



ALEXANDER & BALDWIN
PARTNERS FOR HAWAII

January 5, 2018

Hon. Stacy Crivello
Chair, Housing, Human Services, and Transportation Committee
County Council
County of Maui
200 S. High Street
Wailuku, Maui, Hawaii 96793

2018 FEB -9 AM 11: 26
OFFICE OF THE
COUNTY COUNCIL

RECEIVED

Dear Chair Crivello:

RE: 40-Acre Parcel Owed By Alexander & Baldwin, Inc. for Development of Affordable Housing (HHT-21)

This is in reply to your letter of December 27, 2017, requesting archaeological and topographical surveys, as well as conceptual housing plans prepared in regard to the above subject property.

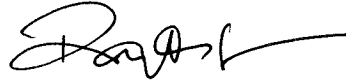
In response to your request we provide the following:

- Conceptual Plan, County Affordable Housing, Wai`ale North, dated 4/20/2016;
- Site Section, County Affordable Housing, Wai`ale North, dated 4/20/2016;
- Regional Context, County Affordable Housing, Wai`ale North, dated 4/19/2016;
- Maui Lani Subdivision preliminary subdivision map with topography, dated 11/19/2014;
- Archaeological Inventory Survey of Wai`ale Project area, prepared by Scientific Consultant Services, Inc., dated February 2010;
- Department of Land and Natural Resources, State Historic Preservation Division letter dated 2/28/2010, accepting the Archaeological Inventory Survey of the Wai`ale Project area;
- Final Burial Site Component of a Data Recovery Plan and Preservation Plan for Sites 50-50-04-5504 and 6679, prepared by Archaeological Services Hawaii, LLC, dated September 2010;

- Department of Land and Natural Resources, State Historic Preservation Division letter dated 9/13/2010, accepting the Final Burial Site Component of a Data Recovery Plan and Preservation Plan for Sites 50-50-04-5504 and 6679.

Should you require any further information, please do not hesitate to contact our office.

Sincerely,

A handwritten signature in black ink, appearing to read "Randall H. Endo", with a long horizontal flourish extending to the right.

Randall H. Endo
Vice President, Maui Land Assets

Encl.

cc: Ms. Carol Reimann, Director, Department of Housing and Human Concerns, w/encl.
Mr. Kaala Buenconsejo, Director, Department of Parks and Recreation, w/encl.

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
661 KANOKILA BOULEVARD, ROOM 333
KAPOLEI, HAWAII 96707

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

RUSSELL Y. TSUJI
DEPUTY GOVERNOR

ALEX C. KAWAHARA
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AGRICULTURE
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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

February 28, 2010

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813
shpdreply@scshawaii.com

LOG NO: 2010.1166
DOC NO: 1002PC41
Archaeology

**SUBJECT: Chapter 6E-42 Historic Preservation Review – REVISED
Archaeological Inventory Survey of Six Separate Parcels Comprising 607 Acres
Wailuku/Waikapu Ahupua'a, Wailuku District, Island of Maui, Hawai'i
TMKs: (2) 3-8-005:023 por.; (2) 3-8-005:037; (2) 3-8-007:071; (2) 3-8-007:101;
(2) 3-8-007:102; (2) 3-8-007:104**

Thank you for the opportunity to again review this revised report, which our staff received in PDF format on February 23 (Tome and Dega 2010): *An Archaeological Inventory Survey of Approximately 607 Acres of Land*... Scientific Consultant Services, Inc.

The report was reviewed by SHPD staff on July 30 of 2009 (SHPD LOG NO: 2009.2922; DOC NO: 0907PC38), December 23 of 2009 (SHPD LOG NO: 2009.4702; DOC NO: 0912PC82) and again on February 12 of 2010 (SHPD LOG NO: 2010.1137; DOC NO: 1002PC06), resulting in several requested revisions.

The survey area as described in the report has been revised from the original 616.74 to 607 acres comprising a portion of TMK (2) 3-8-005:023 and the entirety of TMKs (2) 3-8-005:037 and (2) 3-8-007:071, 101, 102 and 104. Fieldwork, carried out between June 23 and September 4, 2008 and again during September of 2009, was comprised of a 100% pedestrian survey, identification and recording of sites and included the mechanical excavation of 282 trenches and five manually excavated test units. One new site, now on record as SIHP #50-50-04-6578 [subsurface fire pit/*imu*], was identified in ST 90, with two previously identified sites, SIHP #50-50-04-1508 [portion of the Spreckels Ditch] and #50-50-04-5504 [traditional period *in situ* human burial] also found to be within the bounds of the current survey area.

The report now contains the required information as specified in HAR §13-276-5 regarding report documentation of inventory level field work completed in general and is acceptable.

We agree that SIHP #50-60-04-1508 (Spreckels Ditch), -5504 and -6578 are significant under Criterion D of the National and Hawai'i Registers of Historic Places for their ability to yield information important to history or prehistory and that -1508 is further significant under Criterion A for its association with events that have made an important contribution to the broad patterns of Hawai'i State history (*i.e.*, Maui's sugar

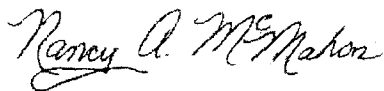
industry). As a traditional period burial site, SIHP #50-50-04-5504 is also significant under Criterion E of the Hawai'i Register of Historic Places for its importance to the native Hawaiian people.

We are also in agreement that full-time archaeological monitoring should occur during all future ground altering disturbance in the project area where sand stratigraphy is known to be present as well as areas which were not subject to subsurface testing during the inventory survey. As such, a project wide monitoring plan will also need to be submitted for review and approval to the SHPD prior to any ground altering disturbance getting underway.

Lastly, while identified in 2003 by an Archaeological Services Hawai'i, LLC employee, it appears that no formal mitigation or preservation of SIHP #50-50-04-5504 has yet occurred. We agree that with respect to the displaced human remains first observed in the sand berm that parallels Kuihelani Highway, the berm should be closely monitored by at least two individuals for the purposes of recovering any additional displaced human remains. A Burial Treatment Plan should also be written for this site and submitted to the SHPD Culture & History section and the MLIBC for consultation and approval.

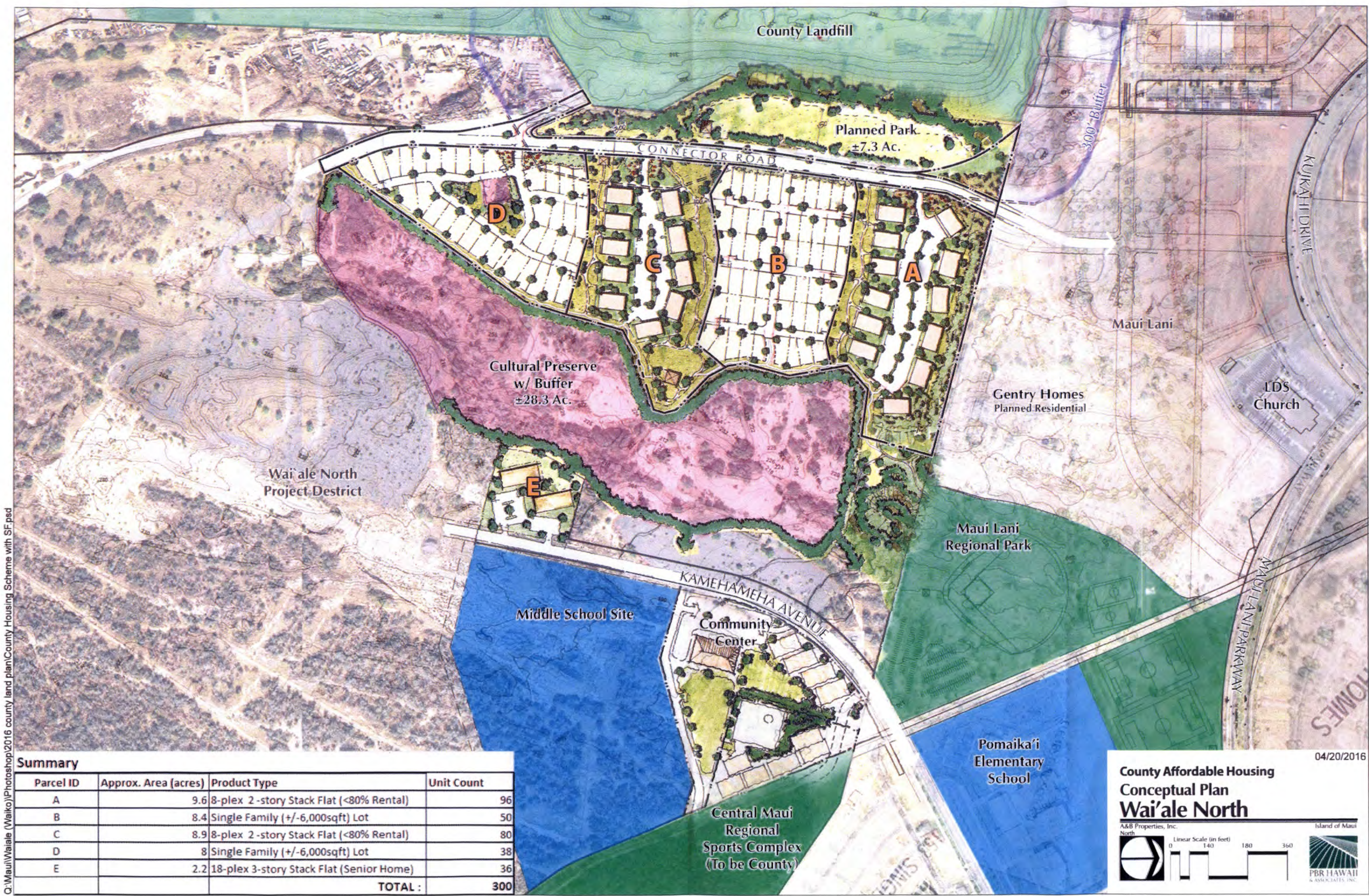
Now that the archaeological inventory report has been accepted pursuant to HAR §13-276, please send one hardcopy and a text searchable PDF copy on CD, clearly marked **FINAL**, to the attention of "**SHPD Library**" at the Kapolei SHPD office. However, before doing so, please correct the typo on page 62 which refers the SIHP #50-50-04-6578 as SIHP #50-50-04-5504.

Aloha.



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

Q:\Maui\Wai'ale (Waiko)\Photoshop\2016 county land plan\County Housing Scheme with SF.psd



Summary

Parcel ID	Approx. Area (acres)	Product Type	Unit Count
A	9.6	8-plex 2-story Stack Flat (<80% Rental)	96
B	8.4	Single Family (+/-6,000sqft) Lot	50
C	8.9	8-plex 2-story Stack Flat (<80% Rental)	80
D	8	Single Family (+/-6,000sqft) Lot	38
E	2.2	18-plex 3-story Stack Flat (Senior Home)	36
TOTAL :			300

04/20/2016

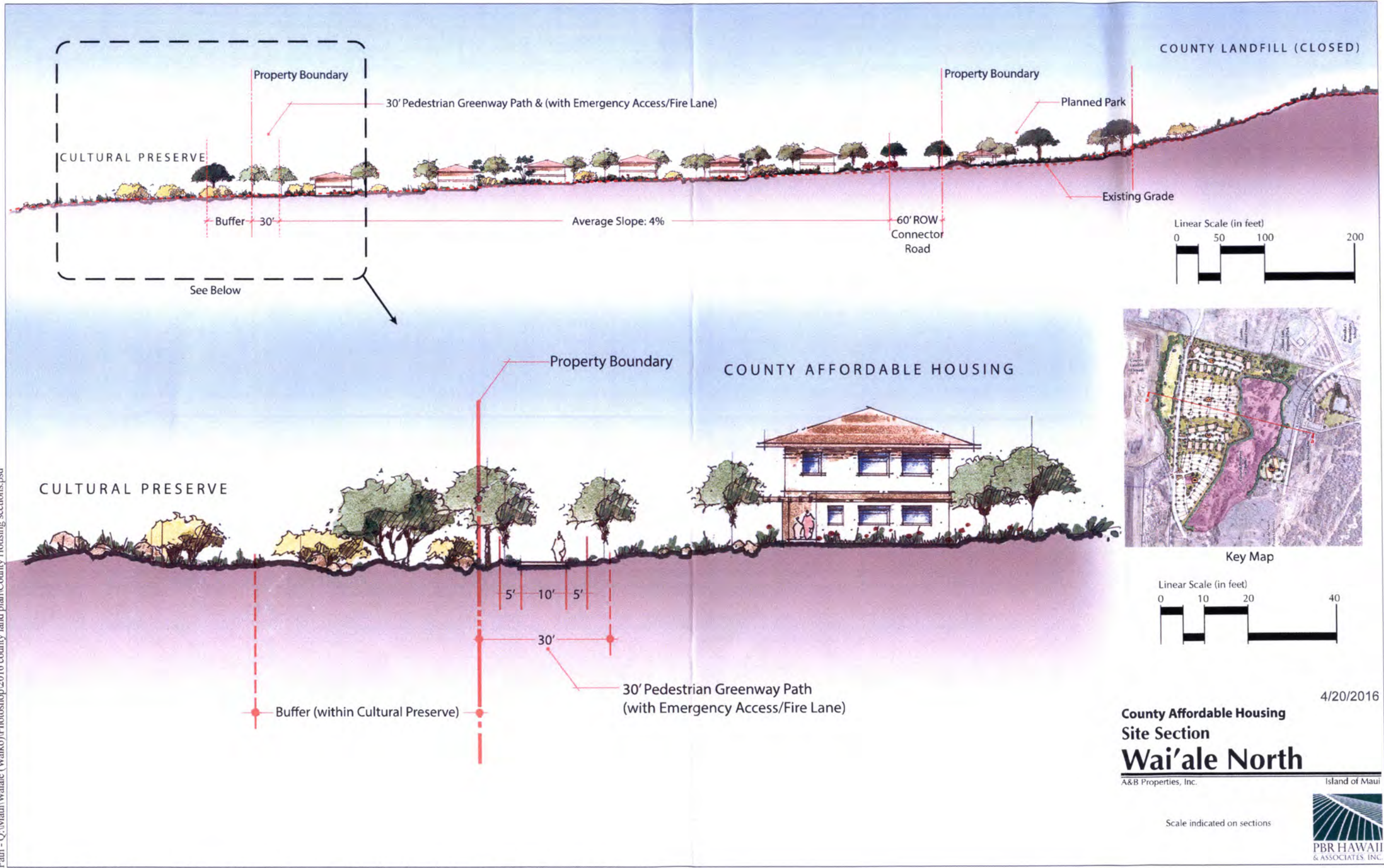
**County Affordable Housing
Conceptual Plan
Wai'ale North**

A&B Properties, Inc. Island of Maui

Linear Scale (in feet)

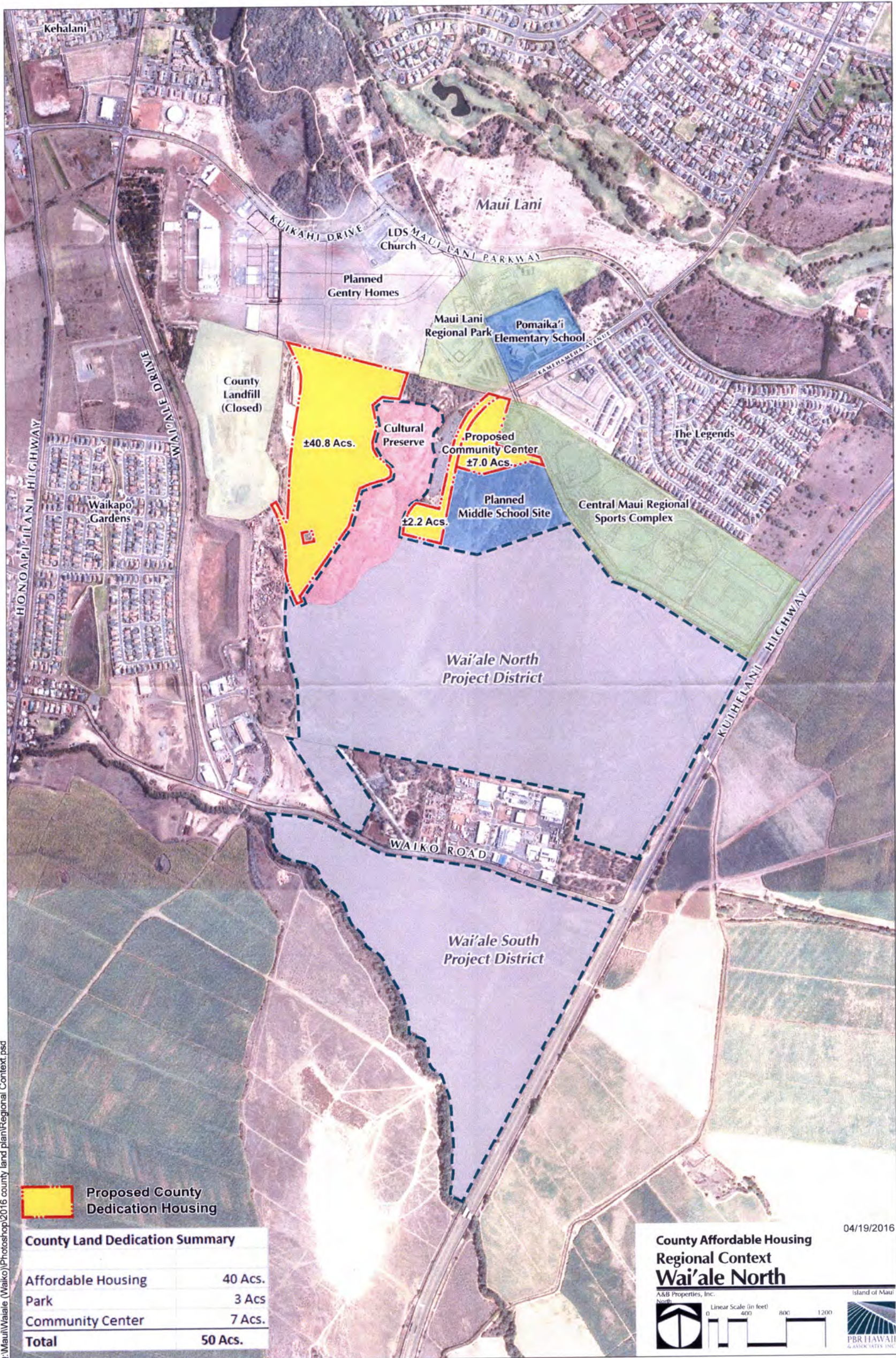
0 140 180 360


PBR HAWAII & ASSOCIATES, INC.



Path - Q:\Maui\Waiale (Waiko)\Photoshop\2016 county land plan\County Housing sections.psd

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

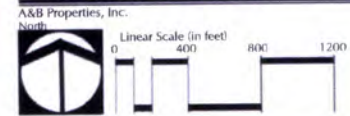


 Proposed County Dedication Housing

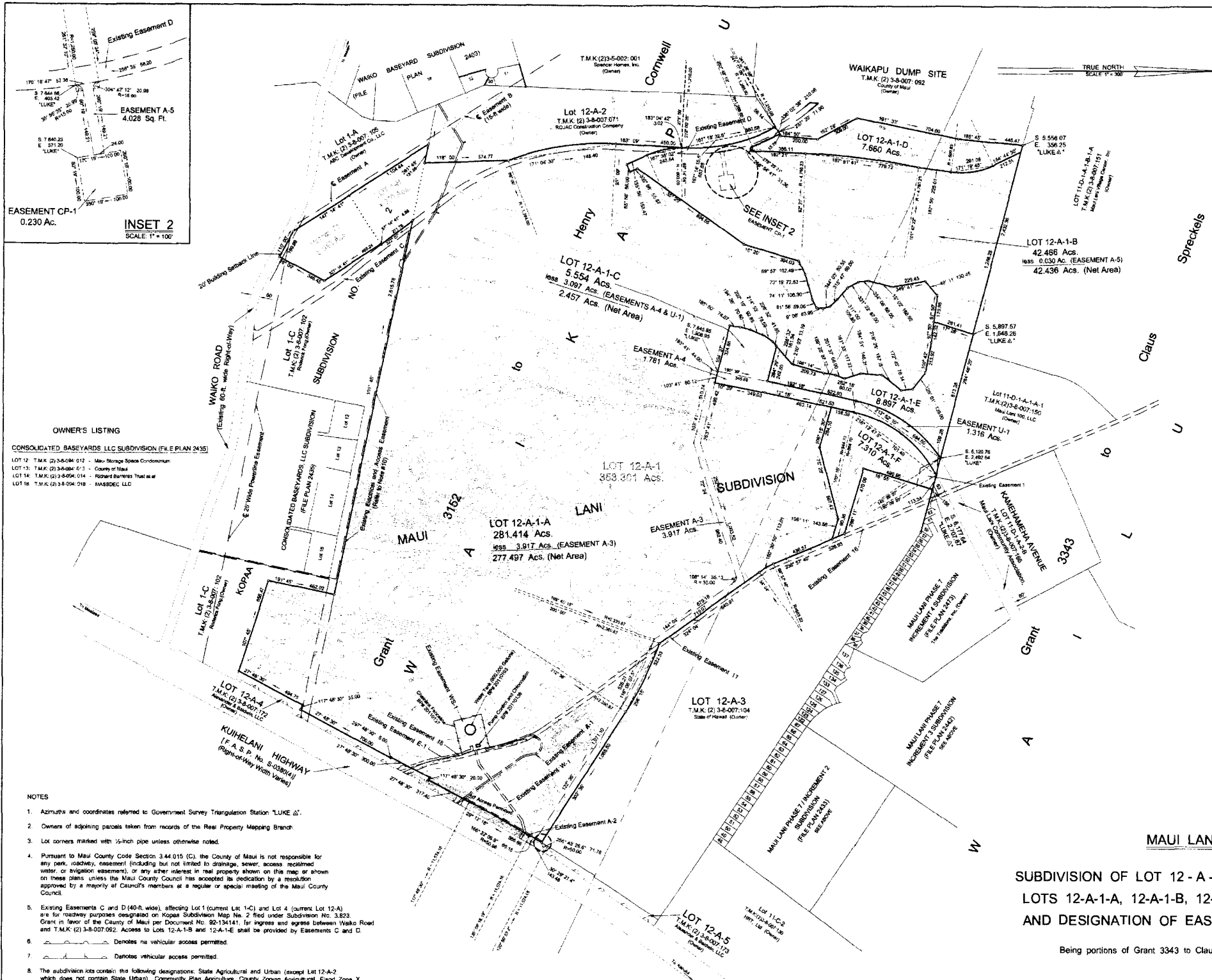
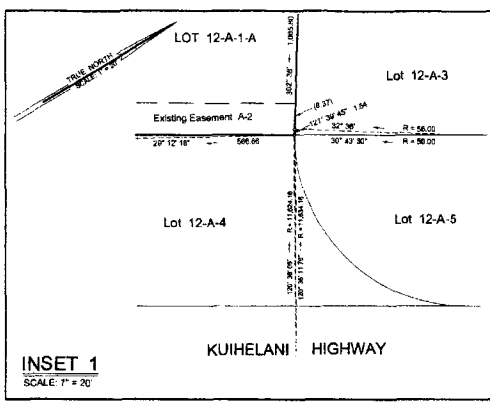
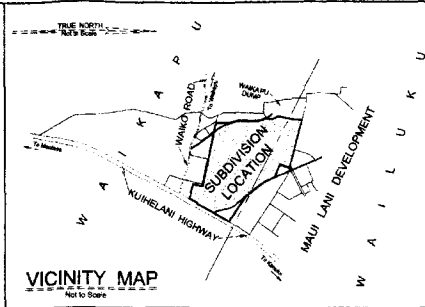
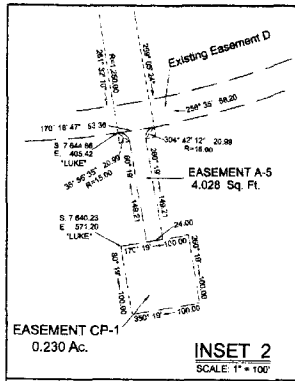
County Land Dedication Summary	
Affordable Housing	40 Acs.
Park	3 Acs.
Community Center	7 Acs.
Total	50 Acs.

**County Affordable Housing
Regional Context
Wai'ale North**

04/19/2016



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OWNER'S LISTING
 CONSOLIDATED BASEYARDS LLC SUBDIVISION (FILE PLAN 2405)
 LOT 12 T.M.K. (2) 3-8-007-013 - Maui Storage Space Condominium
 LOT 13 T.M.K. (2) 3-8-007-014 - County of Maui
 LOT 14 T.M.K. (2) 3-8-007-014 - Richard Business Trust as Trustee
 LOT 16 T.M.K. (2) 3-8-007-016 - MASSDEC LLC

- NOTES**
1. Azimuths and coordinates referred to Government Survey Triangulation Station "LUKE Δ".
 2. Owners of adjoining parcels taken from records of the Real Property Mapping Branch.
 3. Lot corners marked with 1/2-inch pipe unless otherwise noted.
 4. Pursuant to Maui County Code Section 3.44.015 (C), the County of Maui is not responsible for any park, roadway, easement (including but not limited to drainage, sewer, access, reclaimed water, or irrigation easements), or any other interest in real property shown on this map or shown on these plans, unless the Maui County Council has accepted its dedication by a resolution approved by a majority of Council's members at a regular or special meeting of the Maui County Council.
 5. Existing Easements C and D (40-ft. wide), affecting Lot 1 (current Lot 1-C) and Lot 4 (current Lot 12-A) are for roadway purposes designated on Kopas Subdivision Map No. 2 filed under Subdivision No. 3823. Grant in favor of the County of Maui per Document No. 92-134141. For ingress and egress between Waikeo Road and T.M.K. (2) 3-8-007-012, Access to Lots 12-A-1-B and 12-A-1-E shall be provided by Easements C and D.
 6. Denotes no vehicular access permitted.
 7. Denotes vehicular access permitted.
 8. The subdivision lots contain the following designations: State Agricultural and Urban (except Lot 12-A-2 which does not contain State Urban), Community Plan Agriculture, County Zoning Agricultural, Flood Zone X as shown on National Flood Insurance Program Flood Assessment Tool Panels 0391E, 1393E and 0394E.
 9. An existing easement (width varies), affecting Lots 12-A-1-A is for electrical and access purposes in favor of Maui Electric Company, Limited and Hawaiian Telecom, Inc. per Document No. 2005-147435.
 10. An existing easement (25-ft. wide), affecting Lot 12-A-1-A is for electrical and access purposes in favor of Maui Electric Company, Limited and Hawaiian Telecom, Inc. per Liber 3608, page 64.
 11. Existing Easement 17, affecting Lots 12-A-1-A is for water transmission line purposes in favor of the County of Maui per grant of easements recorded in Liber 14533, page 181, 192, and 233, respectively.
 12. Existing Easement 18, affecting Lots 12-A-1-A is for water transmission line purposes in favor of the County of Maui per grant of easements recorded in Liber 14533, page 181, 192, and 233, respectively.
 13. Existing Easement E-1 affecting Lots 12-A-1-A is for electrical and access purposes in favor of Maui Electric Company, Limited and Hawaiian Telecom, Inc. per Document No. 2011-190766.
 14. Existing Easement WS-1, affecting Lot 12-A-1-A, is for well site purposes in favor of Maui Business Park Phase II Association per Document No. A-47550417.
 15. Existing Easement W-1, affecting Lots 12-A-1-A is for waterline purposes in favor of Maui Business Park Phase II Association per Document No. A-47550417.
 16. Existing Easement A-1, affecting Lots 12-A-1-A is for access to well site purposes in favor of Maui Business Park Phase II Association per Document No. A-47550417.
 17. Easement A-3 (64-ft. wide), affecting Lot 12-A-1-A is for access purposes in favor of Lot 12-A-1-C and Lot 12-A-1-E.
 18. Easement A-4 (80-ft. wide), affecting Lot 12-A-1-C is for access purposes in favor of Lot 12-A-1-E and Lot 12-A-1-F.

19. Easement A-5 (24-ft. wide), affecting Lot 12-A-1-B is for access purposes into Cultural Preserve.
20. Lot 12-A-4 (50-ft. wide) is reserved for road widening purposes pursuant to State Department of Transportation comments dated 5/21/12. Lot 12-A-4 shall be owned and maintained by Alexander & Baldwin, LLC until dedication is warranted by the State Department of Transportation.
21. Lot 12-A-5 (50-ft. wide) is reserved for road widening purposes pursuant to State Department of Transportation comments dated 5/21/12. Lot 12-A-5 shall be owned and maintained by Alexander & Baldwin, LLC until dedication is warranted by the State Department of Transportation.
22. Easements A-4 and U-1 (80-ft. wide), affecting Lot 12-A-1-C are for access and utility purposes in favor of Lot 12-A-1-A.
23. Existing Easement 1, affecting Lots 12-A-1-C and 12-A-1-F is for access purposes in favor of Lot 12-A-3 per Document No. A-5290489 dated June 26, 2014.
24. Existing Easement A-2 (10-ft. wide) is for access purposes affecting Lots 12-A-1 and 12-A-4, and will provide temporary access from Kihelani Highway to Lot 12-A-3 until an alternative access to Lot 12-A-3 is provided whereby Easement A-2 will be terminated per Subdivision File No. 3.2226.

MAUI LANI SUBDIVISION
 SUBDIVISION OF LOT 12-A-1 (SUBDIVISION FILE NO. 3.2226) INTO LOTS 12-A-1-A, 12-A-1-B, 12-A-1-C, 12-A-1-D, 12-A-1-E AND 12-A-1-F AND DESIGNATION OF EASEMENTS CP-1, A-3, A-4, A-5 AND U-1

Being portions of Grant 3343 to Claus Spreckels and Grant 3152 to Henry Cornwall
 WAIKAPU AND WAILUKU, WAILUKU, MAUI, HAWAII
 SCALE: 1 inch = 300 feet
 DATE: November 19, 2014

Prepared by: A & B Properties, Inc.
 11 Puuone Avenue
 Kahului, Maui, Hawaii 96732
 OWNER OF LOT 12-A-1: Alexander & Baldwin, LLC.

This work was prepared by me or under my supervision.

 Justin R. Shaw
 Licensed Professional Land Surveyor
 Certificate No. 15559
 Expiration Date April 30, 2016



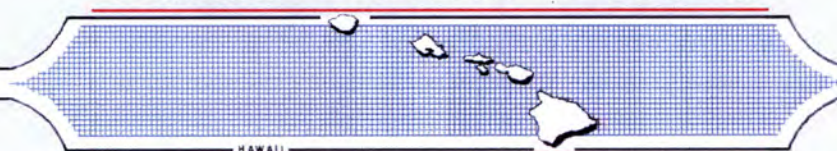
SUBDIVISION FILE NO.

**AN ARCHAEOLOGICAL INVENTORY SURVEY
OF APPROXIMATELY 607-ACRES OF LAND
IN WAI'ALE, WAILUKU AND WAIKAPŪ AHUPUA'A,
WAILUKU DISTRICT, ISLAND OF MAUI, HAWAII
[TMK: (2) 3-8-005: 023 (POR.), 37 AND (2) 3-8-007: 71, 101, 102, 104]**

Prepared by:
Guerin Tome, B.A.
and
Michael Dega, Ph.D.
Revised February 2010

Prepared for:
Mr. Grant Chun
A & B Properties, Inc.
P.O. Box 156
Kahului, HI 96732

SCIENTIFIC CONSULTANT SERVICES Inc.



711 Kapiolani Blvd. Suite 975 Honolulu, Hawai'i 96813

ABSTRACT

Archaeological Inventory Survey was conducted on approximately 607-acres of land in Waiale, Wailuku and Waikapū Ahupua`a, Wailuku District Maui [TMK: (2) 3-8-005:23 (por.), 37 and (2) 3-8-007: 71, 101, 102, 104]. The project area, slated for a residential community inclusive of housing, parks, schools, and light industry, is located on lands that have been historically utilized for various purposes (e.g., agriculture, ranching, and sand mining). [Please note the project area acreage was erroneously stated as 617 acres in the draft version of this report (SCS 913-1). The correct acreage of the project area is approximately 607 acres. This error has been corrected in the current version of this report (SCS 913-5)].

Previous archaeological investigations have occurred on portions of the approximately 607-acre land area, which led to the documentation of burials, a terrace, and several historic-period sites. These include State Site No. 50-50-04-3525, Site -4200, Site -4201, and Site -4202. Additionally, burials previously identified by Archaeological Services Hawaii, Inc. within a portion of the project area will be specifically addressed under separate cover in a Burial Treatment Plan. Only one new archaeological site was identified during the current Inventory Survey. The single-feature site consisted of a subsurface firepit/imu designated as State Site No. 50-50-04-6578.

A total of 282 mechanically excavated trenches and five manually excavated units were placed throughout the project area. While 281 of the trenches and five manual test trenches yielded negative results, one trench (ST-90) revealed the presence of Site -6578, the subsurface fire pit/imu noted above.

Data derived from stratigraphic analysis indicated a large number of ground alteration events through time as the lands were used for industrial agricultural production (e.g., sod farming, sugarcane). Natural processes illustrating flooding and deposition via upslope runoff were also deciphered in the strata. Manual excavation of stratigraphic trenches in the immediate vicinity of Site -5504 did not reveal additional human remains or associated cultural deposits. Nonetheless, its boundaries have been better defined.

Precautionary Archaeological Monitoring is recommended for most portions of the project area which contain natural, sandy matrices that are relatively undisturbed. These locations will be dedicated in an Archaeological Monitoring Plan. In addition, two recommendations are proposed for the burial site (Site -5504) located near Kuihelani Highway. First, a predetermined area of the sand berm in which exposed, displaced human remains alerted the presence of a traditional human burial site (Site -5504), should be closely Monitored for the recovery of any other displaced osseous remains. This area was searched during the current work phase but did not yield additional remains. Second, a Burial Treatment Plan will be prepared for Site -5504 and submitted to the State Historic Preservation Division (SHPD) and the Maui/Lana`i Islands Burial Council (MLIBC) for review. The currently utilized, small section of the Spreckels Ditch (Site -1508), located in the eastern portion of the project area has been documented and will continue in its present state. No further work is recommended for Site -1508. Site -6578, the *imu* feature, has been documented and sampled, and no further work is recommended.

[Please note: As the above-mentioned burials were inadvertently identified by ASH archaeologists, Scientific Consultant Services, Inc. did not consult with community members, as per HAR § 13-276-5(a) and (a) (4) (g)].

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INTRODUCTION

At the request of A&B Properties, Inc., Scientific Consultant Services (SCS), Inc. conducted Archaeological Inventory Survey on approximately 607 acres of mostly undeveloped, but utilized land within Wai`ale, Wailuku and Waikapū Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-8-005:23 (POR.), 37 and (2) 3-8-007: 071, 101, 102, 104] (Figures 1 and 2). Initial fieldwork was conducted from June 13 to September 5, 2008 by SCS archaeologists Tomasi Patolo, B.A. (Field Director), Ian Bassford, B.A., Allison Chun, Ph.D., David Dillon, B.A., Randy Ogg, B.A., and Guerin Tome, B.A., under the direction of the Principal Investigator Michael Dega, Ph.D. A second phase of testing work occurred intermittently between August 3, 2009 and September 16, 2009, with fieldwork conducted by Dave Perzinski, B.A. (Field Director), Ian Bassford, B.A., and Brian Armstrong, B.A., under the same Principle Investigator. The Archaeological Inventory Survey was performed to investigate the presence/absence of historic properties on portions of the acreage not previously subject to formal archaeological work. Once identified, sites were to be evaluated in terms of function, temporal affinity, and significance, among other criteria.

According to the County of Maui's Real Property Tax Assessment website (www.mauipropertytax.com) accessed on Monday, 15 September 2008, the project area is comprised of six tax map key parcels:

- TMK: (2) 3-8-005: 023 por. (122.0-acres; fee owner A&B-Hawaii Inc.)
- TMK: (2) 3-8-005: 037 (10.0-acres; fee owner A&B-Hawaii Inc.)
- TMK: (2) 3-8-007: 071 (5.043-acres; fee owner A&B-Hawaii Inc.)
- TMK: (2) 3-8-007: 101 (434.402-acres; fee owner A&B-Hawaii Inc.)
- TMK: (2) 3-8-007: 102 (31.222-acres; fee owner A&B-Hawaii Inc.)
- TMK: (2) 3-8-007: 104 (4.07-acres; fee owner A&B-Hawaii Inc.)

Development of the project area, know as the Wai`ale project, is slated for a residential community inclusive of housing, parks, schools, and light industry. The project area is located on lands that have been, and are being, utilized for various purposes, including agriculture, ranching, and sand mining, among others.

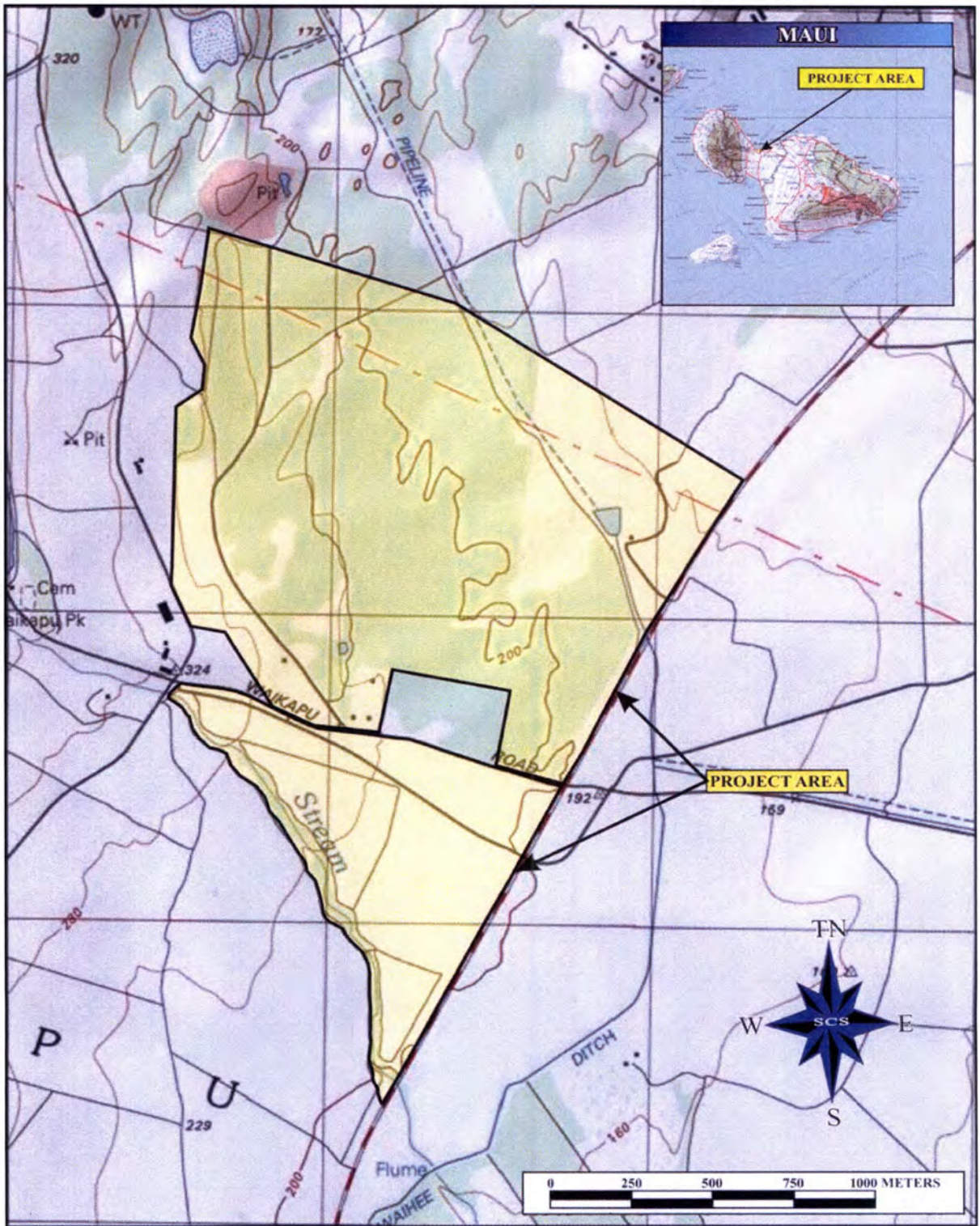


Figure 1: United States Geological Survey (USGS) Wailuku Quadrangle Map Showing Project Area Location.

GEOGRAPHIC SETTING

The multi-acre project area is situated between *c.* 3.65 kilometers (km) southwest of Kahului Harbor coastline and *c.* 4.85 km north-northeast from the beaches of Mā`alaea. The project area is also situated within an elevation of *c.* 37 and 98 meters (120 and 320 ft.) above mean sea level on the isthmus between the West Maui Mountains and Haleakalā (see Figure 1). The project area is bordered by Waikapū Stream and a combination of residential, commercial and unused lands. Waiko Road, oriented east-west, bisects the project area into two main acreages; 122.0-acres south of Waiko Road and 474.7-acres north of Waiko Road. In general the overall shape of the project area is that of a cone with the apex of the cone pointed in a southerly direction. On the western flank of the project area lays commercial businesses and Waikapū Stream while its eastern flank is bordered by Kuihelani Highway. The northern boundary of the project area abuts the Maui Lani residential development.

With the exception of natural topography and Waikapū Stream, no natural features (*i.e.*, major hills or named *pu`u*, valleys, plateaus) exist within the project area confines. Many portions have been extensively altered via mechanical means with uses such as construction baseyards, agriculture, sod farming, and sand mining, to name a few. The relatively intact portions of the project area north of Waiko Road consist of mainly undisturbed sand dunes presently utilized as cattle grazing lands. In addition, modern debris (*e.g.*, abandoned cars, building materials, yard refuse) is evident mainly in the northeast corner, or within an area accounting for approximately 10 percent of the project area. Natural vegetation (as opposed to intentionally planted vegetation) covers approximately 60 percent of the project area with the remaining 40 percent being cleared lands for various uses (see below).

PROJECT AREA SOILS

According to Foote *et al.* (1972:48–49, 115–116, 117), the project area contains three different types of matrices (Figure 3). These matrices are described as Jaucas sand (JaC), Pulehu clay loam (PsA), and Puuone sand (PZUE). Jaucas sand, with zero to fifteen percent slopes, has rapid permeability. While water erosion is slight, aeolian forces can degrade the Jaucas matrix where vegetation is lacking. Water retention per foot has been measured to 0.5 to 1.0 inch. Given such a low retention capacity and landscape instability (sand migration, etc.), utilization of the landscape in recent times has been dominated by uses such as pasture land, sugarcane cultivation (planted in imported clay-silty clay over the sand beds), truck crops, and urban development. Pulehu clay loam, sometimes associated with Jaucas sand, exists with zero to three percent slopes and has a moderate permeability. Erosion is slight with a water retention

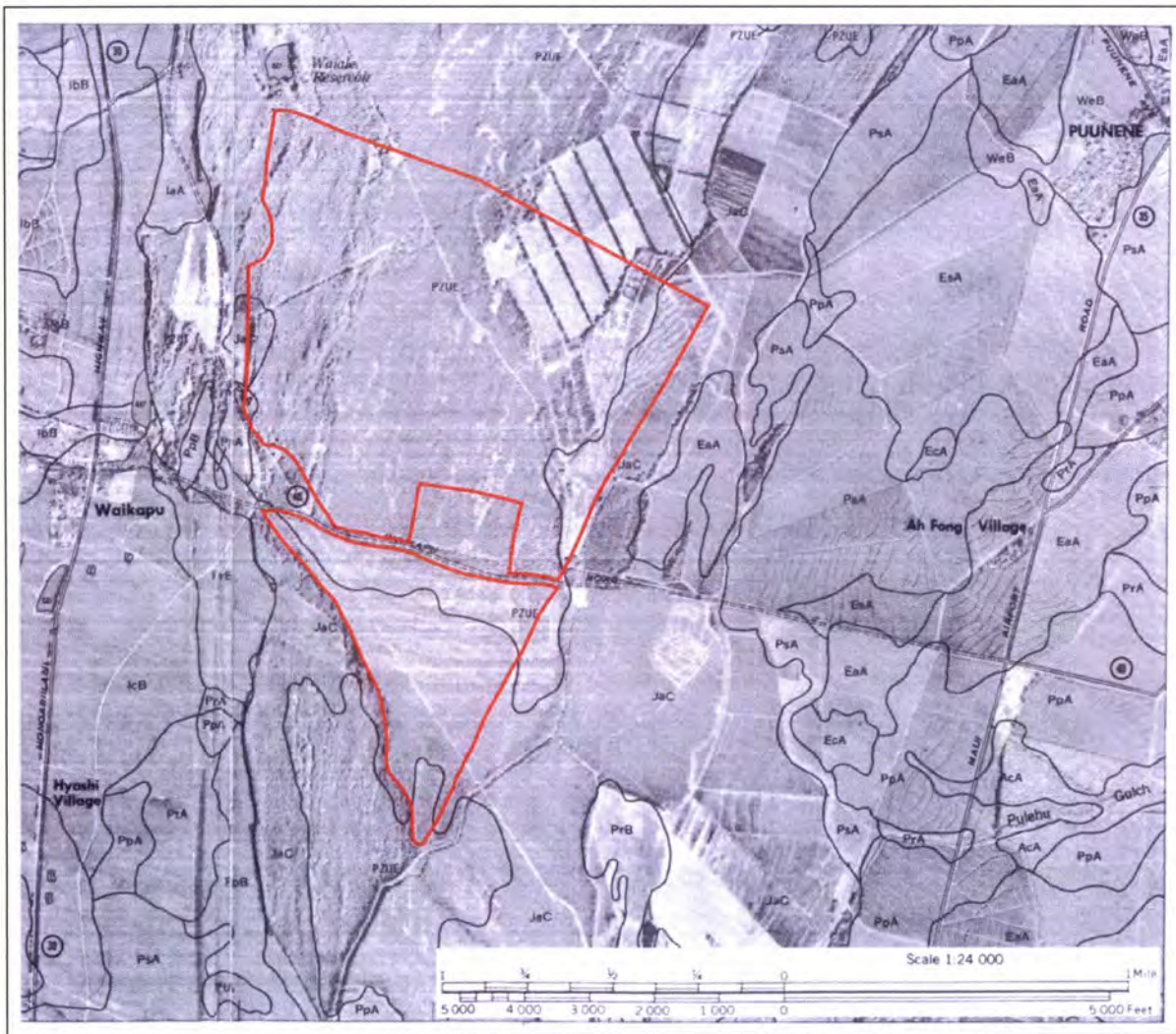


Figure 3: Foote *et al.* (1972) Soil Survey Map Showing Project Area Location.

capacity of approximately 1.4 inches per foot. The Pulehu clay loam is utilized for sugarcane, truck crops, and pastureland. Puuone sand, sometimes associated with Jaucas sand, is created from coral and seashells and occurs on seven to thirty percent slopes and has rapid permeability. Cementation of this matrix has been found within 20 inches of the ground surface. The severity of aeolian forces that can erode this type of matrix is classified as moderate to severe. Water retention per foot is 0.7 inches. Puuone sand is utilized for pastureland and home sites.

PROJECT AREA VEGETATION

The project area contained mainly non-native vegetation inclusive of lion's ear (*Leonotis nepetifolia*), Guinea grass (*Panicum maximum*), kiawe (*Prosopis pallida*), koa haole (*Leucaena leucocephala*), castor bean (*Ricinus communis*), buffel grass (*Cenchrus ciliaris*), lantana

(*Lantana camara*), *klu* (*Acacia farnesiana*), *koa haole* (*Leucaena leucocephala*), indigo (*Indigo suffruticosa*), glycine (*Glycine wightii*), tree tobacco (*Nicotiana glauca*), cow pea (*Macroptilium lathyroides*), and golden crown-beard (*Verbesina encelioides*). Native vegetation observed in the project area included `uhaloa (*Walteria indica*). Coconut (*Cocos nucifera*), a plant brought to the Hawaiian Islands by initial colonists, is also present.

CLIMATE

The area in which the project area lies is the dry region of Maui's isthmus. Rainfall indicators, according to Price (1983:62), show that the project area could receive up to 5 inches during the winter months of December through February. Higher elevations within Wailuku and Waikapū Ahupua`a are prone to receive more precipitation due to increased rainfall, fog drip, and lower temperature climates. The frequency of the project area receiving much upland runoff appears intermittent, given the lack of multiple streams directly emptying onto the project area. Currently, the only source of water that could feed the project area would be Waikapū Stream.

TRADITIONAL AND HISTORIC SETTING

The project area lies near the base of the southeastern slope of Maui's second largest volcano, Pu`u Kukui, that rises to over 1,764 m (5,788 feet) amsl. While most of the project area is situated within the boundaries of Waikapū Ahupua`a, a narrow strip of the project area [TMK: (2) 3-8-007:101] lies in Wailuku Ahupua`a; Waikapū and Wailuku Ahupua`a occur adjacent to one another. Both *ahupua`a* are located on the northeastern side of West Maui in the district of Wailuku.

TRADITIONAL SETTING OF WAILUKU DISTRICT

Wailuku District is frequently mentioned in historical texts and oral tradition as being politically, ceremonially, and geographically important during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `Īao Valley and lower Wailuku. The importance of the district is reflected by the relatively large number of *heiau* (temple/shrine/place of worship) that were reportedly present in pre-Contact times. Oral tradition accounts surrounding these *heiau* provide examples of how religion tied into political power in the traditional Wailuku setting. Indeed, the period immediately preceding contact with the Europeans was one of considerable upheaval and conflict. *Wailuku*, meaning 'water of destruction' (Pukui *et al.*, 1974), succinctly describes the area in the late 1700s. Political power emanating from Moloka`i was an active element during the mid-eighteenth century. The resulting battle at Kalae`ili`ili (A.D. 1765) led to the expulsion of Keeaumoku and the Moloka`i

ali`i (chief) and the beginning of Kahekili's reign (Kamakau 1992). Kahekili successfully defended his capital in Wailuku throughout the 1770s, until his defeat at the hands of Kamehameha's forces.

Closer to the current project area, in the southwest corner of Wailuku District, pre-Contact settlement was not as dense as concentrations to the north. Climate had much to do with that trend, as the lower Waikapū-Mā`alaea area is a more arid environment than the rain-soaked areas located upslope. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-Contact population was located southwest of the project area, near what is now Ukumehame Beach State Park. Settlement was also probable north of Keālia Pond in Waikapū Ahupua`a. Handy and Handy (1972) report that before the historic sugarcane plantations in this region, water from Waikapū Stream ". . . was diverted into *lo`i* [irrigated terraces] and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui" (ibid: 496).

Wailuku District would see drastic change after Captain James Cook's 1778 arrival in Kahului Bay. The reign of Kamehameha I was intertwined with the increasing presence of Europeans within the Hawaiian Islands. By 1821, American missionaries had established a foothold in Lāhainā and arrived in Wailuku the following year. The religion of the Hawaiian people began to wane under the influence of Christianity. Fredericksen and Fredericksen (2002:4) point to a girls' seminary (Central Female Boarding School), established in Wailuku in 1836, as one of the initial steps in the conversion of Hawaiian language and customs in Maui. Sterling (1998:86) notes that "the district of Wailuku was once thickly settled, *kuleanas* to the number of over 400 were granted to natives and others. A large portion of these cultivated *kalo* with the aid of water from the river."

In 1848, commissioners of the Māhele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Māhele was based upon the principles of Western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society into that of a market economy (Kuykendall Vol. I 1938:145, footnote 47, *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. As a result, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I, 1938:145, *et passim*; Kame`eleihiwa 1992:178).

Once lands were made available and private ownership was instituted, Native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, commoners would often only make claims if they had first been made aware of the foreign procedures (*kuleana* lands, or land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. Commoners claiming house lots in Honolulu, Hilo, and Lāhainā were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16). A handful of foreigners (*e.g.*, Anthony Catalena, James Louzada, and E. Bailey) gained control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

TRADITIONAL AND HISTORIC SETTING OF WAILUKU AHUPUA`A

Much of the pre-Western contact folklore and history of the Wailuku Ahupua`a involves `Īao Valley with peripheral areas (*e.g.*, Waihe`e, Waiehu, Greater Wailuku) giving additional content. As only a limited portion of the project area is situated in the Wailuku Ahupua`a, only an overview of the Wailuku Ahupua`a traditional setting will be displayed in the following paragraphs.

One of the earliest references for `Īao Valley itself refers to a Maui king in power during the A.D. 1400s (Sterling 1998:84). The king, Kaka`e, was held in such reverence that commoners could not look upon him without suffering punishment by death. King Kaka`e thus became a hermit within `Īao Valley during the 1400s so that his subjects could live without fear. It was supposed that this king also created a royal burial grounds (*Kapela*), an enigmatic place that was designated for himself and for worthy successors as a sacred burial area.

The Wailuku area, as Kirch (1985:134) also notes, was an important center of political development during late prehistoric and early historic times and was the seat of powerful chiefs, including Kahekili, arch-rival of Kamehameha. Kamehameha I's unification of the Hawaiian Islands in 1790 brought Maui under the political control of its first non-Maui chief during July of that year. The last king of Maui was Kahekili II, son of King Kekaulike, both who are

supposedly interred at the sacred burial grounds in upper `Īao Valley. By the early historic period, significant natural and cultural changes had taken place, not only due to contact with westerners, but also because of internal social and environmental restructuring and external social and environmental factors (*e.g.*, foreign species being introduced as well as foreign ideologies). These combined to have a severe impact on Hawaiian environments, land-tenure, and social structures.

Connolly (1974:5) states that pre-Contact `Īao valley had a large population base with "most people residing in a settlement near `Īao Needle." Supposedly, the subsistence base of this population consisted of fish and taro, with Kahului Harbor and the coast close by and *lo`i* systems lining `Īao Valley's stream banks. Prehistoric ditches or *`auwai* were utilized in taro cultivation (Connolly 1974:5). Sterling (1998:86) adds that two *`auwai* within the valley "have existed immemorially and were evidently constructed for the purpose of irrigating *kalo* on the plains which stretch away to the northward and southward of the [*`Īao*] river. Several minor *`auwai* have, since ancient times, tapped the river at different points lower down and spread the water through the lands in the gulch on either side of the river bed."

Past archaeological research (Fredericksen and Fredericksen 1996:52) has revealed that habitation sites along what is now Lower Main Street in Wailuku, "are associated with the rich taro producing lands in the Lower `Īao River flood plain, and the extensive cultivation systems present in `Īao Valley." These habitation sites have been dated to the A.D. 15th through 17th centuries. The `Īao Valley area was not only renowned for its agricultural base during prehistoric times but its ceremonial and political base as well (see also Cordy 1996; Donham 1996).

Haleki`i Heiau, part of the Haleki`i-Pihana Heiau complex, was constructed during the mid and late 18th century (Sterling 1998:89). Yent (1983:7) noted an interesting life cycle for the *ali`i* who lived nearby those *heiau*. Kamehameha I's wife was born there, Kahekili lived there, and Kekaulike died there. Thrum (1909:46) reported that Kamehameha I evoked his war god at Pihana Heiau after his warriors defeated Kalanikupule's forces during the Battle of `Īao in 1790. The two *heiau* are primarily associated with Kahekili, who is connected with the Haleki`i-Pihana complex between A.D. 1765 and 1790, and Kamehameha, during his conquering of Maui in 1792 (Yent 1983:18).

Importantly, Haleki`i and Pihana Heiau are the only remaining pre-Contact Hawaiian structures of religious and historical importance in the Wailuku-Kahului area that are easily

accessible to the public (Estioko-Griffin and Yent 1986:3). As stated, the area is known not only for its religious and/or ceremonial significance, but for its political prominence as well.

The Fredericksen and Fredericksen (1996:52) report that politically, Wailuku [village] was known as a central settlement for high ranking chiefs and their retinue. The Wailuku area was also witness to many battles, from the Battles of `Āao and Sand Hill to the Battles of Kepaniwai and Kakanilua. The most famous battle was at Kepaniwai where in July 1790, Kamehameha I finally wrested control of Maui Island. Kamehameha I and his warriors landed at the Kawela portion of Kahului Bay and proceeded up `Āao and other valleys to score a decisive victory. *Wailuku*, meaning 'water of destruction,' succinctly describes the area in which many of these major battles occurred. Warriors apparently dwelt in the Kauahea area of `Āao Valley (southeast of `Āao Stream below Pihana Heiau), and were "trained in war skills and there was a boxing site in the time of Kahekili" (Sterling 1998:89).

Several periods of various land utilization strategies occurred within `Āao Valley and down below on the floodplains. Between 1778 and 1848, traditional land use occurred within `Āao Valley, albeit on a smaller scale, as the "Conquest" period began and the Sandalwood and whaling trades dominated political and commercial activity within the islands (Kirch and Sahlins 1992). Quite another conspicuous effect of the growing influence of foreigners in the Hawaiian Islands was the systematic division of lands, the Māhele of 1848. The Land Commission oversaw land divisions of three groups: Crown Lands (king), Konohiki Lands, and Government Lands, all of which were, in theory, open to the prerogative of native tenants. The awarded land claims, known as Land Commission Awards (LCA), bordered `Āao Valley. They were numerous in quantity and concentrated on the plateau above the stream valley, along the top of its sidewalls. Burgett and Spear (2003) and Tome and Dega (2004) both conducted studies adjacent to that area. In a study of land use near the `Āao Stream, Burgett and Spear (2003) noted that Wailuku area residents submitted 199 land claims of which 127 of these were awarded by the Land Commission in 1848 (Waihona `Aina 1998). The LCA information lists several categories of land use in Wailuku area through time, from pre-Historic times through at least the middle of the 19th century (see Burgett and Spear 2003 and Tome and Dega 2004). These include: *lo`i* systems (pondfield cultivation of irrigated taro), *kula* lands (dry land, not wet or taro land), *hala* clumps (*Pandanus odoratissimus* or screw pine; the leaves provide material for weaving baskets or mats), and *po`alima*. Several land divisions parcels were also claimed, from *`ili* (subdivision of *ahupua`a* lands) to *mo`o* (land subdivision of an *`ili*) to *apana* (land division of a *kuleana*).

There are no LCAs or any other claims of land (*e.g.*, royal patents, land grants) present within the Wailuku Ahupua`a section of the project area (see Figure 2). A single Land Grant is present on TMK: (2) 3-8-007: 101 and is identified as Land Grant 3152. This particular Land Grant will be further discussed in the **TRADITIONAL AND HISTORIC SETTING OF WAIKAPŪ AHUPUA`A** section of this report. When looking at a more regional scale of the Waikapū area, in general, more LCA's were awarded within upland reaches, where soils more amenable to agriculture and habitation occur (see below).

Traditional land utilization within and `Īao Valley was, on an initially small scale, replaced by sugar cane cultivation during the 1850s. This small-scale cultivation began with Kamehameha III and was further intensified by foreign plantation managers and owners such as Peck, among others (see Sterling 1998:86).

Many of the awarded LCAs in the area were under sugar cane cultivation by the mid 19th century. By the late 1800s, much of the `Īao Valley and its immediate surroundings were planted with sugar cane. Sugar cane fields extended along the borders of `Īao Valley, within the valley, and even occurred between the Haleki`i-Pihana Heiau site. Connolly (1974:5) notes that in the early 1900s, the sugar cane industry dominated commerce and land use in the `Īao Valley area; it created a fair amount of water irrigation ditches, terraces, free standing walls, historic house sites, and mill structures. Agricultural terracing and a Portuguese worker's camp were located in the lower stream valley. The Portuguese laborers "lived in the stream bed area, growing taro and other vegetables in the *lo`i* and working as laborers on the plantation. This population lived in a worker's camp until the flood of 1916" (Connolly 1974:5). This flood presumably ended habitation within lower `Īao Valley.

In 1912, a rock crusher was installed in `Īao Valley by Mr. Willie Crozier, an entrepreneur who wanted to supply all of the rock needed for construction projects on Maui. This crusher, however, was also destroyed in the 1916 flood. The flood itself, generated within `Īao Valley, demolished taro *lo`i*, the rock crusher, the Portuguese Camp, and, among other things, portions of the two *heiau*. Yent (1983:7) suggests that major erosion of both Haleki`i and Pihana Heiau was due to the 1916 flood. The western half of Haleki`i eroded down the steep valley slope and the eastern half was eroded by `Īao Stream. Importantly, archaeological remnants in the valley were dramatically affected by the flood.

Sugar cane cultivation continued in and near the valley after the flood though, with plantations rebuilding the water systems feeding the sugar cane fields (Connolly 1974:6). Cultivation of sugar cane dominated land use of the project area environs through the middle of this century. During World War II, military training was done in *mauka* `Īao Valley areas while

ranching also occurred. Remnants of these activities (and earlier historic occupations) include iron broilers and concrete foundation walls (large ovens), concrete-lined trenches, and concrete house pads (Bordner 1983:6–9). During the late 1980s, the upper portion of the project area transitioned from sugar cane to macadamia nut production and in the late 1990s, production fell and the fields of macadamia nut were abandoned (Veith 1999).

The Battle of Kakanilua

Many legends point to a famous battle occurring in the sand dunes between Wailuku and Kahului. The Battle of Kakanilua [valley], as it is known, is repeated often as follows¹:

“These names, Piipii and Ahulau, are grievous and fear causing thing in the heart of Kalaniopuu for his chiefs and commoners who dies together in the battle of Kakanilua valley fought with the King Kahekili; all the warriors died except for four. Sixteen-hundred people were killed in the Battle of Kakanilua. Of the opponents, 800 were the warriors of the Alapa Regiment of Kohala and Hamakua under the leadership of Kauanonoula (k), grandson of Peleioholani (k), the chiefs of Hilo. Eight hundred were of the Piipii Regiment under the chiefly leadership of Kekuhaupio (k); all died. Killed was Keawehano, second ranking chief of the Alapa Battalion, and Kauanoanoa, chiefly leader, and his son Kawahaopeleioholani survived as did the great Leader Kekuhaupio and Honolii, second ranking chief of the Piipii warriors.”

Other than “sand dunes”, there is no clear indication of where this battle occurred. In some instances, the word “valley” is used after “Kakanilua” but in most cases, “sands” are noted. The major dune system of central Maui runs from lower Wailuku to Waikapū. As has been raised at two meetings of the Maui/Lana`i Islands Burial Council (meeting dates October 30, 2003, November 26, 2003), some feel the battle location occurs in the current Maui Lani development.

TRADITIONAL AND HISTORIC SETTING OF WAIKAPŪ AHUPUA`A

As previously mentioned, most of the current project area is situated within the Waikapū Ahupua`a located in the land division once known as “Nā Wai Eha” (The Four Streams). This area is “...comprised the four great valleys [Waihe`e, Waiehu, Wailuku, and Waikapū] which cut far back into the slopes of West Maui and drain the eastward watershed of Pu`u Kukui and the ridges radiating northeastward, eastward, and southeastward from it” (Handy and Handy 1972). Currently, only the Waikapū Stream is located in the project area and could empty, if diverted, onto the project area. Waikapū was renowned for “...its majesty and splendid living, whose

¹KE ALOHA AINA / PART 1 & 2 / March 2 & 9, 1907 Mookuauhau Haikupuna Holopuni O John Liwai Kalaniopuuikapali-0- Molilele-Ma-Wai-0-Ahukini-Kau-Hawaii Ena The Complete Ancestry of John Liwai Kalaniopuuikapali-o-Molilele-ma-wai-o-Ahukini-Kau- Hawaii Ena *Page numbers are from reprinted article and translation in Hawaiian Genealogies Volume II*

native songs gather flowers in the dew and weave wreaths of ohelo berries” (S.W. Nailiili in Sterling 1998:93). W. D. Alexander (in Sterling 1998:63) states that “...the lands of Waikapū and Wailuku appropriated almost the whole of the isthmus so as to cut off half of the lands in the district of Kula from access to the sea. These two *ahupua`a*, together with Waiehu and Waihe`e, which were independent, belonging to no *Moku*, were called Na Poko, and have been formed into a district in modern times.”

According to Handy and Handy (1972:497) and Pukui *et al.* (1974:223), the name “Waikapū” (Water of the Conch) refers to an ancient cave in the area where a famous conch shell (*pū*) was hidden until it was stolen by Puapua-lenalena (a supernatural dog). Sterling (1998) offers two alternative origins of the name “Waikapū.” In one account, the area, known as “Nā Wai Eha,” was renowned for the battles fought there; the name Waikapū (the water where the conch was blown) referred to a conch shell which was blown to announce the commencement of a battle [C. W. Stoddard (1894) in Sterling 1998:63]. In another account [H. T. Cheever (1851) in Sterling 1998:63], “Waikapū” (Forbidden Water) refers to the time Kamehameha I, the Conqueror, beached his canoes at Kalepolepo and placed a *kapu* (taboo, restriction) on the nearest stream [Stoddard (1894) in Sterling 1998:63]. Although Waikapū Stream is not the closest stream to Kalepolepo, it does drain into Keālia Pond, and it may have been the closest stream with flowing water at the time of Kamehameha’s landing (Sterling 1998:63).

Waikapū once was the setting of vast wet-land taro fields. Evidence of the widespread *lo`i* planting is provided by the Land Commission Awards that indicate there once were more than 1,300 wet-land taro patches extending along the boundaries of Waikapū Stream (Creed 1993). Handy and Handy (1972: 497) describe the general Waikapū area as follows:

Spreading north and south from the base of Waikapu to a considerable distance below the valley are the vestiges of extensive wet-taro plantings, now almost obliterated by sugar-cane cultivation; a few here and there are preserved in plantation camps and under house and garden sites along the roads. Among these gardens there were, in 1934, a few patches of Japanese taro. Far on the north side, just above the main road and at least half a mile below the entrance to the canyon, an extensive truck garden on old terrace ground showed the large area and the distance below and away from the valley that was anciently developed in terraced taro culture. On the south side there are likewise several sizable *kuleana* where in 1934 old terraces were used for truck gardening. In the largest of these a few old patches were flooded and planted with Hawaiian wet taro. Several terraces were used as ponds planted with lotus for their edible

seed. There were probably once a few small terraces on the narrow of valley bottom in the lower canyon.

Available archival research indicates no Land Commission Awards were awarded within the portion of the current project area located in the Waikapū Ahupua`a. The dearth of Land Commission Awards within the current project area and the area immediately surrounding the project area may be attributed to an absence of pre-1848 Hawaiian population, a result of settlement conditions within these particular *ahupua`a* favoring upland loci (see Creed 1993) where more precipitous conditions are present and ideal for agricultural pursuits. However, as previously stated, a single Land Grant is present on TMK: (2) 3-8-007: 101 and identified as Land Grant 3152. This grant occurs within the project area confines only on the Waikapū Ahupua`a side of the project area. As the mention of Land Grant 3152 in this paragraph is to solely notify the reader of the presence of a land claim, a further explanation of the specific Land Grant will be detailed in the following section regarding the events that occurred in the Waikapū Ahupua`a during late Historic Period.

THE LATE HISTORIC PERIOD AND GROWTH OF THE SUGAR INDUSTRY

Another influence that brought change to Maui was foreign commercialism. Two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company arrived in Wailuku in 1828 to explore the possibility of setting up one of its earliest sugar mills. Atai soon created a plant that processed sugarcane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15-16). Ahung later joined Kamehameha III's sugar producing enterprise, although by 1844 both operations had ceased. In 1862, The Wailuku Sugar Company was established and would expand sugar production over the next 126 years of its existence (4,450 acres by 1939), still more than three decades before its maximum production levels.

As it expanded its territory, the Wailuku Sugar Company first appeared on maps in the area in the 1920s, although their acquisition of land south of the project area may have been as early as the turn of the century (Kennedy and Trimble 1992:4). On November 18, 1875 Henry Cornwell, through Grant 3152, acquired Waikapū Ahupua`a from the state government (ibid.1992). *Hawaiian Reports*, 4:248 in Sterling (1998:95) contains the following passage entitled the "Opinion of the Court by McCully, J., in the Matter of the Boundaries of Pulehunui (from) which discusses the acquisition of Waikapū from the state government:

The land of Waikapu, belonging to the Government, was set over to the Department of Education. There is in the office of the Department a map of Waikapu, and survey notes on separate paper taken to refer to it. The notes and the names written

on the map were in the handwriting of one J.W. Marsh, deceased, who had been a clerk in this Department...

In 1875 the Board of Education sold at auction the "Land known as the ahupua'a of Waikapu, saving grants hitherto made within said ahupua'a, or sales by the Board of Education," to Henry Cornwell, the Government issuing a royal patent in the above terms without survey or statement of area. Mr. Cornwell afterward sold to Claus Spreckels and others the part known as Waikapu Commons.

By the turn of the century, a large portion of Waikapū, and possibly portions of the project area, was under sugarcane cultivation.

Wailuku Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000:66). Owner C. Brewer & Company, Ltd. shut down sugar cultivation on the project area, which was then used almost entirely for pineapple cultivation starting no later than 1992 (Kennedy and Trimble 1992:1). The lands were under pineapple for at least the next three years (Tomonari-Tuggle 1991:11) (and probably slightly longer) before transitioning to smaller-scale "garden" plots.

RANCHING

Livestock was introduced to the Hawaiian Islands in 1793 when Captain Vancouver transported cattle and sheep aboard his ship the *Discovery* with the intention of giving the four cows, two bulls, four ewes, and two rams to Kamehameha I as a gift of goodwill. The rough seas and intense heat of the journey took its toll on the health of the cattle and several of the animals died. In order to ensure that the cattle population would increase, a ten year *kapu* was placed on slaughtering them. Eventually the cattle did recover in number. However, once the 10 year *kapu* on cattle slaughter had been lifted the number of cattle increased so dramatically they became a dangerous nuisance. As they were allowed to roam wild gardens were destroyed and the Native Hawaiians were terrified of being attacked. Managing and controlling the unruly animals became a necessity. In order to solve this problem Kamehameha I employed "a varied crew with unsavory reputations who had immigrated to the islands to escape their pasts" as bullock *hunters* to capture the animals (Cowan-Smith and Stone 1988:8).

Things were about to change in 1803 when Captain Richard Cleveland and his partner Captain William Shaler introduced horses to the Islands. These men brought aboard their ship, the HMS *Lelia Byrd*, several horses including a stallion and a mare with foal which they presented as gifts to Kamehameha. Soon the horses, like the cattle, were roaming freely across

the Islands. The horses (*lio*) adapted rapidly to the rough terrain where the cattle grazed and “their ability to work the livestock [did not] go unnoticed” (Cowan-Smith and Stone 1988:12).

Around 1830, Kamehameha III brought Mexican *vacqueros* from Vera Cruz to the Big Island to teach the local men how to rope and handle the animals. As the cattle and horse populations proliferated the animals were transferred to the various Hawaiian Islands and the *vacqueros*, which now included local cowboys, were needed on the outer islands.

Cattle were on the Island of Maui as early as 1806. Amaso Delano, in Brennan 1995:97, provides the following account of the effect cattle had on traditional life on Maui:

They had recently brought to this island, one of the bulls the Captain Vancouver landed at Owhyee (Hawaii). He had made very great destruction amongst their sugar cane and gardens, breaking them and their cane patches and tearing them to pieces with his horns and tearing them with his feet. He would run after and frighten the natives and appeared to have the disposition to do all the mischief he could, so much so that he was an unwelcome guest among them.

As sandalwood and *koa* were diminishing, cattle became an important resource to the Hawaiian economy. By 1820, the number of cattle had increased to such a degree they were aggressively being hunted for their hides. In addition, their tallow and meat became important commodities of local and international trade. Soon cattle and their importance in the trade industry flourished to such an extent that Hawai'i became a major supplier of beef to California during the Gold Rush and subsequently to the visiting whaling ships, as well (Cowan-Smith and Stone 1988:6). Currently, a portion of the project area (*i.e.*, TMK: (2) 3-8-007: 101) is utilized for cattle ranching and albeit not known when, if ever, cattle ranching terminated within Waikapū Ahupua`a, the presence of such could be interpreted as having continued the Historic Period tradition of cattle ranching within the Waikapū Ahupua`a.

Besides the unification of the islands, perhaps the most significant development following contact with Westerners was the Māhele of 1848. Many awards were distributed in areas bordering `Īao Valley. Most land in that area was being utilized for the cultivation of taro and *hala* trees, and for house sites resting near agricultural production areas.

Another significant development was the cultivation of sugar cane, which began in the `Īao Valley area during the 1850s. Sugar cane became the dominant crop cultivated in the area and provided occupational opportunities for both local and non-local residents. With sugar cane

cultivation came irrigation and processing structures across the landscape like irrigation ditches, mills, and other infrastructures supporting the cash crop production. Sugar cane cultivation continued through the 20th century.

RECENT HISTORIC PERIOD AND PRESENT LAND USE

During the 20th century, sugar cane cultivation continued on an intensive scale. Sugar cane continued to be the dominant activity in the Wailuku-Waikapū area, although small taro plots were still being cultivated. In addition, ranching became a viable activity in the Wailuku and Waikapū areas, particularly in *mauka* areas below the precipitous cliffs of the West Maui mountain range. At present, the portion of the project area located within Wailuku Ahupua`a contains portions of land that have been extensively altered via mechanical means with regards to commercial development (e.g., construction baseyards) and other modern day uses (i.e., sod farming and sand mining). The relatively intact portions of the project area north of Waiko Road consist of mainly undisturbed sand dunes utilized for cattle ranching. In addition, modern debris (e.g., building materials, yard refuse) is evident mainly in the northeast corner that accounts for approximately 10 percent of the project area. Natural vegetation (as opposed to intentionally planted vegetation) covers approximately 60 percent of the project area with the remaining 40 percent being cleared lands for various uses.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Multiple archaeological projects have occurred within and near the current project area. This section first provides a general overview of previous archaeological work in the Wailuku-Waikapū area and the results of the work (Figure 4). The second section specifically targets archaeological projects conducted directly within the current project area.

WAILUKU AHUPUA`A SELECTED PREVIOUS ARCHAEOLOGICAL STUDIES Overview

Early work in the region primarily concentrated on known *heiau*. For example, Thrum (1909) conducted the first archaeological survey within Wailuku Ahupua`a. Thrum first identified the much investigated Haleki`i and Pihana Heiau. In addition to Thrum's work at the monumental structures, Stokes mapped the site in 1916. Walker also recorded the site in 1931, after his island-wide survey of Maui in which he identified many *heiau* within Wailuku Ahupua`a. Kenneth P. Emory in 1959 was the next archaeologist working at that particular site. During his time he reconstructed portions of Halekii and rendered another map of the *heiau*. The most recent work at the site was conducted by Yent (1983, 1984, and 1995) who undertook

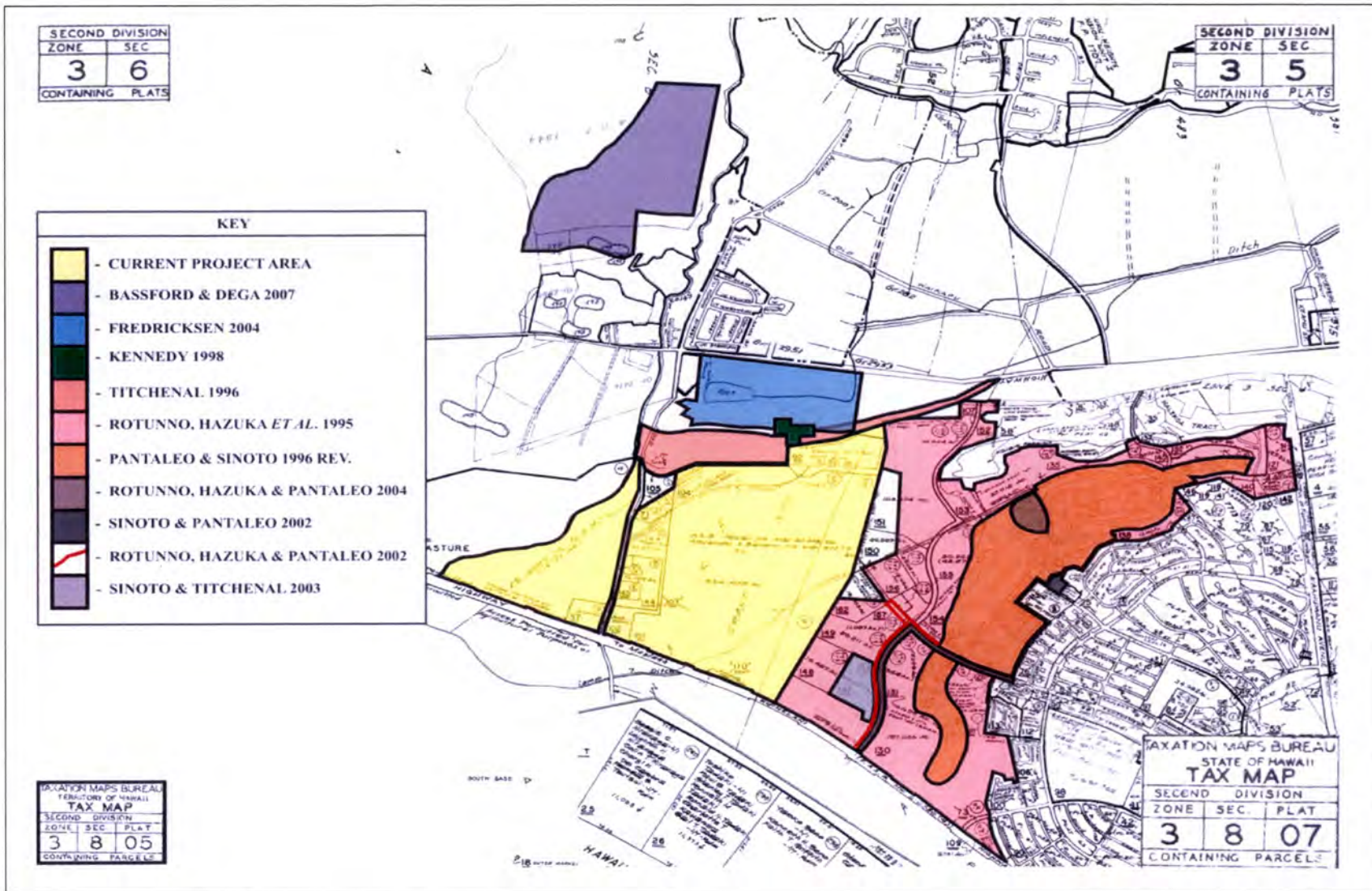


Figure 4: Combined Tax Map Keys [(2) 3-5, 3-6, 3-8-005, 3-8-007] Showing Previous Archaeological Work in the General Project Area and Environs.

systematic survey, mapping, and excavations as part of a restoration plan. Yent's (1995) work yielded plan views of the site and detailed profiles of the *heiau*, as well as revealed construction techniques utilized to build the features.

Prior to the modern era, the only large-scale survey of Wailuku Ahupua`a and environs, albeit slightly biased towards coastal structures, was conducted by Walker (1931). Recently, many other archaeological projects have been conducted in the area and have yielded much data regarding settlement pattern and land utilization within the *ahupua`a*. Kirch (1985:144) notes, however, that a "more intensive study of these important regions will help to unravel the sequence of economic, social, and political change that led to the development of the powerful Maui chiefdoms witnessed by Cook and others."

Connolly (1974), as part of the initial `Īao Valley Phase I Flood Control Project conducted an archaeological survey within `Īao Valley. Connolly's survey augmented a preliminary reconnaissance of the study area by K. Moore of Bishop Museum in April 1974, the latter noting the presence of stone structural remains thought to be taro or *lo`i* terraces. During the survey, Connolly recorded two historic complexes composed of a substantial amount of terraces, free-standing walls, ditches, historic house foundations, and several stone mounds.

Identified by Connolly (1974) and designated as State Site No. 50-50-04-2978 (Wallace System Complex) and 50-50-04-2979 (North Terrace System Complex), the former sites, located on the south stream bank of `Īao Valley, consisted of twenty terraces; two irrigation ditches; one free-standing, diversionary wall; and two house foundations. The North Terrace System Complex consisted of a wetland taro system represented by six taro terraces, two free-standing walls, and two stone mounds of unknown function. Connolly (1974) believed both sites (and all features) to have been constructed during historic times, the sites presumably constructed by Portuguese workers living in a camp within the valley. Several interesting artifacts were also recovered during the survey and represent traditional taro processing such as the fractured basalt *poi* pounder and the unfinished basalt *poi* pounder. Connolly's (1974) work in `Ēao Valley streambed set a precedent for anticipated findings during other studies in the environs of `Ēao Valley.

In 1984, spurred by the finding of a human tibia fragment during an imported sand fill operation for the construction of a Jack-in-the-Box restaurant in Lahaina, Earl Neller recorded an intact human burial in the Wailuku Sand Hills (TMK: 3-8-07:2) while attempting to locate the area from which the bone might have been mined. While Neller never found the exact location of the displaced remain, his investigation did lead to the identification of a single intact human

skeleton protruding from the ground surface, as well as other remains on the surface. Neller theorized that there might be as many as three other graves that were disturbed-probably during other, non-sand mining activities (*e.g.*, dirt-biking). Based on such, he recommended that archaeologists probe the Wailuku Sand Hills for additional human burials.

During the 1990s, the intensity of archaeological work conducted in Wailuku escalated, including much work involving the Maui Lani Development area where many traditional-period human burials have been found. In 1990, Rotunno and Cleghorn located human burials on TMK: (2) 3-8-007: 2 and 110 in an area known as the Maui Lani Development Property. The human burials found on this tax map key were designated as State Site 50-50-04-2797 (Rotunno and Cleghorn 1990). In 1992, archaeological work on grounds of the Nisei Veterans Memorial Center [TMK: (2) 3-8-07:123] located pre-Contact habitation sites (Site 50-50-04-3120) with associated human burials along with a portion Site 50-50-04-3112, identified as the Kahului Railroad (Fredericksen and Fredericksen 1992). Six years later, in a Fredericksen *et al.* September 1998 (Revised) archaeological Data Recovery report, radiocarbon samples obtained from Site -3120 provided dates between A.D. 90 to 1970 for the site. Also in 1992, more human burials were found during construction on the property of the Maui Homeless Shelter [TMK: (2) 3-8-46:21, (Donham 1992)]. The year 1994 saw the additional discovery of human burials. At the Maui Lani Development Property (Rotunno-Hazuka *et al.* 1995) multiple human burials were found. They were designated State Site 50-50-04-2797. At the site of the Home Maid Bakery [TMK: (2) 3-8-37:49] on Lower Main Street in Wailuku, Donham (1994) discovered both historic and pre-Contact human burials. The site number assigned to those particular burials was Site 50-50-04-3556.

In 1995 several projects were conducted in Wailuku that led to the discovery of several loci containing human burials. Dunn *et al.* (1995; 2004) identified three pre-Contact sites along Waiale Road during Archaeological Monitoring for the installation of a sewer pipeline. Site 50-50-04-4005 consisted of a single, disturbed human burial located in fill material; Site 50-50-04-4067 was a hearth; and Site 50-50-04-4068 was an assemblage of 34 subsurface features that included 13 human burials and 21 habitation features. A radiocarbon sample obtained from the hearth provided a radiocarbon date of A.D. 1434 to 1669 (98%) and A.D. 1772 to 1794 (2%) at 2 Sigma. Fredericksen and Fredericksen (1995) also conducted an archaeological survey along Waiale Road in Wailuku though yielding negative results. Based on the presence of sand, known to contain human burials, archaeological monitoring was recommended. However, the recommendation was not adhered to and resulted in several tons of graded sand containing human remains that had to be mechanically screened for recovery. Fredericksen and

Fredericksen (1995) believe that the human remains had originated as part of an existing burial complex previously identified as Site -2916.

Pantaleo and Sinoto (1996 Rev.) conducted subsurface sampling on TMK: (2) 3-8-07:2.110 via 90 backhoe trenches, 2 shovel scrapes, and 1 manually excavated trench. The excavations led to the discovery of two previously unrecorded sites eventually assigned as State Site 50-50-04-4146 and 50-50-04-4147. Each of these sites yielded the presence of a single human burial. Additional excavations at one previously recorded site (Site 50-50-04-2797) revealed the presence of four additional human burials that were interpreted as part of Site -2797.

On Lower Main Street and Mill Street in Wailuku Fredericksen and Fredericksen (1996) conducted Data Recovery on TMK: (2) 3-4-039: portion 81 and 82. Excavations at State Site 50-50-04-4127 revealed two extensive, subsurface cultural deposits, both "overlain by fill from historic earthmoving activities associated with construction of the Kahului Railroad and Lower Main Street" (ibid:1996). While the upper cultural deposit was disturbed by the aforementioned activities, the lower layer contained intact pre-Contact features and artifacts associated with habitation. Artifacts associated with fishhook manufacture, lithic tool utilization and production, and food preparations were recovered from Layer II deposits. The deposits were radiocarbon dated and results suggested the site was occupied during the late pre-Contact period (A.D. 1570–1780). Importantly, this habitation site is likely associated with the lower `Iao River flood plain in which taro was presumably produced. Thus, habitation occurred above the valley floor while taro production for households occurred on the rich but narrow alluvial flood plains of `Iao Valley.

Cordy (1996) and Donham (1996) provide overview studies of prior archaeological work conducted in the Wailuku area. Cordy (1996) discussed an overview of Māhele documents on land patterns in `Iao Valley that clearly showed the lower valley region contained irrigated taro fields throughout the flood plain and houses and associated grave sites at the base of the sand dunes bordering the sides of the flood plain. Donham (1996) also summarized that house sites occur along the base of the sand dunes, although the population moved *mauka* through time.

A year later, Fredericksen and Fredericksen (1997) conducted an Archaeological Inventory Survey on TMK: (2) 3-4-039:82 that led to the identification of an undocumented cultural deposit interpreted as a habitation site (State Site 50-50-14-4414) and an extension of their 1996 documented cultural deposit (State Site 50-50-04-4127). A single radiocarbon sample obtained from the former provided a calibrated date of A.D. 1325 to 1340 and A.D. 1390 to 1670 at 2 Sigma with a 95 percent probability rate.

During Archaeological Monitoring, Sinoto and Pantaleo (2002 Rev.) reported a single human burial that had been almost entirely displaced due to grading for the new Pu`uone Kingdom Hall in Kahului. The displaced remains were collected, analyzed with the remaining *in situ* portion of the burial, and concluded that the finding was that of a “prehistoric indigenous Hawaiian individual” (ibid:2002 Rev.:1). State site 50-50-04-5126 was assigned to the burial and preservation was selected in place where the *in situ* portion of the burial was found.

That same year, Rotunno-Hazuka and Pantaleo (2002) reported on the results of subsurface testing just north of the subject project area. The excavation of 32 trenches was completed on two proposed roadway corridors designated as the Maui Lani Parkway and Kamehameha Avenue. Trenching failed to reveal cultural deposits within the Pulehu-Ewa-Jaucus matrices.

Sinoto and Titchenal (2003) conducted Archaeological Inventory Survey for the proposed Phase VII Residential Project of the Maui Lani Development Area in which 15 trenches were excavated via mechanical means. The results of this project were also negative.

Rotunno-Hazuka and Pantaleo (2004) reported the results of Archaeological Monitoring that led to the documentation of two human burials during mass-grading for the Bluffs Subdivision. One burial, interpreted as the remains of an infant, was assigned as Site -5404. The second burial, an adult male, was exhumed and placed with a previously identified burial site assigned as Site 4146-Locality 12. Together, the burials were classified as belonging to a “traditional Native Hawaiian burial ground” (ibid: 15). Included in their report was the inadvertent finding of at least three human burials by Archaeological Services Hawaii (ASH), LLC, along the western flank of a nearby sand berm constructed by HC&S. Subsequently, the burials’ location was assigned as State Site 50-50-04-5504. A brief inquisition to the Maui/Lanai Islands Burial Council to obtain the burials’ disposition ensued and to date, no formal archaeological work has been conducted and no formal plan to preserve the burials has been submitted for review. Please note: As the above-mentioned burials were inadvertently identified by ASH archaeologists, Scientific Consultant Services, Inc. did not consult with community members, as per HAR § 13-276-5(a) and (a) (4) (g).

An Archaeological Inventory Survey on TMK: (2) 3-3-002: portion of 001 and 3-4-032: portion of 001 by Tome and Dega (2004) led to the identification of four archaeological sites, one of which was previously recorded as Site -1508, Spreckels Ditch. Site 50-50-04-5564 was

an historic bridge constructed and used for the transportation during Wailuku's sugar cane industry; Site 50-50-04-5565 was the former *lo'i* fields used during pre-Contact into early post-Contact times; Site 50-50-04-5566 was the small, concrete-lined irrigation ditch also constructed and used during the sugar cane industry and most likely stemmed into aiding the macadamia nut industry. A supplement of eleven stratigraphic trenches was placed at various points along the proposed routes that tested subsurface soil deposits for human alteration and influence. ST-9, ST-10, and ST-11 aided the confirmation that the former *lo'i* fields, once abundant in the lower portions of Iao Valley, still exist and that they were under fill. With the exception of the former *lo'i* fields that were once used in pre-Contact times, no traditional archaeological sites were found thus, attributing the intensive cultivation of sugar cane and macadamia nuts to the destruction and removal of such sites (Tome and Dega 2004).

WAIKAPŪ AHUPUA`A SELECTED PREVIOUS ARCHAEOLOGICAL STUDIES

In 1988, PHRI conducted a cursory archaeological reconnaissance survey of an 80 acre property over a four day period. This survey included the area containing the existing Pohakea Quarry and its surrounding environs (M.L.K. Rosendahl 1988). Although six newly identified historic sites were located during his project, none were assigned state site numbers until nineteen years later when Scientific Consultant Services, Inc. would conduct Inventory Survey of the area and also provided a reassessment of the sites. Nineteen years later, Scientific Consultant Services' Dagher and Dega (2007) reported on the re-location of five PHRI sites (M.L.K. Rosendahl 1988) in the Pohakea Quarry area as well as finding two previously unrecorded sites. Altogether, a total of seven sites (Site 50-50-09-6061 through -6067) were fully documented and assessed as having Historic Era (post-1778 to pre-1950s) associations.

A year later Kennedy (1989) reported on an archaeological study of TMK: (2) 3-5-02:1 that involved a surface survey and limited subsurface testing (the subsurface testing was conducted utilizing the excavation of six backhoe trenches that revealed the presence of sand). He reported that no archaeological materials had been found and that modern debris observed on the surface of his project area was likely the result of landfill processes.

Also in 1989, PHRI conducted Archaeological Inventory Survey of over 600 acres within the Waikapū Mauka Partners Golf Resort located to the north of the current project area (Brisbin *et al.* 1991). The report, cited as Haun (1989) in Brisbin *et al.* 1991 and documenting the findings of this survey, was not available at the State Historic Preservation Division (SHPD) and appears not to have been printed or reviewed by the SHPD. Based on the findings and recommendations of Haun's (1989) Inventory Survey, Archaeological Data Recovery was

applied to nine sites (comprised of over 46 features) identified during the initial survey (Haun (1989) in Brisbin *et al.* 1991). These nine sites show that this area was utilized for extensive traditional dryland agriculture with limited habitation and some historic ranching activities. It is summarized that only a few habitation sites were located below 500 feet amsl and that the agricultural sites were “continuously distributed” throughout the project area. Fifteen radiocarbon samples collected from data recovery excavations conducted at several of the features yielded sufficient amounts of charcoal suitable for providing reliable dates. The range of the radiocarbon dates suggests initial occupation of the project area occurred during the early 1500s and continued through historic times (Brisbin *et al.* 1991).

Kennedy (1994) conducted an Archaeological Inventory Survey on TMK: (2) 3-6-02:2 (POR.) and TMK: (2) 3-6-04:2 (POR.) within Waikapū Ahupua`a. During the survey a total of 18 sites, comprised of 74 features, were newly identified. These sites also indicated that the area was primarily utilized for traditional agriculture, although there was some evidence of limited habitation, including burials, and ceremonial use. Kennedy (1994) concluded that these sites could be a continuation of the occupation described by Brisbin *et al.* (1991). Five charcoal samples collected from test excavations of several of the features were submitted for radiocarbon dating. These samples yielded dates ranging from A.D. 1040 through 1950, somewhat earlier than postulated in Brisbin *et al.* (1991).

Titchenal (1996) conducted Archaeological Inventory Survey for a proposed water retention basin and associated lands within both Waikapū and Wailuku Ahupua`a [TMK: (2) 3-5-02:01 (POR.) and TMK: (2) 3-5-01:17 (POR.)]. Thirteen backhoe trenches utilized to sample the project area did not yield any subsurface cultural material. Pedestrian survey of the project area also yielded negative results. Although the survey provided negative results, Archaeological Monitoring was recommended due to the presence of sand dunes nearby the project area.

In 1997, Aki Sinoto Consulting (ASC), in association with Garcia and Associates (GANDA), conducted Archaeological Inventory Survey of 15 acres of land north of Pōhākea Gulch. This study included a small portion of the current project area and the site of the present-day, currently operating Pohakea Quarry. One structural feature was documented during the survey. Given the description of this feature and the site location map, the feature may be associated with Site 50-50-09-6062 (T-6) or 50-50-09-6063 (T-11) which were initially documented by PHRI in 1988 (Eblè and Pantaleo 1997:9). This structural feature is briefly described below:

This feature consisted of a short remnant segment of a free-standing, stacked stone wall incorporating a post and wire fence. This remnant, oriented east to west, measures 8 meters in length and .80 to 1.0 meters in width and height. The extensive clearing evident in the surrounding area most likely destroyed the rest of the wall within the boundaries of the current project area. The construction technique, orientation, and dimensions of the remnant features suggest possible association with Sites T-6, T-11, or other walls present in the *mauka* areas.

Buffum and Dega (2001) reported negative results from an archaeological study of 7.5-acres on TMK: (2) 3-5-04:92 through systematic surface survey which failed to reveal extant archaeological sites. It was concluded that the absence of any structures was likely a product of extensive landscape modifications through sugar cane and pineapple cultivation on the parcel over the past c. 150-200 years.

Another archaeological study in the Waikapū area that did not lead to the identification of archaeological sites was an Inventory Survey by Davis (2003). Approximately 57-acres of Tax Map Keys: (2) 3-5-02:005 and 3-5-15:071 were subject to pedestrian survey on moderate to steeply sloping terrain (<30 to 60°). Davis (2003:1) suggested that such a landscape “would be the primary determining factor for land use...”. In other terms, the landscape was steep enough wherein agricultural or habitation use, among others, would be limited. Davis (2003) did report that the survey crew noted a cave high on a ridgeline to the south, outside the study area, but did not further investigate the area as it was on private land.

Following an Archaeological Inventory Survey of approximately 100-acres in 2003 of Tax Map Keys: (2) 3-8-7: 101 (POR.) and 3-5-02: 01 (POR.), Fredericksen (2004) recommended a section of the Kama Ditch (found during the survey) for preservation. No other sites were identified during the research. Although abandoned an estimated 30 years prior to the survey, the non-functional ditch was identified as having historic associations with the plantation-era.

Wilson and Dega (2005) conducted an Archaeological Inventory Survey on TMK: (2) 3-5-02: 02 and 03 within the Waikapū Ahupua`a and recorded seven archaeological sites associated with plantation/historic times: Waihee Ditch (State Site 50-50-04-5197); Waikapu Ditch (50-50-04-5493); an un-named, lesser ditch (50-50-04-5729); a second un-named, lesser ditch (50-50-04-5726); a large, un-named reservoir (50-50-04-5727); a series of fourteen sugarcane-field erosion-control, soil berms (50-50-04-5728); and a County dirt road named “Old Waikapu Road” (50-50-04-5730). No traditional Hawaiian sites were found in this project area.

Bassford and Dega (2007) conducted Archaeological Inventory Survey of TMK: (2) 3-6-04: 03 (POR.) and 06 (POR.). The project yielded only negative results for any surface features, subsurface cultural deposits, or human remains. Some modern materials were observed in many of the trench profiles (*e.g.*, plastic, black irrigation hosing, concrete aggregate chunks) and were interpreted as remnants of the previous land use practices of commercial sugarcane cultivation in the area.

Finally, the 29-acre parcel occurring in the center of the current project area along Waiko Road (TMK: 3-8-7: 89, 143, 144 por), known as the “Consolidated Baseyards”, was subject to long term Archaeological Monitoring. The acreage is owned by another party who is developing the land for light industrial use. Monitoring was conducted in 2006 and 2007 by SCS (Pestana and Dega 2008). During subsurface construction activities, one site comprising two features was identified and assigned State Site No. 50-50-04-6226. The two features included two isolated areas of human remains, which have been protected under approved burial treatment plans.

ARCHAEOLOGICAL STUDIES CONDUCTED WITHIN THE CURRENT PROJECT AREA

Eight archaeological projects have been completed or are in the process of being completed within the current project area. The current Inventory Survey represents one of the projects near completion. Another project, Archaeological Monitoring within the Hawaiian Cement Sand Mining areas, also continues at present. Mitigation of State Site No. 50-50-04-5504 (burial) will be completed upon acceptance of the current report. Thus, a total of five projects (with adjunct mitigation) have been completed in the project area, two are being brought to conclusion, and one project requires additional mitigation. Summary information of all eight projects is listed chronologically below. Figure 5 illustrates projects that have occurred in the current project area.

Moore and Kennedy (1998):

An Archaeological Inventory Survey Report for a Proposed Sand Mine to be Located at TMK: 3-8-07: 101 (por.) in Waikapū and Wailuku Ahupua`a, Wailuku District, Island of Maui

This study, the first formal archaeological work to occur within the current project area, consisted of survey and testing across approximately 90 acres of undeveloped land in the northwest portion of the project area. The survey area consisted of two separate, but adjacent parcels of land bisected by an access road. Area A occurred to the east of the access road and consisted of 59 acres. Area B consisted of 30.3 acres and occurred to the west of the access road.

A total of 117 trenches were excavated in the project area which resulted in the identification of three sites. Site 50-50-04-4200 consists of four burials and associated artifacts, Site -4201 contained one burial, and Site -4202 was composed of a tiered terrace with paving thought to represent a temporary habitation locus. All three sites occurred within Area A and were interpreted as associated with prehistoric/early historic times. Following, a Burial Treatment Plan was composed for Site -4200 and Site -4201 (see below).

Monitoring of sand mining activities in this area was undertaken by Archaeological Services Hawaii, LLC (see Rotunno-Hazuka and Pantaleo n.d. below)

Kennedy and Moore (1998)

A Revised Burial Treatment Plan for a Proposed Sand Mine To Be Located at TMK: 3-8-07: 101 (por.) in Waikapu and Wailuku Ahupua`a, Wailuku District, Island of Maui

The Burial Treatment Plan (BTP) followed the findings of the above noted Inventory Survey and covered Site -4200 and Site -4201. The plan includes temporary mitigation measures (fencing and buffer around sites during construction activities), as well as provisions for long term preservation in place of all five burials. The plan was prepared in consultation with the Maui/Lana`i Islands Burial Council (MLIBC) and the preservation tenets of the plan are still in place as of this writing.

Fredericksen and Fredericksen (1996)

Report on the Waikapu Human Remains Recovery Project, Waikapu, Maui, Hawaii (Borrow Site 50-50-04-3525) TMK: 3-8-07: 104

This report discusses the recovery of human remains both on site and removed off site during sand mining activities. The area of origination occurs along the western flank of the current parcel. The project commenced in May 1994, with mitigation occurring intermittently at least through February 1996. Mitigation included the recovery, description, and inventory of remains. Members of the Maui/Lana`i Islands Burial Council conducted on-site re-interment of the remains in March, 1995. A total Minimum Number of Individuals (MNI) equated to twenty-two individuals recovered during this project. This population included both males and females of various age. All recovered remains, as well as those left *in situ*, remain protected on the parcel.

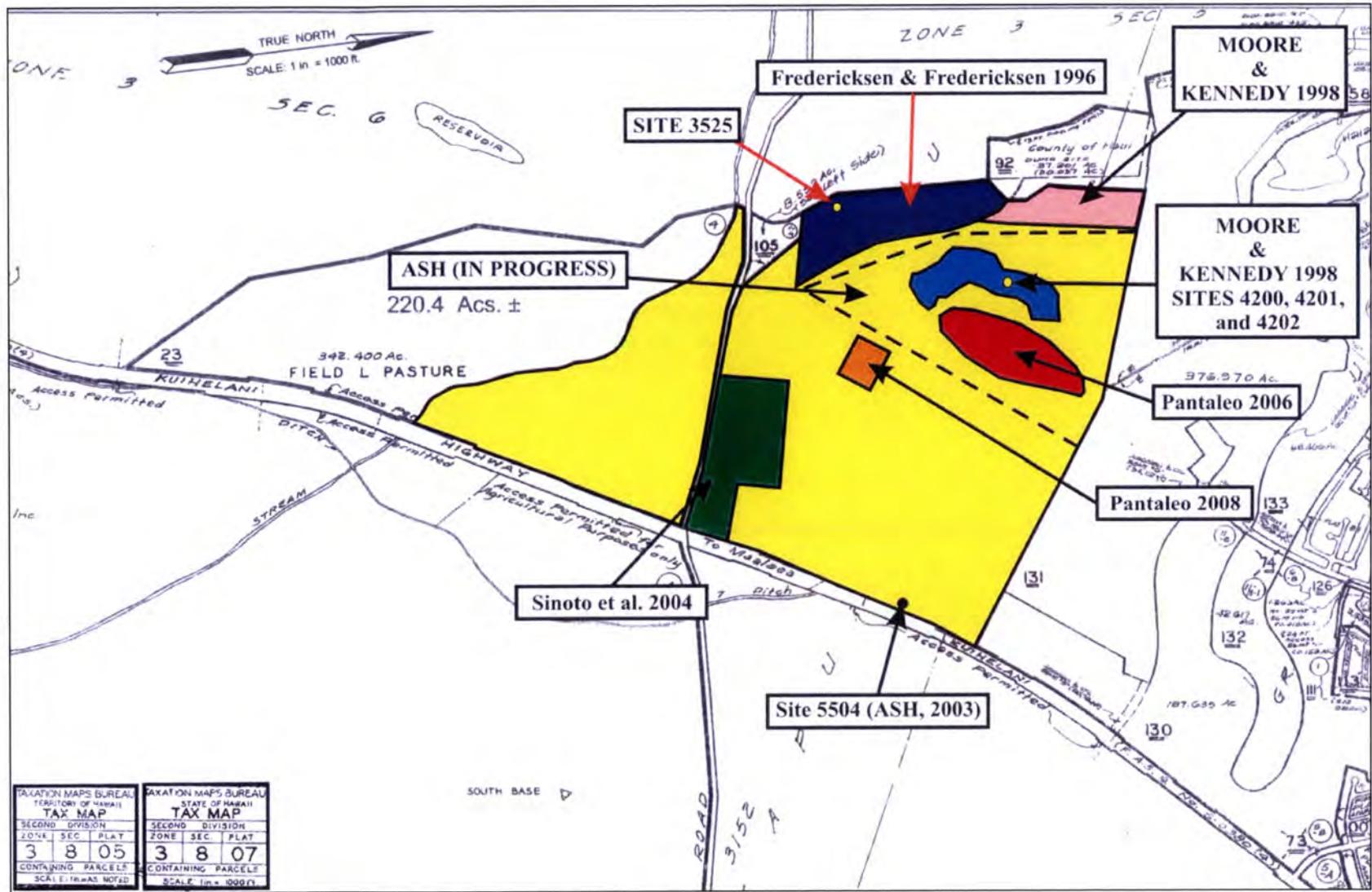


Figure 5: Previous Archaeological Work Conducted within Project Area Boundaries.

Sinoto et al. (2004)

Archaeological Inventory Survey of the Proposed Industrial Park Development Area, Waikapu, Wailuku, Maui Island TMK: 3-8-07:89 & 102 (por.).

Archaeological Inventory Survey of TMK: (2) 3-8-07:89 & 102 (por.) was completed by Sinoto *et al.* (2004). Parcel 89 occurs outside the current project area and is known as the “Consolidated Basesyards.” Parcel 102 is located in the southeastern-most corner of the current parcel. The Inventory Survey involved both pedestrian survey and testing (eight mechanically-excavated trenches). The results of the project were negative; no historic properties were identified on either Parcel 89 or Parcel 102. The authors noted that approximately 75% of the project area had been previously impacted by mechanical means.

Pantaleo 2006

Archaeological Assessment for the Proposed Hawaiian Cement and Ameron Sand Mining Area, Maui Lani Subdivision Lot 12-A, Waikapu Ahupua`a, Wailuku District, Island of Maui TMK: 3-8-07: 101 (por.)

Inventory Survey of this 50-acre parcel was conducted in 2006 though use of survey and the excavation of 50 backhoe trenches. The study area occurs in the northern portion of the current project area and is a section of a license to Hawaiian Cement for sand mining. Testing amounted to one trench per acre and no surface or subsurface cultural remains were identified. While the results of the project were negative, Archaeological Monitoring was recommended due to the sandy nature of the locale and potential for the discovery of burials.

Pantaleo 2008

Archaeological Assessment of a 15-Acre Portion of Hawaiian Cement Sand Mining Area, Maui Lani Subdivision Lot 12-A, Waikapu Ahupua`a, Wailuku District TMK: 3-8-07: 101 (por.)

Inventory Survey of this 15-acre parcel was conducted in 2008 through use of surface survey and representative testing. The area covered by this study is in the central portion of the current project area. A total of 20 trenches were mechanically excavated within the project area. The results of testing were negative and the project was re-designated as an Archaeological Assessment. Due to the presence of sand and thus, the possibility of burials being present in the project area, Archaeological Monitoring was recommended for the project area (see below).

