SHPD Architectural Branch for a determination of architectural mitigation is recommended.

In addition to the above site-specific recommendations, it is recommended that initial grading and grubbing of the project area be monitored by a qualified archaeologist, in order to ensure that a) the preserve areas as designated by approved preservation plans are marked and maintained during earthmoving, and that b) inadvertent discoveries are identified, documented and protected.

Implementation of the mitigation measures as recommended here will require preparation of a burial preservation plan for Site 5706-11, with review and approval by the SHPD and the Maui-Lana'i Islands Burial Council. A preservation plan for Site 5711 and possibly 5795 will be needed, with review and approval by SHPD. If Site 5795 is not preserved, documentation of the site per architectural recommendations will be needed. Completion of the data recovery report and a new oral history study for Site 1007 will also be needed. Finally, a monitoring plan will also be prepared and submitted to SHPD for review and approval, to ensure fulfillment of preservation plans and protect inadvertent discoveries.

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8. APPENDIX

Beta Analytic Inc.
Radiocarbon analysis and calibration reports

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MR. DARDEN HOOD
Director

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

January 17, 2006

Ms. Theresa K. Donham
Akahele Archaeology
30 Laumaewa Loop
Kihei, HI 96753
USA

RE: Radiocarbon Dating Results For Samples C-0601, C-0602, C-0603

Dear Ms. Donham:

Enclosed are the radiocarbon dating results for three samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses went normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of the analysis was charged to the VISA card provided. A receipt is enclosed. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood

BETA

BETA ANALYTIC INC.

DR. M.A. TAMERS and MR. D.G. HOOD

UNIVERSITY BRANCH
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305/667-5167 FAX: 305/663-0964
E-MAIL: beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Ms. Theresa K. Donham — Report Date: 1/17/2006

Akahele Archaeology — Material Received: 1/9/2006

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 212865	220 +/- 40 BP	-21.0 o/oo	290 +/- 40 BP
SAMPLE : C-0601			
ANALYSIS : Radiometric-Priority delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1490 to 1660 (Cal BP 460 to 290)			
Beta - 212866	240 +/- 60 BP	-24.8 o/oo	240 +/- 60 BP
SAMPLE : C-0602			
ANALYSIS : Radiometric-Priority delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1500 to 1690 (Cal BP 450 to 260) AND Cal AD 1730 to 1810 (Cal BP 220 to 140) Cal AD 1920 to 1950 (Cal BP 30 to 0)			
Beta - 212867	290 +/- 60 BP	-11.5 o/oo	510 +/- 60 BP
SAMPLE : C-0603			
ANALYSIS : Radiometric-Priority delivery (with extended counting)			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1310 to 1370 (Cal BP 640 to 580) AND Cal AD 1380 to 1470 (Cal BP 570 to 480)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

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MR. DARDEN HOOD
Director

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

April 4, 2006

Ms. Theresa K. Donham
Akahele Archaeology
30 Laumaewa Loop
Kihei, HI 96753
USA

RE: Radiocarbon Dating Results For Samples C0604, C0605

Dear Ms. Donham:

Enclosed are the radiocarbon dating results for two samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses went normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of the analysis was charged to the VISA card provided. A receipt is enclosed. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood

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BETA ANALYTIC INC.

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REPORT OF RADIOCARBON DATING ANALYSES

Ms. Theresa K. Donham — Report Date: 4/4/2006

Akahele Archaeology — Material Received: 3/28/2006

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 215909	30 +/- 60 BP	-26.0 o/oo	20 +/- 60 BP
SAMPLE : C0604			
ANALYSIS : Radiometric-Priority delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1680 to 1730 (Cal BP 260 to 220) AND Cal AD 1810 to 1930 (Cal BP 140 to 20) Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)			
Beta - 215910	10 +/- 70 BP	-20.3 o/oo	90 +/- 70 BP
SAMPLE : C0605			
ANALYSIS : Radiometric-Priority delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1660 to beyond 1960 (Cal BP 290 to 0)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-21:lab. mult=1)

Laboratory number: **Beta-212865**

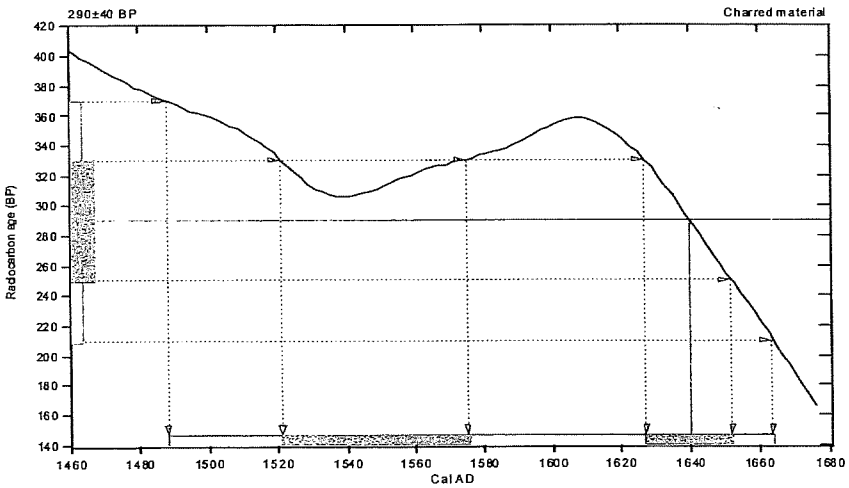
Conventional radiocarbon age: **290±40 BP**

2 Sigma calibrated result: **Cal AD 1490 to 1660 (Cal BP 460 to 290)**
(95% probability)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1640 (Cal BP 310)

1 Sigma calibrated results: Cal AD 1520 to 1580 (Cal BP 430 to 380) and
(68% probability) Cal AD 1630 to 1650 (Cal BP 320 to 300)



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Database used
INTCAL98
Calibration Database
Editorial Comment
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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-212866**

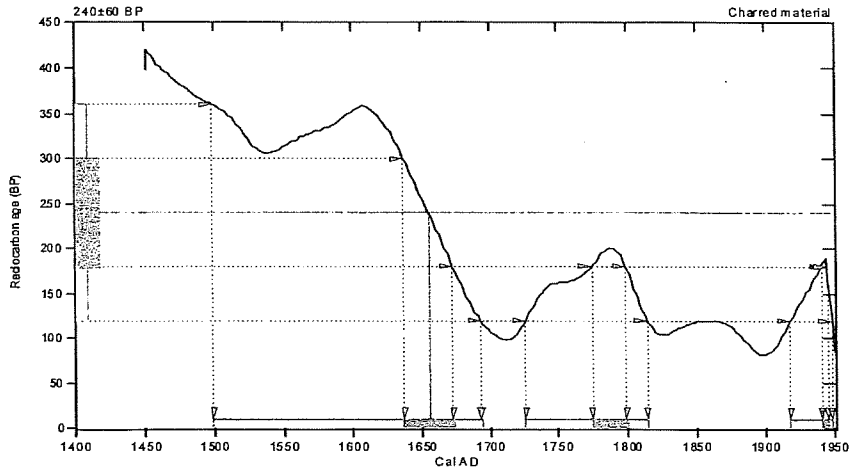
Conventional radiocarbon age: **240±60 BP**

2 Sigma calibrated results: **Cal AD 1500 to 1690 (Cal BP 450 to 260) and**
(95% probability) **Cal AD 1730 to 1810 (Cal BP 220 to 140) and**
Cal AD 1920 to 1950 (Cal BP 30 to 0)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1660 (Cal BP 290)

1 Sigma calibrated results: Cal AD 1640 to 1670 (Cal BP 310 to 280) and
(68% probability) Cal AD 1770 to 1800 (Cal BP 180 to 150) and
Cal AD 1940 to 1950 (Cal BP 10 to 0)



References:

Database used
INTCAL98
Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-11.5:lab. mult=1)

Laboratory number: **Beta-212867**

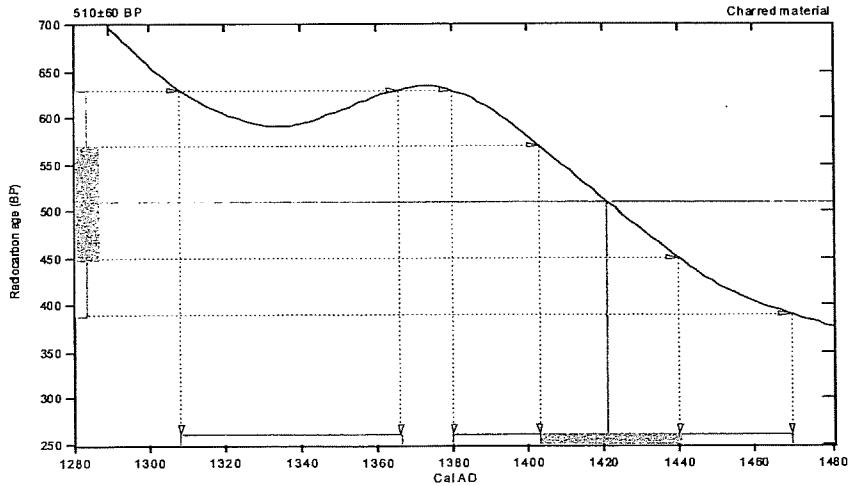
Conventional radiocarbon age: **510±60 BP**

2 Sigma calibrated results: **Cal AD 1310 to 1370 (Cal BP 640 to 580) and**
(95% probability) **Cal AD 1380 to 1470 (Cal BP 570 to 480)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1420 (Cal BP 530)

1 Sigma calibrated result: (68% probability) Cal AD 1400 to 1440 (Cal BP 550 to 510)



References:

Database used
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Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26:lab. mult=1)

Laboratory number: **Beta-215909**

Conventional radiocarbon age: **20±60 BP**

2 Sigma calibrated results[2]: **Cal AD 1680 to 1730 (Cal BP 260 to 220) and**
(95% probability) **Cal AD 1810 to 1930 (Cal BP 140 to 20) and**
Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)

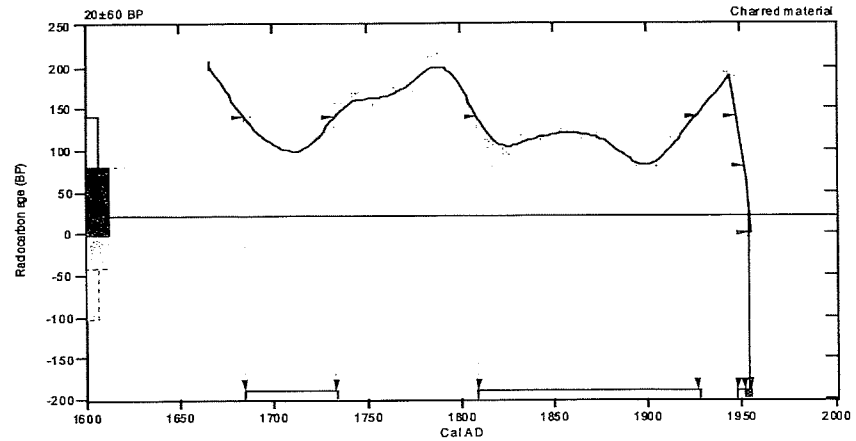
[2] 2 Sigma range being quoted is the maximum antiquity based on the minus 2 Sigma range

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1950 (Cal BP 0)

1 Sigma calibrated result[3]: (68% probability) Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)

[3] 1 Sigma range being quoted is the maximum antiquity based on the minus 1 Sigma range



References:

Database used
INTCAL98
Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
Mathematics
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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

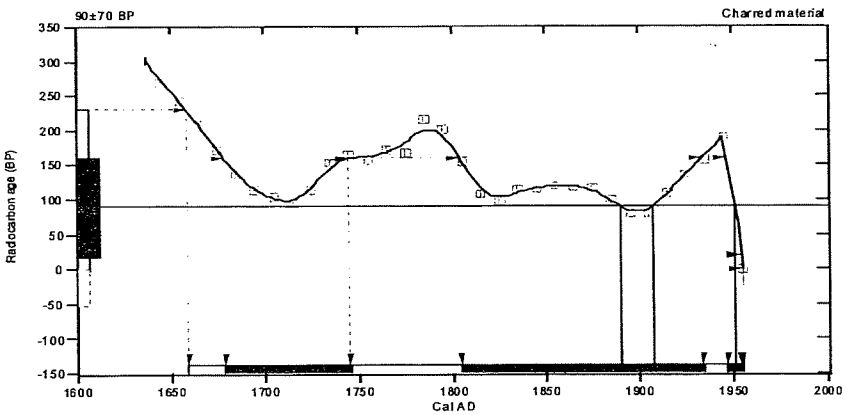
(Variables: C13/C12=-20.3:lab. mult=1)

Laboratory number:	**Beta-215910**
Conventional radiocarbon age:	**90±70 BP**
2 Sigma calibrated result[2]: (95% probability)	**Cal AD 1660 to beyond 1960 (Cal BP 290 to 0)**

[2] *2 Sigma range being quoted is the maximum antiquity based on the minus 2 Sigma range*

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal AD 1890 (Cal BP 60) and Cal AD 1910 (Cal BP 40) and Cal AD 1950 (Cal BP 0)
1 Sigma calibrated results: (68% probability)	Cal AD 1680 to 1740 (Cal BP 270 to 200) and Cal AD 1800 to 1930 (Cal BP 150 to 20) and Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

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Editorial Comment
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Www.radiocarbon.com

Mr. Darden Hood
Director

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

Final Report

The final report package includes the final date report, a statement outlining our analytical procedures, a glossary of pretreatment terms, calendar calibration information, billing documents (containing balance/credit information and the number of samples submitted within the yearly discount period), and peripheral items to use with future submittals. The final report includes the individual analysis method, the delivery basis, the material type and the individual pretreatments applied. The final report has been sent by mail and e-mail (where available).

Pretreatment

Pretreatment methods are reported along with each result. All necessary chemical and mechanical pretreatments of the submitted material were applied at the laboratory to isolate the carbon which may best represent the time event of interest. When interpreting the results, it is important to consider the pretreatments. Some samples cannot be fully pretreated, making their ^{14}C ages more subjective than samples which can be fully pretreated. Some materials receive no pretreatments. Please look at the pretreatment indicated for each sample and read the pretreatment glossary to understand the implications.

Analysis

Materials measured by the radiometric technique were analyzed by synthesizing sample carbon to benzene (92% C), measuring for ^{14}C content in one of 53 scintillation spectrometers, and then calculating for radiocarbon age. If the Extended Counting Service was used, the ^{14}C content was measured for a greatly extended period of time. AMS results were derived from reduction of sample carbon to graphite (100% C), along with standards and backgrounds. The graphite was then detected for ^{14}C content in one of 9 accelerator-mass-spectrometers (AMS) .

The Radiocarbon Age and Calendar Calibration

The "Conventional ^{14}C Age (*)" is the result after applying $^{13}C/^{12}C$ corrections to the measured age and is the most appropriate radiocarbon age. If an "*" is attached to this date, it means the $^{13}C/^{12}C$ was estimated rather than measured (The ratio is an option for radiometric analysis, but included on all AMS analyses.) Ages are reported with the units "BP" (Before Present). "Present" is defined as AD 1950 for the purposes of radiocarbon dating.

Results for samples containing more ^{14}C than the modern reference standard are reported as "percent modern carbon" (pMC). These results indicate the material was respiring carbon after the advent of thermo-nuclear weapons testing (and is less than ~ 50 years old).

Applicable calendar calibrations are included for materials between about 100 and 19,000 BP. If calibrations are not included with a report, those results were either too young, too old, or inappropriate for calibration. Please read the enclosed page discussing calibration.

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PRETREATMENT GLOSSARY
Standard Pretreatment Protocols at Beta Analytic

Unless otherwise requested by a submitter or discussed in a final date report, the following procedures apply to pretreatment of samples submitted for analysis. This glossary defines the pretreatment methods applied to each result listed on the date report form (e.g. you will see the designation "acid/alkali/acid" listed along with the result for a charcoal sample receiving such pretreatment).

Pretreatment of submitted materials is required to eliminate secondary carbon components. These components, if not eliminated, could result in a radiocarbon date, which is too young or too old. Pretreatment does not ensure that the radiocarbon date will represent the time event of interest. This is determined by the sample integrity. Effects such as the old wood effect, burned intrusive roots, bioturbation, secondary deposition, secondary biogenic activity incorporating recent carbon (bacteria) and the analysis of multiple components of differing age are just some examples of potential problems. The pretreatment philosophy is to reduce the sample to a single component, where possible, to minimize the added subjectivity associated with these types of problems. If you suspect your sample requires special pretreatment considerations be sure to tell the laboratory prior to analysis.

"acid/alkali/acid"

The sample was first gently crushed/dispersed in deionized water. It was then given hot HCl acid washes to eliminate carbonates and alkali washes (NaOH) to remove secondary organic acids. The alkali washes were followed by a final acid rinse to neutralize the solution prior to drying. Chemical concentrations, temperatures, exposure times, and number of repetitions, were applied accordingly with the uniqueness of the sample. Each chemical solution was neutralized prior to application of the next. During these serial rinses, mechanical contaminants such as associated sediments and rootlets were eliminated. This type of pretreatment is considered a "full pretreatment". On occasion the report will list the pretreatment as "acid/alkali/acid - insolubles" to specify which fraction of the sample was analyzed. This is done on occasion with sediments (See "acid/alkali/acid - solubles"

Typically applied to: charcoal, wood, some peats, some sediments, and textiles "acid/alkali/acid – solubles"

On occasion the alkali soluble fraction will be analyzed. This is a special case where soil conditions imply
That the soluble fraction will provide a more accurate date. It is also used on some occasions to verify the present/absence or degree of contamination present from secondary organic acids. The sample was first pretreated with acid to remove any carbonates and to weaken organic bonds. After the alkali washes (as discussed above) are used, the solution containing the alkali soluble fraction is isolated/filtered and combined with acid. The soluble fraction, which precipitates, is rinsed and dried prior to combustion.

"acid/alkali/acid/cellulose extraction"

Following full acid/alkali/acid pretreatments, the sample is bathed in (sodium chlorite) $NaClO_2$ under very controlled conditions (Ph = 3, temperature = 70 degrees C). This eliminates all components except wood cellulose. It is useful for woods that are either very old or highly contaminated.

Applied to: wood

"acid washes"

Surface area was increased as much a possible. Solid chunks were crushed, fibrous materials were shredded, and sediments were dispersed. Acid (HCl) was applied repeatedly to ensure the absence of carbonates. Chemical concentrations, temperatures, exposure times, and number of repetitions, were applied accordingly with the uniqueness of each sample. The sample was not be subjected to alkali washes to ensure the absence of secondary organic acids for intentional reasons. The most common reason is that the primary carbon is soluble in the alkali. Dating results reflect the total organic content of the analyzed material. Their accuracy depends on the researcher's ability to subjectively eliminate potential contaminants based on contextual facts.

Typically applied to: organic sediments, some peats, small wood or charcoal, special cases

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Mr. Darden Hood
Director

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Deputy Directors

Calendar Calibration at Beta Analytic

Calibrations of radiocarbon age determinations are applied to convert BP results to calendar years. The short-term difference between the two is caused by fluctuations in the heliomagnetic modulation of the galactic cosmic radiation and, recently, large scale burning of fossil fuels and nuclear devices testing. Geomagnetic variations are the probable cause of longer-term differences.

The parameters used for the corrections have been obtained through precise analyses of hundreds of samples taken from known-age tree rings of oak, sequoia, and fir up to about 10,000 BP. Calibration using tree-rings to about 12,000 BP is still being researched and provides somewhat less precise correlation. Beyond that, up to about 20,000 BP, correlation using a modeled curve determined from U/Th measurements on corals is used. This data is still highly subjective. Calibrations are provided up to about 19,000 years BP using the most recent calibration data available.

The Pretoria Calibration Procedure (Radiocarbon, Vol 35, No.1, 1993, pg 317) program has been chosen for these calendar calibrations. It uses splines through the tree-ring data as calibration curves, which eliminates a large part of the statistical scatter of the actual data points. The spline calibration allows adjustment of the average curve by a quantified closeness-of-fit parameter to the measured data points. A single spline is used for the precise correlation data available back to 9900 BP for terrestrial samples and about 6900 BP for marine samples. Beyond that, splines are taken on the error limits of the correlation curve to account for the lack of precision in the data points.

In describing our calibration curves, the solid bars represent one sigma statistics (68% probability) and the hollow bars represent two sigma statistics (95% probability). Marine carbonate samples that have been corrected for $^{13}C/^{12}C$, have also been corrected for both global and local geographic reservoir effects (as published in Radiocarbon, Volume 35, Number 1, 1993) prior to the calibration. Marine carbonates that have not been corrected for $^{13}C/^{12}C$ are adjusted by an assumed value of 0 %0 in addition to the reservoir corrections. Reservoir corrections for fresh water carbonates are usually unknown and are generally not accounted for in those calibrations. In the absence of measured $^{13}C/^{12}C$ ratios, a typical value of -5 %0 is assumed for freshwater carbonates.

(Caveat: the correlation curve for organic materials assume that the material dated was living for exactly ten years (e.g. a collection of 10 individual tree rings taken from the outer portion of a tree that was cut down to produce the sample in the feature dated). For other materials, the maximum and minimum calibrated age ranges given by the computer program are uncertain. The possibility of an "old wood effect" must also be considered, as well as the potential inclusion of younger or older material in matrix samples. Since these factors are indeterminant error in most cases, these calendar calibration results should be used only for illustrative purposes. In the case of carbonates, reservoir correction is theoretical and the local variations are real, highly variable and dependent on provenience. Since imprecision in the correlation data beyond 10,000 years is high, calibrations in this range are likely to change in the future with refinement in the correlation curve. The age ranges and especially the intercept ages generated by the program must be considered as approximations.)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

Variables used in the calculation of age calibration → (Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-123456**

The uncalibrated Conventional Radiocarbon Age (± 1 sigma)

Conventional radiocarbon age[1]: **2400±60 BP**

The calendar age range in both calendar years (AD or BC) and in Radiocarbon Years (BP)

2 Sigma calibrated result: **Cal BC 770 to 380 (Cal BP 2720 to 2330)**
(95% probability)

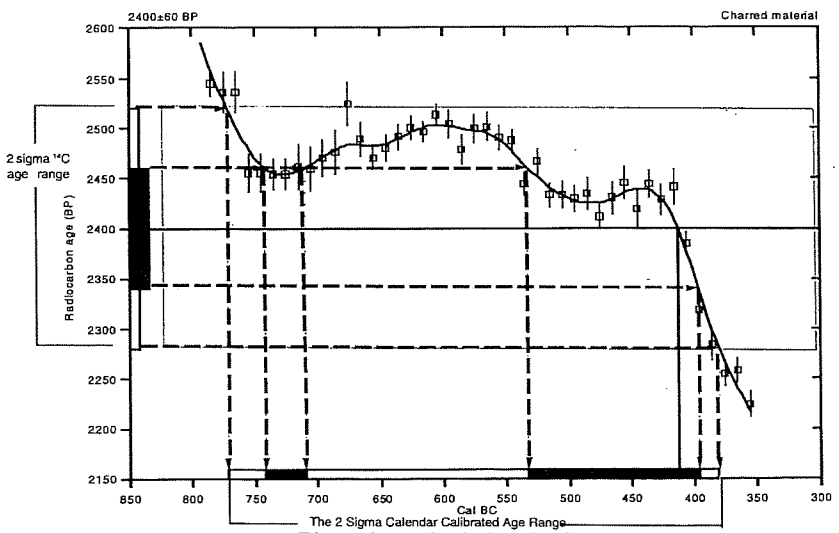
[1] C13/C12 ratio estimated

Intercept data

The intercept between the average radiocarbon age and the calibrated curve time scale. This value is illustrative and should not be used by itself.

Intercept of radiocarbon age with calibration curve: Cal BC 410 (Cal BP 2360)

1 Sigma calibrated result: (68% probability) Cal BC 740 to 710 (Cal BP 2690 to 2660) and Cal BC 535 to 395 (Cal BP 2485 to 2345)



This range is determined by the portion of the curve that is in a "box" drawn from the 2 sigma limits on the radiocarbon age. If a section of the curve goes outside of the "box", multiple ranges will occur as shown by the two 1 sigma ranges which occur from sections going outside of a similar "box" which would be drawn at the 1 sigma limits.

References:

Database used
Intcal 98
Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

References for the calibration data and the mathematics applied to the data. These references, as well as the Conventional Radiocarbon Age and the 13C/12C ratio used should be included in your papers.

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STATE HISTORIC
PRESERVATION DIVISION
ACCEPTANCE LETTER
DATED JUNE 28, 2006

APPENDIX

I-1

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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CONSERVATION AND RESOURCE ENFORCEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

June 28, 2006

Theresa Donham
Akahele Archaeology
30 Laumaewa Loop
Kihei, Hawai'i 96753

LOG NO: 2006.2117
DOC NO: 0606MK35
Archaeology

Dear Ms. Donham:

SUBJECT: Chapter 6E-42 Historic Preservation Review –
Archaeological Inventory Survey of Development Parcel H-1 for Keaka, LLC
Maluaka and Ka'eo Ahupua'a, Makawao District, Island of Maui
TMK: (2) 2-1-005:084 and 2-1-006:037 and 056

Thank you for the opportunity to review this report which our staff received on May 1, 2006 (Donham 2006, *Archaeological Inventory Survey of Development Parcel H-1 [TMK (2) 2-1-05:84; and 2-1-06 37 &56] Maluaka and Ka'eo Ahupua'a, Honua'ula, Maui*...Akahele Archaeology ms).

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-Contact period land uses. The summary of previous archaeological work in the area provides a baseline for the current work. The depth of history for the area is great and includes sites dating from the period 1350-1550 AD through the historic era. During the Mahele, several Land Commission parcels were awarded (LCA) in the project vicinity. Many of these were awarded for "house lots" utilized by people in Ka'eo and Maluaka.

The survey has adequately covered the project area documenting 15 historic properties comprised of 80 features. Eleven (11) of the 15 sites were previously identified (22 component features) during prior archaeological work in the area. Several of the previously identified sites were first documented during work by Bishop Museum in the previous two decades. They were not assigned State Inventory of Historic Places (SIHP) designation until this survey. In several cases, new features not previously identified were added to the previously identified sites/complexes, resulting in the high number of features. Eleven (11) of the archaeological sites had subsurface deposits tested during this phase of the project. In all, 31 features were tested.

The previously identified sites include the SIHP 50-50-14-1007 (Makena School Site- four [4] known features, [two] new features), SIHP-1853 (Maluaka Point Complex-six [6] known features, two [2] new features), SIHP 1864 (Makena Road wall segments-traditional and modern), and SIHP-2272 (a wall and landscaping features, one [1] known, three [3] newly identified). During the most recent two (2) phases of archaeological inventory survey, two (2) habitation sites were identified. SIHP -5706 is a habitation /agricultural complex with 17 features; and-5707 is a habitation site with five (5) features. Historic era sites include -5708 (an historic/modern home sites with historic/modern refuse areas and three features),

-5709 (historic/modern land clearing features evidencing machinery with two [2] features), -5795 (an historic era enclosure with one [1] feature), -5796 (enclosure), -5797 (four [4] stone wall segments, one [1] of which was previously identified), -5798 (historic/modern home site with associated wall-four [4] features), and SIHP -5799 (historic/modern ancillary habitation site with wall-two [2] features). Two (2) additional traditional sites include an agricultural complex (SIHP 50-50-14-5710) with 13 features, and a ceremonial complex (SIHP 50-50-14-5711 with eight [8] features). Site boundaries for all of the sites have been acceptably circumscribed and features have been well documented.

We concur that all of the sites are significant under Criterion "D" and have provided or will provide information important to understanding the history and prehistory of the region. We also agree that SIHP 50-50-14-1007, the Makena School, is also significant under Criterion "A" as it is associated with events that made an important contribution to the broad patterns of our history. Data recovery was conducted at the school site in 1989, the results of which have yet to be written up in a report. SIHP 50-50-14-5711, consisting of eight (8) features with pre-Contact ceremonial and habitation function is significant under Criteria "D" and "E", for traditional cultural significance. SIHP 50-50-14-5795 is deemed significant under Criteria "C" (embodies distinctive characteristics of a type, period or method of construction) and "D" (information content).

We agree with the mitigation commitments for SIHP 50-50-14-1007, that the data recovery report, the work for which was conducted in 1989 should be compiled so that this information can contribute to the database of knowledge about this school site. We also agree that oral interviews with knowledgeable residents/informants will enhance the information we have about the school, as well as the anticipated data recovery report.

We also agree that SIHP 50-50-14-5711 should be preserved in place. We note that Feature 7, interpreted as a possible water control feature, has not been recommended for preservation. We believe that, as indicated on page 108 of the inventory survey report, the relationship between Feature 7 and Feature 8 has not been entirely resolved. Therefore, we believe that SIHP 50-50-14-5711 should be preserved in its entirety, inclusive of Feature 7. We anticipate the inclusion of this site and all eight (8) features in the future Preservation Plan.

The proposed mitigation commitment for SIHP 50-50-14-5076, Feature 11 (burial) is preservation in place. We anticipate the submittal of a Burial Treatment/Preservation Plan for this feature, submitted to the Maui/Lana'i Islands Burial Council and SHPD for approval.

The mitigation recommendation for SIHP 50-50-14-5795, an historic storage enclosure, is preservation or architectural documentation. Given the integrity of the structure, we believe that this site might be preserved with adaptive reuse, perhaps incorporated into a landscaping scheme, or utilized in some other fashion. If this is not possible, we agree that architectural documentation is necessary prior to any alteration of the structure. Again, we encourage adaptive reuse for this feature, as it is significant under multiple Criteria.

We further agree that all future work on the subject parcel should be archaeologically monitored as a precaution against inadvertent impacts to historic properties. Following resolution of the preservation issues, we will await a monitoring plan specific to the project area and the discrete features and topography around which work will ensue.

We are in receipt of two (2) letters from the community. The first is from Na Kupuna O Maui. In their letter, they recommend that Feature 4 of SIHP 50-50-14-5711 be preserved, and not data recovered. As noted above, we concur with this recommendation, that SIHP 50-50-14-5711 be preserved in entirety. Na Kupuna O Maui further indicate that SIHP 50-50-14-5795 minimally be subjected to the architectural mitigation as indicated in the report.

The second letter we received is from Office of Hawaiian Affairs (OHA). They commend the author for a thorough job, stating that this current phase of work "conferred ample time and attention" to the project area and incumbent historic properties, a statement with which we concur. They stress the importance of the pre-Contact Hawaiian sites in the project area, as "last surviving examples of pre-Contact coastal site types in the area." Given this statement, they recommend that all pre-Contact Native Hawaiian sites on the subject parcel be preserved. They acknowledge the preservation of SIHP 50-50-14-5706 Feature 11 Burial, SIHP 50-50-14-5711, and the possible preservation of SIHP 50-50-14-5795. To this list they include SIHP 50-50-14-5706 Features 1, 5 and 15, -5707 Features 2 and 4, and -5796. We note that SIHP 50-50-14-5706, Features 1, 5, and 14, the three (3) habitation features at this site, yielded sparse cultural material during testing, and believe that the architectural integrity of these sites has been compromised by subsequent use of the area for ranching purposes.

One editorial note: on page 23, "parcel 86" appears in two (2) places (paragraph 1 and 2) and should be changed to "parcel 84".

We find this report to be acceptable. We will await the submittal of a Burial Treatment and Preservation Plan. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall at (808) 243-5169 as soon as possible to resolve these concerns.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

MK:kf

c: Bert Ratte, DPWEM, County of Maui, FAX 270-7972
Michael Foley, Director, Dept. of Planning, FAX 270-7634
Maui Cultural Resources Commission, Dept. of Planning, 250 S. High Street, Wailuku, HI 96793

ARCHAEOLOGICAL INVENTORY SURVEY (TMKS 2-1-005:083 AND 120 PORS.)

APPENDIX

J

ASC022508

Archaeological Inventory Survey
H2 Parcel 83, Maluaka *ahupua`a*
Makawao District, Maui Island
TMK 2-1-05: 83 and 120 pors.

REVISED JULY 2008
February 2008

Archaeological Services Hawaii, LLC
Wailuku, Hawai`i 96793

in association with

Aki Sinoto Consulting, LLC
Honolulu, Hawai`i 96826

ASC022508

Archaeological Inventory Survey
H2 Parcel 83, Maluaka *ahupua`a*
Makawao District, Maui Island
TMK 2-1-05: 83 and 120 pors.

for:

Keaka, LLC
2005 Main Street
Wailuku, Hawai`i 96793

by:

Lisa Rotunno-Hazuka
Koa Hodgins
Jeffrey Pantaleo
and
Aki Sinoto

REVISED JULY 2008
February 2008

Archaeological Services Hawaii, LLC
1930A Vineyard Street
Wailuku, Hawai`i 96793

in association with

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ABSTRACT

An archeological inventory survey was undertaken in Parcel 83 and portion of Parcel 120 of the Keaka, LLC holdings in Maluaka *ahupua'a*, Makena, Makawao, Maui Island.The 4.0 acre parcel 83 is located immediately inland of the southern segment of the Makena-Keoneoio Road near its junction with Makena Alanui. At this intersection, is the triangular shaped lot, Parcel 120, comprised of .396 acres.

Two sites composed of 18 component features were recorded within Parcel 83. Site 50-50-14-6366 was a complex of 15 features representing a historic homestead. Site 50-50-14-6367, appears to be a pre-Contact agricultural and temporary habitation site located roughly 40 meters east of Site 6366, was an isolated bedrock outcrop ridge incorporating three structural modifications. No sites were identified within Parcel 120. Subsurface testing was undertaken at six features of Site 6366 and three features of Site 6367. The testing results indicated compounded prior disturbances within Site 6366 and moderate quantities of historic artifacts and minimal quantities of midden were recovered. Trace amounts of marine shell were obtained from shallow deposits in two features of Site 6367, but no artifacts, historical nor traditional Hawaiian in type, were recovered.

The results of the current investigation showed that Site 6366 represented a historic homestead occupied during the early twentieth century which was confirmed through oral testimony form lineal descendants of the Poepoe family and supported by the presence of temporally diagnostic artifacts. Site 6367 was most likely not associated with the occupation of Site 6366 and interpreted to be a traditional Hawaiian agricultural and habitation site originating during the prehistoric or early historic period. Sites 6366 and 6367 have been adequately documented and require no further inventory level procedures. These sites have been assigned Criterion D of the Hawaii Register of Historic Places. A better example of Site 6367, Site 6379 has been preserved in the adjoining parcel, Parcel 85. Two previously recorded free-standing wall features from Site 1007 partially intrude into the project area along the western boundary line (Feature 1) and the northern property line (Feature 7). These features were recorded by Donham in 2006 and were assigned a significance of Criterion D. No further work is recommended for these wall remnants.

Due to the presence of historic properties within and surrounding the project area, as well as the recent discovery of inadvertent burial features in parcel 56 to the south, precautionary monitoring is recommended during all ground-disturbing activities.

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INTRODUCTION

At the request of Keaka, LLC of Wailuku, Archaeological Services Hawaii, LLC., of Wailuku in association with Aki Sinoto Consulting of Honolulu, conducted an inventory survey, on two parcels of land, under their ownership, proposed for development (TMK 2-1-05:83 and 120 pors), in Makena, Makawao, Maui (Fig. 1). The two-fold objective of the current undertaking was to compile pertinent data from previous archaeological studies completed in the area, and to report the results of recent subsurface testing procedures.

PROJECT AREA

The project area is located along the coastal reaches of the lower southwestern slopes of Haleakala in the Makena region. The parcel occupies a small coastal portion of Maluaka *ahupua'a*; Makawao District (Honuaula *Moku*), Maui Island. Honua'ula, one of twelve ancient districts (*moku*) of Maui Island, was subsumed into the Makawao District during the modern era. The project site, located *makai* of Makena Alanui, occurs approximately 300m south of the Maui Prince Hotel. Parcel 83 is a roughly rectangular area encompassing 4.0 acres is bounded on the north and east by Parcel 85, south by the triangular shaped Parcel 120 and Makena Alanui and west by a segment of the Old Makena-Keoneoio Road (Figs. 2 & 3). Parcel 120 is located at the intersection of Makena-Keoneoio and Makena Alanui Roads. The northern and western boundaries of the project area are defined by free-standing stone walls (Site 50-50-14-1007 Feature 1 on the west and Feature 7 on the north), the eastern boundary is not physically defined, and a post and barbed-wire fence-line runs along the southern boundary.

ENVIRONMENT

The environment of Makena is similar to arid leeward regions of the other Hawaiian Islands. The project area receives approximately 20 inches of annual rainfall with January being the wettest month and July the driest (Armstrong 1973). The elevation of the project area ranges from 50 to 80 feet above mean-sea-level with the topography varying from gently-sloping *makai* areas to rocky *mauka* areas with exposed bedrock outcrops. Evidence of previous land modifications in the form of bulldozer cuts, berms, tailings, and clearings are evident within the project boundaries. The soils in the project area consist exclusively of Makena loam, stony complex. The Makena series are well-drained soils developed in volcanic ash with moderately rapid permeability, slow to medium runoff, and slight to moderate erosion hazard. Stony land, occurring on low ridges, makes up 30-60% of this complex and Makena loam in gently sloping areas, occur between the low ridges of Stony land (Foote et al. 1972:91).

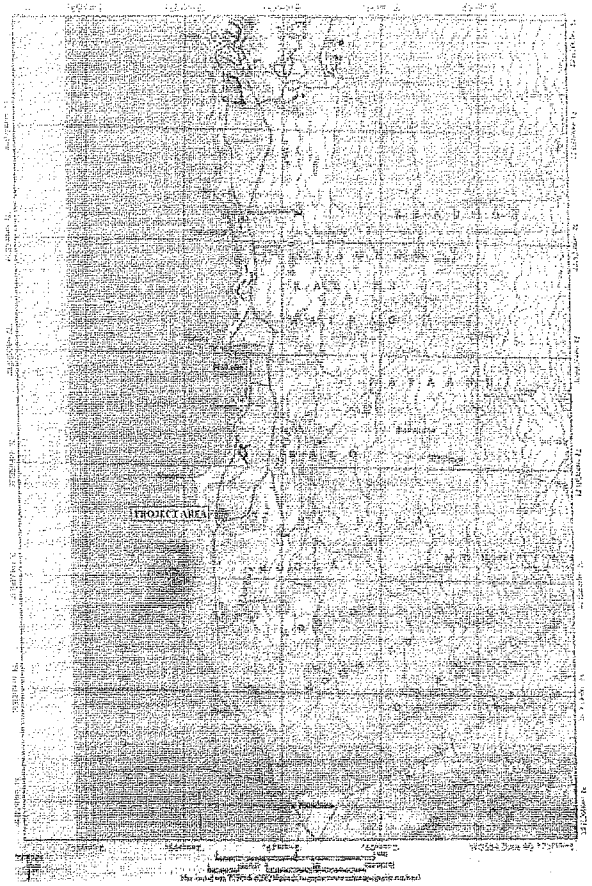


Figure 1. Project Location on USGS Makena Quadrangle

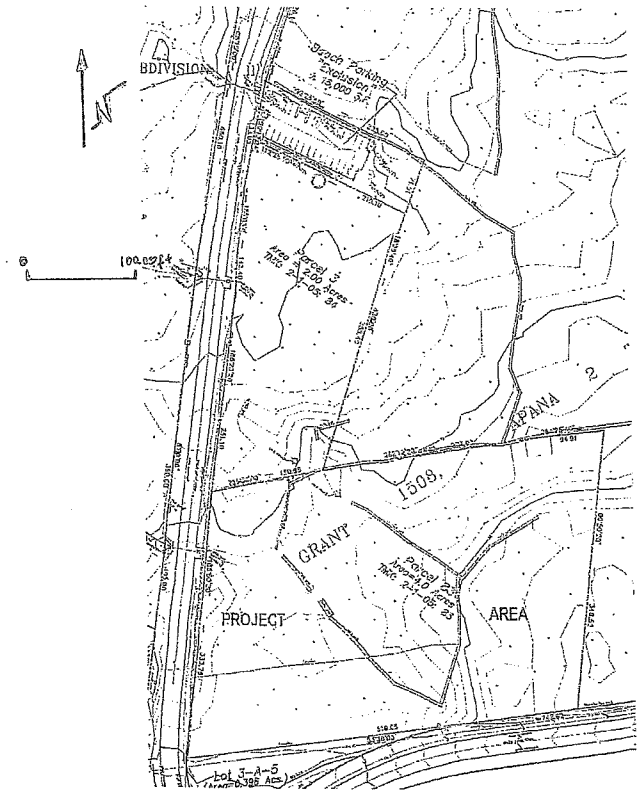


Figure 2. The Project Area (Parcel 83) is the Rectangular Area in the Lower Portion of Map (Makena-Keoneoio Road at left, Makena Alanui on bottom of page, True North top of page)

Figure 3. Project Parcel Overview at Northwest Corner from Makena-Keoneoio Road
The Wall in Foreground is Site 50-50-14-1007 Feature 1. View to East.

The project area flora largely constitutes lowland shrubs (Armstrong 1973:64). The majority of the vegetation is xerophytic and consists of common exotics such as *kiawe* (*Prosopis pallida*) as the dominant high cover with *koa haole* (*Leucaena leucocephala*) with intermittent, isolated stands of endemic *wiliwili* (*Erythrina sandwichensis*) trees. Common ground cover includes variety of endemic *'ilima* (*Sida fallax*), exotics such as basil (*Ocimum basilicum*), lantana (*Lantana camara*), the ubiquitous beggar's tick (*Bidens pilosa*), castor bean (*Ricinus communis*), and various dry grasses. Another notable flora is the introduced prickly pear or *panini* cactus (*Opuntia megacantha*). Golden crown-beard (*Verbesina enceliodes*) with its yellow, daisy-like flowers predominates as secondary ground cover in areas that have been previously cleared of primary growth. Especially notable is a dense growth of aloe (*Aloe barbadensis*) in the western portion of the project area.

HISTORICAL BACKGROUND

Historical background data regarding the Wailea/Makena region has been summarized in Barrere (1974), Clark and Kelly (1985), Cordy and Athens (1988), Schilt (1988), Gosser et al. (1993 & 1996), McIntosh et al. (1997), and most recently by Donham (2006). The reader is thus referred to these studies for detailed information; thus, this section will be limited to a brief historical summary.

The earliest prehistoric settlement on Maui Island is postulated to have occurred between A.D. 300-600 along the windward regions where abundant rainfall and fertile soil supported crop cultivation and human populations (Kirch 1985, Cordy and Athens 1988, Gosser et al. 1996). Population expansion into the drier, leeward areas of Kihei, Wailea, and Makena, likely took place by A.D. 1000-1200 (Cordy 1974, Kirch 1985). Seasonal settlements occurred along the coastal areas to exploit marine resources, while permanent settlements occupied the upland areas to utilize forest products and cultivate agricultural resources. Between these settlement loci was an arid area used for cultivating sweet potatoes and during transit on *mauka-makai* trails. Upland populations exchanged taro, bananas, and sweet potatoes with the coastal populations for ocean resources (Handy 1940). Although a number of scenarios regarding the prehistoric chronology of the coastal Honuaula region have previously been postulated (Cordy and Athens 1988, Gosser et al. 1996, and Donham 2006), the number of dated sites is still too limited to permit the establishment of credible intra-regional chronological benchmarks.

The inhabitants of Honua'ula subsisted mainly on fish and sweet potatoes, a common diet of those who lived in the leeward area of Maui (Barrere 1975:41). The early French navigator La Perouse noted, while anchored at Keoneoio Bay that "this part of the coast was altogether destitute of running water. The inhabitants had no drinking water but a brackish water obtained from shallow wells." (1798:350)

Due to the lack of running water, agricultural production in leeward Maui Island was limited to dryland taro in the upland areas in pockets of moist soil where rainfall was greater, while sweet potatoes were grown at the lower elevations (Handy 1940:113-114). Irish potatoes became an important cash crop in East Maui, for provisioning whaling ships and supplying the west coast of North America during the Gold Rush of 1848. By 1846, the cultivation of Irish potatoes had spread from Kula to Honua'ula. Sweet potatoes were also grown for export, and sugarcane was being cultivated commercially by 1841. M.J. Nowlein and S.D. Burrows leased lands from Kamehameha III at Ulupalakua to grow sugarcane and Irish potatoes. In 1845, Nowlein and

Burrows transferred their lease and interests to Linton L. Torbert, who extended sugarcane cultivation to adjoining lands and started cattle ranching. In 1856, Captain James Makee bought the Torbert Plantation and it was later referred to as the "Rose Ranch." By 1862, sugarcane was being extensively cultivated, and a steam mill was built for processing sugar. A severe drought in 1878 forced the end of sugarcane production, and cattle ranching became the dominant commercial enterprise of Honua'ula. By the 1880s, 'Ulupalakua Plantation was basically a cattle ranch utilizing the road and landing at Makena in Papa`anui. Ranching continued to be practiced into the 1970s. However, the dominant economic and land-use theme since then has focused on tourism and residential development. The past three decades have seen the intensification of golf course, resort, and luxury residence developments in the Wailea and Makena regions.

Land Tenure During the Historic Period

During the Mahele in 1848, lands of Hawaii were divided among the Royalty, Government, and commoners. Applications for land titles were considered by the Board of Commissioners to Quiet Land Titles. When a claim was validated, a Land Claim Award (L.C.A.) was awarded. Following payment of this claim, a Royal Patent (R.P.) was issued. Eleven individuals were awarded such lands in neighboring Ka`eo and Mohopilo. Eight of the awards included parcels used for sweet potato cultivation and house lots located in the coastal, intermediate (Mohopilo), and inland (Ulupalakua) zones. One of these also included a parcel used for the cultivation of Irish potatoes. Three consisted only of single house lots. Table 1 presents pertinent data regarding the 11 awards. Portions of government lands were also sold as Grants. Grant 1508, Apana 1 and 2, and portion of Grant 3088, were awarded in the project area. Both Grants are located in Muluaka *ahupua'a*, Honua'ula District. Grant 1508, Apana 1 (7.66 acres) and 2 (23.20 acres), were awarded to Makahanohano for $32.72 by Kamehameha III in 1854. Grant 3088 was awarded to Kanakahou for $64.46 by Kamehameha IV in 1871. The current project area occupies a 4-acre portion of Grant 1508, Apana 2.

PREVIOUS ARCHAEOLOGY

Winslow M. Walker, who conducted his fieldwork during 1929-30, provided the first modern archaeological descriptions of prominent surface remains, mainly *heiau*, on the island of Maui. However, much of the remains of daily life, the house-sites and other small associated features were not documented until several decades later, especially in the remote Makena region.

