

**Table 28. SIHP Site 23686 agricultural features.**

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
1	Mound	S/P	5.2	2.9	0.8	Irregular
2	Mound	S	2.8	2.7	0.8	Oval
3	Modified outcrop	S	4.3	2.2	1.8	Irregular
4	Modified outcrop	P	4.6	2.9	1.1	Linear
5	Modified outcrop	P	5.8	4.2	0.6	Irregular
6	Mound	P	5.0	2.1	0.4	Linear
7	Modified outcrop	P	4.4	3.6	0.6	Triangular
8	Mound	P	2.8	2.8	0.5	Circular
9	Modified outcrop	S	5.2	2.9	0.8	Irregular
10	Mound	P	2.0	1.5	0.5	Oval
11	Mound	P	3.9	1.8	0.8	Linear
12	Mound	P	3.7	2.1	0.7	Linear
13	Mound	P	3.8	2.7	0.9	Linear
14	Mound	P	2.7	2.7	0.7	Circular
15	Mound	P	3.5	3.0	1.0	Oval
16	Mound	P	2.3	2.3	0.8	Circular
17	<i>Kuaiwi</i>	P	38.7	2.0	0.8	Linear
18	Mound	P	2.7	2.4	0.7	Circular
19	Mound	P	2.1	0.9	0.9	Linear
20	Mound	P	3.1	1.9	0.9	Oval
21	Mound	P	2.7	1.6	1.0	Irregular
22	Mound	P	3.2	2.9	0.5	Rectangular
23	Mound	P	3.3	0.9	0.9	Linear
24	Mound	P	3.8	3.0	0.9	Irregular
25	Mound	P	3.1	2.5	0.5	Irregular
26	Modified outcrop	P	4.5	3.5	0.7	Irregular
27	Mound	P	2.1	2.1	0.7	Circular
28	Mound	P	3.5	2.0	0.4	Irregular
29	Mound	P	4.1	3.5	0.9	Oval
30	Mound	P	10.7	2.7	0.4	Linear
31	Mound	P/S	2.1	1.9	0.7	Irregular
32	Mound	P	1.8	1.6	0.6	Irregular
33	Mound	P	4.0	3.6	0.8	Oval
34	Mound	P	2.2	2.2	1.0	Circular
35	Enclosure	P	3.0	2.5	0.4	Oval
36	Modified outcrop	P/S	2.1	1.4	1.1	Irregular
37	Terrace	P	4.8	3.1	0.9	Linear
38	Mound	P	2.0	1.7	0.5	Oval
39	Mound	P	1.8	1.4	0.5	Oval
40	Mound	P	2.8	2.1	0.7	Oval
41	Mound	P	1.4	1.4	0.4	Circular
42	Mound	S	2.1	1.8	0.8	Irregular
43	Mound	P	1.9	1.8	0.5	Circular
44	Mound	P	2.3	2.0	0.5	Oval
45	Mound	P	2.3	1.5	0.5	Oval
46	Mound	P	3.2	1.0	0.4	Linear
47	Mound	P	2.5	1.9	0.6	Oval
48	Mound	P	2.6	2.0	0.4	Oval
49	Mound	P	2.3	1.9	0.5	Oval
50	Mound	P	3.2	2.1	0.5	Irregular
51	Mound	P	2.7	1.8	0.5	Irregular
52	Mound	P	1.3	1.3	0.6	Circular

\*S=Stacked; P=Piled.

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Table 28. Continued.

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
53	Mound	P	4.4	2.9	0.6	Oval
54	Mound	P	1.8	1.3	0.4	Irregular
55	Mound	P	1.9	1.3	0.4	Rectangular
56	Mound	P	2.5	1.7	0.7	Oval
57	Mound	P	2.5	1.6	0.7	Linear
58	Mound	P	4.5	3.2	0.7	Irregular
59	<i>Kuaiwi</i>	P	18.6	1.1	0.4	Linear
60	Mound	P	1.4	1.4	0.6	Linear
61	Mound	P	3.3	1.5	0.7	Linear
62	Mound	P	2.1	2.1	0.3	Circular
63	Mound	P	1.7	1.0	0.5	Irregular
64	Mound	P	3.3	1.9	0.3	Oval
65	Mound	P	2.1	1.5	0.2	Oval
66	Mound	P	1.7	2.1	0.3	Circular
67	Mound	P	3.5	0.8	0.4	Linear
68	Mound	P	1.8	1.0	0.5	Circular
69	Mound	P	2.7	2.7	0.6	Circular
70	Mound	P	2.2	1.2	0.4	Oval
71	Mound	P	4.8	3.3	0.4	Irregular
72	Mound	P	1.9	1.5	0.8	Oval
73	Mound	P	1.9	1.9	0.4	Circular
74	Mound	P	1.7	1.7	0.3	Circular
75	Mound	P	2.1	1.4	0.6	Oval
76	Mound	P	1.3	1.3	0.5	Circular
77	Mound	P	1.9	1.2	0.3	Oval
78	Mound	P	1.8	1.1	0.5	Oval
79	Mound	P	1.4	1.4	0.4	Circular
80	Mound	P	3.2	1.4	0.7	Linear
81	Terrace	S	60.0	1.0	0.5	Linear
82	<i>Kuaiwi</i>	S	108.0	2.1	0.7	Linear
83	Mound	S	1.8	1.3	0.5	Circular
84	Mound	S	3.4	2.1	0.8	Rectangular
85	Mound	P	3.1	2.2	0.8	Oval
86	Mound	P	3.0	1.7	0.5	Oval
87	Mound	S	1.8	1.1	0.4	Rectangular
88	Mound	P	2.1	1.1	0.4	Oval
89	Mound	P	1.5	1.5	0.5	Circular
90	Mound	P	3.4	1.7	0.6	Linear
91	Mound	P	1.9	1.9	0.6	Circular
92	Mound	P	5.6	2.1	0.7	Linear
93	Mound	P	3.4	1.9	0.4	Rectangular
94	Mound	P	1.9	1.9	0.7	Circular
95	Mound	P	6.4	1.8	1.4	Crescent
96	Mound	P	2.6	1.2	0.7	Irregular
97	Mound	P	1.9	1.4	0.5	Oval
98	Mound	P	2.0	1.2	0.4	Rectangular
99	Mound	P	4.0	1.4	0.4	Linear
100	Mound	P	11.9	1.9	0.5	Circular
101	Mound	P	2.0	2.0	0.5	Circular
102	Mound	P	1.4	1.4	0.4	Circular
103	Mound	P	3.4	1.7	0.5	Irregular
104	Mound	P	1.6	1.1	0.4	Oval

\*S=Stacked; P=Piled.

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**Table 28. Continued.**

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
105	Mound	P	2.4	2.4	0.4	Circular
106	Mound	P	1.7	1.7	0.4	Circular
107	Terrace	P	5.2	2.4	0.3	Linear
108	Mound	P	1.7	1.5	0.5	Irregular
109	Mound	P	1.7	1.2	0.5	Oval
110	Mound	P	1.6	1.6	0.5	Circular
111	Mound	P	1.8	1.2	0.5	Oval
112	Modified outcrop	P	3.6	2.3	0.8	Linear
113	Mound	P	2.8	1.8	0.6	Linear
114	Mound	P	2.2	1.5	0.3	Rectangular
115	Mound	P	2.1	2.0	0.5	Irregular
116	Mound	P	2.3	1.4	0.5	Oval
117	Mound	P	2.4	1.2	0.3	Oval
118	Terrace	P	7.0	0.7	0.6	L-shaped
119	Mound	P	2.8	1.9	0.4	Oval
120	Terrace	S	29.0	1.0	0.6	Linear
121	Mound	P	2.7	1.3	0.4	Oval
122	Mound	S	2.8	1.7	0.6	Oval
123	Mound	P	2.3	1.2	0.5	Linear
124	Mound	P	2.3	1.3	0.4	Oval
125	Mound	P	2.0	1.4	0.5	Oval
126	Mound	S	2.6	1.6	0.7	Rectangular
127	Mound	P	5.2	1.2	0.4	Linear
128	Mound	P	3.2	2.2	0.6	Oval
129	Mound	P	3.5	3.2	1.0	Oval
130	Modified outcrop	S	4.7	2.8	0.3	Linear
131	Mound	S	3.4	2.3	0.5	Triangular
132	Mound	P	1.8	1.3	0.8	Oval
133	Modified outcrop	P	2.2	2.0	0.7	Irregular
134	Mound	P	1.9	1.3	0.4	Oval
135	Modified outcrop	P	1.8	1.1	0.6	Irregular
136	Mound	P	2.3	1.9	0.6	Irregular
137	Modified outcrop	P	2.8	2.0	0.8	Rectangular
138	Mound	P	1.3	1.3	0.3	Circular
139	Modified outcrop	P	1.5	1.1	0.7	Oval
140	Mound	S	2.3	1.8	0.7	Irregular
141	Terrace	P	4.7	2.5	1.0	Rectangular
142	Mound	S	1.3	0.9	0.9	Oval
143	Terrace	P	3.6	1.8	0.8	Rectangular
144	Mound	P	2.6	2.1	0.8	Oval
145	Modified outcrop	P	1.8	2.1	0.7	Oval
146	Mound	P	2.6	2.2	0.6	Oval
147	Mound	P	3.7	1.6	0.5	Linear
148	Mound	P	2.3	1.2	0.6	Oval
149	Mound	P	2.0	2.0	0.7	Circular
150	Mound	P	4.4	2.5	0.6	Linear
151	Mound	P	1.4	1.4	0.3	Circular
152	Mound	P	4.9	3.2	0.7	Linear
153	Mound	P	1.4	0.8	0.3	Oval
154	Mound	P	3.6	2.3	0.7	Linear
155	Mound	P	1.5	1.0	0.4	Triangular
156	Mound	P	3.2	2.1	0.6	Oval

\*S=Stacked; P=Piled.

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**Table 28. Continued.**

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
157	Mound	P	1.8	1.5	0.5	Circular
158	Mound	S	2.5	1.6	0.7	Oval
159	Mound	P	1.5	1.2	0.7	Oval
160	Mound	S	1.8	1.3	0.6	Irregular
161	Modified outcrop	S/P	6.0	3.0	1.4	Rectangular
162	Mound	P	1.3	1.3	0.6	Circular
163	Modified outcrop	P	12.2	1.1	1.1	Irregular
164	Modified outcrop	P	5.8	4.8	1.9	Rectangular
165	Mound	P	1.8	1.8	0.4	Irregular
166	Mound	P	3.2	1.7	0.8	Linear
167	Mound	P	1.3	1.3	0.4	Circular
168	Mound	S/P	5.7	3.9	0.9	Oval
169	Mound	P	2.2	1.6	0.7	Oval
170	Mound	P	1.3	1.3	0.5	Circular
171	Mound	P	2.2	1.7	0.8	Irregular
172	Mound	P	2.3	1.8	0.5	Oval
173	Mound	P	3.0	2.2	0.9	Oval
174	Mound	P	1.8	1.8	0.3	Circular
175	Modified outcrop	P	2.3	2.1	1.0	Irregular
176	Mound	P	1.1	1.0	0.5	Circular
177	Modified outcrop	P	2.9	2.6	0.6	Crescent
178	Mound	P	2.6	2.1	0.5	Irregular
179	Modified outcrop	P	1.4	2.3	0.4	Irregular
180	Mound	P	1.8	1.8	0.6	Circular
181	Mound	P	2.8	1.7	0.8	Irregular
182	Mound	P	2.2	2.2	0.5	Circular
183	Modified outcrop	S	6.7	5.3	0.8	Irregular
184	Mound	P	2.0	2.0	0.4	Circular
185	Terrace	P	17.0	0.6	0.9	Linear
186	Mound	S/P	2.6	1.4	0.9	Oval
187	Mound	S/P	3.0	1.7	0.8	Rectangular
188	Modified outcrop	P	3.5	2.7	1.0	Irregular
189	Mound	P	2.4	2.2	0.7	Irregular
190	Modified outcrop	S/P	3.9	2.3	0.9	Linear
191	Modified outcrop	P	4.4	2.1	0.8	Linear
192	Modified outcrop	S	2.5	1.8	0.8	Oval
193	Modified outcrop	P	9.2	3.1	1.1	Irregular
194	Mound	P	3.0	2.1	0.6	Oval
195	<i>Kuaiwi</i>	S/P	16.0	1.0	0.5	Linear
196	Modified outcrop	P	5.2	2.8	0.8	Linear
197	Mound	S/P	6.0	2.3	1.1	Rectangular
198	Modified outcrop	P	3.1	2.7	0.6	Irregular
199	Modified outcrop	P	6.5	4.8	0.7	L-shaped
200	Terrace	P	7.2	2.1	0.8	Crescent
201	Modified outcrop	S/P	6.2	3.8	0.7	Oval
202	Mound	P	2.1	2.1	0.6	Circular
203	Mound	P	3.4	2.8	0.8	Circular
204	Modified outcrop	S/P	3.4	2.7	0.7	Irregular
205	Modified outcrop	P	3.0	2.3	0.6	Irregular
206	Mound	S	2.3	2.3	0.6	Circular
207	Mound	S	3.2	3.2	0.8	Irregular
208	Modified outcrop	P	2.7	0.9	0.4	Linear

\*S=Stacked; P=Piled.

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**Table 28. Continued.**

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
209	Modified outcrop	P	3.7	2.6	0.6	Oval
210	Modified outcrop	P	5.2	3.4	0.9	Irregular
211	Mound	P	3.6	2.8	0.8	Irregular
212	Terrace	P	5.2	1.4	0.5	Linear
213	<i>Kuaiwi</i>	P	50.2	1.8	0.7	Linear
214	Mound	S/P	2.6	2.1	0.9	Oval
215	Modified outcrop	S/P	10.3	3.9	1.7	Irregular
216	Mound	P	2.7	2.4	0.2	Circular
217	Modified outcrop	S	1.6	0.4	0.4	Linear
218	Modified outcrop	P	2.0	1.8	0.7	Oval
219	Modified outcrop	P	3.0	1.8	1.0	Irregular
220	Modified outcrop	S	1.8	1.0	1.5	Crescent
221	Mound	S/P	3.5	1.9	1.1	Irregular
222	Mound	P	3.6	2.7	1.0	Rectangular
223	Mound	P	2.5	2.0	0.8	Irregular
224	Mound	S/P	3.3	1.9	0.9	Rectangular
225	Mound	P	1.4	1.4	0.7	Circular
226	Mound	P	2.0	2.0	0.6	Circular
227	Mound	P	4.1	3.7	0.8	Irregular
228	Mound	P	2.3	2.1	1.0	Oval
229	Mound	S/P	4.3	2.0	0.9	Rectangular
230	Modified outcrop	P	3.4	2.3	0.9	Oval
231	Modified outcrop	P	2.3	2.0	0.7	Irregular
232	Modified outcrop	P	1.9	1.7	0.9	Oval
233	Mound	P	2.3	1.7	0.8	Irregular
234	Mound	S/P	2.0	1.7	1.0	Irregular
235	Modified outcrop	S/P	3.9	1.9	1.0	Irregular
236	Modified outcrop	S/P	2.1	1.6	1.1	Irregular
237	Terrace	S/P	6.0	4.0	2.1	Rectangular
238	Modified outcrop	P	3.4	2.8	1.0	L-shaped
239	Modified outcrop	S/P	4.0	2.5	0.7	Rectangular
240	Mound	P	2.5	2.1	0.8	Circular
241	Mound	P	4.4	3.1	1.0	Irregular
242	Modified outcrop	S/P	3.4	2.2	0.8	Irregular
243	Terrace	S/P	11.8	7.9	0.9	Crescent
244	Terrace	S/P	9.0	5.6	0.7	Linear
245	Modified outcrop	S/P	13.9	7.8	1.7	Irregular
246	Mound	S/P	2.2	1.0	0.6	Irregular
247	Terrace	S/P	11.0	2.6	0.9	Linear
248	Modified outcrop	P	3.5	1.9	0.7	Irregular
249	Mound	P	4.1	2.3	0.6	Oval
250	Pavement	P	2.5	1.8	0.5	Rectangular
251	Enclosure	P	12.5	11.5	0.6	Rectangular
252	<i>Kuaiwi</i>	P	38.0	2.3	0.8	Linear
253	Terrace	S/P	15.0	2.5	0.7	Linear
254	Terrace	S/P	20.0	2.7	0.8	Linear
255	Mound	P	9.5	2.8	0.8	Linear
256	Mound	P	1.5	1.4	0.5	Circular
257	Mound	S/P	2.9	2.1	0.6	Rectangular
258	Mound	P	1.2	1.0	0.5	Oval
259	Mound	P	2.8	1.2	0.6	Rectangular
260	Mound	S	3.3	2.3	1.2	Triangular

\*S=Stacked; P=Piled.

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**Table 28. Continued.**

<i>Feature #</i>	<i>Feature type</i>	<i>Attribute*</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Height (m)</i>	<i>Shape</i>
261	Mound	S	5.1	3.0	1.2	Oval
262	Mound	S	3.4	1.7	1.2	Irregular
263	Mound	S/P	4.2	2.2	1.4	Oval
264	Terrace	S/P	36.0	2.1	0.7	Linear
265	Terrace	P	5.2	1.4	0.4	Linear
266	Mound	S	2.4	1.2	0.7	Rectangular
267	Terrace	S/P	5.0	5.0	1.0	L-shaped
268	Modified outcrop	P	3.1	2.1	0.9	Irregular
269	Terrace	S/P	22.5	1.8	0.8	Linear
270	Enclosure	S/P	11.0	9.5	0.9	U-shaped
271	Mound	S	2.4	1.2	0.7	Rectangular
272	Modified outcrop	P	4.6	4.5	0.7	Oval
273	Modified outcrop	P	5.5	3.0	1.1	Irregular
274	Mound	P	4.0	2.5	1.0	Oval
275	Modified outcrop	S/P	5.0	4.5	1.2	Oval
276	Mound	P	2.7	1.4	0.8	Linear
277	Mound	S/P	5.0	2.7	0.9	Oval
278	Mound	P	3.2	2.4	0.9	Oval
279	Enclosure	S/P	3.5	2.6	0.7	Oval
280	Mound	P	2.2	2.2	0.6	Circular
281	Modified outcrop	P	6.4	4.3	1.0	L-shaped
282	Pavement	P	12.5	8.5	0.2	Rectangular
283	Mound	P	7.4	1.7	0.8	Linear
284	Mound	P	4.5	2.9	0.7	Irregular
285	Mound	S/P	5.0	1.3	0.8	Linear
286	Terrace	P	16.0	1.8	0.6	Irregular
287	Modified outcrop	S/P	3.5	1.7	0.9	Irregular
288	Modified outcrop	P	3.0	1.1	0.8	Crescent
289	Pavement	P	9.0	5.5	0.2	Irregular
290	Terrace	S/P	11.0	6.5	0.8	Crescent
291	<i>Kuaiwi</i>	P	78.0	3.5	0.3	Linear
292	Modified outcrop	P	5.6	4.7	0.9	Rectangular
293	Enclosure	P	1.9	1.9	0.5	Square
294	Enclosure	P	2.2	2.2	0.6	Square
295	Enclosure	P	5.5	3.4	0.5	U-shaped
296	Mound	P	2.3	1.3	0.7	Oval
297	Modified outcrop	S/P	4.5	4.0	0.7	Oval

\*S=Stacked; P=Piled.

Five mounds (Features 187, 189, 262, 266, 271), ones that appeared to have the most time invested in their construction, underwent subsurface testing in the form of 1 x 1 meter test units.

### **Feature 187**

Feature 187 is a partially stacked rectangular shaped *pāhoehoe* cobble mound located in the extreme western end of Site 23686 (see Figure 76). The mound rests on exposed bedrock. Its edges are mostly stacked, but have collapsed in small sections (Figure 77). Feature 187 measures 3.0 meters long by 1.7 meters wide and 80 centimeters tall. Its surface slopes slightly to the north following the natural bedrock contours.



Figure 77. SIHP Site 23686 Feature 187, view to the southeast.

A 1 x 1 meter test unit (TU-1) was excavated into the north-central portion of Feature 187 (Figure 78) and revealed a single architectural layer (Layer I) resting on bedrock. Layer I consisted of small to medium sized *pāhoehoe* cobbles mixed with some organics. This layer rested directly on bedrock and at the base of the layer a single piece of water rounded coral was discovered. Along the unit's northern edge, a small amount of brown (10YR 4/3) sandy silt (less than 1 centimeter thick) had accumulated subsequent to the feature's construction. No cultural material (with the exception of the coral fragment) was recovered from TU-1 and the excavation terminated at bedrock (Figure 79).

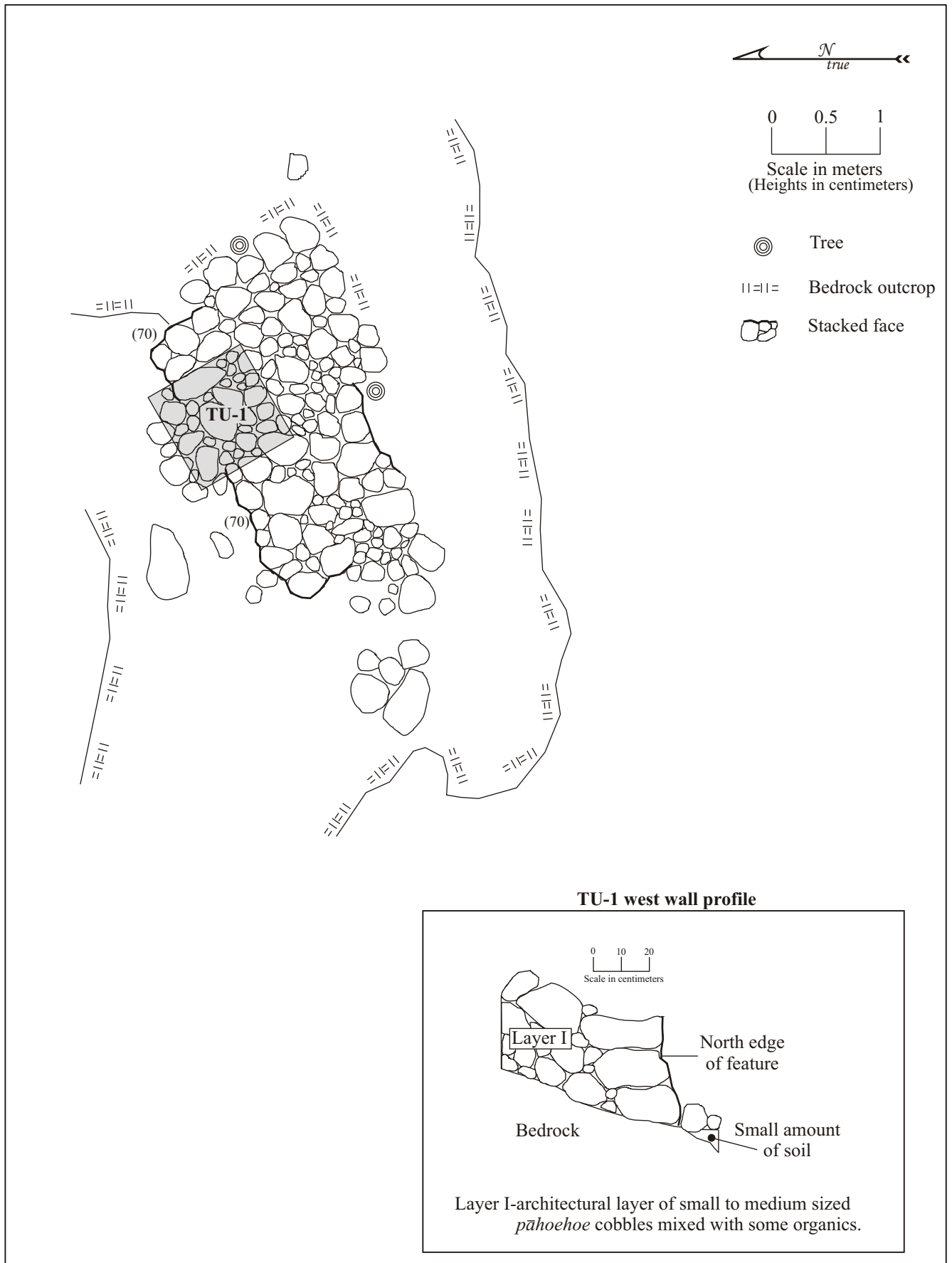


Figure 78. SIHP Site 23686 Feature 187 plan view and TU-1 profile.



Figure 79. SIHP Site 23686 Feature 187 TU-1 base of excavation, view to the southwest.

#### **Feature 189**

Feature 189 is a piled irregular shaped *pāhoehoe* cobble mound located in the extreme western end of the project area (see Figure 76). The mound rests on exposed bedrock and may have been formerly stacked around its edges, but is now largely collapsed (Figures 80 and 81). In its current condition Feature 189 measures 2.4 meters long by 2.2 meters wide and 70 centimeters tall. A small rounded piece of coral was found resting on the feature's southwest corner.



Figure 80. SIHP Site 23686 Feature 189, view to the northeast.

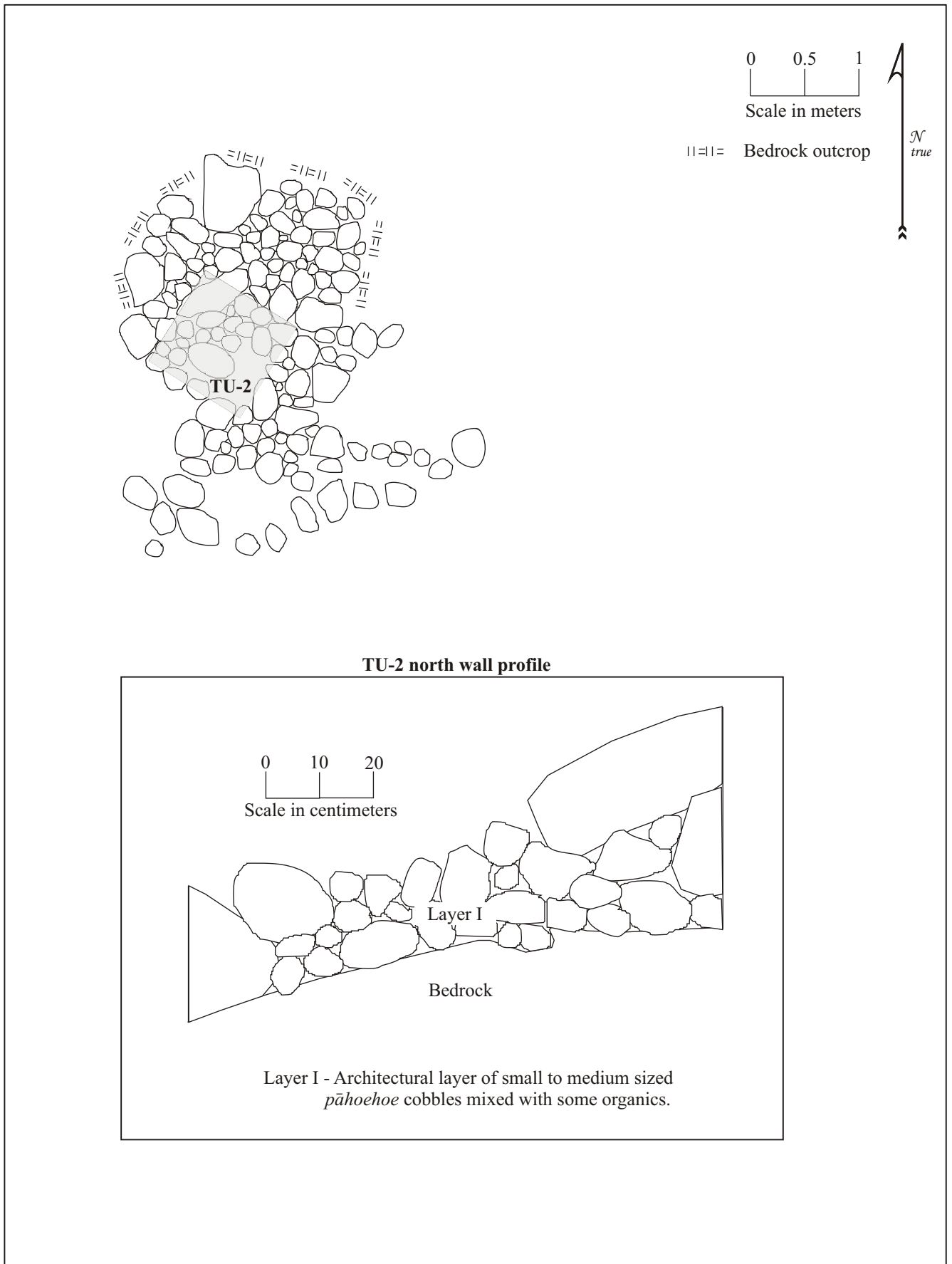


Figure 81. SIHP Site 23686 Feature 189 plan view and TU-2 profile.

A 1 x 1 meter test unit (TU-2) was excavated into the central portion of Feature 189 (see Figure 81). Excavation of TU-2 revealed a single architectural layer (Layer I) resting on bedrock. Layer I consisted of small to medium sized *pāhoehoe* cobbles mixed with some organics. This layer rested directly on bedrock. However, along its southwestern edge, in a bedrock depression, a small amount of brown (7.5YR 3/4) fine silt (less than 1 centimeter thick) had accumulated subsequent to the feature's construction. No cultural material of any kind was recovered from TU-2 and the excavation terminated at bedrock (Figure 82).



Figure 82. SIHP Site 23686 Feature 189 TU-2 base of excavation, view to the northeast.

### Feature 262

Feature 262 is an irregular shaped mound constructed of stacked 'a'ā cobbles located in the southeast quadrant of the project area along the north side of Feature 82, a *kuaiwi* (see Figure 76). The mound measures 3.4 meter long by 1.7 meters wide and up to 1.25 meters tall (Figure 83). It has a squared north side and a slightly rounded south side with a rounded top surface (Figure 84). Feature 262 rests on a soil ground surface covered by dense vegetation.

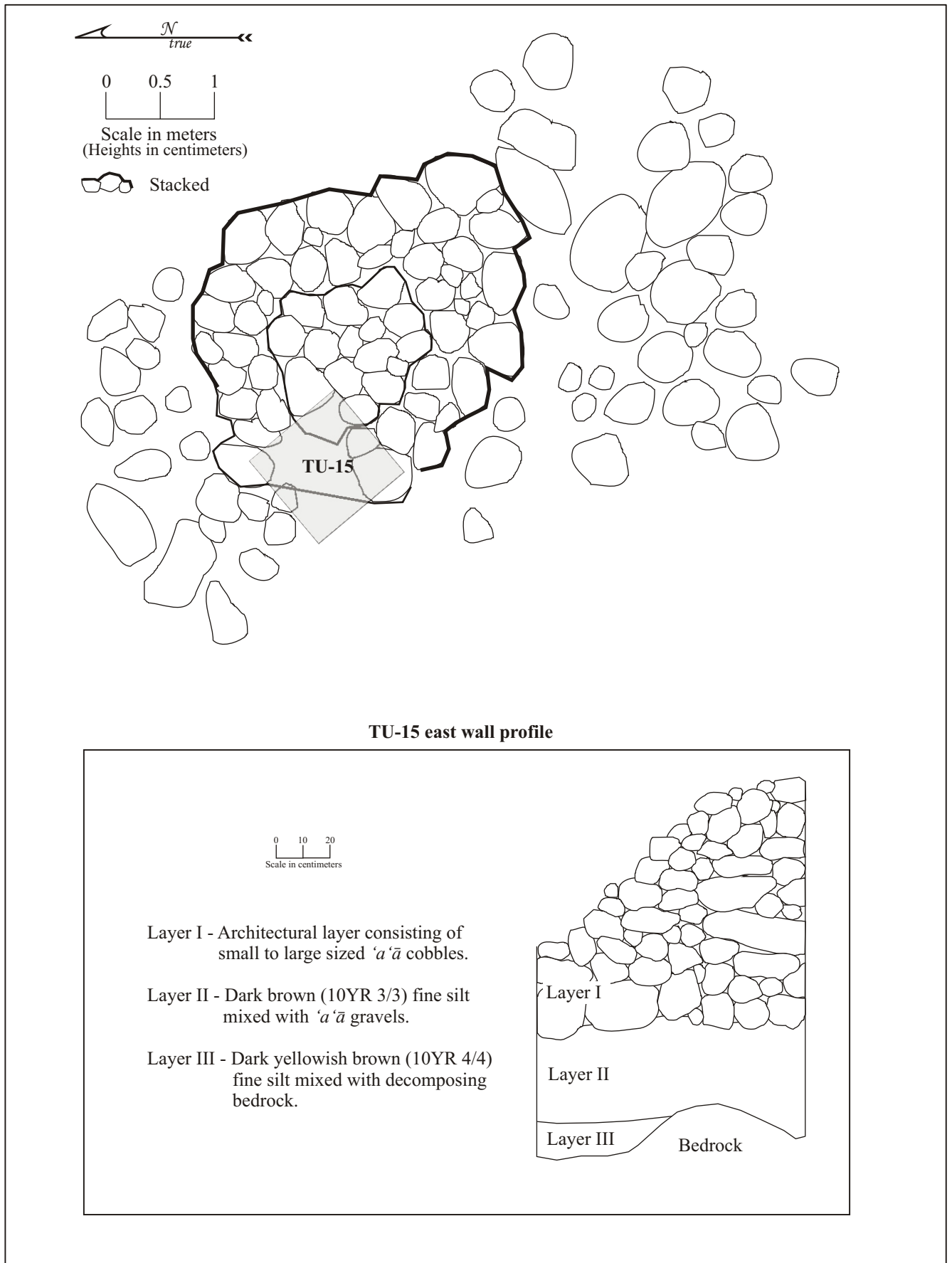


Figure 83. SIHP Site 23686 Feature 262 plan view and TU-15 profile.





Figure 84. SIHP Site 23686 Feature 262, view to the east.

A 1 x 1 meter Test Unit (TU-15) was excavated in the northwest corner of Feature 262 (see Figure 83) and revealed the following stratigraphic profile (which contained no cultural items):

- Layer I (0-92cmbs)..... architectural layer with small to large sized 'a'ā cobbles stacked along the exterior edges of the feature and piled within the interior.
- Layer II (92-141cmbs) ..... dark brown (10YR 3/3) fine silt mixed with 'a'ā gravels on bedrock in the southern portion of TU-15.
- Layer III (141-147cmbs).. dark yellowish brown (10YR 4/4) fine silt mixed with decomposing bedrock on bedrock.

### Feature 266

Feature 266 is a stacked 'a'ā cobble mound located in the southeast quadrant of the project area amongst a number of less formal mounds (see Figure 76). This mound, which is roughly rectangular in shape, measures 2.4 meters long by 1.2 meters wide and stands up to 70 centimeters above the surrounding soil ground surface (Figures 85 and 86). The west end of the feature is neatly stacked and an upright 'a'ā slab (70 centimeters long) is located at the eastern end of the feature.

A 1 x 1 meter test unit (TU-19) was excavated within the center of Feature 266 (see Figure 85 and 87) and revealed the following stratigraphic profile (which contained no cultural items):

- Layer I (0-48cmbs)..... architectural layer with large sized 'a'ā cobbles on top and smaller ones beneath mixed with organics (Figure 41).
- Layer II (48-67cmbs) ..... dark grayish brown (10YR 3/2) silt with approximately 50% gravel on undulating bedrock.

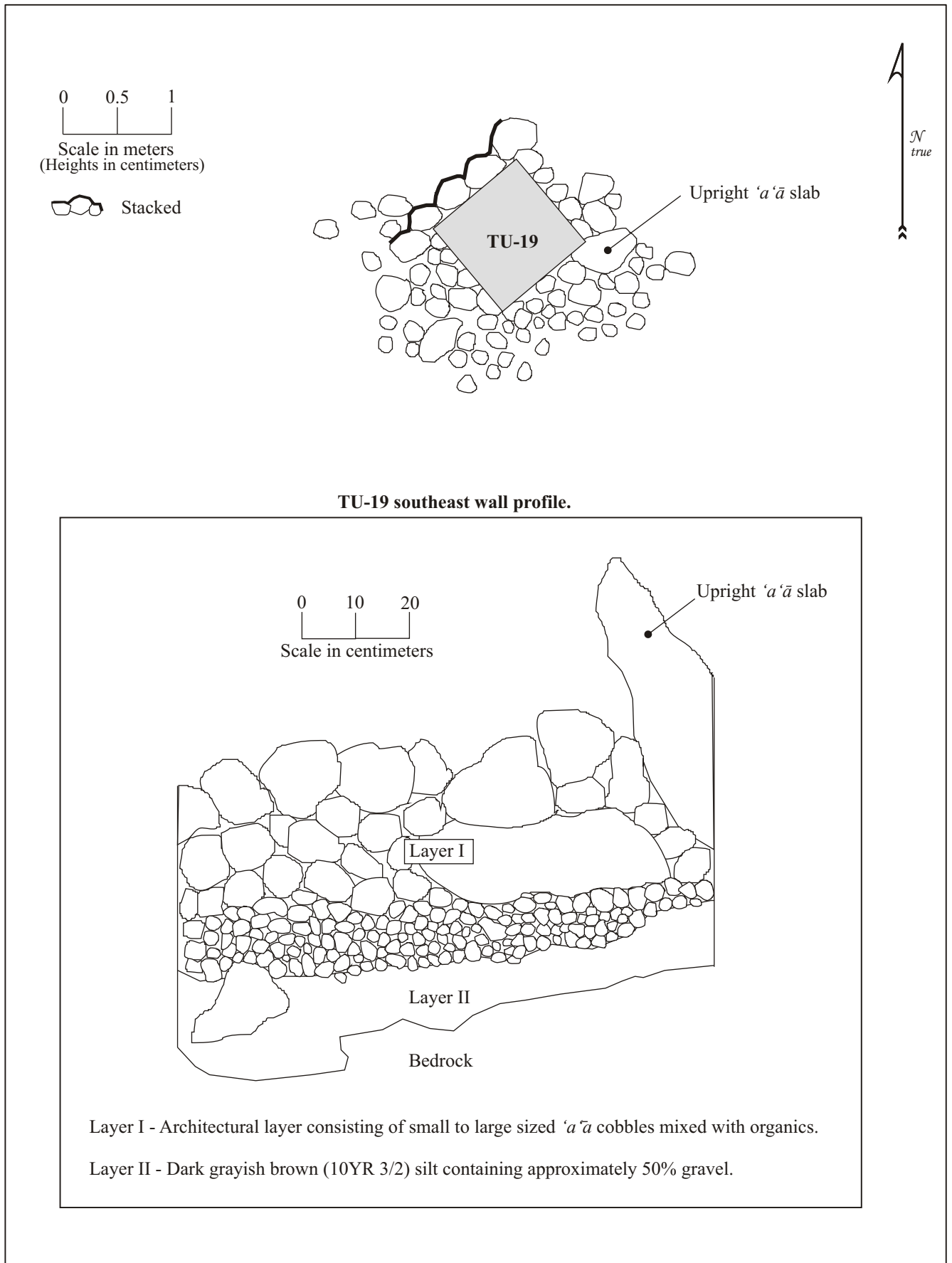


Figure 85. SIHP Site 23686 Feature 266 plan view and TU-19 profile.



Figure 86. SIHP Site 23686 Feature 266, view to the east.



Figure 87. SIHP Site 23686 Feature 266 TU-19 base of excavation, view to the northeast.

### **Feature 271**

Feature 271 is a stacked 'a'ā cobble mound located in the southeast quadrant of the project area along the southern property boundary amongst a number of less formal mounds (see Figure 76). The mound, which is roughly rectangular in shape, measures 2.9 meters long by 2.5 meters wide and stands up to 90 centimeters above the surrounding soil ground surface (Figures 88 and 89). An aluminum site tag with the inscription "PHRI Site T2235-10" was found on the surface of the feature and there was evidence that a 1 meter by 1

meter test unit had been previously excavated at Feature 271. A fragment of water-rounded coral was discovered along the eastern edge of the mound and three coconut husks were resting on its northeast corner.



Figure 89. SIHP Site 23686 Feature 271, view to the southeast.

A 1 x 1 meter test unit (TU-21) was excavated in the northeast corner of Feature 271 adjacent to the north edge of the previously excavated PHRI test unit (Figure 88). Excavation of TU-21 revealed a single architectural layer (Layer I) resting on bedrock. Layer I consisted of small to large sized 'a'ā cobbles mixed with organics 61 centimeters thick resting on bedrock. A small amount of soil (approximately 2 centimeters thick) had accumulated in the southwest corner of the unit on top of the bedrock subsequent to the construction of the feature. Excavation of TU-21 terminated at bedrock 61 centimeters below the feature's surface and no cultural material was recovered from Feature 271.

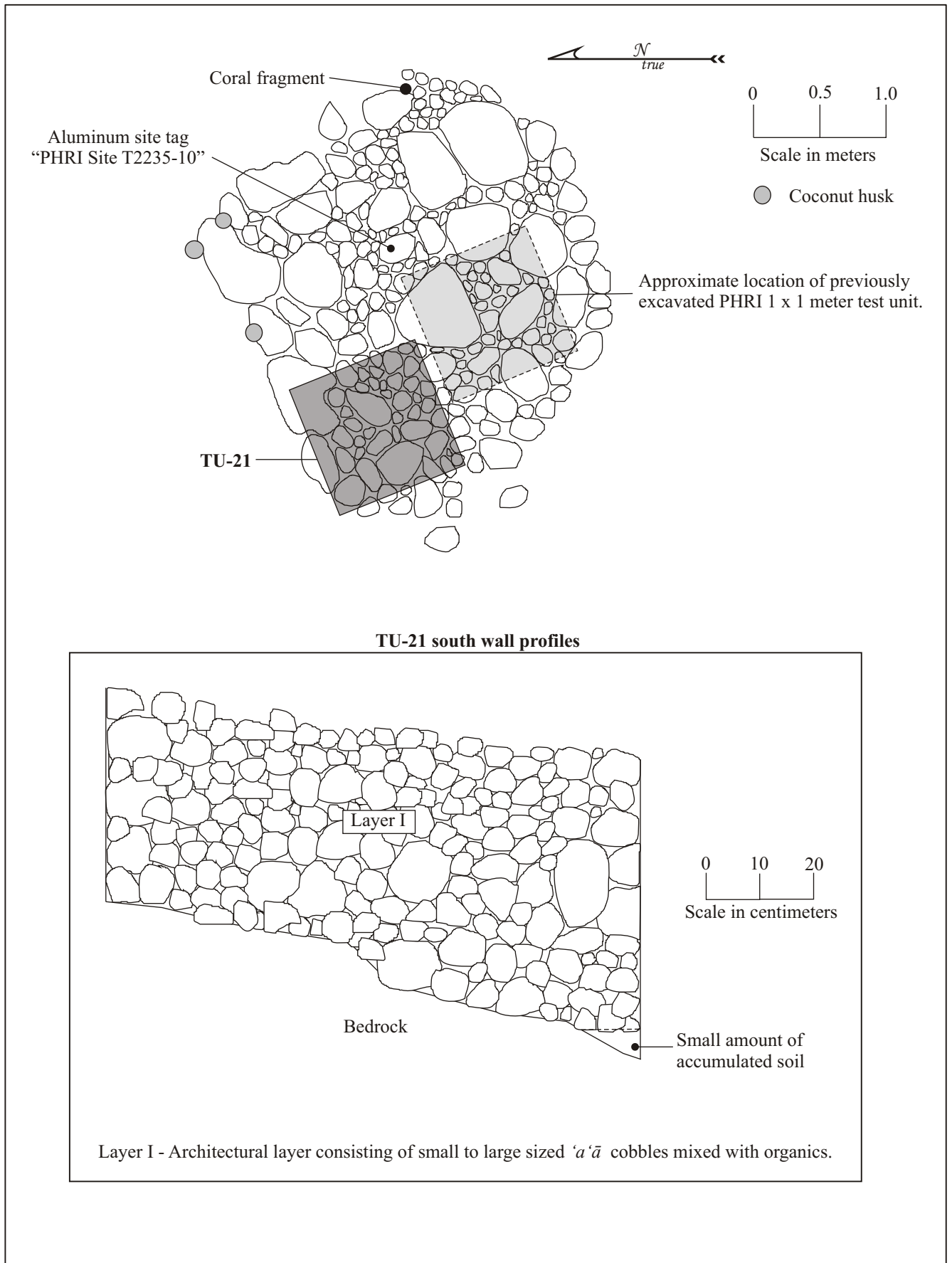


Figure 88. SIHP Site 23686 Feature 271 plan view and TU-21 profile.



Five modified outcrops (Features 183, 201, 204, 239, and 297), ones that appeared to have the most time invested in their construction, underwent subsurface testing in the form of 1 meter by 1 meter test units. The results are presented below.

### Feature 183

Feature 183 is a modified *pāhoehoe* outcrop located in the extreme northwestern portion of the project area (see Figure 76). The feature measures 6.7 meters long by 5.3 meters wide and stands up to 80 centimeters above the surrounding ground surface (Figure 90). It consists of *pāhoehoe* cobbles and boulders stacked along the southeast edge of a bedrock outcrop stretching to the west (Figure 91). The central portion of the feature, on top of the outcrop, consists of a soil area (2 meters in diameter) cleared of cobbles possibly used for planting. Along the west edge of the soil area is a small blister opening that measures 48 centimeters from floor to ceiling and 60 centimeters deep. No cobble modification was evident around the blister. The feature is most likely constructed from the remains of a larger collapsed blister.



Figure 90. SIHP Site 23686 Feature 183, view to the northwest.

A 1 x 1 meter test unit (TU-4) was excavated in the cleared soil area at the center of Feature 183 (see Figure 91) and revealed the following stratigraphic profile (which contained no cultural items, but could have been used as a planting area (Clark and Rechtman 2003)):

- Layer I (0-10cmbs)..... very dark grayish brown (10YR 3/2) topsoil mixed with decaying organics and grass roots.
- Layer II (10-45cmbs) ..... dark yellowish brown (10YR 4/3) fine silt mixed with decomposing bedrock at the base of the layer.