Rotunno-Hazuka and Pantaleo (2008)

Archaeological Monitoring Plan For All Grading and Grubbing Activities at a 15-Acre Portion of Land at Hawaiian Cement Located at TMK: 3-8-07:101 (por.) Waikapu Ahupua`a, Wailuku District, Island of Maui

This Archaeological Monitoring Plan is an outgrowth of the recommendation made after completion of the Archaeological Assessment work (see above report). At the time of this writing, several burials were identified during this Monitoring project (see below update).

Rotunno-Hazuka and Pantaleo (n.d.)

Hawaiian Cement Sand Mining: Archaeological Monitoring Summary for TMK: 3-8-07: 101 Pors., Archaeological Services Hawaii, LLC, July 2009 (Supersedes the 2003 Interim Monitoring Report Update)

This Monitoring summary covers the area subject to Inventory Survey by Moore and Kennedy (1998; designated as Phase A and Phase B), the 50-acre Assessment survey area documented by Pantaleo (2006; Phase C), and the Assessment area documented by Pantaleo (2008; Phase D). Phase A was further divided into six locales known as Locale 1, Locale 2, Locale 2 extension, Locale 3, Locale 4, and Locale 4 extension. Forty-nine inadvertent burials from Phase A were *in situ* and/or were probably *in situ*. Additional to the *in situ* burials are scatters of human skeletal remains that were disturbed prior to Hawaiian Cement grading activities and do not contain an *in situ* component. A minimum of 21 individuals are represented within the scatters. Phase B contained 2 burial features, 1 partial *in situ* and 1 recently disturbed, probable *in situ*. Phase C, the 50-acre survey area, has not yielded any burials and grading by Hawaiian Cement is complete. Within Phase D, the 15-acre survey area, documentation and lab work of the disturbed remains is not complete, however the data is as follows: at least 3 *in situ* burials and a large scatter of human skeletal remains that were previously and possibly recently disturbed have been identified within a discrete 0.90 acre area. Within the scatter, a minimum of 14 individuals are represented. Together, the phased Hawaiian Cement Sand Mining area contains 54 inadvertent burial features which contain articulated, *in situ* human remains and/or were likely to contain *in situ* burial features, as well as a minimum of 35 individuals represented within the assemblage of scattered human remains. In addition to these inadvertent finds by ASH, five previously identified burial features were documented during the Moore and Kennedy (1998) survey, as is noted above (Figure 6).

Specific plans for the preservation of these burials will be detailed under separate cover in a Burial Treatment Plan authored by Archaeological Services Hawaii, LLC. Appropriate interim protocol and procedures, including demarcation and protection of these areas has been instituted.

Inadvertent Discovery:

The inadvertent discovery of multiple burials (one *in situ* and two areas of scattered remains) in the project area occurred on October 27, 2003. The discovery area occurs in the east-northeastern portion of the project area near Kuihelani Highway. The burials, designated as State Site No. 50-50-04-5504, were discovered by ASH employees who had been working at Maui Lani. The following summary paraphrases the Maui/Lana`i Islands Burial Council meeting minutes for October 30, 2003, and November 26, 2003 in which the burials are discussed.

ASH employees, working at the adjacent Maui Lani parcel, investigated an area known as the “Sod Farm” that had been subject to grading by a front-end loader without an archaeological monitor present. Three areas (designated as Area I, II, and III) were found to contain remains, of which would eventually be one *in situ* burial and two areas of scattered remains. During the October 30, 2003 meeting of the MLIBC, the council made a three-part motion concerning the remains: that the area where the human skeletal remains were found be assigned a state inventory site number; that there be a good faith archaeological attempt to define the boundaries of the inadvertent burial area; and that the disturbed dune sands within the inadvertent burial discovery area be screened in order to recover any other human skeletal remains.

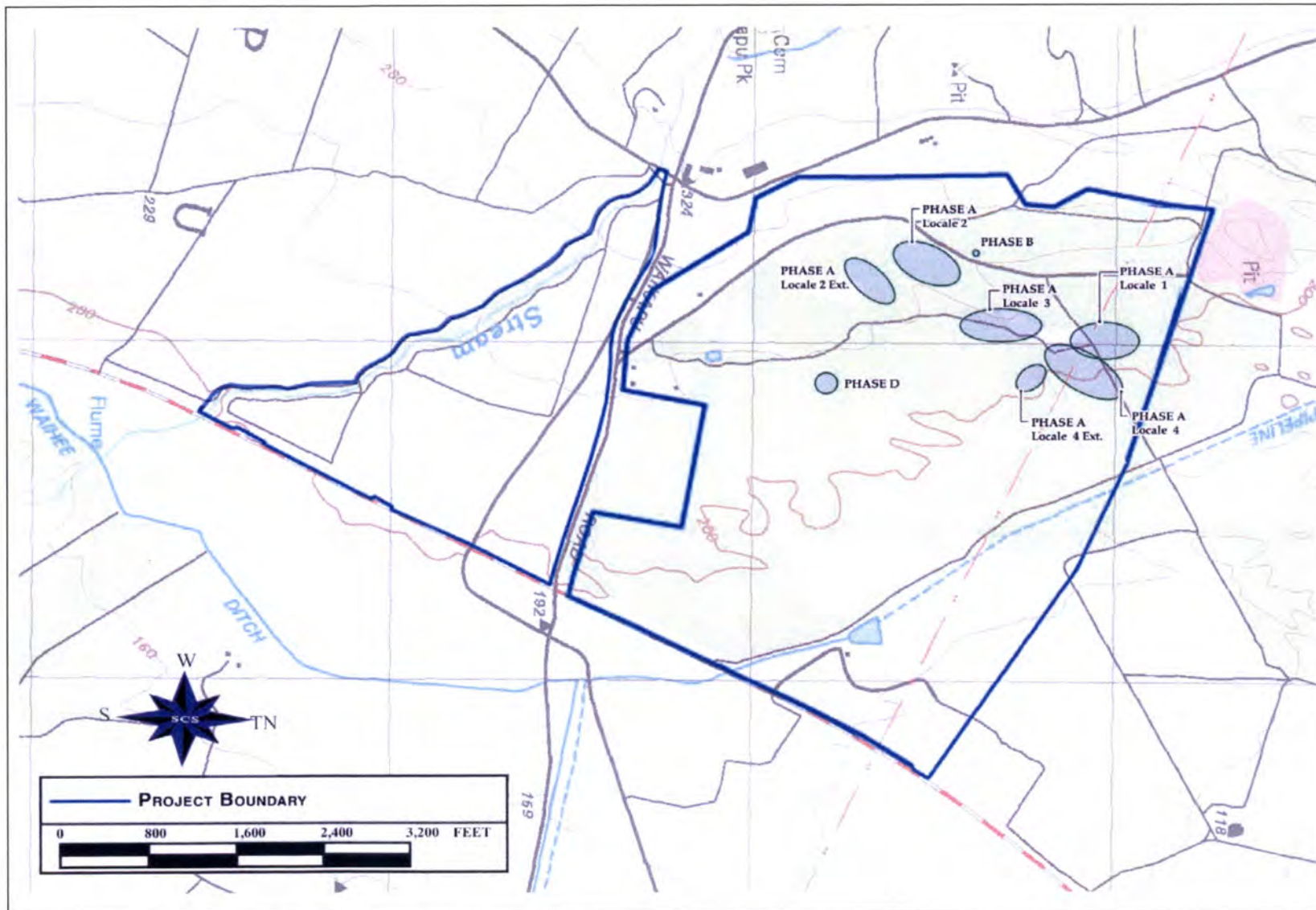


Figure 6: Archaeological Services Hawaii (ASH) Map Showing Hawaiian Cement Testing Locales.

The project was updated again by ASH at the November 26, 2003 meeting of the MLIBC. The three areas containing remains were noted and little work had occurred since the previous meeting, beyond the identification and additional, exposed remains. The inadvertent discovery area still contained one possible *in situ* burial and two areas of scattered remains. There is little information on these burials between November 26, 2003 and in 2008 when SCS conducted fieldwork in the area for the current project (see results below). Please note: As the above-mentioned burials were inadvertently identified by ASH archaeologists, Scientific Consultant Services, Inc. did not consult with community members, as per HAR § 13-276-5(a) and (a) (4) (g).

SCS Current Project (Tome and Dega-in preparation)

The current document presents the results of this Inventory Survey (see below). Briefly, only one new site was identified, State Site No. 50-50-04-6578, an *imu* pit. No burials were identified during the current project.

Previous archaeological work within the project area has revealed definite patterns concerning historic properties in the project area. First and foremost, the ubiquity of burials in this sandy locale is recognizable. However, burials do not appear to occur throughout the entire parcel. Based on the information in hand, they appear clustered in areas of higher elevation dunes (Hawaiian Cement area, recovery area [Fredericksen and Fredericksen 1996]). The burials do not appear as isolates but rather occur in sizeable groupings. That a fairly high proportion of burials occur in this locale may be attributed, at least partially, to the nature of the area: large sand dune systems. These lands would have been quite economically-poor areas for traditional practices, particularly farming and habitation (given the perceived lack of readily available fresh water). Other classes of historic properties that have been documented on the subject parcel include habitation (terrace, *imu* or fire pit) and more modern constructions (water irrigation ditches). The limit of archaeological site types in the area is brought more into focus when compared with the overall settlement pattern of the wider Wailuku/Waikapū region.

GENERAL SETTLEMENT PATTERN AND LAND USE: WAILUKU AND WAIKAPŪ AHUPUA`A

As the current project area is situated within Wailuku and Waikapū Ahupua`a, the settlement pattern for both *ahupua`a* will be generalized in this section of the report.

Archaeological evidence suggests that initial settlement (colonization) in the Hawaiian Islands occurred along windward shoreline areas between the A.D. 4th and 11th centuries. Pollen evidence suggests a settlement date of the A.D. 9th century (see Athens 1997), a date that is more

widely accepted. For the most part, these populations utilized local resources and concentrated settlement near the coastline. Cordy in Creed 1993 suggests that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Wailuku Ahupua`a (and possibly Waikapū Ahupua`a) and its coastal environs are thought to have been initially settled around A.D. 1100 to 1200. Generally, the windward coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones from the c. 12th century. The Wailuku area is considered to have been a chiefly and ceremonial center during pre-Contact times. The numerous *heiau* attest to the significance of the area (e.g., Haleki`i and Pihana Heiau) and war gods were invoked by Hawaiians at the temples (e.g., by Kamehameha I). Settlement, burial grounds, coastal exploitation of marine resources, and *lo`i* systems in `Āao Valley were supposedly common during pre-Contact times. Greater population expansion to inland areas did not occur until the c. A.D. 12th century, with greatest expansions occurring inland between the 14th through 16th century. Large scale or intensive agricultural endeavors were, at that time, contemporary with expanded habitation. Between A.D. 1500 and 1700, archaeological data indicates that habitation occurred within `Āao Valley, with the valley itself utilized as taro-producing lands. Coastal lands were still utilized for settlement and taro was cultivated in near-coastal reaches and in the uplands. More upland areas of Maui, such as the Kula area, saw the influx of a greater population base concomitant with the construction of large garden enclosures, ceremonial structures, and more permanent habitation sites by c. A.D. 1600.

Landscape in the intermediate areas, such as those that are gently to moderately sloped and are located near Waikapū Stream on the northeast side of Pu`u Kukui, were often the former location of taro cultivation along stream courses; dryland taro was grown on *kula* lands, and populations settled in both areas. It is possible that the *kalo* patches described in the LCA accounts of upslope Waikapū region originated during the “Expansion Period” of A.D. 1400 to 1600, perpetuating through historic times (Kirch 1985). However, most of the LCAs for the area describe almost no cultivation occurring in the area during the 1850s. This is primarily due to the prevalence of the lands being used for pasture and sugar cane cultivation (Creed 1993:74). Primary settlement and resource zones lay outside the current medial environmental zone in Wailuku proper, near perennial water sources (e.g., `Āao Valley, Waihee, Waichu). The only substantial settlement along this medial isthmus zone between 300 and 600 feet amsl was at Waikapū, to the west of the current project area, near the base of Waikapū Stream Valley (see Creed 1993). The current project area lies on the isthmus of Maui, borders a perennial water source (i.e., the Waikapū Stream), and is primarily scrubland. It is an area considered peripheral to more resource-rich zones in Wailuku. That many burials have been found in/near the project area sands further attests to sandy matrices often being utilized as burial interment locales. This

could be more to do with the economic nature of the land (sand is not profitable in terms of agriculture or other natural resources) rather than the location.

Historic utilization of the Wailuku-Waikapū landscape was dominated by industrially-produced cash crops, sugar cane and pineapple, made possible by water channeled from traditional sources (*e.g.*, Waikapū Stream) through plantation lands. Historic features associated with this period are represented as water features in the form of reservoirs (*e.g.*, Hopoi Reservoir) and water channels (*e.g.*, Waikapu Ditch, Waihee Ditch). This area was also an important transportation corridor linking both the south and north flanks of the Maui isthmus, with Honoapiʻilani Highway having been demarcated as a Government Road on area maps by 1882 (Creed 1993:20).

Overall, the settlement pattern for the current project area suggests a more narrow range of site types associated with various landforms (see Cordy 1996 and Donham 1996 for a more detailed discussion on settlement pattern summaries). For instance, irrigated *kalo* fields would occur on the flood plains where alluvial soil (not sand) and hydrological output are both present in sufficient quantities (and quality) to allow for successful cultivation. Related to a wholly different soil type, traditional subsurface habitation deposits with associated burial loci occur within sand dunes adjacent to the flood plains (*e.g.*, sand dunes located in the project area). Sand dunes occur on both sides of the Waikapū Stream valley flood plain. In some locations, traditional activity areas were also utilized during Historic times. For example, sugar cane cultivation occurred on an industrial level in flood plain reaches from the 1850s; those same lands that were likely used for *kalo* cultivation. A survey of all topographic features associated with the valley has yielded variable land use patterns through time.

PROJECT AREA EXPECTATIONS

Based on historical documents and previous archaeological research, several classes of archaeological sites were expected in the project area prior to fieldwork. The traditional background of the Waikapū area, authored by Creed (1993:19–21), provides an extensive list, but most of these site types (*i.e.*, *kula* lands, *wauke* patches, *hala* trees, taro and sweet potato patches) would be expected in more *mauka* reaches of Waikapū. The presence of Waikapū Stream would perhaps not be enough to expect agricultural complexes in this predominant sand dune area. More probable, human burials were expected within sandy matrices, particularly undeveloped natural dune locations. Habitation sites were possible, consisting of both surface features (terraces, platforms) and subsurface evidence (fire pits for food processing, etc.).

Finally, historic period sites were highly expected, given their presence on USGS maps (Kama Ditch, etc.). Land use disturbance throughout time was also thought to be present and documented, particularly considering the known sand mining activities over the years in the project area as well as varied land uses (pasture, orchid farming, etc.).

METHODOLOGY

FIELD METHODOLOGY

Two phases of Inventory Survey were performed by SCS in the project area. Phase I fieldwork was conducted between June 13, 2008 and September 5, 2008 by a varying number of SCS archaeologists, including Tomasi Patolo, B.A. (Field Director), Ian Bassford, B.A., Allison Chun, Ph.D., David Dillon, B.A., Randy Ogg, B.A., and Guerin Tome, B.A. under the direction of the Principle Investigator Michael Dega, Ph.D. Phase II fieldwork was conducted intermittently between August 3, 2009 and September 16, 2009 by D. Perzinski, B.A. (Field Director) Brian Armstrong, B.A., and Ian Bassford, B.A., with M. Dega the Principle Investigator. Archaeological Inventory Survey was performed to investigate the presence/absence of archaeological features in the project area through complete pedestrian survey and representative subsurface investigations. If identified assessments were to be made on site function, construction methods, and any associated subsurface cultural deposits. The ultimate goal was to assess the sites in terms of significance and provide recommended mitigation.

Multiple field tasks were completed during this Archaeological Inventory Survey. Pedestrian survey was conducted in order to assess project area geographical features, areas of recent disturbance, identify archaeological sites, and select locations for subsurface examination. All portions of the project area were surveyed. Previously identified sites, inclusive of burial locales (*i.e.*, Moore and Kennedy 1998, Fredericksen and Fredericksen 1996) were re-identified during survey. Vegetation within the project area was identified using Whistler (1995) as a reference.

The primary component of this Inventory Survey was representative testing of the project area not previously subject to sampling. Mechanically excavated stratigraphic trenches (ST) were placed in areas thought to potentially contain subsurface archaeological deposits and to provide a sample of testing across the project area. These trenches allowed for assessing sediment matrix types across a large area, the results in turn providing some evidence for past and present land utilization.

A total of 282 mechanically excavated and five manually excavated trenches were completed during Phase I and Phase II of this project. The testing program, including the location and number of trenches, was developed in direct consultation and with the concurrence of the SHPD. Figures 7 and 8 depict the location of each excavated trench per phase. Appendix A provides additional information for Phase I and Phase II trenches while Appendix B provides representative stratigraphic profiles for both Phase I and Phase II. The figure also shows locations in the project area that were not subject to testing during the current work, but were indeed subject to pedestrian survey. Note that areas not tested during the current project are recommended for full-time Archaeological Monitoring during future ground altering activities.

A handheld Garmin eTrex Legend Global Positioning System (GPS) unit was utilized to plot mechanically excavated stratigraphic trench locations and any archaeological sites within the project area. Soil stratigraphy encountered during excavation was documented utilizing metric graph paper and United States Department of Agriculture (USDA) Munsell soil color charts. Once identified, portable archaeological materials—soils sampled included—were collected and recorded with applicable provenience and curated for laboratory analysis.

LABORATORY METHODOLOGY

All field notes, film photographs, and collected archaeological materials were curated at the SCS laboratory in Honolulu. All stratigraphic profiles have been drafted for presentation within this report. Representative plan view sketches showing location and morphology of identified sites/features/deposits were illustrated. Selected soil samples containing organic materials were submitted to Beta Analytic, Inc. for radiocarbon dating (Appendix C). All retrieved artifact and midden samples were cleaned, sorted, and analyzed. Marine gastropods and bivalves were identified using applicable references. Significant artifacts were photographed and classified for qualitative analysis. These are presented in Appendix D of this report. All metric measurements and weights were also recorded for quantitative analysis. Midden samples were minimally identified to the lowest possible taxonomic classification (e.g., bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). All data were clearly recorded on standard laboratory forms that included numbers and weights (as appropriate) of each constituent category.

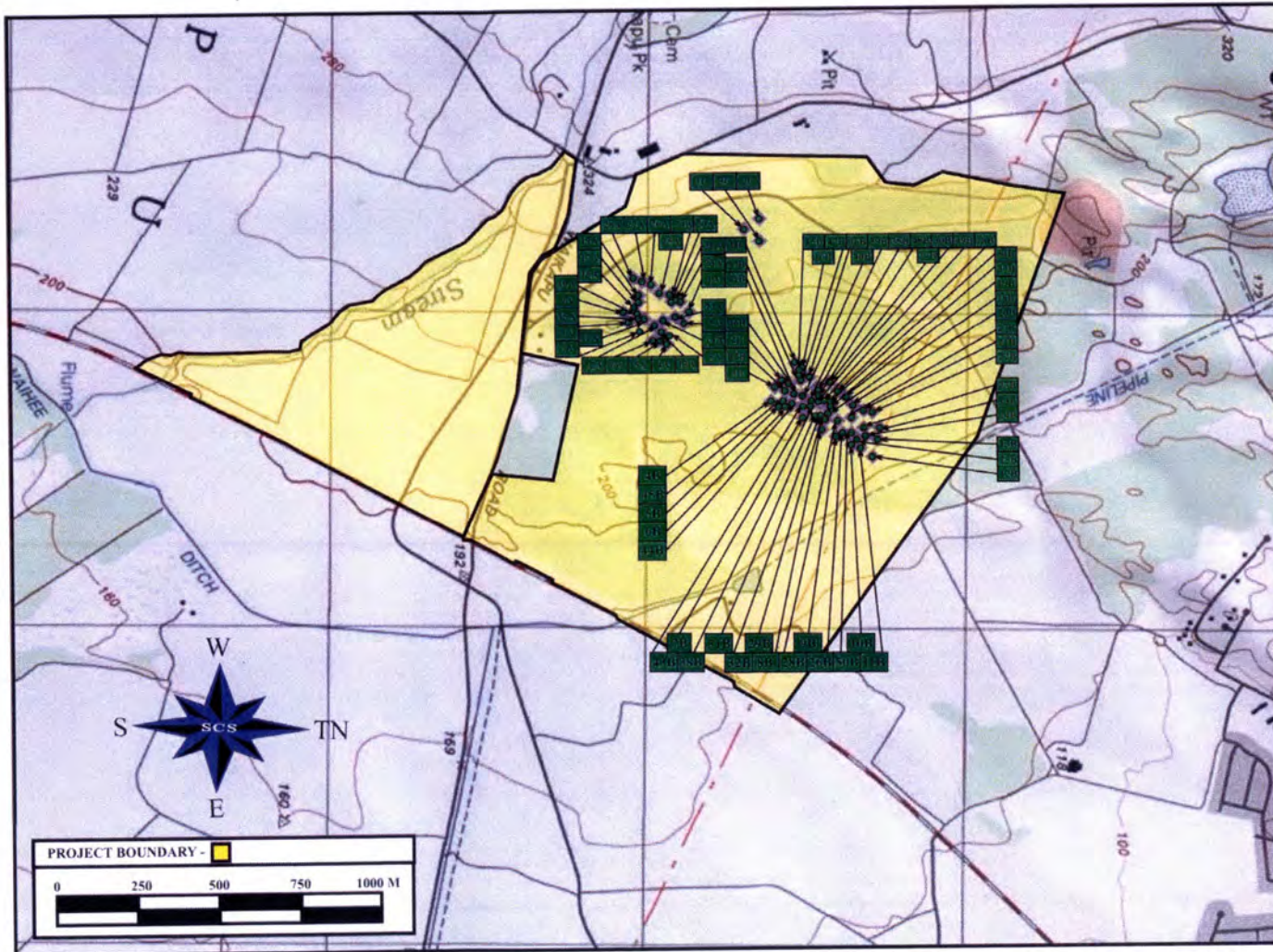


Figure 8: United States Geological Survey Wailuku Quadrangle Map Showing Manual and Mechanically Excavated Stratigraphic Trench Locations in Phase II.

INVENTORY SURVEY RESULTS

Archaeological Inventory Survey was conducted on approximately 607-acres of land in Wai`ale, Wailuku and Waikapū Ahupua`a, Wailuku District Maui [TMK: (2) 3-8-005: 23 (por.), 37 and (2) 3-8-007: 71, 101, 102, 104]. The project area was divided into seven sections designated Area A through Area G (Figure 9). Pedestrian survey, the first phase of work, was conducted to locate any extant archaeological sites and potential areas for subsurface investigations via mechanical (*i.e.*, backhoe) excavation within project area boundaries. During the survey, historic-recent activity areas were identified and represented various uses (*e.g.*, agriculture, landscaping, equipment baseyards, scrap metal repository, ranching) (Figure 10). Several modern structures were also observed within the northeast portion of the project area, these included an abandoned concrete reservoir and remnant concrete foundations (relating to sod farm that once occupied a portion of the project area).

In total, one new archaeological site was identified during this Inventory Survey project. The site consisted of a subsurface firepit/ *imu* identified during testing. The firepit has been designated as State Site 50-50-04-6578 (Figure 11). Two other sites, previously given State Site Numbers but not part of any completed projects in the area, were also identified (see Figure 11). These include State Site No. 50-50-04-5504, initially identified in 2003, and consisting of at least three human burials (one *in situ* and two scattered). This site was re-located near Kuihelani Highway. The second site consists of a portion of the Spreckels Ditch. The site has been previously designated as State Site No. 50-50-04-1508 and also runs beyond the current project area boundaries.

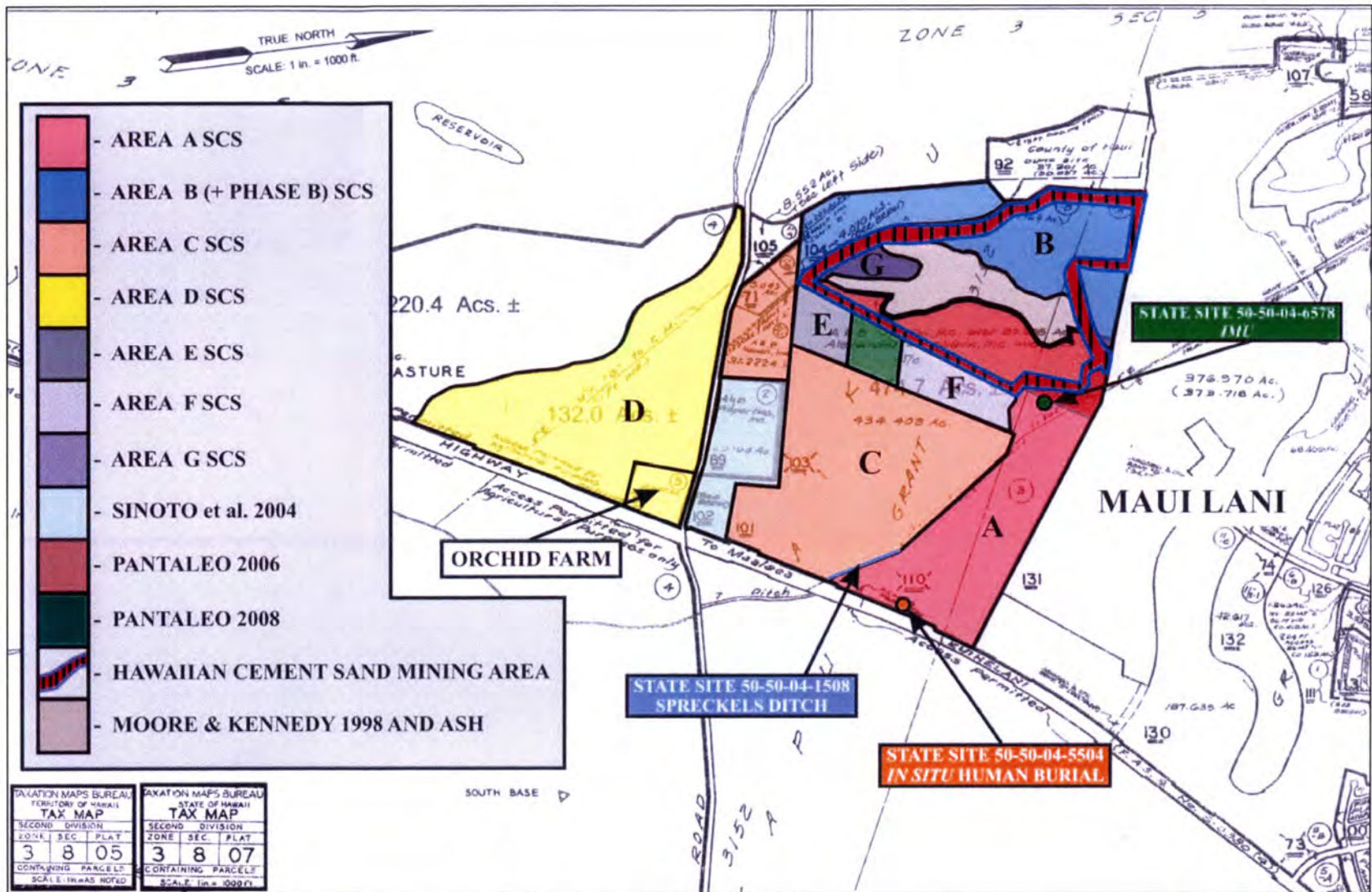




Figure 10: Photograph of Project Area Showing Existing Road and Cattle Ranching Locale. View to Northeast.

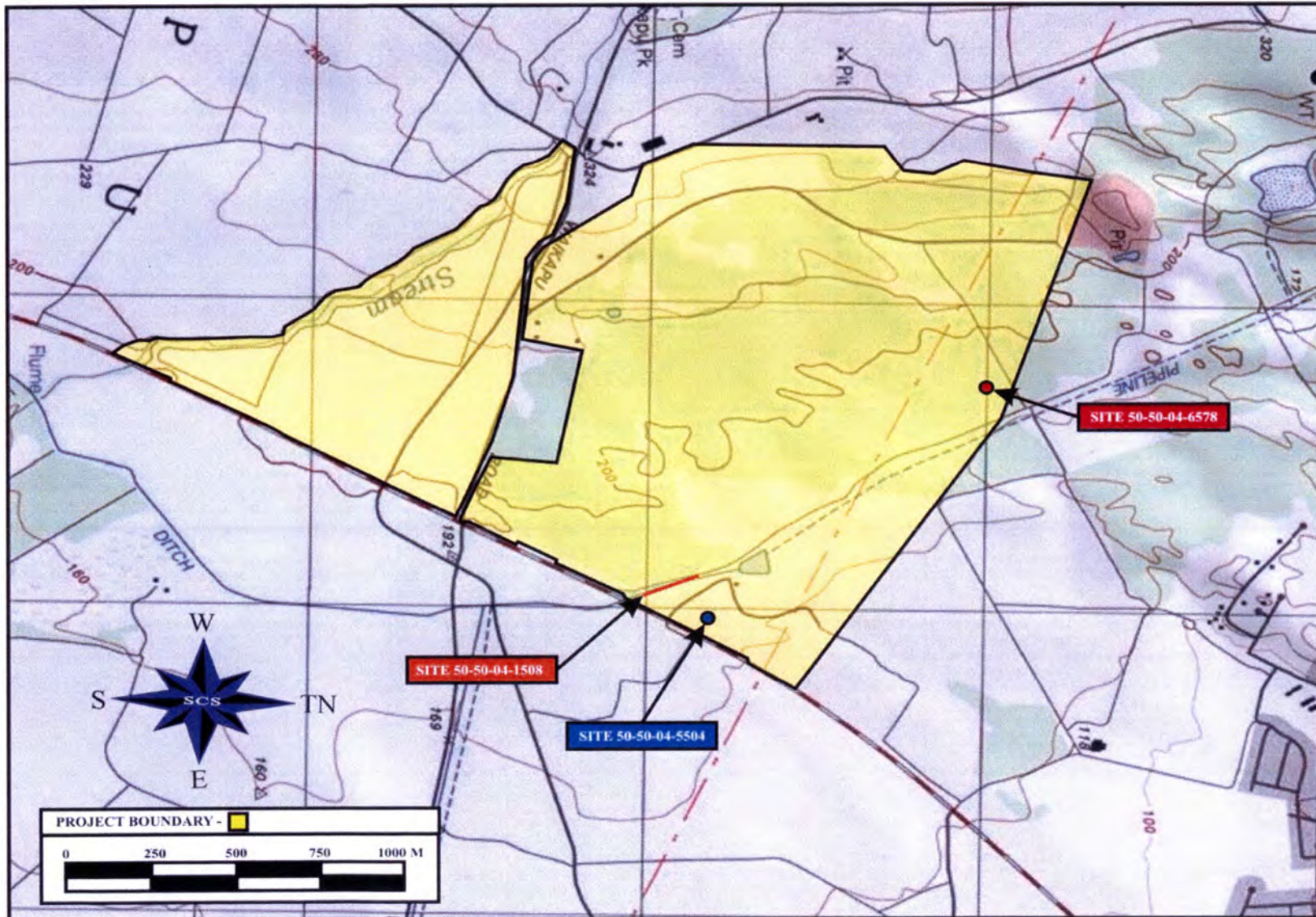


Figure 11: USGS Map Showing Identified Site Locations by SIHP Number.

At the conclusion of pedestrian survey, the project area was divided into seven sections for testing. Testing was completed in two phases: Phase I=Sections A, B, C, D; Phase II=Sections E, F, and G. These sections represent all locations in the project area not previously subject to formal archaeological work (see Previous Archaeology section above), as well as areas actually amenable to testing. As noted above, exceptions to testing included areas currently in use, such as Parcel 37, the orchid farm (see Figure 9). These seven sections were selected as a) they were not previously subject to archaeological work and b) they were not in active use and were open for testing. The sections also contained mostly natural, undeveloped portions of the dune system and represented variation in elevations and geophysical characteristics. In total, 282 trenches were mechanically excavated and five units were manually excavated (four stratigraphic trenches and a test unit) (see Figure 9). The manually excavated units were utilized to investigate areas which were difficult for backhoe access. The results of pedestrian survey and excavations (manual and mechanical) within the project area are discussed in more detail below.

AREA A

Area A is an irregularly shaped, east-west trending linear area situated within a portion of TMK: (2) 3-8-007: 101 (por.). The Maui Lani Subdivision is located on the northern flank and the Hawaiian Cement sand mining area occurs to the west (see Figure 9). Area A is covered with dry grasses, low shrubs, with small to medium-sized *kiawe* (*Prosopis padilla*) and *haole koa* (*Leucaena leucocephala*) trees. In addition, Area A contains remnants of a sod farm and locations with modern debris. Area A includes two businesses, identified as Hawaiian Cement and Brendan Balthazar. Pedestrian survey and testing of Area A led to the identification of two previously identified sites and one newly identified site.

The two previously identified sites within Area A consist of a portion of the Spreckels Ditch (State Site No. 50-50-04-1508) and second, a locale containing human remains (State Site No. 50-50-04-5504). The newly identified site (State Site No. 50-50-04-6578), a subsurface fire pit/*imu*, was also identified during the current testing. A total of eighty-five (85) trenches were mechanically (N=83) and manually (N=2) were excavated within Area A.

The considerable number of excavated units in this sector is attributed to a) the dunes in this area are less disturbed than other locales and b) Site -5504 revealed the presence of human remains and the boundaries of the site were not previously determined. The average length and depth of the 82 mechanically-excavated trenches was 6.2 meters long and 1.10 meters below surface, respectively. The 82 trenches contained between one and nine stratigraphic layers; 100 percent of these trenches contained sandy matrices (alternating strata being well-sorted and

lithified)—the former being the type of matrix in which traditional human burials are often found. Other matrices observed in these Area A trenches included clay, loam, and silt. Twenty-two of the 82 manually excavated trenches (approximately 27 percent) revealed the presence of either waterworn basalt cobbles and/or basalt pebbles, representing natural river rock deposition through time. Sixteen of the 82 manually excavated trenches (approximately 19 percent) displayed modest evidence (*e.g.*, plastic, modern charcoal staining, imported soils) of activity likely associated with sugarcane cultivation. The three manually excavated units (a stratigraphic trench and a test unit) revealed the presence of at least two strata containing between three variants of sandy matrices: silty sand, loose sand, and lithified sand. These three manually excavated units, associated with Site -5504, did not reveal additional human remains.

STATE SITE 50-50-04-5504 HUMAN BURIAL SITE (SCS SITE TS-1)

State Site 50-50-04-5504 was first identified during casual observation an ASH, Inc, employee while conducting Archaeological Monitoring at nearby Maui Lani, adjacent to the current project area (see Figure 9). While constructing a sand berm paralleling Kuihelani Highway, human remains were displaced and mixed with sandy matrices. At the conclusion of the initial investigation, a minimum of three individual human remains had been located; one *in situ* and the other two scattered on the surface of the sandy area (see also Previous Archaeology section above). Although the information was presented to the Maui/Lanai Islands Burial Council in 2003, no further action was taken to investigate the site or officially document the findings. It assumed that the remains were simply left where they were identified.

During the current Inventory Survey, SCS archaeologists Ian Bassford and Tomasi Patolo searched the area in which Site -5504 was located and re-identified the location containing the *in situ* human remains. The area was demarcated by plastic “Caution” tape. Although an extensive search for the displaced components of the site was completed, the two locations were not found. These *iwi* were likely covered and protected in place. Given the time lapse of six years (the human remains in Site -5504 were first observed in 2003), from the moment of discovery to the current SCS investigation and relocation, it can be theorized that the human remains might have been covered over by shifting sands (either natural or human induced).

The only confirmed presence of human remains within Site -5504 was the *in situ* burial. As the disposition of the two scattered burials was unknown, SCS conducted manual excavation in the general area of the *in situ* burial. The burial pit in which the *in situ* human burial was indeed re-located and measures approximately 1.5 m long by 1.0 m wide. During the current Inventory Survey, no excavation was conducted to expose any portion of this burial or obtain a

vertical depth of the *in situ* burial. Thus, beyond identifying and conducting GPS of the burial location, no additional information regarding the current status of the *in situ* burial was gleaned. However, Stratigraphic Trenches 1, 2, and 3 were utilized to determine the presence or absence of additional human remains in the general area of the *in situ* burial (Figure 12).

Stratigraphic Trench 1

Stratigraphic Trench (ST) 1 was situated near the edge of an area that was previously utilized as a sod farm. ST-1's long axis was oriented 177/357° (magnetic; southeast/northwest) and placed approximately 3.5 meters northwest of the *in situ* human burial identified as part of State Site 50-50-04-5504. ST-1 measured 4.0 meters (m) long, 1.0 m wide, and was excavated to a maximum depth of 84 centimeters (cm) below ground surface. Six strata were identified in ST-1 (Figures 13 and 14). Layer I [4–30 cm thick below surface (bs)] consisted of a dark yellowish brown (10YR 3/4) and brown (7.5YR 5/4) sand (80%) and silt (20%) mixture with isolated pebbles, some limestone fragments, and approximately five percent grass roots. Layer II (4–18 cm thick) was a fine to slightly coarse, light reddish brown (5YR 6/3) sand with few roots and very small gravel. Layer III (3–16 cm thick) was a fine, reddish brown (2.5YR 5/4) sand with coral fragments. Layer IV (8–40 cm thick) was a compact, fine to very fine when crushed, light reddish brown (2.5YR 6/4) sand with few coral fragments in the upper portion of the layer. Layer V (8–15 cm thick) was a loose, fine, light reddish brown (2.5YR 7/4) sand with few grass roots and isolated panels of lithified sand in the upper portion of the layer. Layer VI comprised the base of excavation for ST-1 and was identified as a hard packed, brown (10YR 5/3) silty sand with coral fragments. Excavation of ST-1 terminated due to the presence of hard packed sand at the base of the trench. No cultural material was observed during the excavation of ST-1.

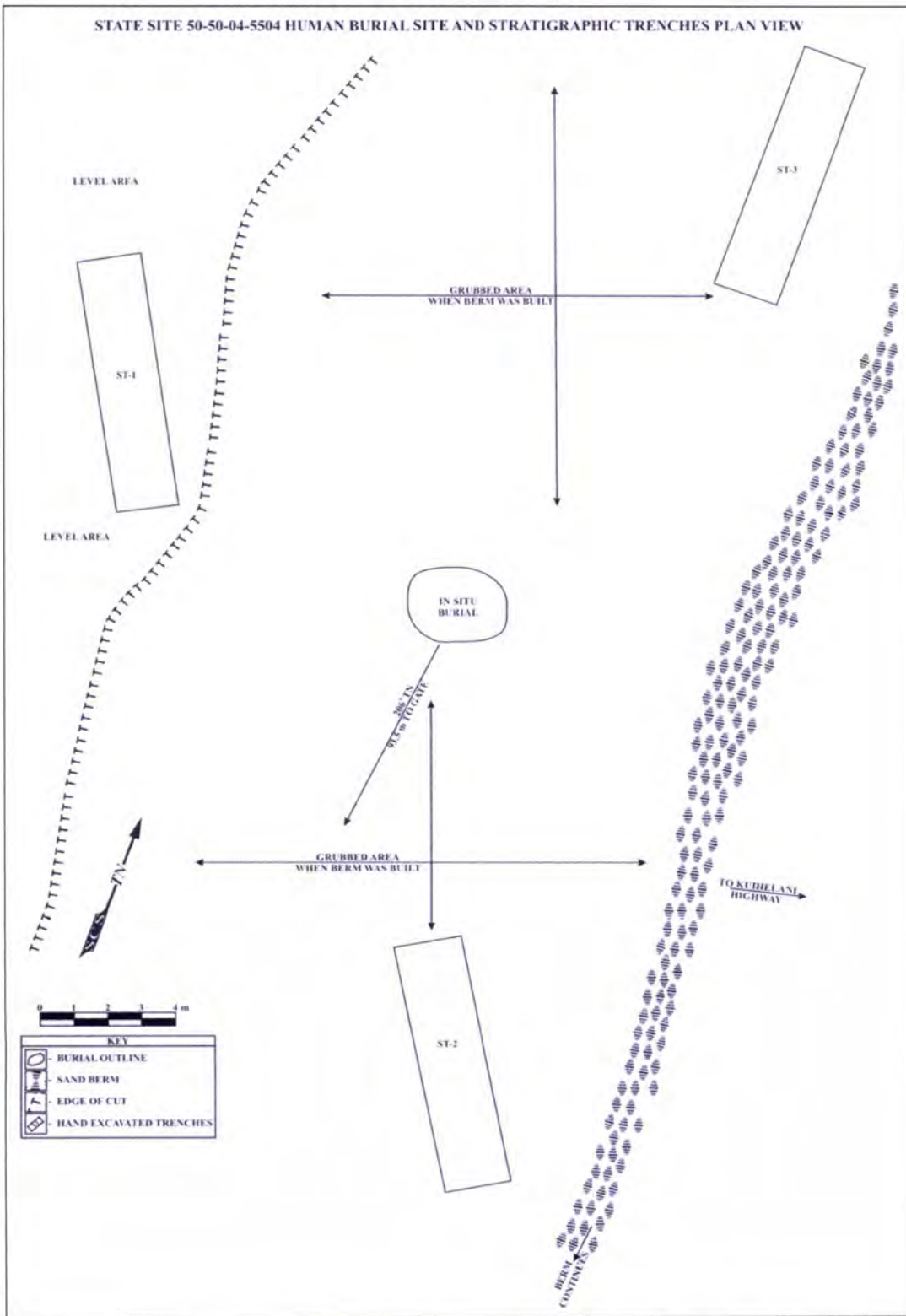


Figure 12: Plan View Drawing Showing Locations of Stratigraphic Trenches 1 Through 3 in the Vicinity of State Site 50-50-10-5504 Human Burial Site.



Figure 13: Photograph of Stratigraphic Trench 1 West Wall Profile in the Vicinity of State Site 50-50-10-5504 Human Burial Site. View to West.

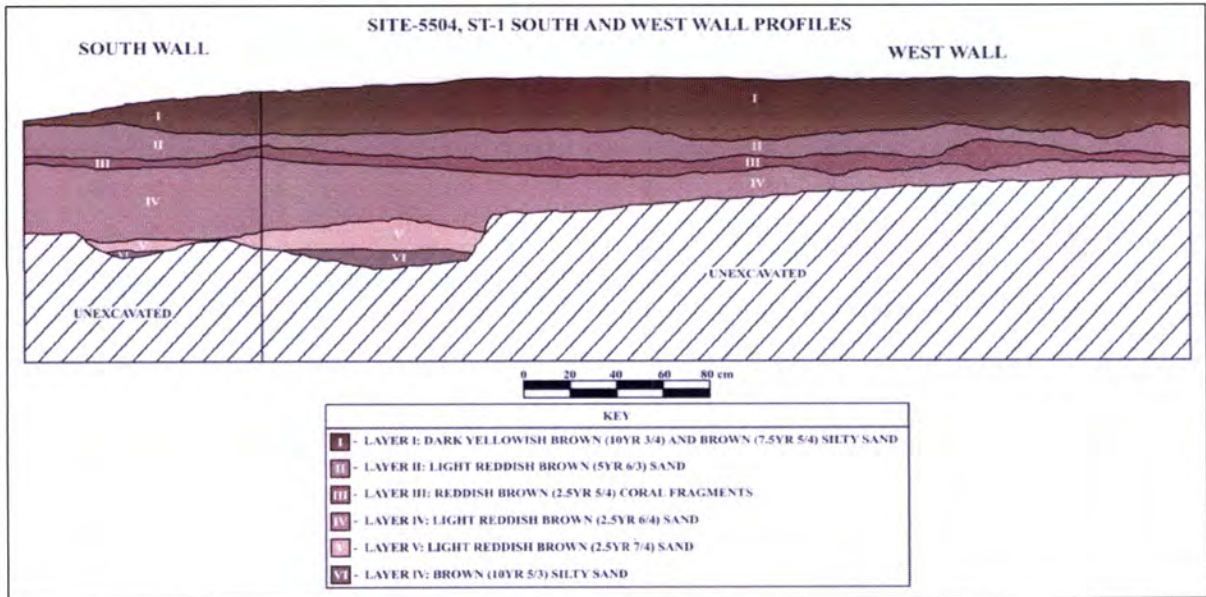


Figure 14: Profile Drawing of Stratigraphic Trench 1 West Wall in the Vicinity of State Site 50-50-10-5504 Human Burial Site.

Stratigraphic Trench 2

ST-2 was placed in an area that had been previously modified (2003) for construction of the sand berm. ST-2's long axis was oriented 20/200° (magnetic; northeast/southwest) and placed approximately five meters northeast of the *in situ* human burial identified as part of State Site 50-50-04-5504. ST-2 measured 4.0 meters (m) long, 1.0 m wide, and was excavated to a maximum depth of 28 centimeters (cm) below ground surface. Two strata were identified (Figure 15). Prior to the excavation of ST-2, matrices that had been displaced by mechanical means were removed (overburden) so that intact matrices could be investigated without contamination. Layer I (4–24 cm thick) was composed of fine to very fine, pale brown (10YR 6/3) sand with approximately 2 percent roots. No rocks or cultural remains were observed in Layer I. Layer I was interpreted as having been previously disturbed. Layer II comprised the base of excavation for ST-2 and was composed of fine (when crushed), blocky, light reddish brown (2.5YR 7/3) lithified sand with very few rootlets in its upper strata and a few pieces of naturally deposited coral. Although a portion of Layer II was excavated, excavation of ST-2 was eventually terminated due to the vertical continuation of the lithified sand (*i.e.*, Layer II). No cultural material was observed during the excavation of ST-2.

Stratigraphic Trench 3

ST-3's long axis was oriented 170/350° (magnetic; southeast/northwest) and placed approximately 4.5 meters south of the *in situ* human burial identified as part of State Site 50-50-04-5504. ST-3 measured 4.0 meters (m) long, 1.0 m wide, and was excavated to a maximum depth of 42 centimeters (cm) below ground surface. Three strata were identified (Figures 16 and 17). Like ST-2, matrices that had been displaced by mechanical means were removed prior to the excavation of ST-3 so that intact matrices could be investigated without contamination. Layer I (4–8 cm thick) was a fine, pale brown (10YR 6/3) sand with some roots and no rocks. Layer I was interpreted as previously disturbed. Layer II (4–14 cm thick) was a blocky (fine to very fine when crushed), light reddish brown (2.5YR 6/3–7/3) lithified sand with fragments of coral. Layer III comprised the base of excavation for ST-3 and was composed of fine to slightly coarse, light reddish brown (2.5YR 7/4) sand with no roots or stones. No cultural material was observed during the excavation of ST-3.

STATE SITE 50-50-04-1508 SPRECKELS DITCH SECTION (SCS SITE TS-2)

State Site 50-50-04-1508 is the second of two previously identified archaeological sites within the current project area (see Figure 9). Also located in Area A, Site -1508 is an historic, single feature site identified as a section of the Spreckels Ditch (State Site 50-50-04-1508). This particular section of the Spreckels Ditch is an open-air, linear, concrete-lined ditch constructed in a relatively flat area of sand dune. The concrete represents recent improvement to the ditch. The dimensions of the open-aired section of the ditch within the project area measure approximately 321.9 m long by 2.5 m wide (804.75 m²); the interior base of the ditch could not be described well as the ditch is still active (*i.e.*, accumulated soil on the ditch interior and flowing water prevented the acquisition of accurate depth measurements). Modern glass beer bottles and food debris [*e.g.*, recently collected *opihi* (*Cellana* sp.) shells] were identified near the ditch. Although the section of Spreckels Ditch within the project area is visible, the remainder of the north section within the project area is located in subsurface contexts. A 1997 USGS map shows a reservoir being fed from the subsurface pipeline portion of the Spreckels Ditch from the northern project area boundary. The visible section of Spreckels Ditch continues out of the project area, under Kuihelani Highway and onto tax map key (2) 3-8-006:003 where the ditch becomes known as the Camp 7 Ditch.

STATE SITE 50-50-04-6578 TRADITIONAL SITE (SCS SITE TS-3)

State Site 50-50-04-6578 is the third and final archaeological site located in Area A and the only one identified during the current Inventory Survey (see Figure 9; see Figure 11). The single feature site was located during the mechanical excavation of Stratigraphic Trench 90 (ST-90). ST-90 measured 5.3 m long by 1.0 m wide, and was excavated to a maximum depth of 173 centimeters (cm) below ground surface. Four strata and one subsurface feature were identified in the trench (see Appendix B). Layer I (0–40 cmbs thick) was composed of loose, pinkish gray (7.5YR 6/2) sandy loam with less than 5% of its matrix comprised of rocks and roots. Layer II (40–120 cmbs) was a very fine, light brown (7.5YR 6/3) sand with few roots. Layer III (120–160 cmbs) consisted of loose, very fine pinkish gray (7.5YR 7/2) sand with few roots. Layer IV (160 + cmbs) was a compact, brown (7.5YR 5/2) silty loam. The mechanical excavation of ST-90 was terminated in basal layers and in one section of the trench (near center), due to the presence of charcoal stained waterworn basalt rocks. Once explored manually, this concentration would later be interpreted as an *imu* and has been designated as State Site 50-50-04-6578. Except for the *imu*, no additional cultural materials or features were observed during the excavation of the four strata in ST-90. Following the excavation of ST-90, the location of the *imu* was manually investigated.

The profile of ST-90's west wall shows the *imu* to have been constructed within Layer II; the thickness of the charcoal staining directly associated with the subsurface feature was approximately 2 to 6 cm thick (Figure 18). The horizontal dimensions of the *imu* measured 0.86 m long by 0.60 m wide, with depths varying between 26 and 53 cmbs. The underground oven (*i.e.*, the *imu*) was constructed of waterworn basalt cobbles laid in a semi-circular ring, within which flatter cobbles of the same type were placed in the interior (Figures 19 and 20). A single, charred botanical sample was collected from the matrices of the *imu* and submitted to Beta Analytic, Inc. for analysis (Beta No. 249137/ SCSRC 614) (Appendix C). This sample provided a conventional radiocarbon age of 150±40 years BP (Before Present). Based on OxCal version 3.5, this radiocarbon age produced a calibrated date range of 1660 to 1960 A.D. (2 sigma; 95.4% probability) and 1720 to 1780 A.D. (1 sigma; 25% probability) (Appendix C). This date range indicates a relatively late period of use [*i.e.*, late pre-Contact to early post-Contact (Western Contact 1778 A.D.)]. The lack of historic artifacts and modern debris within the associated context of the feature, type of construction material to construct the feature, combined with the result of the radiocarbon sample, suggests the single feature site may have traditional-period associations. The feature was interpreted to represent a single food preparation event.

SCS MANUAL TESTING LOCALE

The SCS Manual Testing Locale is also located in Area A, specifically in the area currently under license to Hawaiian Cement for sand mining (Archaeological Services Hawaii, Inc. is conducting Archaeological Monitoring of this area) (see Figures 5 and 9). This SCS Manual Testing Locale is not related to any archaeological site and was done more for representative testing of various locales and is located on a small sand dune knoll approximately 8.0 m long by 7.5 m wide, with varying above ground surface heights between 3 and 37 cm (Figure 21). Modern disturbance identified as a push pile, probably created by one of the machines utilized by Hawaiian Cement to “cut” away sand slopes, was present in the locale's northwest corner. Visibility from the locale was vast, overlooking central Maui and beyond. A total of two excavation units (one stratigraphic trench and one test unit) were manually excavated as the topographic location suggested subsurface cultural deposits might be present. Accessibility by backhoe was also extremely difficult, given the steepness of the terrain.

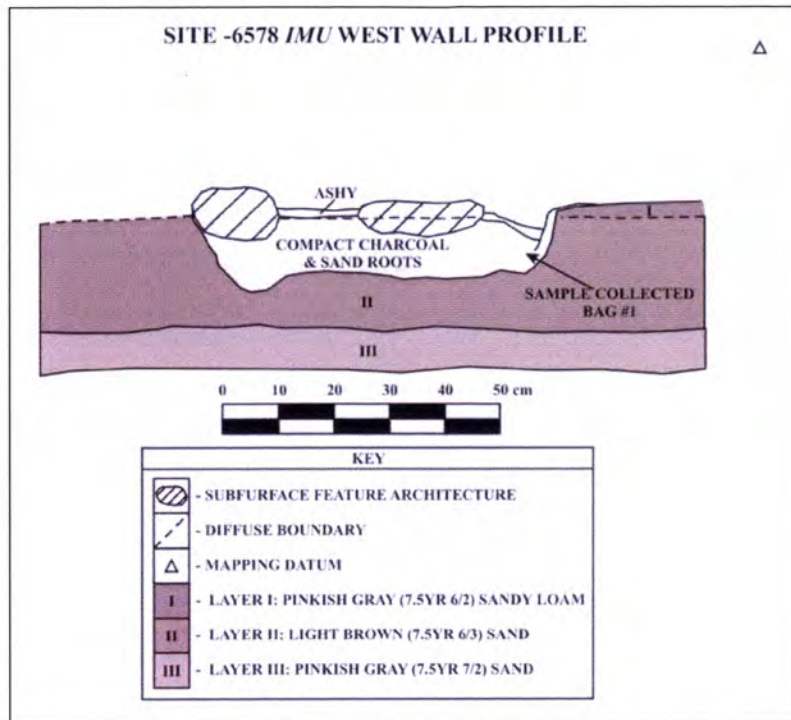


Figure 18: State Site 50-50-10-6578 *Imu* West Wall Profile Drawing.

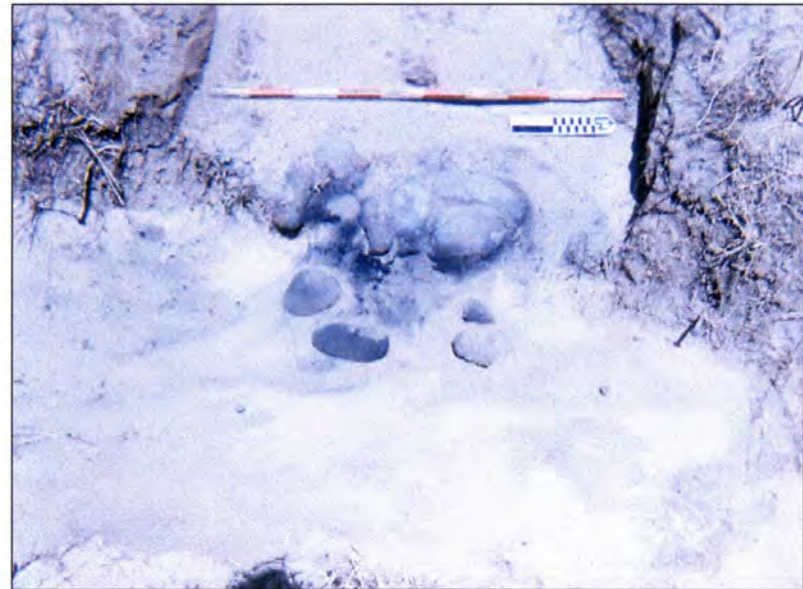


Figure 19: Photograph of State Site 50-50-10-6578 *Imu*. View to West.

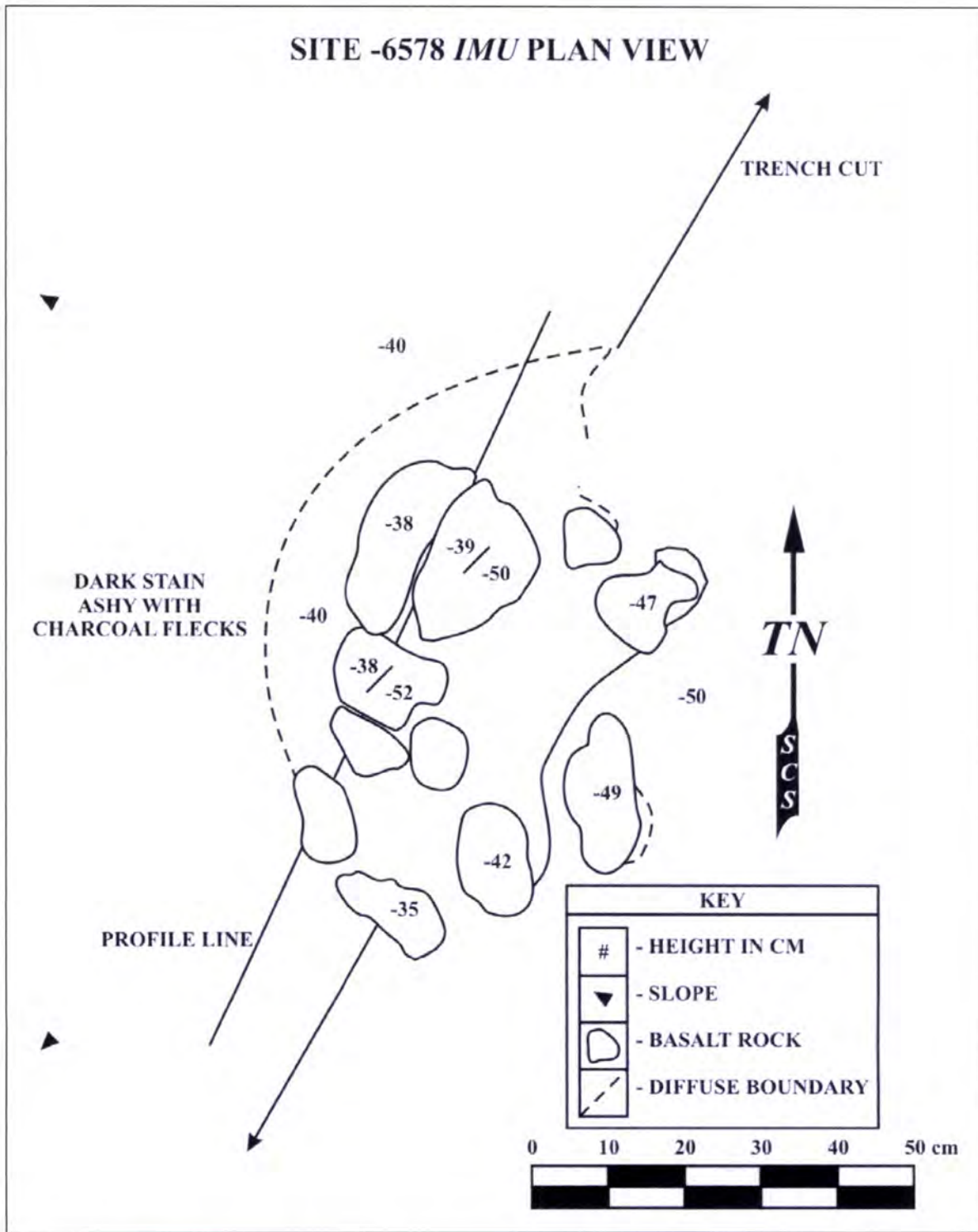


Figure 20: State Site 50-50-10-6578 *Imu* Plan View Drawing.



Figure 21: Photograph of SCS Manual Testing Locale (MTL). View to Northeast.

Test Unit 1 (SCS MANUAL TESTING LOCALE)

Test Unit (TU) 1 was the first (of two) manually excavated units placed in the SCS Manual Testing Locale to investigate the presence/absence of subsurface cultural deposits. Situated near the center of a small sand dune knoll, TU-1 measured 1.0 m by 1.0 m and was excavated to a maximum depth of 21 cm below surface. Only one stratum was observed. Layer I consisted of fine to very fine, dark grayish brown (10YR 4/2) silty sand that did not produce any cultural material. Excavation of TU-1 was terminated due to the presence of very hard lithified sand encountered throughout the test unit base. Cultural material was not observed during the excavation of the single strata.

Stratigraphic Trench 1 (SCS MANUAL TESTING LOCALE)

ST-1 was the second of two manually excavated units placed to investigate the small sand dune knoll for the presence/absence of subsurface cultural deposits. Oriented 120/300° (magnetic; southeast/northwest), ST-3 measured 3.5 meters (m) long, 1.0 m wide, and was excavated to a maximum depth of 78 centimeters (cm) below ground surface. Three strata were identified (Figures 22 and 23). Layer I (4–28 cm thick) was composed of fine to very fine, dark grayish brown (10YR 4/2) silty sand. Layer II (38–52 cm thick) was a coarse, brownish yellow (10YR 6/6) sand with pockets of lithified sand and very few roots. While the excavation of Layer I terminated on the compacted sand in the west two-thirds of the trench, Layer II was

observed in the eastern one-third of ST-1. Layer IIA, like Layer II, was also observed in the eastern third of ST-1. Layer IIA was interpreted as a moderately compact, fine to very fine, pale red (2.5YR 6/2) silty sand containing pockets of lithified sand. Excavation of ST-1 was terminated due to the presence of very hard, compact lithified sand encountered throughout the trench. Cultural material was not observed during the excavation of the three strata.

AREA B

Area B constitutes the western/northwestern portion of the survey area and is situated on TMK: (2) 3-8-007:101 (por.) and 3-8-007:104. The Maui Lani Subdivision is located on its northern flank, the Hawaiian Cement sand mining area to its southwest flank, and Maui Landscape Specialty, Inc. located to the southwest flank (see Figure 9). Area B encompasses two businesses identified as Ameron International Corporation and Tom's Backhoe. The majority of Area B is mostly flat, this likely the result of previous clearing, sand mining, and compaction actions.

A total of ten trenches were mechanically excavated in Area B that revealed between two and nine strata. The average length and depth of the ten trenches was 6.1 meters and 1.36 meters, respectively. All these trenches contained sandy matrices of varying compactness and sorting. Overall, other matrices observed during the excavation of the ten trenches in Area B were identified as loam, silt, and various hues of lithified sand. Only one of the ten trenches revealed the presence of waterworn basalt cobbles, which represented "river rock." One of the ten trenches also displayed evidence of modern disturbance, based on the presence of buried logs to approximately 60 cm below the ground surface. All trenches were culturally sterile.

AREA C

Area C occurs in the center of the project area and is primarily situated on TMK: (2) 3-8-007: 101 (por.), with 3-8-007:71 and 3-8-007:102 also composing the area. Area C contains ranching leases with Brendan Balthazar, Gary Vares, Christopher Lopes, and Manual Lopes (see Figure 9). The majority of Area C is covered with dry grasses, low shrubs, and small to medium sized *kiawe* (*Prosopis padilla*) and *haole koa* (*Leucaena leucocephala*) trees. In addition, Area C contains lands presently used for cattle ranching and informal roads.



Figure 22: Photograph of SCS Manual Testing Locale Stratigraphic Trench 1 Southwest Profile. View to Southwest.

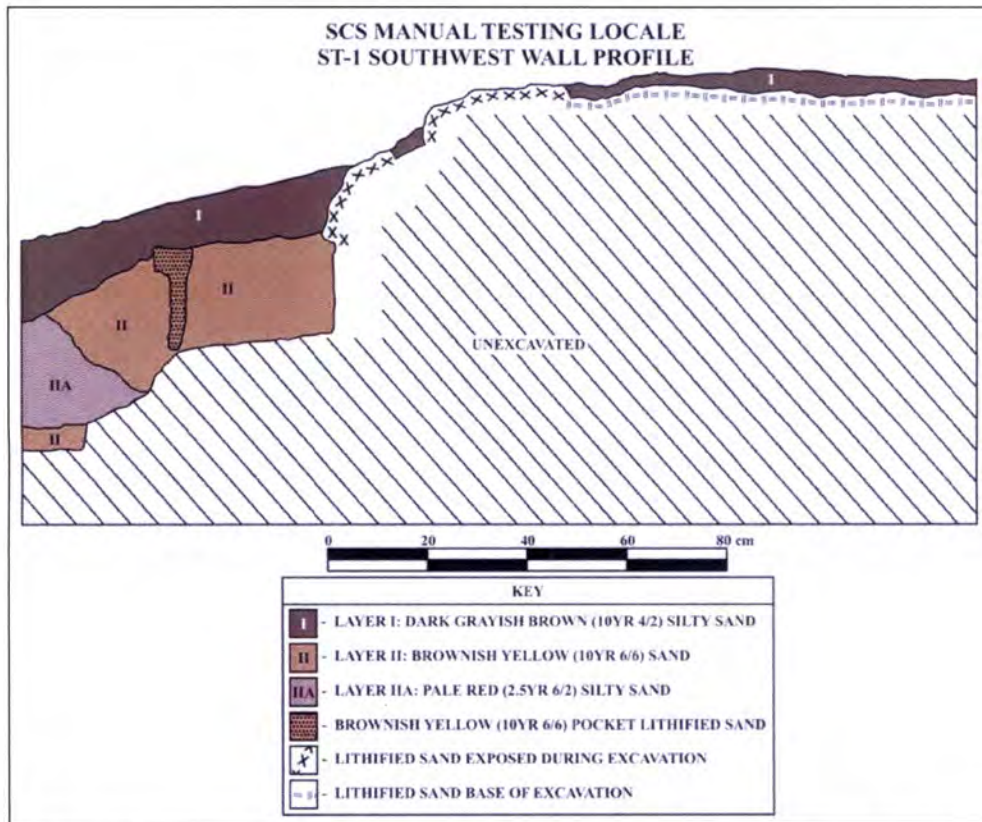


Figure 23: SCS Manual Testing Locale Stratigraphic Trench 1 Southwest Profile Drawing.

A total of 56 trenches were mechanically excavated in Area C, the result of which produced trenches that contained between one and nine strata. All of the trenches contained sandy matrices yet none yielded cultural deposits; all trenches were sterile. The average length and depth of the 56 trenches was 6.5 meters and 1.42 meters, respectively. Beside sand, other matrices observed during the excavations in Area C were identified as loam, silt, and various hues of lithified sand. Sixteen of the 56 trenches (approximately 29 percent) revealed the presence of either waterworn basalt cobbles and/or basalt pebbles interpreted as “river rock.” None of the 56 trenches in Area C exhibited modern disturbances. Survey and excavation of Area C was not totally devoid of cultural material; casual commutes to and from this portion of the project area did lead to the recovery of one basalt core on the surface of one of the many informal cattle paths (see Appendix D for artifact photo). This single artifact (isolated find) is interpreted as having Traditional associations. Prior to the isolated finding of the basalt core, the two closest mechanically excavated trenches, ST-149 (33 meters to the north) and ST-150 (26 meters to the southeast) which were placed on the flanks of the location where the basalt core was found, produced negative results for cultural material.

AREA D

Area D is a somewhat triangular-shaped parcel situated on TMK: (2) 3-8-007:23 (por.) and includes the small parcel 3-8-007:037. Waiko Road is located on its northern flank and Kuihelani Highway on its east flank, with a sugarcane field to the south and west flanks. Tax Map Key (2) 3-8-007: 37 is located specifically within the northeastern corner of Area D and contains an active orchid farm (see Figure 9). This area was not tested. The majority of Area D is covered with remnant/fallow sugarcane and dry grasses. At the time Area D was surveyed, the sugarcane had been cultivated and removed.

A total of 54 trenches were mechanically excavated in Area D. No trenches were excavated within Parcel 37, an active orchid farm, to avoid commercial disturbance to their operations. No cultural deposits were identified in the trenches excavated on Parcel 23. Trenching did yield stratigraphy containing two to nine strata, of which sand occurred in each trench to varying degrees. The average length and depth of the 54 trenches was 6.5 meters and 1.42 meters, respectively. Overall, other matrices observed during the excavation of the 54 trenches in Area D were identified as loam and silt. The lithified sand observed in many of the trenches in Areas A, B, and C was observed in only three of the Area D trenches (Stratigraphic Trenches 111, 138, and 139). Thirty-one of the 54 trenches (57 percent) contained either waterworn basalt cobbles and/or basalt pebbles interpreted as “river rock.” Thirty-two of the 54 trenches (59 percent) contained modern debris (*e.g.*, black plastic irrigation tubes, metal, and

glass) and charred botanical remnants of sugarcane cultivation. The upper level soils on Parcel 23 primarily consist of imported fill. These soils were brought onto the predominantly sandy landscape and bedded to grow sugar cane.

AREA E

Area E is a rectangular-shaped section consisting of c. 40-acres and is situated in the southern, central portion of the project area on TMK: (2) 3-8-007:101 (por.). The area is licensed to Hawaiian Cement. An Archaeological Assessment (Pantaleo 2008) and Archaeological Monitoring (Rotunno-Hazuka and Pantaleo 2008) were conducted on the 15-acre parcel directly to the north (see Figure 9). This parcel is bordered by the aforementioned project area to the north, Area C (of this report) to the east, a cattle feed area and Consolidated Baseyards to the south, and the current Monitoring area of ASH, Inc. to the west. The majority of Area E is covered with dry grasses and *kiawe* and slightly undulates on an east-west axis (elevation decreases to the east).

A total of 28 trenches were mechanically excavated in Area E during Phase II research. All trenches were sterile, with none yielding cultural materials of any period. Area E strata were variable, being very shallow to the south (due to river rock and shallow saprolitic basement) and deeper to the central and northern sections. Most matrices were homogenous across the area, with most trenches exhibiting five strata: Layer I was composed of pale brown (10YR 6/3) very fine sand (loose) and few, subangular cobbles. Layer II consisted of brown (10YR 5/3) silty sand (loose) with common rootlets and few, subangular pebbles and cobbles. Layer III consisted of very pale brown (10YR 7/4) fine sand with was very hard (lithified). Layer IV was composed of brown (10YR 5/3) very fine, sub-angular, granular sand. Rounded basalt cobbles were common. Layer V was composed of strong brown (7.5YR 5/6) very fine, loose sand. Few rootlets and roots were present. This “key” for the 28 trenches slightly varied, again, between the northern and southern portions of the area due to stratigraphic depth and presence/absence of natural pebbles and cobbles. Appendix B provides representative stratigraphic profiles from Area E.

AREA F

Area F is also a somewhat rectangular-shaped parcel situated on TMK: (2) 3-8-007:101 (por.) and consists of c. 50-acres of undeveloped land. Area F is licensed to Hawaiian Cement and occurs directly to the north of the 15-acre project area studied through an Archaeological Assessment (Pantaleo 2008) and Archaeological Monitoring (Rotunno-Hazuka and Pantaleo 2008) (see Figure 9). This segment is bordered by the aforementioned project area to the south,

Area C (of this report) to the east, Area A (of this report) to the north, and the current Monitoring area of ASH, Inc. to the west. Directly to the west is a wide swath of cleared area that is overlain by basalt base course. The majority of Area E is covered with dry grasses and *kiawe* and also slightly undulates on an east-west axis (elevation decreases to the east).

A total of 50 stratigraphic trenches were mechanically excavated in Area F during Phase II research. All trenches were sterile, with none yielding cultural materials of any period. Area F strata were quite homogenous, with less variation in depth and content. Sandy sediment dominated the matrices and typically, six strata were encountered. Layer I was composed of brown (7.5YR 4/3) very fine, silty sand (loose) with common roots. Layer II consisted of very pale brown (10YR 7/4) sand with a clear boundary. Layer III consisted of light brown (7.5YR 6/4) very fine, mostly lithified sand. Layer IV was composed of brownish yellow (10YR 6/6) very fine, sub-angular, granular sand. Layer V consisted of brown (10YR 5/3) very fine, loose sand. Natural basalt cobbles were common. Layer IV was composed of reddish brown (5YR 4/4) clay. Few rootlets and roots were present. The clay represented the base of excavation in most cases. This “key” for the 50 trenches slightly varied, again, although homogeneity was high in this section. Appendix B provides representative stratigraphic profiles from Area F.

AREA G

This small area occurs in the western portion of the project area, between several previous project areas (see Figure 9). The location has been previously graded and the surface is covered with basalt base course. To cover as much of the project area as possible, SCS excavated three trenches in this disturbed locale. The location occurs to the north and east of Parcel 104 and to the south and west of the enveloping ASH, Inc. Hawaiian Cement Sand Mining area. Area G is situated on TMK: (2) 3-8-007:101 (por.).

A total of three (3) trenches were mechanically excavated in Area G during Phase II research. All trenches were sterile, with none yielding cultural materials of any period. Area G strata was homogenous, with five layers present in each of the trenches. Layer I was composed of gray (5YR 5/1) basalt base course (artificial layer). Layer II was composed of brown (10YR 4/3) silt loam. Layer III consisted of dark gray (5YR 4/1) basalt gravels (artificial layer). Layer IV consisted of brownish yellow (10YR 6/6) sand with no roots or clastics. Layer V was composed of dark reddish brown (5YR 3/3) clay with strong structure. This “key” for the 3 trenches showed redundancy in matrices encountered within the three trenches, all of which were sterile. Appendix B provides representative stratigraphic profiles from Area G.

CONSULTATION

The initial conceptual plan for the Waiale Project was formulated with the participation of the greater Maui Community, including those with knowledge of the Wai`ale area. Excerpts from a flyer explaining the process and identifying some of the participants are presented in Appendix E. Archaeological Consultants Hawaii, Inc. (ASH) has also consulted with the Maui/Lana`i Islands Burial Council (MLIBC) regarding the inadvertent finding of human skeletal remains, identified during Archaeological Monitoring of portions of the current project area, on three separate occasions. The initial presentation to the MLIBC occurred on October 30, 2003 and the follow-up occurred on November 26, 2003. On August 28, 2008, ASH provided the MLIBC with an up-date on the number of burials located within the Hawaiian Cement, AMERON sand mining, and Maui Lani Project Areas. Thus, consultation with the community, including the MLIBC, has been on-going for over 5 years.

DISCUSSION AND CONCLUSION

Excluding previously identified State Site No. 50-50-04-3525, sites within the work area of Archaeological Services Hawaii (ASH) (State Site No. 50-50-04-4200, -4201, and -4202), as well as two previously identified sites (Spreckels Ditch, State Site No. 50-50-04-1508 in Area A of the project area and human burial site, State Site No. 50-50-04-5504, also in Area A), current Inventory Survey of the approximate 607-acre area of land yielded only one previously unrecorded archaeological site (see Figure 9). This site was identified as a subsurface oven (*imu*) and designated State Site No. 50-50-04-6578. The mechanical excavation of 282 stratigraphic trenches (and five manual trenches) revealed that 40 trenches (20 percent) produced evidence for human alteration and influence (modern) through the presence of subsurface modern debris and charred botanical remnants. The alterations of matrices are interpreted to be the result of sugarcane cultivation, sand mining, or a combination. The finding of a single subsurface *imu* aside, the lack of additional subsurface archaeological cultural materials and features in the remaining trenches did not support the existence of significant settlement, either temporary or permanent, within the project area. This is not surprising considered the instability of the surface (sand) and the location of the project area (mid-isthmus). A single surface find (isolated find), interpreted as a basalt core, was the only artifact found in the project area and was the likely result of Traditional-period transient movement through the area (see Appendix D for artifact photo).

Based upon previous archaeological research for the project area and environs, as well as archival research of historical texts regarding central Maui, two main types of archaeological

sites associated with traditional and historic times were suspected to occur within the project area: agricultural sites (temporary habitation features possibly included) and human burials. Agricultural sites were expected to occur only in Area D, due to its proximity to Waikapū Stream, but none were identified. The area is too sandy for cultivation; modern cultivation in the area involved importing massive amounts of non-sandy soil in which to plant sugar cane. It is unlikely such practices would have occurred in prehistoric/early historic times. Only one agriculturally-related historic surface site was found in the project area, a segment of the previously identified Spreckels Ditch (Site -1508). Potentially, temporary habitation/activity sites (temporary in the sense of occupation for only a few hours during the day) would be present. Evidence for temporary occupation was identified in the form of Site -6578, the subsurface fire pit, and the single, isolated basalt hammerstone. No other artifacts or ecofacts supporting habitation were identified in the project area.

As is well documented in the State, human burials are often found in sandy sediment. For the current project area, human burials were expected to be found in such sandy matrices, but more so in the natural sand dunes of Areas A, B, and C due to absence of modern agricultural disturbances (*i.e.*, sugarcane). However, with the exception of Site -5504, in which evidence for three burials (one *in situ* and two scattered) was previously identified, no additional human burials were found. Various types of terrain (*e.g.*, sand dune hilltops, hill slopes, flats, swales) were mechanically and manually excavated yet all were sterile. Site -5504 aside, the project area, at least the north half, is not devoid of human remains, as shown by the excavations of Moore and Kennedy (1998), the results of Archaeological Monitoring in the Hawaiian Cement areas, and the recovery project on Parcel 104. In addition, the adjacent Maui Lani Subdivision (north) is well known to also contain many burials interred within sandy matrices.

This begs the question: in over 287 excavated trenches, why were no burials identified during this project? Certainly sampling could be one reason, as 100% of the project area was not tested. Second, was depth a factor? A majority of the trenches were excavated to at least 1.5-2.0 mbs, certainly at depths containing burials in the area (see Previous Archaeology section above). Depth appears not to have been a factor. Third, the lack of burials could be associated with lack of settlement in the area. This appears unlikely, given the large number of burials in the Hawaiian Cement area, but there is still the lack of habitation deposits in the area. Fourth, could the known burials be exclusively associated with the Battle of Kakanilua? This remains a possibility, although the battle text appears more to reflect the Maui Lani area than the current project area. Also, an analysis of the identified burials could reveal whether weaponry (sling stones, etc.) or skeletal trauma was present, to further associate with the battle. Finally, it is

possible, given the state of the currently tested areas, that burials are most often found in the larger, undisturbed natural sand dunes. Much of the current project area has been subject to some form of grading/clearing through time. It is also possible that burials were more often to occur at higher elevations (c. 250-350 ft. a.m.s.l.) within a sand dune belt extending from the western/central portion of the current project area through Maui Lani toward Wailuku.

Past research in the general environs of the current project area, combined with the presence of previously undocumented Site -6578 (the *imu*) and several previously identified burials, suggests that the current project parcel was not the location for primary settlement during Traditional or historic times. Burial is one site type identified in the project area, as well as a subsurface feature associating with transient use of one portion of the area. In the Waikapū area, the settlement pattern is such that a majority of the agricultural plots with associated habitations were situated above what is now the Honoapiilani Highway (c.400 ft. elevation), mostly near Waikapū Stream, and much upland from the current project area. The current parcel did not reveal evidence for agriculture, beyond modern sugar cane cultivation (no formal sites though). No evidence of permanent occupation was found; this not surprising considering the land type and surface. Permanent settlement is typically associated with stable land surfaces, not potentially shifting dune surfaces. In all, this isthmus area is somewhat a “barren zone”, but differs from the “barren zone” of southeastern Maui in that the current parcel has deep, sandy stratigraphy while the latter consists of shallow soils overlying bedrock. Both these zones, however, were transitional environmental areas between coastal and upland resources. As such, they would have supported transient occupation more so than permanent settlement, with subsistence regimes being minimal. These zones compose an outer periphery to settlement core areas such as Wailuku.

In sum, the highest concentration of human burials (previously identified State Sites -4200 and -4201) within the project area is located to the east of Area B and was identified in the area utilized as sand mining for Hawaiian Cement (currently Monitored by ASH) (see Figure 5). Area A contains an historic agricultural site identified as a portion of the Spreckels’ Ditch (Site -1508) and two Traditional-period sites [Site -6578 (the *imu*) and Site -5504 (evidence for three burials)]. Area B did not reveal the presence of sites. While only an isolated basalt core was found on its ground surface, Area C also did not reveal the presence of a site. Area D, while thought to contain potential agricultural sites due to its proximity to Waikapū Stream, also yielded negative results. Areas E, F, and G were also sterile. The project area, cast as a “barren zone” of sorts above, appears to have been peripheral to even modest settlement and activity

from traditional times through historic times, the latter period wherein the area was used more heavily for sugar cane cultivation and more recently, the profitable business of sand mining.

SIGNIFICANCE ASSESSMENTS

Three sites are evaluated herein for significance as a) they occur in the current project area and b) are not being mitigated by other firms working in the project area. The aforementioned burials occurring in Hawaiian Cement areas are being mitigated by ASH, Inc. and the burials noted on parcel 104 have been mitigated by Fredericksen and Fredericksen (Xamanek, Inc.). Thus, three sites are being evaluated herein: newly identified *imu* (State Site 50-50-04-5504), a segment of Spreckels Ditch (State Site 50-50-04-1508), and the three burials (State Site 50-50-04-5504). Please note: As the above-mentioned burials were inadvertently identified by ASH archaeologists, Scientific Consultant Services, Inc. did not consult with community members, as per HAR § 13-276-5(a) and (a) (4) (g). All three sites are subject to the broad criteria established for the State of Hawai'i's Register of Historic Places §13-275-6 classified below:

- Criterion A: Site is associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B: Site is associated with the lives of persons significant to our past.
- Criterion C: Site is an excellent site type; embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction.
- Criterion D: Site has yielded or has the potential to yield information important in prehistory or history.
- Criterion E: Site has cultural significance; probable religious structures or burials present (State of Hawai'i criteria only).

Of the five criteria, the historic Spreckels Ditch (Site -1508) will continue to be classified under Criteria A and D as it is associated with events that have made an important contribution to the broad patterns of Hawaii State history (*i.e.*, Maui's sugar industry) and has yielded information important to history. The burial site (Site -5504) is considered significant under Criterion D and E in that while the mere presence of the site has yielded additional information to prehistory, the site is culturally significant (E). The late-traditional/ early historic period *imu*

(Site -6578) is considered significant under Criterion D in that the site has yielded information to prehistory.

RECOMMENDATIONS

Several archaeological actions are being recommended for the current project area and the archaeological sites present within its confines. First, full-time Archaeological Monitoring is recommended for sandy locations in the project area and those locales not subject to testing. Second, while the general boundaries of Site -5504 (burials) have been determined, no direct excavation of the osseous remains was conducted which would have allowed—at a minimum—evaluating the age, sex, and ethnicity of the burials. While identified in 2003 by an ASH, Inc. employee, it appears that no formal mitigation or preservation of the site has occurred over the past six years. Several recommendations are posed herein for Site -5504. First, with regards to the displaced human remains first observed in the sand berm that parallels Kuihelani Highway, the sand berm should be closely monitored by at least two individuals for the purposes of recovering any additional displaced human remains. Second, a Burial Treatment Plan should be written for Site -5504 and submitted to the SHPD-Culture History section and the MLIBC for consultation and approval. Please note: As the above-mentioned burials were inadvertently identified by ASH archaeologists, Scientific Consultant Services, Inc. did not consult with community members, as per HAR § 13-276-5(a) and (a) (4) (g).

Next, the presence of an open-aired section of a modified historic structure (concrete reinforcement) will continue to be utilized by currently lessees of the land. No further archaeological work is recommended for the segment running through the project area. The site's use as an irrigation ditch appears limited, although it still does minimally feed current agricultural land within the project area and transports water for cattle in the area. Its presence in the project area was primarily for the transportation of water to sugarcane lands located southeast of the project area. The site has been previously recorded during other surveys in different portions of Wailuku, Waiehu, Waihee—now Waikapu—Spreckels Ditch was placed on the State of Hawai'i's Register of Historic Places. No further work is recommended for this small segment of the ditch. Much finer examples of the ditch, as noted in the above valleys, have been preserved and many are still in active use.

Regarding State Site 50-50-04-6578, the *imu*, no further archaeological work is recommended. The site has been mapped, recorded, and sampled. Areas within and near Site -6578 will be Monitored during ground altering work.

A Burial Treatment Plan will also be prepared to specifically address interim and permanent mitigation of those burials identified by Archaeological Services Hawaii, LLC. within the Hawaiian Cement sand mining area.

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APPENDIX A: MECHANICALLY EXCAVATED STRATIGRAPHIC TRENCH
GENERAL INFORMATION

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area A	ST-1 (Phase I)	E 0762009 N 2308131	8.3 x 1.0 x 1.35	5	Yes	No	Plastic irrigation line	I, II, IV
Area A	ST-2 (Phase I)	E 0761981 N 2308167	6.8 x 1.0 x 1.00	5	Yes	Yes; IV	-	-
Area A	ST-3 (Phase I)	E 0761961 N 2308206	7.0 x 1.0 x 1.04	5	Yes	No	-	-
Area A	ST-4 (Phase I)	E 0762005 N 2308243	9.3 x 1.0 x 1.14	5	Yes	No	-	-
Area A	ST-5 (Phase I)	E 0762030 N 2308229	9.0 x 1.0 x 1.20	5	Yes	No	-	-
Area A	ST-6 (Phase I)	E 0762054 N 2308231	7.2 x 1.0 x 1.15	2	Yes	No	-	-
Area A	ST-7 (Phase I)	E 0762042 N 2308269	6.8 x 1.0 x 1.22	4	Yes	No	-	-
Area A	ST-8 (Phase I)	E 0762084 N 2308313	5.0 x 1.0 x 0.87	5	Yes	No	-	-
Area A	ST-9 (Phase I)	E 0762116 N 2308333	9.2 x 1.0 x 1.00	6	Yes	No	-	-
Area A	ST-10 (Phase I)	E 0762142 N 2308416	5.0 x 1.0 x 0.50	1	Yes	No	Charcoal from modern burning	I
Area A	ST-11 (Phase I)	E 0762151 N 2308492	8.0 x 1.0 x 1.12	4	Yes	No	Charcoal from modern burning, pieces of plastic sheets and irrigation pipes	I
Area A	ST-12 (Phase I)	E 0762101 N 2308505	8.0 x 1.0 x 1.12	5	Yes	No	Pieces of plastic pipe	I
Area A	ST-13 (Phase I)	E 0762028 N 2308471	9.0 x 1.0 x 0.90	5	Yes	No	Imported soil	I
Area A	ST-14 (Phase I)	E 0761921 N 2308180	9.0 x 1.0 x 0.64	3	Yes	No	Imported soil, charcoal from modern burning	I
Area A	ST-15 (Phase I)	E 0761947 N 2308145	8.9 x 1.0 x 1.18	2	Yes	No	Plastic sheet	I
Area A	ST-16 (Phase I)	E 0761974 N 2308089	6.5 x 1.0 x 0.71	4	Yes	Yes; IV	-	I

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area A	ST-17 (Phase I)	E 0761975 N 2308087	7.8 x 1.0 x 0.94	5	Yes	No	-	-
Area A	ST-18 (Phase I)	E 0762005 N 2308191	10.2 x 1.0 x 1.00	3	Yes	No	-	-
Area A	ST-19 (Phase I)	E 0761937 N 2308089	10.2 x 1.0 x 0.98	4	Yes	No	Glass, slag, iron wire	I, II
Area A	ST-20 (Phase I)	E 0761961 N 2308054	9.7 x 1.0 x 1.16	4	Yes	Yes; III	Imported soil	I, II
Area A	ST-21 (Phase I)	E 0761949 N 2308028	7.6 x 1.0 x 0.93	5	Yes	Yes; III, IIIA	Imported soil	I
Area A	ST-22 (Phase I)	E 0761964 N 2308359	5.3 x 1.0 x 0.75	5	Yes	No	-	-
Area A	ST-23 (Phase I)	E 0761932 N 2308380	5.5 x 1.0 x 0.72	4	Yes	No	-	-
Area A	ST-24 (Phase I)	E 0761898 N 2308401	6.3 x 1.0 x 0.90	4	Yes	Yes; III, IV	-	-
Area A	ST-25 (Phase I)	E 0761864 N 2308441	5.4 x 1.0 x 0.80	5	Yes	Yes; IV	Irrigation tubing, Charcoal from modern burning	I
Area A	ST-26 (Phase I)	E 0761842 N 2308478	6.0 x 1.0 x 1.22	6	Yes	No	-	-
Area A	ST-27 (Phase I)	E 0761807 N 2308499	6.2 x 1.15 x 1.15	3	Yes	Yes; II, III	-	-
Area A	ST-28 (Phase I)	E 0761827 N 2308545	7.2 x 1.0 x 1.20	5	Yes	Yes; III, IV	-	-
Area A	ST-29 (Phase I)	E 0761859 N 2308592	5.5 x 1.0 x 0.80	3	Yes	No	-	-
Area A	ST-30 (Phase I)	E 0761894 N 2308613	5.7 x 1.0 x 1.10	4	Yes	No	-	-
Area A	ST-31 (Phase I)	E 0761933 N 2308623	7.0 x 1.0 x 1.10	3	Yes	No	-	-
Area A	ST-32 (Phase I)	E 0761919 N 2308580	5.8 x 1.0 x 0.91	4	Yes	No	-	-
Area A	ST-33 (Phase I)	E 0761927 N 2308535	5.5 x 1.0 x 0.88	4	Yes	No	-	-
Area A	ST-34 (Phase I)	E 0761942 N 2308491	5.0 x 1.0 x 1.05	5	Yes	No	-	-
Area A	ST-35 (Phase I)	E 0761994 N 2308507	5.5 x 1.0 x 1.02	5	Yes	Yes; IV	-	-
Area A	ST-36 (Phase I)	E 0761971 N 2308552	6.0 x 1.0 x 1.04	3	Yes	No	-	-

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area A	ST-37 (Phase I)	E 0761843 N 2308643	5.8 x 1.0 x 1.00	4	Yes	No	-	-
Area A	ST-38 (Phase I)	E 0761790 N 2308560	6.5 x 1.0 x 1.25	3	Yes	Yes; III	-	-
Area A	ST-39 (Phase I)	E 0761745 N 2308531	6.3 x 1.0 x 1.43	4	Yes	No	-	-
Area A	ST-40 (Phase I)	E 0761698 N 2308532	6.3 x 1.0 x 1.52	2	Yes	No	-	-
Area A	ST-41 (Phase I)	E 0761752 N 2308468	5.6 x 1.0 x 1.43	4	Yes	Yes; III	-	-
Area A	ST-42 (Phase I)	E 0761827 N 2308676	5.8 x 1.0 x 1.09	3	Yes	No	-	-
Area A	ST-42 Extension (Phase I)	E 0761827 N 2308676	8.4 x 1.0 x 1.19	6	Yes	No	-	-
Area A	ST-43 (Phase I)	E 0761775 N 2308669	5.0 x 2.7 x 1.35	2	Yes	No	-	-
Area A	ST-44 (Phase I)	E 0761778 N 2308615	5.0 x 1.0 x 0.65	4	Yes	No	Charcoal from modern burning	II
Area A	ST-45 (Phase I)	E 0761679 N 2308588	5.5 x 1.0 x 1.12	3	Yes	No	-	-
Area A	ST-46 (Phase I)	E 0761648 N 2308620	4.0 x 1.0 x 1.35	2	Yes	No	-	-
Area A	ST-47 (Phase I)	E 0761690 N 2308647	5.5 x 1.0 x 1.32	5	Yes	Yes; V	-	-
Area A	ST-48 (Phase I)	E 0761742 N 2308697	5.5 x 1.0 x 0.70	3	Yes	No	-	-
Area A	ST-49 (Phase I)	Data not taken	4.5 x 1.0 x 1.31	5	Yes	No	-	-
Area A	ST-50 (Phase I)	E 0761839 N 2308667	7.5 x 1.0 x 1.26	6	Yes	No	-	-
Area A	ST-51 (Phase I)	E 0761637 N 2308702	6.0 x 1.0 x 1.24	4	Yes	No	-	-
Area A	ST-52 (Phase I)	E 0761670 N 2308685	5.3 x 1.0 x 1.53	9	Yes	Yes; V	-	-
Area A	ST-53 (Phase I)	E 0761704 N 2308718	6.5 x 1.0 x 1.60	9	Yes	Yes; IX	Charcoal lens associated with modern burning	I, II, III, IV
Area A	ST-54 (Phase I)	E 0761744 N 2308746	7.4 x 1.0 x 0.83	4	Yes	No	-	-

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area A	ST-55 (Phase I)	E 0761737 N 2308787	5.0 x 1.0 x 1.25	4	Yes	Yes; III	-	-
Area A	ST-56 (Phase I)	E 0761693 N 2308755	6.5 x 1.0 x 1.41	7	Yes	No	-	-
Area A	ST-57 (Phase I)	E 0761689 N 2308748	4.4 x 1.0 x 1.20	2	Yes	No	-	-
Area A	ST-58 (Phase I)	E 0761641 N 2308794	4.0 x 2.5 x 1.35	1	Yes	No	Possible collapse from sand mining	I
Area A	ST-59 (Phase I)	E 0761687 N 2308810	6.5 x 1.0 x 1.16	7	Yes	No	Rusted metal and wire	II, IIA
Area A	ST-60 (Phase I)	E 0761653 N 2308832	5.0 x 1.0 x 1.15	3	Yes	No	-	-
Area A	ST-61 (Phase I)	E 0761622 N 2308749	4.5 x 1.0 x 1.22	4	Yes	No	Charcoal from modern burning	I
Area A	ST-62 (Phase I)	E 0761627 N 2308810	3.0 x 1.0 x 1.40	7	Yes	No	-	-
Area A	ST-63 (Phase I)	E 0761630 N 2308850	4.1 x 1.0 x 1.45	6	Yes	No	-	-
Area A	ST-64 (Phase I)	E 0761601 N 2308843	4.5 x 1.0 x 1.76	4	Yes	No	-	-
Area A	ST-65 (Phase I)	E 0761412 N 2309003	4.0 x 1.0 x 0.74	2	Yes	No	-	-
Area A	ST-66 (Phase I)	E 0761425 N 2309003	5.8 x 1.0 x 0.80	4	Yes	No	-	-
Area A	ST-67 (Phase I)	E 0761428 N 2308982	7.7 x 1.0 x 0.96	6	Yes	No	-	-
Area A	ST-68 (Phase I)	E 0761444 N 2308977	3.2 x 1.0 x 0.56	4	Yes	No	-	-
Area A	ST-69 (Phase I)	E 0761448 N 2308961	9.7 x 1.0 x 0.10	2	Yes	No	-	-
Area A	ST-70 (Phase I)	E 0761457 N 2308932	5.2 x 1.0 x 0.56	8	Yes	No	-	-
Area A	ST-71 (Phase I)	E 0761482 N 2308968	5.8 x 1.0 x 0.66	4	Yes	No	-	-
Area B	ST-72 (Phase I)	E 0760824 N 2309049	5.4 x 1.0 x 0.96	3	Yes	Yes; III	-	-
Area B	ST-73 (Phase I)	E 0760868 N 2309065	5.4 x 1.0 x 1.20	7	Yes	No	Charcoal associated with recent use	IV, V, VI

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area B	ST-74 (Phase I)	E 0760904 N 2309092	4.8 x 1.0 x 1.27	9	Yes	No	-	-
Area B	ST-75 (Phase I)	E 0760944 N 2309097	6.1 x 1.0 x 0.60	3	Yes	No	-	-
Area B	ST-76 (Phase I)	E 0760982 N 2309114	6.0 x 1.0 x 1.74	2	Yes	No	-	-
Area B	ST-77 (Phase I)	E 0760936 N 2309129	6.0 x 1.1 x 1.50	5	Yes	No	-	-
Area B	ST-78 (Phase I)	E 0760906 N 2309124	8.0 x 1.4 x 2.04	5	Yes	No	-	-
Area B	ST-79 (Phase I)	E 0760861 N 2309145	6.5 x 1.08 x 1.53	5	Yes	No	-	-
Area B	ST-80 (Phase I)	E 0760847 N 2309105	7.0 x 1.30 x 1.44	6	Yes	No	-	-
Area B	ST-81 (Phase I)	E 0760818 N 2309165	6.0 x 1.15 x 1.30	7	Yes	No	-	-
Area A	ST-82 (Phase I)	E 0761309 N 2308839	4.6 x 1.0 x 0.39	3	Yes	Yes; III	-	-
Area A	ST-83 (Phase I)	E 0761292 N 2308904	5.0 x 1.0 x 1.18	4	Yes	Yes; III, IV	-	-
Area A	ST-84 (Phase I)	E 0761311 N 2308931	7.3 x 1.0 x 1.10	5	Yes	Yes; II, IV	-	-
Area A	ST-85 (Phase I)	E 0761256 N 2308849	4.3 x 1.0 x 0.81	3	Yes	No	-	-
Area A	ST-86 (Phase I)	E 0761266 N 2308896	5.0 x 1.0 x 0.75	4	Yes	Yes; III	-	-
Area A	ST-87 (Phase I)	E 0761269 N 2308934	5.2 x 1.0 x 0.92	4	Yes	Yes; I, II, IV	-	-
Area A	ST-88 (Phase I)	E 0761255 N 2308959	5.5 x 1.0 x 1.86	3	Yes	No	-	-
Area A	ST-89 (Phase I)	E 0761297 N 2308969	5.7 x 1.0 x 1.13	8	Yes	Yes; IV, VI, VIII	-	-
Area A	ST-90 (Phase I)	E 0761281 N 2308991	5.3 x 1.0 x 1.73	4	Yes	No	Subsurface <i>Imu</i> (Site - 5504)	-
Area A	ST-91 (Phase I)	E 0761254 N 2309019	6.1 x 1.0 x 1.17	3	Yes	Yes; I	-	-
Area D	ST-92 (Phase I)	E 0761552 N 2307238	5.2 x 1.0 x 1.62	5	Yes	No	Irrigation tubes	I, II, III, IV
Area D	ST-93 (Phase I)	E 0761505 N 2307149	8.2 x 1.0 x 1.60	6	Yes	No	-	I, II, III, IV, V
Area D	ST-94 (Phase I)	E 0761455 N 2307064	8.2 x 1.0 x 1.76	4	Yes	Yes; IV	Irrigation tubes	I, II

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area D	ST-95 (Phase I)	E 0761416 N 2306976	9.2 x 1.0 x 1.63	6	Yes	Yes; V	Irrigation tubes	I, II, III
Area D	ST-96 (Phase I)	E 0761371 N 2306892	9.0 x 1.0 x 1.80	6	Yes	Yes; V	-	I, II, III
Area D	ST-97 (Phase I)	E 0761328 N 2306805	8.0 x 1.0 x 1.90	6	Yes	Yes; VI	-	I, II, III
Area D	ST-98 (Phase I)	E 0761278 N 2306714	5.0 x 1.0 x 1.70	6	Yes	No	-	I
Area D	ST-99 (Phase I)	E 0761221 N 2306760	5.2 x 1.0 x 1.77	5	Yes	No	-	I
Area D	ST-100 (Phase I)	E 0761263 N 2306845	8.8 x 1.0 x 1.63	5	Yes	No	Irrigation tubes	I, II
Area D	ST-101 (Phase I)	E 0761284 N 2306894	7.5 x 1.0 x 1.72	8	Yes	No	Irrigation tubes	I, II, III, IV, V, VI
Area D	ST-102 (Phase I)	E 0761321 N 2306963	9.2 x 1.0 x 1.54	5	Yes	Yes; VI	Irrigation tubes and charcoal from recent land use	I, II, III, IV
Area D	ST-103 (Phase I)	E 0761359 N 2307040	9.0 x 1.0 x 1.67	6	Yes	Yes; IV	Irrigation tubes	I, II, III
Area D	ST-104 (Phase I)	E 0761401 N 2307129	7.8 x 1.0 x 1.62	8	Yes	Yes; VII	Irrigation tubes	I, II, III, IV
Area D	ST-105 (Phase I)	E 0761447 N 2307177	6.5 x 1.0 x 1.60	5	Yes	Yes; IV	Irrigation tubes	I, II, III
Area D	ST-106 (Phase I)	E 0761450 N 2307221	8.4 x 1.0 x 1.27	4	Yes	No	Charcoal flecks from modern burning	I, II
Area D	ST-107 (Phase I)	E 0761399 N 2307302	7.15 x 1.3 x 1.50	5	Yes	Yes; III	-	-
Area D	ST-108 (Phase I)	E 0761340 N 2307199	8.5 x 1.10 x 1.20	6	Yes	Yes; VI	-	-
Area D	ST-109 (Phase I)	E 0761294 N 2307105	7.0 x 1.1 x 1.80	7	Yes	No	-	I, II, III
Area D	ST-110 (Phase I)	E 0761260 N 2307035	10.5 x 1.1 x 1.50	4	Yes	Yes; III, IV	-	I, II, III
Area D	ST-111 (Phase I)	E 0761218 N 2306945	9.5 x 1.1 x 1.70	9	Yes	No	-	I, II, III, IV, V, VI
Area D	ST-112 (Phase I)	E 0761202 N 2306863	9.3 x 1.1 x 1.60	7	Yes	No	-	I, II, III, IV
Area D	ST-113 (Phase I)	E 0761315 N 2307376	4.8 x 1.0 x 1.48	5	Yes	No	Irrigation tubes	I, II, III

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area D	ST-114 (Phase I)	E 0761276 N 2307291	5.4 x 1.0 x 1.27	4	Yes	Yes; IV	-	I, II
Area D	ST-115 (Phase I)	E 0761234 N 2307205	6.5 x 1.0 x 1.50	4	Yes	Yes; IV	-	I, II
Area D	ST-116 (Phase I)	E 0761207 N 2307116	5.2 x 1.0 x 1.70	6	Yes	Yes; V	-	I, II, III
Area D	ST-117 (Phase I)	E 0761173 N 2307020	5.5 x 1.0 x 1.50	3	Yes	No	-	I, II
Area D	ST-118 (Phase I)	E 0761095 N 2307073	6.0 x 1.0 x 1.30	4	Yes	No	-	I, II, III
Area D	ST-119 (Phase I)	E 0761118 N 2307168	5.4 x 1.0 x 1.22	5	Yes	Yes; IV	Plastic irrigation line	I, II, III
Area D	ST-120 (Phase I)	E 0761157 N 2307254	6.0 x 1.0 x 1.50	5	Yes	Yes; IV	-	I, II, III
Area D	ST-121 (Phase I)	E 0761204 N 2307347	5.5 x 1.0 x 1.66	5	Yes	Yes; II	-	I, II, III, IV, V
Area D	ST-122 (Phase I)	E 0761127 N 2307414	6.6 x 1.0 x 1.40	4	Yes	Yes; III	-	I, II
Area D	ST-123 (Phase I)	E 0761095 N 2307323	5.0 x 1.0 x 0.95	4	Yes	Yes; V	Irrigation tubes	I, II
Area D	ST-124 (Phase I)	E 0761033 N 2307214	5.4 x 1.0 x 0.96	4	Yes	Yes; IV	Charcoal from modern burning	I, II
Area D	ST-125 (Phase I)	E 0760974 N 2307274	8.4 x 1.0 x 0.82	3	Yes	Yes; III	Irrigation tubes	I, II
Area D	ST-126 (Phase I)	E 0761019 N 2307391	4.7 x 1.0 x 1.20	8	Yes	Yes; III, VIII	Irrigation tubes	I, II, III, IV, V
Area D	ST-127 (Phase I)	E 0761038 N 2307525	5.2 x 1.0 x 1.36	6	Yes	Yes; III, IV	PVC and irrigation tubes	I, II, III, IV
Area D	ST-127B (Phase I)	E 0761078 N 2307522	5.4 x 1.0 x 1.64	3	Yes	Yes; III	Modern fire pit containing charred sugarcane	I, II, III
Area D	ST-128 (Phase I)	E 0760964 N 2307549	5.5 x 1.0 x 1.25	5	Yes	Yes; V	-	I, II, III
Area D	ST-129 (Phase I)	E 0760935 N 2307462	5.2 x 1.0 x 1.46	5	Yes	Yes; V	Charcoal flecks and irrigation tubes	I, II, III, IV
Area D	ST-130 (Phase I)	E 0760839 N 2307451	5.4 x 1.0 x 0.67	2	Yes	Yes; II	Irrigation tubes	I, II

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area D	ST-131 (Phase I)	E 0760845 N 2307557	5.2 x 1.0 x 1.50	4	Yes	No	PVC pipes	I, II, III, IV
Area D	ST-132 (Phase I)	E 0760775 N 2307537	5.5 x 1.0 x 1.46	4	Yes	Yes; II	Irrigation tubes and charcoal flecks from modern fires	I, II, III
Area D	ST-133 (Phase I)	E 0760813 N 2307573	5.6 x 1.0 x 1.70	6	Yes	No	Plastic irrigation tubes	I, II, III
Area D	ST-134 (Phase I)	E 0760820 N 2307612	5.0 x 1.0 x 0.85	2	Yes	Yes; II	Plastic irrigation tubes	I
Area D	ST-135 (Phase I)	E 0760773 N 2307536	5.2 x 1.0 x 1.30	3	Yes	Yes; III, IIIA	Plastic irrigation tubes	I
Area D	ST-136 (Phase I)	E 0760772 N 2307624	5.7 x 1.0 x 1.50	5	Yes	No	Charcoal flecks and irrigation tubes	I, II, III, IV
Area D	ST-137 (Phase I)	E 0761044 N 2307610	4.2 x 1.0 x 1.50	4	Yes	No	Metal and 1 piece of glass	I, II, III
Area D	ST-138 (Phase I)	E 0761112 N 2307593	6.7 x 1.0 x 0.74	3	Yes	No	-	I, II
Area D	ST-139 (Phase I)	E 0761145 N 2307588	5.2 x 1.0 x 0.83	4	Yes	No	Plastic irrigation tubes	I, II
Area D	ST-140 (Phase I)	E 0761194 N 2307573	5.3 x 1.0 x 0.95	4	Yes	Yes; IV	Plastic irrigation tubes	I, II
Area D	ST-141 (Phase I)	E 0761240 N 2307557	5.2 x 1.0 x 1.34	6	Yes	No	-	I, II
Area D	ST-142 (Phase I)	E 0761284 N 2307554	4.4 x 1.0 x 1.30	6	Yes	No	Plastic irrigation tubes and charcoal flecks	I, II, III
Area D	ST-143 (Phase I)	E 0761273 N 2307500	5.5 x 1.0 x 1.45	4	Yes	No	Plastic	I