Table 1. List of LCA in Ka`eo and Mohopilo *ahupua`a*

Name	LCA #	Agam	Locality	Acres	Landuse
Hinpo	3071-2579	2	Mohopilo	9.76	Sweet potato & houselot
Hualii	2581	2	"	10.16	"
Kahalekaia	4152	3	Ka`eo	22.10	"
Kaika	2395	1	"	0.20	houselot
Kalii	2395-B	1	"	0.25	"
Kalama	4292-B	4	(Ulupalakua)	7.50	sweet potato & houselot
Kalili	2389	2	Mohopilo	10.17	"
Kiniokua	2658	2	"	7.10	"
Kohihae	2401	3	(Ulupalakua)	23.87	"
Meuweiki	3676	1	Ka`eo	0.32	houselot
Nawaiki	5402-B	1	"	6.31	Irish, sweet potato & house

Since the 1970s, the aforementioned intensification of land-altering activities associated with the expanding influx of tourism and in-migration of new residents have ironically provided the means for archaeological study of the region. Many archaeological studies have been conducted in Makena both within and in the neighboring vicinity of the current project area. Again, interested readers are referred to some of the previously completed reports (Gosser et al. 1993 & 1996 and Donham 2006) that contain comprehensive summaries and reviews of past investigations in the region. For the purposes of the current report, previous investigations completed wholly within or incorporating portions of the current project area will be briefly summarized together with notable earlier and recent undertakings in neighboring areas (Fig. 4).

Over the years, a large number of archaeological procedures have been undertaken within the Makena Lands LLC holdings in conjunction with golf course and hotel development and expansion during the period between 1970 and 1992, the installation of a wastewater treatment facility and infrastructural improvements during 1992 to 2006, and most recently (2006-2008) for a multi-family residential development.

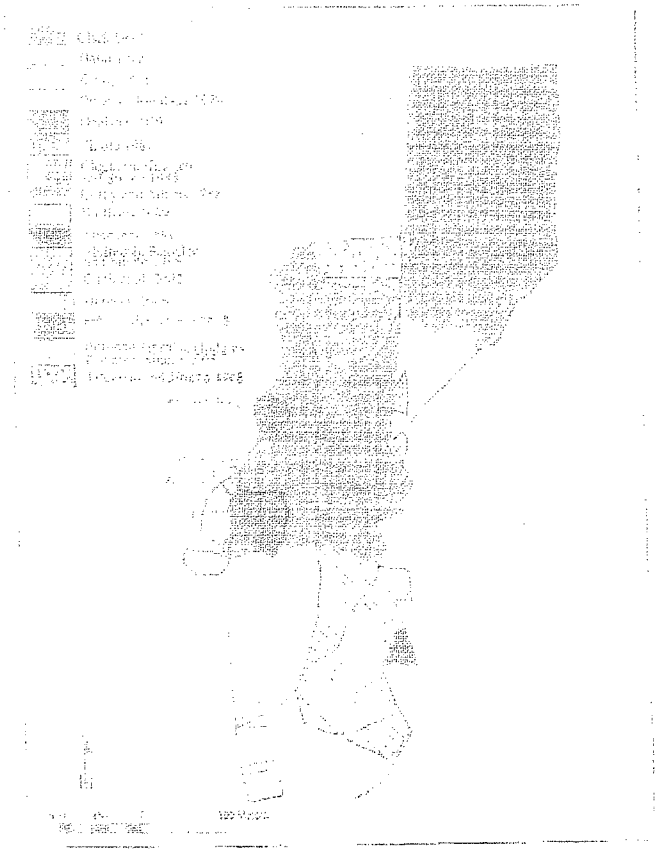


Figure 4. Locations of Previous Archaeological Studies

Earlier Studies in Neighboring Parcels

In 1977, an archaeological reconnaissance survey undertaken in conjunction with the proposed realignment of the Makena coast road for the *mauka* alternate route (the current Makena Alanui), investigated the eastern periphery of parcel 85 adjoining the current project area (Davis & Bordner 1977 and EIS 1981). Site 1266, the "Makena Complex," was referenced, but it was located outside of the study area *makai* of the existing *makai* road (Makena-Keoneoio Road). Site Complex 248, located on both sides of the survey corridor essentially included the sites recorded by Clark in 1974.

In early 1978, increment one of the proposed Seibu Golf Courses was investigated by Bishop Museum (Haun 1978) and Site 50-Ma-B8-7 (State Site 50-50-14-1853), a complex of 12 features, was located in the coastal area north of Maluaka Point. Many of these features were impacted following data recovery during the golf course construction; however, some remnants in the periphery of this complex still exist today. This area and some of the remnant sites and features were included in Donham's (2006) recent investigation.

In mid-1978, a survey of the third increment of the Seibu Golf Course (Fairways 1,7-10,17,&18) by the Bishop Museum recorded 76 sites, 7 of which were located in the parcel adjoining the current project area (Cordy 1978). Bishop Museum site numbers 218, 229-231, 233, 234 and 242 were assigned to these surface remains. No state numbers have been assigned to these sites. Site B8-7 recorded by Haun earlier as a 12-feature complex was separated into several discrete sites by Cordy. Haun's Features 2 and 9 were kept as B8-7; Features 1, 3, & 10 became B8-238, the midden scatter became B8-235, Feature 5 became B8-232, Feature 4 became B8-241, and the wooden shack and midden scatter not assigned feature numbers by Haun became B8-236. These sites are all presumed to have been destroyed during golf course construction. Haun's Features 6-8, 11, & 12 were not re-recorded nor assigned discrete site numbers. Since Cordy's was the first study in which the locations and descriptions of individual sites were specific enough to allow relocation and correlation in the field, the data from this survey became the basis for all subsequent work in the current project area. Some of these features were also included in Donham's (2006) recent study.

In 1979, two surveys were undertaken in the proposed hotel and residential areas (Denison 1979 and Rogers-Jourdane 1979). Sites B8-111 and B8-112 were located in the area adjacent to the current project area. Although the numbers were the same as those assigned by Haun, these were not the same sites. Site 111 was a remnant wall and Site 112 was a semi-circular enclosure. Both

sites were tested and produced no subsurface cultural remains. Neither of these sites could be correlated with either Haun's or Cordy's sites based on description or location.

In 1985, intensive data recovery was undertaken at Site 50-Ma-B8-217, a modified outcrop platform originally recorded by Cordy and recommended for preservation in tha area east of parcel 85.. This site was in the path of the proposed Makena Alanui extension and required salvage excavations to be conducted. Minimal remains were recovered from the rock fill of the platform. The interpreted function was a probable sleeping platform (Komori 1985).

In 1988, a survey was conducted for the public beach parking lot (TMK 2-1-05:84) and the south cul-de-sac (TMK 2-1-06:37) for the Makena-Keoneoio Road (Cleghorn, Kawachi, & Sinoto 1988). A complex of five surface features consisting of 2 walls (Fe. 1 and 2), 2 platforms/privies (Fe. 3 and 4), and a cement lined cistern (Fe. 5) with two curvilinear stone alignments around the base were documented and designated Site 50-50-14-1007. Eight shovel probes were conducted with negative results. The structural features were thought to be associated with the Old Makena School, formerly present in that location. Bishop Museum conducted subsequent data recovery at Features 3 and 4. Several historic period artifacts were collected and some internal wooden structural members from the old privies were found, but a formal report was never completed (Hurst, post-field summary letter, 1988). Feature 5, the cistern, was filled and preserved *in situ* in an area adjoining the parking lot to the south. Later, the cul-de-sac area was monitored during construction and installation of landscaping and irrigation. No significant subsurface features were encountered during the construction activities. This area was also included in Donham's (2006) recent study.

Recent Studies in the Neighboring Areas

One of the more recent projects located in close proximity to the subject area was undertaken in two adjoining parcels (TMK 2-1-06:34 & 35) situated immediately south of Fairway 6 of the South Course of the Makena Prince Golf Course. An inventory survey was conducted as part of a due diligence, for the prospective purchase of the two parcels for a single-family residential development. Surface features including retaining walls, terraces, mounds (5089 Fe. 2 and 3), enclosures, portions of a fishpond wall, a pre-contact infant burial (5090) a small family historic cemetery enclosure (Fe.1) were present. A surface scatter of historic-period artifactual remains, along with several traditional artifacts were recovered. Test excavations confirmed the presence of multiple historic burials (5091) within an area specified by lineal descendants, apart from the

known cemetery. A residential project, incorporating permanent preservation areas, was completed (Rotunno-Hazuka et al., 2002).

Two other projects also occurred in adjoining parcels located immediately north and west of the Makena Lands LLC holdings *makai* of Makena Alanui, near the existing Makena Surf residential development at the junction of Makena Alanui and the old Makena-Keoneoio Road. The triangular lot (TMK 2-1-07:71) defined by the junction is the Cella residence, which contained three sites consisting of an overhang shelter (Site 50-50-14-4505), a habitation mound (Site 4506), and a historic-period enclosure (Site 4504). Sites 4504 and 4506 have been preserved *in situ* (Fredricksen 1998). The adjoining lot to the south (TMK 2-1-07:101), a multi-family residential development, Na Hale o Makena, contained 6 sites composed of 25 features (Sites 3513-3518) representing habitation, agricultural, and marine exploitation activities (Spear et al. 2001). Pohakunahaha heiau (Site 197) occurs in an exclusion adjoining the southern boundary of this parcel. Two burials were inadvertently discovered during construction activities. One burial, Fe.1 of Site 197, was re-interred in its original location and the other burial located in a *puka* along a boundary wall remains *in situ*.

An one-acre parcel (TMK 2-1-01:7 & 98) is located on Nahuna Point, south of the other two project areas, along the coast on Makena-Keoneoio Road. Four archaeological sites (Sites 4524-4527) were recorded in this private residential property. Site 4524 is a *ko'a* that has been preserved *in situ*, Sites 4525 and 4526 were overhang shelters, and Site 4527 was a historic rock wall (Fredricksen 1999).

Most recently, Donham (2006) completed an archaeological inventory of three parcels (TMK:2-1-05:84 and 2-1-06:37 & 56) encompassing a total of 12.2acres, located immediately adjacent to the current project area. A total of 15 sites comprising 80 component features were recorded. Twenty-two of the features at 11 of the sites were identified during the course of previous surveys. Thirty-one features at 11 sites underwent subsurface testing. Radiocarbon analyses of 5 samples collected from four habitation features yielded a date range from A.D.1400-1440 to A.D. 1680-1740. Traditional agricultural, habitation, burial, and ceremonial functions were interpreted to be represented while historic era features were interpreted to be associated with; agriculture, boundary demarcation, education, habitation, livestock management, refuse disposal, and transportation activities. Features with indeterminate functions were present in both traditional and historic categories.

Previous Studies Involving the Current Project Area

Five previous investigations, constituting various phases of archaeological research ranging from surface reconnaissance to inventory surveys, were performed within or incorporated portions of the current project area. The only previously recorded sites or features consist of continuous segments of free-standing linear walls from adjoining parcels. Each of these investigations will be briefly summarized below.

The first attempt at systematic documentation of surface remains on Maui occurred in 1973 during the Statewide Inventory of Historic Places implemented by the State Department of Land and Natural Resources. In that year, a large complex of coastal sites ("Makena Complex," Site 50-50-14-1266) was recorded in the area between Makena Landing and Pu'u Olai. The five major feature types cited were; walls (numerous, mostly associated with ranching), enclosures (16+), one burial in wall, platforms (3+), and a pit. Although the arbitrary boundaries established for Site 1266 incorporated portions of the current project area, the map and descriptions were too general to correlate the surface remains and their locations to any of the currently extant sites.

In 1974, the Bishop Museum conducted a surface survey in approximately 1000 acres of Makena properties for the Seibu Corporation (Clark 1974). This reconnaissance addressed Parcels I, II, IIIA, IIIB, and IV where 120+ sites were recorded. Parcel I appeared to include portions of the project area, however the descriptions and map were unclear as to what areas constituted Parcel I. A total of 29 sites, consisting of 6 platforms (2 house platforms), 17 enclosures, 2 wall segments, one rock shelter, a possible burial, a well, a small complex of 3 pens, 8 agricultural terraces and a house platform; were recorded in Parcel I. Some of these features were most likely those cited in the Site 1266 complex documented during the Statewide Inventory. However, the survey concentrated in the *mauka* areas and the descriptions and locations in the coastal areas were too general and the determination of whether any of these sites were located within the current project area remains problematic

In 1997, inventory survey for a State Land-use Boundary Amendment petition for six areas, including the current project area as a portion of Petition Area 5, was completed (McIntosh and Pantaleo 1998). This undertaking included a review of previously completed work and surface assessments of selected areas and limited subsurface testing where warranted. No further fieldwork, beyond the relocation of previously documented surface features in Petition Area 5, was performed during this survey.

On two separate occasions in 1994 and 2000, subsurface testing procedures were implemented at the former Poepoe property (TMK 2-1-05:83) at the request of the family. The objective of these attempts was to locate an infant burial from the 1920s. During the first attempt, Mrs. Cresencia Poepoe from O'ahu was present to oversee the procedures. No remains were found during the first attempt. During the more recent procedure, Mr. Fred Kanoho of Maui, also a lineal descendant familiar with the burial location assisted with the search, unfortunately, also with negative results. Several additional areas, including stone mounds, were investigated with negative results. Documentation of this procedure is presented later in this report.

SETTLEMENT PATTERN

The general pattern of extant archaeological remains in the Makena area appears to consist of prehistoric and historic permanent habitation along the coastal areas with isolated pockets of agricultural activity transformed into more extensive clusters of *kula* type features in the inland areas around the 200-foot elevation. Limited permanent and some temporary or seasonal occupation sites occur in the inland areas in association with agricultural complexes. Site densities and complex features focus around Ka`eo *ahupua`a*, owing to a favorable micro-climate in the area. The variety of available archaeological data as well as historic documentation indicate a traditional subsistence-base dependent on marine exploitation and limited dryland cultivation for the Makena region.

The "Makena Agricultural System," as previously defined by Cordy (1978), Haun (1978), Cordy and Athens (1988), and Gosser et al. (1996), is characterized by discontinuous areas of cultivation associated with permanent and temporary habitation features. Gosser suggested that "agricultural pursuits in the Makena region were small-scale and probably on the level of family garden horticulture. The relative abundance of terraces, low retaining walls, mounds, and the absence of formal irrigation features, suggest that most of the farming was restricted to crops such as sweet potato and dry-land taro" (Gosser et al. 1996:16).

Both Gosser (1996) and Titchenal (1996) have pointed out that walled agricultural complexes or *kauhale* occur inland and appear to be situated along fairly uniform elevations. These *kauhale* appear to be unique components of the "Makena Agricultural System" and exhibit fundamental differences from *kauhale* defined in neighboring areas such as Palauea and Wailea. Based on higher site densities, due in part to relatively higher rainfall, Ka`eo *ahupua`a* has been suggested as the focus of settlement in Makena (Cordy 1978, Sinoto 1980). Historic period permanent habitation concentrated along the coastal areas as suggested by Jones (1994). Some of the larger

walled complexes and structural features in the inland areas have also been attributed to the major efflorescence of commercially-driven agricultural pursuits of the mid-1800s (Titchenal 1966).

SITE EXPECTABILITY

The discussions in the preceding sections indicate the types of sites expected in the current project area. Permanent habitation features, such as walled historic house compounds, other historic structures, enclosures, platforms, *ko'a, heiau*, limited agricultural features, and ranch walls and other ranching-related structural remains are expected in the coastal areas of the Makena region.

METHODS

To adequately address the scoped of the current inventory survey, specific tasks were undertaken in accordance to HRS Chapter 6E and HAR Title 13, Subtitle 13, Chapter 276. Standard and accepted archaeological practices and techniques were followed during the survey, testing , and laboratory phases of this project. The tasks included:

1. Background documents and literature compilation,
2. Systematic surface survey of project area,
3. Recording of pertinent data, and plan and location mapping, as warranted,
4. Subsurface testing, as warranted,
5. Laboratory procedures, as required,
6. Synthesis of data,
7. Report write-up, editing, and production, and
8. Coordination with the State Historic Preservation Division.

The methods employed during each phase of the current undertaking are addressed as follows:

Survey

The surface survey consisted of systematic east/west transects using the various boundary demarcations as described in the preceding section. Survey transects were spaced at 5-10 meter intervals based on variable visibility due to vegetation density. Previously unrecorded remains were documented through photographic records, forms and maps. Temporary site (TS) designations were assigned to new sites and for previously recorded sites, the use of existing site numbers in Bishop Museum or State nomenclature was continued. All sites were located by a licensed survey crew from Austin, Tsutsumi and Associates (ATA). Backhoe trenches were plotted by the archaeologist utilizing tape and compass. Presumed function of the sites was determined by the formal feature type, architectural design and the presence/absence of

diagnostic artifacts. Site boundaries were drawn utilizing surface structural remains, and or surface and subsurface cultural materials identified during testing.

Subsurface Testing

Subsurface testing was undertaken at selected features and included manually excavated, controlled test units as well as a few shovel and trowel probes for expedient stratigraphic comparisons, determination of the nature of deposition, and confirmation of presence/absence of subsurface cultural remains. Controlled test excavations were performed in selected sites and excavated by natural stratigraphic layers, in 10 cm levels in strata greater than 10 cm in thickness. All excavated soil was sieved through nested ¼ and 1/8 inch mesh screens and midden, artifacts, and other samples were collected and processed in the lab. Stratigraphic profiles were recorded in each unit and soil color was determined using the Munsell color system. Through consultation with Ms. Jenny Pickett of SHPD, additional backhoe testing would need to be performed in areas that were devoid of historic properties.

Laboratory

All midden, artifacts, and other samples were initially accessioned, sorted and cleaned. Then the artifacts were analyzed , catalogued, and photographed; the sorted midden weighed and tabulated, and carbon samples cleaned, dried, and prepared for radio carbon analyses if warranted. All recovered artifacts and sample are currently under temporary custodial curation at the Archaeological Services Hawaii facility in Wailuku. Additionally, all field notes, maps, photographs, and other documentation generated during the course of this project are also reposted at the Archaeological Services Hawaii facility in Wailuku.

Project Personnel

The major fieldwork for the subject area was conducted during two separate occasions. The initial survey was conducted from November-December 2001 by Ms. Jenny Pickett and Mr. Ian Bassford (B.A.) under the direction of Mr. Jeffry Panteleo (M.A). From November 2006-January 2007 the fieldwork was conducted by Mr. Koa Hodgins and in 2008 additional subsurface testing was conducted by Ms. Diane Guerreiro, Ms. Rochelle Baretto and Mr. Mikele Fagher from February through April. This recent work was accomplished under the direction of Ms. Lisa Rotunno-Hazuka (B.A.). Mr. Paul Titchenal (M.A.) performed the backhoe testing program under the direction of Mr. Aki Sinoto. Photographic recording was also undertaken by Mr. Aki Sinoto. Mr. Jeffrey Pantaleo, M.A. was the Principal Investigator, and Mr. Aki Sinoto participated during field checks and contributed to editing and preparing the final report.

RESULTS OF FIELDWORK

During the course of the current inventory survey, two sites consisting of one multi-feature complex and one isolated modified outcrop were recorded within the boundaries of the parcel (Fig. 5). Segments of the perimeter walls along the western and northern boundaries of the subject land parcel were previously assigned site and feature numbers by Donham (2006). Since these walls continue beyond the limits of the subject parcel, for consistency, the same site number designations will be maintained. Site and feature descriptions and results of the subsurface testing are presented in this section.

OVERVIEW OF SITES

Site 50-50-14-6366, comprised of 15 features, consists of a trapezoidal walled enclosure with two wall segments, a remnant wooden house foundation, concrete slabs, two historic refuse scatters, nine small circular rock mounds, and a surface scatter of `ili`ili (Fig. 6). All, except 4 features, occur within the central trapezoidal enclosure designated Feature A-1 with two associated wall segments designated A-2 and A-3. Feature A-2 is a short rock wall segment that adjoins the north perimeter wall at one end and the other end approaches the northwestern terminus of the Feature A-1 enclosure. Feature B is the remnant historic wooden house foundation and associated scatter of dimensional lumber; Feature C is two adjoining rectangular concrete slabs located in the a break in the wall at the southwest side of the Feature A-1 enclosure, Feature D is the `ili`ili scatter, Features E and F are historic refuse scatters located outside of enclosure A-1, Feature E is a refuse scatter, encompassing roughly 6 square meters, located 10m southwest of Feature A-1 south wall and south of the barbed wire fence that traverses across the southeast corner of Feature A-1. Feature F is a large refuse scatter, measuring roughly 50 square meters, located immediately east of and paralleling the east wall of Feature A-1. Features G-M are seven circular rock mounds situated near the center of the parcel together with Features B and D, and Feature N and O are two circular rock mounds situated outside of enclosure A-1 to the south. Test excavations were undertaken at 6 of the 15 features of Site 1 to aid in functional interpretations and better understand the construction of the features. Site 6366 was in fair to good condition and assessed a significance of Criterion D.

Site 50-50-14-6367 is located in the eastern portion of the project area, just upslope of Feature A-3 wall segment that extends northeastward from the northeast corner of Site 6366 Feature A-1. This site consists of a natural basalt outcrop ridge that incorporates three features; a stacked stone

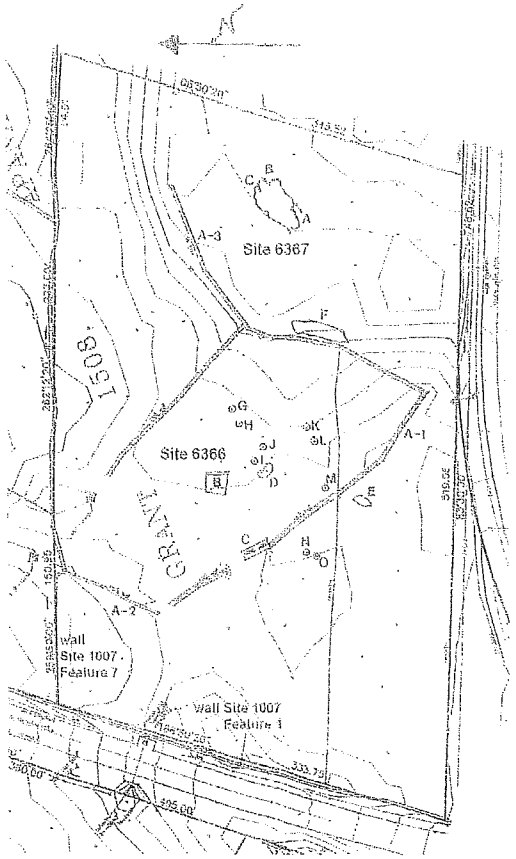


Figure 5. Locations of Sites and Features in Parcel 83
(1"=70' / 21.35 meters and Top of Page is Due East)

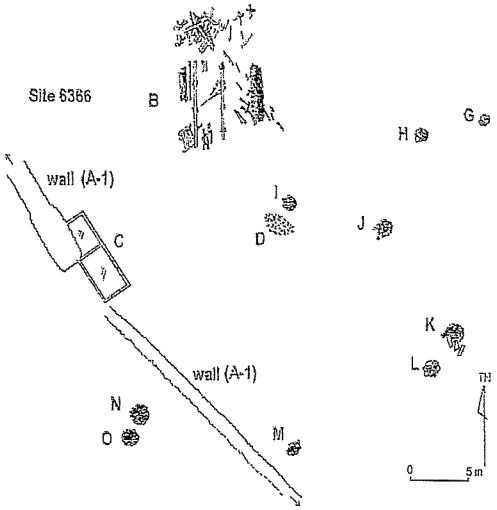


Figure 6. Plan View of Site 6366 Features B-D and G-O

facing and an L-shaped facing along a portion of the northern edge and a small U-shaped enclosure at eh southeastern edge (Fig. 7). This site does not appear to be associated with site 6366. The interior of the U-shaped enclosure and two features at the northern section of the outcrop were tested. Site 6367 is in good condition and assigned a significance of Criterion D.

FEATURE DESCRIPTIONS

A total of eighteen component features were recorded in association with the two sites present within the project area. The component features of each site are described in detail.

Site 6366

Feature A-1 is comprised of a series of interconnected rock walls that are in good condition and form a rough trapezoidal enclosure measuring approximately 90-100 m long by 40-50 m wide (Fig. 8). The height of the wall varies from 0.3 m to 1.5 m, but averages about 0.6 m high. The wall widths range between 0.8 m. to 1.2 m. It is constructed of small to large basalt cobbles and boulders stacked up to 8 courses high. A barbed wire fence running west to east crosses the wall in two places. A concrete slab (Feature C) occupies a break in the southwestern wall with its long axis oriented parallel to the wall. Sections of this wall are collapsed due to deterioration, animal (cattle and deer) disturbance, and bulldozing. Cultural material observed on the surface of this feature and in the surrounding areas consists of glass bottles, glass fragments, metal items (tin cans, buckets, barrels, galvanized roofing sheets, and fragments), ceramic fragments, fragments of lumber, and marine shell. This feature was constructed on a fairly level ground surface that slopes gently from east to west. This feature is in good condition and appears to surround a historic house site and other features associated with the homestead. The interior soil area is relatively level and appears clear of loose rocks

.

Feature A-2 is a low wall segment in good condition that extends approximately 28 m long in a roughly north/south orientation. Its northern end adjoins the northern parcel perimeter wall (Site 1007 Feature 7) near a bend and the southern end of this wall segment approaches the western terminus of the Feature A-1 south wall. This wall is constructed of small to large basalt cobbles and boulders stacked 2 to 3 courses high with a maximum height of 0.5 m and ranging 0.5 to 0.8 m width, comparatively smaller than the Feature A-1 walls. Cultural material observed on and around this feature consists of glass fragments, pieces of metal, and marine shell. This deteriorated condition of this feature can be attributed to modern activities and animal disturbances. It is located on a level soil surface, northwest of the Feature B house site and likely served in conjunction with the rest of Feature A-1 to form a boundary or barrier wall for the homestead.

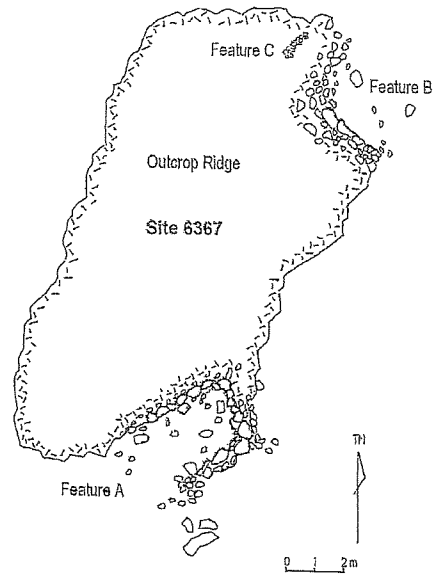


Figure 7. Planview of Site 6367, Features A, B, and C

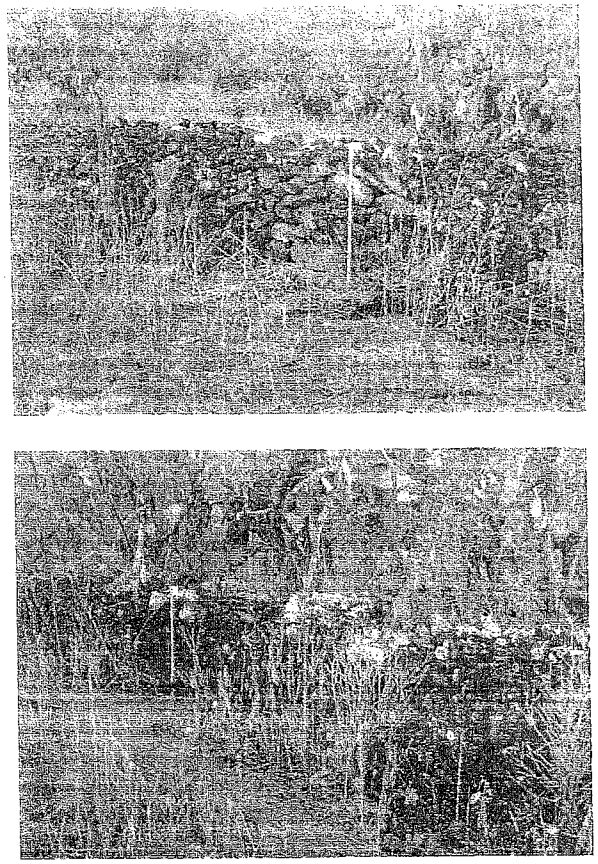


Figure 8. Feature A-1 North Wall, View North (top), South Wall, View Southeast (bottom)

Feature A-3 is a wall segment that continues northeastward from the northeast corner of the Feature A-1 enclosure for an approximate distance of 40 meters. The width, height, and construction of the wall remain consistent with the Feature A-1 walls.

Feature B is the remnant of an historic wooden house structure, a scatter of dimensional lumber, and other associated debris (Fig. 9). The overall feature area measures 11.0 m (n/s) by 8.0 m (e/w). The original structure itself appears to have measured approximately 7.0 by 7.0 m. Three large floor beams remain supported off the ground with the long axis oriented in a north to south direction. These beams rest on posts sitting atop flat bases of basalt. With the ground-surface sloping gently from east to west, the heights above ground surface of the three floor beams are 35 cm, 55 cm, and 70 cm from east to west respectively. A two-course stacked rock wall, 0.30 m high by 0.50 m wide and 5.0 m long, is constructed parallel and just east of the easternmost floor beam. A debris pile measuring 0.25 m high, encompassing a roughly 2 by 3 m area, occurs to the northwest of the remnant structure and consists of dimensional lumber and corrugated metal roofing. Round wire nails were observed in many of the pieces of lumber. Other material observed within and surrounding this feature are metal buckets, glass bottles and fragments, metal roofing, and round ended nails. This feature is located centrally within the Feature A-1 enclosure.

Feature C is made up of two connected, rectangular concrete slab foundations and a rubble pile made up of rock and historic trash (Fig. 10). The slabs measure 7.4 m long by 2.5 m wide by 0.2 m high. The southern slab measures 4.4 m long by 2.5 m wide and includes a raised edge along all its sides that measures 10 cm wide and is raised 10 cm from the interior of the slab. A crude concrete step located in the center, along the exterior western side appears to have a date inscribed into it that reads "11-47". The northern concrete slab connects to the north side of the southern slab and measures 3.0 m long by 2.5 m wide and appears to be older due to its more deteriorated condition. It also contains a similar raised edge along its sides. Both slabs exhibit rusted bolts that stick up along the edges, likely used for fastening a wooden frame. A large rubble pile, measuring 5.5 by 2.5 meters and .40m high, possibly the remnant of the wall segment pushed by a dozer, is made up of piled basalt cobbles and boulders, broken concrete pieces, bottle glass fragments, pieces of wood, and pieces of metal. This rubble pile obscures the western edge of the northern concrete slab and continues in a northwest direction. This feature is situated on a level soil area in a break along the southern wall of the Feature A-1 enclosure.

Feature D is a medium-density surface scatter of water-worn basalt and coral pebbles and small cobbles in an area that measures 3.0 m long by 2.0 m wide. This feature is spread out over a

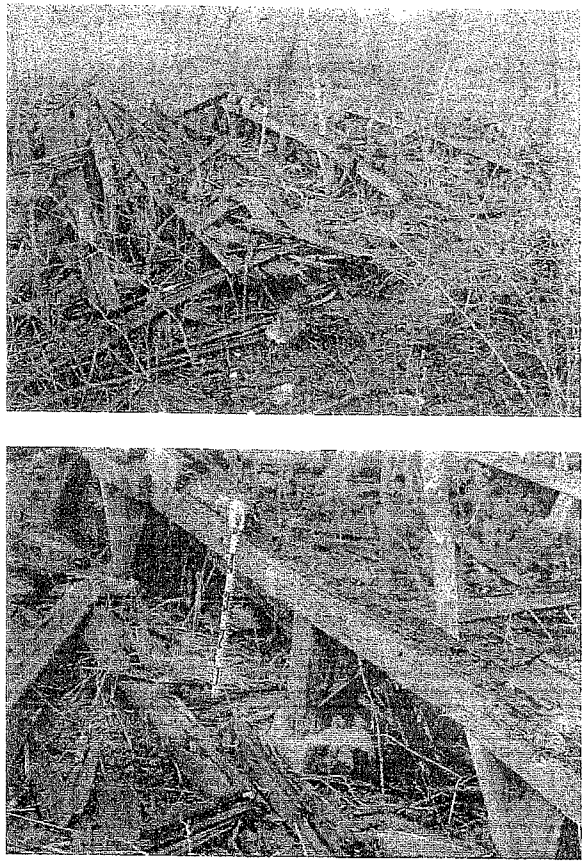


Figure 9. Overview of Feature B to North (top), Close-up of Floor Beam and Posts (bottom)

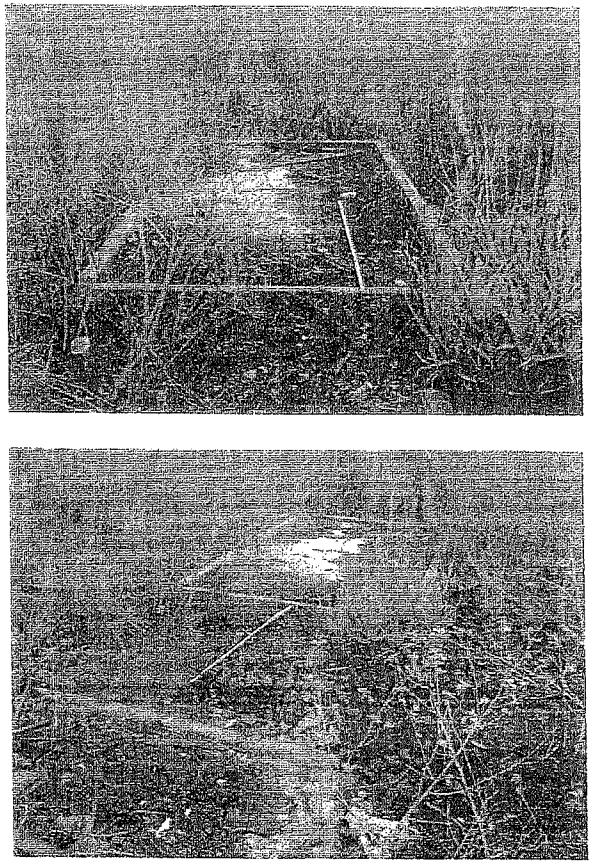


Figure 10. Feature C South Slab, View SE (top), North Slab and Buried Slab, View SE (bottom)

surface of silt, sand, and loose rocks, that slopes gently from north to south (Fig. 11). Feature I, a small rock mound, is situated 1 meter to the north. Some deterioration to this feature is evident, likely due to natural erosion and animal disturbance.

Feature E is a surface scatter of historic refuse that covers and area roughly measuring 3 m long by 2m wide. It is located 5 m southeast of the Feature A-1 wall, just east of its junction with the barbed wire fenceline. Curiously, the scatter is comprised primarily of the bottoms of bleach (Chlorox) bottles, about twenty in clear, amber, and green glass. There are also a few beer bottles and some tin cans (Fig. 12). The distinctive necks of the Chlorox bottles with the small finger loop and the bodies of the bottles are markedly outnumbered by the bottoms in the scatter.

Feature F is a surface scatter of historic refuse that encompasses an area measuring roughly 23 m long by 6 m wide (Fig. 13). It is comprised of discarded historic trash that includes glass bottles and fragments, metal buckets, barrels, *wire, tin cans, ceramic fragments, wood, and marine shell.* This feature occurs paralleling the eastern wall of Feature A-1, on the eastern or exterior side, from the approximate intersection of the barbed wire fence and extends north along the wall for 23 meters. It is located on a level soil surface with some of the trash partially buried. It appears that the trash was discarded over the wall and accumulated over a period of time.

Discussion

Based on an assessment of the bottle types (condiment, beverage, and bleach) and maker marks (Owens Illinois with the Duraglas trade mark [ca 1940 through 1950] and a maker mark MG with the date "45"Duraglass) represented at both Features E and F, a mid-twentieth century time period is indicated, most likely between 1940s and early 1960s. These features appear to be associated with the Site 6366 homestead.

Feature G is a small, circular rock mound measuring 0.9 m in diameter by 0.1 m high. It is comprised of small to large basalt cobbles and boulders piled on a level soil area. No artifacts or other cultural material was observed on the surface of this mound. This feature, most likely, represents another clearing mound associated with the occupation of the nearby historic house.

Feature H is a circular rock mound measuring 1.2 m in diameter by 0.1 m high (Fig. 14). It is comprised of a single course of small to large cobbles and boulders piled on top of uneven bedrock. No artifacts or other cultural material was observed on the surface. This feature, similar in appearance to the other mounds nearby, appears to also have been a clearing mound.

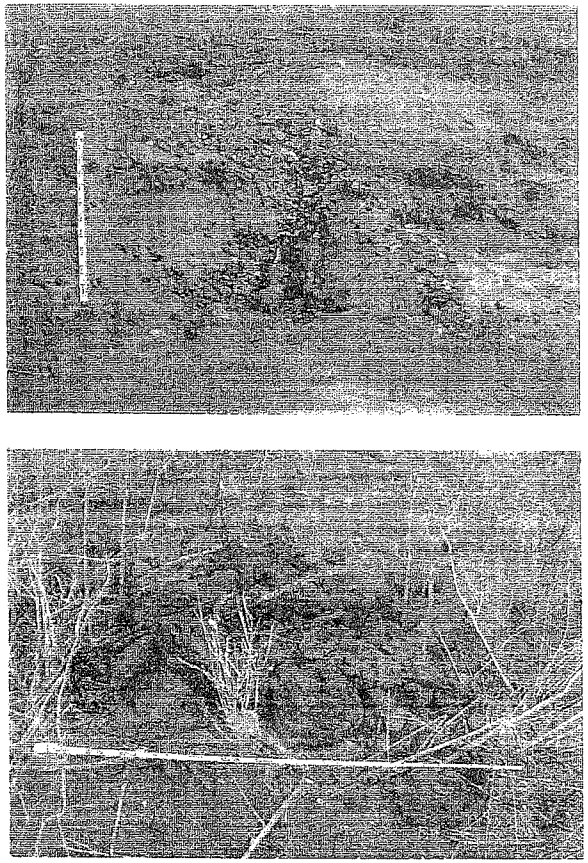


Figure 11. Feature D Test Unit to N (top), Feature J Mound to SW (bottom)

Figure 12. Feature E Refuse Scatter Chlorox Bases, View S (top), Feature E, View SW (bottom)

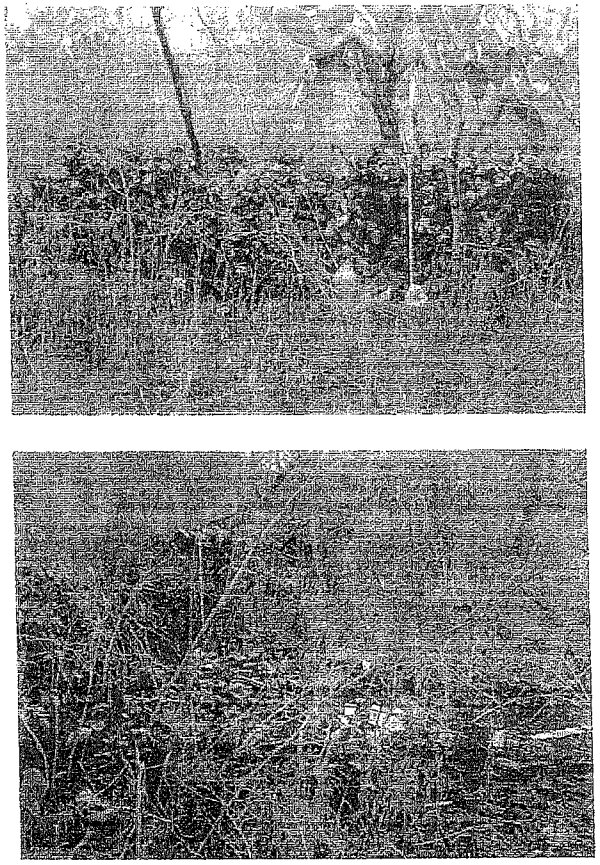


Figure 13. Feature A-1 East Wall at Feature F, View E (top), Refuse Scatter, View N (bottom)

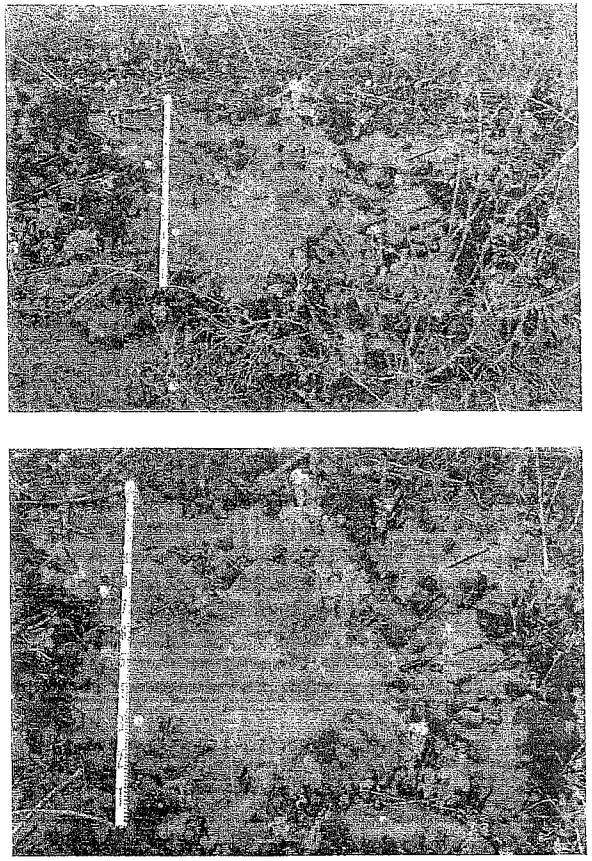


Figure 14. Feature H Mound after Testing, View W (top), Uneven Bedrock, View W (bottom)

Feature I is a circular rock mound measuring 1.4 m in diameter by 0.15 m high. It is comprised of small to large basalt cobbles and boulders piled on top of a level soil area. No artifacts or other cultural materials were observed on the surface of this mound. The form and dimensions of this mound again suggests a clearing function. With the house site located 7 meters to the northwest, this mound is the closest of the nine similar mounds.

Feature J is another circular rock mound measuring 1.4 m in diameter by 0.2 m high (see Fig. 11). It is comprised of small to large basalt cobbles piled 2 courses high, constructed on a level soil area. No artifacts or other cultural material were observed on the surface of this mound. Similar in construction and form to the similar features nearby, this feature also appears to have been a clearing mound associated with the occupation of the historic house site.

Feature K is a rock mound measuring 1.7 m long x 1.4 m wide x 0.35 m high. It is comprised of small to large basalt cobbles and boulders piled 2-3 courses high. On the surface of this mound are 3 rectangular pieces of corrugated metal roofing and chicken wire fencing. This feature is located on a gently sloping ground-surface and situated 3 meters to the northeast of a similar mound (Feature L). The location in the vicinity of the historic house site suggests that this and the other similar mounds were clearing mounds resulting from the clearing and gathering of loose rocks and trash in the yard area of the homestead during its occupation.

Feature L is a circular rock mound measuring 1.4 m in diameter and 0.3 m in height. It is comprised of small to large semi-angular basalt cobbles and boulders piled approximately 2-3 courses high with many of the larger boulders along the outside edge of the mound. No artifacts or other cultural material were observed on the surface of this feature. The ground surface which this feature is constructed on is level. A similar mound (Feature K) located 3 meters to the northeast of this feature contains metal roofing and other historic trash on its surface. This mound also appears to be a clearing mound.

Feature M is an oblong rock mound that measures 1.5 m long x 0.9 m wide x 0.2 m high. It is comprised of small to large, water-worn and semi-angular basalt cobbles, piled two courses high. Many of the water-worn cobbles are vesicular in nature, the type commonly used in *imu*. These rocks are different than the local material in the area and were likely transported here. No artifacts or other cultural materials were present on the surface in the vicinity of this feature. This feature is most likely associated with the occupation of the historic house site. It is situated in an area of level ground that appears markedly devoid of surface stones and boulders.

Feature N is a circular rock mound measuring 2.0 m in diameter and 0.35 m high. It is comprised of small to large basalt cobbles piled 2-4 courses high. Observed on the surface were two fragments of bottle glass and a rusty tin can. This feature, another probable clearing mound, was constructed on a level, silty ground-surface approximately 1 meter to the north of another similar mound (Feature O). Features N and O are located outside of the Feature A-1 enclosure wall to the southwest. Of the nine mound features, these two are the only ones located beyond the enclosure walls.

Feature O is a circular rock mound measuring 1.4 m in diameter by 0.2 m high (Fig. 15). It is comprised of small to large basalt cobbles piled 2-4 courses high. No artifacts or other cultural material was observed on the surface of this mound. This feature was constructed on a level soil area and situated 1 m to the south of a similar mound (Feature N). This feature is also most likely a clearing mound.

Site 6367

Site 6367, in the central eastern portion of the subject parcel, is comprised of three features incorporated into the sides of a basalt outcrop ridge located about 10 m east of the junction of the Feature A-3 wall and the northeast corner of Feature A-1. The outcrop, measuring 17 m in maximum length and 9 m at its widest point, is oriented northeast to southwest along its long axis. Its height ranges from 0.25 to 0.40m along the eastern side and 0.50 to 1.20 m along its western side. Surface artifacts or other cultural materials were absent in the surrounding area.

Feature A, near the southern end of the ridge, is a small U-shaped enclosure, open to the southwest, measuring 3.5 m in length, 3.0 m in width with heights ranging from 0.30 to 0.60 m (Fig. 15). Its walls are constructed of basalt boulders stacked up to 3 courses high and the interior floor is level and comprised of loose basalt cobbles and some soil.

Feature B, at the northern end of the ridge, is a short L-shaped section of stacked stone facing with each leg measuring about 3.0 m in length. The western leg is more deteriorated in appearance with smaller stones stacked 2-3 courses to a height of 0.35 m. The southern leg exhibits a more intact facing, up to 0.50 m high, with 4-5 courses of stone. The area defined by the L-shaped wall, below the level of the outcrop, consists of level soil with a scattering of rocks.

Feature C, located 2.0 m northwest of and paralleling the western leg of Feature B, is a short section of stacked stone facing. Measuring about 1.5 meters in length and ranging 0.50 to 1.0 m in height, 3-5 course facing retains a rock-filled area paralleling the western edge of the outcrop.