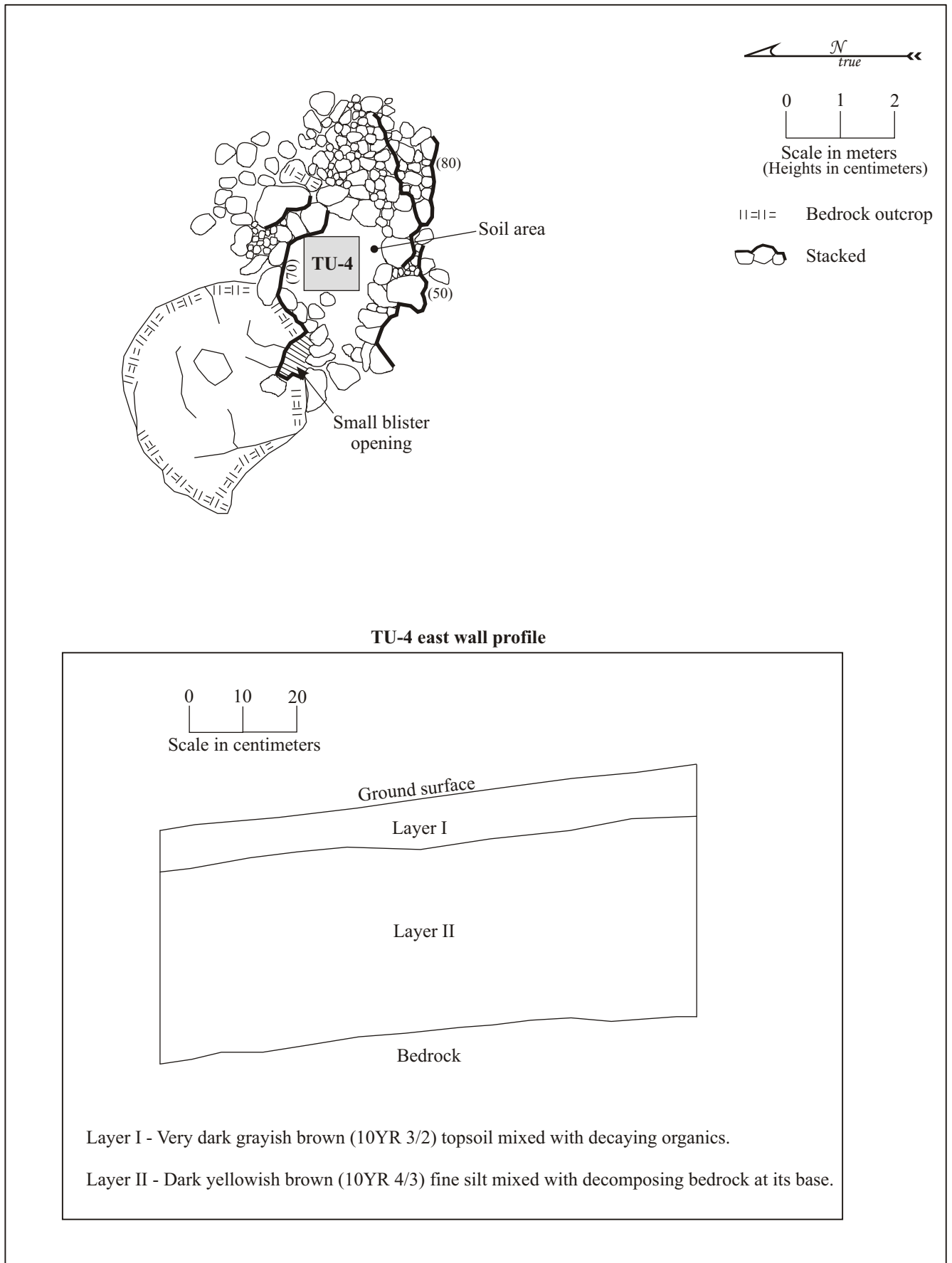


Figure 91. SIHP Site 23686 Feature 183 plan view and TU-4 profile.

### Feature 201

Feature 201 is a modified *pāhoehoe* outcrop located in the northwestern quadrant of the project area along the northern property boundary (see Figure 76). The feature consists of formerly stacked *pāhoehoe* cobbles and boulders, now partially collapsed, supported by a bedrock outcrop to the east (Figure 92). Feature 201 is roughly oval in shape and measures 6.2 meters long by 3.8 meters wide and stands up to 70 centimeters high along its western edge (Figure 93). The surface of the feature is roughly leveled and paved with small *pāhoehoe* cobbles.



Figure 92. SIHP Site 23686 Feature 201, view to the east.

A 1 x 1 meter test unit (TU-5) was excavated in the central portion of Feature 201 (see Figure 93) and revealed the following stratigraphic profile (which contained no cultural items, but could have been a by-product of agricultural clearing nearby (Clark and Rechtman 2003):

Layer I (0-25/40cmbs) ..... architectural layer with small to large sized *pāhoehoe* cobbles.

Layer II (25/40-35/50cmbs)..... dark brown (10YR 3/3) silt mixed with organics only within bedrock low spots.

### Feature 204

Feature 204 is a modified *pāhoehoe* outcrop located in the northwestern quadrant of the project area (see Figure 76). The feature has an irregular shape and may have been formerly stacked, but is now mostly collapsed (Figures 94 and 95). Some remnant *pāhoehoe* cobble stacking still remains along its southwestern edge and the northeastern edge abuts the bedrock outcrop. The surface of the feature, which has evidence of protruding bedrock, is roughly leveled and paved with small *pāhoehoe* cobbles (see Figure 95). A waterworn cobble was found on the feature's surface adjacent to the bedrock outcrop. Feature 204 measures 3.4 meters long by 2.7 meters wide and stands 70 centimeters high along its western edge.

A 1 x 1 meter test unit (TU-6) was excavated in the west-central portion of Feature 204 (see Figure 94) and revealed the following two layers (which contained no cultural items):

Layer I (0-18cmbs)..... small to large sized *pāhoehoe* cobbles mixed with organics on bedrock and bedrock pockets.

Layer II (18-25cmbs) ..... low-lying bedrock pockets with dark brown (10YR 3/3) silt mixed with organics on bedrock.



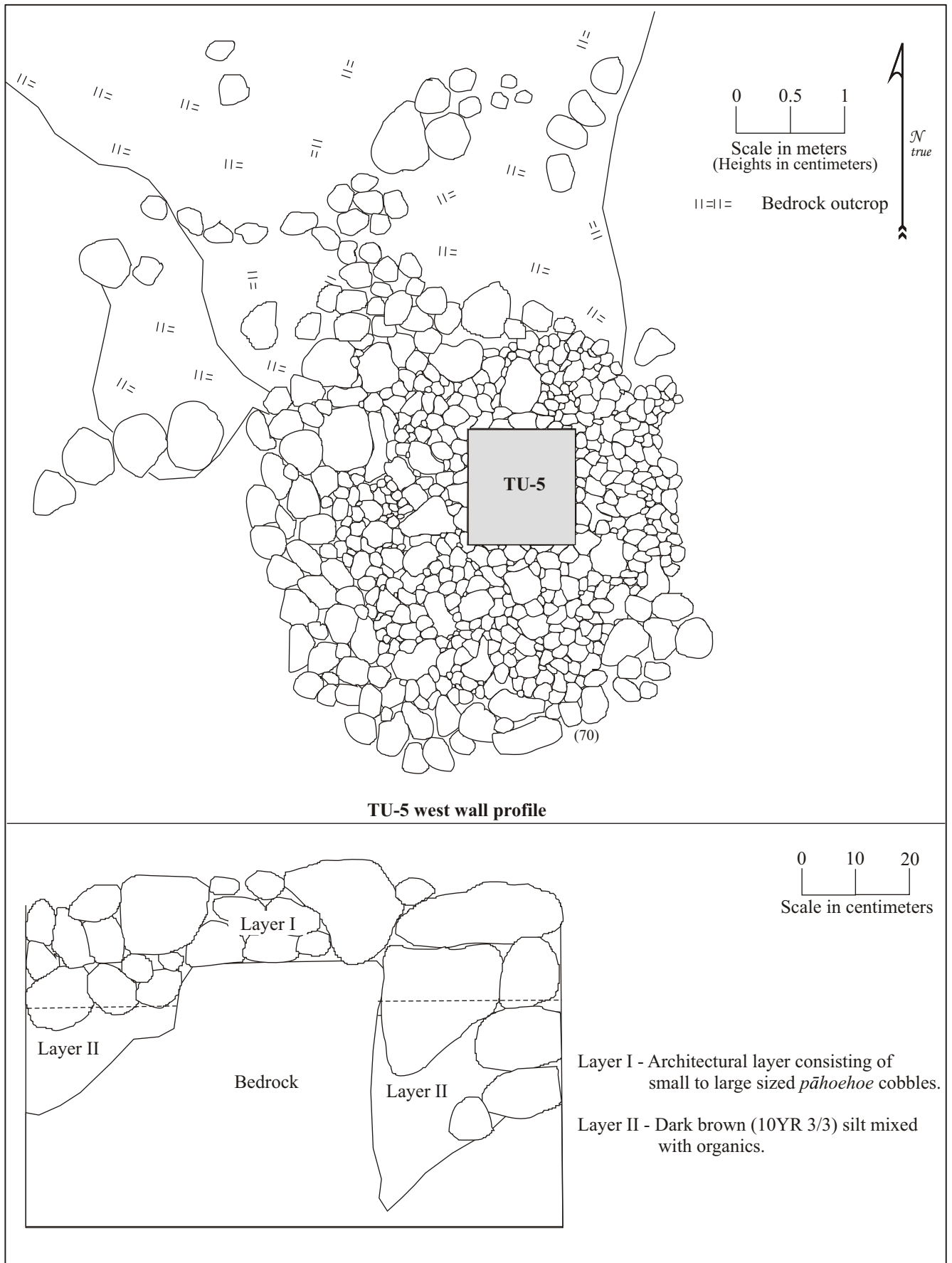


Figure 93. SIHP Site 23686 Feature 201 plan view and TU-5 profile.

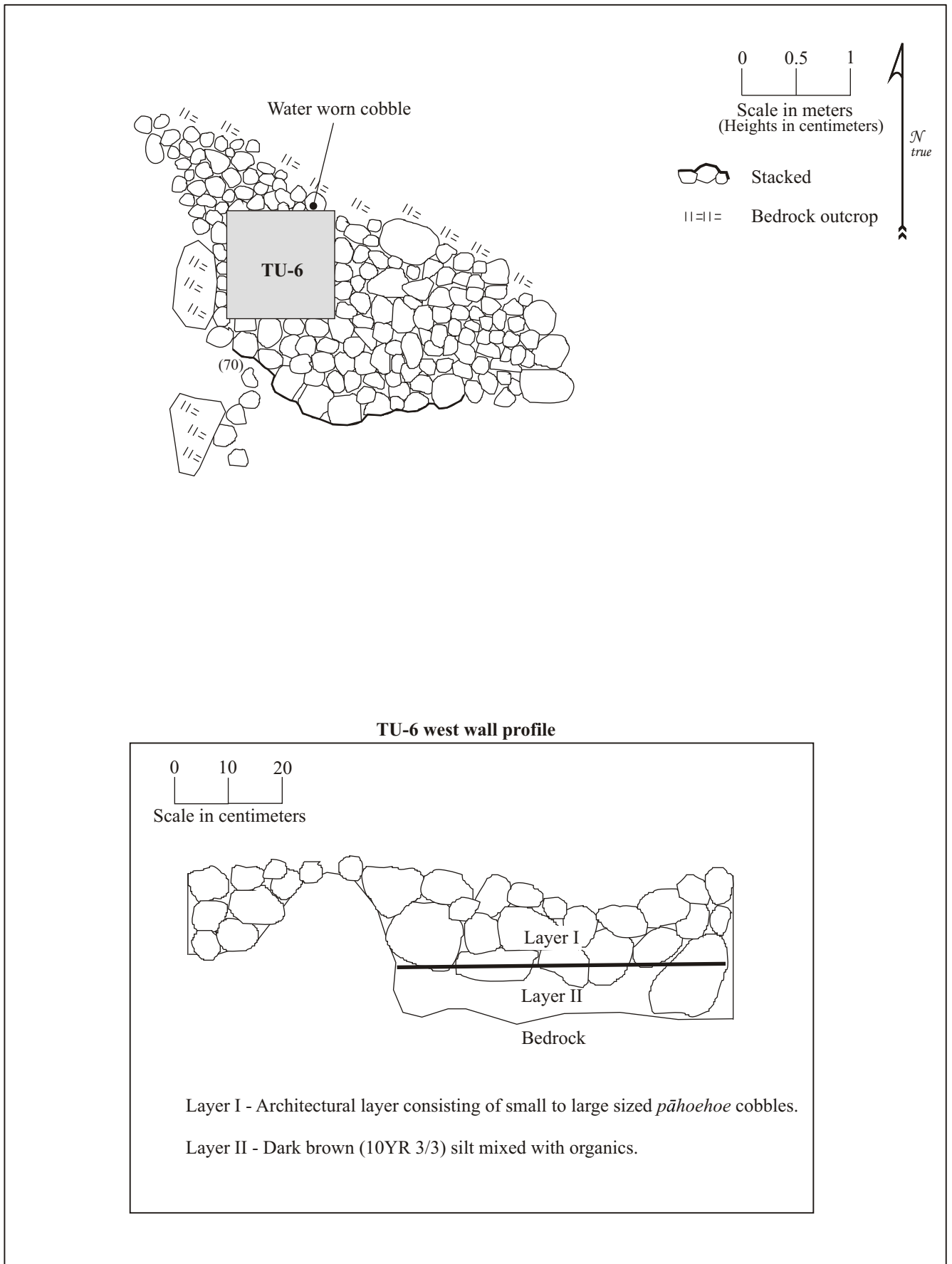


Figure 94. SIHP Site 23686 Feature 204 plan view and TU-6 profile.



Figure 95. SIHP Site 23686 Feature 204, view to the west.

#### **Feature 239**

Feature 239 is a modified 'a'ā outcrop centrally located within the project area amongst a number of other agricultural features (see Figure 76). The feature, which is roughly rectangular, measures 4.0 meters long by 2.5 meters wide and stands up to 70 centimeters high along its southern edge (Figure 96). The southern and western edges consist of stacked 'a'ā cobbles and boulders (Figure 97). The eastern edge is completely collapsed and the bedrock outcrop supports the northern edge of the feature. The surface of Feature 239 is roughly paved and leveled with small 'a'ā cobbles.



Figure 96. SIHP Site 23686 Feature 239, view to the north.

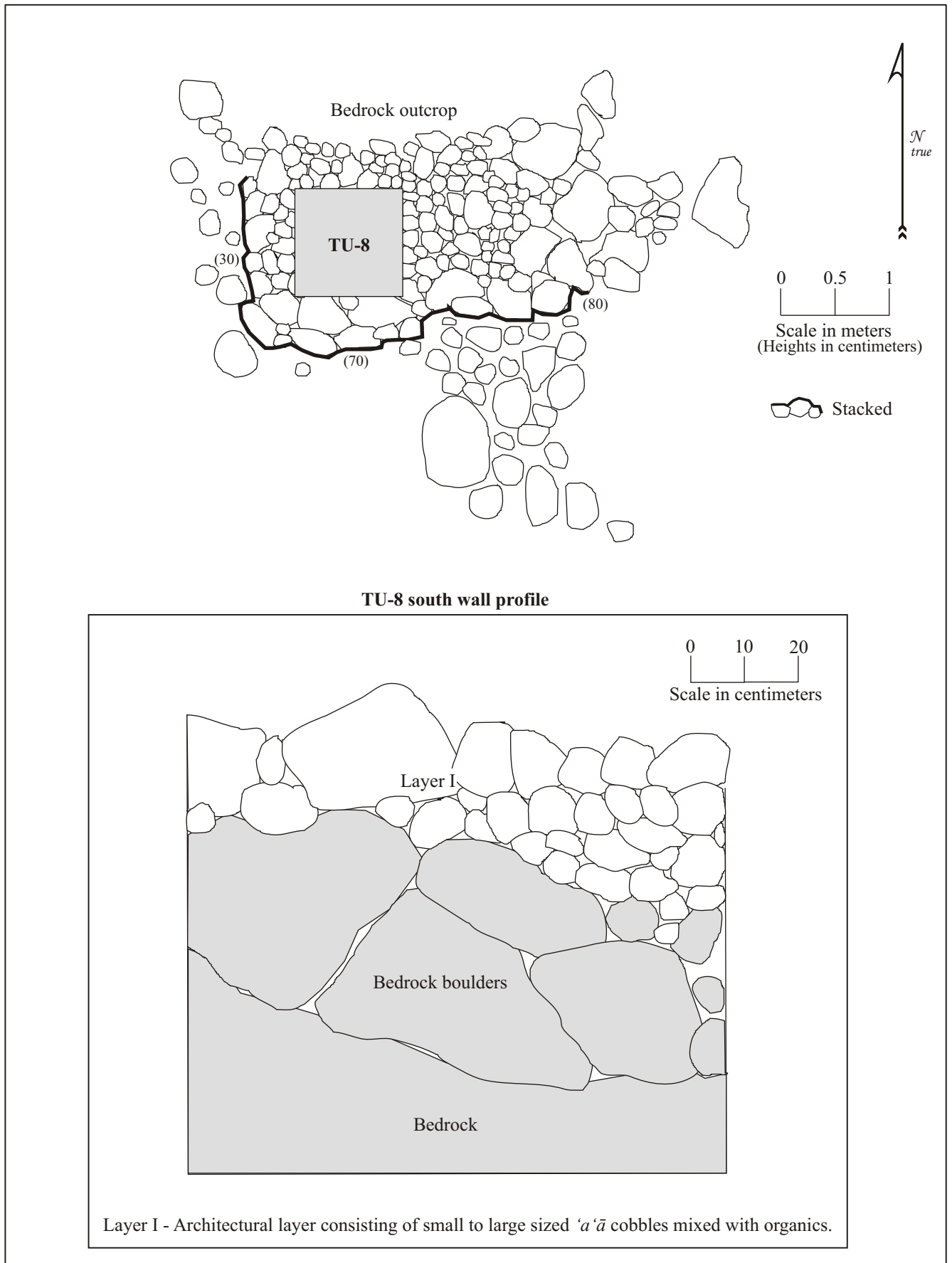


Figure 97. SIHP Site 23686 Feature 239 plan view and TU-8 profile.

A 1 x 1 meter test unit (TU-8) was excavated in the west-central portion of Feature 239 (see Figure 97). Excavation of TU-8 revealed a single architectural layer (Layer I) resting on bedrock. Layer I consisted of small to large sized 'a'ā cobbles mixed with organics 55 centimeters thick resting on bedrock and mixed with fractured bedrock boulders. A small amount of soil (approximately 1 to 2 centimeters thick) had accumulated at the base of the unit within low-lying bedrock areas subsequent to the construction of the feature. Excavation of TU-8 terminated at bedrock 55 centimeters below the feature's surface (Figure 98). No cultural material was recovered from Feature 239, and Clark and Rechtman (2003) suggested that this feature may be a by-product of agricultural clearing in the area.



Figure 98. SIHP Site 23686 Feature 239 TU-8 base of excavation, view to the south.

### Feature 297

Feature 297 is a modified 'a'ā outcrop located at the extreme eastern end of the project area along the southern edge of the old access road (see Figure 76). Feature 297 was formerly constructed of stacked 'a'ā cobbles, but is now collapsed in several sections (Figures 99 and 100). The feature, which is roughly oval in shape, measures 4.5 meters long by 4.0 meters wide and stands up to 70 centimeters above ground surface in its southwestern corner. The southern and northern edges of the feature are stacked. The western edge is nearly completely collapsed and a bedrock outcrop supports the eastern edge of the feature. The surface of Feature 297 is roughly paved and leveled with small sized 'a'ā cobbles. Overall, the feature has a very formal appearance.

A 1 x 1 meter test unit (TU-22) was excavated in the east central portion of Feature 297 (see Figure 99) and revealed the following stratigraphic profile:

- Layer I (0-33cmbs)..... architectural layer with small to large sized 'a'ā cobbles mixed with organics
- Layer II (33-63cmbs) ..... dark brown (10YR 3/3) very fine sandy silt mixed with decaying organics, the lower portions grading into dark yellowish brown soil (10YR 4/4) mixed with decomposing bedrock on bedrock.

No cultural material of any kind was recovered from TU-22, and Clark and Rechtman (2003) suggested that Feature 297 may be the by-product of agricultural clearing in the area.

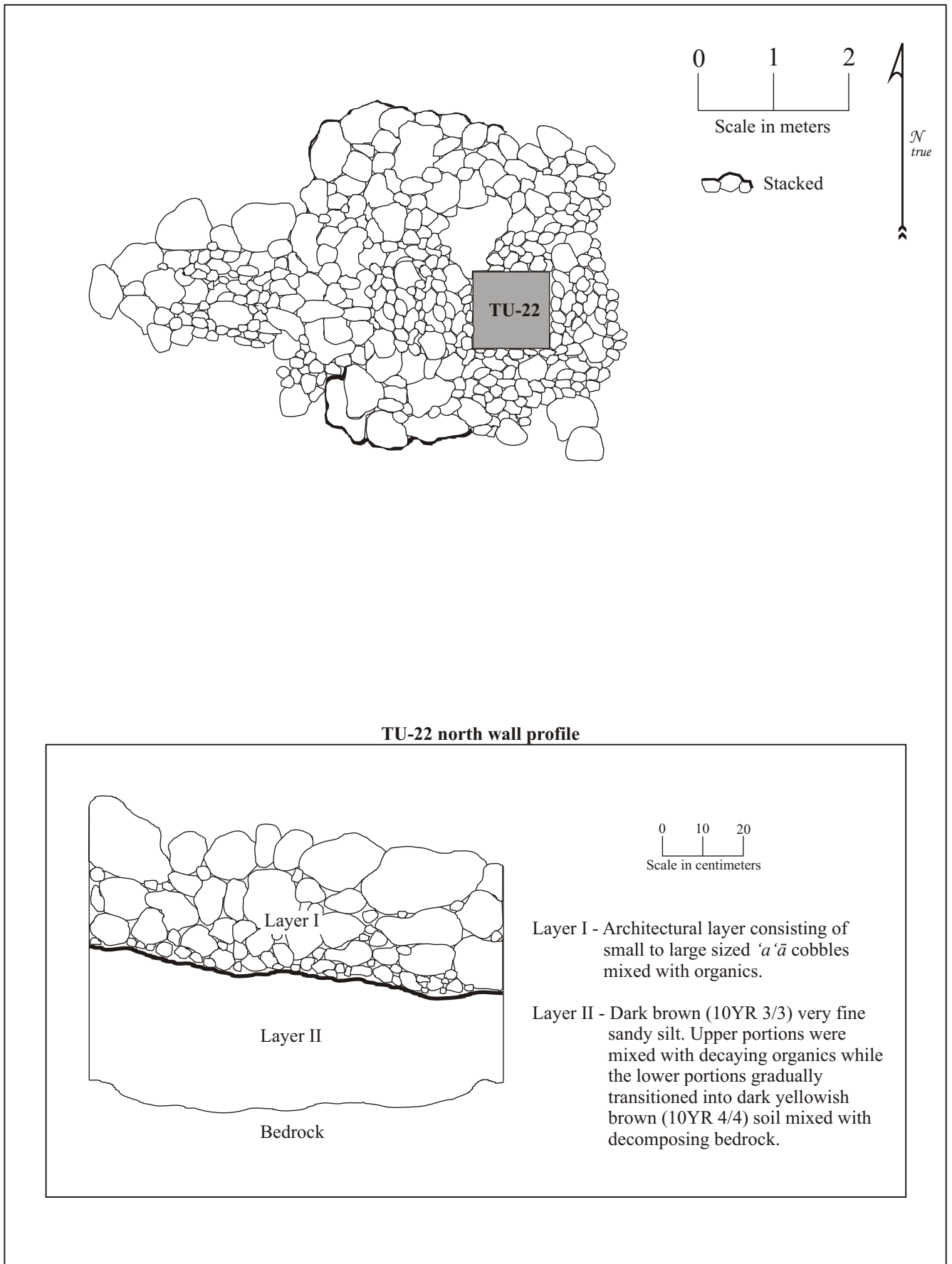


Figure 99. SIHP Site 23686 Feature 297 plan view and TU-22 profile.





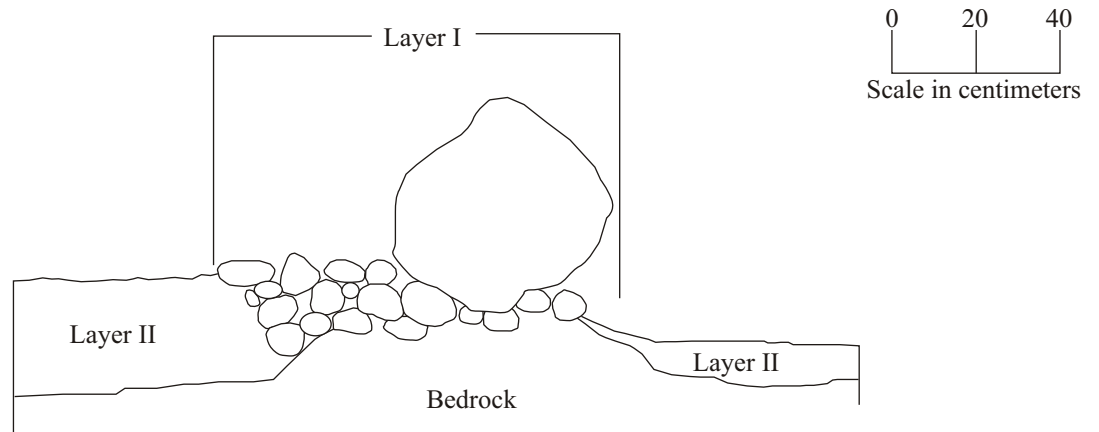
Figure 100. SIHP Site 23686 Feature 297, view to the north.

#### Feature 185

Feature 185 is a linear terrace constructed of piled *pāhoehoe* near the western end of the project area not far from the Kuakini Highway (see Figure 76). The southeast to northwest aligned feature is 17 meters long, 60 centimeters wide, and 90 centimeters high. Small to medium boulders align the *makai* edge of the wall whereas small cobbles make-up the *mauka* side of the wall. Soil accumulation occurred after construction of the wall, particularly on the northeastern side. The wall rested directly on *pāhoehoe* bedrock.

A 2 x 1 meter excavation unit (EU-1a), aligned southwest-northeast, was placed two meters from the northern edge of the terrace wall and revealed the following stratigraphic profile (Figure 101). No cultural items were recovered:

- Layer I with boulders on wall (0-50cmbs) .....architectural layer with medium to small *pāhoehoe* boulders and cobbles on *pāhoehoe* bedrock.
- Layer II northeast/*mauka* of wall (0-40cmbs) .....very dark brown (7.5YR 2.5/3) silt mixed with 10 percent rock.
- Layer II northeast/*makai* of wall (0-20cmbs) .....very dark brown (7.5YR 2.5/3) silt mixed with 10 percent rock.



Layer I - Architectural layer consisting of medium to small *pāhoehoe* boulders and cobbles on bedrock.

Layer II (northeast/*mauka* of wall) - Very dark brown (7.5YR 2.5/3) silt mixed with 10% rock.

Layer II (northeast/*makai* of wall) - Very dark brown (7.5YR 2.5/3) silt mixed with 10% rock.

Figure 101. SIHP Site 23686 Feature 185 EU-1a south wall profile.



### Feature 247

Feature 247 is a linear terrace constructed of small 'a'ā cobbles near the center of the project area (see Figure 76). The southwest to northeast aligned feature is 11 meters long, 2.6 meters wide, and 90 centimeters high. The wall consists of piled stone with an outer stacked edge.

A 2 x 1 meter excavation unit (EU-5) aligned west to east, was placed within the wall *mauka* of the *makai* stacked wall edge. EU-5 revealed the following stratigraphic profile (Figures 102 and 103):

- Layer I (0-40cmts)..... architectural layer with piled 'a'ā cobbles and stacked 'a'ā cobble facing on the west.
- Layer II (40-80cmts) ..... very dark grayish brown (10YR 3/2) fine silt grading into reddish brown (5YR 4/4) silt immediately above weathered and undulating 'a'ā bedrock (95cm deep pocket within 'a'ā bedrock in northwest corner).

Recovered items from EU-5 include *Cypraea* sp., *Drupa* sp., *Cellana* sp., coral, *kukui* nutshell, charcoal, basalt flakes, and a volcanic glass flake (Table 29). A corroded iron horseshoe nail (Acc# 034) from Level 1 of Layer I is probably intrusive. This nail is 36 millimeters long, 7.4 millimeters wide and 3 millimeters thick. Other than the nail the vertical distribution of species and artifact types appears fairly constant within the unit.

**Table 29. Recovered items from SIHP Site 23686, Feature 247, EU-5.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
33	Surface		Marine shell	<i>Cypraea</i> sp.	1	1	23.4
36	I	1	Marine shell	<i>Cypraea</i> sp.	3	1	4.3
38	I	1	Marine shell	<i>Cellana</i> sp.	1	1	0.7
35	I	1	Coral	Unidentified	10	-	9.7
37	I	1	Organic	<i>Kukui</i> nutshell	4	-	2.6
34	I	1	Metal	Iron horseshoe nail	1	-	2.1
Layer I, Level 1 Total:					19	2	19.4
42	II	1	Marine shell	<i>Cypraea</i> sp.	2	1	1.1
41	II	1	Coral	Unidentified	3	-	1.2
40	II	1	Volcanic glass	Flake	1	-	1.4
39	II	1	Organic	<i>Kukui</i> nutshell	5	-	2.2
Layer II, Level 1 Total:					11	1	5.9
45	II	2	Marine shell	<i>Cypraea</i> sp.	7	2	9.0
47	II	2	Marine shell	<i>Drupa</i> sp.	1	1	2.8
44	II	2	Basalt	Flake	1	-	4.2
48	II	2	Basalt	Flake	8	-	6.7
46	II	2	Organic	<i>Kukui</i> nutshell	7	-	2.2
43	II	2	Organic	Charcoal	-	-	3.3
Layer II, Level 2 Total:					24	3	28.2
EU-5 Total:					55	7	76.9

Charcoal collected from Layer II Level 2 of EU-5, Feature 247, was submitted for radiocarbon assaying. The sample (Beta-212757) intercepts the tree-ring calibration curve at AD 1530, 1560, and 1630 and has a 2-sigma standard deviation calibrated date range of AD 1460 to 1660.



Figure 102. SIHP Site 23686 Feature 247 EU-5 base of excavation.

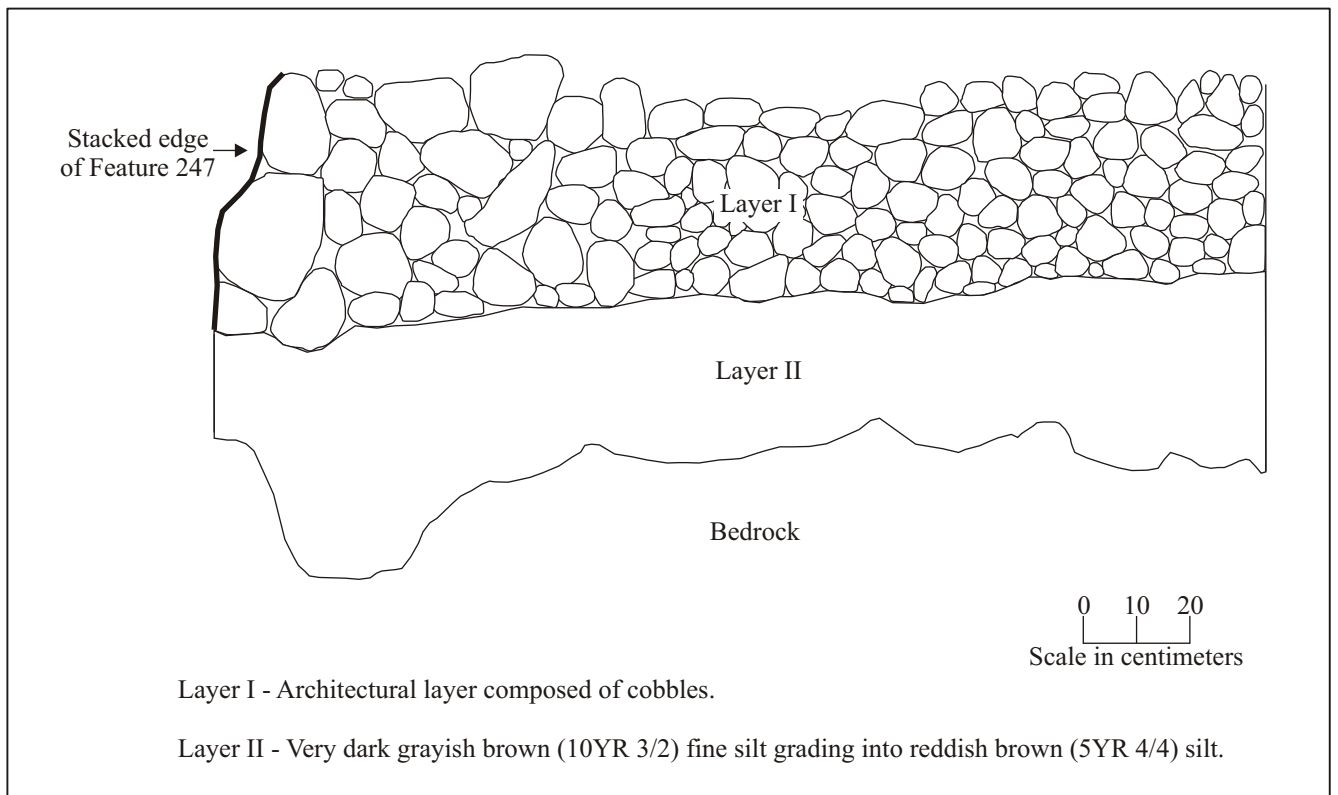


Figure 103. SIHP Site 23686 Feature 247 EU-5 north wall profile.

### Feature 251

Feature 251 is a rectangular enclosure constructed of 'a'ā cobbles within the southeastern quadrant of the project area (see Figure 76). The southeast to northwest aligned walled-enclosure is 12.5 meters long by 11.5 meters wide, and the wall is 60 centimeters high.

A 2 x 2 meter excavation unit (EU-8) was placed within the enclosure, two meters east of the western wall and four meters south of the northern wall, and revealed the following stratigraphic profile (Figures 104 and 105):

Layer I (0-25cmbs)..... 20cm thick dark brown (10YR 3/3) sandy silt with 25% cobbles on  
5cm thick dark yellowish brown (10YR 3/4) silt mixed with  
decomposing 'a'ā bedrock.

Seventeen fragments, or 34.5 grams, of bovine bone and teeth fragments came from Layer I Level 1 of EU-8 (Acc# 95). The fragments probably represent the remains of a single cow.

### Feature 250

Feature 250 is a rectangular pavement constructed of 'a'ā cobbles within the southeastern quadrant of the project area (see Figure 76). The east to west aligned platform is 2.5 meters long, 1.8 meters wide, and 50 centimeters high.

A 2 x 2 meter excavation unit (EU-11) was placed on the central portion of the platform surface, and revealed the following stratigraphy (Figure 106):

Layer I Level 1 (0-65cmbs) .....architectural layer with piled 'a'ā cobbles, diminishing in size with  
increasing depth.

Layer II Level 1 (65-90cmbs).....dark brown (10YR 3/3) silt with 85% cobbles.

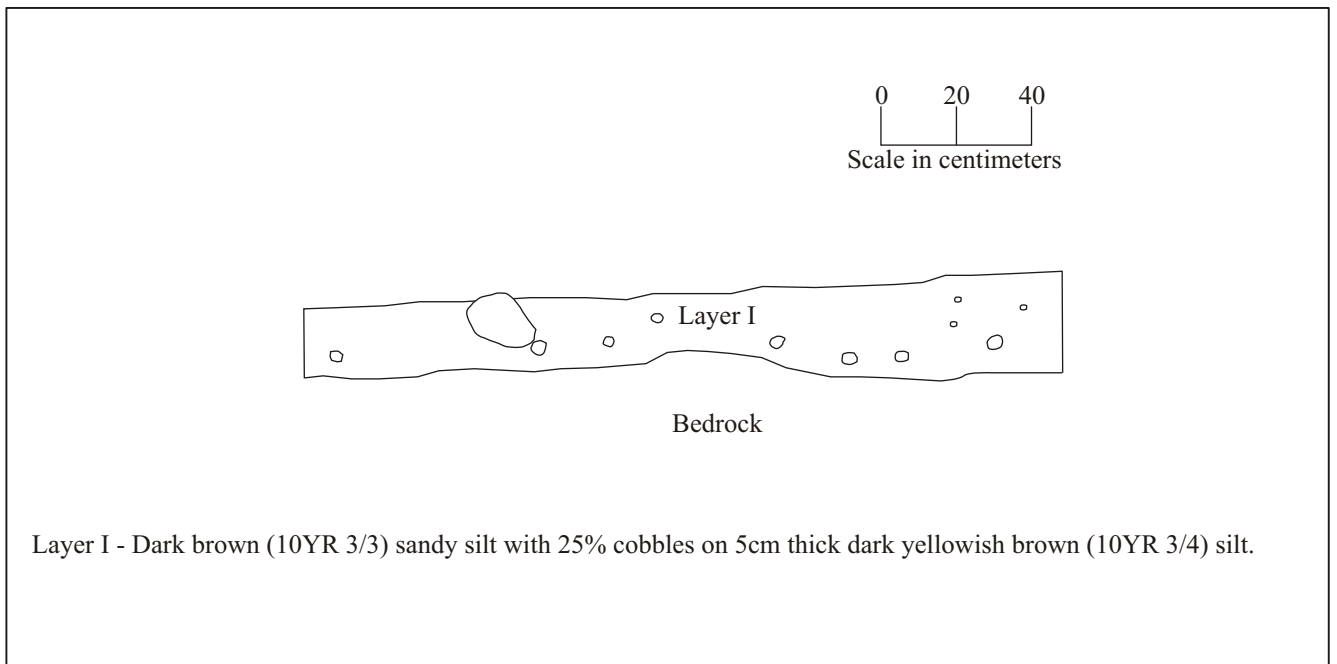
Layer II, Level 2 (90-100cmbs).....dark brown (10YR 3/3) silt with 85% cobbles on weathered  
bedrock.

Recovered items from EU-11 include fish, *Cypraea* sp., *Drupa* sp., *Cellana* sp., coral, *Sus* sp., *kukui* nutshell, charcoal, and volcanic glass flakes (Table 30). Overall species and artifact type density increases with increasing depth within EU-11. Apart from this stratigraphic trend there is no evidence for shifting diet or activities between the different layers.





Figure 104. SIHP Site 23686 Feature 251 EU-8 base of excavation, view to the west/southwest.



Layer I - Dark brown (10YR 3/3) sandy silt with 25% cobbles on 5cm thick dark yellowish brown (10YR 3/4) silt.

Figure 105. SIHP Site 23686 Feature 251 EU-8 north wall profile.

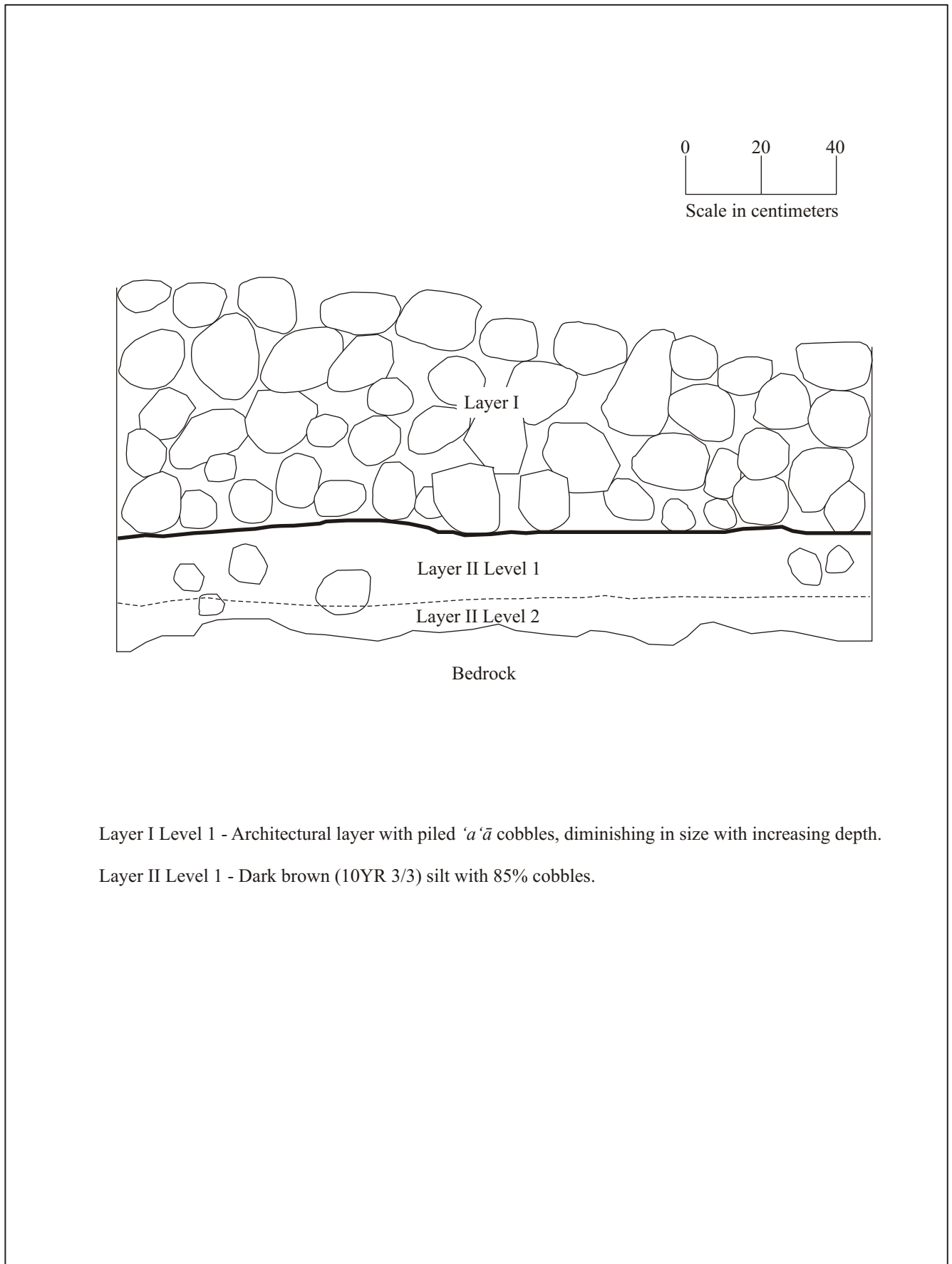


Figure 106. SIHP Site 23686 Feature 250 EU-11 north wall profile.

**Table 30. Recovered items from SIHP Site 23686, Feature 250, EU-11.**

ACC#	Layer	Level	Material	Species/type	Count	MNI	Weight (g)
142	I	1	Marine shell	<i>Drupa</i> sp	1	1	20.5
143	I	1	Marine shell	<i>Cellana</i> sp.	1	1	59.1
Layer 1, Level 1 Total:					2	2	79.6
147	II	1	Fish bone	<i>Scarus</i> sp. pharyngeal plate	1	1	0.6
148	II	1	Marine shell	<i>Drupa</i> sp.	1	1	2.2
149	II	1	Coral	Unidentified	1	-	0.4
146	II	1	Mammal	<i>Canis</i> sp. tooth	1	1	1.0
145	II	1	Volcanic glass	Flake	2	-	1.8
144	II	1	Organic	<i>Kukui</i> nutshell	3	-	1.0
Layer II, Level 1 Total:					9	3	7.0
153	II	2	Fish bone	Unidentified	1	-	0.1
154	II	2	Marine shell	<i>Cypraea</i> sp.	4	1	1.3
155	II	2	Marine shell	<i>Drupa</i> sp.	3	1	3.5
156	II	2	Coral	Unidentified	10	-	7.2
157	II	2	Coral	Unidentified	1	-	0.3
152	II	2	Volcanic glass	Flake	5	-	3.2
151	II	2	Organic	<i>Kukui</i> nutshell	2	-	0.9
150	II	2	Organic	Charcoal	-	-	0.5
Layer II, Level 2 Total:					26	2	17.0
EU-11 Total:					37	7	103.6

Charcoal collected from Layer II Level 2 of EU-11, Feature 250, was submitted for radiocarbon assaying. The sample (Beta-212760) intercepts the tree-ring calibration curve at AD 1650 and has a 2-sigma standard deviation calibrated date range of AD 1520 to 1950.

### Feature 254

Feature 254 is a linear terrace wall constructed of 'a'ā cobbles within the southeastern quadrant of the project area (see Figure 71). The southeast to northwest aligned wall is 20 meters long, 2.7 meters wide, and 80 centimeters high. The wall is loosely stacked along its edges with a slightly mounded interior surface of piled cobbles.

A 2 x 1 meter excavation unit (EU-12) was placed perpendicularly across the terrace wall in a northeastern alignment and revealed the following stratigraphic profile (Figures 107 and 108):

- Layer I, Level 1 (0-60cmbs).....architectural layer with small piled 'a'ā cobbles and larger stacked 'a'ā cobbles along outer edges.
- Layer II, Level 1 (60-70cmbs).....dark yellowish brown (10YR 3/4) silt with cobbles.
- Layer II, Level 2 (70-80cmbs).....dark yellowish brown (10YR 3/4) and dark brown (10YR 3/3) mottled silt with medium-sized cobbles.
- Layer II, Level 3 (80-90cmbs).....very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) mottled silt with cobbles.
- Layer II, Level 4 (90-100cmbs).....dark brown (10YR 3/3) silt with less cobbles on undulating 'a'ā bedrock.

Recovered items from EU-12 included *Cypraea* sp., coral, unidentifiable shell, *Sus* sp., and charcoal (Table 31). All the recovered items came from Layer II; the architectural layer and the bottom-most silt layer being sterile.



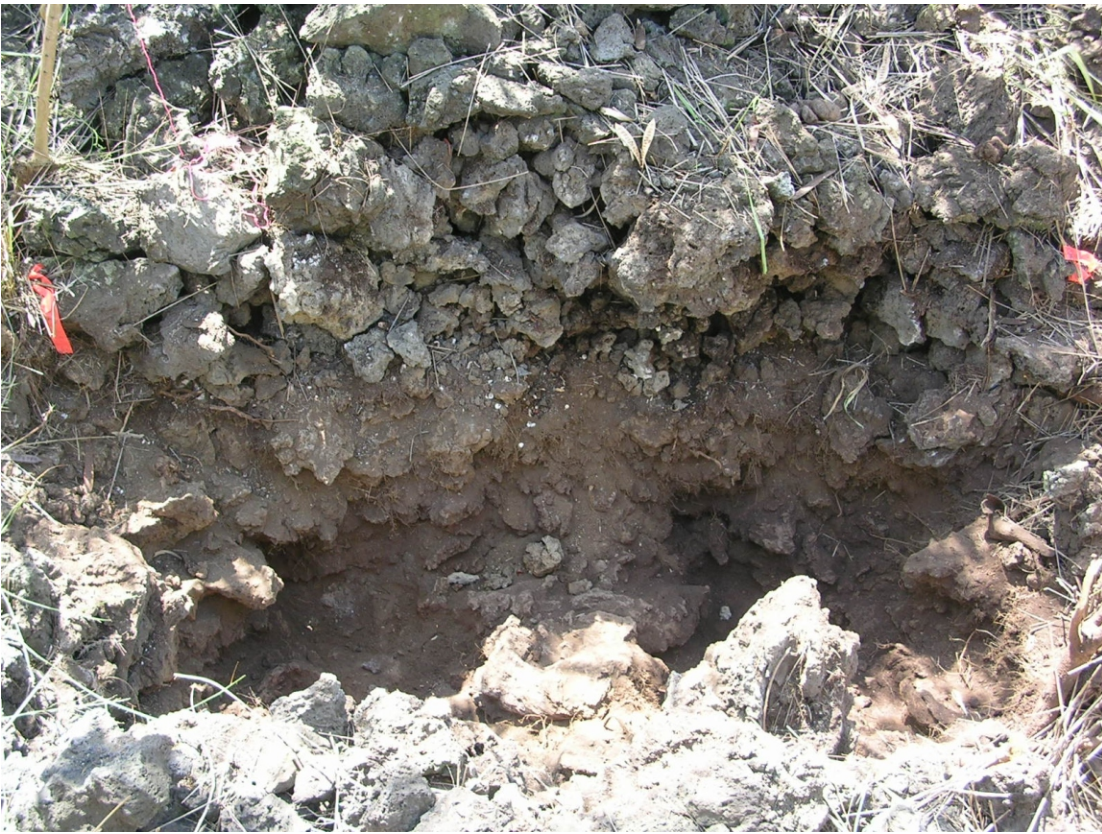


Figure 107. SIHP Site 23686 Feature 254 EU-12 base of excavation, view to the southeast.