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area D	ST-144 (Phase I)	E 0761217 N 2307516	5.4 x 1.0 x 1.48	4	Yes	No	Plastic irrigation tubes and charred <i>kiawe</i>	I, II
Area C	ST-145 (Phase I)	E 0761552 N 2308575	5.3 x 1.0 x 0.56	2	Yes	No	-	-
Area C	ST-146 (Phase I)	E 0761507 N 2308642	5.2 x 1.0 x 1.00	3	Yes	No	-	-
Area C	ST-147 (Phase I)	E 0761473 N 2308620	5.4 x 1.0 x 0.82	2	Yes	No	-	-
Area C	ST-148 (Phase I)	E 0761503 N 2308560	5.6 x 1.0 x 1.36	4	Yes	No	-	-
Area C	ST-149 (Phase I)	E 0761428 N 2308542	5.5 x 1.0 x 1.42	4	Yes	No	-	-
Area C	ST-150 (Phase I)	E 0761445 N 2308491	5.7 x 1.0 x 1.38	3	Yes	No	-	-
Area C	ST-151 (Phase I)	E 0761482 N 2308423	6.2 x 1.0 x 1.72	5	Yes	No	-	-
Area C	ST-152 (Phase I)	E 0761360 N 2308422	4.6 x 1.0 x 1.00	2	Yes	No	-	-
Area C	ST-153 (Phase I)	E 0761299 N 2308333	5.4 x 1.0 x 1.00	4	Yes	No	-	-
Area C	ST-154 (Phase I)	E 0761284 N 2308252	6.0 x 1.0 x 0.92	2	Yes	No	-	-
Area C	ST-155 (Phase I)	E 0761312 N 2308182	6.4 x 1.0 x 1.32	2	Yes	Yes; II	-	-
Area C	ST-156 (Phase I)	E 0761266 N 2308154	5.9 x 0.98 x 1.25	4	Yes	No	-	-
Area C	ST-157 (Phase I)	E 0761224 N 2308071	6.1 x 1.0 x 0.82	2	Yes	Yes; II	-	-
Area C	ST-158 (Phase I)	E 0761209 N 2308026	5.9 x 1.1 x 1.33	2	Yes	Yes; II	-	-
Area C	ST-159 (Phase I)	E 0761162 N 2307957	5.6 x 1.0 x 1.20	2	Yes	No	-	-
Area C	ST-160 (Phase I)	E 0761259 N 2307932	6.6 x 1.0 x 0.35	2	Yes	Yes; II	-	-
Area C	ST-161 (Phase I)	E 0761308 N 2307879	5.7 x 1.0 x 1.80	1	Yes	No	-	-
Area C	ST-162 (Phase I)	E 0761421 N 2307864	7.2 x 1.0 x 1.50	3	Yes	Yes; II	-	-
Area C	ST-163 (Phase I)	E 0761539 N 2307845	6.3 x 1.0 x 1.20	4	Yes	Yes; III	-	-

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Area C	ST-164 (Phase I)	E 0761404 N 2307968	5.2 x 1.0 x 1.45	1	Yes	No	-	-
Area C	ST-165 (Phase I)	E 0761467 N 2307952	5.5 x 1.0 x 1.40	1	Yes	No	-	-
Area C	ST-166 (Phase I)	E 0761540 N 2307993	5.9 x 1.0 x 1.70	3	Yes	No	-	-
Area C	ST-167 (Phase I)	E 0761555 N 2308114	6.2 x 1.0 x 1.30	4	Yes	Yes; III	-	-
Area C	ST-168 (Phase I)	E 0761562 N 2308283	5.9 x 1.0 x 1.55	2	Yes	No	-	-
Area C	ST-169 (Phase I)	E 0761609 N 2308566	5.9 x 1.0 x 1.65	1	Yes	No	-	-
Area C	ST-170 (Phase I)	E 0761347 N 2308239	5.9 x 1.0 x 1.85	1	Yes	No	-	-
Area C	ST-171 (Phase I)	E 0761426 N 2308250	5.7 x 1.0 x 1.40	3	Yes	Yes; III	-	-
Area C	ST-172 (Phase I)	E 0761437 N 2308138	6.5 x 1.0 x 0.80	2	Yes	Yes; II	-	-
Area C	ST-173 (Phase I)	E 0761511 N 2308128	5.6 x 1.0 x 1.85	1	Yes	No	-	-
Area C	ST-174 (Phase I)	E 0761262 N 2308043	5.1 x 1.0 x 1.10	5	Yes	Yes; III	-	-
Area C	ST-175 (Phase I)	E 0761338 N 2308096	6.0 x 1.0 x 1.60	1	Yes	No	-	-
Area C	ST-176 (Phase I)	E 0761509 N 2308229	6.0 x 1.0 x 1.50	2	Yes	No	-	-
Area C	ST-177 (Phase I)	E 0761496 N 2308463	5.8 x 1.0 x 2.10	1	Yes	No	-	-
Area C	ST-178 (Phase I)	E 0761536 N 2308493	6.6 x 1.0 x 1.30	1	Yes	No	-	-
Area C	ST-179 (Phase I)	E 0761422 N 2308352	5.9 x 1.0 x 1.80	1	Yes	No	-	-
Area C	ST-180 (Phase I)	E 0761594 N 2307872	5.6 x 1.0 x 0.60	1	Yes	No	-	-
Area C	ST-181 (Phase I)	E 0761636 N 2307955	5.9 x 1.0 x 1.60	2	Yes	No	-	-
Area C	ST-182 (Phase I)	E 0761656 N 2308028	6.2 x 1.0 x 1.50	2	Yes	No	-	-
Area C	ST-183 (Phase I)	E 0761787 N 2308100	5.9 x 1.0 x 1.50	4	Yes	Yes; IV	-	-
Area C	ST-184 (Phase I)	E 0761681 N 2307914	5.0 x 1.0 x 1.30	4	Yes	Yes; III	-	-
Area C	ST-185 (Phase I)	E 0761725 N 2308000	6.1 x 1.0 x 1.20	3	Yes	No	-	-

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Area C	ST-186 (Phase I)	E 0761667 N 2308393	6.0 x 1.0 x 0.90	4	Yes	No	-	-
Area C	ST-187 (Phase I)	E 0761659 N 2308327	5.5 x 1.0 x 1.50	4	Yes	Yes; III	-	-
Area C	ST-188 (Phase I)	E 0761633 N 2308221	5.7 x 1.0 x 0.90	5	Yes	No	-	-
Area C	ST-189 (Phase I)	E 0761665 N 2308098	5.8 x 1.0 x 1.30	4	Yes	No	-	-
Area C	ST-190 (Phase I)	E 0761712 N 2308171	5.6 x 1.0 x 1.40	2	Yes	No	-	-
Area C	ST-191 (Phase I)	E 0761723 N 2308299	5.2 x 1.0 x 1.30	1	Yes	No	-	-
Area C	ST-192 (Phase I)	E 0761789 N 2308265	5.8 x 1.0 x 1.00	3	Yes	Yes; II, III	-	-
Area C	ST-193 (Phase I)	E 0761731 N 2308059	5.9 x 1.0 x 1.00	2	Yes	No	-	-
Area C	ST-194 (Phase I)	E 0761838 N 2308009	6.1 x 1.0 x 0.90	4	Yes	Yes; II	-	-
Area C	ST-195 (Phase I)	E 0761634 N 2307884	5.5 x 1.0 x 1.20	1	Yes	No	-	-
Area C	ST-196 (Phase I)	E 0761688 N 2307877	5.8 x 1.0 x 1.40	2	Yes	No	-	-
Area C	ST-197 (Phase I)	E 0761565 N 2307926	6.0 x 1.0 x 1.30	4	Yes	Yes; IV	-	-
Area C	ST-198 (Phase I)	E 0761568 N 2308013	6.0 x 1.0 x 1.20	3	Yes	No	-	-
Area C	ST-199 (Phase I)	E 0761622 N 2307992	5.9 x 1.0 x 1.50	2	Yes	No	-	-
Area C	ST-200 (Phase I)	E 0761787 N 2308043	6.5 x 1.0 x 1.40	3	Yes	No	-	-
Area E	1A (Phase II)	E 0760999 N 2308131	7.12 x 1.0 x 2.36	5	Yes	Yes; IV	-	-
Area E	2A (Phase II)	E 0761039 N 2308111	7.28 x 1.0 x 2.48	2	Yes	No	-	-
Area E	3A (Phase II)	E 0761076 N 2304075	7.00 x 1.0 x 1.63	3	Yes	No	-	-
Area E	4A (Phase II)	E 0761104 N 2308059	7.68 x 1.0 x 0.72	3	Yes	No	-	-
Area E	5A (Phase II)	E 0761096 N 2308034	7.04 x 1.0 x 2.08	5	Yes	Yes; IV	-	-
Area E	6A (Phase II)	E 0761092 N 2308014	7.44 x 1.0 x 1.44	3	Yes	Yes; IV	-	-
Area E	7A (Phase II)	E 0761061 N 2307683	7.12 x 1.0 x 0.68	2	Yes	No	-	-

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area E	8A (Phase II)	E 0761037 N 2307941	7.32 x 1.0 x 1.44	4	Yes	No	-	-
Area E	9A (Phase II)	E 0761006 N 2307925	7.20 x 1.0 x 1.20	4	Yes	Yes; IV	-	-
Area E	10A (Phase II)	E 0761004 N 2307962	7.44 x 1.0 x 1.60	4	Yes	Yes; IV	-	-
Area E	11A (Phase II)	E 0761022 N 2307987	5.48 x 1.0 x 1.68	4	Yes	Yes; IV	-	-
Area E	12A (Phase II)	E 0761043 N 2308021	6.80 x 1.0 x 1.44	4	Yes	Yes; IV	-	-
Area E	13A (Phase II)	E 0761066 N 2308041	6.96 x 1.0 x 1.36	4	Yes	Yes; IV	-	-
Area E	14A (Phase II)	E 0761027 N 2308049	7.20 x 1.0 x 2.08	2	Yes	No	-	-
Area E	15A (Phase II)	E 0761024 N 2307989	6.24 x 1.0 x 1.36	4	Yes	Yes; IV	-	-
Area E	16A (Phase II)	E 0761006 N 2307968	7.12 x 1.0 x 1.36	3	Yes	No	-	-
Area E	17A (Phase II)	E 0760973 N 2307973	5.48 x 1.0 x 0.64	2	Yes	No	-	-
Area E	18A (Phase II)	E 0760924 N 2308901	5.32 x 1.0 x 0.48	3	Yes	No	-	-
Area E	19A (Phase II)	E 0760949 N 2307973	3.28 x 1.0 x 0.40	3	Yes	No	-	-
Area E	20A (Phase II)	E 0760971 N 2308076	5.84 x 1.0 x 0.64	3	Yes	No	-	-
Area E	21A (Phase II)	E 0760975 N 2308079	5.28 x 1.0 x 0.96	4	Yes	Yes; IV	-	-
Area E	22A (Phase II)	E 0761015 N 2308086	5.28 x 1.0 x 1.28	4	Yes	Yes; IV	-	-
Area E	23A (Phase II)	E 0760971 N 2308101	5.28 x 1.0 x 1.24	5	Yes	Yes; IV	-	-
Area E	24A (Phase II)	E 0760946 N 2308067	5.20 x 1.0 x 1.28	4	Yes	Yes; IV	-	-
Area E	25A (Phase II)	E 0760942 N 2308034	5.12 x 1.0 x 0.64	3	Yes	No	-	-
Area E	26A (Phase II)	E 0760917 N 2308010	5.28 x 1.0 x 1.16	4	Yes	Yes; IV	-	-
Area E	27A (Phase II)	E 0760907 N 2307980	5.52 x 1.0 x 0.76	4	Yes	Yes; IV	-	-
Area E	28A (Phase II)	E 0760893 N 2307955	6.56 x 1.0 x 0.96	2	Yes	No	-	-
Area F	1B (Phase II)	E 0761161 N 2308459	5.92 x 1.0 x 2.08	3	Yes	No	-	-

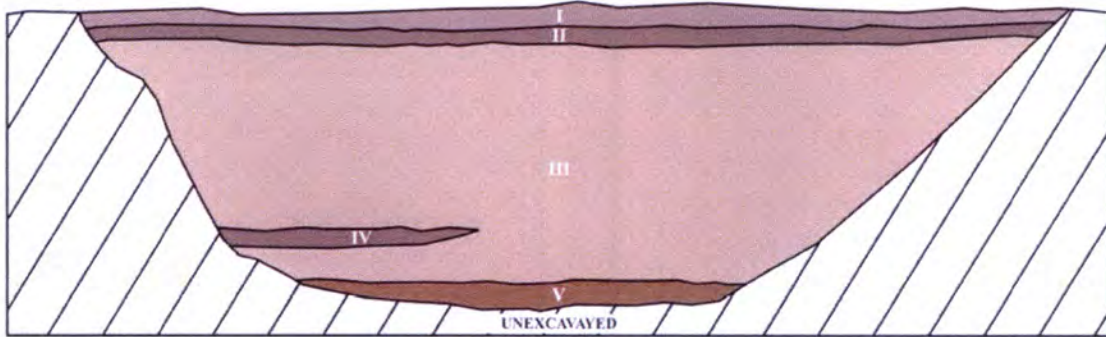
Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area F	2B (Phase II)	E 0761219 N 2308421	5.80 x 1.0 x 1.36	5	Yes	Yes, V	-	-
Area F	3B (Phase II)	E 0761243 N 2308400	8.00 x 1.0 x 1.28	3	Yes	Yes, V	-	-
Area F	4B (Phase II)	E 0761282 N 2308387	7.52 x 1.0 x 1.84	2	Yes	No	-	-
Area F	5B (Phase II)	E 0761302 N 2308415	5.84 x 1.0 x 1.44	4	Yes	Yes, V	-	-
Area F	6B (Phase II)	E 0761301 N 2308440	5.84 x 1.0 x 1.60	3	Yes	No	-	-
Area F	7B (Phase II)	E 0761336 N 2308488	7.44 x 1.0 x 2.08	3	Yes	No	-	-
Area F	8B (Phase II)	E 0761375 N 2308545	5.52 x 1.0 x 1.72	3	Yes	No	-	-
Area F	9B (Phase II)	E 0761397 N 2308592	5.60 x 1.0 x 1.12	2	Yes	No	-	-
Area F	10B (Phase II)	E 0761420 N 2308636	5.44 x 1.0 x 1.20	2	Yes	No	-	-
Area F	11B (Phase II)	E 0761434 N 2308668	6.80 x 1.0 x 0.96	3	Yes	No	-	-
Area F	12B (Phase II)	E 0761459 N 2308702	6.72 x 1.0 x 1.76	3	Yes	No	-	-
Area F	13B (Phase II)	E 0761403 N 2308720	6.80 x 1.0 x 1.52	3	Yes	No	-	-
Area F	14B (Phase II)	E 0761368 N 2308727	7.24 x 1.0 x 2.24	3	Yes	Yes, V	-	-
Area F	15B (Phase II)	E 0761183 N 2308475	5.60 x 1.0 x 1.84	3	Yes	Yes, V	-	-
Area F	16B (Phase II)	E 0761209 N 2308923	7.92x 1.0 x 1.12	3	Yes	Yes, V	-	-
Area F	17B (Phase II)	E 0761224 N 2308563	6.76 x 1.0 x 0.96	3	Yes	No	-	-
Area F	18B (Phase II)	E 0761250 N 2308590	7.84 x 1.0 x 1.04	5	Yes	No	-	-
Area F	19B (Phase II)	E 0761270 N 2308618	8.00 x 1.0 x 0.64	3	Yes	No	-	-
Area F	20B (Phase II)	E 0761295 N 2308643	5.84 x 1.0 x 1.76	2	Yes	No	-	-
Area F	21B (Phase II)	E 0761310 N 2308675	5.84 x 1.0 x 1.68	2	Yes	No	-	-
Area F	22B (Phase II)	E 0761319 N 2308704	5.76 x 1.0 x 0.88	3	Yes	No	-	-
Area F	23B (Phase II)	E 0761366 N 2308675	5.60 x 1.0 x 1.40	2	Yes	No	-	-

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area F	24B (Phase II)	E 0761391 N 2308683	5.76 x 1.0 x 1.12	2	Yes	No	-	-
Area F	25B (Phase II)	E 0761403 N 2308654	5.92 x 1.0 x 1.72	3	Yes	No	-	-
Area F	26B (Phase II)	E 0761382 N 2308611	5.60 x 1.0 x 1.32	3	Yes	No	-	-
Area F	27B (Phase II)	E 0761336 N 2308637	5.76 x 1.0 x 1.84	3	Yes	No	-	-
Area F	28B (Phase II)	E 0761347 N 2308592	5.32 x 1.0 x 1.36	3	Yes	No	-	-
Area F	29B (Phase II)	E 0761319 N 2308568	5.68 x 1.0 x 1.96	3	Yes	No	-	-
Area F	30B (Phase II)	E 0761294 N 2308540	6.96 x 1.0 x 1.72	4	Yes	No	-	-
Area F	31B (Phase II)	E 0761337 N 2308531	5.36 x 1.0 x 1.72	3	Yes	No	-	-
Area F	32B (Phase II)	E 0761343 N 2308554	7.20 x 1.0 x 1.52	4	Yes	No	-	-
Area F	33B (Phase II)	E 0761296 N 2308574	5.44 x 1.0 x 1.72	2	Yes	No	-	-
Area F	34B (Phase II)	E 0761285 N 2308077	5.36 x 1.0 x 1.36	2	Yes	No	-	-
Area F	35B (Phase II)	E 0761237 N 2308530	6.44 x 1.0 x 0.88	3	Yes	No	-	-
Area F	36B (Phase II)	E 0761208 N 2308504	5.68 x 1.0 x 1.04	4	Yes	No	-	-
Area F	37B (Phase II)	E 0761188 N 2308473	5.68 x 1.0 x 0.96	3	Yes	No	-	-
Area F	38B (Phase II)	E 0761304 N 2308504	5.84 x 1.0 x 1.84	3	Yes	No	-	-
Area F	39B (Phase II)	E 0761282 N 2308511	5.36 x 1.0 x 1.84	3	Yes	No	-	-
Area F	40B (Phase II)	E 0761265 N 2308486	5.76 x 1.0 x 0.96	3	Yes	No	-	-
Area F	41B (Phase II)	E 0761262 N 2308458	5.68 x 1.0 x 1.00	3	Yes	No	-	-
Area F	42B (Phase II)	E 0761250 N 2308430	5.68 x 1.0 x 0.92	2	Yes	No	-	-
Area F	43B (Phase II)	E 0761299 N 2308486	5.68 x 1.0 x 1.68	3	Yes	No	-	-
Area F	44B (Phase II)	E 0761292 N 2308452	5.40 x 1.0 x 1.72	3	Yes	No	-	-
Area F	45B (Phase II)	E 0761283 N 2308427	5.96 x 1.0 x 1.76	3	Yes	No	-	-

Arbitrary Excavation Location	Stratigraphic Trench Identification and Work Phase	GPS Coordinates (UTM; NAD83)	Dimensions (meters; LxWxMax D.)	Layer Types	Sandy Matrix Present? (Y/N)	River Rock Exposed? (Y/N, Provenience)	Cultural Material Observed	Modern Influence Provenience (Layer Designation)
Area F	46B (Phase II)	E 0761230 N 2308443	5.68 x 1.0 x 1.36	3	Yes	No	-	-
Area F	47B (Phase II)	E 0761220 N 2308477	5.84 x 1.0 x 1.44	3	Yes	No	-	-
Area F	48B (Phase II)	E 0761248 N 2308531	5.92 x 1.0 x 1.96	2	Yes	No	-	-
Area F	49B (Phase II)	E 0761275 N 2308546	5.68 x 1.0 x 1.60	2	Yes	No	-	-
Area F	50B (Phase II)	E 0761382 N 2308639	5.60 x 1.0 x 1.04	3	Yes	No	-	-
Area G	1C (Phase II)	E 0760739 N 2308300	5.76 x 1.0 x 1.76	5	Yes	No	Plastic irrigation line and imported angular basalt gravel	I, II, III
Area G	2C (Phase II)	E 0760705 N 2308346	5.52 x 1.0 x 1.36	5	Yes	No	Imported angular basalt gravel	I, II, III
Area G	3C (Phase II)	E 0760975 N 2308267	5.92 x 1.0 x 1.44	5	Yes	No	Imported angular basalt gravel	I, II, III

**APPENDIX B: REPRESENTATIVE MECHANICALLY EXCAVATED
STRATIGRAPHIC TRENCH PROFILE DRAWINGS**

SITE E
ST-1E



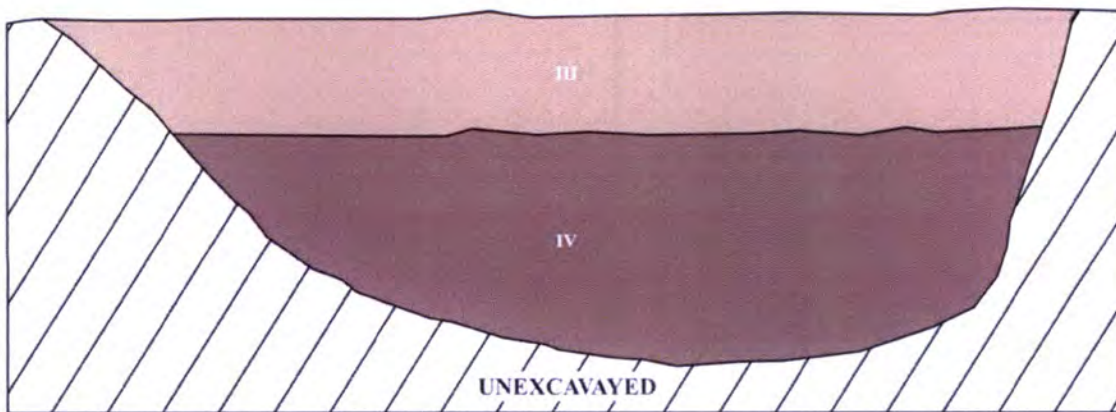
0 40 80 120 160 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SAND
V	- LAYER V: STRONG BROWN (7.5YR 5/6) SAND

SITE E
ST-2E



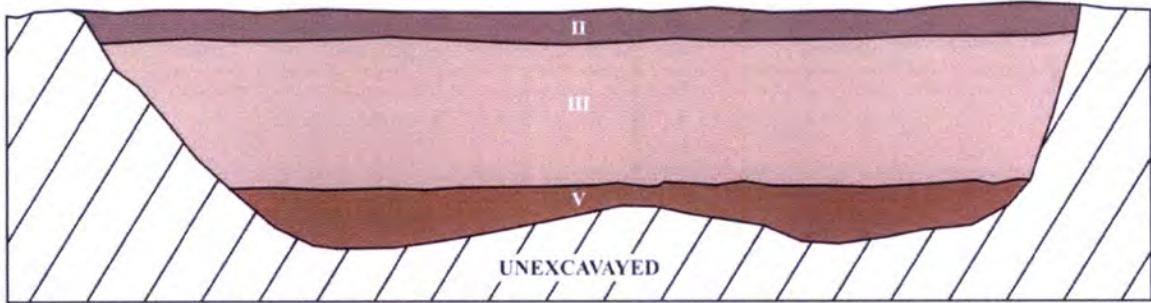
0 40 80 120 160 cm



KEY

III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SAND

**SITE E
ST-3E**

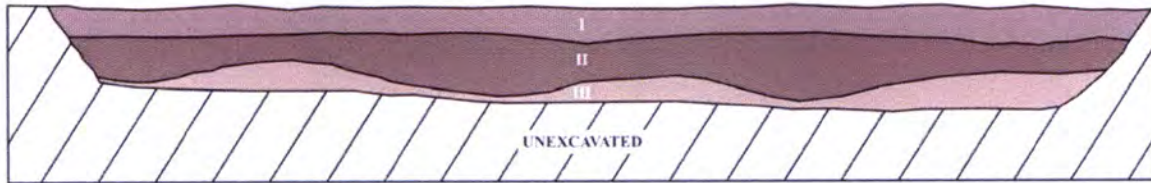


0 40 80 120 160 cm



KEY	
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
V	- LAYER V: STRONG BROWN (7.5YR 5/6) SAND

**SITE E
ST-4E**

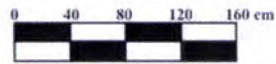
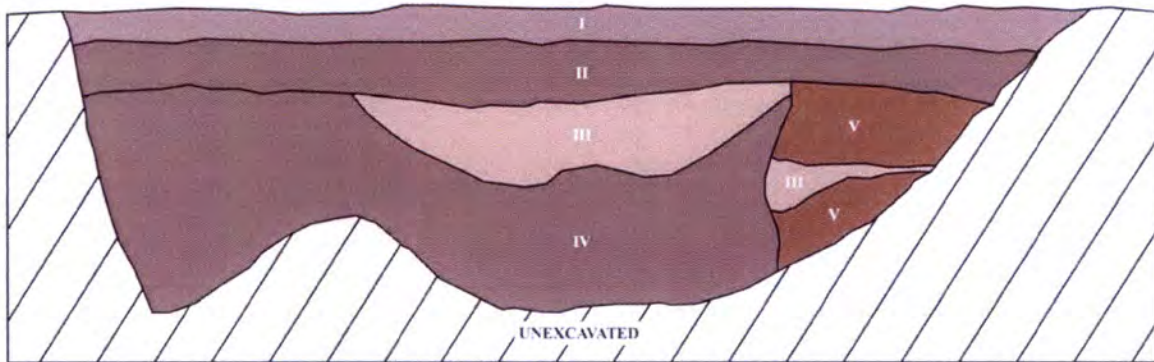


0 40 80 120 160 cm



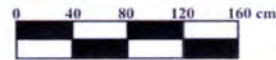
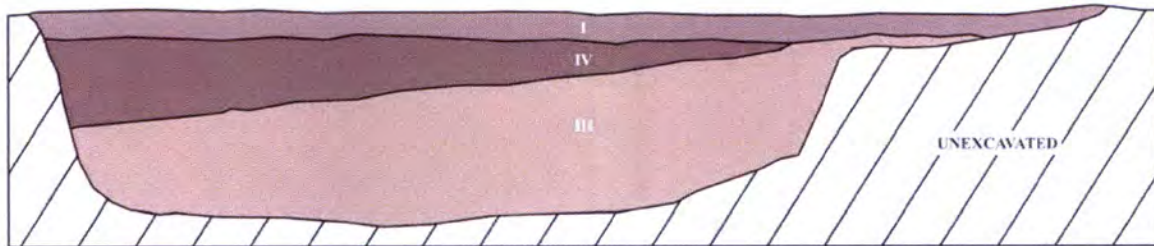
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

SITE E
ST-5E



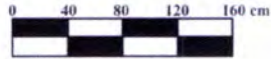
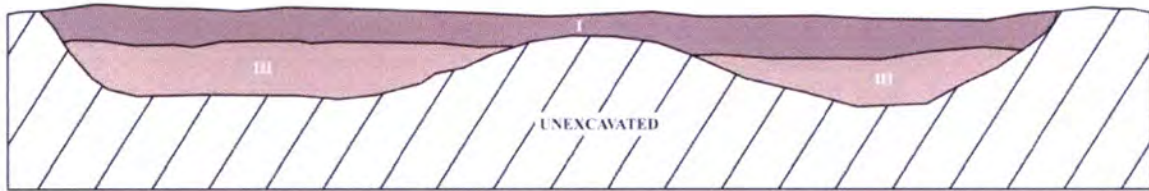
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SAND
V	- LAYER V: STRONG BROWN (7.5YR 5/6) SAND

SITE E
ST-6E



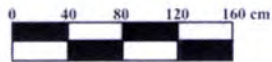
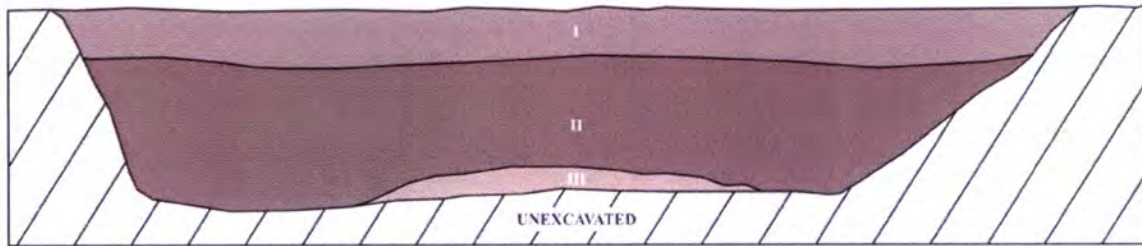
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

SITE E
ST-7E



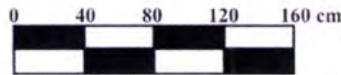
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III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

SITE E
ST-16E



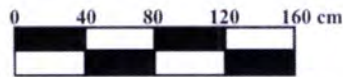
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

**SITE E
ST-17E**



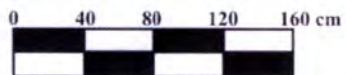
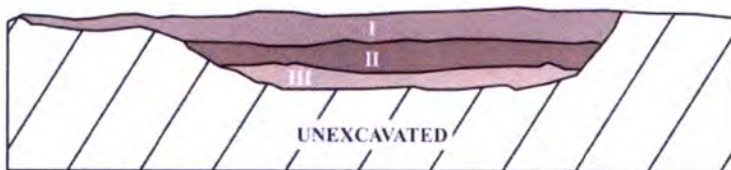
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

**SITE E
ST-18E**



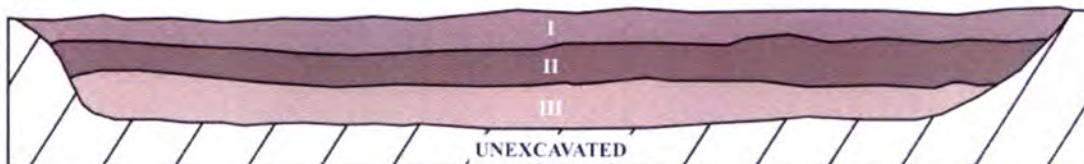
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

**SITE E
ST-19E**



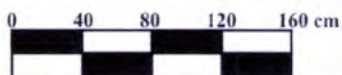
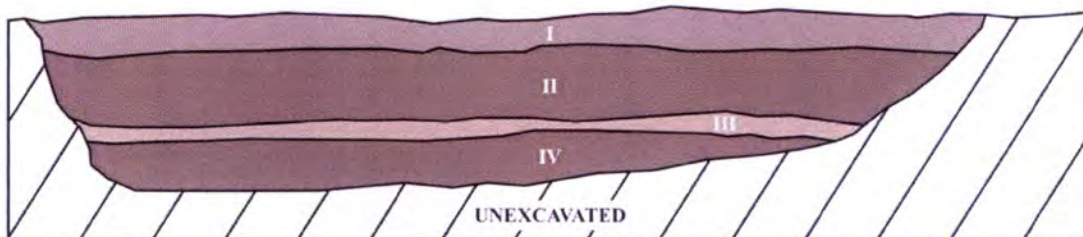
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

**SITE E
ST-20E**



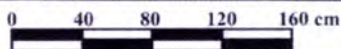
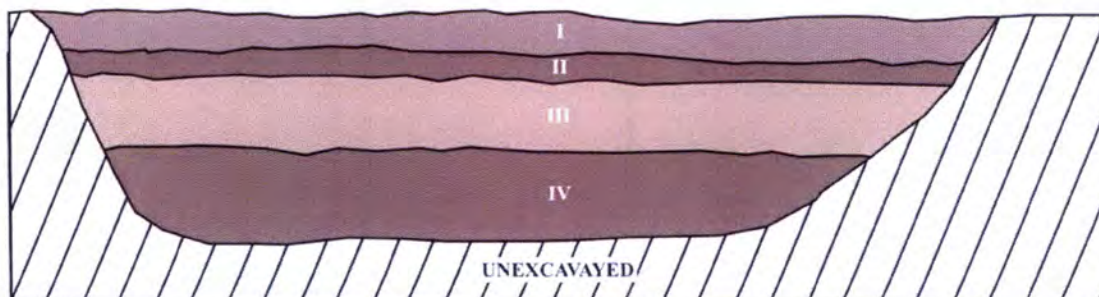
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND

**SITE E
ST-21E**



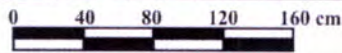
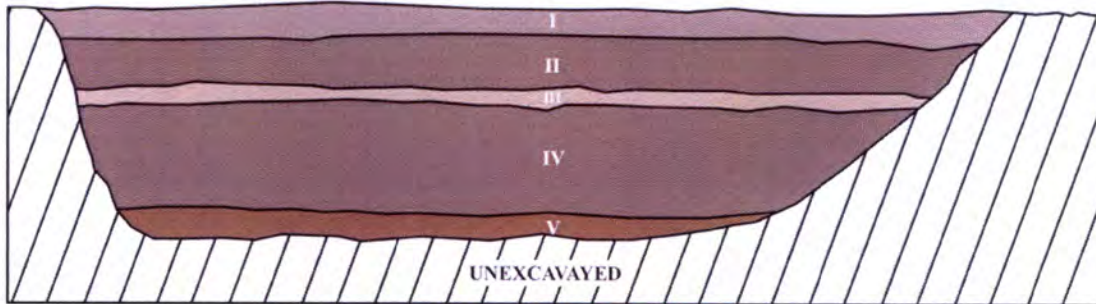
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SILT SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SAND

**SITE E
ST-22E**



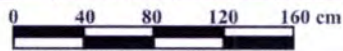
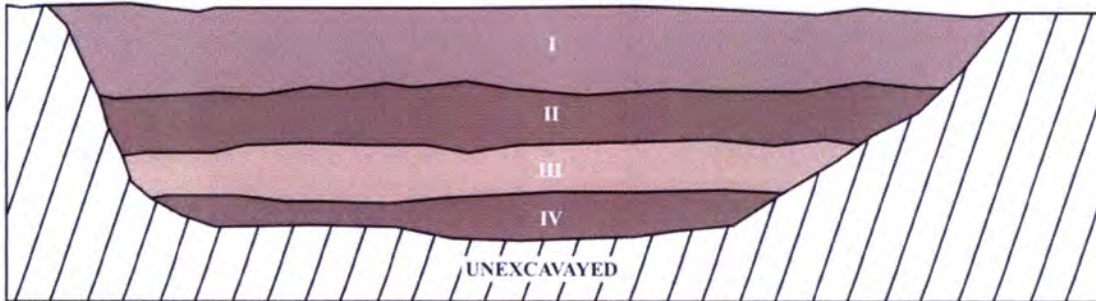
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II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND
IV	- LAYER IV: BROWN (10YR 5/3) VERY FINE SAND, LOOSE

**SITE E
ST-23E**



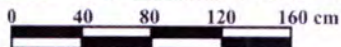
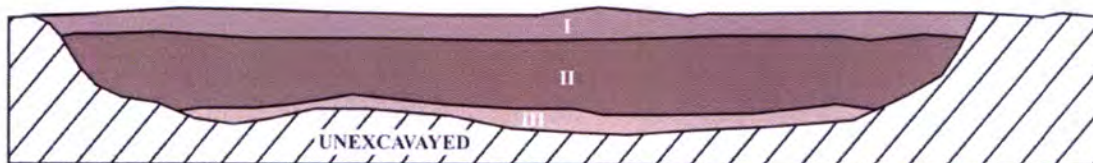
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND
IV	- LAYER IV: BROWN (10YR 5/3) VERY FINE SAND, LOOSE
V	- LAYER V: STRONG BROWN (7.5YR 5/6) VERY FINE SAND, LOOSE

**SITE E
ST-24E**



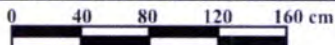
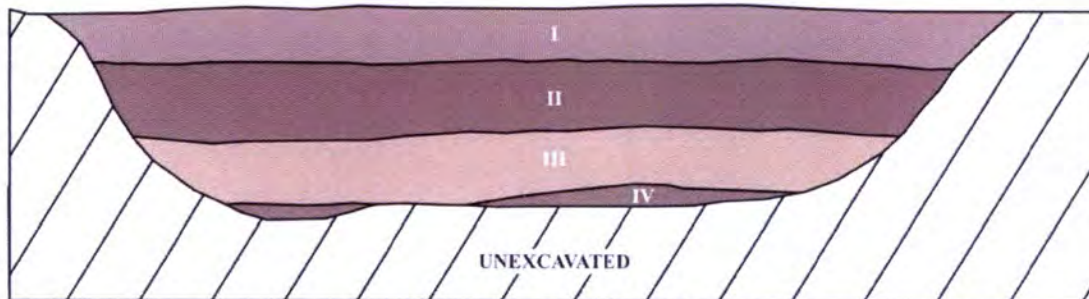
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND
IV	- LAYER IV: BROWN (10YR 5/3) VERY FINE SAND, LOOSE

**SITE E
ST-25E**



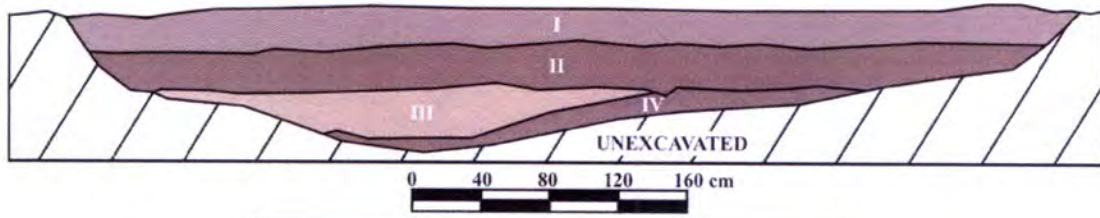
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND

**SITE E
ST-26E**



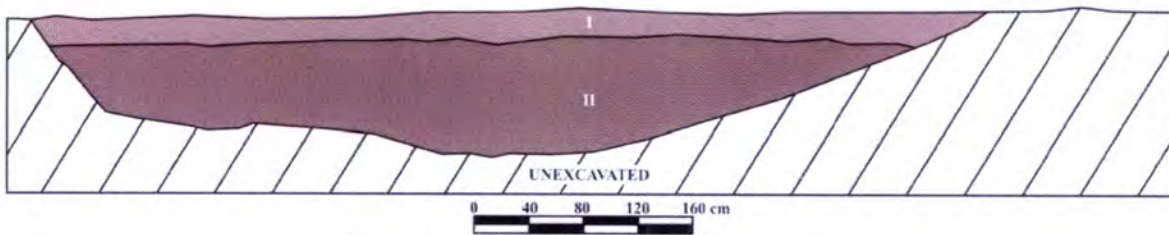
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND
IV	- LAYER IV: BROWN (10YR 5/3) VERY FINE SAND, LOOSE

**SITE E
ST-27E**



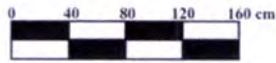
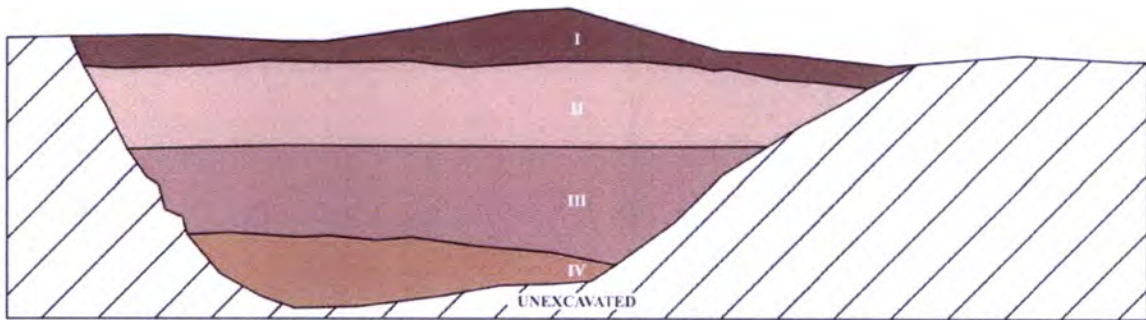
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE
III	- LAYER III: VERY PALE BROWN (10YR 7/4) VERY FINE SAND
IV	- LAYER IV: BROWN (10YR 5/3) VERY FINE SAND, LOOSE

**SITE E
ST-28E**



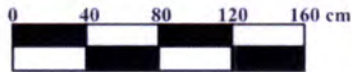
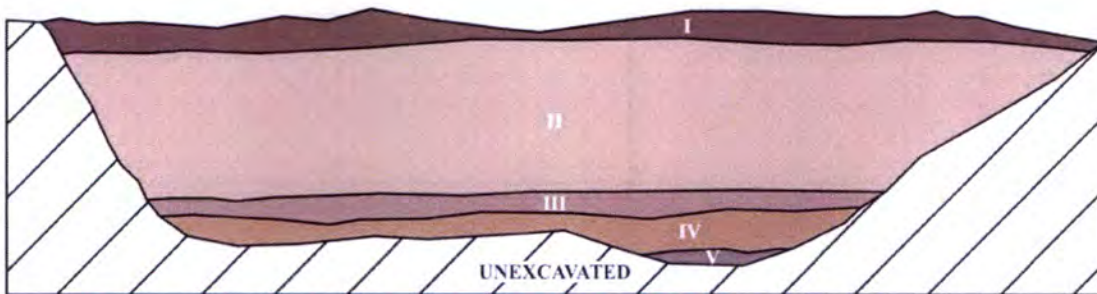
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) VERY FINE SAND, LOOSE
II	- LAYER II: BROWN (10YR 5/3) VERY FINE SILT SAND, LOOSE

**SITE F
ST-1F**



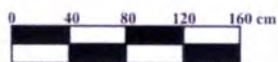
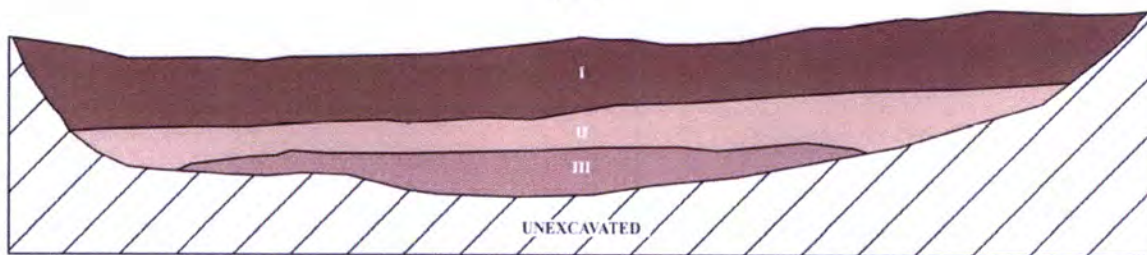
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND

**SITE F
ST-2F**



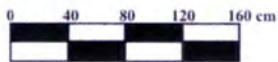
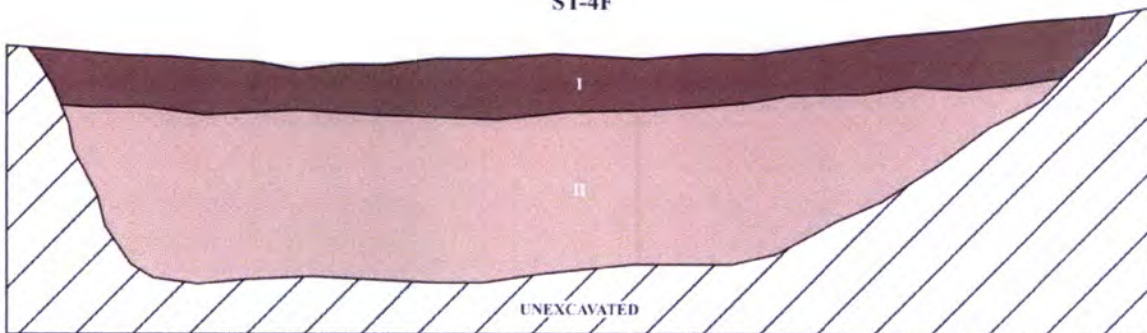
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: BROWN (10YR 5/3) SAND

SITE F
ST-3F



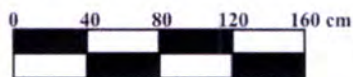
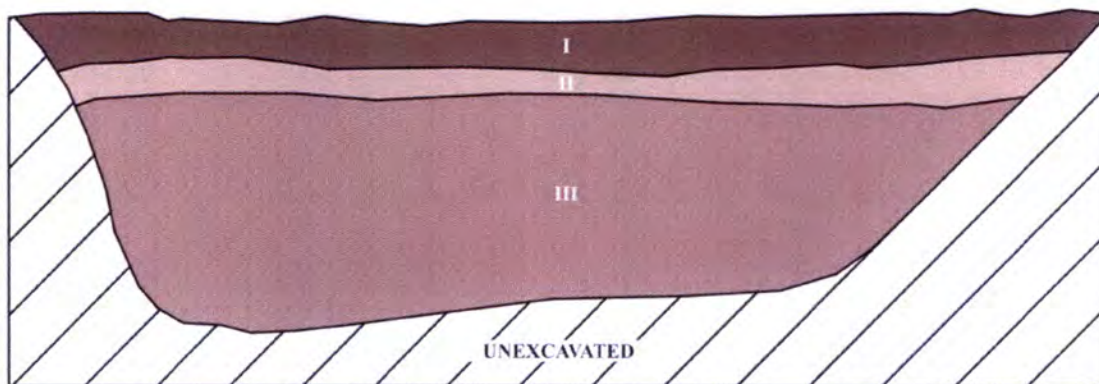
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND

SITE F
ST-4F



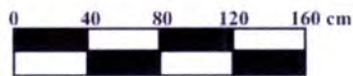
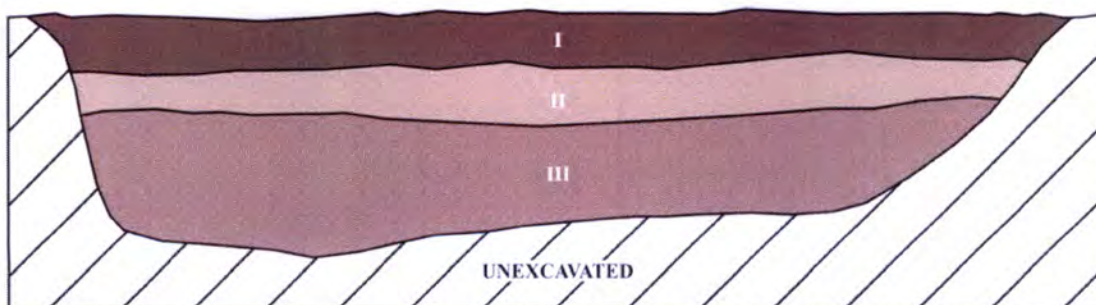
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND

**SITE F
ST-25F**



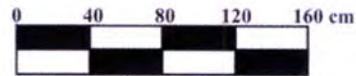
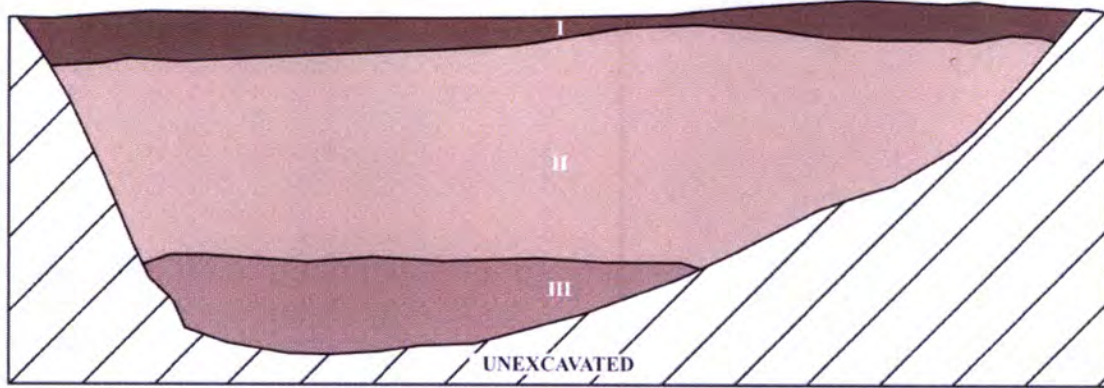
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND

**SITE F
ST-26F**



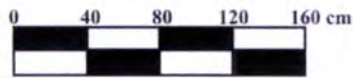
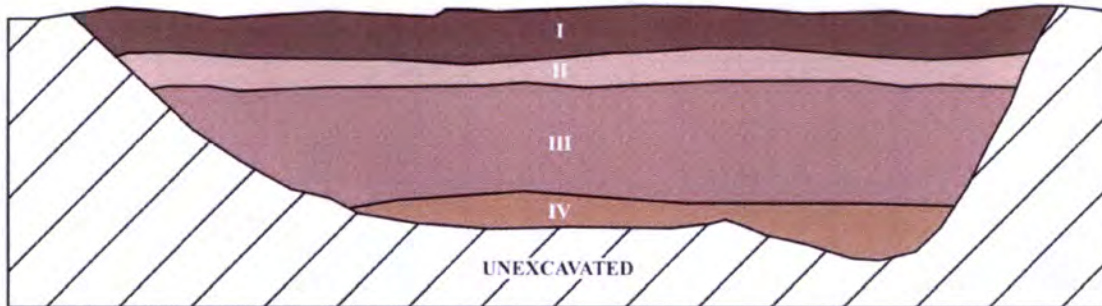
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND

SITE F
ST-27F



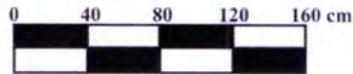
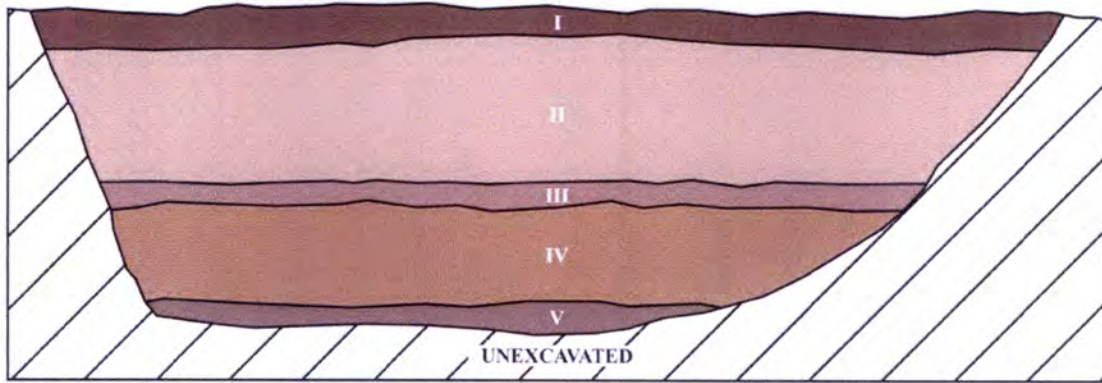
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND

SITE F
ST-28F



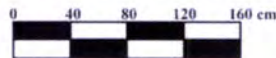
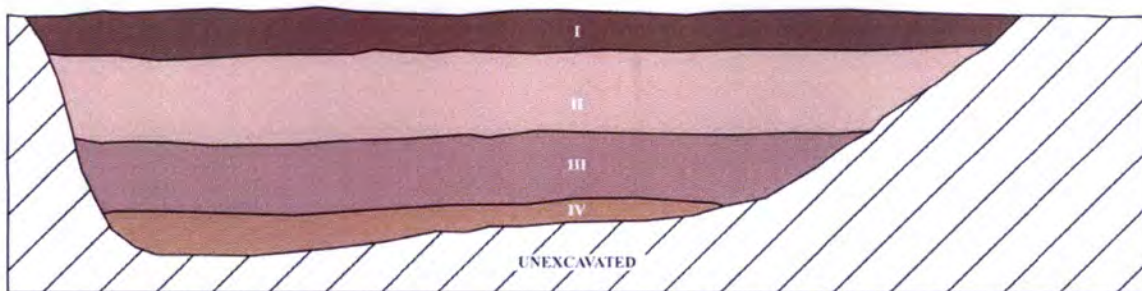
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND

**SITE F
ST-29F**



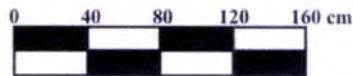
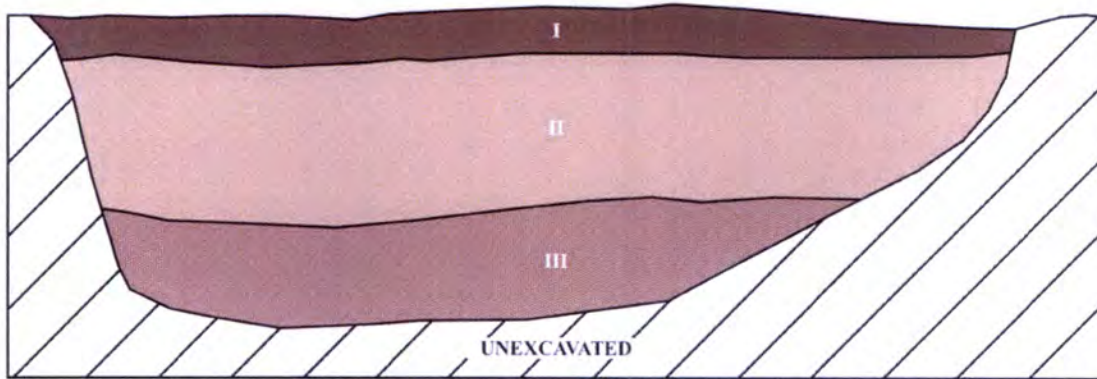
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: BROWN (10YR 5/3) SAND

**SITE F
ST-30F**



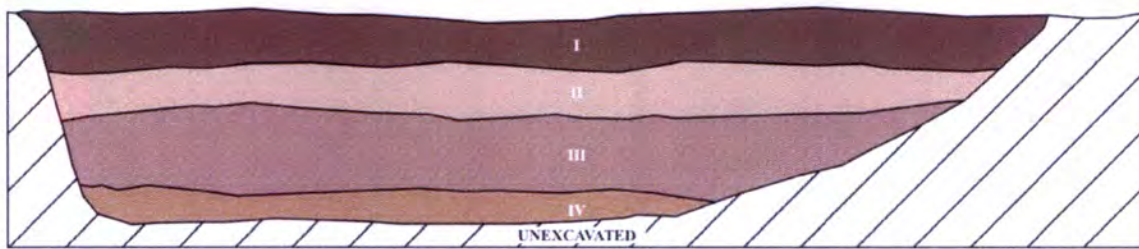
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND

**SITE F
ST-31F**



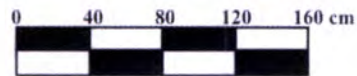
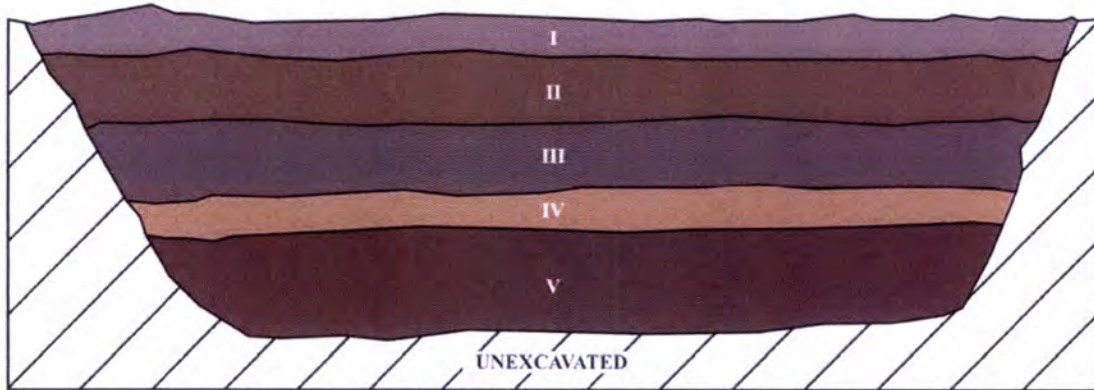
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND

**SITE F
ST-32F**



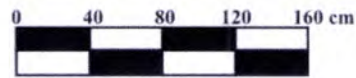
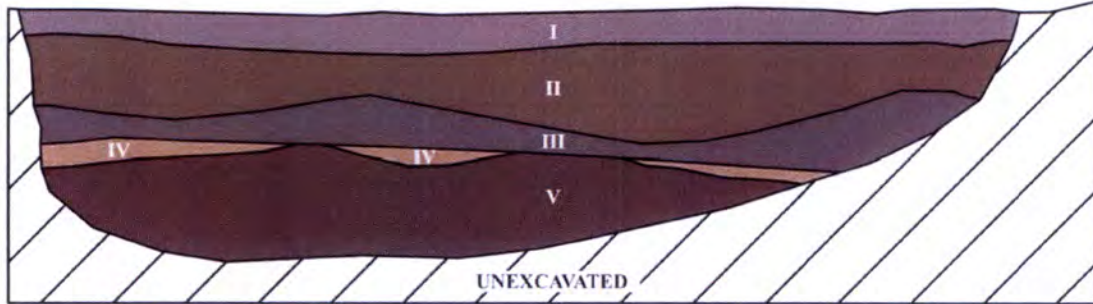
KEY	
I	- LAYER I: BROWN (7.5YR 4/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT BROWN (7.5YR 6/4) SAND
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND

SITE G
ST-1G



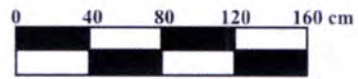
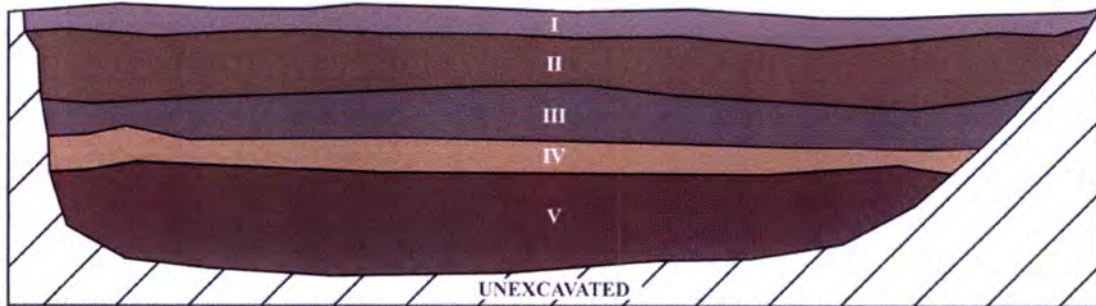
KEY	
I	- LAYER I: GRAY (5YR 5/1) GRAVEL
II	- LAYER II: BROWN (10YR 4/3) SILT LOAM
III	- LAYER III: DARK GRAY (5YR 4/1) GRAVEL
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: DARK REDDISH BROWN (5YR 3/3) CLAY

SITE G
ST-2G



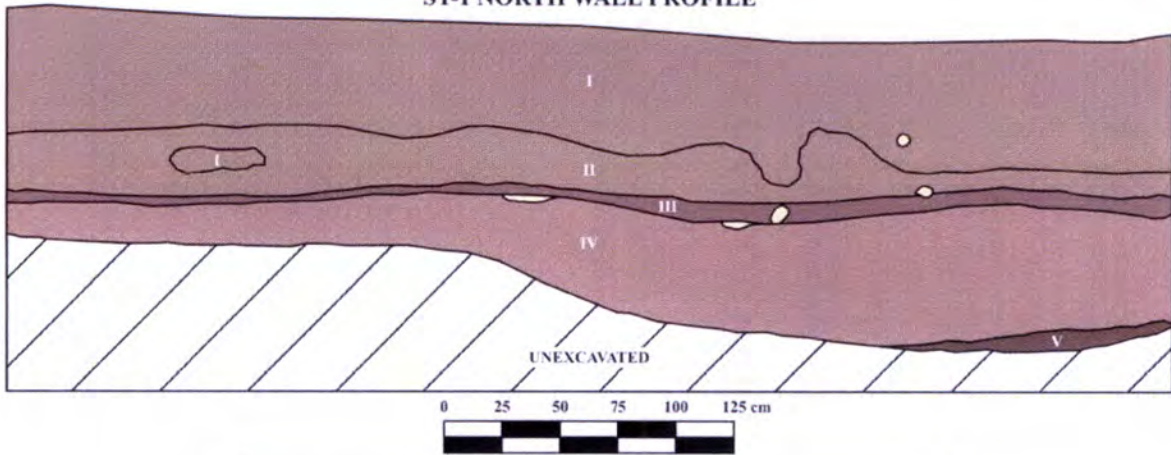
KEY	
I	- LAYER I: GRAY (5YR 5/1) GRAVEL
II	- LAYER II: BROWN (10YR 4/3) SILT LOAM
III	- LAYER III: DARK GRAY (5YR 4/1) GRAVEL
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: DARK REDDISH BROWN (5YR 3/3) CLAY

SITE G
ST-3G



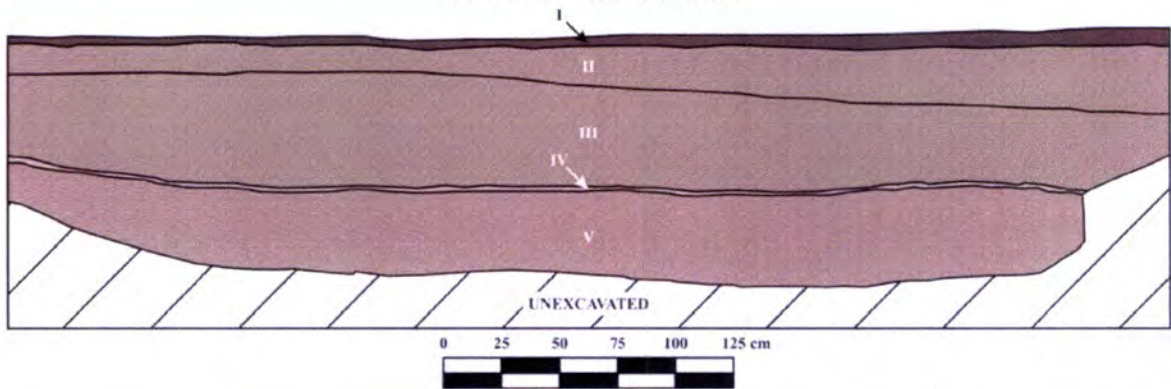
KEY	
I	- LAYER I: GRAY (5YR 5/1) GRAVEL
II	- LAYER II: BROWN (10YR 4/3) SILT LOAM
III	- LAYER III: DARK GRAY (5YR 4/1) GRAVEL
IV	- LAYER IV: BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: DARK REDDISH BROWN (5YR 3/3) CLAY

ST-1 NORTH WALL PROFILE



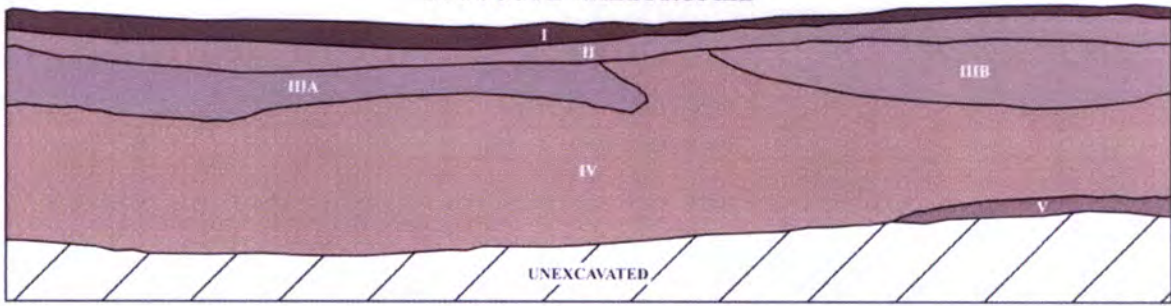
KEY	
I	- LAYER I: LIGHT YELLOWISH BROWN (2.5Y 6/4) SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (2.5Y 6/4) PARTIALLY CONCRETED SAND
III	- LAYER III: BROWN (10YR 5/3) CONCRETED LOAMY SAND
IV	- LAYER IV: LIGHT YELLOW BROWN (10YR 6/4) SAND
V	- LAYER V: OLIVE BROWN (2.5Y 4/3) CLAY LOAM
□	- CONCRETED SAND

ST-2 WEST WALL PROFILE



KEY	
I	- LAYER I: DARK BROWN (7.5YR 3/2) SANDY LOAM
II	- LAYER II: LIGHT YELLOWISH BROWN (2.5Y 6/4) PARTIALLY LITHIFIED SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (2.5Y 6/4) LITHIFIED SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) ROCK
V	- LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) SAND

ST-3 SOUTH WALL PROFILE



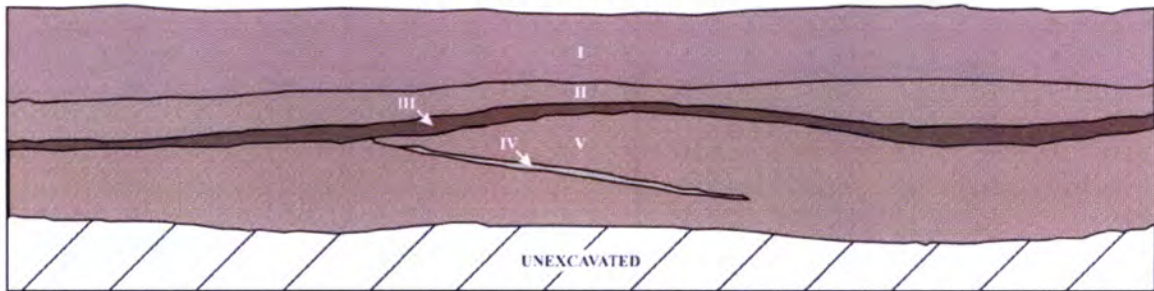
0 25 50 75 100 125 cm



KEY

I	- LAYER I: DARK BROWN (7.5YR 3/2) SANDY LOAM
II	- LAYER II: PALE BROWN (10YR 6/3) PARTIALLY LITHIFIED SAND
IIIA	- LAYER IIIA: LIGHT BROWNISH GRAY (10YR 6/2) LITHIFIED SAND
IIIB	- LAYER IIIB: PALE BROWN (10YR 6/3) LITHIFIED SAND
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) PARTIALLY LITHIFIED SAND
V	- LAYER V: BROWN (10YR 5/3) CLAY LOAM

ST-4 EAST WALL PROFILE



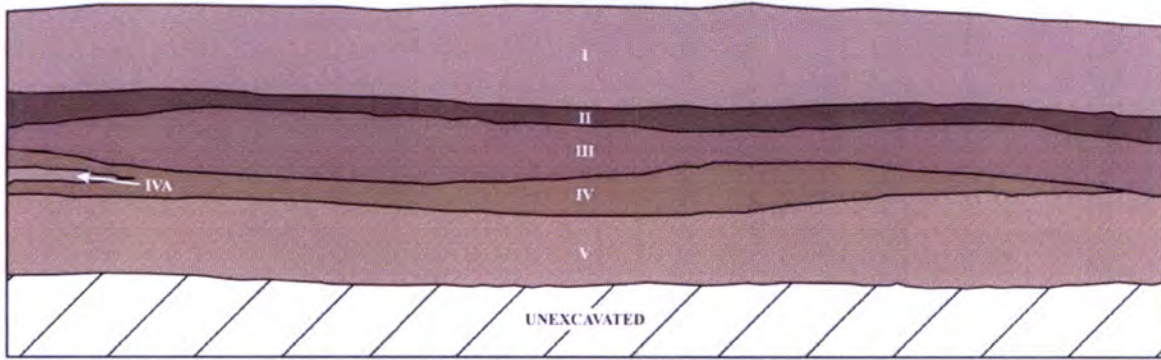
0 25 50 75 100 125 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (2.5Y 6/3) SAND
III	- LAYER III: OLIVE BROWN (2.5Y 4/4) SANDY LOAM
IV	- LAYER IV: LIGHT GRAY (5Y 7/2) SAND
V	- LAYER V: LIGHT YELLOWISH BROWN (2.5Y 6/4) SAND

ST-5 WEST WALL PROFILE



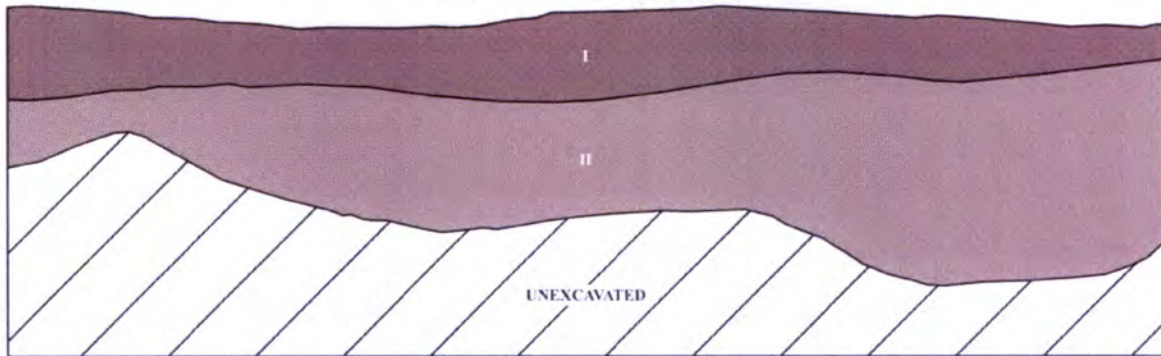
0 25 50 75 100 125 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: DARK GRAYISH BROWN (10YR 4/2) SAND
III	- LAYER III: BROWN (10YR 5/3) SAND
IV	- LAYER IV: LIGHT OLIVE BROWN (2.5Y 5/3) SAND
IVA	- LAYER IVA: LIGHT YELLOWISH BROWN (2.5Y 6/3) SAND
V	- LAYER V: LIGHT YELLOWISH BROWN (2.5Y 6/4) SAND

ST-6 EAST WALL PROFILE



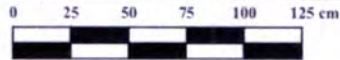
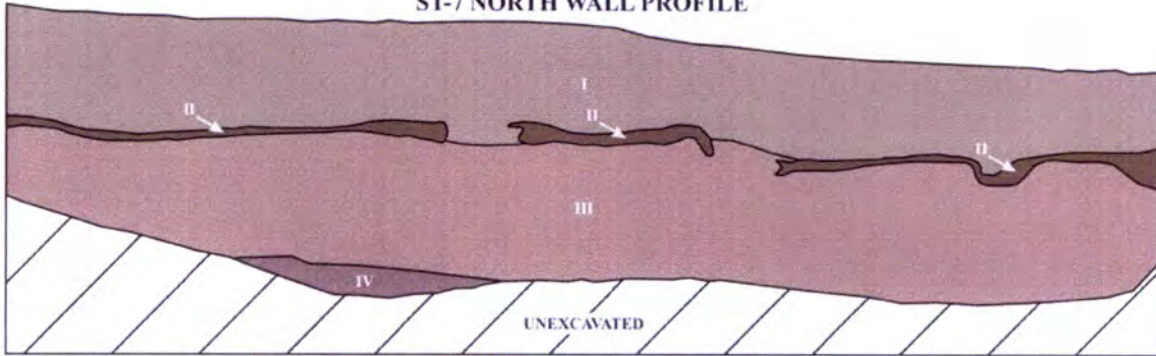
0 25 50 75 100 125 cm



KEY

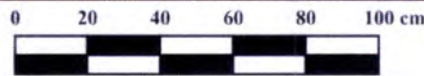
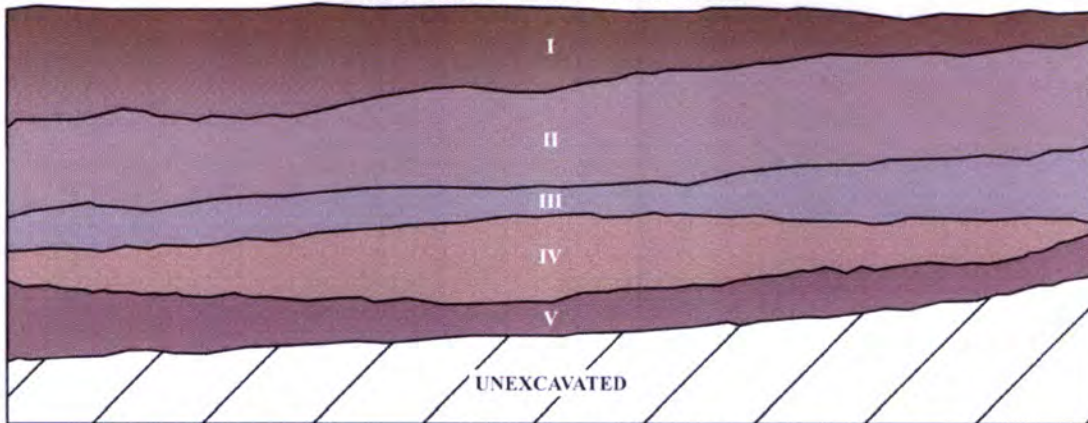
I	- LAYER I: BROWN (10YR 5/3) LOAMY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) SAND

ST-7 NORTH WALL PROFILE



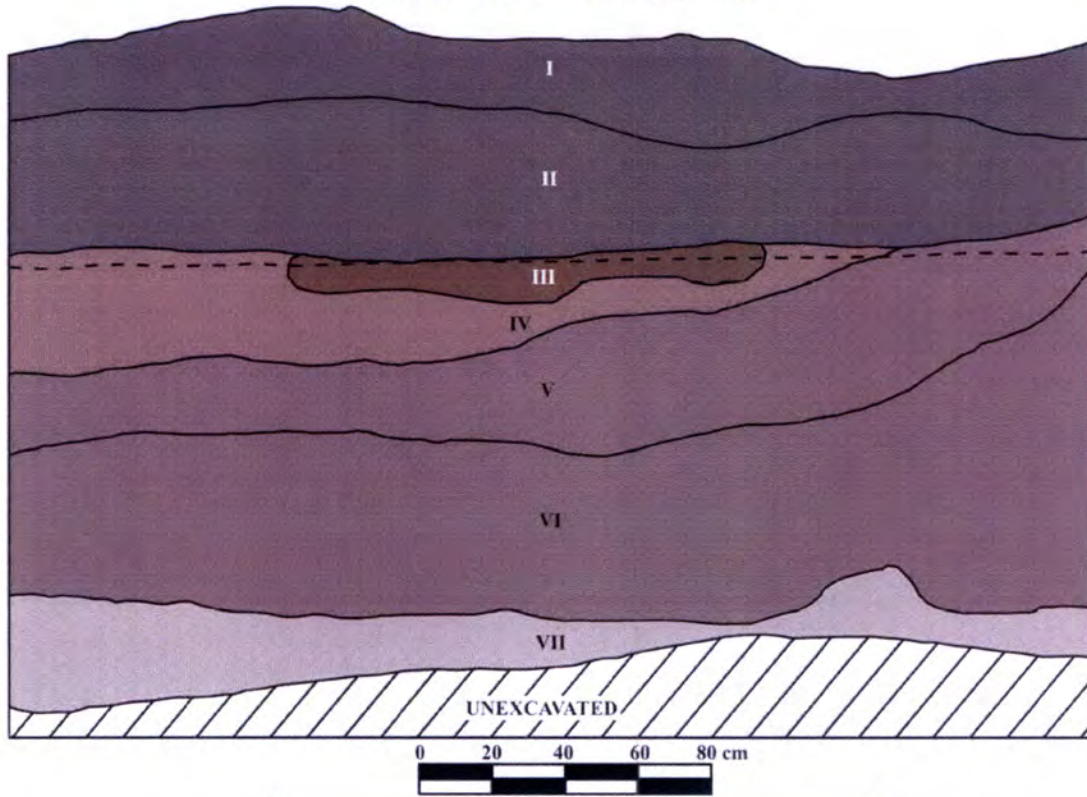
KEY	
I	- LAYER I: LIGHT YELLOWISH BROWN (2.5Y 6/3) SAND
II	- LAYER II: OLIVE BROWN (2.5Y 4/4) LOAMY SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) LOAMY SAND

ST-8 EAST WALL PROFILE



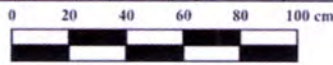
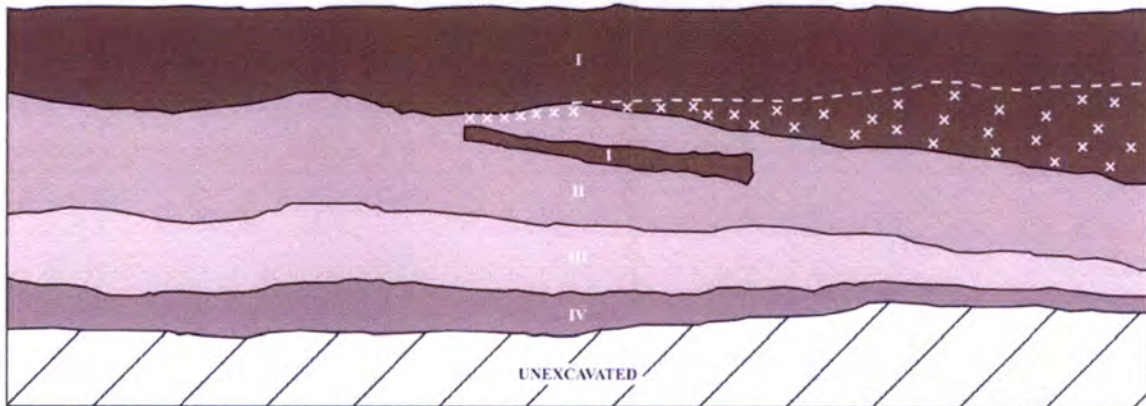
KEY	
I	- LAYER I: DARK YELLOWISH BROWN (10YR 4/4) SILT AND LIGHT BROWNISH GRAY (10YR 6/2) SAND
II	- LAYER II: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND
III	- LAYER III: REDDISH GRAY (2.5YR 6/1) SAND
IV	- LAYER IV: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
V	- LAYER V: REDDISH BROWN (2.5YR 5/3) SILTY SAND

ST-9 WEST WALL PROFILE



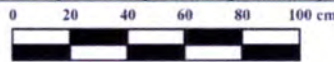
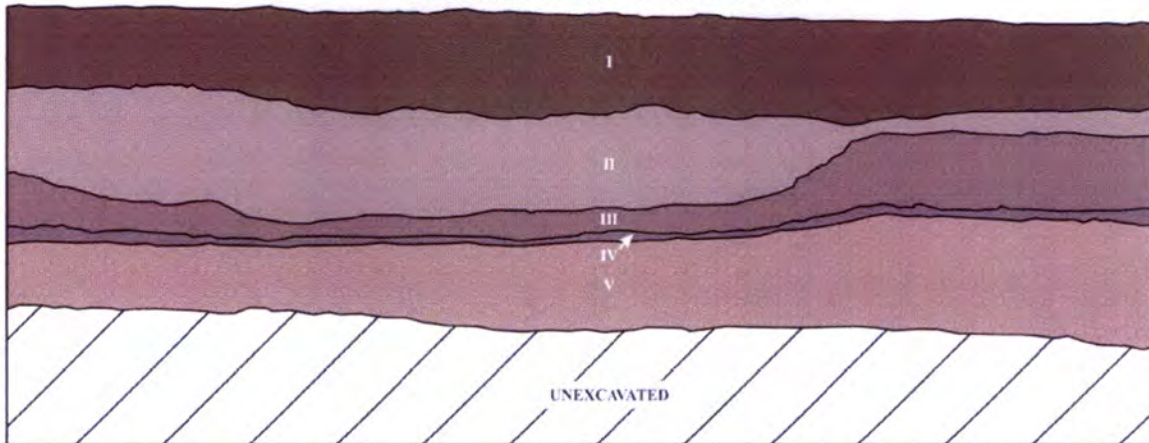
KEY	
I	- LAYER I: DARK GRAY (10YR 4/1) SAND
II	- LAYER II: DARK GRAY (10YR 4/1) SAND
III	- LAYER III: REDDISH BROWN (2.5YR 4/4) SILTY SAND
IV	- LAYER IV: BROWN (10YR 4/3) SILTY SAND
V	- LAYER V: GRAYISH BROWN (10YR 5/2) SANDY SILT
VI	- LAYER VI: GRAYISH BROWN (10YR 5/2) SANDY SILT
VII	- LAYER VII: LIGHT GRAY (10YR 7/1) SAND
- -	- DIFFUSE BOUNDARY

ST-11 SOUTH WALL PROFILE



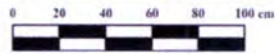
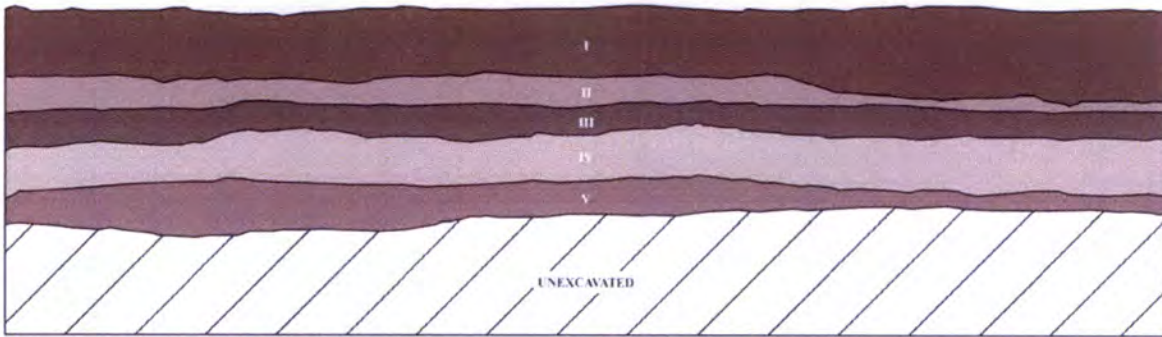
KEY	
I	- LAYER I: BROWN (10YR 4/3) SILT
II	- LAYER II: PALE RED (2.5YR 7/2) SAND
III	- LAYER III: PINKISH WHITE (2.5YR 8/2) SAND
IV	- LAYER IV: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND
x	- CHARCOAL SCATTER
/	- DIFFUSE BOUNDARY

ST-12 SOUTHEAST WALL PROFILE



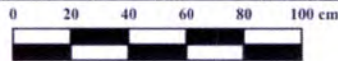
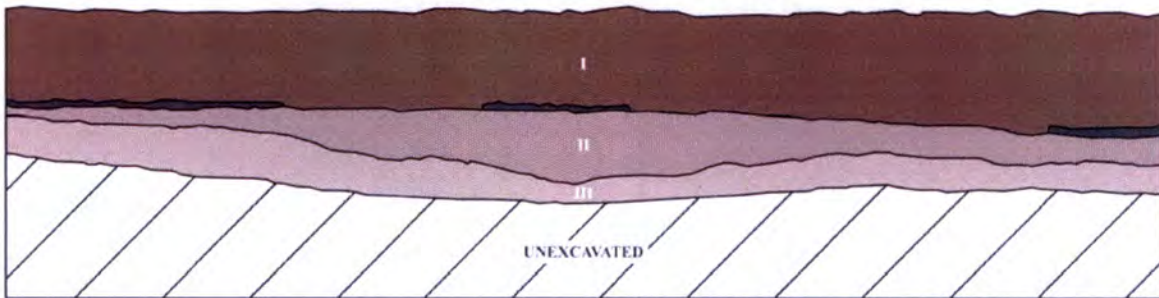
KEY	
I	- LAYER I: BROWN (10YR 4/3) SILT
II	- LAYER II: PALE BROWN (10YR 6/3) AND VERY PALE BROWN (10YR 7/4) SILTY SAND
III	- LAYER III: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SAND
IV	- LAYER IV: GRAYISH BROWN (10YR 5/2) SAND
V	- LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND

ST-13 SOUTHEAST WALL PROFILE



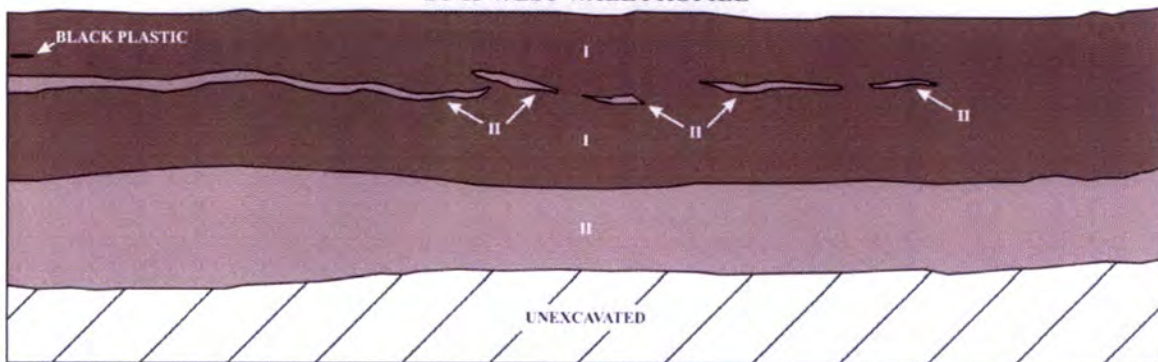
KEY	
I	- LAYER I: BROWN (10YR 4/3) SILT
II	- LAYER II: PALE BROWN (10YR 6/3) AND VERY PALE BROWN (10YR 7/4) SILTY SAND
III	- LAYER III: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND
IV	- LAYER IV: LIGHT GRAY (10YR 7/2) AND VERY PALE BROWN (10YR 7/3) SAND
V	- LAYER V: BROWN (10YR 5/3) SILT

ST-14 NORTHEAST WALL PROFILE



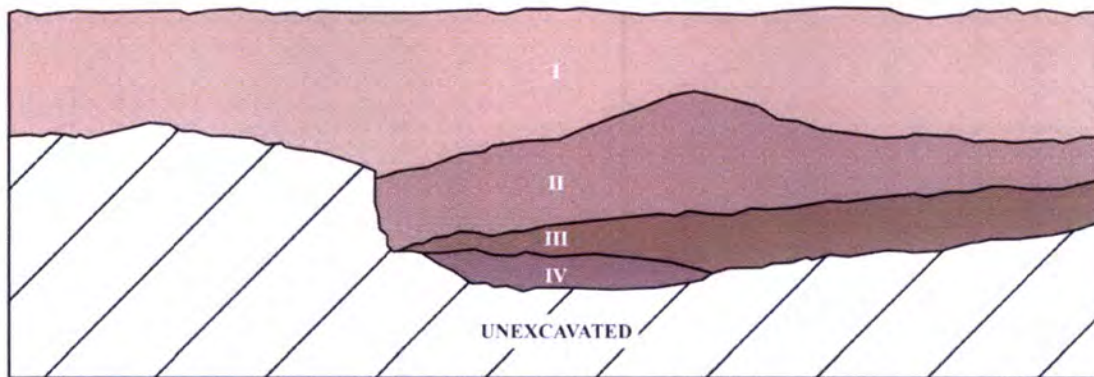
KEY	
I	- LAYER I: DARK YELLOWISH BROWN (10YR 4/4) SILTY LOAM
II	- LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/3) SAND
	- OXIDIZED SOILS WITH SOME CHARCOAL

ST-15 WEST WALL PROFILE



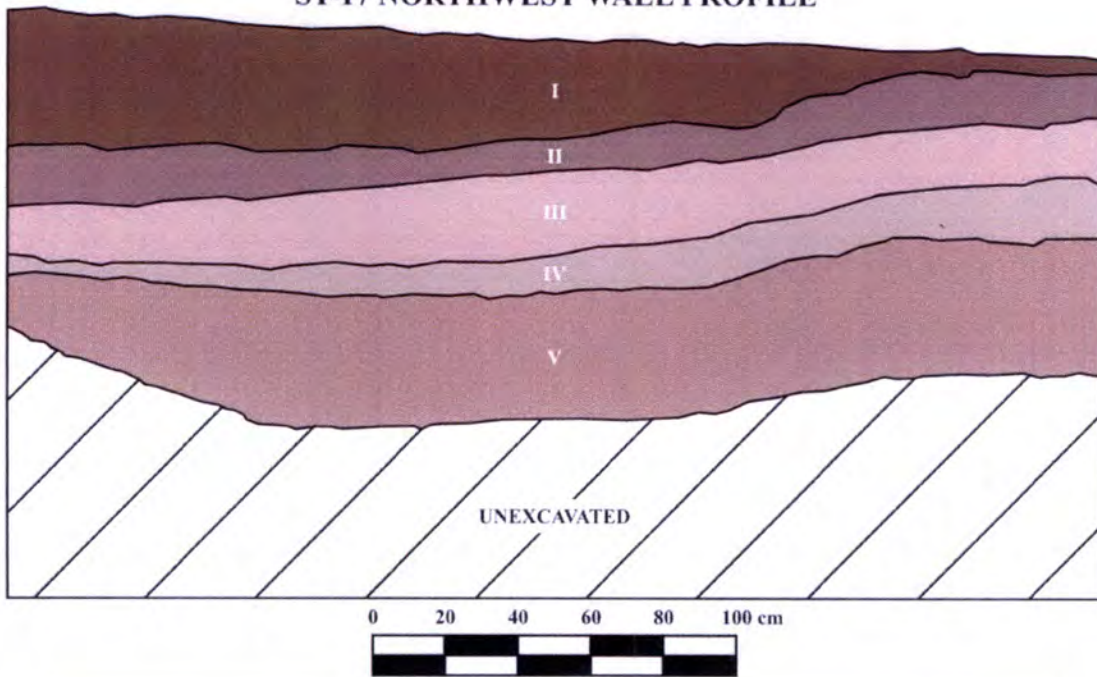
KEY	
I	- LAYER I: BROWN (10YR 4/3) LOAM
II	- LAYER II: PALE BROWN (10YR 6/3) LOAMY SAND

ST-16 SOUTHEAST WALL PROFILE



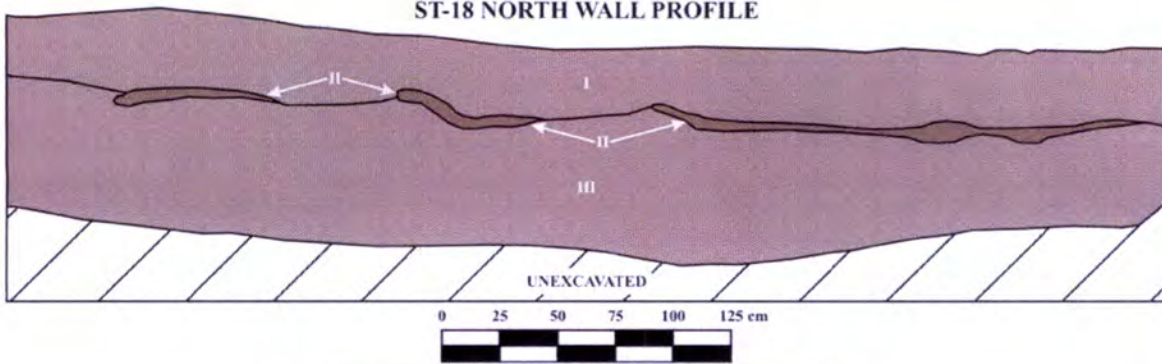
KEY	
I	- LAYER I: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) LITHIFIED SAND
III	- LAYER III: YELLOWISH BROWN (10YR 5/4) SILTY SAND
IV	- LAYER IV: BROWN (10YR 5/3) SILTY SAND

ST-17 NORTHWEST WALL PROFILE



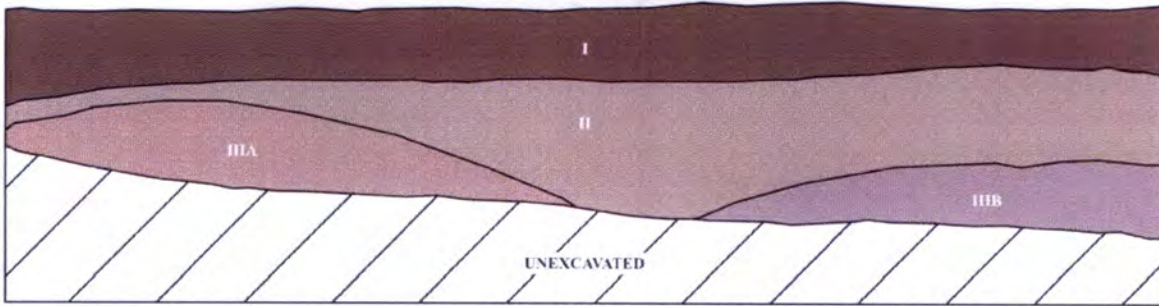
KEY	
I	- LAYER I: DARK YELLOWISH BROWN (10YR 4/4) SILT LOAM
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: LIGHT REDDISH BROWN (2.5YR 7/3) AND LIGHT REDDISH BROWN (2.5YR 7/4) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) SAND
V	- LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) LITHIFIED SAND

ST-18 NORTH WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: LIGHT OLIVE BROWN (2.5Y 5/3) LOAMY SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SAND

ST-19 EAST WALL PROFILE



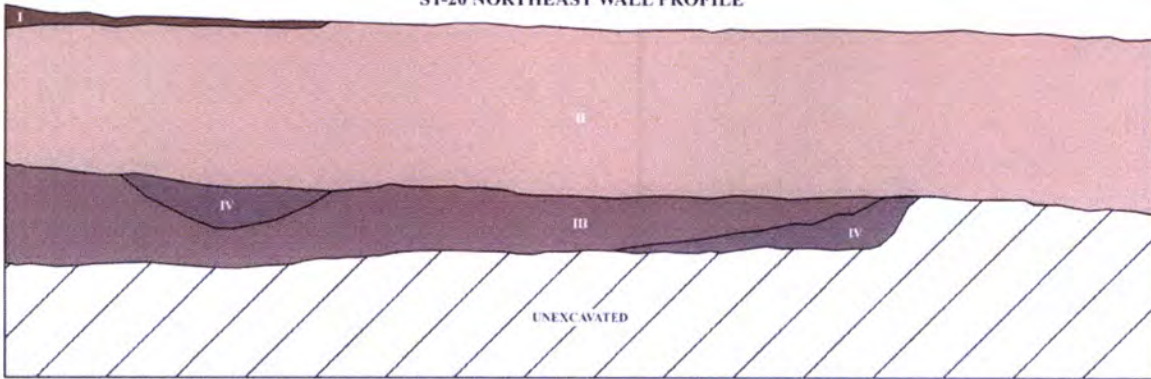
0 25 50 75 100 125 cm



KEY

I	- LAYER I: BROWN (10YR 4/3) LOAM
II	- LAYER II: LIGHT YELLOWISH BROWN (2.5Y 6/3) SAND
IIIA	- LAYER IIIA: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IIIB	- LAYER IIIB: LIGHT BROWNISH GRAY (10YR 6/2) SAND

ST-20 NORTHEAST WALL PROFILE



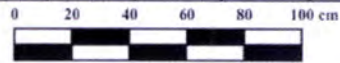
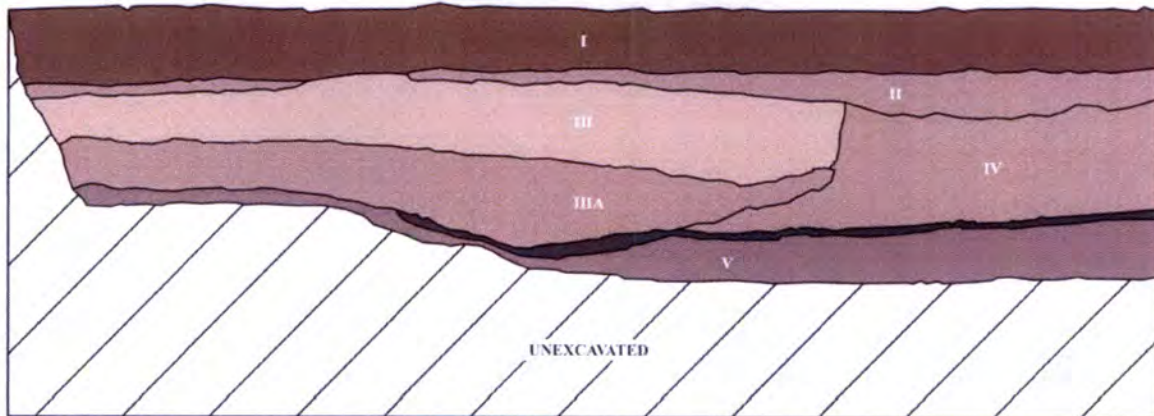
0 20 40 60 80 100 cm



KEY

I	- LAYER I: DARK YELLOWISH BROWN (10YR 4/4) SILTY CLAY
II	- LAYER II: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND
III	- LAYER III: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SILTY SAND
IV	- LAYER IV: GRAYISH BROWN (10YR 5/2) SILTY SAND

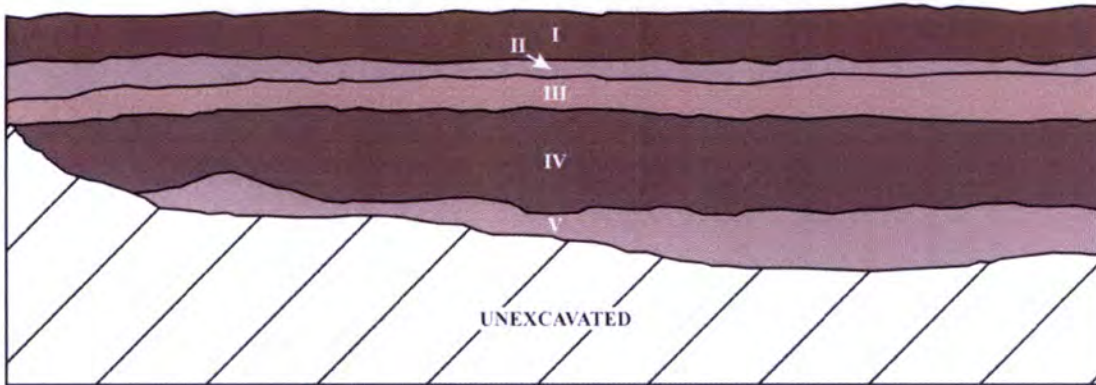
ST-21 WEST WALL PROFILE



KEY

I	- LAYER I: DARK YELLOWISH BROWN (10YR 4/4) SILTY CLAY
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) LITHIFIED SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IIIA	- LAYER IIIA: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IIIV	- LAYER IIIV: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	- LAYER IV: YELLOWISH BROWN (10YR 5/4) SILTY SAND
V	- LAYER V: BROWN (10YR 5/3) SILT
	- LENS OF DARK SILT

ST-22 SOUTHWEST WALL PROFILE



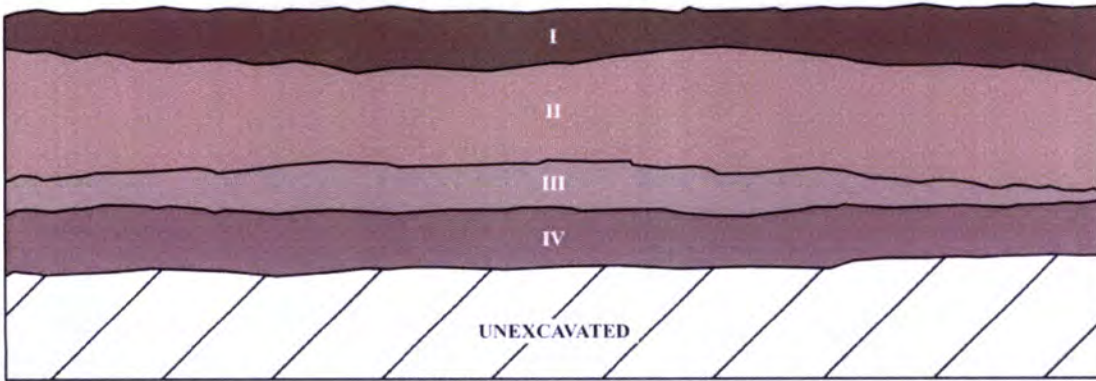
0 20 40 60 80 100 cm



KEY

- I** - LAYER I: BROWN (10YR 4/3) SILT LOAM
- II** - LAYER II: PALE BROWN (10YR 6/3) SAND
- III** - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IV: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND
- V** - LAYER V: PALE BROWN (10YR 6/3) SILT

ST-23 NORTHWEST WALL PROFILE



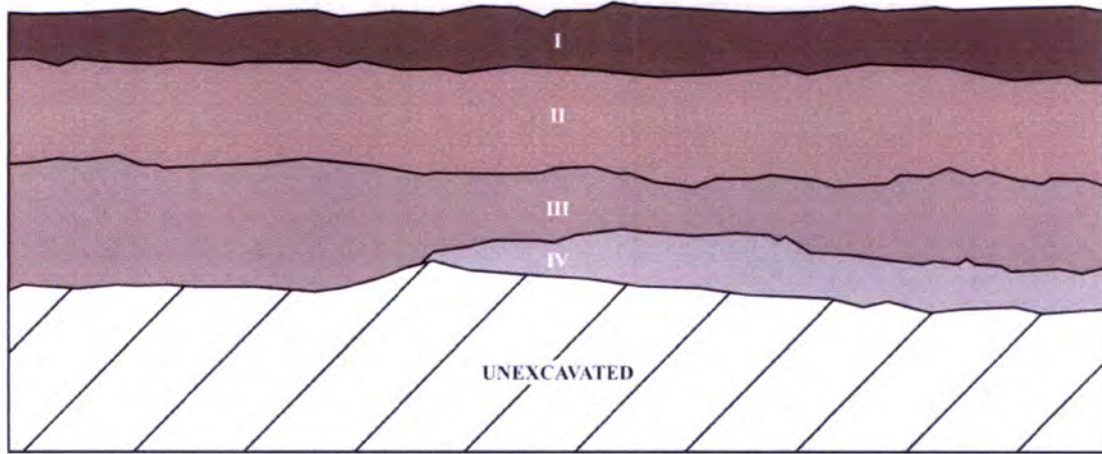
0 20 40 60 80 100 cm



KEY

- I** - LAYER I: BROWN (10YR 4/3) SILTY LOAM
- II** - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- III** - LAYER III: PALE BROWN (10YR 6/3) SILT
- IV** - LAYER IV: BROWN (10YR 5/3) SILTY LOAM

ST-24 NORTHWEST WALL PROFILE



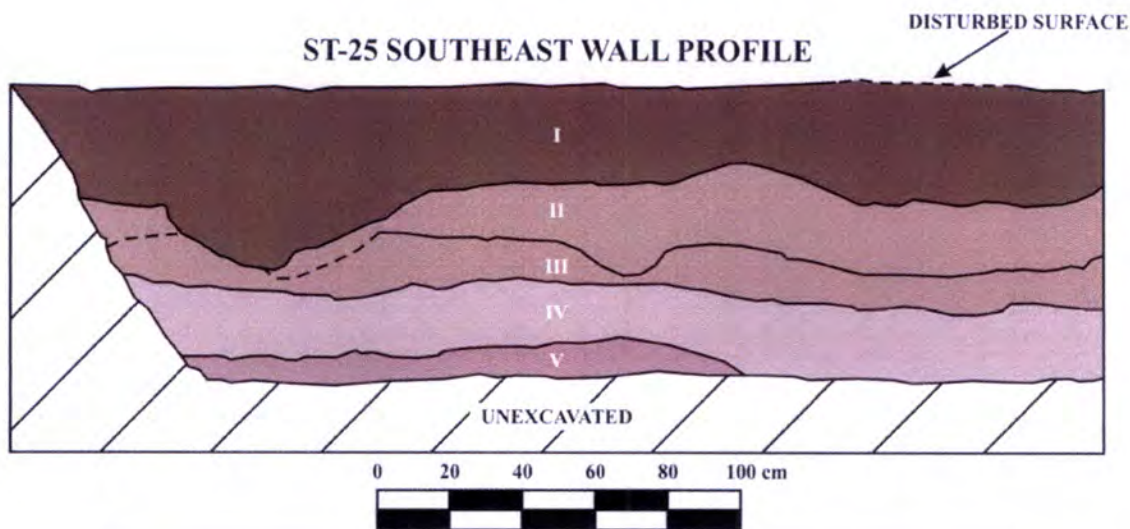
0 20 40 60 80 100 cm



KEY

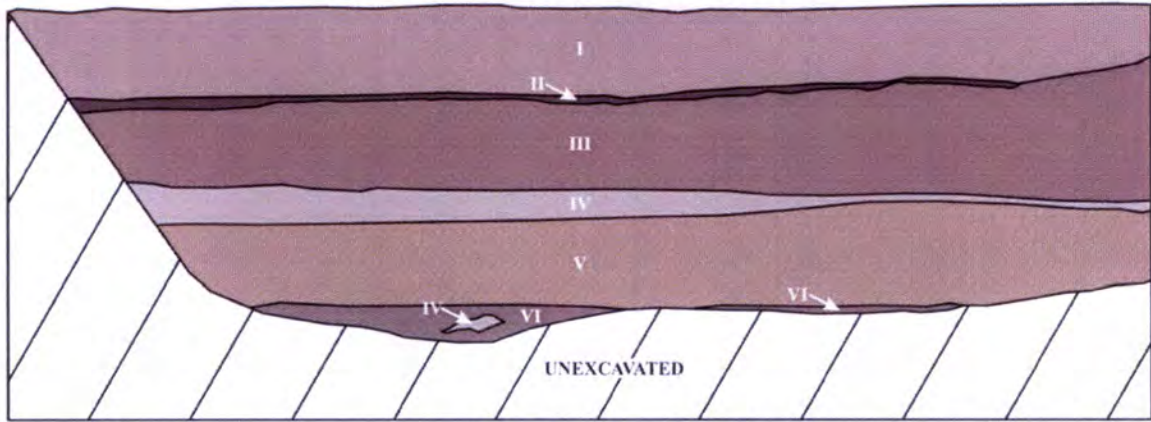
I	- LAYER I: BROWN (10YR 4/3) SILT LOAM
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SILT
IV	- LAYER IV: LIGHT GRAY (10YR 7/1) AND LIGHT GRAY (10YR 7/2) SAND