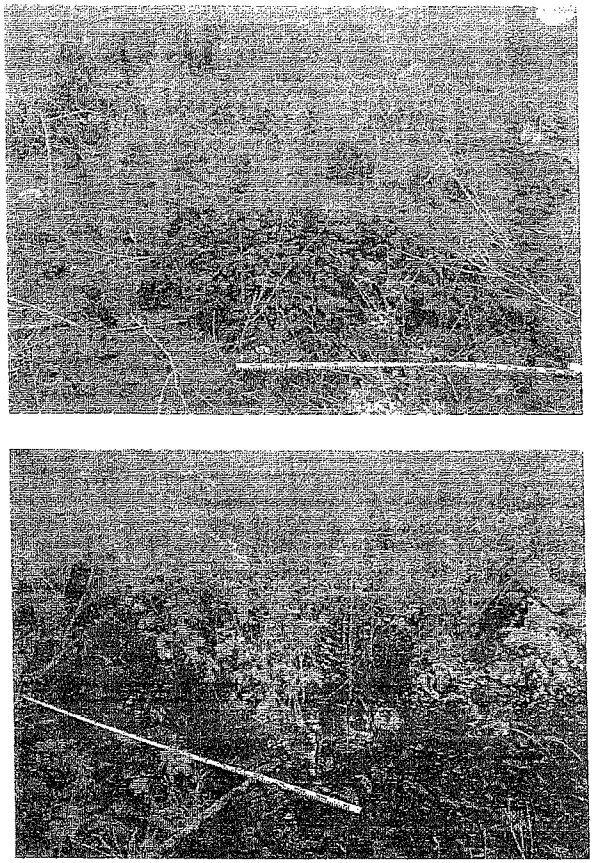


Figure 15. Feature O Mound, View N (top), Site 6367 Feature A Opening, View SW (bottom)

RESULTS OF TESTING

Six features of Site 6366 and three features of Site 6367 underwent subsurface testing. A one-meter by one-meter test unit was manually excavated at each of the features of Site 6366. A variety of historic period artifacts in quantities ranging from a low of 9 items at Site 6366 Feature H to a high of 656 at Site 6366 Feature B and minimal quantities of midden were recovered from the test units. Relatively large amounts of charcoal were recovered from Site 6366 Features C & M, but based on the stratigraphic context, samples were not submitted for radiometric analyses. No historic period artifacts were recovered from testing at Site 6367 Features A-C.

Site 6366

Features B, C, D, H, M, and N underwent subsurface testing. Feature B was the remnant wooden house, Feature C was the adjacent concrete slabs, Feature D was the surface *'ili'ili* scatter, and Features H, M, and N were circular rock mounds. Besides the cultural assemblage recovered from Feature B, the material from the other features appeared to have been secondarily deposited, either through physical disturbance or artificial aggregation into clearing piles.

Feature B

A 1.0 x 1.0 m test unit was placed along the eastern edge of this feature, encompassing a portion of the stacked rock wall that supports the easternmost floor beam of the remnant house structure. The rocks were manually removed and the soil was sifted through a ¼ inch mesh screen. Layer I consisted of the top layer of the rock wall at 0 cmbs and continued until 30 cmbs. Cultural material recovered from this layer consisted of metal nails and pieces of tarred roofing shingles. Layer II began at 20 cmbs and extended to 28 cmbs and was comprised of a duff layer of organic debris and a dark brown silt/sand material (7.5 YR 3/2). This material was mixed in between the rocks that made up the rock wall in the western half of the unit. Cultural material recovered from this layer consisted of several fragments of bottle and window glass, tarred roofing shingles, metal nails, bottle caps, and a bottle opener. Layer III extended from 28 to 57 cmbs and was comprised of a dark brown silt/sand material (7.5 YR 3/3) mixed with sub-angular basalt cobbles. Cultural material recovered from this layer consisted of fragments of bottle and window glass, metal bottle caps, nails, and other metal fragments, tarred roofing shingles, a toy rubber wheel, and marine midden. Layer IV was present only on the eastern half of the unit and extended from 28 to 40 cmbs. The soil matrix consisted of a brown silt/sand mixture (7.5 YR 4/2) mixed with small to large basalt cobbles. A charcoal/ash feature was observed from 18 to 21 cmbs along the eastern edge of the test unit. Cultural material recovered from this layer consisted of fragments of glass and metal, a button, and pieces of tarred roofing shingles. Layer V extended from 40 cmbs

to the base of excavation at 60 cmbs. The soil matrix was made up of silt (7.5 YR 4/4) mixed with small cobbles. Excavation was halted after no cultural material was observed and Layer V was determined to be culturally sterile. The base of the unit sloped from east to west (Fig.16).

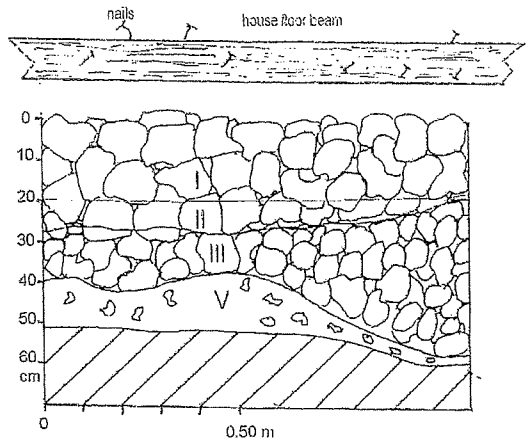
Discussion

Excavation of this unit yielded a relatively large quantity of historic cultural material, totaling 656 items, including fragments of bottle and window glass, metal artifacts (aluminum foil, tin cans, bottle caps, can openers, nails, and wire), a toy rubber wheel, a button, pieces of tarred roofing shingles, and 71.4 grams of primarily marine midden (Tables 2 & 3). Much of the material came from the decaying house structure itself and the rest of the recovered material was consistent with items that would have been used domestically by a historic homestead. It is likely that the remnant wooden structure was the primary house site in the immediate area with all of the other features surrounding it associated with the occupation of the house. The rock wall paralleling the easternmost wooden floor beam likely served as some sort of a barrier wall associated with the crawl space under the house structure. While this house appears to have been collapsed for quite some time, the round nails along with diagnostic bottle glass fragments indicate a relatively recent age, possibly from the 1930s to the 1960s.

Feature C

A 1.0 x 1.0 m test unit was placed up against the northwestern end of the northern concrete slab, incorporating a portion of the rock/rubble pile to the southwest. It was excavated to aid in determining the function of the feature and to see if a wall-base remnant existed beneath the rubble pile. The rocks were manually removed and soil was sifted through a 1/8th inch mesh screen. Layer I was comprised of small to large basalt cobbles concentrated in the western half of the unit and extending from 0 to 20 cm above the surface. The cobbles were loosely stacked and may represent a displaced section of the Feature A-1 wall. Cultural material recovered from this layer consisted of fragments of concrete, ceramics, metal, wood, glass, and marine shell. Layer II began at 0 cmbs and was comprised of a dark brown (10 YR 3/3) soil/sand mixture combined with approximately 50 percent of loose small to large cobbles. In the northeastern half of the test unit, an old concrete slab was encountered at 4 cmbs. The southwestern half of the unit extended down to 24 cmbs (Fig. 17). Cultural material recovered from this layer consisted of charcoal, concrete, marine shell, ceramic, metal, animal bone, and glass fragments.

TU-1 Profile West Face



Stratigraphic Descriptions:

Layer I (0-30 cm)- Partially Collapsed, Low Rock Wall Feature, Parallel with Foundation Beam of House

Layer II (20-28 cm)- Duff Layer of Organic Material, Sandy Silt (7.5YR3/2 Dark Brown)

Layer III (28-57 cm)- Sandy Silt with Sub-angulr Cobbles (7.5YR3/3 Dark Brown)

Layer VI *(Only Appears on Eastern Half of Test Unit)*

Layer V (40-60 cm)- Loamy Silt with Saprolytic Rocks and Cobbles, Culturally Sterile (7.5YR4/4 to 4/6 Dark Brown to Strong Brown)

Figure 16. Site 6366 Feature B: West Face Profile of TU-1

Table 2. Site 6366 Feature B, TU-1 Artifacts

MAKENA PARCEL 93								
Site 6366 Feature B, TU 1	Layer I-1	Layer II-1	Layer III-1	Layer III-2	Layer III-3	Layer III-4	Layer IV-1	TOTAL
Depth in cm BD	0/30	10/20	18/28 W 1/2	28/38 W 1/2	38/48 NW 1/4	48/57 NW 1/4	10/20 E 1/2	
GLASS								
CLEAR								
Bottle, beverage	0	28 (3)	6 (1)	0	0	0	0	34
Curved (bottle/jar)	0	6 (1)	0	3 (1)	0	0	0	9
Flat glass	0	68	58	38	0	1	3	168
TOTAL CLEAR GLASS	0	102	64	41	0	1	3	211
METAL								
ALUMINUM								
Foil	0	0	0	0	1	0	0	1
TIN/STEEL								
Can, food	0	0	0	4	1	3	0	8
Cap, crown	0	6	3	15	0	7	0	31
Gun casing								
Key, can opener	0	1	0	1	0	0	0	2
Nail, wire	0	11	4	3	0	0	1	19
Paper clip	0	0	0	1	0	0	0	1
Tack/roofing	0	2	0	0	0	0	0	2
Wire, smooth	0	0	1	0	0	1	0	2
Indeterminate	5	0	0	2	0	2	1	10
TOTAL METAL	5	20	8	26	2	13	2	76
MIXED MATERIALS								
RUBBER								
Toy, wheel	0	0	1	0	0	0	0	1
SHELL								
Button	0	0	0	0	0	0	1	1
SHINGLES								
Roofing, tarred	210	2	120	18	0	14	3	367
TOTAL MIXED MATERIALS	210	2	120	18	0	14	4	368
GRAND TOTAL	215	124	193	65	2	28	9	656

** denotes quantity*

Discussion

Cultural material recovered from this test unit was consistent with findings from the other features tested from Site 6366. The recovered assemblage, totaling 375 items (Table 4), consisted of historic artifacts and cultural material most likely associated with the occupation of the historic house site (Feature B) nearby. Of the total 453.3 grams of midden, 209.1 grams were charcoal, and the remaining 244.2 grams consisted primarily of marine midden (Table 5). A remnant concrete slab, encountered at 4 cmbs, adjoins the exposed concrete foundation slab to the south. Small basalt cobbles and gravel were mixed in with the concrete which appears to have been crudely poured without the use of any forms. Each concrete slab likely served as the foundation/floor for a small structure, possibly a shed. The loose rocks appear to have been part of the boundary wall (Feature A-1) that may have been pushed with a bulldozer some time in the past, perhaps to accommodate the construction of the slabs. Charcoal and historic trash was observed in between the rocks as well as in the soil surrounding this feature.

Table 3. Site 6366 Feature B, TU-1 Midden

Makena Parcel 63, Site 6366

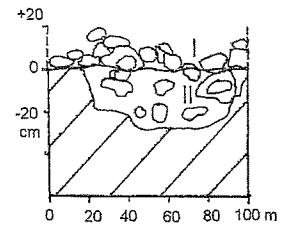
FEATURE B, TU 1	Layer II-1	Layer III-1	Layer III-2	Layer III-3	Layer III-4	Layer IV-1	Total
Depth in cm BD	10/20	13/28 W 1/2	28/38 W 1/2	38/48 NW 1/2	48/57 NW 1/4	10/20 E 1/2	
	WT	WT	WT	WT	WT	WT	
SHELL							
Gastropoda							
Cypraeidae							
Cypraea sp.	2.6	0	0	0	0	2.1	4.7
Nassariidae							
Nassarius sp.	1.0	0	0	0	0	0	1.0
Neritidae							
Nerita picea	1.0	4.8	3.7	0	3.0	0.9	16.4
Fasciolidae							
Cellana sp.	5.5	4.2	3.7	0	0.3	0	13.7
Trochidae							
Drupa sp.	0	0.6	2.1	0	0	0	2.7
Unidentified	0.6	0.6	0	0	0	0	1.2
Total Shell	**10.7**	**10.2**	**12.5**	**0.0**	**3.3**	**3**	**39.7**
Invertebrae							
Echinoidea Spine	0	0	0.2	0	1.1	0	1.3
Echinoidea Shell	0	0.1	0.1	0	0	0.1	0.3
Total Invert.	**0**	**0.1**	**0.3**	**0**	**1.1**	**0.1**	**1.6**
Vertebrae							
Unidentified small mammal	0	3.9	0	0	0	0	3.9
Unidentified fish	1.3	1.1	1.3	0.3	1.5	0.6	8.1
Total Vert.	**1.3**	**5.0**	**3.3**	**0.3**	**1.5**	**0.6**	**12.0**
Other							
Charcoal	0.0	7.0	4.9	7.1	0	0	19.1
Site Total	**12.0**	**22.3**	**20.1**	**7.4**	**5.9**	**3.7**	**71.4**

WT=Weight in grams

Feature D

A 1.0 by 1.0 m test unit was placed over in the center of the feature with the objective to aid in determining its function. Lose surface rocks were manually removed and all excavated matrix was sifted through a ¼ inch mesh screen. Layer I was comprised of water-worn *`ili`ili*, coral, and a brown silty sand (10YR4/3) mixed with organic debris. This layer extended from the surface, 0 cmbs, to 12 cmbs. Cultural material recovered from this layer consisted of marine shell, bottle glass fragments, and a metal bottle cap. Layer II (a&b) extended from 12 to 36 cmbs and was comprised of a pale brown to light yellowish brown silt and sand mixture (10YR6/3-6/4) overlying sub-angular basalt cobbles and boulders. Sand deposits were concentrated along

TU-1 Profile Southwest Face



Stratigraphic Descriptions:

Layer I (+20 – 0 cm)- Surface Rock Pile

Layer II (0-24 cmbs)- Sandy Silt (10YR 3/3 Dark Brown) with Sub-angular Rocks and Cobbles

Figure 17. Site 6366 Feature C: Southwest Face Profile of TU-1

the southern half of the test unit. Cultural material recovered from this layer consisted of charcoal, marine shell, glass fragments, and coral. A possible remnant feature comprised of buried boulders and rocks occurred in the northeastern corner of the test unit. This feature was intrusive into Layer III down to about 40 cmbs and Layers I and II abruptly end at the edge of this feature. Layer III extended from 27 to 46 cmbs and was comprised of dark yellowish brown silt (10 YR 4/4). This layer was culturally sterile (Fig. 18).

Discussion

Excavation of Feature D yielded historic material similar to that recovered from other features tested in Site 1. The 57.6 grams of midden consisted of marine shell (Table 6). The 10 artifacts included bottle glass fragments and a metal bottle cap (Table 7). The waterworn coral and basalt pebbles (*`ili`ili*) observed on the surface appeared to be superficial with the exception of a few that had fallen through the interstices between rocks. The function of Feature D could not be confirmed, but most likely its current manifestation was associated with the historic homestead. The intrusive nature of the possible feature into Layer III suggested that it may be a remnant of an earlier feature that was destroyed when the historic homestead (Feature B) was built.

Table 4. Site 6366 Feature C, TU-1 Artifacts

Makena Parcel 83

Site 6366 Feature C, TU 1	Layer I-1&2	Layer II-1	Layer II-2&3	TOTAL
Depth in cm BD	0/18	0/10	10/24	
CERAMIC				
EARTHERNWARE				
Glazed, button	0	0	84	
Glazed, crockpot	19(1)	16	0	
TOTAL CERAMIC	19	16	84	119
GLASS				
CLEAR				
Curved (bottle/jar)	0	7	8	
Flat glass	2	6	11	
Light bulb	0	3(1)	8	
BROWN-bottle,beverage	1	3	0	
WHITE-Houseware	0	0	0	
TOTAL GLASS	3	16	27	46
METAL				
ALUMINUM				
Foil				
embroidery thread wrapper	1	0	0	
IRON	0	0	0	
Pot, cooking	1	0	0	
TIN/STEEL	0	0	0	
Bolt	0	0	1	
Can, food	4(1)	91(2)	33(2)	
Cap, crown	0	0	5	
Chicken wire	1	0	0	
Coupling for water hose	1	0	0	
Grommet	0	3	2	
Key, can opener	0	0	0	
Nail, wire	2	10	9	
Nail, square	0	1	0	
Paper clip	0	0	0	
Screw	0	1	1	
Shotgun Casing	0	0	0	
Safety Pin	0	0	0	
Spike	0	0	0	
Spool	0	0	0	
Staple, fencing	0	2	0	
Tack-roofing	0	5	0	
Wire, braided	0	1	0	
Wire, smooth	0	2	0	
Indeterminate	0	1	5	
LEAD				
Pencil lead	0	0	0	
Molten drop	3	0	0	
Window, lead	0	1	1	
TOTAL METAL	13	118	57	188
MIXED MATERIALS				
MORTAR				
Finished surface	0	0	0	
Unfinished	0	10	0	
Painted	6	0	0	
MISC				
Cork	0	1	0	
TOTAL MIXED MATERIALS	8	11	0	19
GRAND TOTAL	43	164	168	375

** denotes quantity*

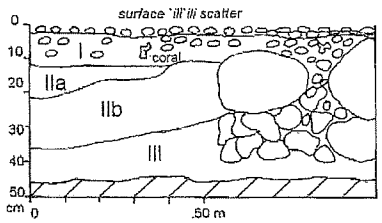
Table 5. Site 6366 Feature C, TU-1 Midden

Parcel 83 Site 6366

Feature C TU-1	Layer I-1&2	Layer II-1	Layer II-2&3	Total
Depth in cm BS	0/18	0/10	10/24	
	WT	WT	WT	
SHELL				
Gastropoda				
Cypraeidae				
Cypraea sp.	0	19.5	1.1	20.6
Nassariidae				
Nassarius sp.	0	0.1	0	0.1
Neritidae				
Nerita picea	0	7.2	10.2	17.4
Patellidae				
Cellana sp.	57.8	35.7	52.7	146.2
Terebridae				
Terebridae sp.	0	1.8	2.0	3.8
Thaididae				
Drupa sp.	0	0	7.5	7.5
Unidentified	0	2.1	0	2.1
Total Shell	57.8	66.4	73.5	197.7
Echinoidea Spine	0	0	17.4	17.4
Echinoidea Shell	0	10.7	8.3	19.0
Total	0	10.7	25.7	36.4
Vertebrae				
Fish	0	1.2	2.8	4.0
other				
Kukui Nut			6.1	6.1
Charcoal	60.5	66.5	82.1	209.1
Total	60.5	66.5	88.2	215.2
Site Total	118.3	144.8	190.2	453.3

WT=Weight in grams

TU-1 North Face Profile



Stratigraphic Description:

Layer I (0-12cmbs)- Duff, Silty Sand Matrix with High Organic Content (10YR4/3 Brown)

Layer IIa (12-22 cmbs)- Mottled Sand (10YR6/3 Pale Brown), Only in West Half of Face

Layer IIb (10-36 cmbs)- Mottled Sandy Silt (10YR6/4 Light Yellowish Brown)

Layer III (27-46 cmbs)- Sandy Silt (10YR4/4 Dark Yellowish Brown) Culturally Sterile

Figure 18. Site 6366 Feature D: North Face Profile of TU-1

Table 6. Site 6366 Feature D, TU-1 Midden

Makena Parcel 83, Site 6366	
Feature D, TU 1	Layer I-1&2
Depth in cm BD	0/18
GLASS	
CLEAR	
Curved (bottle/jar)	3
BROWN-bottle,beverage	6 (3)
TOTAL GLASS	9
METAL	
Cap, crown	1
TOTAL MIXED MATERIALS	1
GRAND TOTAL	10

* *denotes quantity*

Table 7. Site 6366 Feature D, TU-1 Artifacts

Parcel 83, Site 6366	
Feature D, TU 1	Layer I
Depth in cm BS	0-10 cmbs
SHELL	
Gastropoda	
Conidae	
Conus sp.	19.5
Cypraeidae	
Cypraea sp.	27.5
Patellidae	
Cellana sp.	0.7
Thaididae	
Drupa sp.	4.5
Unidentified	5.4
Total Shell	57.6

WT=Weight in grams

Feature H

A 1.0 by 1.0 m test unit was placed on this low mound. After the rocks were manually removed, the remaining soil was sifted through a 1/8th inch mesh screen. Layer I consisted of rocks that were stacked from the ground surface to approximately 10 cm above the surface. No cultural

material was recovered from this layer although some may have fallen through the gaps in the rocks as several glass fragments and pieces of metal were recovered immediately underlying the rock layer. Layer II extended from 0 cmbs to 20 cmbs and consisted of a dark yellowish-brown silt/sand mixture (10 YR 3/6) with a few rocks. Cultural material recovered from this layer was recovered from the top 10 cm and consisted of a metal hinge, metal bottle caps, a plastic bottle cap, bottle glass fragments, a single piece of coral, and one fragment of marine shell. Excavation was halted at 20 cmbs with the absence of cultural material and emerging solid bedrock (Fig. 19).

Discussion

Although the cultural remains recovered from this test unit were minimal in quantity; 9 artifacts and 2.3 grams of marine shell (Tables 8 & 9); the variety of material was similar to that yielded from test units in other mound features of Site 1. This feature, too, was likely a clearing mound, associated with the occupation of the historic house nearby. This mound, like Feature N, was also constructed to cover an area of uneven bedrock in an otherwise level soil area.

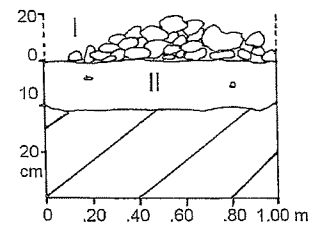
Feature M

A 1.0 x 1.0 m test unit was centrally placed on this feature. The rocks were manually removed and excavated soil was sifted through a 1/8th inch mesh screen. The excavation progressed by natural layers. Layer I was comprised of the mounded rocks and extended from the ground surface to 20 cm above the surface. No cultural material was observed in this layer. Layer II extended from 0 cmbs to 25 cmbs and was comprised of a dark yellowish brown silt (10 YR 4/4) mixed with several small to large fractured basalt cobbles. This layer appeared to be the primary cultural layer with a large quantity of charcoal along with fish bone, marine shell, metal, and glass fragments. Layer III extended from 25 cmbs to the base of excavation at 35 cmbs and represented a culturally 'sterile' layer (Fig. 20). The soil matrix consisted of a fine, yellowish brown sand (10 YR 5/4) with no inclusions of rocks and cultural materials.

Discussion

The excavation of this feature determined that many of the rocks were fire or heat altered, likely used for cooking purposes. Due to the amount of charcoal (3,451.4 grams) recovered from Layer II (Table 10), along with the fact that many of the rocks from this layer appeared to be fractured

TU-1 North Face Profile



Stratigraphic Description:

Layer I (+20 – 0 cm)- Surface Rock Pile

Layer II (0-20 cmbs)- Sandy Silt (10YR 3/6 Dark Yellowish Brown) with few Sub-angular Rocks and Cobbles

Figure 19. Site 6366 Feature H: North Face Profile of TU-1

Table 8. Site 6366 Feature H, TU-1 Artifacts

Makena Parcel 83, Site 6366

Feature H, TU 1	Layer II-1
Depth in cm BD	0/10
GLASS	
CLEAR	
Flat glass	5
BLUE-jar, medicinal	1
TOTAL GLASS	6
METAL	
TIN/STEEL	
Chicken wire	2
Spool	1
TOTAL METAL	3
GRAND TOTAL	9

*denotes quantity

Table 9. Site 6366 Feature H, TU-1 Midden

Makena Parcel 83, Site 6366	
Feature H, TU 1	Layer II-1
Depth in cm BS	0/10
	WT
SHELL	
Gastropoda	
Neritidae	
Nerita picea	0.4
Patellidae	
Cellana sp.	1.9
Total Shell	**2.3**

WT=Weight in grams

or fire-cracked, it is likely that this was the location of a fire pit. Metal and glass fragments, totaling 17 items (Table 11) were also collected from the test unit and it is likely that this fire pit was associated with the historic house site nearby. The presence of metal and glass fragments suggests that this feature may represent two different functions; initially as a *imu*, or earth oven, and subsequently as a pit where domestic refuse was burned. Based on the chronology and provenience of the artifacts, however, both activities can be attributed to the period of occupation of the historic homestead.

Feature N

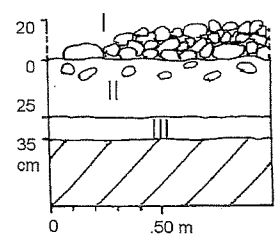
A 1.0 x 1.0 m test unit was placed on the western portion of this mound feature. Rocks were manually removed and the remaining soil was screened through a 1/8th inch mesh screen. The excavation revealed two layers. Layer I consisted of the piled rocks extending from 0 to 35 cm above the surface. Cultural material recovered from this layer consisted of charcoal, concrete, marine shell, bone fragments, glass and metal pieces. Layer II extended from 0 cmbs to the base of excavation at 20 cmbs and consisted of dark brown silt (10 YR 3/3) mixed with approximately 20 percent of loose basalt cobbles. Cultural material recovered from this layer consisted of charcoal, marine shell, bone fragments, glass and metal pieces. Excavation was halted at 20 cmbs with the absence of cultural materials and when solid bedrock substrate was exposed on the floor of the unit (Fig. 21).

Table 10. Site 6366 Feature M, TU-1 Midden

Makena Parcel 83, Site 6366				
FEATURE M, TU 1	Layer II-1	Layer II-2	Layer II-3	Total
Depth in cm BD	0/10	10/20	20/25	
	WT	WT	WT	
SHELL				
Gastropoda				
Neritidae				
Nerita picea	0.6	1.1	0	1.7
Patellidae				
Cellana sp	23.3	4.6	0	27.9
Total Shell	23.9	5.7	0	29.6
Vertebrae				
Fish	0.1	0.1	0	0.2
other				
Charcoal	2198.2	1235.0	18.2	3451.4
Site Total	2222.2	1240.8	18.2	3481.2

WT=Weight in grams

TU-1 North Face Profile



Stratigraphic Description:

Layer I (+20 – 0 cm)- Surface Rock Pile

Layer II (0-25 cmbs)- Sandy Silt (10YR 4/4 Dark Yellowish Brown) with fractured Sub-angular Basalt Rocks and Cobble

Layer III (25-35 cmbs)- Fine Sand (10YR 5/4 Yellowish Brown), Culturally Sterile

Figure 20. Site 6366 Feature M: North Face Profile of TU-1

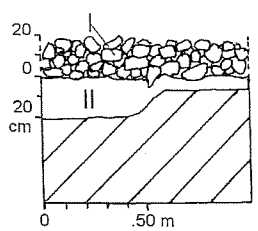
Table 11. Site 1 Feature M, TU-1 Artifacts

Makena Parcel 83, Site 6366

Feature M, TU 1	Layer II-1	Layer II-2	Layer II-3	TOTAL
Depth in cm BS	0/10	10/20	20/25	
GLASS				
CLEAR				
Flat glass	0	1	0	1
GREEN-bottle/jar	1	0	0	1
TOTAL GLASS	1	1	0	2
METAL				
TIN/STEEL				
Cap, crown	4	5	0	9
Nail, wire	1	0	0	1
Safety Pin	1	0	2	3
LEAD				
Window lead	0	2	0	2
TOTAL METAL	6	7	2	15
GRAND TOTAL	7	8	2	17

** denotes quantity*

TU-1 West Face Profile



Stratigraphic Description:

Layer I (+20 – 0 cm)- Surface Rock Pile

Layer II (0-20 cmbs)- Fine Silt (10YR 3/3 Dark Brown) with Some Basalt Cobbles

Figure 21. Site 6366 Feature N: West Face Profile of TU-1

Discussion

The test unit yielded minimal quantities of midden (Table 12) and a variety of cultural material, totaling 151 items (Table 13), both within the rock pile and below the ground surface. The material was historic domestic trash which appeared to have been secondarily deposited at this location. The excavation revealed that the stone mound was most likely purposely placed at its location to cover an exposed, jagged section of bedrock in an otherwise level soil area.

Table 12. Site 6366 Feature N, TU-1 Midden

Makena Parcel 83, Site 6366

Feature N, TU 1	Layer I-1&2	Layer II-1	Total
Depth in cm BS	0/20	0/10	
	WT	WT	
SHELL			
Gastropoda			
Haliotidae			
Nerita picea	1.2	10.3	11.5
Patellidae			
Cellana sp.	98.7	8.1	106.8
Total Shell	99.9	18.4	118.3
Invertebrate			
Echinoidea Shell	0	1.9	1.9
Vertebrae			
Bovine (saw cut)	0.0	1.8	1.8
Unidentified medium mammal	0.8	13.4	14.2
Fish	0	0.2	0.2
Total	0.8	15.4	16.2
other			
Charcoal	1.1	5.6	6.7
Site Total	101.8	41.3	143.1

WT=Weight in grams

Table 13. Site 6366 Feature N, TU-1 Artifacts

Makena Parcel 83, Site 6366

Feature N, TU 1	Layer I	Layer II-1	TOTAL
Depth in cm BD	0/20	0/10	
GLASS			
CLEAR			
Bottle, beverage	21 (2)		
Curved (bottle/jar)	10 (2)	30 (2)	
TOTAL CLEAR GLASS	31	30	61
BROWN-bottle,beverage	9 (1)	18	
BLUE-jar, medicinal	7 (2)	9	
AQUA-bottle	11 (1)	9	
SUBTOTAL OTHER GLASS	27	36	63
METAL			
ALUMINUM			
Foil	0	1	
TIN/STEEL			
Can, food	1(1)	5 (1)	
Chicken wire	1	0	
Key, can opener	0	1	
Shotgun Casing	1	0	
Safety Pin	0	1	
Spool	1	0	
Wire, smooth	1	0	
LEAD			
Molten drop	1	3	
TOTAL METAL	6	11	17
MIXED MATERIALS			
LEATHER			
Shoe Soles	3	0	
MORTAR			
Unfinished	6	0	
PLASTIC			
Button	0	1	
TOTAL MIXED MATERIALS	9	1	10
GRAND TOTAL	73	78	151

** denotes quantity*

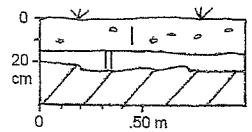
Site 6367

All three features of Site 6367 underwent subsurface testing. Feature A was a small U-shaped enclosure located near the southern end of the outcrop ridge. Feature A was considered to hold the best potential for cultural remains within the floor deposit. Feature B, the L-shaped facing and Feature C, the short retaining wall, both at the northern end of the outcrop, were also tested

Feature A

A 1.0 by 1.0 m test unit, TU-1, was centered in the interior floor of Feature 1. All excavated matrix was sieved through 1/8 inch mesh screen. The deposition consisted of two layers of silt overlying a substrate of solid basalt. Below a thin surface layer of overburden, Layer I, a brown (10YR4/3) silt was 0.15 to 0.17 m in depth. One small piece of coral was recovered from the surface and 2 small marine shell fragments were recovered from Layer I. Layer II was a thin layer of culturally sterile, yellowish-brown silt (10YR 5/6) overlying solid bedrock which was exposed around 0.20-0.25 m in depth (Fig. 22). TU-2, 2.0 by 1.5 m, was excavated at the opening of the U-shape. Subsurface characteristics were identical to TU-1 and only trace amounts of unidentified marine shell fragments were recovered from Layer I.

TU-1 East Face Profile



Stratigraphic Description:

Layer I (0-17 cmbs)- Silt (10YR 4/3 Brown) with some Angular Basalt Cobbles

Layer II (17-25 cmbs)- Silt (10YR 5/6 Yellowish Brown) Culturally Sterile, Overlying Bedrock

Figure 22. Site 6367 Feature A: East Face Profile of TU-1

Feature B

A 0.50 by 0.50 m test unit was excavated in the floor at the interior corner of the L. All excavated matrix was sieved through ¼ and 1/8 inch mesh screens. The deposition consisted of

two layers of silt overlying a substrate of saprolytic basalt. Below a thin surface layer of organic durff, Layer I, a brown (10YR4/3) silt with subangular cobbles was 0.20 to 0.30 m in depth. Layer II was a thin layer of culturally sterile, yellowish-brown silt (10YR 5/6) with a high density of subangular cobbles overlying a densely packed substrate of saprolytic basalt which was exposed around 0.40 to 0.50 m in depth (Fig. 23). No cultural remains were recovered.

TU-1 West Corner Profile

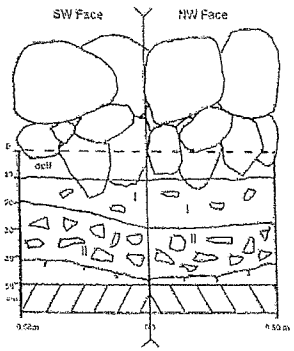


Figure 23. Site 6367 Feature B: West Corner Profile of TU-1

Feature C

A 1.20 by 0.30 m area of cobble fill behind the retaining wall was manually removed to expose an opening in the outcrop considered to be a possible filled lava tube. The fill of cobbles and small boulders were removed to depths ranging between 0.40 to 0.50 m below surface where sloping basalt bedrock was encountered. The fill was found to consist primarily of cobbles, boulders, and rubble with minimal pockets of soil infiltrating down from above, with no depositional layers. Cultural material was absent and the opening was revealed to be a small and shallow bubble tube.

Discussion

Site 6367, spatially isolated from the Site 6366 complex, is most likely not associated with the historic homestead. Historic period artifacts and materials, ever-present in Site 6366, were totally

absent from both the surface and subsurface deposits. The traditional features types suggest early historic, if not pre-contact, origins for this site. The paucity of cultural materials and minimal deposition suggests short term use of this feature, perhaps in association with dry-land agricultural and habitational (u-shaped enclosure) pursuits in the region.

Results of Previous Testing at Site 6366

On two previous occasions, subsurface testing was conducted in the vicinity of the Feature B house to search for an infant burial dating to the 1920s. During both attempts, lineal descendents of the Poepoe family were present and guided the search. Unfortunately, both undertakings resulted in negative findings. In the course of the first attempt in 1994, the search was limited to manual testing in areas immediately adjacent to the house and a 110 square meter area fronting the northeast corner of the house undergoing mechanical blading to bedrock. However, a much more extensive subsurface search, assisted by a backhoe from Makena Resort Corp., was undertaken during the second attempt which took place over three days between June 28 and June 30, 2000. This second search is briefly described and summarized here.

A total of 24 linear meters of manual trenching, 40 linear meters of backhoe trenching and ca 500 square meters of areal mechanical blading were completed (Fig. 24). The subsurface testing was primarily concentrated within the enclosing walls (Features A-1 & A-2) of the homestead, however, four 4 meter long trenches were excavated through two rock mounds and two soil areas located in the northern central portion of Parcel 83 between the homestead enclosure and the Site 1007 Feature 7 wall. The vertical extent of all test areas did not exceed 0.30 m in depth. Solid bedrock or culturally sterile silt layers with dense inclusions of saprolytic basalt cobbles were encountered within 0.15 to 0.30 m from the existing ground surface. No buried cultural material or depositional layer was encountered during the testing procedures.

Discussion

Based on the young age (< 1 year old) of the individual, absorption of the skeletal remains by acidic soil was a possibility. However, any evidence of a burial pit was also totally absent. An alternative possibility is that, since the interment was at the base of a large mango tree near the house, according to the lineal descendent, and no evidence of that tree could be found, the burial and pit may have been displaced when the tree or its stump was removed. Modern cleanup activities may also have obliterated any sign of such a burial.

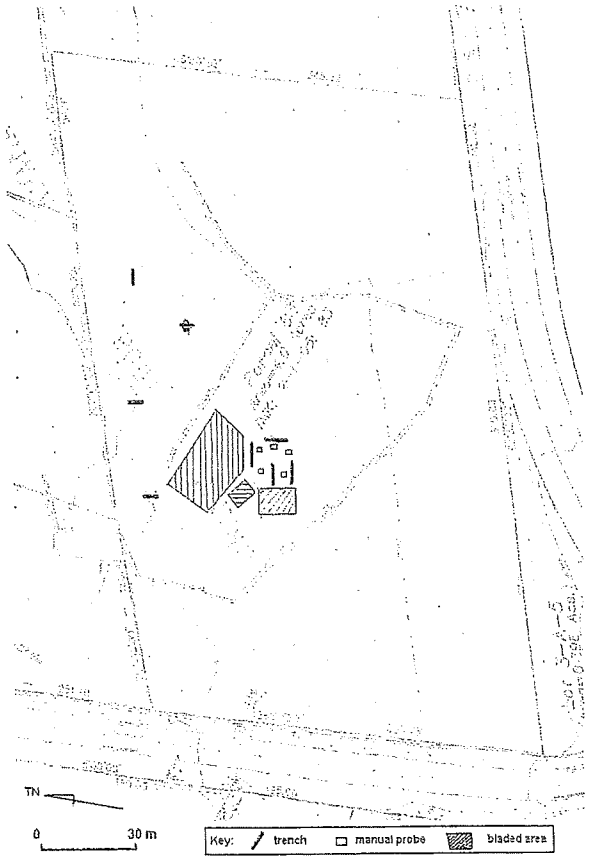


Figure 24. Map of Parcel 83 Depicting the Previously Tested Areas

CONCLUSIONS

The fifteen currently extant surface components of the Site 6366 complex collectively constitute the remains of a historic period homestead that occupied a major portion of Parcel 83. This homestead consisted of the perimeter walls (Features A-1 thru A-3), the house (Feature B), a couple of ancillary structures (Feature C), an *`ili`ili* scatter (Feature D), two refuse scatters (Features E & F), and nine clearing mounds (Features G thru O). Land-use documents and oral testimony from family members confirm that this complex was indeed a homestead occupied by the Poepoe family into the 1960s. Because the house-lot occupied a small portion of a large land grant and was not recorded as a discrete award, its origin, most likely, post-dated the time of the Mahele. Based on artifactual evidence (the fragments of temporally diagnostic glass bottles), it appears that the bulk of the historic activity represented within the homestead area, took place during the first half of the twentieth century within the immediate area of the homestead.

Small, circular mounds of rocks and boulders, simply piled atop the ground surface, are the most frequently occurring feature in the Site 6366 complex. The quantities, varieties of historic and midden materials within the stacked rocks as well as in the upper zones of the underlying deposits strongly suggest that these features represent the result of periodic collection and accumulation of loose stones and selected refuse by the occupants of the homestead. The age of the historic artifacts also coincides closely with the period of occupation of the homestead. Although clearing mounds are most commonly associated with agricultural activity, these could also be attributed to the periodic manual cleaning of the yard area of the homestead. At least two of the mound features (H & N) are constructed to cover areas of rough exposed bedrock, thus indicating a possible dual purpose for some of the mounds.

Feature D, the *`ili`ili* scatter, and the possible subsurface feature exposed during testing may represent the remains of a feature that was destroyed prior to the occupation of the homestead and further modified during the period of occupation. However, the disturbance has been so extensive that currently no original integrity remains of the structure itself, any associated cultural deposit is absent, as is any other evidence of *`ili`ili* within the area of the homestead indicating the potential extent of any prior cultural activity.

An assessment of a representative sampling of glass bottles from the Features E and F surface scatters indicates a date range in the first half of the twentieth century. The bottles most

commonly represented are beer, condiment, medicinal, and bleach (Chlorox) containers with diagnostic Owens Illinois Duraglass makers marks.

Feature M appears to have been a firepit prior to the construction of the rock mound as indicated by the nearly 3.5 kilograms of charcoal recovered from the test unit. It may have been an *imu* used for food preparation and/or a firepit where refuse was burned. The accumulated rocks are mostly vesicular basalt and heat-altered and fractured rocks occur both on the surface and as inclusions in the upper layers of subsurface deposit. The presence of the vesicular basalt stones, which do not readily occur in the immediate area, support the *imu* function. The charcoal was not submitted for radiometric analyses in view of the fact that no prehistoric or traditional type cultural materials were encountered during the testing and the presence of late historic-period materials throughout the excavated layers.

The results of the subsurface testing show that a number of ground surface alterations took place within the homestead area prior to, during, and after its occupation. The presence of historic artifacts and materials, all dating within a fairly short age range, within multiple layers of deposition suggest that these alterations took place in relatively close temporal succession. Most likely the soil areas within the walled yard area were graded prior to construction of the house. Also, some localized ground surface alterations took place during the occupation of the homestead as well, with the construction of Feature C perhaps having the most impact. During testing, no primary or stratified deposition of cultural materials were encountered. All of the artifacts and samples, with the exception of the charcoal in Feature M, were secondarily deposited, either artificially aggregated or displaced and re-deposited mechanically. In addition, the age of the historic materials is closely consistent throughout the homestead area and no great variation occurs horizontally in surface scatters nor vertically in subsurface proveniences. Although no surface indications of small–scale, domestic agriculture were encountered, such practices were common and highly expectable within the boundary of the homestead and immediately adjacent areas. Some of the mounds may have been the result of clearing small gardens or planting areas.

Evidence of past bulldozing, in the form of cuts and berms, are present in the area surrounding the homestead and in the adjoining parcels. Most of the earlier bulldozing can be attributable to ranching-related activities, which also account for some of the stone walls in the area. The presence of common secondary growths, especially *panini* cactus (*Opuntia megacantha*) and golden crown beard (*Verbesina encelioides*) ground cover, also indicate previous clearing.

During the decades following abandonment of the homestead, especially during the late 1960s and early 70s, the area was occupied by squatters. Later, when development started for the Makena Prince golf course and resort, the accumulated modern rubbish, automobiles, and shelters in the area fronting the Makena-Keoneoio Road were removed with the use of heavy equipment. Signs of this cleanup activity are still evident today.

The origin of Site 6367, as suggested by the results of the current study in the preceding discussions, most likely dates to the pre-contact or the early historic periods. Thus, Site 6367 is not associated with the occupation of the Site 6366 historic homestead complex and probably represents the remains of cultural activity from an earlier time period. It may have been associated with agriculture or temporary habitation. The testing resulted in the recovery of trace amounts of marine shell fragments and one piece of coral, thus the function and age of Site 6367 is inconclusive.

INITIAL SIGNIFICANCE ASSESSMENTS

All historic properties are evaluated according to significance criteria. Significant properties must possess integrity of location, design, setting, materials, workmanship, feeling and association and shall meet at least one of the following Hawaii Register criterion:

Criterion "A"-Be associated with events that have made an important contribution to the broad patterns of history;

Criterion "B"-Be associated with the lives of persons important in our past;

Criterion "C"-Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master, or possess high artistic value;

Criterion "D"-Have yielded, or is likely to yield, information important for research on prehistory or history; or

Criterion "E"- Have an important value to the native Hawaiian people or to another ethnic group of the State due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

Site 6366, the historic homestead complex can be said to have possessed the typical characteristics of early 20th century homesteads of the historic coastal settlements of the Makena

region. However, its current deteriorated condition does not possess the integrity necessary to be considered under any other criterion but D for having yielded important information toward better understanding a part of the historic period lifeways of the Makena region.

Site 6367, the outcrop ridge incorporating three structural features attributed to traditional Hawaiian origins, is also considered significant under Criterion D for having contributed to the inventory of archaeological data for the Makena region. The site type is ubiquitous in the region and well represented in other permanent preservation precincts within the total Makena Lands LLC holdings in the neighboring areas.

RECOMMENDATIONS

Sites 6366 and 6367 require no further archaeological procedures prior to commencement of development activities. However, in view of the inadvertent discoveries of significant cultural remains in the neighboring parcel, archaeological monitoring during all construction-related, ground-disturbing activities in the subject parcel is recommended.

Following the review and approval of this report by SHPD, a monitoring plan shall be prepared and submitted for review and approval.

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STATE HISTORIC PRESERVATION DIVISION ACCEPTANCE LETTER DATED JULY 31, 2008

APPENDIX

J-1

LINDA LINGLE
GOVERNOR OF HAWAII

AUG 0 7 2008

BY:

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

July 31, 2008

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793

LOG NO: 2008.3048
DOC NO: 0807PC41
Archaeology

Dear Mr. Pantaleo:

SUBJECT: Chapter 6E-42 Historic Preservation Review – REVISED Archaeological Inventory Survey of H2 Parcel 83 in Maluaka Ahupua'a, Makawao District, Maui Island TMK: (2) 2-1-005:083 and 120 por.

Thank you for the opportunity to review this revised report, which our staff received on July 23 of 2008 (Rotunno-Hazuka, Hodgins, Pantaleo and Sinoto 2008): *Archaeological Inventory Survey H2 Parcel 83, Maluaka Ahupua'a*...Archaeological Services Hawai'i, LLC.

The report was first reviewed by SHPD staff on June 8, 2008 (SHPD DOC NO: 0806PC08), resulting in a series of requested revisions. The most recent version of the report was reviewed in hardcopy format to confirm completion of those requested revisions and suggestions.

The report now contains the required information as specified in HAR §13-276-5 regarding the contents of inventory survey reports in general and is acceptable. *However, please ensure that all future AIS reports include an adequate figure showing identified site location (as opposed to project area only) on a portion of a 1:24,000 U.S.G.S. Topo Map, as per HAR §13-276-5 (4)(f)(2).*

As stated in the initial report review letter, with respect to the Hawai'i Register of Historic Places, we concur that SIHP #50-50-14-6366 and -6367 are significant under Criterion D for their potential to yield information important to history or prehistory.

We also concur that precautionary archaeological monitoring is warranted during all future ground altering disturbance within the subject parcel because of the potential that culturally significant subsurface deposits may still be found in the area. Now that the revised AIS report has been accepted, an associated monitoring plan will be reviewed by the SHPD under separate cover.

Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793
Aki Sinoto Consulting, LLC., 2333 Kapiolani Blvd., #2704, Honolulu, Hawai'i 96826

ARCHAEOLOGICAL INVENTORY SURVEY REPORT (TMKS 2-1-005:085 AND 108 PORS.)

APPENDIX

K

INVENTORY SURVEY REPORT FOR PARCEL H-2 LOCATED IN MALUAKA *AHUPUA'A* MAKAWAO DISTRICT ISLAND OF MAUI TMK: 2-1-05:85 and 108 pors.

FOR: Keaka LLC.,

BY: Lisa J. Rotunno-Hazuka (B.A.), Aki Sinoto (B.A)
And Jeffrey Pantaleo (MA)

With Contributions by: Mr. Koa Hodgins (B.A.) and Mr. Mikele Fager (B.A.)

REVISED OCTOBER 2008
REVISED SEPTEMBER 2008
JUNE 2008

ARCHAEOLOGICAL SERVICES HAWAII, LLC.
1930 A VINEYARD ST.
WAILUKU, HI 96793

"Protecting, Preserving, Interpreting the Past While Planning the Future"

EXECUTIVE SUMMARY

Under contract to Keaka LLC of Wailuku, Archaeological Services Hawaii (ASH) of Wailuku in association with Aki Sinoto Consulting (ASC) of Honolulu, prepared this inventory survey report for an approximate 21.0 acre project area located in Maluaka *ahupua`a*, Makawao District, Honua`ula traditional District, Island of Maui, TMK 2-1-05: 85 and 108 pors.

A total of eight historic properties, State Inventory of Historic Places (SIHP) 50-50-14-6371-6374 and 6376-6379 comprised of 59 component features were identified within the project area. Sites 50-50-14-6371, 6373, and 6376 through 6379 are believed to be of traditional Native Hawaiian origin. The traditional complexes consisted of enclosures, C-shapes, platforms, alignments, walled pits and cupboards. Sites 6372 and 6374 are from the historic period and were comprised of habitation dwellings associated with rock mounds, alignments, boundary walls and refuse deposits. One feature, Feature 5 of Site 6374, a marginally modified outcrop, maybe modern.