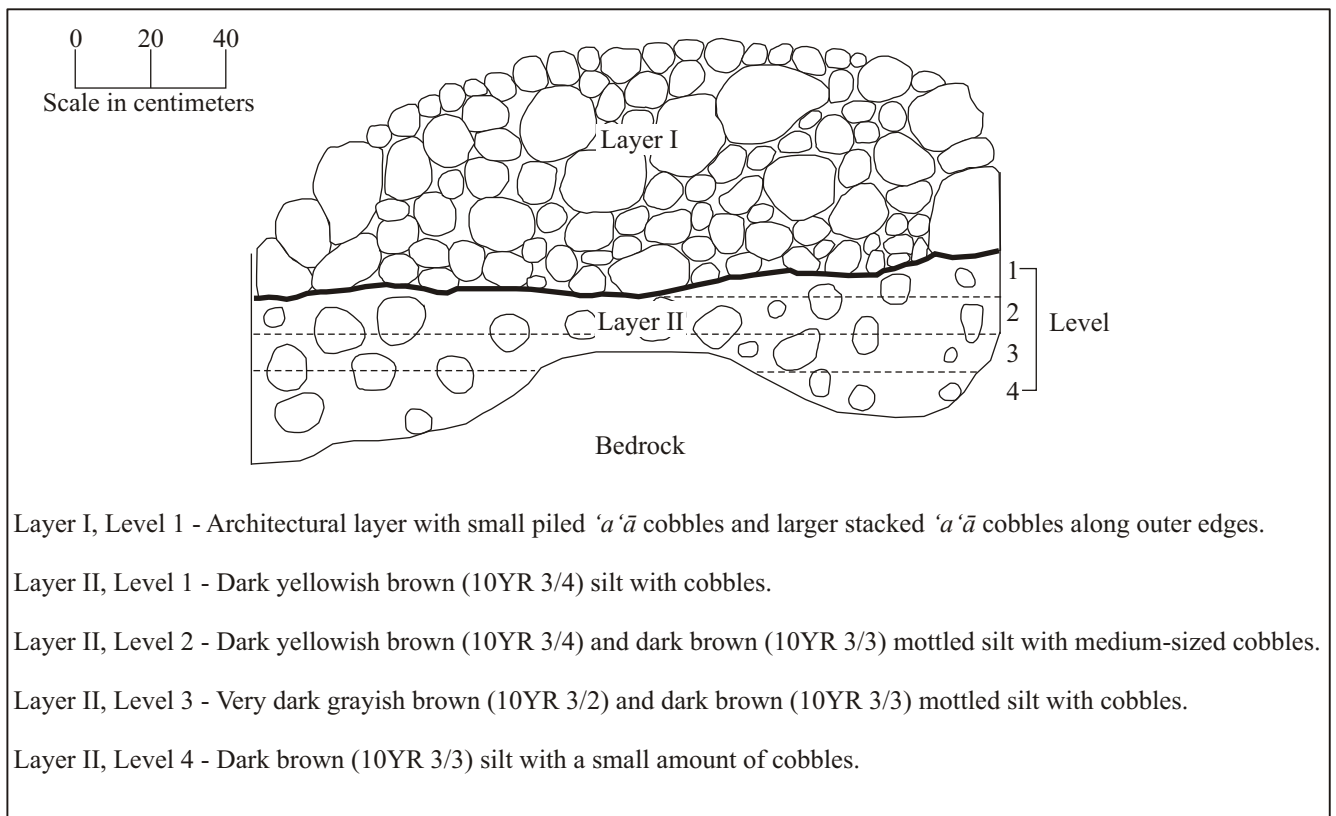


Figure 108. SIHP Site 23686 Feature 254 EU-12 northwest wall profile.

**Table 31. Recovered items from SIHP Site 23686, Feature 254, EU-12.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
159	II	1	Marine shell	<i>Cypraea</i> sp.	1	1	0.7
158	II	1	Organic	Charcoal	-	-	0.2
Layer II, Level 1 Total:					1	1	0.9
163	II	2	Marine shell	Unidentified	1	-	0.2
162	II	2	Coral	Unidentified	4	-	1.5
161	II	2	Mammal bone	<i>Sus</i> sp. vertebrae	1	1	1.1
160	II	2	Organic	Charcoal	-	-	0.5
Layer II, Level 2 Total:					6	1	3.3
164	II	3	Organic	Charcoal	-	-	0.3
Layer II, Level 3 Total:					0	0	0.3
EU-12 Total:					7	2	4.5

Charcoal collected from Layer II Level 2 of EU-12, Feature 254, was submitted for radiocarbon assaying. The sample (Beta-212761) intercepts the tree-ring calibration curve at AD 1650 and has a 2-sigma standard deviation calibrated date range of AD 1520 to 1950.

### Feature 291

Feature 291 is a linear *kuaiwi* constructed of 'a'ā cobbles within the northeastern quadrant of the project area (see Figure 76). The southwest to northeast aligned wall is 78 meters long, 3.5 meters wide, and 30 centimeters high. The wall is comprised of loosely piled small to medium cobbles.

A 2 x 1 meter excavation unit (EU-13) was placed from north to south across the wall near its northeastern tip and revealed the following profile (Figure 109):

Layer I (0-30cmbs).....architectural layer with small to medium piled 'a'ā cobbles.  
 Layer II, Level 1 (30-40cmbs).....dark brown (10YR 3/3) silt with cobbles.  
 Layer II, Level 2 (40-50cmbs).....brown (10YR 4/3) silt with 40% cobbles.  
 Layer II, Level 3 (50-60cmbs).....brown (10YR 4/3) silt with smaller cobbles.  
 Layer II, Level 4 (60-80cmbs).....brown (10YR 4/3) silt with 80% smaller cobbles on undulating 'a'ā bedrock.

Items recovered from EU-13 include *Cypraea* sp., *Drupa* sp., *Morula* sp., *Isognomon* sp., coral, Echinoidea, *Comus* sp., unidentifiable shell, volcanic glass flake, and waterworn basalt pebbles (Table 32). Layer II yielded more items than the architectural Layer I. However, no dietary or activity shifts are evident.



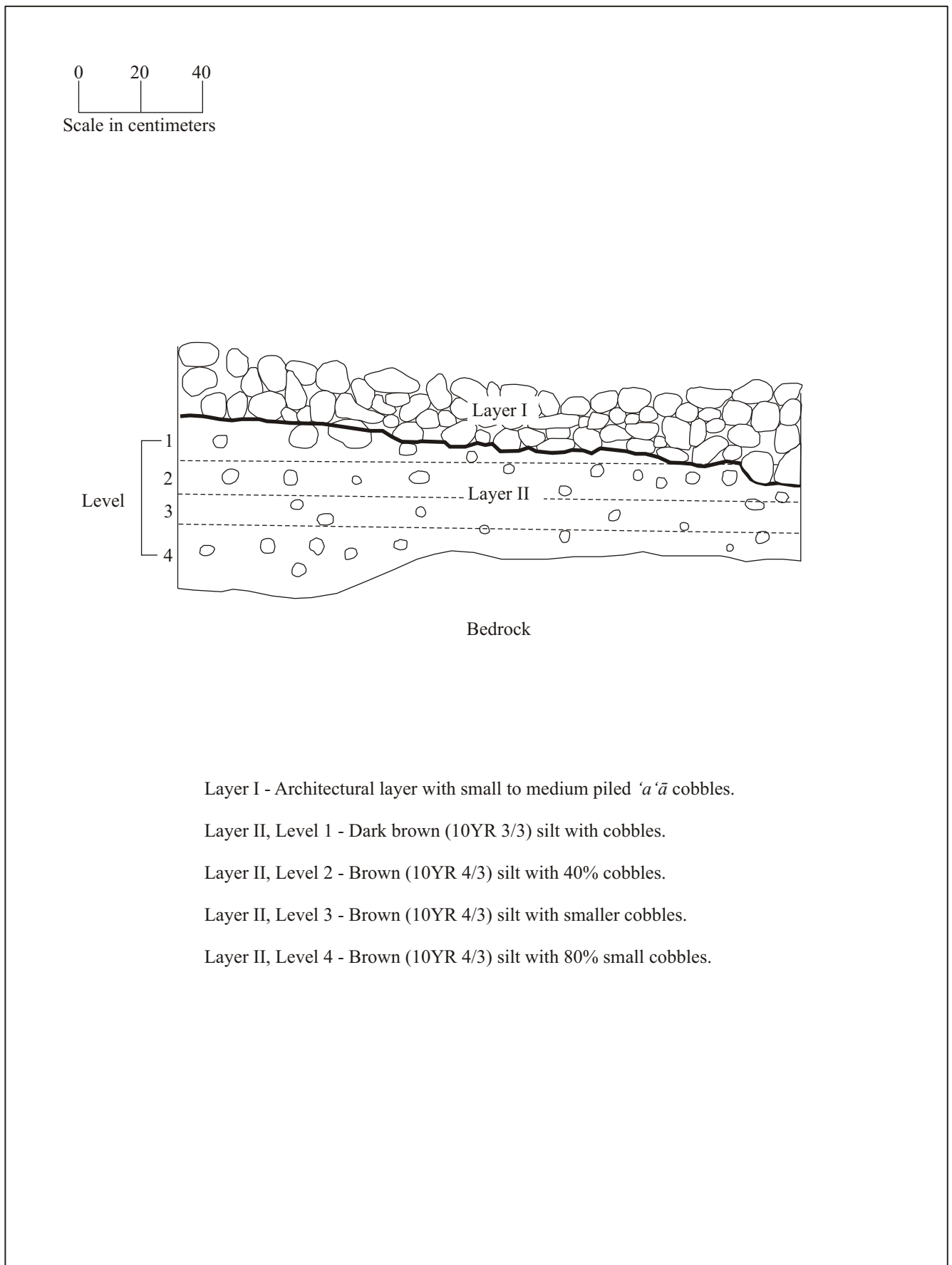


Figure 109. SIHP Site 23678 EU-13 west wall profile.

**Table 32. Recovered items from SIHP Site 23686, Feature 291, EU-13.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
165	I	1	Marine shell	<i>Cypraea</i> sp.	7	2	15.3
166	I	1	Marine shell	<i>Drupa</i> sp.	1	1	1.2
167	I	1	Marine shell	<i>Conus</i> sp.	1	1	2.1
170	I	1	Marine shell	<i>Conus</i> sp.	1	1	0.0
168	I	1	Coral	Unidentified	1	-	2.8
169	I	1	Coral	Unidentified	12	-	67.5
Layer I, Level 1 Total:					23	5	88.9
172	II	1	Marine shell	<i>Cypraea</i> sp.	7	1	5.3
173	II	1	Marine shell	<i>Drupa</i> sp.	3	1	1.1
174	II	1	Marine shell	<i>Conus</i> sp.	6	2	2.4
175	II	1	Marine shell	Unidentified	1	-	0.2
176	II	1	Coral	Unidentified	20	-	7.7
177	II	1	Coral	Unidentified	1	-	1.5
178	II	1	Coral	Waterworn	2	-	1.1
171	II	1	Basalt	Waterworn pebble	2	-	3.7
Layer II, Level 1 Total:					42	4	23.0
180	II	2	Marine shell	<i>Cypraea</i> sp.	11	1	5.2
184	II	2	Marine shell	<i>Drupa</i> sp.	1	1	1.5
185	II	2	Marine shell	<i>Morula</i> sp.	1	1	1.0
183	II	2	Marine shell	<i>Isognomon</i> sp.	1	1	0.1
182	II	2	Marine shell	<i>Conus</i> sp.	4	1	1.5
186	II	2	Marine shell	Unidentified	5	-	1.6
188	II	2	Coral	Unidentified	2	-	1.5
189	II	2	Coral	Waterworn	2	-	0.4
190	II	2	Coral	Unidentified	5	-	3.3
181	II	2	Echinoderm	Echinoidea	1	-	0.3
179	II	2	Volcanic glass	Flake	1	-	0.9
Layer II, Level 2 Total:					34	5	17.2
191	II	3	Marine shell	<i>Cypraea</i> sp.	10	2	6.1
194	II	3	Marine shell	<i>Drupa</i> sp.	1	1	0.4
192	II	3	Marine shell	<i>Conus</i> sp.	8	2	3.9
195	II	3	Marine shell	Unidentified	12	-	1.1
196	II	3	Coral	Unidentified	5	-	1.7
197	II	3	Coral	Waterworn	6	-	2.5
193	II	3	Echinoderm	Echinoidea	3	-	0.5
Layer II, Level 3 Total:					45	5	16.2
EU-13 Total:					144	19	145.3

**Feature 286**

Feature 286 is an irregularly shaped terrace wall constructed of 'a'ā cobbles within the east-central portion of the project area (see Figure 76). The roughly L-shaped wall extends for approximately ten meters from the southeast to the northwest where it turns into a generally northeasterly facing arc-shape for another six meters. The average width of the wall is 1.8 meters and its height is 60 centimeters. The wall consists of piled large cobbles and small boulders.

A 2 x 1 meter excavation unit (EU-16) was placed from east to west across the wall near its eastward turn and revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figure 110):

- Layer I (0-50cmbs)..... architectural layer with piled large to small 'a'ā cobbles and a few boulders.
- Layer II (50-80cmbs) ..... dark brown (10YR 3/3) silt grading into dark yellowish brown (10YR 3/4) silt immediately above weathered and undulating 'a'ā bedrock.

### Feature 282

Feature 282 is a rectangular pavement constructed of 'a'ā cobbles within the east-central portion of the project area (see Figure 76). The southeast to northwest aligned platform is 12.5 meters long, 8.5 meters wide, and 20 centimeters above ground surface. Two excavation units (i.e., EU-17 and EU-18) were placed on the Feature 282 pavement.

A 2 x 1 meter excavation unit (EU-17) was placed in the northwestern portion of the pavement and revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 111 and 112):

- Layer I (0-25cmbs)..... architectural layer with piled small to large 'a'ā cobbles (smaller pebbles formed a 10cm thick pavement).
- Layer II (25-50cmbs) ..... brown (10YR 4/3) silt with 80% rock above weathered 'a'ā bedrock.

A 2 x 2 meter excavation unit (EU-18) was placed near the northwestern corner of the pavement and revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 113 and 114):

- Layer I (0-25cmbs)..... architectural layer with piled small to large 'a'ā cobbles.
- Layer II (25-45cmbs) ..... brown (10YR 4/3) silt with 80% rock above weathered 'a'ā bedrock.

### Feature 289

Feature 289 is an irregularly-shaped pavement constructed of 'a'ā cobbles within the east-central portion of the project area (see Figure 76). The west to east aligned platform is nine meters long, 5.5 meters wide, and 20 centimeters above the surrounding ground surface. Two excavation units (i.e., EU-19 and EU-20) were placed on the Feature 289 pavement.

A 2 x 2 meter excavation unit (EU-19) was placed near the southwestern portion of the pavement and revealed the following stratigraphic profile (Figure 115):

- Layer I (0-45cmbs).....architectural layer with piled small to large 'a'ā cobbles and a few small boulders.
- Layer II, Level 1 (45-55cmbs).....dark brown (10YR 3/3) silt with 'a'ā cobbles from architectural layer.
- Layer II, Level 2 (55-65cmbs).....dark brown (10YR 3/3) silt with 20% 'a'ā gravels.
- Layer II, Level 3 (65-80cmbs).....dark brown (10YR 3/3) silt with crumbly 'a'ā cobble fragments from underlying undulating bedrock.

Items recovered from EU-19 include *Cypraea* sp., *Morula* sp., *Isognonom* sp., coral, and *Conus* sp. (Table 33). All the items came from Layer II below the architectural layer.

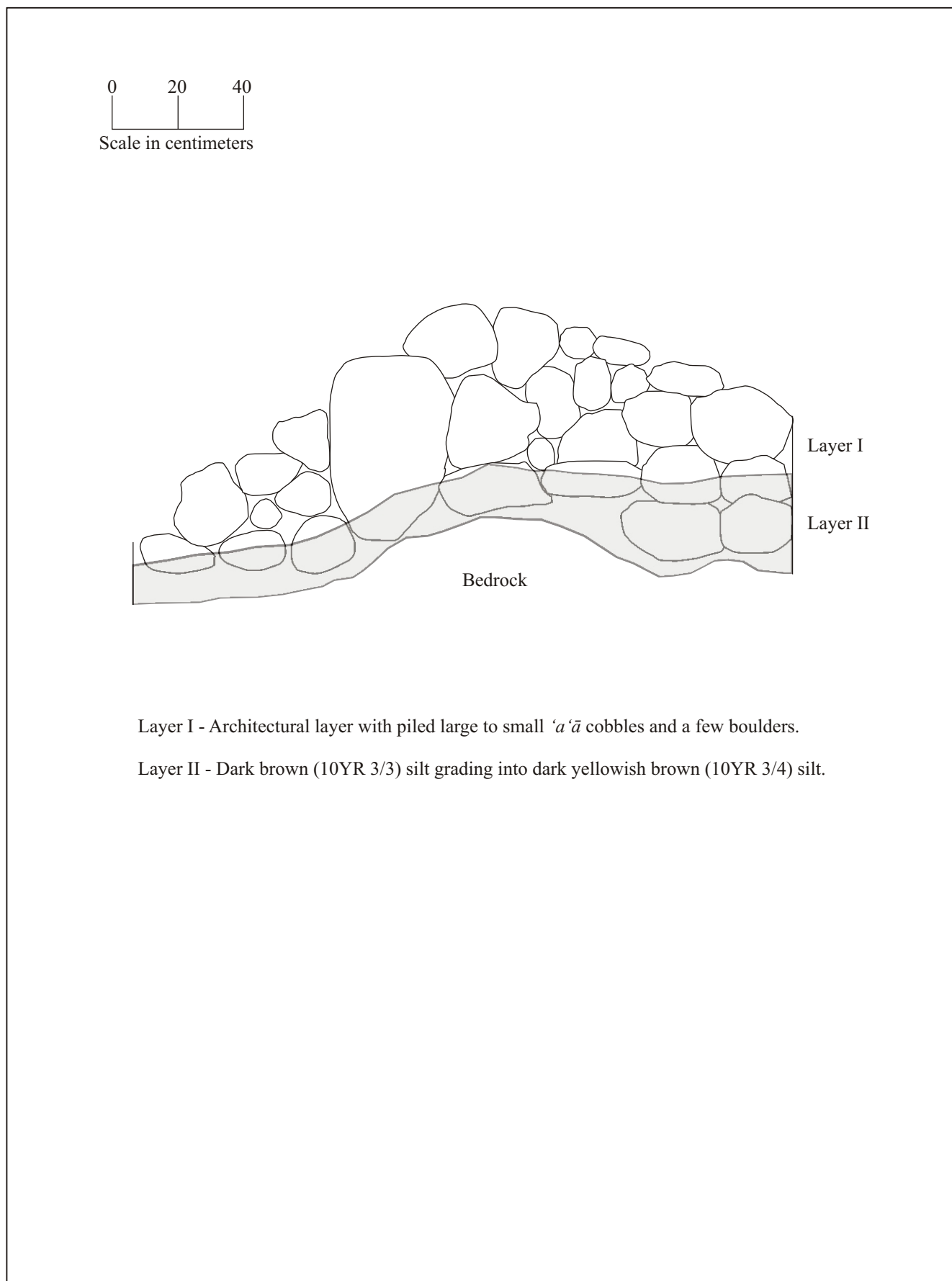


Figure 110. SIHP Site 23686 Feature 286 EU-16 north wall profile.



Figure 111. SIHP Site 23686 Feature 282 EU-17 base of excavation, view to the east.

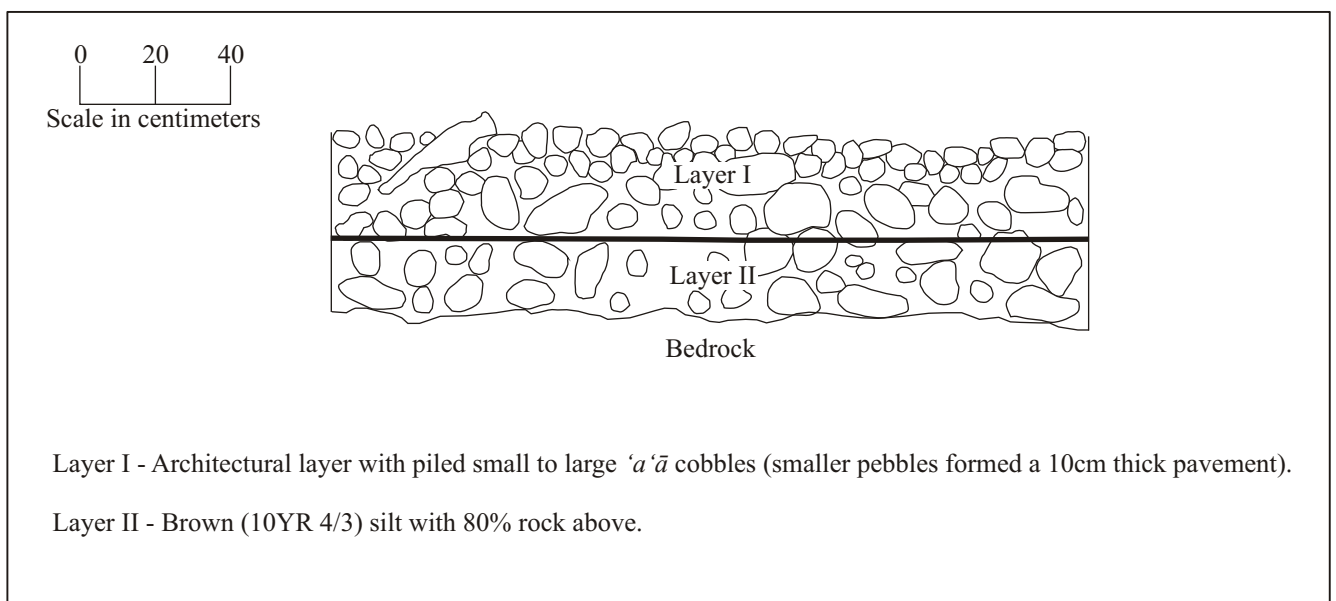


Figure 112. SIHP Site 23686 Feature 282 EU-17 east wall profile.





Figure 113. SIHP Site 23686 Feature 282 EU-18 base of excavation, view to the east.

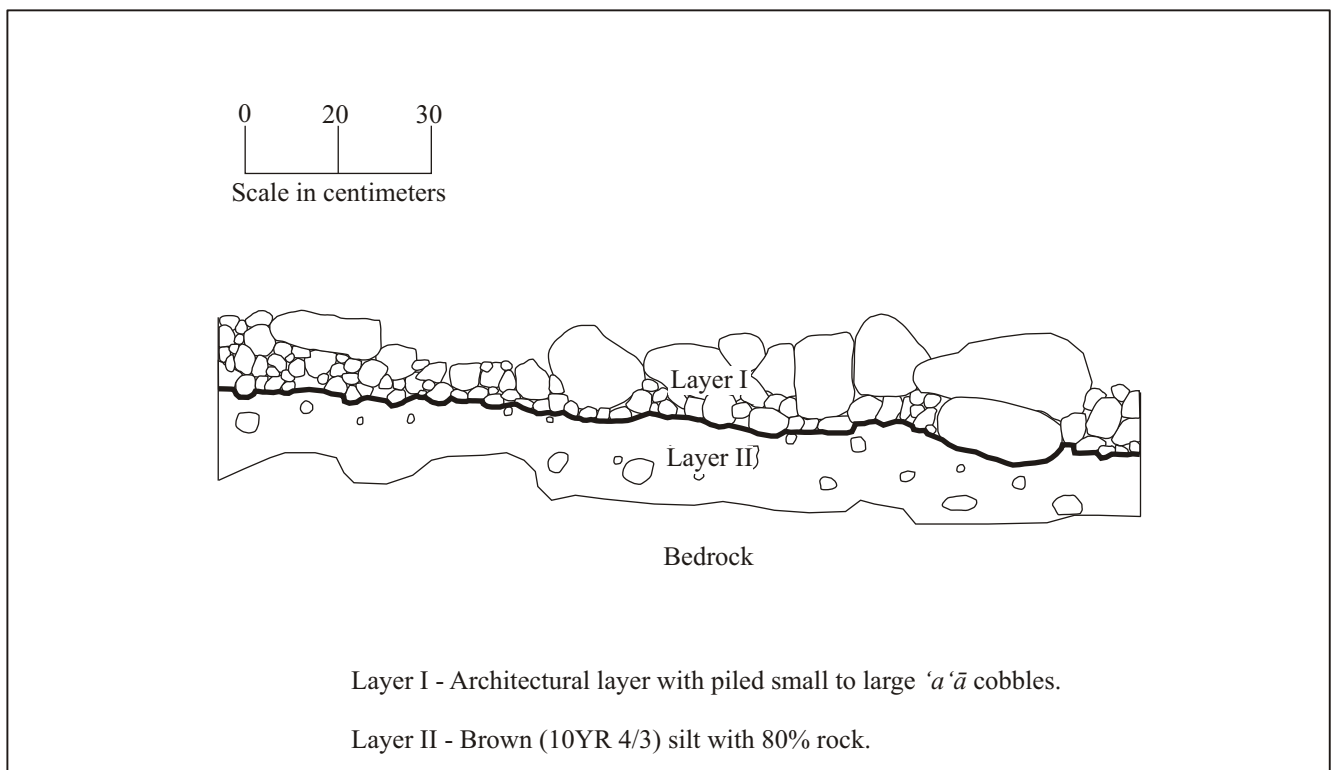
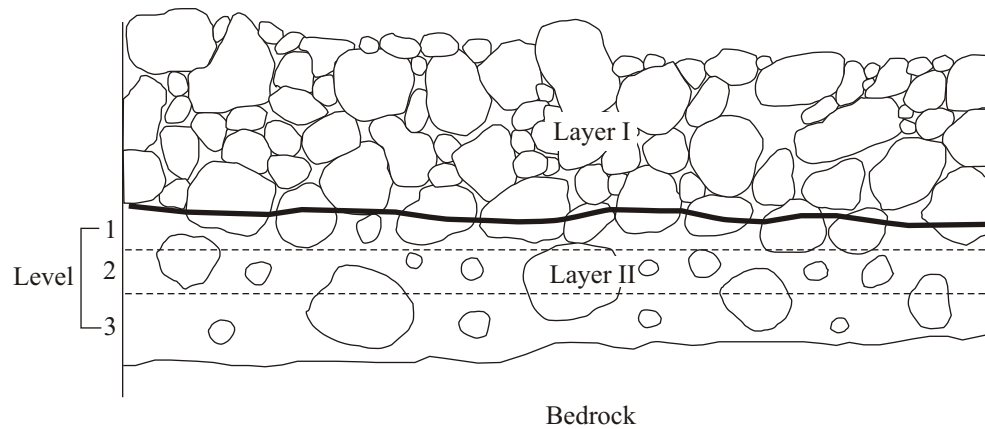


Figure 114. SIHP Site 23686 Feature 282 EU-18 east wall profile.



0 20 30  
Scale in centimeters



Layer I - Architectural layer with piled small to large 'a'ā cobbles and a few small boulders

Layer II, Level 1 - Dark brown (10YR 3/3) silt with 'a'ā cobbles from architectural layer.

Layer II, Level 2 - Dark brown (10YR 3/3) silt with 20% 'a'ā gravels.

Layer II, Level 3 - Dark brown (10YR 3/3) silt with crumbly 'a'ā cobble fragments.

Figure 115. SIHP Site 23686 Feature 289 EU-19 north wall profile.

**Table 33. Recovered items from SIHP Site 23686, Feature 289, EU-19.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
282	II	1	Marine shell	<i>Cypraea</i> sp.	10	2	7.6
284	II	1	Marine shell	<i>Isognomon</i> sp.	2	1	0.4
283	II	1	Marine shell	<i>Conus</i> sp.	1	1	0.2
285	II	1	Coral	Unidentified	1	-	0.3
Layer II, Level 1 Total:					14	4	8.5
286	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	0.7
Layer II, Level 2 Total:					1	1	0.7
287	II	3	Marine shell	<i>Cypraea</i> sp.	3	1	1.0
288	II	3	Marine shell	<i>Morula</i> sp.	1	1	0.7
Layer II Level 3 Total:					4	2	1.7
EU-19 Total:					19	7	10.9

A 2 x 2 meter excavation unit (EU-20) was placed near the central portion of the pavement (immediately east of and abutting EU-19) and revealed the following stratigraphic profile (Figures 116 and 117):

- Layer I (0-30cmbs).....architectural layer with piled small to large 'a'ā cobbles and a few small boulders.
- Layer II, Level 1 (30-40cmbs).....brown (10YR 4/3) silt with 60% 'a'ā cobbles from architectural layer.
- Layer II, Level 2 (40-50cmbs).....brown (10YR 4/3) silt with 60% 'a'ā gravels.
- Layer II, Level 3 (50-60cmbs).....brown (10YR 4/3) silt with crumbly 'a'ā cobble fragments from underlying bedrock.

Items recovered from EU-20 include *Cypraea* sp., *Cymatium* sp., *Conus* sp., coral, and a volcanic glass flake (Table 34). The architectural layer yielded more remains than the underlying Layer II.

**Table 34. Recovered items from SIHP Site 23686, Feature 289, EU-20.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
289	I	1	Marine shell	<i>Cypraea</i> sp.	2	1	5.6
292	I	1	Marine shell	<i>Cypraea</i> sp.	14	2	7.8
294	I	1	Marine shell	<i>Cymatium</i> sp.	1	1	3.1
293	I	1	Marine shell	<i>Conus</i> sp.	2	1	2.9
290	I	1	Coral	Unidentified	1	-	17.2
291	I	1	Volcanic glass	Flake	1	-	0.5
Layer I, Level 1 Total:					21	5	37.1
295	II	2	Marine shell	<i>Cypraea</i> sp.	4	1	1.6
296	II	2	Marine shell	<i>Conus</i> sp.	2	1	1.5
297	II	2	Coral	Unidentified	1	-	2.5
Layer II, Level 2 Total:					7	2	5.6
EU-20 Total:					28	7	42.7

### Feature 81

Feature 81 is a linear terrace constructed of 'a'ā cobbles within the southeastern quadrant of the project area (see Figure 76). The southeast to northwest aligned wall is 60 meters long, one meter wide, and 50 centimeters above the surrounding ground surface.



Figure 116. SIHP Site 23686 Feature 289 EU-20 base of excavation, view to the east.

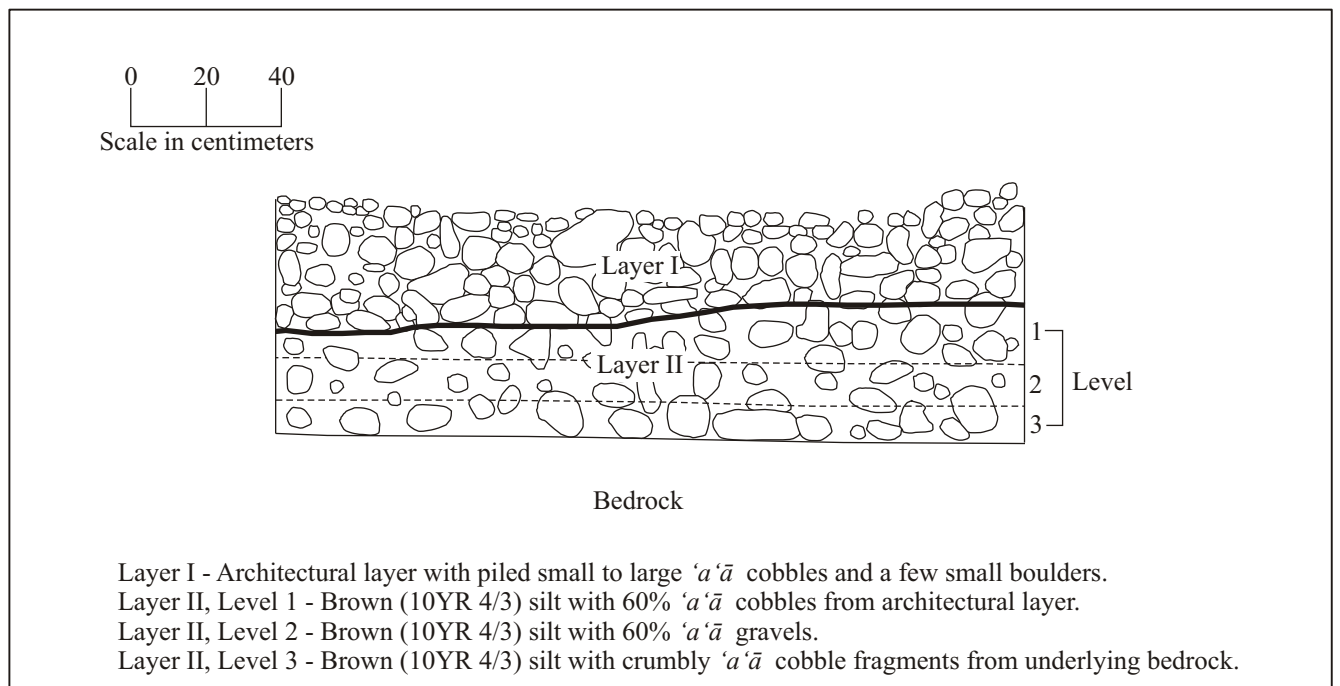


Figure 117. SIHP Site 23686 Feature 289 EU-20 south wall profile.

A 2 x 1 m excavation unit (EU-25), aligned southeast-northwest, was placed in the *makai* portion of the terrace wall. EU-25 revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 118 and 119):

- Layer I (0-30cmbs).....architectural layer with piled small to large 'a'ā cobbles.
- Layer II, Level 1 (30-40cmbs).....dark brown (10YR 3/3) silt with 60% 'a'ā cobbles.
- Layer II, Level 2 (40-50cmbs).....brown (10YR 4/3) silt with 80% 'a'ā gravels on bedrock.

### Feature 82

Feature 82 is a linear *kuaiwi* constructed of 'a'ā cobbles within the southeastern quadrant of the project area (see Figure 76). The southwest to northeast aligned wall is 108 meters long, 2.1 meters wide, and 70 centimeters high. The wall is composed of loosely piled small to medium cobbles and exhibits a considerable degree of post-constructional disturbance.

A 2 x 1 meter excavation unit (EU-26) was placed from east to west across the wall near its right-angled intersection with the Feature 81 wall and revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 120 and 121):

- Layer I (0-15cmbs)..... architectural layer with small to large piled 'a'ā cobbles.
- Layer II (15-28cmbs) ..... dark brown (10YR 3/3) and dark yellowish brown (10YR 3/4) mottled silt with small cobbles on crumbly 'a'ā bedrock.

### Feature 17

Feature 17 is a linear *kuaiwi* constructed of 'a'ā cobbles close to the southwestern quadrant of the project area (see Figure 76). The southwest to northeast aligned wall is 38.7 meters long, two meters wide, and 80 centimeters high. The wall consists of loosely piled small to medium cobbles.

A 2 x 1 meter excavation unit (EU-35) was placed from southeast to northwest across the wall and revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 122 and 123):

- Layer I (0-60cmbs)..... architectural layer with small to large piled 'a'ā cobbles.
- Layer II (60-65cmbs) ..... dark yellowish brown (10YR 3/4) silt with organic debris on uneven 'a'ā bedrock.

### Feature 293

Feature 293 is a square enclosure constructed of 'a'ā cobbles towards the southwestern portion of the project area (see Figure 76). The enclosure wall is 1.9 meters long by 1.9 meters thick and 50 centimeters above ground surface. Extensive modern-day activities in and around the feature have impacted the configuration and height of the enclosure wall as well as introduced recent items to the deposits, such as glass, plastic and metal containers, automobile parts, clothing, and fish remains.

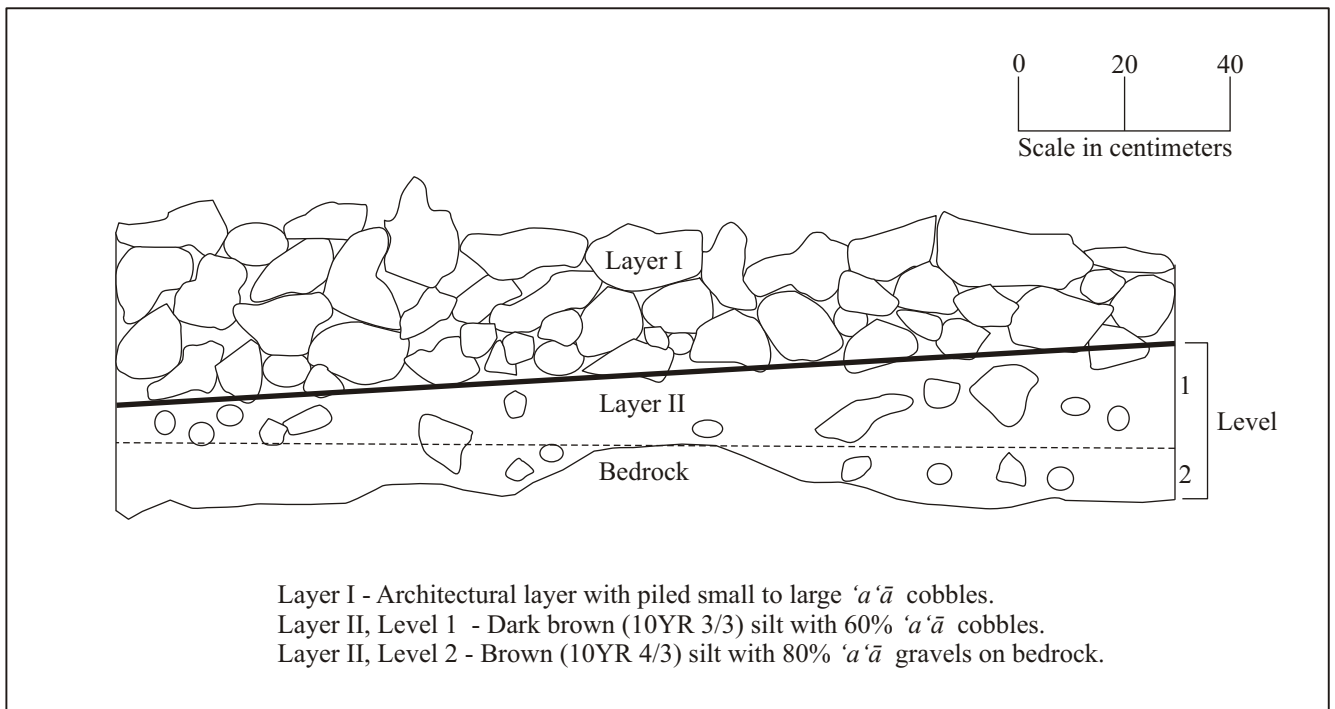
A 2 x 1 meter excavation unit (EU-36) aligned south to north, was placed in the central portion of the enclosed space covered by inwardly collapsed wall remnants. EU-36 revealed the following stratigraphic profile with evidence of disturbance (Figures 124 and 125):

- Layer I (0-40cmbs).....architectural layer with piled small to large 'a'ā cobbles, 'ili'ili pebbles, coral, and marine shell.
- Layer II Level 1 (40-60cmbs) .....dark brown (10YR 3/3) silt with 30% 'a'ā gravel.
- Layer II Level 2 (60-80cmbs) .....dark brown (10YR 3/3) and brown (10YR 4/3) mottled silt on undulating 'a'ā bedrock.





Figure 118. SIHP Site 23686 Feature 81 EU-25 base of excavation, view to the northwest.



Layer I - Architectural layer with piled small to large 'a'ā cobbles.  
 Layer II, Level 1 - Dark brown (10YR 3/3) silt with 60% 'a'ā cobbles.  
 Layer II, Level 2 - Brown (10YR 4/3) silt with 80% 'a'ā gravels on bedrock.

Figure 119. SIHP Site 23686 Feature 81 EU-25 northeast wall profile.





Figure 120. SIHP Site 23686 Feature 82 EU-26 base of excavation, view to the north.

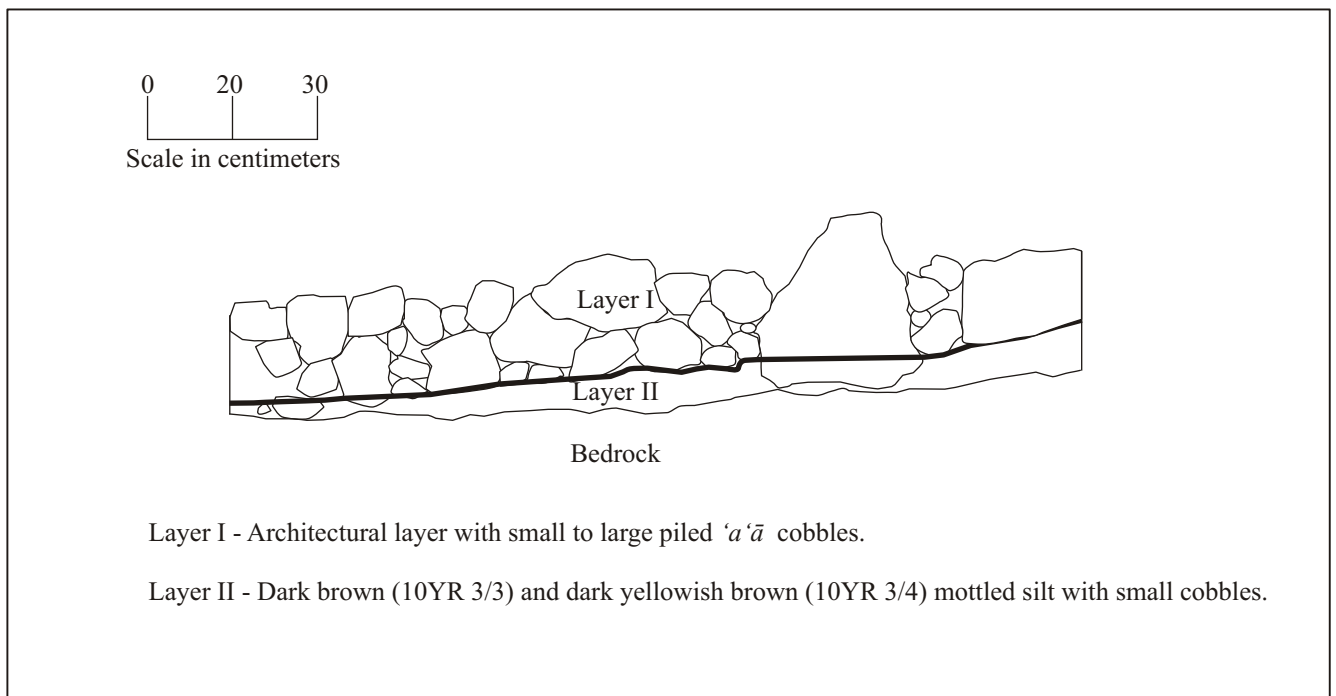


Figure 121. SIHP Site 23686 Feature 82 EU-26 north wall profile.





Figure 122. SIHP Site 23686 Feature 17 EU-35 base of excavation, view to the east.

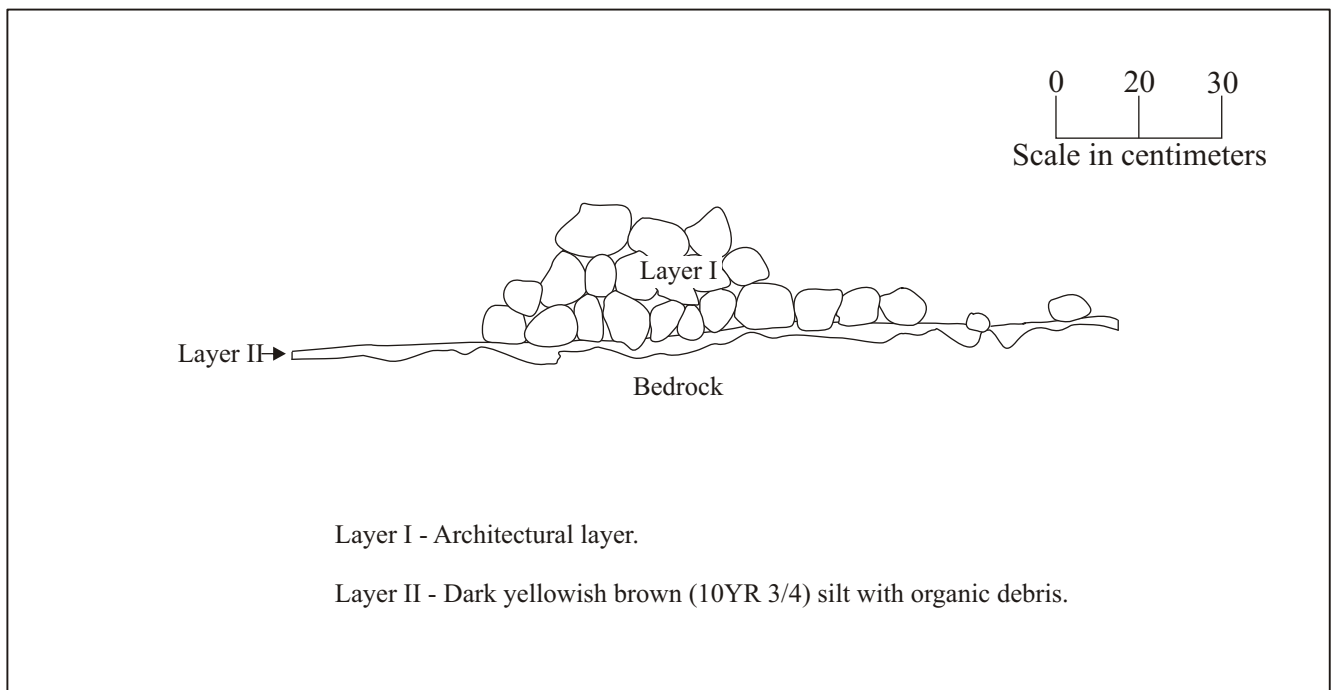
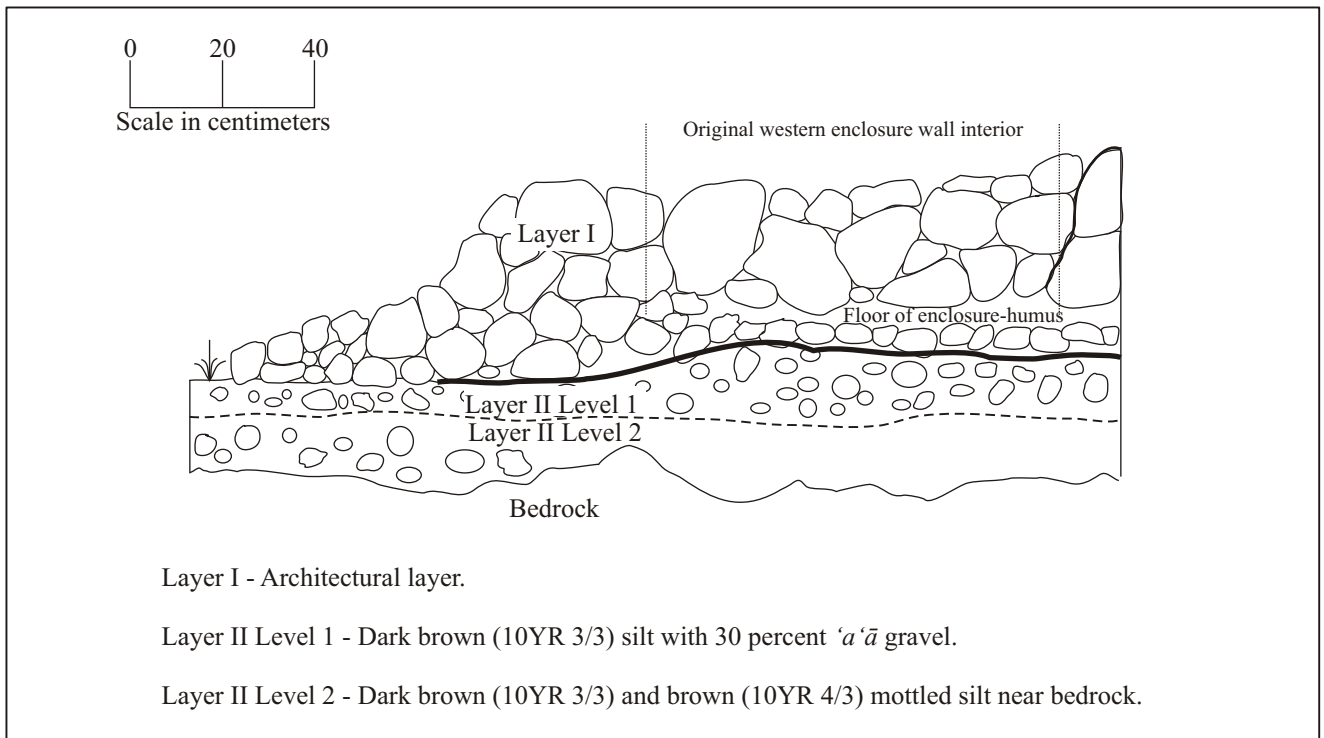


Figure 123. SIHP Site 23686 Feature 17 EU-35 northeast wall profile.