ST-25 SOUTHEAST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 4/3) SILT LOAM AND YELLOWISH BROWN (10YR 5/4) SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SILT
IV	- LAYER IV: PALE RED (2.5YR 7/2) AND LIGHT REDDISH BROWN (2.5YR 7/3) SAND
V	- LAYER V: LIGHT REDDISH BROWN (2.5YR 6/3) SILT
- - -	- DIFFUSE BOUNDARY

ST-26 NORTHWEST WALL PROFILE



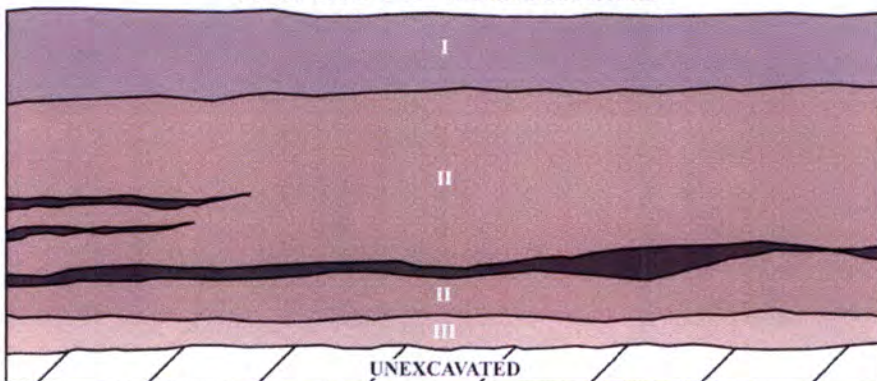
0 25 50 75 100 125 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) LOAMY SAND
II	- LAYER II: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
III	- LAYER III: BROWN (10YR 5/3) SAND
IV	- LAYER IV: LIGHT GRAY (10YR 7/1) SANDY CLAY LOAM
V	- LAYER V: LIGHT YELLOWISH BROWN (2.5Y 6/4) SANDY LOAM
VI	- LAYER VI: GRAYISH BROWN (2.5Y 5/2) LOAM

ST-27 SOUTH WALL PROFILE



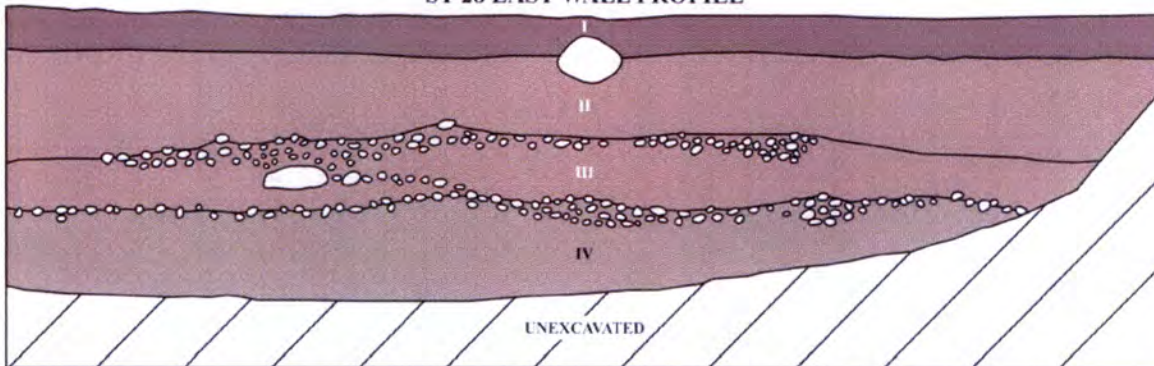
0 25 50 75 100 125 cm



KEY

- I - LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SILTY SAND
- II - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- III - LAYER III: VERY PALE BROWN (10YR 7/4) SAND
- BASALT PEBBLE LENSES

ST-28 EAST WALL PROFILE



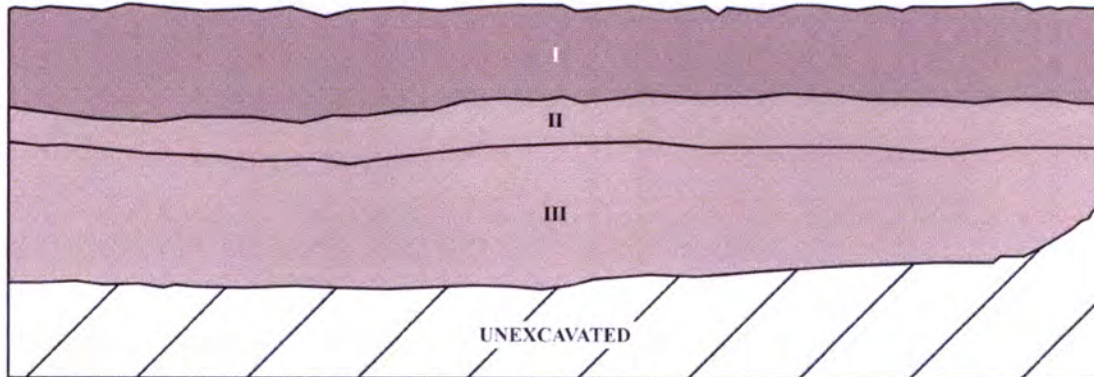
0 25 50 75 100 125 cm



KEY

- I - LAYER I: BROWN (10YR 5/3) SAND
- II - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- III - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV - LAYER IV: LIGHT YELLOWISH BROWN (2.5YR 6/3) SAND
- BASALT PEBBLES
- BASALT COBBLE

ST-29 NORTHEAST WALL PROFILE



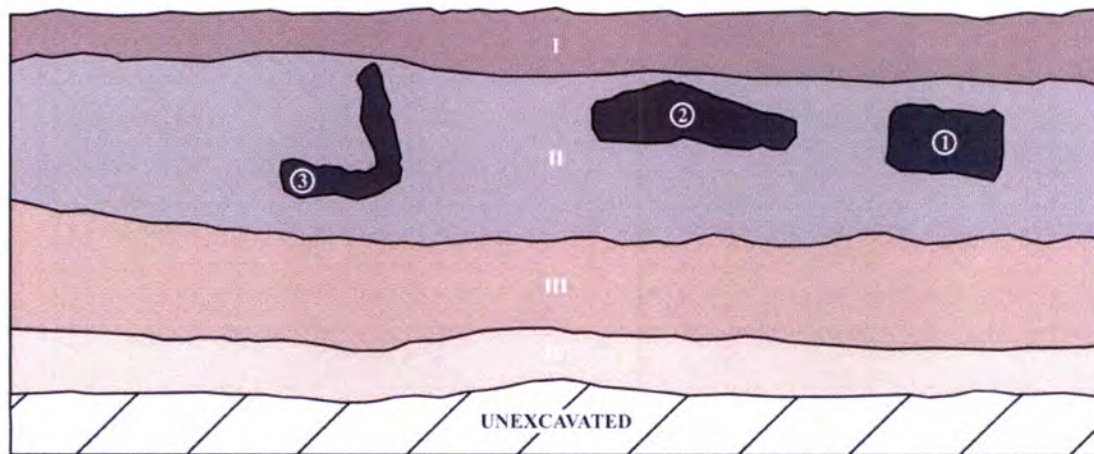
0 20 40 60 80 100 cm



KEY

- I** - LAYER I: PALE BROWN (10YR 6/3) SAND
- II** - LAYER II: LIGHT GRAY (10YR 7/2) AND VERY PALE BROWN (10YR 7/3) SAND
- III** - LAYER III: VERY PALE BROWN (10YR 7/3) LITHIFIED SAND

ST-30 NORTHEAST WALL PROFILE



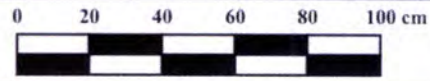
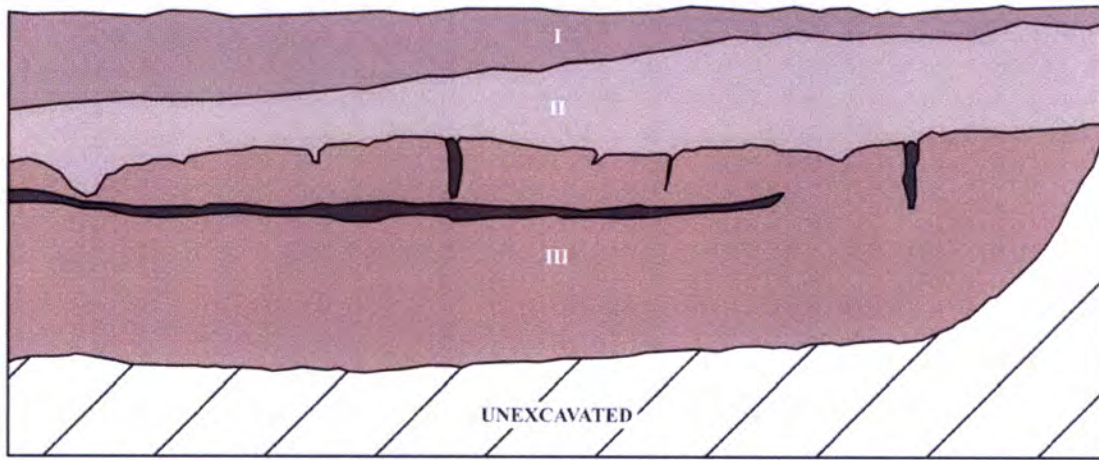
0 20 40 60 80 100 cm



KEY

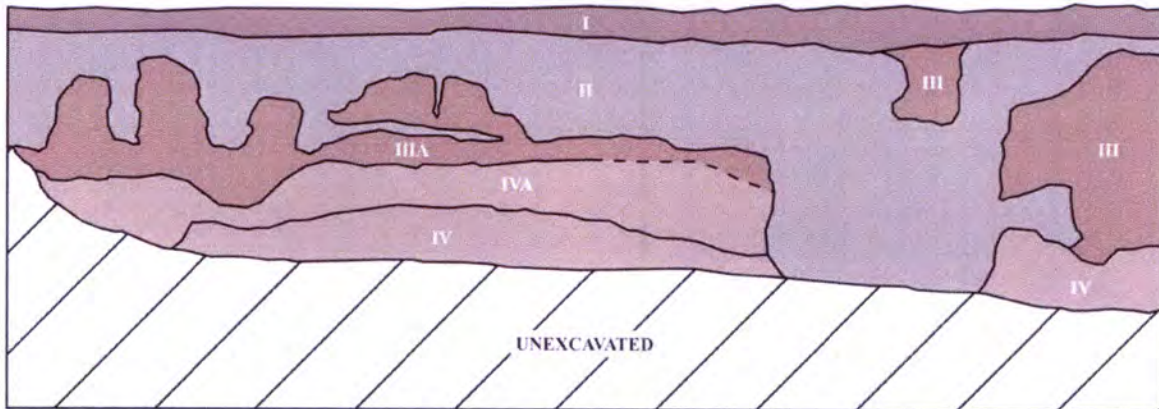
- I** - LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
- II** - LAYER II: LIGHT GRAY (10YR 7/1) AND LIGHT GRAY (10YR 7/2) SAND
- III** - LAYER III: VERY PALE BROWN (10YR 7/4) SAND
- IV** - LAYER IV: VERY PALE BROWN (10YR 8/3) AND VERY PALE BROWN (10YR 8/4) LITHIFIED SAND
- ① ② ③** - STAIN POCKETS

ST-31 NORTHEAST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
	- LITHIFIED SAND VEINS

ST-32 NORTHWEST WALL PROFILE



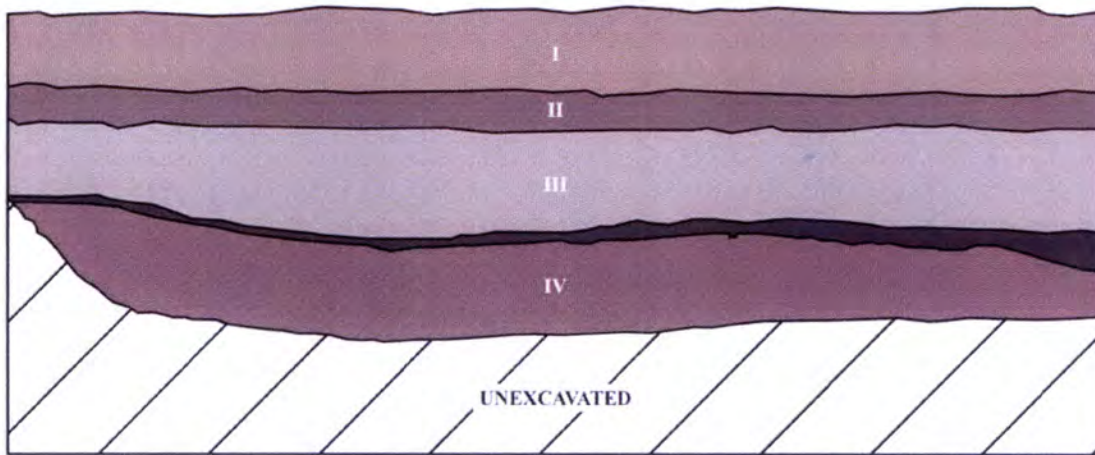
0 20 40 60 80 100 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: LIGHT GRAY (10YR 7/1) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) LITHIFIED SAND
IVA	- LAYER IVA: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND
	- DIFFUSE BOUNDARY

ST-33 NORTHWEST WALL PROFILE



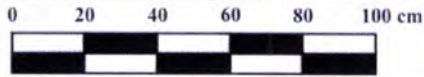
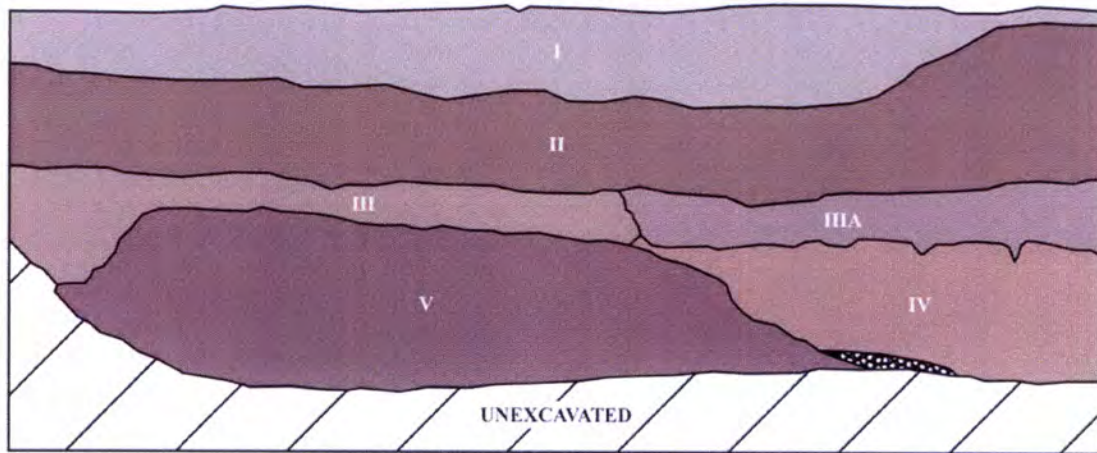
0 20 40 60 80 100 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: GRAYISH BROWN (10YR 5/2) SILTY SAND
III	- LAYER III: LIGHT GRAY (10YR 7/1) AND LIGHT GRAY (10YR 7/2) SAND
IV	- LAYER IV: WEAK RED (2.5YR 5/2) SILT
	- LITHIFIED SAND LENS

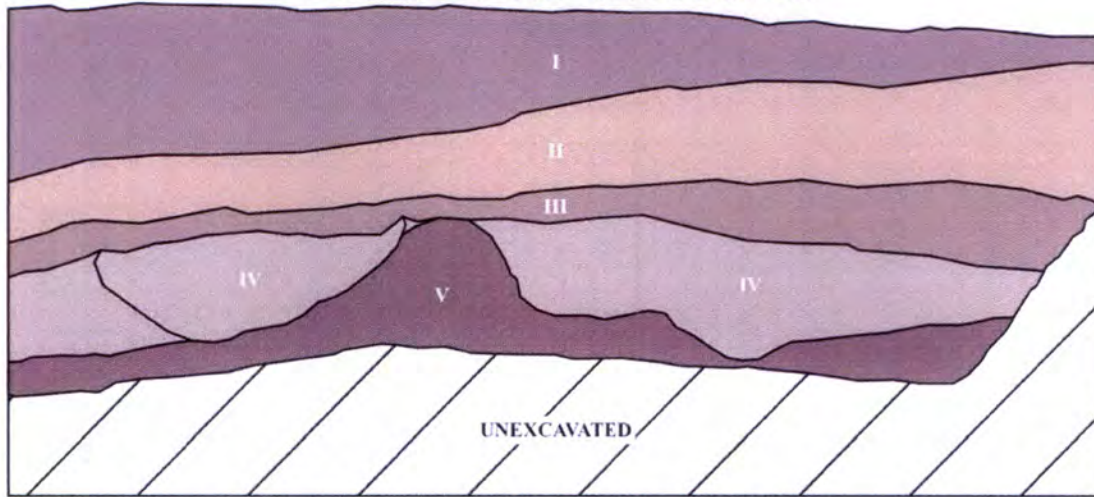
ST-34 SOUTHWEST WALL PROFILE



KEY

I	- LAYER I: LIGHT GRAY (10YR 7/1) AND LIGHT GRAY (10YR 7/2) SAND
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SILT
IIIA	- LAYER IIIA: LIGHT BROWNISH GRAY (10YR 6/2) AND VERY PALE BROWN (10YR 7/3) SAND
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: WEAK RED (2.5YR 5/2) SILT
•••••	- BASALT GRAVEL POCKET

ST-35 NORTHEAST WALL PROFILE



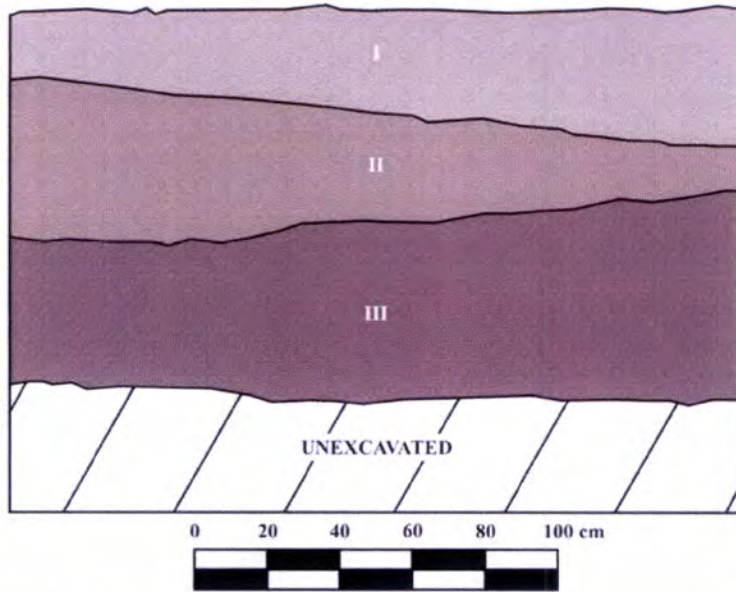
0 20 40 60 80 100 cm



KEY

- | | |
|-----|--|
| I | - LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SAND |
| II | - LAYER II: VERY PALE BROWN (10YR 7/4) SAND |
| III | - LAYER III: PALE BROWN (10YR 6/3) SILT |
| IV | - LAYER IV: LIGHT GRAY (10YR 7/2) SAND |
| V | - LAYER V: WEAK RED (2.5YR 5/2) SILT |

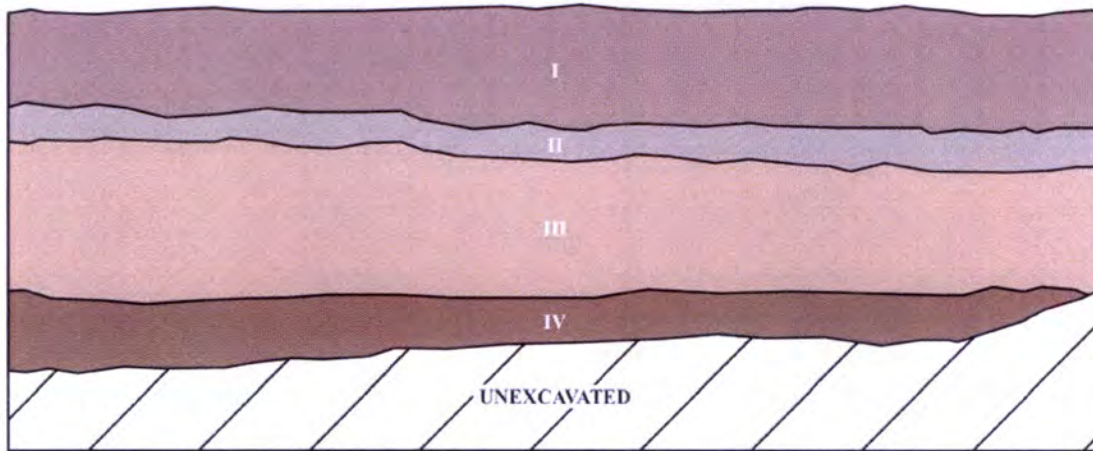
ST-36 NORTHWEST WALL PROFILE



KEY

- | | |
|-----|---|
| I | - LAYER I: LIGHT GRAY (10YR 7/2) SAND |
| II | - LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND |
| III | - LAYER III: WEAK RED (2.5YR 5/2) SILT |

ST-37 SOUTHEAST WALL PROFILE



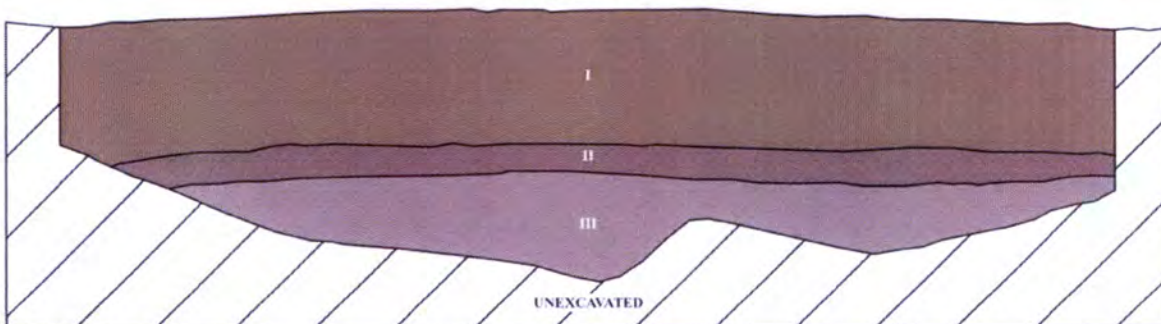
0 20 40 60 80 100 cm



KEY

- I** - LAYER I: PALE BROWN (10YR 6/3) SAND
- II** - LAYER II: LIGHT GRAY (10YR 7/1) SILTY SAND
- III** - LAYER III: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IV: YELLOWISH BROWN (10YR 5/4) SILTY LOAM

ST-38 EAST WALL PROFILE



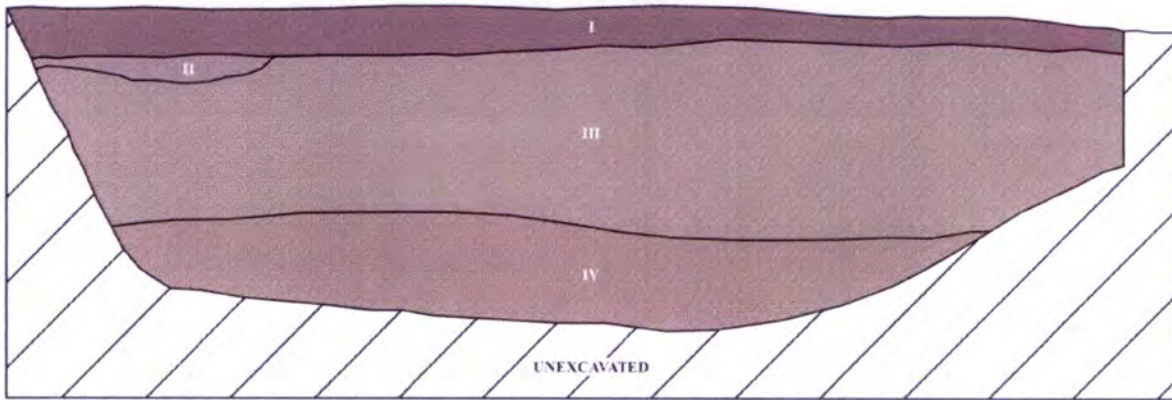
0 25 50 75 100 125 cm



KEY

- I** - LAYER I: LIGHT OLIVE BROWN (2.5Y 5/3) LOAMY SAND
- II** - LAYER II: BROWN (10YR 5/3) LOAMY SAND
- III** - LAYER III: LIGHT BROWNISH GRAY (10YR 6/2) LOAMY SAND

ST-39 WEST WALL PROFILE



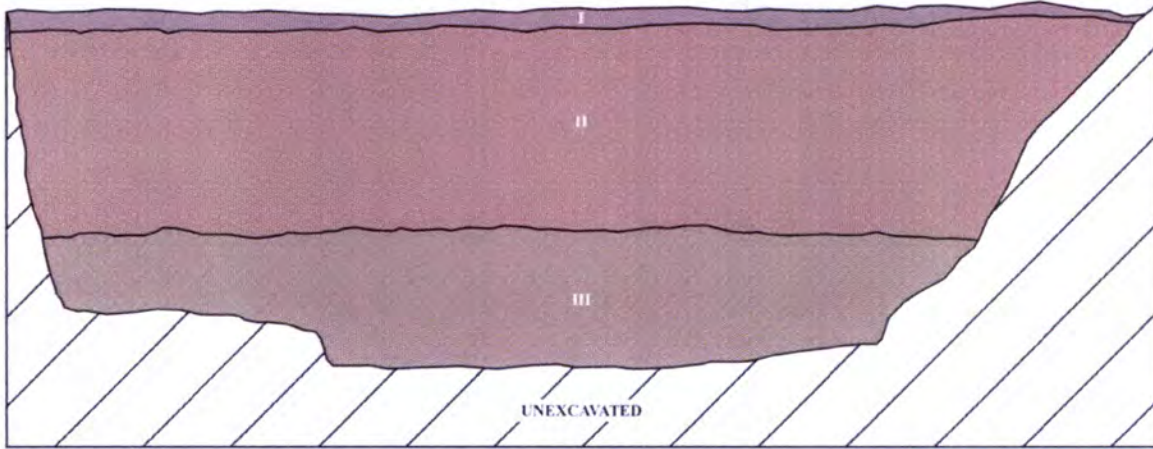
0 25 50 75 100 125 cm



KEY

- I - LAYER I: BROWN (10YR 5/3) SANDY LOAM
- II - LAYER II: PALE BROWN (10YR 6/3) SAND
- III - LAYER III: LIGHT YELLOWISH BROWN (2.5Y 6/3) PARTLY LITHIFIED SAND
- IV - LAYER IV: LIGHT YELLOWISH BROWN (2.5Y 6/4) SAND

ST-40 NORTH WALL PROFILE



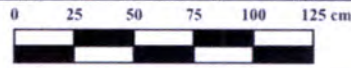
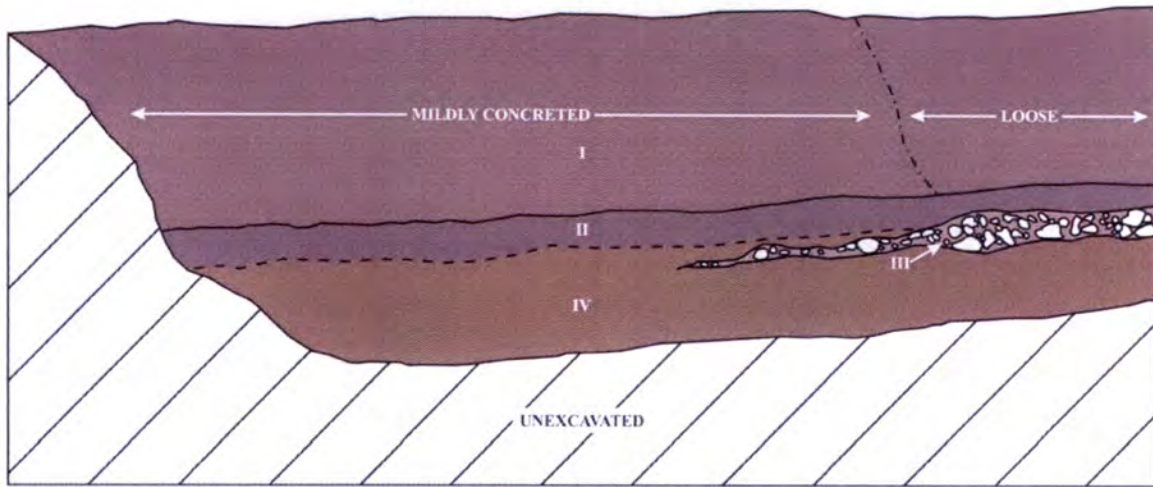
0 25 50 75 100 125 cm



KEY

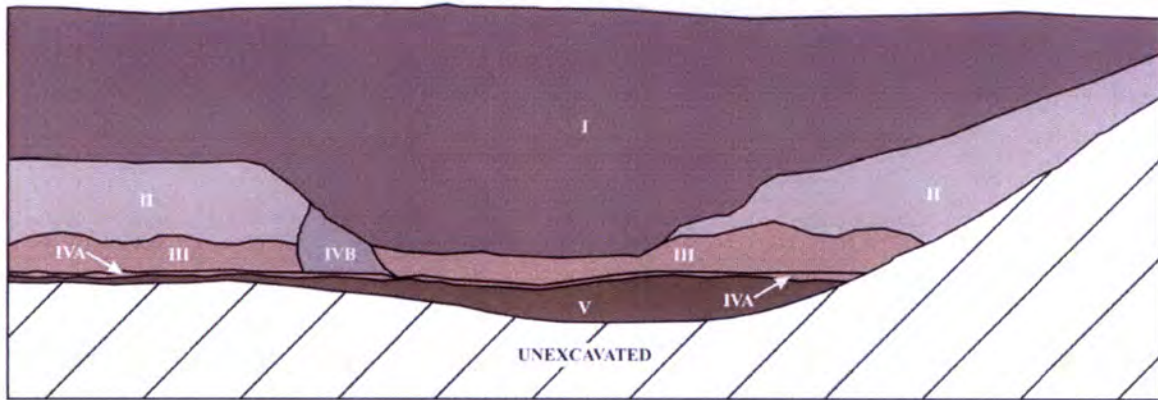
- I - LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) AEOLIAN SAND
- II - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) AEOLIAN SAND
- III - LAYER III: LIGHT YELLOWISH BROWN (2.5Y 6/3) LITHIFIED SAND

ST-41 SOUTH WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) AEOLIAN SAND
II	- LAYER II: GRAYISH BROWN (10YR 5/2) AEOLIAN SAND
III	- LAYER III: PALE BROWN (10YR 6/3) AEOLIAN SAND
IV	- LAYER IV: YELLOWISH BROWN (10YR 5/4) AEOLIAN SAND
	- BASALT ROCK
	- LAYER I DIFFUSE BOUNDARY
	- DIFFUSE BOUNDARY

ST-42 EXTENSION EAST WALL PROFILE



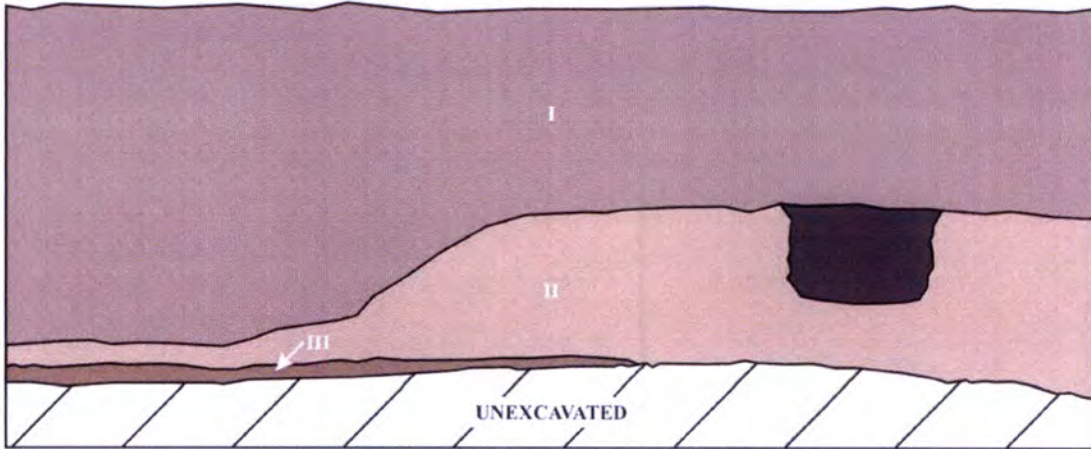
0 25 50 75 100 125 cm



KEY

I	- LAYER I: GRAYISH BROWN (10YR 5/2) SAND
II	- LAYER II: LIGHT GRAY (10YR 7/1) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IVA	- LAYER IVA: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IVB	- LAYER IVB: GRAY (10YR 6/1) SANDY LOAM
V	- LAYER V: OLIVE BROWN (2.5Y 4/3) SILT

ST-42 WEST WALL PROFILE



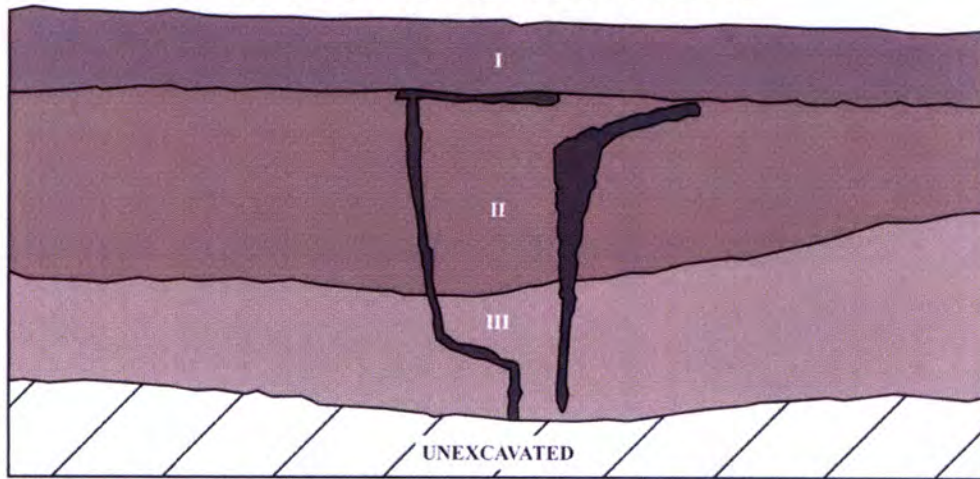
0 20 40 60 80 100 cm



KEY

I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	- LAYER III: YELLOWISH BROWN (10YR 5/4) SILT LOAM
	- STAIN

ST-43 SOUTHWEST WALL PROFILE



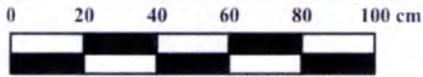
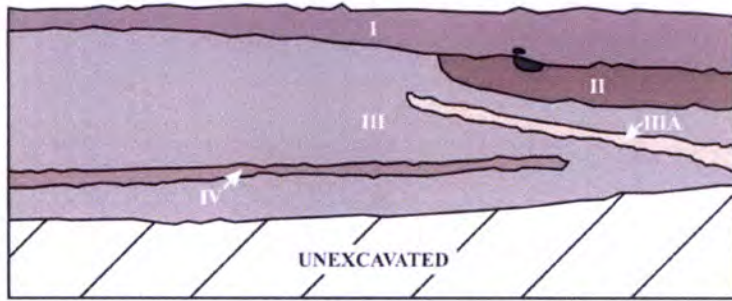
0 20 40 60 80 100 cm




KEY

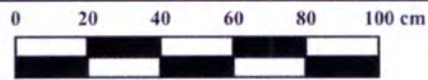
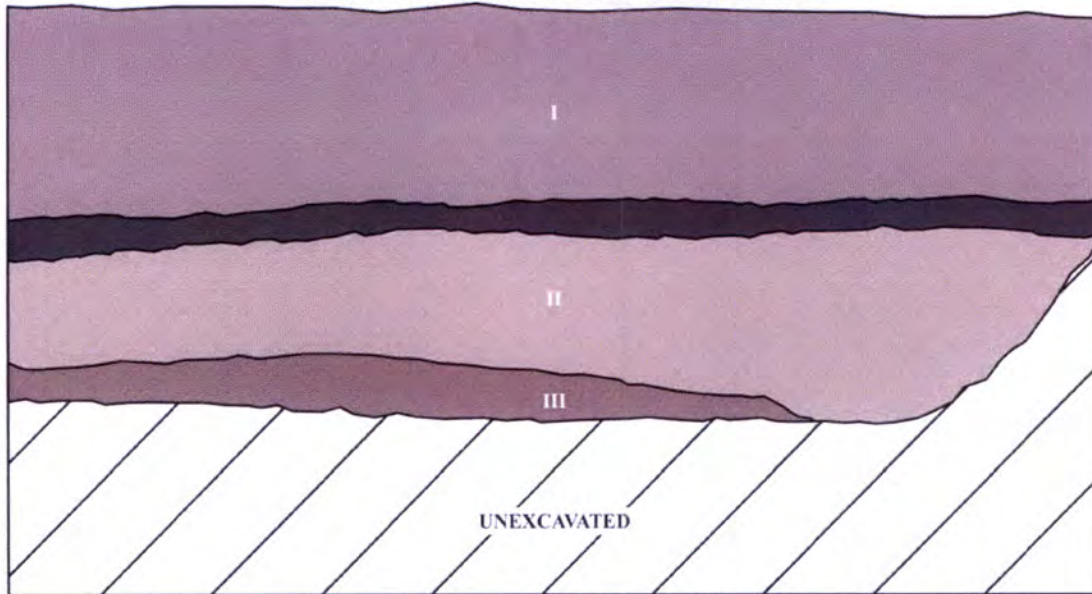
- | | |
|-----|--|
| I | - LAYER I: GRAYISH BROWN (10YR 5/2) SAND |
| II | - LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SAND |
| III | - LAYER III: GRAYISH BROWN (10YR 5/2) AND PALE BROWN (10YR 6/3) SAND |
| | - LITHIFIED SAND AND CORAL VEINS |

ST-44 NORTHEAST WALL PROFILE



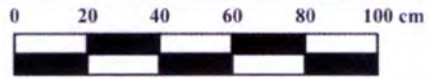
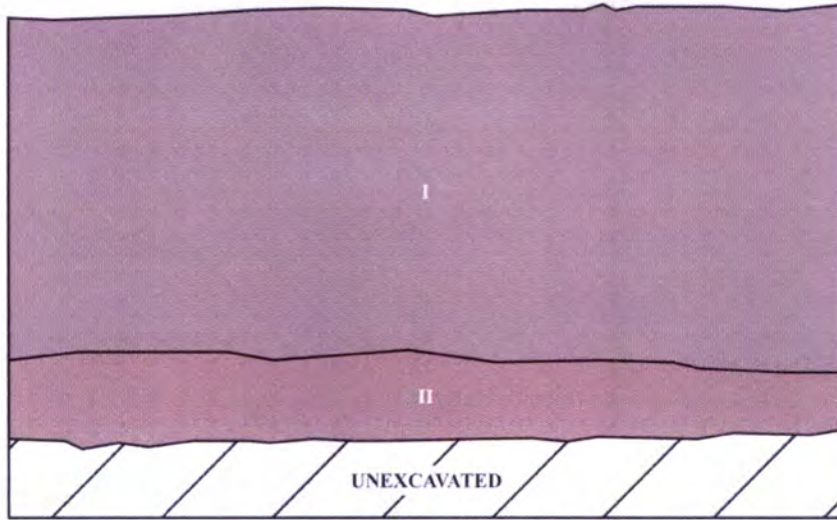
KEY	
I	- LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SAND
II	- LAYER II: BROWN (10YR 5/3) SILTY SAND
III	- LAYER III: LIGHT GRAY (10YR 7/1) LITHIFIED SAND
IIIA	- LAYER IIIA: VERY PALE BROWN (10YR 8/3) SAND
IV	- LAYER IV: PALE BROWN (10YR 6/3) SAND
	- MINUTE CHARCOAL FLECKS

ST-45 SOUTHEAST WALL PROFILE



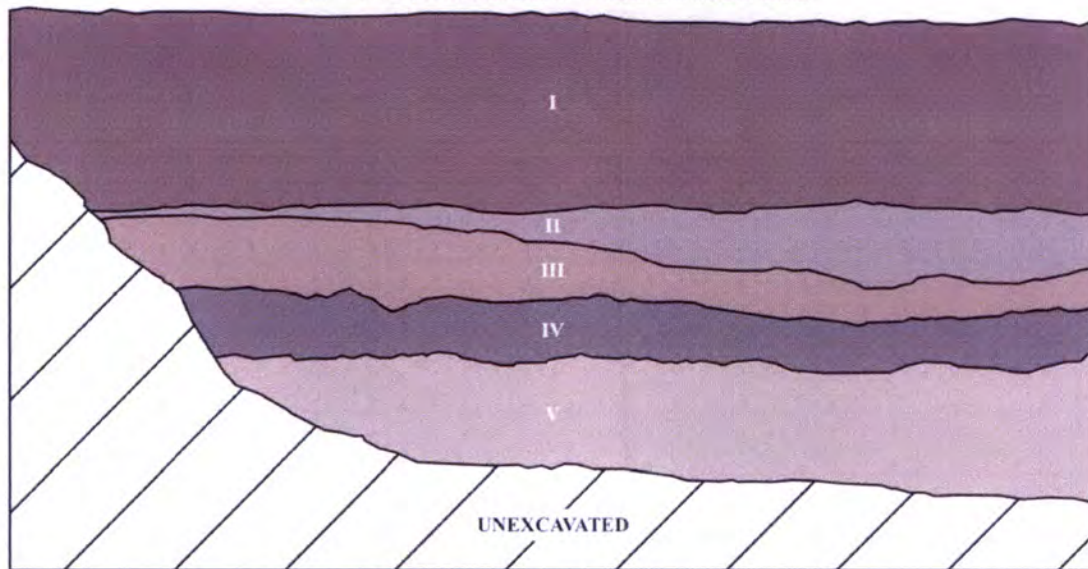
KEY	
I	- LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/3) SAND
III	- LAYER III: BROWN (10YR 5/3) SILT
	- LENS OF LOOSE SAND AND BASALT GRAVEL

ST-46 EAST WALL PROFILE



KEY	
I	- LAYER I: PALE RED (2.5YR 6/2) SAND
II	- LAYER II: LIGHT REDDISH BROWN (2.5YR 6/3) SAND

ST-47 NORTHEAST WALL PROFILE



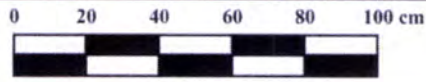
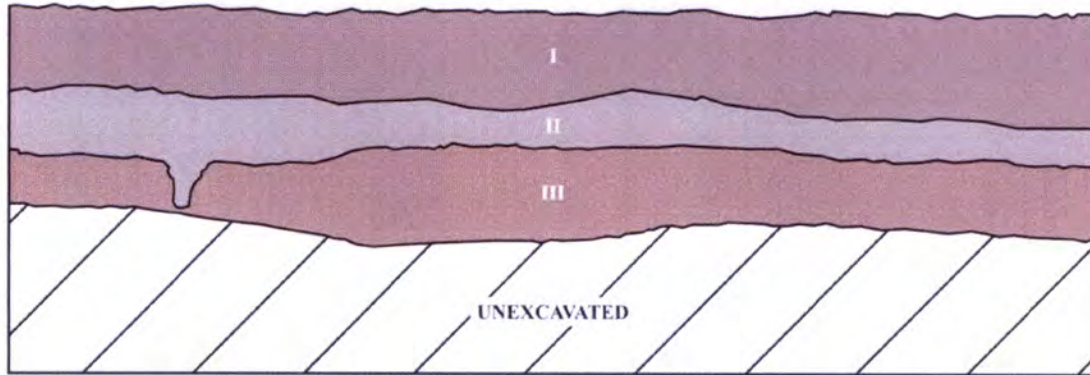
0 20 40 60 80 100 cm



KEY

- | | |
|-----|--|
| I | - LAYER I: GRAYISH BROWN (10YR 5/2) SAND |
| II | - LAYER II: GRAY (10YR 6/1) SILTY SAND |
| III | - LAYER III: PALE BROWN (10YR 6/3) SILT |
| IV | - LAYER IV: GRAY (10YR 5/1) SILTY SAND |
| V | - LAYER V: LIGHT GRAY (10YR 7/2) AND VERY PALE BROWN (10YR 7/3) SAND |

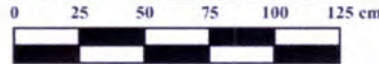
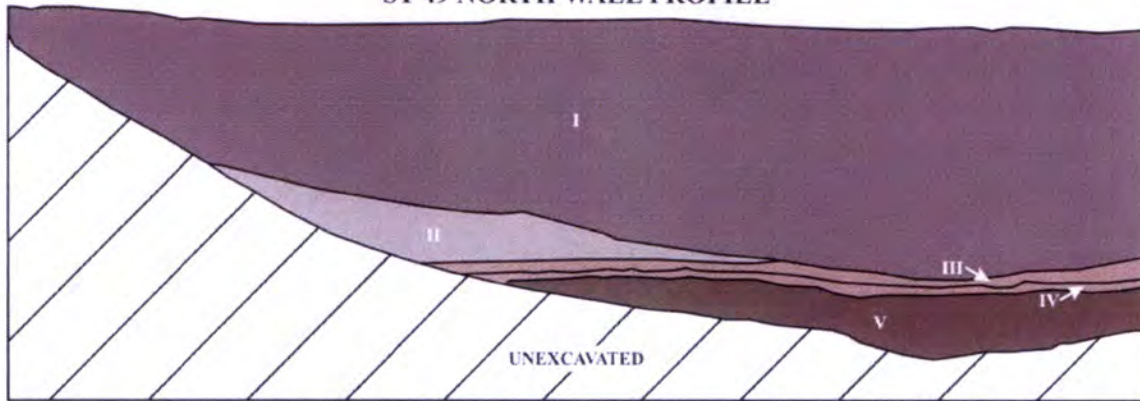
ST-48 NORTHWEST WALL PROFILE



KEY

- I** - LAYER I: PALE BROWN AND (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- II** - LAYER II: LIGHT GRAY (10YR 7/1) LITHIFIED SAND
- III** - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) LITHIFIED SAND

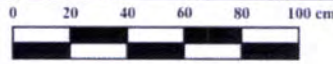
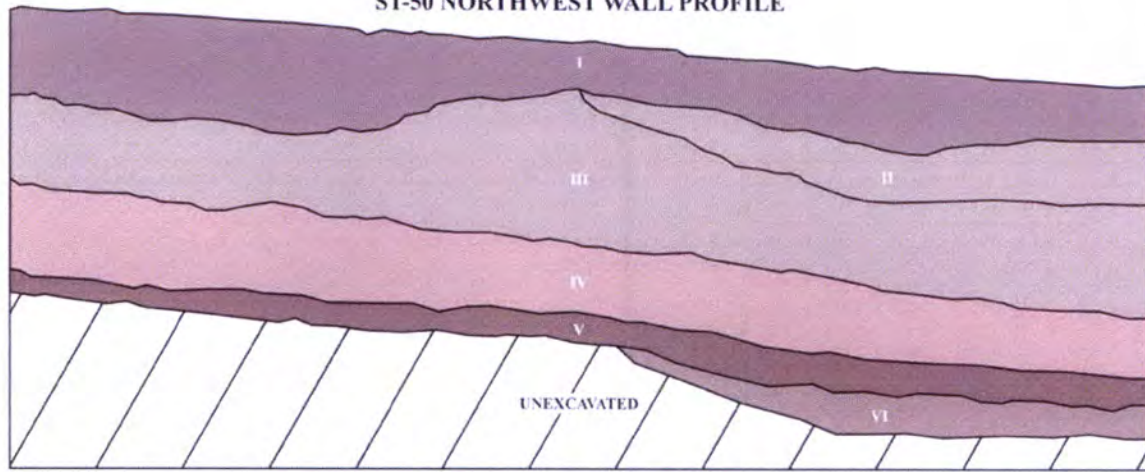
ST-49 NORTH WALL PROFILE



KEY

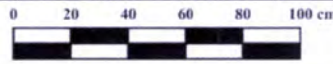
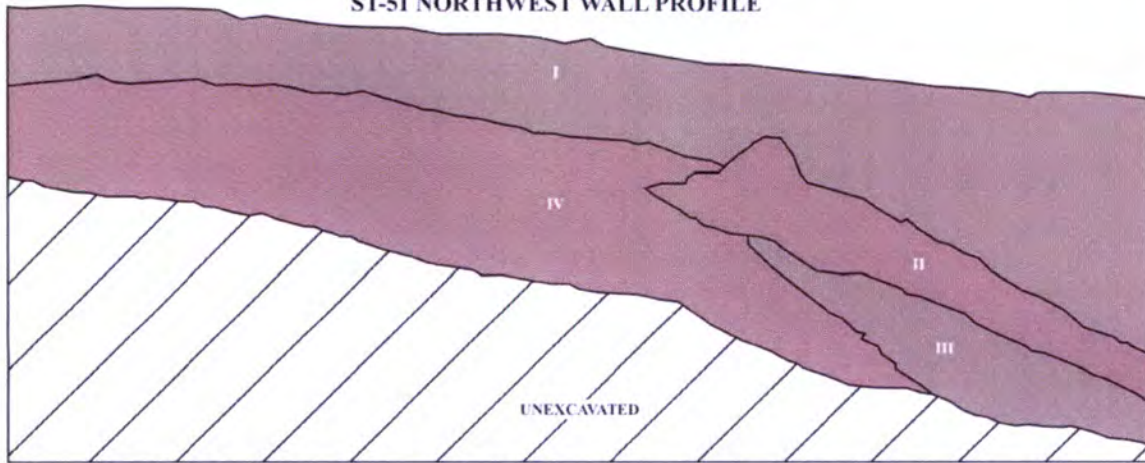
- I** - LAYER I: GRAYISH BROWN (10YR 5/2) SAND
- II** - LAYER II: LIGHT GRAY (10YR 7/1) SAND
- III** - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IVA: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- V** - LAYER V: OLIVE BROWN (2.5Y 4/3) SILT

ST-50 NORTHWEST WALL PROFILE



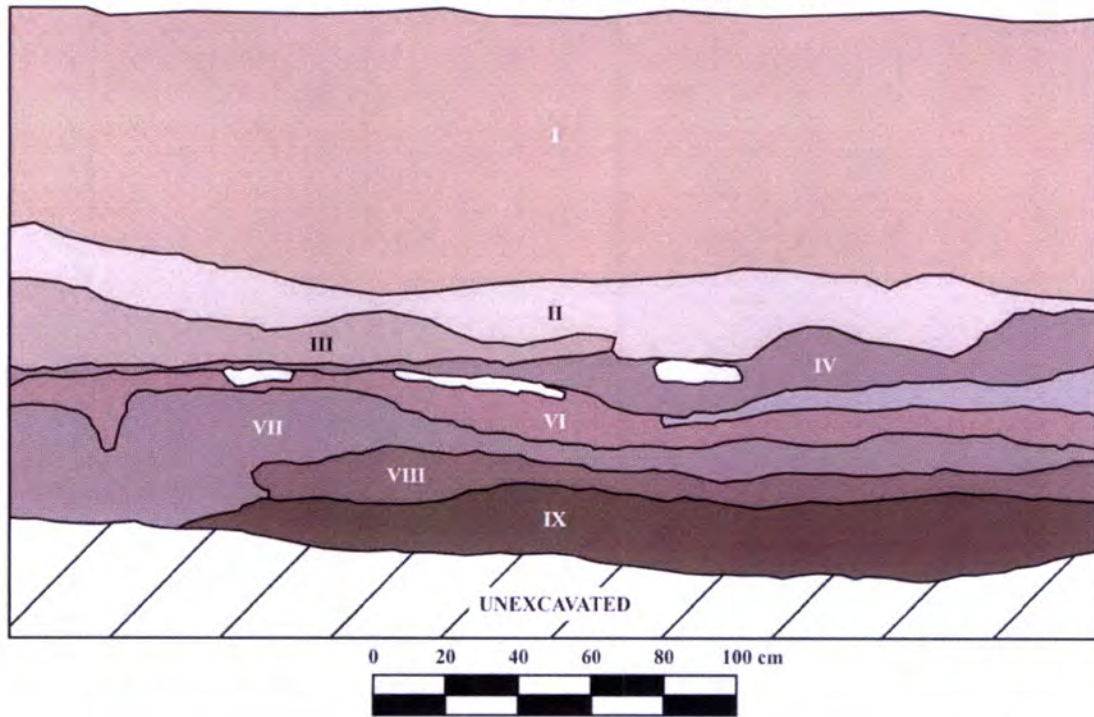
KEY	
I	- LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) LITHIFIED SAND
III	- LAYER III: LIGHT GRAY (10YR 7/2) SAND
IV	- LAYER IV: LIGHT REDDISH BROWN (2.5YR 7/3) SAND
V	- LAYER V: BROWN (10YR 5/3) SILTY SAND
VI	- LAYER VI: PALE BROWN (10YR 6/3) SAND

ST-51 NORTHWEST WALL PROFILE



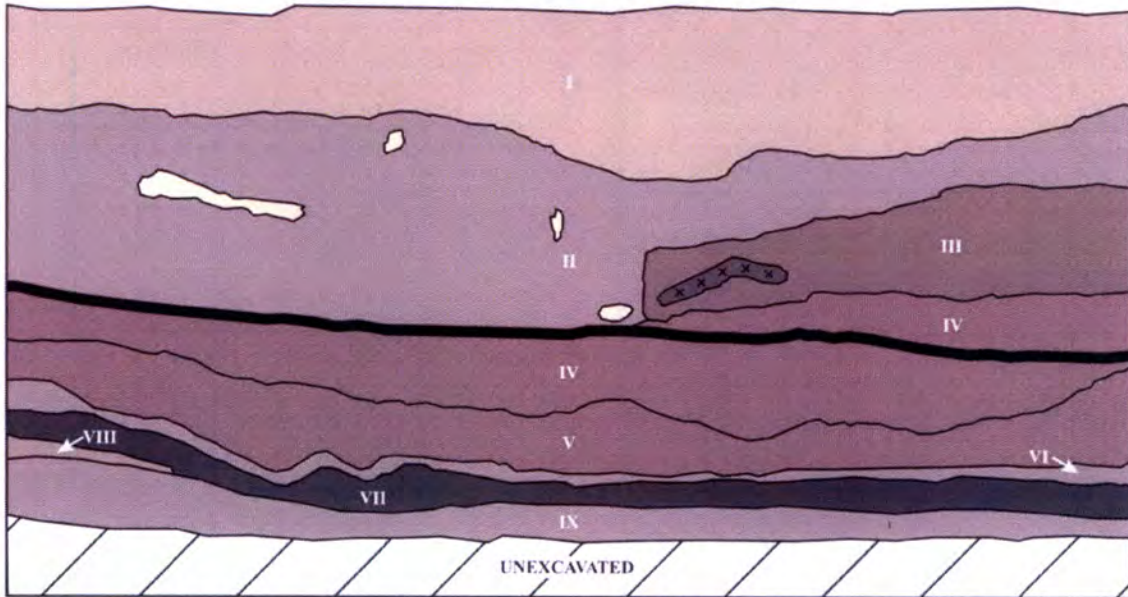
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) LITHIFIED SAND
II	- LAYER II: LIGHT REDDISH BROWN (2.5YR 6/4) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: LIGHT REDDISH BROWN (2.5YR 6/4) LITHIFIED SAND

ST-52 NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: VERY PALE BROWN (10YR 7/4) SAND
II	- LAYER II: VERY PALE BROWN (10YR 8/2) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: PALE RED (2.5YR 6/2) SILTY SAND
V	- LAYER V: LIGHT REDDISH GRAY (2.5YR 7/1) SAND
VI	- LAYER VI: LIGHT REDDISH BROWN (2.5YR 6/3) SILT
VII	- LAYER VII: LIGHT BROWNISH GRAY (10YR 6/2) SILTY SAND
VIII	- LAYER VIII: BROWN (10YR 5/3) SILTY LOAM
IX	- LAYER IX: BROWN (10YR 4/3) SILTY LOAM




ST-53 NORTHEAST WALL PROFILE



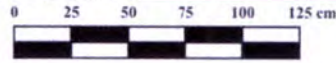
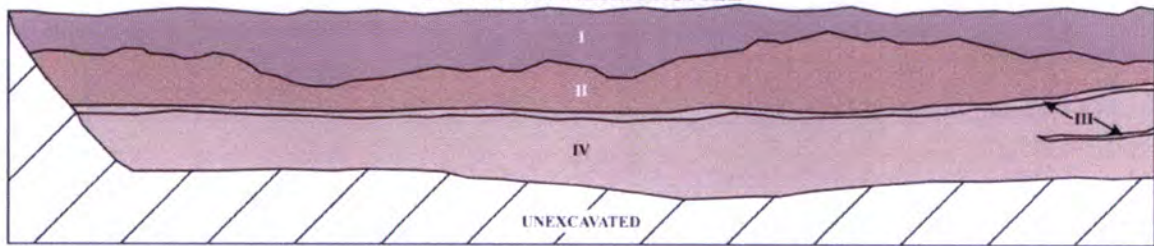
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KEY

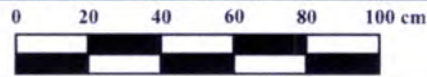
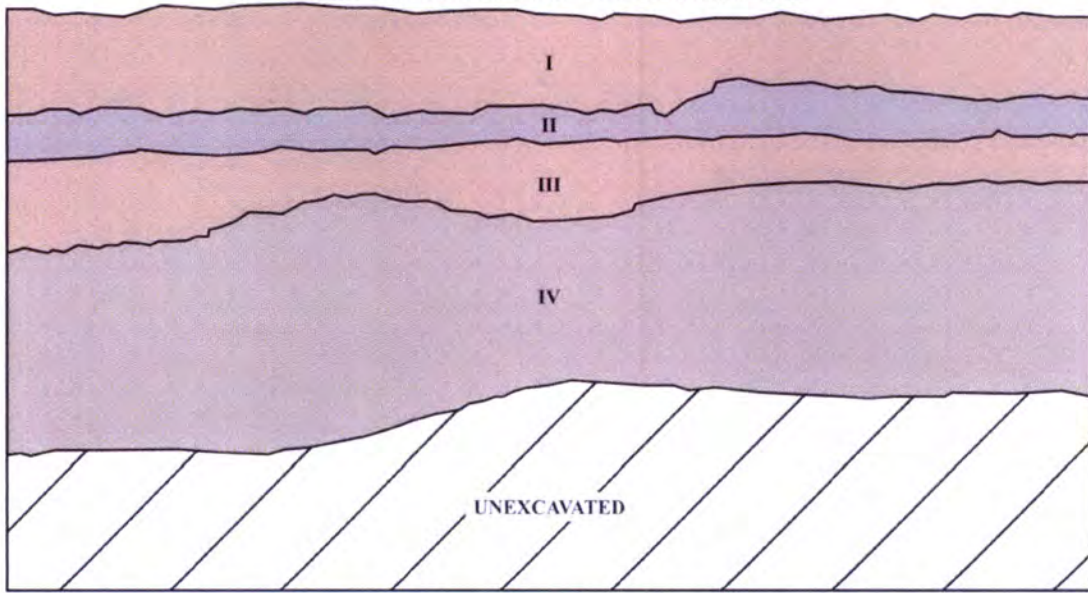
I	- LAYER I: VERY PALE BROWN (10YR 7/4) SAND
II	- LAYER II: PALE RED (2.5YR 6/2) AND LIGHT REDDISH BROWN (2.5YR 6/3) SAND
III	- LAYER III: BROWN (10YR 5/3) SAND AND GRAYISH BROWN (10YR 5/2) SILTY SAND
IV	- LAYER IV: REDDISH BROWN (2.5YR 5/3) SAND
V	- LAYER V: REDDISH BROWN (2.5YR 5/3) SAND
VI	- LAYER VI: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND
VII	- LAYER VII: BASALT PEBBLES
VIII	- LAYER VIII: PALE BROWN (10YR 6/3) SILT
IX	- LAYER IX: LIGHT BROWNISH GRAY (10YR 6/2) SILT
	- CHARCOAL LENS
	- KIAWE WOOD
	- CHARCOAL FLECKING

ST-54 WEST WALL PROFILE



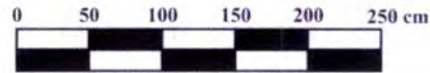
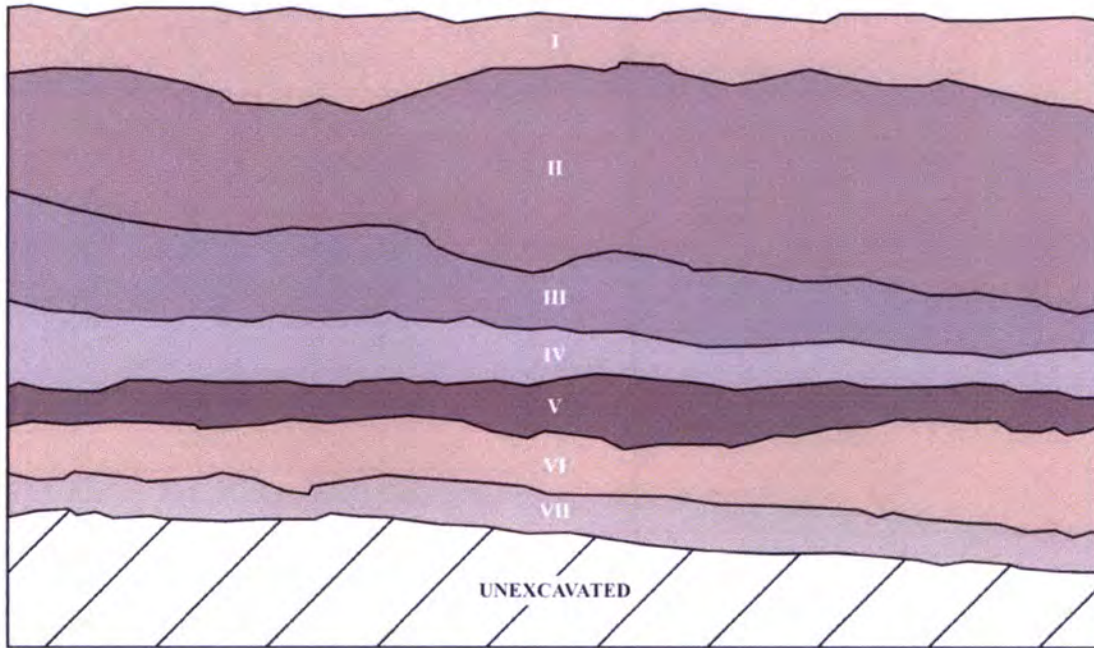
KEY	
I	- LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) LOAMY SAND
III	- LAYER III: LIGHT GRAY (10YR 7/2) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) LITHIFIED SAND

ST-55 NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: VERY PALE BROWN (10YR 7/4) SAND
II	- LAYER II: LIGHT REDDISH GRAY (2.5YR 7/1) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: LIGHT GRAY (10YR 7/2) LITHIFIED SAND

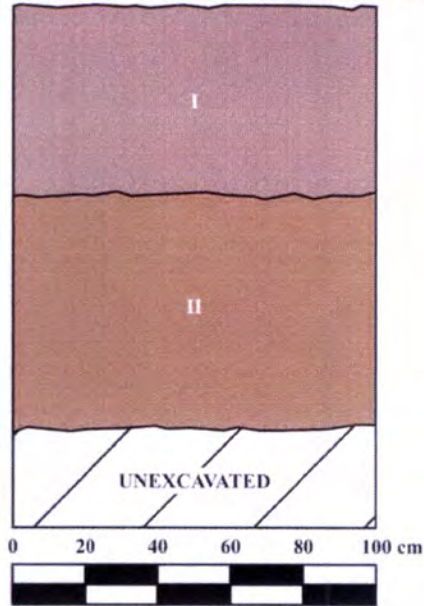
ST-56 NORTHWEST WALL PROFILE



KEY

- | | |
|-----|---|
| I | - LAYER I: VERY PALE BROWN (10YR 7/4) AND GRAY (10YR 6/1) SAND |
| II | - LAYER II: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND |
| III | - LAYER III: REDDISH GRAY (2.5YR 6/1) AND REDDISH GRAY (2.5YR 5/1) SAND |
| IV | - LAYER IV: LIGHT REDDISH GRAY (2.5YR 7/1) AND PALE RED (2.5YR 7/2) SAND |
| V | - LAYER V: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SILTY SAND |
| VI | - LAYER VI: VERY PALE BROWN (10YR 7/4) SAND |
| VII | - LAYER VII: LIGHT GRAY (10YR 7/2) LITHIFIED SAND |

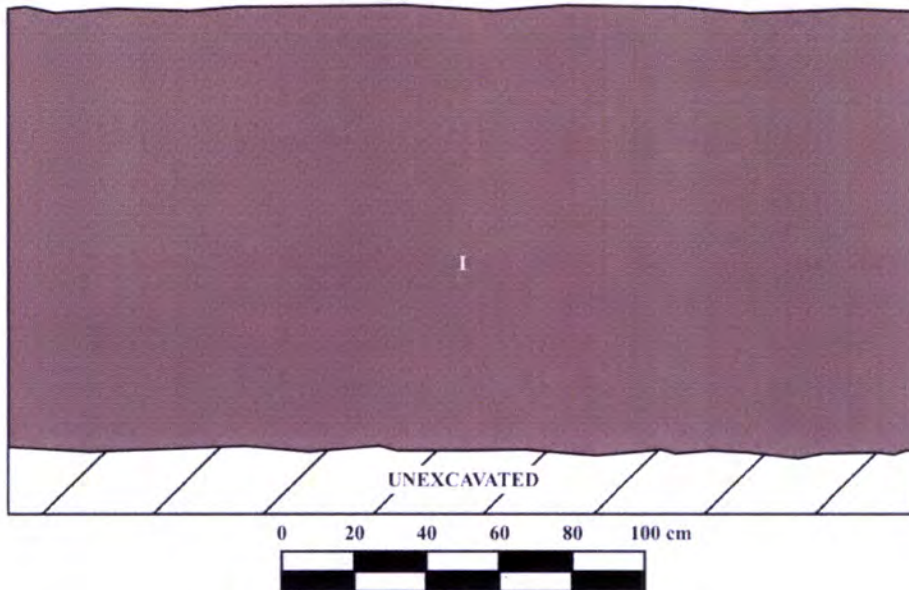
ST-57 NORTHWEST WALL PROFILE



KEY

- I** - LAYER I: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- II** - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND

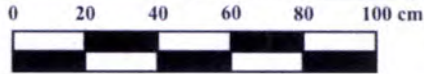
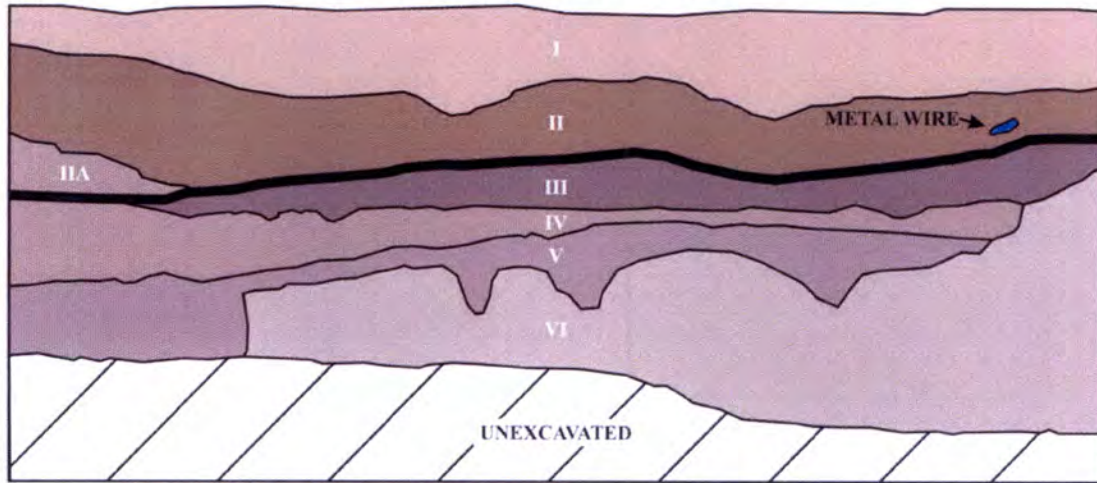
ST-58 SOUTHWEST WALL PROFILE



KEY

- I** - LAYER I: BROWN (10YR 5/3) SAND

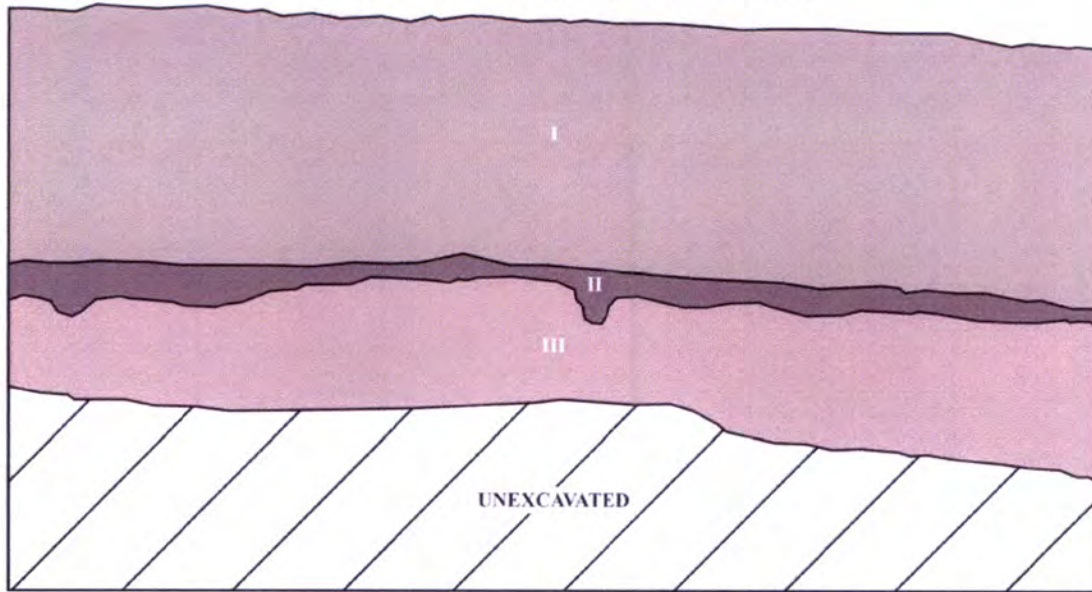
ST-59 NORTHWEST WALL PROFILE



KEY

- | | |
|-----|---|
| I | - LAYER I: VERY PALE BROWN (10YR 7/4) SAND |
| II | - LAYER II: YELLOWISH BROWN (10YR 5/4) SAND |
| IIA | - LAYER IIA: PALE BROWN (10YR 6/3) SAND |
| III | - LAYER III: GRAYISH BROWN (10YR 5/2) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND |
| IV | - LAYER IV: PALE BROWN (10YR 6/3) SAND |
| V | - LAYER V: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SILTY SAND |
| VI | - LAYER VI: LIGHT GRAY (10YR 7/2) LITHIFIED SAND |

ST-60 NORTHWEST WALL PROFILE



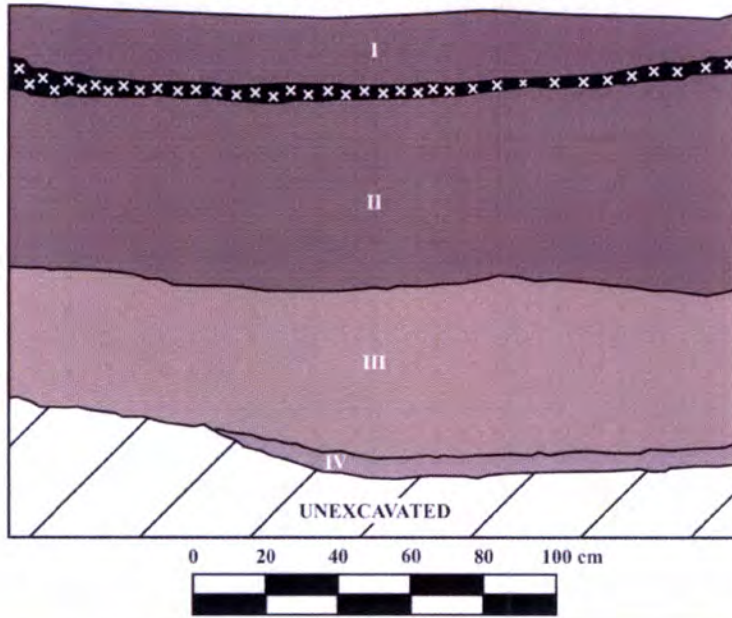
0 20 40 60 80 100 cm



KEY

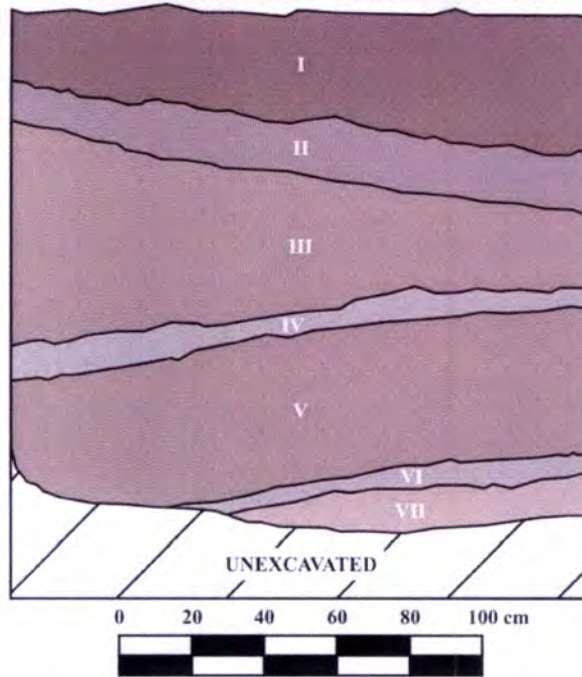
- | | |
|-----|---|
| I | - LAYER I: VERY PALE BROWN (10YR 7/3) SAND |
| II | - LAYER II: GRAYISH BROWN (10YR 5/2) SILTY SAND |
| III | - LAYER III: LIGHT REDDISH BROWN (2.5YR 7/3) LITHIFIED SAND |

ST-61 NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: GRAYISH BROWN (10YR 5/2) SAND
II	- LAYER II: GRAYISH BROWN (10YR 5/2) SAND
III	- LAYER III: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: LIGHT BROWNISH GRAY (10YR 6/2) SILTY SAND
xx xx	- CHARCOAL FROM RECENT FIRE

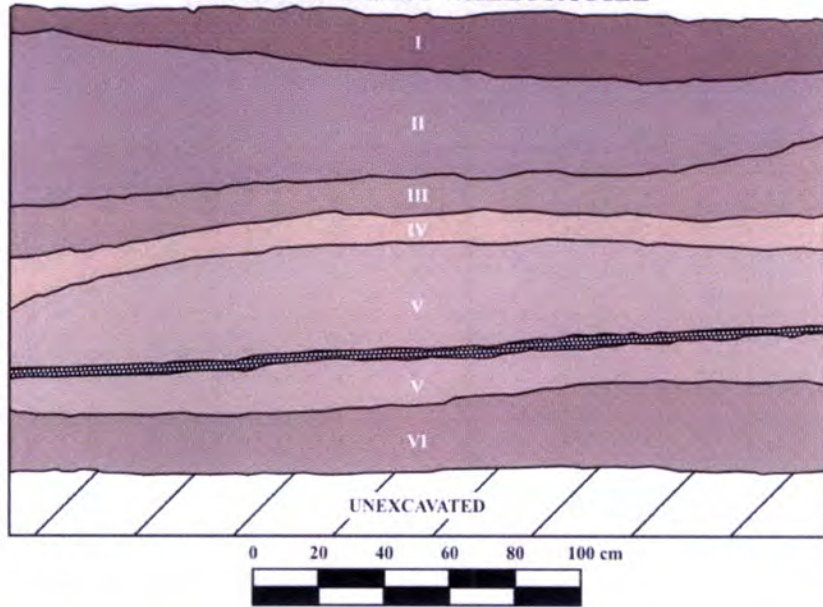
ST-62 NORTHEAST WALL PROFILE



KEY

- I** - LAYER I: BROWN (10YR 5/3) SAND
- II** - LAYER II: LIGHT BROWNISH GRAY (10YR 6/2) SAND
- III** - LAYER III: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IV: LIGHT GRAY (10YR 7/1) AND VERY PALE BROWN (10YR 7/3) SAND
- V** - LAYER V: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- VI** - LAYER VI: LIGHT GRAY (10YR 7/1) AND VERY PALE BROWN (10YR 7/3) SAND
- VII** - LAYER VII: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND

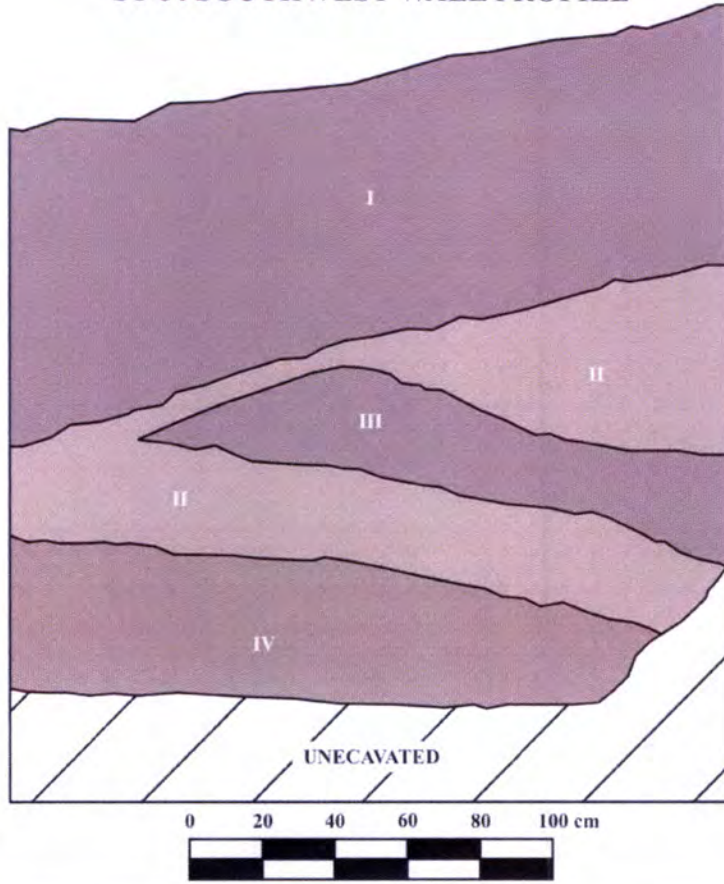
ST-63 NORTHEAST WALL PROFILE



KEY

I	- LAYER I: BROWN (10YR 5/3) SAND
II	- LAYER II: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
V	- LAYER V: VERY PALE BROWN (10YR 7/3) SAND
VI	- LAYER VI: PALE BROWN (10YR 6/3), LIGHT YELLOWISH BROWN (10YR 6/4), AND BROWNISH YELLOW (10YR 6/6) SAND
	- SAND LENS

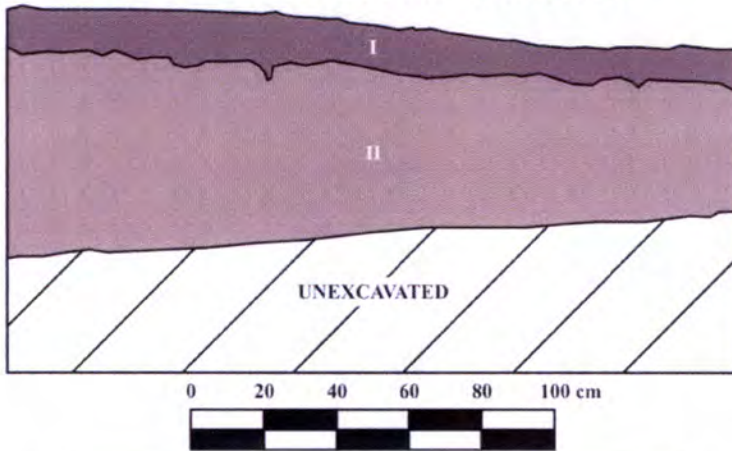
ST-64 SOUTHWEST WALL PROFILE



KEY

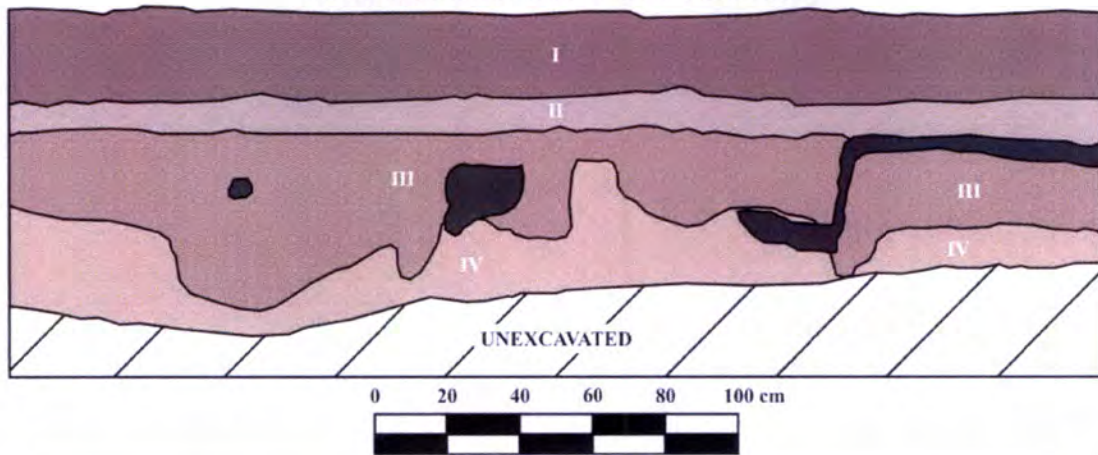
- | | |
|-----|--|
| I | - LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) AND PALE BROWN (10YR 6/3) SAND |
| II | - LAYER II: VERY PALE BROWN (10YR 7/3) SAND |
| III | - LAYER III: LIGHT BROWNISH GRAY (10YR 6/2) SAND |
| IV | - LAYER IV: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SAND |

ST-65 NORTHWEST WALL PROFILE



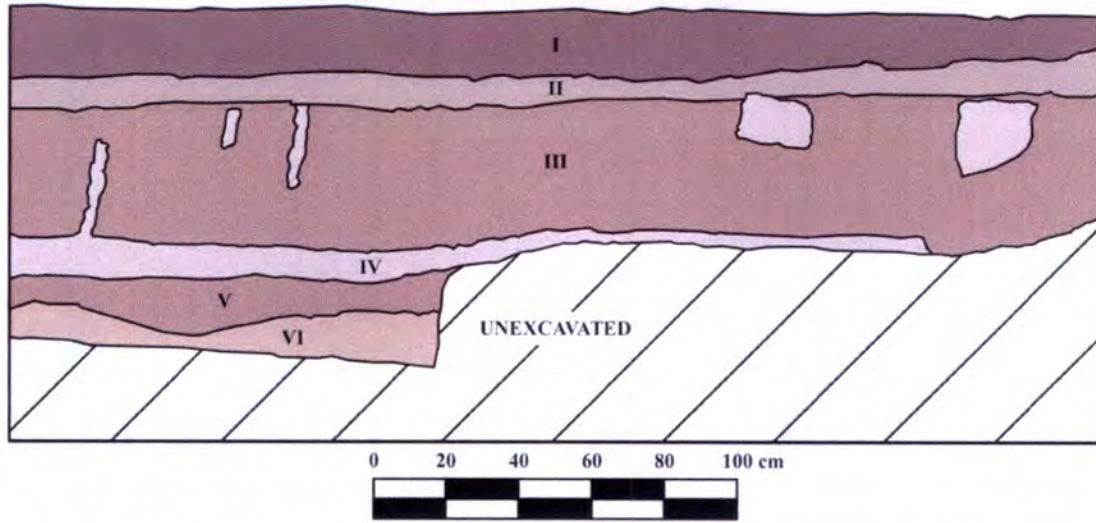
KEY	
I	- LAYER I: GRAYISH BROWN (10YR 5/2) SILTY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) LITHIFIED SAND

ST-66 NORTHEAST WALL PROFILE



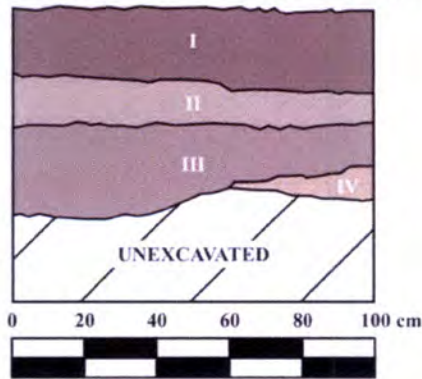
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILT
II	- LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND
■	- SANDSTONE

ST-67 EAST WALL PROFILE



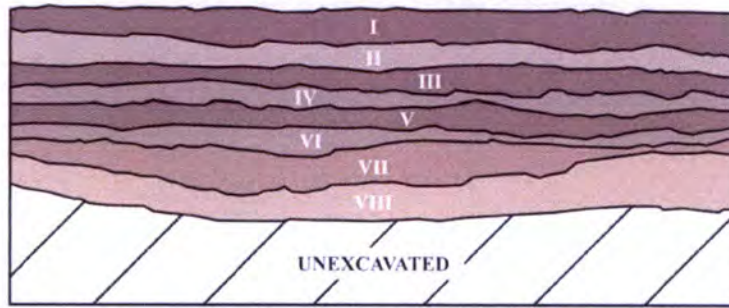
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILT
II	- LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
IV	- LAYER IV: WHITE (2.5YR 8/1) SANDSTONE
V	- LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
VI	- LAYER VI: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND

ST-68 SOUTHEAST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SILT
II	- LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND

ST-70 SOUTHWEST WALL PROFILE



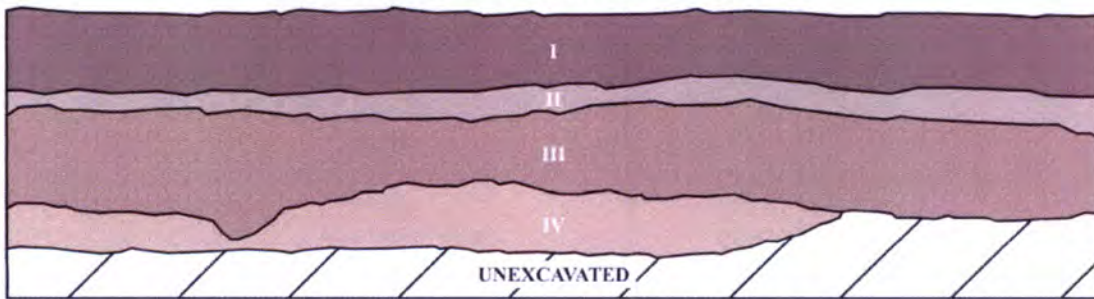
0 20 40 60 80 100 cm



KEY

- | | |
|------|---|
| I | - LAYER I: BROWN (10YR 5/3) SILTY SAND |
| II | - LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND |
| III | - LAYER III: BROWN (10YR 5/3) SILTY SAND |
| IV | - LAYER IV: PALE BROWN (10YR 6/3) SAND |
| V | - LAYER V: BROWN (10YR 5/3) SILTY SAND |
| VI | - LAYER VI: PALE BROWN (10YR 6/3) SAND |
| VII | - LAYER VII: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND |
| VIII | - LAYER VIII: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND |

ST-71 NORTHWEST WALL PROFILE



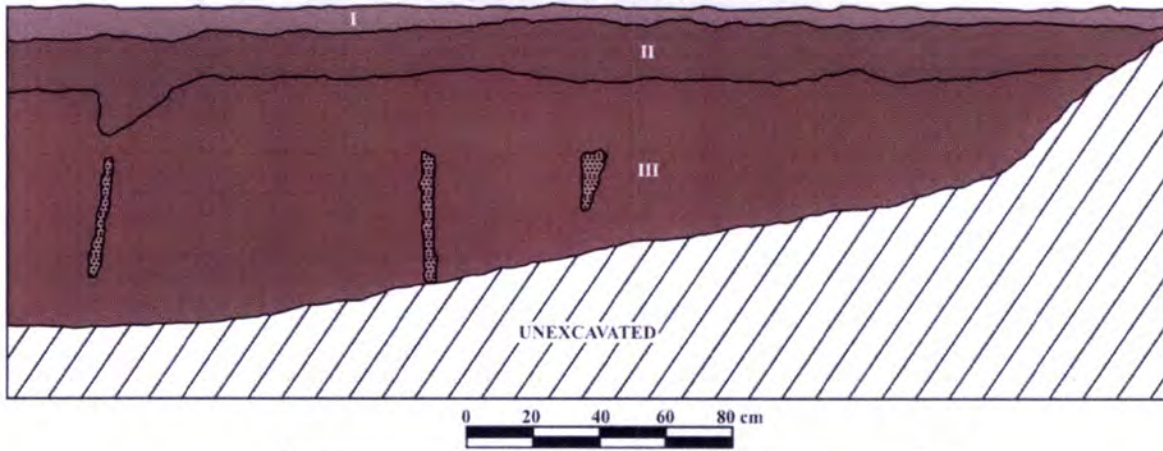
0 20 40 60 80 100 cm



KEY

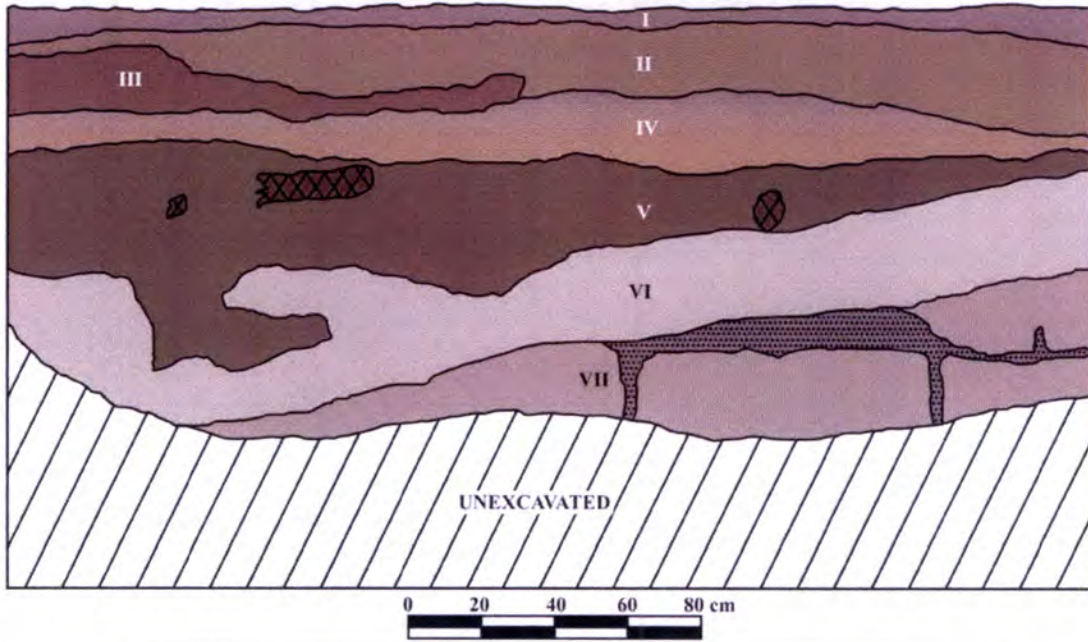
- | | |
|-----|--|
| I | - LAYER I: BROWN (10YR 5/3) SILT |
| II | - LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND |
| III | - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND |
| IV | - LAYER IV: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) LITHIFIED SAND |



ST-72 SOUTH WALL PROFILE



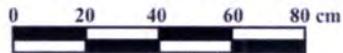
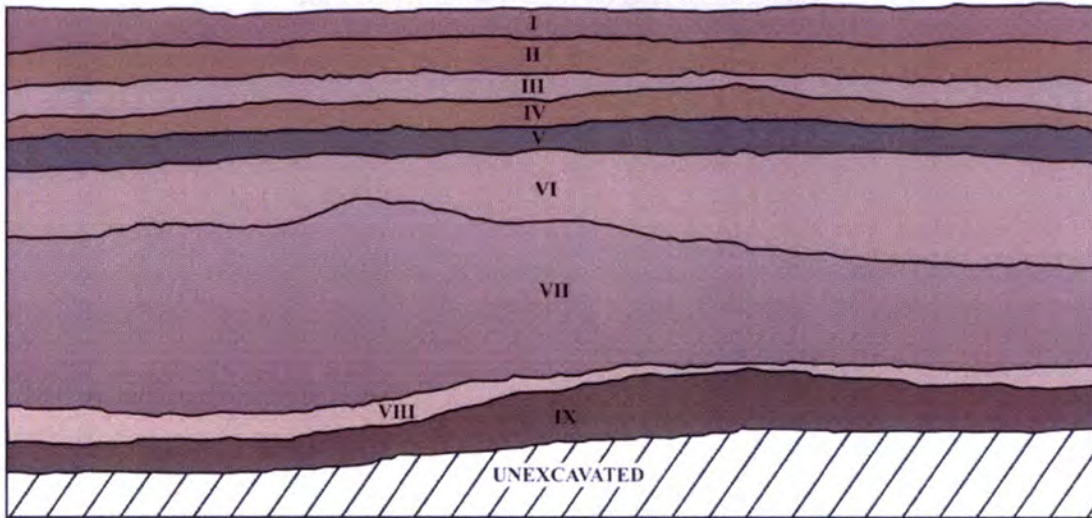
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: BROWN (7.5YR 4/3) SILT
III	- LAYER III: BROWN (7.5YR 4/4) SILTY LOAM
☐	- LIGHT YELLOWISH BROWN (10YR 6/4) POCKETS OF SILTY SAND

ST-73 SOUTHEAST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: YELLOWISH BROWN (10YR 5/4) SILTY SAND
III	- LAYER III: BROWN (7.5YR 4/4) SILT
IV	- LAYER IV: BROWN (10YR 5/3) AND BROWNISH YELLOW (10YR 6/6) SAND
V	- LAYER V: BROWN (10YR 4/3) SANDY SILT
VI	- LAYER VI: LIGHT GRAY (10YR 7/2) SAND AND BROWN (10YR 5/3) SILTY SAND
VII	- LAYER VII: PALE BROWN (10YR 6/3) SAND
	- BURIED LOGS
	- LITHIFIED SAND VEINS

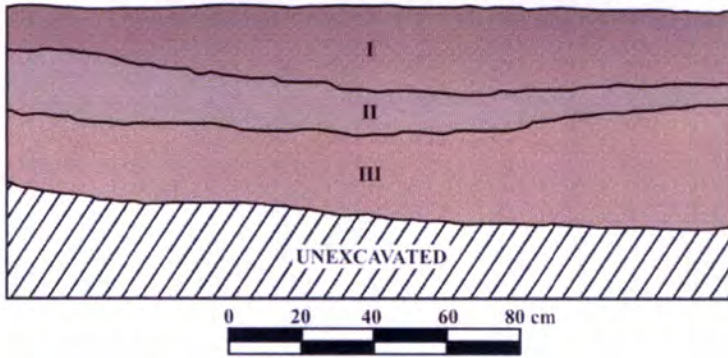
ST-74 NORTHWEST WALL PROFILE



KEY

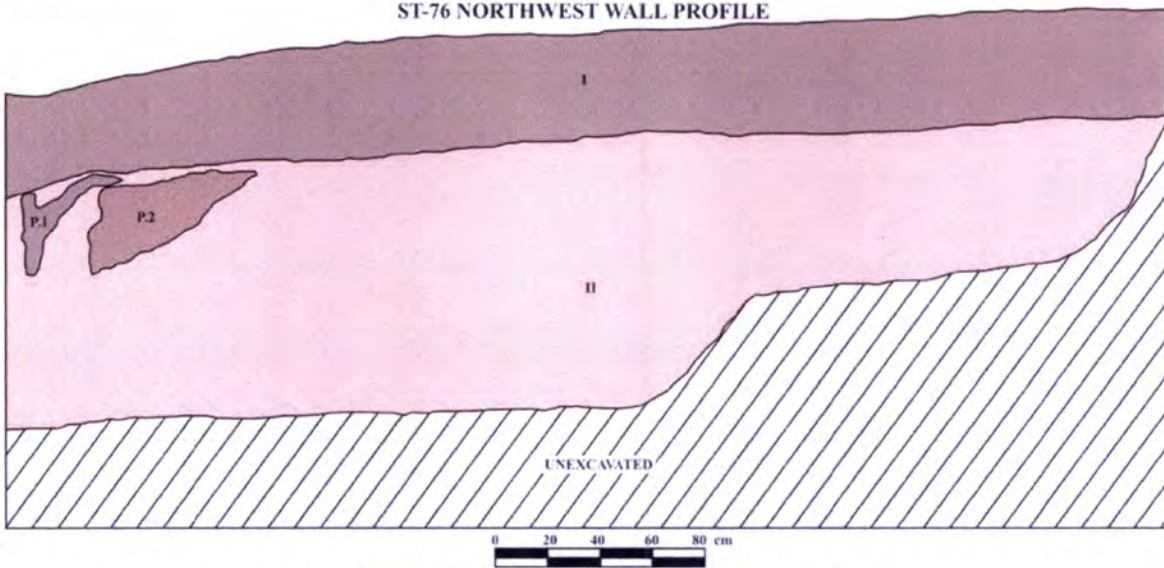
- | | |
|-------------|---|
| I | - LAYER I: BROWN (10YR 5/3) SILTY SAND |
| II | - LAYER II: YELLOWISH BROWN (10YR 5/4) SILTY SAND |
| III | - LAYER III: PALE BROWN (10YR 6/3) SAND |
| IV | - LAYER IV: YELLOWISH BROWN (10YR 5/4) SILT |
| V | - LAYER V: DARK GRAY (10YR 4/1) SILTY SAND |
| VI | - LAYER VI: PALE BROWN (10YR 6/3) SAND |
| VII | - LAYER VII: LIGHT BROWNISH GRAY (10YR 6/2) AND GRAYISH BROWN (10YR 5/2) SAND |
| VIII | - LAYER VIII: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND |
| IX | - LAYER IX: DARK GRAYISH BROWN (10YR 4/2) SILT |

ST-75 NORTHWEST WALL PROFILE



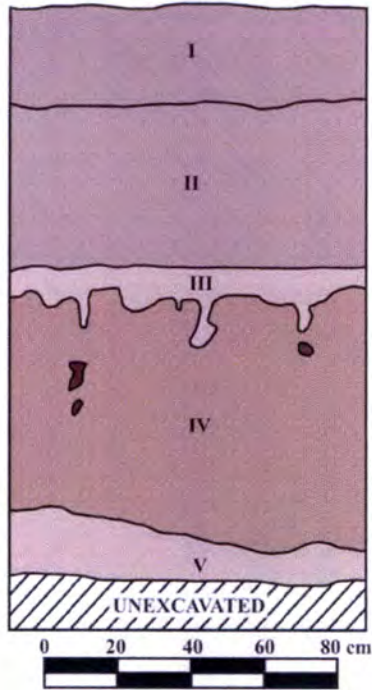
KEY	
I	- LAYER I: BROWN (10YR 5/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
II	- LAYER II: PALE BROWN (10YR 6/3) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND

ST-76 NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: PINK (2.5YR 8/3) LITHIFIED SAND
P.1	- POCKET 1: LIGHT BROWNISH GRAY (10YR 6/2) SILTY SAND
P.2	- POCKET 2: LIGHT YELLOWISH BROWN (10YR 6/4) SAND

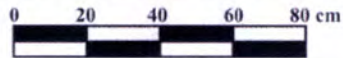
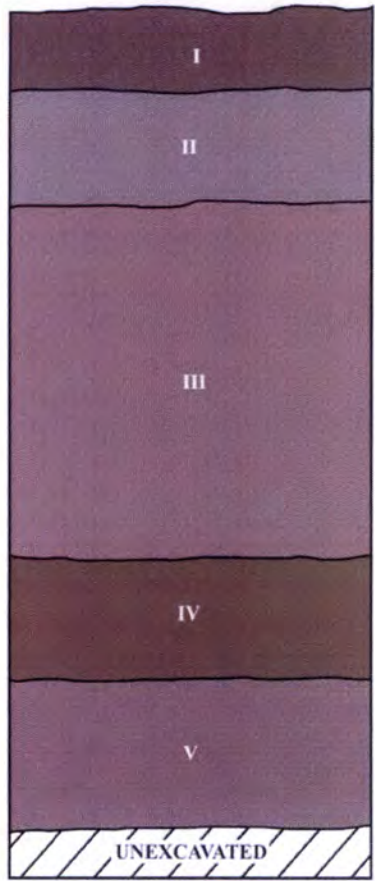
ST-77 SOUTH WALL PROFILE



KEY

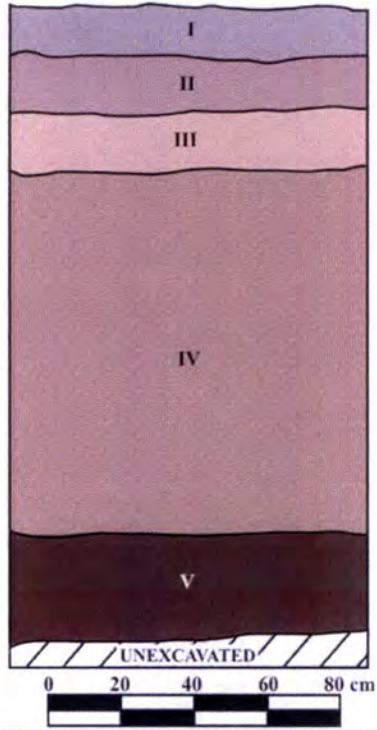
- I** - LAYER I: PINKISH GRAY (5YR 6/2) SANDY LOAM
- II** - LAYER II: PINKISH GRAY (5YR 6/2) SAND
- III** - LAYER III: PINKISH GRAY (5YR 7/2) CONCRETED SAND
- IV** - LAYER IV: LIGHT BROWN (7.5YR 6/4) SAND
- V** - LAYER V: PINKISH GRAY (5YR 7/2) SAND
- !** - ROOTS

ST-78 NORTHEAST WALL PROFILE



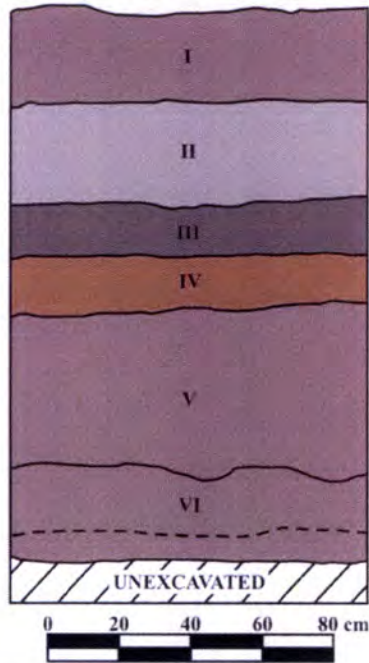
KEY	
I	- LAYER I: DARK REDDISH GRAY (5YR 4/2) SANDY LOAM
II	- LAYER II: GRAY (5YR 5/1) SAND
III	- LAYER III: REDDISH GRAY (5YR 5/2) SAND
IV	- LAYER IV: BROWN (10YR 4/3) SANDY LOAM
V	- LAYER V: BROWN (7.5YR 5/2) SILTY SAND

ST-79 EAST WALL PROFILE



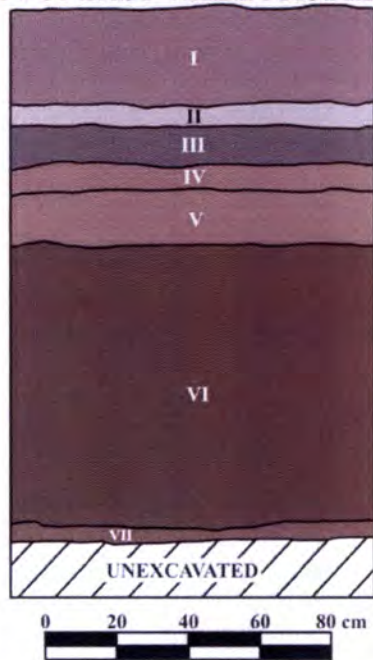
KEY	
I	- LAYER I: GRAY (5YR 6/1) SANDY LOAM
II	- LAYER II: LIGHT BROWN (7.5YR 6/3) SAND
III	- LAYER III: PINK (7.5YR 7/4) COMPACTED SAND
IV	- LAYER IV: LIGHT BROWN (7.5YR 6/4) COMPACTED SAND
V	- LAYER V: DARK REDDISH BROWN (5YR 3/4) SILTY LOAM