Twelve features of five sites; Site 6371 Features 2 and 3, Site 6372 Feature 2.4, 2.6, 2.7; Site 6373 Features 3 and 4, Site 6376 Features 1, 2 and 4, and Site 6379 Features 1-3; underwent subsurface testing through controlled manual excavations. Additionally, a series of 8 backhoe trenches were executed within the west-central portion of the project area. The controlled testing program recovered sparse amounts of midden (marine shell, echinodermata and charcoal) from several of the test units. The charcoal from two pre-Contact period sites (Site 6376 and 6379) was submitted for radiocarbon assays. Feature 2a, a charcoal affected soil deposit at Site 6376, returned a conventional age of 190 +/- 40 BP, and Site 6379 Feature 3a, a slab-lined hearth was 290 +/- 40 BP. All backhoe trenches were negative for material cultural remains, and most terminated upon bedrock at .60 m bs.

Three of the pre-Contact period complexes were significant under multiple criteria. Criterion C and D were assigned to Site 6373, 6378 and 6379. The remaining historic properties were assessed a significance of Criterion D.

Five of the six pre-Contact period sites (Sites 6371, 6373, 6377 Feature 2, 6378, and 6379) comprised of 21 component features have been recommended for preservation. The proposed development plan has been re-designed to accommodate the permanent preservation of these sites. The long-term commitments for these sites will be presented in a Preservation Plan. The form of preservation shall initially incorporate conservation (avoidance and protection); however pending further consultation with the SHPD, Na Kupuna o Maui, and Hui Alanui o Makena, an interpretive component may be implemented.

INTRODUCTION

Under contract to landowner Keaka LLC of 2005 North Main Street in Wailuku, Archaeological Services Hawaii (ASH) of Wailuku in association with Aki Sinoto Consulting (ASC) of Honolulu, prepared this inventory survey report for an approximate 21.0 acre parcel of land located in Maluaka *ahupua`a*, Makawao District, Honua`ula traditional District, Island of Maui, TMK 2-1-05: 85 and 108 pors. This report compiles and incorporates the results of three previously completed surveys that range in date from 1978 by the Bishop Museum, 2001 by ASH and ASC, with the results from the most recent supplementary survey and testing procedures undertaken in 2007 and 2008. The objective of this report was to document all surface archaeological properties and to evaluate the initial significance of each of the extant sites. This study will also aid in formulating future mitigation measures for the historic properties identified.

PROJECT AREA

The project area is located in Makena and is comprised of approximately 19-acres. It is in the coastal portion of Maluaka *ahupua'a* (Figure 1). The project area is comprised primarily of Parcel 85 (19.039 acres) and smaller portions of parcel 108 (2.079 acres). Parcel 108 is located in the northeast quadrant and along Makena-Alanui Road. The subject parcel is situated near the south cul-de-sac of the Maui Prince Hotel and is bounded to the north by Fairway 17 of the Makena South Golf Course. It is *mauka* (east) and adjacent to Makena-Keone`o`io Road. Portions of the south and western sides of the project area are bounded by Makena-Alanui Road and Parcels 84 and 83 (Figure 2). These parcels were previously surveyed by Donham (Parcel 84) in 2006, and Hodgins et. al. (Parcel 83) in 2008 and manifested similar environmental and archaeological conditions.

ENVIRONMENT

The environment of Makena is similar to arid leeward regions of the other Hawaiian Islands. The project area receives approximately 20 inches of annual rainfall with January being the wettest month and July the driest (Armstrong 1973). The elevation of the project area ranges from 40 to 80 feet above mean-sea-level and is situated approximately 500 ft. inland from the coast. The terrain slopes downward from east to west with areas of soil, loose rock, and exposures of bedrock outcrops. The project area is vegetated with an over-story of *kiawe* (*Prosopis pallida*), with stands of *wiliwili* (*Erythrina sandwichensis*), *panini* cactus (*Opuntia megacantha*). *koa haole* (*Leucaena leucocephala*, *`ilima* (*Sida fallax*), lantana (*Lantana camara*), the ubiquitous beggar's tick (*Bidens pilosa*), castor bean (*Ricinus communis*), and various grasses. Evidence of previous

land modifications in the form of bulldozer clearing, berms, tailings, and clearings are apparent within the northwest, southeast and along the northern project boundaries. The northern boundary was graded during the construction of the golf course (Fairway 17), the northwestern corner was a former stable area. The southeastern corner was filled with imported rock and soil, and sand to be utilized for the sand traps at the golf course.

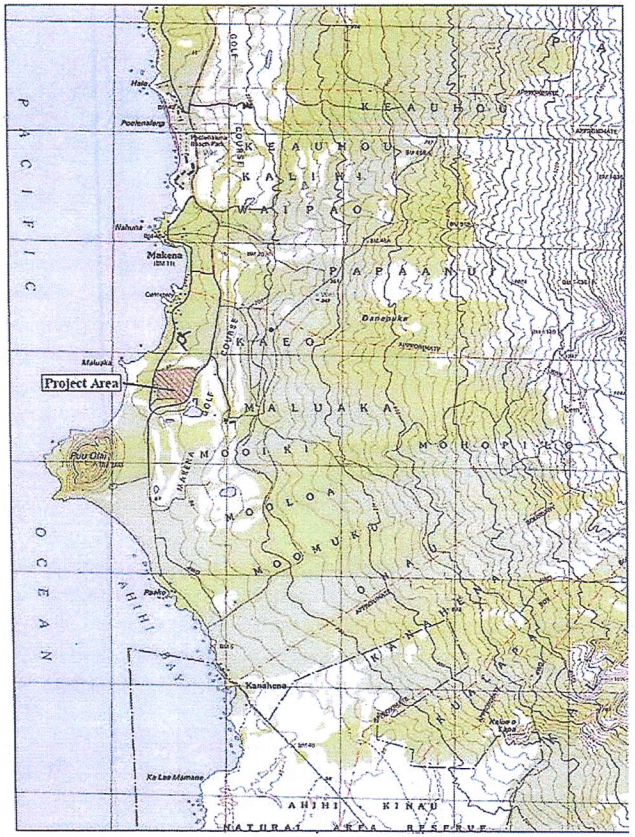


Figure 1. Location of Project Area on USGS Quadrangle

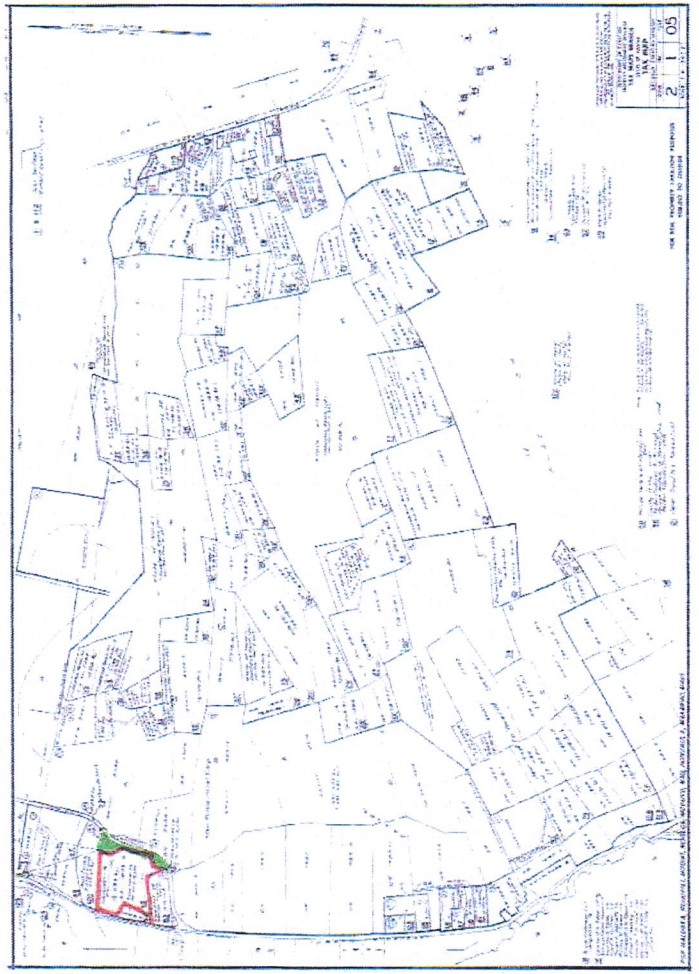


Figure 2. Location of Project Area on Tax Map Key (Parcel 85-Red; Portion of Parcel 108-Green)

The soils in the project area consist exclusively of Makena loam, stony complex. The Makena series are well-drained soiled developed in volcanic ash with moderately rapid permeability, slow to medium runoff, and slight to moderate erosion hazard. Stony land, occurring on low ridges, makes up 30-60% of this complex and Makena loam in gently sloping areas, occurs between the low ridges of Stony land (Foote et al. 1972:91).

HISTORICAL BACKGROUND

Historical background data regarding the Wailea/Makena region has been summarized in Barrere (1974), Clark and Kelly (1985), Cordy and Athens (1988), Schilt (1988), Gosser et al. (1993 & 1996), and McIntosh et al. (1997). The reader is referred to these studies for detailed information. Thus, this section will be limited to a brief historical summary.

The earliest prehistoric settlement on Maui Island is postulated to have occurred between A.D. 300-600 along the windward regions where abundant rainfall and fertile soil supported cultivation and human populations (Kirch 1985, Cordy and Athens 1988, Gosser et al. 1996). Population expansion into the drier, leeward areas of Kihei, Wailea, and Makena, likely took place by A.D. 1000-1200 (Cordy 1974, Kirch 1985). Seasonal settlements occurred along the coastal areas to exploit marine resources, while permanent settlements occupied the upland areas to utilize forest products and cultivate agricultural resources. Between these settlements was a dry area used for cultivating sweet potatoes and traversed *mauka-makai* trails. Upland populations exchanged taro, bananas, and sweet potatoes with the coastal populations for ocean resources (Handy 1940).

The inhabitants of Honua'ula subsisted mainly on fish and sweet potatoes, a common diet of those who lived in the leeward area of Maui (Barrere 1975:41). The early French navigator La Perouse noted, while anchored at Keone`o`io Bay that "this part of the coast was altogether destitute of running water. The inhabitants had no drinking water but a brackish water obtained from shallow wells (1798:350)."

Due to the lack of running water, agricultural production on the leeward side of Maui Island was limited to dry-land taro in the upland areas in pockets of moist soil where rainfall was greater, while sweet potatoes were grown at the lower elevations (Handy 1940:113-114). Irish potatoes became an important cash crop in East Maui, for provisioning whaling ships and supplying the west coast of North America during the Gold Rush of 1848. By 1846, the cultivation of Irish potatoes had spread from Kula to Honua'ula. Sweet potatoes were also grown for export, and

sugarcane was being cultivated by 1841. M.J. Nowlein and S.D. Burrows leased lands from Kamehameha III at Ulupalakua to grow sugarcane and Irish potatoes. In 1845, Nowlein and Burrows transferred their lease and interests to Linton L. Torbert, who extended sugarcane cultivation to adjoining lands and started cattle ranching. In 1856, Captain James Makee bought the Torbert Plantation and it was later referred to as the "Rose Ranch." By 1862, sugarcane was being extensively cultivated, and a steam mill was built for processing sugar. A severe drought in 1878 forced the end of sugarcane production, and cattle ranching became the dominant commercial enterprise of Honua'ula. By the 1880s, `Ulupalakua Plantation was basically a cattle ranch utilizing the road and landing at Makena in Papa`anui. Ranching continued to be practiced into the 1970s. However, the dominant economic and land-use theme since then has focused on tourism. The past three decades have seen the intensification of golf course, resort, and luxury residence developments in the Wailea and Makena regions.

Land Tenure During the Historic Period

During the Mahele in 1848, lands of Hawaii were divided among the Royalty, Government, and commoners. Applications for land titles were considered by the Board of Commissioners to Quiet Land Titles. When a claim was validated, a Land Claim Award (L.C.A.) was awarded. Following payment of this claim, a Royal Patent (R.P.) was issued. No L.C.A. appear on historic land documents within the current project area. Portions of government lands were also sold as Grants. Grant 1508, Apana 1 and 2, and portion of Grant 3088, were awarded in the project area. Both Grants are located in Maluaka *ahupua'a*, Honua'ula District. Grant 1508, Apana 1 (7.66 acres) and 2 (23.20 acres), were awarded to Makahanohano for $32.72 by Kamehameha III in 1854. Grant 3088 was awarded to Kanakahou for $64.46 by Kamehameha IV in 1871.

PREVIOUS ARCHAEOLOGY

Winslow M. Walker with his fieldwork during 1929-30, provided the first modern archaeological descriptions of prominent surface remains, mainly *heiau*, on the island of Maui. However, much of the remains of daily life, the house-sites and other small associated features were not documented until several decades later, especially in the remote Makena region.

Since the 1970s, the aforementioned intensification of land-altering activities associated with the expanding influx of tourism and in-migration of new residents has ironically provided the means for archaeological study of the region. Many archaeological studies have been conducted in Makena, both within and in the neighboring vicinity of the current project area. Interested

readers are referred to some of the previously completed reports (Gosser et al. 1993, 1996, and Donham 2008) that contain comprehensive summaries and reviews of past investigations in the region. For the purposes of the current report, those previous investigations completed wholly within or incorporating portions of the current project area will primarily be discussed. In addition, a few recently undertaken studies in the neighboring areas will also be briefly summarized.

Recent Studies in the Neighboring Area

An inventory survey was conducted as part of a due diligence for two parcels adjoining parcels situated immediately south and *makai* of the project area at (TMK 2-1-06:34 & 35). Surface features including retaining walls, terraces, mounds (5089 Fe. 2 and 3), enclosures, portions of a fishpond wall, a pre-contact infant burial (5090) a small family historic cemetery enclosure (Fe.1) were present. A surface scatter of historic-period artifactual remains, along with several traditional artifacts was recovered. Test excavations confirmed the presence of multiple historic burials (5091) within an area specified by lineal descendants, apart from the known cemetery (Rotunno-Hazuka et al. 2003).

Two other projects also occurred in adjoining parcels located immediately north and west of the Makena Resort Corporation holdings *makai* of Makena Alanui, near the existing Makena Surf residential development at the junction of Makena Alanui and the old Makena-Keone`o`io Road.

The triangular lot (TMK 2-1-07:71) defined by the junction is the Cella residence, which contained three sites consisting of an overhang shelter (Site 50-50-14-4505), a habitation mound (Site 4506), and a historic-period enclosure (Site 4504). Sites 4504 and 4506 have been preserved *in situ* (Fredricksen 1998).

The adjoining lot to the south (TMK 2-1-07:101), a multi-family residential development-Na Hale o Makena, contained 6 sites composed of 25 features (Sites 3513-3518) representing habitation, agricultural, and marine exploitation activities (Spear et al. 2001). Pohakunahaha (Site 197) *heiau* occurs in an exclusion adjoining the southern boundary of this parcel. Two burials were inadvertently discovered during recent construction activities. One burial, Feature 1 of Site 197, was re-interred in its original location, the other burial, located in a *puka* underlying a boundary wall to the south of the project area, will also remain *in situ*. This burial feature may be

the same one described by Clark as B8-6 which was a "burial in a wall" that was identified within the Makena Complex (Site 1266).

An additional area located at Nahuna Point (TMK 2-1-01:7 & 98) is south of the preceding two project areas and situated along the coast off Makena-Keone`o`io Road. Four archaeological sites (Sites 4524-4527) were recorded within this private residential property. Site 4524 is a *ko'a* that has been preserved *in situ*, Sites 4525 and 4526 were overhang shelters, and Site 4527 was a historic rock wall (Fredricksen 1999).

Over the years, a large number of projects have been undertaken for the Makena Resort Corp. in conjunction with golf course and hotel development, and most recently for the installation of a wastewater treatment facility and infrastructural improvements. Archaeological monitoring was conducted for these improvements. For a detailed summary of past work completed in the Makena Lands, LLC holdings, the reader is referred to Gosser et. al 1996.

Previous Studies Within or Incorporating Portions of the Current Project Area

Several previous investigations have been performed within or incorporating portions of the current project area. These investigations ranged from surface reconnaissance, assessments, inventory surveys and archaeological monitoring. Each of the prior investigations will be briefly summarized below and some are located on an overall project area map (Figures 3-5). The project area contains 4 previously recorded sites by the Bishop Museum Sites 50-Ma-B9-218, 225, 230 and 231. Two additional sites, 229 and 242, may be partially located within the project area.

The first attempt at systematic documentation of previously known surface remains on Maui occurred in 1973 during the Statewide Inventory of Historic Places implemented by the State Department of Land and Natural Resources. In that year, a large complex of coastal sites ("Makena Complex," Site 50-50-14-1266) was recorded in the area between Makena Landing and Pu`u Olai. The five major feature types cited were; walls (numerous, mostly associated with ranching), enclosures (16+), one burial in wall, platforms (3+), and a pit. Although Site 1266 incorporated portions of projects that have already been completed since 1973 along the Makena coastline, the map and descriptions were too general in most instances to correlate specific sites and features. The origin and intent of documenting this complex as well as several others, have been long misunderstood and misinterpreted by those unfamiliar with the objective and purpose of the 1973 Statewide Inventory Program. The stated goal of the 1973 Statewide Inventory

Survey Program was to document and update the condition of all *known* archaeological and historic sites previously recorded prior to 1973. The documentation was completed in a format that would facilitate the future establishment of a computerized database. No provision was made to undertake any data gathering of new sites. On occasion, the archaeological inventory team members sought to note areas of previously unrecorded aggregations of sites for future study. The objective of the historic sites inventory was a bit different since very few historic buildings and structures had been formally recorded prior to the time of the inventory initiative. In fact, the Makena Landing historic complex was recorded adjacent to the Makena Complex. Perhaps, it was a mistake on the part of SHPD to have included the Makena Complex in the formal inventory files, since it was originally intended only as an internal reminder for future project reviews. A legal challenge by private land owners statewide, nullified numerous inventory entries, based on the technicality that the State had failed to notify the various landowners of the initiative to register historical and archaeological sites that occurred on private property. In the case of the Makena Complex, it expansive boundaries crossed through many ownerships. The documentation of this complex has served its intended purpose by bringing to light the need for more survey and documentation of historic and archaeological sites in the period following the Statewide Inventory Program. In fact, the majority of the sites included in the original Makena complex and other recorded complexes, have been well-documented incrementally in conjunction with the development of various parcels in the area of the complex, starting with the following project.

In 1974, the Bishop Museum conducted a surface survey in approximately 1000 acres of Makena properties for the Seibu Corporation (Clark 1974). This reconnaissance addressed Parcels I, II, IIIA, IIIB, and IV. More than 120 sites were recorded (Figure 3). The *mauka* portion of Parcel I includes portions of the current project area. For Parcel I a total of 29 sites, consisting of 6 platforms (2 house platforms), 17 enclosures, 2 wall segments, one rock shelter, a possible burial, a well, a small complex of 3 pens, 8 agricultural terraces and a house platform; were recorded in Parcel I. Some of these features were most likely those cited in the Site 1266 complex documented during the Statewide Inventory.

In 1977, an archaeological reconnaissance survey undertaken in conjunction with the proposed realignment of the Makena coast road for the *mauka* alternate route (the current Makena Alanui), investigated the eastern periphery of the current project area (Davis & Bordner 1977 and EIS 1981). Site 1266, the "Makena Complex," was referenced, but it was located outside of the study

area *makai* of the existing road (Makena-Keoneoio Road). Site Complex 248, located on both sides of the survey corridor essentially included the sites recorded by Clark in 1974 (Figure 3).

In early 1978, increment one of the proposed Seibu Golf Courses was investigated by Bishop Museum (Haun 1978) and Site 50-Ma-B8-7 (State Site 50-50-14-1853), a complex of 12 features, was located in the coastal area north of Maluaka Point. Many of these features were disturbed during the golf course construction; however, some remnant walls located in the periphery of this complex were still extant and included in Donham's 2006 study of TMK 2-1-05:37 and 56.

In mid-1978, a survey of the third increment of the Seibu Golf Course (Fairways 1,7-10,17,&18) by the Bishop Museum recorded 76 sites, 4-5 of which were located in the current project area (Cordy 1978, Figure 5). Bishop Museum site numbers 218, 225, 229, 230 and 231were assigned to the surface remains (Figure 3 and 7). Site B8-7 recorded by Haun earlier as a 12-feature complex was separated into several discrete sites by Cordy. Haun's Features 2 and 9 were kept as B8-7; Features 1, 3, & 10 became B8-238, the midden scatter became B8-235, Feature 5 became B8-232, Feature 4 became B8-241, and the wooden shack and midden scatter not assigned feature numbers by Haun became B8-236. These site are all presumed to have been destroyed during golf course construction. Haun's Features 6-8, 11, & 12 were neither re-recorded, nor assigned discrete site numbers. Since Cordy's was the first study in which the locations and descriptions of individual sites were specific enough to allow relocation and correlation in the field, the data from this survey became the basis for all subsequent work in the current project area.

Cordy based his functional interpretations and age assessments of sites on artifact assemblages and architectural design or type. The initial interpretations were later refined after excavations were completed. In his analysis of historic house sites, Cordy utilized two criteria, (1) walls that are over 1.0 m high vertical and well built (2) wooden structures (sawn timber) with or without concrete foundations. Further classification of sites was housing and non-housing or agricultural functions. Non-housing structural types were terraces, abutted enclosures (abutted to knolls or gulches), tiny caves, faced pits, mounds, clearings and free-standing enclosures with no entrances. High-walled enclosures with no internal features and with soil interiors were considered animal pens or agricultural plots. Size of the interior surface would also be a determining factor in historic house use. However if the structure is small and contains stone paving then a house function is applicable. Long walls enclosing large land areas were assigned to the ranching era for livestock. Pre-Contact house sites would include field shelter (no

description of a field shelter given by Cordy, but often C-shapes and caves are assigned to this category). Caves, free-standing walled enclosures with entrances, platforms and paving. These site types were further divided into temporary or permanent, where in general "temporary housing included field shelters, shelters along trails, fishing camps, quarry camps and etc. Classification is based on a floor area criterion, on a cave/non-cave criterion, and on associations with other structures in the case of multi-structure sites (Cordy 1978:34). He further explained that no one structure type can be classified as temporary or permanent, but that the size would determine the use pattern of a feature. He based traditional temporary and permanent house sites on three facts- (1) unless burials are present, caves are considered temporary (2) Outside floor area is greater than 20 m square for permanent house sites (3) A multi-cultural site would be designated as temporary if all features were considered temporary, and permanent would be assigned if one or more of the structures are considered permanent. He further stated that inside floor areas may also be an indicator of the permanent vs. temporary dichotomy. The above categories and classifications would be further refined and or refuted based on the presence and or absence of artifacts. The following assumptions were made by Cordy in determining chronology and or function. Historic artifacts consisted of metal, ceramic and glass. Pre-Contact artifacts were comprised of tools made from basalt, volcanic glass, shell, coral and echinodermata. Shell midden and charcoal may occur within both historic and traditional cultural layers. Stone lined firepits were associated with pre-Contact sites unless it is associated with historic materials.

The discussion section of the report stated that "in sum, this project has recovered the significant information from these sites. This fact and the fact that the area has little potential for exhibition or long-term scientific research now place the historical remains of this area into a category of minimal significance". Cordy recommended only two sites to be preserved. Site 217 and Site 208, neither of which occurred in the current study area.

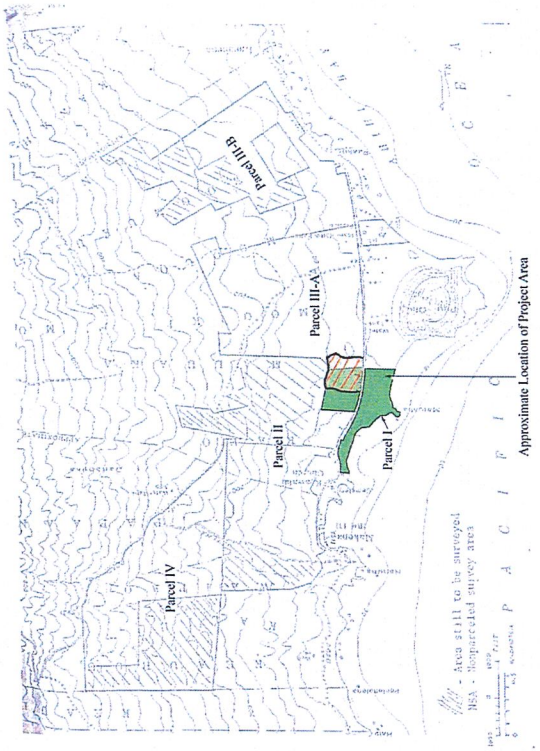


Figure 3. Parcel Location Map from Clark (1974)

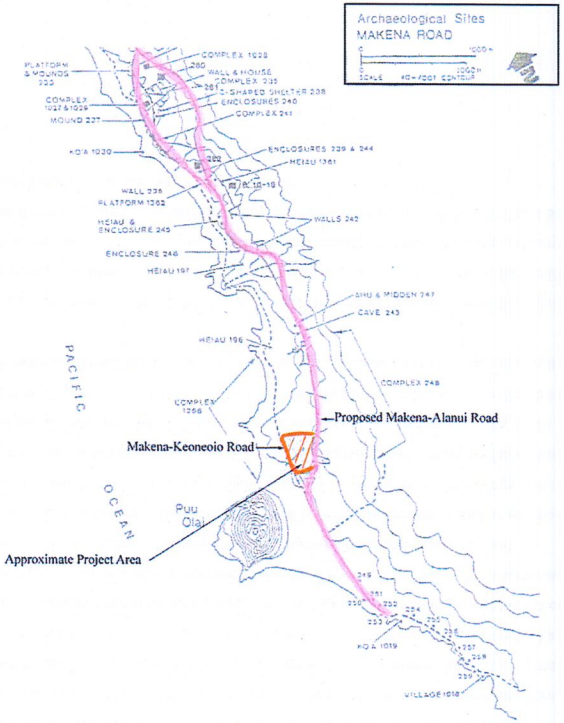


Figure 4. Plan View Map Showing Location of Sites along Proposed Road

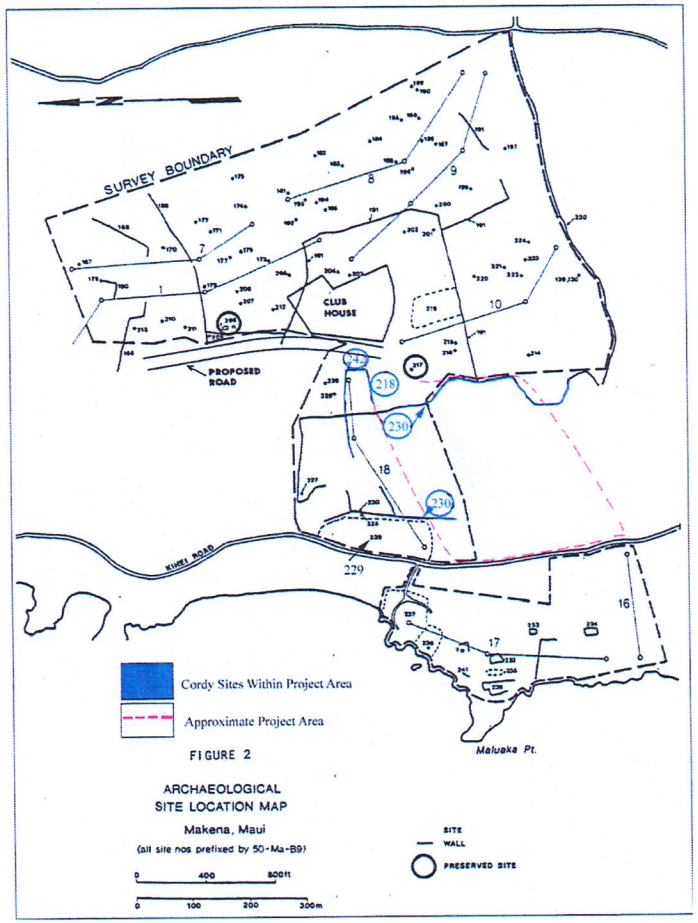


Figure 5. Site Location Map from Cordy (1978)

In 1979, two surveys were undertaken in the proposed hotel and residential areas (Denision 1979 and Rogers-Jourdane 1979-Figure 6). Sites B8-111 and B8-112 should have been located in the parcel *makai* of the current project area. Although the numbers were the same as those assigned by Haun, these were not the same sites. Site 111 was a remnant wall and Site 112 was a semi-circular enclosure. Both sites were tested and produced no subsurface cultural remains. Neither of these sites could be correlated with either Haun's or Cordy's sites based on description or location.

In 1985, intensive data recovery was undertaken at Site 50-Ma-B8-217, a modified outcrop platform originally recorded by Cordy. This site was recommended for preservation however due to its location within the proposed Makena-Alanui extension, salvage excavations and or data recovery procedures were conducted. Minimal remains were recovered from the rock fill of the platform and Site 218 was interpreted as a probable sleeping platform (Komori 1985).

In 1988, a survey was conducted for the public beach parking lot and the south cul-de-sac for the Makena-Keoneoio Road (Cleghorn, Kawachi, & Sinoto 1988). A complex of five surface features consisting of 2 walls (Fe. 1 and 2), 2 platforms/privies (Fe. 3 and 4), and a cement lined cistern (Fe. 5) with two curvilinear stone alignments around the base were documented and designated Site 50-50-14-1007. Eight shovel probes were conducted with negative results. The structural features were thought to be associated with the Old Makena School, formerly present in that location. Bishop Museum conducted subsequent data recovery at Features 3 and 4. Several historic period artifacts were collected and some internal wooden structural members from the old privies were found, but a formal report was never completed (Hurst, post-field summary letter, 1988). Feature 5, the cistern, was filled and to be preserved *in situ* in an area adjoining the parking lot to the south. As no report was ever generated for this work, Donham re-recorded the features during the 2006 re-assessment and inventory survey of parcel 84 (Donham 2006). Later, the Bishop Museum monitored the cul-de-sac area during construction and installation of landscaping and irrigation. No significant subsurface features were encountered during monitoring activities (pers. comm. Mr. Aki Sinoto).

In 1997, inventory survey fieldwork for a State Land-use Boundary Amendment petition for six areas was conducted (McIntosh and Pantaleo 1998). The current subject parcel was included within Petition Area 5. This undertaking included a review of previously completed work and surface assessments of selected areas and limited subsurface testing where warranted. No further

fieldwork, beyond the relocation of previously documented surface features occurred within Petition Area 5, was performed during this assessment.

On two separate occasions in 1994 and 2000, subsurface testing procedures were implemented at the former Poepoe property (TMK 2-1-05:83) at the request of the family. The objective of these attempts was to locate an infant burial from the 1930s. During the first attempt, Mrs. Cresencia Poepoe from O`ahu was present to oversee the procedures. No remains were found during the first attempt. For the more recent procedure, Mr. Fred Kanoho of Maui, another descendant familiar with the burial location assisted with the search, unfortunately, also with negative results. Several additional areas were investigated however no infant burial feature was recovered. It appears that based on the disturbed nature of the parcel and that no remains of a mango tree were evident, perhaps the burial was displaced when the tree or its stump was removed. Additional work was performed at the property in 2001 and again in 2007 (Rotunno-Hazuka et. al.). In 2001, a reconnaissance and subsurface testing was conducted within parcel 83. In 2007, a pedestrian survey and further documentation and testing of extant sites was undertaken. This survey identified several clearing piles, historic refuse pits and *kuleana* walls associated with a historic house structure. Additionally, the parcel contains a modified outcrop which appeared to be a pre-Contact agricultural site and or temporary habitation site. These sites were assigned State Inventory of Historic Places 6366 and 6367 (Sinoto et. al. 2008) and this parcel adjoins the project area to the south.

The most recent studies performed adjacent to the study area were conducted by Donham 2006 and Aki Sinoto Consulting (ASC) with Archaeological Services Hawaii in 2008 (ASH-Figure 7). The study by Donham was performed at 2-1-05: 84, 2-1-06: 37 and 56, where historic properties from both the pre-Contact and historic period era's were identified. A total fifteen sites (Site 1007, 1853, 1864, 2272, 5706-11 and 5795-99 comprised of 80 component features. Eleven of the sites with 20 features had been previously documented during prior studies. The traditional features identified consisted of a burial, a *k`oa* with associated terraces, rock mounds, enclosures, terraces, c-shape, midden scatter and wall segments. Historic period sites were comprised of rock mounds, terraces, boundary walls, school site, structural remains from house site, corrals, cesspool, privy and previously dozed road. Among these sites, the burial Feature 11 of Site 5706, and ceremonial complex-Site 5711 Features 1-3, 5 and 6, which includes the *ko'a* and associated terraces and a secondary *ko`a* were slated for preservation. Further ethnographic work was

recommended for Site 1007, the Makena School site, as well as archaeological monitoring during construction.

Archaeological monitoring is currently on-going and being conducted by Archaeological Services Hawaii at the Maluaka Development area. During the course of monitoring 2 burial sites containing 3 individuals have been identified at parcel 56. The proposed development plan has been modified to accommodate preserving the burials in place.

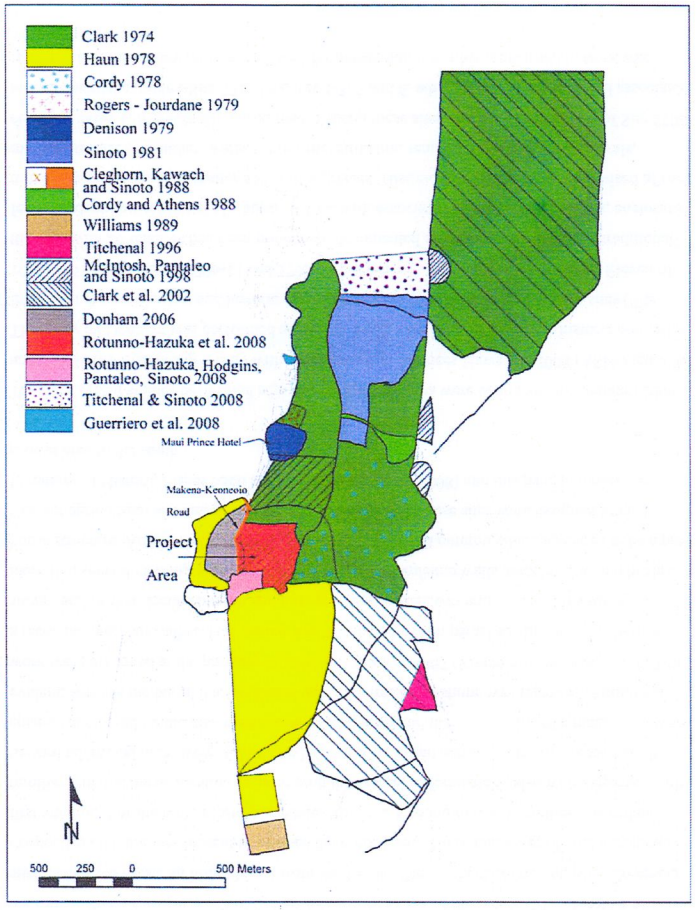


Figure 6. Previous Archaeological Studies in the Adjoining Areas

Figure 7. Map Showing Recent Studies Adjacent to Project Area (Green)

SETTLEMENT PATTERN

The general pattern of extant archaeological remains in the Makena area appears to consist of prehistoric and historic permanent habitation along the coastal areas with isolated pockets of agricultural activity transformed into more extensive clusters of *kula* type features in the inland areas around the 200-foot elevation. Limited permanent and some temporary or seasonal occupation sites occur in the inland areas in association with agricultural complexes.

The variety of available archaeological data as well as historic documentation indicates a traditional subsistence base dependent on marine exploitation and limited dryland cultivation for the Makena region. The "Makena Agricultural System," as previously defined by Cordy (1978), Haun (1978), Cordy and Athens (1988), and Gosser et al. (1996), is characterized by discontinuous areas of cultivation associated with permanent and temporary habitation features. Gosser suggested that "agricultural pursuits in the Makena region were small-scale and probably on the level of family garden horticulture. The relative abundance of terraces, low retaining walls, mounds, and the absence of formal irrigation features, suggests that most of the farming was restricted to crops such as sweet potato and dry-land taro (Gosser et al. 1996:16)."

Both Gosser (1996) and Titchenal (1996) have pointed out that walled agricultural complexes or *kauhale* occur inland and appear to be situated along fairly uniform elevations. These *kauhale* appear to be unique components of the "Makena Agricultural System" and exhibit fundamental differences from *kauhale* defined in neighboring areas such as Palauea and Wailea. Based on higher site densities, due in part to relatively higher rainfall, Ka`eo *ahupua`a* has been suggested as the focus of settlement in Makena (Cordy 1978, Sinoto 1980). Historic period permanent habitation concentrated along the coastal areas as suggested by Jones (1994). Some of the larger walled complexes and structural features in the inland areas have also been attributed to the major efflorescence of commercially-driven agricultural pursuits of the mid-1800s (Titchenal 1966).

SITE EXPECTABLITY

The discussions in the preceding sections indicate the types of sites expected in the current project area. Permanent habitation features, such as walled historic house compounds which could contain enclosures, mounds, alignments and terraces. Prehistoric temporary or permanent habitation sites would include enclosures, c-chapes, platforms, *ko`a*, *heiau*, and agricultural features of enclosures, L-shaped alignments, terraces, mounds, mulch pits and or walled pits.

Lastly, ranching-related structural remains are likely present in the coastal areas of the Makena region.

METHODS

To adequately address the scope of the current inventory survey, specific tasks were undertaken in accordance to standard and accepted archaeological practices and techniques during the survey, testing, and laboratory phases of this project. The tasks included:

1. Background research of previous archaeology
2. Systematic surface survey of project area,
3. Recording of all surface structural remains which are suspected to be historic properties,
4. Subsurface testing through backhoe trenching and or manual controlled excavations as warranted,
5. Laboratory procedures, as required,
6. Synthesis of data,
7. Report write-up, editing, and production, and

The following subsections present the methods employed during each phase of the current undertaking.

Survey Methods

The surface survey consisted of systematic transects throughout the parcel. Survey transects were spaced at 5-10 meter intervals based on visibility due to vegetation density. Newly identified historic properties were documented through photographic records, forms, and site maps. Updated information was performed for previously recorded sites as warranted. Temporary site (TS) designations were assigned to new sites and for previously recorded sites, the existing site numbers from the Bishop Museum were utilized until final SIHP numbers were obtained from SHPD. Sites were located by licensed surveyors Austin, Tsutsumi and Associates and plotted onto the overall map. Function of sites was determined by feature type, architectural construction and by presence/absence of cultural materials retrieved during testing. Site boundaries were partially determined by the surrounding topography and the presence/absence of cultural materials surrounding the features.

The parcel was first surveyed in January of 2001 by Ms. Jenny Pickett, Mr. Ian Bassford (B.A.) under the supervision and direction by Ms. Lisa Rotunno-Hazuka and Mr. Aki Sinoto. Mr. Jeffrey Pantaleo the Principal Investigator. From 2006-2007 the parcel was reassessed on several occasions by Mr. Koa Hodgins (B.A.), Mr. Paul Titchenal (M.A.), Ms. Lisa Rotunno-Hazuka

(B.A.), Mr. Mikele Fager (B.A.), Mr. Aki Sinoto (B.A.) and Mr. Jeffrey Pantaleo (M.A.) Principal Investigator.

Testing Methods

Subsurface testing was undertaken at selected features and included manually excavated, controlled test units, shovel test trenches (STR) as well as shovel test pits/probes (STP) for expedient stratigraphic comparisons, determination of the nature of deposition, and confirmation of presence/absence of subsurface cultural remains. Controlled test excavations were performed in selected sites and excavated by natural stratigraphic layers, in 10 cm levels in strata greater than 10 cm in thickness. All soil from the test excavations was sieved through nested 1/4 and 1/8 inch mesh screens. Midden, artifacts, and other samples were collected and processed at the lab. Profiles were drawn for each unit and soil color and texture determined using the Munsell color system.

During consultation with Ms. Jenny Pickett of the SHPD, backhoe testing in open areas with the potential for soil deposits was highly recommended. Thus, in 2008, eight backhoe test trenches were executed in areas that were devoid of surface sites and or natural bedrock. The trenches were numbered sequentially, and recorded through the use of stratigraphic profiles and photos. Trenches were located on the project area topographic map by GPS format.

Laboratory Methods

All midden, artifacts, and other samples were initially processed by being accessioned, sorted, and cleaned. Then following other pertinent procedures the artifacts were analyzed, catalogued, and photographed; the sorted midden weighed and tabulated, and carbon samples cleaned, dried, and submitted for radiocarbon analyses. All recovered artifacts and samples will be prepared for temporary custodial curation at the Archaeological Services Hawaii laboratory in Wailuku. In addition, all field notes, maps, photographs, and other documentation generated during the course of this project will be reposited at the offices of Archaeological Services Hawaii in Wailuku.

Terminology for Basalt and Volcanic Glass Tools

A flake must contain at least one of three characteristics; bulb of percussion, striking platform and dorsal ridge. Flakes are further classified into primary, secondary and tertiary. The primary flake contains greater than 50% cortex, the secondary flake contains less than 50% cortex and a tertiary flake contains no cortex. It is an inner flake. Shatter is referred to as angular waste created as a by-product during flaking or core reduction. Shatter contains no flake characteristics.

RESULTS OF FIELDWORK

A total of eight sites comprised of 59 features have been identified within the project area (Figures 8 and 9, Table I). SIHP 6371 (Site 218), 6373 (Site 225), 6374 (Site 230 Fe. 1) and 6379 (Site 231) were previously recorded by Cordy during his 1978. Additionally, Feature 2 of Site 6372 (Site 229) and Feature 4 of Site 6374 (Site 242) may have been recorded by Cordy. The remaining sites and features (Site 6371 Feature 1, Site 6376-6378) were documented during the more recent series of investigations cited in earlier sections of this report. Fourteen features of five sites; Site 6371 Features 2 and 3, Site 6372 Features 1, 2.4, 2.6, 2.7; Site 6373 Features 3 and 4, Site 6376 Features 1, 2 and 4, and Site 6379 Features 1-3; underwent subsurface testing through controlled manual excavations. (Table II). Additionally, a series of 8 backhoe trenches were executed in specified localities of the subject parcel with soil deposits (Figure 10 and Table III). These results are described below.

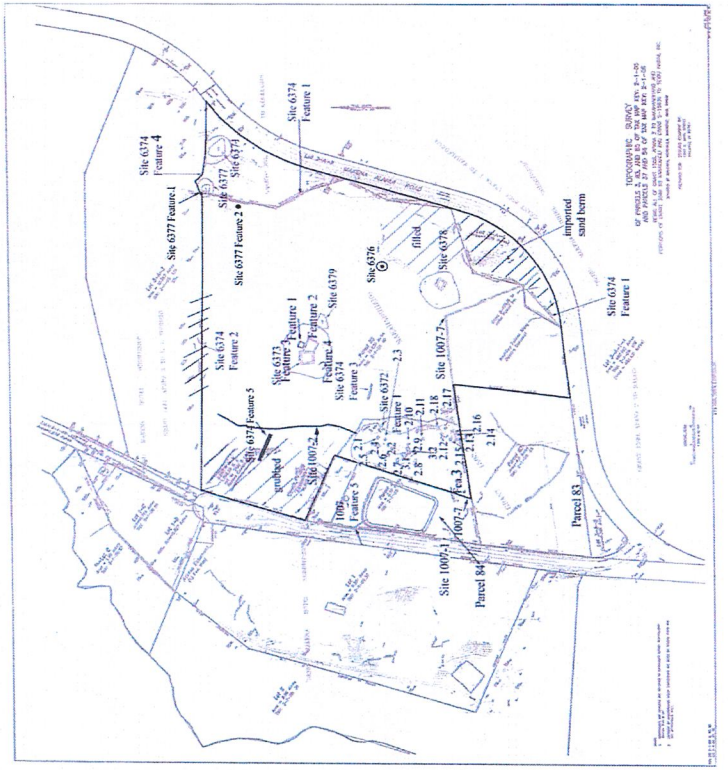


Figure 8. Plan View Map of Project Area Showing Sites 50-50-14-6371-6374, and 6376-6379

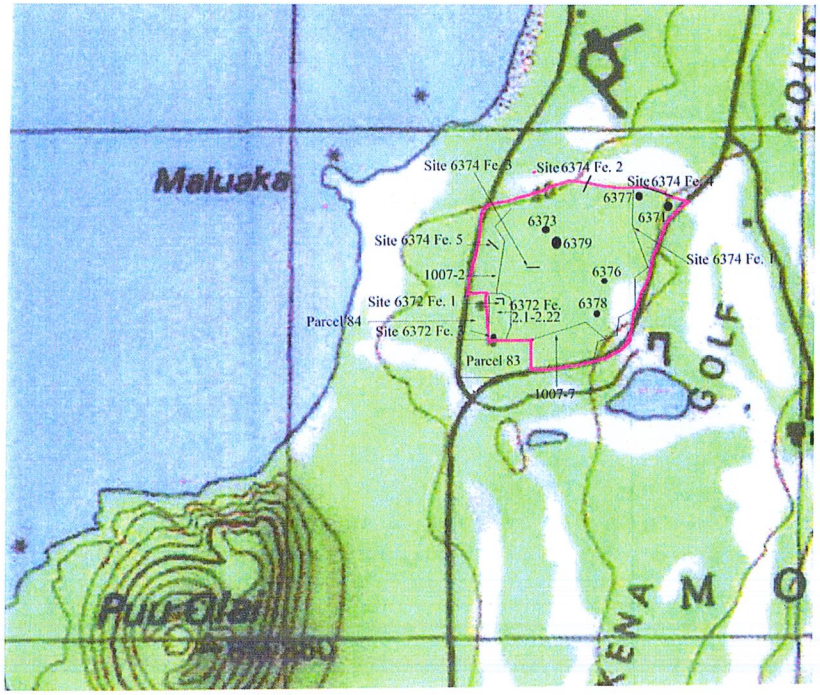


Figure 9. Location of Historic Properties on USGS 50-50-14-6371-6474 and 6476-6379

Table I. Summary of Archaeological Sites

SIHP#	Temporary Site#	Description of Features from Current Survey	Total # Features	Formal Site Type and Age	SIGNIFICANCE
6371	50-Ma-B8-218	Modified Outcrop Enclosure Fe. 1	1	Perm.Pre-Contact Habitation with Ag.	D
		Circular Walled Pit Fe. 2	1		
		Circular Walled Pit Fe. 3	1		
		Circular Walled Pit Fe. 4	1		
		Circular Walled Pit Fe. 5	1		
		Alignment Fe. 6	1		
6372		Historic House Site Fe. 1	1	Perm.Historic Habitation with Ag.	D
		Oval Rock Clearing Mounds (n=22) Fe2.1-2.22	22		
	50-Ma-B8 229-2	Refuse Deposit Fe. 3	1		
6373	50-Ma-B8-225	(Complex) Platform Fe.1	1	Perm.Pre-Contact Habitation with Ag.	C, D
		Enclosure Fe. 2	1		
		Enclosure Fe. 3	1		
		C-shape Fe.4	1		
		V-shaped Wall Fe. 5	1		
		Alignment Fe. 6	1		
		Remnant Wall Fe. 7	1		
		Depression Fe. 8	1		
6374	50-Ma-B8-230	Wall Around Project Area Fe.1	1	Historic Boundary Wall Remnant	D
		Wall Segment Fe. 2	1	Historic Ranching Wall Remnant	
		Wall Segment Fe. 3	1	Historic Ranching Wall Remnant	
	50-Ma-B8-242	Wall Segment Fe. 4	1	Historic Ranching Wall Remnant	
		Modified Outcrop Wall Remnant Fe. 5	1	Historic/Modern Ranching Wall Rem.	
6376		Modified Outcrop Wall Fe. 1	1	Temp. Pre-Contact Habitation with Ag	D
		Modified Outcrop U-Shape Enc. Fe. 2	1		
		Modified Outcrop Poss. Cupboards Fe. 3.1-3.4	4		
		Modified Outcrop Alignment and Soil Fe. 4	1		
6377		U-Shaped Enclosure with Wall Segment Fe. 1	1	Temp.Pre-Contact Habitation with Ag.	D
		Circular Walled Pit Fe. 2	1		
6378		Pre-Contact Square Enclosure Fe. 1	1	Perm.Pre-Contact Habitation with Ag.	C, D
		Walled Pits/Depressions Fe. 2.1-2.2	2		
		Cupboard Fe. 3	1		
6379	50-Ma-B8-231	Modified Outcrop Pavement Fe. 1	1	Temp.Pre-Contact Habitation with Ag.	C, D
		Modified Outcrop Enclosure Fe. 2	1		
		Modified Outcrop L-shaped Fe. 3	1		
8 Sites			59 Fe.		