Figure 124. SIHP Site 23686 Feature 293 EU-36 base of excavation, view to the west.



Layer I - Architectural layer.

Layer II Level 1 - Dark brown (10YR 3/3) silt with 30 percent 'a' gravel.

Layer II Level 2 - Dark brown (10YR 3/3) and brown (10YR 4/3) mottled silt near bedrock.

Figure 125. SIHP Site 23686 Feature 293 EU-36 west wall profile.



Items recovered from EU-36 include fish, *Cypraea* sp., coral, Echinoidea, *Sus* sp., *Rattus* sp., *kukui* nutshell, charcoal, a volcanic glass flake, and waterworn basalt (Table 35). Historic Period items include steel nuts, screws, nails, bottle glass, and a plastic container. A steel common nail (Acc # 530) from Level 1 in Layer II appears modern. It is 38.5 millimeters long, 6.3 millimeters wide, and 2.85 millimeters thick. A steel finish nail (Acc# 546) from Level 2 in Layer II also appears modern. This nail is 51 millimeters long, 4 millimeters wide, and 2.9 millimeters thick. And finally, a hexagonal steel nut (Acc# 532) from Level 1 in Layer II also appears modern. This nut is sheared and corroded on the inside. It is 13.7 millimeters long, 12.5 millimeters wide, and 8.9 millimeters thick. The recovery of Historic Period materials from the deepest levels within EU-36 indicate post-depositional disturbance.

**Table 35. Recovered items from SIHP Site 23686, Feature 293, EU-36.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
526	I	1	Marine shell	<i>Cypraea</i> sp.	1	1	8.3
525	I	1	Coral	Unidentified	3	-	16.1
524	I	1	Basalt	Waterworn	1	-	5.5
Layer I, Level 1 Total:					5	1	30
533	II	1	Fish bone	Unidentified	2	-	0.3
527	II	1	Basalt	Waterworn	22	-	47.1
535	II	1	Organic	<i>Kukui</i> nutshell	1	1	0.9
528	II	1	Organic	Charcoal	-	-	1.8
530	II	1	Metal	Steel nail	1	-	1.5
531	II	1	Metal	Iron fragments rusted	43	-	15.6
532	II	1	Metal	Steel nut	1	-	6.1
534	II	1	Glass	Brown bottle	3	-	4.8
536	II	1	Glass	Clear thin fragments	4	-	3.3
537	II	1	Glass	Clear thick fragments	2	-	0.7
538	II	1	Glass	Light green bottle	2	-	0.7
539	II	1	Glass	Clear fragments	2	-	1.1
529	II	1	Synthetic	Plastic container	9	-	4.9
Layer II, Level 1 Total:					92	1	89
552	II	2	Fish bone	Unidentified vertebrae	1	-	1.8
553	II	2	Fish bone	Unidentified	1	-	0.2
545	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	3.0
544	II	2	Coral	Unidentified	4	-	1.7
556	II	2	Echinoderm	Echinoidea	1	-	>0.1
541	II	2	Mammal bone	<i>Sus</i> sp. rib	2	1	6.4
551	II	2	Mammal bone	<i>Rattus</i> sp. jaw	1	1	0.1
542	II	2	Basalt	Waterworn	13	-	24.1
550	II	2	Volcanic glass	Flake	1	-	0.5
543	II	2	Organic	<i>Kukui</i> nutshell	1	-	0.9
561	II	2	Organic	Charcoal	4	-	0.2
540	II	2	Metal	Iron fragments rusted	57	-	33.4
546	II	2	Metal	Steel finish nails	3	-	5.6
555	II	2	Metal	Steel screw	1	-	3.8
547	II	2	Glass	Clear bottle fragments	8	-	10.5
548	II	2	Glass	Light green bottle	3	-	5.8
549	II	2	Glass	Brown bottle	6	-	2.5
554	II	2	Glass	Clear fragments	5	-	4.2
557	II	2	Glass	Clear fragment	1	-	2.7
558	II	2	Glass	Clear fragment	1	-	0.3
559	II	2	Synthetic	Plastic	4	-	0.9
560	II	2	Synthetic	Plastic	9	-	0.8
Layer II, Level 2 Total:					128	3	109
EU-36 Total:					225	5	228

Charcoal collected from Layer II Level 1 of EU-36, Feature 293, was submitted for radiocarbon assaying. The sample (Beta-212770) intercepts the tree-ring calibration curve at AD 1410 and has a 2-sigma standard deviation calibrated date range of AD 1290 to 1480.

#### **Feature 294**

Feature 294 is a square enclosure constructed of loosely piled 'a'ā cobbles. The feature is located towards the southwestern portion of the project area (see Figure 76). The enclosure wall is two meters long by two meters thick and 60 centimeters above ground surface. Extensive modern-day activities in and around the feature have impacted the configuration and height of the enclosure wall as well as introduced recent items to the architectural layer, such as glass, plastic and metal containers, and automobile parts.

A 2 x 1 meter excavation unit (EU-37), aligned west to east, was placed across Feature 294, including the enclosed space and the surrounding wall. EU-37 revealed the following stratigraphic profile (apart from the modern items, the deposits yielded no cultural items) (Figures 126 and 127):

- Layer I (0-40cmbs).....architectural layer with piled small to large 'a'ā cobbles and a few small boulders.
- Layer II (40-42cmbs) .....dark brown (10YR 3/3) silt on uneven 'a'ā bedrock.

#### **Feature 212**

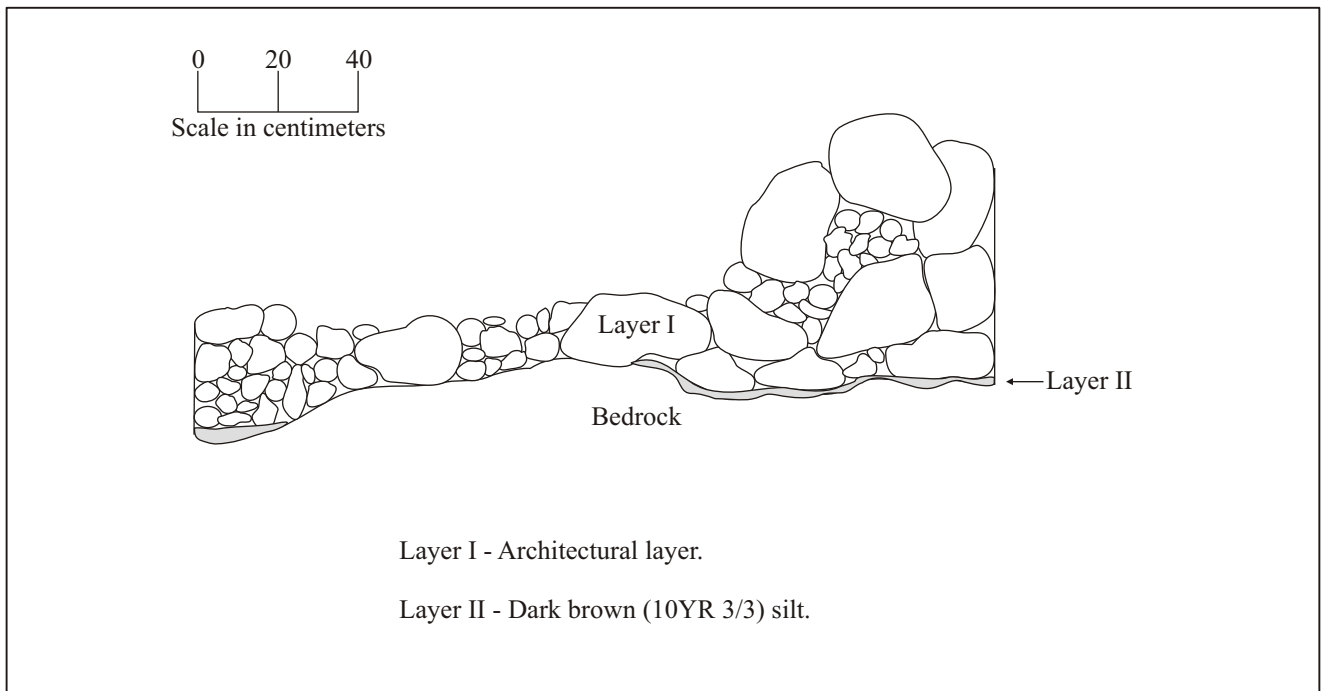
Feature 212 is a linear terrace constructed of very loosely piled *pāhoehoe* cobbles. The feature is located in the north-central portion of the project area (see Figure 76). The terrace wall is 5.2 meters long by 1.4 meters thick and 50 centimeters high. The orientation of the wall is southwest to northeast.

A 2 x 1 meter excavation unit (EU-38), aligned southeast to northwest, was placed perpendicularly across Feature 212. EU-38 revealed the following stratigraphic profile (the deposits yielded no cultural items) (Figures 128 and 129):

- Layer I (0-10cmbs).....architectural layer with loosely piled *pāhoehoe* cobbles.
- Layer II (10-20cmbs) .....dark brown (10YR 3/3) silt on uneven *pāhoehoe* bedrock.



Figure 126. SIHP Site 23686 Feature 294 EU-37 base of excavation, view to the south.



Layer I - Architectural layer.

Layer II - Dark brown (10YR 3/3) silt.

Figure 127. SIHP Site 23686 Feature 294 EU-37 south wall profile.





Figure 128. SIHP Site23686 Feature 212 EU-38 base of excavation, view to the southwest.

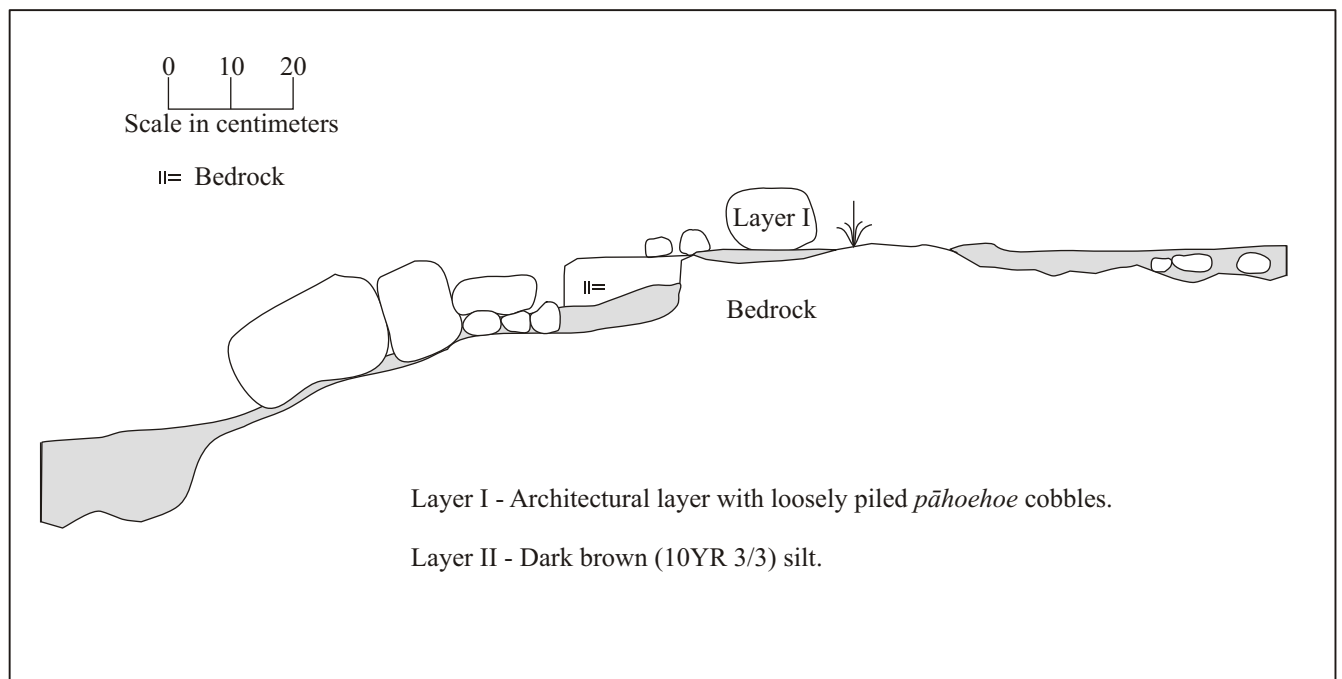


Figure 129. SIHP Site23686 Feature 212 EU-38 southwest wall profile.



# SYNTHESIS OF EXCAVATION RESULTS

## Introduction

The following synthesis considers together the results from the inventory survey and from the data recovery work. The synthesis is presented to evaluate the hypotheses outlined in the research objective. First, as far as radiocarbon assays and cross-dating evidence allow, habitation and agricultural sites and features are ordered within a chronological framework. Secondly, the identity and function of roughly contemporaneous habitation and agricultural sites and features are interpreted in terms of architectural criteria and associated items. Once roughly contemporary sets of habitation and agricultural sites and features and associated items are compared and contrasted with sets from different periods, it would be possible to evaluate the primary hypothesis. The primary research question was to determine if short term habitation and associated opportunistic agriculture was indeed followed by recurrent habitation and associated formal agriculture and finally by more consistent habitation with associated household gardens and animal pens. Changes in resource exploitation through time are also considered as is an assessment of tentatively identified permanent and temporary habitation features, and agricultural features.

## Site and Feature Chronology

Altogether, seventeen charcoal samples were submitted for radiocarbon assaying (Table 36). Of these, two were previously submitted samples from Test Units 13 and 16. Of the remaining fifteen, eleven came from suspected habitation features and four came from suspected agricultural features.

**Table 36. Charcoal samples submitted for radiocarbon assaying, by laboratory number.**

Beta-	RC-	Site	Feature	EU	Layer	Level	Measured BP	Standard Deviation	13C/12C	Conventional BP
175916	-	23672	B	TU-13	I	-	-	-	-	210
175917	-	23677	A	TU-16	I	-	-	40	-	160
212756	0223-10	23671	-	4	I	2	340	40	-23.1‰	370
212757	0223-43	23686	247	5	II	2	350	40	-26.9‰	320
212758	0223-98	23675	-	10	I	in situ	100	40	-21.7‰	150
212759	0223-130	23675	-	10	II	3	190	80	-26.2‰	170
212760	0223-150	23686	250	11	II	2	300	40	-27.4‰	260
212761	0223-160	23686	254	12	II	2	250	40	-24.4‰	260
212762	0223-209	23678	-	14	I	2	200	40	-24.1‰	210
212763	0223-298	23676	-	21	I	-	390	60	-23.4‰	410
212764	0223-314	23676	-	21	II	1	410	70	-25.4‰	410
212765	0223-332	23676	-	21	II	2	340	60	-25.1‰	340
212766	0223-378	23677	A	22	II	1	60	40	-24.1‰	70
212767	0223-409	23677	A	22	III	3	120	40	-22.6‰	160
212768	0223-474	23673	B	29	II	3	400	80	-22.5‰	440
212769	0223-498	23673	B	29	II	4	300	50	-24.4‰	310
212770	0223-528	23686	293	36	II	1	520	80	-23.5‰	540

Table 37 presents the calibrated dates sequentially, starting with the most recent ones and moving back in time. The two calibrated dates from EU-22 (i.e., Feature A of Site 23677) appear to match the stratigraphy in terms of chronological succession; charcoal from Layer II Level 1 is slightly younger than charcoal from Layer III Level 3. The two calibrated dates from EU-10 (i.e., Site 23675) are similarly compatible with stratigraphic depth; charcoal from Layer I is younger than charcoal from Layer II Level 3. However, the three radiocarbon dates from EU-21 (i.e., Site 23676) appear to be jumbled when viewed in their stratigraphic contexts; Layer II Level 1 is sandwiched between Layer I and Layer II Level 2 has yielded the earliest charcoal, whereas the charcoal from the deepest the three proveniences (i.e., Layer II Level 2) is the most recent. Two charcoal dates from EU-29 (i.e., Feature B of Site 23673) are also inverted; Layer II Level 3 contained older charcoal than the underlying Level 4. The calibrated standard

deviation ranges of the dates from each of these four excavation units (i.e., EU-10, EU-21, EU-22, and EU-29) overlap within the same unit, suggesting that the dates represent different estimates of a site's occupation. Of the four sites, the dates from Site 23676 and Site 23677 appear to have the tightest range (Figure 130). The ostensibly “inverted” dates could actually be the result of fluctuations in counting radioactive carbon instead of stratigraphic disturbance or post-depositional movement of charcoal. Indeed, “split dates” of the same charcoal sample are known to produce slightly different results, not unlike the overlapping but tight range of variation as exhibited by the three dates from EU-21 in Site 23676.

**Table 37. Calibrated radiocarbon dates by increasing age.**

Beta-	Site	Feature	EU	Layer	Level	Conventional AD	AD intercept(s)	2- $\sigma$ calibration
212766	23677	A	22	II	1	1880	1950	1680-1960
212767	23677	A	22	III	3	1790	1680/1740/1800/1930/1950	1660-1950
175917	23677	A	TU-16	I		1790	1680/1740/1800/1930/1950	1660-1950
212762	23678	-	14	I	2	1740	1660	1640-1950
212758	23675	-	10	I	in situ	1800	1680/1740/1810/1930/1950	1660-1950
212759	23675	-	10	II	3	1780	1680/1770/1800/1940/1950	1520-1960
212760	23686	250	11	II	2	1690	1650	1520-1950
212761	23686	254	12	II	2	1690	1650	1520-1950
175916	23672	B	TU-13	I		1740	1660	1510-1950
212756	23671	-	4	I	2	1580	1490	1440-1640
212765	23676	-	21	II	2	1610	1520/1590/1620	1440-1660
212763	23676	-	21	I	-	1540	1460	1420-1640
212764	23676	-	21	II	1	1540	1460	1410-1650
212769	23673	B	29	II	4	1640	1530/1550/1630	1460-1660
212768	23673	B	29	II	3	1510	1440	1320-1640
212757	23686	247	5	II	2	1630	1530/1560/1630	1460-1660
212770	23686	293	36	II	1	1410	1410	1290-1480

A “best estimate” age of different radiocarbon dates from the same unit or the same feature can be derived from calculating a weighted average of the dates and then calibrate the weighted average against the tree-ring calibration curve (Table 38, Figure 131). Judging from roughly contemporary calibration intercepts (which, by the way, do not necessarily represent the most probable date) and from similarities in the calibrated standard deviation ranges, four phases, labeled A to D, appear to be represented. The breaks between the phases are somewhat arbitrary, especially considering overlaps in standard deviation ranges. Nonetheless, for comparative purposes and for the detection of possible habitation and agricultural trends through time, grouping together roughly contemporary sites and features can be useful.

**Table 38. Single and weighted average calibrated radiocarbon dates by increasing age.**

Site	Feature	Unit (x dates per unit)	Layer	Level	AD multiple date weighted average and single date calibration intercept(s)	AD calibrated 2- $\sigma$ range	Phase
23677	A	EU-22 (x2) and TU-16	I-III	1-3	1690/1730/1810/1920/1950	1690-1950	D
23678	-	EU-14	I	2	1660	1640-1950	D
23675	-	EU-10 (x2)	I-II	3	1690/1740/1800/1930/1950	1670-1950	D
23686	250	EU-11	II	2	1650	1520-1950	C
23686	254	EU-12	II	2	1660	1510-1950	C
23672	B	TU-13	I		1660	1510-1950	C
23686	247	EU-5	II	2	1530/1560/1630	1460-1660	B
23671	-	EU-4	I	2	1490	1440-1640	B
23676	-	EU-21 (x3)	I-II	1-2	1470	1450-1620	B
23673	B	EU-29 (x2)	II	3-4	1500	1470-1630	B
23686	293	EU 36	II	1	1410	1290-1480	A

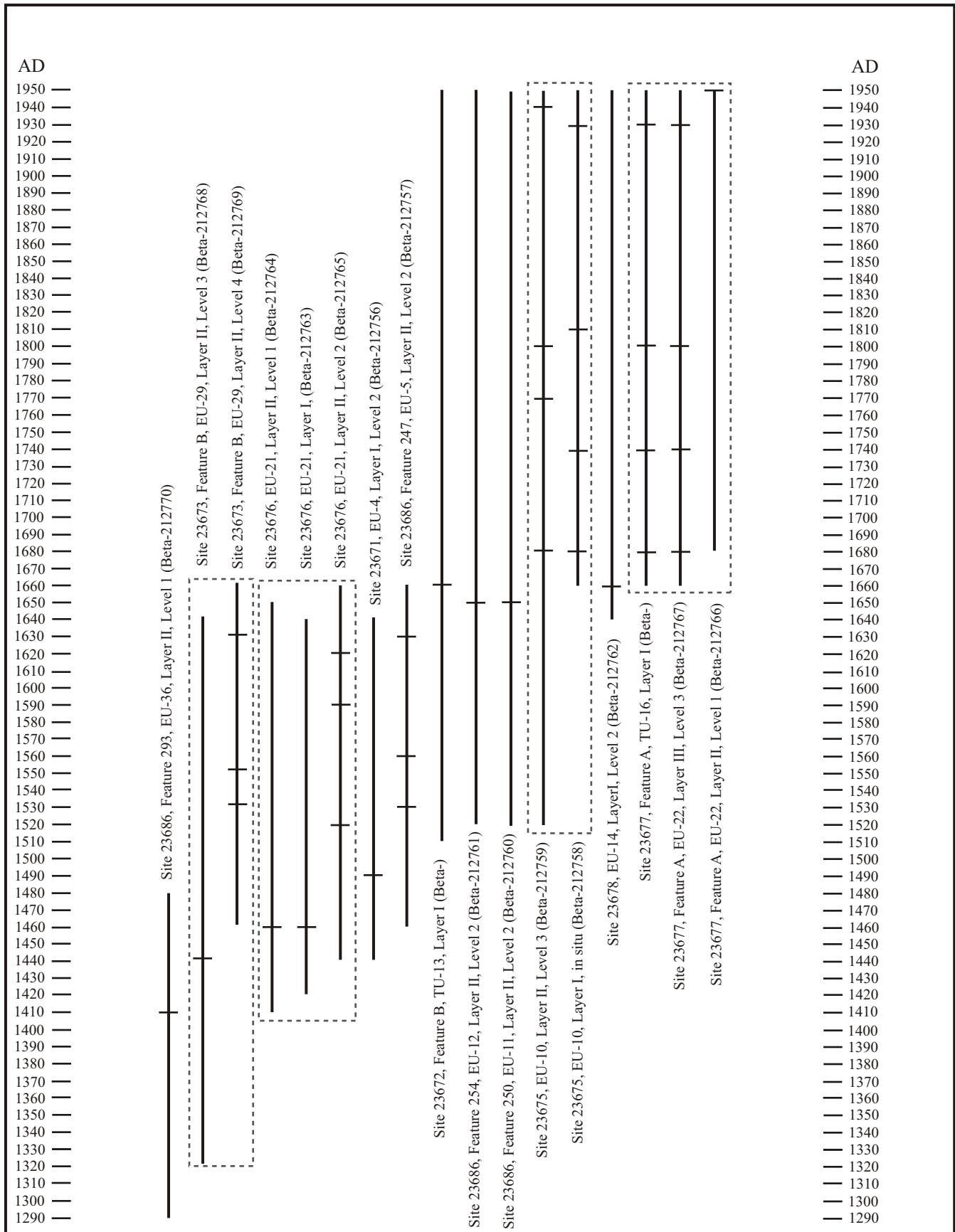


Figure 130. Diagrammatic representation of calibrated radiocarbon dates.

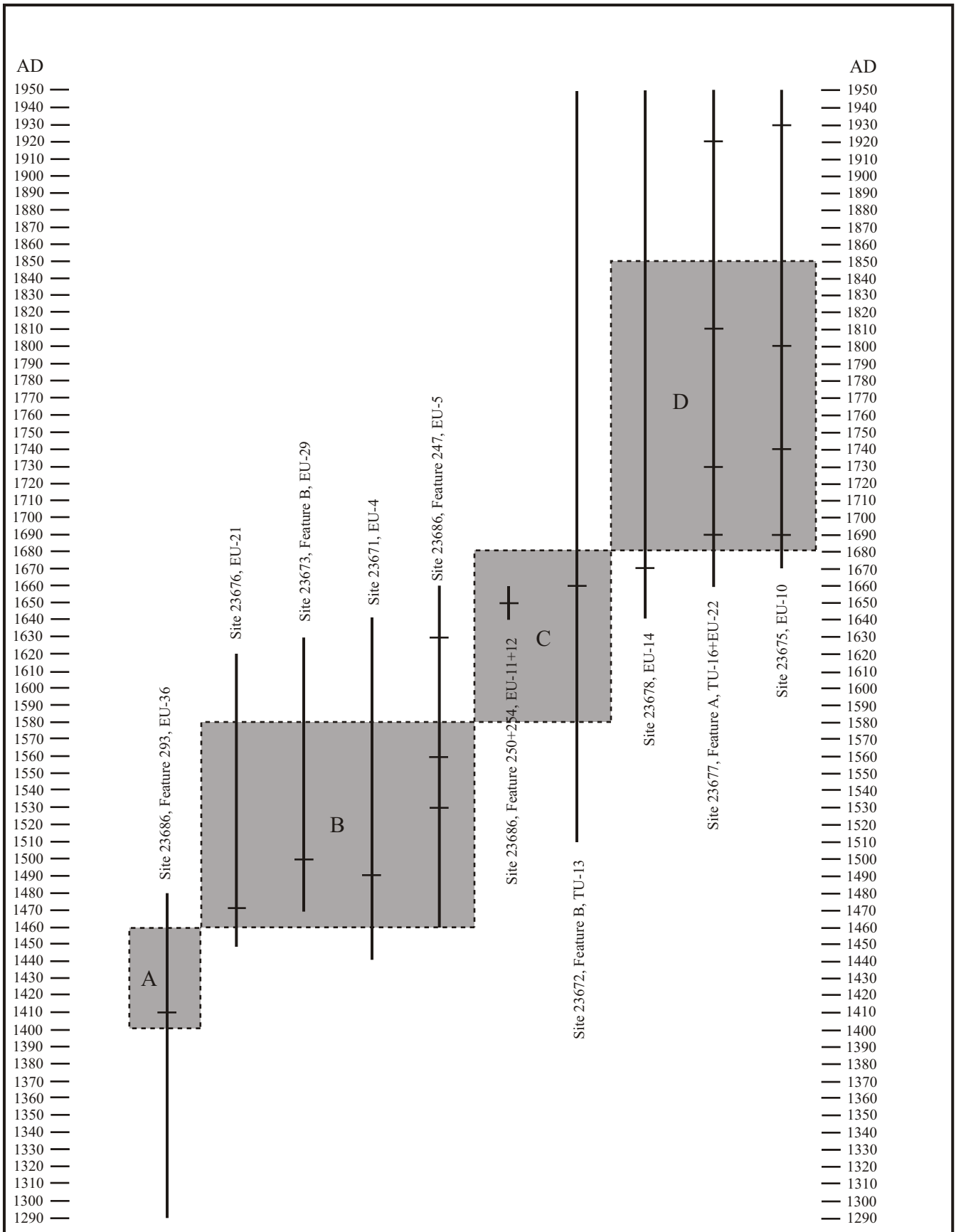


Figure 131. Diagrammatic representation of calibrated weighted averages with proposed phases.

Based on the information in Table 38 and Figure 129, the suggested phases probably span the following four somewhat arbitrary time periods: Phase A from AD 1400 to AD 1460, Phase B from AD 1460 to AD 1580, Phase C from AD 1580 to AD 1680, and Phase D from AD 1680 to AD 1850. The AD 1850 cut-off date is based on the probable AD 1830 to AD 1850 time range for the inscribed brass button from EU-31 in Feature A of Site 23670. Albeit overlapping and probably representing a gradual development, the phases are used as heuristic devices to help detect similarities and differences of site use and recovered items through time.

## SITE AND FEATURE FUNCTION

Now that the time periods have been established in broad outline, roughly contemporary sites and features can be grouped by phase and then compared to sites and features from different phases. Doing this would help determine if the primary hypothesis is valid or if it needs modification. To re-iterate, this hypothesis states that: The first use was for short term habitation and associated opportunistic agriculture, followed by formal agriculture and associated recurrent habitation, then the end of the sequence is marked by more consistent habitation with associated household gardens and animal pens.

Starting with the earliest dated feature in the project area and then progressively moving towards the Historic Period, the following discussion synthesizes the field and laboratory results, first on an intra-site feature-by-feature basis and then on an inter-site settlement level. Undated features and sites are lumped with dated features and structures whenever possible, using criteria such as spatial proximity (i.e., closely juxtaposed sites are likely to be contemporary), architectural connectedness (e.g., a wall surrounding a platform), similarity and/or relatedness of recovered items, and related feature types as suggested in the ethnographic record (cf. primarily Handy and Handy 1972).

### Phase A (ca. AD 1400-1460)

Two features associated with the earliest dated evidence of occupation within the project area are Feature 293 and the nearby Feature 294 of Site 23686. Both features, which are located near the southwestern corner of the project area (Figure 132), have been preliminarily identified as being related to agricultural activities. Almost five meters of empty ground separate the features, both of which are square enclosures of roughly equal size (i.e., approximately 4 m<sup>2</sup>). Both features also have been disturbed somewhat by modern-day activities and are covered in recent refuse, such as glass, plastic and metal containers, and automobile parts. The features also have a similar architectural layer comprised of 'a'ā cobbles and small boulders, roughly 40 centimeters thick. Considering the generally similar size, shape, architectural attributes, and deposits from Features 293 and 294, it is proposed that the two are roughly contemporary (i.e., the charcoal date from Feature 293 is plausibly an indicator of Feature 294's antiquity).

In spite of these similarities between the two features some differences are also apparent. First, the thirty-centimeter thick dark brown (10YR3/3) silt layer within Feature 293 far exceeds the two-centimeter thick silt layer within Feature 294. Secondly, Feature 293 showed signs of once having had a pavement of 'ili'ili pebbles, coral, and marine shell, which was absent within Feature 294. And finally, Feature 293 yielded ten different kinds of items, mostly from the silt layer, whereas Feature 294 yielded no items (Table 39). Overall then, Feature 293 appears to have been more elaborate and used more extensively than the nearby Feature 294. Whether these differences translate into significant chronological differences is not certain, although it is proposed here that the differences probably have more to do with different functions, intensity of use, and/or persistence of use than with time differences.

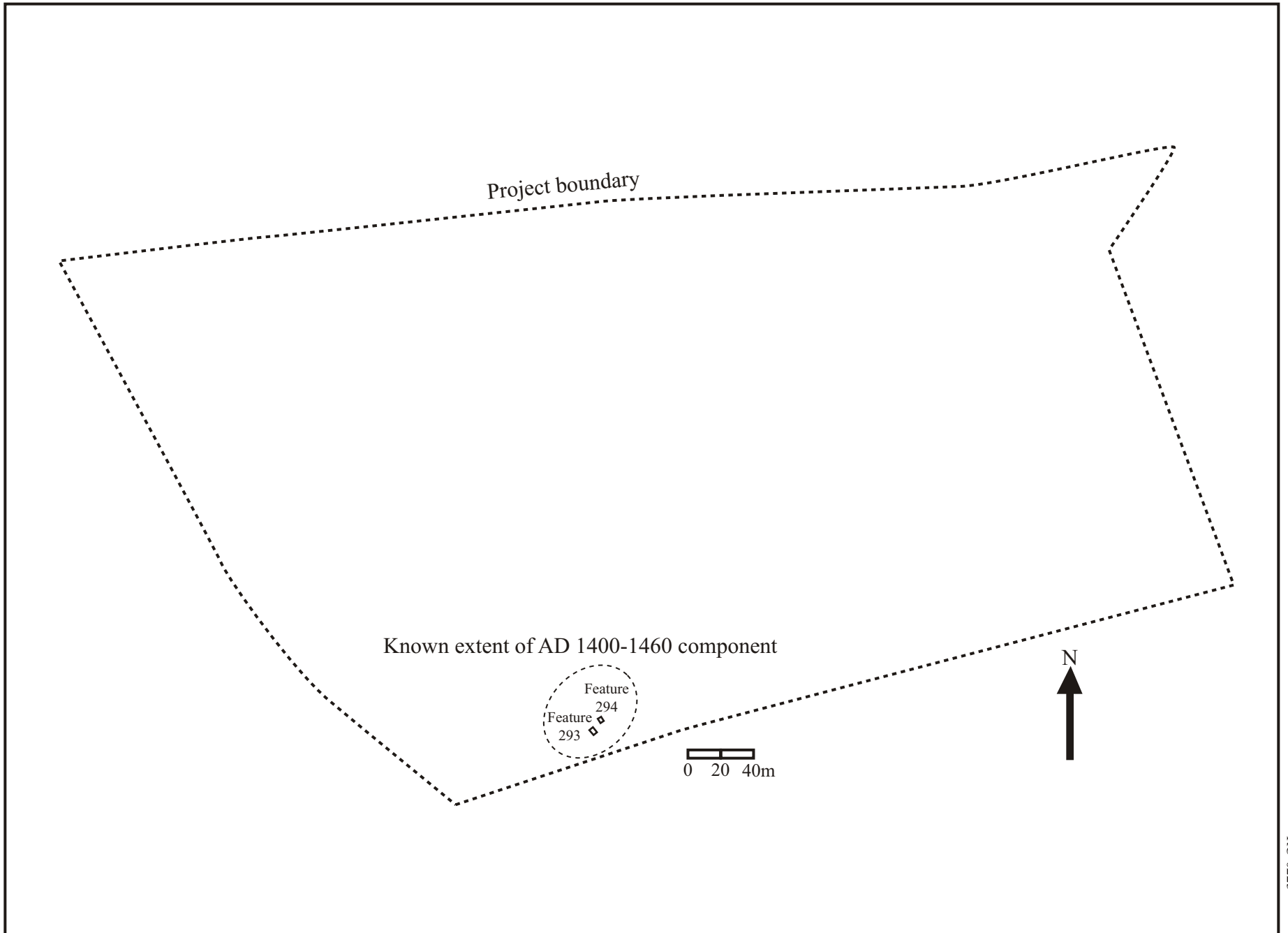


Figure 132. Probable extent of known Phase A features.



As can be seen in Table 39, items recovered from Feature 293 include fish, *Cypraea* sp., coral, Echinoidea, pig, rodent, *kukui* nutshell, wood charcoal, volcanic glass flakes, and waterworn basalt. These items indicate that resources from the ocean, rocky coast line, local area, and interior were utilized (no beach shells were recovered). The presence of pig remains suggests the possibility that males used the structure. Based on its small size and the comparatively low combined weight of recovered items per square meter (i.e., 58.2 g), the structure was most likely used on an intermittent or temporary basis. Being isolated in the *kula* zone during this relatively early period, suggests that Feature 293 was probably used by men cultivating fields away from the main habitation area. The nearby Feature 294 was probably used for a shorter period or as temporary sleeping quarters. Whatever the case might have been, the available radiocarbon and site functional evidence suggests that the initial fifteenth century AD occupation of the project area was restricted and temporary.

**Table 39. Weight (grams) of recovered items from Phase A features.**

Site	Feature	Unit	Fish UID	<i>Cypraea</i>	Branch coral	Echinoidea	Pig	Rodent	<i>Kukui</i> nutshell	Charcoal	Volcanic glass flake	Basalt waterworn	Total
23686	293	E36	2.3	8.6	17.8	0.1	6.4	0.1	1.8	2	0.5	76.7	116.3
23686	294	E37	-	-	-	-	-	-	-	-	-	-	-

#### Phase B (ca. AD 1460-1580)

The five features that can be associated with the second oldest period of occupation within the project area are the following: (1.) the Site 23676 platform, (2.) the Feature B enclosure of Site 23673; (3.) the Feature A platform of Site 23673; (4.) the Site 23671 platform, and (5.) the Feature 247 terrace within Site 23686. Considering that Features B and A of are part of one Site 23673 and that Site 23671 and Feature 247 are neighbors (an approximately 15 m gap separates 23671 and 247) with virtually identical radiocarbon dates, the following three separate sites can be said to be presented during Phase B: (1.) Site 23676; (2.) Site 23673, and (3.) Site 23671/Feature 247. Viewed together, these three sites extend from the southeast to the northwest, more-or-less within the southeastern portion of the project area (Figure 133).

Based on the kinds and weight of items recovered, plus considerations of feature shape and size, the function of each feature can be inferred. First, the presence of certain animal species and artifacts are indicative of the highly gendered dietary and activity “preferences” in Hawaiian culture. Shark, tuna, chicken, pig, and dog remains particularly indicate male consumption, activities, and rituals. According to Malo (1951), prior to 1819 shark meat was *kapu* for Hawaiian women. The recovery of a burnt shark tooth from Site 23676 could be the remains of a meal or a discarded tool (see Table 40). Malo (1951) notes that tuna, or *'ahi*, was particularly favored by men of high status. The concentration of tuna remains within the Feature B enclosure of Site 23673 is suggestive that the feature was used by high status males. The recovery of pig and dog remains from the same Feature B underscores its male association. The recovery of pig, dog, and bird (chicken?) remains from Site 23676 (Table 40) is also significant in this regard; all three animal species were consumed as food by men or used as offerings to the family ancestor spirits in the *hale mua* (Handy and Handy 1972:24, 252, 256, 387). Even after the early nineteenth century abolition of the *kapu* against women eating pig and dog, these animals were still considered a favorite among men (ibid. 245). Moreover, according to Handy and Handy (1972:301) fishing and the making of fishing gear were essentially male activities. The *Cypraea* sp. shell lure from Site 23676 is an example of a composite fishing tool that took some time and skill to manufacture. The entire composite tool was lowered on a line from a canoe to the ocean floor, where the cowry lure attracted octopus (Kirch 1997:203-204). The recovery of fishing gear, albeit minimal, suggests that at least some of the men who cultivated the *kula* zone also fished in the ocean. Bone awls recovered from Sites 23676 and 23673 further suggest male-related activities in these two locales.

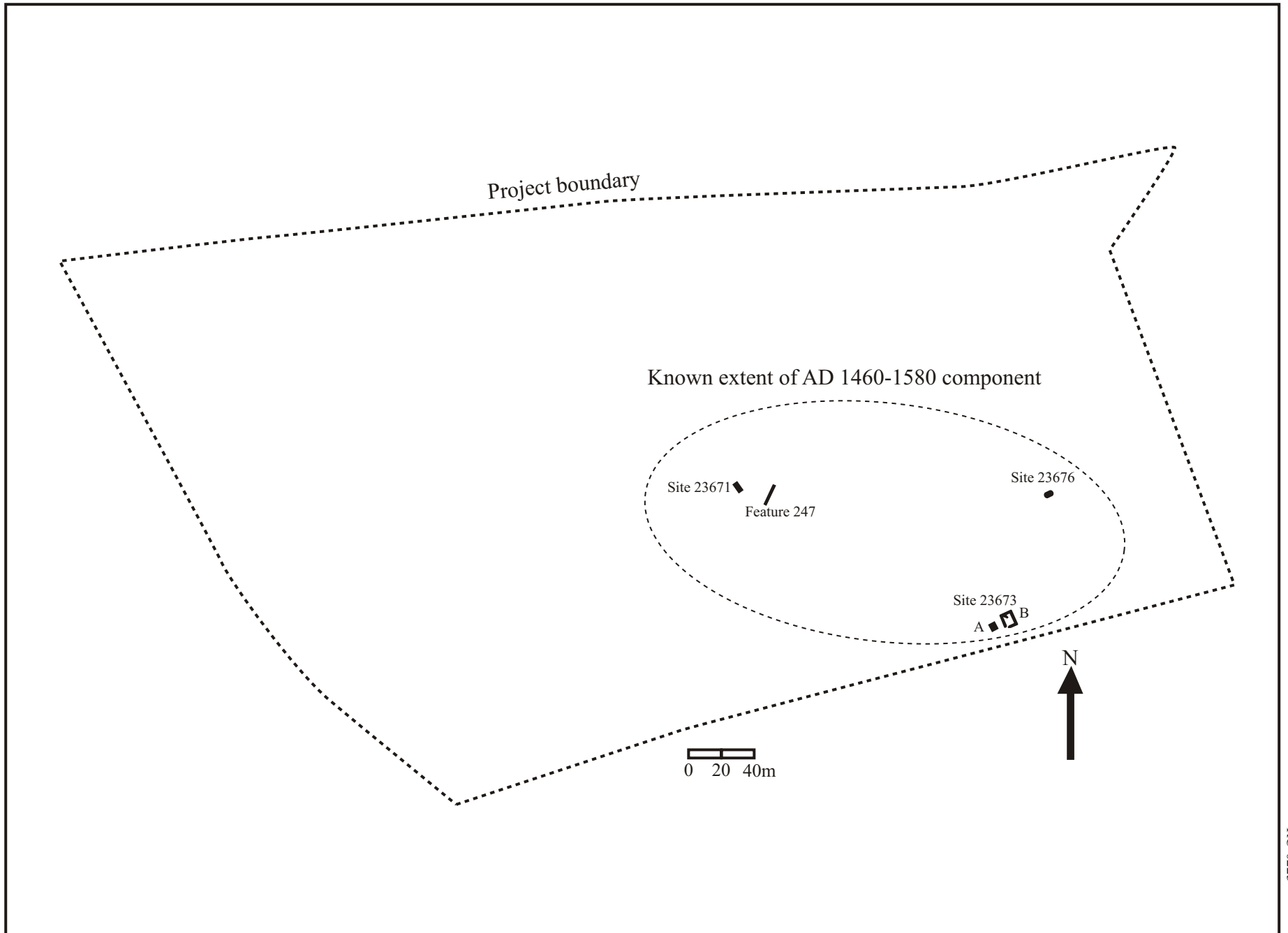


Figure 133. Probable extent of known Phase B sites and features.

**Table 40. Weight (grams) of recovered fish, fishing gear, and land animals from Phase B features.\***

Site	Feature	Unit	Tuna	Shark	Fish Scaridae	Fish UID	He'e iure	Avian bone	Pig	Dog	Rodent	Mammal bone	Medium mammal bone cut	Small mammal	Small mammal bone owl	Small mammal worked bone
23676	-	E21	-	0.5	-	-	-	0.2	8.8	1.7	0.2	1	0.4	-	3.2	-
23676	-	T18	-	-	0.1	-	32.0	-	1.4	-	0.3	-	-	0.8	-	-
23673	B	E29	0.8	-	-	0.1	-	-	2.2	-	-	-	-	-	0.7	-
23673	B	E30	9.1	-	-	-	-	-	-	0.2	0.1	-	-	4.7	-	13
23673	A	E27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23673	A	E28	-	-	-	1	-	-	-	-	0.4	-	-	-	-	-
23673	A	T17	-	-	4.2	-	-	-	-	-	0.2	-	-	-	-	-
23671	-	E04	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-
23686	247	E05	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*male related items are shaded

Of note is the absence of male-related remains from Site 23671 and from the contemporary Feature 247 (Table 40), suggesting some other function for these two features which will be discussed below. Although the Feature A platform at Site 23673 also lacks male-related items, its proximity to the Feature B enclosure suggests that the platform and enclosure are related. Indeed, the high combined average weight of recovered items per square meter (i.e., 104 g) from the three Feature A units is higher than that for the average per square meter weight from the nearby two Feature B units (i.e., 40.2 g). The average mass of recovered items from the Feature A platform, however, is less than that from the Site 23676 platform (i.e., 115 g). The deposits within both platforms are dark in color, suggesting some kind of cooking residue. But perhaps more importantly, the Feature A and Site 23676 platforms have similar rectangular shapes, even though Feature A (i.e., 26.5 m<sup>2</sup>) is somewhat bigger than Site 23676 (i.e., 18 m<sup>2</sup>). Based on the similar architecture and deposits of the platforms at Feature A and Site 23676, it is suggested that they could have functioned primarily as cooking areas for male consumption, whereas Feature B of Site 23673 was actually a *hale mua* structure in which males consumed and discarded their food. The partition wall within this Feature B, together with a branch coral on the wall and tuna remains, suggests that it was a comparatively important structure in the project area, perhaps with a shrine-like area behind the partition. The absence of pig and dog remains at Feature A could be that these prestige animals were all taken to the nearby Feature B for consumption, whereas the more isolated location Site 23676 meant that the pigs and dogs cooked on site were also consumed and discarded on site. Sites 23676 and 23673 are contemporary in terms of the radiocarbon time-scale, so it is likely that they existed on the landscape at roughly the same time, perhaps serving different sections of the work force. Alternatively, Site 23676 could be slightly earlier than the more elaborate Site 23673. If this was indeed the scenario, then the addition of an enclosure next-to the platform at Site 22673 could signify the beginning of settling down in the project area.

The more-or-less simultaneous appearance of the Site 23671 platform and Feature 247 terrace wall roughly 180 meters northwest of Site 23673 is an additional sign of filling-in of the landscape. Albeit disturbed, the intact portions of the Site 23671 platform exhibits a level surface paved with small 'a'ā cobbles. Although the size of this platform (i.e., 26.2 m<sup>2</sup>) is somewhat small for a *hale noa* sleeping hut, it could indeed have served as the foundation of a somewhat temporary hut. The brown (10YR 4/3) deposits within the platform were slightly lighter than the very dark gray brown (10YR 3/2) silt within the *hale mua* features discussed above, suggesting less cooking activities inside the platform. But perhaps more importantly, the excavation unit within Site 23671 only yielded a total of 27.2 grams of items per square

meter. The nearby contemporary terrace wall midden yielded 37.4 grams. This comparatively low mass of items recovered suggests far less food preparation, consumption, and discard at this proposed *hale noa* locale than the *hale mua* area to the southeast and east.

Nonetheless, as can be seen in Tables 41 to 43, the shell and lithic items recovered from the proposed *hale noa* and associated wall midden broadly match those from the contemporary *hale mua*. A variety of shells from a rocky coastline, corals, Echinoidea, beach shells, *kukui* nutshell, wood charcoal fragments, volcanic glass flakes, and waterworn basalt came from all the features dating to Period B. These items indicate that resources from the ocean, rocky coastline, beach, local area, and interior were utilized.