ST-80 SOUTH WALL PROFILE



KEY	
I	- LAYER I: REDDISH GRAY (5YR 5/2) SANDY LOAM
II	- LAYER II: GRAY (5YR 6/1) SANDY LOAM
III	- LAYER III: DARK GRAY (5YR 4/1) SAND
IV	- LAYER IV: STRONG BROWN (7.5YR 5/6) SAND
V	- LAYER V: REDDISH GRAY (5YR 5/2) COMPACTED SAND
VI	- LAYER VI: REDDISH GRAY (5YR 5/2) LOAM
- - -	- DIFFUSE BOUNDARY

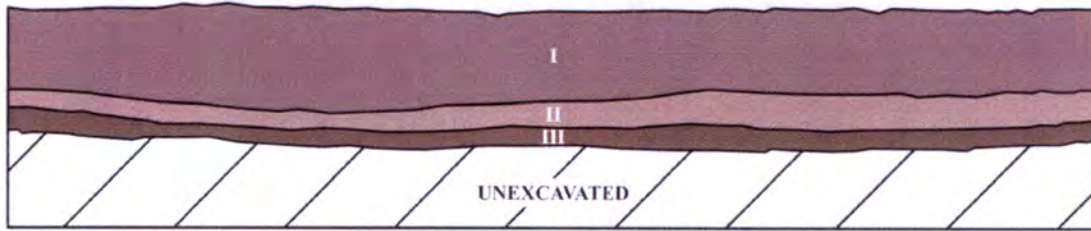
ST-81 EAST WALL PROFILE



KEY

- | | |
|------------|---|
| I | - LAYER I: REDDISH GRAY (5YR 5/2) SANDY LOAM |
| II | - LAYER II: LIGHT GRAY (5YR 7/1) SAND |
| III | - LAYER III: DARK GRAY (5YR 4/1) SANDY SILT |
| IV | - LAYER IV: REDDISH BROWN (5YR 5/3) SAND |
| V | - LAYER V: REDDISH BROWN (5YR 5/3) SANDY SILT |
| VI | - LAYER VI: DARK REDDISH BROWN (5YR 3/3) SAND |
| VII | - LAYER VII: REDDISH BROWN (5YR 4/3) SILT |

ST-82 NORTHEAST WALL PROFILE



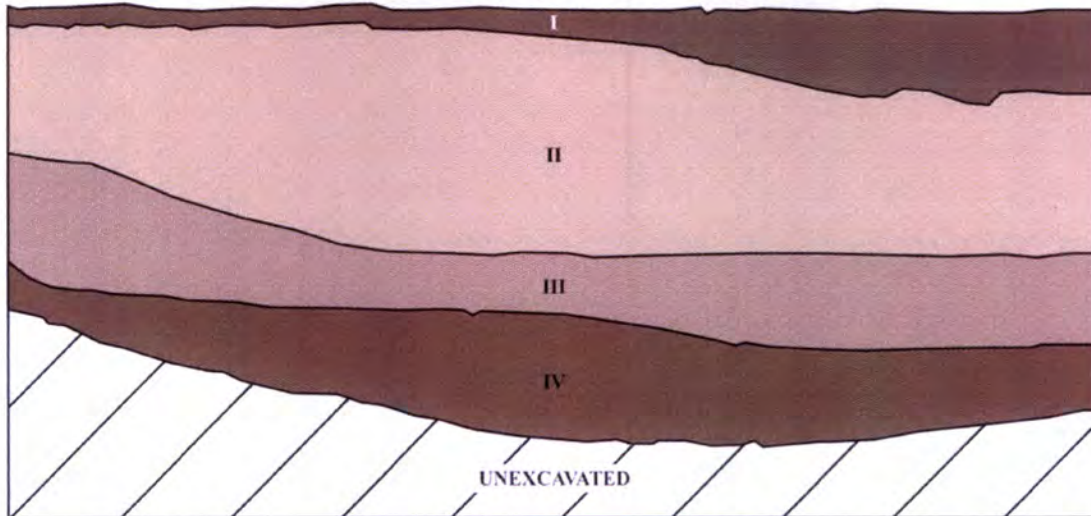
0 20 40 60 80 100 cm



KEY

- | | |
|-----|---|
| I | - LAYER I: BROWN (10YR 5/3) SILT |
| II | - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND |
| III | - LAYER III: BROWN (10YR 4/3) SILT LOAM |

ST-83 NORTHWEST WALL PROFILE



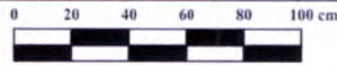
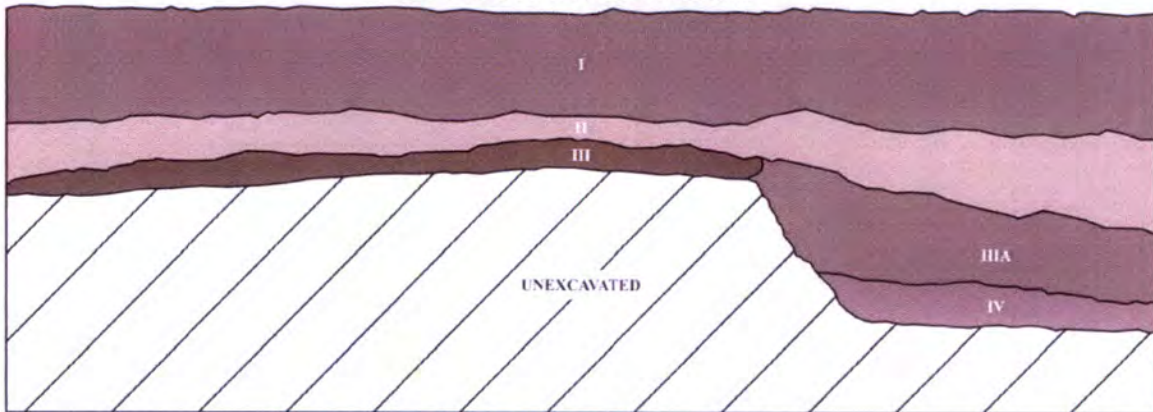
0 20 40 60 80 100 cm



KEY

- | | |
|-----|--|
| I | - LAYER I: BROWN (10YR 4/3) SANDY SILT |
| II | - LAYER II: VERY PALE BROWN (10YR 7/4) LITHIFIED SAND |
| III | - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND |
| IV | - LAYER IV: DARK YELLOWISH BROWN (10YR 4/4) SILTY LOAM |

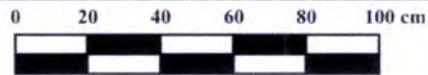
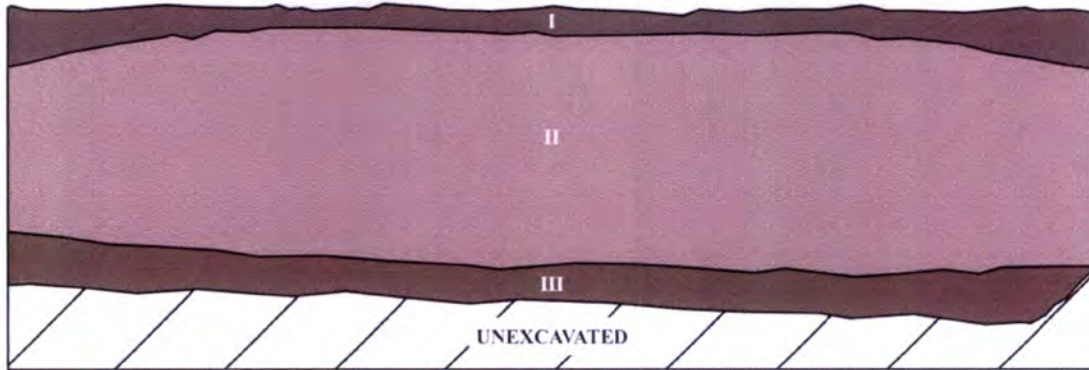
ST-84 SOUTH WALL PROFILE



KEY

- I - LAYER I: BROWN (10YR 5/3) SILT
- II - LAYER II: LIGHT REDDISH BROWN (2.5YR 7/3), PALE RED (2.5YR 6/2), AND LIGHT REDDISH BROWN (2.5YR 6/3) SAND
- III - LAYER III: BROWN (10YR 4/3) SILT LOAM
- IIIA - LAYER IIIA: BROWN (10YR 5/3) SILT
- IV - LAYER IV: WEAK RED (2.5YR 5/2) AND LIGHT REDDISH BROWN (2.5YR 6/3) SAND

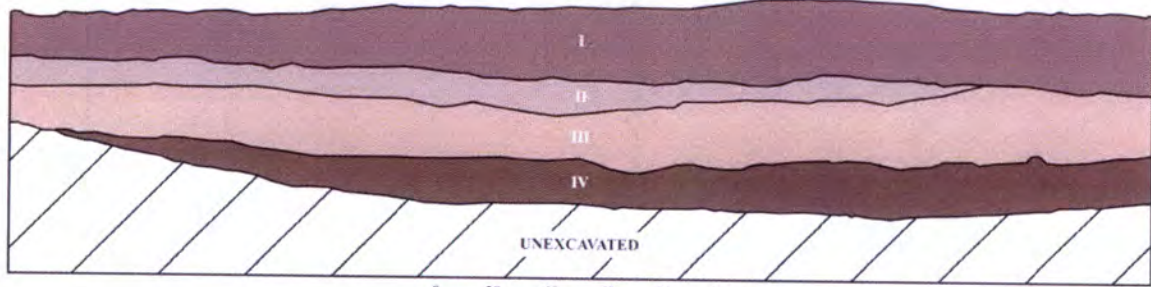
ST-85 EAST WALL PROFILE



KEY

- I - LAYER I: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND
- II - LAYER II: LIGHT REDDISH BROWN (2.5YR 6/3) LITHIFIED SAND
- III - LAYER III: BROWN (10YR 4/3) SILTY LOAM

ST-86 NORTHEAST WALL PROFILE



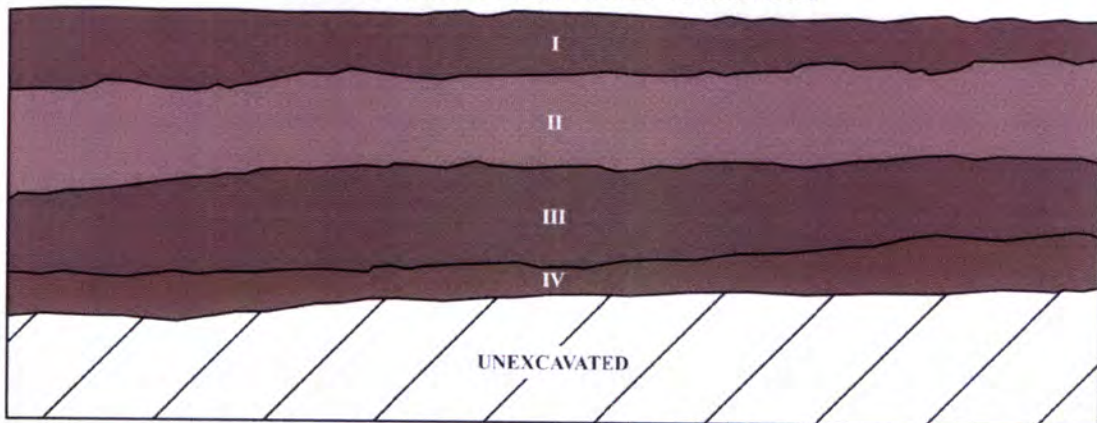
0 20 40 60 80 100 cm



KEY

- | | |
|-----|--|
| I | - LAYER I: BROWN (10YR 5/3) SANDY SILT |
| II | - LAYER II: VERY PALE BROWN (10YR 7/3) SAND |
| III | - LAYER III: VERY PALE BROWN (10YR 7/4) SAND |
| IV | - LAYER IV: BROWN (10YR 4/3) SILTY LOAM |

ST-87 NORTHWEST WALL PROFILE



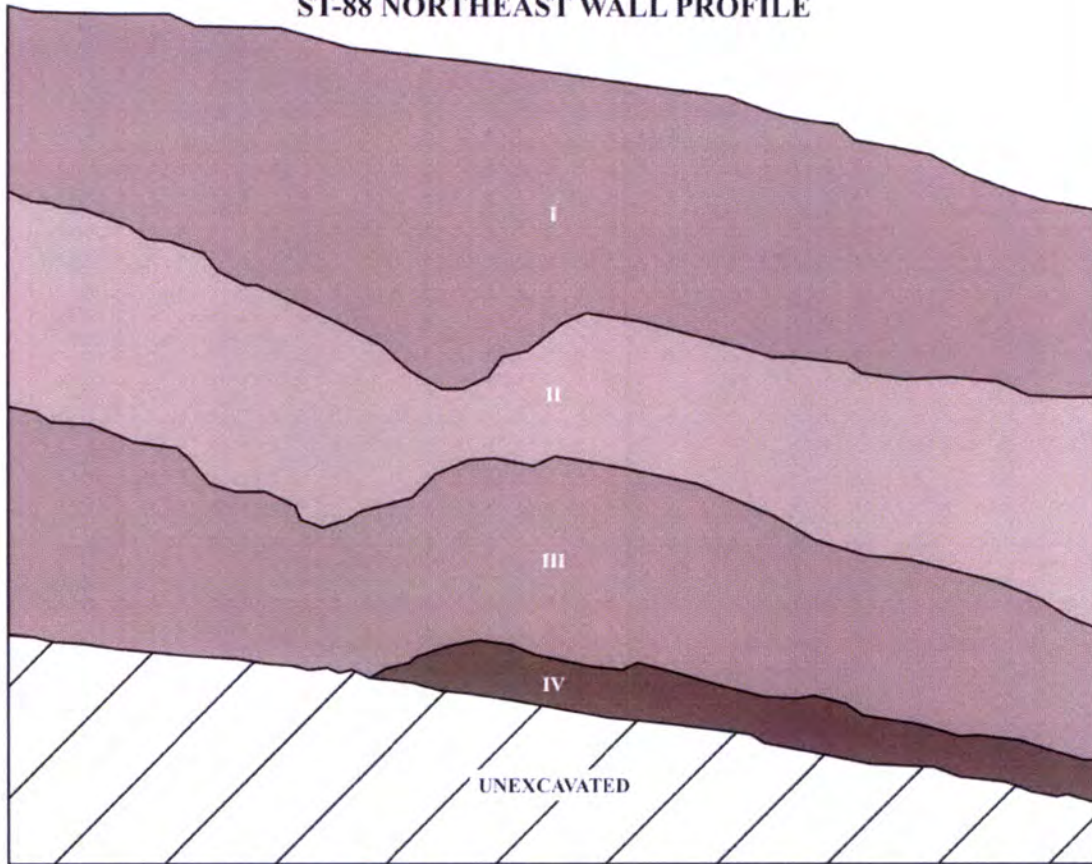
0 20 40 60 80 100 cm



KEY

- | | |
|-----|---|
| I | - LAYER I: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND |
| II | - LAYER II: BROWN (10YR 5/3) SILTY SAND |
| III | - LAYER III: DARK GRAYISH BROWN (10YR 4/2) SILT |
| IV | - LAYER IV: BROWN (10YR 4/3) SILTY LOAM |

ST-88 NORTHEAST WALL PROFILE



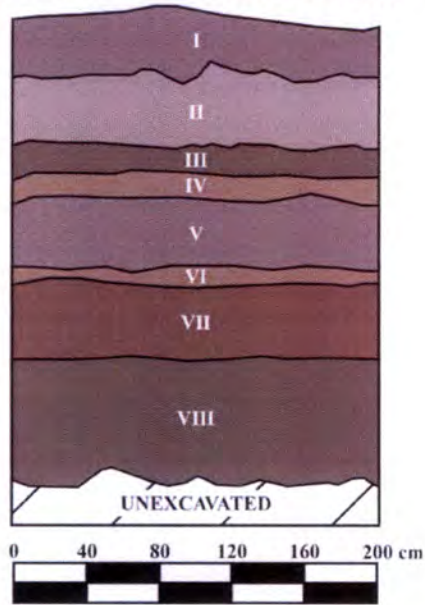
0 20 40 60 80 100 cm



KEY

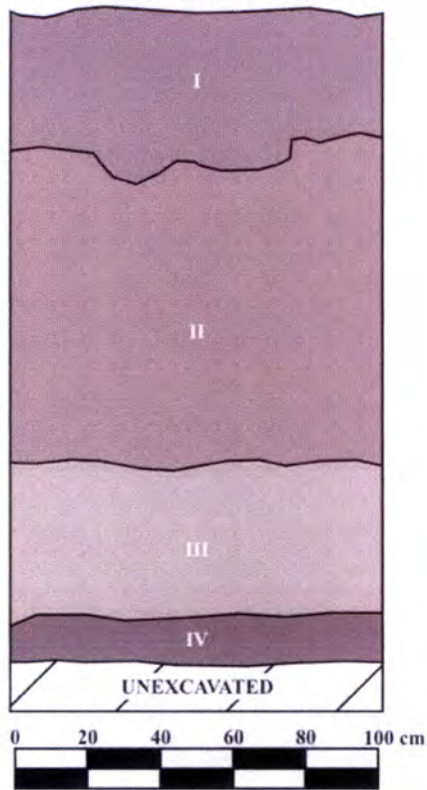
- I** - LAYER I: PALE BROWN (10YR 6/3) SAND
- II** - LAYER II: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
- III** - LAYER III: PALE BROWN (10YR 6/3), LIGHT YELLOWISH BROWN (10YR 6/4), VERY PALE BROWN (10YR 7/4) SAND
- IV** - LAYER IV: BROWN (10YR 4/3) SILT LOAM

ST-89 WEST WALL PROFILE



KEY	
I	- LAYER I: BROWN (7.5YR 5/2) SANDY LOAM
II	- LAYER II: PINKISH GRAY (7.5YR 6/2) SAND
III	- LAYER III: BROWN (7.5YR 4/2) SANDY LOAM
IV	- LAYER IV: BROWN (7.5YR 5/4) SAND
V	- LAYER V: BROWN (7.5YR 5/2) SANDY LOAM
VI	- LAYER VI: BROWN (7.5YR 5/4) SAND
VII	- LAYER VII: BROWN (7.5YR 4/4) SANDY LOAM
VIII	- LAYER VIII: BROWN (7.5YR 4/2) SAND WITH BASALT RIVER ROCK

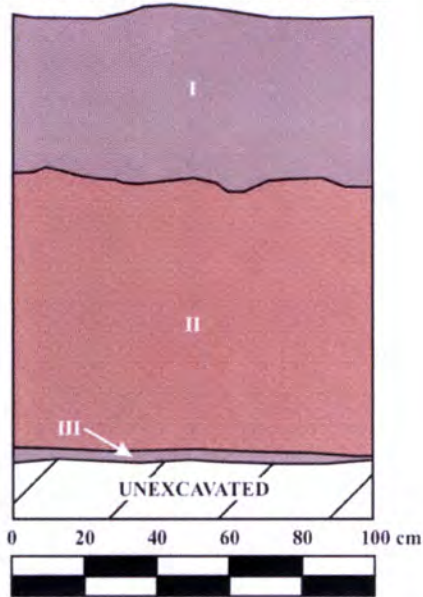
ST-90 WEST WALL PROFILE



KEY

- | | |
|-----|--|
| I | - LAYER I: PINKISH GRAY (7.5YR 6/2) SANDY LOAM |
| II | - LAYER II: LIGHT BROWN (7.5YR 6/3) SAND |
| III | - LAYER III: PINKISH GRAY (7.5YR 7/2) SAND |
| IV | - LAYER IV: BROWN (7.5YR 5/2) SILTY LOAM |

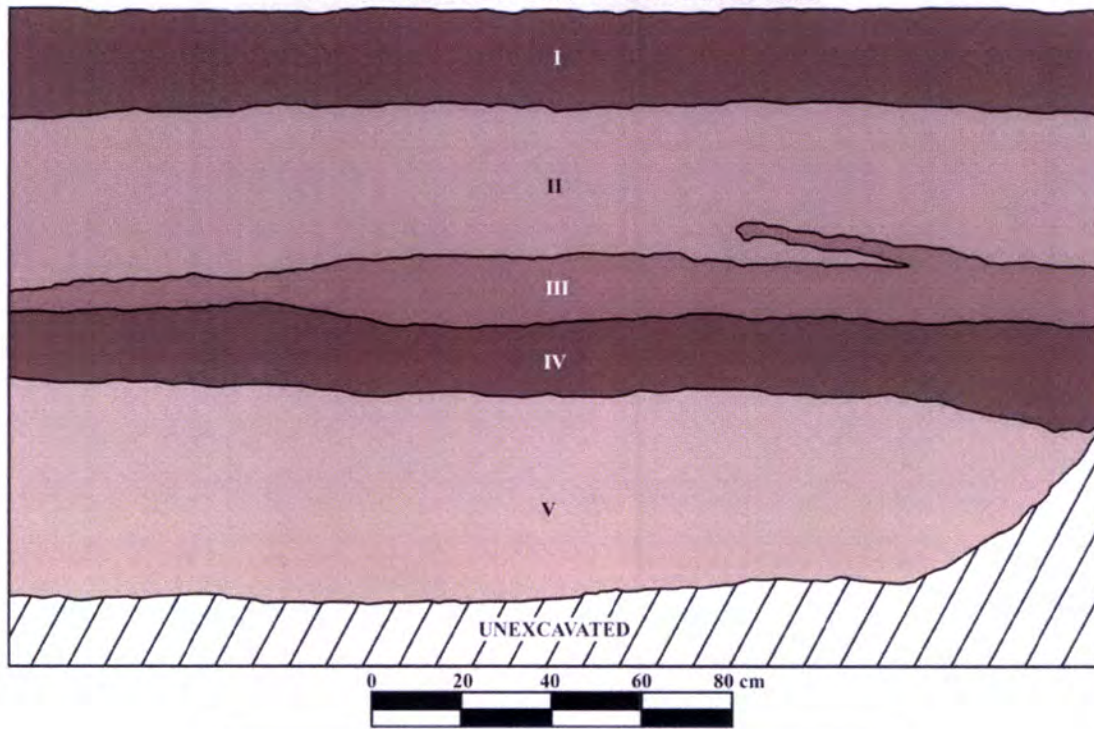
ST-91 EAST WALL PROFILE



KEY

I	- LAYER I: PINKISH GRAY (7.5YR 6/2) SANDY LOAM
II	- LAYER II: REDDISH YELLOW (7.5YR 6/6) AND PINKISH GRAY (7.5YR 6/2) SAND
III	- LAYER III: PINKISH GRAY (7.5YR 6/2) LITHIFIED SAND

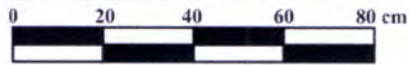
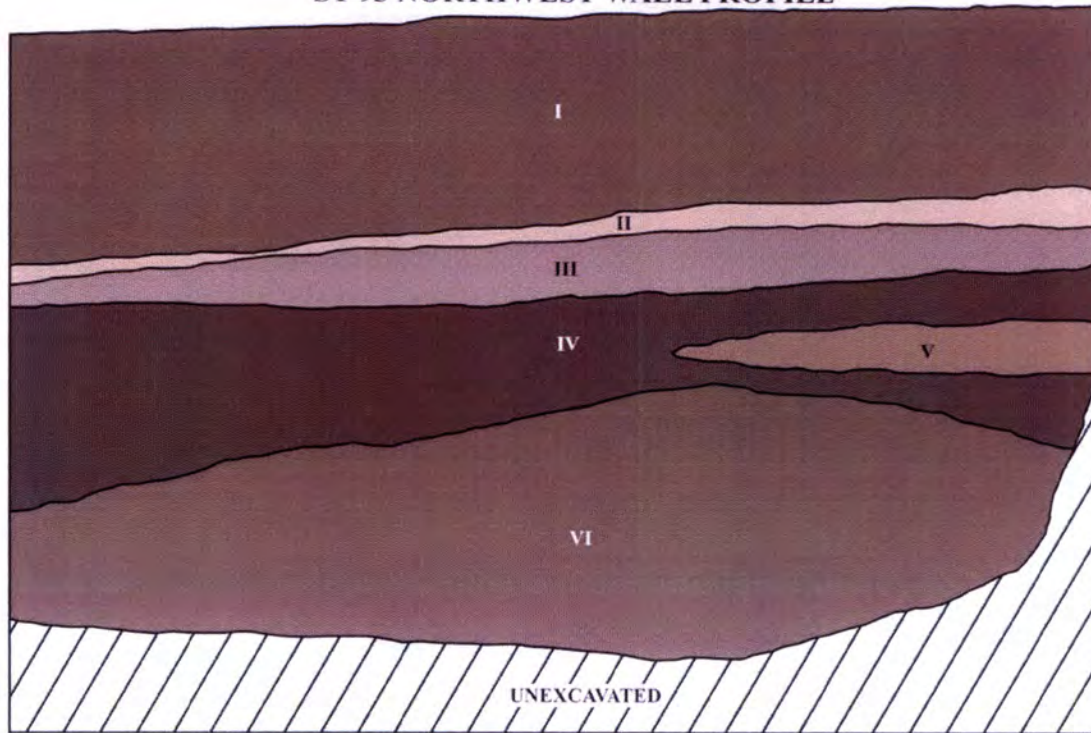
ST-92 NORTHWEST WALL PROFILE



KEY

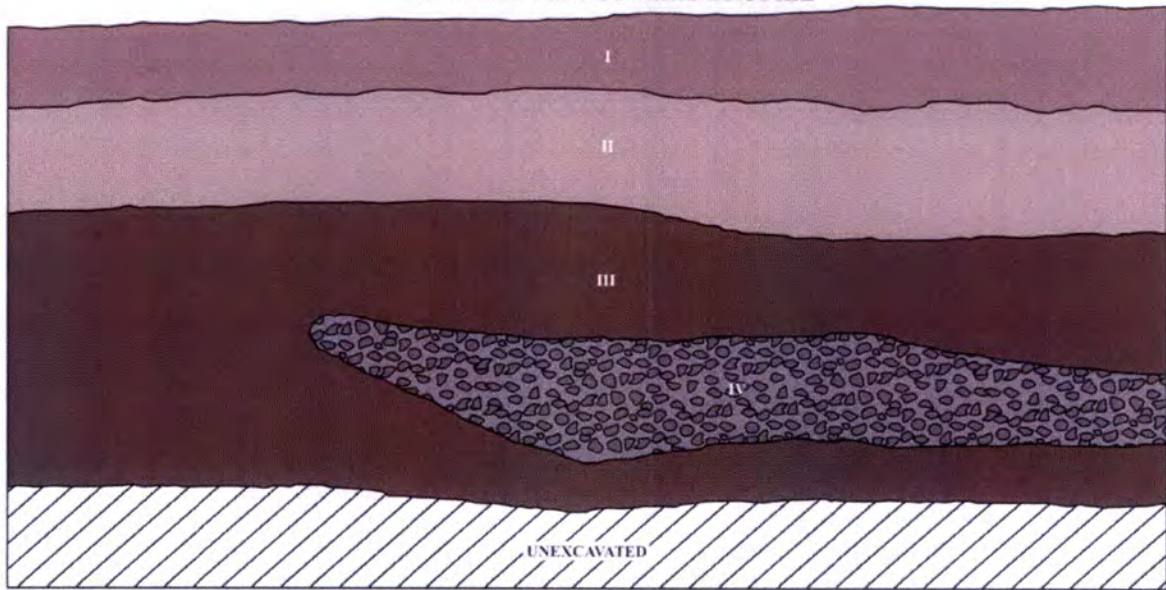
- | | |
|------------|---|
| I | - LAYER I: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND |
| II | - LAYER II: PALE BROWN (10YR 6/3) SAND |
| III | - LAYER III: BROWN (10YR 5/3) SILT |
| IV | - LAYER IV: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND |
| V | - LAYER V: VERY PALE BROWN (10YR 7/3) TO
VERY PALE BROWN (10YR 7/4) SAND |

ST-93 NORTHWEST WALL PROFILE



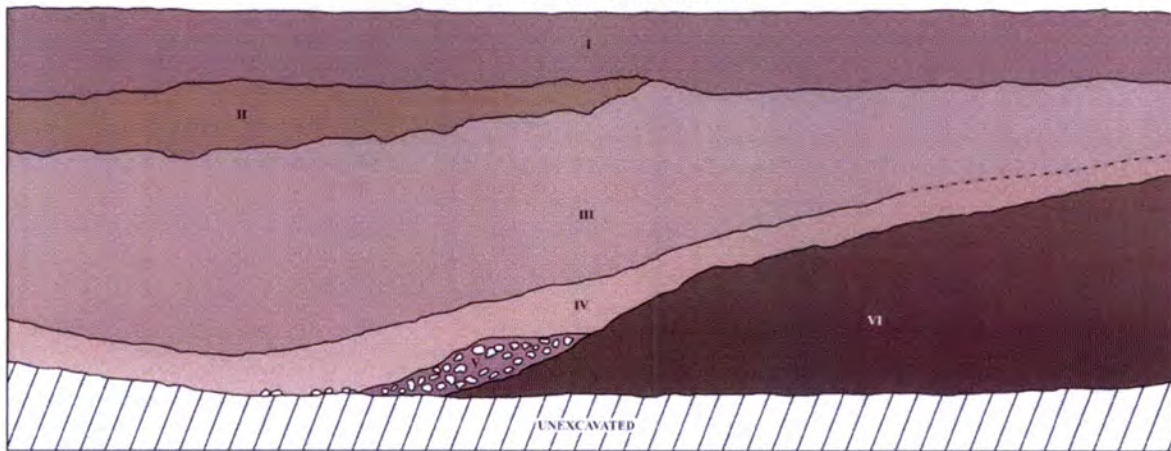
KEY	
I	- LAYER I: BROWN (10YR 4/3) SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: BROWN (10YR 5/3) AND PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: DARK BROWN (10YR 3/3) SILT
V	- LAYER V: YELLOWISH BROWN (10YR 5/4) SILT
VI	- LAYER VI: BROWN (10YR 4/3) SILT WITH BROWN (10YR 5/3) SILTY SAND

ST-94 SOUTHEAST WALL PROFILE



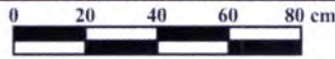
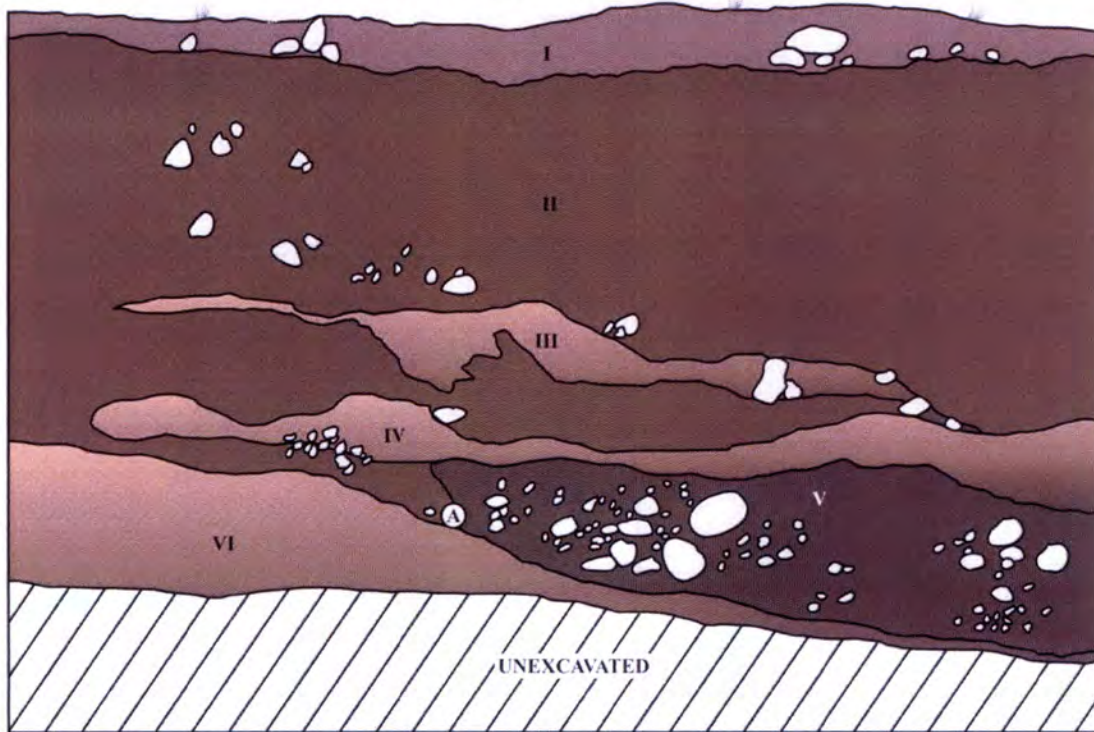
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SAND
III	- LAYER III: DARK BROWN (10YR 3/3) SILTY LOAM
IV	- LAYER IV: GRAY (10YR 5/1) SILT

ST-95 NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SAND
II	- LAYER II: YELLOWISH BROWN (10YR 5/4) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) AND VERY PALE BROWN (10YR 7/4) SAND
V	- LAYER V: LIGHT REDDISH BROWN (2.5YR 6/4) AND WEAK RED (2.5YR 5/2) SAND AND SILT
VI	- LAYER VI: BROWN (10YR 4/3) AND DARK BROWN (10YR 3/3) SILTY LOAM
- - -	- DIFFUSE BOUNDARY

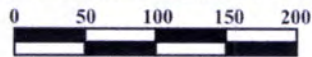
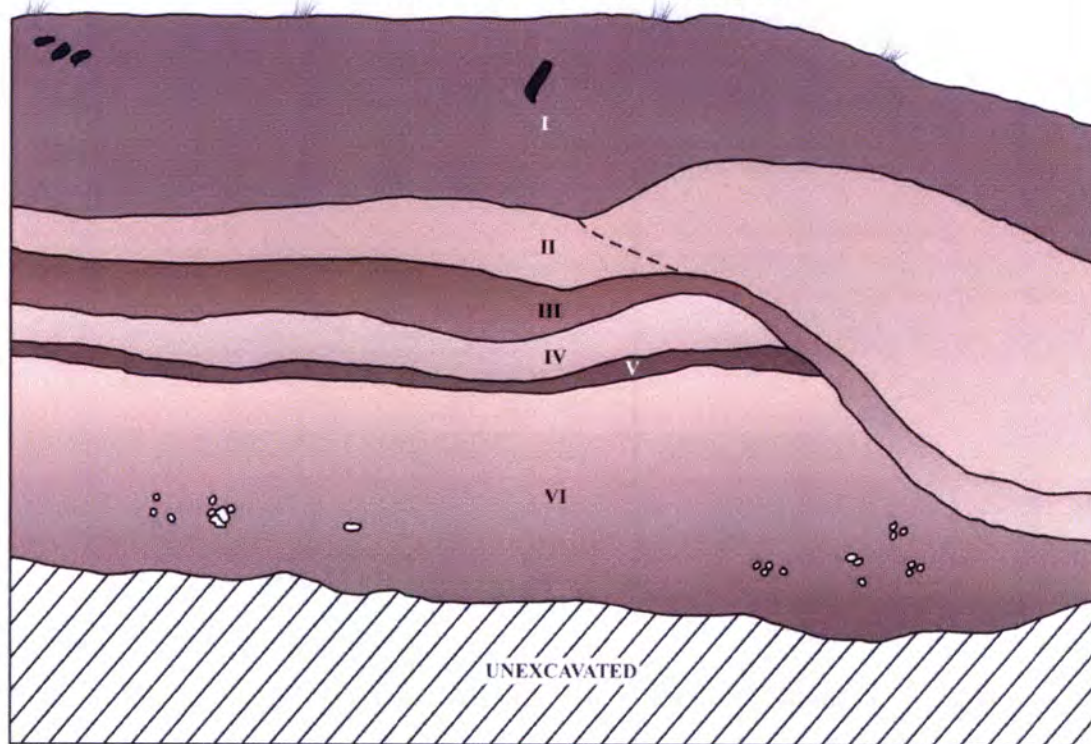
ST-96 WEST WALL PROFILE



KEY

- I** - LAYER I: BROWN (10YR 5/3) SILT
- II** - LAYER II: BROWN (10YR 4/3) SANDY SILT
- III** - LAYER III: REDDISH YELLOW (7.5YR 7/6) AND VERY DARK GRAYISH BROWN (10YR 3/2) SAND
- IV** - LAYER IV: REDDISH YELLOW (7.5YR 7/6) AND VERY DARK GRAYISH BROWN (10YR 3/2) SAND
- V** - LAYER V: VERY DARK GRAYISH BROWN (10YR 3/2) SAND
- VI** - LAYER VI: REDDISH YELLOW (7.5YR 7/6) SAND
- (A)** - KUKU NUT/ PROBABLY STREAM TRANSPORTED
- (◊)** - BASALT ROCK

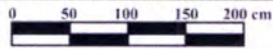
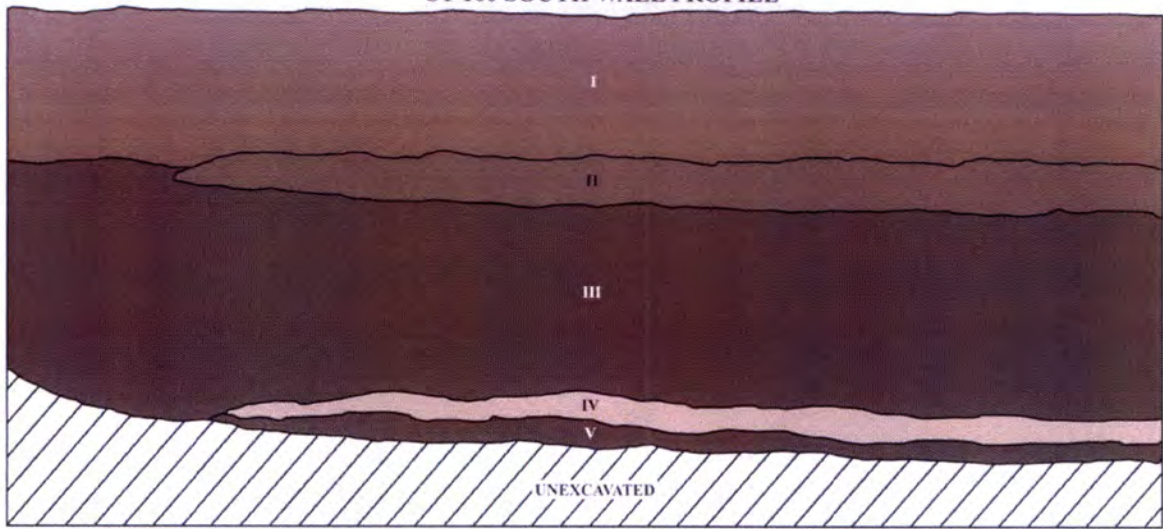
ST-97 EAST WALL PROFILE



KEY

- I** - LAYER I: BROWN (7.5YR 5/2) SANDY SILT
- II** - LAYER II: MOTTLED PINK (7.5YR 7/4) SAND AND BROWN (7.5YR 5/2) SILT
- III** - LAYER III: BROWN (7.5YR 4/3) MOTTLED WITH PINK (7.5YR 8/3) SILT
- IV** - LAYER IV: PINK (7.5YR 8/3) WITH BROWN (7.5YR 4/3) SAND
- V** - LAYER V: DARK GRAYISH BROWN (10YR 4/2) SILT
- VI** - LAYER VI: PINK (7.5YR 8/4) WITH BROWN (7.5YR 4/3) AND DARK GRAYISH BROWN (10YR 4/2) SAND
- ⊙** - SMALL BASALT COBBLES AND GRAVEL
- ▬** - IRRIGATION PIPE
- - DIFFUSE BOUNDARY

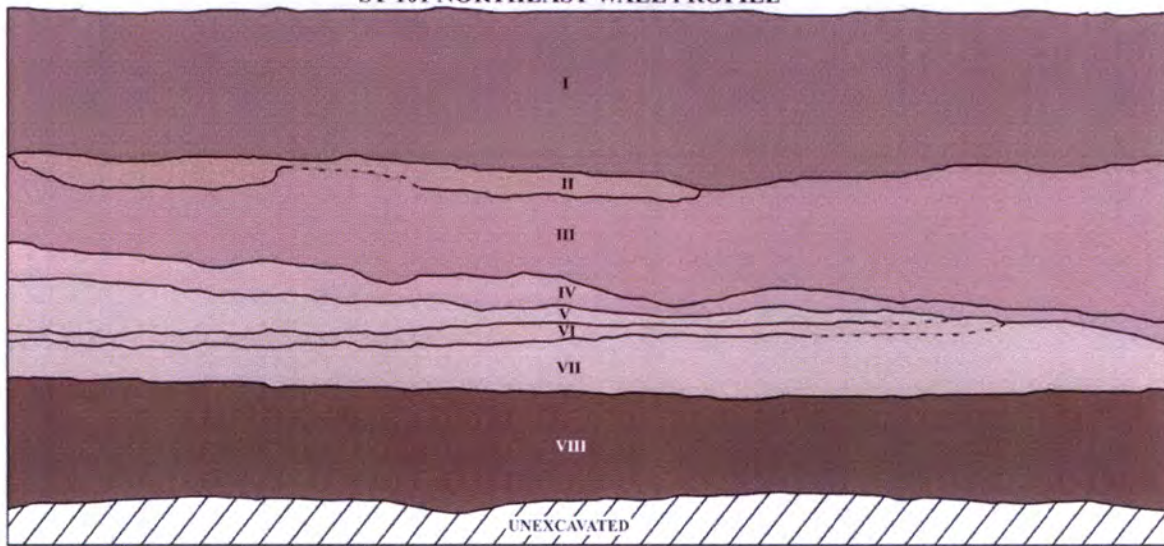
ST-100 SOUTH WALL PROFILE



KEY

- | | |
|------------|---|
| I | - LAYER I: BROWN (10YR 5/3) SILTY SAND AND DARK YELLOWISH BROWN (10YR 4/4) SILTY LOAM |
| II | - LAYER II: BROWN (10YR 4/3) SILTY SAND |
| III | - LAYER III: DARK BROWN (10YR 3/3) SILTY LOAM |
| IV | - LAYER IV: VERY PALE BROWN (10YR 7/4) SAND |

ST-101 NORTHEAST WALL PROFILE

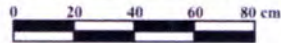
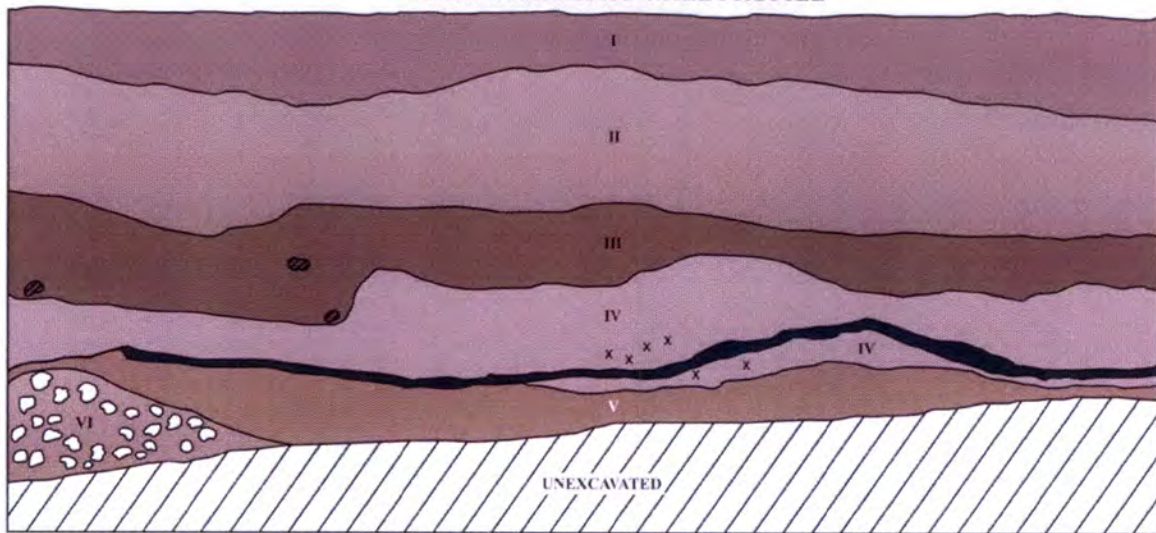


0 20 40 60 80 cm

KEY

- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- III** - LAYER III: LIGHT REDDISH BROWN (2.5YR 6/3) SAND
- IV** - LAYER IV: LIGHT REDDISH BROWN (2.5YR 7/3) AND PALE RED (2.5YR 6/2) SILTY SAND
- V** - LAYER V: LIGHT GRAY (10YR 7/2) SAND
- VI** - LAYER VI: VERY PALE BROWN (10YR 7/3) SILT
- VII** - LAYER VII: LIGHT GRAY (10YR 7/2) SAND
- VIII** - LAYER VIII: BROWN (10YR 4/3) SILTY LOAM
- -** - DIFFUSE BOUNDARY

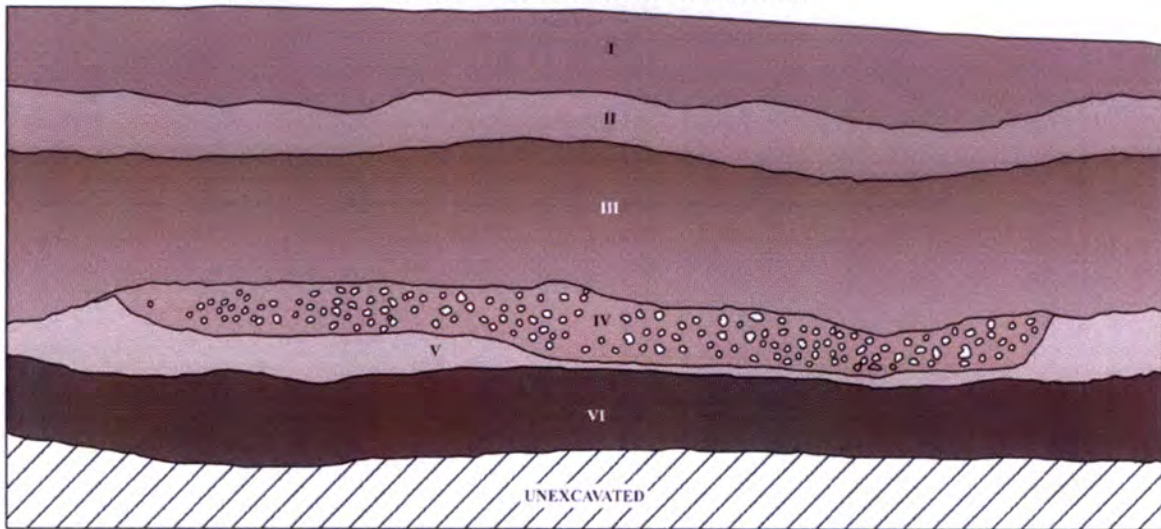
ST-102 NORTHEAST WALL PROFILE



KEY

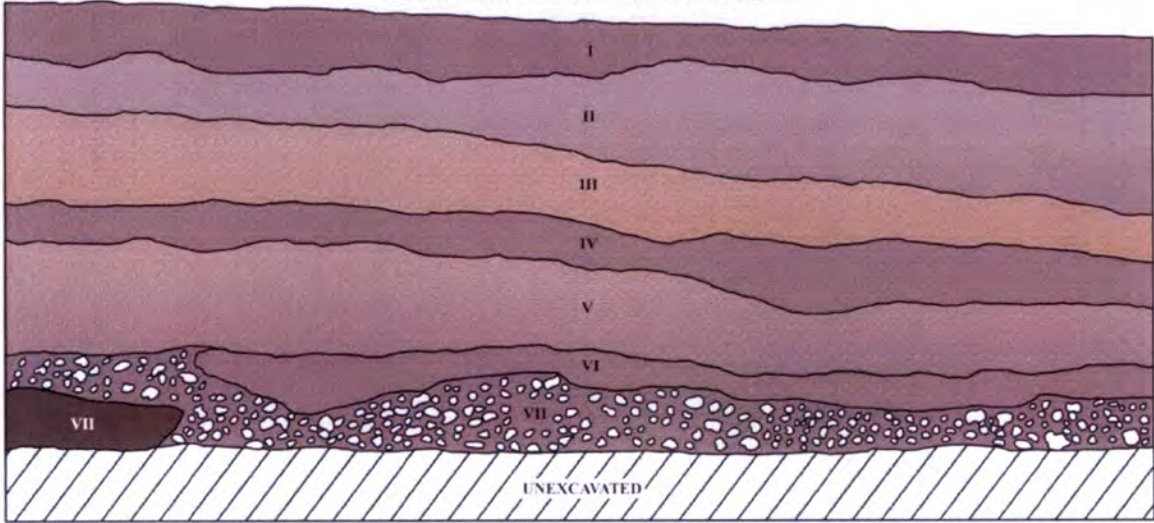
	- CHARCOAL LENS
	- BURIED KJAALE BRANCH
	- LAYER I: BROWN (10YR 5/3) SILTY SAND
	- LAYER II: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SAND
	- LAYER III: BROWN (10YR 4/3) SAND
	- LAYER IV: PALE RED (2.5YR 6/2) SAND
	- LAYER V: YELLOWISH BROWN (10YR 5/4) SILT
	- LAYER VI: PALE BROWN (10YR 6/3) SAND AND A MIX OF YELLOWISH BROWN (10YR 5/4) SILT
	- CHARCOAL FLECKINGS
	- BASALT COBBLES

ST-103 NORTHEAST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SILTY SAND
III	- LAYER III: BROWN (10YR 4/3) AND PALE BROWN (10YR 6/3) SILTY SAND
IV	- LAYER IV: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
V	- LAYER V: LIGHT GRAY (10YR 7/2) SAND
VI	- LAYER VI: DARK BROWN (10YR 3/3) SILTY LOAM
⊙	- BASALT PEBBLES

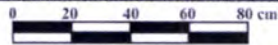
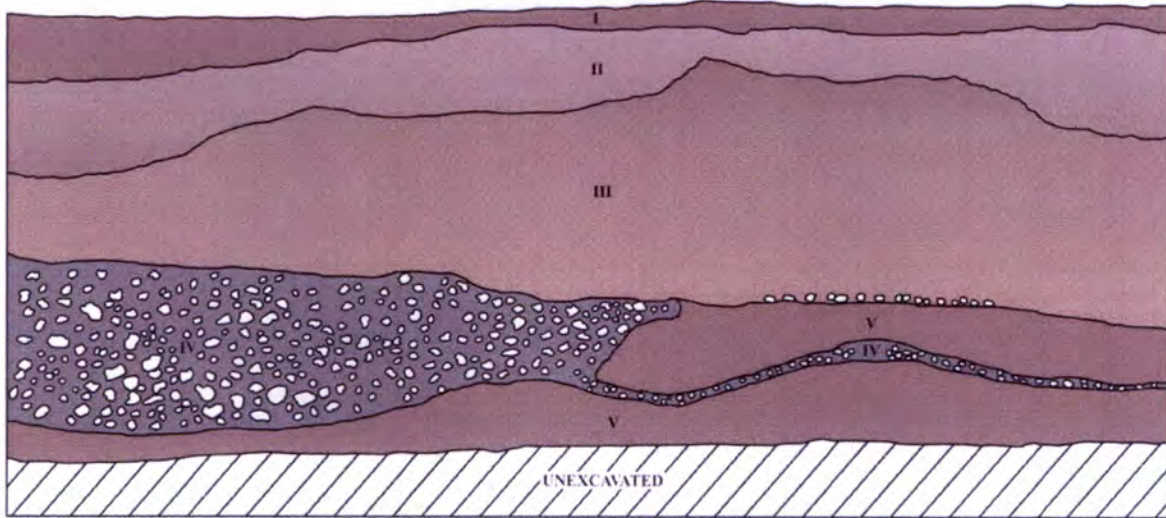
ST-104 NORTHEAST WALL PROFILE




KEY

- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SILTY SAND
- III** - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
- IV** - LAYER IV: BROWN (10YR 5/3) SAND
- V** - LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWN (10YR 5/3) SAND
- VI** - LAYER VI: BROWN (10YR 5/3) SANDY SILT
- VII** - LAYER VII: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SILTY SAND
- VIII** - LAYER VIII: DARK BROWN (10YR 3/3) LOAMY SILT
-  - BASALT PEBBLES

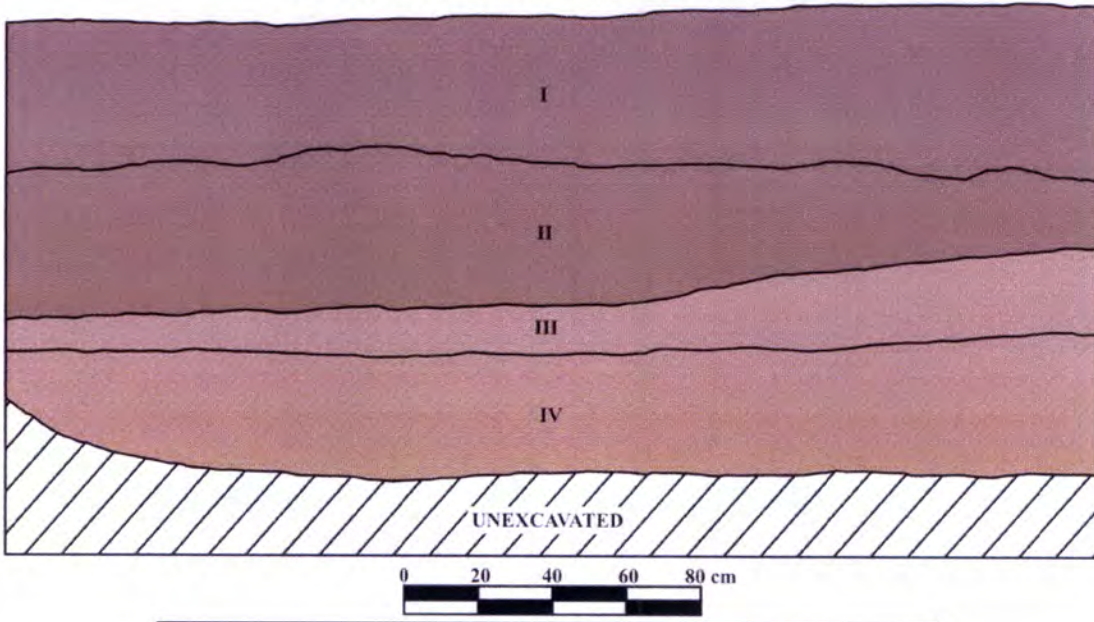
ST-105 SOUTH WALL PROFILE



KEY

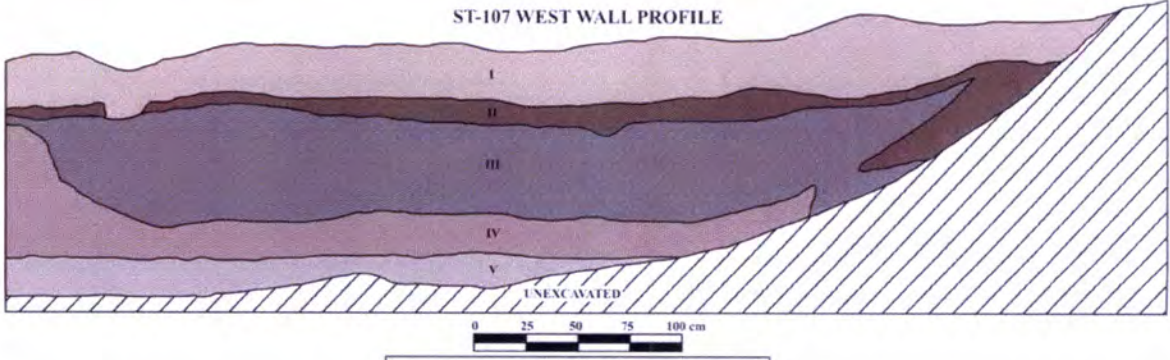
- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SAND
- III** - LAYER III: BROWN (10YR 5/3), VERY PALE BROWN (10YR 7/3), AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IV: GRAY (10YR 5/1) SANDY SILT WITH WATERWORN BASALT PEBBLES AND COBBLES
- V** - LAYER V: BROWN (10YR 5/3) SILT
-  - WATERWORN BASALT PEBBLES

ST-106 SOUTHWEST WALL PROFILE



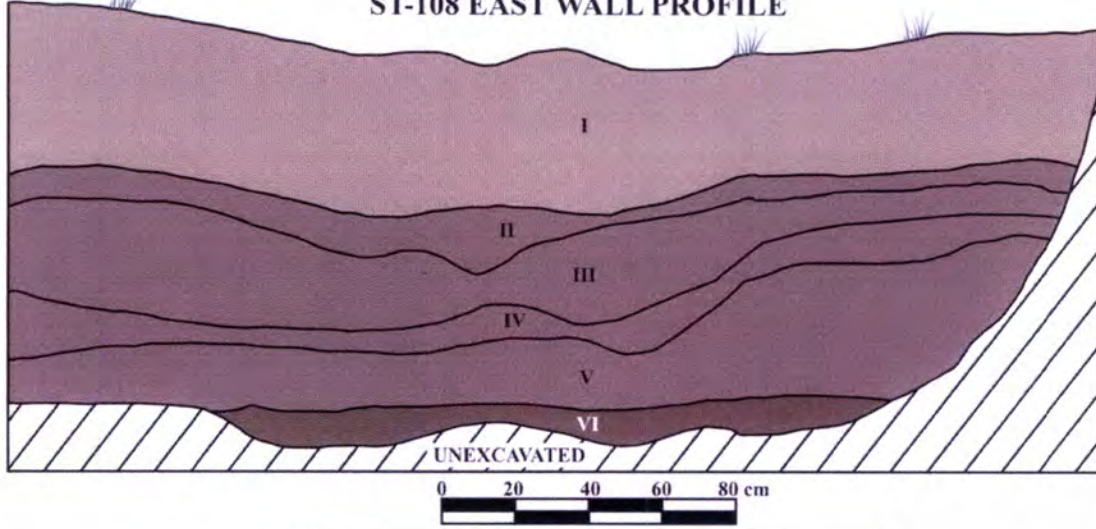
KEY	
I	LAYER I: BROWN (10YR 5/3) SILTY SAND
II	LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SAND
III	LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOWISH (10YR 6/6) SAND



ST-107 WEST WALL PROFILE



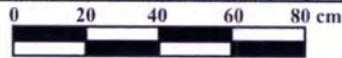
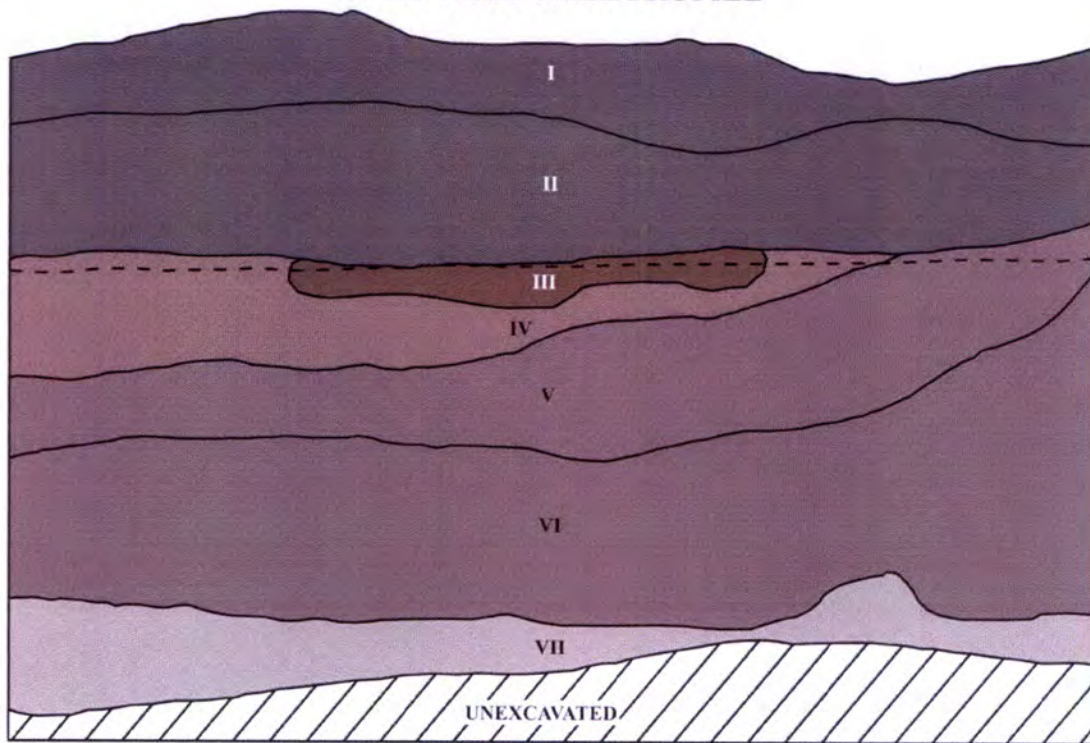
KEY	
I	LAYER I: LIGHT GRAY (10YR 7/2) SAND
II	LAYER II: DARK GRAYISH BROWN (10YR 4/2) SILT
III	LAYER III: GRAY (10YR 6/1) AND GRAY (10YR 5/1) SAND
IV	LAYER IV: LIGHT BROWNISH GRAY (10YR 6/2) SILT
V	LAYER V: LIGHT GRAY (10YR 7/1) SAND

ST-108 EAST WALL PROFILE



KEY	
	- GRASS
	- LAYER I: PALE BROWN (10YR 6/3) SANDY LOAM
	- LAYER II: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER III: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER IV: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER V: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER VI: DARK GRAYISH BROWN (10YR 4/2) SILT

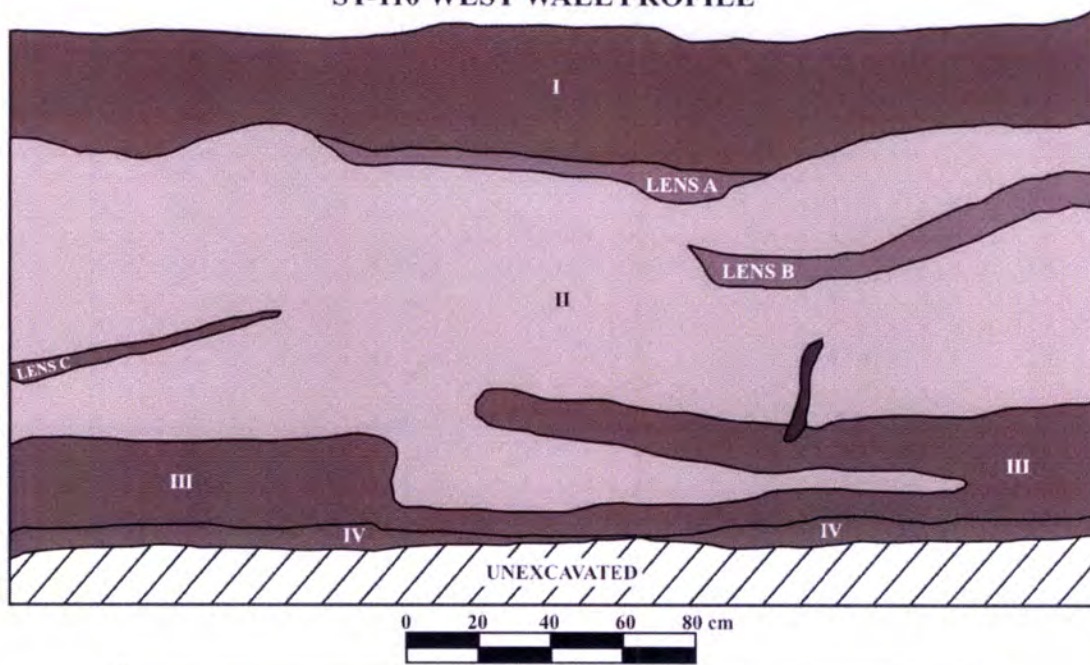
ST-109 WEST WALL PROFILE




KEY

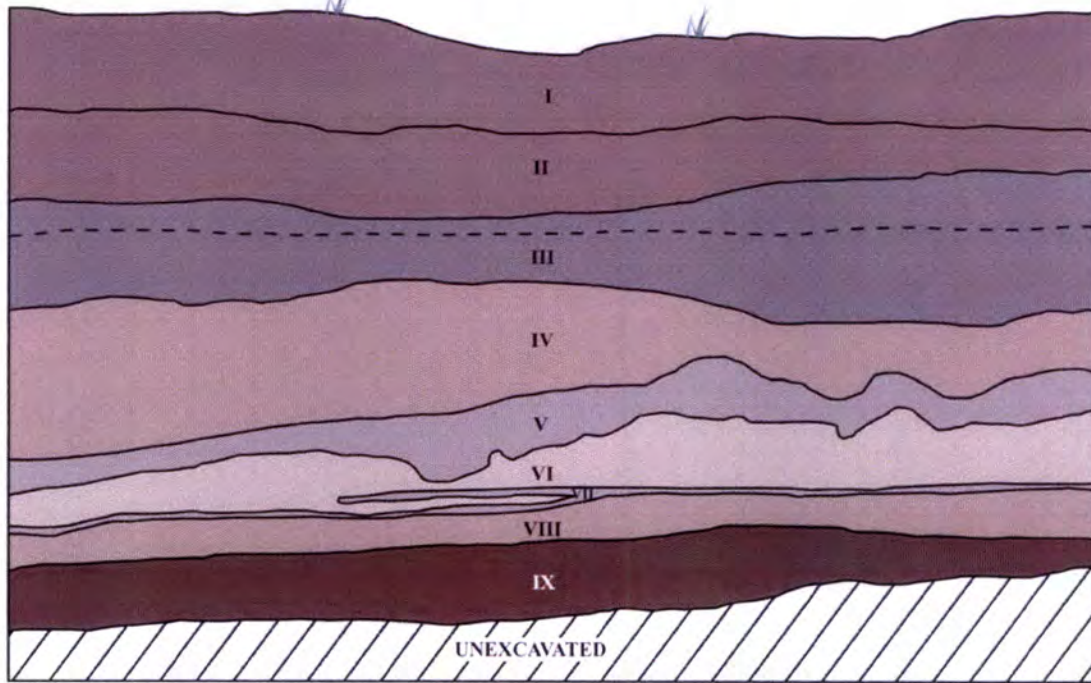
- | | |
|---|---|
| I | - LAYER I: DARK GRAY (10YR 4/1) SAND |
| II | - LAYER II: DARK GRAY (10YR 4/1) SAND |
| III | - LAYER III: REDDISH BROWN (2.5YR 4/4) SILTY SAND |
| IV | - LAYER IV: BROWN (10YR 4/3) SILTY SAND |
| V | - LAYER V: GRAYISH BROWN (10YR 5/2) SANDY SILT |
| VI | - LAYER VI: GRAYISH BROWN (10YR 5/2) SANDY SILT |
| VII | - LAYER VII: LIGHT GRAY (10YR 7/1) SAND |
|  | - DIFFUSE BOUNDARY |

ST-110 WEST WALL PROFILE



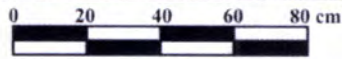
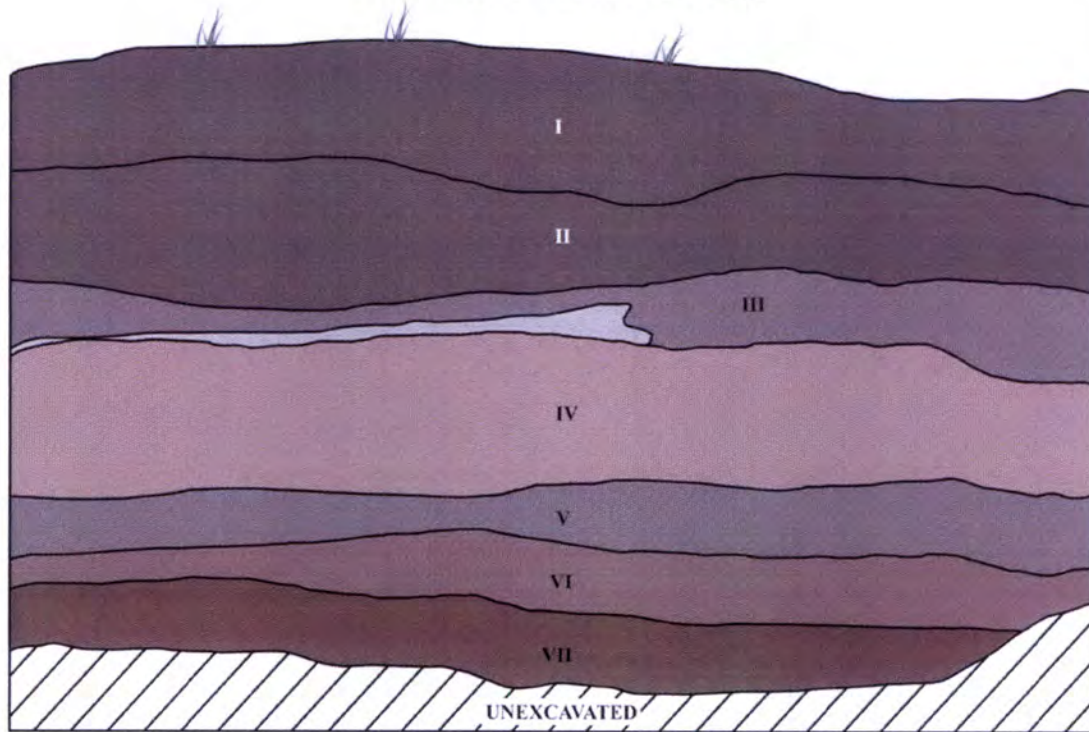
KEY	
I	- LAYER I: DARK GRAYISH BROWN (10YR 4/2) SANDY LOAM
II	- LAYER II: LIGHT GRAY (10YR 7/2) SAND
III	- LAYER III: DARK REDDISH GRAY (5YR 4/2) BASALT GRAVEL WITH SAND
IV	- LAYER IV: DARK GRAYISH BROWN (10YR 4/2) BASALT GRAVEL AND COBBLES
LENS A	- LENS A: GRAYISH BROWN (10YR 5/2) SAND
LENS B	- LENS B: GRAYISH BROWN (10YR 5/2) SAND
LENS C	- LENS C: DARK GRAYISH BROWN (10YR 4/2) SILT
	- ROOTS

ST-111 EAST WALL PROFILE



KEY	
	- GRASS
	- LAYER I: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER II: GRAYISH BROWN (10YR 5/2) SAND
	- LAYER III: GRAY (10YR 5/1) SAND
	- LAYER IV: PALE BROWN (10YR 6/3) SAND
	- LAYER V: GRAY (10YR 6/1) SAND
	- LAYER VI: LIGHT GRAY (10YR 7/2) SAND
	- LAYER VII: GRAY (10YR 6/1) LITHIFIED SAND
	- LAYER VIII: PALE BROWN (10YR 6/3) SAND
	- LAYER IX: DARK BROWN (7.5YR 3/4) SILTY SAND
	- DIFFUSE BOUNDARY

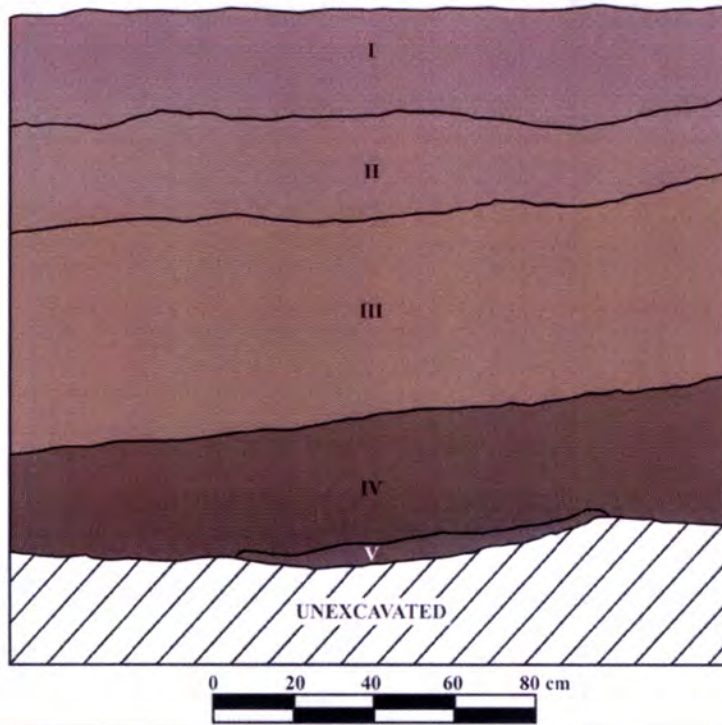
ST-112 EAST WALL PROFILE



KEY

	- GRASS
	- ROOT STAIN
	- LAYER I: DARK GRAY (10YR 4/1) SANDY LOAM
	- LAYER II: DARK GRAY (10YR 4/1) SAND
	- LAYER III: GRAY (10YR 5/1) SAND
	- LAYER IV: LIGHT BROWNISH GRAY (10YR 6/2) SAND
	- LAYER V: GRAY (10YR 5/1) SANDY SILT
	- LAYER VI: GRAYISH BROWN (10YR 5/2) SANDY LOAM
	- LAYER VII: DARK GRAYISH BROWN (10YR 4/2) SILT

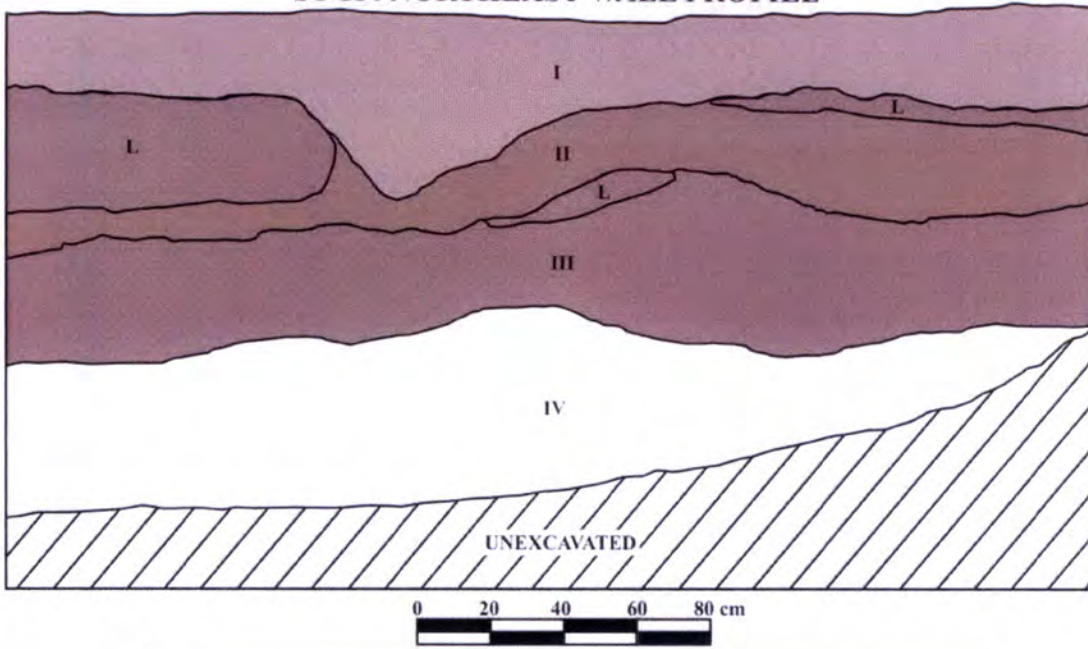
ST-113 NORTHEAST WALL PROFILE



KEY

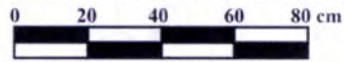
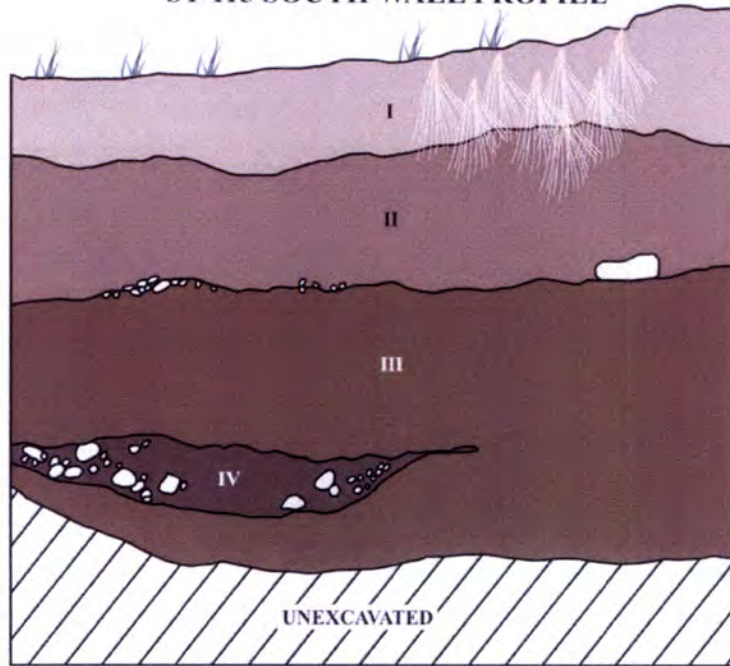
- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILTY SAND
- III** - LAYER III: YELLOWISH BROWN (10YR 5/4) SAND
- IV** - LAYER IV: DARK BROWN (10YR 4/3) AND DARK BROWN (10YR 3/3) SILTY SAND
- V** - LAYER V: DARK BROWN (7.5YR 3/2) LOAMY SILT

ST-114 NORTHEAST WALL PROFILE



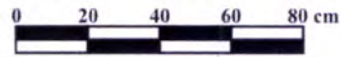
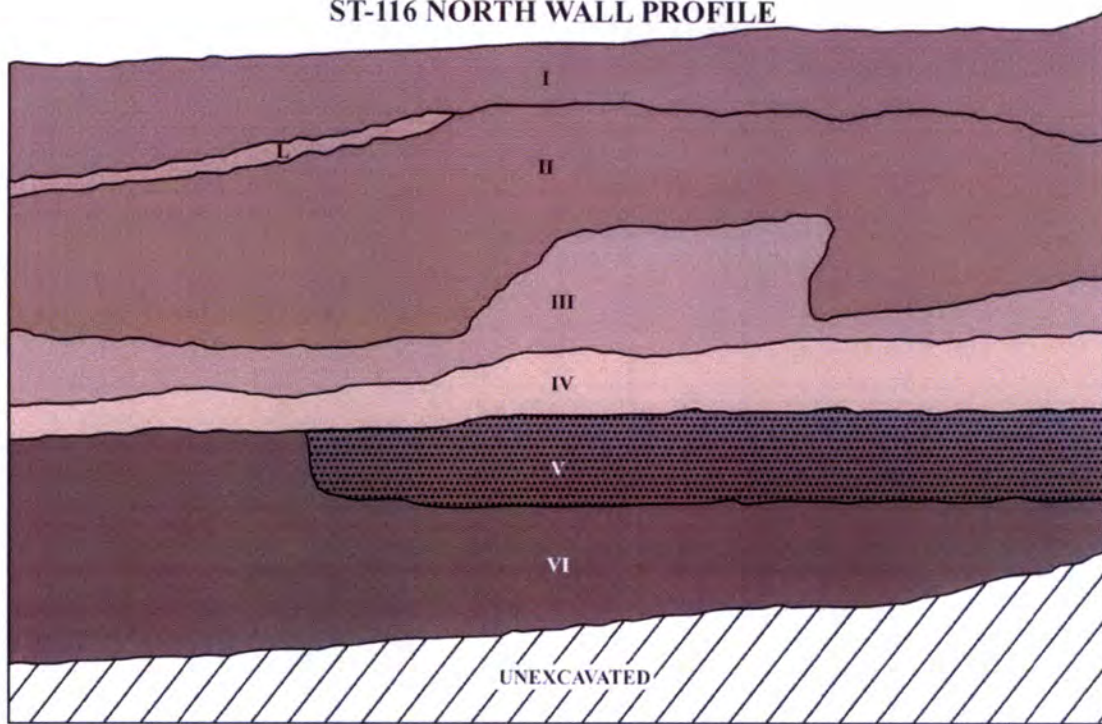
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILTY SAND
III	- LAYER III: BROWN (10YR 5/3) SILT
IV	- LAYER IV: BASALT PEBBLES AND COBBLES
L	- LENS OF BASALT PEBBLES

ST-115 SOUTH WALL PROFILE



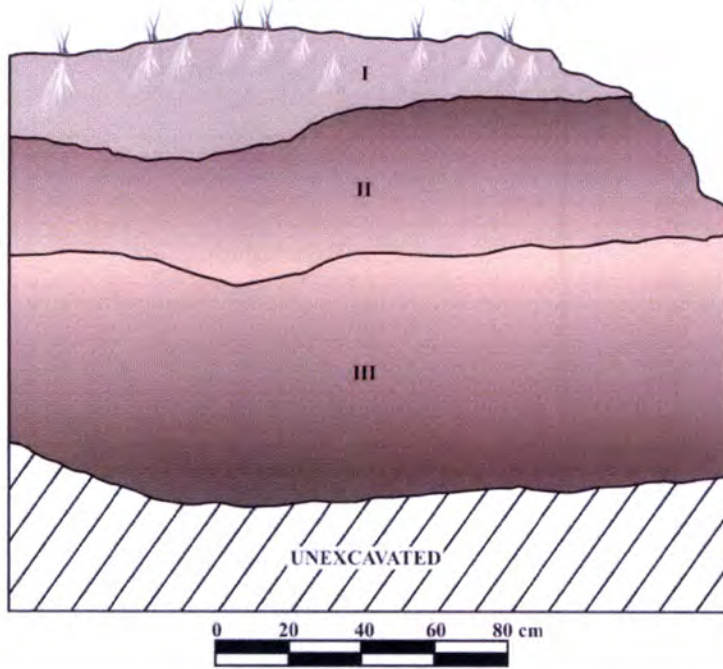
KEY	
	- GRASS
	- ROOTS
	- LAYER I: LIGHT GRAY (10YR 7/2) SILT AND SAND
	- LAYER II: BROWN (10YR 5/3) SILT AND SAND
	- LAYER III: BROWN (10YR 4/3) SILT
	- LAYER IV: VERY DARK GRAYISH BROWN (10YR 3/2) SAND
	- BASALT ROCK

ST-116 NORTH WALL PROFILE








KEY	
	- LENS: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
	- LAYER I: BROWN (10YR 5/3) SILTY SAND
	- LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILTY SAND
	- LAYER III: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
	- LAYER IV: VERY PALE BROWN (10YR 7/4) SAND
	- LAYER V: GRAY (10YR 5/1) AND BROWN (10YR 4/3) SILT
	- LAYER VI: DARK GRAYISH BROWN (10YR 4/2) SILT

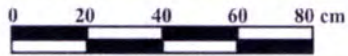
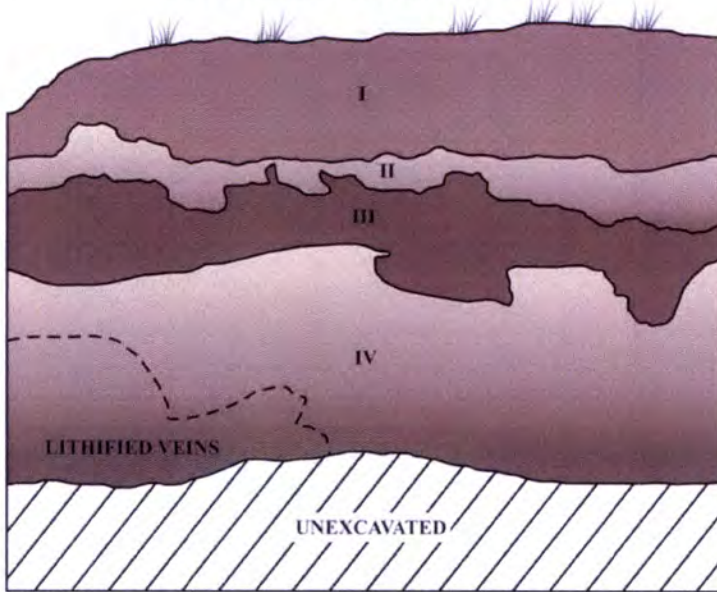
ST-117 SOUTH WALL PROFILE









KEY

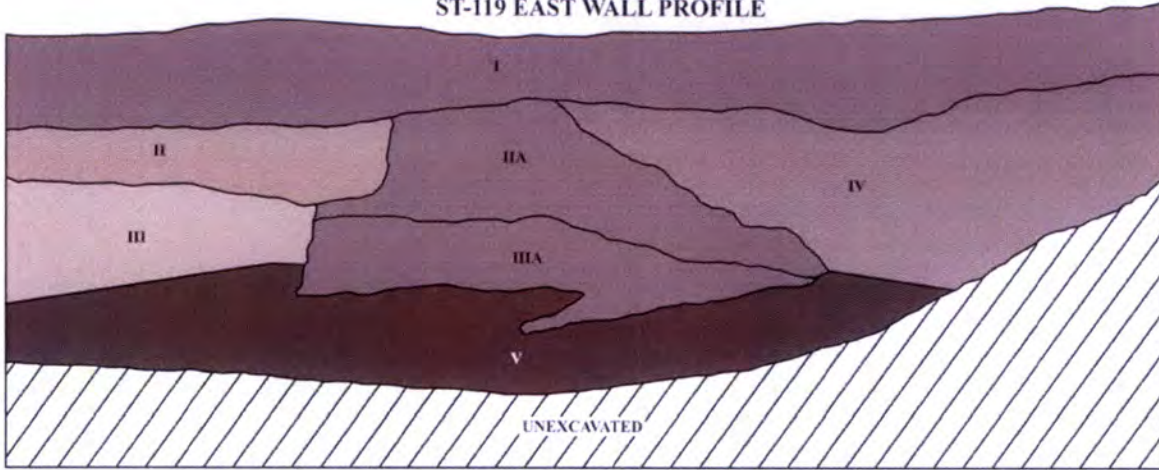
-  - GRASS
-  - ROOTS
-  - LAYER I: LIGHT GRAY (10YR 7/2) SILTY SAND
-  - LAYER II: PINK (7.5YR 8/4) SAND AND BROWN (7.5YR 4/2) SILT
-  - LAYER III: PINK (7.5YR 8/4) AND VERY DARK GRAYISH BROWN (10YR 3/2) SAND

ST-118 EAST WALL PROFILE



KEY	
	- GRASS
	- LAYER I: BROWN (10YR 5/3) SAND AND SILT
	- LAYER II: VERY PALE BROWN (10YR 8/3) SAND MOTTLED WITH DARK GRAYISH BROWN (10YR 4/2) SAND
	- LAYER III: DARK GRAYISH BROWN (10YR 4/2) SAND
	- LAYER IV: VERY PALE BROWN (10YR 8/3) MOTTLED WITH VERY DARK GRAYISH BROWN (10YR 3/2) SAND
	- DIFFUSE BOUNDARY

ST-119 EAST WALL PROFILE

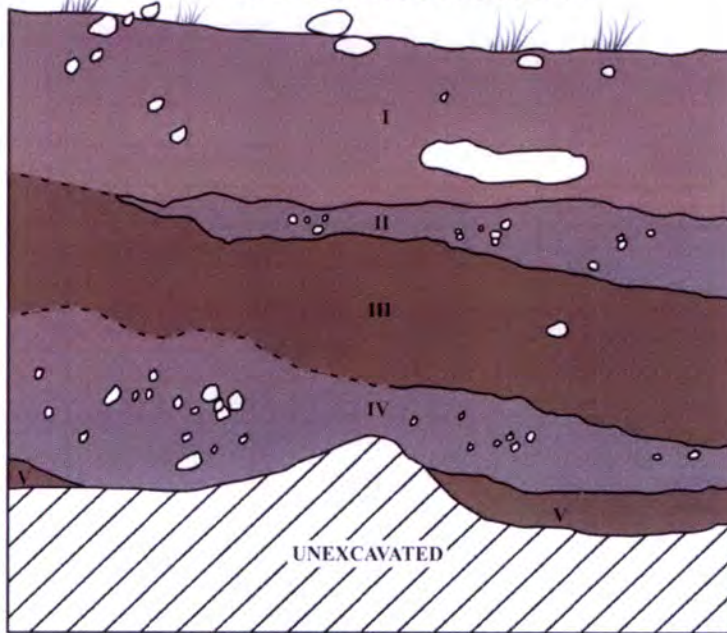


0 20 40 60 80 cm









KEY

I	LAYER I: GRAYISH BROWN (10YR 5/2) SILTY SAND
II	LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IIA	LAYER IIA: GRAYISH BROWN (10YR 5/2) SANDY SILT
III	LAYER III: VERY PALE BROWN (10YR 7/3) AND VERY PALE BROWN (10YR 7/4) SAND
IIIA	LAYER IIIA: GRAYISH BROWN (10YR 5/2) SANDY SILT
IV	LAYER IV: GRAYISH BROWN (10YR 5/2) AND LIGHT BROWNISH GRAY (10YR 6/2) SANDY SILT
V	LAYER V: DARK BROWN (10YR 3/3) SILT

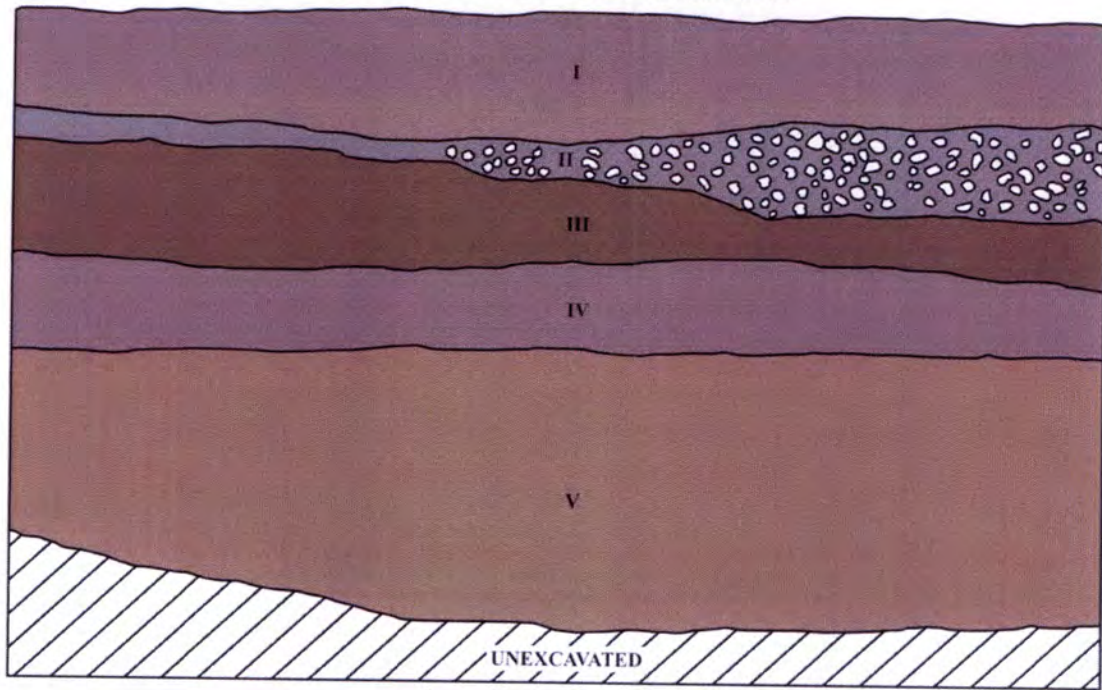
ST-120 EAST WALL PROFILE



KEY

-  - GRASS
-  - BASALT ROCK
-  I - LAYER I: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SANDY SILT
-  II - LAYER II: GRAYISH BROWN (10YR 5/2) AND GRAY (10YR 5/1) SAND
-  III - LAYER III: BROWN (10YR 4/3) SILT
-  IV - LAYER IV: GRAYISH BROWN (10YR 5/2) AND GRAY (10YR 5/1) SAND
-  V - LAYER V: BROWN (10YR 4/3) SILT
-  - DIFFUSE BOUNDARY

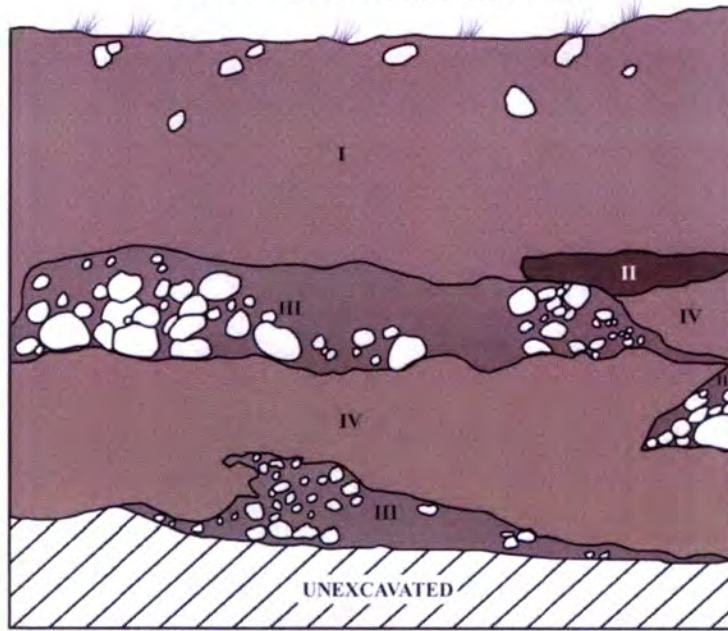
ST-121 WEST WALL PROFILE



KEY







- I** - LAYER I: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: GRAY (10YR 5/1) SAND AND SILT WITH SMALL BASALT PEBBLES
- III** - LAYER III: BROWN (10YR 4/3) SILT
- IV** - LAYER IV: GRAYISH BROWN (10YR 5/2) SILT
- V** - LAYER V: YELLOWISH BROWN (10YR 5/4) SILT

ST-122 WEST WALL PROFILE

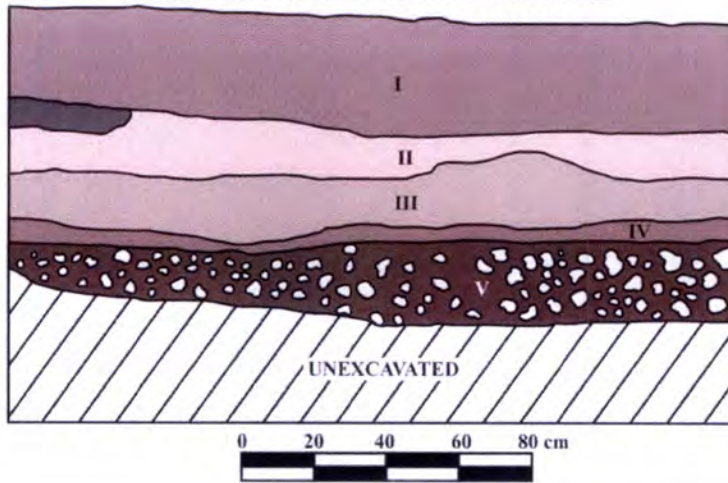


0 20 40 60 80 cm

KEY

-  - GRASS
-  - BASALT ROCK
-  - LAYER I: BROWN (10YR 5/3) SANDY SILT
-  - LAYER II: DARK BROWN (10YR 3/3) SILT
-  - LAYER III: GRAYISH BROWN (10YR 5/2) AND DARK GRAYISH BROWN (10YR 4/2) SAND WITH BASALT COBBLES AND PEBBLES
-  - LAYER IV: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILT

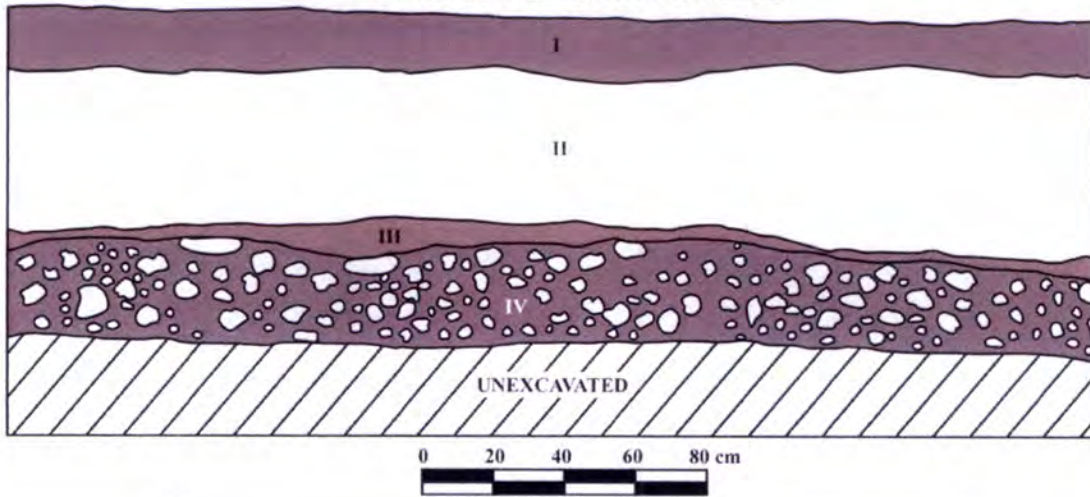
ST-123 NORTH WALL PROFILE



KEY

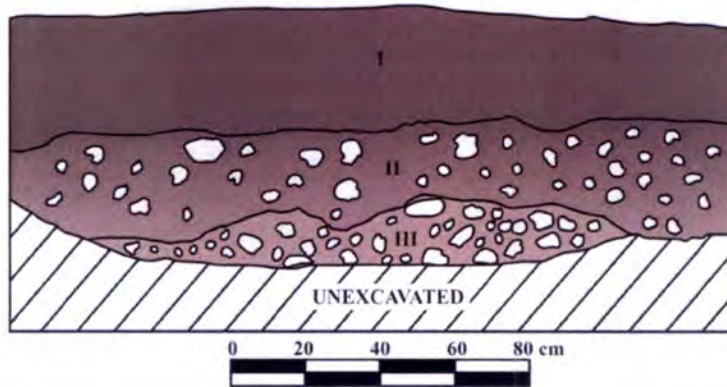
-  - STAIN
-  - LAYER I: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SILTY SAND
-  - LAYER II: PINKISH WHITE (2.5YR 8/2) AND PINK (2.5YR 8/3) SAND
-  - LAYER III: VERY PALE BROWN (10YR 7/3) SAND
-  - LAYER IV: BROWN (10YR 5/3) SILT
-  - LAYER V: DARK BROWN (10YR 3/3) SILT WITH BASALT COBBLES AND PEBBLES

ST-124 NORTH WALL PROFILE



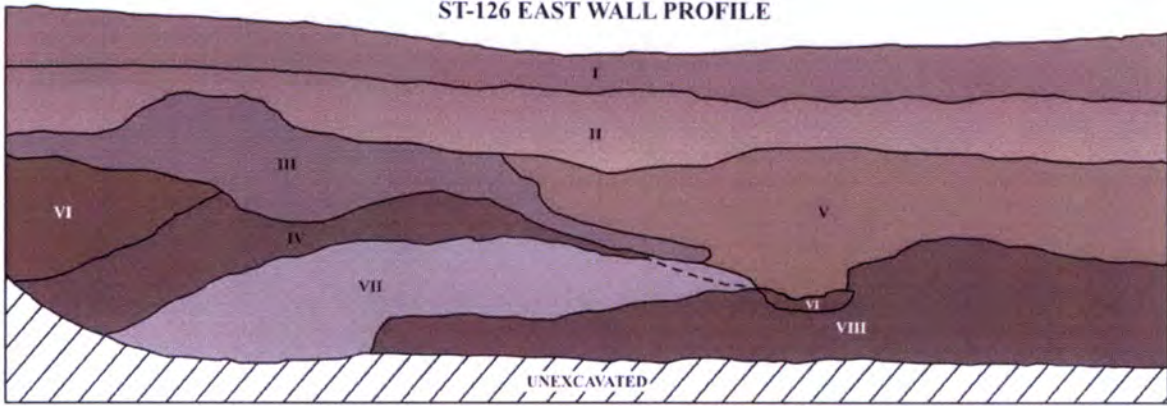
KEY	
I	- LAYER I: GRAYISH BROWN (10YR 5/2) AND BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: MOTTLED SILT, SAND, BASALT PEBBLES
III	- LAYER III: BROWN (10YR 5/3) SILT
IV	- LAYER IV: GRAYISH BROWN (10YR 5/2) SILT

ST-125 NORTHEAST WALL PROFILE



KEY	
I	- LAYER I: DARK GRAYISH BROWN (10YR 4/2) SILTY LOAM
II	- LAYER II: DARK GRAYISH BROWN (10YR 4/2) SILTY LOAM AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND WITH PEBBLES/COBBLES
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND WITH BASALT PEBBLES AND COBBLES
	- BASALT ROCKS

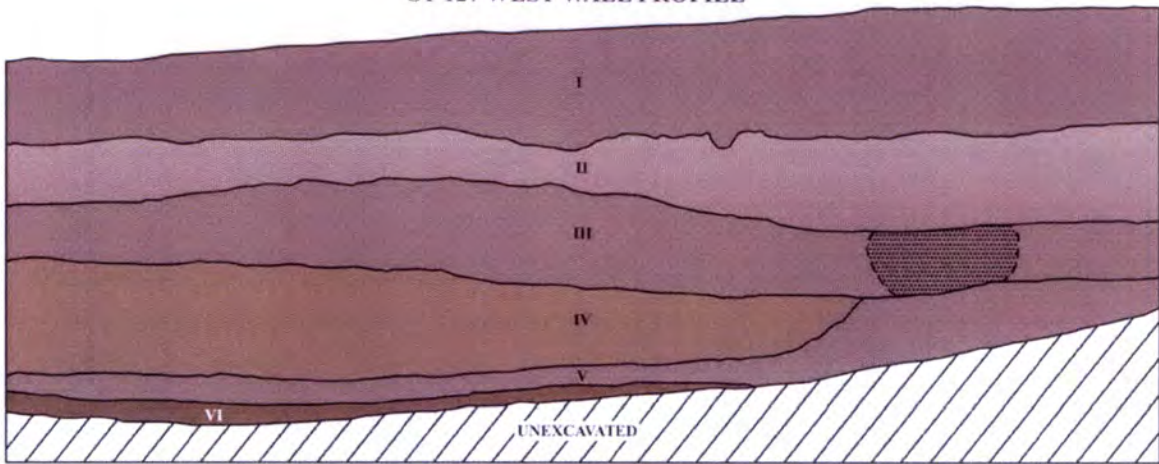
ST-126 EAST WALL PROFILE



KEY

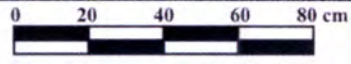
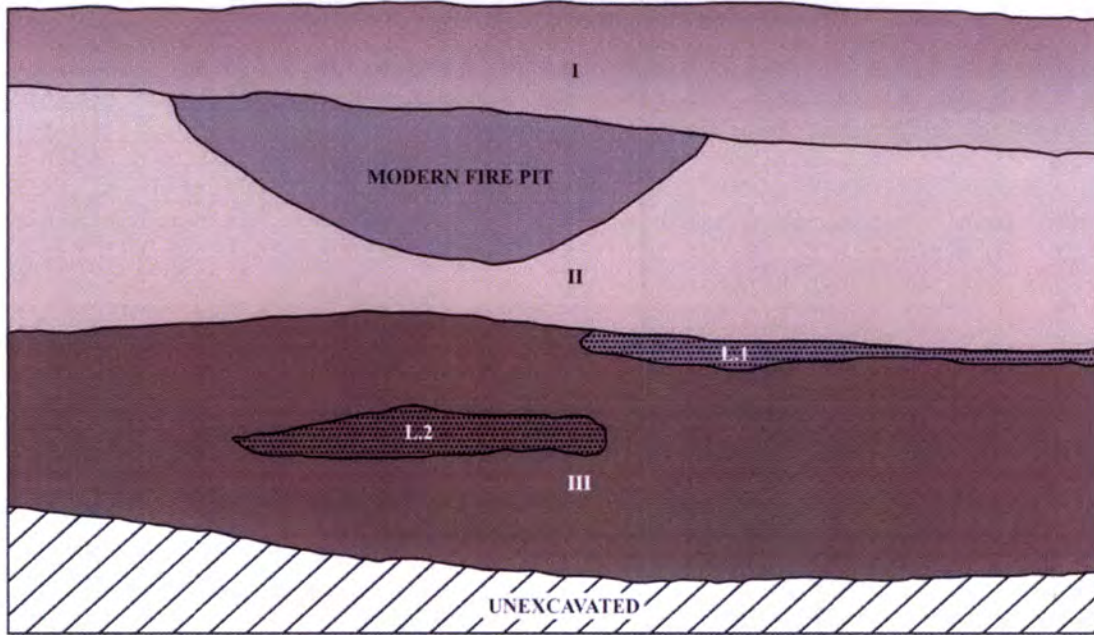
- I** - LAYER I: BROWN (10YR 5/3) SANDY SILT
- II** - LAYER II: BROWN (10YR 5/3) SILT MIXED WITH LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- III** - LAYER III: GRAYISH BROWN (10YR 5/2) SILT
- IV** - LAYER IV: DARK GRAYISH BROWN (10YR 4/2) SILT
- V** - LAYER V: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILT
- VI** - LAYER VI: BROWN (10YR 4/3) SILT
- VII** - LAYER VII: REDDISH GRAY (2.5YR 6/1) SANDY SILT
- VIII** - LAYER VIII: DARK GRAYISH BROWN (10YR 4/2) SILT
- - DIFFUSE BOUNDARY