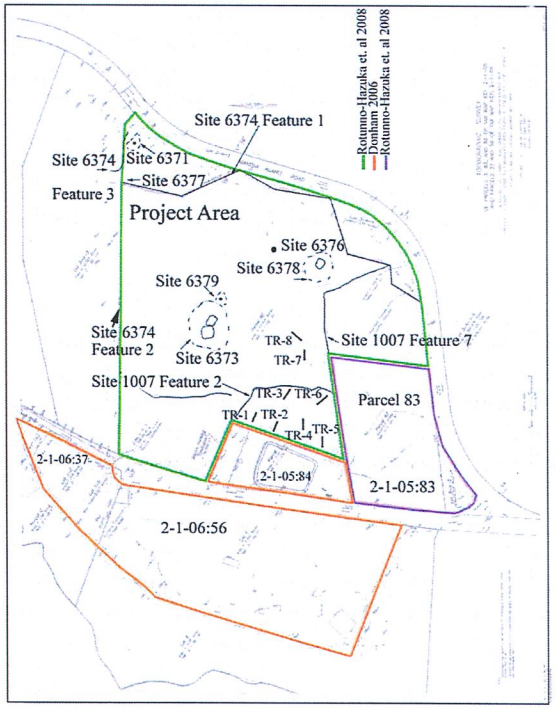


Figure 10. Project Area Map Showing Location of Backhoe Trenches 1-8 and Archaeological Sites

Table II. Summary of Testing Results at the Archaeological Sites

SHP#	Temporary Site#	Description of Features from Current Survey	TESTING	CULTURAL
6371	50-Ma-B8-218	Modified Outcrop Enclosure Fe. 1		
		Circular Walled Pit Fe. 2	ASH .50 m by .50 m	YES
		Circular Walled Pit Fe. 3	ASH .50 m by.50 m	YES
		Circular Walled Pit Fe. 4		
		Circular Walled Pit Fe. 5		
		Alignment Fe. 6		
6372	50-Ma-B8-229-2	Historic House Site Fe. 1	ASH 2-.30 by .30 m	NO
		Oval Rock Clearing Mounds (n=15) Fe2.1-2.22	ASH 3- 1.00 m by 1.00	NO
		Refuse Deposit Fe. 3		
6373	50-Ma-B8-225	(Complex) Platform Fe.1	CORDY 1.0 m by 1.0 m	YES
		Enclosure Fe. 2	CORDY 1.0 m by 1.00 ASH 1.00 m by.50 m	YES
		Enclosure Fe. 3	ASH .50 m by.50 m	YES
		C-shape Fe.4		
		V-shaped Wall Fe. 5		
		Alignment Fe. 6		
		Remnant Wall Fe. 7		
		Depression Fe. 8		
6374	50-Ma-B8-230	Wall Around Project Area Fe.1		
		Wall Segment Fe. 2		
		Wall Segment Fe. 3		
	50-Ma-B8-242	Wall Segment Fe. 4		
		Modified Outcrop Wall Remnant Fe. 5		
6376		Modified Outcrop Wall Fe. 1	ASH ST 1-8 (.25 m by .25 m)	NO
		Modified Outcrop U-Shape Enc. Fe. 2	ASH 1.00m by .50 m 1.50 by 1.00/ST 15-17	YES/NO
		Modified Outcrop Poss. Cupboards Fe. 3.1-3.4		
		Modified Outcrop Alignment and Soil Fe. 4	ASH 1.00 m by .50 m	NO
6377		U-Shaped Enclosure with Wall Segment Fe. 1		
		Circular Walled Pit Fe. 2		
6378		Pre-Contact Square Enclosure Fe. 1		
		Walled Pits/Depressions Fe. 2.1-2.2		
		Cupboard Fe. 3		
6379	50-Ma-B8-231	Modified Outcrop Pavement Fe. 1	ASH 2.0 m by 1.0 and 1.0 m by 1.0 m	YES
		Modified Outcrop Enclosure Fe. 2	ASH 1.0 m by 1.0 m	YES
		Modified Outcrop L-shaped Fe. 3	ASH 1.50 m by 1.0 m and 1.0 m by .50 m	YES
8 Sites		59 Features		

BACKHOE TRENCH TESTING

A walk-through assessment to determine potential trench placement localities within the project area revealed that the majority of the property consisted of exposed *a`a* flows and basalt bedrock outcrops, unsuitable for trench testing. Thus, a series of eight test trenches were located in the western portion of Parcel H-2 near Sites 6372 where limited soil areas are present among bedrock outcroppings (Figure 10). Trenches were excavated by Goodfellow Brothers Incorporated utilizing a tracked excavator with a 1 meter wide bucket. No subsurface cultural materials and or architecture were encountered during the course of the trenching procedure. Table III presents a summary of the backhoe trenches.

Test Trench 1

Trench 1 was located approximately 30 meters southeast of the southeastern corner of the public beach parking lot on Old Makena Road (Figure 10) and immediately east of the boundary between parcels 3 and 85. Trench 1, oriented on a magnetic bearing of 281°, was 9.0 m long by 1.0 m wide by .43 m deep before encountering basalt bedrock. Figure 11 provides a representative profile of the two soil layers identified in Trench 1. Layer I, around 8 cm in thickness, contained loose dark brown (10YR 3/3) silty loam with a few small to medium sized roots. The base of this layer was distinct and nearly level. Layer II soils consisted of slightly compact, strong brown (7.5YR 4/6) silt with small to medium roots continuing from the overlying layer. Layer II soils reached a maximum depth of 0.43 mbs. Angular basalt cobbles occurred in an irregular transition between Layer II soils and the underlying basalt bedrock (see Figure 9).

Test Trench 2

Trench 2 was located approximately 20 meters south of Trench 1(see Figure 10). Trench 2, oriented on a magnetic bearing of 300°, was 9.0 m long by 1.0 m wide by 0.74 m deep (Table II). Layer I, averaging about 14 cm in thickness, consisted of loose brown (10YR 5/3) coral sand with a few small to medium sized roots. The base of this layer was very distinct and nearly level (Figure 11). Layer II, about 6cm thick, contained loose dark reddish brown (5YR 3/2) silt with small to medium roots. The base of this layer was distinct and undulated slightly. Layer III extended to a maximum depth of 0.74 mbs and consisted of slightly compact dark brown (7.5YR 3/4) silt. An abrupt, irregular transition occurred between this layer and the underlying basalt bedrock (see Figure 11).

Test Trench 3

Trench 3 was located approximately 20 meters east of Trench 2 (see Figure 10). Trench 3, oriented along a magnetic bearing of 284°, was 10.0 m long by 1.0 m wide by 0.52 m deep before encountering bedrock. Layer I, averaging 8 cm in thickness, was comprised of loose brown (10YR 5/3) coral sand with a few small to medium sized roots (Figure 11). The base of this layer was distinct and nearly level. Layer II, a narrow band averaging about 4 cm in thickness, contained loose dark reddish brown (5YR 3/2) silt with continuing small to medium roots and rootlets. The top and base of this layer are generally parallel. Layer III, which extended to an irregular surface of basalt bedrock at a maximum depth of 0.52 mbs consisted of slightly compact dark brown (7.5YR 3/4) silt with a few medium roots.

Test Trench 4

Trench 4 was located about 40 m southwest of Trench 3. (see Figure 10). This trench, oriented on a magnetic bearing of 244°, was 9.0 m long by 1.0 m wide by 1.35 m deep (Figure 11). Layer I consisted of loose brown (10YR 5/3) coral sand extending to a depth of about 24 cm. The base of this layer was distinct and nearly level (Figure 9). Small to medium roots continued from the surface into Layer II. Layer II, averaging about 40 cm in thickness, was comprised of loose dark reddish brown (5YR 3/2) silt. The base of this layer formed a very distinct, slightly undulating boundary with Layer III which was composed of loose, bedded, black (2.5Y 2.5/1) volcanic cinder. Layer IV, composed of slightly compact yellowish-brown (10YR 5/6) gritty silt, formed very distinct lenses and layers within the black volcanic cinder of Layer III. Layer V was composed entirely of bedded *a`a* clinkers and gravels. Layers III, IV, and V probably represent discrete episodes of ejected deposition from the eruption of the nearby cinder cone, Pu`u Ola`i.

Test Trench 5

Trench 5 paralleled the north side of a stacked rock wall about 15 m southeast of Trench 4 (see Figure 8). This trench, oriented on a magnetic bearing of 256°, was 11.0 m long by 1.15 m wide by .96 m deep (Figure 12). Layer I was comprised of loose brown (10YR 5/3) coral sand extending about 20 cmbs to a clear, abrupt, nearly level base boundary. Layer II, a loose, dark reddish brown 5YR 3/2) silt, averaging about 40 cm in thickness, exhibited clear, smooth, nearly parallel boundaries. Some small and medium roots continued into Layer II. Layers III and IV were alternating, undulating layers and lenses of loose black (2.5YR 2.5/1) volcanic cinder; and a slightly compact yellowish brown (10YR 5/6) gritty silt, separated by clear smooth boundaries.

Layer III soils (black cinder) lay directly on top of an irregular surface of basalt bedrock at an average depth of about 90 cmbs.

Test Trench 6

Trench 6 was located about 40 m northeast of Trench 5 and about 10 m east of a north trending, staked rock wall (Site 1007 Feature 2) which separates fairly uniform soil areas with intermittent outcrops of basalt west of the wall, and occasional small pockets of soil amid primarily basalt outcrops and flows east of the wall (see Figure 10). Oriented on a magnetic bearing of 330°, Trench 6 was 5.0 m long by 2.0 m wide by .80 m deep (Figure 12). Layer I, composed primarily of loose detritus extended 2 to 4 cmbs. Layer II, loose, dark reddish brown (5YR 3/2) silt with a few small to medium roots, exhibited a clear, gently slopping basal boundary 40 to 45 cmbs. Layers III and IV were, as in Trenches 4 and 5, alternating deposits of black (2.5Y 2.5/1) volcanic cinder; and slightly compact yellowish brown (10YR 5/6) gritty silt, overlying an irregular surface of basalt bedrock 60 to 80 cmbs.

Trench 7

Trench 7 was located in a pocket of soil, surround by outcrops about 30 m southeast of Trench 6 (see Figure 10). This trench, oriented on a magnetic bearing of 90°, was 7.0 m long by 1.0 m wide by .54 m deep (Figure 12). A layer composed primarily of detritus extended about 4 cmbs. Layer II was composed of loose, dark yellowish brown (10YR 3/6) silt with loosely bedded volcanic clinkers overlying an irregular surface of basalt bedrock about 40 to 50 cmbs. A few small roots extended into the upper 15 cm of Layer II.

Trench 8

Trench 8 was located in a pocket of soil between basalt bedrock outcrops about 15 m north of Trench 7 (see Figure 10). Trench 8, oriented on a magnetic bearing of 300°, was 7.0 m long by 1.0 m wide by .65 m deep. Layer I consisted of detritus extending to a depth of about 3 cmbs (Figure 12). Layer II consisted of loose, dark yellow brown (10YR 3/6) silt forming a clear undulating boundary with Layer III at about 55 cmbs. Layer III was composed of loose, dark reddish brown (5YR 2.5/2) volcanic cinder overlying a sloping surface of fractured bedrock 55 to 65 cmbs.

Table III. Summary of Backhoe Trenching

BACKHOE TRENCH #	DIMENSIONS	LAYERS	CULTURAL
1	9.0 m by 1.0 m by .43 m	2	NONE
2	9.0 m by 1.0 m by .74 m	3	NONE
3	10.0 m by 1.0 m by .52 m	3	NONE
4	9.0 m by 1.0 m by 1.35 m	5	NONE
5	11.0 m by 1.15 m by .96 m	4	NONE
6	5.0 m by 2.0 m by .80 m	4	NONE
7	7.0 m by 1.0 m by .54 m	2	NONE
8	9.0 m by 1.0 m by .65 m	3	NONE

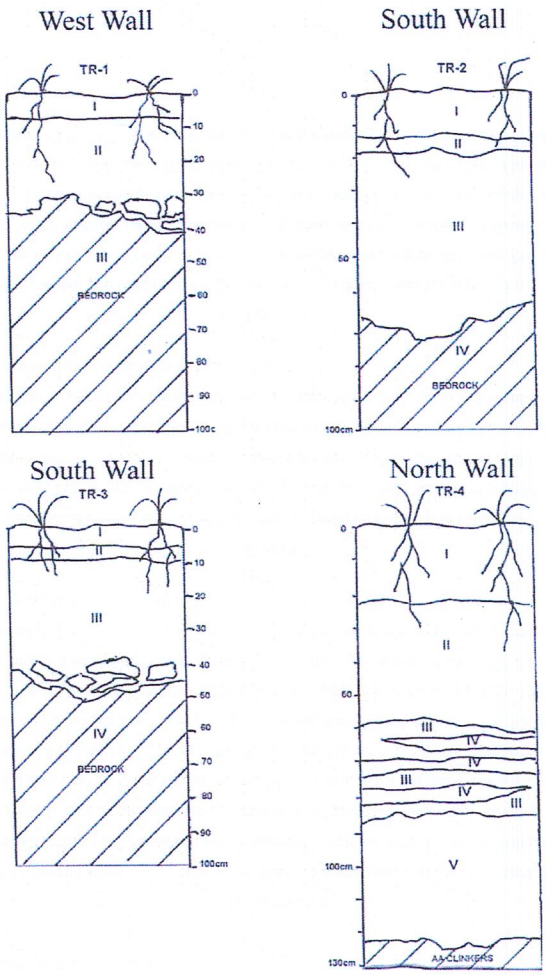


Figure 11. Stratigraphic Profiles of Trenches 1-4

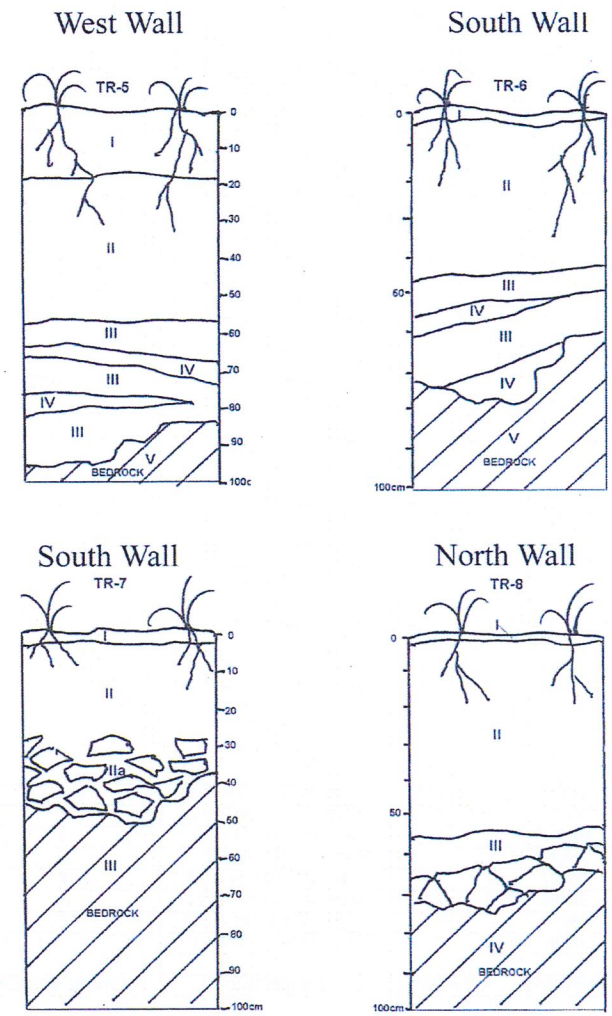


Figure 12. Stratigraphic Profiles of Trenches 5-8

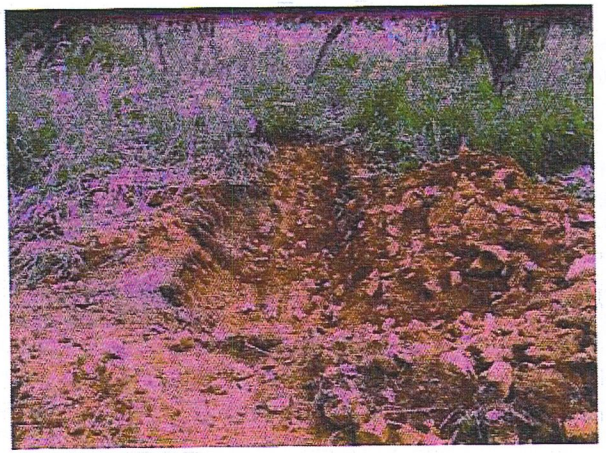


Figure 13. (Top) Photograph of Trench 5, View to West
(Bottom) Photograph of Trench 7, View to East

Figure 14. (Top) Photograph of Trench 1, View to West
(Bottom) Photograph of Trench 8, View to Southwest

Overview of Sites

The surface survey of this parcel revealed several historic properties from both the pre-Contact (SIHP 50-50-14-6371, 6373, 6376-79) and historic periods (SIHP 6372, 6374). The age of Feature 5 Site 6374, a marginally modified outcrop, maybe modern. Historic period sites consist of habitation dwellings associated with rock mounds, alignments, boundary walls and historic period refuse deposits. Native Hawaiian sites were comprised of three large complexes (SIHP 6371, 6373 and 6378) consisting of enclosures, C-shapes, platforms, alignments, walled pits and cupboards, as well as three smaller sites, Sites 6376, 6377 and 6379 primarily composed of modified outcrops. The large archaeological complexes within the parcel were Site 6378 situated near the southeastern corner, Site 6371 in the northeast corner and Site 6373 located near the center of the parcel. The smaller sites were all identified near the large complexes. Site 6376 is situated in the southeast corner north of Site 6378, Site 6377 is along the northern boundary line by Site 6371 and Site 6379 is located just east of Site 6373 within the center of the project area. The post-contact features were situated along the western edge of the parcel.

The sites were all significant under Criterion D, and several (Sites 6373, 6378 and 6379) were considered good examples of site types and therefore significant under Criterion C as well (Table IV). All historic properties are described in the following sections.

PREVIOUSLY RECORDED SITES

Four to six (Site 229 and 242 remain problematic due to locational discrepancies) of the sites; Sites 218, 225, 230, and 231 previously recorded by Cordy during his 1978 survey, were still extent within the current project area (Figures 5 and 7, Table I). These historic properties have been assigned permanent state site numbers; SIHP 6371 for Site 218; SIHP 6373 for Site 225; SIHP 6372 for Site 229-2; SIHP 6374-1 for Site 230, and SIHP 6374-4 for Site 242, and SIHP 6379 for Site 231

Site Descriptions

The following paragraphs begin with a summary of Cordy's work for each site, followed by the results of the current survey. Cordy's interpretations and temporal assessments of each site are also presented in the summary and were based on several sets of criteria which were discussed in detail under the previously archaeology section.

Table IV. Summary of Historic Properties and Initial Significance

SIHP#	Description of Features from Current Survey	Formal Site Type and Age	SIGNIFICANCE
6371	Modified Outcrop Enclosure Fe. 1	Pre-Contact Permanent Habitation with Agricultural	D
	Circular Walled Pit Fe. 2		
	Circular Walled Pit Fe. 3		
	Circular Walled Pit Fe. 4		
	Circular Walled Pit Fe. 5		
	Alignment Fe. 6		
6372	Historic House Site Fe. 1	Historic Permanent Habitation with Agricultural	D
	Oval Rock Clearing Mounds (n=15) Fe2.1-2.22		
	Refuse Deposit Fe. 3		
6373	(Complex) Platform Fe.1	Pre-Contact Permanent Habitation with Agricultural	C, D
	Enclosure Fe. 2		
	Enclosure Fe. 3		
	C-shape Fe.4		
	V-shaped Wall Fe. 5		
	Alignment Fe. 6		
	Remnant Wall Fe. 7		
	Depression Fe. 8		
6374	Wall Around Project Area Fe.1	Historic and Ranching Boundary Walls and Animal Husbandry	D
	Wall Segment Fe. 2		
	Wall Segment Fe. 3		
	Wall Segment Fe. 4		
	Modified Outcrop Wall Remnant Fe. 5	Recent (Former Stable Area) Animal Husbandry	
6376	Modified Outcrop Wall Fe. 1	Pre-Contact Temporary Habitation with Agricultural	D
	Modified Outcrop U-Shape Enc. Fe. 2		
	Modified Outcrop Poss. Cupboards Fe. 3.1-3.4		
	Modified Outcrop Alignment and Soil Fe. 4		
6377	U-Shaped Enclosure with Wall Segment Fe. 1	Pre-Contact Temporary Habitation with Agricultural	D
	Circular Walled Pit Fe. 2		
6378	Pre-Contact Square Enclosure Fe.1	Pre-Contact Permanent Habitation with Agricultural	C, D
	Walled Pits/Depressions Fe. 2.1-2.2		
	Cupboard Fe. 3		
6379	Modified Outcrop Pavement Fe. 1	Pre-Contact Temporary Habitation with Agricultural	C, D
	Modified Outcrop Enclosure Fe. 2		
	Modified Outcrop L-shaped Fe. 3		
Total	59 Features	8 Sites	

SITE 50-50-14-6371 (formerly Site 218)

Previous Site Description

Site 50-Ma-B8-218

This site was described by Cordy as follows:

> Platform and Five Walled Pits
> Immediately north of Site 217, the platform incorporates the natural, bare rock of the surface. It measures 7.3 by 5.8 meters (342 sq.m), and 1.0 meter high. A small cavity is in the north wall of the platform (Figure 15). Five faced or low-walled pits are near the platform, and two abut it. These pits are very similar—3.0 to 3.8 meters in diameter, 0.6 meter deep inside, 0.6 to 0.7 meter high outside, with sparse soil inside. No midden was visible at this site, and no excavation was done (Cordy 1978:74).

Cordy interpreted Site 218 as a permanent pre-Contact house site with agricultural sites.

This site is composed of a platform for a sleeping house, and the walled pits [are presumed to be the agricultural function.] Cordy stated that he had a difficult time assigning a function of sleep house to the platform as it is an enclosure with a very rocky undulating surface.

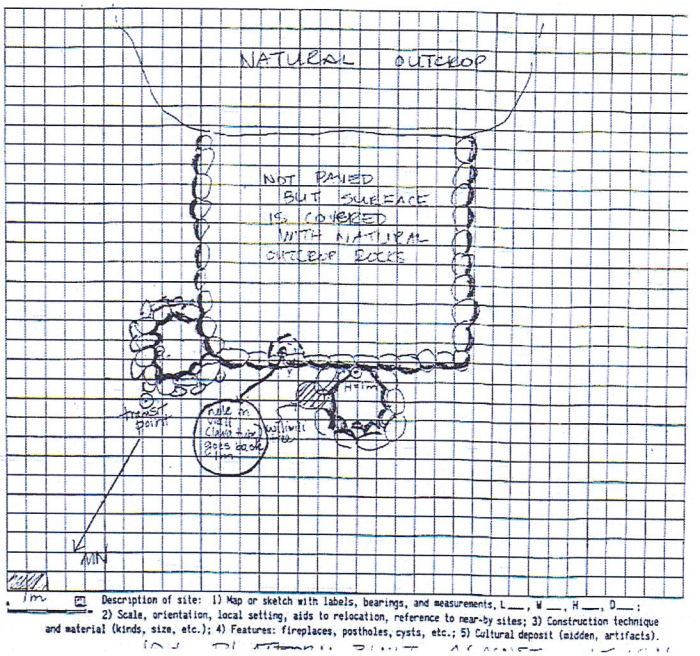


Figure 15. Plan View Sketch of Site 218 (Cordy 1978)

Current Site Description

Site 50-50-14-6371 is situated in the NE corner of the project area near Makena-Alanui Road. The site straddles the northern property line and extends into the adjoining golf course parcel (See Figure 8). Cordy recorded the site as a platform with five faced pits in close proximity, two of which abut the platform. During the current reassessment, four walled pits (Features 2-5) were identified near Feature 1. Another walled pit is approximately 60 meters east of this site and has been incorporated into Site 6377. Site 6371 is now comprised of six features consisting of the platform/enclosure (Feature 1), circular walled pits (Features 2-5) and an L-shaped alignment (Feature 6). Site 6371 occupies an area measuring 21.0 m long by 20 m wide area and is bounded by Site 6374 Feature 4 a low wavy wall.

Feature 1

Feature 1, appears as an enclosure which has been created by modifying the natural bedrock outcrop on the upslope side, and a lava flow on the down slope side (Figures 16 and 17). Specifically, this main feature (Feature 1) is comprised of two parallel terraces which are somewhat connected at their termini by piled rock wall alignments to form an enclosure. The southern most terrace located just upslope of the smaller one, measures 12.5 m long by 9.4 m wide. It is composed primarily of natural bedrock and small boulders that forms a ledge measuring 1.0 m high. A small lava tube, designated Feature 1a was observed in the northwest corner of the terrace ledge. It measures approximately 0.8 m long by 0.5 m wide by .35 m deep and was likely utilized for storage. The other terrace is located to the north of the bedrock terrace and it measures 7.5 m long by 4.0 m wide. It is irregular in shape and is composed of small to large basalt cobbles and boulders stacked three to five courses high to a maximum height of 0.90 m. A small lava tube, designated Feature 1b was observed at the northeast corner of this terrace. Feature 1b measures 1.2 m long by 0.5 m wide by .40 m deep and was probably utilized for storage. Feature 1 has a rocky interior surface that is somewhat level but not paved. Adjacent to the northeast and northwest corners of Feature 1, as well as to the southeast of the enclosure are circular walled pits (Features 2-5). These walled pits are not deeply intrusive into the ground, rather they are small circular walls built into the natural depressions of the bedrock that encircle a rocky soil area. Cordy recorded five faced pits that were in close proximity to the main feature, two of which abut the structure. However during this survey only four walled pits (Features 2-5) were identified near Feature 1; another walled pit is approximately 60 meters east of Site 6371 and has been incorporated into Site 6377.

Feature 2

Feature 2 is the southern most pit and is a well constructed circular enclosure. The walls are wide and constructed of subangular cobbles that are stacked 2-6 courses high measuring 1.0 m thick and .50m high on the interior and up to .70 m high along the exterior. Feature 2 has an interior soil area that is approximately 1.6 m in diameter. A dozer push pile butts up against the eastern side of this enclosure. Feature 2 was tested along with Feature 3 and the results are presented within the testing section below.

Feature 3

Feature 3 is an oval shaped walled pit located on the northeast side of Feature 1. It measures 2.0 m long (n/s) by 1.0 m wide and ranged in height along the interior from .40-.65 m. The walls are

from .30-.50 m wide and stacked 3-4 courses. Features 3-5 are contiguous to each other and abut Feature 1.

Feature 4

Feature 4 is near Feature 3 and is situated along the northwest corner of Feature 1. This feature is disturbed and not completely enclosed along its northern side. The interior height of Feature 4 ranges from .30-.90 m and would have had a diameter of about 3.0 meters. Currently, a *Na wiliwili* tree is growing out of the pit (Figure 16).

Feature 5

Feature 5 is located in between Features 3 and 4 and is an oval shaped walled pit. It has also been disturbed along its northern side from pushed rocks and tree fall. This disturbance is presumably from the golf course construction (recall this site was not slated for preservation during Cordy's survey, thus the golf course construction commenced). The feature measures 3.0 m long (nw/se) by 1.0 m wide and ranges in height from .30-.80 m.

Feature 6

Feature 6 is an L-shaped remnant alignment located north and adjacent to Feature 4. This Feature has also been disturbed by pushed rocks and tree fall as it is only a remnant feature. The interior is faced and similar to the interior of the walled pits. Feature 6 measures 1.0 m long by .50 m wide (Figure 18).

Figure 16. Photograph of Site 6371 Feature 1 To South, Feature 1a to left of Na wiliwili tree, Features 4 and 5 in Foreground

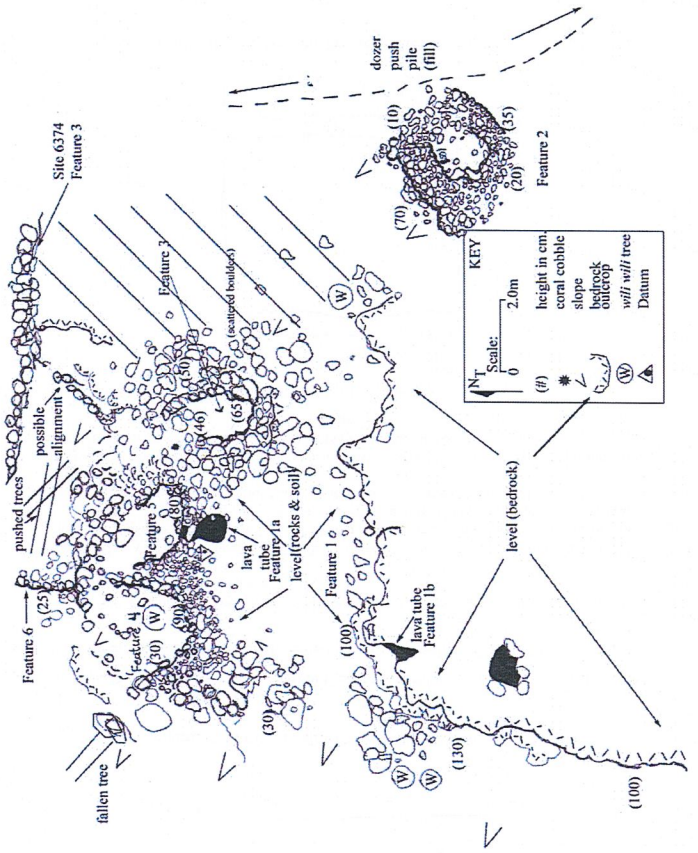


Figure 17. Plan View Map of Site 6371 Features 1-6

Figure 18. Photograph of Site 6371 Feature 6 Alignment, View to South

TESTING

Features 2 and 3

No excavations were performed in the platform (Feature 1) during the current survey, however two of the pit features (2 & 3) were selected for testing. A 0.25 sq.m test unit was excavated in the interior soil area of Feature 2 to determine the presence/absence of any sub-surface cultural remains and possible function.

Two stratigraphic layers (Layers I and II) were revealed during excavation (Figure 19):

Layer I (0-10 cmbs) is a dark yellowish-brown (10YR 4/4), non-sticky, non-plastic, very fine-grain, silt loam with abundant roots, rootlets, and rocks.

Layer II (10-22 cmbs) is a brown (10YR 4/3), non-sticky, non-plastic, very fine-grain, powdery silt with abundant rocks. Cultural material included marine shell (*Cyprea* sp. 8.0g ; *Conidae* sp. 7.1g; *Thaididae drupa*, .5g and *Nerita picea*, 4.9g) and 2 pieces of coral (*porites sp.*) and 7 pieces of basalt shatter and 2 pieces of volcanic glass debitage. Excavations were terminated at 22 cmbs when outcrop was encountered.

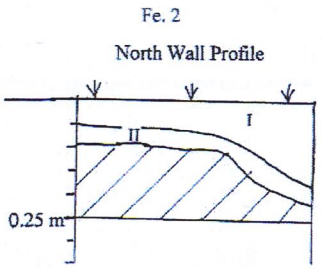


Figure 19. Stratigraphic Profiles of Site 6371 Feature 2

A 0.25 sq. m test unit (TU1) was excavated in the interior soil area of Feature 3. Three stratigraphic layers (Layers I-III) were revealed during excavation (Figure 20):

Layer I (0-5 cmbs) is a very dark gray brown (10YR 3/2), non-sticky, non-plastic, fine-grain, silt loam with abundant roots and rootlets and rocks.

Layer II (6-43 cmbs) is a black (10YR 2/1), non-sticky, non-plastic, very fine-grain, silt with abundant roots and rootlets and rocks. Cultural material, including marine shell (*Nerita picea*, .3g; *Conidae* sp., 2.5g; *Thaididae* sp.,.6g; and unidentified burnt shell, 3.0g) and 5 pcs. of coral was recovered in Layer II. Excavations were terminated at 50 cmbs in Layer III.

Layer III (44-50 cmbs) is a dark yellowish-brown (10YR 4/6), non-sticky, non-plastic, crumbly, fine-grain sterile silt with moderate amounts of rootlets and rocks.

Feature 3

NORTH WALL PROFILE

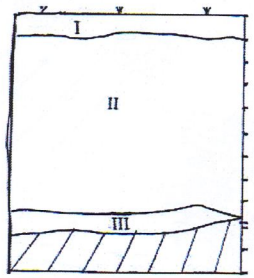


Figure 20. Stratigraphic Profile of Site 6371 Feature 3

DISCUSSION OF SITE 6371

Site 6371 may be a temporary habitation site and the circular walled pits would have been utilized for agricultural purposes. It is composed of a primary feature, Feature 1, surrounded by smaller, ancillary structures (Features 2-6). Although the function of Feature 1 is still inconclusive, the recovered cultural materials and site type or architectural classification of Features 2 and 3, clearly represents and agricultural function. Site 6371 may have been part of a larger complex, perhaps Site 6377 (the U-shaped enclosure and walled pit) located approximately 45 meters west of this site, but such association is difficult to determine.

As previously discussed, Cordy postulated a set of criteria in which to categorized the documented features and or sites. Based on his classification system, Site 6371 (Site 218) was interpreted a permanent pre-Contact house site with agricultural features. The size of the interior floor and exterior floor area were the determining factors of permanence, and this hypothesis could have been further supported if multiple cultural layers and or additional permanent features were documented at the site. Based on the information collected to date, this site appears to have been intermittently occupied, although Feature 1 was not tested. Future excavations if they are to occur within this site should be undertaken at Feature 1 to determine its function and age. Although the previous surveys did not recommend preservation of Site 6371, the landowner has re-designed the development to avoid this historic property. Thus Site 6371 Features 1-6 will be preserved within the proposed development.

SITE 50-50-14-6372 (formerly Site 229)

Previous Site Description

Site 50-Ma-B8-229

Cordy described this site as follows:

> Midden Scatter and Wooden Shack
> This is a very large area on the sand flat around the 18th tee, extending north along the road. The area around the collapsed wooden shack (229-1) of recent vintage is strewn with midden and artifacts (229-2). Surface collection was made (Cordy 1978:76).

This site was interpreted by Cordy as a permanent historic house site that was probably utilized in the mid to late 1900's (Cordy 1978:48).

Current Site Description

During the current undertaking, pieces of milled lumber in association with corrugated metal roofing (Feature 1) was observed upon a flat outcrop within a silty, sandy area (Figure 21). This area was originally thought to be the wooden shack that Cordy recorded. However, based on comparative analysis of location maps, the wooden shack (Site 229-1) appears to have been located further north, thus Feature 1 of Site 6372 may not represent the same wooden shack feature (229-1). For Site 229, Cordy also recorded a large midden and artifact scatter, Site 229-2, (see Fig. 5, dashed black line *mauka* of Makena-Keone`o`io Road) which may be in the vicinity of the recently recorded refuse scatter designated Feature 3 of Site 6372 (Figures 8 and 22). Cordy's midden and artifact scatter dated to the 1940's-1950's and 1965-1970's, and contained the diagnostic maker's mark, Owens-Duraglas (no other historic scatters contained Owens-Duraglas in Cordy's study area). Documentation of Feature 3 at Site 6372 contained bottle glass, ceramics, and metal. The scatter yielded diagnostics from this scatter were crown cap beer bottles including those with Owens-Duraglas maker's mark. Based on the presence of similar historic artifacts, and the location of Site 229-2 compared with Feature 3, these scatters may represent the same feature.

Site 6372 is located along the western boundary line and measures 131.0 m long n/s by 61 m wide (Figure 22). It is comprised of Feature 1, the lumber and metal roofing, in association with several oval-shaped rock mounds/piles (Features 2.1-2.22), and a refuse scatter (Feature 3). Features 1-3 of Site 6372 occur within a rectangular area enclosed by free-standing walls (recorded as Site 1007 Feature 2 by Donham (2006).

Feature 1

Feature 1 is the collapsed remnants of a wooden structure located in the west central portion of the project area. The remnants measures 8.0 m long (e/w) by 7.0 m wide (n/s) and is comprised of a few pieces of weathered and deteriorating lumber associated with corrugated metal roofing dispersed upon an outcrop (Figures 21-22). A rusted metal barrel was observed on a level soil area, approximately 10 m to the northwest of the structure. Feature 1 is situated near the interior corner of an enclosure (Site 1007-2). Testing through shovel test pits (STP) was conducted along the perimeter of Feature 1. Vegetation in the area consists of *koa haole*, *Panini* cactus, and grass.

Figure 21. Photograph of Site 6372 Feature 1, View to South

Features 2.1-2.22

Feature 2 consists of twenty-two circular rock mounds or piles which are situated to the south, east and west of Feature 1 (Figures 23-29). These rock piles are associated with cleared ground surface areas. Features 2.1-2.22, range in size from 1.0-3.0 m in diameter, constructed of piled cobbles and small boulders, and .20-.45 m in height above the surrounding surface of silt and wind-blown coral sand, and occasional bedrock. Some mounds are situated upon bedrock outcrops, again suggesting the piles have resulted from clearing the soil areas for agriculture. This is a common practice even today among farmers.

Three of the rock piles, Features 2.4, 2.6 and 2.7, were tested to determine presence/absence of cultural materials, and to assess construction. No cultural materials were recovered during the excavations, and all rock mounds were made by stacking or piling stones and boulders, with no formal faces and or courses.

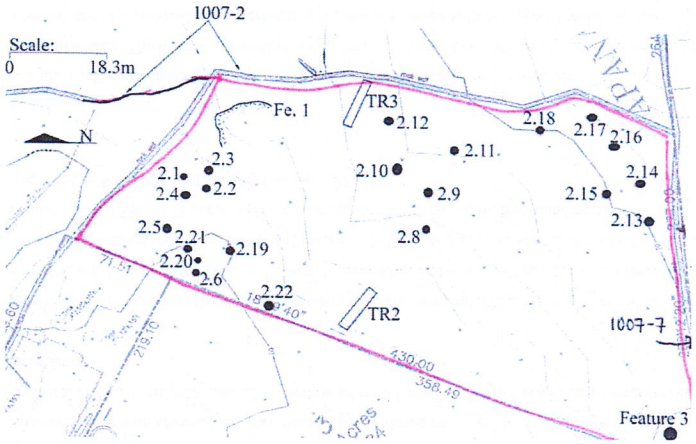


Figure 22. Plan View Map of Site 50-50-14-6372

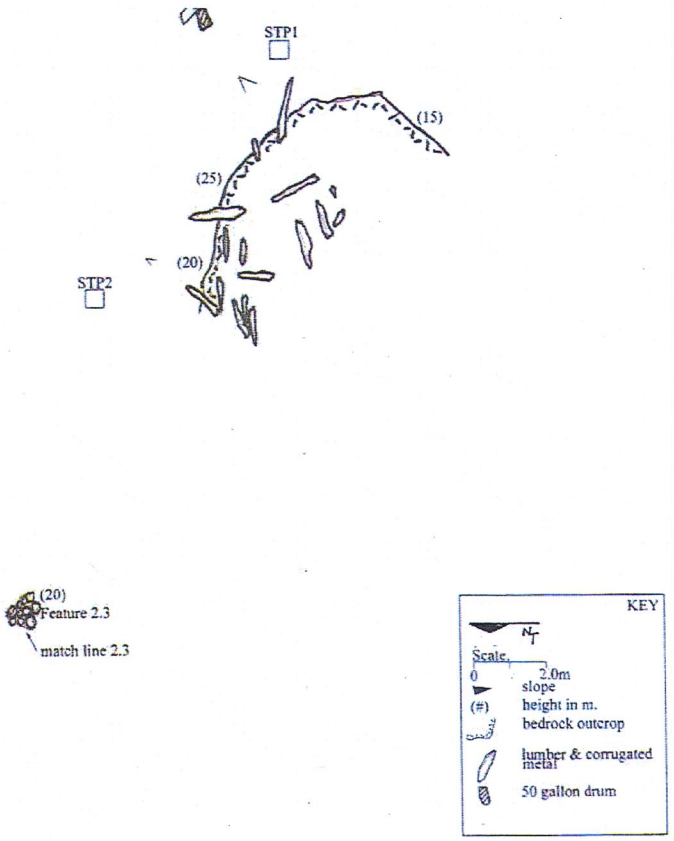


Figure 23. Plan View Map of Site 6372 Feature 1 and Rock Mound-Feature 2. 3

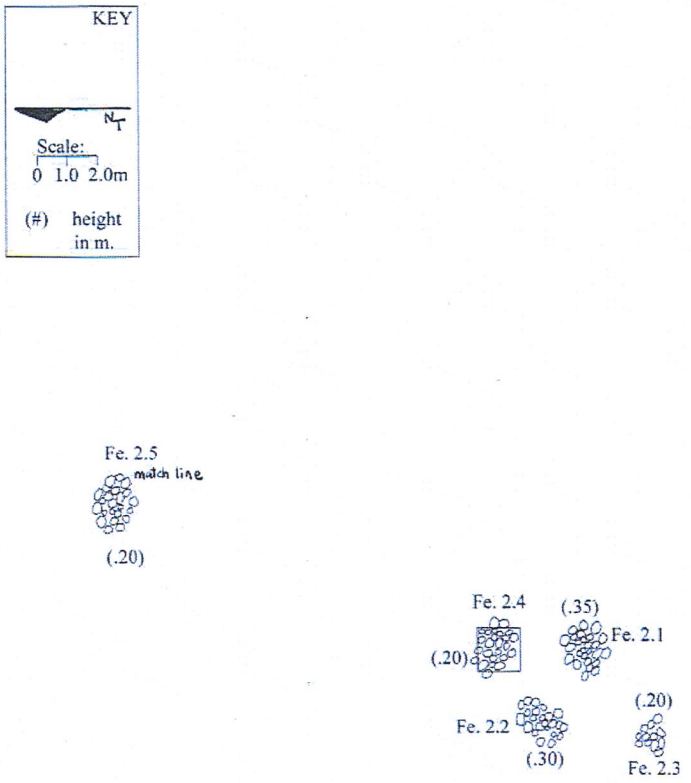


Figure 24. Plan View Map of Site 6372 Features 2.1-2.5

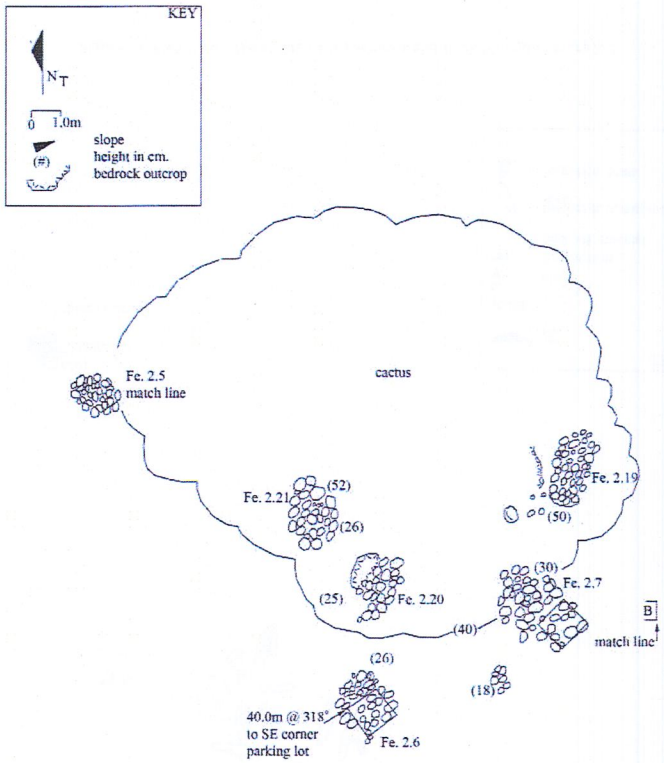


Figure 25. Plan View Map of Site 6372 Features 2.5-2.7, 2.19-2.21

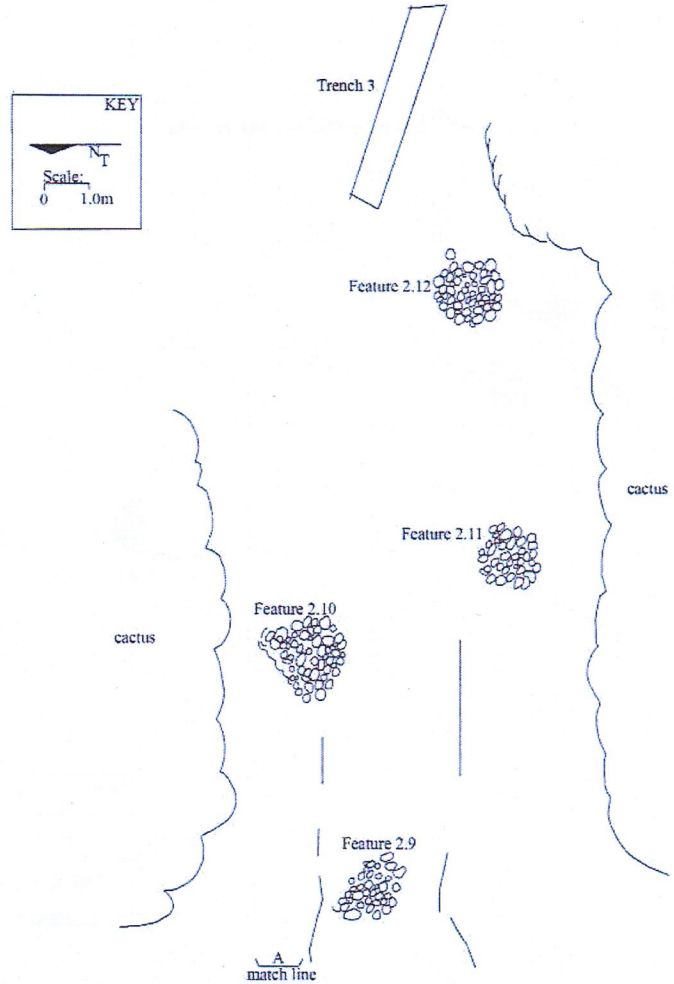


Figure 26. Plan View Map of Site 6372 Features 2.9-2.12 and Trench 3

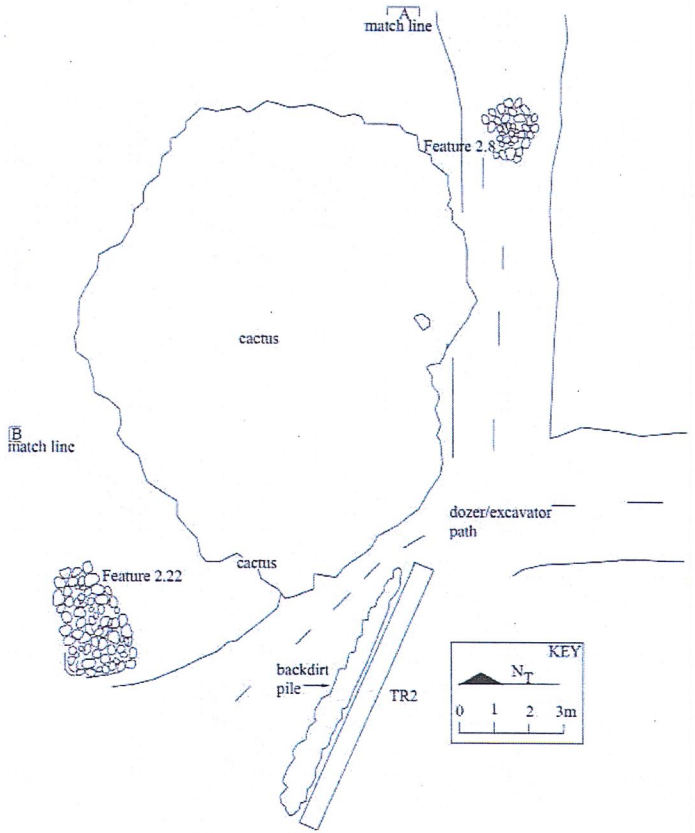


Figure 27. Plan View Map of Site 6372 Features 2.8, 2.22 and Trench 2

Figure 28. Photograph of Rock Mounds Site 6372 Features 2.8 and 2.11, View to East

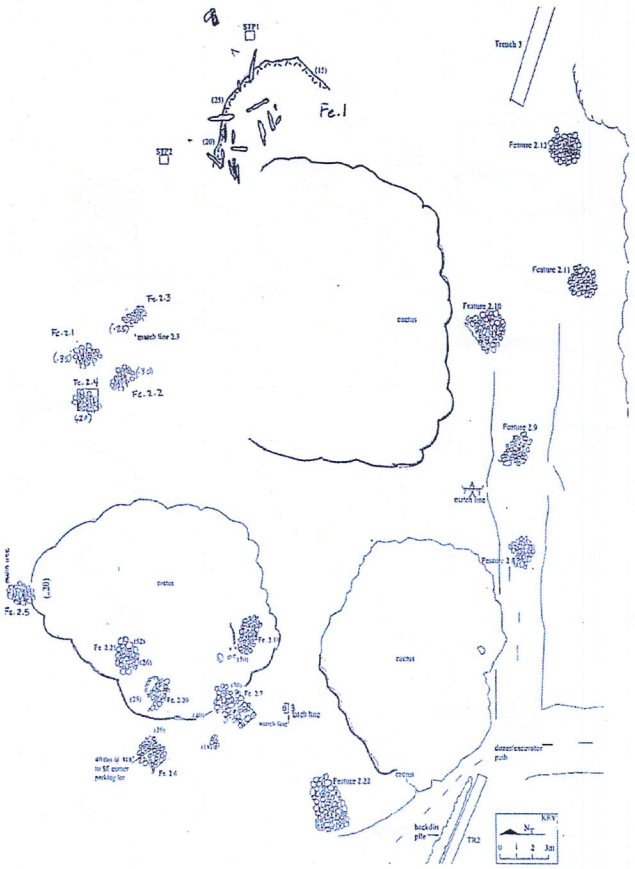


Figure 28a. Showing Relationship of Features 1, 2.1-2.12 and 2.19-2.22

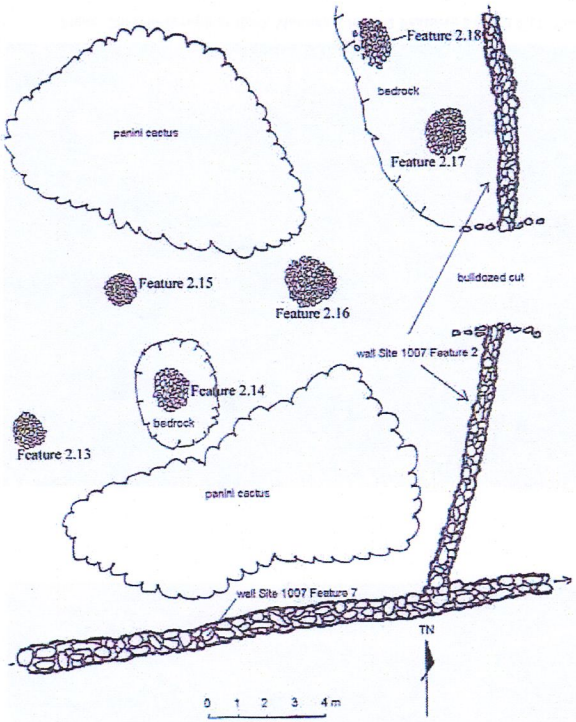


Figure 29. Plan View Map of Site 6372 Features 2.13-2.18

Feature 3

This refuse pit scatter, on a rise at the extreme southern end of Site 6372, is situated immediately north of Site the 1007-7 wall near the southeast boundary corner of Parcel 84. The scatter consists of a circular pit roughly 1.0 m in diameter and about 0.30 m deep with a surface concentration of broken bottle glass, ceramic, and metal fragments strewn over an irregular area down-clope to the north and northwest of the pit. The surface scatter, occupying an area 1-2.5 m from the pit and 3 m across, suggests a relatively recent episode of disturbance possibly by bottle hunters. Some of the glass fragments appeared deformed and showed signs of exposure to heat, however the feature pit itself manifested no evidence of burning. Figure 30 depicts the pit and scatter relative to adjacent parcel boundaries.