**Table 41. Weight (grams) of recovered rocky shore shell from Phase B features.**

Site	Feature	Unit	<i>Serpulorbis</i> sp.	<i>Trochus</i> sp.	<i>Cypraea</i> sp.	<i>Drupa</i> sp.	<i>Morula</i> sp.	<i>Cellana</i> sp.	<i>Isognomon</i> sp.	<i>Chama</i> sp.	<i>Nerita</i> sp.	<i>Strombina</i> sp.	<i>Thais</i> sp.	
23676	-	E21	4.1	-	160.2	26.8	4.3	4.1	-	4.0	0.6	-	-	<i>hale mua</i> kitchen
23676	-	T18	-	-	44.7	0.1	-	0.5	-	-	0.3	0.3	-	
23673	B	E29	-	0.3	151.2	0.6	-	-	1.2	-	0.3	-	0.5	<i>hale mua</i>
23673	B	E30	-	-	-	1.9	-	-	-	-	-	-	-	
23673	-	E27	-	-	3.9	-	-	-	0.2	-	-	-	-	<i>hale mua</i> kitchen
23673	A	E28	-	-	19.5	0.9	-	-	-	-	-	-	-	
23673	A	T17	-	-	16.6	1.0	-	0.5	-	-	0.4	-	-	
23671	-	E04	-	-	41.8	4.8	2.7	-	5.8	-	0.4	-	-	
23686	247	E05	-	-	37.8	2.8	-	0.7	-	-	-	-	-	<i>hale noa</i> boundary

**Table 42. Weight (grams) of recovered coral, Echinoidea, and beach shell from Phase B features.**

Site	Feature	Unit	Coral abrader	Branch coral	Echinoidea	Turbo	Nassarius	Brachidontes	Fimbria sp.	Comus	Mitra sp.	Terebra sp.	Shell UID	
23676	-	E21	-	168.0	4.2	-	6.6	-	0.3	4.9	-	-	8.2	<i>hale mua</i> kitchen
23676	-	T18	-	-	4.4	-	-	-	-	0.2	-	-	1.3	
23673	B	E29	-	68	33.5	-	-	-	-	0.9	-	-	4.9	<i>hale mua</i>
23673	B	E30	-	8.7	0.1	-	-	-	-	-	-	-	-	
23673	A	E27	-	113.3	0.8	-	-	-	2.6	-	-	-	0.7	<i>hale mua</i> kitchen
23673	A	E28	17.8	131	1.9	-	-	-	-	-	0.1	0.05	3.9	
23673	A	T17	-	29.1	11.0	-	-	-	-	2.1	-	-	-	
23671	-	E04	-	3.8	28.1	0.5	-	7.2	-	3.7	-	-	0.4	
23686	247	E05	-	10.9	-	-	-	-	-	-	-	-	-	<i>hale noa</i> boundary

**Table 43. Weight (grams) of recovered plants and lithics from Phase B features.**

Site	Feature	Unit	Kukui nutshell	Charcoal	Basalt flake	Volcanic glass flake	Volcanic shatter	Basalt waterworn	
23676		E21	8.2	10.4	-	40.6	-	-	<i>hale mua</i> kitchen
23676		T18	6.9	0.7	-	11.0	-	-	
23673	B	E29	-	10.4	-	4	-	-	<i>hale mua</i>
23673	B	E30	4.2	-	-	-	-	-	
23673	A	E27	7.2	0.4	-	4.2	35	51.4	<i>hale mua</i> kitchen
23673	A	E28	0.4	0.3	5.7	1.5	12.6	-	
23673	A	T17	6.3	-	-	23.7	-	-	
23671		E04	-	2.1	7.2	-	-	-	<i>hale noa</i>
23686	247	E05	7	3.3	10.9	1.4	-	-	<i>hale noa</i> boundary

Based on the evidence then, the following two main categories of features were used during Phase B: (1.) *hale mua* male eating house (Feature B walled structure of Site 23673) and *hale mua* kitchen (Feature A platform of Site 23673 and platform at Site 23676); and (2.) *hale noa* sleeping house (platform at Site 23671) and the possibly related *hale noa* midden that accumulated within the nearby agricultural terrace (Feature 247 of Site 23686). Furthermore, the appearance of a terrace wall, albeit diagonal to later *kuaiwi* walls, shows that by the late fifteenth to early sixteenth centuries, agricultural land started to have short partitions, in this case seemingly some kind of a boundary wall between the *hale noa makai* and *hale mua mauka*.

#### Phase C (ca. AD 1580-1680)

The seven features that can be associated with the third phase of occupation within the project area are the following: (1.) the Feature 250 pavement within Site 23686; (2.) the Feature 254 terrace within Site 23686; (3.) possibly the Site 23674 articulated platform and circular enclosure; (4.) the Feature A enclosure of Site 23672; (5.) the smaller Feature B enclosure of Site 23672; (5.) possibly the Feature 289 pavement within Site 23686; and (6.) possibly the large Feature 282 pavement within Site 23686. Although Site 23674 has not been dated, its placement between the contemporary Features 250/254 *mauka* and Site 23672 *makai* suggests that Site 23674 belongs to the same period. The observation that Features 282 and 289 fall on the *mauka* end of the same line tentatively suggests that they too date to Phase C, although this is less certain.

Considering that 20 meters separates Features 250 and 254 that have virtually identical radiocarbon dates, these two features are treated as part of one site, labeled Feature 250/254. Also considering that six meters separate Features A and B of Site 23672, this site too is treated as one entity. The following five sites can then be said to be present during Phase C: (1.) Feature 250/254; (2.) Site 23674; (3.) Site 23672; (4.) Feature 289; and (5.) Feature 282. Viewed together, these five sites form a long line that stretches west to east along the east-central portion of the project area (Figure 134).

Based on the kinds and weight of items recovered and on considerations of feature shape and size, the function of each Phase C feature is interpreted. The recovery of pig and dog from Features 250/254 (Table 44) suggests that males cooked, consumed, and discarded food in these structures. However, the average weight per square meter of all the items recovered from Features 250/254 is comparatively light (i.e., 18 g). This suggests that the fairly small Feature 250 platform (i.e., 4.5 m<sup>2</sup>) was only a temporary or short-term cooking and/or eating house, perhaps catering for men laboring in the fields. The contemporary south to north aligned Feature 254 terrace wall probably marked a boundary *mauka* of this small platform (reminiscent of the earlier Feature 247 terrace wall *mauka* of the Site 23671 *hale noa*).



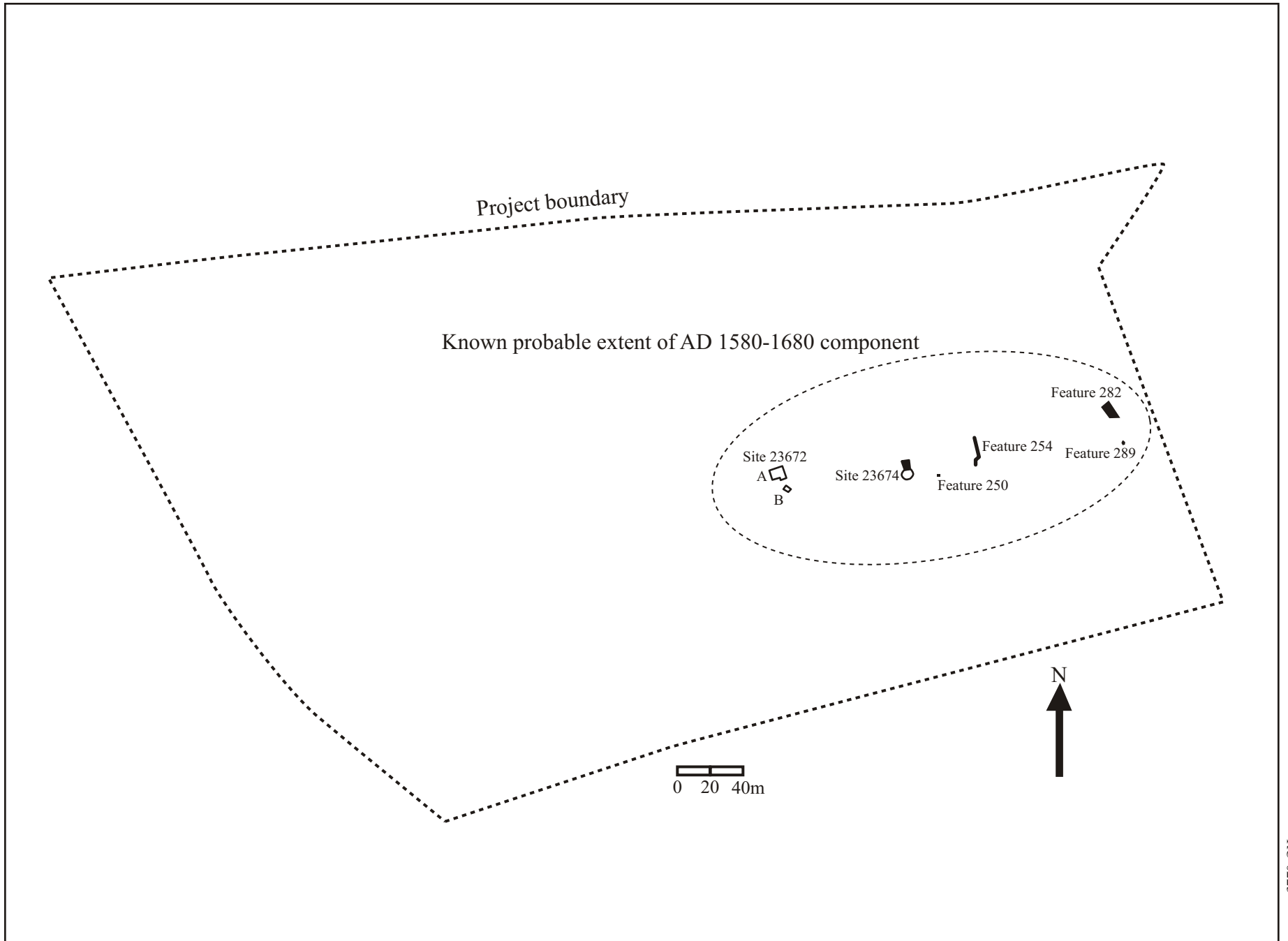


Figure 134. Probable extent of known and possible Phase C sites and features.

Roughly 15 meters *makai* from Feature 250 platform is the more substantial Site 23674 platform. The recovery of bird (chicken?) and dog from Site 23674 suggests that it too is associated with male eating. Judging from the size, weight, and variety of items, the Site 23674 platform seems to be a more substantial and permanent *hale mua* than Feature 250. The Site 23674 platform, which covers 17.2 m<sup>2</sup>, has a wider variety of items than Feature 250 (i.e., 20 versus 10 different kinds of items). The items recovered from Site 23674 also weigh more (i.e., 62.3 g per square meter) and came from comparatively dark 10 YR3/2 grayish brown silt compared to the lighter 10 YR3/3 dark brown of Feature 250. The circular enclosure that is attached to the Site 23674 was sterile with lighter and thinner soil, however, suggesting that this space was kept clean.

The two shark teeth from Feature B of Site 23672 (Table 44) could also have been associated with male-related activities. It should be noted that once a day men cooked meals for women and children of their family in a temporary shed, called *hale 'aina*, near the common sleeping house, or *hale noa*. At times a substantial oven would have been built into the surface of the *hale 'aina* cooking shed (e.g., Handy and Handy 1972:302). It could indeed be that Feature B of Site 23672 with its 69.5 grams of items and very dark grayish brown (10YR 3/2) fine silt was such a cooking locale. The shark teeth found within could have been introduced while men were preparing food.

The nearby Feature A walled enclosure of Site 23672 is probably a *hale noa* where everybody slept. This identification is supported by the comparatively big size of the walled enclosure (i.e., 114.8 m<sup>2</sup>), bearing in mind that a *hale noa* was normally the largest building around (Handy and Handy 1972:291). Also, the absence of male-related items, the low average weight of items recovered (i.e., 1.94 g per square meter), and the low variety of items identified (i.e., 5 different kinds of items) fit the specifications of a typical *hale noa*.

The likely functions of Features 282 and 289 near the extreme eastern boundary of the project area are less certain. The mere size and even surface of the rectangular Feature 282 platform (i.e., 106.3 m<sup>2</sup>) suggests that it could have been a *heiau* platform. Together with its big size, rectangular shape, the paucity of associated items are attributes of *heiau* elsewhere in Hawai'i (e.g., Loubser and Rechtman 2007). A wide variety of *heiau* existed in Hawai'i, both in terms of architectural layout and function. *Heiau* vary from seemingly insignificant natural rock outcrops to elaborately constructed platforms. Moreover, like *hale mua*, *heiau* were placed at the approach toward a settlement, such as in front of a household cluster (Valeri 1985:174) or agricultural plots; people had to pass through these "gateways" to reach destinations beyond. It is worth noting that in relation to the *hale noa* dating to Phases B and C, the *hale mua* and proposed *heiau* were all on the *mauka* side. If these identifications are indeed correct, then the agricultural settlement within the project area was approached from the *mauka* side. The south to north orientation of the terrace walls dating to Phases B and C could also be significant in this regard, providing a "front" fence as people approached the nearby *hale noa* (i.e., the Feature 247 wall and Site 23671) and *hale mua* (i.e., Feature 254 and Site 23674) from the interior.

Feature 289 yielded a more restricted range of items than the other features with the exception of the nearby Feature 282 that yielded nothing (see Tables 44 and 45). Only shell and a volcanic glass flake were recovered from the small (i.e., 49.5 m<sup>2</sup>) platform; the feature could have been a convenient stopping and snacking point on the way to agricultural plots.

Fish, shell, coral, urchin, crab, bird, mammal, terrestrial plants, and volcanic glass and basalt were found at most of the excavated Phase C locales (Tables 44 and 45). Shell from beach-like settings only came from the Site 23674 *hale mua* and Feature 289 platform. The recovered items indicate that resources from the ocean, rocky coast line, beach (at two locales), local area, and interior were utilized.

**Table 44. Weight (grams) of recovered shark, land animals, plants, and lithics from Phase C features.\***

Site	Feature	Unit	Shark	Avian bone	Pig	Dog	Rodent	Small mammal	Kukui nutshell	Charcoal	Basalt flake	Volcanic glass flake	Volcanic shatter	Basalt waterworn	
23686	250	E11	-	-	-	1.0	-	-	1.9	0.5	-	5.0	-	-	<i>hale mua</i>
23686	254	E12	-	-	1.1	-	-	-	-	1.0	-	-	-	-	<i>hale mua</i> boundary
23674	-	E06	-	1.9	-	2.0	0.7	0.1	1.4	1.2	2.8	78.2	12.1	-	<i>hale mua</i>
23674	-	E07	-	-	-	-	-	-	-	-	-	-	-	-	
23672	A	E03	-	-	-	-	2.0	-	-	0.4	-	0.6	-	-	<i>hale noa</i>
23672	A	E02	-	-	-	-	-	-	-	-	-	2.8	-	-	
23672	A	T11	-	-	-	-	-	-	-	-	-	-	-	-	
23672	B	T13	0.2	-	-	-	0.05	-	3.00	1.80	-	1.50	17.50	45.10	<i>hale noa</i> kitchen
23672	B	E1b	-	-	-	-	-	-	-	-	-	-	-	-	
23686	289	E19	-	-	-	-	-	-	-	-	-	-	-	-	agricultural platform
23686	289	E20	-	-	-	-	-	-	-	-	-	0.5	-	-	
23686	282	E17	-	-	-	-	-	-	-	-	-	-	-	-	<i>heiau?</i>
23686	282	E18	-	-	-	-	-	-	-	-	-	-	-	-	

\*male related items are shaded

**Table 45. Weight (grams) of recovered fish and shell from Phase C features.**

Site	Feature	Unit	Fish Scariidae	Fish UID	Gyrraea sp.	Drupa sp.	Morula sp.	Cellana sp.	Isognomon sp.	Cynatium sp.	Nerita sp.	Branch coral	Echinoidea	Crustacean	Brachidontes sp.	Conus sp.	Shell UID
23686	250	E11	0.6	0.1	1.3	26.2	-	59.1	-	-	-	7.9	-	-	-	-	-
23686	254	E12	-	-	0.7	-	-	-	-	-	-	1.5	-	-	-	-	0.2
23674	-	E06	0.6	1.2	79.0	16	-	0.8	-	-	0.4	27.3	7.5	0.2	-	11	4.8
23674	-	E07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23672	A	E03	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-
23672	A	E02	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-
23672	A	T11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23672	B	T13	-	-	-	0.10	-	-	-	-	0.20	-	-	-	-	-	-
23672	B	E1b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23686	289	E19	-	-	9.3	-	0.7	-	0.4	-	-	0.3	-	-	-	0.2	-
23686	289	E20	-	-	15.0	-	-	-	-	3.1	-	19.7	-	-	4.4	-	-
23686	282	E17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23686	282	E18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Based on the evidence then, the following four main categories of features were used during Phase C: (1.) *hale mua* male eating houses (Site 23674 and Feature 250 of Site 23686) and an associated terrace wall (Feature 254 of Site 23686); (2.) a *hale noa* sleeping house (Feature A of Site 23672) and the possibly associated *hale noa* kitchen (Feature B of Site 23672); (3.) an agricultural platform (Feature 289); and (4.) a possible *heiau* platform. The Feature 254 terrace wall could be a partition between the *hale mua makai* and *heiau mauka*. The increase in the different kinds of features on the late sixteenth to mid- seventeenth century landscape suggests a settling in and increasingly permanent use of the area. However, as will be

discussed below, Phase C represents an overall drop in the mass and variety of resources exploited when compared to the earlier Phase B. Phase D, nonetheless, shows a dramatic increase over Phase C.

#### **Phase D (ca. AD 1680-1850)**

The nine excavated features that can be associated with the fourth phase of occupation within the project area are the following: (1.) the Site 23675 enclosed platform; (2.) the Site 23670A lower tier platform; (3.) the Site 23670B upper tier platform; (4.) the Site 23670C platform; the Site 23678 oval enclosure; (5.) the Site 23677A enclosure; (6.) the Site 23677B platform; (7.) (8.) the Feature 251 enclosure within Site 23686; and (9.) the Feature 23686 *kuaiwi*. Although the *kuaiwi* has not been dated directly, its age can be inferred from it being an extension of the late-seventeenth century Site 23678 oval enclosure.

Considering that Features A and B are two platforms arranged at different levels within the same “stepped” platform structure of Site 23670, they are really part of one feature. Moreover, considering that Feature C is a small rectangular platform some 1.5 meters south of Feature A, it too is an integral part of Site 23670. Knowing that the Feature A platform at Site 23677 is partly enclosed by the Feature B wall, these features are treated as part of the same occupation. Accordingly, the following six sites are present during Phase D: (1.) Site 23675; (2.) Site 23670; (3.) Site 23678; (4.) Site 23677; (5.) Feature 251; and (6.) Feature 291. Viewed together, these six sites stretch from south to north in the eastern half of the project area. Site 23670 appears as an outlier *makai* from this settlement line (Figure 135).

The function of each Phase D feature is interpreted based on the kinds and weight of items recovered and on considerations of feature shape and size. The recovery of pig and dog from Site 23675 (Table 46) suggests that males cooked, consumed, and discarded food in this structure. The average weight per square meter of all items recovered from Site 23675 is comparatively heavy (i.e., 112 g). This suggests that the comparatively big Site 23675 enclosure (i.e., 33.1 m<sup>2</sup>) was a permanent eating house. Two depressions and a C-shaped rock alignment visible on the paved surface could be remnants of hearths. Also, black (10YR 2/1) silt from EU-10 suggests organic refuse generated by cooking. The comparatively robust Site 23675 being in the vicinity of the earlier but smaller male cooking structures at Feature 250 and Site 23674 suggests that the *hale mua* was a more permanent fixture on the landscape.

The tiered Site 23670A and B platform structure probably functioned as a *heiau*. The overall size (approximately 56 m<sup>2</sup>) of Site 23670, its roughly rectangular shape, its fairly level but stepped surface, and general paucity of associated items are attributes of *heiau* elsewhere in Hawai‘i (e.g., Loubser and Rechtman 2007). The nearby Feature C is aligned in a similar direction as Features A and B. This suggests that the small Feature C platform, albeit sterile, was somehow related to the Features A and B platform. In this regard then one can perhaps refer to Site 23670 as a complex.

Unlike the location of the proposed *heiau* from the earlier Phases B and C on the *mauka* end of the occupation, the Phase D *heiau* complex appears to be *makai* from the main settlement. If the identification of the Phase D *heiau* is correct, then the settlement would probably have been approached from the *makai* side. This suggests that the main approach to the agricultural settlement changed 180° during Phase D times.

The southwest to northeast aligned Feature 291 wall runs more-or-less perpendicular to the coast line. In this regard the wall is roughly parallel to nearby but longer *kuaiwi* in the project area. The appearance of a wall that runs perpendicular instead of parallel to the coast by the mid- to late seventeenth century suggests that new kinds of divisions emerged on the agricultural landscape of the project area; up slope-down slope boundary walls appeared alongside earlier terraced walls.

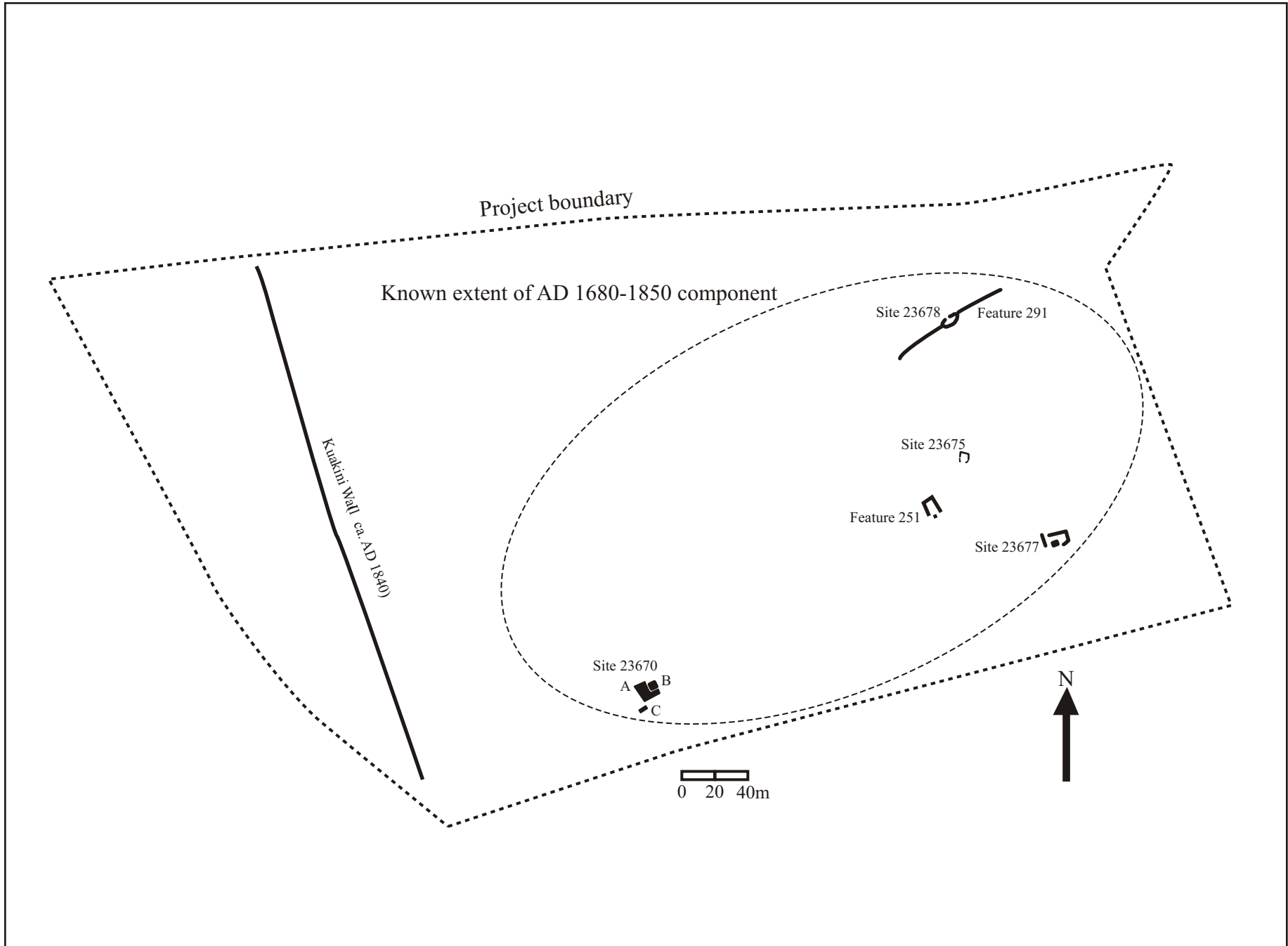


Figure 135. Probable extent of known Phase D sites and features.



Built within the Feature 291 wall is the oval-shaped Site 23678 (judging from how their walls abut, the undated Feature 291 is either contemporary or slightly later than the dated Site 23678). Judging from the medium-sized structure (55 m<sup>2</sup>) and the absence of male-related items (Table 46), Site 23678 might very well have been a common sleeping house, or *hale noa*. However, the unusually high average weight of items recovered (i.e., 178 g per square meter) and high variety of items identified (i.e., 21 different kinds of items) exceed the specifications of a typical *hale noa*. Nonetheless, instead of suggesting a different function, an increase in the mass and variety of items deposited within could simply be the result of increased and more intensive use of the structure. A fragment of a basalt adze found within the Feature 23678 is the only one recovered from the project area. The recovery of fire cracked rock and dark brown (10YR 3/3) silt from Site 23678 suggests that cooking occurred within, an activity that typically generate an above average amount of refuse. Excess trash was also probably disposed within the nearby wall, roughly two meters to the northeast of the proposed *hale noa*. Whatever the function of Site 23678 might have been, the weight and variety of items from within and from nearby deposits strongly suggests increased and more intensified occupation.

On the opposite side of the Phase D occupation within the project area, at Site 23677 Features A and B, are the remains of what could be a second *hale noa*. As already mentioned, the Feature A platform being partly enclosed by the Feature B wall shows that these two features are part of the same structure. Whereas the wall yielded only a few shell remains and nothing else, the platform yielded 19 different kinds of items and an average weight of 69.2 grams per square meter of items. Recovered remains from the platform include fish, rocky shore shell, beach shell, mammals and plants from around the settlement, and volcanic glass from the interior. Together with these items, the presence of 10YR 2/1 black ashy silt within the platform suggests that cooking occurred on this platform. If so, then as in the case of Site 23678, Site 23677 had a cooking area within. The cooking areas being part of the proposed *hale noa* structures at Sites 23677 and 23678 of Phase D contrast with the earlier Phase C Site 23672 proposed *hale noa* where the cooking area was a spatially separate structure. The incorporation of the cooking areas within structures during the eighteenth century, whatever the function of the structures might have been, is a topic worth pursuing in future data recovery projects.

Fish, shell, coral, Echinoidea, bird, mammals, terrestrial plants, and volcanic glass and basalt were found at most of the excavated Phase D locales (Tables 46 and 49). The recovered items indicate that resources from the ocean, rocky coast line, beach, local area, and interior were utilized.

Not shown in Table 46 are the cattle bones recovered from within the rectangular Feature 251 enclosure. The size (143.8 m<sup>2</sup>) of this enclosure, together with the absence of items apart from the cow carcass, strongly suggests that the enclosure served as a cattle pen. Cattle were first introduced to Hawai'i in 1793 and by 1810 big herds roamed across the island. By 1812 the *kapu* against capturing feral cattle was lifted, marking the beginning of fully fledged ranching activities. Captured animals were taken to stone-walled paddocks where they were given food and water. By the 1830s, ranching was an important part of the Hawaiian economy and by the late 1800s cattle ranches had grown up in the Kona District (e.g., Kelly 1980). The presence of cattle bones within Feature 251 suggests that it could have been used as a paddock, most likely some time between 1812 and the 1850s. In this regard the Feature 251 probable stock pen probably post-dates the radiocarbon dated structures.

**Table 46. Weight (grams) of recovered bone and plant from Phase D features.\***

Site	Feature	Unit	Avian bone	Pig	Dog	Rodent	Small mammal	Mammal bone	Small mammal worked bone	Kukui nutshell	Charcoal	
23675	-	E10	-	4.3	0.9	-	0.8	-	0.2	0.5	10.9	
23675	-	T20	-	9.6	-	-	-	-	-	-	0.6	<i>Hale mua</i>
23675	-	E09	-	-	-	-	-	-	-	-	0.4	
23670	A	E31	-	-	-	-	-	-	-	8.9	0.6	
23670	A	E32	-	-	-	-	-	-	-	0.5	-	
23670	B	E34	-	-	-	-	-	-	-	-	-	<i>Heiau platforms</i>
23670	B	T12	-	-	-	-	-	-	-	-	-	
23670	C	E33	-	-	-	-	-	-	-	-	-	
23678	-	E14	-	-	-	-	-	-	-	-	1.3	<i>Hale noa</i>
23678	-	E15	0.1	-	-	-	-	-	-	-	0.3	
23677	B	E24	-	-	-	-	-	-	-	-	-	<i>Hale noa</i>
23677	B	E23	-	-	-	-	-	-	-	-	-	
23677	A	E22	-	-	-	0.2	-	0.9	-	0.2	3.3	<i>Hale noa kitchen</i>
23677	A	T16	-	-	-	-	3.4	-	-	-	3.9	
23686	251	E08	-	-	-	-	-	-	-	-	-	Cattle enclosure
23686	291	E13	-	-	-	-	-	-	-	-	-	<i>Kuaiwi wall</i>

\*male related items are shaded

**Table 47. Weight (grams) of recovered fish and shell from Phase D features.**

Site	Feature	Unit	Fish Scariidae	Fish UID	Cypraea sp.	Drupa sp.	Morula sp.	Celana sp.	Isoegomon sp.	Chama sp.	Nerita sp.	
23675	-	E10	0.7	0.05	62.7	3.1	-	2.4	-	-	11.2	
23675	-	T20	-	-	1.3	-	-	-	-	-	-	<i>Hale mua</i>
23675	-	E09	-	-	2.6	-	-	-	-	-	-	
23670	A	E31	-	-	3.3	-	-	-	-	-	-	
23670	A	E32	-	-	-	-	-	-	-	-	-	
23670	B	E34	-	-	-	-	-	-	-	-	-	<i>Heiau platforms</i>
23670	B	T12	-	-	-	-	-	-	-	-	-	
23670	C	E33	-	-	-	-	-	-	-	-	-	
23678	-	E14	-	-	50.6	2.3	-	0.6	0.1	-	-	<i>Hale noa</i>
23678	-	E15	-	0.05	67.7	4.6	1	0.1	0.3	-	0.1	
23677	B	E24	-	-	5.2	-	-	-	-	-	-	<i>Hale noa</i>
23677	B	E23	-	-	-	-	-	-	-	-	-	
23677	A	E22	-	-	50.6	1.5	-	-	-	0.3	2.3	<i>Hale noa kitchen</i>
23677	A	T16	0.2	-	23.5	4.1	-	0.2	-	-	2.1	
23686	251	E08	-	-	-	-	-	-	-	-	-	Cattle enclosure
23686	291	E13	-	-	31.9	4.2	1	-	0.05	-	-	<i>Kuaiwi wall</i>

**Table 48. Weight (grams) of recovered shell, coral, and Echinoidea from Phase D features.**

Site	Feature	Unit	<i>Strombina</i> sp.	Coral abrader	Branch coral	Echinoidea	<i>Cantharus</i> sp.	<i>Conus</i> sp.	<i>Venus</i> sp.	Shell UID	
23675	-	E10	-	1	345.8	1.3	-	-	-	0.4	<i>Hale mua</i>
23675	-	T20	-	-	-	-	-	-	-	-	
23675	-	E09	-	-	-	-	-	-	-	-	
23670	A	E31	-	-	-	0.7	-	-	-	-	<i>Heiau</i> platforms
23670	A	E32	-	-	-	-	-	-	-	-	
23670	B	E34	-	-	-	-	-	-	-	-	
23670	B	T12	-	-	-	-	-	-	-	-	
23670	C	E33	-	-	-	-	-	-	-	-	
23678	-	E14	-	-	77.2	0.95	-	7.6	1.9	8.7	<i>Hale noa</i>
23678	-	E15	0.6	-	333.4	4.9	-	22.3	3.7	33.2	
23677	B	E24	-	-	-	-	-	0.3	-	-	<i>Hale noa</i>
23677	B	E23	-	-	-	-	-	-	-	-	
23677	A	E22	-	-	16.5	5	-	1.9	-	2.2	<i>Hale noa</i> kitchen
23677	A	T16	-	-	4.1	5.8	0.1	0.7	0.1	0.1	
23686	251	E08	-	-	-	-	-	-	-	-	Cattle enclosure
23686	291	E13	-	-	90	0.75	-	9.93	-	2.9	<i>Kuaiwi</i> wall

**Table 49. Weight (grams) of recovered lithics from Phase D features.**

Site	Feature	Unit	Basalt fire cracked rock	Basalt adze fragment	Basalt flake	Volcanic glass flake	Volcanic shatter	Basalt grinder	Basalt waterworn	
23675	-	E10	-	-	2.2	20.3	-	-	-	<i>Hale mua</i>
23675	-	T20	-	-	-	-	-	116.7	71.4	
23675	-	E09	-	-	-	-	-	-	-	
23670	A	E31	-	-	-	-	-	-	-	<i>Heiau</i> platforms
23670	A	E32	-	-	-	-	-	-	-	
23670	B	E34	-	-	-	-	-	-	-	
23670	B	T12	-	-	-	-	-	-	-	
23670	C	E33	-	-	-	-	-	-	-	
23678	-	E14	54.2	0.2	0.7	12.2	2.5	-	0.5	<i>Hale noa</i>
23678	-	E15	-	-	2.8	9.3	1.8	-	2.8	
23677	B	E24	-	-	-	-	-	-	-	<i>Hale noa</i>
23677	B	E23	-	-	-	-	-	-	-	
23677	A	E22	-	-	-	4.4	-	-	-	<i>Hale noa</i> kitchen
23677	A	T16	-	-	-	0.5	0.3	-	-	
23686	251	E08	-	-	-	-	-	-	-	Cattle enclosure
23686	291	E13	-	-	-	0.9	-	-	3.7	<i>Kuaiwi</i> wall

Based on the available evidence, the following five main categories of features were used during Phase D: (1.) a *hale mua* male eating house (Site 23675); (2.) two *hale noa* sleeping houses containing kitchens within (Sites 23678 and 23677); (3.) a *kuaiwi* (Feature 291) associated with the Site 23678 *hale noa*; (4.) a

possible *heiau* platform complex (Site 23670, Features A-C); and (5.) a likely cattle enclosure (Feature 251). Except for the *heiau* platform complex *makai* of the main site concentration, all the Phase D features were sandwiched between the Feature 291 *kuaiwi* to the north and the Feature 82 *kuaiwi* wall to the south. Considering that these *kuaiwi* walls followed the slope they were not soil retention or water-holding devices (e.g., Kirch 1985:228). Rather, these walls were intended to define boundaries between plots and/or homestead units, or *kauhale*. Generally speaking, the presence of *kuaiwi* walls on the landscape suggests that a permanent cropping system replaced a shifting system of rotating cultivation by the eighteenth century.

The probable post- AD 1680 date for the *kuaiwi* within the project area supports evidence from Ka‘awaloa that the formal walled fields (*kuaiwi*) immediately above Kealakekua Bay were established after AD 1670 (Clark and Rechtman 2002), during what has been termed the Competition Period (Burtchard 1995).

It could be that the land sandwiched between the *kuaiwi* represented an ‘*ili*, or land division. An ‘*ili* was typically a long and narrow strip of land running lengthwise along an *ahupua‘a*, or tax unit. An ‘*ili* could be discontinuous and represented portions of *ahupua‘a* land allotted to the families who lived on them and cultivated them. The right to continue to use and cultivate these small strips of land stayed with the ‘*ohana* (extended families) living on them regardless of any transfer of title to the *ahupua‘a* (Kelly 1980:22-25). Division chiefs of any particular *ahupua‘a* could construct an agricultural shrine, or *heiau*, where increase ceremonies could be attended by those who worked the land.

The Kuakini Wall (SIHP 50-10-28-6302/-7276), that falls in the *makai* third of the project area, was probably constructed during Governor Kuakini’s administration (AD 1820-1844). The most likely date of this wall’s construction falls within the latter portion of Phase D and so the wall is probably roughly contemporary with the Feature 251 proposed cattle enclosure. Indeed, one likely function of the Kuakini Wall was to keep cattle away from settlements along the coast.

Data recovery results have for the most part upheld the primary hypothesis given above under research objectives. As can be inferred from summary information in Table 50, the first use (ca. AD 1400-1460, or Phase A) was for short term habitation and associated opportunistic agriculture (i.e., only one probable cooking and eating facility of a temporary nature and an associated structure of uncertain function), followed by formal agriculture and associated recurrent habitation (ca. AD 1460-1680, or Phases B and C) (i.e., *hale noa* sleeping quarters appearing not far from fairly permanent-looking *hale mua* eating houses as well as the eventual appearance of *heiau*-looking platforms and terrace walls), then the end of the sequence (ca. AD 1680-1850, or Phase D) is marked by more consistent habitation (i.e., more than two *hale noa* common houses and *kuaiwi*) with associated animal pens. The dates of associated household gardens are not certain due to the lack of charcoal from these contexts (but see discussion below).

**Table 50. Summary of site and feature function types through time.**

<i>Phase</i>	<i>Date range (AD)</i>	<i>Sites/ Features (n)</i>	<i>hale mua (n)</i>	<i>hale noa (n)</i>	<i>terrace wall (n)</i>	<i>heiau (n)</i>	<i>unknown agricultural (n)</i>	<i>Kuaiwi (n)</i>	<i>cattle enclosure (n)</i>
A	1400-1460	2	1	-	-	-	1	-	-
B	1460-1580	5	3	1	1	-	-	-	-
C	1580-1680	7	2	2	1	1	1	-	-
D	1680-1850	9	1	3	-	3	-	1	1

Material traces that survived on the landscape suggest changing trends in gender presence and activities. The two temporary Phase A structures probably represent temporary male eating and sleeping quarters. The drastic increase of Phase B structures, particularly the prominent Site 23673 proposed *hale mua*, suggests that some time after AD 1460 men slept and ate in the fields on a more permanent basis. However, the fairly rudimentary Site 23671 probable *hale noa* suggests that common sleeping structures for the entire family was still temporary. This situation seemed to have changed by the late sixteenth and

early seventeenth centuries, for by then the prominent Site 23672 probable *hale noa* appears on the landscape with an associated cooking area. This is also the time period that a possible *heiau* platform makes its appearance. By the late seventeenth century a prominent *hale mua* (i.e., Site 23675) occurs in the roughly the same locale of where an earlier but smaller *hale mua* structures (i.e., Site 23674 and Feature 250) stood previously. The late seventeenth to early eighteenth centuries also witnessed the construction of two prominent probable *hale noa*, one at Site 23678 and the other at Site 23677. Both of these latter two sites yielded considerable amounts of items, suggesting that by that time families were more-or-less permanently settled in the *kula* zone of the project area. The stepped platform probable *heiau* at Site 23670 and Feature 291 *kuaiwi* wall support this evidence for increasingly permanent occupation of the area.

It is perhaps of tangential interest that through time recognizable concentrations of sites and features shifted *makai* (southwest) to *mauka* (northeast): the two Phase A features are in the southwestern portion of the project area; the five Phase B features are in the center to the southeastern portion of the project area; the seven Phase C features are in the east-central portion of the project area; whereas the Phase D occupation expanded to the north of the previous three (compare Figures 132, 133, 134, and 135).

Assuming that agricultural features, such as field-clearing piles and modified outcrops, were not far from the dated features, certain tentative inferences can be made about the intensity of agricultural activities based on the number of agricultural features near dated features. As six agricultural features (i.e., Features 19-24) occur near Features 293 and 294 of Phase A, it can be assumed that these features probably date to the earlier known phase of agricultural activity in the project area (see Figure 76). Site 23673 of Phase B is the only dated structure near twenty seven agricultural features (i.e., Features 34-37, Features 84-93, Features 102-104, Feature 106, Feature 112, Feature 118, Feature 260, Feature 263, and Features 276-279) in the southeastern portion of the project area. Bearing in mind that the eastern portion of Phase D overlaps Phase C, it is not clear to what component the agricultural features in the eastern third of the project area belong. However, the forty two agricultural features *makai* of the westernmost known Phase C structure, Site 23672, seem to best fit the spatial spread of Phase D sites and features. These are Features 1 to 17 and Features 218 to 242. An addition eleven agricultural features (i.e., Features 146, 148, 150, 152, 154, 156, 158, 160-163) *mauka* of the Phase D Feature 291 *kuaiwi* most likely are associated with the Site 23678 proposed *hale noa* structure. Judging from these spatial associations then, the latest occupation, Phase D, witnessed the culmination of agricultural activity within the project area. Due to its spatial overlap with Phase D, the agricultural activity during Phase C is uncertain, although a fair number of agricultural features occur in the vicinity of Sites 23672 and Features 250 and 254. Undated and ostensibly sterile agricultural features in the far western and far northern portions of the project area probably date to the latest phase of Hawaiian occupation.

From the evidence presented thus far it would appear that each phase is more extensive than the preceding one. Most notably, Phase A is represented by two habitation features and six agricultural features, Phase B by five substantial features and at least twenty seven associated features, Phase C by seven substantial features and an unknown number of associated features, and Phase D by nine substantial features and at least fifty three associated features. However, it is proposed that these ostensible increases in site and feature numbers and their spatial expansion across the landscape are not echoed by the mass, kinds, and varieties of resources extracted during the different time periods. Once the weights of recovered items and variety of items from the different phases are compared it would become apparent that resource exploitation did not necessarily increase linearly with time.

## Changes in Resource Exploitation through Time

Albeit not directly addressed in the research objectives, a potentially interesting trend apparent in the results is variation in the weight and variety of items used through time. When recovered items from only the twelve radiocarbon dated proveniences are considered (taking into consideration that EU-10 yielded 2 dates, EU-21 yielded 3 dates, EU-22 yielded 2 dates, and EU-29 yielded 2 dates, so the number of dated proveniences (n=12) are less than the total of radiocarbon dates (n=17)), temporal associations are more tight and reliable. The following dated proveniences are included in this assessment: Feature 293 of Site 23686 (Phase A); Site 23676 (Phase B); Feature B of Site 23673 (Phase B); Site 23671 (Phase B); Feature 247 of Site 23686 (Phase B); Feature 250 of Site 23686 (Phase C); Feature 254 of Site 23686 (Phase C);



Feature B of Site 23672 (Phase C); Site 23675 (Phase D); Site 23678 (Phase D); Feature A of Site 23677 (Phase D); Feature A of Site 23677 (Phase D).

From the radiocarbon evidence we can see that one provenience dates to Phase A, four proveniences date to Phase B, three proveniences date to Phase C, and four proveniences date to Phase D. The number of dates alone suggests that there is an ostensible drop in intensity (as opposed to extensiveness) of occupation during Phase C (i.e., the period roughly dating to between AD 1580 and AD 1680). Fluctuations in the total weight of charcoal recovered from the different phases indeed suggest that wood was not equally available or exploited with the same intensity through time. This can be seen when the following total weights of charcoal recovered from the different dated proveniences are compared: 2 grams from Phase A; 26.2 grams from Phase B; 3.3 grams from Phase C; and 19.4 grams from Phase D. According to these numbers then most wood was burned during Phase B and then picking up again in Phase D after a drop in Phase C.

This fluctuation in the amount of recovered charcoal is mirrored by other items recovered from the different phases (Table 51). As can be seen in Table 51, Phase B (i.e., the period dating to roughly between AD 1460 and 1580) has a greater average weight and variety of items than the other three phases. Phase C represents a drop in weight and variety of items recovered, whereas Phase D represents an increase. The Phase D increase is perhaps not that substantial, however, considering that it lasted roughly two centuries (i.e., from approximately AD 1680 to AD 1850) as opposed to the shorter century-long duration of each other phase.

**Table 51. Weight and variety of items recovered by Phase.**

<i>Phase</i>	<i>Number of Dated Proveniences</i>	<i>Total weight of recovered items (g)</i>	<i>Corrected weight per square meter (g)</i>	<i>Different kinds of items recovered</i>
A	1	116	58	10
B	4	935	63	32
C	3	118	32	17
D	4	829	91	29

The same fluctuation trend is apparent when the presence/absence of recovered items is considered; Phase B represents a rapid increase in variety of items recovered over Phase A. This increase contrasts with a drop during Phase C and a rise in Phase D (Table 52). Specifically, beach shell (i.e., *Turbo* sp., *Nassarius* sp., *Cantharus* sp., *Brachidontes* sp., *Fimbria* sp., *Conus* sp., *Mitra* sp., *Terebra* sp., and *Venus* sp.) and basalt tools/flakes are absent from directly dated Phase A and Phase C proveniences. Moreover, comparatively rare items, such as tuna, octopus lure, and bird (chicken?) remains were only recovered from Phase B deposits. Considered overall then, Phase B, dating to roughly between AD 1460 and AD 1580, represents both an expansion and an intensification of activities over the previous Phase A. Even though Phase C might have been associated with more sites and features than the earlier Phase B, individually dated Phase C sites and features yielded a smaller mass of items and a smaller variety of items than their Phase B predecessors. The drop-off in weight and variety of items during the period dating roughly to between AD 1580 and AD 1680 is worth additional investigation in neighboring areas. Depending on results from neighboring areas, it can be determined if the drop-off is of local or regional extent, for instance.

**Table 52. Presence/absence and percentage ubiquity of recovered items by Phase.**

	<i>Ocean fish</i>	<i>Rocky shell</i>	<i>Beach shell</i>	<i>UID shell</i>	<i>Bird</i>	<i>Pig</i>	<i>Dog</i>	<i>Rat</i>	<i>UID bone</i>	<i>Kukui nutshell</i>	<i>Charcoal</i>	<i>Basalt adze</i>	<i>Basalt flake</i>	<i>Volcanic flake</i>	<i>Volcanic shatter</i>	<i>Basalt utilized</i>	<i>Total presence</i>
Phase A presence	1	3	-	-	-	1	-	1	-	1	1	-	-	1	-	1	10
Phase A ubiquity %	10	30	-	-	-	10	-	10	-	10	10	-	-	10	-	10	100
Phase B presence	3	26	7	3	1	2	1	2	4	2	4	-	2	3	-	-	60
Phase B ubiquity %	5	43	12	5	2	3	2	3	7	3	7	-	3	5	-	-	100
Phase C presence	3	8	-	1	-	1	1	1	-	2	3	-	-	2	1	1	24
Phase C ubiquity %	13	33	-	4	-	4	4	4	-	8	13	-	-	8	4	4	100
Phase D presence	3	25	5	4	-	1	1	1	4	2	4	1	2	4	2	2	61
Phase D ubiquity %	5	41	8	7	-	2	2	2	7	3	7	2	3	7	3	3	100

## Assessing Permanent, Temporary, and Agricultural Features

The above discussed features were identified not only through the nature and variety of items recovered, but also in terms of their shapes, sizes, and the deposits they contain. Ultimately, the functions of the excavated sites and features could be inferred via certain similarities with ethnographically recorded instances. However, due to variations in human behavior, even within one cultural group living during the same time period, residues left at sites and their shapes and sizes are bound to vary somewhat. Idiosyncrasies, especially between families, are bound to result in some variation between sites with similar functions. For instance, one *hale mua* can be expected to differ somewhat in architecture from the next, depending on preferences and wealth of a particular family. The nature and time of site abandonment or even possible re-use are also factors to consider. For example, were sites abandoned in a “clean” or “messy” state and were they left in a hurry or gradually? It is for reasons such as these then that rigidly quantifiable categories or threshold values might not be realistic ways to categorize sites.