ST-127 WEST WALL PROFILE



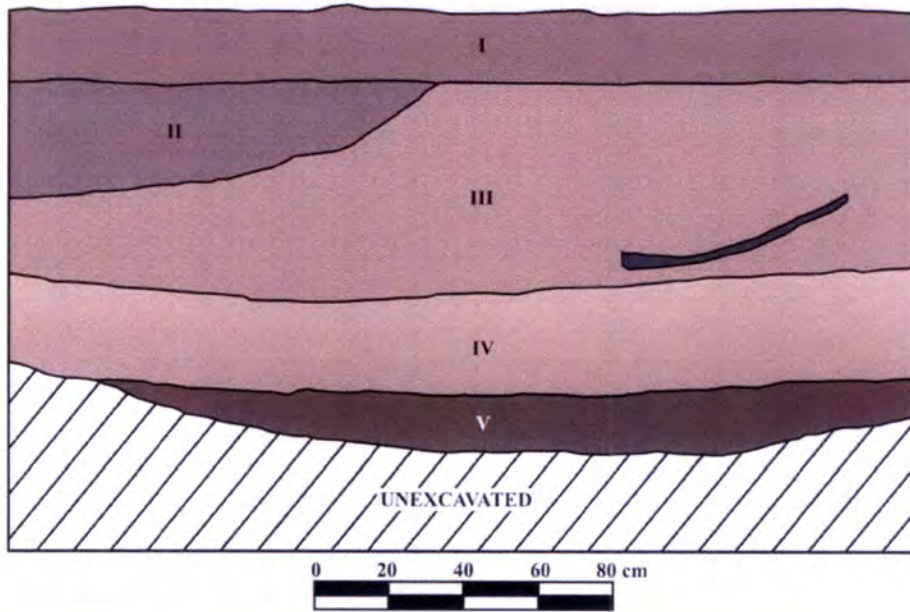
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND AND BROWN (7.5YR 5/3) SILT
II	- LAYER II: PALE BROWN (10YR 6/3) SAND AND BROWN (10YR 5/3) SILT
III	- LAYER III: BROWN (10YR 5/3) SANDY SILT
IV	- LAYER IV: YELLOWISH BROWN (10YR 5/4) SILT
V	- LAYER V: BROWN (10YR 5/3) SILT
VI	- LAYER VI: DARK YELLOWISH BROWN (10YR 4/4) LOAMY SILT
[Hatched Box]	- POCKET OF BASALT GRAVEL AND PEBBLES

ST-127B NORTHWEST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND AND LIGHT GRAY (10YR 7/2) SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) AND VERY PALE BROWN (10YR 7/3) SAND
III	- LAYER III: DARK GRAYISH BROWN (10YR 4/2) LOAMY SILT
L1	- LENS I: REDDISH GRAY (2.5YR 5/1) SILTY SAND
L2	- LENS II: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND

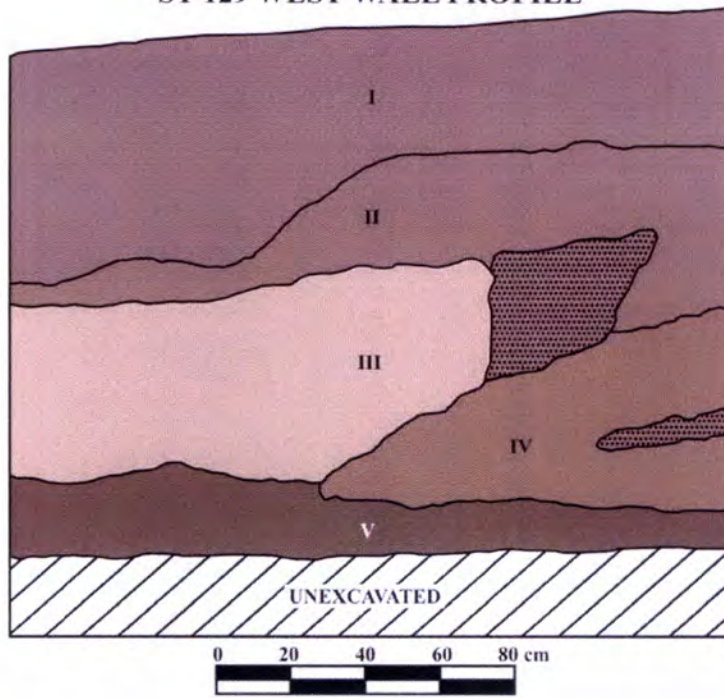
ST-128 SOUTHEAST WALL PROFILE



KEY

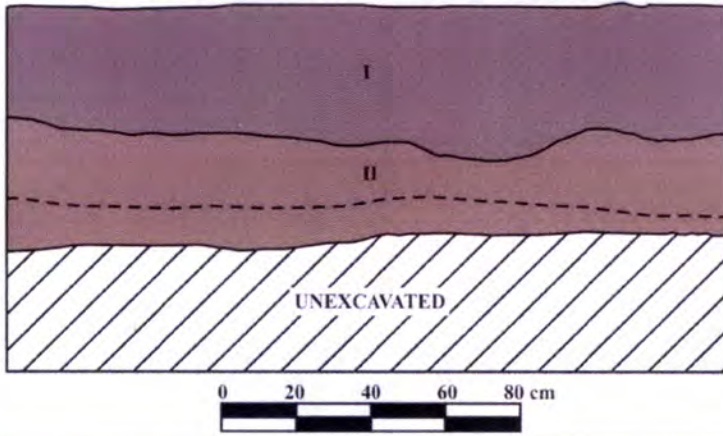
-  - STAIN
-  - LAYER I: BROWN (10YR 5/3) SILTY SAND
-  - LAYER II: GRAYISH BROWN (10YR 5/2) SAND
-  - LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SAND
-  - LAYER IV: VERY PALE BROWN (10YR 7/4) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
-  - LAYER V: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SILT

ST-129 WEST WALL PROFILE




KEY	
	- ROCKY POCKETS
	- LAYER I: BROWN (10YR 5/3) SILTY SAND
	- LAYER II: BROWN (10YR 5/3) SILTY SAND AND YELLOWISH BROWN (10YR 5/4) SANDY SILT
	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
	- LAYER IV: YELLOWISH BROWN (10YR 5/4) SILT
	- LAYER V: BROWN (10YR 4/3) LOAMY SILT

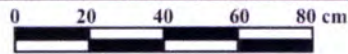
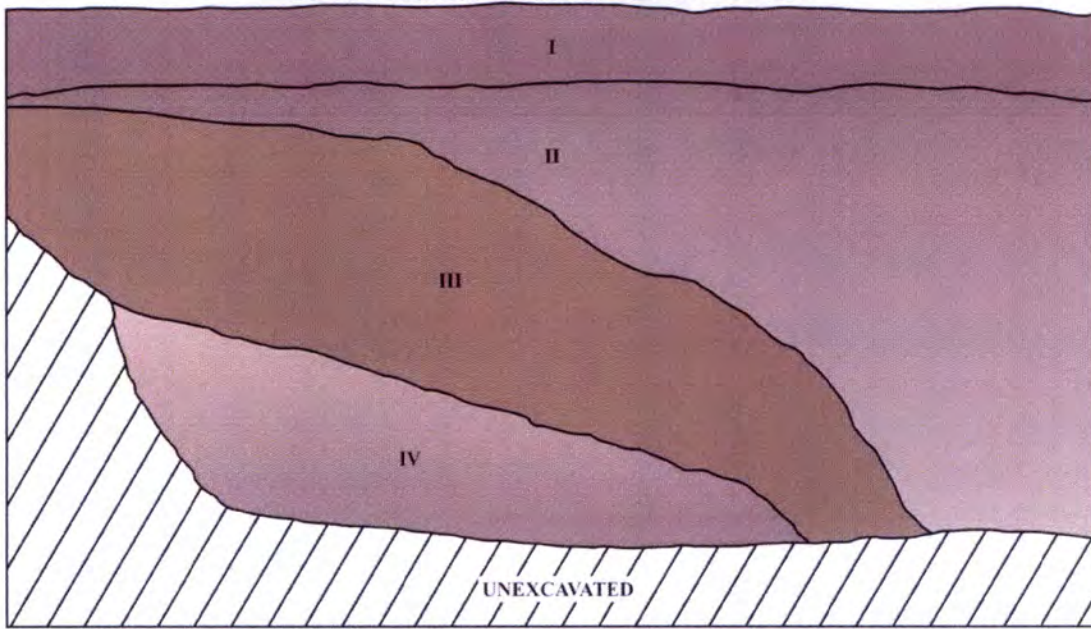
ST-130 SOUTHWEST WALL PROFILE



KEY

- I** - LAYER I: GRAYISH BROWN (10YR 5/2) SANDY SILT
- II** - LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILT
-  - DIFFUSE BOUNDARY

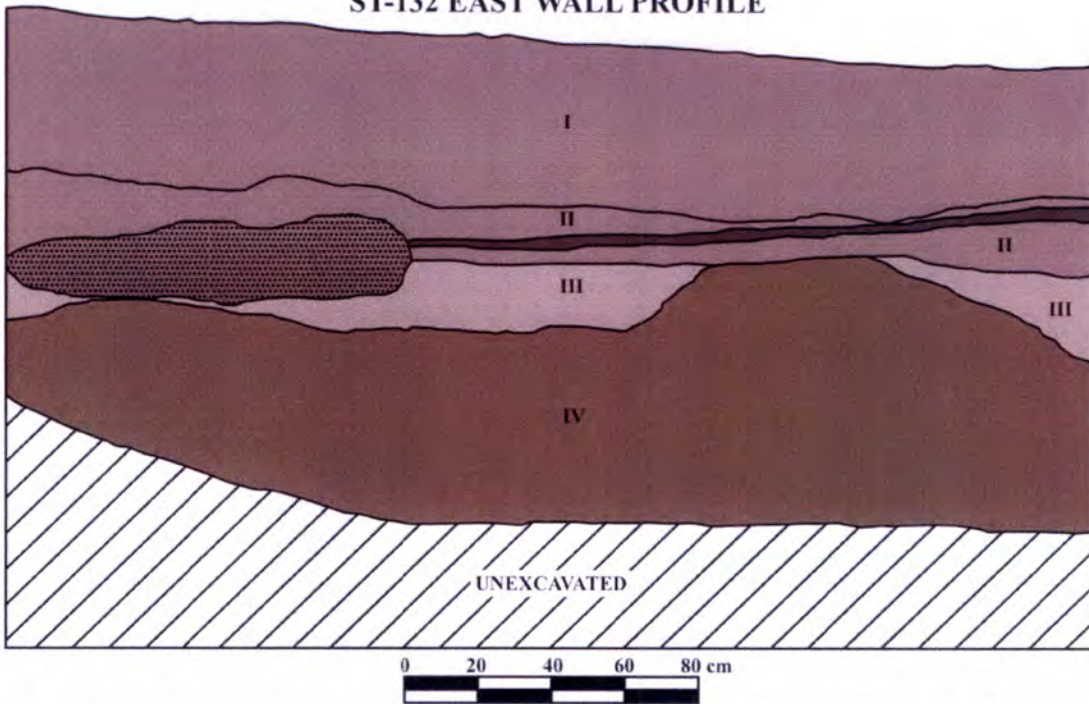
ST-131 NORTHEAST WALL PROFILE



KEY

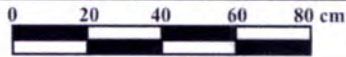
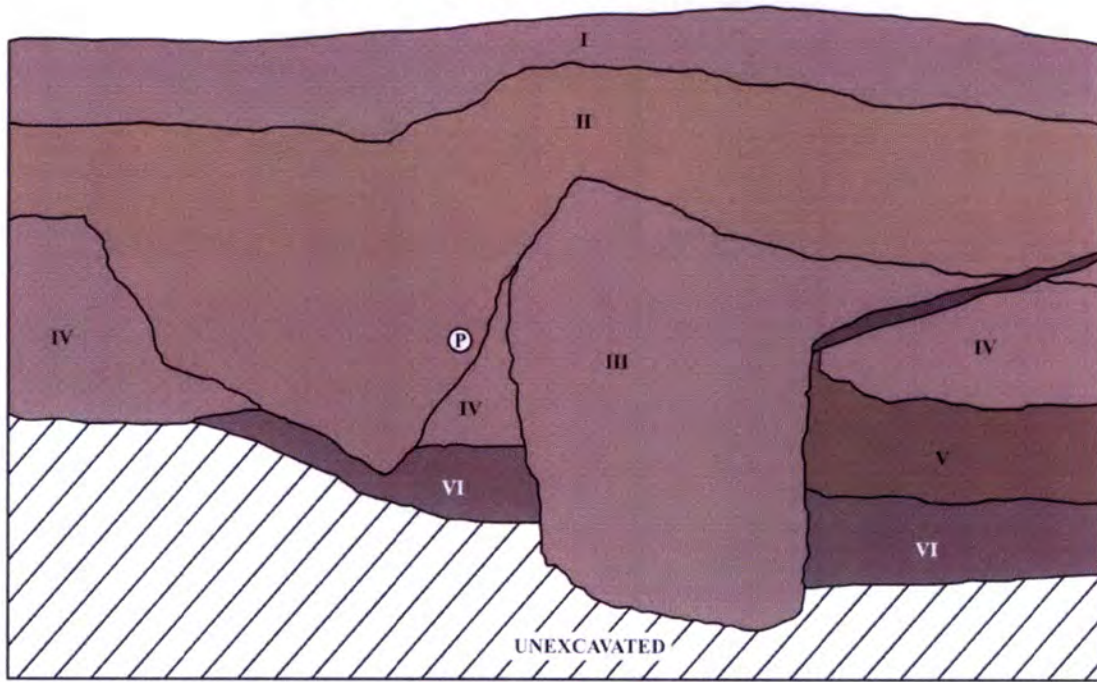
- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: BROWN (10YR 5/3) SILTY SAND AND VERY PALE BROWN (10YR 7/3) SAND
- III** - LAYER III: YELLOWISH BROWN (10YR 5/4) SILT
- IV** - LAYER IV: VERY PALE BROWN (10YR 7/4) SAND AND BROWN (10YR 5/3) SILT

ST-132 EAST WALL PROFILE



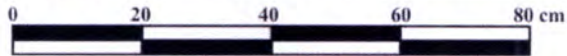
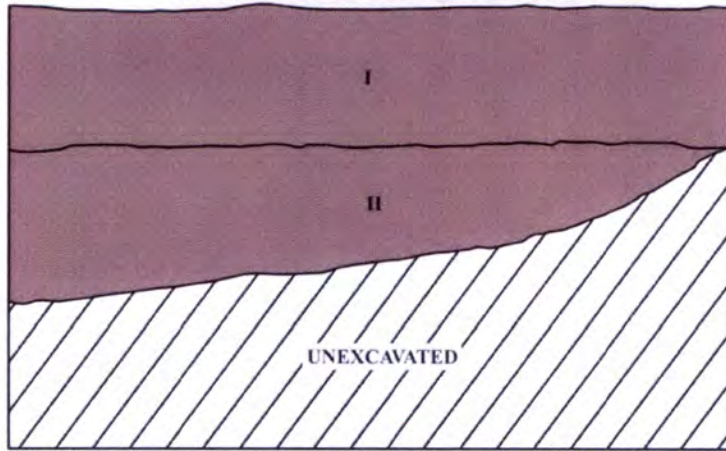
KEY	
	- POCKET OF BASALT ROCK: BROWN (10YR 5/3) AND BROWN (10YR 4/3) SANDY SILT
	- SAND LENS
	I - LAYER I: BROWN (10YR 5/3) SILTY SAND
	II - LAYER II: BROWN (10YR 5/3) SILT
	III - LAYER III: PALE BROWN (10YR 6/3) SILT
	IV - LAYER IV: DARK YELLOWISH BROWN (10YR 4/4) SILTY LOAM

ST-133 NORTHWEST WALL PROFILE



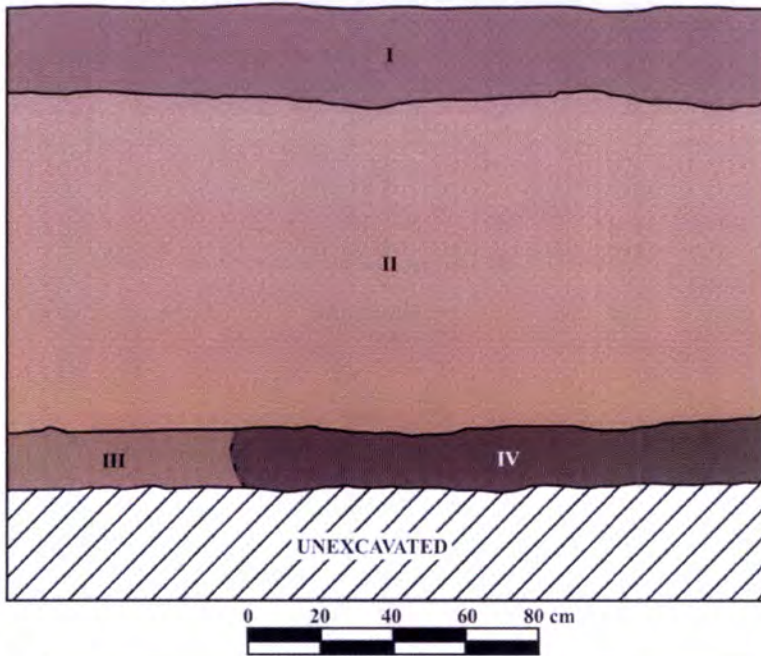
KEY	
	PVC PIPE
	SAND LENS
	LAYER I: BROWN (10YR 5/3) SILTY SAND
	LAYER II: YELLOWISH BROWN (10YR 5/4) SILT AND BROWN (10YR 5/3) SILTY SAND
	LAYER III: BROWN (10YR 5/3) SILTY SAND
	LAYER IV: BROWN (10YR 5/3) SILT
	LAYER V: BROWN (10YR 4/3) SILTY LOAM
	LAYER VI: WEAK RED (2.5YR 4/2) SILTY LOAM

ST-134 WEST WALL PROFILE



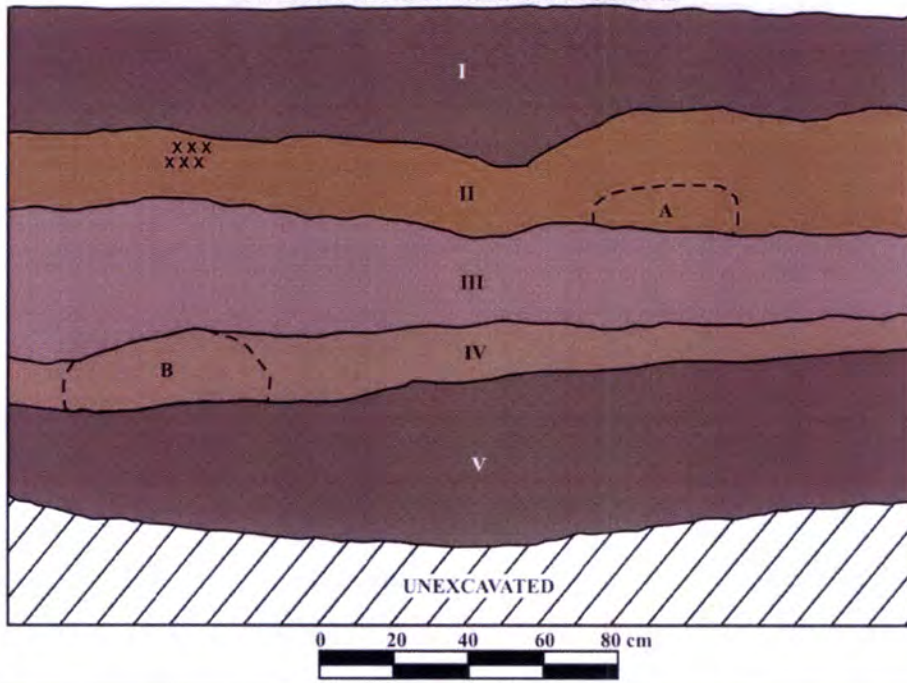
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: BROWN (10YR 5/3) SILT

ST-135 NORTH WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) AND BROWNISH YELLOW (10YR 6/6) SAND
III	- LAYER III: YELLOWISH BROWN (10YR 5/4) SILTY SAND
IV	- LAYER IV: VERY DARK GRAYISH BROWN (10YR 3/2) SANDY SILT
	- DIFFUSE BOUNDARY

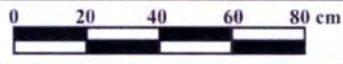
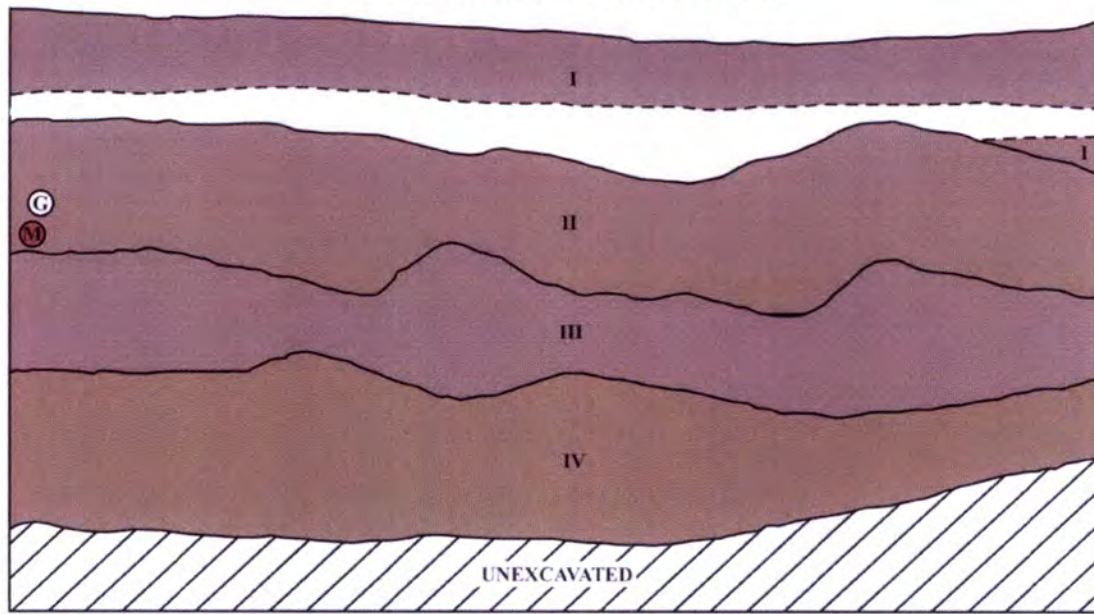
ST-136 SOUTH WALL PROFILE



KEY

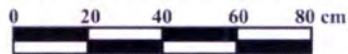
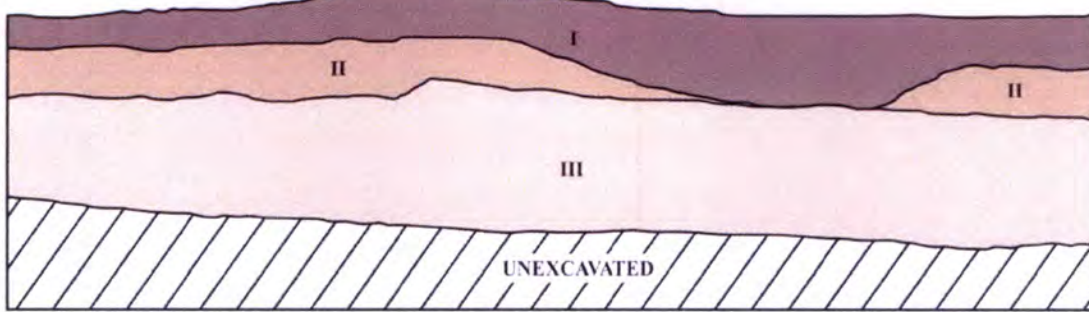
- I** - LAYER I: DARK GRAYISH BROWN (10YR 4/2) SILTY SAND
- II** - LAYER II: YELLOWISH BROWN (10YR 5/4) AND YELLOWISH BROWN (10YR 5/6) SAND
- III** - LAYER III: BROWN (10YR 5/3) MIXED WITH LIGHT YELLOWISH BROWN (10YR 6/4) SAND
- IV** - LAYER IV: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILTY SAND
- V** - LAYER V: DARK GRAYISH BROWN (10YR 4/2) SILTY LOAM
- A** - PLANT REMAINS
- xxx** - CHARCOAL FLECKINGS
- B** - SILTY LOAM AND SAND MIXTURE

ST-137 WEST WALL PROFILE



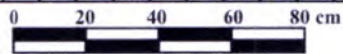
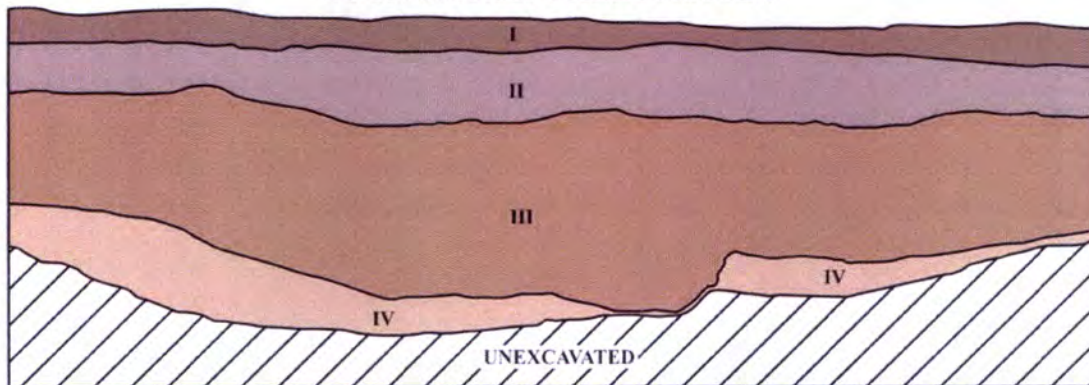
KEY	
	GLASS FRAGMENT
	RUSTED METAL
	UNDETERMINED LENS
	LAYER I: BROWN (10YR 5/3) SILTY SAND
	LAYER II: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILTY SAND
	LAYER III: BROWN (10YR 5/3) SILT
	LAYER IV: YELLOWISH BROWN (10YR 5/4) SILT

ST-138 NORTH WALL PROFILE



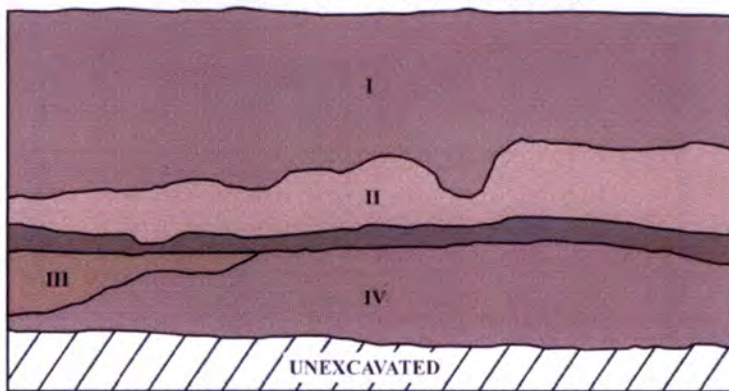
KEY	
I	LAYER I: BROWN (10YR 5/3) SILTY SAND
II	LAYER II: YELLOW (10YR 7/6) SILTY SAND
III	LAYER III: VERY PALE BROWN (10YR 8/3) LITHIFIED SAND

ST-139 NORTH WALL PROFILE



KEY	
I	LAYER I: YELLOWISH BROWN (10YR 5/4) SILTY SAND
II	LAYER II: PALE BROWN (10YR 6/3) SILTY SAND
III	LAYER III: BROWNISH YELLOW (10YR 6/6) LITHIFIED SAND
IV	LAYER IV: YELLOW (10YR 7/6) LITHIFIED SAND

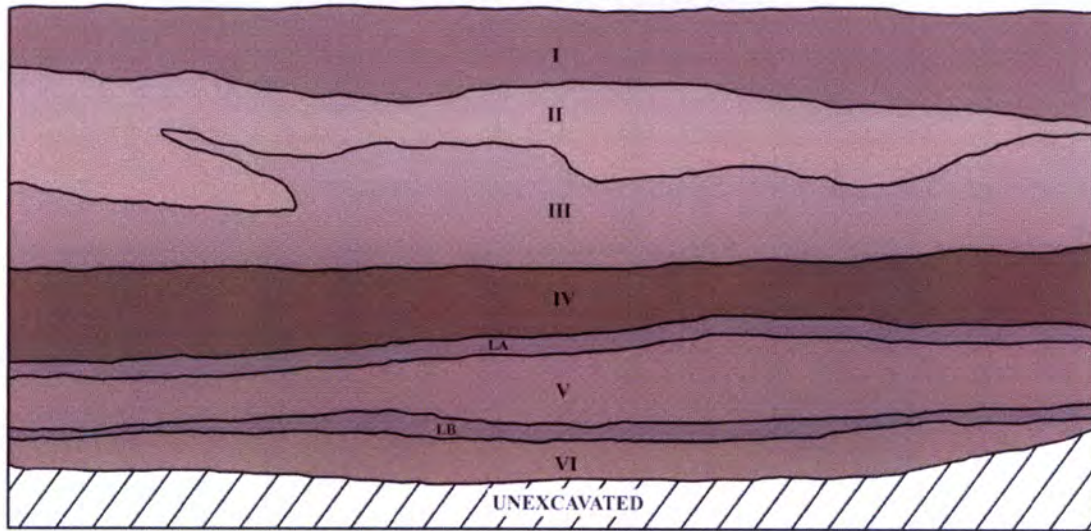
ST-140 EAST WALL PROFILE



KEY

- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SAND AND BROWN (10YR 5/3) SANDY SILT
- III** - LAYER III: YELLOWISH BROWN (10YR 5/4) SILT
- IV** - LAYER IV: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SANDY SILT
- LENS**: DARK GRAY (10YR 4/1) AND BROWN (10YR 4/3) SILTY SAND

ST-141 WEST WALL PROFILE

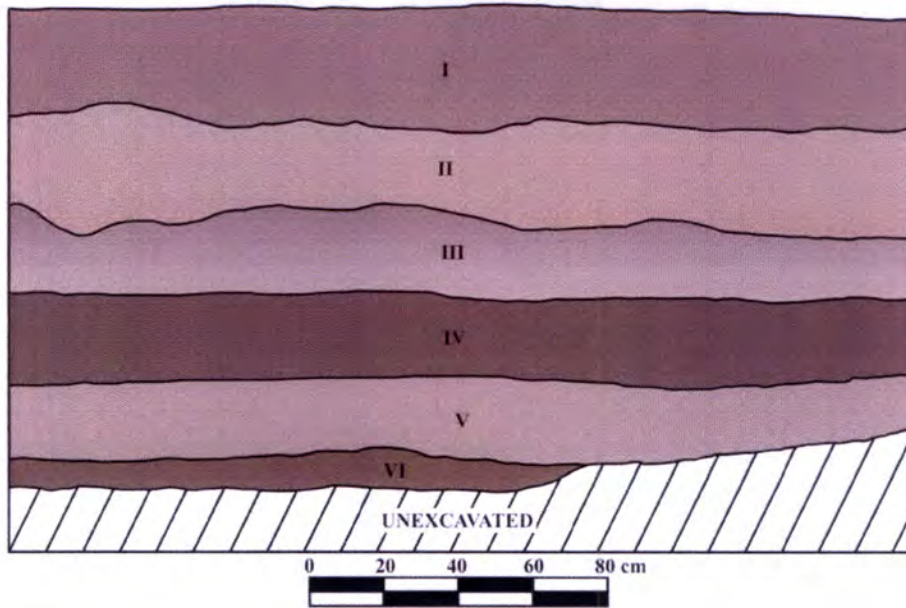


0 20 40 60 80 cm

KEY

- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
- III** - LAYER III: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SAND
- IV** - LAYER IV: BROWN (10YR 4/3) SILT
- V** - LAYER V: BROWN (10YR 5/3) SILT
- VI** - LAYER VI: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SILT
- LA** - LENS A: GRAYISH BROWN (10YR 5/2) SILT
- LB** - LENS B: GRAYISH BROWN (10YR 5/2) SANDY SILT

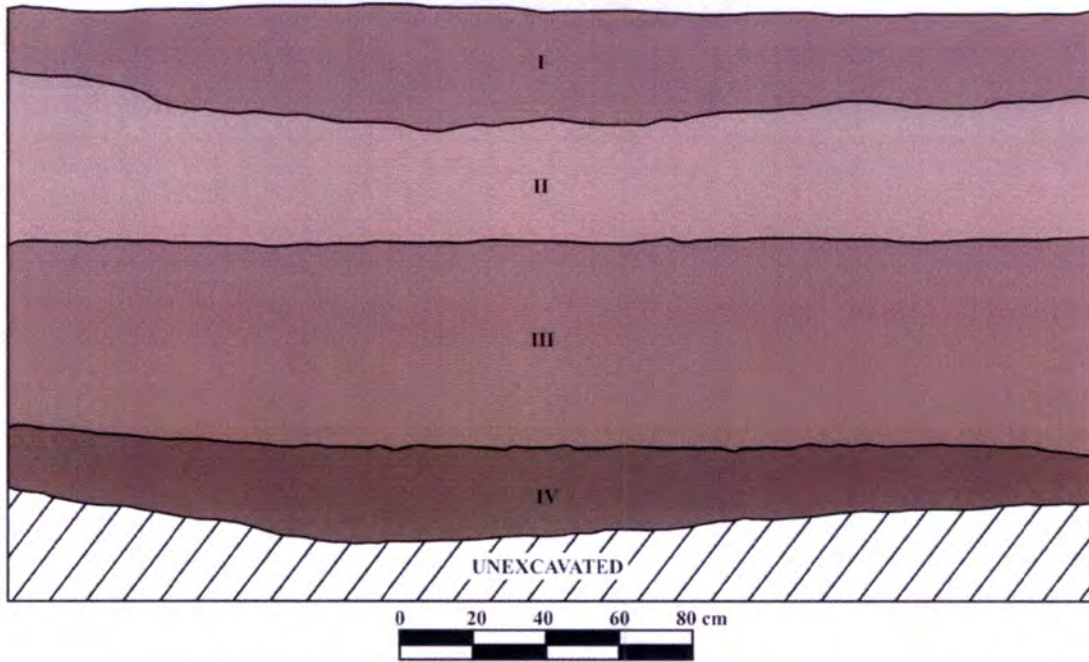
ST-142 NORTHEAST WALL PROFILE



KEY

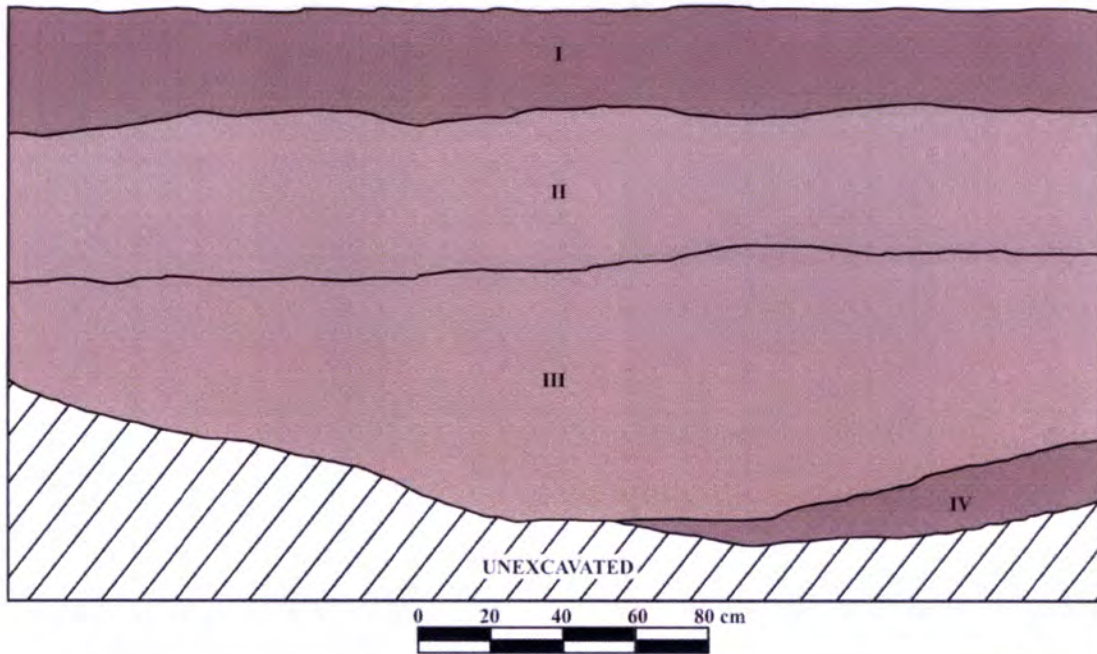
- I** - LAYER I: BROWN (10YR 5/3) SILTY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
- III** - LAYER III: GRAYISH BROWN (10YR 5/2) AND VERY PALE BROWN (10YR 7/3) SAND
- IV** - LAYER IV: DARK GRAYISH BROWN (10YR 4/2) SILT
- V** - LAYER V: PALE BROWN (10YR 6/3) SAND
- VI** - LAYER VI: BROWN (10YR 4/3) SILTY SAND

ST-143 WEST WALL PROFILE



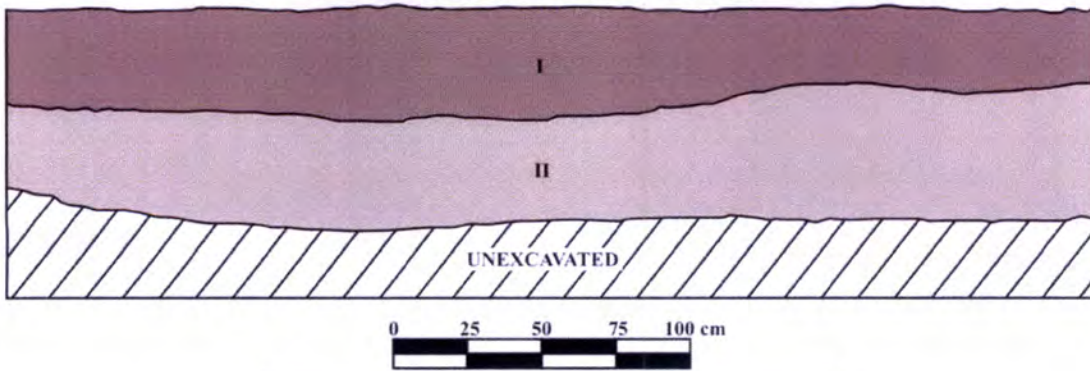
KEY	
I	LAYER I: BROWN (10YR 5/3) SILTY SAND
II	LAYER II: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
III	LAYER III: BROWN (10YR 5/3) AND YELLOWISH BROWN (10YR 5/4) SAND
IV	LAYER IV: BROWN (10YR 4/3) SILT

ST-144 SOUTHWEST WALL PROFILE



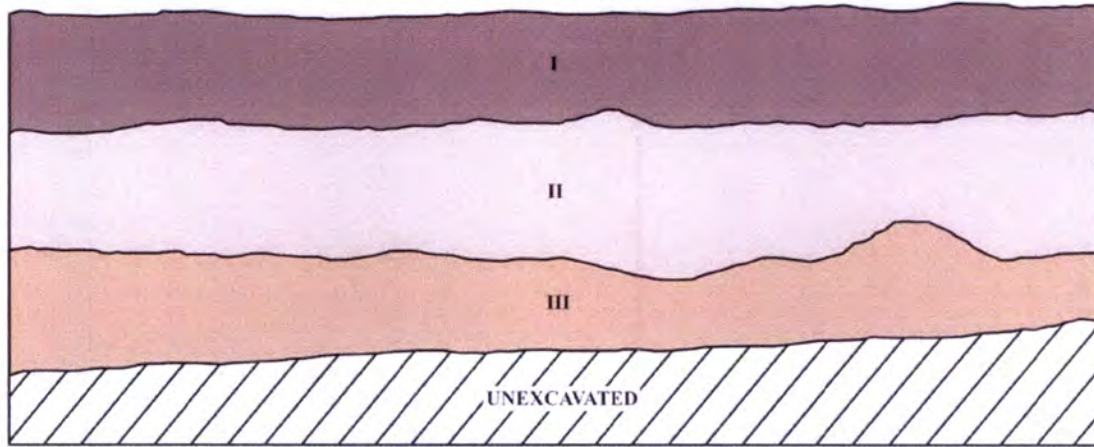
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) SAND
III	- LAYER III: PALE BROWN (10YR 6/3) AND LIGHT YELLOWISH BROWN (10YR 6/4) SAND
IV	- LAYER IV: BROWN (10YR 5/3) SILTY SAND

ST-145 NORTH WALL PROFILE



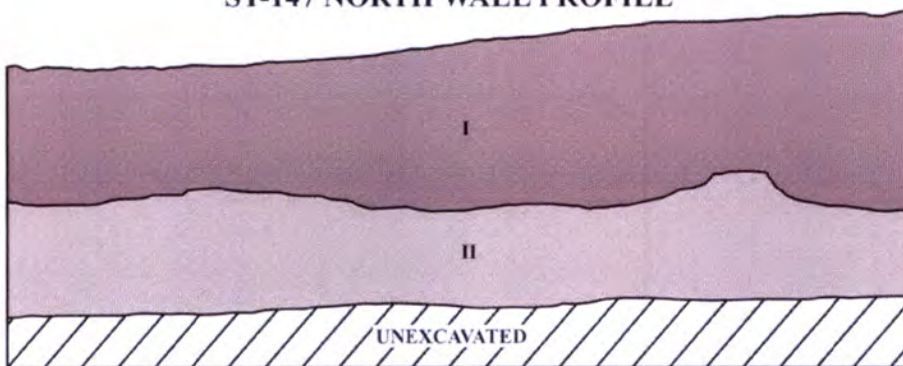
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) LITHIFIED SAND

ST-146 NORTH WALL PROFILE



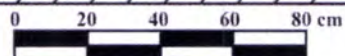
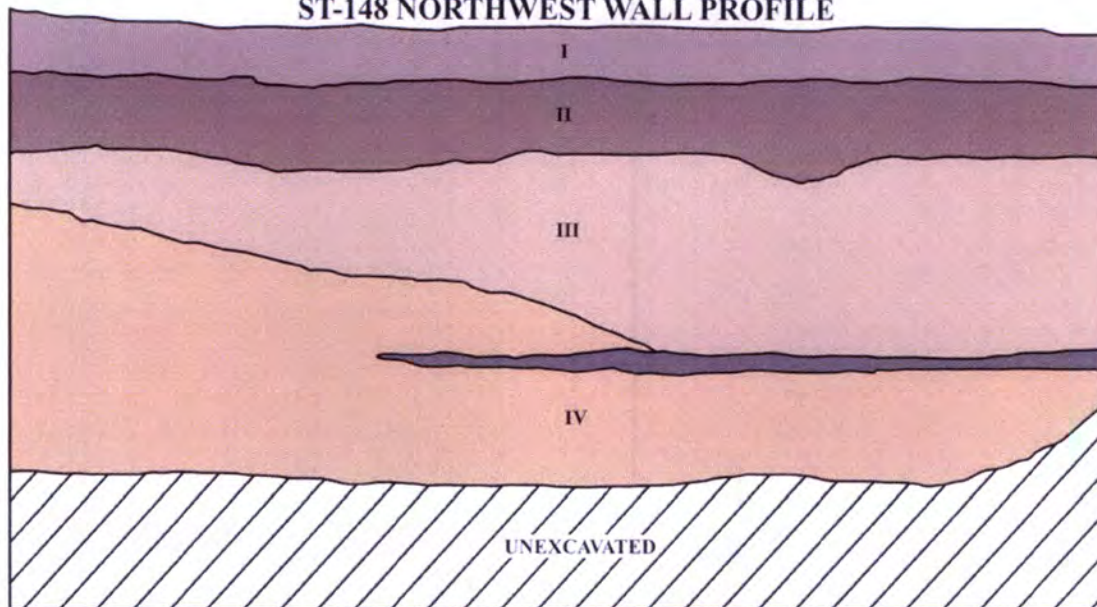
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 8/2) SAND
III	- LAYER III: YELLOW (10YR 7/6) LITHIFIED SAND

ST-147 NORTH WALL PROFILE



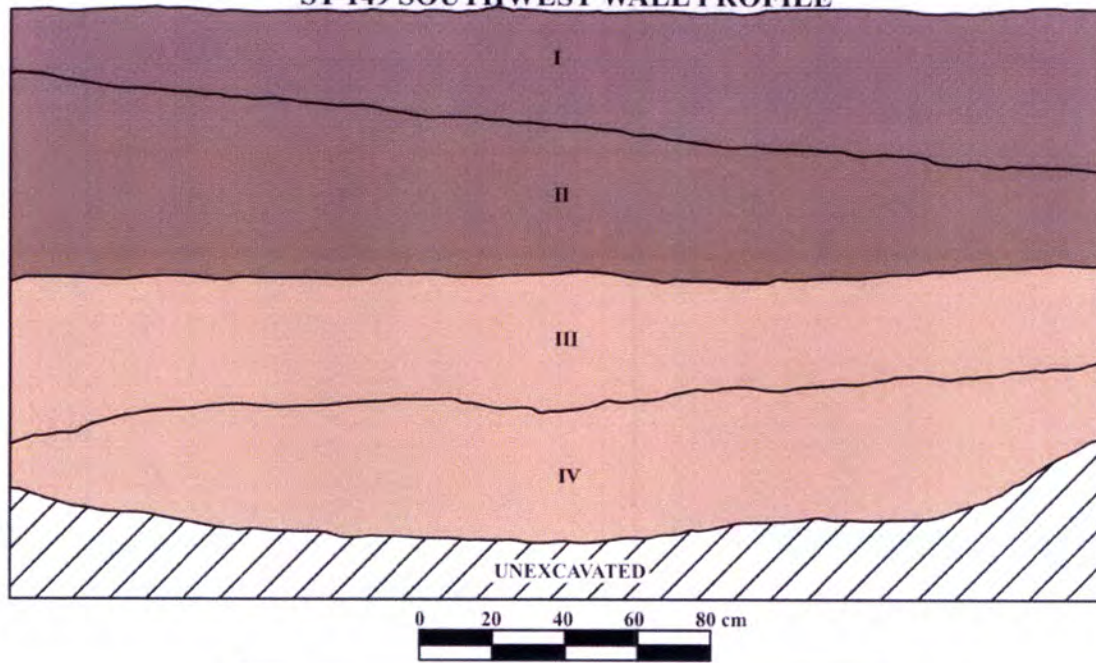
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) AND BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) SAND

ST-148 NORTHWEST WALL PROFILE



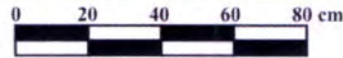
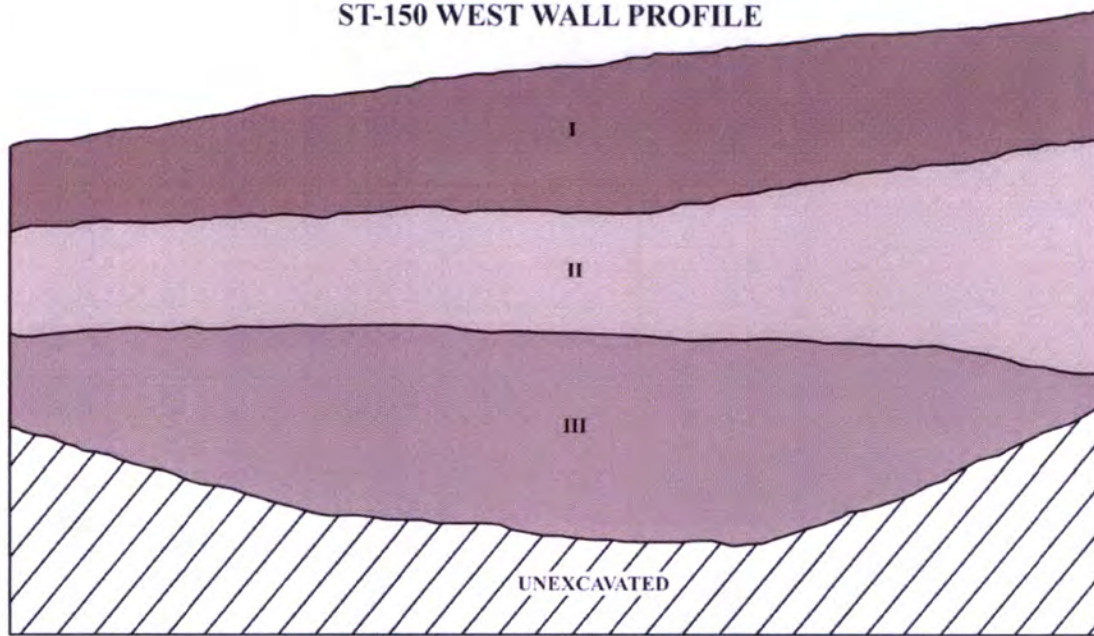
KEY	
I	LAYER I: LIGHT BROWNISH GRAY (10YR 6/2) SILT
II	LAYER II: GRAYISH BROWN (10YR 5/2) TO BROWN (10YR 5/3) SILTY SAND
III	LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	LAYER IV: YELLOW (10YR 7/6) SAND
	BASALT GRAVEL LENS

ST-149 SOUTHWEST WALL PROFILE



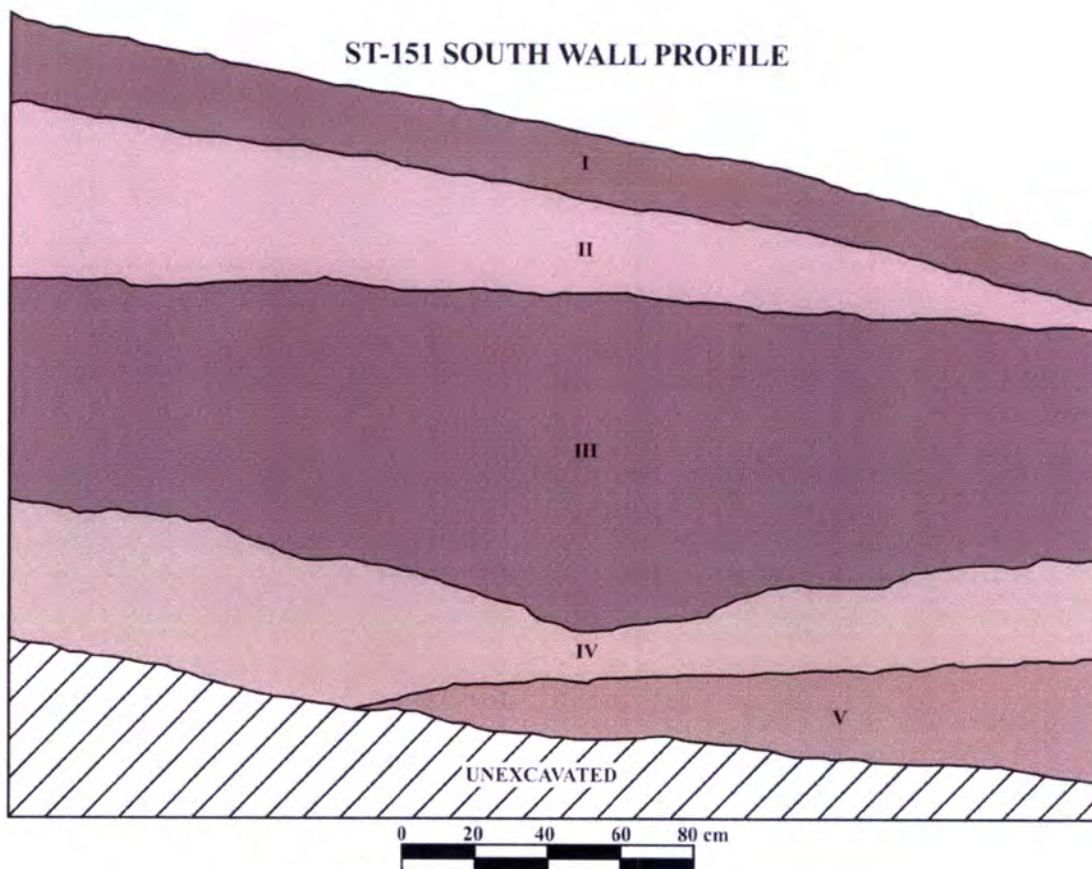
KEY	
I	- LAYER I: BROWN (10YR 5/3) TO YELLOWISH BROWN (10YR 5/4) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/3) LITHIFIED SAND
III	- LAYER III: YELLOW (10YR 7/6) SAND
IV	- LAYER IV: YELLOW (10YR 7/6) SAND

ST-150 WEST WALL PROFILE



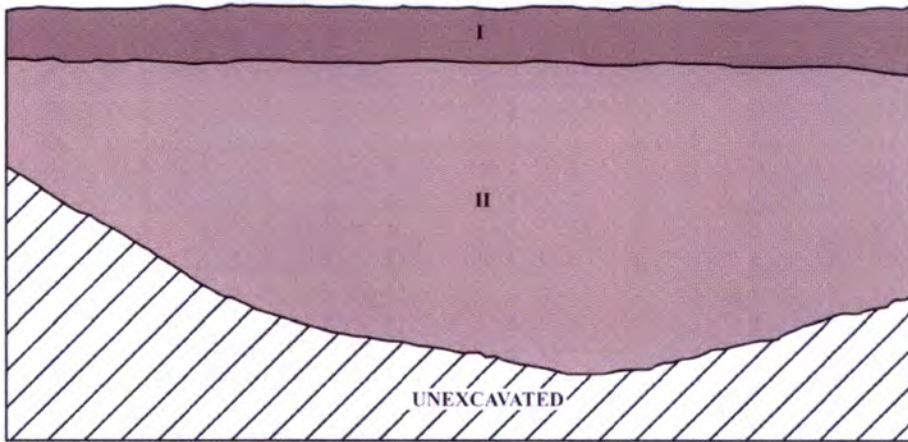
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) SILTY SAND
III	- LAYER III: LIGHT BROWNISH GRAY (10YR 6/2) TO PALE BROWN (10YR 6/3) LITHIFIED SAND

ST-151 SOUTH WALL PROFILE



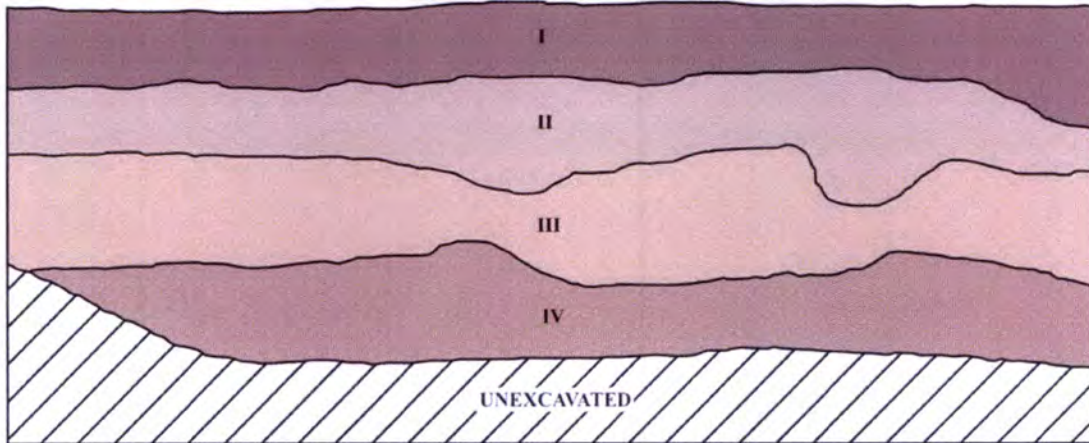
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: LIGHT REDDISH BROWN (2.5YR 7/3) SILTY SAND
III	- LAYER III: WEAK RED (2.5YR 5/2) SILTY SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) TO VERY PALE BROWN (10YR 7/4) SAND
V	- LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) SAND

ST-152 NORTHEAST WALL PROFILE



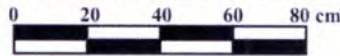
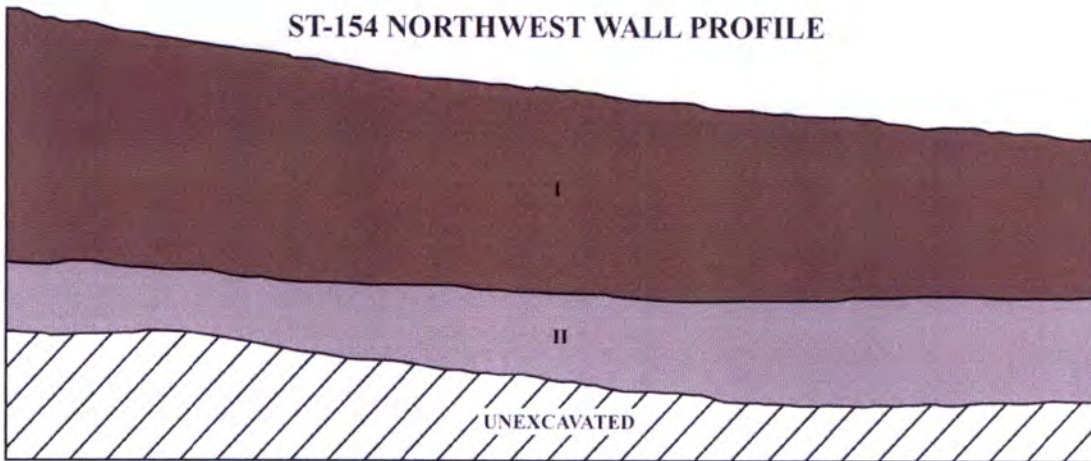
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) LITHIFIED SAND

ST-153 NORTHEAST WALL PROFILE



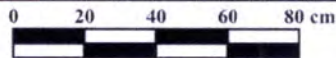
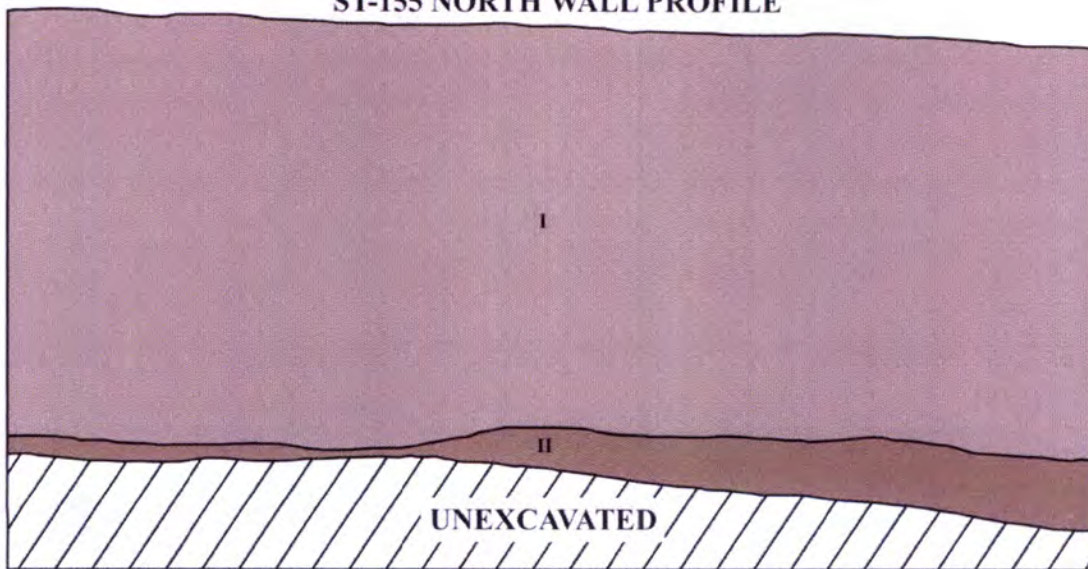
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: VERY PALE BROWN (10YR 7/3) SILTY SAND AND VERY PALE BROWN (10YR 7/4) SAND
III	- LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) SAND

ST-154 NORTHWEST WALL PROFILE



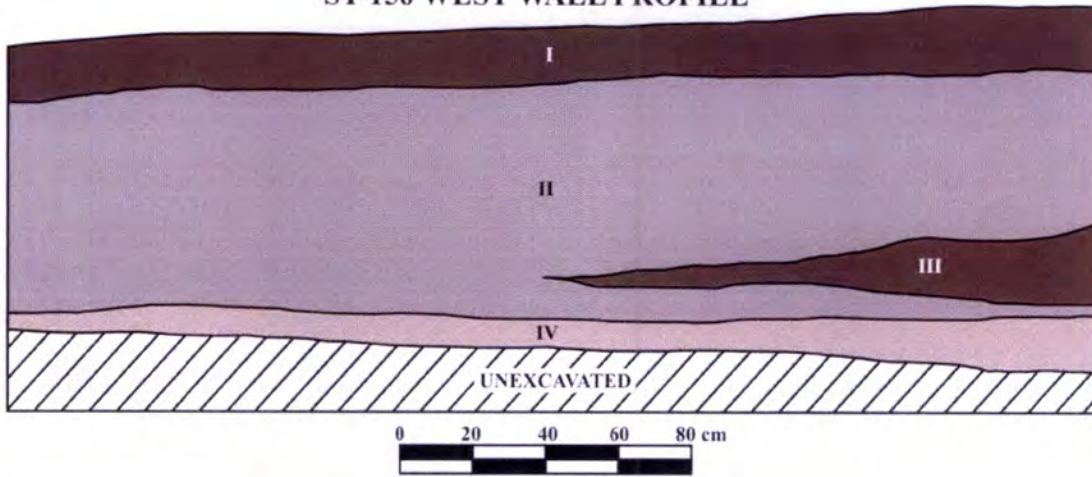
KEY	
I	- LAYER I: BROWN (10YR 4/3) SAND
II	- LAYER II: GRAY (10YR 6/1) SILTY SAND

ST-155 NORTH WALL PROFILE



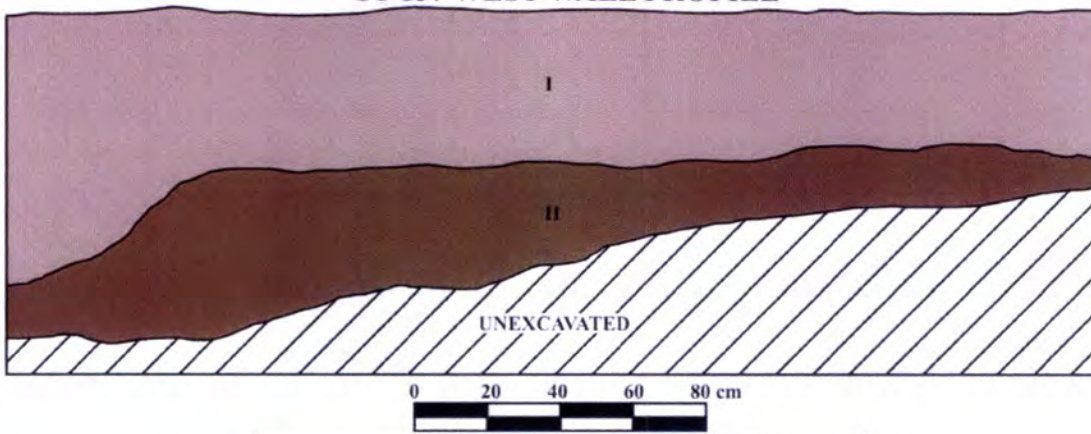
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SAND
II	- LAYER II: YELLOWISH BROWN (10YR 5/4) SILT

ST-156 WEST WALL PROFILE



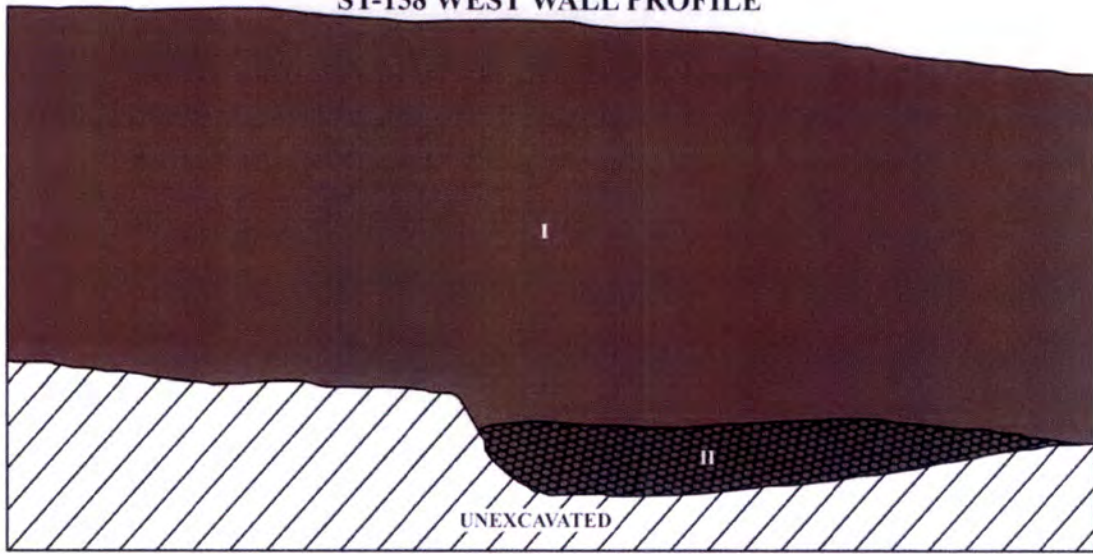
KEY	
I	- LAYER I: BROWN (10YR 5/3) SILTY SAND
II	- LAYER II: GRAY (10YR 6/1) SILTY SAND
III	- LAYER III: DARK YELLOWISH BROWN (10YR 3/4) SAND
IV	- LAYER IV: VERY PALE BROWN (10YR 7/3) SILTY SAND

ST-157 WEST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: DARK YELLOWISH BROWN (10YR 4/6) BASALT COBBLES AND SMALL BOULDERS

ST-158 WEST WALL PROFILE

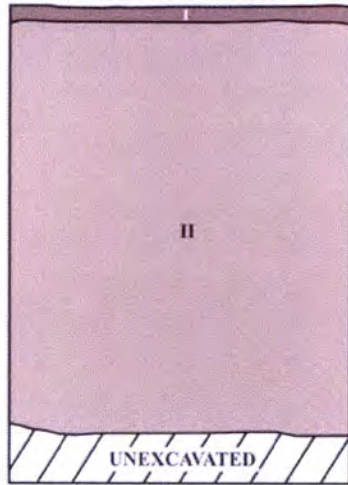


0 20 40 60 80 cm

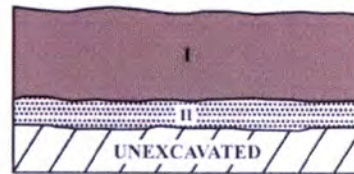
KEY

- I** - LAYER I: DARK YELLOWISH BROWN (10YR 3/4) CEMENTED SAND
- II** - LAYER II: OLD STREAMBED, LARGE COBBLES AND FINE GRAVEL

ST-159 SOUTHEAST WALL PROFILE



ST-160 SOUTHEAST WALL PROFILE



KEY	
I	LAYER I: BROWN (10YR 5/3) SAND
II	LAYER II: VERY PALE BROWN (10YR 7/3) COMPACTED SAND

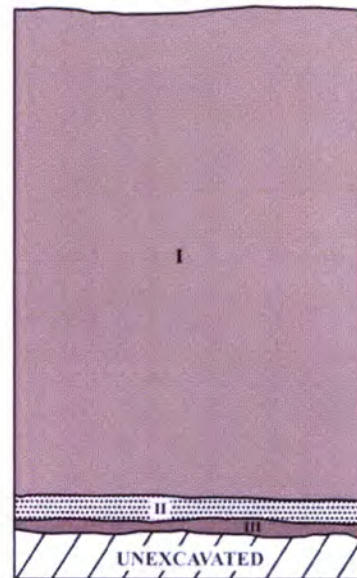
KEY	
I	LAYER I: BROWN (10YR 5/3) SAND
II	LAYER II: BASALT COBBLES AND PEBBLES

ST-161 NORTHEAST WALL PROFILE



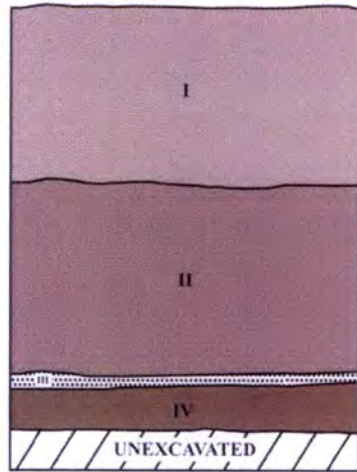
KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

ST-162 EAST WALL PROFILE



KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	LAYER II: BASALT COBBLES AND PEBBLES
III	LAYER III: BROWN (10YR 5/3) SAND

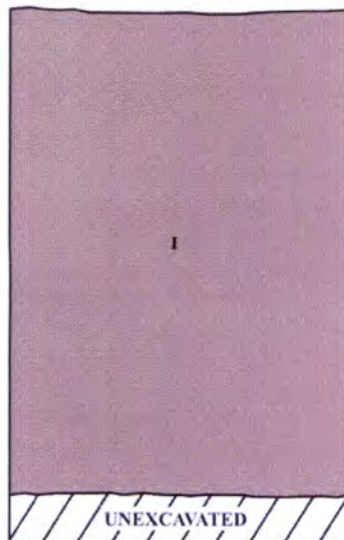
ST-163 EAST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: BASALT COBBLES AND PEBBLES
IV	- LAYER IV: DARK YELLOWISH BROWN (10YR 4/4) SILTY SAND

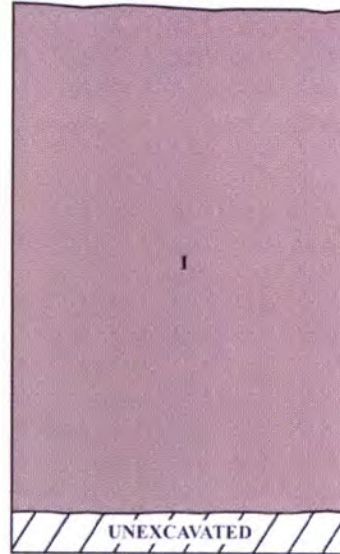


ST-165 NORTHWEST WALL PROFILE



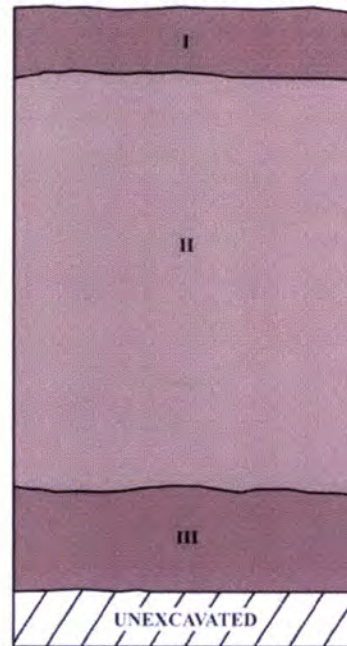
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

ST-164 WEST WALL PROFILE



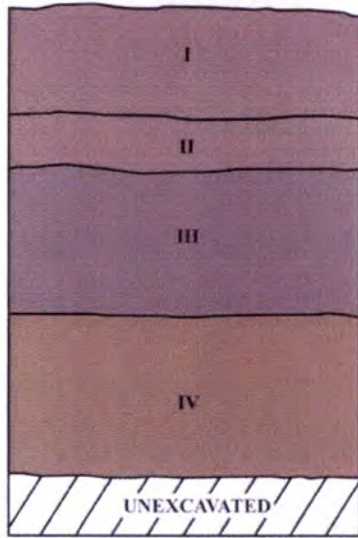
KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

ST-166 EAST WALL PROFILE



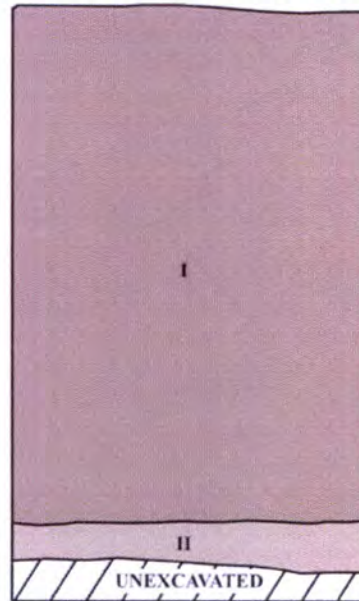
KEY	
I	- LAYER I: BROWN (10YR 5/3) SAND
II	- LAYER II: PALE BROWN (10YR 6/3) SILTY SAND
III	- LAYER III: BROWN (10YR 5/3) SAND

ST-167 SOUTHWEST WALL PROFILE



KEY	
I	- LAYER I: BROWN (10YR 5/3) SAND
II	- LAYER II: BROWN (10YR 5/3) SAND
III	- LAYER III: GRAYISH BROWN (10YR 5/2) SILTY SAND
IV	- LAYER IV: YELLOWISH BROWN (10YR 5/4) SILT

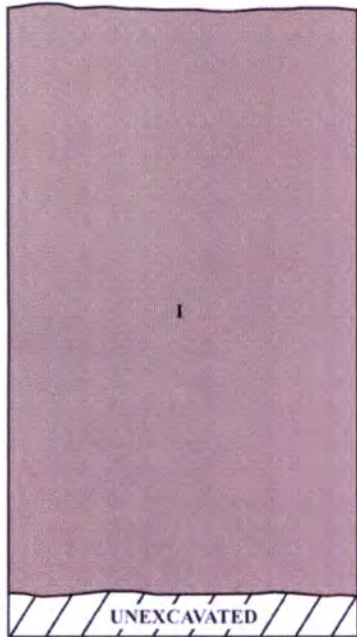
ST-168 SOUTHWEST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: LIGHT GRAY (10YR 7/2) SILTY SAND

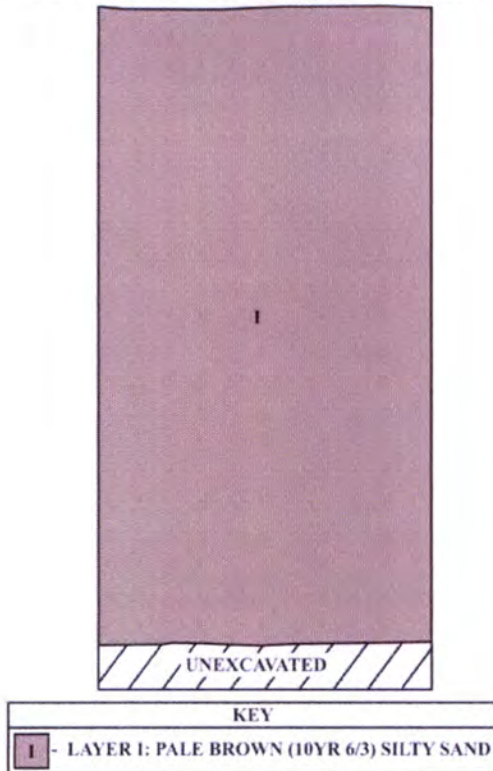


ST-169 SOUTH WALL PROFILE

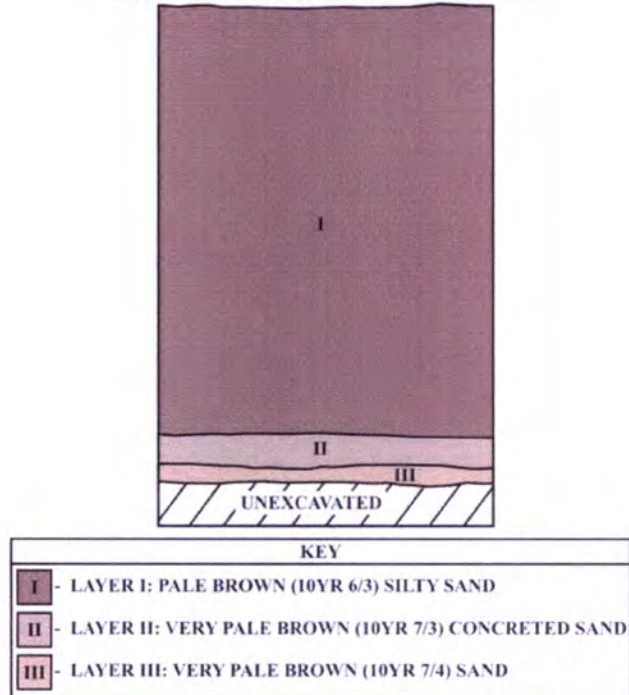


KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

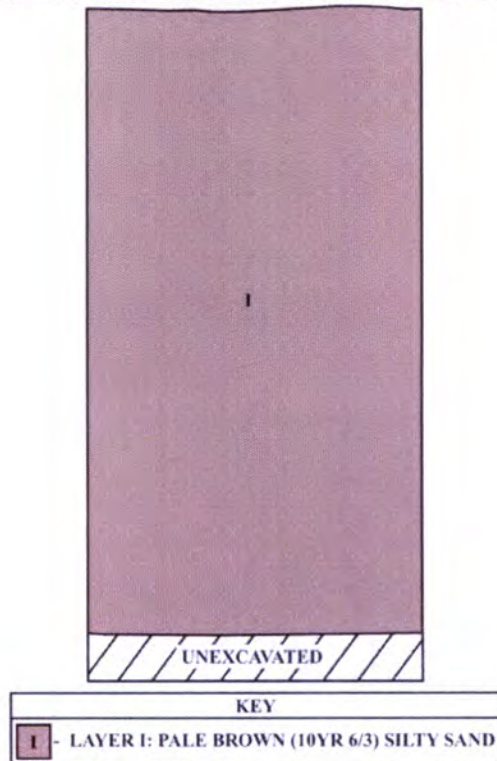
ST-170 NORTHEAST WALL PROFILE



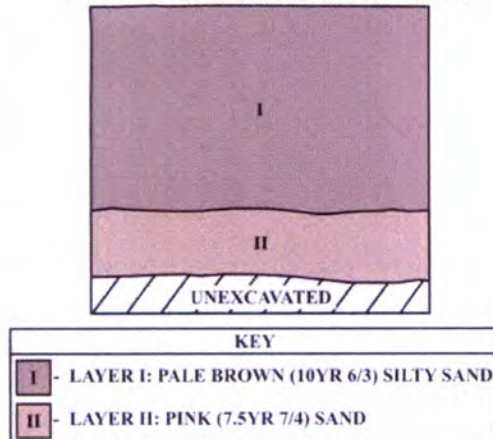
ST-171 NORTH WALL PROFILE



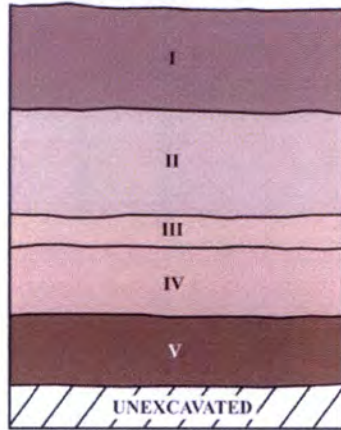
ST-173 SOUTHWEST WALL PROFILE



ST-172 SOUTH WALL PROFILE



ST-174 NORTH WALL PROFILE



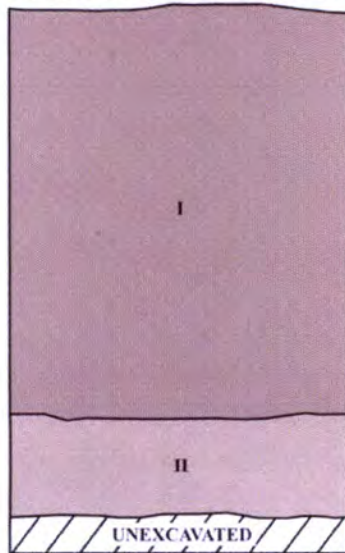
KEY	
I	LAYER I: BROWN (10YR 5/3) SILTY SAND
II	LAYER II: VERY PALE BROWN (10YR 7/3) CONCRETED SAND
III	LAYER III: VERY PALE BROWN (10YR 7/4) SAND
IV	LAYER IV: PINK (7.5YR 7/4) SAND
V	LAYER V: DARK YELLOWISH BROWN (10YR 4/4) SILT

ST-175 WEST WALL PROFILE



KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

ST-176 SOUTH WALL PROFILE



KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	LAYER II: VERY PALE BROWN (10YR 7/3) CONCRETED SAND



ST-177 SOUTH WALL PROFILE



KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND



ST-178 WEST WALL PROFILE



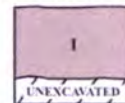
KEY	
I	LAYER I: VERY PALE BROWN (10YR 7/3) CONCRETED SAND

ST-179 SOUTH WALL PROFILE



KEY	
I	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND

ST-180 SOUTHEAST WALL PROFILE



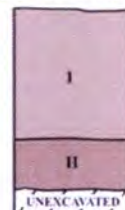
KEY	
I	LAYER I: VERY PALE BROWN (10YR 7/3) CONCRETED SAND

ST-181 SOUTH WALL PROFILE



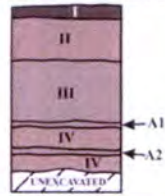
KEY	
I	LAYER I: VERY PALE BROWN (10YR 7/3) CONCRETED SAND
II	LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

ST-182 SOUTH WALL PROFILE



KEY	
I	LAYER I: VERY PALE BROWN (10YR 7/3) CONCRETED SAND
II	LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

ST-183 NORTH WALL PROFILE



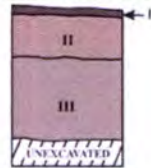
KEY	
I	- LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
A1	- LENSE 1: PALE BROWN (10YR 6/3) SAND
A2	- LENSE 2: PALE BROWN (10YR 6/3) SAND

ST-184 EAST WALL PROFILE



KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: YELLOWISH BROWN (10YR 5/4) SANDY SILT
III	- LAYER III: YELLOWISH BROWN (10YR 5/4) SANDY SILT WITH BASALT COBBLES AND PEBBLES
IV	- LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
-	- DIFFUSE BOUNDARY

ST-185 WEST WALL PROFILE



KEY	
I	- LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
II	- LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
III	- LAYER III: PALE BROWN (10YR 6/3) SILTY SAND

ST-186 SOUTH WALL PROFILE



KEY	
I	- LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
II	- LAYER II: YELLOWISH BROWN (10YR 5/4) SANDY SILT
III	- LAYER III: PALE BROWN (10YR 6/3) SAND
IV	- LAYER IV: DARK YELLOWISH BROWN (10YR 4/4) SILT

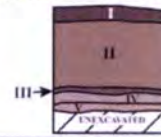
ST-187 SOUTH WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: BROWN (10YR 4/3) SANDY SILT
- III** - LAYER III: YELLOWISH BROWN (10YR 5/4) SANDY SILT
- IV** - LAYER IV: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

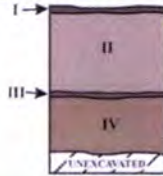
ST-188 SOUTH WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: YELLOWISH BROWN (10YR 5/4) SANDY SILT
- III** - LAYER III: DARK GRAYISH BROWN (10YR 4/2) LOAMY SAND
- IV** - LAYER IV: PALE BROWN (10YR 6/3) SAND
- V** - LAYER V: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

ST-189 SOUTHEAST WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) SILTY SAND
- III** - LAYER III: DARK GRAYISH BROWN (10YR 4/2) LOAMY SAND
- IV** - LAYER IV: YELLOWISH BROWN (10YR 5/4) SANDY SILT

ST-190 NORTH WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) SILT



ST-192 NORTH WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: PALE BROWN (10YR 6/3) SILT WITH BASALT COBBLES
- III** - LAYER III: YELLOWISH BROWN (10YR 5/4) SILT WITH BASALT PEBBLES
- - BASALT ROCKS
- - BASALT PEBBLE POCKETS

ST-191 NORTHEAST WALL PROFILE



KEY

- I** - LAYER I: PALE BROWN (10YR 6/3) SILTY SAND



ST-194 SOUTHWEST WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: YELLOWISH BROWN (10YR 5/4) SANDY SILT WITH BASALT COBBLES AND PEBBLES
- III** - LAYER III: PALE BROWN (10YR 6/3) SILTY SAND
- IV** - LAYER IV: DARK YELLOWISH BROWN (10YR 4/4) SILT

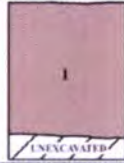
ST-193 SOUTH WALL PROFILE



KEY

- I** - LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
- II** - LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

ST-195 WEST WALL PROFILE



KEY	
	LAYER I: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND

ST-196 EAST WALL PROFILE



KEY	
	LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
	LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND



ST-197 NORTHEAST WALL PROFILE



KEY	
	LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
	LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
	LAYER III: PALE BROWN (10YR 6/3) SILTY SAND
	LAYER IV: BROWN (10YR 4/3) SILT AND VERY DARK GRAY (10YR 3/1) BASALT GRAVEL

ST-198 SOUTH WALL PROFILE



KEY	
	LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
	LAYER II: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND
	LAYER III: BROWN (10YR 4/3) SILT

ST-199 EAST WALL PROFILE

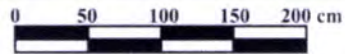


KEY	
I	- LAYER I: PALE BROWN (10YR 6/3) SILTY SAND
II	- LAYER II: BROWN (10YR 4/3) SILT

ST-200 SOUTHEAST WALL PROFILE



KEY	
I	- LAYER I: VERY DARK GRAYISH BROWN (10YR 3/2) LOAMY SAND
II	- LAYER II: PALE BROWN (10YR 6/3) SAND
III	- LAYER III: LIGHT YELLOWISH BROWN (10YR 6/4) SILTY SAND



APPENDIX C: SITE 50-50-10-6578 IMU RADIOCARBON DATA

BETA**BETA ANALYTIC INC.**

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX: 305-663-0964
beta@radiocarbon.com**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Robert L. Spear

Report Date: 10/8/2008

Scientific Consultant Services, Inc.

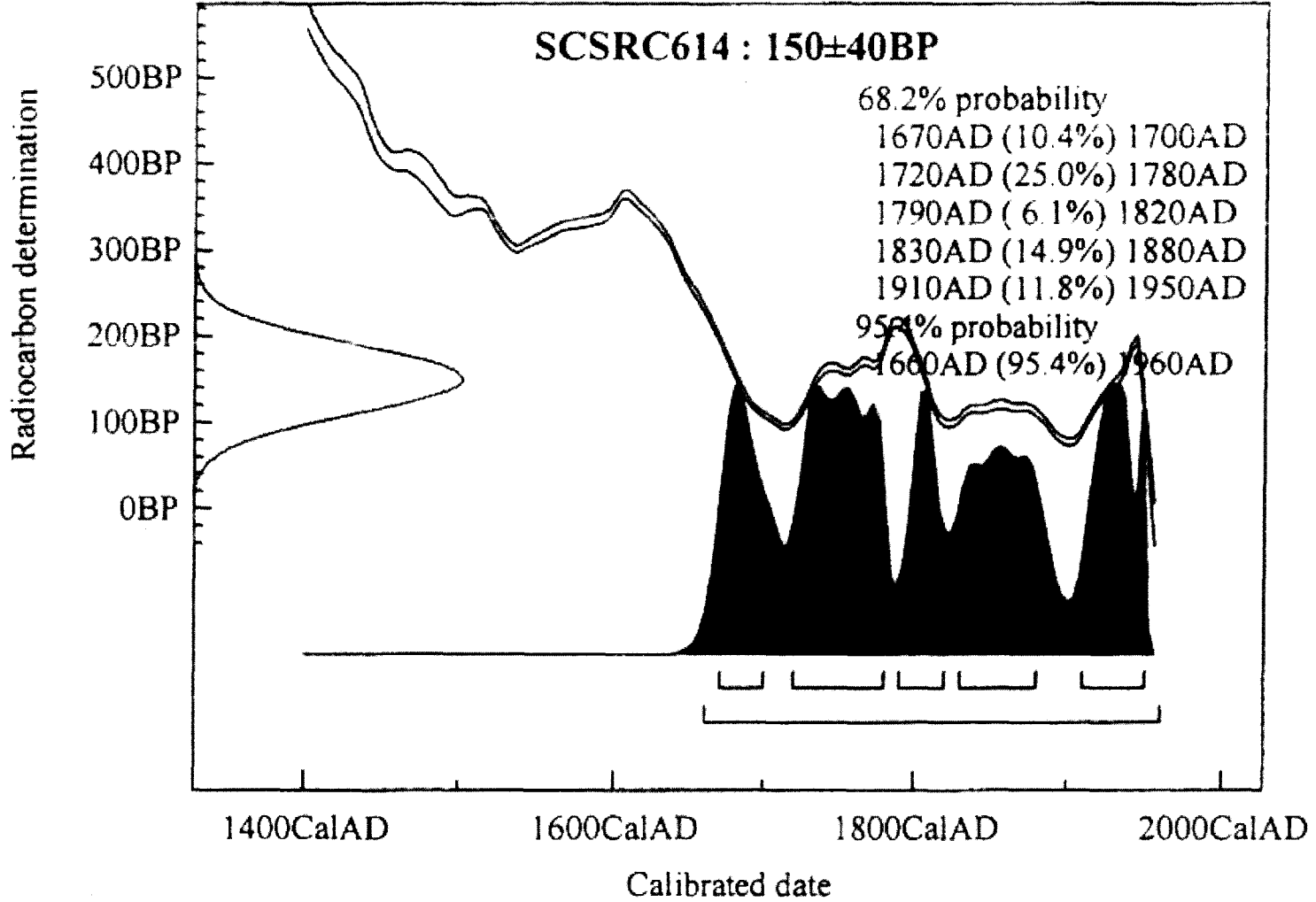
Material Received: 9/16/2008

Sample Data	Measured Radiocarbon Age	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age(*)
Beta - 249137 SAMPLE : SCSRC614 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1660 to 1960 (Cal BP 290 to 0)	160 +/- 40 BP	-25.5 o/oo	150 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the ^{14}C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby ^{14}C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured $^{13}\text{C}/^{12}\text{C}$ ratios (delta ^{13}C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta ^{13}C . On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta ^{13}C , the ratio and the Conventional Radiocarbon Age will be followed by ***. The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

Atmospheric data from Stuiver et al. (1998); CalCal v3.5 Bronk, Ramsey (2000); cub r 4 rd 12 prob usp[chron]



APPENDIX D: PHOTOGRAPH OF ISOLATED BASALT CORE



5

10



D1

APPENDIX E: CONSULTATION

Mahalo. A sincere mahalo to all those who participated in and contributed to this important community planning effort. Your insights were terrific and we look forward to your continued participation as we move forward with our planning.

SHAPING OUR COMMUNITY'S FUTURE.

COMMUNITY PARTICIPANTS (AS OF SUMMER OF 2005)

Jim Berling
Raymond Hew
Blaine Kobayashi
Gilbert Coloma-Agaran
Glenn Yamasaki
Curtis Tom
Dan Crockford
Alvin T. Imada
Scott Sakakihara
Zandra Amaral
Dr. Barry Shitamoto
Sgt. Mitchell Pellazar
Keith Regan
Michele Yoshimura
Rob Parsons
John Summers
Glenn Ueno
Milton Arakawa
Valeriano Martin
Sydney Kikuchi
Michael Foley
Alice L. Lee
Eric Barstan
Dave DeLeon
Agnes Hayashi
Kathleen Ross Aoki
Herman Andaya
Ed & Denise Vogel
Jamie Tavares

Roy Katsuda
Robyne Nishida Nakao
Tony Krieg
Garret Hew
Willie Kennison
Rev. Dexter Teruya
Stan Gima
Bob Takitani
Leilani Pulmano
Michele M. Hamada
Dick Mayer
Mark Sheenan
Russel Gushi
Mark King
Jo-Ann Rida
Lloyd Lee
Mr. & Mrs. Larry Anderson
Steve Kikuchi
Sharon Suzuki
Councilmember Charmaine Tavares
Councilmember Joe Pontanilla
Leslie Wilkins
Jeanne Skog
Meleana Higgins
Tom Blackburn-Rodrigues
Glays Baisa
Sandy Baz
Neal Shinyama
Randy Yamanuha

Lani Correa
Steve Miller
Leiane Paci
Darren Suzuki
Dave Gleason
Wesley Lo
Lucienne deNale
David Schen
Claire Mtyasato
Leatrice M. Kauahi
Kaimo Muhlestein
Boyd Mossman
Henry Spencer
Brian McCafferty
Susan Moikeha
Suzanne Freitas
Ed Reinhardt
Dr. Kevin Omuro
Wally & Darlene Rogers
Kay Fukumoto
Stan Franco
George Paresa
Cielo Molina
Ken Nomura
Noe Deleon
Jacob Kellow
Valerie Monson
Amanda Cowan
Daryl Atay

Mark Tracy
Mike & Monika Irwin
Yvette Kahauolopua
Jim Dodd
Reid Kawabata
Steph Ohigashi
Bill Ruidas
Colleen V. Cluney
Dana Naone Hall
Florence Nakama
Joan Martin
Kallie Keith
Kevin Gillies
Les Kulololo
Mary Baga
Melissa Prince
Mike Victorino
Mr. & Mrs. Eric Umetsu
Patricia Rouse
Rosie Etoquilla
Wayne Hikiji
Jacqueline Perreira
Robyn Cabral
Hartmut "Hoppy" Bielous
Katrina Madamba
Lynne Gilroy
Rick Medina

AB A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

Meredith Ching, Vice President
Grant Chun, Vice President
Clyde Murashige, Vice President
Charlie Buckingham, Manager, Leasing
Jeff Faulkner, Manager, Construction
Linda Howe, Manager, Community Relations
Hideo Kawahara, Manager, Engineering & Construction
Jason Koga, Manager, Land & Environmental
Paul Oshiro, Manager, Government Relations
Melanie Kaimioli, Planning Technician
Sharon Shimabukuro, Administrative Assistant
Mercer "Chubby" Vicens, Vicens Entitlement Group



Tom Witten, President
Grant Murakami, Senior Associate
Scott Abrigo, Planner
Lacey Kazama, Planner
Ryan Gonzalez, Graphic Designer
Chris Chavez, Graphic Designer

For more information, please contact Sharon Shimabukuro at: sshimabukuro@abprop.com



WAI'ALE

“Growth in Central Maui is due in large part to the fact that our kids grow up, they get educated, they have an opportunity to live and work on Maui, and they choose to do so. The challenge we face together is ensuring that our community can accommodate for this growth in a manner that will make Maui an even better place to live. That’s what Wai’ale is all about.”

- GRANT CHUN,
A&B PROPERTIES

COMMUNITY VISION STATEMENT

Create a socially integrated community with a unique sense of identity and character, capitalizing on its location and natural features.

As an extension of Kahului “Dream City”, Wai’ale will be a community that makes both visitors and residents feel welcomed and plans for the long range community and civic facilities to support the Central Maui region.

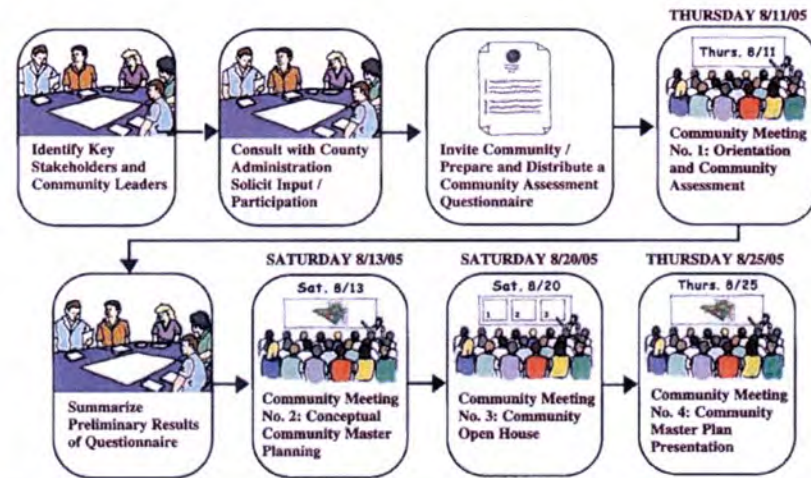
KEY COMMUNITY PLANNING GOALS

- Provide walkable mixed-use neighborhoods.
- Provide homes for a variety of income ranges, ages, and lifestyles. If so desired, a resident can grow up and spend their entire life in the community with the appropriate housing types available.
- Plan for community facilities to meet the region’s current and future needs.
- Include a multi-modal transportation system that accommodates walking, biking, jogging, and driving.
- Include commercial activities (including locally-owned stores and restaurants), schools, and other civic and recreational facilities.
- Respect the natural and historical significance of the land.
- Capitalize on the views of Haleakalā, the West Maui Mountains, and other significant landmarks.

WAI'ALE COMMUNITY PLANNING PROCESS

Wai’ale has been planned through a community-based process including meetings with key stakeholders, community leaders, the County of Maui Administration, and Maui residents. Questionnaires, informational meetings, and planning workshops held in August 2005 sought community input and participation in developing a vision and conceptual master plan for Wai’ale.

The products of these meetings are Wai’ale’s conceptual master plan and vision statement, which envisions a socially integrated community with a unique sense of identity and character that makes both visitors and residents feel welcomed.



“I loved this experience. The feedback and commitment of all the participants was great. The end result truly represents the needs and wants of the community. Wai’ale will become the neighborhood of choice for generations to come.”

- KAY FUKUMOTO,
COMMUNITY PARTICIPANT

LINDA LINGLE
GOVERNOR OF HAWAII



RECEIVED

NOV 15 2010

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

RUSSELL Y. TSUJI
FIRST DEPUTY

LENORE N. OHYE
DEPUTY DIRECTOR - WATER

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

A&B PROPERTIES-MAUI

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

September 13, 2010

Mr. Grand Chun, Vice President
A & B Properties
11 S. Puunene Avenue
Kahului, Hawai'i 96732

LOG NO: 2010.0116
DOC NO: 1009.HR02

Dear Mr. Chun:

**SUBJECT: Burial Site Component of a Data Recovery Plan and Preservation Plan for Sites 50-50-04-5504 and 6679 at A & B Properties Parcel, Wailuku Ahupua'a, Wailuku District, Island of Maui.
TMK: (2) 3-8-07: 101Pors.**

The State Historic Preservation Division (SHPD) has reviewed and finds your Burial Site Component of a Data Recovery Plan and Preservation Plan in compliance with §HAR 13-300 (i) (j). You may proceed with its provisions.

Should you have any questions or concerns, please feel free to contact our Maui SHPD Cultural Historian, Mr. Hinano Rodrigues at 808 243-4640.

Sincerely,

A handwritten signature in cursive script that reads "Phyllis Coochie Cayan".

Phyllis Coochie Cayan
History and Culture Branch Chief
State Historic Preservation Division

cc: Mr. Hinano Rodrigues, SHPD Cultural Historian
Ms. Lisa Rotunno-Hazuka, ASH, LLC

**FINAL BURIAL SITE COMPONENT OF A
DATA RECOVERY PLAN AND PRESERVATION PLAN FOR
SITES 50-50-04-5504 and 6679
AT A & B PROPERTIES PARCEL
TMK: 3-8-07:101 PORS.
WAIKAPU AND WAILUKU AHUPUA'A;
WAILUKU DISTRICT;
ISLAND OF MAUI**

FOR: A&B Properties

**BY: Lisa J. Rotunno-Hazuka,
And Jeffrey Pantaleo (MA)**

**REVISED SEPTEMBER 2010
JUNE 2010**



**ARCHAEOLOGICAL SERVICES HAWAII, LLC.
1930 A VINEYARD ST.
WAILUKU, HI 96793**

"Protecting, Preserving, Interpreting the Past While Planning the Future"

INTRODUCTION

Under contract to landowner A & B Properties, Inc (A &B) of 11 S. Puunene Avenue, Kahului, Hi and per Hawaii Administrative Rules (HAR)§ 13-300-40, Archaeological Services Hawaii, LLC (ASH) proposes this Burial Component of a Preservation Plan and Data Recovery Plan for Sites 50-50-04-5504 and 50-50-04-6679 situated at the former Hawaiian Cement sand operations located within Waikapu and Wailuku *ahupua'a*, Wailuku District, Island of Maui, TMK 3-8-07:101 pors (Figures 1 and 2).

The Preservation Plan proposes the preservation in place of inadvertent burial features of Site 5504 and 6679 consisting of thirty-three partially intact primary burial features (Features 8, 9, 12a, 14a-18c, 20-26, 29, 31a, 33a/b, 34, 43, 44, 53a/c, 54, 56-58, 61 and Site 5504), thirteen burial pits which are highly probable to contain human skeletal remains (Features 12b, 14b, 18d, 32, 33c, 36-41, 53b and 59) six recently disturbed, possible primary burials (Features 4, 19, 22a, 31b, 50 and 55) and secondarily deposited/scatters of human skeletal remains with no primary/*in situ* component representing thirty-six individuals (Features 1a-f, 5, 6, 11, 13, 27, 28, 35a/b, 42, 47a/b, 52 and 56a-q). The Data Recovery Plan presents the relocation of two partially intact primary burial features (Features 46 and 49a) and five secondary scatters (Features 48, 49b/c, 51 and 60). These burial features will be preserved within five established preservation areas that constitute approximately 30 acres (Figure 3).

PROJECT AREA DESCRIPTION

The project area which consists of approximately 154.00 acres is located within Waikapu and Wailuku *ahupua'a*, Wailuku District. It is comprised of four distinct areas designated Phases A-D (Figure 3). Phases A, C and D are to the east of the current access road, and Phase B is to the west. Phase A, composed of 59 acres, contained two parallel north-south trending sand dune ridge lines which decrease in elevation towards Kuihelani Highway to the east. Within Phase A, the sand dune ridgeline closest to the access road was designated as the primary dune and the adjacent dune was the secondary ridgeline. Phase B, comprised of 30.3 acres, contained several large dunes which slope from west to east. Phase C is adjacent and east of Phase A and consists of approximately 50 acres of undulating sand dunes significantly lower than Phase A. Phase D is situated along the south east side of Phase C and is comprised of 15-acres. Similar topography was noted at Phase D when compared with Phase C. This phased project area is a portion of a larger parcel, TMK 3-8-07: 101 consisting of approximately 434.00 acres. This larger parcel is bounded to the north by undeveloped lands of Maui Lani Development, to the south by

undeveloped lands and a Base yard as well as Waiko Road, to the east by Kuihelani Highway and to the west by portions of the County Landfill (Figure 2). Burial sites have been found within these adjoining areas.

In 1998, Archaeological Consultants of the Pacific, Inc. conducted an archaeological inventory survey (AIS) of the project area where a total of 117 backhoe trenches were excavated resulting in the discovery of two burial sites within Phase A (Site 4200 and 4201) comprised of five burial features and a multi-stepped terrace. Site 4200 contained four primary burials (a-d) which were partially articulated. Site 4201 was comprised of one burial feature situated within a tiered terrace designated Site 4202. Site 4202 measured 15.0 m (e/w) long by 13.0 wide (n/s) and was constructed of waterworn basalt cobbles. These burial sites were preserved in place within Preservation Area 1 per a previously accepted Burial Treatment and Preservation Plan (Figure 4- Kennedy and Moore 1998).

Grading activities have been intermittently conducted from 2000 through 2009. Monitoring began in Phase B, and progressed to Phase A, C and lastly within Phase D in 2009. Two Preservation Areas designated Preservation Area 1 and 4 will be established within Phase A, one within Phase B and is assigned Preservation Area 2, one within Phase D which is Preservation Area 3 and the last one, Preservation Area 5 situated along Kuihelani Highway in the vicinity of Site 5504.