A cursory inventory of representative diagnostic bottles and bottle fragments indicates a fairly narrow temporal range around 1945 for the assemblage. Maker's marks on the bases of several brown, crown cap beer bottles include Owens Illinois with the Duraglas trade mark (ca 1940 through 1950) and a maker mark MG with the date "45" (see Toulouse). A number of bottle and jar forms are represented in the deposit. Many of the bottle fragments are partially melted, possibly from treatment in a burn barrel. Ceramic fragments, butchered bone, and *opihi* shell were also noted in the deposit. Vegetation in the vicinity of Feature3 is dominated by *panini* cactus but includes *kiawe*, *koa haole*, Asian basil, *ilima*, golden crown beard and various grasses.

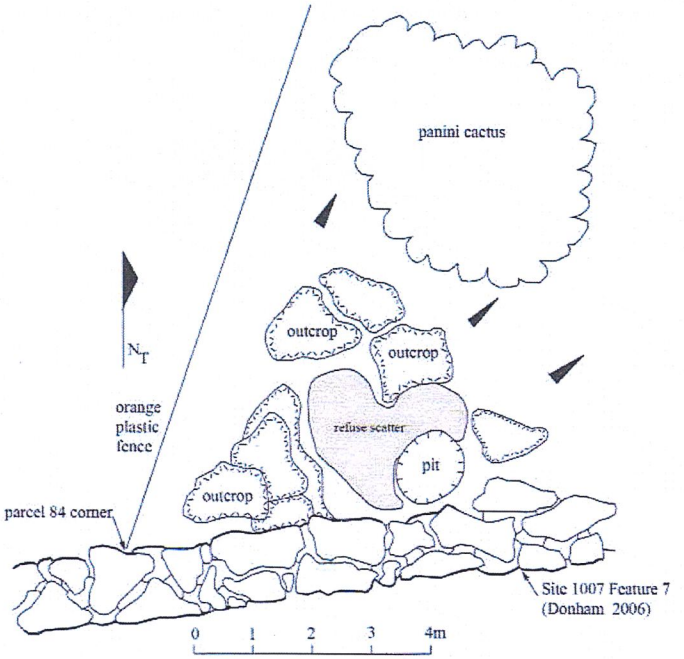


Figure 30. Plan View of Site 6372 Feature 3 Historic Refuse Pit

TESTING

Feature 1

Two shovel probes were excavated during the current survey in exposed soil areas on the northern and western sides of Feature 1 to determine presence/absence of cultural remains.

Shovel Test Pit 1 (STP 1), measuring 0.3 by 0.3 m and 10 cm deep, was located on the northern side of Feature 1 to determine presence/absence of subsurface cultural remains. No cultural remains were recovered during testing. Exposed soil included sandy loam. Excavation was terminated when outcrop was encountered at 10 cmbs.

STP 2, measuring 0.3 by 0.3 m and 15 cm deep, was located along the western side of Feature 1. No cultural remains were recovered, and excavation was terminated when bedrock was encountered at 15 cmbs.

Feature 2

All twenty-two rock piles were similar in size and morphology. Three of the rock mounds, Features 2.4, 2.6 and 2.7, were selected for testing to determine presence/ absence of cultural remains, and mode of construction (Figures 31-34). A 1.0 by 1.0 m test unit was excavated in each mound.

Testing did not recover any cultural materials and clearly showed that the rock mounds were simply piled and not formally constructed. These findings precluded further testing and Features 2.1-2.22 have been adequately documented.

Figure 31. Photograph of Site 6372 Feature 2.4 at Base of Excavations, View to East

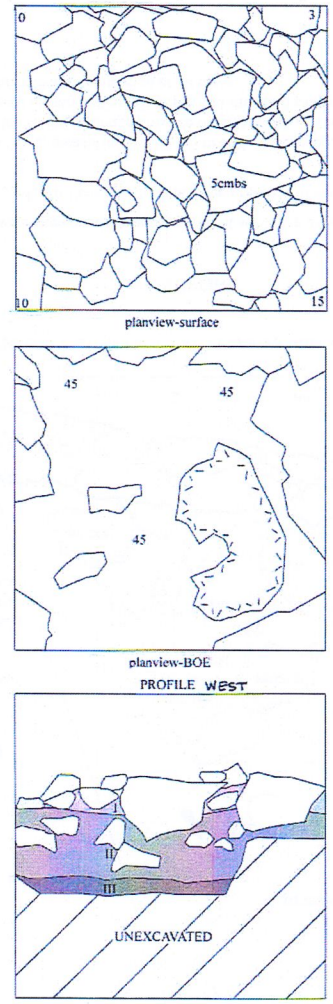


Figure 32. Plan View of Test Unit at Site 6372 Feature 2.4 and Stratigraphic Profile of West Wall

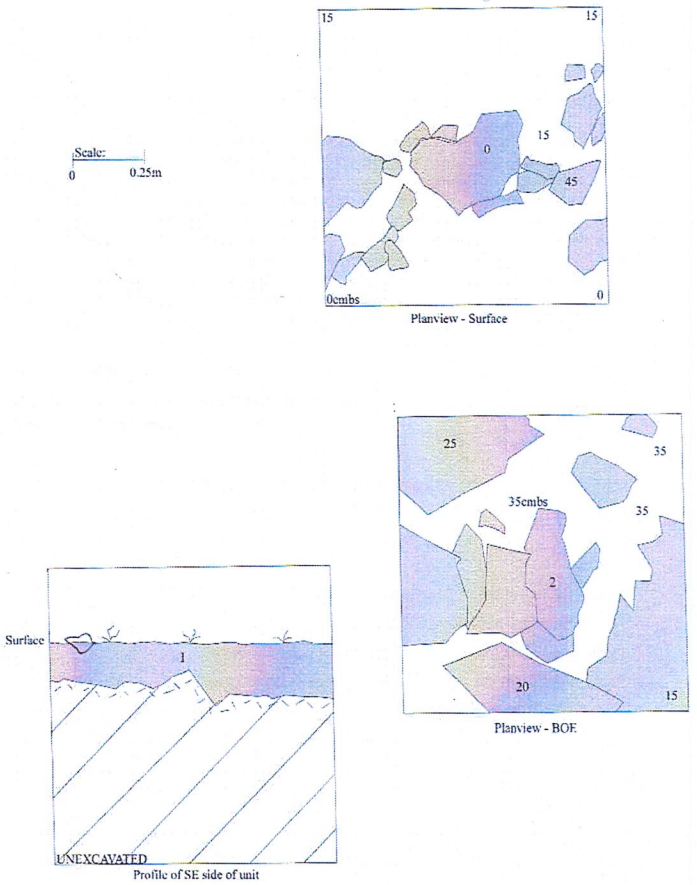


Figure 33. Plan View of Test Unit at Site 6372 Fe. 2.6 and Stratigraphic Profile of Southeast Wall

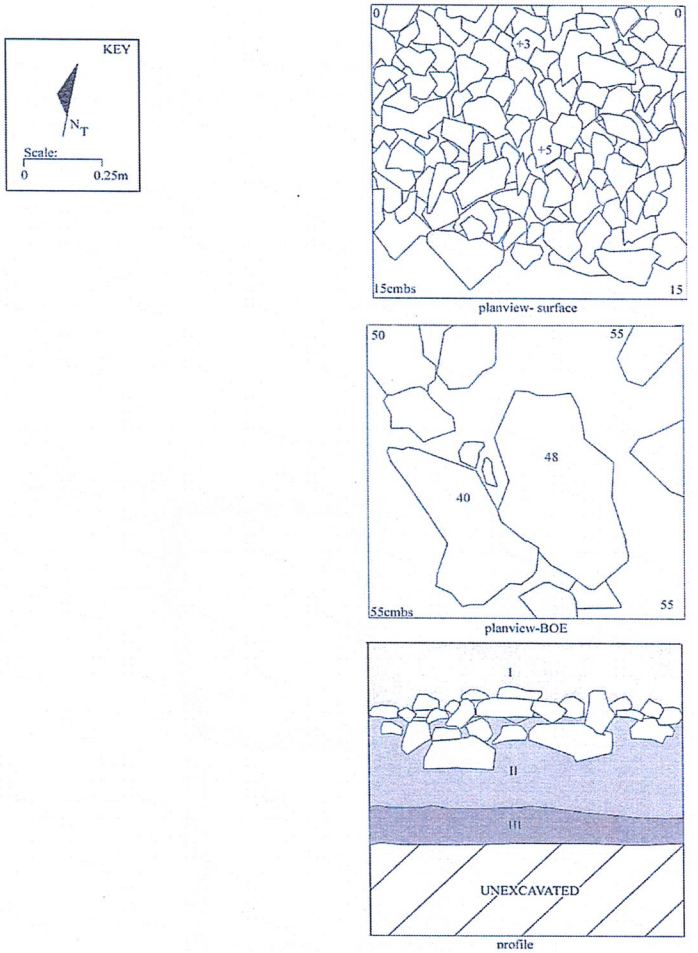


Figure 34. Plan View of Test Unit at Site 6372 Feature 2.7 and Stratigraphic Profile of North Wall

DISCUSSION OF SITE 6372

Site 6372 is a historic homestead centrally located along the western boundary of the project area. This site is similar to another homestead (Site 6366) recorded in Parcel 8, adjoining to the south. Site 6372 consists of 3 primary features (Features 1-3), with 22 sub-features documented at Feature 2. Feature 1 is the remnants of a wooden structure comprised of deteriorating wood and corrugated metal. These construction materials are resting upon a flat bedrock area which is likely where the residential structure was originally located. Feature 2 is a series of twenty-two rock clearing piles which are situated around the main feature, Feature 1.These features are in association with cleared soil areas and considered to be associated with agricultural activities. Feature 3 is a refuse pit and scatter located at the southwest corner of Site 6372. Diagnostic materials observed from Feature 3 were dated to the 1940's. All features of Site 6372 are enclosed by a roughly rectangular wall interpreted to be a house lot boundary wall, designated Site 1007-2. Site 6372 has been adequately documented. No further archaeological work is warranted at this site prior to commencement of development activities. However an archaeological monitoring plan shall and implementation of monitoring following SHPD approval of the plan is highly recommended.

SITE 50-50-14-6373 (formerly Site 225)

Previous Site Description

Site 50-Ma-B8-225 Two Enclosures and a Platform

Cordy's original description of this site reads as follows:

> This site is south of the 18th tee and inland of the bluff overlooking the coastal sand flat. The platform (225-1) is small (3.5 by 2.9 meters = 10 sq. m) and low (0.2 to 0.6 meters high), with no midden visible. Just south is one enclosure (225-2), built on bare pahoehoe with a few patches of soil. This enclosure is rectangular, 14.0 by 10.5 meters (147 sq. m), with walls 0.6 to 0.8 meter high inside and 0.6 to 1.0 meter high outside, and an entrance in the east wall. A few pieces of midden were visible. Abutted to the seaward side of 225-2 is the second enclosure (225-3), also rectangular (12.8 by 9.8 meters = 125 sq. m), with wider walls (1.0 vs. 0.7 meter) and higher walls (1.1 to 1.5 meter) and no entrances. One excavation square was dug in the enclosures (Cordy 1978:75).

Cordy interpreted this site as a historic, non-permanent house-site with livestock structures.

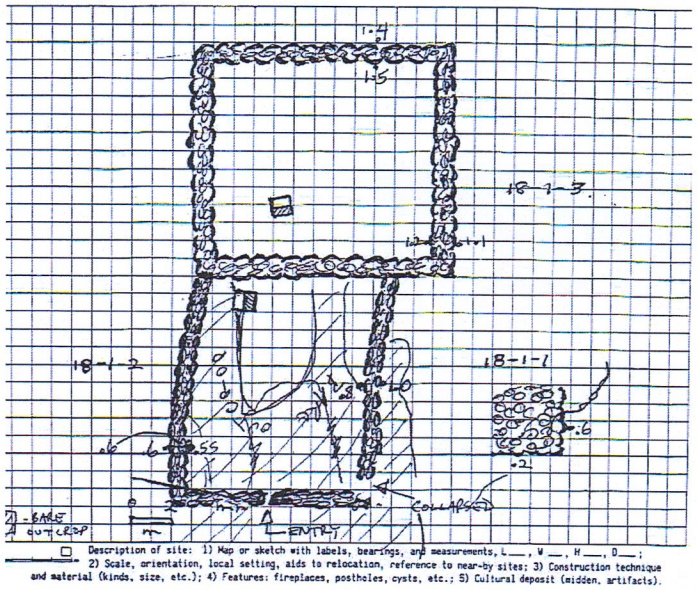


Figure 35. Plan View Sketch of Site 225 (Cordy 1978)

Current Site Description

The current survey identified five additional features (Features 4-8) as part of this complex. Site 50-50-0-14-6373 is comprised of eight features consisting of a platform (Feature 1), two adjoining enclosures (Features 2 and 3), a C-shape (Feature 4), a remnant wall (Feature 5), an alignment (Feature 6), another remnant wall (Feature 7), and a depression (Feature 8). The total site area measures, in excess of 1000 square meters, 37.5 m long (n/s) by 27.0 m wide (e/w) and incorporates a natural outcrop within the site complex (Figure 36).

Feature 1

Feature 1 is a paved, platform; northernmost of the features (Figures 37 and 38). It is located approximately 3.0 meters north of Feature 2 the rectangular enclosure. Feature 1 measures

approximately 4.0 m long by 4.0 m wide and .10-.60 m high. It is comprised of loosely fitted, basalt cobbles and boulders that form a roughly square level, raised area.

Features 2 and 3

Features 2 and 3 are two adjoining rectangular enclosures sharing a common wall (see Figure 37). Feature 2, measuring 10.8 m long (e/w) by 9.0 m wide (n/s) and approximately 1.0 m high, is a three-walled enclosure abutted onto the eastern wall of the Feature 3. Its walls are constructed of stacked basalt cobbles and boulders and range in width from .65 to .80 m and in height from 1.0-1.50 m (interior) to 1.0-1.30 m (exterior). Although several areas of wall collapse are present, a constructed entrance is located into the east wall about three meters from the southeast corner of the structure. This is evident from a finished facing on the south side of the opening, the north side is tumbled. Feature 2 occurs atop a bedrock outcrop that slopes from east to west.

Feature 3, measuring 12.2 m long (e/w) by 11.5 m wide (n/s), manifests much better construction than Feature 2. Its walls, comprised of small to large basalt cobbles and boulders stacked and faced up to eight courses high, are robust and range in width from 1.2 to 1.5 m and in height from 1.0 to 1.5 m on the interior and exterior. The walls are in good condition with the exception of a few partially collapsed sections. A possible constructed opening, with a walkway or ramp paved with *`ili`ili,* occupies the central portion of the east wall and connects Feature 3 with the adjoining Feature 2. The interior consists of a level soil area. One piece of coral was observed atop the eastern wall of the enclosure.

Figure 36. Plan View Map of Site 50-50-14-6373

Figure 37. Photograph of Site 6373 Feature 1, View East

Feature 4

Approximately 4.0 m south of Feature 3 is the newly identified C-shaped structure. This feature, which opens to the northwest, measures 4.6 m long (e/w) by 4.2 m wide (n/s) and ranges in height .40-1.40 m high. Its walls are constructed of small to large basalt cobbles and boulders stacked two to four courses high around a small level interior area (Figure 38). The walls are partially collapsed on all sides and several pieces of coral were observed within and surrounding this feature. One test unit was placed within the interior of the C-shape which revealed a three-layer stratigraphic sequence and a remnant hearth feature designated Feature 4a. Approximately 2.5 m to the northwest is Feature 5, a V-shaped remnant.

Feature 5

Feature 5, a short wall with an acute bend, is the westernmost feature of Site 6373. The walls, measuring 3.7 m (n/s) and 2.7 m (nw/se) long, abut against a bedrock ledge at both ends to form a low enclosed area. The walls are 1.0 m wide and constructed of stacked and piled basalt cobbles and boulders to a height of 0.40 m.

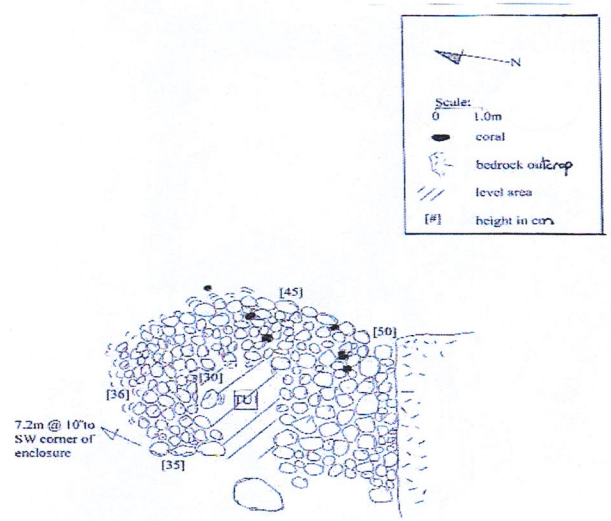


Figure 38. (Top) Photograph of Site 6373 Feature 4, View Southeast (Bottom) Plan View Map of Feature 4

Feature 6

A short, single-course alignment of boulders is located just south of Feature 3 enclosure. It is oriented north-south and measures 3.0 m long by 0.50 m wide and ranges in height from 0.30 to 0.40 m.

Feature 7

A disturbed wall remnant occurs south of Features 2 and 3. It is built atop a bedrock bench and comprised of two sections that are stacked up to four courses high with a maximum height of 0.60 m. The heavily collapsed wall segment measures 3.0 m long by 1.2 m wide. Based on their proximity, Features 6 and 7 may represent the remnants of an older feature that was dismantled to construct portions of Site 6373.

Feature 8

Feature 8 is a 3.0 m wide depressed area located along the northwest corner of Feature 3. The depression is .50 m deep and is within the *a`a* flow.

TESTING

Features 2 and 3

Features 2 and 3 were tested by Cordy in 1978 with 1.0 sq. m units excavated inside each enclosure. Both contained a cultural layer that was 0-5 cm thick (Cordy 1978:20). Only Feature 3 contained shell midden (33.3 g) with Cypraea sp. (23.5 g) being the most dominant. Cordy interpreted the enclosures to be temporary habitation sites from the historic period

During the 2001 investigation, Feature 3 was tested for the presence/absence of cultural materials that would aid in determining its function and support a historic age for this feature.
The interior soil floor measures approximately 103.00 sq. meters. A .50 m sq. (.50 by 1.0 m) test unit (TU1), oriented east-west, was placed in the interior of the enclosure near the western wall. Testing revealed three stratigraphic layers (Layers I-III), and recovered cultural material included sparse amounts of coral in Layer I (17.0 g) and *'ili'ili* at the transition between Layers I and II (Figure 39). Excavations were terminated in Layer III at .20 m bs due to absence of cultural materials.

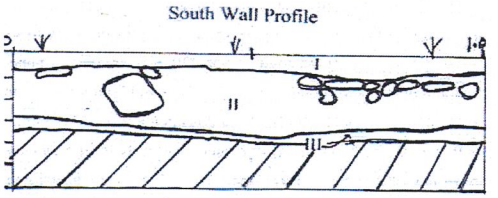


Figure 39. Stratigraphic Profile of the South Wall of Feature 3 Site 6373

Layer I (0-3 cmbs) is a very dark brown (10YR 2/2), non-plastic, non-sticky, very fine-grain, powdery silt loam with abundant roots, rootlets, rocks and 2 pieces of coral (*porites*) on surface.
Layer II (4-18 cmbs) is a very dark grayish-brown (10YR 3/2), non-plastic, non-sticky, very fine-grain, powdery silt with abundant rootlets and rocks. Cultural material included *'ili'ili*.
Layer III (18-20 cmbs) is a dark yellowish-brown (10YR 4/4), non-plastic, non-sticky, very fine-grain, silt with abundant rocks.

Feature 4

A 0.25 sq. m test unit (TU1) was excavated in the central interior soil area of the C-shape to determine presence/absence of subsurface cultural remains and age. Three stratigraphic layers (Layers I-III), and a hearth (Feature 4a), were identified during excavation (Figures 40). Charcoal was recovered from the rock-lined hearth and Layer I, and moderate amounts of marine shell were recovered in Layers I and II (Table II). A charcoal sample was collected for dating, however it was contaminated before it submitted to Beta Analytic, Inc., for radiocarbon assay, As this site is being preserved, a second sample may be collected and sent to Beta Analytical. Results of this sample will be presented in the preservation plan. Excavations at Feature 4 were terminated in Layer III at .35 m bs.

Layer I (0-12 cmbs) is a dark yellowish-brown (10YR 3/4), non-plastic, non-sticky, very fine-grain, powdery silt loam with abundant roots, rootlets, and rocks. Cultural material included marine shell (*Cyprea* sp. 19.6g, *Nerita picea* 4.0 g, *Thaididae drupa* 1.5 g., *Brachiodontes* sp..01g, *Cellana exerata* .3g. , and unidentified shell 1.2 g), *echinoidea* 4.0 g., branch coral 40.0g, coral *porites* sp. 3.5g, and a burned dog tooth.
Layer II (13-23 cmbs) is a dark yellowish-brown (10YR 3/4), non-plastic, non-sticky, very fine-grain, powdery silt with moderate amounts of rootlets and rocks. Cultural material included marine shell , charcoal, a dog tooth, and coral.

Feature 4a (23-28 cmbs) is a rock-lined hearth consisting of a black (10YR 2/1), non-sticky, non-plastic, very fine-grain, charcoal-stained silt. An abundant amount of charcoal was recovered from the hearth. The base of the hearth was aligned with fire-cracked basalt cobbles.
Layer III (29-35 cmbs) is a yellowish-brown (10YR 5/6), compact, fine-grain, non-sticky, non-plastic, non-cultural, silt loam.

East Wall Profile

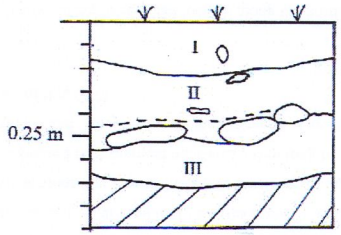


Figure 40. Photograph (Top) and Stratigraphic Profile of Test Unit 1 (Bottom) in Feature 4 of Site 6373 (Note Charcoal Layer)

DISCUSSION OF SITE 6373

Cordy interpreted this site as a historic, non-permanent house-site with livestock structures. The results of the current study indicate that a re-interpretation of this site as a traditional Hawaiian permanent habitation may be appropriate.

Site 6373 is a habitation complex that appears to originate in the late pre-Contact to early historic period based on the construction of Feature 3 and the findings from the testing. The site is centrally located within the subject property and is comprised of a minimum of eight features. Since this site will be preserved and incorporated into the proposed development plan, minimal testing was conducted during the current investigations. The Feature 1 platform/enclosure was not tested and its function has not been confirmed, but it may be the foundation for a sleeping house.

Feature 2, the rectangular enclosure is a structure that appears to have been a later addition based on its morphology and construction. The Feature 2 walls abut onto the east wall of Feature 3 to complete the rectangular enclosed area. Feature 2, thus post-dates Feature 3. It likely served as an animal pen being built on an uneven bedrock surface, containing little soil with a sloping interior floor area. Testing within this feature did not recover any materials to refute this interpretation.

Feature 3, the primary structure of the complex, appears to be a house site; however no formal entrance was identified during the survey. Testing within this feature recovered coral and *`ili`ili* though it was not abundant. This lack of cultural materials may be a result of sampling error due to the placement of the unit near the western wall. However, as the stratigraphic profile depicted in Figure 23 shows, the *`ili`ili* may be a portion of a living floor. Additionally, Cordy's testing within Feature 3 recovered 33.3 g of marine shell.

Within Feature 4, the C-shaped structure, a small rock-lined hearth was recorded that likely dates to the pre-Contact era. Feature 4a supports a habitation function, perhaps as a cooking house. Features 5 and 8 are ancillary features probably utilized as small planting areas or for storage. Features 6 and 7 the wall segment and alignment may represent remnants of an older feature that was dismantled and the rocks used for the construction of other features.

Cordy inferred this complex to be a temporary historic habitation site with livestock enclosures based a set of pre-determined criteria. It is important to note that no historic artifacts were

recovered in or around the site. Based on the currently available data, this site is interpreted to be a traditional Hawaiian habitation complex or *kauhale* originating sometime during the late prehistoric through the early historic periods; with some modifications that post-date the main components. Site 6373 is slated to be preserved in place with a protective buffer zone.

SITE 50-50-14-6374 (formerly Site 230)

Previous Site Description

Site 50-Ma-B8-230

Cordy's description of this site was:

Wall

> This large wall bounds the southern edge of the survey area near holes 8, 9, and 10, swings north seaward of hole 10, crosses hole 18, turns seaward and runs north of Site 227, and finally turns south again, running along the top of the bluff overlooking the coastal sand flat. The wall is high (1.4 meters), wide (c. 1.0 meter) and well built with square corners.

Current Site Description

Today, Site 6374 is a freestanding wall that meanders around the property primarily along the east and western portions of the project area. These large intact sections have been designated as Feature 1 of Site 6374. Smaller isolated segments, possibly from this original wall, are present throughout the project area and have been subsumed into this site. Along the central portion of the northern property boundary line, is Feature 2, Feature 3 is a short segment located within the central portion of the project area just east of Site 6372. Feature 4 is an east west trending low meandering wall located along the northern boundary line of the project area. This low wall segment may have been a portion of Cordys' Site 242 (Figure 5). Feature 5 is a modified outcrop with an attached freestanding wall located in the northwest quadrant of the project area.

Feature 1

The wall within the larger sections is primarily double-faced and core-filled and ranges .85-1.55m in height and the .48-1.28 m in width. It meanders in a zig-zag fashion following the eastern and portions of the southern boundary line (See Figure 8).

Feature 2

Feature 2 is centrally located along the northern boundary line. It is a relaxed L-shaped wall that measures 5.5 m long in the north/south direction and curves to the east 4.0 m (Figure 41). The width of the wall ranges from 1.2 to 1.6 m and the heights range from 0.25 to 0.60 m. The wall is faced with cobbles and boulders and core-filled with smaller basalt cobbles. Although it is not definitive, this wall segment is likely a remnant of the long meandering wall originally recorded

by Cordy, Site 230. This feature is in good condition except for the collapse along the northeastern section.

Feature 3

Feature 3 is centrally located within the subject parcel and is situated near the rectangular shaped wall (Site 1007-2) that encloses Site 6372. It measures 8.5 m long by .90 to 1.6 m wide and ranges in height from .25 to .50 m (Figure 42). The wall is straight and runs in an east to west direction. It is constructed of stacked small to large basalt cobbles and boulders that are core filled with small to medium basalt cobbles.

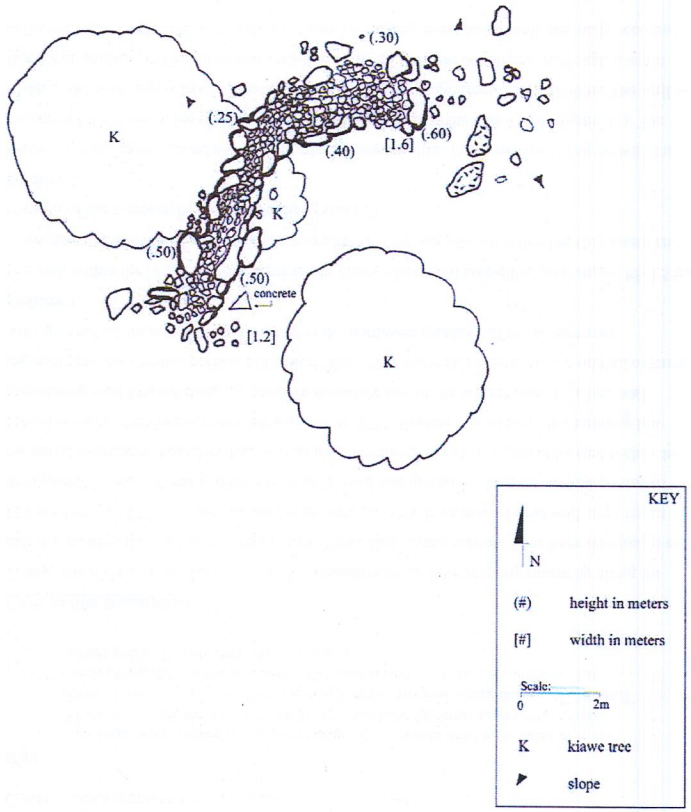


Figure 41. Plan View Map of Site 6374 Feature 2 Wall Remnant

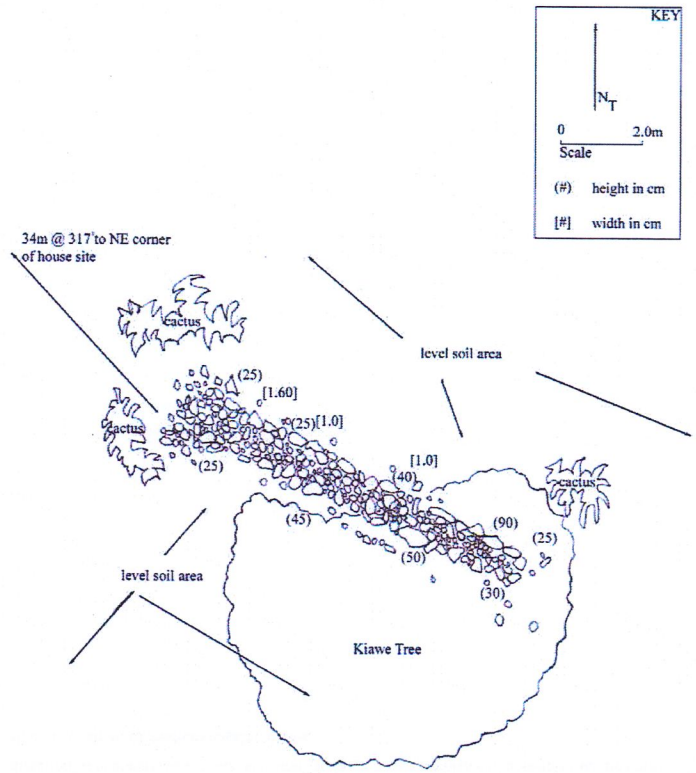


Figure 42. Plan View Map of Site 6374 Feature 3 Wall remnant

Feature 4

Feature 4 is a low meandering wall located along the northern boundary within the northeast corner of the project area. It is adjacent to and north of Site 6374. This wall is piled and badly disturbed probably during the golf course construction. Based on its location, Feature 4 appears to be a segment of the formerly recorded Site 242 by Cordy (see Figure 5).

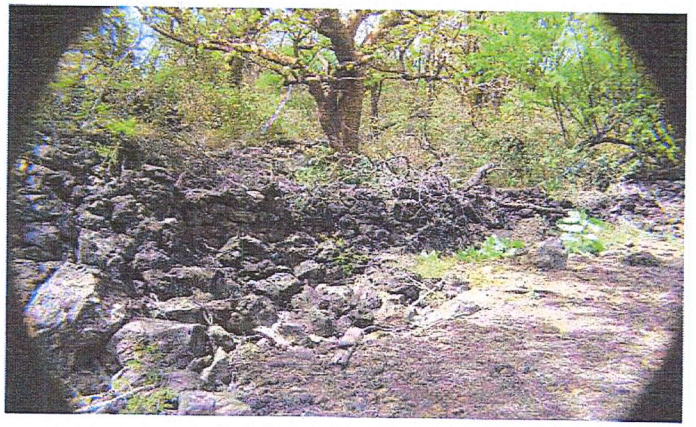


Figure 43. Photograph of Site 6374 Feature 4, View to Southwest (Site 6371 in Background by Na Wiliwili Tree)

Feature 5

Feature 5 is located within the northwest quadrant of the project area where a former stable was situated. It is a large outcrop that has been modified by minimally stacking rocks upon the outcrop, and constructing a freestanding stacked wall to the southern terminus of the outcrop. Feature 5 measures 26.2 m long by .70-1.60 m wide and is oriented at 145 degrees.

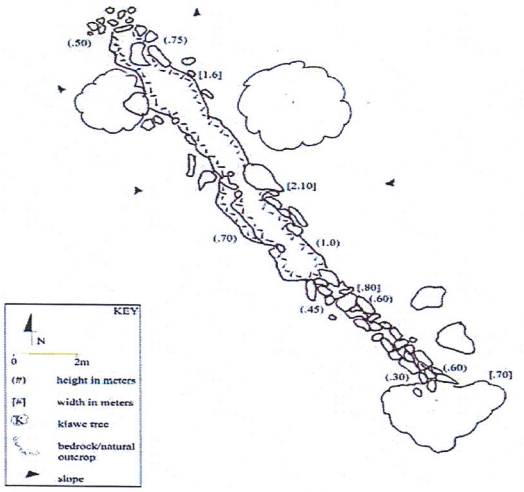


Figure 44. Plan View Map of Site 6374 Feature 5

DISCUSSION SITE 6374

Site 6374 is composed of a property boundary wall (Feature 1), and several sections of remnant walls assigned Features 2-5. Feature 1 is largely intact along the eastern and portions of the southern property line. Features 2-5 are scattered throughout the project area. Site 6374 Features 1-5 have been adequately documented. No further work is warranted for this site beyond construction monitoring. The rocks from Site 6374 will be reused to delineate the buffer zones around the five preservation areas.

SITE 50-50-14-6376 (TS 29)

Site 50-50-14-6376 was recorded during the current undertaking. It is located within the northeast quadrant of the project area near Makena-Alanui Road. It is a large modified bedrock outcrop that measures 19.0 m long by 17.0 m wide and is comprised of four primary features with five sub-features (Figure 45). Feature 1 is located on the extreme north side of the outcrop. It consists of an elongated section of soil bounded to the north by stacked cobbles upon the outcrop. Feature 2 is a U-shaped feature that is located along the central east side. Feature 3 is comprised of five possible modified crevasses or lava blister designated as Features 3.1-3.5. Feature 4 is situated along the southwest corner and is a remnant alignment of stacked cobbles and boulders bordering a cleared soil area. Testing throughout the outcrop was conducted utilizing controlled test units, shovel test pits (STP) and shovel test trenches (STR).

Feature 1

Feature 1 is an elongated section of intermittently low stacked cobbles upon an outcrop associated with a linear soil area. It is located along the northern section of the outcrop (Figures 45-46). This modified area measures approximately 9.5 m long (e/w) by .15-.65 m (n/s) wide and ranges in height from .14-.45 m high. It appears as a low wall however some sections are flush with the rock and resemble a rock terrace. Adjacent and south of the stacked wall is a linear section of soil which measures approximately 11.0 m long (e/w) by 2.0 m wide. Within this elongated soil area, seven shovel test pits (STP 1-7) were executed to assess the soil composition.

Feature 2

Feature 2 is the most well constructed feature at this site. It is comprised of a U-shaped structure that measures 3.0 m long (e/w) by 4.0 m wide (n/s) and bounds a rocky soil interior that measures approximately 2.1 m long (e/w) by 1.40 wide (n/s) (Figure 45, 47 and 48). The interior of Feature 2 is faced and averages .48 m high. The exterior is stacked along all sides (.32-48 high), except for the southern side which is faced with large blocky basalt boulders and averages 2-3 courses high. Two test units (TU 1 and 2) were placed inside Feature 2 to aide in determining function and chronology. Testing recovered a three layer stratigraphic sequence and an ashy grey charcoal deposit, designated Feature 2a.

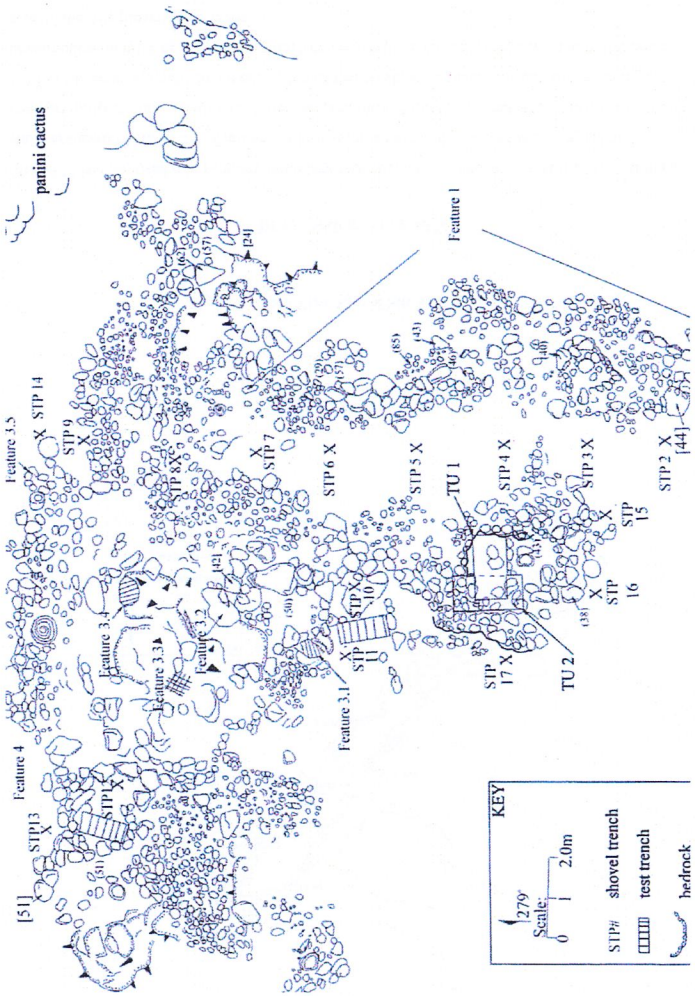


Figure 45. Plan View Map of Site 6376 Features 1-4

Figure 46. Photograph of Site 6376 Feature 1 (Note Stacking Moss Rock), View to West

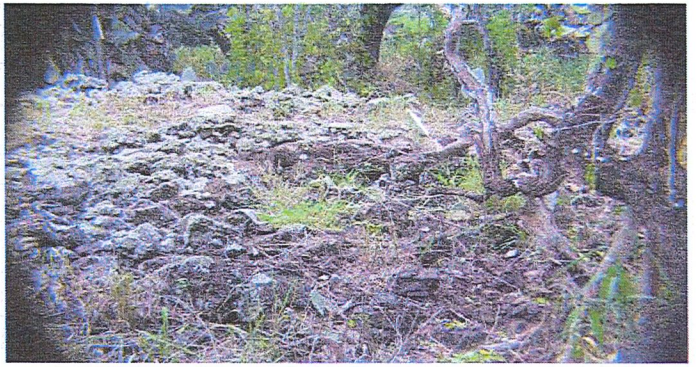


Figure 47. Photograph of Site 6376 Feature 2, View to North

Figure 48. Photograph of Interior Site 6376 Feature 2, View to West

Features 3.1-3.5

Features 3.1-3.5 are located within the central portion of the outcrop that is dominated by a raised *pahoehoe* lava flow. These features are natural crevasses and or lava blister that have been partially modified.

Feature 3.1

Feature 3.1 is located west of Feature 2 within the south central portion of the outcrop. This small lava blister is rectangular shaped, measuring approximately .80 m long by .50 m wide and ranging in depth .45-.65 m (Figures 45 and 49). The opening appears to have been modified by removing rocks along the eastern side to form a straight edge. A .40 m slab is situated along the west side, a boulder appears to create the south wall and the north is the natural overhang from the lava blister.

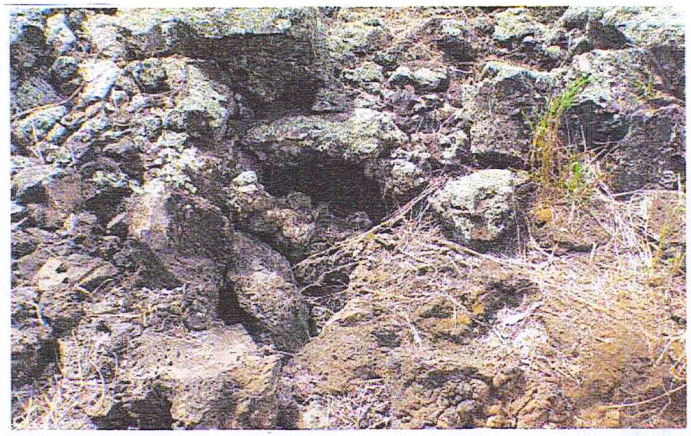


Figure 49. Photograph of Site 6376 Feature 3.1, View to West

Feature 3.2 (c-2)

Feature 3.2 is a depression within a small lava blister which measures approximately 1.10 by .50 and ranges in depth from .40-.52 m (Figure 50). The north and west sides are rubbled bedrock descending to the floor. The eastern side may be deliberately stacked but is only 1-2 courses (.20-.40 m) high with broken and decomposing lava.