With these caveats in mind the following discussion uses the results from the excavated sites and features to assess Cordy’s (1981) model that uses surface attributes to differentiate permanent from temporary occupations (also included are features identified as agricultural in terms of surface criteria). Related to Clark’s (1987) use of abundance and diversity of accumulated habitation debris to assess permanence of habitation, the following assessment considers total average weight and variety of recovered items per square meter. Basically, if assessments based on surface features alone are valid, then permanent habitations will have a greater weight and variety of items than temporary habitations or agricultural features. In other words, there would be a clear rank ordering of permanent habitations, temporary habitations, and agricultural features in terms of descending weight and variety of items recovered. That this is clearly not the case within the project area is shown in Table 53; proposed temporary habitations are interspersed with permanent habitations and agricultural features. Of particular note are the oval structure of Site 23678 and the platform of Site 23676 that were both thought to be temporary but turned out to be at the top of the list in terms of weight and variety of items recovered. On the opposite side of the spectrum is the paucity of items from the proposed permanent platform complex at Site 23670. If anything, Table 53 shows that the relationship between feature shape, size, and associated items is a complicated one.

**Table 53. Sites and features by descending weight and variety of items recovered.**

Site	Feature	Unit	Form	Function	Tentative assignment	Area (sq. m)	Total weight of items (g)	Weight per sq.m (g)	Variety of items
23678		E15	Oval enclosure	<i>Hale noa</i>	Temporary habitation	55.0	489	245	19
23675		T20	Enclosed platform depression	<i>Hale mua</i>	Permanent habitation	33.1	200	200	5
23676		E21	Platform	<i>Hale mua</i> kitchen	Temporary habitation	18.0	472	118	24
23675		E10	Enclosed platform depression	<i>Hale mua</i>	Permanent habitation	33.1	469	117	18
23678		E14	Oval enclosure	<i>Hale noa</i>	Temporary habitation	55.0	222	111	16
23673	A	E27	Platform	<i>Hale mua</i> kitchen	Permanent habitation	26.5	220	110	11
23676		T18	Platform	<i>Hale mua</i> kitchen	Temporary habitation	18.0	105	105	16
23673	A	E28	Platform	<i>Hale mua</i> kitchen	Permanent habitation	26.5	207	103	14
23673	A	T17	Platform	<i>Hale mua</i> kitchen	Permanent habitation	26.5	95	95	12
23677	A	E22	Small platform in enclosure	<i>Hale noa</i> kitchen	Temporary habitation	7.3	89	89	13
23686	291	E13	Linear wall	<i>Kuaiwi</i>	Agricultural	273.0	145	73	10
23673	B	E29	Enclosure	<i>Hale mua</i>	Permanent habitation	74.8	280	70	16
23672	B	T13	Enclosure	<i>Hale noa</i> kitchen	Permanent habitation	8.8	69	69	9
23674		E06	Platform	<i>Hale mua</i>	Temporary habitation	17.2	249	62	20
23686	293	E36	Enclosure	<i>Hale mua</i>	Agricultural	3.6	116	58	10
23677	A	T16	Small platform in enclosure	<i>Hale noa</i> kitchen	Temporary habitation	7.3	49	49	15
23686	247	E05	Terrace	Wall w/midden	Agricultural	28.6	75	37	8
23671		E04	Platform	<i>Hale noa</i>	Temporary habitation	26.2	109	27	14
23686	250	E11	Pavement	<i>Hale mua</i>	Agricultural	4.5	104	26	10
23686	289	E20	Pavement	Platform	Agricultural	49.5	43	11	5
23673	B	E30	Enclosure	<i>Hale mua</i>	Permanent habitation	74.8	42	11	9
23686	289	E19	Pavement	Platform	Agricultural	49.5	11	5.5	5
23672	A	E02	Enclosure	<i>Hale noa</i>	Permanent habitation	114.8	4.6	4.6	2
23670	A	E31	Lower two-tiered platform	<i>Heiau</i>	Permanent habitation	10.2	14	3.4	4
23675		E09	Enclosed platform depression	<i>Hale mua</i>	Permanent habitation	33.1	3	3	2
23677	B	E24	Enclosure	<i>Hale noa</i>	Temporary habitation	125.4	5.5	2.8	2
23686	254	E12	Terrace	Terrace wall	Agricultural	54.0	4.5	2.3	5
23672	A	E03	Enclosure	<i>Hale noa</i>	Permanent habitation	114.8	5.1	1.3	4
23670	A	E32	Lower two-tiered platform	<i>Heiau</i>	Permanent habitation	55.8	0.5	0.1	1
23677	B	E23	Enclosure	<i>Hale noa</i>	Temporary habitation	125.4	0	0	0
23672	A	T11	Enclosure	<i>Hale noa</i>	Permanent habitation	114.8	0	0	0
23674		E07	Circular enclosure	<i>Hale mua</i> yard	Temporary habitation	18.0	0	0	0
23670	B	E34	Upper two-tiered platform	<i>Heiau</i>	Permanent habitation	10.2	0	0	0
23670	B	T12	Upper two-tiered platform	<i>Heiau</i>	Permanent habitation	10.2	0	0	0
23670	C	E33	Platform	<i>Heiau</i>	Permanent habitation	9.5	0	0	0
23672	B	E1b	Enclosure	<i>Hale noa</i> kitchen	Permanent habitation	8.8	0	0	0

Perhaps it can be argued that the permanent versus temporary dichotomy is problematic due to the terms used. Substantial and carefully constructed structures, such as the residences of royalty, can be labeled as temporary if they are occupied for a brief period only, whereas a seemingly insignificant agricultural shed can be re-occupied over a long period and so become a permanent fixture. One potentially effective way of distinguishing permanent from temporary structures might be to compare thickness of stratigraphic build-up between structures and/or temporal spread of different radiocarbon dates from the same structure. Arguably the most important finding that emerges from this assessment is the need for excavation, bearing in mind that interpretations based on surface inspections alone can be misleading.

## CONCLUDING REMARKS

This data recovery effort satisfactorily mitigated the adverse effects to Ten Sites on TMKs: 3-7-5-10:85 and 3-7-5-17:06 that resulted from development of the area. The research objectives were addressed concerning the determination of both dates and possible duration of occupation as well as site function assessment. The information collected from this data recovery project will hopefully contribute to the growing corpus of knowledge concerning Pre-contact use of Kona's *kula* zone, and is available for use into future regional syntheses. It is hoped that the interpretations of feature use and site layout proposed in the concluding section would prove to be of heuristic value, especially if the interpretations help generate opposing interpretations and encourage looking at the archaeological record in innovative and revealing ways.

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# **APPENDIX—A—Master Catalog**

**SIHP Site 23672 Feature A EU-2.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
1	I	1	Marine shell	<i>Cypraea</i> sp.	1	1	1.8
2	II	1	Volcanic glass	Flake	1	-	2.8

**SIHP Site 23672 Feature A EU-3.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
3	I	1	Mammal bone	Unidentified rodent	6	-	2.0
4	I	1	Coral	Waterworn	3	-	2.1
5	I	2	Volcanic glass	Flake	2	-	0.6
6	I	2	Organic	Charcoal	-	-	0.4

**SIHP Site 23671 EU-4.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
7	I	1	Marine shell	<i>Cypraea</i> sp.	3	2	6.8
8	I	1	Coral	Waterworn	2	-	3.2
9	I	1	Echinoderm	Echinoidea	1	-	0.4
10	I	2	Organic	Charcoal	-	-	1.6
11	I	2	Basalt	Flake	1	-	5.7
12	I	2	Marine shell	<i>Cypraea</i> sp.	17	4	14.6
13	I	2	Mammal bone	Unidentified rodent	1	-	0.3
14	I	2	Marine shell	<i>Morula</i> sp.	3	3	2.7
15	I	2	Marine shell	<i>Conus</i> sp.	1	1	1.5
16	I	2	Marine shell	<i>Drupa</i> sp.	1	1	0.7
17	I	2	Marine shell	<i>Nerita</i> sp.	1	1	0.4
18	I	2	Marine shell	<i>Isognomon</i> sp.	14	4	1.6
19	I	2	Marine shell	<i>Brachiodontes</i> sp.	50	10	3.4
20	I	2	Echinoderm	Echinoidea	167	-	13.5
21	I	2	Marine shell	<i>Turbo</i> sp.	1	1	0.5
22	I	2	Marine shell	Unidentified	3	-	0.4
23	II	1	Organic	Charcoal	-	-	0.5
24	II	1	Volcanic glass	Flake	1	-	0.5
187	II	1	Volcanic glass	Utilized flake	1	-	1.0
25	II	1	Marine shell	<i>Isognomon</i> sp.	80	30	4.2
26	II	1	Marine shell	<i>Brachidontes</i> sp.	58	14	3.8
27	II	1	Marine shell	<i>Cypraea</i> sp.	24	4	18.0
28	II	2	Echinoderm	Echinoidea	208	-	14.2
29	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	2.4
30	II	2	Coral	Waterworn	1	-	0.6
31	II	2	Marine shell	<i>Conus</i> sp.	1	1	2.2
32	II	2	Marine shell	<i>Drupa</i> sp.	5	2	4.1

**SIHP Site 23686 Feature 247 EU-5.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
33	Surface	-	Marine shell	<i>Cypraea</i> sp.	1	1	23.4
34	I	1	Metal	Iron horseshoe nail	1	-	2.1
35	I	1	Coral	Unidentified	10	-	9.7
36	I	1	Marine shell	<i>Cypraea</i> sp.	3	1	4.3
37	I	1	Organic	<i>Kukui</i> nutshell	4	-	2.6
38	I	1	Marine shell	<i>Cellana</i> sp.	1	1	0.7
39	II	1	Organic	<i>Kukui</i> nutshell	5	-	2.2
40	II	1	Volcanic glass	Flake	1	-	1.4
41	II	1	Coral	Unidentified	3	-	1.2
42	II	1	Marine shell	<i>Cypraea</i> sp.	2	1	1.1
43	II	2	Organic	Charcoal	-	-	3.3
44	II	2	Basalt	Flake	1	-	4.2
45	II	2	Marine shell	<i>Cypraea</i> sp.	7	2	9.0
46	II	2	Organic	<i>Kukui</i> nutshell	7	-	2.2
47	II	2	Marine shell	<i>Drupa</i> sp.	1	1	2.8
48	II	2	Basalt	Flake	8	-	6.7

**SIHP Site 23674 EU-6.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
49	I	1	Marine shell	<i>Cypraea</i> sp.	59	10	50.4
50	I	1	Marine shell	<i>Drupa</i> sp.	11	5	6.4
51	I	1	Marine shell	<i>Conus</i> sp.	6	2	0.7
52	I	1	Marine shell	<i>Cellana</i> sp.	1	1	0.8
53	I	1	Marine shell	Unidentified	3	-	2.0
54	I	1	Mammal bone	<i>Canis</i> sp.	2	1	2.0
55	I	1	Bird bone	Unidentified	5	-	1.0
56	I	1	Fish bone	<i>Scarus</i> sp. teeth	4	1	0.6
57	I	1	Volcanic glass	Flake	23	-	15.0
564	I	1	Volcanic glass	Shatter	7	-	12.1
58	I	1	Basalt	Flake	2	-	2.8
60	I	1	Organic	<i>Kukui</i> nutshell	1	-	0.4
61	I	1	Coral	Waterworn	12	-	24.4
62	I	1	Organic	Charcoal	-	-	0.2
63	II	1	Marine shell	<i>Cypraea</i> sp.	18	2	10.4
64	II	1	Marine shell	<i>Drupa</i> sp.	9	3	2.9
65	II	1	Marine shell	<i>Conus</i> sp.	3	2	1.2
66	II	1	Marine shell	Unidentified	3	-	0.6
67	II	1	Echinoderm	Echinoidea	7	-	6.6
68	II	1	Mammal bone	Unidentified	1	-	0.1
69	II	1	Fish Bone	Unidentified jaw	1	-	0.4
70	II	1	Volcanic glass	Flake	73	-	26.1
71	II	1	Organic	<i>Kukui</i> nutshell	3	-	0.8
72	II	1	Coral	Waterworn	1	-	2.9
73	II	1	Organic	Charcoal	-	-	0.3
74	II	2	Marine shell	<i>Cypraea</i> sp.	16	2	7.6
75	II	2	Marine shell	<i>Drupa</i> sp.	7	3	4.5
76	II	2	Marine shell	<i>Conus</i> sp.	3	2	5.2
77	II	2	Marine shell	Unidentified	4	-	0.7
78	II	2	Echinoderm	Echinoidea	2	-	0.4
79	II	2	Bird bone	Unidentified	2	-	1.8
80	II	2	Fish bone	Unidentified vertebrae	1	-	0.8
81	II	2	Mammal bone	Unidentified rodent	1	-	0.2
82	II	2	Volcanic glass	Flake	30	-	22.8



83	II	2	Organic	<i>Kukui</i> nutshell	2	-	0.2
84	II	2	Organic	Charcoal	-	-	0.2
85	II	3	Marine shell	<i>Cypraea</i> sp.	25	3	10.6
86	II	3	Marine shell	<i>Drupa</i> sp.	8	1	2.2
87	II	3	Marine shell	<i>Conus</i> sp.	6	2	4.0
88	II	3	Marine shell	<i>Nerita</i> sp.	1	1	0.4
89	II	3	Marine shell	Unidentified	5	-	1.5
90	II	3	Echinoderm	Echinoidea	6	-	0.5
91	II	3	Crustacean	Unidentified claw fragment	1	-	0.2
92	II	3	Mammal bone	Unidentified rodent	10	-	0.5
93	II	3	Volcanic glass	Flake	48	-	14.3
94	II	3	Organic	Charcoal	-	-	0.5

**SIHP Site 23686 Feature 251 EU-8.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
95	I	1	Mammal bone	Bovine bone and teeth fragments	17	1	34.5

**SIHP Site 23675 EU-9.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
96	II	1	Organic	Charcoal	-	-	0.4
97	II	1	Marine shell	<i>Cypraea</i> sp.	3	2	2.6

**SIHP Site 23675 EU-10.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
98	I	-	Organic	Charcoal in situ	-	-	2.3
99	I	-	Volcanic glass	Flake	1	-	1.5
100	I	-	Mammal bone	<i>Sus</i> sp.	1	1	1.5
101	I	-	Marine shell	<i>Cypraea</i> sp.	4	1	6.7
102	I	-	Marine shell	<i>Nerita</i> sp.	1	1	0.8
103	I	-	Coral	Unidentified	20	-	209.5
104	I	-	Coral	Waterworn	1	-	6.3
105	II	1	Organic	Charcoal	-	-	2.0
106	II	1	Organic	<i>Kukui</i> nutshell	2	-	0.5
107	II	1	Volcanic glass	Flake	3	-	4.1
108	II	1	Mammal bone	<i>Sus</i> sp.	2	1	1.1
109	II	1	Coral	Abrader	1	-	1.0
110	II	1	Marine shell	<i>Cellana</i> sp.	2	1	1.3
111	II	1	Marine shell	<i>Nerita</i> sp.	7	6	2.3
112	II	1	Marine shell	<i>Cypraea</i> sp.	26	5	21.8
113	II	1	Echinoderm	Echinoidea	5	-	0.5
114	II	1	Marine shell	<i>Drupa</i> sp.	3	1	2.3
115	II	1	Marine shell	<i>Cellana</i> sp.	1	1	1.1
116	II	1	Marine shell	Unidentified	2	-	0.4
117	II	1	Coral	Unidentified	54	-	69.5
118	II	1	Coral	Waterworn	3	-	16.0
119	II	1	Coral	Unidentified	4	-	4.2
120	II	2	Organic	Charcoal	-	-	2.0
121	II	2	Volcanic glass	Flake	6	-	9.5
122	II	2	Small mammal bone	Unidentified	9	-	0.8
059	II	2	Small mammal bone	Unidentified/worked	1	-	0.2
123	II	2	Marine shell	<i>Nerita</i> sp.	19	16	4.2
124	II	2	Fish bone	<i>Scarus</i> sp.	2	1	0.7
125	II	2	Echinoderm	Echinoidea	4	-	0.8

126	II	2	Marine shell	<i>Cypraea</i> sp.	33	6	21.0
127	II	2	Marine shell	<i>Drupa</i> sp.	1	1	0.4
128	II	2	Coral	Unidentified	12	-	22.5
129	II	2	Coral	Waterworn	1	-	0.4
130	II	3	Organic	Charcoal	-	-	4.6
131	II	3	Basalt	Flake	6	-	2.2
132	II	3	Volcanic glass	Flake	9	-	5.2
133	II	3	Mammal bone	<i>Sus</i> sp.	5	1	1.7
134	II	3	Mammal bone	<i>Canis</i> sp. tooth	2	1	0.9
135	II	3	Fish bone	Unidentified	1	-	0.05
136	II	3	Marine shell	<i>Nerita</i> sp.	18	15	3.9
137	II	3	Marine shell	<i>Cypraea</i> sp.	23	2	13.2
138	II	3	Coral	Unidentified	2	-	1.3
139	II	3	Coral	Waterworn	1	-	9.4
140	II	3	Coral	Unidentified	8	-	6.7
141	II	3	Marine shell	<i>Drupa</i> sp.	1	1	0.4

**SIHP Site 23686 Feature 250 EU-11.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
142	I	1	Marine shell	<i>Drupa</i> sp.	1	1	20.5
143	I	1	Marine shell	<i>Cellana</i> sp.	1	1	59.1
144	II	1	Organic	<i>Kukui</i> nutshell	3	-	1.0
145	II	1	Volcanic glass	Flake	2	-	1.8
146	II	1	Mammal bone	<i>Canis</i> sp. tooth	1	1	1.0
147	II	1	Fish bone	<i>Scarus</i> sp. pharyngeal plate	1	1	0.6
148	II	1	Marine shell	<i>Drupa</i> sp.	1	1	2.2
149	II	1	Coral	Unidentified	1	-	0.4
150	II	2	Organic	Charcoal	-	-	0.5
151	II	2	Organic	<i>Kukui</i> nutshell	2	-	0.9
152	II	2	Volcanic glass	Flake	5	-	3.2
153	II	2	Fish bone	Unidentified	1	-	0.1
154	II	2	Marine shell	<i>Cypraea</i> sp.	4	1	1.3
155	II	2	Marine shell	<i>Drupa</i> sp.	3	1	3.5
156	II	2	Coral	Unidentified	10	-	7.2
157	II	2	Coral	Unidentified	1	-	0.3

**SIHP Site 23686 Feature 254 EU 12.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
158	II	1	Organic	Charcoal	-	-	0.2
159	II	1	Marine shell	<i>Cypraea</i> sp.	1	1	0.7
160	II	2	Organic	Charcoal	-	-	0.5
161	II	2	Mammal bone	<i>Sus</i> sp. vertebrae	1	1	1.1
162	II	2	Coral	Unidentified	4	-	1.5
163	II	2	Marine shell	Unidentified	1	-	0.2
164	II	3	Organic	Charcoal	-	-	0.3

**SIHP Site 23686 Feature 291 EU-13.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
165	I	1	Marine shell	<i>Cypraea</i> sp.	7	2	15.3
166	I	1	Marine shell	<i>Drupa</i> sp.	1	1	1.2
167	I	1	Marine shell	<i>Conus</i> sp.	1	1	2.1
168	I	1	Coral	Unidentified	1	-	2.8
169	I	1	Coral	Unidentified	12	-	67.5
170	I	1	Marine shell	<i>Conus</i> sp.	1	1	0.25
171	II	1	Basalt	Waterworn pebble	2	-	3.7
172	II	1	Marine shell	<i>Cypraea</i> sp.	7	1	5.3
173	II	1	Marine shell	<i>Drupa</i> sp.	3	1	1.1
174	II	1	Marine shell	<i>Conus</i> sp.	6	2	2.4
175	II	1	Marine shell	Unidentified	1	-	0.2
176	II	1	Coral	Unidentified	20	-	7.7
177	II	1	Coral	Unidentified	1	-	1.5
178	II	1	Coral	Waterworn	2	-	1.1
179	II	2	Volcanic glass	Flake	1	-	0.9
180	II	2	Marine shell	<i>Cypraea</i> sp.	11	1	5.2
181	II	2	Echinoderm	Echinoidea	1	-	0.25
182	II	2	Marine shell	<i>Conus</i> sp.	4	1	1.5
183	II	2	Marine shell	<i>Isognomon</i> sp.	1	1	0.05
184	II	2	Marine shell	<i>Drupa</i> sp.	1	1	1.5
185	II	2	Marine shell	<i>Morula</i> sp.	1	1	1.0
186	II	2	Marine shell	Unidentified	5	-	1.6
188	II	2	Coral	Unidentified	2	-	1.5
189	II	2	Coral	Waterworn	2	-	0.4
190	II	2	Coral	Unidentified	5	-	3.3
191	II	3	Marine shell	<i>Cypraea</i> sp.	10	2	6.1
192	II	3	Marine shell	<i>Conus</i> sp.	8	2	3.9
193	II	3	Echinoderm	Echinoidea	3	-	0.5
194	II	3	Marine shell	<i>Drupa</i> sp.	1	1	0.4
195	II	3	Marine shell	Unidentified	12	-	1.1
196	II	3	Coral	Unidentified	5	-	1.7
197	II	3	Coral	Waterworn	6	-	2.5

**SIHP Site 23678 EU-14.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
198	I	1	Organic	Charcoal	-	-	0.2
199	I	1	Basalt	Fire cracked	1	-	54.2
200	I	1	Basalt	Flake	1	-	0.7
201	I	1	Volcanic glass	Flake	9	-	4.7
202	I	1	Marine shell	<i>Conus</i> sp.	6	-	2.8
203	I	1	Marine shell	<i>Cellana</i> sp.	1	1	0.1
204	I	1	Marine shell	<i>Cypraea</i> sp.	37	4	29.1
205	I	1	Marine shell	Unidentified	4	-	0.7
567	I	1	Marine shell	<i>Cellana</i> sp.	1	1	0.5
568	I	1	Marine shell	<i>Conus</i> sp.	1	1	1.0
569	I	1	Marine shell	Unidentified Bivalve	3	-	1.9
206	I	1	Coral	Unidentified	12	-	12.2
207	I	1	Coral	Unidentified	19	-	22.2
208	I	1	Coral	Waterworn	11	-	6.5
209	I	2	Organic	Charcoal	-	-	1.0
210	I	2	Organic	Unidentified Wood	1	-	0.1
211	I	2	Volcanic glass	Shatter	1	-	2.5
212	I	2	Volcanic glass	Flake	18	-	7.5

213	I	2	Basalt	Waterworn pebble	1	-	0.5
214	I	2	Marine shell	<i>Conus</i> sp.	7	3	3.8
215	I	2	Marine shell	<i>Drupa</i> sp.	5	-	2.3
216	I	2	Marine shell	<i>Isognomon</i> sp.	2	1	0.1
217	I	2	Marine shell	<i>Cypraea</i> sp.	30	3	17.5
218	I	2	Echinoderm	Echinoidea	11	-	0.9
219	I	2	Marine shell	Unidentified	20	-	6.0
220	I	2	Coral	Unidentified	22	-	2.0
221	I	2	Coral	Unidentified	30	-	30.5
222	I	2	Coral	Waterworn	3	-	0.6
223	I	3	Basalt	Adze fragment	1	-	0.2
224	I	3	Marine shell	<i>Cypraea</i> sp.	7	1	4.0
225	I	3	Echinoderm	Echinoidea	1	-	0.05
226	I	3	Marine shell	Unidentified	6	-	2.0
227	I	3	Coral	Unidentified	2	-	0.4
228	I	3	Coral	Unidentified	5	-	2.8

**SIHP Site 23768 EU-15.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
229	I	1	Marine shell	<i>Cypraea</i> sp.	2	1	2.9
230	I	1	Coral	Branch	2	-	67.0
231	I	1	Coral	Unidentified	3	-	12.2
232	I	1	Coral	Unidentified	15	-	66.4
233	II	1	Volcanic glass	Flake	1	-	0.8
234	II	1	Basalt	Waterworn pebble	1	-	2.3
235	II	1	Fish bone	Unidentified	1	-	0.05
236	II	1	Marine shell	<i>Conus</i> sp.	7	3	3.5
237	II	1	Marine shell	<i>Drupa</i> sp.	2	1	0.5
238	II	1	Marine shell	<i>Cypraea</i> sp.	16	2	12.0
239	II	1	Marine shell	<i>Morula</i> sp.	2	2	0.3
240	II	1	Marine shell	Unidentified	15	-	4.3
241	II	1	Marine shell	<i>Drupa</i> sp.	2	1	0.6
242	II	1	Coral	Unidentified	16	-	12.2
243	II	1	Coral	Unidentified	42	-	43.9
244	II	1	Echinoderm	Echinoidea	5	-	0.3
245	II	2	Organic	Charcoal	-	-	0.3
246	II	2	Basalt	Flake	4	-	2.8
247	II	2	Volcanic glass	Flake	10	-	7.7
248	II	2	Volcanic glass	Shatter	1	-	1.8
249	II	2	Bird bone	Unidentified	1	-	0.1
250	II	2	Marine shell	<i>Cypraea</i> sp.	58	4	36.5
251	II	2	Marine shell	<i>Conus</i> sp.	20	3	9.4
252	II	2	Marine shell	<i>Drupa</i> sp.	3	1	0.9
253	II	2	Marine shell	<i>Morula</i> sp.	2	1	0.7
254	II	2	Marine shell	<i>Isognomon</i> sp.	2	1	0.3
255	II	2	Marine shell	<i>Cellana</i> sp.	1	1	0.1
256	II	2	Marine shell	Unidentified bivalve	3	-	1.4
257	II	2	Marine shell	<i>Strombus</i> sp.	2	2	0.6
258	II	2	Marine shell	Unidentified	59	-	19.7
259	II	2	Echinoderm	Echinoidea	44	-	2.6
260	II	2	Coral	Unidentified	32	-	13.2
261	II	2	Coral	Unidentified	72	-	75.3
262	II	3	Volcanic glass	Flake	1	-	0.8
263	II	3	Marine shell	<i>Conus</i> sp.	17	3	8.2
264	II	3	Marine shell	<i>Drupa</i> sp.	5	2	2.6

265	II	3	Marine shell	<i>Nerita</i> sp.	1	1	0.1
266	II	3	Marine shell	<i>Cypraea</i> sp.	16	2	13.5
267	II	3	Marine shell	Unidentified bivalve	3	-	1.7
268	II	3	Marine shell	Unidentified	18	-	8.0
269	II	3	Echinoderm	Echinoidea	24	-	1.1
270	II	3	Coral	Unidentified	12	-	3.7
271	II	3	Coral	Unidentified	30	-	30.0
272	II	3	Coral	Waterworn	3	-	1.2
273	II	4	Basalt	Waterworn pebble	1	-	0.5
274	II	4	Marine shell	<i>Cypraea</i> sp.	4	1	2.8
275	II	4	Marine shell	<i>Conus</i> sp.	2	1	1.2
276	II	4	Marine shell	Unidentified	5	-	1.2
277	II	4	Marine shell	Unidentified bivalve	1	-	0.6
278	II	4	Echinoderm	Echinoidea	4	-	0.9
279	II	4	Coral	Unidentified	3	-	2.0
280	II	4	Coral	Unidentified	8	-	6.2
281	II	4	Coral	Waterworn pebble	1	-	0.1

**SIHP Site 23686 Feature 289 EU-19.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
282	II	1	Marine shell	<i>Cypraea</i> sp.	10	2	7.6
283	II	1	Marine shell	<i>Conus</i> sp.	1	1	0.2
284	II	1	Marine shell	<i>Isognomon</i> sp.	2	1	0.4
285	II	1	Coral	Unidentified	1	-	0.3
286	II	3	Marine shell	<i>Cypraea</i> sp.	1	1	0.7
287	II	4	Marine shell	<i>Cypraea</i> sp.	3	1	1.0
288	II	4	Marine shell	<i>Morula</i> sp.	1	1	0.7

**SIHP Site 23686 Feature 289 EU-20.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
289	I	1	Marine shell	<i>Cypraea</i> sp.	2	1	5.6
290	I	1	Coral	Unidentified	1	-	17.2
291	I	1	Volcanic glass	Flake	1	-	0.5
292	I	1	Marine shell	<i>Cypraea</i> sp.	14	2	7.8
293	I	1	Marine shell	<i>Conus</i> sp.	2	1	2.9
294	I	1	Marine shell	<i>Cymatium</i> sp.	1	1	3.1
295	II	2	Marine shell	<i>Cypraea</i> sp.	4	1	1.6
296	II	2	Marine shell	<i>Conus</i> sp.	2	1	1.5
297	II	2	Coral	Unidentified	1	-	2.5

**SIHP Site 23676 EU-21.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
298	I	-	Organic	Charcoal	-	-	3.0
299	I	-	Organic	<i>Kukui</i> nutshell	4	-	0.8
300	I	-	Volcanic glass	Flake	12	-	20.0
301	I	-	Marine shell	<i>Cellana</i> sp.	2	1	0.8
302	I	-	Marine shell	<i>Morula</i> sp.	1	1	0.6
302	I	-	Marine shell	<i>Drupa</i> sp.	2	1	6.6
304	I	-	Marine shell	<i>Cypraea</i> sp.	73	4	68.0
305	I	-	Marine shell	Unidentified	44	-	0.2
306	I	-	Marine shell	<i>Conus</i> sp.	2	1	0.2
307	I	-	Mammal bone	<i>Canis</i> sp. tooth	1	1	0.4
308	I	-	Mammal bone	<i>Rattus</i> sp.	1	1	0.1
309	I	-	Mammal bone	<i>Sus</i> sp.	6	1	2.0

310	I	-	Marine shell	<i>Serpuloris variabilis</i>	2	-	2.9
311	I	-	Echinoderm	Echinoidea	5	-	0.4
312	I	-	Coral	Unidentified	14	-	15.0
313	I	-	Coral	Unidentified	2	-	9.1
314	II	1	Organic	Charcoal	-	-	2.4
315	II	1	Organic	<i>Kukui</i> nutshell	10	-	4.3
316	II	1	Volcanic glass	Flake	17	-	10.8
317	II	1	Mammal bone	<i>Sus</i> sp.	18	1	3.4
318	II	1	Fish bone	Shark tooth burnt	1	1	0.4
319	II	1	Marine shell	<i>Cypraea</i> sp.	81	6	33.7
320	II	1	Marine shell	<i>Nerita</i> sp.	5	4	1.0
321	II	1	Marine shell	<i>Cellana</i> sp.	7	1	3.2
322	II	1	Marine shell	<i>Conus</i> sp.	7	2	1.9
323	II	1	Marine shell	<i>Morula</i> sp.	2	2	1.4
324	II	1	Marine shell	<i>Drupa</i> sp.	5	2	9.9
325	II	1	Marine shell	<i>Serpuloris variabilis</i>	1	1	0.3
326	II	1	Marine shell	<i>Nassarius</i> sp.	2	2	1.6
327	II	1	Marine shell	<i>Chama</i> sp.	1	1	4.0
328	II	1	Marine shell	Unidentified	26	-	3.2
329	II	1	Coral	Unidentified	1	-	16.9
330	II	1	Coral	Unidentified	22	-	119.2
331	II	1	Echinoderm	Echinoidea	10	-	1.2
332	II	2	Organic	Charcoal	-	-	3.3
333	II	2	Organic	<i>Kukui</i> nutshell	19	-	3.1
334	II	2	Volcanic glass	Flake	11	-	5.4
335	II	2	Mammal bone	<i>Rattus</i> sp. jaw	1	1	0.1
336	II	2	Mammal bone	<i>Sus</i> sp. /burnt	5	1	3.4
337	II	2	Mammal bone	Unidentified/awl	1	-	0.4
338	II	2	Marine shell	<i>Cellana</i> sp.	1	1	0.1
339	II	2	Marine shell	<i>Conus</i> sp.	2	1	2.0
340	II	2	Marine shell	<i>Morula</i> sp.	3	3	1.8
341	II	2	Marine shell	<i>Drupa</i> sp.	3	1	3.7
342	II	2	Marine shell	<i>Nassarius</i> sp.	6	5	2.8
343	II	2	Marine shell	<i>Cypraea</i> sp.	52	7	29.2
344	II	2	Marine shell	Unidentified	22	-	3.2
345	II	2	Coral	Waterworn	1	-	0.6
346	II	2	Coral	Unidentified	10	-	5.9
347	II	2	Echinoderm	Echinoidea	20	-	0.9
348	II	3	Organic	Charcoal	-	-	1.6
349	II	3	Volcanic glass	Flake	8	-	3.9
350	II	3	Mammal bone	<i>Canis</i> sp. teeth/burnt	2	1	0.5
351	II	3	Mammal bone	Unidentified/burnt	4	-	1.0
352	II	3	Mammal bone	Unidentified/awl	1	-	2.8
353	II	3	Marine shell	<i>Drupa</i> sp.	1	1	4.0
354	II	3	Marine shell	<i>Conus</i> sp.	1	1	0.3
355	II	3	Marine shell	<i>Nerita</i> sp.	2	2	0.5
356	II	3	Marine shell	<i>Nassarius</i> sp.	3	3	1.4
357	II	3	Marine shell	<i>Fimbria</i> sp.	1	1	0.3
358	II	3	Marine shell	<i>Cypraea</i> sp.	37	6	23.1
359	II	3	Marine shell	Unidentified	13	-	1.5
360	II	3	Coral	Unidentified	3	-	0.8
361	II	3	Echinoderm	Echinoidea	15	-	1.5
362	II	4	Organic	Charcoal	-	-	0.1
363	II	4	Volcanic glass	Flake	2	-	0.5
364	II	4	Medium mammal bone	Unidentified/cut	1	-	0.4
365	II	4	Mammal bone	<i>Canis</i> sp. tooth	1	1	0.8



366	II	4	Bird bone	Unidentified	2	-	0.2
367	II	4	Marine shell	<i>Cypraea</i> sp.	5	2	6.2
368	II	4	Marine shell	<i>Morula</i> sp.	1	1	0.5
369	II	4	Marine shell	<i>Drupa</i> sp.	1	1	2.6
370	II	4	Marine shell	<i>Conus</i> sp.	2	1	0.5
371	II	4	Marine shell	<i>Nassarius</i> sp.	2	2	0.8
372	II	4	Marine shell	<i>Serpuloris variabilis</i>	1	1	0.9
373	II	4	Marine shell	Unidentified	2	-	0.1
374	II	4	Fish bone	Shark tooth	1	1	0.1
375	II	4	Coral	Unidentified	1	-	0.2
376	II	4	Coral	Unidentified	1	-	0.3
377	II	4	Echinoderm	Echinoidea	3	-	0.2

**SIHP Site 23677 Feature A EU-22.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
378	II	1	Organic	Charcoal	-	-	1.0
379	II	1	Small mammal bone	<i>Rattus</i> sp.	1	1	0.2
380	II	1	Marine shell	<i>Cypraea</i> sp.	2	1	2.8
381	II	1	Coral	Unidentified	15	-	3.1
382	II	2	Marine shell	<i>Conus</i> sp.	2	1	0.7
383	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	1.2
384	II	2	Coral	Unidentified	1	-	5.1
385	II	2	Coral	Unidentified	2	-	3.7
386	II	2	Echinoderm	Echinoidea	1	-	0.1
387	II	3	Marine shell	<i>Cypraea</i> sp.	4	3	5.2
388	II	3	Marine shell	<i>Drupa</i> sp.	1	1	1.1
389	II	3	Coral	Unidentified	1	-	0.6
390	III	1	Organic	Charcoal	-	-	0.2
391	III	1	Volcanic glass	Flake	1	-	0.4
392	III	1	Marine shell	<i>Cypraea</i> sp.	4	1	5.8
393	III	1	Marine shell	<i>Conus</i> sp.	3	1	1.1
394	III	1	Marine shell	<i>Nerita</i> sp.	2	2	0.5
395	III	1	Coral	Unidentified	1	-	0.1
396	III	1	Echinoderm	Echinoidea	2	-	0.3
397	III	2	Organic	Charcoal	6	-	0.4
398	III	2	Organic	Charcoal in situ	14	-	0.2
399	III	2	Organic	<i>Kukui</i> nutshell	1	-	0.2
400	III	2	Volcanic glass	Flake	3	-	2.8
401	III	2	Mammal bone	Unidentified/burnt	2	1	0.9
402	III	2	Marine shell	<i>Cypraea</i> sp.	35	5	26.4
403	III	2	Marine shell	<i>Conus</i> sp.	3	1	1.0
404	III	2	Marine shell	<i>Nerita</i> sp.	7	5	1.4
405	III	2	Marine shell	<i>Drupa</i> sp.	1	1	0.1
406	III	2	Marine shell	Unidentified	9	-	2.2
407	III	2	Coral	Unidentified	4	-	3.9
408	III	2	Echinoderm	Echinoidea	45	-	4.6
409	III	3	Organic	Charcoal	37	-	1.5
410	III	3	Volcanic glass	Flake	1	-	1.2
411	III	3	Marine shell	<i>Cypraea</i> sp.	6	1	9.2
412	III	3	Marine shell	<i>Nerita</i> sp.	1	1	0.4
413	III	3	Marine shell	<i>Drupa</i> sp.	1	1	0.3
414	III	3	Marine shell	<i>Pseudochama</i> sp.	2	1	0.3

**SIHP Site 23677 Feature B EU-24**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
562	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	5.2
563	II	2	Marine shell	<i>Conus</i> sp.	1	1	0.3

**SIHP Site 23673 Feature A EU-27.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
415	I	1	Organic	Charcoal	-	-	0.2
416	I	1	Volcanic glass	Flake	1	-	0.7
417	I	1	Basalt	Waterworn pebble	1	-	51.4
418	I	1	Organic	<i>Kukui</i> nutshell	3	-	5.1
419	I	1	Marine shell	<i>Cypraea</i> sp.	1	1	3.8
420	I	1	Marine shell	<i>Fimbria</i> sp.	2	1	2.6
421	I	1	Coral	Branch	4	-	59.0
422	I	1	Coral	Unidentified	-	-	54.2
423	II	1	Organic	<i>Kukui</i> nutshell/burnt	8	-	1.2
424	II	1	Volcanic glass	Flake	1	-	0.1
570	II	1	Volcanic glass	Shatter	1	-	13.5
425	II	1	Shell	<i>Isognomon</i> sp.	2	1	0.2
426	II	1	Echinoderm	Echinoidea	2	-	0.1
427	II	2	Organic	Charcoal	-	-	0.2
428	II	2	Organic	<i>Kukui</i> nutshell	7	-	0.9
429	II	2	Volcanic glass	Flake	9	-	2.6
571	II	2	Volcanic glass	Shatter	7	-	21.5
430	II	2	Marine shell	Unidentified	3	-	0.7
431	II	2	Coral	Unidentified	1	-	0.1
432	II	2	Echinoderm	Echinoidea	6	-	0.7
433	II	3	Volcanic glass	Flake	2	-	0.8
434	II	3	Marine shell	<i>Cypraea</i> sp.	1	1	0.05

**SIHP Site 23673 Feature A EU-28.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
435	I	-	Volcanic glass	Flake	6	-	6.3
572	I	-	Basalt	Flake	1	-	6.0
573	I	-	Volcanic glass	Shatter	1	-	6.6
436	I	-	Marine shell	<i>Cypraea</i> sp.	1	1	2.2
437	I	-	Marine shell	Unidentified	1	-	3.8
438	I	-	Coral	Unidentified	25	-	88.4
439	I	-	Coral	Abrader	1	-	17.3
440	II	1	Volcanic glass	Flake	7	-	4.8
441	II	1	Fish bone	Unidentified	1	-	1.0
442	II	1	Marine shell	<i>Cypraea</i> sp.	2	2	15.9
443	II	1	Marine shell	<i>Drupa</i> sp.	1	1	0.9
444	II	1	Organic	<i>Kukui</i> nutshell	6	-	0.4
445	II	1	Coral	Unidentified	5	-	41.2
446	II	1	Coral	Unidentified	1	-	0.6
447	II	1	Echinoderm	Echinoidea	5	-	0.2
448	II	2	Organic	Charcoal	-	-	0.3
449	II	2	Volcanic glass	Volcanic glass	10	-	6.0
450	II	2	Coral	Worked	1	-	0.5
451	II	2	Small mammal bone	Unidentified jaw and teeth	2	-	0.4
452	II	2	Marine shell	<i>Cypraea</i> sp.	1	-	1.4
453	II	2	Marine shell	<i>Terebra</i> sp.	1	1	0.05
454	II	2	Marine shell	<i>Mitra</i> sp.	1	1	0.1

455	II	2	Marine shell	Unidentified	1	-	0.1
456	II	2	Coral	Unidentified	3	-	0.8
457	II	2	Echinoderm	Echinoidea	5	-	0.1
565	II	2	Echinoderm	Echinoidea abrader	1	-	1.6

**SIHP Site 23673 Feature B EU-29.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
458	II	1	Organic	Charcoal	-	-	1.1
459	II	1	Volcanic glass	Flake	1	-	0.2
460	II	1	Fish bone	<i>Thynnus thynnus</i> , from 3ft. specimen	2	1	0.8
461	II	1	Mammal bone	Unidentified	1	-	0.1
462	II	1	Marine shell	<i>Cypraea</i> sp.	9	2	7.8
463	II	1	Marine shell	<i>Nerita</i> sp.	1	1	0.15
464	II	1	Marine shell	Unidentified	2	-	0.4
465	II	1	Coral	Unidentified	1	-	27.4
466	II	1	Coral	Unidentified	2	-	3.1
467	II	1	Echinoderm	Echinoidea	9	-	0.6
468	II	2	Organic	Charcoal	-	-	1.2
469	II	2	Volcanic glass	Flake	4	-	2.0
470	II	2	Marine shell	<i>Cypraea</i> sp.	29	2	25.0
471	II	2	Marine shell	<i>Conus</i> sp.	2	1	0.6
472	II	2	Echinoderm	Echinoidea	22	-	2.0
473	II	2	Coral	Unidentified	3	-	3.6
474	II	3	Organic	Charcoal	21	-	2.0
475	II	3	Marine shell	<i>Cypraea</i> sp.	36	7	36.5
476	II	3	Marine shell	<i>Isognomon</i> sp.	6	1	1.2
477	II	3	Mammal Bone	Unidentified	3	-	0.6
478	II	3	Marine shell	<i>Nerita</i> sp.	1	1	0.1
479	II	3	Metal	Lead .177 cal Pellet	1	-	0.9
480	II	3	Fish bone	Unidentified	1	-	<0.1
481	II	3	Volcanic glass	Flake	2	-	1.8
482	II	3	Echinoderm	Echinoidea abrader fragment	1	-	0.2
483	II	3	Marine shell	<i>Conus</i> sp.	5	2	3.0
484	II	3	Coral	Unidentified	10	-	33.9
485	II	3	Marine shell	Unidentified	18	-	4.5
486	II	3	Marine shell	<i>Thais</i> sp.	1	1	0.5
487	II	3	Marine shell	<i>Drupa</i> sp.	2	2	0.6
488	II	3	Echinoderm	Echinoidea	208	-	25.8
489	II	4	Organic	Charcoal	47	-	5.5
490	II	4	Echinoderm	Echinoidea	42	-	4.9
491	II	4	Marine shell	<i>Cypraea</i> sp.	12	3	10.2
492	II	4	Mammal bone	<i>Sus</i> sp. vertebrae	1	1	2.2
493	II	4	Organic	Unidentified nut	1	-	0.6
494	II	4	Marine shell	<i>Trochus</i> sp.	1	1	0.3

**SIHP Site 23673 Feature B EU-30.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
495	I	1	Fish bone	<i>Thynnus thynnus</i>	13	1	4.7
496	I	1	Mammal bone	<i>Canis sp.</i>	1	1	0.2
497	II	1	Fish bone	<i>Thynnus thynnus</i>	8	1	4.1
498	II	1	Mammal bone	Unidentified	6	-	4.7
566	II	1	Mammal bone	Unidentified/cut	3	-	13.2
499	II	1	Coral	Unidentified	2	-	7.8
500	II	1	Organic	<i>Kukui</i> nutshell	2	-	2.1
501	II	2	Fish bone	<i>Thynnus thynnus</i>	3	1	0.2
502	II	2	Mammal bone	<i>Rattus sp.</i>	1	1	<0.1
503	II	2	Echinoderm	Echinoidea	2	-	0.1
504	II	2	Coral	Unidentified	3	-	0.7
505	II	2	Organic	<i>Kukui</i> nutshell	2	-	0.2
506	II	3	Fish bone	<i>Thynnus thynnus</i>	2	1	<0.1
507	II	3	Organic	<i>Kukui</i> nutshell	1	-	1.9
508	II	3	Coral	Unidentified	1	-	0.2
509	II	3	Marine shell	<i>Drupa sp.</i>	1	1	1.9

**SIHP Site 23670 Feature A EU-31.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
510	I	1	Organic	Charcoal	-	-	0.4
511	I	1	Organic	<i>Kukui</i> nutshell	14	-	6.8
512	I	1	Marine shell	<i>Cypraea sp.</i>	3	1	3.3
513	I	1	Metal	Iron fragments	4	-	0.9
514	I	1	Glass	Brown bottle fragment	1	-	0.4
515	I	1	Echinoderm	Echinoidea	7	-	0.6
516	I	1	Metal	Brass button part	1	-	0.8
517	I	1	Metal	Brass button part inscribed	1	-	0.8
518	II	1	Organic	Charcoal	-	-	0.2
519	II	1	Echinoderm	Echinoidea	2	-	0.1
520	II	1	Organic	<i>Kukui</i> nutshell	7	-	2.1

**SIHP Site 23670 Feature A EU-32.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
521	I	1	Glass	Brown bottle fragment	1	-	0.7
522	I	1	Organic	<i>Kukui</i> nutshell	2	-	0.5

**SIHP Site 23670 Feature B EU-34.**

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
523	II	1	Organic	Charcoal	-	-	0.4

## SIHP Site 23686 Feature 293 EU-36.

<i>ACC#</i>	<i>Layer</i>	<i>Level</i>	<i>Material</i>	<i>Species/type</i>	<i>Count</i>	<i>MNI</i>	<i>Weight (g)</i>
524	I	1	Basalt	Waterworn	1	-	5.5
525	I	1	Coral	Unidentified	3	-	16.1
526	I	1	Marine shell	<i>Cypraea</i> sp.	1	1	8.3
527	II	1	Basalt	Waterworn	22	-	47.1
528	II	1	Organic	Charcoal	-	-	1.8
529	II	1	Synthetic	Plastic container	9	-	4.9
530	II	1	Metal	Steel nail	1	-	1.5
531	II	1	Metal	Iron fragments rusted	43	-	15.6
532	II	1	Metal	Steel nut	1	-	6.1
533	II	1	Fish bone	Unidentified	2	-	0.3
534	II	1	Glass	Brown bottle fragments	3	-	4.8
535	II	1	Organic	<i>Kukui</i> nutshell	1	-	0.9
536	II	1	Glass	Clear thin fragments	4	-	3.3
537	II	1	Glass	Clear thick fragments	2	-	0.7
538	II	1	Glass	Light green bottle fragments	2	-	0.7
539	II	1	Glass	Clear fragments	2	-	1.1
540	II	2	Metal	Iron fragments rusted	57	-	33.4
541	II	2	Mammal bone	<i>Sus</i> sp. rib	2	1	6.4
542	II	2	Basalt	Waterworn	13	-	24.1
543	II	2	Organic	<i>Kukui</i> nutshell	1	-	0.9
544	II	2	Coral	Unidentified	4	-	1.7
545	II	2	Marine shell	<i>Cypraea</i> sp.	1	1	3.0
546	II	2	Metal	Steel finish nails	3	-	5.6
547	II	2	Glass	Clear bottle fragments	8	-	10.5
548	II	2	Glass	Light green bottle fragments	3	-	5.8
549	II	2	Glass	Brown bottle fragments	6	-	2.5
550	II	2	Volcanic glass	Flake	1	-	0.5
551	II	2	Mammal bone	<i>Rattus</i> sp. jaw	1	1	0.1
552	II	2	Fish bone	Unidentified vertebrae	1		1.8
553	II	2	Fish bone	Unidentified	1		0.2
554	II	2	Glass	Clear fragments	5		4.2
555	II	2	Metal	Steel screw	1		3.8
556	II	2	Echinoderm	Echinoidea	1	-	<0.1
557	II	2	Glass	Clear fragment	1	-	2.7
558	II	2	Glass	Clear fragment	1	-	0.3
559	II	2	Synthetic	Plastic	4	-	0.9
560	II	2	Synthetic	Plastic	9	-	0.8
561	II	2	Organic	Charcoal	-	-	0.2

## **APPENDIX—B—Radiocarbon Results**




**BETA ANALYTIC INC.**

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**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Bob Rechtman

Report Date: 2/14/2006

Rechtman Consulting, LLC

Material Received: 1/3/2006

Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 212756 SAMPLE : RC-0223-10 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1440 to 1640 (Cal BP 510 to 310)	340 +/- 40 BP	-23.1 o/oo	370 +/- 40 BP
Beta - 212757 SAMPLE : RC-0223-43 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1460 to 1660 (Cal BP 490 to 290)	350 +/- 40 BP	-26.9 o/oo	320 +/- 40 BP
Beta - 212758 SAMPLE : RC-0223-98 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1660 to 1950 (Cal BP 290 to 0)	100 +/- 40 BP	-21.7 o/oo	150 +/- 40 BP
Beta - 212759 SAMPLE : RC-0223-130 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1520 to 1580 (Cal BP 430 to 380) AND Cal AD 1630 to 1960 (Cal BP 320 to 0)	190 +/- 80 BP	-26.2 o/oo	170 +/- 80 BP
Beta - 212760 SAMPLE : RC-0223-150 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1520 to 1590 (Cal BP 430 to 360) AND Cal AD 1620 to 1670 (Cal BP 330 to 280) Cal AD 1770 to 1800 (Cal BP 180 to 150) AND Cal AD 1940 to 1950 (Cal BP 10 to 0)	300 +/- 40 BP	-27.4 o/oo	260 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950 A.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.