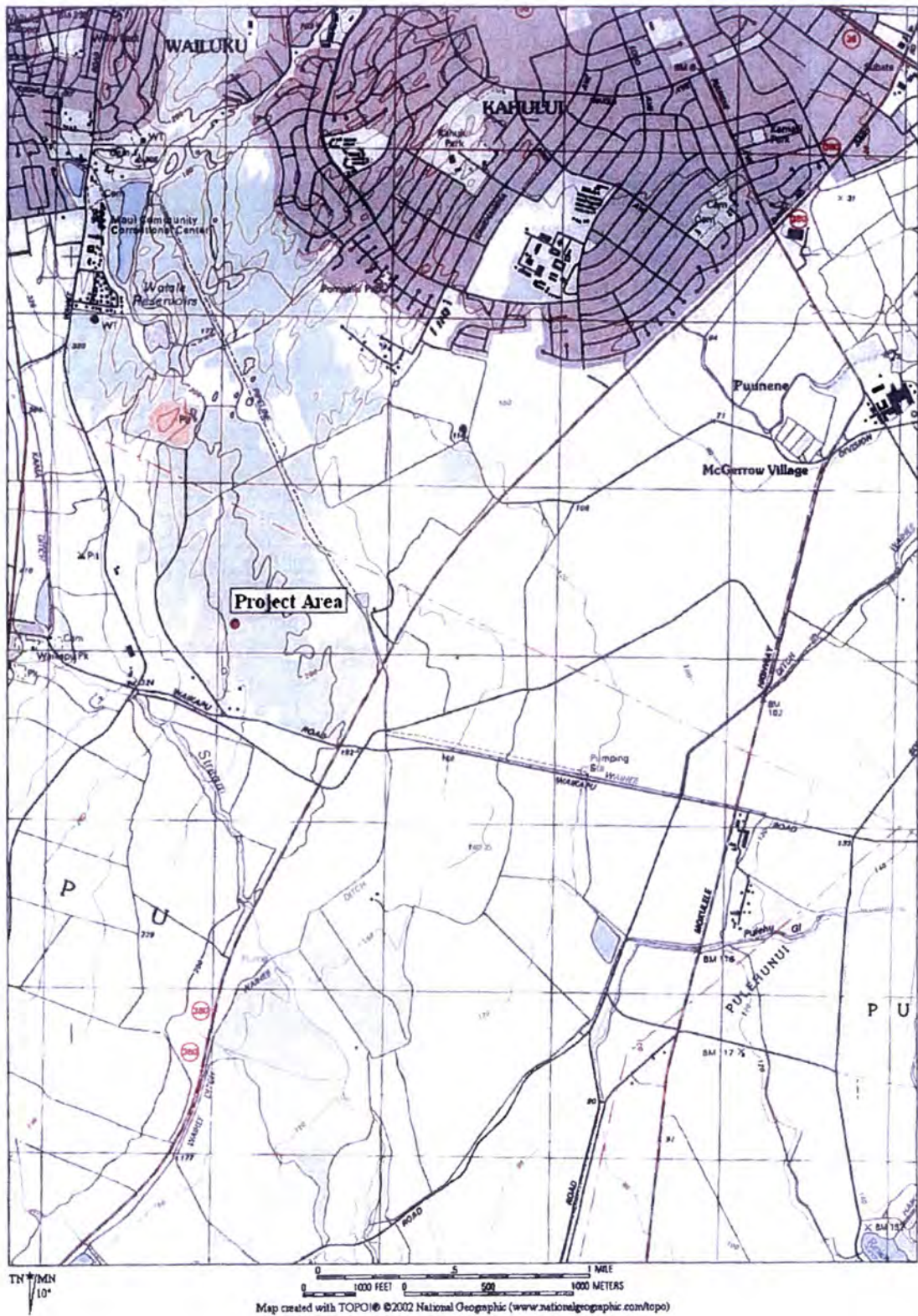


Figure 1. Project Area Location Map on USGS Map

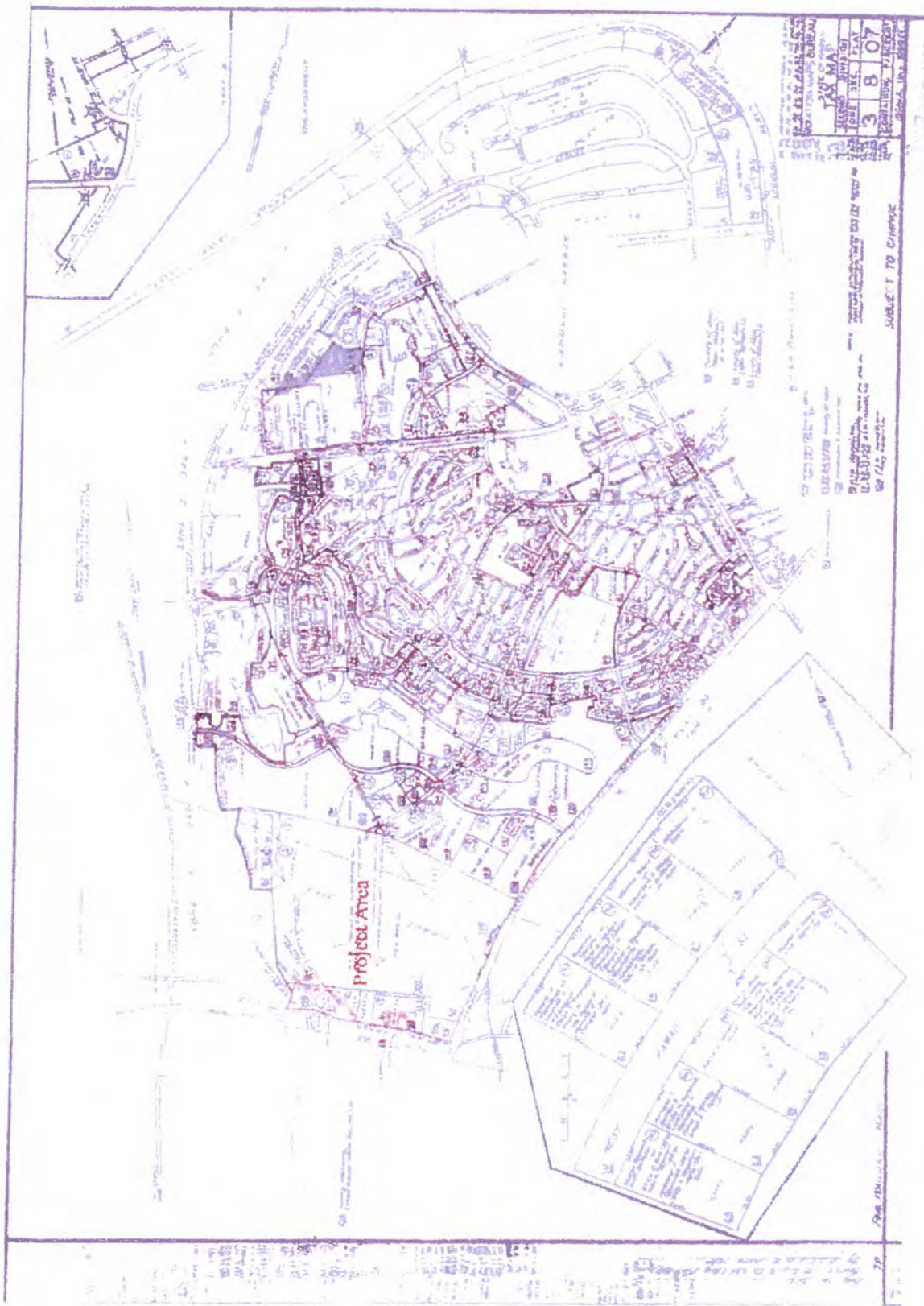


Figure 2. Location of Project Area on Tax Map Key 3-8-07

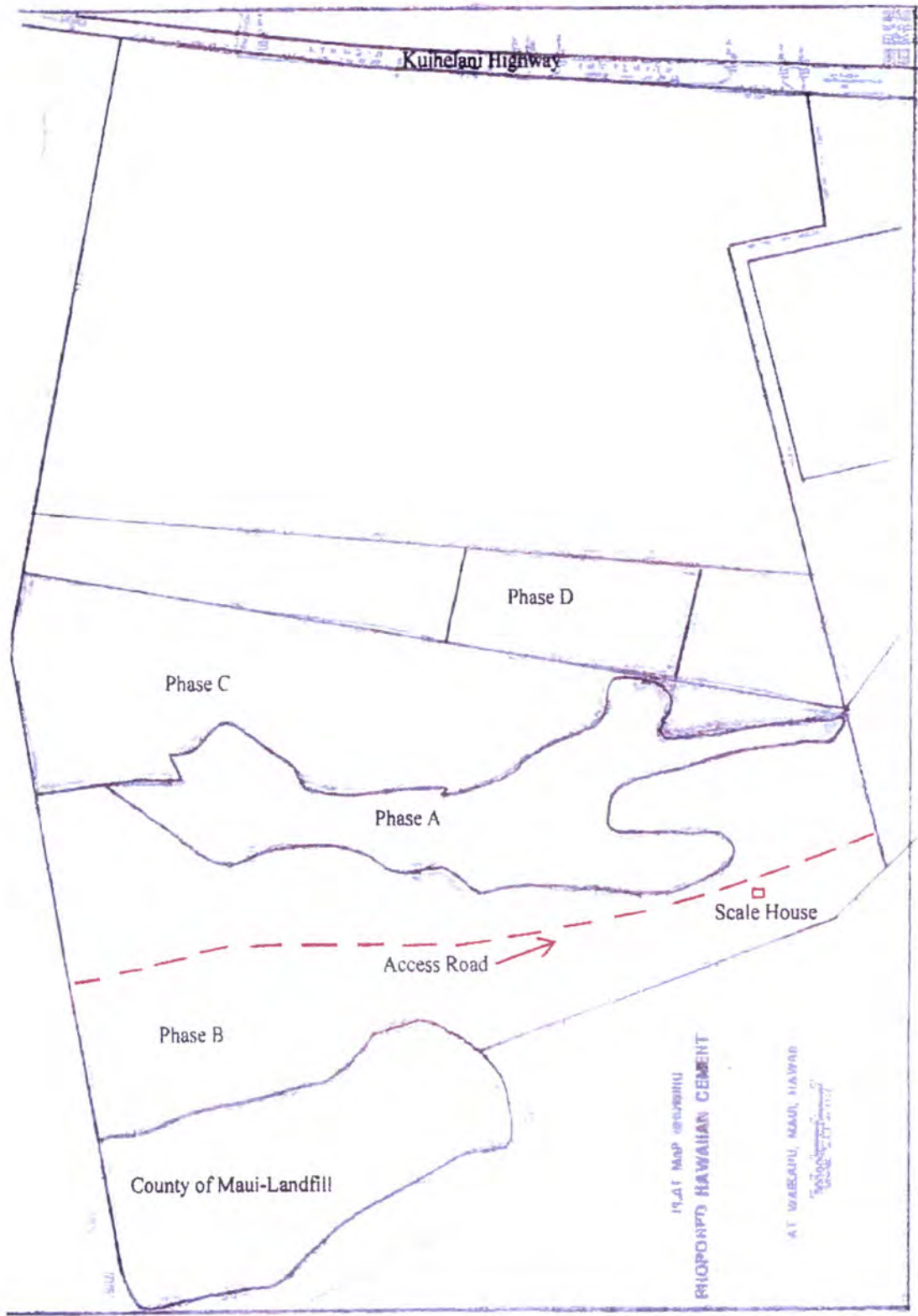


Figure 3. Map Showing Location of Phases A-D within TMK 3-8-07:101

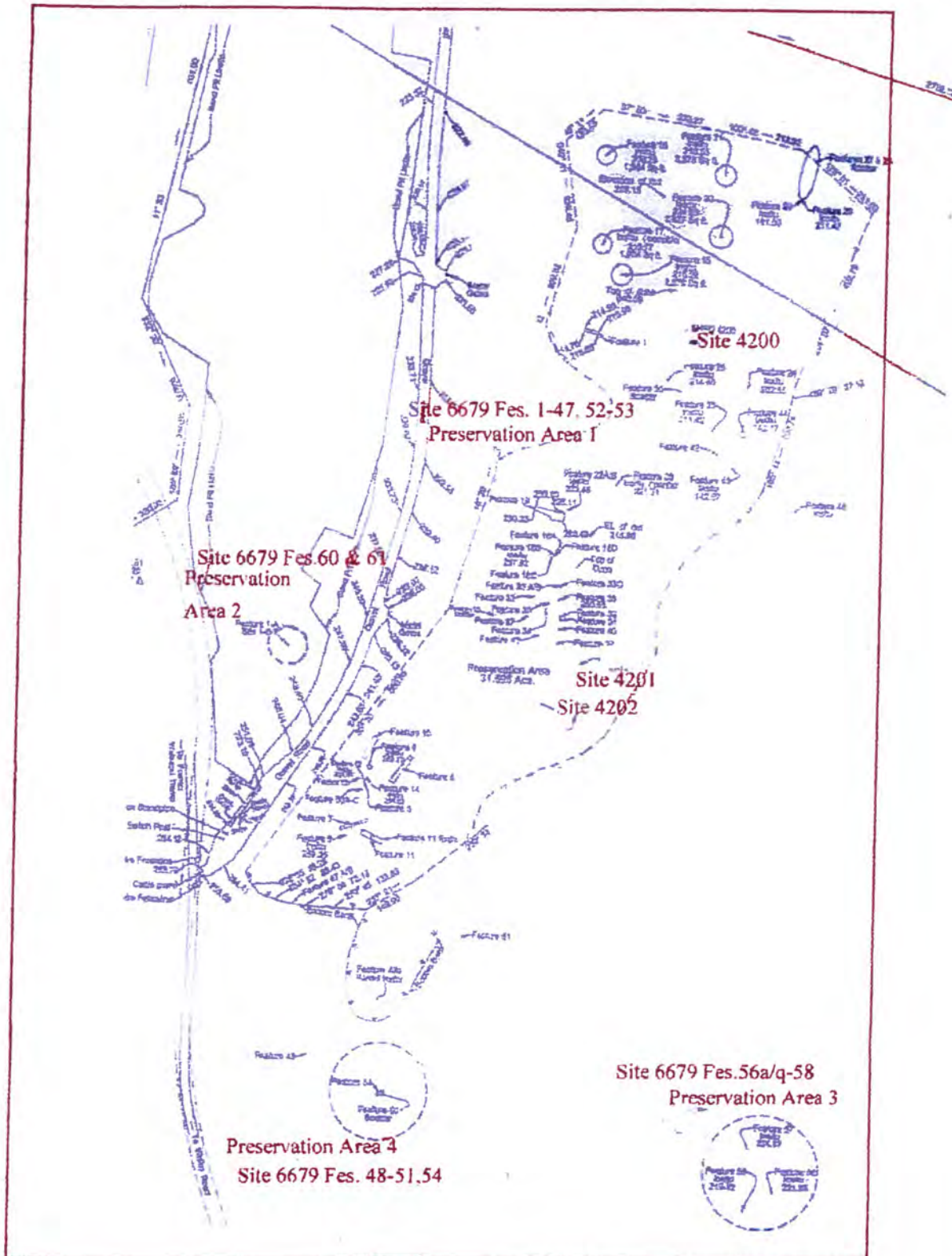


Figure 4. Plan View Map of Project Area Showing Burial Features Within Preservation Areas 1-4

The following methods and procedures were instituted at Hawaiian Cement when displaced human skeletal remains were identified during sand mining operations. In addition to these procedures once an *in situ* burial feature has been identified, a 50 ft. buffer is erected around the site and grading commences outside the buffer while maintaining a 2:1 slope outside the 50 ft. buffer line.

METHODS AND PROCEDURES

The primary reason for monitoring at the above location was to determine the presence of unmarked Native Hawaiian burial features and previously disturbed secondarily deposited human skeletal remains.

The methods for monitoring sand removal at a highly sensitive area were as follows: Initially all vegetation must be removed following the below protocol. After vegetation was removed and if 2 or more burials were identified in the immediate area, controlled excavations were instituted. Controlled excavations consisted of grading with a D-6 dozer in controlled 4-6 inch lifts. Controlled excavations were performed within the "Grade B" Layer II grayish brown fine silty sand through the "Grade A" yellowish brown fine to coarse sand up to 5.0 ft. If no additional burials were identified during the controlled grading process, the D-9 dozer was again utilized. After vegetation removal and no burials have been identified in the area, then grading with the D-9 is initiated. If skeletal remains are exposed during grading activities, the below methods for displaced human remains will be instituted.

All primary, intact or partially intact burial features were surveyed by the professional survey crew of Alexander and Baldwin and left in place pending a determination. After the burials were documented, a layer of clean sand was placed over the remains and then covered with a tarp. The tarp was covered in sand and a wooden pallet was placed over the tarp to further protect the burial. A buffer zone of 50.0 ft. was erected around the primary *in situ* remains. Grading outside the buffer zone must maintain a 2:1 slope to protect the integrity of the geological feature and or cultural landscape. All displaced skeletal remains were collected and curated at the ASH lab.

Field inspections were performed of previously graded areas and inadvertently discovered burial features to ascertain the presence of additional burials exposed through natural erosional

processes (aeolian, alluvial) and to insure that protective measures for the burials consisting of tarps, yellow caution tape and orange fencing were still in place.

METHODS AND PROCEDURES FOR MONITORING VEGETATION REMOVAL

Monitoring of vegetation removal is difficult due to low visibility and dangerous conditions (falling trees). As the dozer topples trees and removes only surface vegetation and the fine silty humic layer that supports it, the silt fills the air and obscures all visibility. Due to these conditions, a set of procedures was instituted that would provide a safe working environment for the archaeologist, and would diminish disturbances to shallow burial features and or scattered skeletal remains.

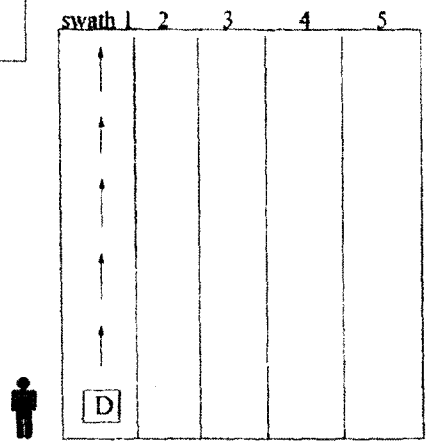
1. A predetermined area would be initially grubbed of vegetation.
2. The dozer sets up on the down-wind side and clears in the up wind direction. The dozer makes one pass, thus clearing a single swath. The operator is informed that the cuts should be at a maximum of 1.0 ft. deep and that the dozer may only make one initial pass through the area due to the potential for previously disturbed skeletal remains and or intact, primary burial features. One initial pass would prevent the skeletal remains from being further fragmented and scattered.
3. After the dozer makes this initial pass and if the dust has settled, the archaeologist walks the initial swath, as the dozer moves into position for the second swath (Figure 5).
4. The dozer then clears the next swath and is essentially moving in the up-wind direction.
5. Step 3 is initiated again, and followed by step 4 until the entire area has undergone and initial vegetation removal.
6. Once the predetermined area has been opened up, the entire process is repeated until all the vegetation and the silty organic layer removed.
7. Periodic field inspections are performed of areas that have recently undergone vegetation removal. These field inspections, particularly after several days of wind erosion, have identified burial features and disturbed skeletal remains.

MONITORING VEGETATION REMOVAL PROCEDURES #3

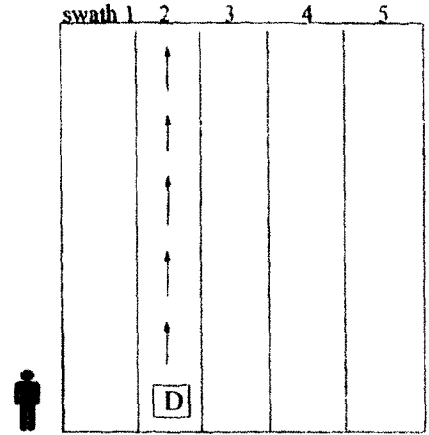
KEY

- D Bulldozer
- Archaeologist (monitor)
- Direction of Bulldozer Push

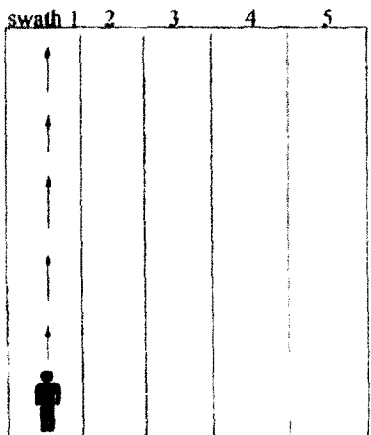
Pre-determined Work Area
 Wind Direction



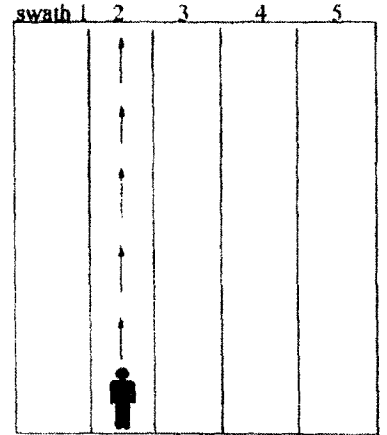
Step 1



Step 3



Step 2



Step 4

D

D

Figure 5. Map Showing Methods for Monitoring Vegetation Removal with Fair to Low Visibility

METHODS AND PROCEDURES FOR DISPLACED HUMAN REMAINS

ASH methods and procedures for displaced human skeletal remains are described below.

1. Upon identification of displaced human remains, a possible burial pit outline, or basalt and coral manuports all construction activities in the immediate area of the find is temporarily halted.
2. SHPD and the MLIBC shall be notified.
3. Mark the perimeter of the avoidance area with yellow caution tape, and or orange construction fencing and cover the remains to protect them from the elements
4. Extend a baseline through the center of the dispersal area.
5. Mark all displaced remains with pin flags and produce a plan view map. Locate and identify displaced remains and only collect the displaced remains.
6. If a concentration is identified, map the concentration and leave in place for determination of disposition and controlled manual excavations, as warranted.
7. Manually rake bulldozed or other mechanically produced tailings and screen push piles to collect all displaced and fragmented remains.
8. Complete an osteological inventory of the collected remains to determine the components that may be left *in situ* or missing.
9. If a concentration or possible burial pit was identified, place a 2.0 by 2.0 meter controlled test unit, centrally locating the concentration within the test unit. Clean the surface with a trowel to determine if a pit outline is present. Map pit outline.
10. If no concentration was identified and raking is complete, skip to blade testing on item #13.
11. Excavate the *in situ* portion to identify any articulation, document the articulated portion within the pit outline, and collect all clearly displaced remains. Articulated remains and those in an anatomically correct position, shall be left in place until a disposition determination can be made by SHPD in consultation with the MLIBC.
12. Fill out all test excavation and burial forms and draw a plan view map of the *in situ* remains. Then cover remains with a thin layer of sand (if SHPD and MLIBC have seen the feature) and or tarp.
13. Conduct mechanical blade testing in potential areas of further discoveries. Blade testing is conducted by removing shallow (2-6") lifts over a predetermined area.

The burial features are described by their body positions and mode of interment. The body positions are divided into four categories (extended, semi-extended, flexed, fully flexed) which describe the relationship of the torso to the legs. The mode of interment presents the context of the human skeletal remains. The context of a burial may be of two types, primary and secondary. Age and sex determination are based on the observation of morphological features and diagnostic attributes of the skeletal remains. According to Buistra and Ubelker (1994), there are seven age classes used to segregate the osteological remains (White 2000:341-342). Additionally, due to the disturbances exhibited at the burial site, the percent of articulated, intact human remains is presented within each burial feature description. See further burial terminology below.

BODY POSITION

Supine/Extended-Legs and Arms extend outward from the body.

Semi-Extended-The torso is extended and the lower legs flexed back.

Flexed-The upper legs bent brought partially up to the lower torso. Lower legs are folded underneath the upper legs. Arms may be extended down the sides, or bent towards the chest.

Fully Flexed-The upper legs bent brought up to the chest with the lower legs folded underneath the upper legs. Arms are bent up towards the chest.

BURIAL CONTEXT

Primary-A primary burial is the original place the human skeletal remains were buried. Most often primary burials are articulated in an anatomically correct placement for that type of body position; however in some cases, such as bundle burials, the remains may not be articulated but they are in their original context.

Secondary-A secondary context is not the first, original interment location and is often associated with a disturbance that is intentional displacement (i.e. indigenous disturbance by placing a burial adjacent to an older burial thus displacing the older burial, through bone acquisition and etc.) or inadvertent disturbance (i.e. environmental factors such as shoreline erosion, aeolian (wind), alluvial (water/stream flow), floralturbation (tree roots), or human intervention).

Previously Disturbed-This terminology refers to all activities which occurred to the burial area prior to the current undertaking. Human remains with old breaks, or bleaching (white color) are categorized as such.

Recently Disturbed-This definition describes any activity that happened during the present monitoring activities at the project area.

Recently disturbed possible primary/in situ-This definition applies to skeletal remains that have been displaced during monitoring activities and based on the condition of the remains, as well as the percentage collected greater than 90%, the burial was likely articulated and in its primary condition prior to monitoring.

Isolated Finds-Isolated finds consist of 1-3 fragments of skeletal remains which are solitary and do not appear to belong to burial features in close proximity, and do not constitute an individual.

AGE CATEGORIES

Fetal-Before birth

Middle Adult-35-50 Years

Infant-0-3 Years

Older Adult-50+ Years

Child-3-12 Years

Young Adult-20-35 Years

Adolescent-12-20 Years

DETERMINING PERCENTAGE OF ARTICULATION

To further describe the burial context of each feature, a percentage of the completeness or portions which remain intact and articulated have been added to the burial descriptions and Table I. These percentages are calculated using the following methods.

The upper torso is calculated at 50% and comprised of the following percentages. Cranium 5%, scapula, clavicle and ribcage (10%), vertebral column including c-vertebrae and thoracic vertebrae (5%), Right arm (10%), Right hand (5%), Left hand (5%) and Left arm (10%).

The lower torso is calculated at 50% and is comprised of the following percentages. Lumbar vertebrae, innominate and sacrum (10%), Right leg (15%), Right foot (5%), Left leg (15%) and Left foot (5%).

RESULTS

Site 6679 is comprised of all burial features identified within Phases A, B and D. Site 5504 is a solitary burial situated along Kuihelani Highway. A total of 70 burial features have been identified to date within Phase A. These features consist of partially intact primary burials (n=30), burial pits which are highly possible to contain primary burial features (n=12), recently disturbed possible primary burial features (n=5) and secondarily deposited scatters of human remains (n=23). The majority of these features will be preserved in place within Preservation Areas 1 and 4. Within Phase B a partially intact burial feature (n=1) and a secondary scatter of human remains (n=1) have been identified and these two burial features will be preserved within Preservation Area 2. A total of 22 burial features were documented at Phase D and were comprised of partially intact primary burials (n=3), a burial pit (n=1), a recently disturbed possible primary burial (n=1) and secondary deposits of human skeletal remains (n=17). All burials will be preserved in place and or in close proximity to where they were identified within Preservation Area 3. Lastly, a partially intact burial feature inadvertently discovered along Kuihelani Highway will be preserved in place within Preservation Area 5. The burials are further discussed below and are presented in Table I.

STRATIGRAPHY

Within the project area and surrounding inland sand dunes, a four-layer stratigraphic sequence has been recorded. Layer I consists of an organic, humic layer with decaying leaf and twig matter. Underlying Layer II, is the grayish brown silty sand which contains the majority of the burial features and vegetation. This layer, also designated as the "Grade B" layer ranges from 8 inches to 5.0 ft. thick and is aeolian deposited. Layer II contains more silt than Layer III and when mined is used as pipe bedding for utility installation and as fertilizer for the sugar cane fields due to the high phosphorus content. Layer II directly overlies Layer III, the coarse to fine yellowish brown sand and appears as a distinctly yellowish gold color. This layer is referred to as "Grade A" sand being fine to coarse with little to no silt and when harvested is utilized for the purposes of making concrete. The upper horizons of Layer III can be loose and stratified with cross-bedding in cross-section being aeolian driven prior to the deposition of Layer II. The upper and lower sections of Layer III may sometimes be a lithified, sand stone layer. Layer III, like the underlying Layer IV clay stratum may also contain burial features. Layer IV is a reddish brown silty clay which contains numerous rounded cobbles and boulders and appears to have been a colluvial deposit.

Table I. Quantitative Burial Data for Phases A-D

SITE	FEATURE	PHASE	AGE/SEX	DESCRIPTION	PIP	RELOCATE	PRES. AREA	INDIVIDUAL
Site 6679	1a	A	MAF	Secondary Scatter	X		Preservation 1	1
Site 6679	1b	A	OAM	Secondary Scatter	x		Preservation 1	2
Site 6679	1c	A	INFANT	Secondary Scatter-1+/- 4mos	X		Preservation 1	3
Site 6679	1d	A	INFANT	Secondary Scatter-o-6mos	X		Preservation 1	4
Site 6679	1e	A	OAM	Secondary Scatter	X		Preservation 1	5
Site 6679	1f	A	MAM	Secondary Scatter	X		Preservation 1	6
Site 6679	2	A		2ndary scatter belonging to Fe.1a,b,e,f	n/a			1, 2, 5 and 6
Site 6679	3	A	Adole. F	2ndary scatter-may have been clay pit bur.	X		Preservation 1	7
Site 6679	4	A	OAM	Rec.dist.prob.primary-clay pit burial	X		Preservation 1	8
Site 6679	5	A	OAM	Secondary Scatter	X		Preservation 1	9
Site 6679	6	A	CHILD	2ndary Scat same Individ.as Fe. 7 and 10	X		Preservation 1	10
Site 6679	7	A		2ndary Scatter belongs to Feature 6	X		Preservation 1	10
Site 6679	8	A	INFANT	Partial Primary	X		Preservation 1	11
Site 6679	9	A	MA?	Partial Primary	X		Preservation 1	12
Site 6679	10	A		2ndary Scatter belongs to Feature 6	X		Preservation 1	10
Site 6679	11	A	MAM	Secondary Scatter-Robust	X		Preservation 1	13
Site 6679	12a	A	INFANT	Partial Primary-fully flexed	X		Preservation 1	14
Site 6679	12b	A		Burial Pit	X		Preservation 1	BP1
Site 6679	13	A		Secondary Scatter	X		Preservation 1	15
Site 6679	14a	A	MAM	Partial Primary-only foot articulated	X		Preservation 1	16
Site 6679	14b	A		Burial Pit	X		Preservation 1	BP2
Site 6679	15	A	YAM	Partial Primary-Robust-flexed	X		Preservation 1	17
Site 6679	16	A	YAM	Partial Primary-fully flexed	X		Preservation 1	18
Site 6679	17a	A	YAF	Partial Primary-flexed	X		Preservation 1	19
Site 6679	17b	A	MAM	Partial Primary-clay pit burial	X		Preservation 1	20
Site 6679	18a	A	YAF	Partial Primary-flexed	X		Preservation 1	21
Site 6679	18b	A	CHILD	Partial Primary-lithified slabs	X		Preservation 1	22
Site 6679	18c	A	YAF	Partial Prim.-deep lithified pit-full.flexed	X		Preservation 1	23
Site 6679	18d	A		Burial Pit-deep lithif.pit with boulders	X		Preservation 1	BP3
Site 6679	19	A		Rec.Dist.Prob.Partial Prim.	X		Preservation 1	24
Site 6679	20	A	YAM	Partial Primary-perf.human molar	X		Preservation 1	25
Site 6679	21	A	MAM	Partial Primary-basalt artifacts	X		Preservation 1	26
Site 6679	22a	A	YAF	Rec.Dist.Prob.Partial Prim.	X		Preservation 1	27

Site 6679	22b	A	YAM	Primary Burial-likely fully flexed	X		Preservation 1	28
Site 6679	23	A	OAF	Partial Primary-context indeterminate	X		Preservation 1	29
Site 6679	24	A	?AM	Partial Primary-flexed	X		Preservation 1	30
Site 6679	25	A	OAF	Partial Primary-flexed	X		Preservation 1	31
Site 6679	26	A	MAM	Partial Primary-fully flexed	X		Preservation 1	32
Site 6679	27	A	OAM	Secondary Scatter	X		Preservation 1	33
Site 6679	28	A	?AM	Secondary Scatter	X		Preservation 1	34
Site 6679	29	A	MAM	Partial Primary-fully flexed-llth.slabs	X		Preservation 1	35
Site 6679	30	A		2ndary E16Scatter belongs to Feature 26	X		Preservation 1	32
Site 6679	31a	A	MAF	Partial Primary-perforated conus shells	X		Preservation 1	36
Site 6679	31b	A	MAM	Rec.dist.prob.primary	X		Preservation 1	37
Site 6679	32	A		Burial Pit	X		Preservation 1	BP4
Site 6679	33a	A	ADULT	Partial Primary-disturbed in cult.context	X		Preservation 1	38
Site 6679	33b	A	Adolescent	Partial Primary-disturbed in cult.context	X		Preservation 1	39
Site 6679	33c	A		Burial Pit	X		Preservation 1	BP5
Site 6679	34	A	MAM	Partial Primary-perforated conus shells	X		Preservation 1	40
Site 6679	35a	A	INFANT	Secondary Scatter-0-1 year	X		Preservation 1	41
Site 6679	35b	A	INFANT	Secondary Scatter	X		Preservation 1	42
Site 6679	36	A		Burial Pit	X		Preservation 1	BP6
Site 6679	37	A		Burial Pit	X		Preservation 1	BP7
Site 6679	38	A		Burial Pit	X		Preservation 1	BP8
Site 6679	39	A		Burial Pit	X		Preservation 1	BP9
Site 6679	40	A		Burial Pit	X		Preservation 1	BP10
Site 6679	41	A		Burial Pit	X		Preservation 1	BP11
Site 6679	42	A	YA?	Isolated Find 2 cranial-Y.A.? IF1	X		Preservation 1	43
Site 6679	43	A	ADULT	Primary -sacrum dors. Side up in pit	x		Preservation 1	44
Site 6679	44	A	MAM	Partial Primary	X		Preservation 1	45
Site 6679	46	A	YAM	Partial Primary to be disinterred		x*	Preservation 1	46
Site 6679	47a	A	YAF	Secondary Scatter	X		Preservation 1	47
Site 6679	47b	A	INFANT	Secondary Scatter-6mos-1 year	X		Preservation 1	48
Site 6679	48	A	OAM	Secondary Scatter		X	Preservation 4	49
Site 6679	49a	A	MAM	Partial Primary to be disinterred		x*	Preservation 4	50
Site 6679	49b	A	CHILD	Secondary Scatter-7-10 YRS		X	Preservation 4	51
Site 6679	49c	A	YAF	Secondary Scatter		X	Preservation 4	52

Table II. (cont) Quantitative Burial Data for Phases A-D

Site 6679	50	A	MAF	2ndary Scat. But may have been part.intact	X		Preservation 4	53
Site 6679	51	A	MAM	Secondary Scatter		x	Preservation 4	54
Site 6679	52	A	ADULT	Isolated Find 1 Long Bone- IF2+E98	X		Preservation 1	55
Site 6679	53a	A	MAM	Partial Primary	X		Preservation 1	56
Site 6679	53b	A		Burial Pit	X		Preservation 1	BP12
Site 6679	53c	A		Primary -cranium, humerus in pit	X		Preservation 1	57
Site 6679	54	A	MAM	Partial Primary-ww cobble-fully flexed	X		Preservation 4	58
Site 6679	55	D	CHILD	Rec.dist. Prob.primary-6 year +/- 24 mos	X		Preservation 3	59
Site 6679	56	D	YAF	Partial Primary-pit excavated into lithified	X		Preservation 3	60
Site 6679	56a	D	OAM	Secondary Scatter	X		Preservation 3	61
Site 6679	56b	D	OAM	Secondary Scatter	X		Preservation 3	62
	56c	D	OAM	Secondary Scatter	X		Preservation 3	63
	56d	D	OAM	Secondary Scatter	X		Preservation 3	64
	56e	D	OAF	Secondary Scatter	X		Preservation 3	65
	56f	D	MAM	Secondary Scatter	X		Preservation 3	66
	56g	D	MAM	Secondary Scatter	X		Preservation 3	67
	56h	D	OAF	Secondary Scatter	X		Preservation 3	68
	56i	D	OAF	Secondary Scatter	X		Preservation 3	69
	56j	D	MAM	Secondary Scatter	X		Preservation 3	70
	56k	D	OAM	Secondary Scatter	X		Preservation 3	71
	56l	D	YAF	Secondary Scatter	X		Preservation 3	72
	56m	D	OAF	Secondary Scatter	X		Preservation 3	73
	56n	D	MAM	Secondary Scatter	X		Preservation 3	74
	56o	D	MAM	Secondary Scatter	X		Preservation 3	75
	56p	D	CHILD	Secondary Scatter	X		Preservation 3	76
	56q	D	INFANT	Secondary Scatter	X		Preservation 3	77
	57	D		Partial Primary-pit excavated into lithified	X		Preservation 3	78
	58	D	MAF	Partial Primary-fully flexed	X		Preservation 3	79
	59	D		Burial Pit	X		Preservation 3	BP13
	Fe. 60	B		Secondary (formerly 18)		x	Preservation 2	80
	Fe. 61	B	OAM	Partial Primary (formerly2B)-fully flexed.	x		Preservation 2	81
Site 5504		N/A		Partial Primary	x		Preservation5	82

OAM=Older Adult Male OAF=Older Adult Female MAM=Middle Adult Male MAF=Middle Adult Femal YAM=Younger Adult Male
YAF=Younger Adult Female ?Sex or Age Indeterminate Adole.=Adolescent

Table III. (cont) Quantitative Burial Data for Phases A-D

PHASE A

Phase A is situated along the east side of the current scale house access road and is comprised of two parallel dune ridgelines. The first dune system which is oriented north-south contains the highest ridgeline. The dunes are undulating and consist of approximately 59.0 acres.

Features 1a-f

Features 1a-f are comprised of the co-mingled skeletal remains of six individuals which were recovered from two discrete linear areas (Features 1 and 2) and designated as recently and previously disturbed. The Feature 1 area measured 55.0 m long by 40.0 m wide and Feature 2 was 20.0 m long by 5.0 m wide (Figure 6). Upon completion of discussions with SHPD, the methods for displaced skeletal remains consisting of mapping, raking and testing were undertaken to ascertain if a primary/*in situ* portion was extant and to collect all displaced human remains (Figure 7). After testing was completed, no *in situ* burial features were identified, and the skeletal population constituted of six co-mingled individuals. Features 1a, b, e, and f, are the remains of adults and Features 1c and 1d are the remains of infants. Osteological analysis of the human skeletal remains (HSR) was performed at the ASH lab to determine sex and age using the criteria listed in the methods section. The results are presented below for each of the individuals.

Feature 1a

Feature 1a is the remains of a middle adult female individual. The sex was determined from the size of the brow ridge as well as the shape of the gonial angle and age was based on the cranial suture closure.

Feature 1b

Feature 1b was identified as an older adult male individual. Sex was determined by the overall robustness of remains, brow ridge size, the mastoid process, and gonial angle. Estimated age was based upon observation of cranial suture closure in which 90% of them were considered obliterated and or are no longer visible.

Feature 1c

Osteological analysis of Feature 1c was determined to be an infant 1+/- 4 mos, and was based upon dentition (unerupted deciduous teeth) and stage of unfused vertebrae. Sex determination can't be established at infancy.

Feature 1d

Feature 1d is also the remains of an infant estimated to be between newborn and 6 months of age. Age was based on the observation of size of the non-fused Os coxae growth. Osteological analysis to determine sex could not be established.

Feature 1e

Feature 1e is an older adult male individual where sex determination was based on observation of the greater sciatic notch and shape/size of the gonial angle of the mandible. Estimated age was based on the alveolar resorption of the maxilla and mandible as well as noting visible degradation of the surface of the pubic symphysis, which is commonly associated with old age.

Feature 1f

Osteological analysis of the recovered skeletal remains belonging to Feature 1f were determined to be a middle adult male. This was based on complete epiphyseal fusion and that the pubic symphysis in addition to other surface features had not yet undergone significant deterioration.

A total of six individuals comprised of two older adult males (Features 1b and e), a middle adult male (Feature 1f), a middle adult female (Feature 1a) and two infants (Features 1c and d) have been recorded for both the Feature 1 and 2 areas. Minimal quantities of skeletal remains were collected at Feature 2 and belonged with the adult assemblage recovered from Feature 1. The proposed treatment for Features 1a-f is preservation in place within Preservation Area 1 (Figure 8 and Table I). The collected remains of these six individuals shall be prepared and reinterred in the area where they were discovered.

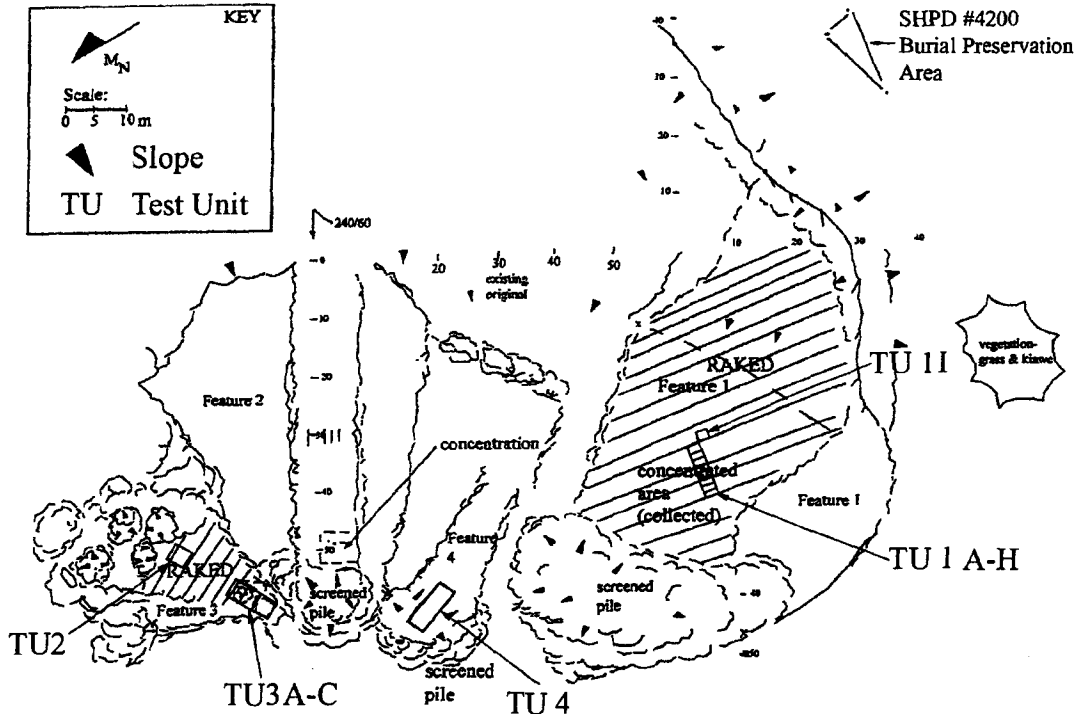


Figure 6. Plan View Map of Features 1-4

Scale:	KEY
0 2.0m	
TU Test Unit	
■ HSR- Child	
X HSR- Adult	
(#) Depth in Meters Below Surface	

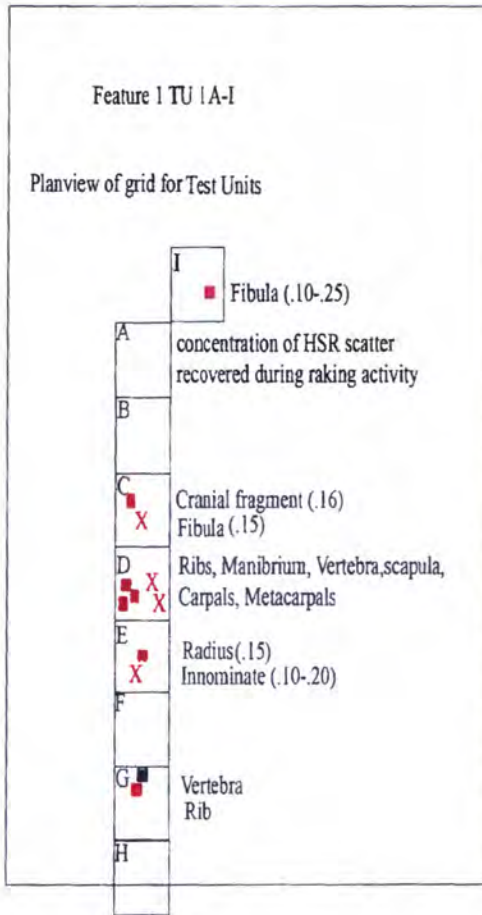


Figure 7. Plan View Map of Testing at Feature 1 Area

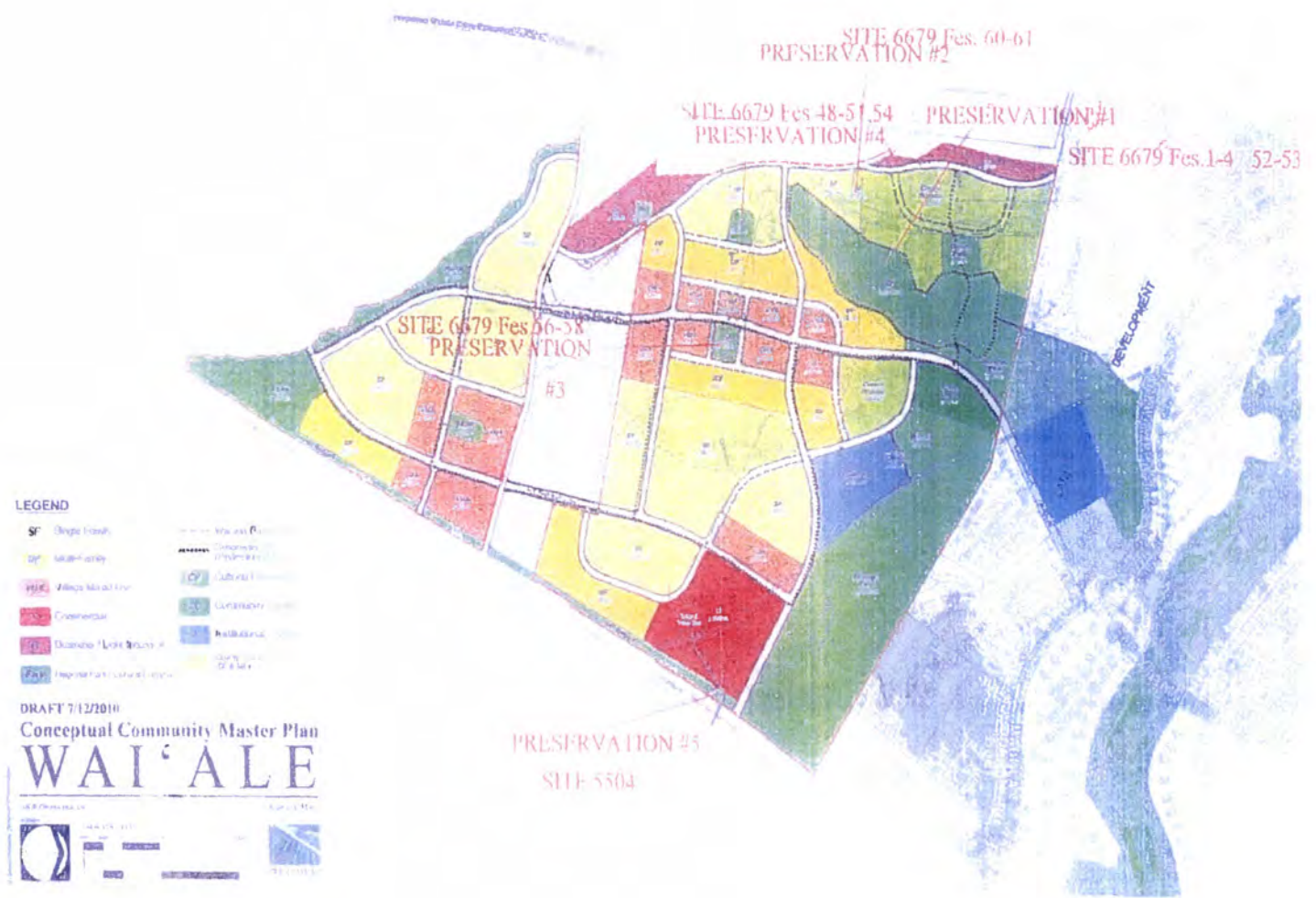


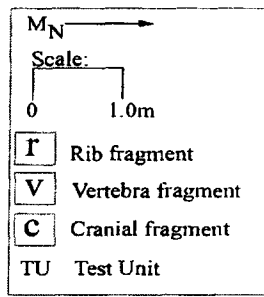
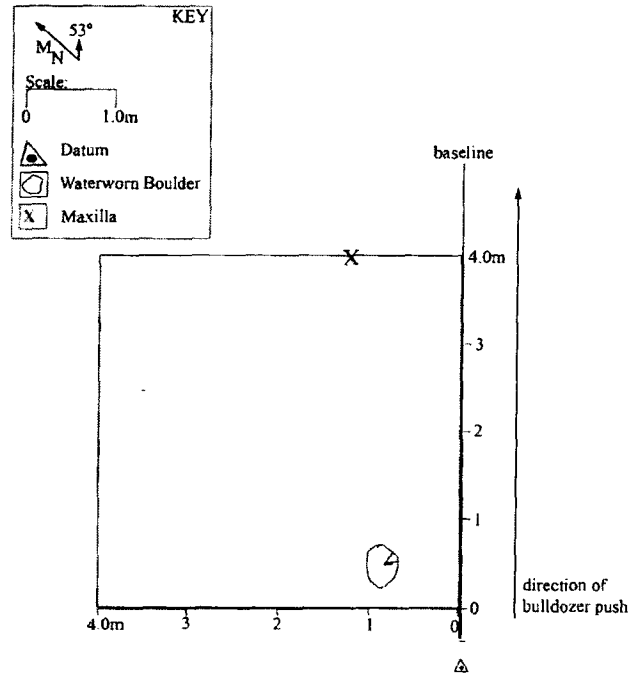
Figure 8. Plan View Map Showing Preservation Areas 1-5 for Site 50-50-04-6679 within Development Area

Feature 2

The Feature 2 area is located east of Feature 1 juxtaposed to Features 3 and 4 (see Figure 7). It measured 20.0 m long by 5.0 m wide and contained minimal skeletal remains. Recovered from the Feature 2 area is the right trapezium and distal phalange, 1st metacarpal of the right hand. Left hand remains consisted of the capitate and hamate and from the right foot the 3rd metatarsal a long with the distal phalange of the 1st metatarsal was recovered. Additionally two rib fragments and the distal end of the left fibula were also collected and these aforementioned skeletal remains belonged to the adults recovered from the Feature 1 area. Thus no individual was collected from the Feature 2 area.

Feature 3

Feature 3 was inadvertently exposed during monitoring activities when the D-9 bulldozer was grading "Grade B" grayish brown sand material mixed with compact, dense alluvial clay (the clay stratum is usually the basal layer and Grade B sand is found at the surface). The observation of these two soils mottled together exemplifies prior disturbances. Upon the discovery of human skeletal remains, all mechanical activity was halted in the immediate area and hand testing commenced. Scattered skeletal remains were spread over a 15.0 m long by 25.0 m wide area where two test areas (TU2 and TU3a-c) were set up to collect all disturbed remains and to ascertain if an intact, primary component was present (Figure 9). Diagnostic traits indicating sex was based on the size of the brow ridge and age was based on epiphyseal fusion. Further analysis of the skeletal remains identified old breaks along the occipital portion of the cranium indicating that Feature 3 was previously disturbed and secondarily deposited. This prior disturbance is further supported by the mixed soil matrix (Grade B sand and alluvial clay) previously mentioned and recorded during testing. The skeletal remains of Feature 3 were designated as a secondary deposit that was previously and recently disturbed and shall be preserved in place within Preservation Area 1 (see Figure 8 and Table I).



TU 3A-C

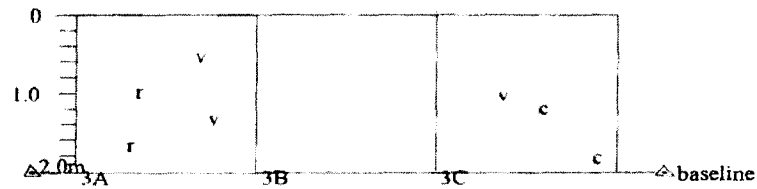


Figure 9. Plan View Map of Site 6679 Feature 3 Area Showing Skeletal Remains within Dozer Track (Top) and Test Units 3A-C (Bottom)

Feature 4

Feature 4 was discovered while determining the extent of secondarily deposited skeletal remains of Features 2 and 3. The dozer was removing a disturbed soil matrix and was grading sand above the basal clay layer when sand mixed with clay peds and skeletal remains were exposed. All mechanical equipment was stopped and testing of the area was continued by hand. An 8.0 m long by 4.0 m wide grid designated TU 4 was erected over the scatter to recover all disturbed human remains and to ascertain if a primary and or *in situ* burial was extant within the Feature 4 area (Figure 10). TU 4 was excavated to the compact, clay surface where no burial pit outline or articulated remains were observed, however testing and raking recovered approximately 98% of this individual. During analysis of the skeletal remains to ascertain sex and age of this individual, clay particles were observed adhering to the bone. Based on the presence of these clay particles and the documentation of clay peds mixed with sand during testing, Feature 4 was likely a primary clay pit burial that was recently disturbed and is the remains of an older adult male.

Age was based on several factors. The extreme occlusal wear and alveolar resorption of the mandible and maxilla as well as the obtuse angle of the vertical ramus and corpus of the mandible (typically associated with advanced age-Steele & Bramblett, 1988: 51). Furthermore, the cranial sutures were almost completely obliterated indicating near complete fusion and extensive metamorphosis in the auricular and periauricular surface areas of the ilium were also noted. Sex determination was based on the sciatic notch and overall robust nature of the remains. Feature 4 was determined to be recently displaced and shall be preserved in place and or reinterred within the area where it was discovered.

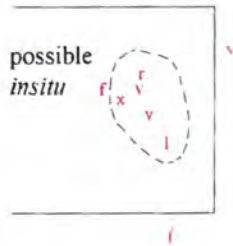
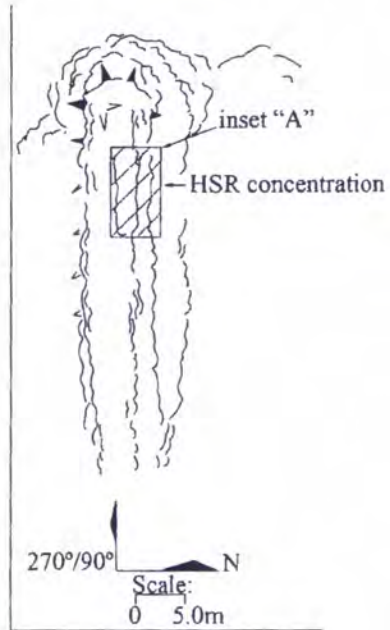


Figure 10. Plan View Map of Site 6679, Feature 4, TU 4

After the discovery of eight individuals from the Features 1-4 area, sand mining activities were relocated to the south central portion of the project area near the western boundary line.

Feature 5

Feature 5 was documented as a secondarily deposited scatter of human skeletal remains identified during monitoring of surface vegetation removal (vegetation grubbing). Upon removal of trees and various plant materials, disturbed skeletal remains comprised of a partial left innominate and tarsals/metatarsals of the left foot were exposed. Four test units (TU1-4); TU1, a 2.0m by 2.0m unit; and TU2- TU4, all 1.0m by 1.0m units, were placed upon the scatter to ascertain if a burial pit outline and/or a primary/*in situ* portion of this feature was present (Figure 11). Test Units 1-3 were negative, and TU 4 contained a human metatarsal in the southwest corner near the base of Layer I at .25 meters below the surface (m bs). The tarsal was entwined in a small root mass indicative that the burial was previously disturbed and encased by the root ball of the tree (floralturbation) and during tree removal or "tree-throw" the metatarsal was exposed and deposited on the surface.

A two-layer stratigraphic sequence was recorded within TU 1-4 (Figure 12). Layer I was a disturbed yellowish brown silty sand with numerous root inclusions and Layer II was a grayish brown silty sand (Grade B), slightly compact recorded from .20-.26 m bs. Due to limited findings within a disturbed layer, Feature 5 was designated as previously disturbed, secondarily deposited remains. Osteological analysis determined that the remains belonged to an older adult male. Sex determination was based on the shape of the sciatic notch and age was based on metamorphosis observed in the auricular and periauricular area, which typically indicates an advanced age. Feature 5 was determined to be previously disturbed but will be preserved in the area where it was discovered (see Figure 8 and Table I).

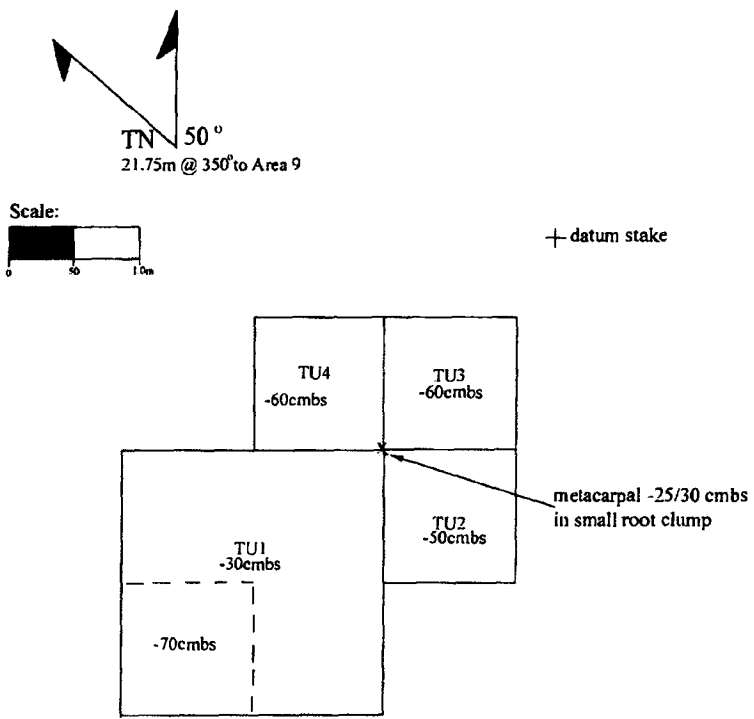
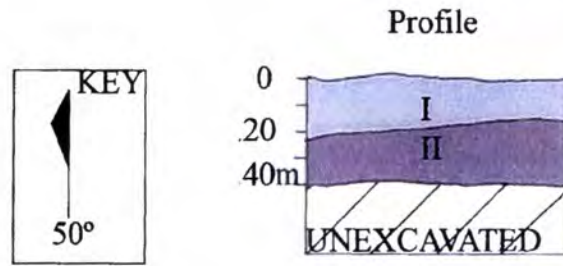


Figure 11. Plan View Map of Site 6679, Feature 5, TU1-4



Planview Test Unit 1: Area 5

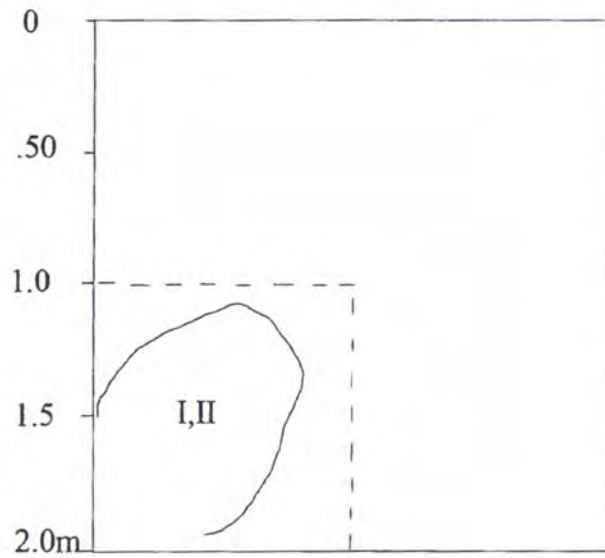


Figure 12. Plan View Map of Site 6679, Feature 5, Test Unit 1

Feature 6

Upon the discovery of Feature 5, a larger area was grubbed of vegetation. As this area contained numerous trees and thick dust, the entire area was grubbed and the archaeologist inspected the area per methods exemplified on Figure 5. During the inspection, several areas of scattered remains and or concentrated human remains were identified and designated as Features 6-10. Each feature area was then investigated separately to ascertain the context of the skeletal remains. Feature 6 was comprised of four cranial fragments located upon the surface at 258 amsl. The area was raked and shovel scraped where no additional remains were identified (Figure 13). Osteological analysis of the remains determined that Feature 6 remains belonged to a child approximately 3 years old. Testing then commenced at the Feature 7 area.

Feature 7

Feature 7 was comprised of a scatter of skeletal remains within a 25.0 m long by 9.0 m wide area, thus a grid system was erected over the spread and was comprised of twenty-four 4.0 m by 4.0 m grid designated TU 1A-X. Initially each grid was raked to ascertain presence absence of skeletal remains. If skeletal remains were present, hand excavations were instituted within that particular grid and some adjoining grids (Figure 13). All material was screened through nested ¼" and 1/8" mesh screens. Definitive sex determination could not be established at this age. Feature 6 will be reinterred in the area where it was discovered and thus preserved in place. Feature 7 is further discussed below.

The testing program documented the surface matrix as the "Grade B" Layer II grayish brown silty sand which contained concreted (ped) "Grade A" inclusions (Layer III) and rootlets throughout. The presence of concreted Layer III peds mottled with Layer II exemplifies a previously disturbed layer. TU 1D and 1E consisted of the above matrix with discontinuous lenses of coarse "Grade A" yellowish brown sand, another indication of disturbance. Test units 1A-J, 1M, 1O, 1U, and 1V were hand-excavated from .20 m-.50 m below the surface to collect all disturbed materials. The disturbed collected remains from the Feature 7 area were comprised of the right innominate, cranial fragments, the right tibia and fibula, ribs, and tarsals and belonged to a child (3 yr +/-12 mos). Age determination was based on dentition (deciduous erupted teeth) and epiphyseal stage of fusion for innominate and long bones (at this age sex is indeterminate). Additionally, the four cranial fragments collected at the Feature 6 area, appear to belong with the Feature 7 assemblage. Through the above testing program, Feature 7 was determined to be previously disturbed and secondarily deposited prior to the Hawaiian Cement grading operations.

Feature 8

Feature 8 was identified during the subsequent survey and was comprised of a concentration of small cranial fragments. Minimal testing was initiated, documenting a slightly disturbed cranium articulated with the upper cervical vertebrae. Upon this documentation no further testing was warranted and Feature 8 was designated as a primary *in situ* infant burial. This sand burial was surveyed in at 259 amsl and shall be preserved in place within the southern portion of Phase I.

Feature 9

Feature 9 was identified during the subsequent walk-through of a previously grubbed area which recorded Features 6-10. On the surface, it consisted of cranial fragments and one tooth within a possible burial pit outline (Figure 14). A 1.0 by 1.0 m test unit was placed over the surficial skeletal remains (cranial and tooth) and as excavations proceeded, a partially intact, fragmented in place, primary burial feature was documented from .15 m to .28 m bs (Figure 15). Feature 9 was within a burial pit (259 amsl) defined by a darker sandy loam soil (10YR 3/4) with numerous root inclusions. Although Feature 9 was disturbed, it was positioned anatomically correct for a flexed burial. Collected displaced remains consisted of cervical vertebrae, ribs, humerus, ulna, fibula, tibia and maxillae. Analysis of these remains determined that Feature 9 is a middle adult individual where age was based on minimal occlusal wear of recovered permanent teeth. Due to the fragmentary condition, Diagnostic criteria used to determine sex was not definitive enough from *in situ* portion of remains to correctly identify sex. Feature 9 is a partially intact, primary burial which had been previously and recently (minimal) disturbed and shall be preserved in place within the southern portion of Preservation Area 1 (see Figure 8 and Table I).

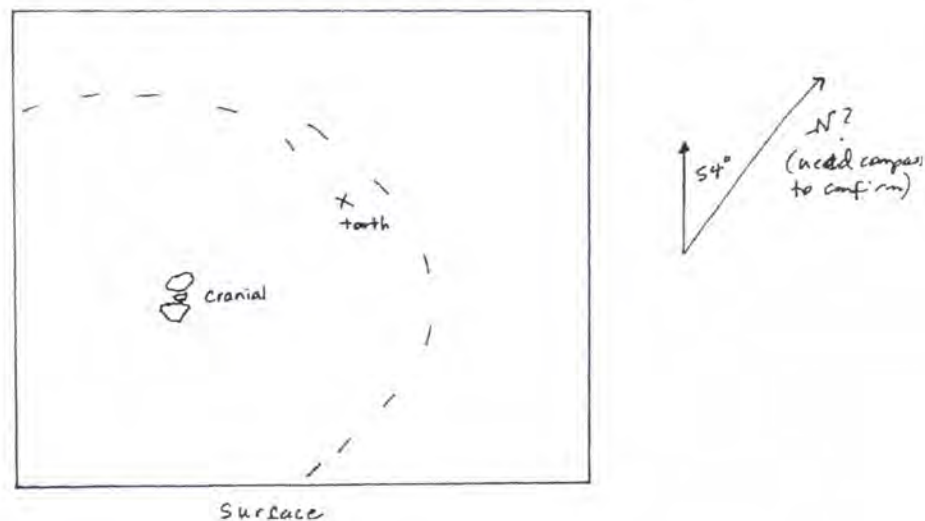
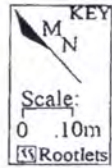


Figure 14. Plan View Map of Site 6679, Feature 9, Surface of TU 1



TU5 Plan View

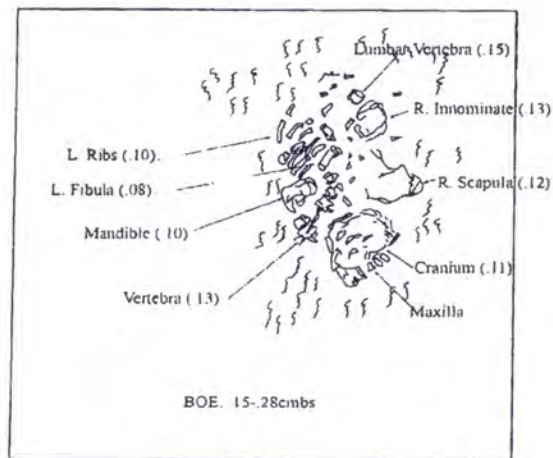


Figure 15. Plan View Map of Site 6679, Feature 9, .15-.28 mbs of TU 1

Feature 10

Feature 10 was also identified during the field inspection of the south central portion of the project area. It consisted of displaced remains within a 21.0 m long by 6.0 m wide swath. To determine nature and extent of the remains, a baseline was set up and a grid system erected consisting of 19-2.0 by 2.0 m test units (TU) (Figure 16). All TUs were initially raked, and 8 were hand-excavated. Testing resulted in the identification of a dense root zone .05-.20 m bs (indicative of prior disturbances) and secondarily deposited skeletal remains consisting primarily of unidentifiable skeletal remains from a child. Blade testing and a second grid system was erected in the area and secondarily deposited skeletal remains comprised of a clavicle, metatarsal, sacrum fragment, cranial fragments and various unidentifiable human skeletal remains were collected from TU2 b, c, l, r and z (Figure 17). Faunal remains comprised of rat or mice were also recovered from the hand testing. Analysis of the osteological assemblage determined that the skeletal remains belonged to a child approximately 3+/- 12 months of age. Estimated age was based on observation of erupted deciduous teeth. Diagnostic traits indicating sex could not be established at this age. The skeletal remains from the Feature 10 area were assessed with the Features 6 and 7 assemblage and were determined to be from the same individual. Thus, Features 6, 7 and 10 are from the same child and shall be preserved together within this south central area.

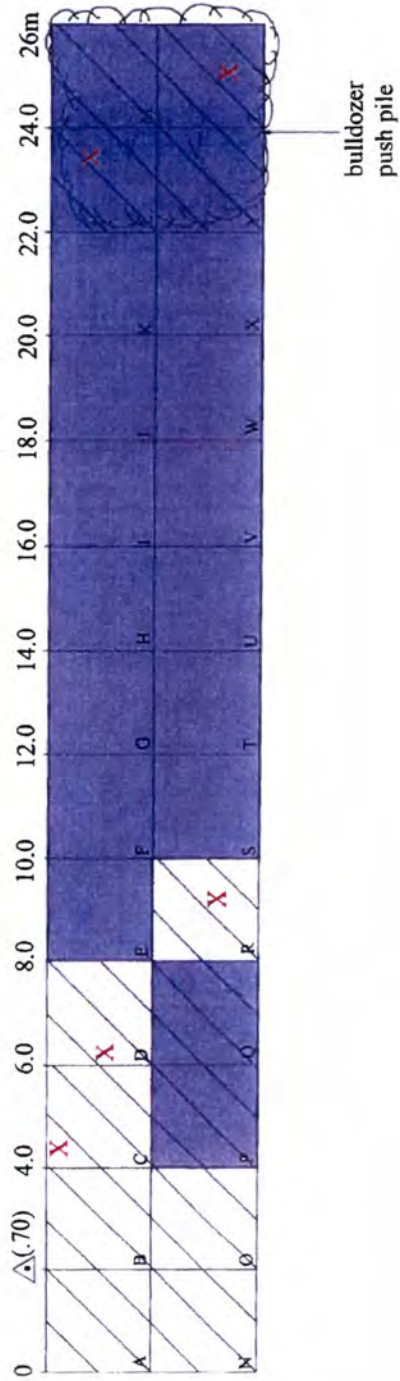
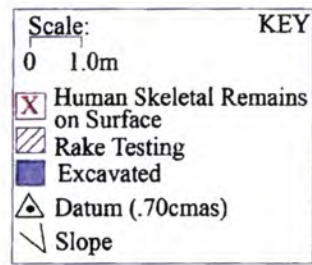
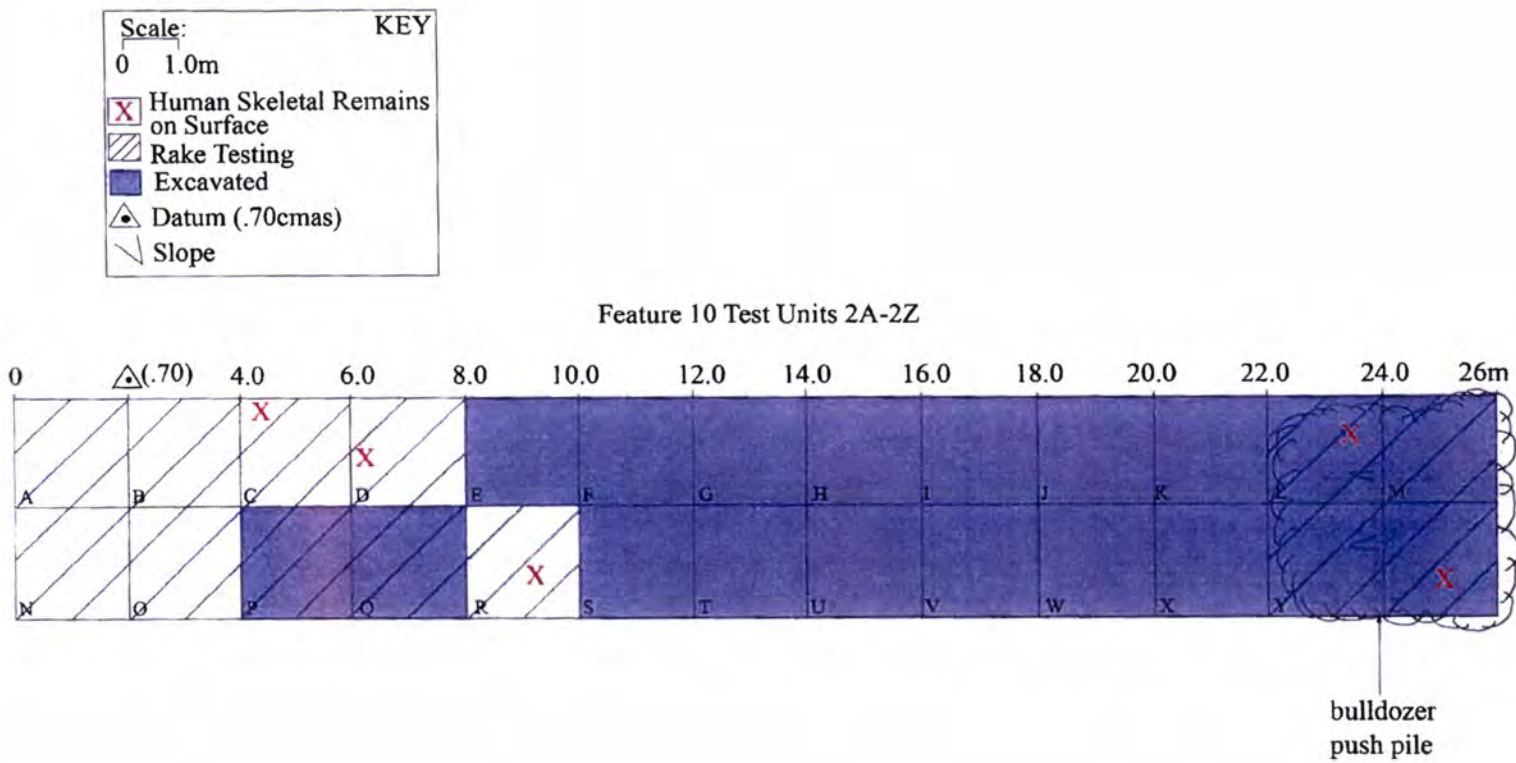


Figure 16. Plan View Map of Grid System, Site 6679, Feature 10, TU 1a-s.

Figure 17. Plan View Map of Second Grid System, Site 6679, Feature 10, TU 2a-z



Feature 11

Feature 11 was identified after vegetation grubbing of the southeastern perimeter. It consisted of a scatter of human skeletal remains. Three-1.0 m by 1.0 m test units (TU 1a-c) were placed over and adjacent to the surficial scatter. Results from the testing identified concentrated secondarily deposited skeletal remains within TU 1a while TU 1b and 1c were negative (Figure 18). The skeletal remains, though concentrated, were not articulated and appeared to have been re-buried but not in a cultural context (i.e. construction workers). Analysis of the osteological assemblage documented the remains as a robust middle adult male approximately 35 years of age. The remains were primarily from the right side of the individual, however a few tarsals and metatarsals from the left side were collected. Since portions of the right side of Feature 11 were collected, this individual may have originally been buried on their left side, thus the right side would have endured the majority of the disturbance. Based on this presumption, it is possible that a portion of the left side may still be in situ within the nearby vicinity. Since this south central section will be preserved, no further testing was warranted for the Feature 11. The age of Feature 11 was determined by dentition (moderate occlusal wear on the teeth). Criteria used to determine sex included the shape of the sciatic notch, and size of clavicle and femoral head. Feature 11 was a previously disturbed secondarily deposited burial. The skeletal remains of Feature 11 shall be preserved within the area where identified, the south central portion of Preservation Area 1 (see Figure 8 and Table I).

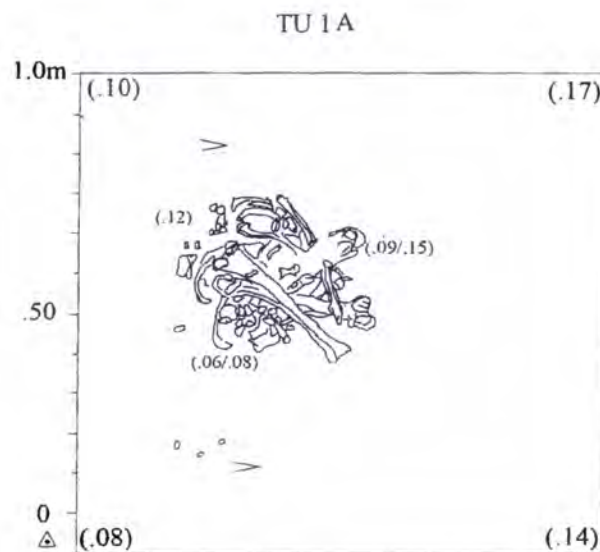
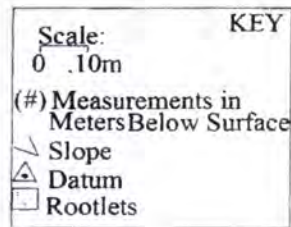


Figure 18. Plan View Map of Feature 11, TU 1a.

Additional Testing at Features 5-11

Features 5-7 and 10-11 were documented as previously disturbed secondarily deposited human skeletal remains as well as partially intact primary burial features. Each locality incurred varying degrees of disturbance. Due to the pervasiveness of these disturbances, additional testing was instituted to ascertain the vertical and horizontal extent of these former disturbances. The testing program consisted of blade testing mentioned in the methods and procedure section. Blade testing consists of large, broad swaths that are graded down to a sterile level. The dozer grades/excavates the swath in 4-6 inch controlled increments while the archaeologist monitors each pass. Five

blade tests were conducted to determine the presence/absence of additional subsurface cultural remains resulting in the discovery of Features 12-14. The results are listed below.

Features 12a and 12b

Feature 12a was identified during Blade Test 2 upon the knoll adjacent and west of the Feature 5. Upon the exposure of skeletal remains at the base of the trench (approximately 3.5-4.0 m bs) and in the dozer tailings, mechanical testing was halted and raking of the trench floor and stockpile as well as hand excavations were initiated. A 1.0m by 1.0m test unit was placed over the skeletal remains and identified a primary *in situ* burial at 255-elevation amsl. The burial was placed face down with legs fully flexed in a defined burial pit. The pit was composed of numerous rootlets and measured .85 m long by .55 m wide, oriented at 180 degrees extending outside of the test unit (Figure 19). Minimal disturbance occurred along the right humerus, right scapula, cervical vertebrae and a few ribs. Feature 12a was assessed as an infant 12 mos+/- 6 mos based on deciduous teeth. Definitive sex determination could not be established at this age.

During the raking and testing procedures, as well as inspection of the trench walls, two additional features were identified and designated Features 12b and 13. Feature 12b consisted of a possible burial pit outline containing sand mixed with clay peds and a water worn basalt cobble and is situated approximately .20 m east of Feature 12a. Due to its close proximity to a known primary burial feature, no testing was conducted at Feature 12b, however based on the presence of clay peds mixed within the sand, Feature 12b is likely a primary clay pit burial feature. Feature 13 was documented in the north wall of Blade Test 2 and is further discussed below. Feature 12a was determined to be a partially intact, primary burial that was recently disturbed. Feature 12b was designated as a possible burial pit and along with Feature 12a, shall be preserved in place within the southern portion of Preservation Area 1.

Feature 13

Feature 13 comprised of disturbed skeletal remains was noted in the north wall of Blade Test 2 from .20-.27 m bs (Figure 20). A 1.3 m by 1.0 m test unit was hand excavated to a maximum depth of .67 m bs where no additional skeletal remains were collected, however clay peds were again noted within the sand matrix. Minimal skeletal remains (cranial and long bone fragments) were collected from a disturbed context and no primary burial feature or pit outline was noted during the testing. Feature 13 will be reinterred within the area it was found and preserved in placed within Preservation Area 1.

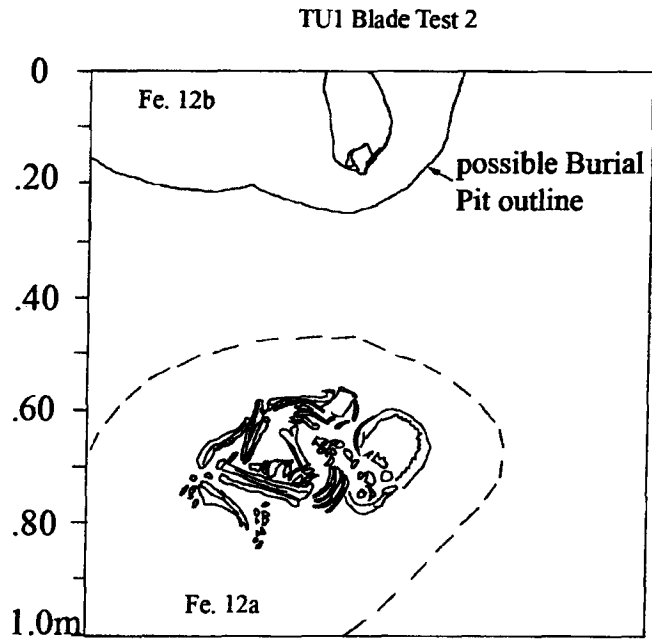
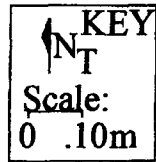
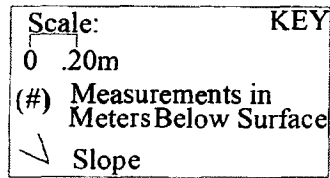


Figure 19. Plan View Map of Site 6679, Features 12a and 12b, TU 1a



TU2 Blade Test 2

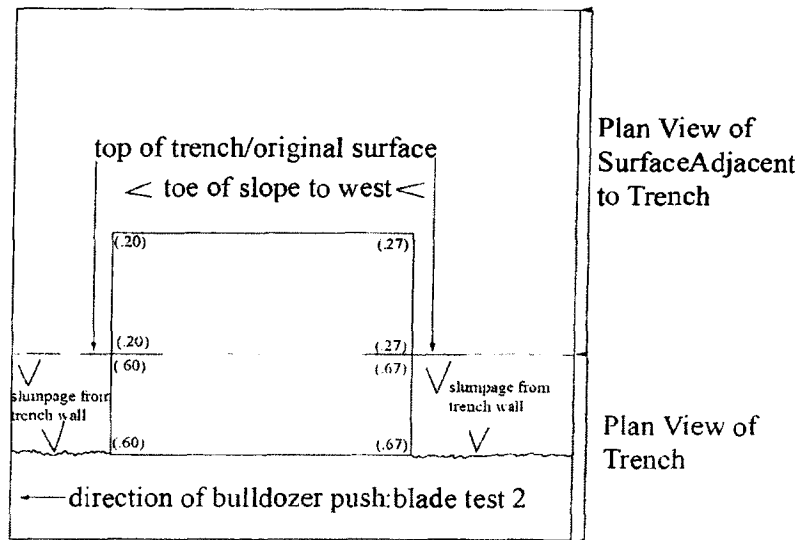


Figure 20. Plan View Map of Site 6679, Shove Test TU1, Feature 13

Features 14a and 14b

Feature 14a was identified on the floor of Blade Test 1 at approximately 1.20 m bs and was comprised a few ribs which appeared to be disturbed (Figure 21). An initial 1.0 by .50 m test unit (TU 1A) was placed over the ribs to determine the context of the human remains. This unit was eventually expanded into a 1.0 by 1.0 m unit and subsequent additional test units (TU1B-D) were placed adjacent to TU1A. Thus, a total of four-contiguous 1.0m by 1.0 m test units (TU 1A-D) were undertaken on and around Feature 14 documenting disturbed soils and skeletal remains as

well as three pit outlines, one of which was designated Feature 14b. These disturbed skeletal remains (which constitute 25% of the individual) consisted of scapulae, a mandible, ribs, vertebrae, rt. innominate, rt. patella and bones from the hands and rt. foot (Figure 22). Within TU1 A-D, an initial pit outline was recorded from .70-.83 m bs and the disturbed remains were observed from .80-1.20 m bs (Figure 23). As excavations proceeded downward, displaced remains (which lacked long bones) were collected within each subsequent level displaying no articulation or purposeful arrangement. The initial burial pit, oriented at 110 degrees, was clearly distinct on the southeastern side where it becomes obscure and indistinct on the south and west and is completely obliterated to the north and northeastern sides. Based on the intact portions, this initial pit appeared to measure 2.10 m long by 1.20 m wide. The subsequent lower pit identified from 1.05 to 1.22 m bs appeared to measure 1.60 m long by 1.00 m wide and was oriented at 120 degrees (see Figure 23). This lower pit contained fill that was a light grayish-brown silty sand with a high root content and both disturbed and primary skeletal remains of Feature 14 comprised of two ribs, a portion of a cranium, innominate and an articulated left foot (Figure 24). Osteological analysis determined the remains belonged to a middle adult male individual. Sex determination was based on the shape of the sciatic notch and mandible. Estimated age was based on moderate occlusal wear. The third possible pit outline was located within TU1D extension at 1.30 m bs along the northeast and southwest edges of the unit. Due to its close proximity to Feature 14, this possible pit was not investigated but was designated as Feature 14b.

Feature 14 has been designated as a partially intact (articulated left foot within burial pit) burial feature that was previously and recently disturbed. Due to the absence of long bones, the skeletal remains may have been disturbed in a cultural context possibly for bone acquisition. As previously discussed, disturbed skeletal remains were collected from successive layers (.80-1.20 m bs) within an upper and lower burial pit outline. The collected remains comprise approximately 25% of this individual with a notable lack of long bones being identified and or recovered. The upper burial pit outline likely represents the intrusion into this burial pit either during traditional times (for bone reclamation), or during a more recent activity such as a pit excavated by construction workers for reburial of the disturbed remains. The soil profile also indicates various episodes of previous disturbances with mixed Layers II and III and an inverted stratigraphy with Layer III (yellowish brown coarse Grade A sand) overlying Layer II (Figure 25). The proposed treatment for Features 14 and 14 b shall be preservation in place within this southern portion of Preservation Area 1.

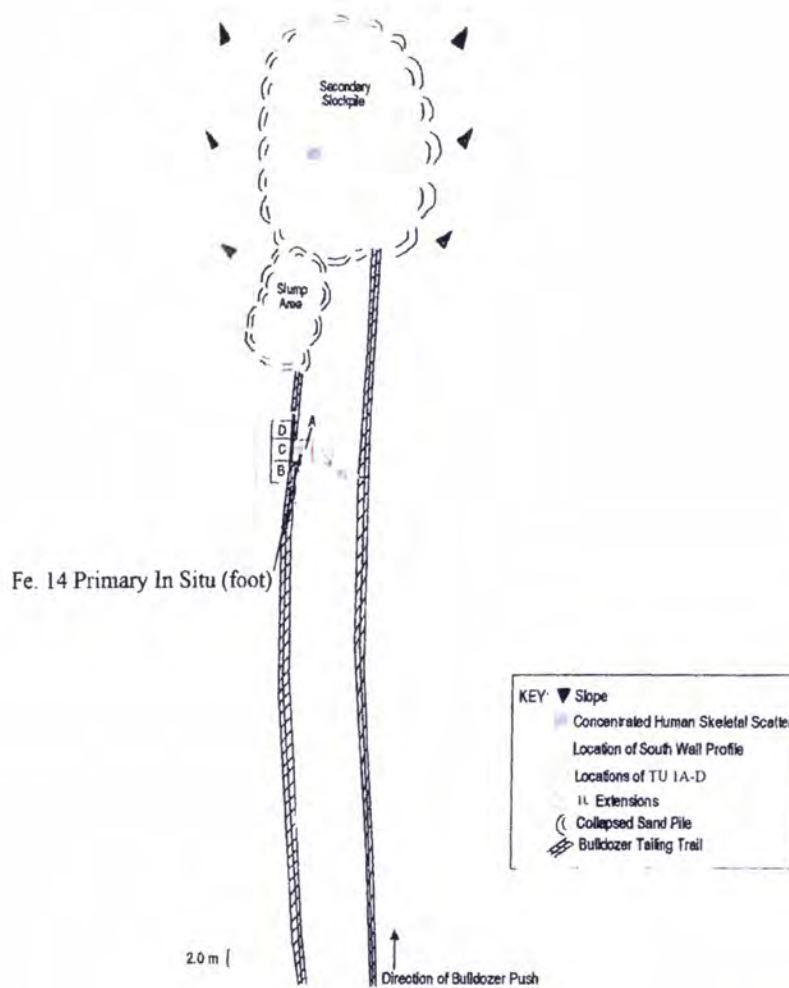
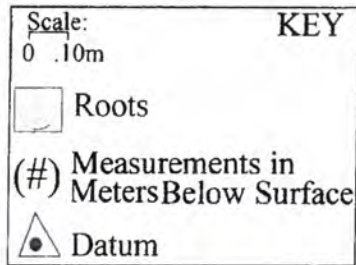


Figure 21. Plan View Map of Site 6679, Blade Test 1, Feature 14, Showing TU1A-D



Test Unit 1A Feature 14

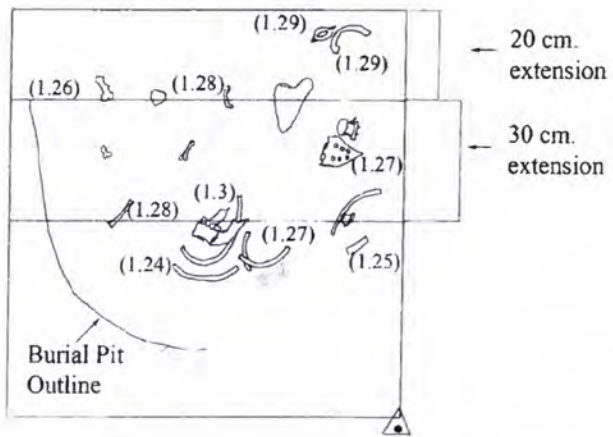
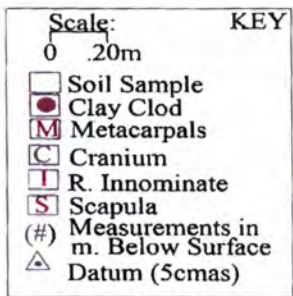


Figure 22. Plan View Map of Site 6679, Blade Test 1, Feature 14a, Test Unit 1a



Feature 14 Shovel Tests

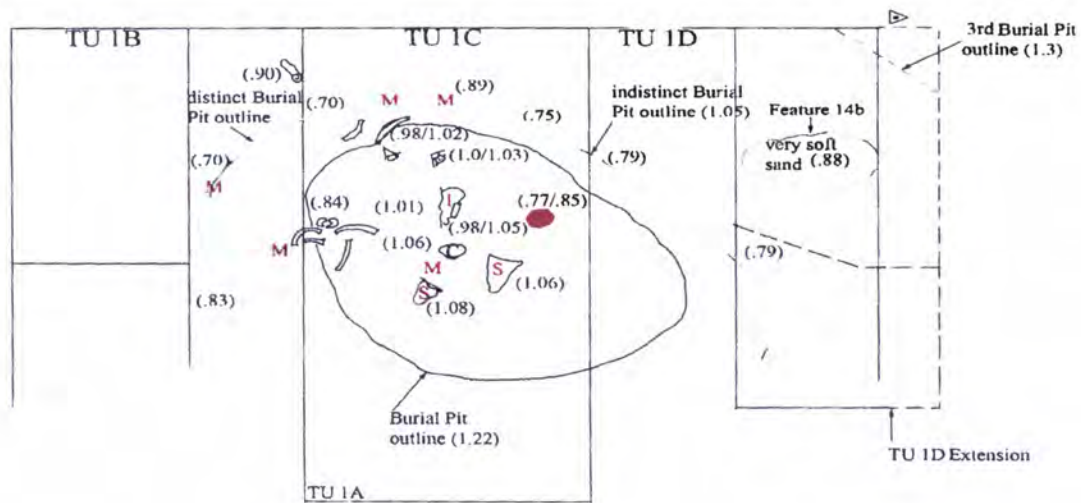
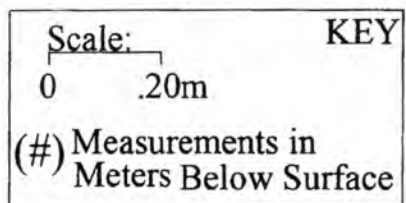


Figure 23. Plan View Map of Feature 14 testing Showing Test Units 1A-D



Feature 14

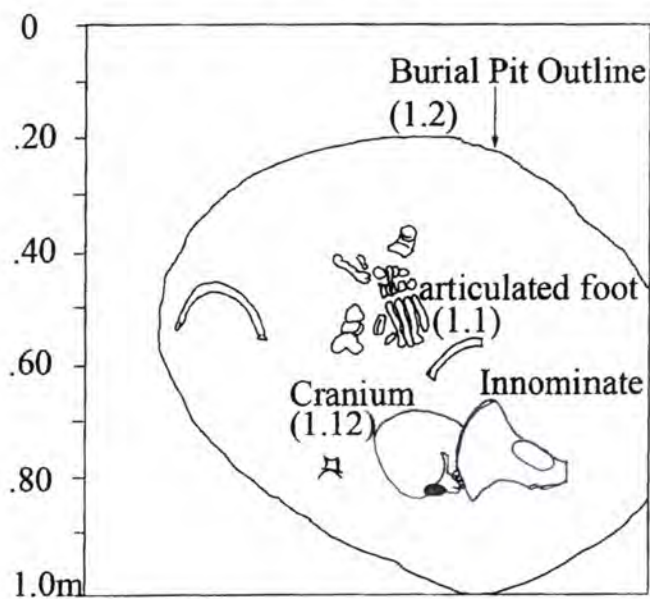
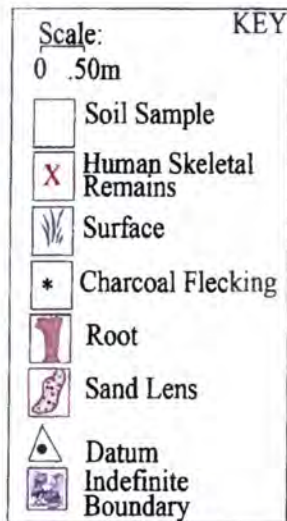


Figure 24. Plan View Map of STU 12 Showing Articulation of Left Foot, Feature 14



Feature 14 Burial Pit #2, Blade Test #1 South Profile

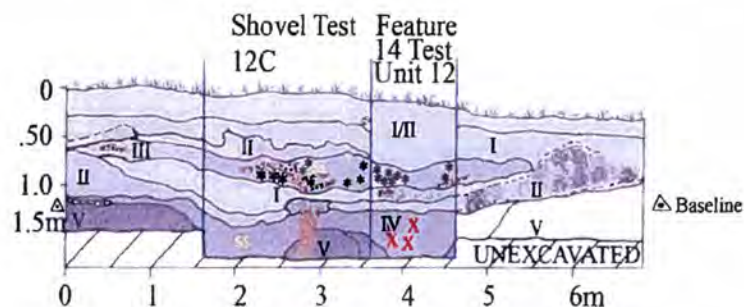


Figure 25. Stratigraphic Profile of South Wall Blade Test 2 Showing Location of Site 6679 Feature 14

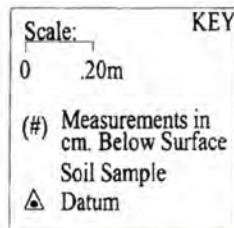
Due to the documentation of intensive and extensive disturbances across this knoll top, along with the discovery of secondarily deposited skeletal remains and partially intact primary burial features, grading activities were relocated back to the northern portion of the project area west of Features 1-4.

Feature 15

Feature 15 was inadvertently exposed while cutting "Grade B" aeolian sand near the base of the dune. As the D-9 pushed material into the sand stockpile, skeletal remains comprised of long-bones and tarsals from both feet were identified. All mechanical grading was stopped and the archaeologist walked the dozer track to determine presence absence of additional skeletal remains. At the beginning of the cut, articulated clavicles and one phalange was identified and a 1.0 m by 1.0 m test unit (TU1) was placed over the concentration documenting the grayish brown

(Grade B) sand mixed with coarse concreted peds (probable pitfill). At .05 m bs, a distinct burial pit outline excavated into the lithified (Grade A) yellowish-brown coarse sand was identified. Excavations continued and additional articulated skeletal remains were documented to .11 m bs and consisted of the left arm, a few carpals, ribs, scapula and vertebrae. No additional human remains were identified in TU 1 except for a disturbed, proximal end of a humerus. Based on the position of these articulated remains, Feature 15 was placed on their right side in a flexed position and situated at 215 amsl (Figure 26).

Laboratory analysis of the skeletal remains documented a robust young adult male approximately 30 years of age. Sex was determined by the robusticity of the skeletal remains (specifically the long bones, brow ridge and gonial angle) and the sciatic notch of the left innominate. Estimated age was determined through minimal occlusal wear, cranial suture closure and the fusion of the clavicle (epiphyses). Feature 15 was determined to be a primary partial *in situ* burial which was recently disturbed and will be preserved in place within the northwestern portion of Preservation



Feature 15

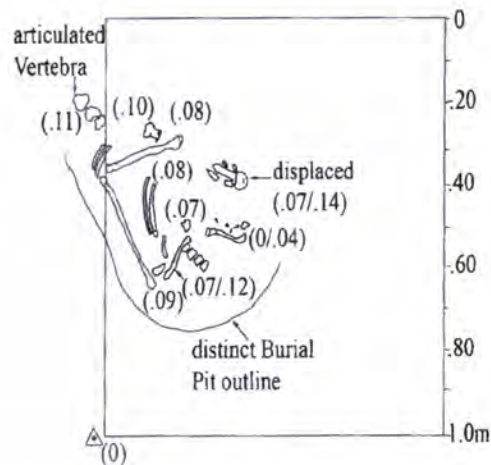


Figure 26. Plan View Map of Site 6679, Feature 15

Feature 16

Feature observed during monitoring of sand mining activities near the toe of the extant dune. As the dozer was grading sand into a stockpile, displaced skeletal remains were observed within the dozer track near the stock pile. Once skeletal remains were exposed, a 50.0 m baseline was erected to ascertain the context of the skeletal remains (primary or secondary) (Figure 27). Two areas of concentrated remains were noted that required further exploration. The first area was along the push pile and the second was at the beginning of the dozer track. The stockpile area was raked and screened and all disturbed skeletal remains (cervical vertebrae, a carpal, and fragments of the innominate and sacrum) were collected. A 2.0 m by 2.0 m test unit (TU 1) was excavated over the skeletal remains and possible pit at the beginning of the track. During the testing a recently disturbed primary burial was documented from .01-.10 m bs within a distinct pit and designated Feature 16a (see Figures 28 and 29). The burial pit was comprised of a pale brown sand surrounded by a yellowish brown almost cemented sand. It measured 1.30 m long by .70 m wide and was oriented 210 degrees. Within the pit, the burial was flexed, placed on its stomach with legs tilted to the left and the fragmented cranium appeared face-up (see Figure 28). While shovel scraping around TU 1, a second possible pit was noted adjacent and east of Feature 16 and temporarily designated Feature 16b. This pit also contained a pale brown sand with numerous roots and measured 1.20 m long by .60 m wide and oriented at 342 degrees. TU 1 was expanded an additional 1.0 m to the east to test Feature 16b where no skeletal remains were documented and excavations terminated at .23 m bs (see Figure 30). Due to a lack of cultural materials, Feature 16b is likely a depression from a former tree.

Based on the above, Feature 16 is a primary burial of a young adult male that was recently disturbed. Sex was determined by the shape of the gonial angle and size of brow ridge and mastoid process and Age was based on dentition (minimal occlusal wear). Features 16 and the anomalous pit shall be preserved in place within the northwestern portion of Preserve Area 1 see Figure 8 and Table I.

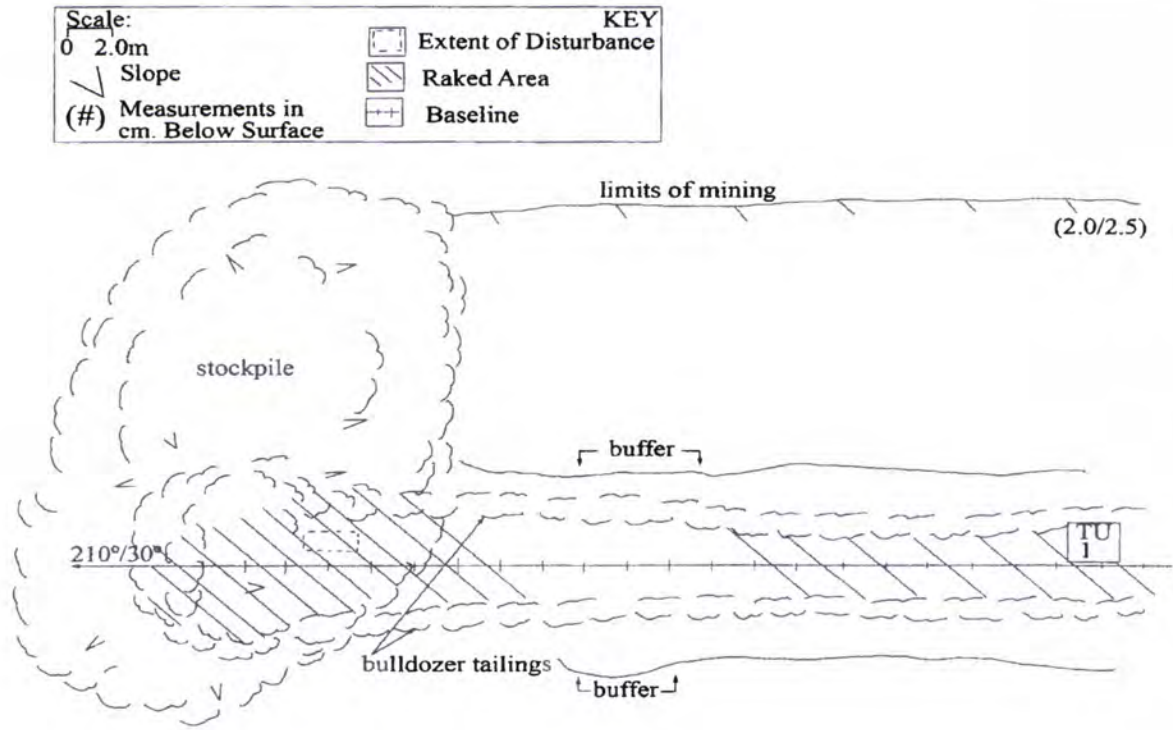


Figure 27. Plan View Map of Scatter for Site 6679, Feature 16, TU 1

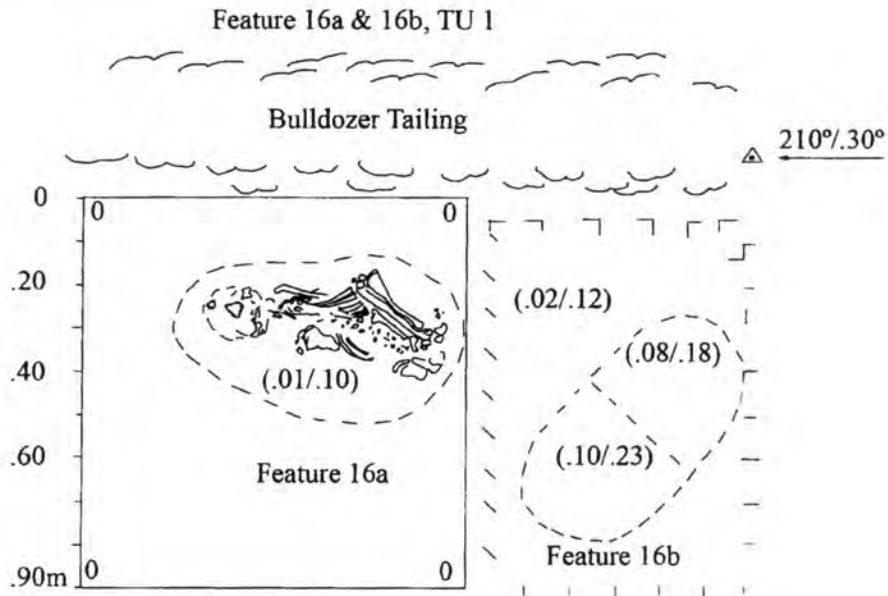
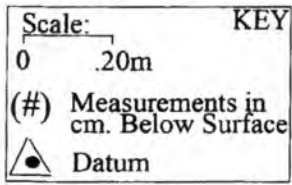


Figure 28. Plan View Map of site 6679, Features 16a and 16b, Test Unit 1

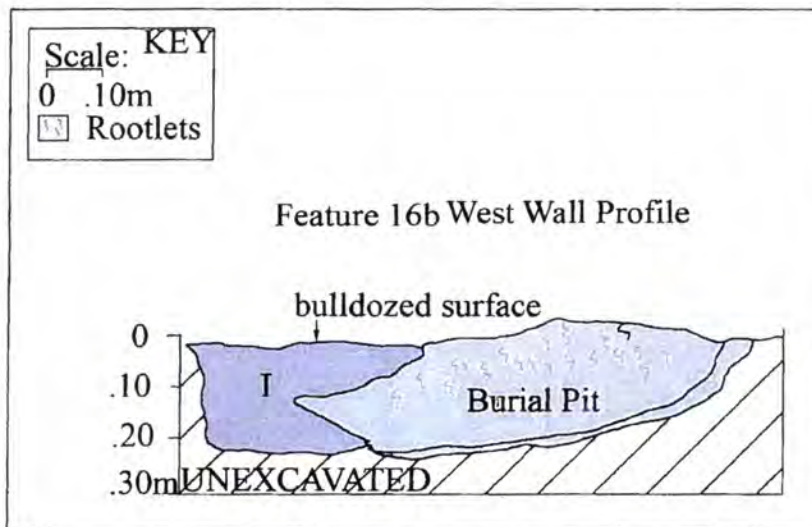


Figure 29. Profile of West Wall, Site 6679, Feature 16b

Feature 17a and b

Feature 17a was originally identified during a field inspection after an intense rain storm. Water flowed through the floor/graded surface of the project area exposing and re-depositing human remains along the sandy clay surface. A baseline approximately 40.0 m long was erected along these re-deposited materials and all clearly displaced remains were collected and consisted of ribs, carpals and phalanges from both hands, long bones of both arms except for left ulna, portions of the maxillae, mandible and cranium (Figure 30). While documenting the disturbance only the right scapula, a few cervical vertebrae and portions of the clavicles were still articulated within the sand burial pit and designated as Feature 17a. The collected displaced remains from Feature 17a belong to a young adult female. Sex was determined by the shape of the gonial angle as well as size of remains. Estimated age was determined through the dentition, cranial suture closure and observation of epiphyseal closure of the long bones. Feature 17a was determined to be a recently disturbed primary burial feature that will be preserved within Preservation Area 1.

After a subsequent storm, additional skeletal remains were dispersed along the floor of the pit and a concentration of skeletal remains was noted within the clay adjacent to Feature 17a (which is a sand burial). After the skeletal remains were documented along the baseline, a 2.0m by 1.0m test unit (TU 2) was excavated over the new concentration (Figure 31). A defined burial pit within the Layer IV clay was apparent at .26 m bs, measured 1.0 m long by .60 m wide and was oriented at 20 degrees. An articulated right femur and foot were identified at .23 m bs and this burial was designated as Feature 17b (Figure 33). As excavations continued, the burial extended outside the boundaries of TU 2, thus another test unit was excavated along the north side of TU 2 exposing the upper torso of Feature 17b. The testing documented a clay pit burial placed on its left side flexed with right arms extended down the side. Bird bone was noted just outside the burial pit along the northeast side of the cranium. Feature 17b is a middle adult male that was disturbed by the storm wash along the right innominate and ribs. Sex was determined by the shape of the sciatic notch and size of femoral and humeral head. Estimated age was based on cranial suture closure as well as observation of moderate occlusal wear of dentition. The faunal remains comprised of bird bone were likely a grave good that was slightly displaced from the burial pit by rushing water. Feature 17b (a clay pit burial) was recently disturbed and will be preserved in place in the northern section of Preservation Area 1 (see Figure 8 and Table I).