Feature 3.3 (c-3)

Feature 3.3 is a very small cavity within the outcrop that may have been modified. It measures .60 m wide and approximately .60 deep and is a depression or sunk into the raised central *pahoehoe* portion the outcrop (Figure 45). Possible piling of rock, 1-2 courses high, was observed along the west side. Feature 3.3 is not as formally modified as Features 3.1 and 3.2.

Figure 50. Photograph of Site 6376 Feature 3.2 Shallow Depression, View in Plan

Feature 3.4 (c-4)

Feature 3.4 is similar in construction to Feature 3.3 as it is sunk into the *pahoehoe* lava measuring .80 m long by .50 m wide and averages .55 deep (Figure 51).

Feature 3.5

Feature 3.5 is a circular depression in the rocks which measures approximately .45 m in diameter. It appears to be a purposeful construction that is .19 m deep (Figure 52).

Feature 4

Feature 4 is a crude alignment possibly associated with a soil area (Figure 53). The alignment is oriented roughly 50 degrees and measures 2.2 m long .55 m wide. The soil area bounded to the east of the alignment is approximately 1.2 m long by 1.0 m wide. A 1.0 by .50 m shovel test trench (STR 13) was placed within the soil area to determine presence/absence of cultural materials. Three stratigraphic layers were observed and are described below.

Figure 51. Photograph of Site 6376 Feature 3.4 Possible Modified Lava Blister, View to West

Figure 52. Photograph of Site 6376 Feature 3.5, View in Plan

Figure 53. Photograph of Site 6376 Feature 4 Crude Alignment, View to North

TESTING

Feature 1

Feature 1 is composed of stacked cobbles and a soil area. A total of seven shovel test pits (STP 1-7), measuring approximately .30 by .30 m were excavated into the soil area. No cultural materials were observed within the 2-3 layer stratigraphic sequence (Figures 54-56). The stratigraphy is as follows:

STP 1-4
Layer I 10YR 3/3 yellowish brown silty loam fine grained, slightly sticky, non-plastic, non-cultural, abrupt smooth boundry.
Layer II 10YR ¾-10 YR 3/6 rocky dark brown loamy silt, fine grained slightly sticky, slightly plastic, non-cultural, abrupt, wavy boundary.
Layer III 10YR 4/4 dark yellowish brown (appears reddish orange brown) silty, sterile basal layer.

STP 5-7
Layer I 10YR 3/3 to 3/4 yellowish brown silty loam fine grained, slightly sticky, non-plastic, abrupt smooth boundary.
Layer II 7.5 YR4/6 reddish brown loamy silt, rocky, fine grained, slightly sticky, slightly plastic, non-cultural.

Figure 54. Photograph of STP 5, Feature 1 Soil Area, Site 6376, View in Plan

Figure 55. Photograph of STP 2, Feature 1 Soil Area, Site 6376, View in Plan

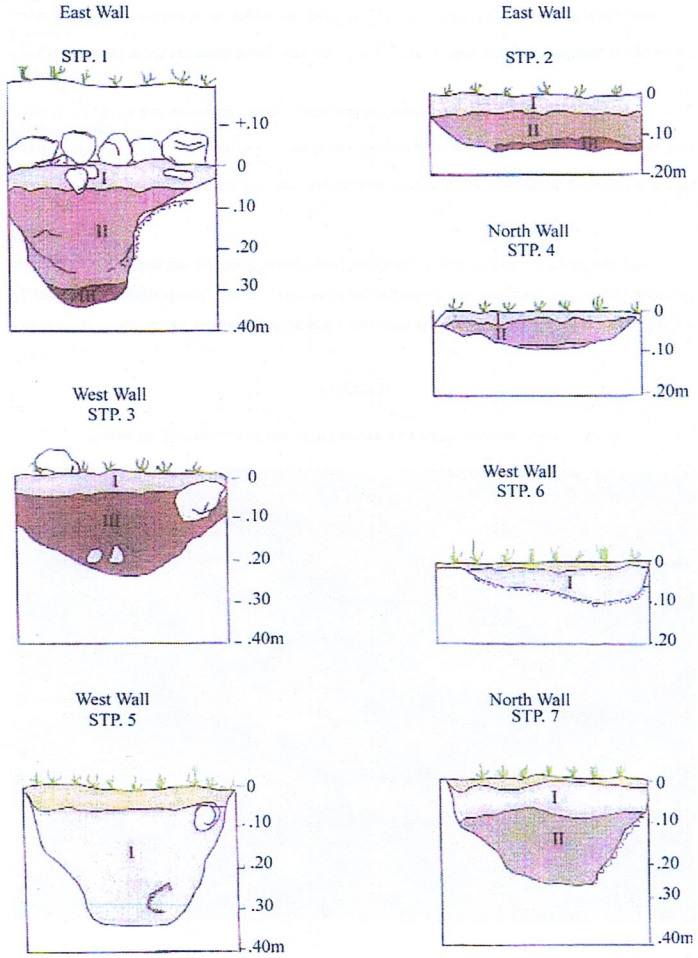


Figure 56. Stratigraphic Profiles of Shovel Tests Pits 1-7 Soil Areas, Feature 1, Site 6376

Feature 2

A 1.5 m long by .50 m wide test unit (TU 1) was placed across the width of the central portion of the feature. The test unit abutted both the interior north and south walls. A thin A horizon with crumbly decaying matter 0-3 cm thick was first encountered in the unit (Figure 57). Underlying this initial layer (Layer I), was a uniform yellowish brown (10YR 3/3) fine silt designated Layer II. Layer II (10YR ¾) was approximately 13 cm thick and contained sparse amounts of marine shell (*cypraea*) and one basalt spall. As excavations proceeded within the southern end of TU 1, a darker soil (10YR3/2-3/3) with charcoal flecking was encountered at .07 m bs and designated as Feature 2a. This fire affected soil was observed in the southern 1/3 of the unit and appeared in plan view as a half moon shape curving towards the southern wall of the test unit (Figure 58 and 59). Due to the presence of this subsurface feature; a second test unit (TU 2) was situated over Feature 2a to determine its overall extent and if additional midden remains were present. TU 2 a (1.0 m long by 1.50 m wide unit) contained a layer of structural rock fill over the entire surface. The rock, which was 30 cm thick was removed and revealed a crumbly A horizon with numerous roots. This layer was 5 cm thick and overlies Layer II, the primary cultural layer. Layer II was a loamy silt that ranged in color from dark yellowish brown to brown (10 YR3/4-3/6) and was about 10 cm thick. Collected from this layer was 1 basalt spall, marine shell (*cypraea, conidae), echinodermata*, small coral pieces), artifacts (3 pieces basalt debitage, 1 primary flake) and Feature 2a. Spalls are pieces of rock that have been intentionally manufactured during flaking. They are generally the result of extreme temperatures.

Feature 2a was a charcoal deposit that was more fully exposed within TU 2. It is approximately 10 cm thick and measures .50 m long by .30 m wide and appears more triangular shaped in plan. The feature was bisected across its long axis, and within the central portion of the feature, a concentrated lens of charcoal, 3 cm thick, and three fire altered cobbles were observed (Figure 59). A sample of charcoal was collected from this charcoal laden area and submitted for radiocarbon assay. A conventional age of 190 +/-40 BP was returned for this sample. The calibrated results at 2 sigma were AD 1650-1700, AD 1720-1820, AD 1840-1880 and AD 1920-1950.

Layer III was the dark yellowish brown silt sterile layer. This layer generally underlies Layer II, however when not present, Layer II overlies bedrock (Figure 60 and 61).

Layer I (0-.03/.05 m bs) 10Yr 3/3 dark brown, silty loam, friable. slightly plastic, non-sticky, fine grained non-cultural. Many roots, an abrupt, smooth boundary

Layer II (.03-.14/.16 m bs)10YR ¾ dark yellowish brown loamy silty, slightly sticky, slightly plastic, very fine grained. Few roots, abrupt smooth boundary. Cultural materials in TU 1 included (*Cypraea* 7.0g, *pipipi* .2g, *conch* 5.9g, unidentified marine shell 1.0g, *echinodermata* spine .2 g, *echinodermata* mouth parts 1.1g with 2 pieces coral *porites*, 3 pieces basalt debitage, 1 piece basalt spall. Cultural Material in TU 2 consisted of *Cypraea* 16.5 g, *drupa* 1.0 g, conch shell 3.9 g, *Echinodermata* body (burned) 1.8 g, *echinodermata* mouth parts 1.2 g, 3 pieces basalt debitage, 1 basalt spall, 1 primary flake.

Feature 2a (.06-BOE) 10YR 3/2-3/3 dark brown to silty loam with charcoal, marine shell, and 3 pieces of fire-cracked rocks. Cultural materials included burned *Cypraea* 11.1g (burned), *drupa* .6 g (burned), Conch 6.7, *pipipi* .1 g, *echinodermata* mouth parts .4 g (burned), unidentified marine shell .9 g, 4 pieces of coral

Layer III (.14-BOE) 10YR 3/6 yellowish brown silty loam,

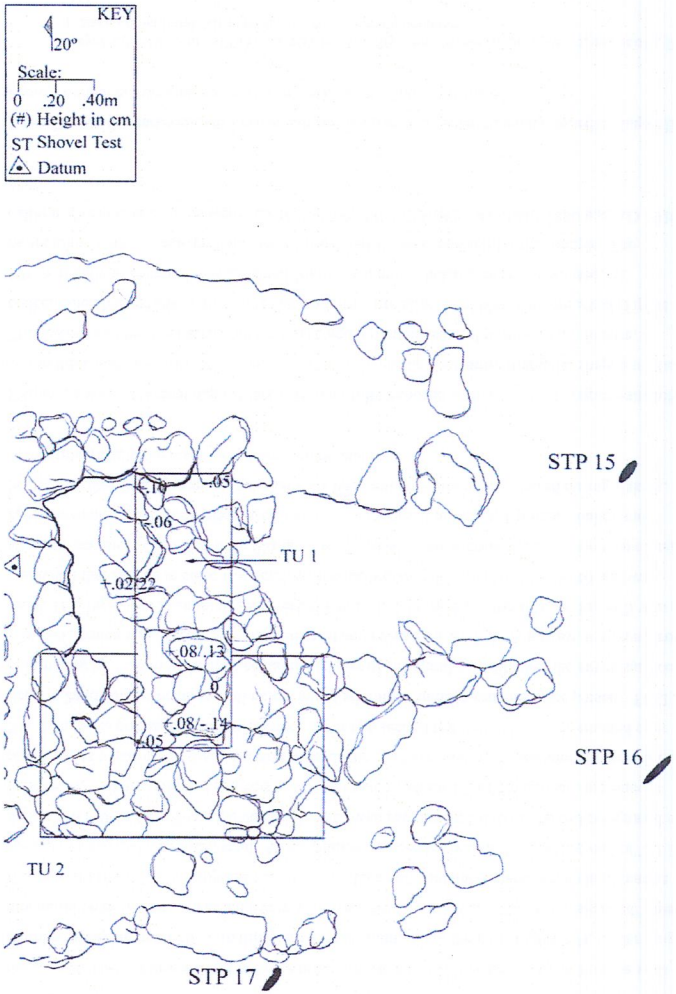


Figure 57. Plan View Map of Test Units 1 and 2, Feature 2, Site 6376

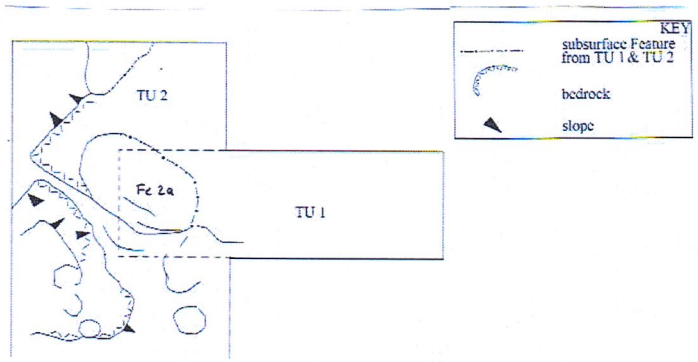


Figure 58. Plan View of TU 1 Showing Feature 2a (dashed line)

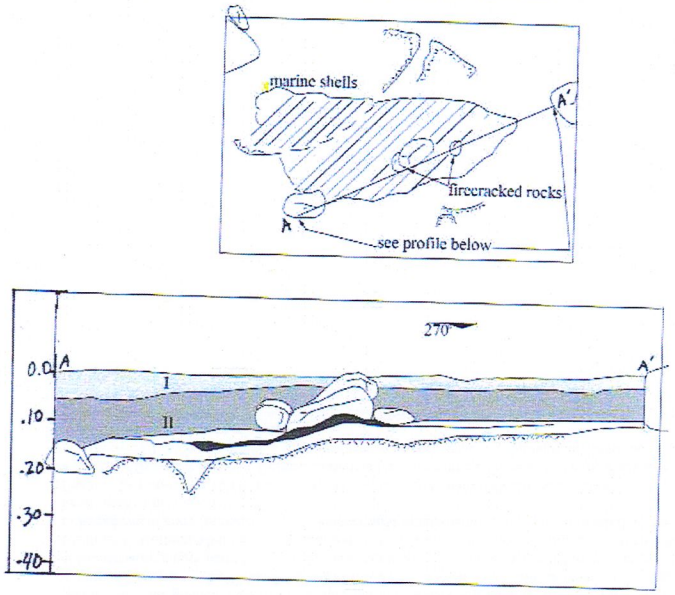


Figure 59. Plan View and Stratigraphic Profile of TU 1 South Wall, Feature 2a, Site 6376

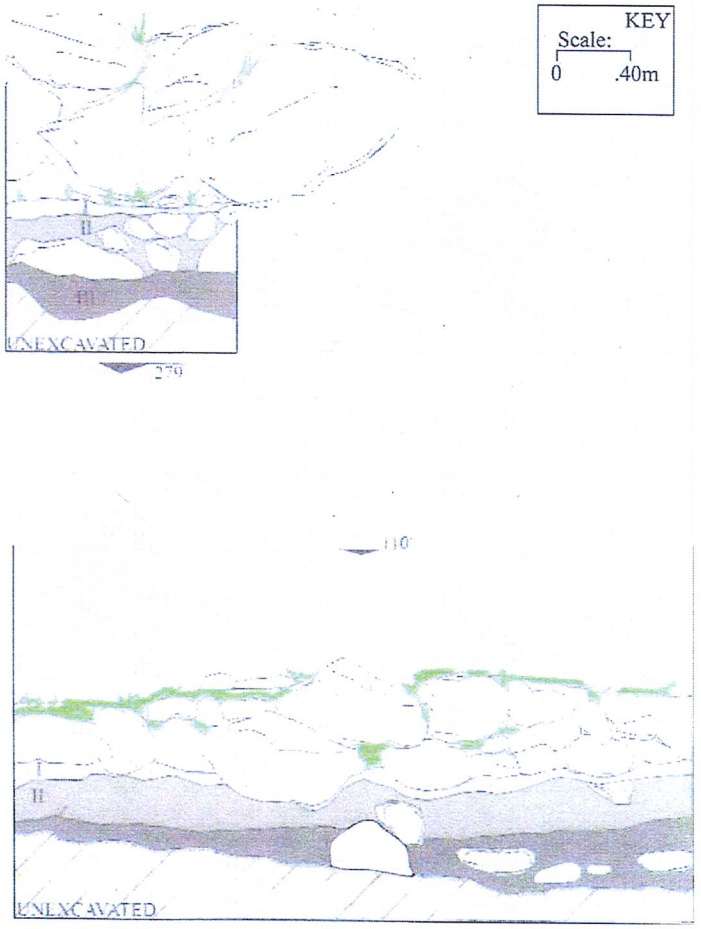


Figure 60. Stratigraphic Profiles of TU 1 North Face (Top) and TU 2 South Face (Bottom), Feature 2, Site 6376

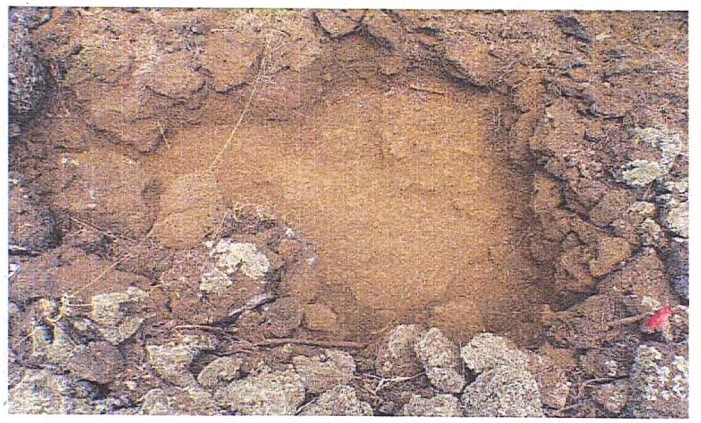


Figure 61. Photograph of B.O.E. of TU 1 and TU 2, Feature 2, Site 6376, View in Plan

STP 8-10, 12, 14-17 and STR 11 and 13 all exhibited a similar stratigraphic sequence as recorded in STP 1-4 of Feature with the exception of Layer I in STR 13 (Feature 4) which was a 7.5 YR 2.5/3 very dark brown silty loam (Figure 59). The shovel test pits and trenches were situated throughout the modified outcrop and all were negative for cultural remains (Figure 42). STP 8 was situated in the loose rock just west of Feature 1, STP 9 and 14 along the northern perimeter of the outcrop (Figure 60), STP 10 and STR 11 were situated in a small soil pocket within the east central portion, STP 12 and STR 13 were excavated at Feature 14 soil area (Figures 61 and 62), and STP 15-17 were placed around the perimeter of Feature 2.

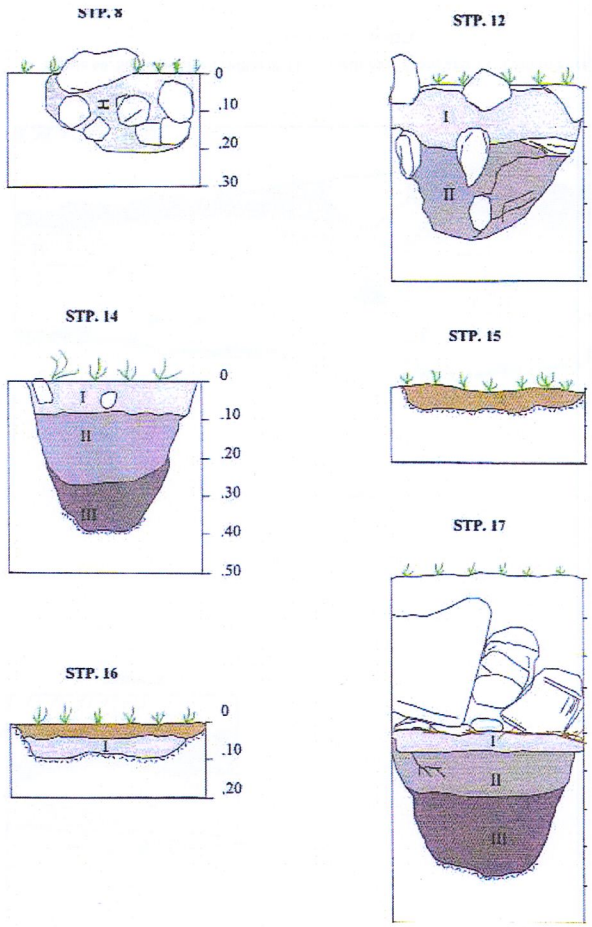


Figure 62. Stratigraphic Profiles of STP 8 and 12 North Walls, 14-West Wall, 15-17 North Walls

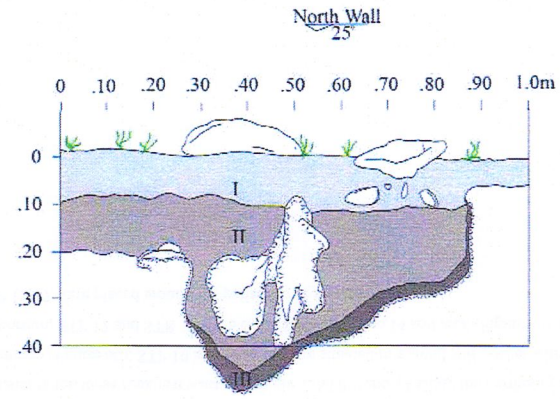


Figure 63. Stratigraphic Profile of STR 11

Figure 64. Photograph of STP 14, View in Plan

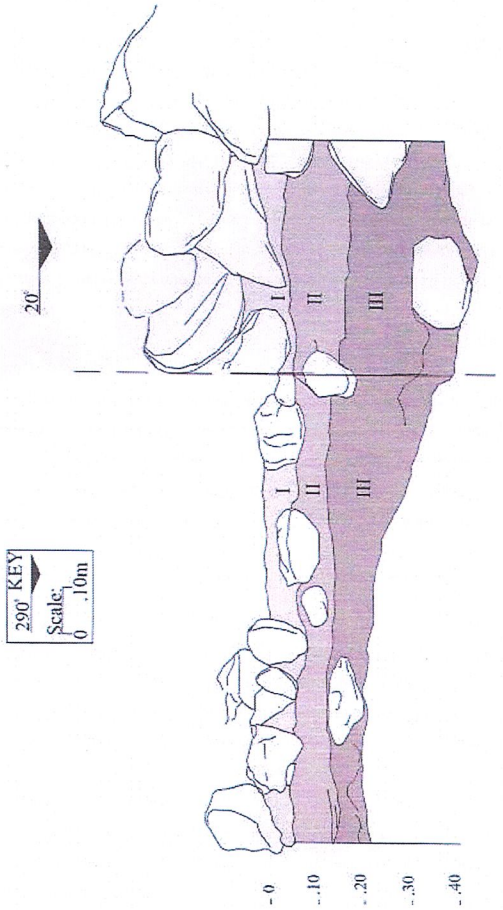


Figure 65. Stratigraphic Profile of STR 13 at Feature 4, Site 6376, South and West Walls

Figure 66. Photograph of STP 12 and STR 13, Feature 4, Site 6376, View to West

DISCUSSION SITE 6376

Site 6376 is a modified outcrop comprised of four main feature areas (Features 1-4) and five possible subfeatures (Features 3.1-3.5). Feature 1 is a modified outcrop associated with a linear soil area. The soil area was systematically tested with 7 STP's and all were negative for cultural materials. Testing within the U-shaped feature, Feature 2, identified a cultural layer within Layer II which was comprised of sparse marine shell, echinodermata, coral fragments (possible tools) and 1 piece each volcanic glass and basalt debitage. Also within Layer II was a charcoal deposit (Feature 2a) which returned a radiometric date of 190+/-40 BP. The interior soil area of Feature 2 measures 2.10 sq. m., the two test units covered 2.20 sq. m. and extended over the rock construction. Thus, almost the entire interior of this feature was tested during this undertaking. Feature 3 was comprised of five component sub-features (Features 3.1-3.5) which were natural crevasses and or lava blisters that had been partially modified. Features 3.1 and 3.2 were likely cupboard and or storage areas. Features 3.3 and 3.4 may have been modified and utilized for storage. Feature 3.5 appears to be a mulch or planting pit. Feature 4 is a crude alignment which

bounds a level soil area. Testing within this soil area was negative for cultural materials, however the soil area was probably utilized for agricultural purposes.

Site 6376 is interpreted as a habitation and agricultural area that was used intermittently during the pre-Contact to early historic periods. The presence of a charcoal deposit and cupboards supports a habitation function; however the fire pit is not lined and or formally constructed. Modifications to the outcrop and the presence of several soil pockets and or areas would be ideal for planting purposes.

Site 6376 been thoroughly tested and no further work beyond construction monitoring is warranted for this area. This site is very similar to Site 6379 which has been slated for preservation. Site 6379 is also a modified outcrop that contains similar but more formally constructed features. Furthermore, an earlier date (290+/-40 BP) was retrieved from a rock lined fire pit at Site 6379.

SITE 50-50-14-6377 (TS 7 and 28)

Site 50-50-14-6377 was recorded during the current undertaking. It is located within the northeast corner of the project area near Site 6371 and 6374 Feature 5. It measures 14.20 m (northeast) long by 9.0 m wide (southwest) and consists of two features, a well constructed three-sided structure designated Feature 1 (TS 7) and a circular walled pit assigned Feature 2 (TS 28-Figure 67). The site partially straddles the northern property line extending into the adjoining golf course property.

Feature 1

Feature 1 consists of a relaxed U-shaped structure which is 2.8 m east of Site 6374 Feature 1 boundary wall. It measures 6.5 m long (n/s) by 4.3 m wide (e/w) and is oriented east west (Figures 68 and 69). The walls are constructed of basalt cobbles and boulders stacked three to five courses high and measure 1.2 m wide with a maximum height of 0.9 m. Feature 1 opens to the west and is partially collapsed along its ends. The interior of this structure is comprised of a level soil area. Near the northeastern corner of this feature is an irregular shaped wall/alignment that has been created by incorporating the natural outcrop. It measures 11.5 m long by 0.6 m wide and is constructed of loosely stacked and aligned basalt boulders with heights ranging from 0.30 to 0.50 m. This site is in a rocky area that slopes downward from east to west. No testing was

performed at Feature 1 as it will be preserved within the proposed development. Further to the north is Feature 2 a circular walled pit.

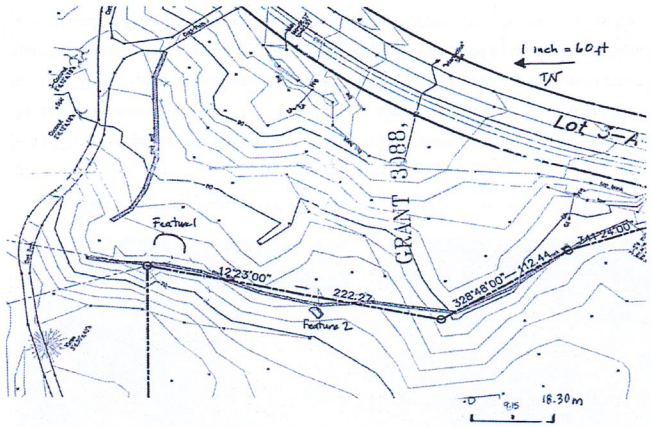


Figure 67. Plan View Map of Site 6377

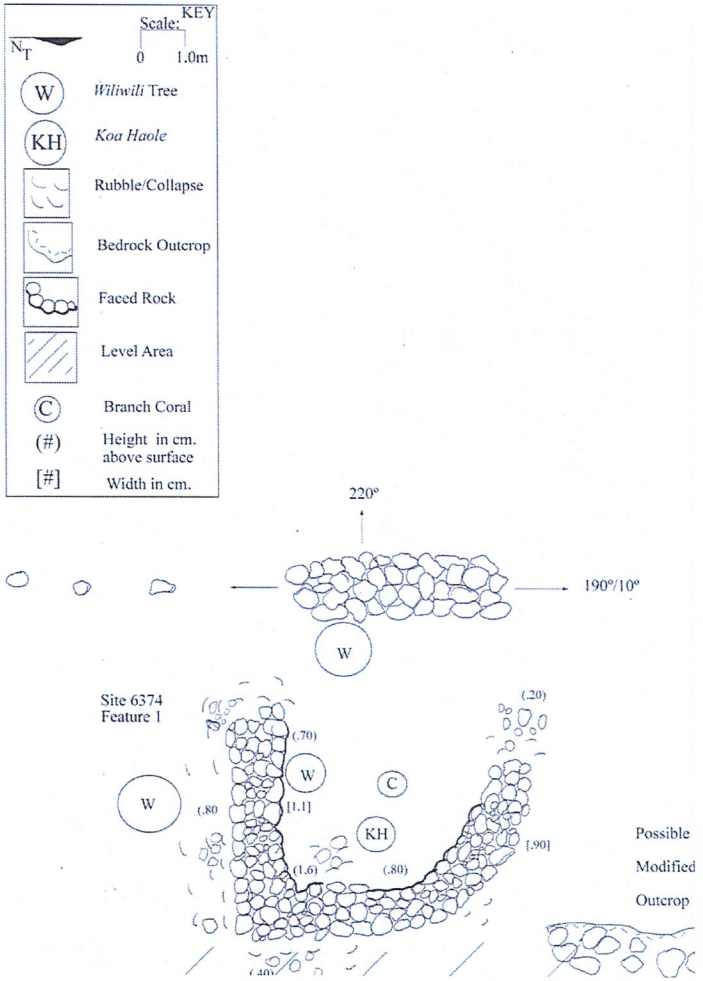


Figure 68. Plan View Map of Feature 1, Site 6377

Figure 69. Photograph of Site 6377 Feature 1, View to Southeast

Feature 2

Feature 2 is an oval shaped walled pit located west of Site 6374 Feature 1 boundary wall and approximately 38.0 m to the southwest from Feature 1 (Figure 70). It is 5.0 m long by 3.0 m wide and comprised of stacked subangular cobbles ranging in height from .36-.70m. This walled pit feature is similar to the walled pits identified at Site 6371 however it was grouped with this Site 6377 due to its close proximity to Feature 1. A .50 by .50 m test unit was excavated inside Feature 2 to determine presence/absence of cultural materials, and to record the stratigraphic sequence.

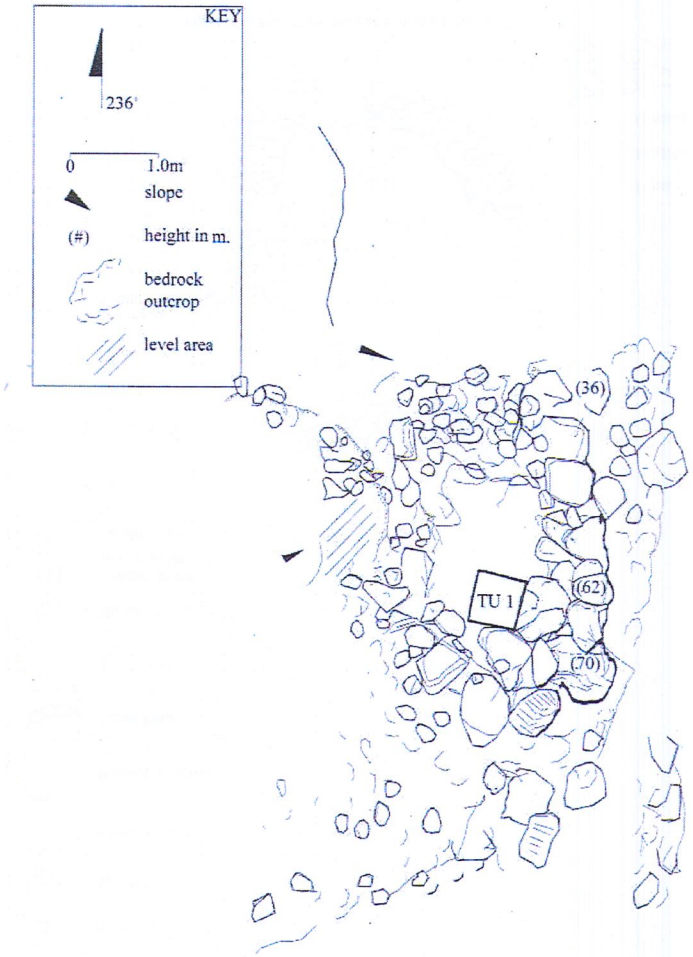


Figure 70. Plan View Map of Site 6377, Feature 2

Testing Feature 2

TU 1 is a .50 m by .50 m square test unit excavated along the interior northeast side of Feature 2. Testing identified two non-cultural stratigraphic layers, and that Feature 2 was built upon Layer I (Figure 71). Layer I was approximately 25 cm thick and consisted of a loamy clay and Layer II was 2-3 cm thick and comprised of the yellowish brown sterile basal layer. Layer II terminated on bedrock.

Layer I-(0-.30 m bs) dark brown loamy clay (10YR3/3), slightly sticky, slightly plastic, granular, non-cultural, abrupt, smooth boundary.
Layer II-(.30-.33 m bs) brownish yellow (10YR6/6), loose, non plastic, very fine, non-cultural, very abrupt, smooth boundary.

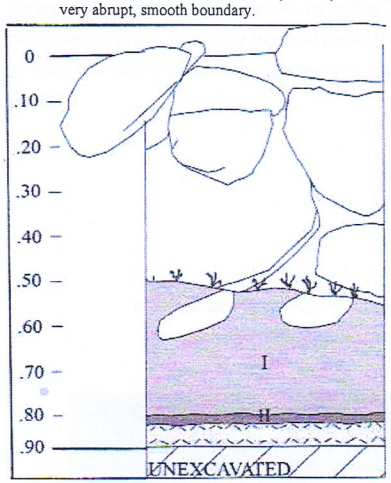


Figure 71. Stratigraphic Profile of North Wall Site 6377, Feature 2 TU 1

DISCUSSION OF SITE 6377

Site 6377 is comprised of two features. Feature 1 a U-shaped structure, and Feature 2 a walled pit. This site possibly functioned as a temporary habitation enclosure with an agricultural planting pit. Although this site is in close proximity to Site 6371, a permanent pre-Contact habitation and agricultural site, and that it contained a similar walled pit as those identified at Site 6371, the relationship of these two sites was indeterminate and they were assigned discrete site numbers.

Site 50-50-14-6378 (TS 27)

This site was located during the current survey and is situated in the southeast portion of the project area and is comprised of a square enclosure, Feature 1, associated with a modified outcrop, Features 2-4 (Figure 72). It is situated near Makena-Alanui Road and the imported sand fill area noted on Figure 7.

Feature 1

Feature 1 enclosure measures approximately 16.0 m long by 16.0 m wide with walls ranging in height from .56-.96 m and 1.0-1.8 m in width. It is constructed of boulder-faced, core-filled walls that bound a level soil area. One large piece of branch coral, rounded basalt, echinodermata, and mammal bone were observed on the surface of the interior. Two water-worn basalt cobbles are located outside the northeast corner of the enclosure, and one water-worn boulder outside the northwestern corner of the feature. The southern wall and the NW corner are disturbed due to Panini cactus and deer. Extending from the southwestern corner is a linear wall measuring 4.5 m long by 1.0 m wide. It is similarly constructed as the enclosure walls and its height ranges from 0.20 m on the south faced side to 1.0 m on the north faced side. Some collapse is evident at the southwestern end of this wall. One test unit measuring 1.0 by .5 meters was excavated in the NE corner and the results of this test excavation are described below. Feature 1 is surrounded by a natural outcrop along its northern side. The outcrop has been modified with circular pits (Features 2 and 3), and a cupboard (Feature 4).

Features 2 and 3

Two circular pits have been built into the outcrop north of the enclosure. Feature 2 measures 1.7 m in diameter forming a 'hole' or planting area in the lava field approximately 0.60 m deep. Feature 3 measures 2.5 m in diameter, is similarly constructed, and measures 0.55 m in the center. Both appear to have likely functioned as planting pits or perhaps small storage areas.

Feature 4

The last feature in this complex is a natural cupboard in the lava field to the southwest of the enclosure feature. The cupboard measures 1.0 m long by 0.6 m wide and was probably used for storage.

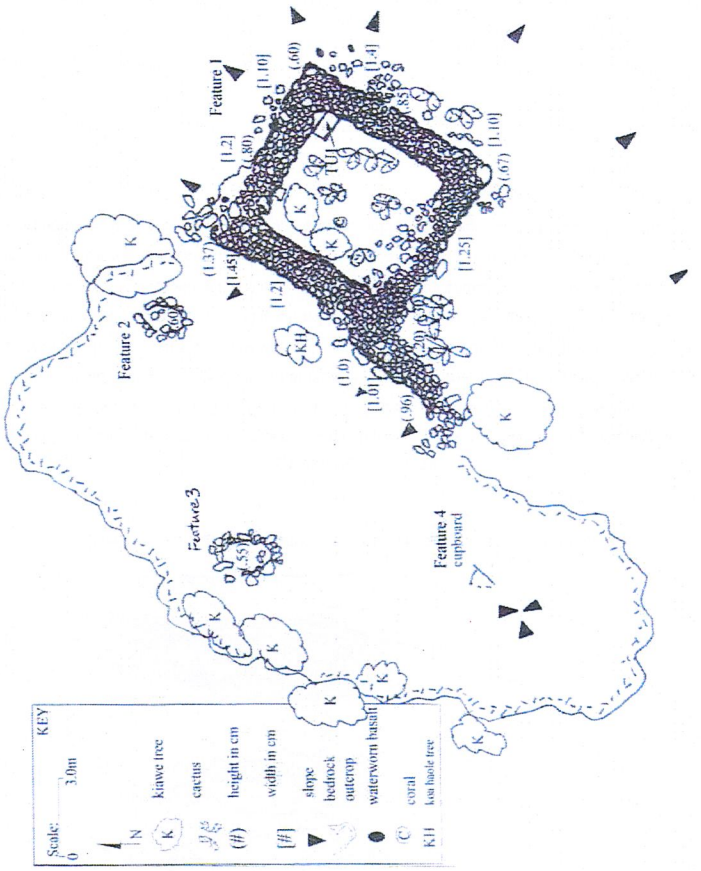


Figure 72. Plan View of Site 6378

TESTING

Feature 1

A 1.0 m long by .50 m wide test unit (TU 1) was excavated against the (interior) north wall to determine presence/absence of cultural materials, and which layer the basal stones of the wall correlate with (Figure 73). One subsurface feature; Feature 1a, a pocket of stained soil with charcoal, bone, and coral was encountered in the east wall of TU 1 at approximately .20 m bs (Figure 74). In profile, Feature 1a measures .42 m long by .11 m wide and is oriented at 297 degrees. Feature 1a may extend further to the east under the walled enclosure. TU1 contained two stratigraphic layers which are described below.

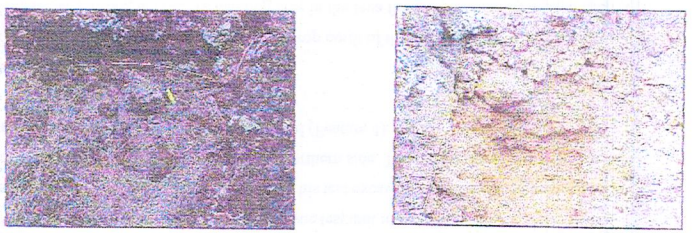


Figure 73. Photograph of TU 1 Pre-Excavation (Left) and Post Ex. (Right), Feature 1, Site 6378

Layer I (.06-.15 m bs) was a pavement of small cobbles intermixed with humic debris and contained no midden or artifacts. The pavement was built over Layer II a brown silty clay.

Layer II (.06-.48 m bs), brown (7.5 YR 2.5/3) slightly sticky, slightly plastic, silty clay. This layer was approximately 22 cm thick and virtually devoid of cultural materials. Only one basalt flake was recovered from level 3 ( ).

Layer III (.48-BOE), yellowish brown clayey silt basal layer.

Fe. 1a (.20-.32 m bs) was a grayish (10YR 3/4) soil pocket with ash and charcoal flecking, echinoid (.3g), animal bone fragments and pieces of coral (porites 6.8 g, and unidentifiable coral pieces (1.9 g).

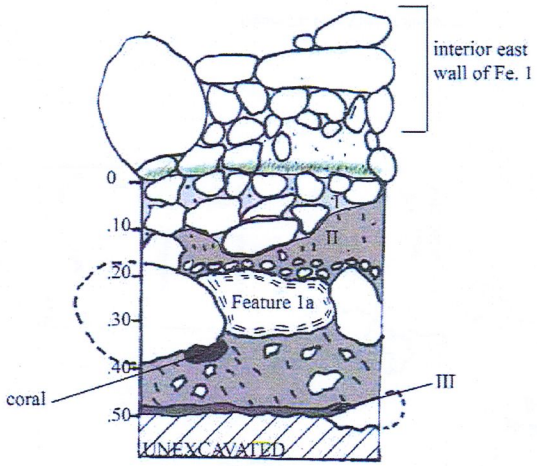


Figure 74. Stratigraphic Profile of East Wall of TU 1, Feature 1, Site 6378

DISCUSSION SITE 6378

Site 6378 appears to be a pre-Contact permanent habitation enclosure (based on the architectural type and substantive construction of Feature 1) associated with small agricultural planting pits (Features 2 and 3) and possible cupboard or storage area (Feature 4). One test unit was placed inside the enclosure abutting the east wall. A charcoal pocket (Feature 1a) with sparse cultural remains (echinodermata, unidentifiable animal bone and coral was documented from this feature). As this feature is located along the extreme eastern portion of the unit, it is possible that a formal subsurface hearth is in close proximity to this test unit. Site 6378 will be preserved and incorporated within the proposed development. No additional testing was performed within this feature.

SITE 50-50-14-6379 (formerly Site 231)

Previous Site Description

Site 50-Ma-B8-231

Cordy's description of this site was:

> Two Enclosures and Two Platforms
> Site 231 is just behind Site 225, south of the 18th tee. All structures are contiguous. One enclosure(231-1) is rectangular, with the north end open. It is 5.0 by 6.0 meters with low walls (.3-.6 m high). Platform (231-2) is abutted on the south and is small (2.0-4.0- m and .6 m high).Platform (231-3) is abutted to the inland side of 231-1, and also is small (6.0 by 2.0 m) and rectangular. Enclosure (231-4) is a rectangular enclosure with the inland side open. It is small (2.0 by 5.0 m) and low (.4-.7 m high). Midden [and a piece of volcanic glass] was visible only in 231-1, and one square was excavated (Figure 75).

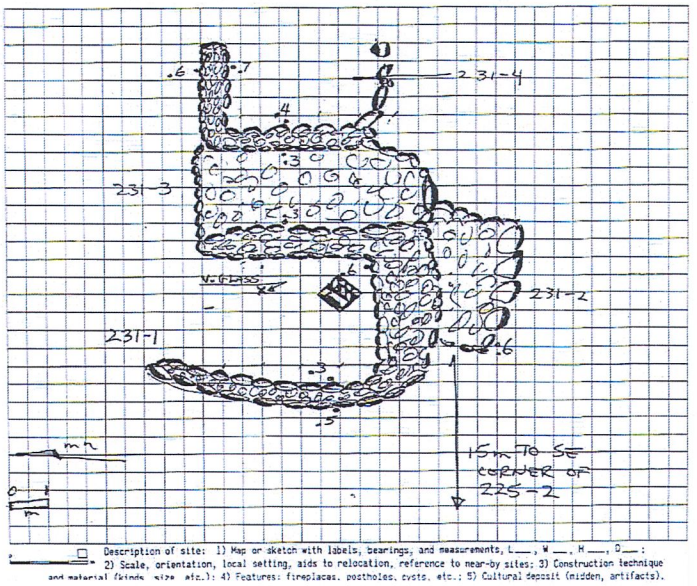


Figure 75. Sketch Map of Site 231 (Cordy 1978)

Current Site Description

Site 50-50-14-6379 consists of an extensively modified outcrop that is located within the central portion of the project area. It is east (*mauka*) of Site 6373 and measures approximately 15.0 m long (e/w) x 10.0 (n/s) m wide and is oriented at 178 degrees. The outcrop is comprised of a fairly level paved area situated across its central portion. The pavement, assigned Feature 1, has been created by filling the surface with cobbles. Extending from north side of the outcrop is a freestanding curved wall segment that forms somewhat of a U shaped enclosed area designated Feature 2. Along the southern side of the outcrop, an L- shaped faced alignment has been created by stacking basalt against the exterior edge of the outcrop. This L-shaped alignment has been designated Feature 3 (Figure 76).

Site 6379 has been adversely affected by dense vegetation growth, mechanical equipment and possibly from the removal and dismantling of the rocks to build historic ranch walls in the area. Although there is some resemblance, what was recorded by Cordy is not clearly represented today, and this discrepancy is likely due to the above mentioned impacts (Figures 75 and 76). Presented below are detailed descriptions of Site 6379 Features 1-3, as well as two subsurface features (Features 2a and 3a) documented during testing.

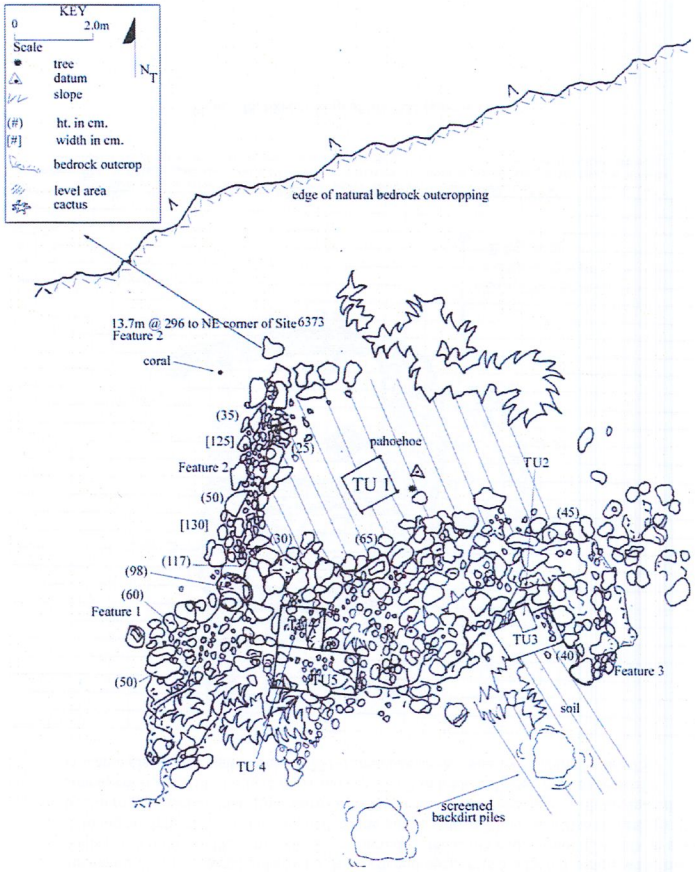


Figure 76. Plan View Map of Site 6379

Feature 1

Feature 1 appears to be a fairly level paved or filled surface area along the central portion of the outcrop (Figure 71). It extends approximately 7.0 m long (e/w) by 3.0 m wide (n/s) within this central area. The filled area is slightly depressed and may cover a *puka* or natural crevasse. It was indeterminate if the paving was a purposeful construction and if an interior chamber/*puka* was present under the cobble filling. Thus two units, TU 4 and 5 were placed within the paved area to ascertain presence/absence of an interior chamber and to assess the construction of the cobble pavement. Feature 1 may coincide with Cordy's Site 231-2 platform (See Figure 75).

Feature 2

Along the north face of the outcrop are crudely stacked sub-angular rocks which have been placed atop natural boulders to create a terrace/bench like area. This terraced area creates the back (south) wall of Feature 2. Extending from the northwest side of the outcrop is a freestanding wall that eventually curves to the east at its northern terminus. The freestanding wall is a boulder-faced and core-filled measuring 5.0 m long by 1.25 m wide, and ranging in height from .25-.50 m. In plan view, the curvilinear nature of this wall together with the stacked north face of the outcrop forms a U-shaped enclosed area designated Feature 2. The enclosed area is fairly level and contains a rocky soil within its interior. During the current survey, a 1.0 by 1.0 m test unit (TU 1) was placed upon the rocky soil.