**BETA ANALYTIC INC.**

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 PH: 305/667-5167 FAX: 305/663-0964  
 E-MAIL: beta@radiocarbon.com

**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Bob Rechtman

Report Date: 2/14/2006

Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 212761 SAMPLE : RC-0223-160 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1520 to 1590 (Cal BP 430 to 360) AND Cal AD 1620 to 1670 (Cal BP 330 to 280) Cal AD 1770 to 1800 (Cal BP 180 to 150) AND Cal AD 1940 to 1950 (Cal BP 10 to 0)	250 +/- 40 BP	-24.4 o/oo	260 +/- 40 BP
Beta - 212762 SAMPLE : RC-0223-209 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1640 to 1690 (Cal BP 310 to 260) AND Cal AD 1730 to 1810 (Cal BP 220 to 140) Cal AD 1920 to 1950 (Cal BP 30 to 0)	200 +/- 40 BP	-24.1 o/oo	210 +/- 40 BP
Beta - 212763 SAMPLE : RC-0223-298 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1420 to 1640 (Cal BP 540 to 310)	390 +/- 60 BP	-23.4 o/oo	410 +/- 60 BP
Beta - 212764 SAMPLE : RC-0223-314 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1410 to 1650 (Cal BP 540 to 300)	410 +/- 70 BP	-25.4 o/oo	410 +/- 70 BP
Beta - 212765 SAMPLE : RC-0223-332 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1440 to 1660 (Cal BP 510 to 290)	340 +/- 60 BP	-25.1 o/oo	340 +/- 60 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950 A.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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**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Bob Rechtman

Report Date: 2/14/2006

Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 212766 SAMPLE : RC-0223-378 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1680 to 1740 (Cal BP 270 to 210) AND Cal AD 1810 to 1930 (Cal BP 140 to 20) Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)	60 +/- 40 BP	-24.1 o/oo	70 +/- 40 BP
Beta - 212767 SAMPLE : RC-0223-409 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1660 to 1950 (Cal BP 290 to 0)	120 +/- 40 BP	-22.6 o/oo	160 +/- 40 BP
Beta - 212768 SAMPLE : RC-0223-474 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1320 to 1340 (Cal BP 630 to 600) AND Cal AD 1390 to 1640 (Cal BP 560 to 310)	400 +/- 80 BP	-22.5 o/oo	440 +/- 80 BP
Beta - 212769 SAMPLE : RC-0223-489 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1460 to 1660 (Cal BP 490 to 290)	300 +/- 50 BP	-24.4 o/oo	310 +/- 50 BP
Beta - 212770 SAMPLE : RC-0223-528 ANALYSIS : Radiometric-Standard delivery (with extended counting) MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1290 to 1480 (Cal BP 660 to 470)	520 +/- 80 BP	-23.5 o/oo	540 +/- 80 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950 A.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=-23.1:lab. mult=1)

Laboratory number: **Beta-212756**

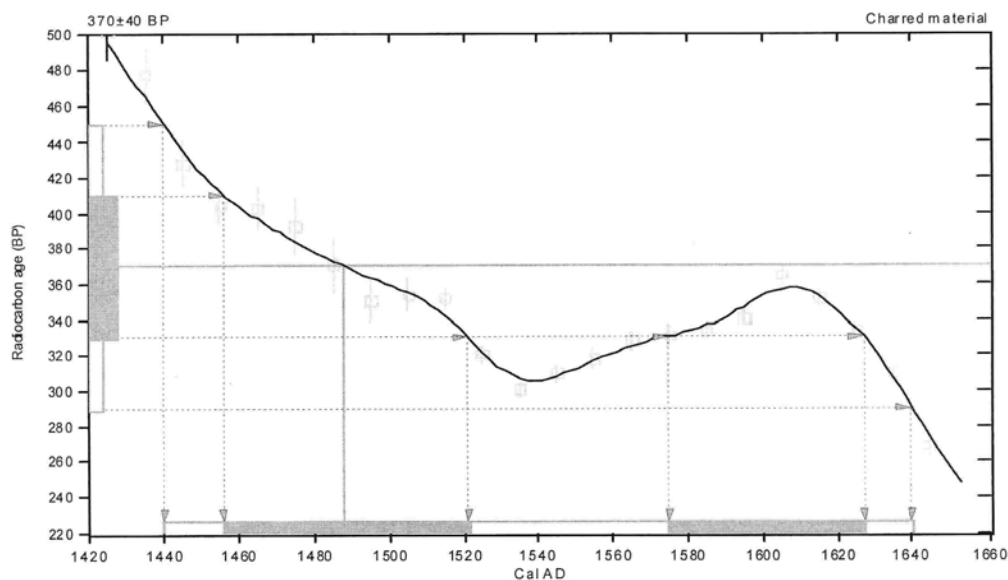
Conventional radiocarbon age: **370±40 BP**

**2 Sigma calibrated result: Cal AD 1440 to 1640 (Cal BP 510 to 310)**  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1490 (Cal BP 460)

1 Sigma calibrated results: Cal AD 1460 to 1520 (Cal BP 490 to 430) and  
(68% probability) Cal AD 1580 to 1630 (Cal BP 380 to 320)



### 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

## Beta Analytic Radiocarbon Dating Laboratory

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## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.9;lab. mult=1)

Laboratory number: **Beta-212757**

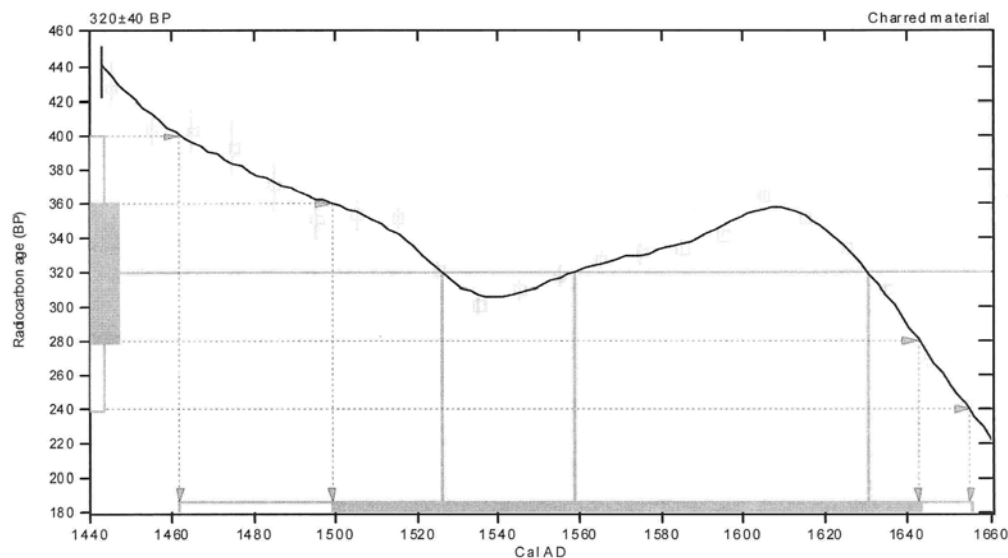
Conventional radiocarbon age: **320±40 BP**

**2 Sigma calibrated result: Cal AD 1460 to 1660 (Cal BP 490 to 290)**  
(95% probability)

Intercept data

Intercepts of radiocarbon age  
with calibration curve: Cal AD 1530 (Cal BP 420) and  
Cal AD 1560 (Cal BP 390) and  
Cal AD 1630 (Cal BP 320)

**1 Sigma calibrated result: Cal AD 1500 to 1640 (Cal BP 450 to 310)**  
(68% probability)



### References:

- Database used*  
INTCAL98  
*Calibration Database*  
*Editorial Comment*  
Stuiver, M., van der Plicht, H., 1998, *Radiocarbon* 40(3), pxi-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=-21.7:lab. mult=1)

Laboratory number: **Beta-212758**

Conventional radiocarbon age: **150±40 BP**

**2 Sigma calibrated result: Cal AD 1660 to 1950 (Cal BP 290 to 0)**  
(95% probability)

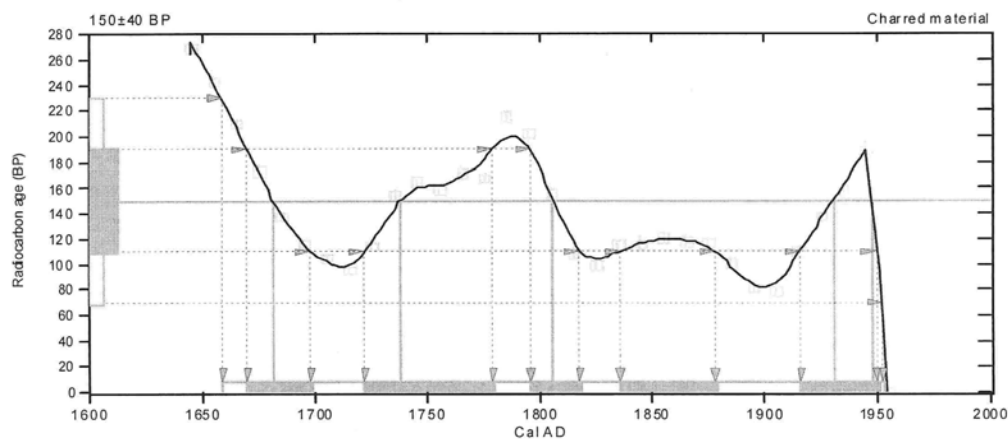
Intercept data

Intercepts of radiocarbon age  
with calibration curve:

Cal AD 1680 (Cal BP 270) and  
Cal AD 1740 (Cal BP 210) and  
Cal AD 1810 (Cal BP 140) and  
Cal AD 1930 (Cal BP 20) and  
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results:  
(68% probability)

Cal AD 1670 to 1700 (Cal BP 280 to 250) and  
Cal AD 1720 to 1780 (Cal BP 230 to 170) and  
Cal AD 1800 to 1820 (Cal BP 150 to 130) and  
Cal AD 1840 to 1880 (Cal BP 110 to 70) and  
Cal AD 1920 to 1950 (Cal BP 30 to 0)



### References:

*Database used*

INTCAL98

*Calibration Database*

*Editorial Comment*

Stuiver, M., van der Plicht, H., 1998, *Radiocarbon* 40(3), pxi-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=-26.2:lab. mult=1)

Laboratory number: **Beta-212759**

Conventional radiocarbon age: **170±80 BP**

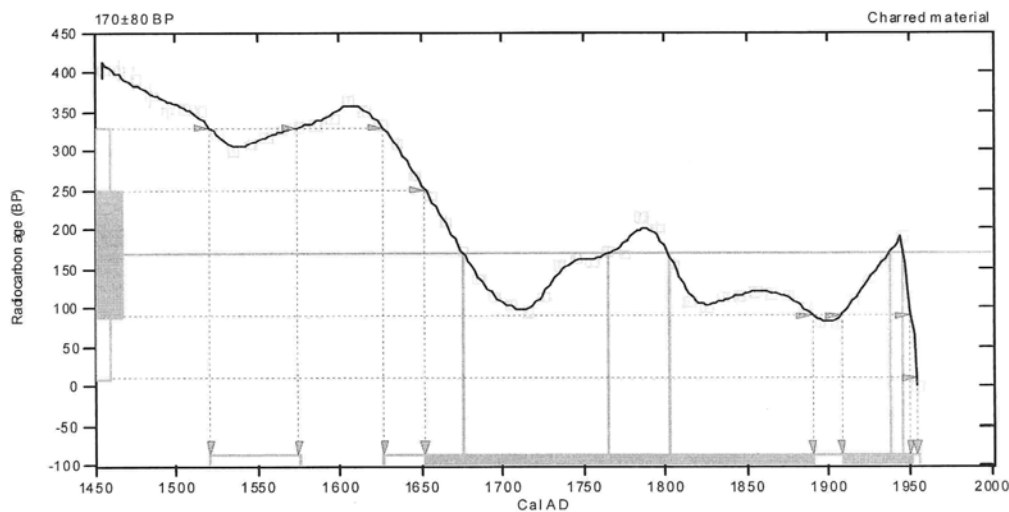
**2 Sigma calibrated results:** Cal AD 1520 to 1580 (Cal BP 430 to 380) and  
Cal AD 1630 to 1960 (Cal BP 320 to 0)

Intercept data

Intercepts of radiocarbon age  
with calibration curve:

Cal AD 1680 (Cal BP 270) and  
Cal AD 1770 (Cal BP 180) and  
Cal AD 1800 (Cal BP 150) and  
Cal AD 1940 (Cal BP 10) and  
Cal AD 1950 (Cal BP 0)

**1 Sigma calibrated results:** Cal AD 1650 to 1890 (Cal BP 300 to 60) and  
(68% probability) Cal AD 1910 to 1950 (Cal BP 40 to 0)



### 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

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## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.4;lab. mult=1)

Laboratory number: **Beta-212760**

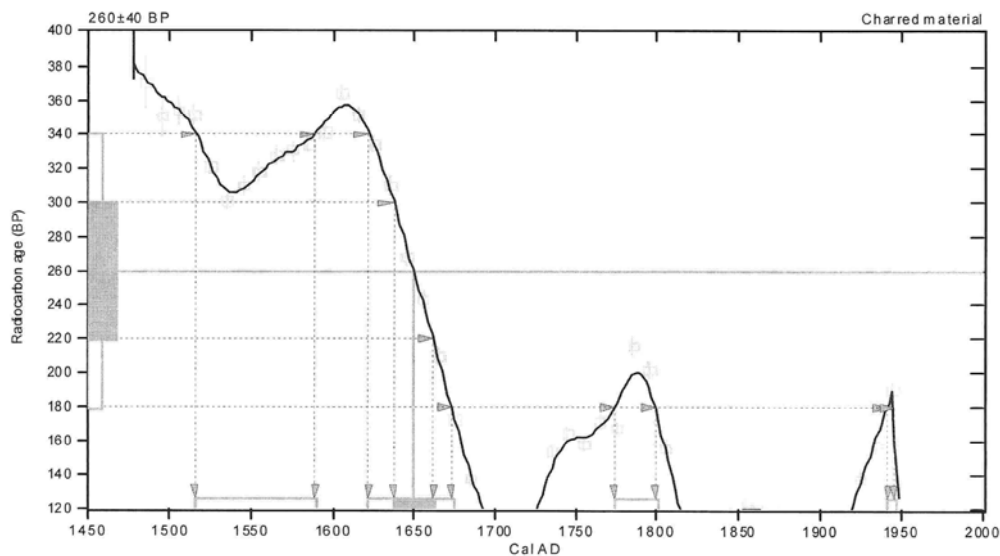
Conventional radiocarbon age: **260±40 BP**

**2 Sigma calibrated results:** Cal AD 1520 to 1590 (Cal BP 430 to 360) and  
 Cal AD 1620 to 1670 (Cal BP 330 to 280) and  
 Cal AD 1770 to 1800 (Cal BP 180 to 150) and  
 Cal AD 1940 to 1950 (Cal BP 10 to 0)

Intercept data

Intercept of radiocarbon age  
 with calibration curve: Cal AD 1650 (Cal BP 300)

**1 Sigma calibrated result:** Cal AD 1640 to 1660 (Cal BP 310 to 290)  
 (68% probability)



### 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*

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## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.4;lab. mult=1)

Laboratory number: **Beta-212761**

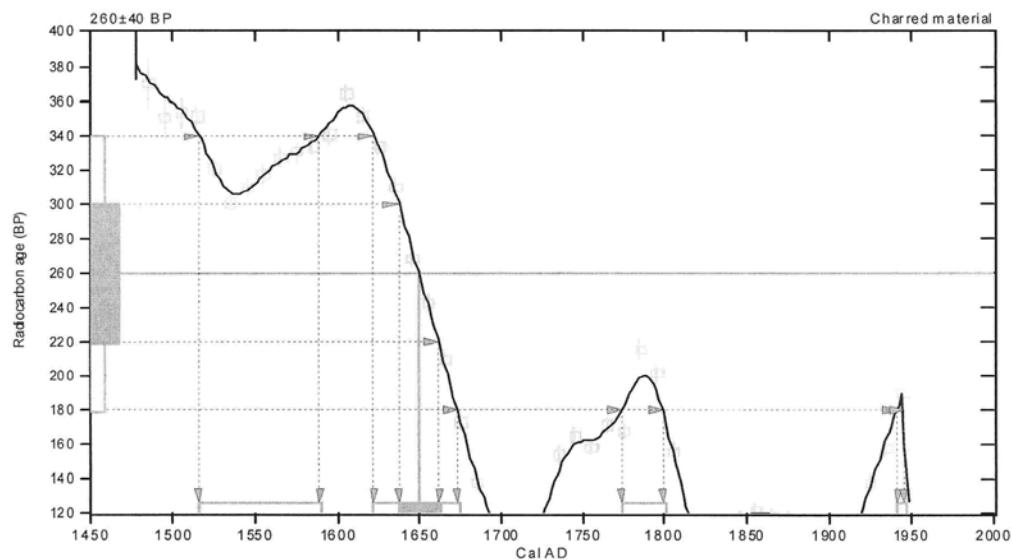
Conventional radiocarbon age: **260±40 BP**

2 Sigma calibrated results: Cal AD 1520 to 1590 (Cal BP 430 to 360) and  
 Cal AD 1620 to 1670 (Cal BP 330 to 280) and  
 Cal AD 1770 to 1800 (Cal BP 180 to 150) and  
 Cal AD 1940 to 1950 (Cal BP 10 to 0)

Intercept data

Intercept of radiocarbon age  
 with calibration curve: Cal AD 1650 (Cal BP 300)

1 Sigma calibrated result: Cal AD 1640 to 1660 (Cal BP 310 to 290)



### 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=-24.1;lab. mult=1)

Laboratory number: **Beta-212762**

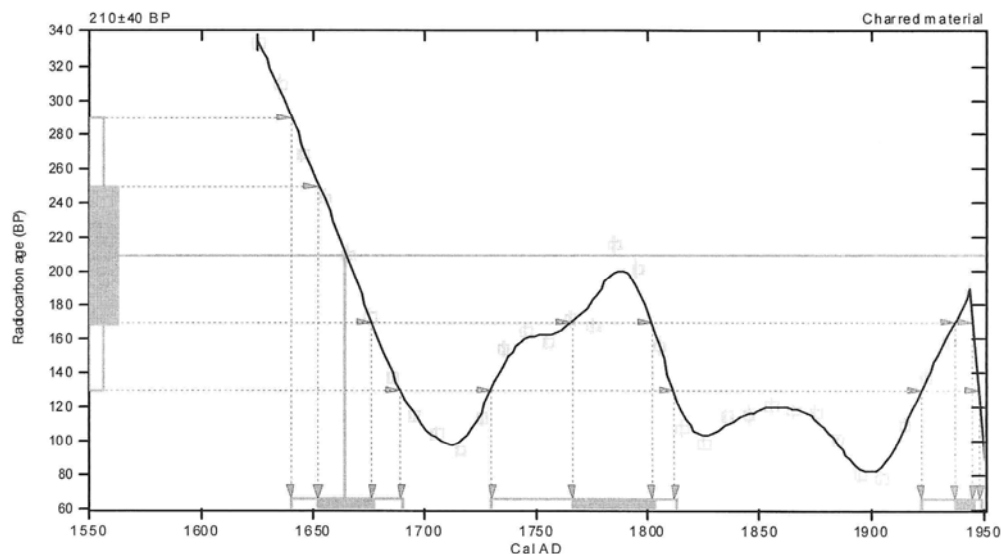
Conventional radiocarbon age: **210±40 BP**

**2 Sigma calibrated results:** Cal AD 1640 to 1690 (Cal BP 310 to 260) and  
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 1650 to 1680 (Cal BP 300 to 270) and  
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-xii

*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=-23.4;lab. mult=1)

Laboratory number: **Beta-212763**

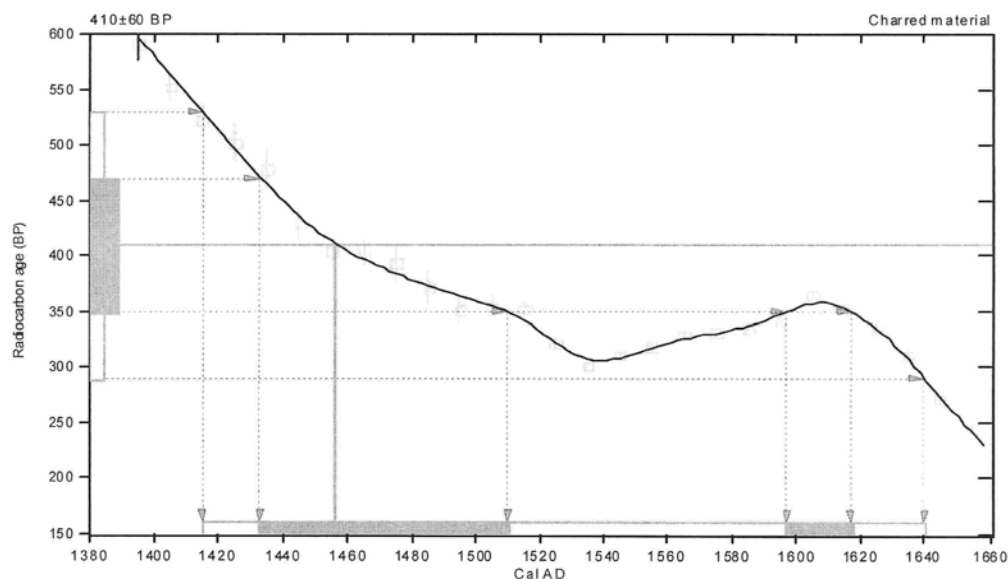
Conventional radiocarbon age: **410±60 BP**

**2 Sigma calibrated result: Cal AD 1420 to 1640 (Cal BP 540 to 310)**  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1460 (Cal BP 490)

1 Sigma calibrated results: Cal AD 1430 to 1510 (Cal BP 520 to 440) and  
(68% probability) Cal AD 1600 to 1620 (Cal BP 350 to 330)



### References:

*Database used*

INTCAL98

*Calibration Database*

*Editorial Comment*

Stuiver, M., van der Plicht, H., 1998, *Radiocarbon* 40(3), pxi-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=-25.4;lab. mult=1)

Laboratory number: **Beta-212764**

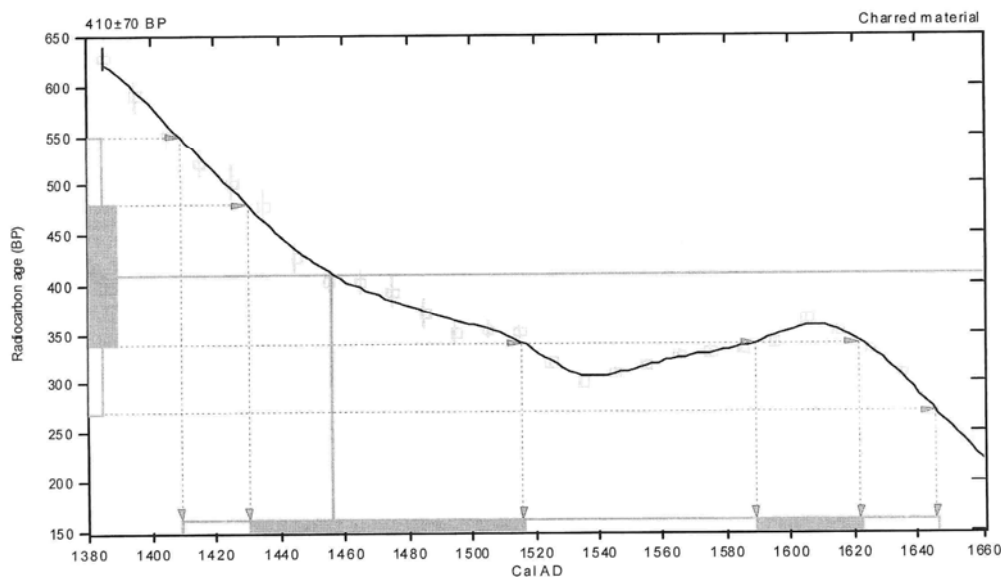
Conventional radiocarbon age: **410±70 BP**

**2 Sigma calibrated result: Cal AD 1410 to 1650 (Cal BP 540 to 300)**  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1460 (Cal BP 490)

**1 Sigma calibrated results: Cal AD 1430 to 1520 (Cal BP 520 to 430) and**  
(68% probability) **Cal AD 1590 to 1620 (Cal BP 360 to 330)**



### 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=-25.1:lab. mult=1)

Laboratory number: **Beta-212765**

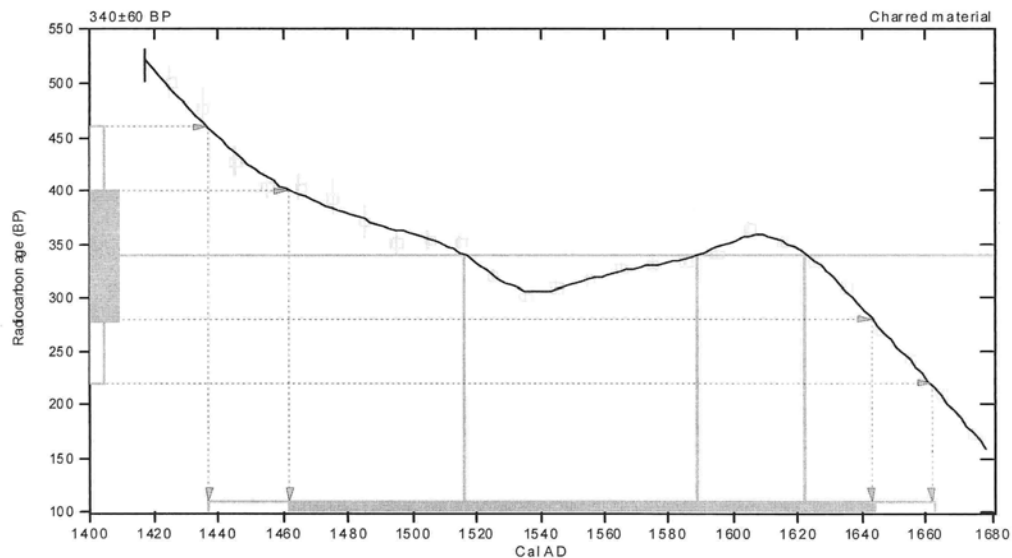
Conventional radiocarbon age: **340±60 BP**

**2 Sigma calibrated result: Cal AD 1440 to 1660 (Cal BP 510 to 290)**  
(95% probability)

Intercept data

Intercepts of radiocarbon age  
with calibration curve: Cal AD 1520 (Cal BP 430) and  
Cal AD 1590 (Cal BP 360) and  
Cal AD 1620 (Cal BP 330)

**1 Sigma calibrated result: Cal AD 1460 to 1640 (Cal BP 490 to 310)**  
(68% probability)



### References:

*Database used*

*INTCAL98*

*Calibration Database*

*Editorial Comment*

*Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxi-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=-24.1:lab. mult=1)

Laboratory number: **Beta-212766**

Conventional radiocarbon age: **70±40 BP**

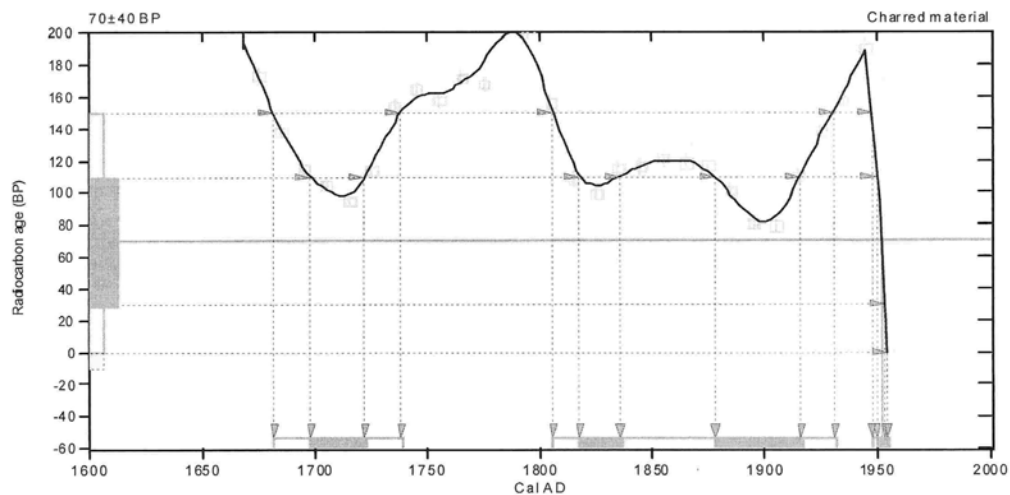
**2 Sigma calibrated results<sup>2</sup>:** Cal AD 1680 to 1740 (Cal BP 270 to 210) and  
 (95% probability) Cal AD 1810 to 1930 (Cal BP 140 to 20) and  
 Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)

<sup>2</sup> 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 results:** Cal AD 1700 to 1720 (Cal BP 250 to 230) and  
 (68% probability) Cal AD 1820 to 1840 (Cal BP 130 to 110) and  
 Cal AD 1880 to 1920 (Cal BP 70 to 30) and  
 Cal AD 1950 to 1950 (Cal BP 0 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

## 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



## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.6:lab. mult=1)

Laboratory number: **Beta-212767**

Conventional radiocarbon age: **160±40 BP**

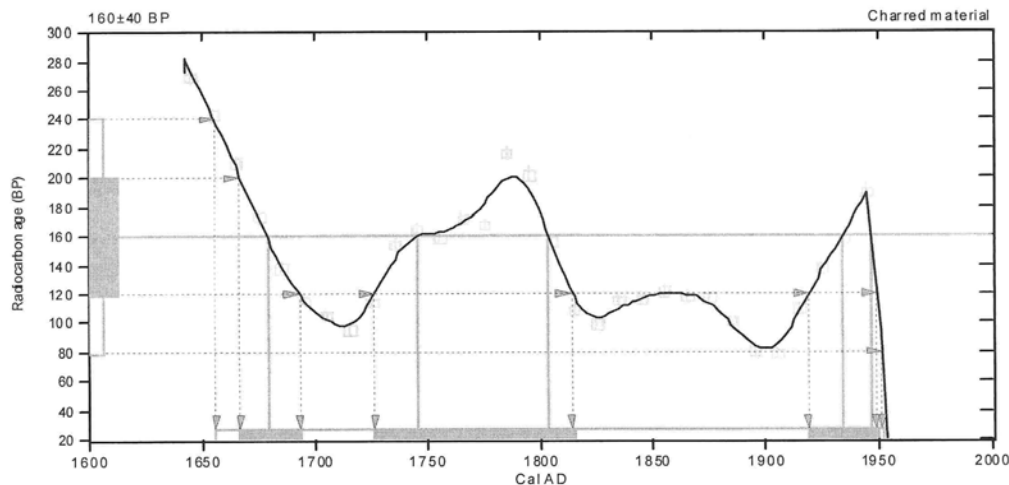
2 Sigma calibrated result: **Cal AD 1660 to 1950 (Cal BP 290 to 0)**  
(95% probability)

Intercept data

Intercepts of radiocarbon age  
with calibration curve:

Cal AD 1680 (Cal BP 270) and  
Cal AD 1740 (Cal BP 200) and  
Cal AD 1800 (Cal BP 150) and  
Cal AD 1930 (Cal BP 20) and  
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: Cal AD 1670 to 1690 (Cal BP 280 to 260) and  
(68% probability) Cal AD 1730 to 1810 (Cal BP 220 to 140) and  
Cal AD 1920 to 1950 (Cal BP 30 to 0)



### 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*

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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=-22.5:lab. mult=1)

Laboratory number: **Beta-212768**

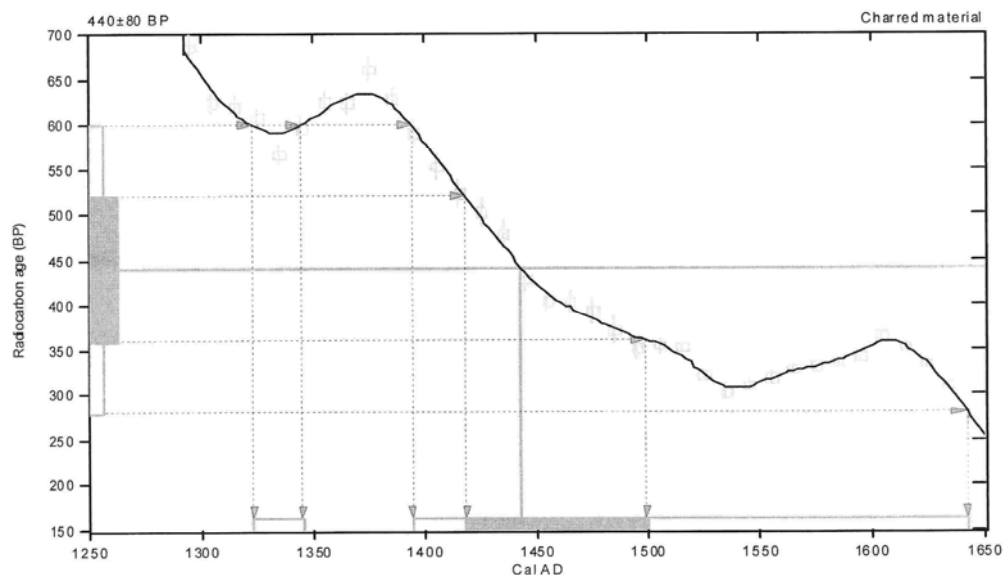
Conventional radiocarbon age: **440±80 BP**

**2 Sigma calibrated results:** Cal AD 1320 to 1340 (Cal BP 630 to 600) and  
(95% probability) Cal AD 1390 to 1640 (Cal BP 560 to 310)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1440 (Cal BP 510)

**1 Sigma calibrated result:** Cal AD 1420 to 1500 (Cal BP 530 to 450)  
(68% probability)



### 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=-24.4;lab. mult=1)

Laboratory number: **Beta-212769**

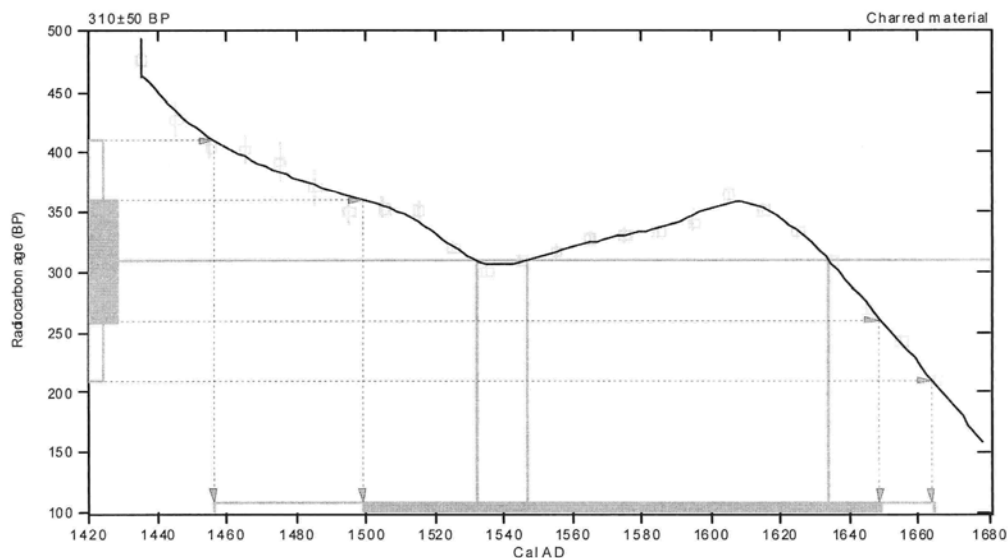
Conventional radiocarbon age: **310±50 BP**

**2 Sigma calibrated result: Cal AD 1460 to 1660 (Cal BP 490 to 290)**  
(95% probability)

Intercept data

Intercepts of radiocarbon age  
with calibration curve: Cal AD 1530 (Cal BP 420) and  
Cal AD 1550 (Cal BP 400) and  
Cal AD 1630 (Cal BP 320)

**1 Sigma calibrated result: Cal AD 1500 to 1650 (Cal BP 450 to 300)**  
(68% probability)



### 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=-23.5:lab. mult=1)

Laboratory number: **Beta-212770**

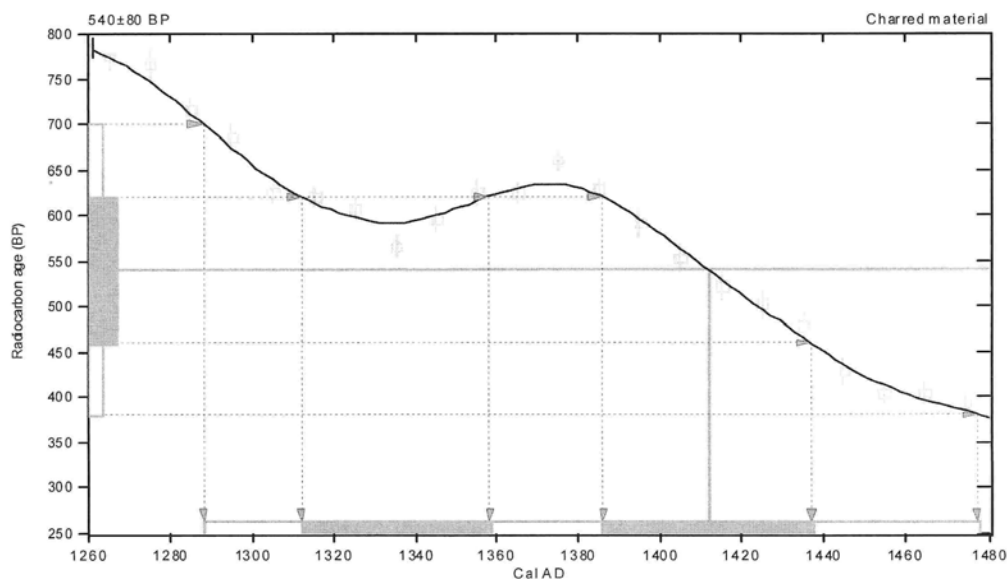
Conventional radiocarbon age: **540±80 BP**

**2 Sigma calibrated result: Cal AD 1290 to 1480 (Cal BP 660 to 470)**  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1410 (Cal BP 540)

1 Sigma calibrated results: Cal AD 1310 to 1360 (Cal BP 640 to 590) and  
(68% probability) Cal AD 1390 to 1440 (Cal BP 560 to 510)



### 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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Appendix I.6

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**Preservation Plan for  
SIHP Site 6032 and Site 23681,  
October 2013**





## Preservation Plan for SIHP Site 6032 and Site 23681

(TMKs: 3-7-5-10:085  
and 3-7-5-17:006)

Wai‘aha 1<sup>st</sup> Ahupua‘a  
North Kona District  
Island of Hawai‘i



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**FINAL VERSION**

PREPARED BY:

Robert B. Rechtman, Ph.D.

PREPARED FOR:

U of N BENCORP  
75-165 Hualalai Road  
Kailua-Kona, HI 96740

October 2013

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ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES



# Preservation Plan for SIHP Site 6032 and Site 23681

(TMKs: 3-7-5-10:085 and 3-7-5-17:006)

Wai‘aha 1<sup>st</sup> Ahupua‘a  
North Kona District  
Island of Hawai‘i



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## INTRODUCTION

At the request of Mr. Jeffrey Dobbins of U of N BENCORP (landowner), Rechtman Consulting, LLC has prepared this Preservation Plan for SIHP Sites 6302 and 23681 located within a roughly 62-acre project area (TMK: 3-7-5-10:085 and 3-7-5-17:006) adjacent to Kuakini Highway in Wai‘aha 1<sup>st</sup> Ahupua‘a, North Kona District, Island of Hawai‘i (Figures 1 and 2) . As a result of an earlier Archaeological Inventory Survey (Clark and Rechtman 2003) of the project area, twenty-six sites were recorded (Figure 3), eleven of which warranted no further work, ten (SIHP Sites 23670-23678 and 23686) were subject to data recovery (Rechtman and Loubser 2007), three (SIHP Sites 23683, 23684, and 23685) were preserved under a Burial Treatment Plan (Rechtman 2003), and two (SIHP Sites 6302 and 23681) are to be preserved under this current Preservation Plan. SIHP Site 6302 was determined to be significant under Criteria A, C, and D, and the site has been determined eligible for listing (but is not formally listed) in the National Register of Historic Places. DLNR-SHPD also concurred with the determination that SIHP Site 23681 (interpreted to be an agricultural *heiau*) was significant under Criteria D and E (Clark and Rechtman 2003). The current plan, prepared in accordance with HAR 13§13-277 provides both short-term protection and long-term preservation measures for Site 23681 and the portion of the Site 6302 that exists within the current project area.

## DESCRIPTION OF THE PROJECT AREA AND DEVELOPMENT PLANS

The current project area is located roughly one mile southeast of Kailua-Kona Town, immediately adjacent to Kuakini Highway, within Wai‘aha 1<sup>st</sup> Ahupua‘a, North Kona District, Island of Hawai‘i (see Figure 1). The boundaries of the current project area are defined to the north by the existing University of the Nations campus and a stone wall along the Wai‘aha 1st/Pua‘a 3<sup>rd</sup> *ahupua‘a* boundary, to the east by Hualālai Road, to the south by Kona Hillcrest residential subdivision, and to the west by a stone wall along the *mauka* edge of Kuakini Highway (see Figure 2).

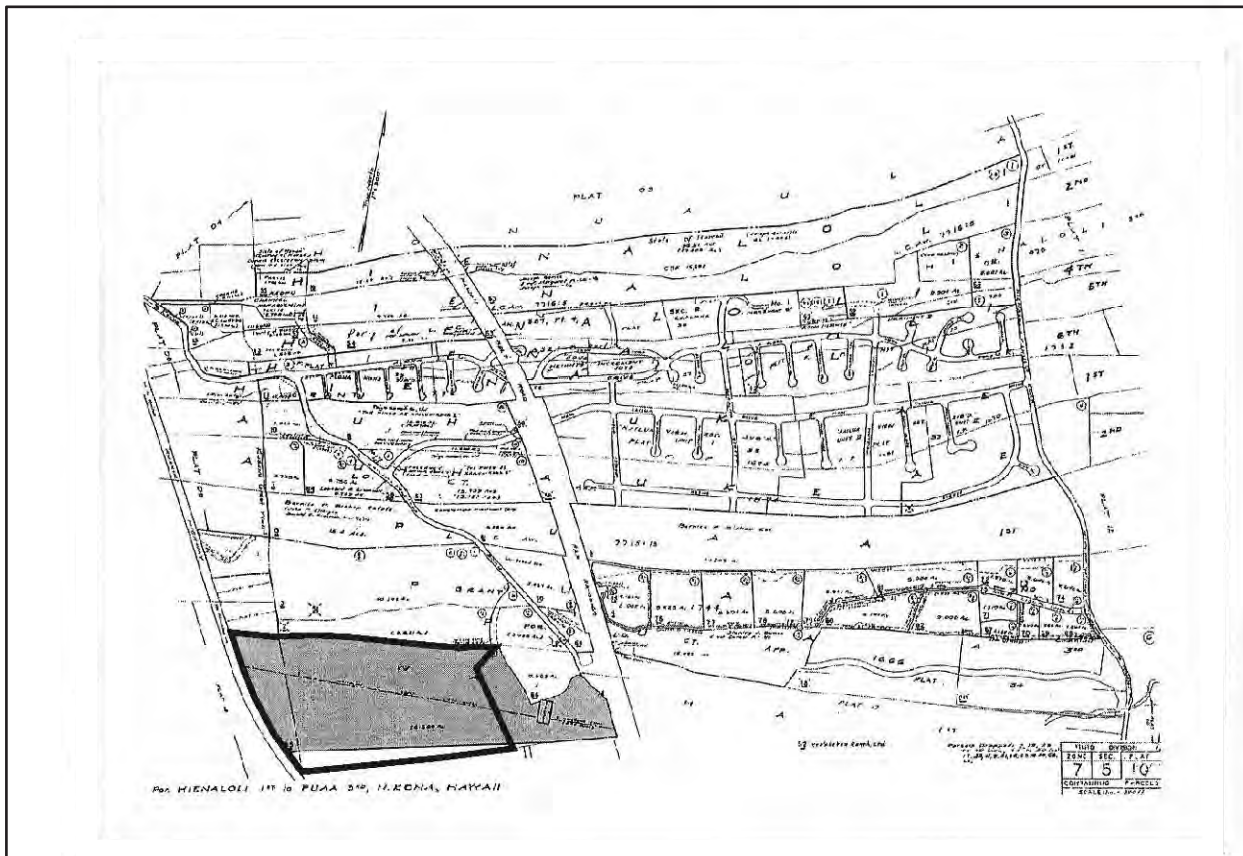
Terrain in the project area is gently undulating and elevation ranges from 40 to 60 feet above sea level. Two soils characterize the project area: Wai‘aha extremely stony silt loam and Punalu‘u extremely rocky peat (Sato et al. 1973). Both are well-drained, thin organic soils over bedrock. The underlying bedrock is *pāhoehoe* within the western third of the project area switching to ‘*a‘ā* bedrock underlying the eastern two-thirds and dating to more than 5,000 years B.P. (Wolfe and Morris 1996).