In 1978, one volcanic glass fragment was identified on the surface of this rocky soil area, and a 1.0 by 1.0 m test unit was placed adjacent to the fragment. According to the report, no cultural materials were recovered from the test unit. Feature 2 appears to correlate to Site 231-1 during Cordy's survey (See Figure 75).

Feature 3

Feature 3 is situated on the south side of the modified outcrop and is comprised of an L-shaped faced wall that bounds a level soil area. The L-shape is formed by stacking large and small cobbles against the outcrop producing two perpendicular faced sections. The wall segments of Feature 3 are stacked 2-3 courses and measure .40-.55 m high. The eastern wall, oriented at 250 degrees, measures approximately 2.5 m long and is .80 m wide (See Figure 76). The northern wall measures 2.0 m long by .50 m wide and is oriented at 340 degrees. Feature 3 appears to be near the south side of Cordy's site areas 231-1 and 231-4 (see Figure 75). A 1.0 m long (n/s) by .50 m wide (e/w) test unit (TU 2) was situated within the level soil area to determine

presence/absence of cultural remains. During testing, a subsurface hearth feature designated Feature 3a was observed within the southern portion of the test unit. In order to fully document Feature 3a, another test unit, TU 3, was placed across and encompassing the southern half of TU 2.

TESTING

Feature 1

Test Unit 4 contained three layers of structural rock fill mixed with soil. Layer I was .09-.15 m thick and was comprised of soil and primarily small cobbles, however a few large cobbles were noted within this initial layer (Figures 77 and 78). Layer II, which averaged .15 m in thickness, contained soil and a greater percentage of larger cobbles. Layer III was confined to the southern half of the unit where it was observed at approximately .30 m bs. This layer consisted of a much smaller "clinker-like" pebbles and small cobbles mixed with a silt loam.

At the transition layer between Layers I and II, cultural materials and remains consisting of three pieces of marine shell, two tertiary basalt flakes, one tertiary flake fragment were collected. Similarly at this transition zone, an internal alignment of large cobbles was documented along the southern edge of TU 4 and designated Feature 1a (Figure 79). The top of Feature 1a was identified from approximately .06-.10 cm bs and appeared to extend outside of the unit towards the east and west; thus additional testing (TU 5) was conducted along this southern edge (See Figure 77-bottom). Testing was discontinued at approximately .45 m below the surface within TU 4, as further excavations could compromise the structural integrity of Feature 1a.

Test Unit 5, measuring 2.0 m long by 1.0 m wide was placed adjacent to and south of TU 4 to ascertain the overall nature and extent of the alignment, Feature 1a, and to determine if additional cultural materials were present. Testing within TU 5 revealed a similar stratigraphic sequence, however no cultural materials were collected. Feature 1a within TU 4 and 5 measures 2.10 m in length and appears to extend further west and possibly east.

Layer I (0-.26/.40 mbs) dark brown (10YR 3/3 dry) silty loam, 1vfgr, friable, non-sticky, non plastic, many coarse to fine roots, an abrupt, smooth boundary.
Layer II: (0.26/.40-.60/.65 mbs) Brown (10YR 4/3), loamy silt, 1vfsg/gr, very friable, slightly sticky, non- plastic, common coarse to medium roots, clear, wavy boundary. Cultural material from TU 4 included 3 basalt flakes, 1 piece of coral *porites, Cypraea* .4g, conch 6.4 g.
Layer III: (0..60/.65-.85/1.10-BOE mbd) Dark yellowish brown (10YR 5/4), rocky, silty loam, 1fsg/gr, f slightly sticky, non- plastic, common coarse to medium roots, abrupt smooth boundary.

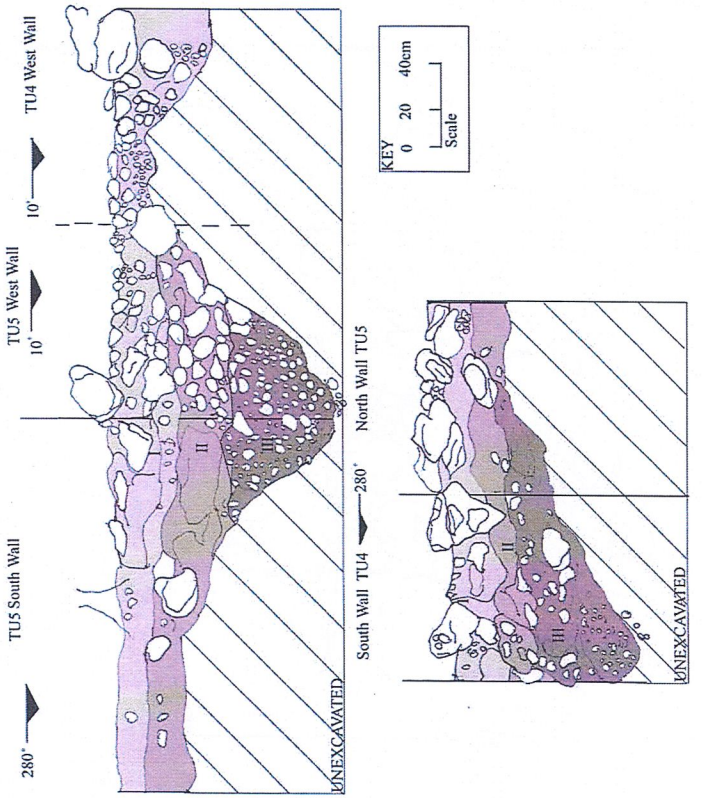


Figure 77. Stratigraphic Profiles of Test Units 4 and 5, Feature 1, Site 6379

Figure 78. Plan View Map of Test Units 4 and 5, Feature 1, Site 6379, Showing Rock Paving

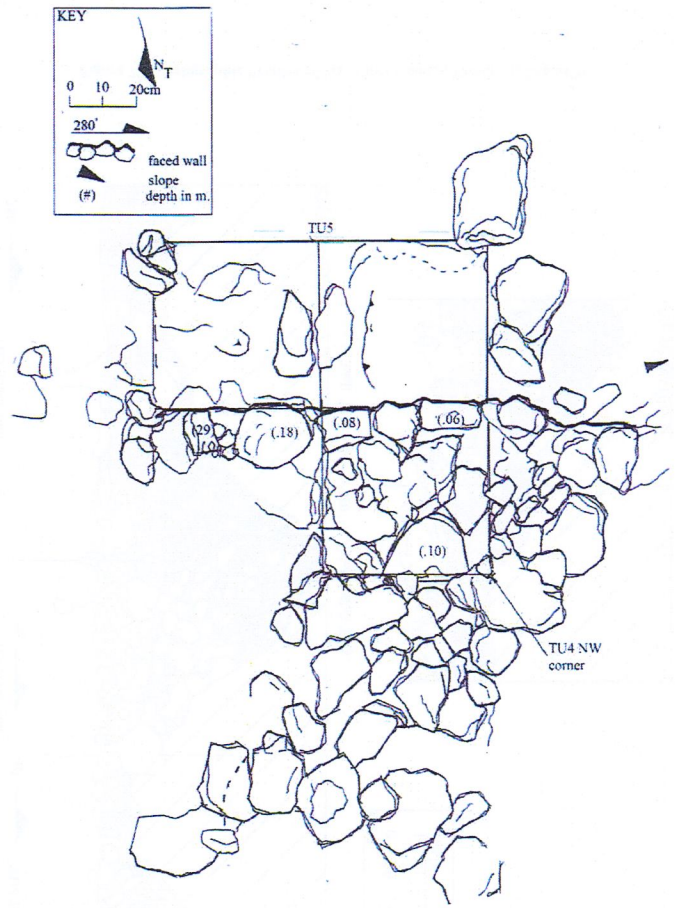


Figure 79. Plan View Map of Test Unit 4 and 5 Showing Feature 1a Internal Alignment, Site 6379

Feature 2

During the current investigation, a 1.0 by 1.0 m test unit (TU 1) was placed within the rocky soil interior to determine presence absence of cultural remains. TU 1 was situated near Cordy's test unit and the volcanic glass fragment. TU 1 recovered a tripartite stratigraphic sequence where a volcanic glass core and flake, conch 2.4 g, and *echinodermata* mouth parts .4 g were recovered within Layer II in the NW quadrant .82-.85 m bd (7-10 cm bs). The stratigraphy is described below and shown in Figure 80.

> **Layer I**-(0.71-0.80 m bd) Dark brown (10YR 3/3 dry) silty loam, 1vfgr, friable, non-sticky, non plastic, many coarse to fine roots, an abrupt, smooth boundary
> **Layer II**- (0.77-0.95 m bd) Dark yellowish brown (10YR 3/4), loamy silt, 1vfsg/gr, very friable, slightly sticky,non- plastic, common coarse to medium roots, abrupt smooth boundary. Cultural material recovered a volcanic glass core and flake at .83 m bd, conch 2.4 g and *echinodermata* .4g.
> **Layer III** (0.95-1.05 m bd) basal sterile layer composed of a dark yellowish brown (10YR 4/4), rocky, silty loam, 1fsg/gr, slightly sticky, non- plastic, common coarse to medium roots, abrupt smooth boundary.

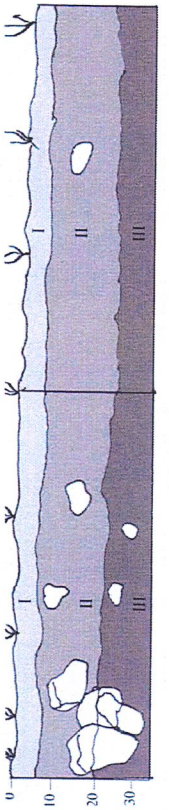


Figure 80. Stratigraphic Profile of Test Unit 1 at Feature 2, Site 6379, East and West Wall

Feature 3

Test Units 2 and 3 contained a thick layer I and a subsurface hearth feature designated Feature 3a. Layer II was only observed with TU 3 (Figure 81). TU 2 (1.0 m by .50 m) was positioned where the short axis was placed against the east wall to maximize the overall soil area to be tested. TU 3 (1.5 m by 1.0 m) was situated over the south half of TU 2 to expand on the subsurface feature, Feature 3a.

In the south central portion of TU 2, fire-cracked rocks and three large aligned cobbles were noted at.02 m bs. Charcoal influenced soil was observed from .18-.21 m bs within this southern portion. The cobbles and dark soil were assigned Feature 3a (Figures 81 and 82). Excavations proceeded in the north half of TU 2 where Layer I terminated upon bedrock from .10-.31 m bs. No cultural materials were collected within Layer I. In plan view, Feature 3a appeared to extend further south, east and west within TU 2, thus a second unit, TU 3 which measured 1.5 m long (e/w) by 1.0 m wide (n/s) was situated over Feature 3a. Testing commenced within TU 3 where at .03 m bs the aligned cobbles become more u-shaped in plan, and are placed upright on their sides like slabs (Figure 83). At .23 m bs a fourth stone was observed along the western side which created a definitive square-shaped, slab-lined hearth feature associated with ash and charcoal. The slabs were .40-.50 m in length by approximately.15 m in width and ranged from .25 to .37 m deep within in the western portion (Layer I) of the unit, and .55 to .60 m deep (Layer II) in the eastern portion. Excavations of the hearth were processed separately.

Excavations inside Feature 3a encountered concentrated charcoal fragments and flecking in the west portion, and large deposits of ash noted in the eastern portion. Near the base, a thermally altered material comprised of a light oxidized reddish-brown (5yr 6/4) ash/soil was documented (Figure 84). Interestingly, no cultural materials (besides the charcoal) were observed within TU 2 and 3. A charcoal sample was obtained throughout the excavated feature and submitted to Beta Analytical for radiometric dating. The sample from Feature 3a returned a conventional radiocarbon age of 290+/-40 BP and this date was calibrated to a range of AD 1480-1660 (see radiocarbon section).

Layer I-(0.28-0.43 cmbd) Very dark brown (7.5YR 2.5/3 dry) silty loam, 1vfgr, friable, non-sticky, non plastic, many coarse to fine roots, an abrupt, smooth boundary.
Layer II (0.45-0.61cmbd) Brown (7.5YR 4/4), rocky, silty loam, 1fsg/gr, f slightly sticky, non-plastic, common coarse to medium roots, abrupt smooth boundary.

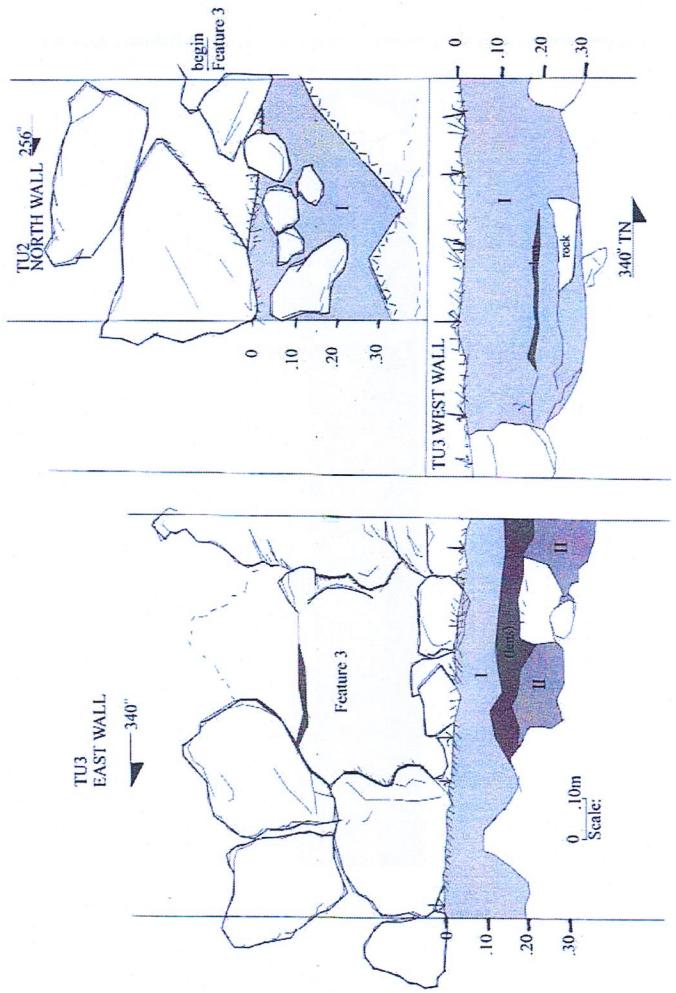


Figure 81. Stratigraphic Profiles of TU 2 North Wall and TU 3 East and West Walls

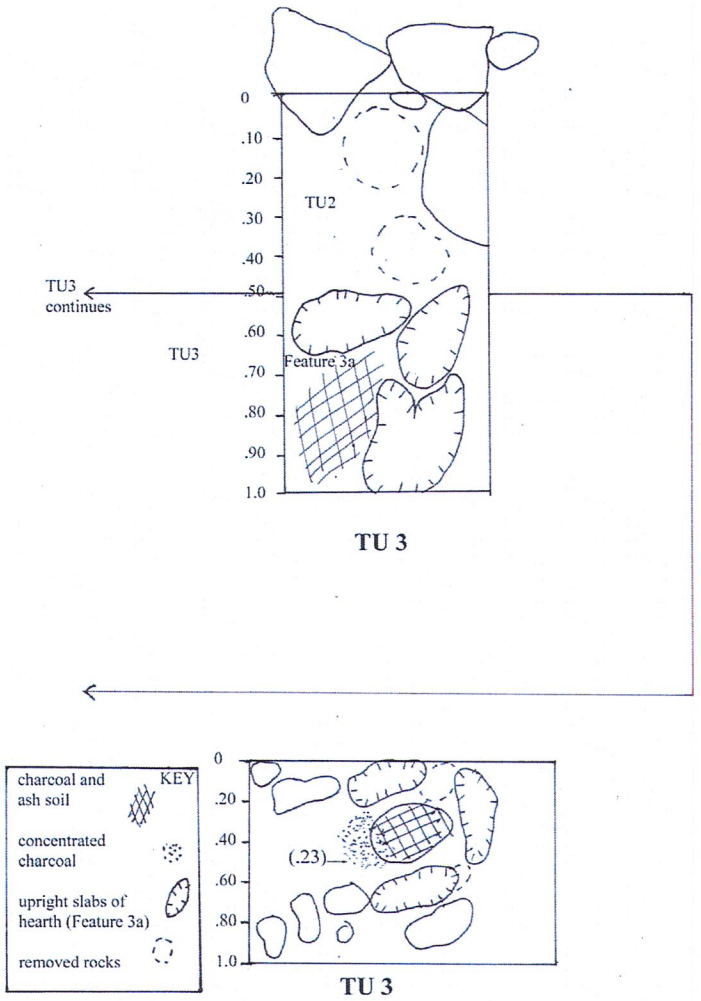


Figure 82. Plan View of Feature 3a within TU 2 and TU 3 (Top) at .21 m bs (Bottom) at .23 mbs

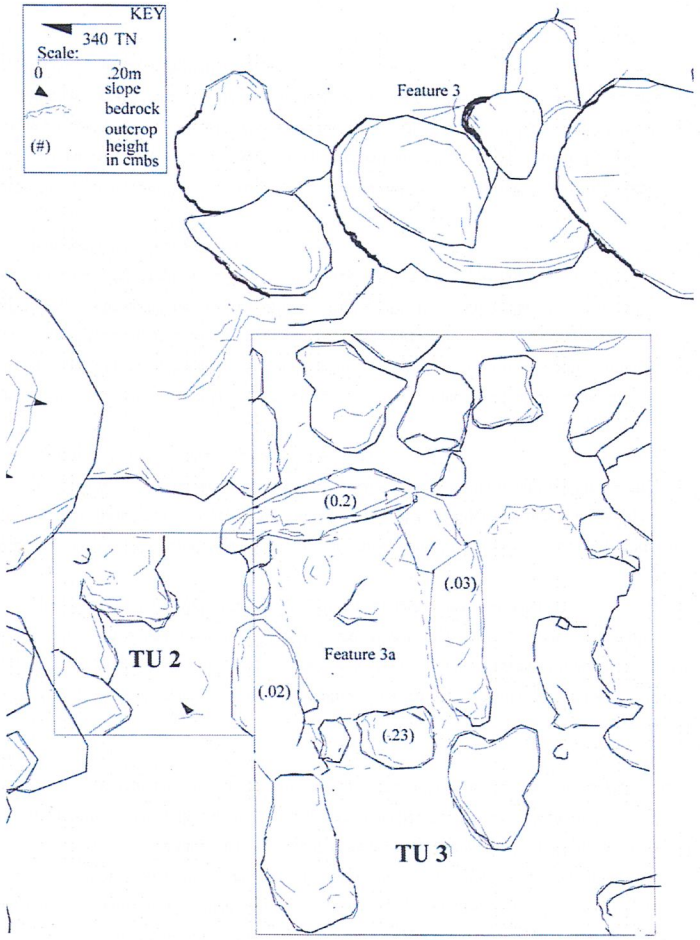


Figure 83. Plan View of Feature 3a at .02 m bs within TU 2 and TU 3

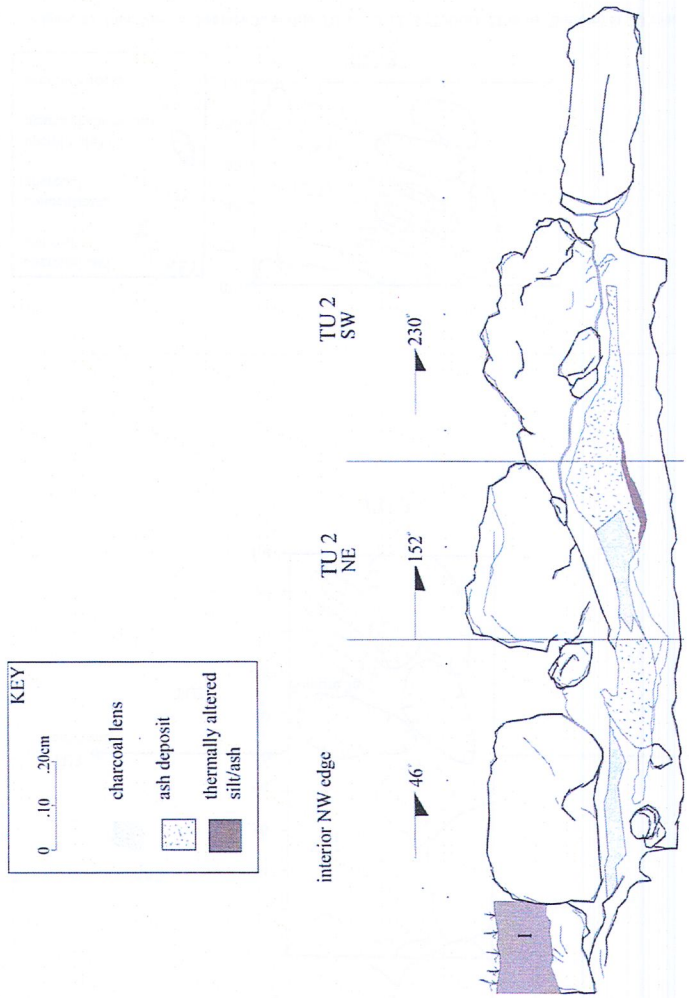


Figure 84. Stratigraphic Profile of Interior Slab Walls of Feature 3a

DISCUSSION SITE 6379

Site 6379 is comprised of three distinct features. Feature 1 was a deliberate paved portion of the natural outcrop. Testing within this area identified at least two sections of purposeful rock fill, as well as sparse cultural materials (marine shell, basalt debitage) and a subsurface alignment designated Feature 1a. This alignment was located along the southern edge of TU 4 and appeared near the base of Layer I (.06-.10 m bs). At this same location sparse cultural materials were recovered. Although the purpose of the internal alignment is indeterminate at this time, it would likely be correlated with the cultural materials, and may be an earlier component of this temporary habitation feature. No additional testing was conducted at Feature 1 as it is slated for preservation.

Feature 2, the U-shaped area, may have been utilized for temporary habitation due its formal site type, size, and the presence of sparse cultural materials consisting of volcanic glass fragments and marine shell. The sparse collection of shellfish and artifacts may be due to the placement of the test unit. Since this site will be preserved, no additional testing was warranted.

Feature 3 contained a well defined subsurface hearth (Feature 3a) that was just below the organic humic layer. Based on the presence of Feature 3a, the L-shaped alignment functioned as the cooking area for the overall site complex. A charcoal sample was submitted from the hearth feature which returned an age range of AD 1480-1660.

Site 6379 is very similar to Site 6376, an elongated modified outcrop which contains three features, and appears to have been utilized for temporary habitation during traditional times. Site 6379 also appears to be a temporary habitation complex from the pre-Contact period. The chronology is based on the charcoal sample collected from the hearth feature, as well as the overall feature types represented. Site 6379 is clearly a better site type example and older structure and thus will be preserved.

Also of interest is that Site 6379 is in close proximity to Site 6373, a possible permanent pre-Contact habitation site associated with agricultural and animal husbandry features. Due to the close proximity of these sites, it would seem that the two sites are related however no conclusive evidence was collected during the current undertaking. Fortunately, both sites will be preserved within the proposed development plans.

MIDDEN AND ARTIFACT ANALYSIS

MIDDEN

Marine invertebrates

Shellfish collected from the testing program was minimal. The representation of marine shell was from the high surge reef zone and tide pools (Neritidae and Thaididae), as well as deeper offshore varieties from 10-200m depths (Conidae and Cypraeidae). Four different types of genus (Conidae, Cypraeidae, Neritidae, Thaididae) were represented in the assemblage. Conidae (53.9 g) and Cypraeidae (44.2 g) were the dominant species.

Radiocarbon Analysis

Two radiocarbon assays have been conducted for two fire pit deposits at the pre-Contact period sites. The conventional radiocarbon age for Site 6376 Feature 2a was 190 +/- 40 BP and Site 6379 Feature 3a was 290 +/- 40 BP.

ARTIFACTS

Basalt

The primary flake obtained from Site 6376-Feature TU 2 Layer II was a light grey rough material. The dorsal surface contained 100% cortex and the flake measured 3.9 cm long by 3.1 cm wide by .4 cm thick. Three pieces of debitage were collected from this layer and was comprised of a similar material.

Two secondary flakes and one secondary flake fragment were recovered from Site 6379, Feature 1, TU 5 Layer . These secondary flakes were of a fine to medium grained dark grey basalt. Flake 1.1 measured 3.1 cm long by 3.7 wide by .9 thick, Flake 1.2 was 3.8 cm long by 2.0 cm wide by.9 cm thick, and the fragment was 3.1 cm long by 4.3 cm wide by 1.1 cm thick.

Volcanic Glass

The volcanic glass core was a dark black opaque glass with no cortex. It measured approximately 1.6 cm by .9 cm wide by .9 cm thick. The tertiary flake which appeared to be from the same material as the core, measured 1.4 cm long by .5 wide by .4 thick.

Figure 85. Photograph of Artifacts Volcanic Glass Core, Volcanic Glass Flake, and (3) Basalt Flakes

Table V. Midden and Artifact Table for Site 6371 and 6373

	Site 6371	Site 6371	Site 6373	Site 6373	TOTAL
	Feature 2	Feature 3	Feature 3	Feature 4	
	Layer II (10-22 cm bs)	Layer II (6-43 cm bs)	Layer I (0-3 cmbs)	Layer I (0-12 cmbs)	
Shell					
Gastropoda					
Conidae	8			19.6	**27.6**
Cypraeidae	7.1	2.5			**9.6**
Neritidae					
Thaididae	0.5	0.6		1.5	**2.6**
unidentified					
TOTAL	**15.6**	**3.1**		**21.1**	**39.8**
Crustacaea					
echinodermata					
mouth parts					
body parts					
spine					
Artifacts					
Basalt debitage					
Vol. Gls. deb.					
Manuports					
Coral porites			2 pcs		
Coral Branch					
iiiiii					

Table VI. Midden and Artifact Table for Sites 6376 and 6379

	Site 6376	Site 6376	Site 6376	Site 6379	Site 6379	TOTAL
	Feature 2/TU1	Feature 2/TU2	Feature 2a	Feature 1/TU4	Fe. 2/TU1	
	Layer II(3-16cmbs)	Layer II(6-43 cmbs)	(6-.27cmbs)	Layer II(26-60cm)		
Shell						
Gastropoda						
Conidae	5.9	3.9	7.7	6.4	2.4	**26.3**
Cypraeidae	7	16.5	11.1			**34.6**
Neritidae			0.1			**0.1**
Thaididae	2.4	2.4				**4.8**
unidentified	1	0.9	0.9			**2.8**
TOTAL	**16.3**	**23.7**	**19.8**	**6.4**	**2.4**	**68.6**
Crustacaea						
echinodermata						
mouth parts	1.1	0.2	0.4		0.4	**2.1**
body		2.3				**2.3**
spine	0.2					**0.2**
TOTAL	**1.3**	**2.5**	**0.4**		0.4	**4.6**
Artifacts						
Basalt flake	1	1		3		**5**
Basalt debitage		3 pcs				**3**
Vol. Gls.core					1	**1**
Vol. Gls. Flake					1	**1**
TOTAL	**1**	**4 pcs**		**3**	**2**	**10**
Manuports						
Coral porites	2 pcs	2 pcs	4 pcs	1 pc		**9 pcs**
Coral Branch						
iiiiii						

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.5:lab. mult=1)

Laboratory number: Beta-242397

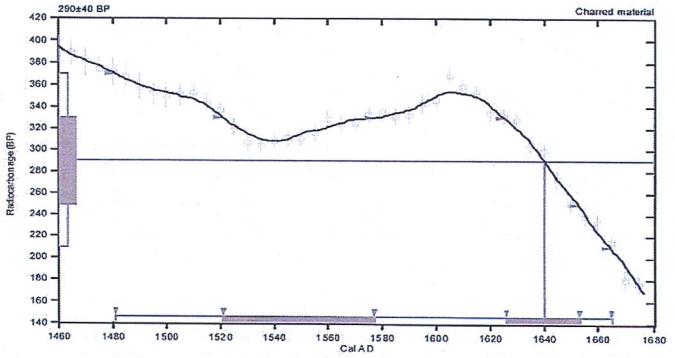
Conventional radiocarbon age: 290±40 BP

2 Sigma calibrated result: (95% probability) Cal AD 1480 to 1660 (Cal BP 470 to 280)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1640 (Cal BP 310)

1 Sigma calibrated results: (68% probability) Cal AD 1520 to 1580 (Cal BP 430 to 370) and Cal AD 1630 to 1650 (Cal BP 320 to 300)



References:

Database used
INTCAL04
Calibration Database
INTCAL04 Radiocarbon Age Calibration
IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

Figure 86. Radiocarbon Data Sheet for Site 6379 Feature 3a

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: Beta-244667

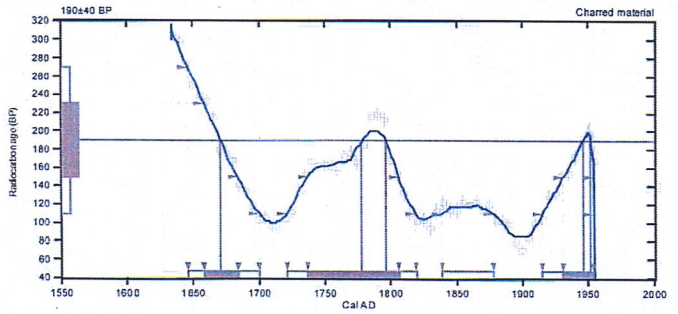
Conventional radiocarbon age: 190±40 BP

2 Sigma calibrated results: (95% probability) Cal AD 1650 to 1700 (Cal BP 300 to 250) and Cal AD 1720 to 1820 (Cal BP 230 to 130) and Cal AD 1840 to 1880 (Cal BP 110 to 70) and Cal AD 1920 to 1950 (Cal BP 40 to 0)

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1670 (Cal BP 280) and Cal AD 1780 (Cal BP 170) and Cal AD 1800 (Cal BP 150) and Cal AD 1950 (Cal BP 0) and Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: (68% probability) Cal AD 1660 to 1680 (Cal BP 290 to 270) and Cal AD 1740 to 1810 (Cal BP 210 to 140) and Cal AD 1930 to 1950 (Cal BP 20 to 0)



References:

Database used
INTCAL04
Calibration Database
INTCAL04 Radiocarbon Age Calibration
IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).
Mathematics
A Simplified Approach to Calibrating C14 Dates
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Figure 87. Radiocarbon Data Sheet for Site 6376 Feature 2a

Initial significance has been assessed for Sites 50-50-14-6371-74, 6376-79 (Table II). These assessments are based on the Hawaii Register of Historic Places significance evaluation criteria:

> **Criterion A:** Associated with events that have made an important contribution to the broad patterns of our history;
>
> **Criterion B:** Associated with the lives of persons important to our past;
>
> **Criterion C:** Embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; or possess high artistic value;
>
> **Criterion D:** Have yielded, or is likely to yield, information important for research on prehistory or history; and
>
> **Criterion E:** Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the State due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts; these associations being important to the group's history and cultural identity.

Based on the above criteria, all sites are considered significant under Criterion D, however Sites 6373, 6378 and 6379 are significant under multiple criteria of C and D (Table VI). These sites have yielded information important for understanding settlement patters and or occupation in Honuaula region. Similarly, a few sites are good representation of formal site type categories, and exemplify a distinctive characteristic for mode of construction.

Table VII. Summary of Initial Significance Evaluations for Sites 50-50-14-6371-6374 and 6376-6379

SIHP#	Description of Features from Current Survey	Formal Site Type and Age	SIGNIFICANCE
6371	Modified Outcrop Enclosure Fe. 1	Pre-Contact Permanent Habitation with Agricultural	D
	Circular Walled Pit Fe. 2		
	Circular Walled Pit Fe. 3		
	Circular Walled Pit Fe. 4		
	Circular Walled Pit Fe. 5		
	Alignment Fe. 6		
6372	Historic House Site Fe. 1	Historic Permanent Habitation with Agricultural	D
	Oval Rock Clearing Mounds (n=15) Fe2.1-2.22		
	Refuse Deposit Fe. 3		
6373	(Complex) Platform Fe.1	Pre-Contact Permanent Habitation with Agricultural	C, D
	Enclosure Fe. 2		
	Enclosure Fe. 3		
	C-shape Fe.4		
	V-shaped Wall Fe. 5		
	Alignment Fe. 6		
	Remnant Wall Fe. 7		
	Depression Fe. 8		
6374	Wall Around Project Area Fe.1	Historic and Ranching Boundary Walls and Animal Husbandry	D
	Wall Segment Fe. 2		
	Wall Segment Fe. 3		
	Wall Segment Fe. 4		
	Modified Outcrop Wall Remnant Fe. 5	Recent (Former Stable Area) Animal Husbandry	
6376	Modified Outcrop Wall Fe. 1	Pre-Contact Temporary Habitation with Agricultural	D
	Modified Outcrop U-Shape Enc. Fe. 2		
	Modified Outcrop Poss. Cupboards Fe. 3.1-3.4		
	Modified Outcrop Alignment and Soil Fe. 4		
6377	U-Shaped Enclosure with Wall Segment Fe. 1	Pre-Contact Temporary Habitation with Agricultural	D
	Circular Walled Pit Fe. 2		
6378	Pre-Contact Square Enclosure Fe.1	Pre-Contact Permanent Habitation with Agricultural	C, D
	Walled Pits/Depressions Fe. 2.1-2.2		
	Cupboard Fe. 3		
6379	Modified Outcrop Pavement Fe. 1	Pre-Contact Temporary Habitation with Agricultural	C, D
	Modified Outcrop Enclosure Fe. 2		
	Modified Outcrop L-shaped Fe. 3		
Total	59 Features	8 Sites	

DISCUSSION

The current completion of the inventory survey procedures, together with the results of the previous phases of work, have collectively identified eight historic properties; Sites 50-50-14-6371 through 6374 and 6376 through 6379; composed of fifty-nine component features. Six of the sites are interpreted to originate in the pre-Contact period (SIHP 50-50-14-6371, 6373, 6376-79), two from the historic period (SIHP 6372, 6374), and the origin of a wall remnant, Site 6374 Feature 5, remains unknown (Table I). The pre-Contact era Native Hawaiian sites were comprised of complexes consisting of enclosures, C-shapes, platforms, alignments, walled pits, and cupboards. The larger archaeological complexes within the parcel were; Site 6378 situated near the southeastern corner, Site 6371 in the northeast corner and Site 6373 located near the center of the parcel. The smaller pre-Contact sites comprised of modified outcrops with ancillary features are situated near the large complexes. Site 6376 is situated in the southeast corner north of Site 6378, Site 6377 is along the northern boundary line by Site 6371 and Site 6379 is located just east of Site 6373 within the center of the project area. Two radiocarbon assays have been conducted for two fire pit deposits at the pre-Contact period sites. The conventional radiocarbon age for Site 6376 Feature 2a was 190 +/- 40 BP and Site 6379 Feature 3a was 290 +/- 40 BP.

The post-contact features were situated along the western edge of the parcel. The post-contact site, Site 6372, was situated along the western edge of the parcel. It consisted of a walled homestead with a probable habitation dwelling associated with rock mounds and a historic period refuse pit. The second historic era site, Site 6374, was made up of an arbitrary assemblage of several discrete, free-standing, rock wall segments that likely functioned as property boundary walls and animal enclosures and or exclosures. For all 59 features identified within the project area, the most frequently occurring feature-type represented in the project area was the clearing mound (22), followed by modified outcrops (12), walled pits (7), wall segments (5), and enclosures (4).

Some interesting patterns of site distribution along with the probable influencing factors, could be inferred from the results of the current undertaking. As indicated above, the post-contact period sites, such as Site 6372, occurred along the western edge of the parcel. Two factors appeared to have influenced this trend. One was the presence of more level areas with soil in the western periphery of the project area as revealed by the backhoe trench testing. This kind of topography was more favorable for the relatively expansive (larger footprint) historic period homesteads, defined by perimeter walls that contained the house, other ancillary features, and often small

garden plots within the enclosed yard. The second and possibly the more influential was the existence of the Makena-Keoneoio Road along the coastal area fronting the western boundary. All along the coast, to the north and south of the subject project area, during the 1800s, historic homesteads clustered along the coastal roadway and other hubs of commerce and transportation such as boat landings and *mauka/makai* roadway junctions. What is currently evidenced in the project area is the remnant of this historic settlement pattern. The exception was the long, linear, free-standing walls that often continued far inland. These walls functioned as cattle control during the ranching era and others delineated various land division boundaries. Walls that surrounded habitation and agricultural areas functioned as enclosures or exclosures. Such exclosures against intrusion of marauding wild cattle was a noted characteristic of early historic period sites in the Makena region. Fine examples of such sites, such as Sites 1969 and 1941, are preserved elsewhere in the Makena Lands LLC holdings located *mauka* of the current project area.

What becomes evident through time is the change in the traditional land division and settlement schemes that were oriented *mauka-makai*, or from shoreline to inland, within specific *ahupua`a* boundaries to one of traversing across the traditional boundaries in a pattern paralleling the coastline along major roadways. The earlier largely temporary, semi-permanent or seasonal settlements evolved into more self-sufficient and permanent habitation areas with the advent of western commercialism in the latter half of the 1800s. The former *ahupua`a* boundaries in most cases came to define large private landholdings owned by recent immigrants.

The clusters of pre-Contact period sites, such as Sites 6371, 6373, 6378, and 6379, appeared to concentrate atop and around low outcrop knolls. Most of the habitation-related features were situated atop the knoll and the agricultural features occupied the low lying areas with more soil surrounding the outcrop knolls. Another apparent trend was that of U-shaped structures at smaller outcrop knolls, such as at Site 6379 and 6376. A similar feature, Site 6367, occurred in the immediately adjoining parcel to the south. These small complexes are interpreted as agricultural sites with temporary habitation or storage features. Since Site 6379 returned an earlier date that Site 6376, and it is a better example of this site type, Site 6379 has been recommended for preservation.

Unfortunately, compounded disturbances have obscured other patterns that may have been inherent in concert with the neighboring areas. The connections to adjoining areas have been lost

through the construction of roads and other modern infrastructural as well as resort and residential developments that have impacted the integrity of the past cultural landscape. What are left are the records from earlier archaeological studies and historic period land use documentation that chronicled the settlement of this region through time. Based on such data the historic period occupation of the project area and Maluaka *ahupua`a* can be said to have occurred later than the neighboring localities to the south and north that show awards dating from the mid-1800s. The absence of *kuleana* awards and grants that date to or close to the time of the *mahele* accounts for this temporal difference. The chronologically diagnostic historic artifacts from the Site 6372 Feature 3 refuse pit support the later occupation of the historic homestead, ca 1930-1950. The historic homestead, Site 6366, located within the adjoining parcel to the south dated to the same period.

The paucity of datable remains, both artifacts and radiocarbon samples, from many of the sites also precludes the conclusive interpretation of the pre-historic origins of these sites. The absence of historic period artifacts by itself is not always a declaration that the site is pre-Contact. Often during the early periods of assimilation or contact, the early historic period sites would manifest only traditional types of artifacts and midden remains, thus a possibility exists for some of the sites to have been occupied during the early historic era.

In general, the collective results of past and recent phases of work appeared to coincide well with the settlement pattern ascribed for the region and conformed to the stated site expectations. Several sites within the project area are good examples of site types and modifications to the surrounding rocky terrain and have been recommended for preservation.

RECOMMENDATIONS

Five historic properties (Sites 6371, 6373, 6377 Feature 2, 6378, and 6379) from the pre-Contact period comprised of 21 component features have been recommended for preservation and portions of the proposed development were redesigned to accommodate the permanent *in situ* preservation of these historic properties (Table V). A Preservation Plan stating the short-term and long-term preservation commitments for the sites shall be prepared and submitted to the SHPD. All other sites, Site 6372, 6374 and 6376 have been adequately documented and require no further inventory level procedures. However, due to the sensitive nature of the area, and that

subsurface remnant features may be present, archaeological monitoring is recommended during all ground altering activities. A Monitoring Plan is being prepared for submission to the SHPD.

Table VIII. Summary of Preservation Sites

SIHP#	Temporary Site#	Description of Features from Current Survey	Total # Features	STATUS
6371	50-Ma-B8-218	Modified Outcrop Enclosure Fe. 1	1	PRESERVE
		Circular Walled Pit Fe. 2	1	PRESERVE
		Circular Walled Pit Fe. 3	1	PRESERVE
		Circular Walled Pit Fe. 4	1	PRESERVE
		Circular Walled Pit Fe. 5	1	PRESERVE
		Alignment Fe. 6	1	PRESERVE
6372		Historic House Site Fe. 1	1	No Further Work
		Oval Rock Clearing Mounds (n=22) Fe2.1-2.22	22	No Further Work
	50-Ma-B8 229-2	Refuse Deposit Fe. 3	1	No Further Work
6373	50-Ma-B8-225	(Complex) Platform Fe.1	1	PRESERVE
		Enclosure Fe. 2	1	PRESERVE
		Enclosure Fe. 3	1	PRESERVE
		C-shape Fe.4	1	PRESERVE
		V-shaped Wall Fe. 5	1	PRESERVE
		Alignment Fe. 6	1	PRESERVE
		Remnant Wall Fe. 7	1	PRESERVE
		Depression Fe. 8	1	PRESERVE
6374	50-Ma-B8-230	Wall Around Project Area Fe.1	1	No Further Work
		Wall Segment Fe. 2	1	No Further Work
		Wall Segment Fe. 3	1	No Further Work
	50-Ma-B8-242	Wall Segment Fe. 4	1	No Further Work
6376		Modified Outcrop Wall Remnant Fe. 5	1	No Further Work
		Modified Outcrop Wall Fe. 1	1	No Further Work
		Modified Outcrop U-Shape Enc. Fe. 2	1	No Further Work
		Modified Outcrop Poss. Cupboards Fe. 3.1-3.4	4	No Further Work
		Modified Outcrop Alignment and Soil Fe. 4	1	No Further Work
6377		U-Shaped Enclosure with Wall Segment Fe. 1	1	PRESERVE
		Circular Walled Pit Fe. 2	1	No Further Work
6378		Pre-Contact Square Enclosure Fe. 1	1	PRESERVE
		Walled Pits/Depressions Fe. 2.1-2.2	2	PRESERVE
		Cupboard Fe. 3	1	PRESERVE
6379	50-Ma-B8-231	Modified Outcrop Pavement Fe. 1	1	PRESERVE
		Modified Outcrop Enclosure Fe. 2	1	PRESERVE
		Modified Outcrop L-shaped Fe. 3	1	PRESERVE
	Total		59 Features	21 Features Preserved

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STATE HISTORIC PRESERVATION DIVISION ACCEPTANCE LETTER DATED OCTOBER 18, 2008

APPENDIX

K-1

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
OCT 23 2008
BY:

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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CONSERVATION AND COASTAL LANDS
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

October 18, 2008

Jeffrey Pantaleo, M.A.
Archaeological Services Hawai'i, LLC
1930 A Vineyard Street
Wailuku, Hawai'i 96793

LOG NO: 2008.4506
DOC NO: 0810PC21
Archaeology

Dear Mr. Pantaleo:

SUBJECT: **Chapter 6E-42 Historic Preservation Review – REVISED Archaeological Inventory Survey for Parcel H2, Maluaka Ahupua'a, Makawao District, Maui Island**
TMK: (2) 2-1-005:085 and por. 108

Thank you for the opportunity to review this revised report, which our staff received on October 17, 2008 (Rotunno-Hazuka, Sinoto and Pantaleo 2008): *Inventory Survey Report for Parcel H-2 Located in Maluaka Ahupua'a*...Archaeological Services Hawai'i, LLC.

The report was first reviewed by SHPD staff on July 23 of 2008 (SHPD LOG NO: 2008.2038; DOC NO: 0807PC27), resulting in a series of requested revisions. Resubmitted on October 13 of 2008, the report was again reviewed that same day (SHPD LOG NO: 2008.4500; DOC NO: 0810PC13) and returned to you because some of the previously requested revisions had not been addressed. The most recent version of the report was reviewed in PDF format to confirm completion of those revisions and suggestions.

The survey area as described in the report consists of 19.036 acres (7.6 hectares) of land situated at TMK (2) 2-1-005:085 and a 2.079 acre (0.83 hectare) portion of TMK (2) 2-1-005:108. Pedestrian survey within the parcel, first conducted in 1978 by Dr. Alan Haun (Bishop Museum) and later same year by Dr. Ross Cordy, was again undertaken by Archaeological Services Hawai'i in conjunction with Aki Sinoto Consulting in January of 2001 and again between 2006 and 2007, with sample backhoe trenching occurring in 2008. Sixteen variously sized controlled test units, nine 0.3 m x 0.3 m shovel probes and eight backhoe trenches were excavated. Eight sites comprised of 59 component features, now on record as SIHP #50-50-14-6371 [pre-Contact habitation platform and five walled pits], -6372 [mid 19th century habitation midden scatter and wooden shack], -6373 [pre-Contact habitation enclosures and platform] -6374 [four boundary walls and a modified outcrop wall, all post-Contact in origin], -6376 [pre-Contact to early post-Contact habitation and agricultural features], -6377 [pre-Contact habitation U-shape and circular walled pit probably used for agriculture], -6378 [pre-Contact habitation square enclosure and modified outcrop with constructed pits and a natural cupboard] and -6379 [two rectangular pre-Contact habitation enclosures and platforms] were identified. Two charcoal samples, one from SIHP #50-50-14-6376 Feature 2a and the other from SIHP #50-50-14-6379 Feature 3a, also returned age ranges of A.D. 1650-1700, 1720-1820, 1840-1880, 1920-1950 and A.D. 1480-1660, respectively.

The report now contains the required information as specified in HAR §13-276-5 regarding the documentation of inventory level fieldwork in general and is acceptable.

As stated in the initial review letter, with respect to the Hawai'i Register of Historic Places, we concur that all of the abovementioned sites are significant under Criterion D for their potential to yield information important to history or prehistory and that SIHP #50-50-14-6373, -6378 and -6379 are also significant under Criterion C for their excellent site type and distinctive characteristics.

We also agree with the recommendation that the 21 component features comprising SIHP #50-50-14-6371, -6373, 6377 Feature 2, -6378 and -6379 be preserved through avoidance (conservation) and that -6372 and -6374 require no further historic preservation work. *Further, we question whether SIHP #50-50-14-6376 may still provide useful information and should also be set aside for preservation or selected for data recovery.* We agree that precautionary archaeological monitoring is warranted for all ground altering disturbance associated with development of the subject parcels due to the likelihood that culturally significant subsurface deposits may be identified in the process. Although a monitoring plan was received in July, it will remain on hold until an associated preservation plan and if applicable, data recovery plan has also been submitted.

Now that the inventory survey report has been accepted pursuant to HAR §13-276, please send one hardcopy of the current version, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF file on CD to the attention of "SHPD Library" at the Kapolei SHPD office. *However, before doing so, please correct the total acreage of the surveyed area as shown in the Project Area section of the Introduction.*

Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

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