Despite the seemingly consistent semi-arid condition of this area, seasonality is evident. Throughout the Hawaiian Islands, the warmer and drier summer months, traditionally referenced as *kau*, extend from May to September, and the wetter, cooler months (*ho‘oilō*) extend from October to April (Handy and Handy 1972). The temperatures in the Kona area are generally consistent with this seasonal pattern, ranging between 62-80 degrees in winter and 68–86 degrees during the summer months (Schilt 1984). However, the typical rainfall pattern differs considerably from that seen elsewhere; in all elevations along the Kona coast, rainfall during *kau* is typically greater than that during *ho‘oilō* (Schilt 1984).

Two historically introduced species—*kiawe* (*Prosopis pallida*) and *koa haole* (*Leucaena leucocephala*)—dominate the vegetation within the project area. A variety of grasses, vines, weeds, and shrubs are also present. Prior impacts within the project area can be described as substantial. Bulldozing activity in the project area is evidenced by an old access road (no longer in use) corresponding to a waterline easement that extends *mauka/makai* through the property, terminating roughly 10 meters east of Site 6302; and several grubbed areas along the old access road and in the southern portion of the property (see Figure 3). Modern fence lines intersect across the property, extending north/south near the east edge of Site 23681, and wire fencing at the north and south extents of Site 6302 transformed the wall to form the east boundary of a cattle paddock, which likely occurred during utilization of the project area by the Gomes Ranch (1927-1960s). The landowner plans to expand their campus to the south incorporating the current project area. Their current proposed development plan for the property is shown on Figure 4.







 = Project area  = U of N BENCORP parcels

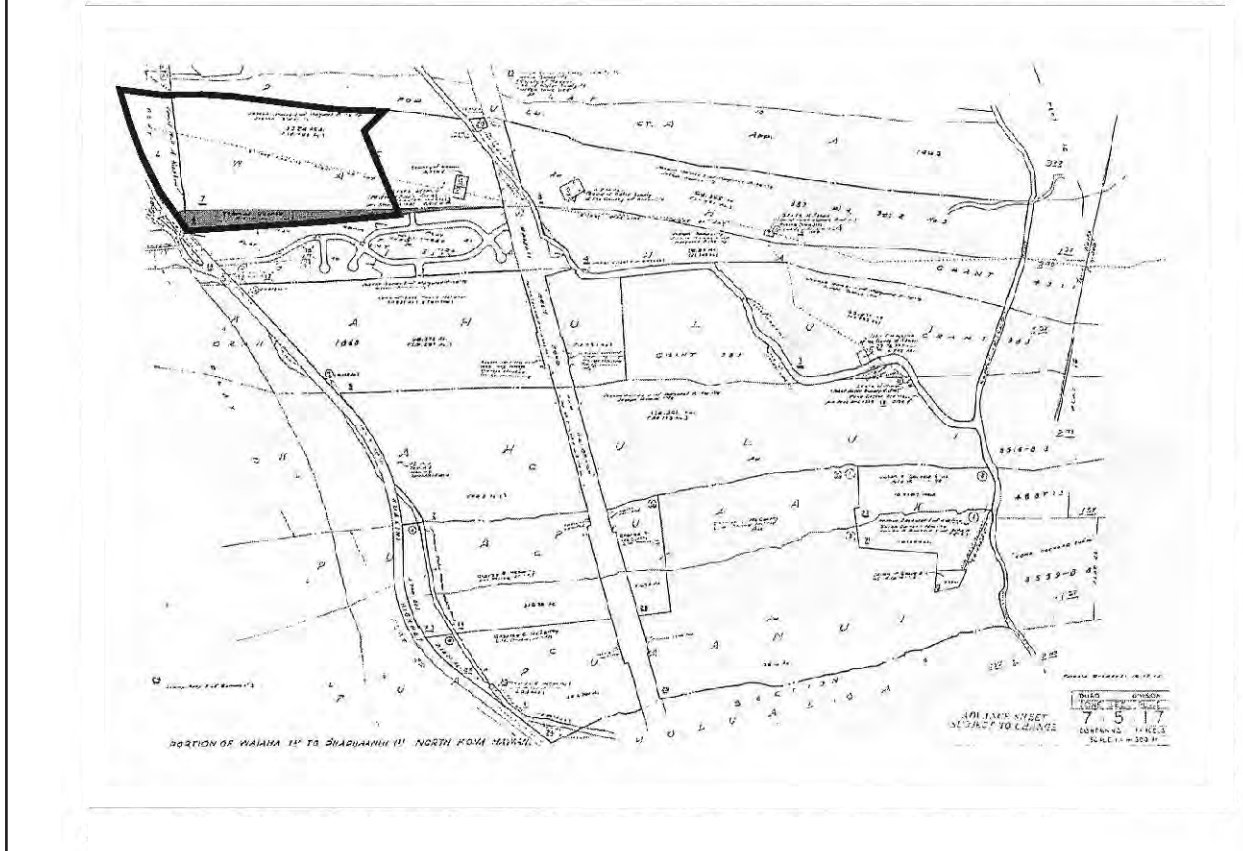


Figure 2. Tax Map Keys: 3-7-5-10 and 17 showing current project area, parcels 85 and 10 (shaded).





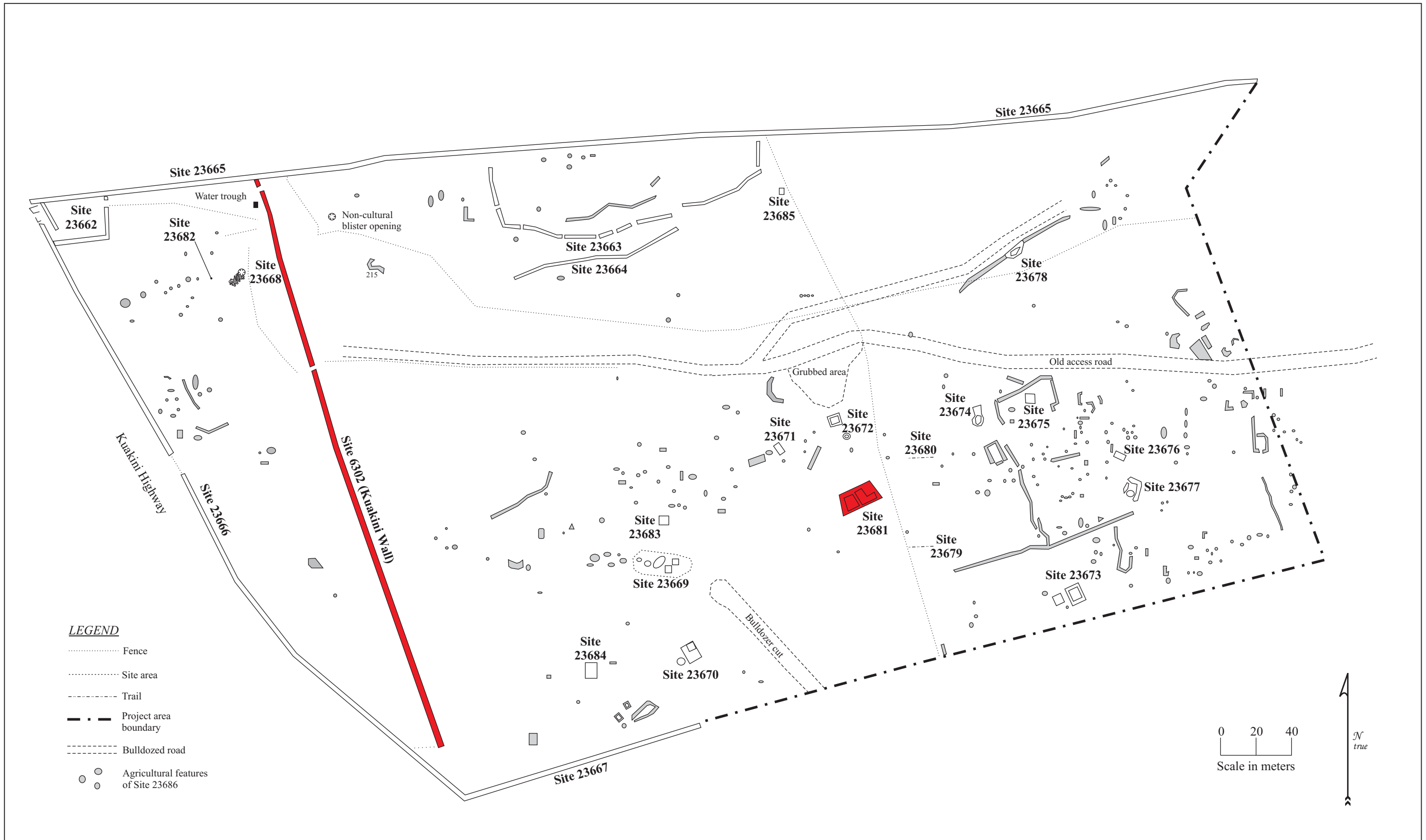


Figure 3. Project area plan view showing archaeological site locations on TMK: 3-7-5-10 and 17 parcels 85 and 06 (SIHP Sites 6302 and 23681 highlighted in red) (Clark and Rechtman 2003).



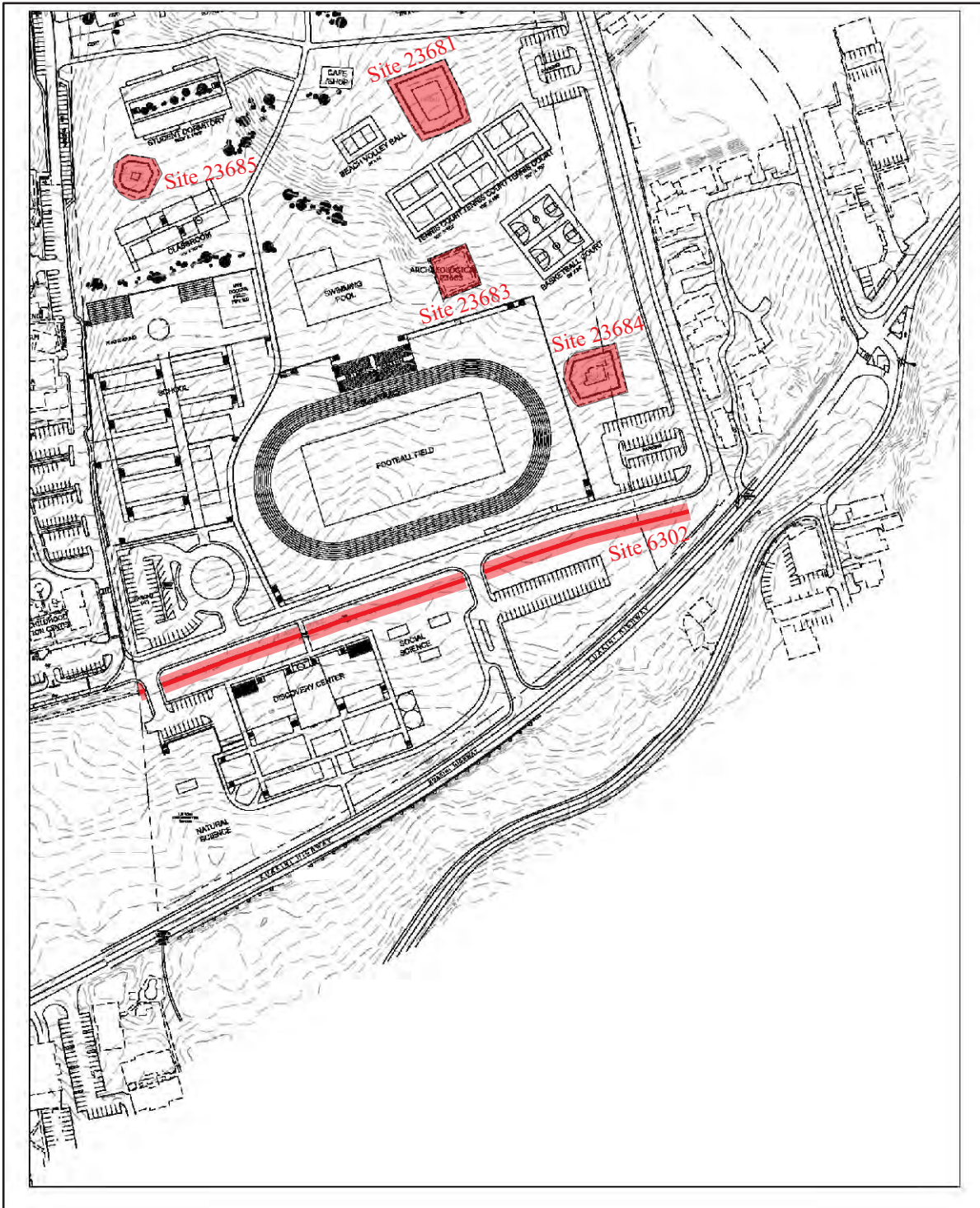


Figure 4. Proposed development showing archaeological and burial preserves.

## DESCRIPTION OF THE PRESERVATION SITES

### SIHP SITE 6302

Site 6302 is the Statewide Inventory of Historic Places (SIHP) designation for the Kuakini Wall, which extends through the western portion of the current project area. It is generally cited in the archaeological literature (e.g., O'Hare and Wolforth 1998) that the construction of the Great Wall of Kuakini began in the early 1800s as a response to the growing number of feral animals (e.g. cattle, goats, and pigs) running rampant in Kona. Although no record exists of Governor Kuakini having ordered the wall built, its final configuration is attributed to him. John Adams Kuakini was governor of Hawai'i Island between 1820 and 1844. According to Kelly (1983), prior to 1855 this wall was simply known as the Great Wall or the Great Stone Wall. It is perhaps a result of the Reverend Albert Baker's 1915 account of the wall that it has commonly become known as the Kuakini Wall:

Just a little above [the stone church at Kahalu'u], and continuing all the way to Kailua, is a huge stone wall built in Kuakini's time to keep pigs from the cultivated lands above.  
(Baker 1915:83)

Other early references to this wall are contained in *Māhele* records for *kuleana* parcels awarded bordering the wall. Typical of these is a *ca.* 1850 map (Figure 5) that accompanied the Land Commission Award to the ABCFM. The wall is documented in the vicinity of the current project area on a *ca.* 1880 map of Kailua town (Figure 6) prepared by J. S. Emerson and S. M. Kananui.

Archival research helps shed some light on the timing of the construction of the Great Wall (Rechtman et al. 2005). In Lucy Thurston's writings (Thurston 1882), she states that a stone wall was built in 1825 that completely surrounded the 5-acre property that was given to them; presumably the Great Wall had not yet been built. It was also recorded that the portion of the Great Wall extended north from the northeast corner of the Thurston's property was constructed against the pre-existing Thurston residential compound wall. These facts indicate that the Kuakini Wall was not built as a single construction but rather likely incorporated many preexisting property boundary walls along its course. It is clear from historical records that construction of the wall did not begin until after 1825 and that significant portions of the wall were completed by 1850. It is also interesting to note that the wall's originally cited function—to protect the cultivated fields *mauka* of the wall from feral animals—has been inverted over the years with the purpose becoming the protection of the coastal settlement areas *makai* of the wall. Perhaps the function of the wall changed through time.

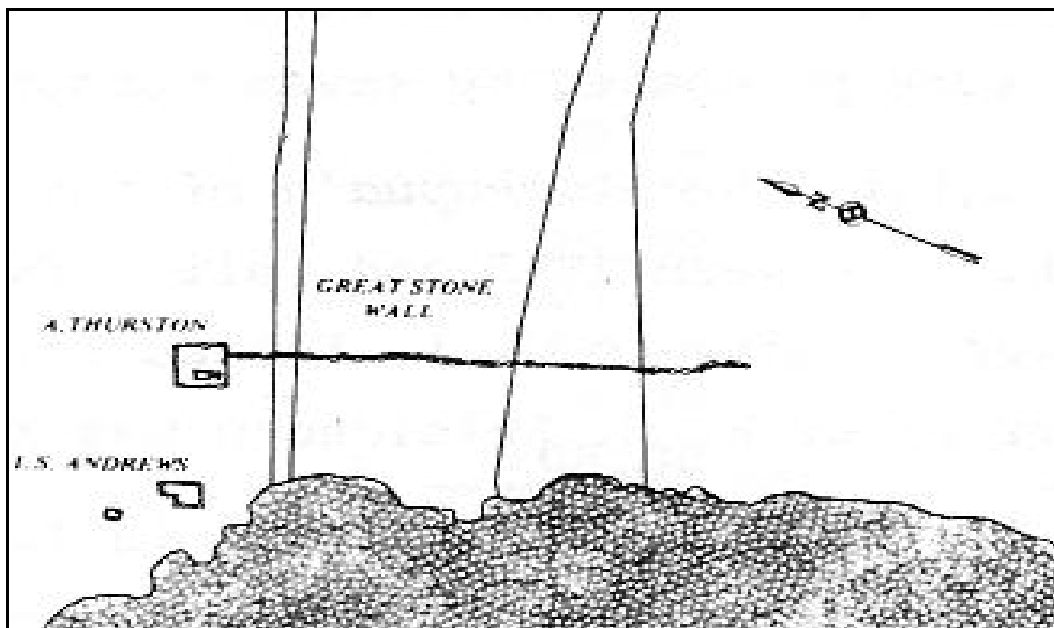


Figure 5. Portion of 1850 map that accompanied LCAw. 387 (from Kelly 1983:41).

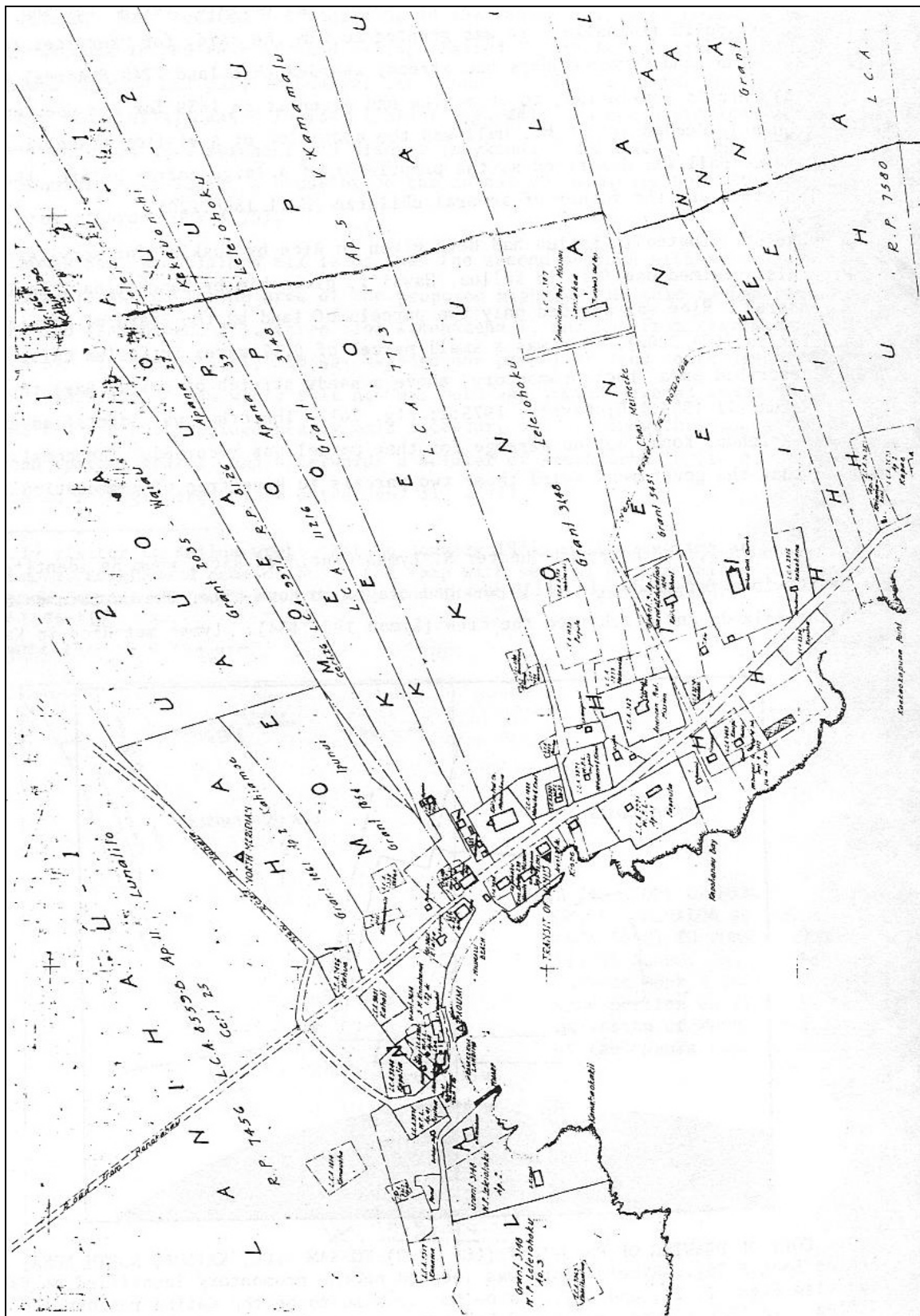


Figure 6. Portion of a ca. 1880 map of Kailua town and vicinity.



The portion of Site 6302 within the current project area consists of a 340-meter section of wall that extends in a north/south direction in the western portion of the property, terminating to the south near the boundary between the two Tax Map parcels that comprise the project area (see Figure 3). This section of the Kuakini Wall stands up to 1.2 meters high with a maximum width of 1 meter, and is constructed in a core-filled method. Three gaps are present along this section of the wall (see Figure 3). The first gap occurs along its northern end and is 3 meters wide; and the second gap occurs 110 meters south of the northern end and is also 3 meters wide. These gaps were most likely created by the Gomes Ranch (1927-1960s) to help funnel cattle west towards Site 23662, and pasture areas, respectively. At the northern most gap there is a metal water trough located just to the west of the gap and a wire fence parallels Site 23665 all the way to Site 23662. At the second gap there are stub walls and a set of gates. The third gap occurs at the wall's south end 20 meters from the southern boundary of the project area. This section of wall was most likely removed to construct Sites 23666 and 23667. A wire fence connects the southern end of the Kuakini Wall segment to Site 23666 creating a large paddock between the two walls (Clark and Rechtman 2003).

## SIHP Site 23681

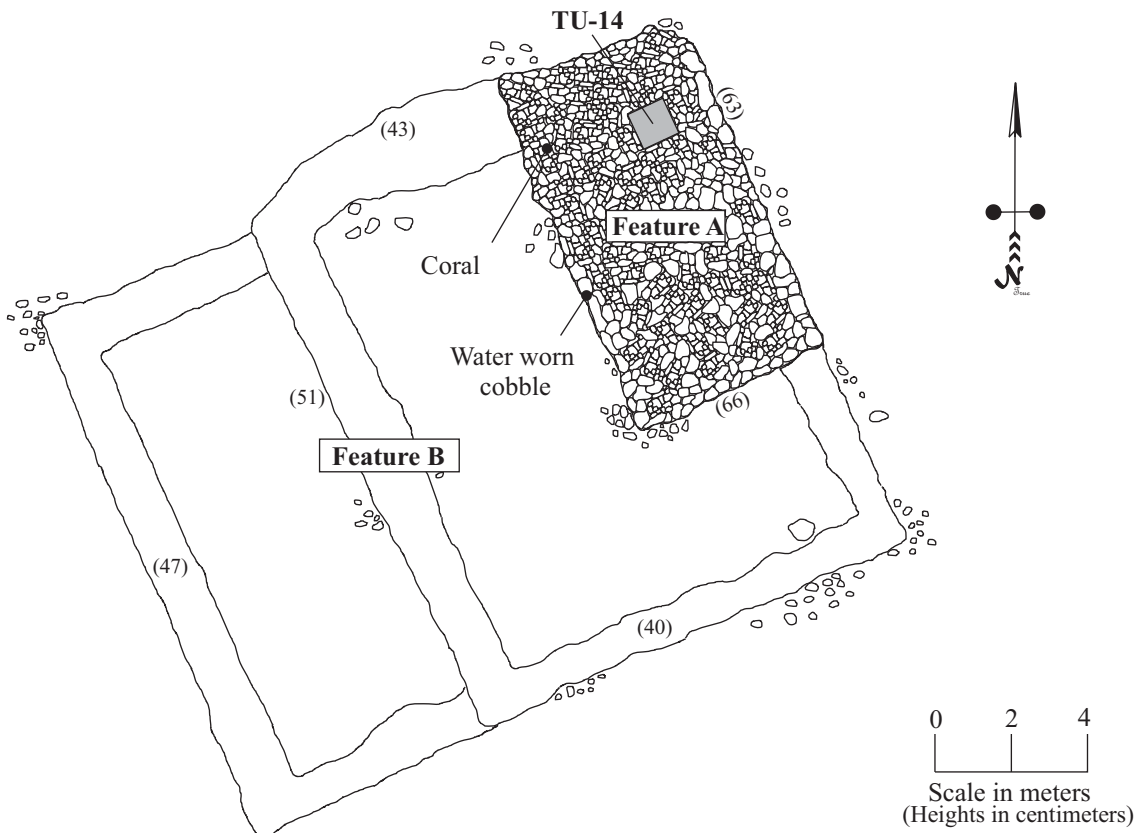
Site 23681 is interpreted as an agricultural *heiau*, or shrine, located within the south central portion of the project area (see Figure 3). It was originally recorded during fieldwork conducted by Clark and Rechtman (2003). The following description is reproduced here from the Archaeological Inventory Survey report prepared as a result of that fieldwork.

The site consists of a platform (Feature A) constructed within the northeast corner of a double enclosure (Feature B) [Figure 7]. The platform and enclosure walls are constructed of 'a'ā cobbles and boulders, while the floor of the enclosure area consists of thin soil covered by dense vegetation. Site 23681 resembles in size and shape other sites described in North Kona as *heiau* (Stokes and Dye 1991).

Feature A is a large rectangular platform (9.1 meters long by 5.3 meters wide) located in the northeast corner of Site 23681. The platform is constructed with large 'a'ā cobbles and boulders stacked along its outside edges and a surface of small cobbles paving top [see Figure 7]. The platform rises up to 0.7 meters above the surrounding ground surface and is mostly intact with the exception of some collapse in the southwest corner and along the north edge. The enclosure walls (Feature B) run in a perpendicular direction from the platform's edge starting at its southeast and northwest corners. The walls are not of continuous construction and may have been built subsequent to the completion of the platform. A single piece of water rounded coral and a water work cobble were found on the surface of the Feature A.

A 1 X 1 meter test unit (TU-14) was excavated in the northeast corner of Feature A [see Figure 7]. Excavation of TU-14 revealed a three-layer stratigraphic soil profile resting on bedrock. Cultural material collected from TU-14 included volcanic glass, fire cracked rock, marine shell, urchin, *kukui*, and mammal bone.

Feature B consists of a double enclosure located to the south and west of Feature A [see Figure 7]. The enclosure measures 19 meters long by 15 meters wide. A partially terraced central dividing wall creates two enclosure areas within Feature B; the interior of the western area measures 12 meters by 5 meters, and the interior of the eastern area measures 12 meters by 10 meters. The eastern enclosure area is slightly terraced (0.5 meters high) above its western counterpart. The enclosure walls are constructed of 'a'ā cobbles and boulders, they were formerly stacked, but are now mostly collapsed. Intact sections of wall stand up to 0.5 meters above the ground surface and measure 1.0 meter wide. Ground surface within Feature B consists of thin soil covered by dense vegetation. (Clark and Rechtman 2003:52-54).



**TU-14 north wall profile**

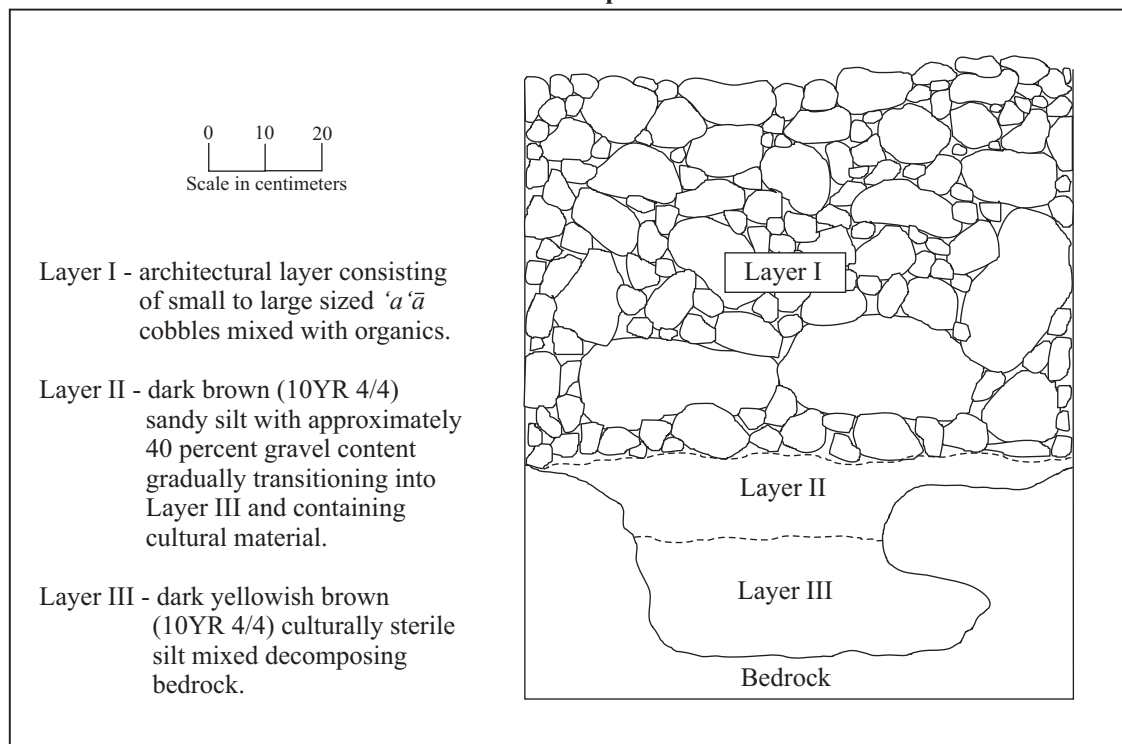


Figure 7. SIHP Site 23681 plan view and TU-14 profile (Clark and Rechtman 2003:53).

# PROPOSED PRESERVATION TREATMENTS

## SIHP Site 6302

A multi-modal preservation approach is the treatment proposed for the portion of Kuakini Wall within the current project area (Figure 8). The stable intact portions of the wall will be conserved through avoidance and protection, collapsed portions of the wall will be restored and stabilized, the missing southern portion of the wall will be reconstructed to the extent possible given availability of appropriate stones, and the site will be interpreted for the public. An allowance for widening one of the three existing breaches and the creation of a new 40 foot wide breach is also proposed. The overall preservation will be achieved through the establishment of a defined preservation easement, which is described below. No construction, land modification, or other unauthorized activities would be permitted to occur within the preservation easement.

As a primary access to the proposed development area, a roadway will be established extending *mauka* from Kuakini Highway in the south-central portion of the property (see Figure 4). This roadway will require the creation of a new 40 foot wide gap in Site 6302 to accommodate a roadway wide enough for emergency vehicles, curb and gutter, sidewalks, and landscaping. Also, at the northern end of the Kuakini Wall within the proposed development area an existing gap in the wall will be used for the placement of a sewer line and driveway (see Figure 4). It will be necessary to widen this existing gap to facilitate the placement of the infrastructure. Such widening in this area will be limited to no more than 15 feet (roughly 5 meters) of the wall. A third, centrally located gap will be used for pedestrian ingress and egress across the property; the wall terminations at this breach have been previously stabilized during Gomes Ranch use of the land.

All rocks taken from the existing gaps and during the creation of the new breach will be removed by hand and used to repair existing collapsed sections of the wall within the project area, and to restore the missing portion of the wall beginning at its current southern termination and extending southward. The dismantling process will be monitored by an archaeologist and cross-section profile drawings will be prepared and photographs will be taken documenting the walls construction techniques. The new wall terminations will be stabilized consistent with the recent treatment of this site in the vicinity of Palani Road (Rechtman and Nelson 2012). All sections of the wall that will require stabilization/restoration will be documented prior to any such work. A dismantling/restoration plan will be submitted to DLNR-SHPD for approval prior to the implementation of any of the above proposed work. This plan will describe the locations of all dismantling/stabilization/restoration work and contain plan view maps and photographs. The plan will also discuss the provision for preparing a documentation report to be submitted to DLNR-SHPD upon completion of the dismantling/stabilization/restoration work.

The below described preservation measures are consistent with approved preservation plans for this same site on other similar Kailua-Kona properties (e.g., Rechtman 2005; Tulchin and McDermott 2009).

### **Long-Term/Permanent Preservation Measures**

Long-term preservation will be achieved through the establishment of a permanent preservation easement that will be recorded with the Bureau of Conveyances and will be attached to the property deed. The buffer zone will be delineated by a vegetation transition.

#### *Buffer*

A twenty-foot buffer zone on either side of the wall, measured from the *mauka* and *makai* faces of the wall, will be established. No construction will be allowed within this buffer zone.

#### *Landscaping and Stabilization*

Invasive vegetation will be removed by hand from within the preservation buffer and collapsed portions of the wall will be restacked using immediately available stones (those from the collapses) and any stones removed from the potential gap widening areas. If any vegetation is introduced into the buffer zone it will consist of shallow rooted native and Polynesian-introduced species.

#### *Interpretation*

Several small interpretive/cautionary signs will be established along the preservation buffer zone boundary. The proposed language for the signs reads as follows:

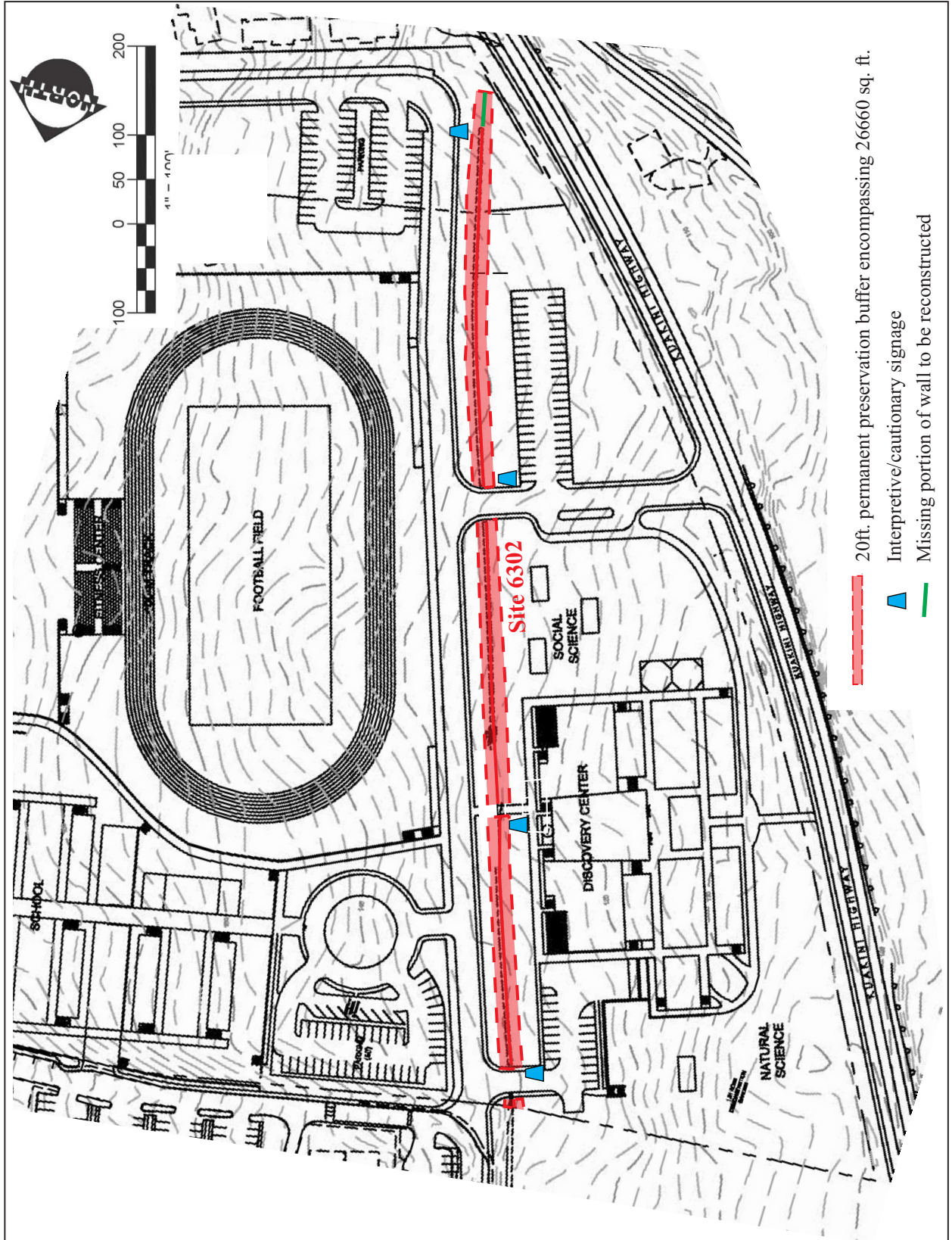


Figure 8. SIHP Site 6302 preservation treatment.

***Kuakini Wall***  
*(SIHP Site 6302)*  
*Wai'aha Ahupua'a*  
*North Kona District*

Known also as the Great Wall and *Pā Pipi* (the cattle wall), construction of this wall began sometime after 1825. The building of the wall is attributed to Kuakini (John Adams), the Governor of Hawai'i Island from 1820 to 1844. It is said that the wall was built to control feral animals, which during the nineteenth century were becoming an increasing nuisance in the upland gardens as well as in the coastal settlement area. This significant site has been determined eligible for listing in the Hawai'i Register of Historic Places as well as the National Register of Historic Places.

This is a culturally and historically significant site;  
 please show your respect by not removing rocks from this area.

Historic sites are protected under state law. Violation could result in a \$10,000 fine.  
 (Chapter 6E-11, Hawai'i Revised Statutes)  
 DLNR-SHPD (808) 692-0015

### **Short-Term/Interim Protection Measures**

Interim protection of the site will be achieved through the placement of orange construction fencing along the permanent preservation boundary. Proper placement of the fence will be checked by a qualified archaeologist and verified in writing to SHPD. Absolutely no construction activity will be allowed within the preservation easement. The location of the preservation site relative to the construction zone will be plotted on the appropriate construction plans. Prior to any construction activities, a qualified archaeologist will meet on-site with construction supervisors to point out the site and construction zone, and to review all preservation requirements needed to assure the protection of the site. Once the construction is complete, the protective fencing will be removed and the preservation buffer will be treated as per the above-described permanent preservation measures.

### **SIHP Site 23681**

Preservation as a stabilized ruin and interpretation is the treatment proposed for Site 23681 (Figure 9). Preservation will be achieved through the establishment of a defined preservation easement, which is described below. No construction, land modification, or other unauthorized activities would be permitted to occur within the preservation easement.

### **Long-Term/Permanent Preservation Measures**

Long-term preservation will be achieved through the establishment of a permanent preservation easement for the *heiau*. This easement will be recorded with the Bureau of Conveyances and will be attached to the property deed.

#### *Buffer*

A twenty-foot buffer zone surrounding Site 23681 will be established. No construction will be allowed within this buffer zone. The boundaries of the buffer zone will be defined by a stone wall constructed of local basalt boulders and cobbles. The wall would be built so as to be typically traditional Hawaiian in appearance. The wall will have a dry stacked appearance with a hidden concrete core for stability. Wall height will be a minimum of three feet and width will be approximately 2 feet. An inconspicuously situated narrow gated opening will be left through the enclosing wall to allow access for appropriate visitation and for maintenance purposes.

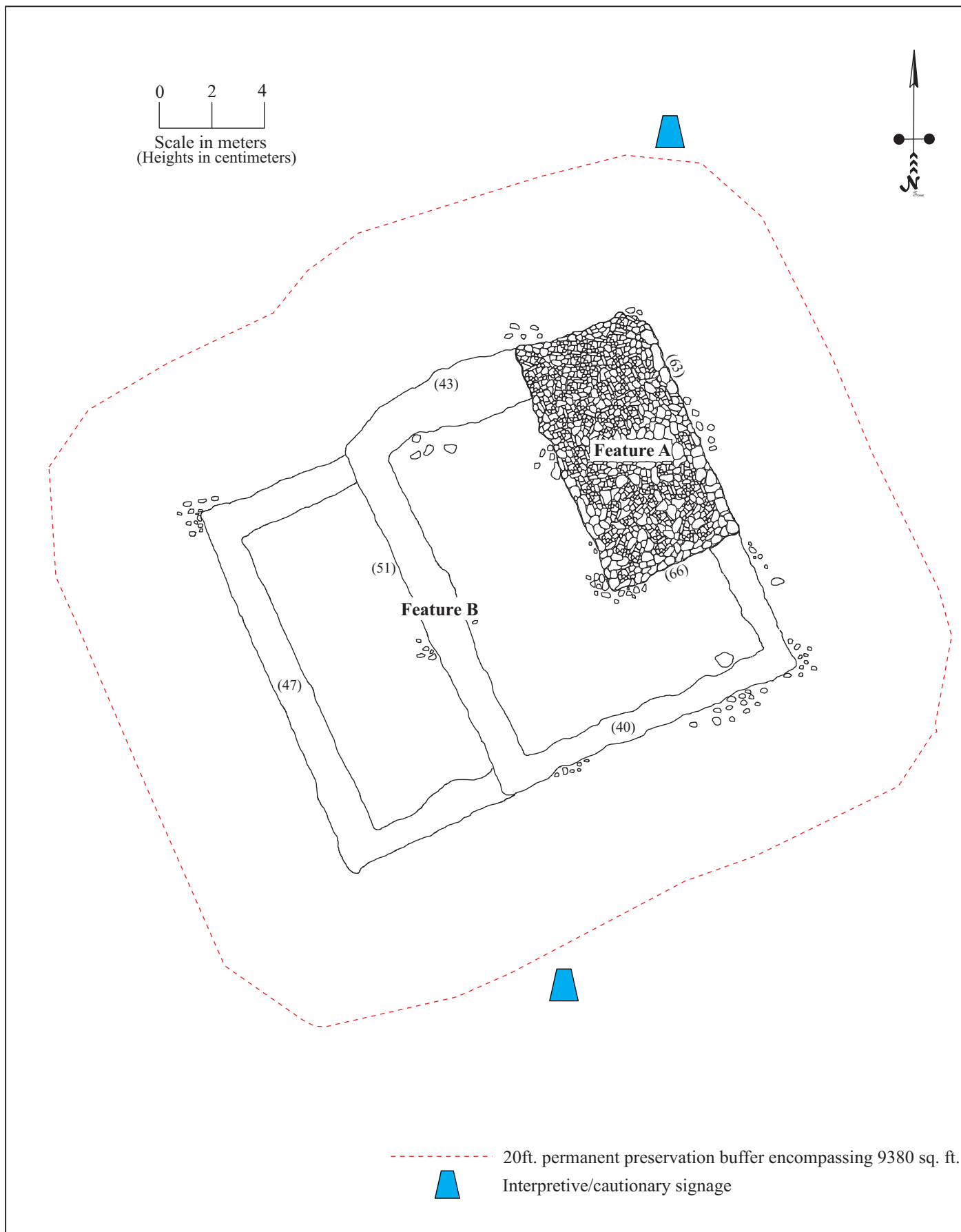


Figure 9. SIHP Site 23681 preservation treatment.

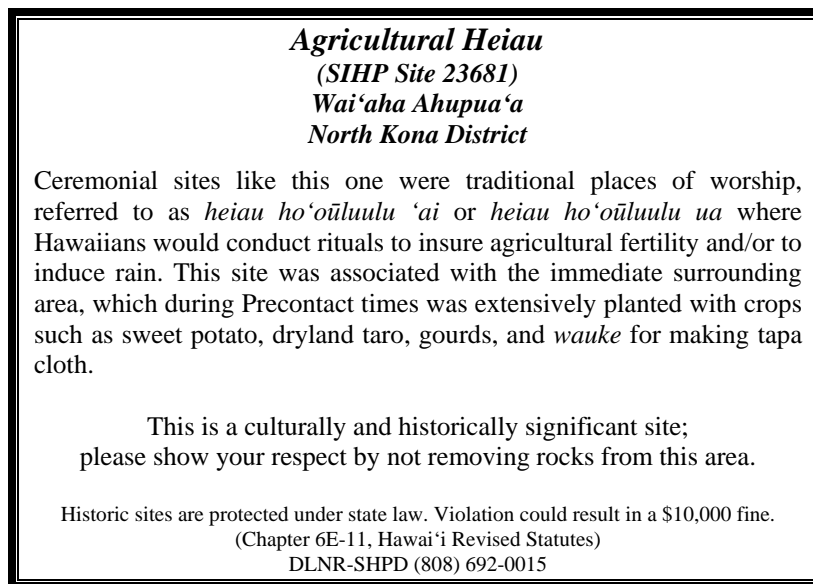


### *Landscaping and Stabilization*

Invasive vegetation will be removed by hand from within the preservation buffer and collapsed portions of Site 23681 will be restacked. If any vegetation is introduced into the buffer zone it will consist of shallow rooted native and Polynesian-introduced species.

### *Interpretation*

At least one interpretive/cautionary sign will be established along the preservation buffer zone boundary. The proposed language for the signs reads as follows:



### **Short-Term/Interim Protection Measures**

Interim protection of the site will be achieved through the placement of orange construction fencing along the permanent preservation boundary. Proper placement of the fence will be checked by a qualified archaeologist and verified in writing to SHPD. Absolutely no construction activity will be allowed within the preservation easement. The location of the preservation site relative to the construction zone will be plotted on the appropriate construction plans. Prior to any construction activities, a qualified archaeologist will meet on-site with construction supervisors to point out the site and construction zone, and to review all preservation requirements needed to assure the protection of the site. Once the construction is complete, the protective fencing will be removed and the preservation buffer will be treated as per the above-described permanent preservation measures.



## CONSULTATION

On June 27, 2013, an earlier version of this preservation plan was presented at a board meeting of the Kona Hawaiian Civic Club. Among those present, comments on the plan were offered by Maurice Kahawaii, Aka DeMesa, Teresa Nakama, and Chuck Flaherty. The earlier version of this plan indicated that as much as 75 feet of the Kuakini Wall might be impacted during development of the property. This was disturbing to those that commented and as a result, the roadways and other infrastructure have been redesigned to utilize existing gaps in the wall, which will greatly lessen the amount of potential direct impact to Site 6302. Those assembled at the board meeting asked if a site visit be conducted of the area. The landowner consented to such a visit, but attempts to organize such a visit have been unsuccessful as there has no further contact from the Kona Hawaiian Civic Club despite several attempted efforts to make such contact.

As part of the preservation planning (Rechtman 2005) for section of this same site on a portion of TMK:3-7-5-009:054 and TMK: 3-7-009:067 in Heinaloli 6<sup>th</sup> and 'Auhaukea'e 1<sup>st</sup> ahupua'a, to the north of the current project area, two individuals of prominence in the community were consulted (Ruby McDonald [now deceased] and J. Curtis Tyler III). For that proposed development these individual concurred with a buffer zone of 15 feet (5 feet small than that proposed for the current development area) as well as both the short-term and long-term measures that area similar to those proposed in the current plan. Mr. Tyler was contacted with respect to the current preservation effort to share his *mana'o*. He agreed with the proposed treatments as outlined above.

## IMPLEMENTATION OF PRESERVATION PLAN

U of N BENCORP will implement the preservation measures described in this plan, and insure that all requirements and restrictions associated with the perpetual easements are incorporated into the property deed. They will also retain the management responsibilities associated with the perpetual preservation of these sites. The interim protection measures described above will govern the development activities until such time as the permanent preservation measures are implemented.

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