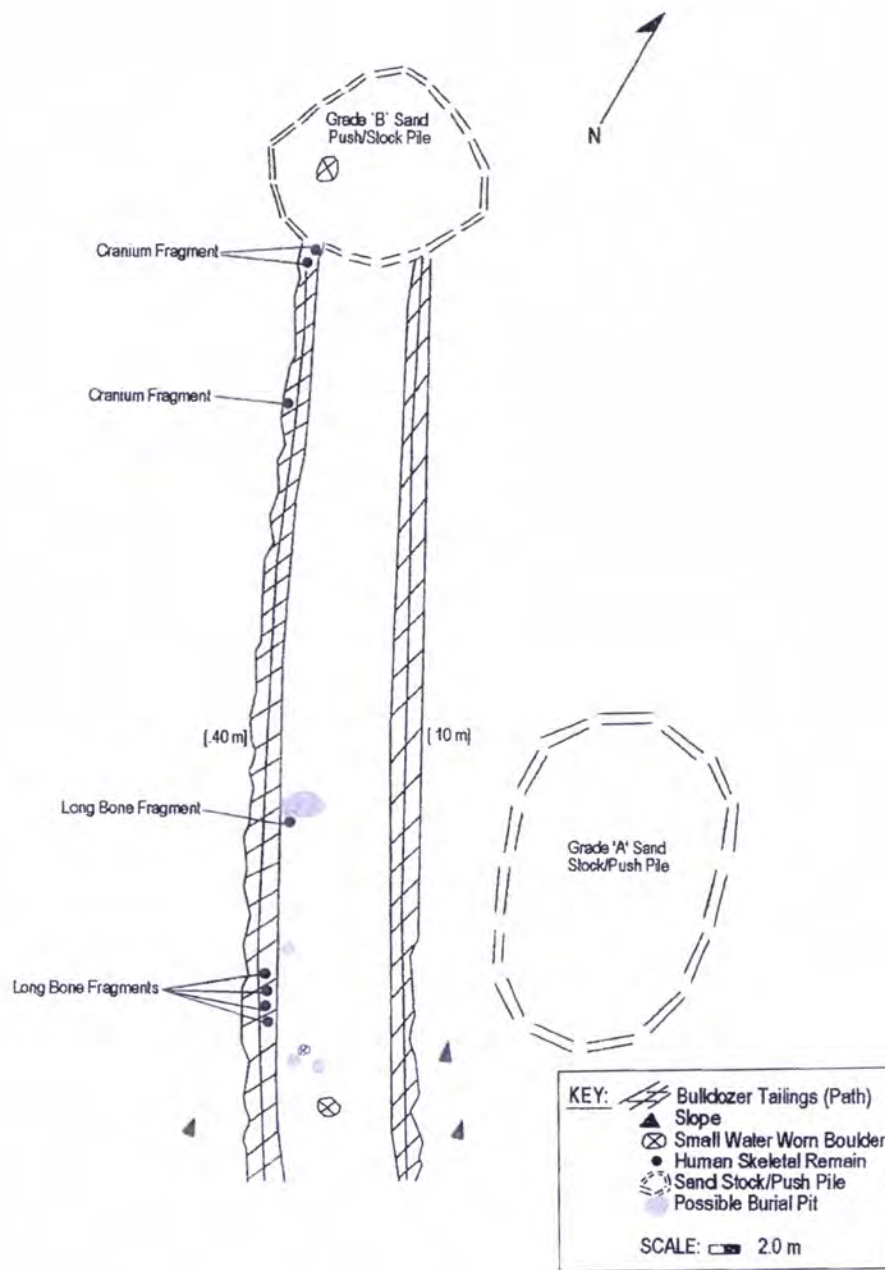


Figure 30. Plan View Map of Surface Scatter, Feature 17

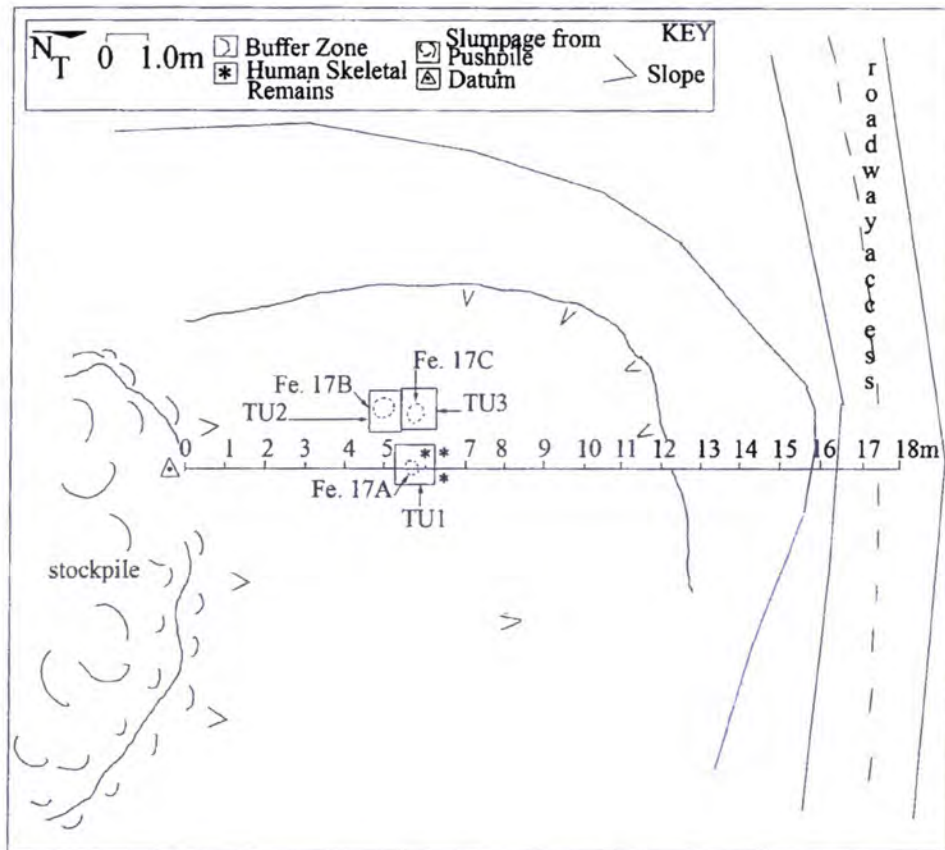


Figure 31. Plan View Map Showing Test Units 1-3 for Site 6679 Features 17a and b

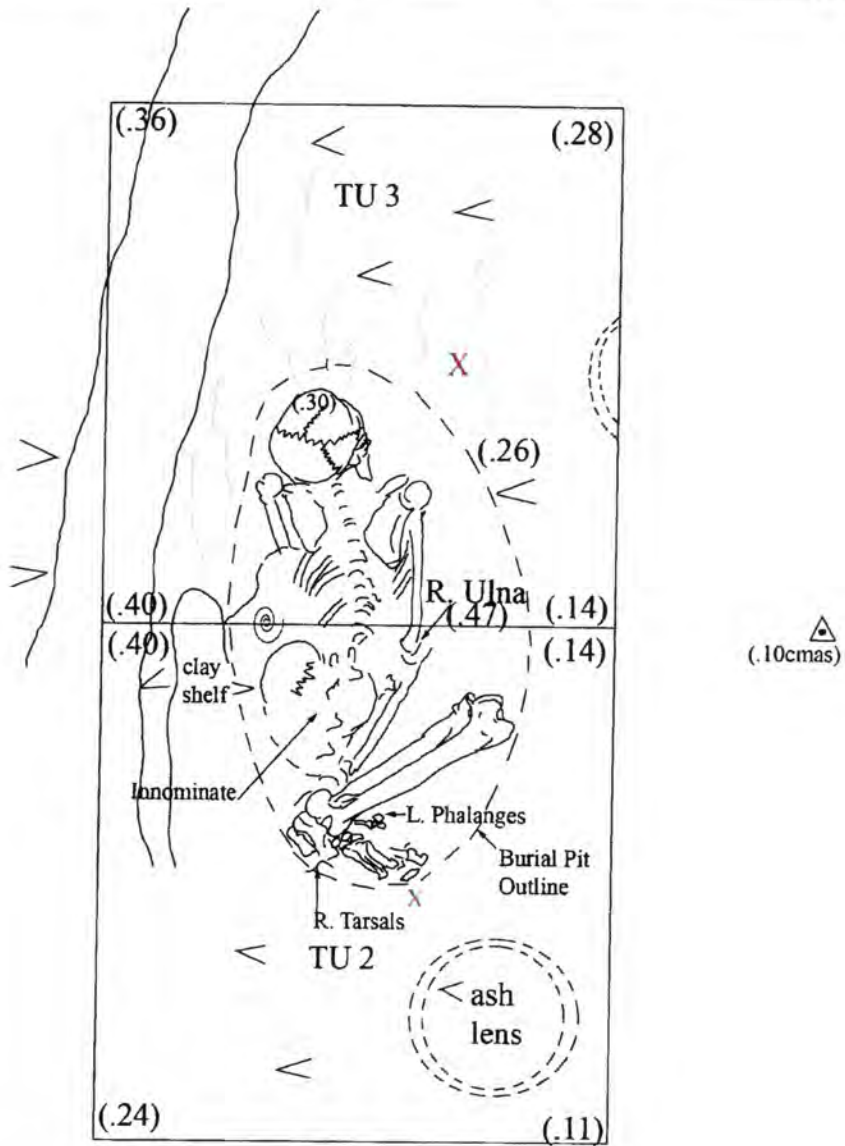
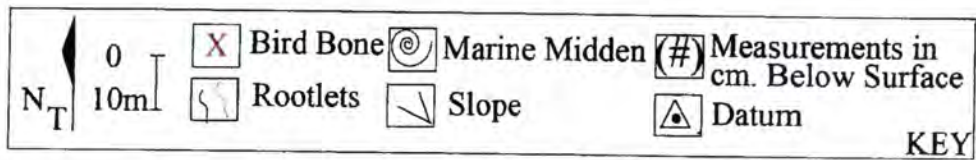


Figure 32. Plan View Map of Site 6679, Feature 17b, Clay Pit Burial, TU 2 and 3

Upon the discovery of Features 15-17 in the northern portion of the project area, sand mining activities were relocated to the center of the Phase A.

Feature 18a-d

Features 18a-d were identified during monitoring of grading activities within the central portion of Phase A. The features are situated along the slope near the top of the dune adjacent to future Features 33a-c (Figure 33). Burial feature 18a was first observed because a distinct pit outline measuring 1.00 m long by .60 m wide was identified within the yellowish-brown "Grade A" sand. The pit contained a light yellowish grey silty sand with a high root content, and was clearly evident within the yellowish gold sand. Upon identification of the pit all mechanical dozing ceased and the area was examined documenting two additional potential burial pits (Features 18b and 18c). A 2.0 by 2.0 m test unit was placed over Feature 18a documenting a primary *in situ* burial placed on its back, flexed with legs and cranium tilted towards the right side. The left arm was flexed crossing over the torso to the right clavicle, and the right arm extended along the right side where the right hand is adjacent to right innominate (Figure 34). A lithified sandstone cobble was noted on the sternum and may have been a burial marker and or part of a burial capstone. Displaced remains consisted of the right leg long bones, tarsals of the left foot and the frontal piece of cranium. Feature 18a is designated as a recently disturbed primary burial of a young adult female situated at 237 amsl. Sex was established by size of humeral head and clavicle.

The second burial pit, Feature 18b, was adjacent and north of Feature 18a measuring .50 m (e/w) by .40 m (n/s). contained two lithified slabs and one tarsal belonging to a child which was documented at .17 cm below the surface of the pit (see Figure 34). No other remains were observed at this depth, and due to the determination that Feature 18b was cultural, no other excavations were warranted and Feature 18b is presumed to be a primary *in situ* burial of a child. Estimated age was preliminarily based on the size of the tarsal.

Feature 18c is a defined pit within the lithified "Grade A" sand which measured .94 m by .94 m (Figure 35). A 1.0 by 1.0 m test unit was placed over the burial pit, however after excavations commenced, the pit became larger and at .40 m bs bootlegs to the east, thus the unit was expanded subsurface following the excavated pit. At 1.77 m bd, the western portion of the pit (which is on the downslope side) terminates on concreted sand creating a shelf as the eastern portion of the pit continues downward (Figure 36). And organic deposit of reddish brown silty clay was noted on the lithified sand shelf and likely represents a purposeful preparation of a step

for access to the burial below. This cultural manifestation was noted at another deep burial pit at the Maui Lani development burial TS 9. Test excavations at TS9 noted that each lithified step or shelf contained a layer of clay loam deposit which was surmised to prevent erosion of the lithified sand during continuous access on the steps. Excavations along the eastern side of the Feature 18c burial pit noted the occipital portion of the cranium at 1.62 m bs with the remainder of the burial situated at 1.70-1.77 m bs. The base of the pit was documented at 1.82 m bs and measured 1.05 m long by .45 m wide. The burial pit in its entirety measured 1.09 m long by .87 m wide including the western shelf/step. Although the burial was not fully exposed, excavations showed that Feature 18c was placed on their right side, fully flexed with left arm bent encircling the flexed legs (see Figure 36). Feature 18c is a primary burial feature of young adult female. Sex was based on the gracile brow line and mandible as well as the shape and size of the gonial angle.

While inspecting the surfaces around Feature 18a, another possible pit designated Feature 18d was observed to the north of Feature 18a. This pit was J-shaped on the surface and measured 1.35 m long by .39-.88 m wide, however at .04-.15 m bs the shape of the pit changed to an oval shape and a basalt cobble was noted in the northwest portion of the pit (Figure 37). Excavations continued to approximately 1.00 m bs where three aligned basalt boulders were noted (Figure 38). The pit was bisected and two boulders were removed. Excavations continued for another .20 m when a second layer of boulders was noted which contained an upright oblong boulder. Upon the identification of two layers of basalt boulders with an upright stone in a pit excavated into the lithified sand, no further excavations were deemed necessary at Feature 18d (Figure 39). Based on the location of this presumed burial site atop a high sand dune, coupled with the uniqueness of the pit (the presence of basalt boulders and an upright stone within a deep lithified pit) Feature 18d was likely a well respected, high status individual.

Features 18a-d are primary burial features with little to no disturbances. These burials will be preserved in placed within the central portion of Preservation Area 1.

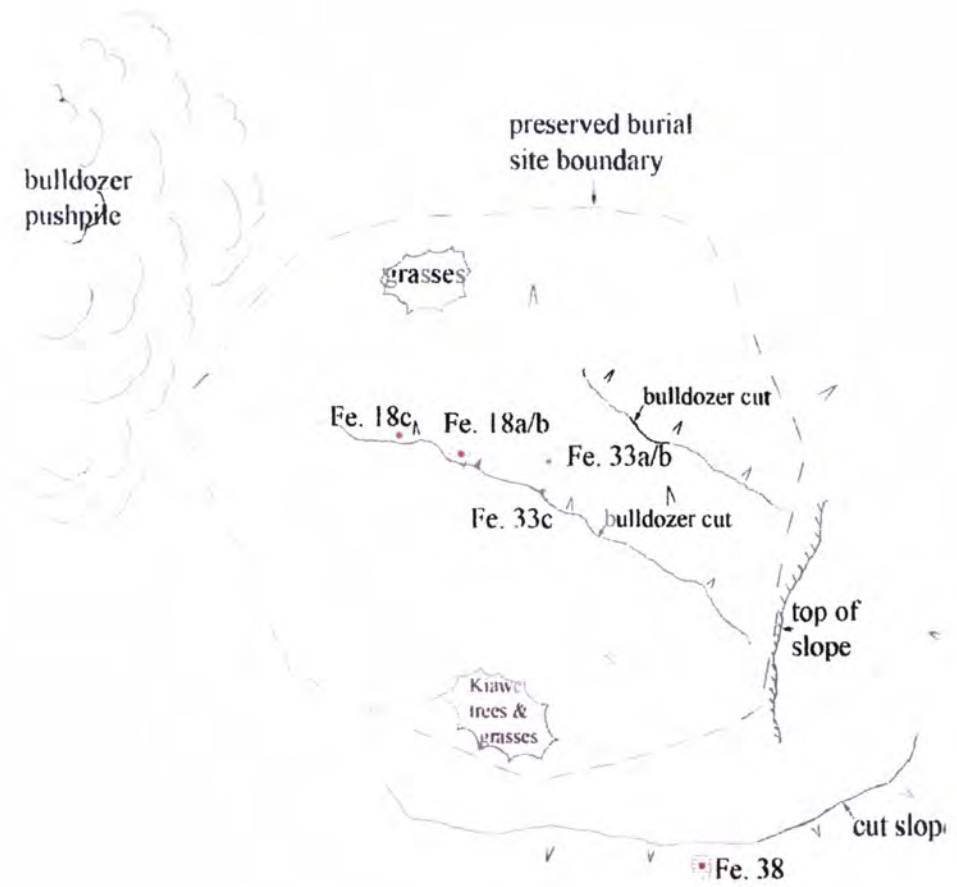
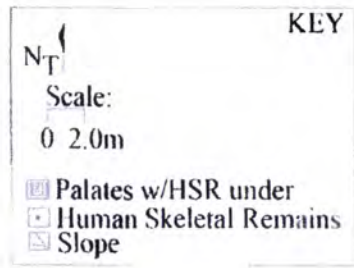


Figure 33. Plan View Map of Site 6679, Features 18a-d and 33a-c

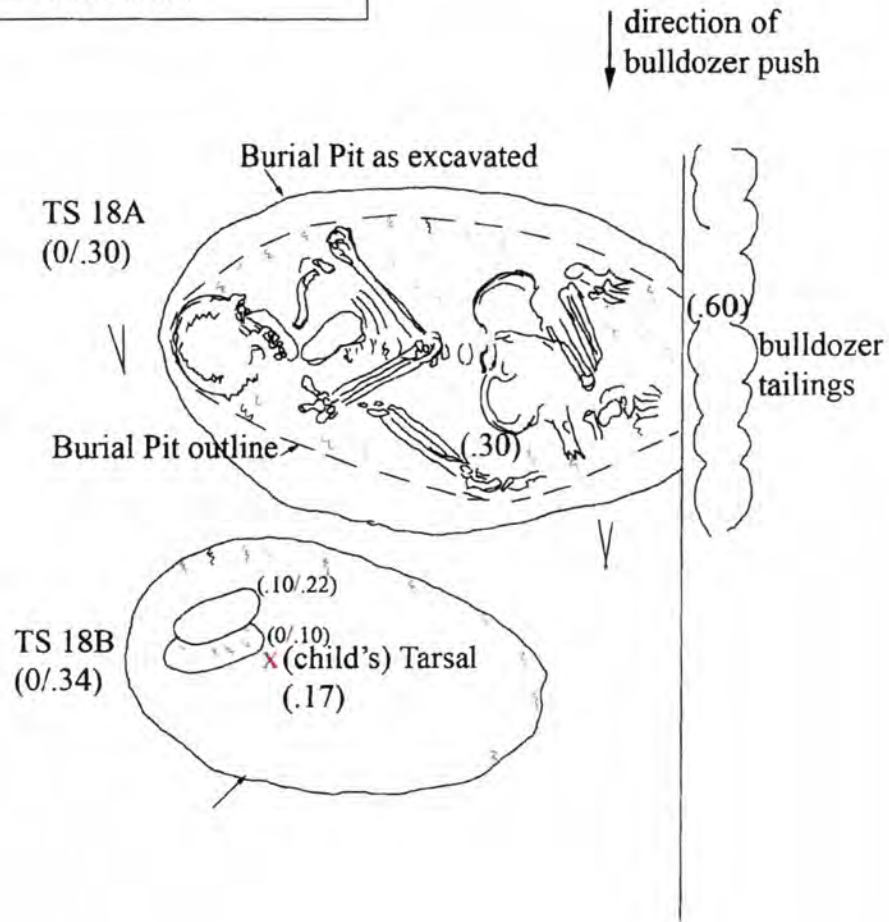
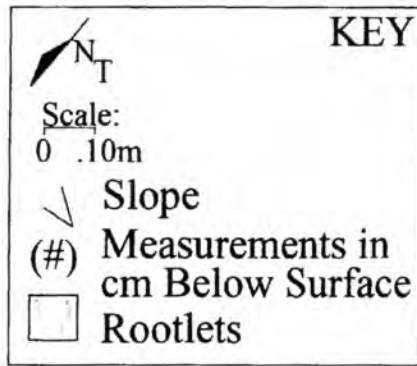


Figure 34. Plan View Map of Features 18a& 18b

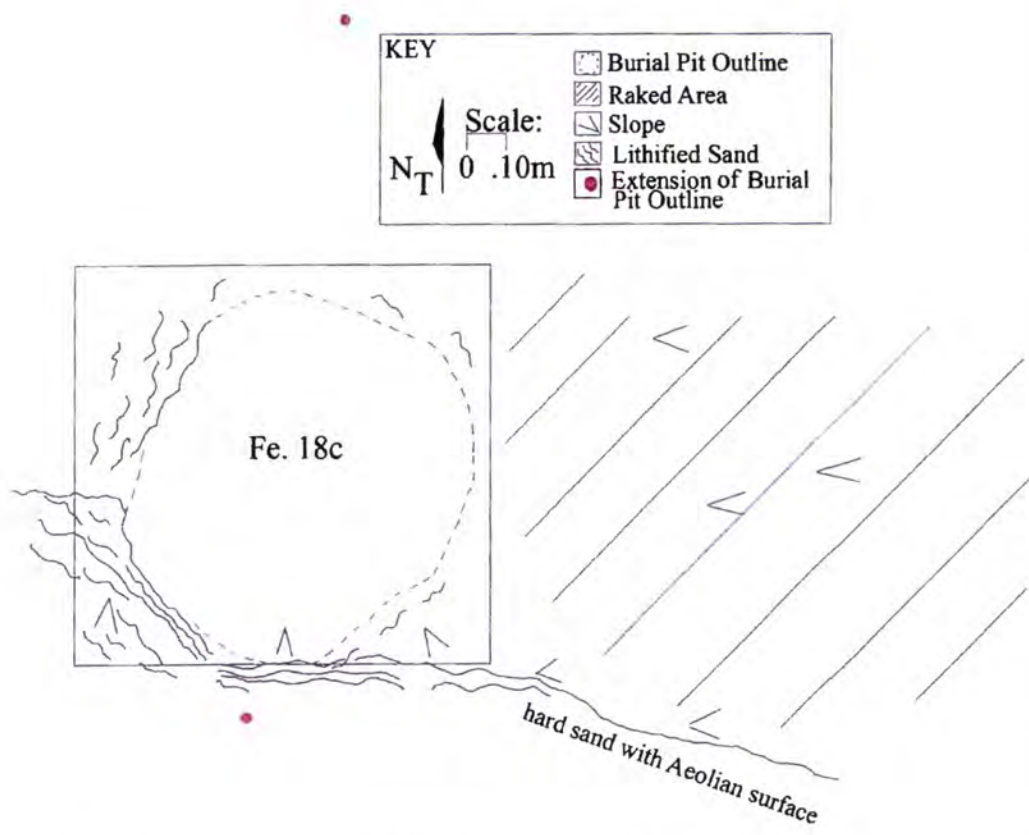


Figure 35. Plan View Map of Burial Pit Outline for Site 6679, Feature 18c at Surface

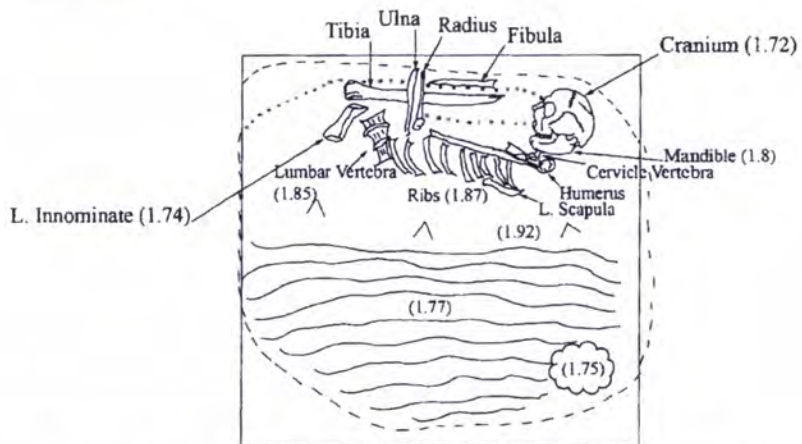
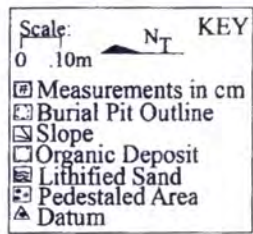
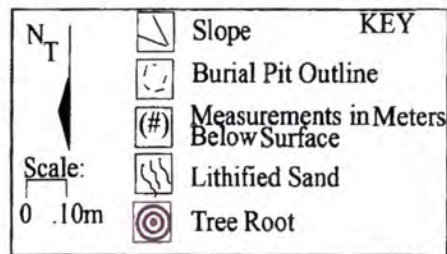


Figure 36. Plan View Map of Feature 18c at Base of Excavations (1.82 m bs)



Feature 18D

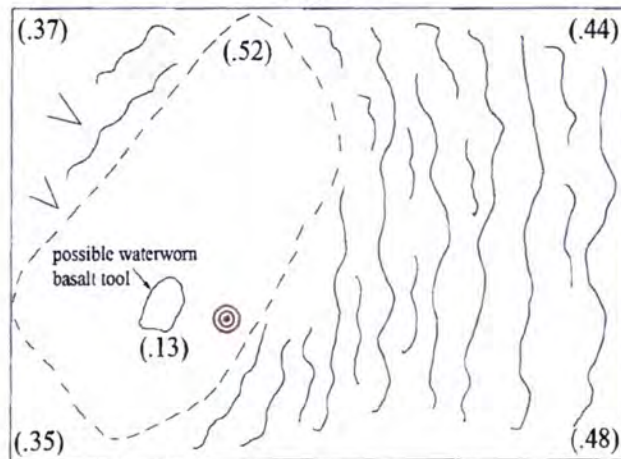
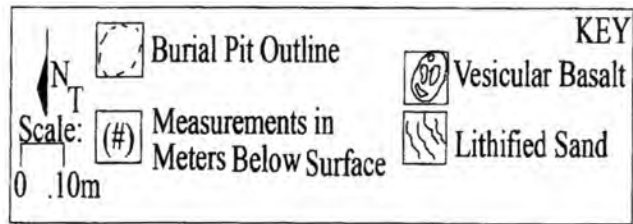


Figure 37. Plan View Map of Site 6679, Feature 18d at .15 m bs



Feature 18D

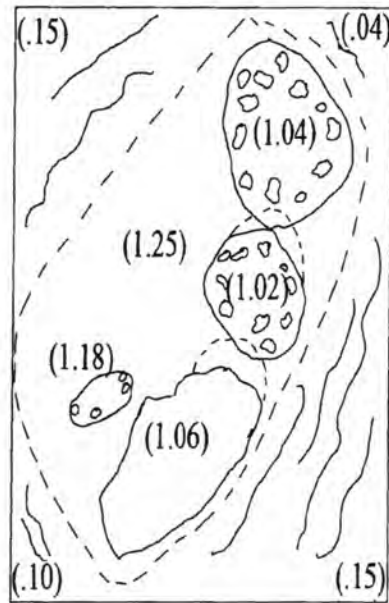


Figure 38. Plan View Map of Site 6679, Fe. 18d Showing Aligned Boulders at approximately 1.00m bs

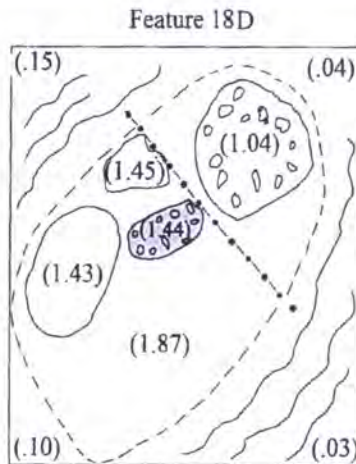
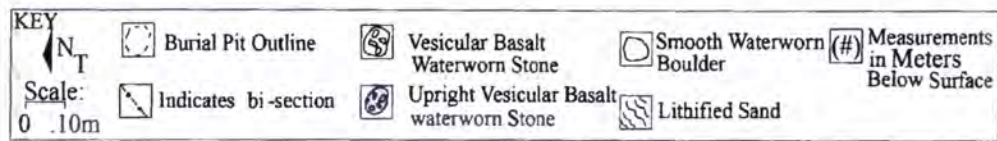


Figure 39. Plan View Map of Site 6679, Feature 18d at 1.20 m bs

Feature 19

Feature 19 was designated as a recently displaced possible primary burial. It was identified and partially disturbed during grading activities in the central portion of the project area. As the dozer was pushing sand into a stockpile, several skeletal remains were observed in the dozer tailing. A baseline was erected documenting the skeletal elements spread within a 12.0 m long by 6.0 m area (315 degrees) from 226 to 230 amsl (Figure 40). During documentation, no concentration of skeletal remains or a burial pit indicative of a primary/*in situ* component was noted. The collected displaced remains consisted primarily of the upper torso except for portions of the cranium (frontal and parietals), vertebrae and ribs. Additionally the right arm bones were fragmented as compared with the left arm bones. Also collected were shaft fragments of both fibula, a portion of the right femur shaft and most of the bones of both feet.

Laboratory analysis of the osteological assemblage indicates that Feature 19 is the remains of a young adult female. Sex was determined from the size/shape of the sciatic notch, the clavicle and attributes of the cranium. Estimated age was based on observation of minimal occlusal wear of

dentition, epiphyseal union of long bones as well as cranial suture closure. Although less than 90% of this individual was collected, it is possible that the upper portions of Feature 19 may have been articulated prior to the current undertaking. Thus Feature 19 has been categorized as a recently disturbed possible primary burial that will be preserved in the area where it was identified (see Figure 8 and Table I).

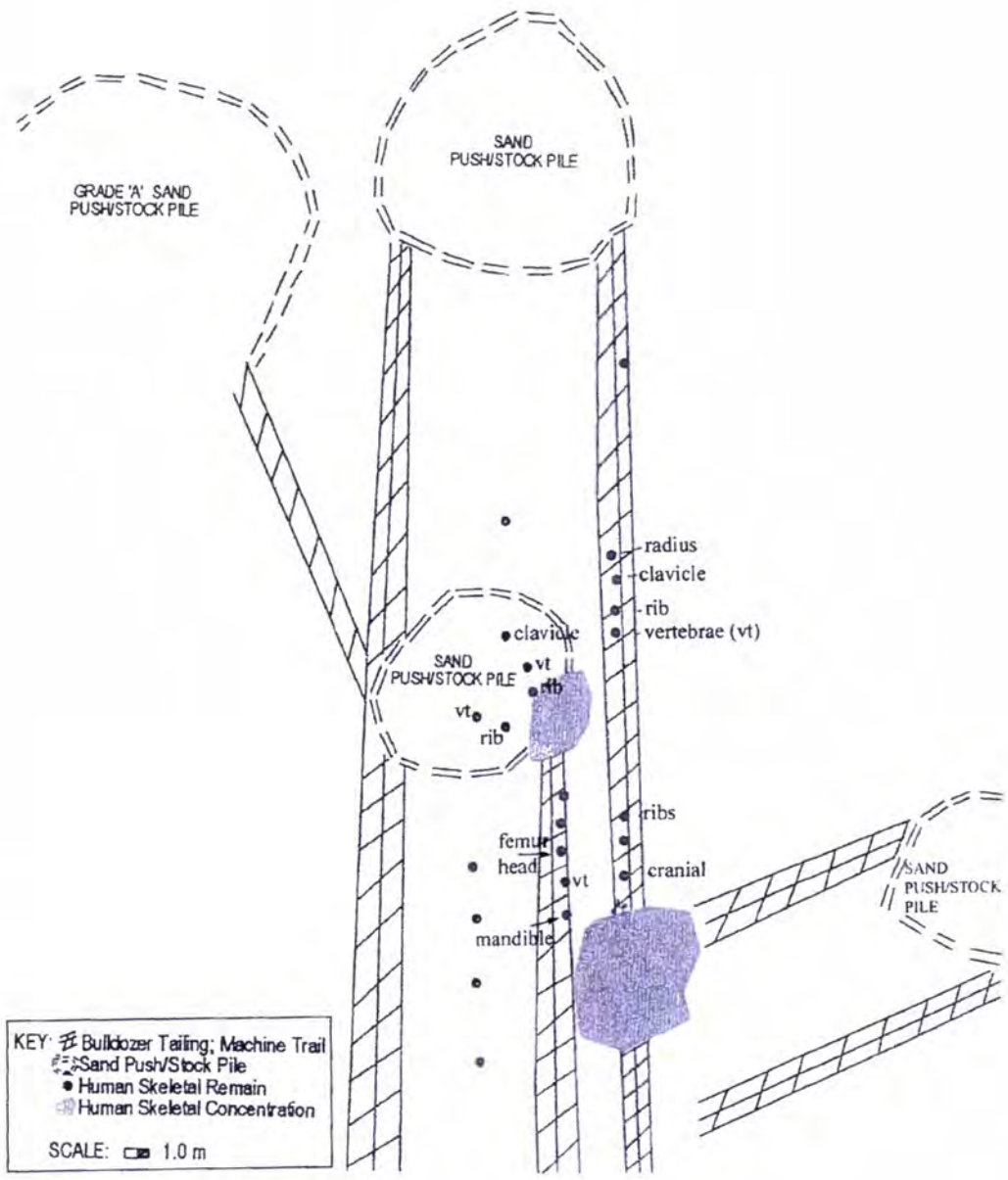


Figure 40. Plan View Map of Surface Scatter, Site 6679, Feature 19

Feature 20

Feature 20 was identified during monitoring of grading activities with a D-6 bulldozer upon a high dune situated in the northern portion of Phase A. After the skeletal remains were exposed a plan view map was created documenting the findings (Figure 41). Raking, shovel scraping and screening was instituted within the dozer pass and stockpiles. Upon the identification of a concentration of remains, a 2.0m by 2.0 m test unit was placed over the concentration documenting articulated and displaced but anatomically correct remains comprised of the innominate with lumbar and thoracic vertebrae, as well as a portion of the left hand (Figure 42). The innominate and lower vertebrae were slightly displaced from their original, primary context however they were still articulated and held together by a root mass. Collected displaced remains consisted of portions of the cranium, vertebrae and ribs, both clavicle, right ulna, left humerus fragments of right foot and right hand. A perforated human molar was also found close to the scatter and is presumed to have been a grave good. Based on the foregoing, Feature 20 has been designated as a partially, intact primary burial of a young adult female situated at 225 amsl (approximately 20.0 ft above the surrounding surface). Sex was established through observation of the sciatic notch, humeral head and acetabulum and estimated age was based on observation of epiphyseal fusion of long bones as well as cranial suture closure. Feature 20 will be preserved in place within northeastern portion of Preservation Area.

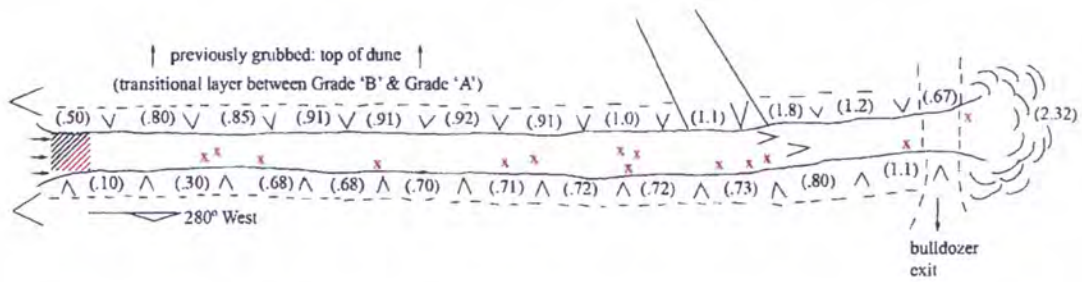


Figure 41. Plan View Map of Scattered Human Remains, Site 6679 Feature 20 within Bulldozer Track

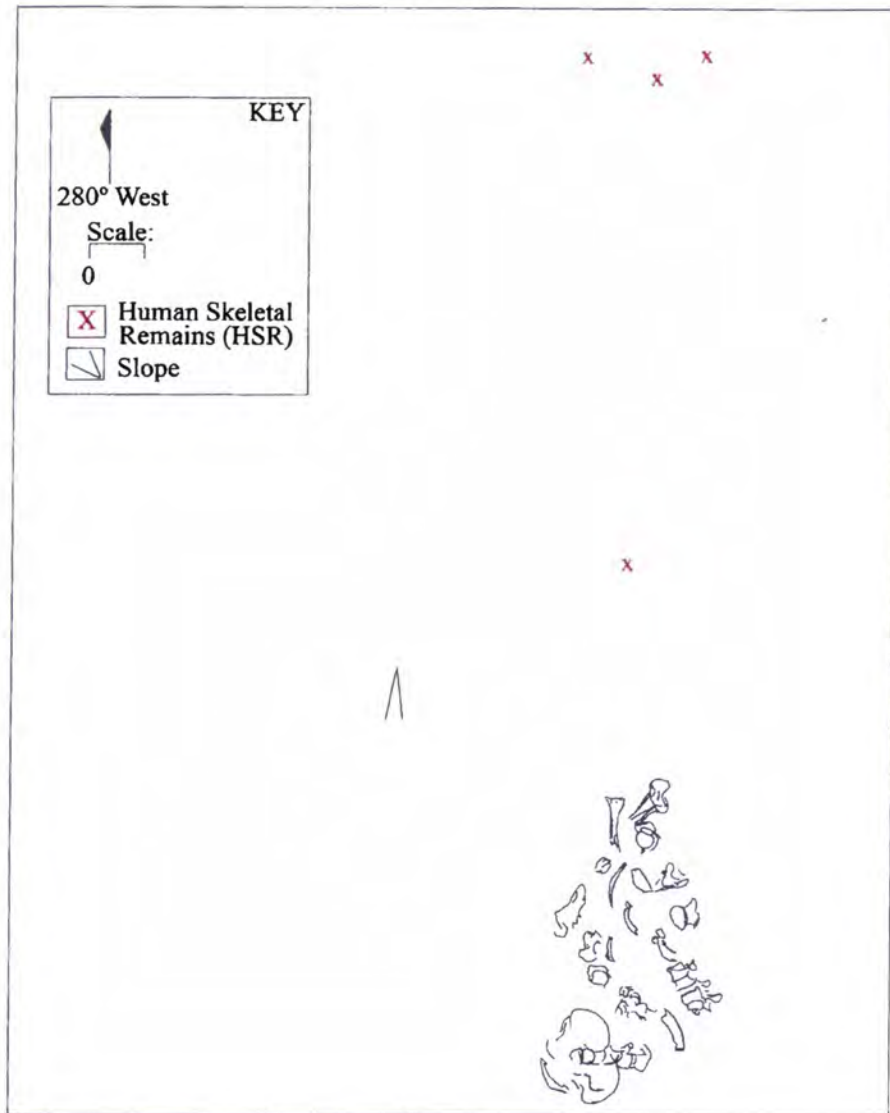


Figure 42. Plan View Map of Test Unit Showing Partially Articulated Remains Site 6679-Feature 20

Feature 21

Feature 21 was identified in the northern portion of Phase A just north of Feature 20. It was observed during grading activities utilizing a D6 bulldozer. Upon the discovery of skeletal remains, hand testing was initiated and documented a clearly defined burial pit excavated into the lithified sand and measured .60 m (n/s) by .30 m (e/w) and was oriented at 325 degrees. Within the pit are *in situ* human remains consisting primarily of long bones in a tightly flexed, “bundle like” position along with basalt artifacts (Feature 43). Specifically, Feature 21 consists of robust skeletal remains comprised of articulated right and left arms with hands, articulated right leg with foot, articulated left tibia, fibula and foot where the left femur is not articulated and positioned under the right humerus. The long bones of the left and right femur exhibit cut marks likely from the basalt chopper and basalt flake embedded into the proximal end of the left femur. The cut marks appear to be related to the removal of these extremities from the torso as opposed to inflicted trauma. Missing from the osteological assemblage of Feature 21 is the cranium, the chest and shoulder girdle (vertebrae, ribs, sternum, scapulae, clavicle), patella and the pelvic girdle (sacrum and innominate). Additionally, an *opihi* shell (*cellana sp.*) was recovered while screening material in close proximity to the burial pit. Based on the above information, along with the analysis of the skeletal remains, Feature 21 belongs to a mid adult male situated at 216.63 amsl which shall be preserved in place within the northern portion of Preserve Area 1.

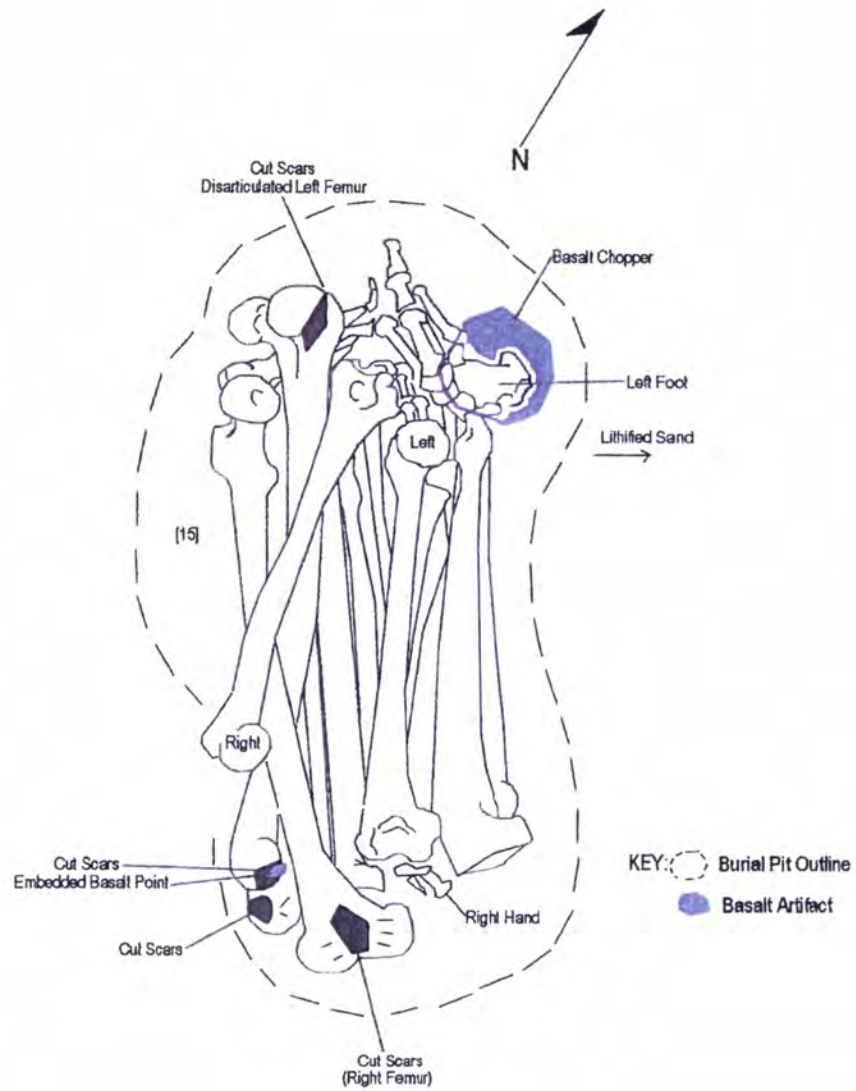


Figure 43. Plan View Map of Site 6679, Feature 21

Features 22a and b

Feature 22a and b consists of two individuals; one that was recently displaced and was likely a primary burial (Feature 22a) and the other, which remains *in situ* in its primary position (Feature 22b). Feature 22a was inadvertently exposed while monitoring a D-6 bulldozer cutting and pushing sand up against a steep vertical cut slope. Once the skeletal remains were identified a 45.0 m area was cordoned off and raked in an effort to document the findings (Figure 44). The area was raked, shovel scraped and screened where no intact component of Feature 22a was identified. The testing recovered approximately 98% of this individual, thus it is presumed that Feature 22a was a primary *in situ* burial that was recently displaced. Observation of the skeletal remains identified this individual as a young adult female. Estimated age was based on observation of the auricular surface of the ilia, minimal occlusal wear of dentition as well as epiphyseal and cranial suture closure. Sex was determined by the sciatic notch and cranial characteristics.

During the testing and documentation of Feature 22a, a second possible burial pit with skeletal remains was identified and designated Feature 22b. A 1.0m by 1.0m test unit was erected over the findings and at .11 mbs a defined burial pit measuring .75 m long by .66 m wide and oriented at 150 degrees was identified. Within the pit were *in situ* remains comprised of cranium, humeral head and a portion of the mandible situated at elevation 223.85 amsl (Figure 45). Excavations proceeded around the cranium to insure the remains were articulated and in their primary context. The atlas (1st cervical vertebrae) was confirmed under the cranium approximately .10m into the pit. Based on the position of these remains, within a relatively small pit, the individual appears to be placed in a sitting position and is the remains of a young adult male. The only disturbance to this individual was to the top of cranium. Sex determination was based on the size of humeral head and attributes of cranium and mandible. Age was based on stage of fusion for humeral head and cranial suture closure.

Feature 22b is documented as a young adult male primary burial feature and Feature 22a is a young adult female probable primary burial that was recently disturbed from its original context. Both features are young adults that will be preserved in place (Feature 22b) and or near where they were found (Feature 22a) within the central portion of Preservation Area 1 (see Figure 8 and Table I).

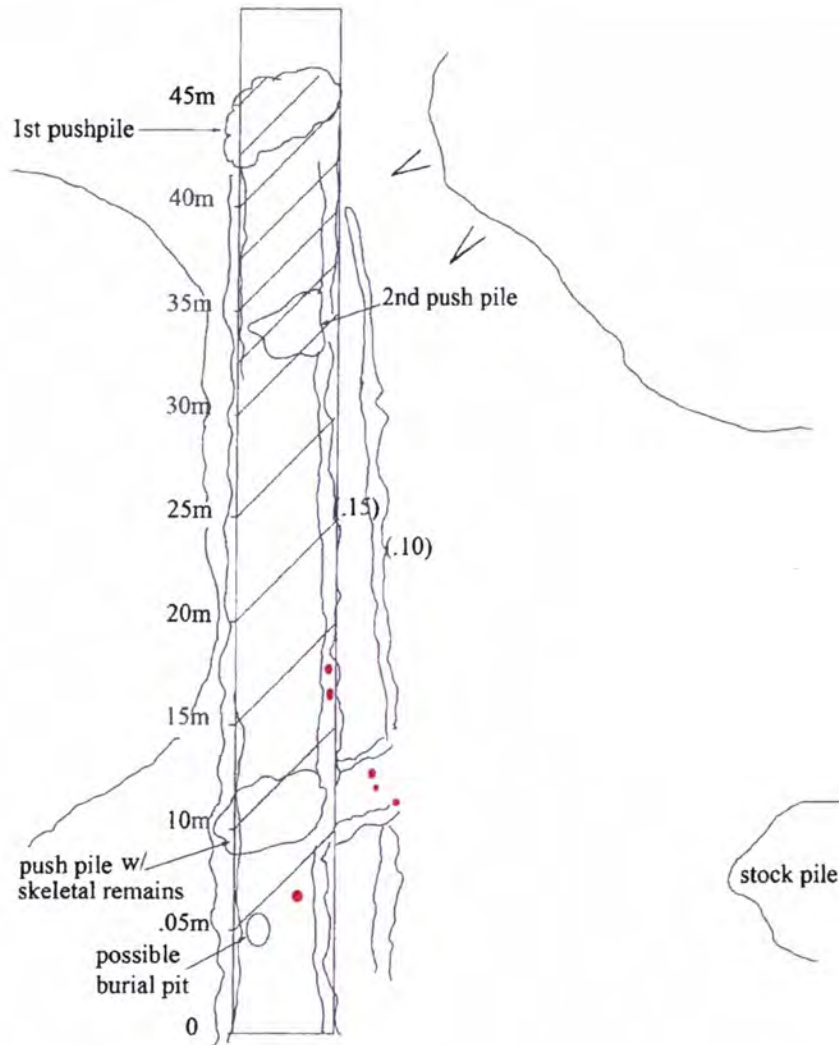


Figure 44. Plan View Map of Scattered Human Remains for Site 6679, Feature 22a

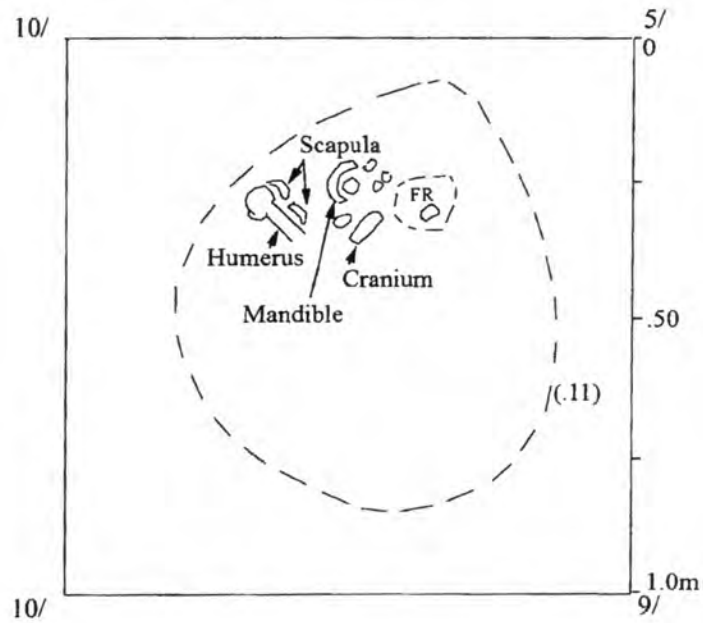
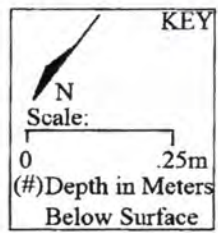


Figure 45. Plan View Map of Site 6679, Feature 22b.

Features 23a and 23b

Feature 23 was inadvertently exposed during controlled grading with the D-6 dozer. As grading commenced within the lithified sand, human remains were identified within the dozer track that measured 26.0 m long by 6.0 m wide and two possible burial pits were also visible on the surface (Figure 46). The first distinct pit within the sandstone contained grayish silty sand- Grade B (10YR 5/3.5) with sand stone peds and a concentration of broken remains (tarsals, calcaneous, talus, fibula and phalange) and was designated Feature 23a. A 1.0m by 1.0m test unit (TU1) was placed over the burial pit and excavated down to a maximum depth of 0.22cm below the current surface. The oval shaped burial pit measured 0.90 (n/s) by 0.45m (e/w) and at approximately .02-.05 m below the surface in the pit, anatomically correctly positioned humerus (left), scapula, ribs, portions of foot (right) and hands (both) were noted within the pit (Figure 47). All excavations were ceased at this point and raking and collection of displaced human remains were initiated. Most of the skeletal elements that were not previously documented were collected except for some ribs and portions of the feet and innominate. The human remains of Feature 23a were from an older adult female approximately 60 + years of age. Estimated age was based on observation of the mandible exhibiting subperiosteal/abscessed lower central incisors, as well as alveolar resorption- which typically indicates old age. Sex was determined by the sciatic notch. The amorphous shaped second pit (Feature 23b) was also excavated (TU2) into lithified sand and contained a grayish silty sand. Excavations terminated at .17 m into the pit where no human remains were identified (Figure 48). The pits function is inconclusive, but due to its shape it was likely from tree fall and or tree removal and likely not a cultural pit. Feature 23a was determined to be a primary burial feature that was recently disturbed and will be preserved in place. Feature 23b was not a burial pit and was designated as an anomalous pit like 16b.

Due to the identification of Features 18-23, grading activities relocated to the secondary ridge within the northeastern portion of the Phase A.

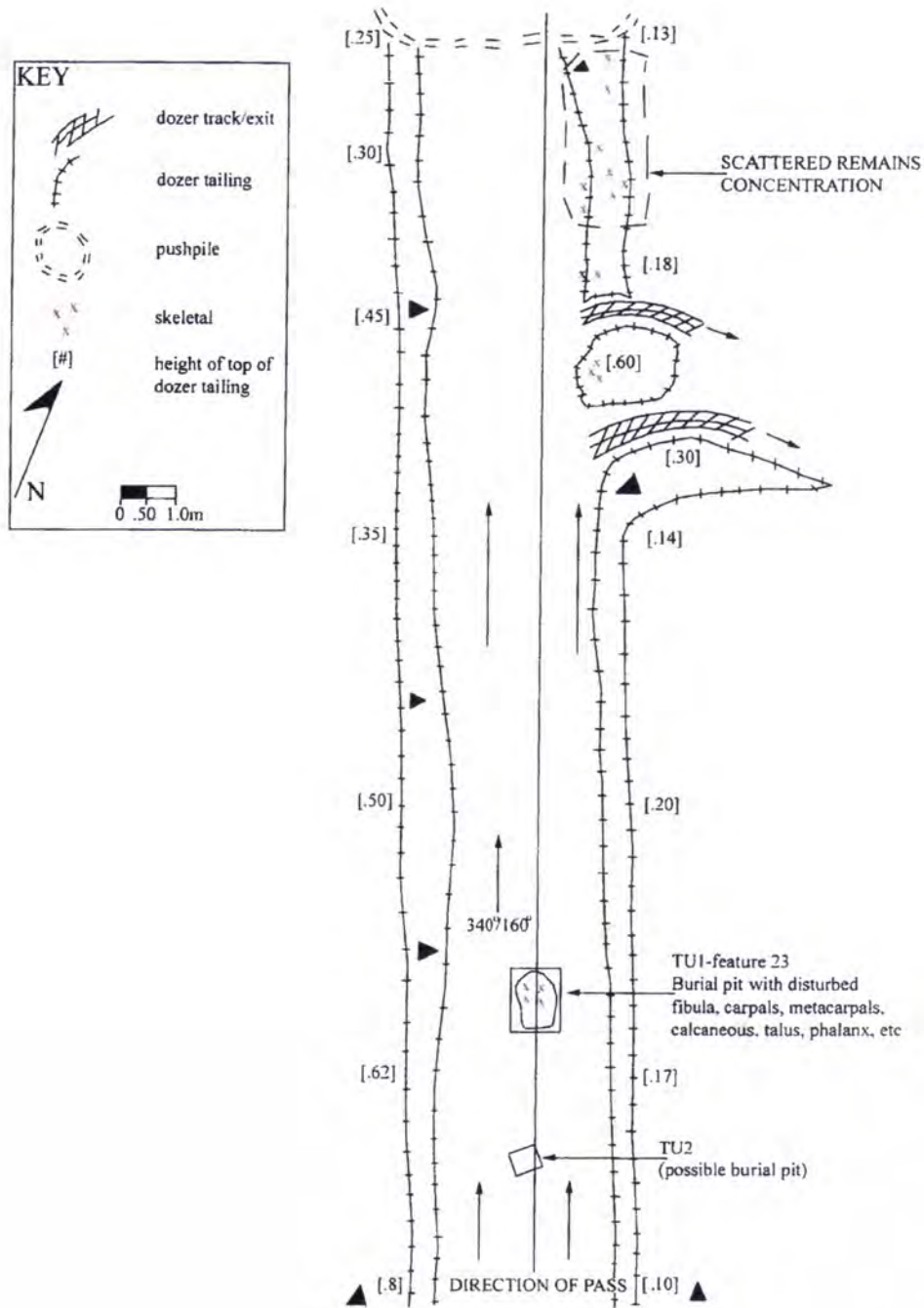


Figure 46. Plan View Map of Surface Scatter at Site 6679 Showing Features 23a and 23b

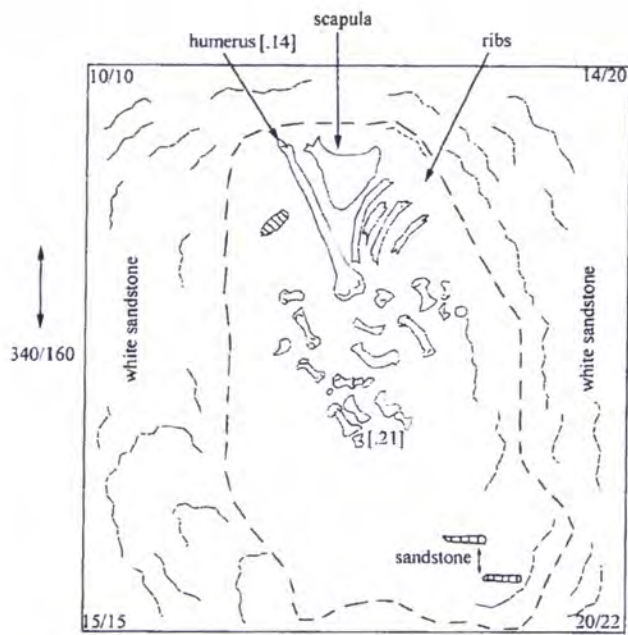
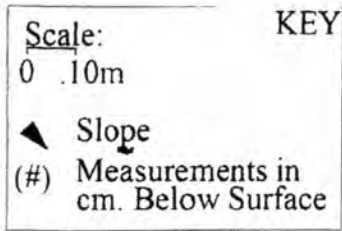


Figure 47. Plan View Map of Site 6679, Feature 23a, Test Unit 1



Feature 23 TU 2 I I

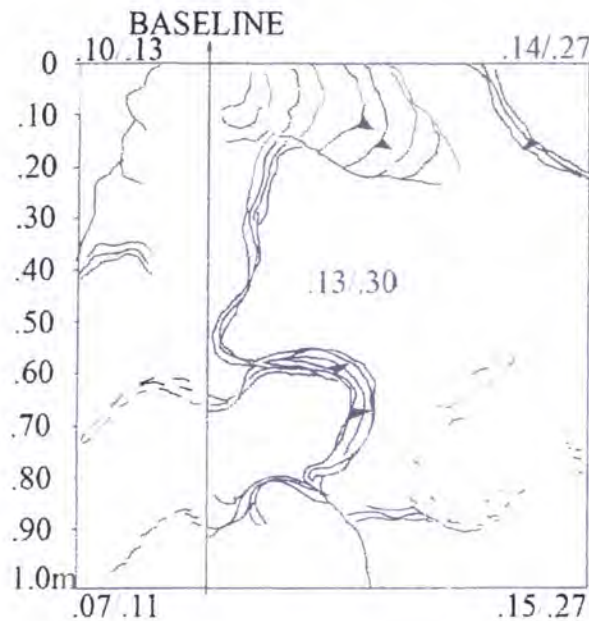


Figure 48. Plan View Map of TU 2 at Feature 23b

Feature 24

Feature 24 was identified during controlled grading within the secondary ridgeline northeast of Site 6679 Features 1-5 and previously identified burial feature Site 4200. During the sand mining activities, a burial pit, skeletal remains and a section of a trench from the 1998 inventory survey were documented within the dozer track (Figure 49). Feature 24 was comprised of a distinct burial pit excavated into sandstone. The pitfill was a very dark brown to dark grayish brown (10YR6/3) silty sand with dense organic root matter and pale brown sandstone peds. The pit measured 1.10 m (e/w) by 0.65 m, was oriented at 65 degrees and contained a primary *in situ*

burial almost entirely encased in root matter. The burial was placed on its left side in a flexed position at an elevation of 202.85 amsl (Feature 50). Although most remains were intact within the pit, the controlled grading slightly displaced a portion of the right leg and left foot. No further testing was conducted and detailed analysis to ascertain sex and age was not performed. However based on the robustness of the right femur and tibia, Feature 24 may represent an adult male that will be preserved in place in the north eastern portion of Preserve Area 1.

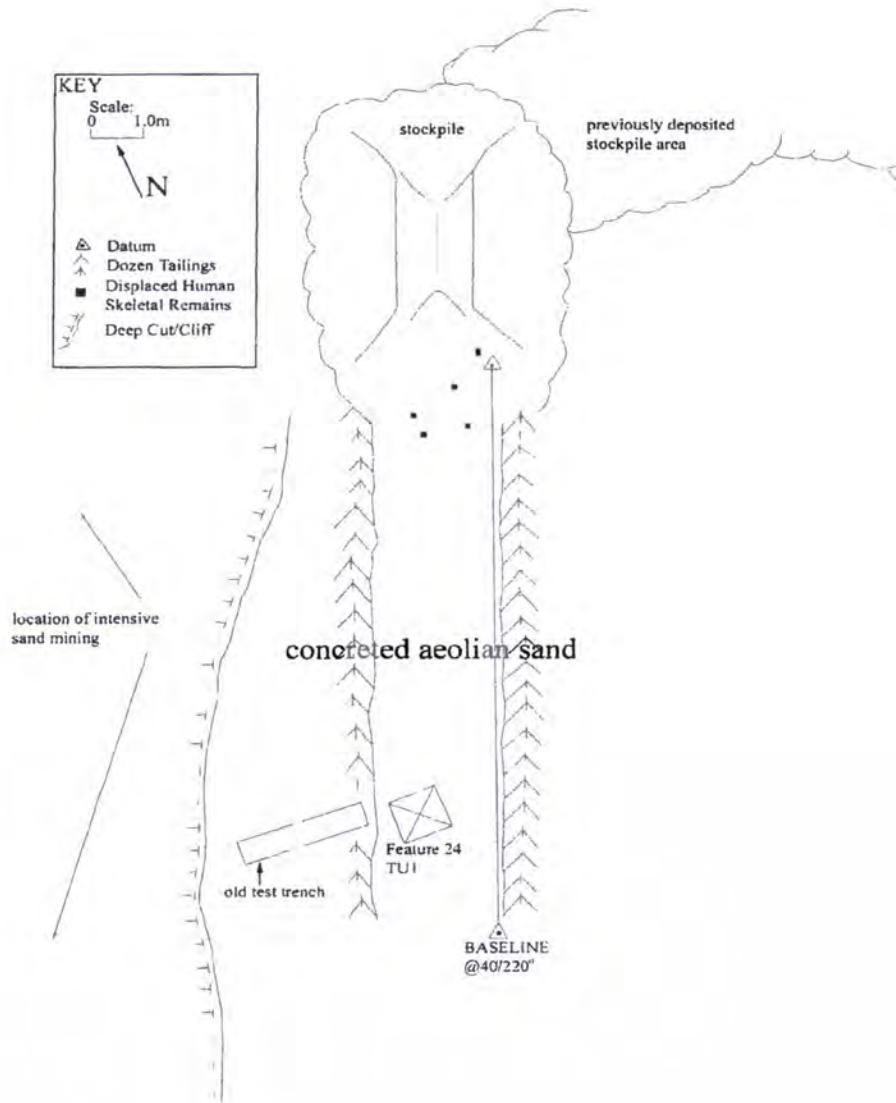


Figure 49. Plan View Map of Surface Scatter at Site 6679, Feature 24

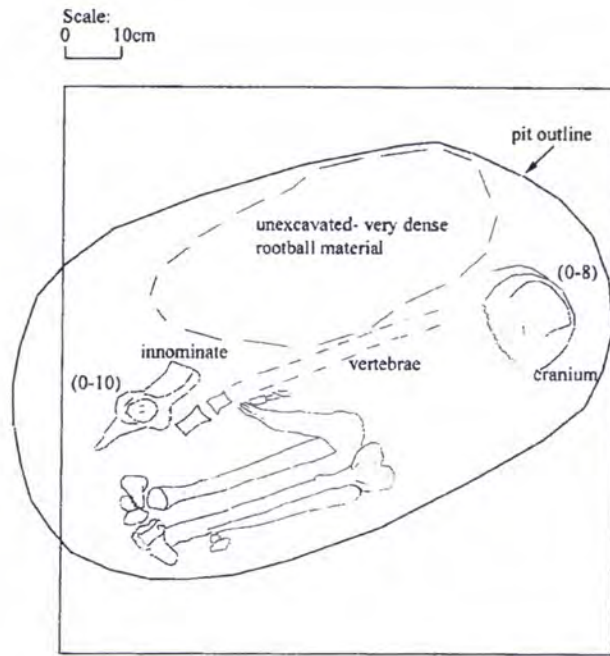


Figure 50. Plan View Map of Site 6679, Primary Burial Feature 24

Feature 25

Feature 25 was inadvertently exposed in the dozer track and stockpile during grading activities within the secondary ridgeline. A concentration of skeletal remains was noted at the beginning of the dozer tailing and within the stock push pile. A 1.0m by 1.0m test unit was hand excavated over the first concentration to ascertain if an *in situ* component was extant (Figure 51). Testing documented a burial feature excavated into concreted sandstone with dense root matting around the skeletal remains. The burial is placed on its right side at 211.42 amsl, in a fully flexed position within a pit that measures 0.80m (n/e) by 0.45m and contains grayish silty sand-7.5 YR 6/3 (Figure 52). Displaced remains consisting of a probable grave marker (waterworn cobble), portions of the cranium, the left tibia, fibula, femur, 3 cervical vertebrae and portions of the feet were collected and are curated at the ASH lab. Once articulation and the primary context of the individual was established, no further excavations were warranted. Laboratory analysis of the displaced remains determined that Feature 25 was an older adult female. Sex was ascertained through observation of the sciatic notch. Estimated age was based on cranial suture closure and extreme occlusal wear, which included abscessed cavities near the lower molars. Feature 25 was determined to be a primary partially *in situ* individual that was recently disturbed. Like Feature 24, Feature 25 will be preserved in place within the northeastern portion of Preservation Area 1 (see Figure 8 and Table I).

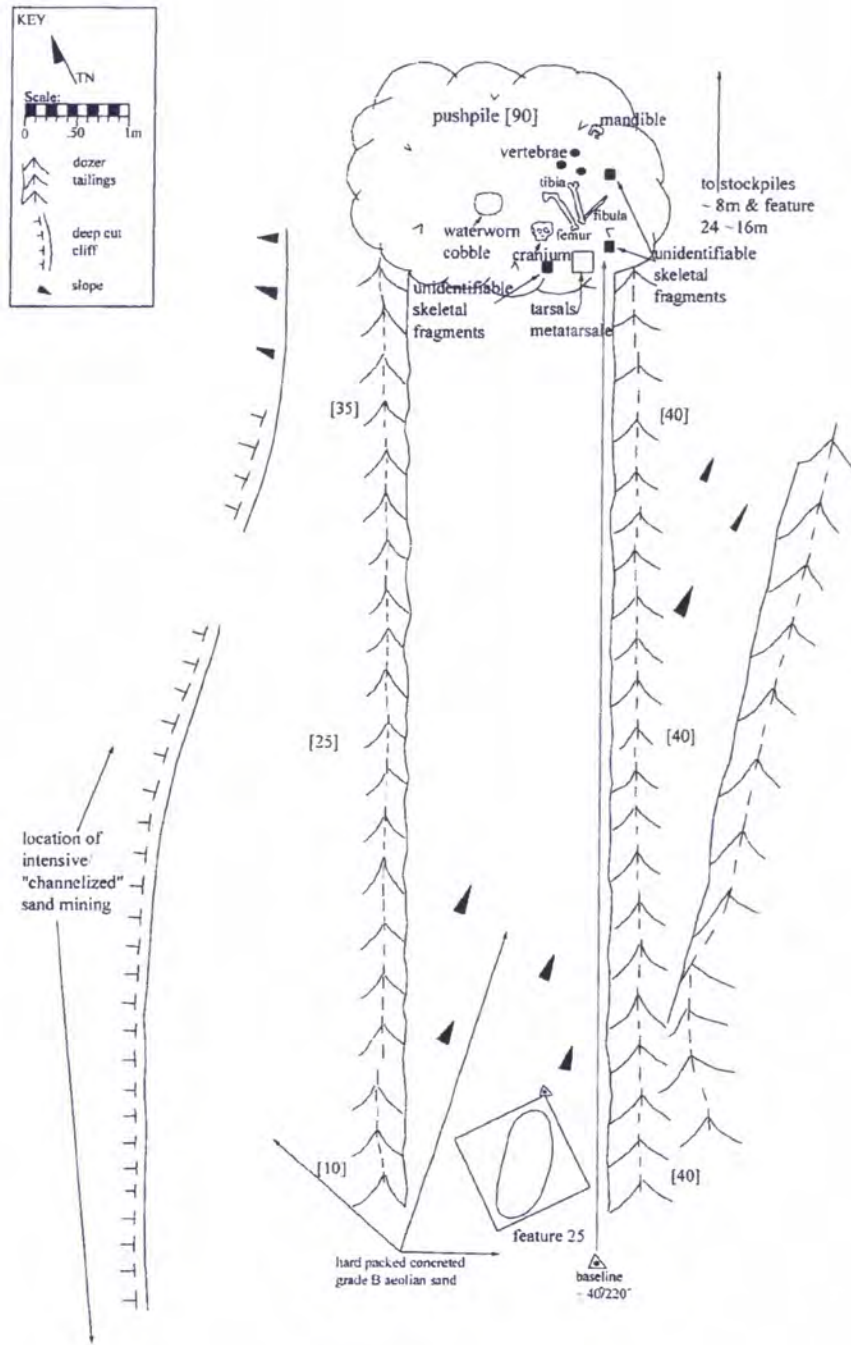


Figure 51. Plan View Map of Activity area for Site 6679, Feature 25

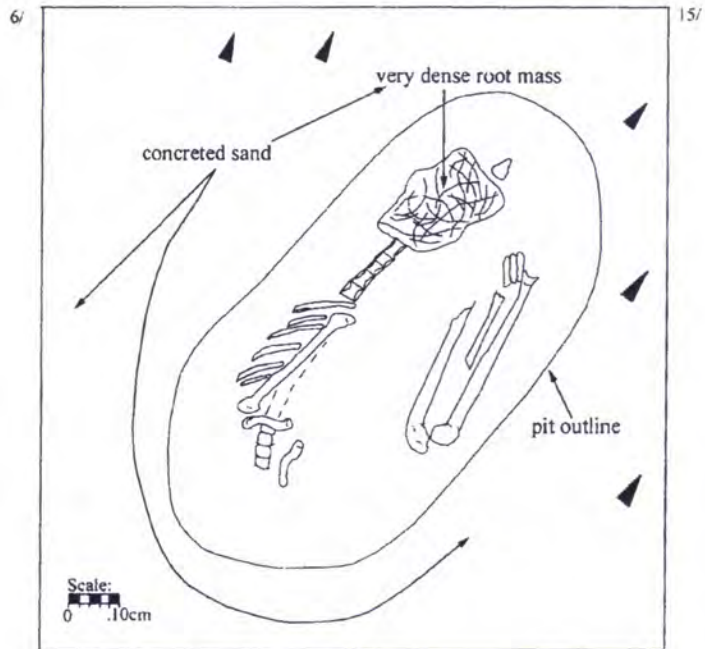


Figure 52. Plan View Map of Site 6679, Feature 25

Feature 26

Feature 26 was first noted during monitoring of sand mining operations, and like Features 24 and 25 is a primary burial within a pit excavated into sandstone. The burial pit measures 1.10 m long by .60 m wide, is oriented at 330 degrees and comprised of silty pale brown sand (10YR6/3) surrounded by a 10YR 6/2 light brown grey sandstone (Figure 53). The burial is fully flexed and placed on its left side with a water worn cobble (probable grave marker) placed at the back (occipital) portion of the cranium. Recent disturbance to Feature 26 occurred along the right humerus, sacrum, the femur and portions of both feet. This individual is a middle adult male that will be preserved in place within the northeastern portion of Preservation Area 1.

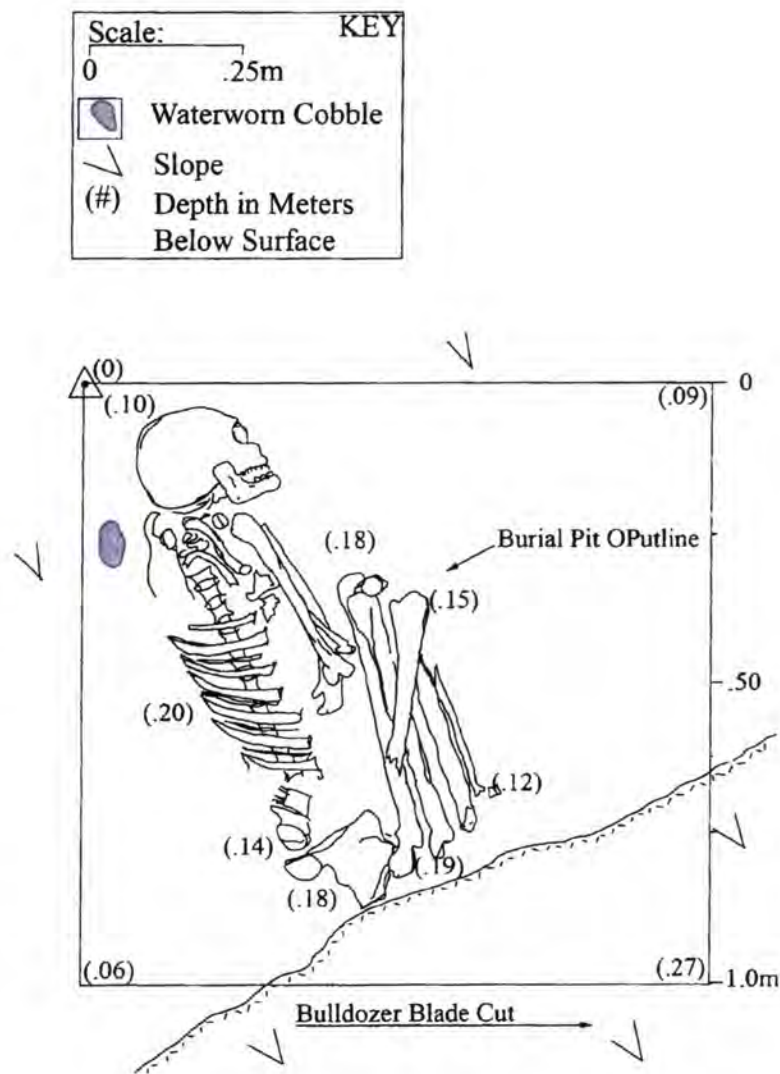
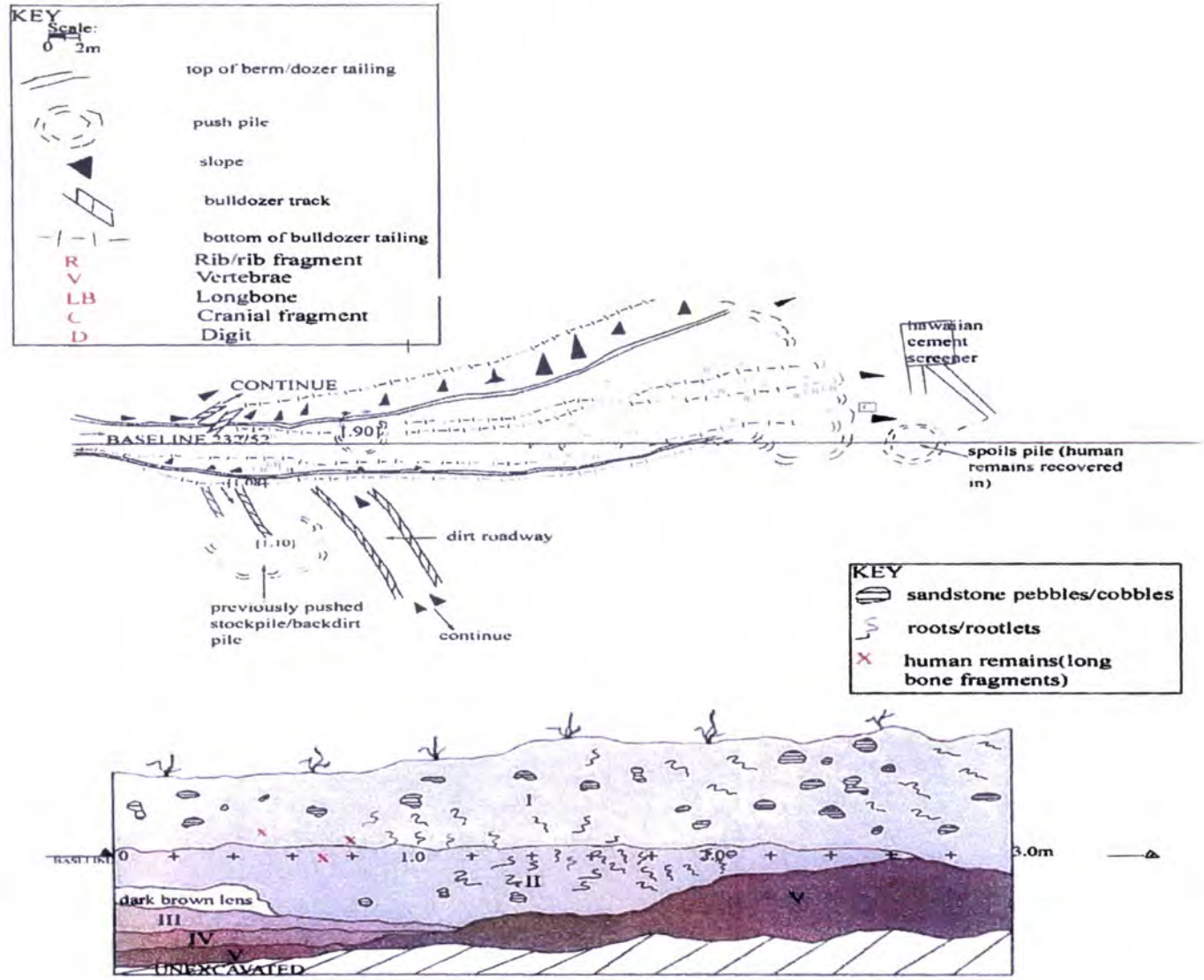


Figure 53. Plan View Map of Site 6679, Feature 26

Feature 27

Feature 27 was identified during monitoring of sand mining activities with human remains observed within the dozer tract approximately 30 meters long. A plan view map was created documenting the events and subsequent scatter (Figure 54). The remains were observed to be fragmented, bleached and thus were in a secondary context being previously disturbed. This area contained an access road that once bisected the dune, thus, Feature 27 was likely disturbed during the construction of this road. The area has been raked, shovel scraped and mapped where no primary and or *in situ* remains have been identified. The soil profile of the dozer cut exemplified a 5-layer stratigraphic sequence, where Layers I and II were disturbed matrices. Layer III appeared to be an old A horizon overlying two intact layers of sand, Layers IV and V (Figure 57). The disturbed remains from Feature 27 were from Layers I and II. Collected skeletal remains consist of ribs, portions of all long bones except the right fibula, ulna, innominate and foot. The osteological assemblage for Feature 27 is from an older adult male approximately 50+ years of age. Estimated age was based on observation of extreme osteophytes on proximal and distal ends of long bones as well as cranial suture closure. Sex was based on observation of gonial angle and mastoid process, as well as overall size of remains. Feature 27 is determined to be a secondarily deposited scatter of human skeletal remains that were previously disturbed. The collected remains of Feature 27 will be preserved in the area near where they were discovered in the north central portion of Preservation Area 1.

Figure 54. Plan View Map and Profile of Site 6679, Feature 27 Area



Feature 28

Feature 28 was inadvertently exposed during monitoring of bulldozer activities in the same previously disturbed area as Feature 27. The human skeletal remains were distributed within a 25.0 m long by 12.0 m wide area of the bulldozer's track (Figure 54). Due to the volume and linear distribution of the human skeletal remains, it was initially thought that two individuals were represented within the assemblage. Thus, the linear secondary scatters were temporarily designated as Feature areas 28a and 28b (Figure 55). A 4.0m by 4.0m test unit (TU1) was erected at the start of the bulldozer's path and a 6.0m by 2.0m shovel test (STU1) placed near the bulldozer push pile at the end of the track. Testing in these localities was undertaken to ascertain if a primary *in situ* component was extant and to collect all disturbed remains. Recovery efforts suggested that the skeletal remains belong to one person and these remains were very fragmented and fragile being weathered and bleached out. Over 1000 fragmented and bleached skeletal elements were collected and analysis of the remains determined that Feature 28 is an adult male. Sex was determined by observation of the clavicle and femoral head, as well as the gonial angle of the mandible. Estimated age was based on the epiphysis of clavicle. Based on the fragmented condition of the osteological assemblage, Feature 28 was a secondary deposit that was previously disturbed possibly during the access road construction. Like Feature 27, the collected displaced remains of this individual will be reburied and preserved in the northeastern portion of Preservation Area 1.

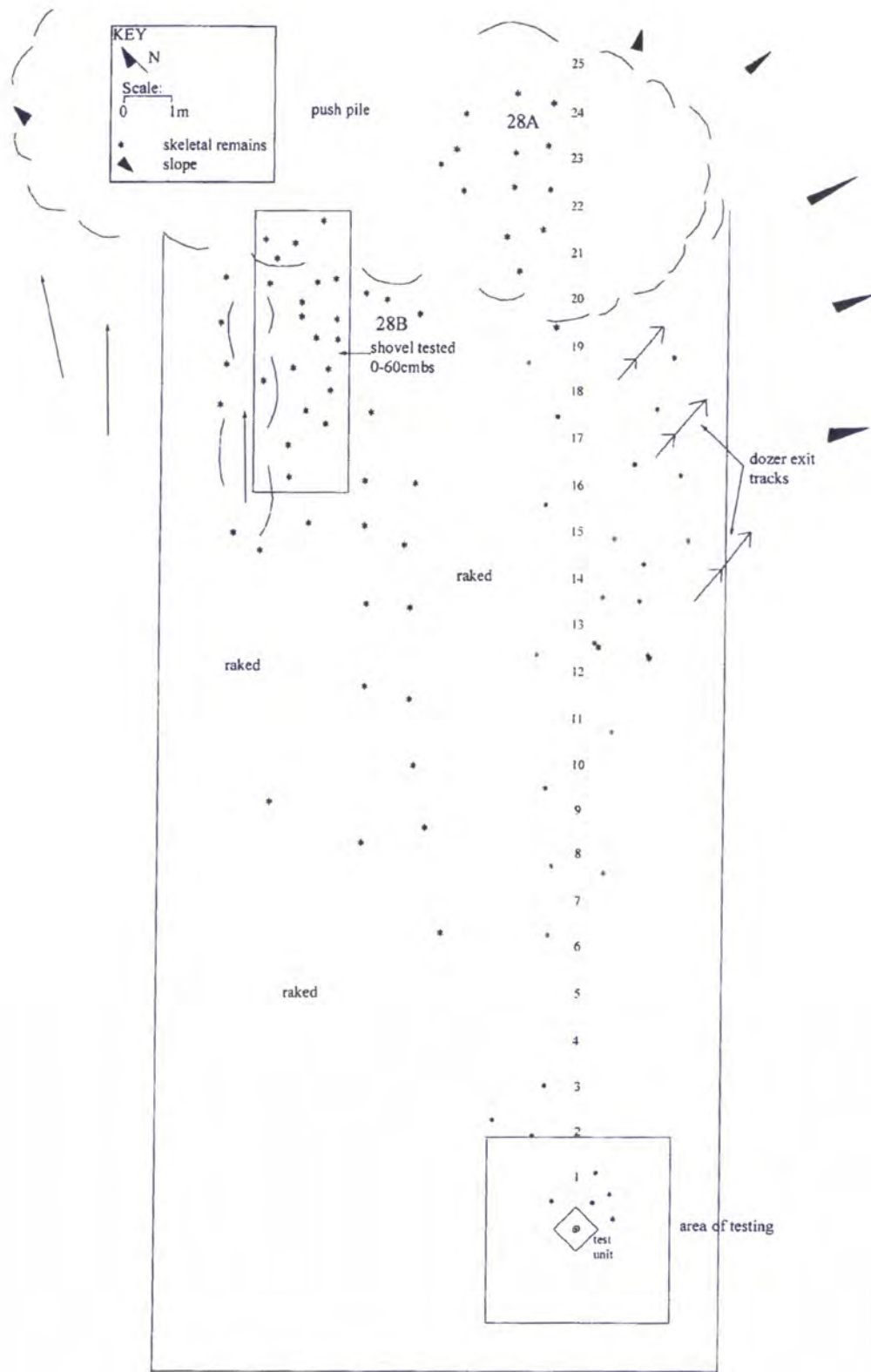


Figure 55. Plan View Map of Surface Scatter, Feature 28.

Feature 29

Feature 29 was identified within the same area as the above features (Features 27-28); however this burial was in a primary *in situ* context within the work area (Figure 56). The grading activities bifurcated the top of the burial pit, exposing and disturbing the femoral heads, carpals and metatarsals. A 1.0m by 1.0m test unit (TU1) was erected and hand-excavated exposing an articulated individual within a defined pit at .38 m bs (Figure 57). The pit measured .78m (n/s) by .74m (e/w) and was excavated within lithified sand. Two lithified slabs appeared to have been placed on top of the pit. The burial was unusually placed with the head down first in the pit, approximately 0.20 cm below the innominate. The remains were fully flexed with the left and right arms and hands extended below and underneath the torso with the hands a little higher in elevation than the arms. A lithified slab was covering the left side of the individual from the lower sacrum and lumbar vertebrae up to the scapula. A basalt sub-angular cobble was placed atop the lithified slab. Analysis of the remains exemplified Feature 29 as a middle adult male individual. Sex was established upon observation of the sciatic notch in the innominate, as well as overall robusticity of the remains. Estimated age was based on epiphyseal fusion and skeletal remains which lacked osteophytes. Feature 29 was determined to be a recently disturbed primary burial that will be preserved in place within the northern portion of Preserve Area 1.

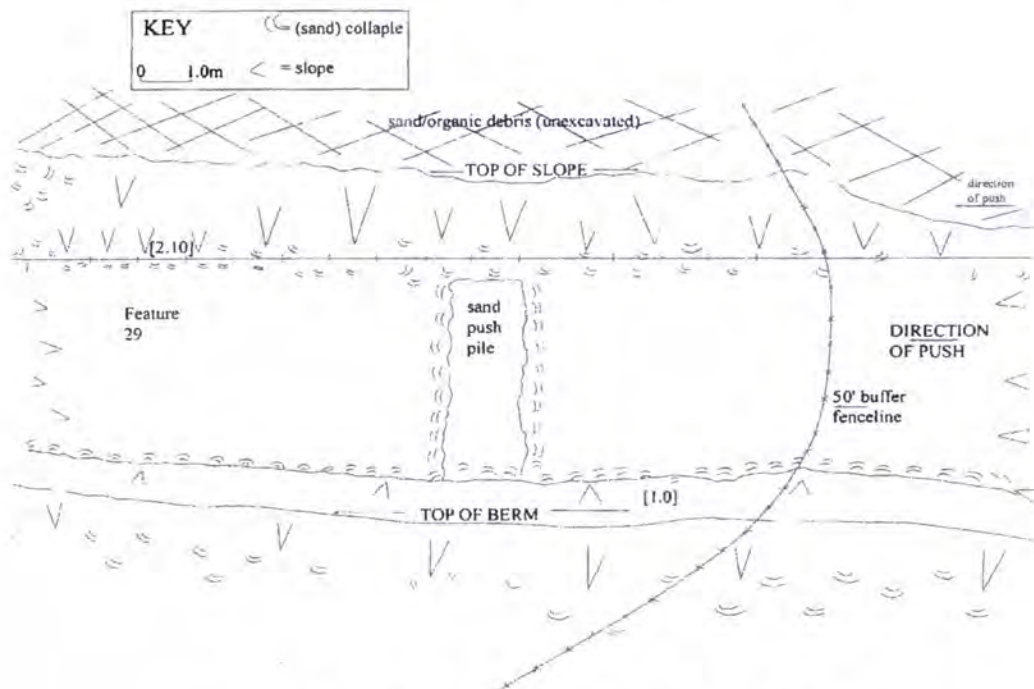


Figure 56. Plan View Map of Site 6679, Feature 29 Area

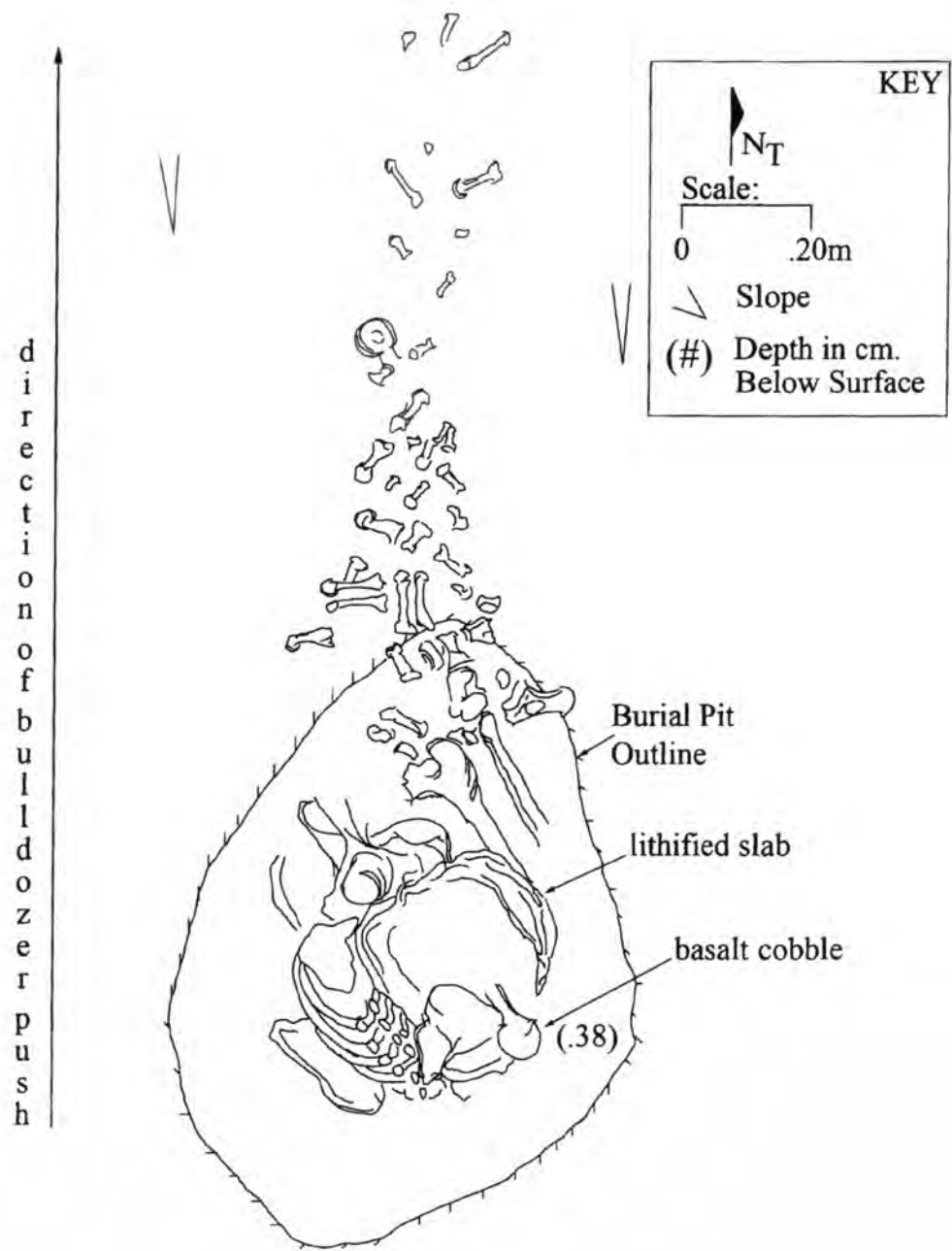


Figure 57. Plan View Map of Site 6679, Feature 29 Burial

Feature 30

During a field inspection near the Feature 26 area, a previously displaced skeletal scatter was identified. The skeletal remains consisted of phalanges which likely belonged to Feature 26, and will be reinterred with that respective individual.

Based on the discovery of Features 24-30 within the northeastern portion of the Phase A project area, as well as the documentation of prior disturbances, grading activities relocated to the central portion of the project area.

Features 31a and 31b

Grading activities were again undertaken in the central portion of Phase A approximately 200 ft. south of Feature 18. Due to the presence of documented burials in the central area, grading activities were implemented in a pre-determined area in a controlled manner with a D-6 dozer. After the vegetation was cleared across the top of the knoll several areas containing skeletal remains and possible burial pits were observed (Figure 58). Upon this discovery, all possible features were labeled and designated Features 31-41 and hand testing was performed. The first area tested was Features 31a and 31b comprised of a remnant burial pit and displaced skeletal remains approximately .10 m below the existing surface. Feature 31a was placed in a flexed position on their back possibly on their left side in an east/west orientation. Several perforated conus (*puka* shells) were placed on the chest and underneath the mandible of the burial and were likely a necklace or wristlet (Figure 59). Articulation was noted on the cranium, cervical vertebrae and portions of the right hand which was laid across the chest. Recent disturbance occurred along the lower extremities however some of the collected remains had old breaks indicative of prior disturbances. During the analysis of the osteological assemblage, Feature 31a was determined to be a middle adult female that was partially disturbed from its primary context. Sex was determined by the shape of the sciatic notch and age was based on fused epiphyses of the long bones. Also noted during the lab analysis was evidence of a second individual (a mid-adult male) and designated Feature 31b. Based on the linear pattern of the disturbed remains extending from the burial pit, it appears that Features 31a and 31b were likely buried together. No intact component was observed for Feature 31b, thus it has been designated as recently disturbed probable *in situ*. Sex determination for Feature 31b was through observation of the sciatic notch. Estimated age was based on overall condition of the remains as well as cranial suture closure. Features 31a and 31b will be preserved in place within the central portion of the Preservation Area 1.

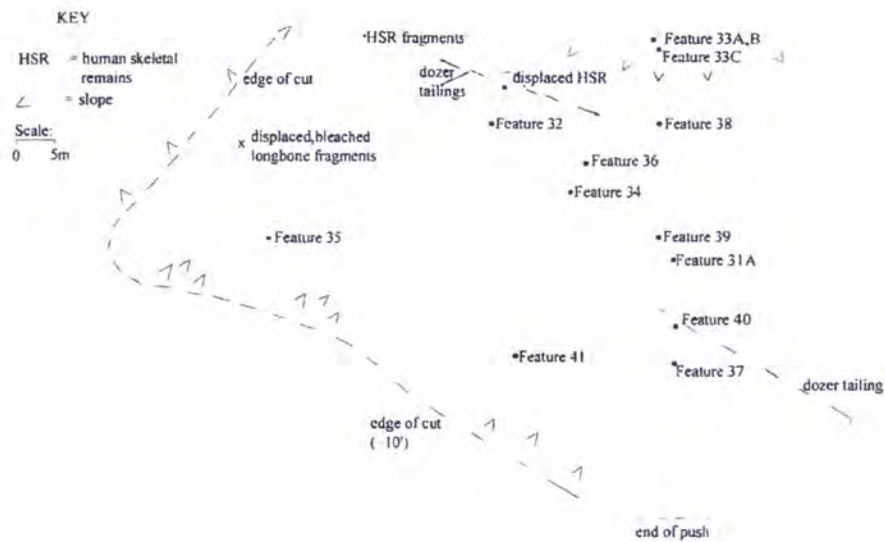


Figure 58. Plan View Map Showing Locations of Features 31-41, Site 6679

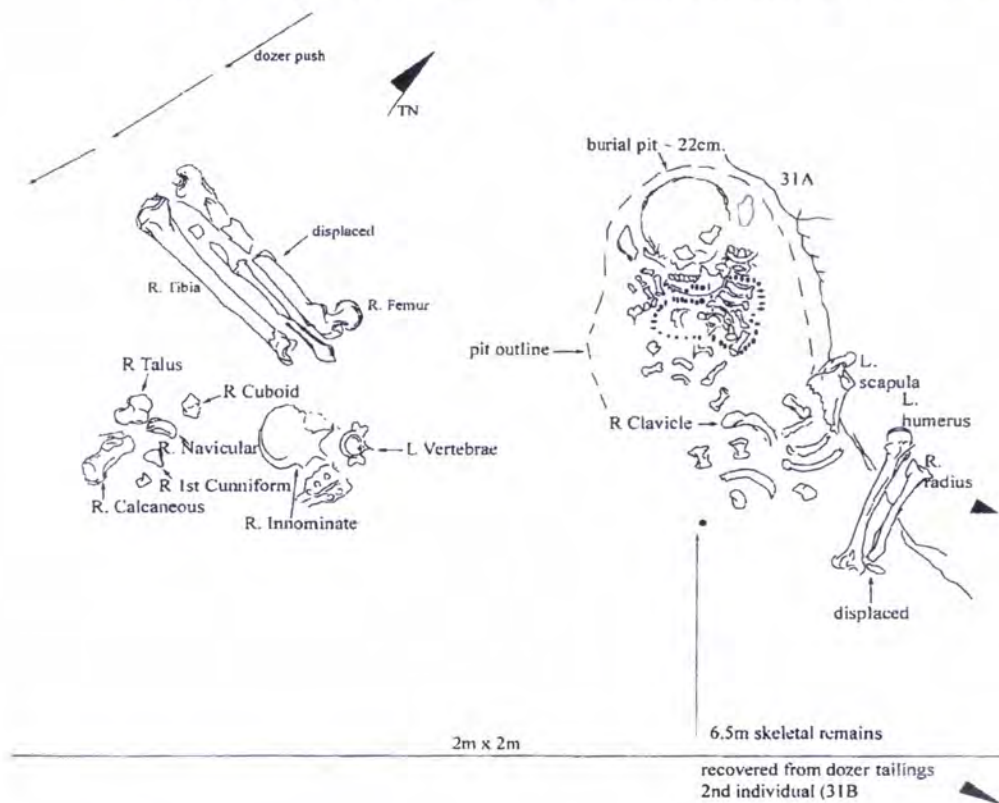


Figure 59. Plan View Map for Site 6679, Features 31a and 31b

Feature 32

During a field inspection after vegetation grubbing, Feature 32 was discovered and consisted of a possible burial pit within grey silty sand (Grade B) that was transitioning into yellowish brown fine to coarse "Grade A" sand. The area was scraped and brushed off revealing a distinct (probable) burial pit outline with 4 large waterworn boulders (Figure 60). Tiny rootlets were observed around the circumference of the pit outline, providing further evidence of a burial pit. Feature 32, designated as a possible burial pit, was not tested but is assumed to contain a primary *in situ* burial.

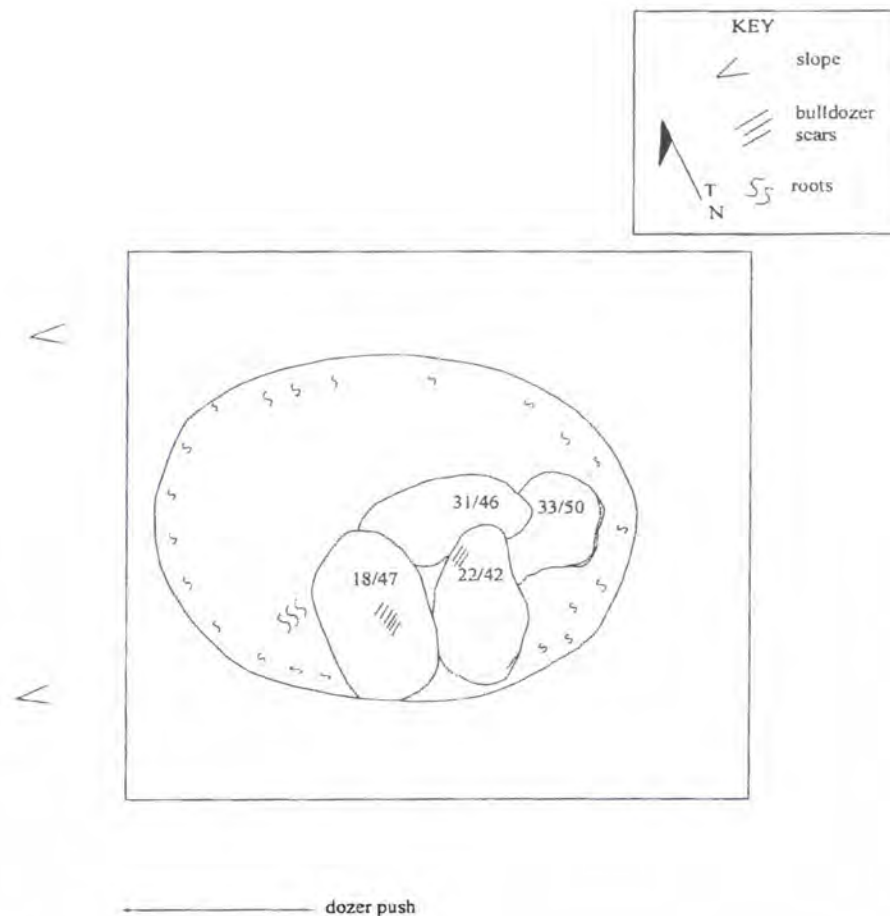


Figure 60. Plan View Map of Probable Burial Pit, Feature 32

Features 33a-c

As previously discussed in the methods section periodic field inspections were performed of previously graded areas. During an inspection of the slope containing Features 18a-c, an area with concentrated fragmented remains was noted and designated Feature 33. Apparently wind erosion had exposed this burial feature. A 1.0m by 1.0m test unit was excavated over the concentration documenting the co-mingled remains of two individuals (Features 33a and b) within a primary context (Figure 61). The burial pit was excavated into lithified sand and measured .40m long by .35m wide and contained the shattered, disarticulated skeletal remains of an adult (33a) and adolescent (33b) that was likely previously disturbed in a cultural context. Age of the individuals was based on epiphyseal and cranial suture closure, as well as size of the remains. The fragmented remains of Feature 33a consisted of cranial, a mandible, a calcaneous, phalanges and long bone shaft fragments. The osteological assemblage which constitutes the adolescent (33b) was portions of the cranium, maxillae, mandible and long bone shaft fragments. While cleaning (shovel scraping and troweling) around this initial finding, a second burial pit designated Feature 33c was identified .20 m southeast of Feature 33a and b. Feature 33c was a distinct circular pit excavated into the lithified sand and measured approximately .40m long by .25m wide. Although Feature 33c was not excavated, it is designated as a burial pit which is highly likely to contain an articulated primary burial feature. Features 33a and b are primary features that were likely previously disturbed in a cultural context. Features 33a-c will be preserved in place within the central portion of Preserve Area #1.

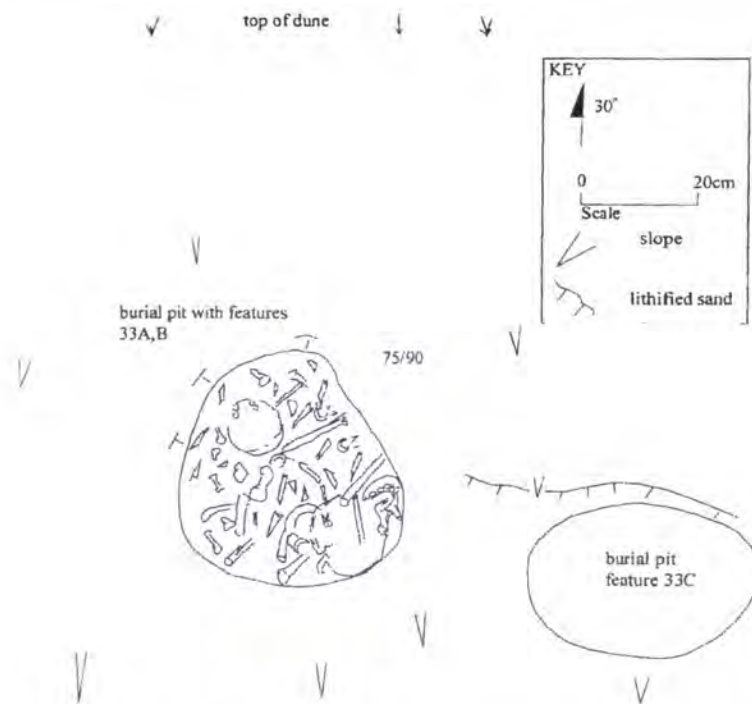


Figure 61. Plan View Map of Features 33a & 33b, and Unexcavated Burial Pit (33c)

Feature 34

Feature 34 consisted of partially disturbed human skeletal remains, a water worn basalt cobble and *puka* shells within a concentrated area. A 2.0m by 2.0m test unit was placed over the concentration which revealed a partially intact burial within a pit excavated into lithified sandstone. The burial pit measured approximately .70m long by .30m wide and contained a middle adult male placed on their back with cranium face-up (Figure 62). The *in situ* portions consisted of the cranium (except for the occipital and mastoid process of the right side), lower vertebrae, ribs, sternum, scapula, 3 *puka* shells, and phalanges). The *puka* shells (*Conus* sp.) were located in the vicinity of the manibrium indicating a possible neck adornment. Displaced remains consisted of additional phalange, rib fragments, left scapula, *puka* shells, right tibia, long bones of the arms and legs, and left patella. Sex was determined by the sciatic notch of the right innominate and age was estimated on the stage of fused epiphyses of long bones. Two manuports

(waterworn cobbles) were collected in the vicinity of the displaced portion of the cranium. Feature 34 was determined to be a recently disturbed primary burial feature that will be preserved in place in Preserve Area 1 (see Figure 8 and Table I).

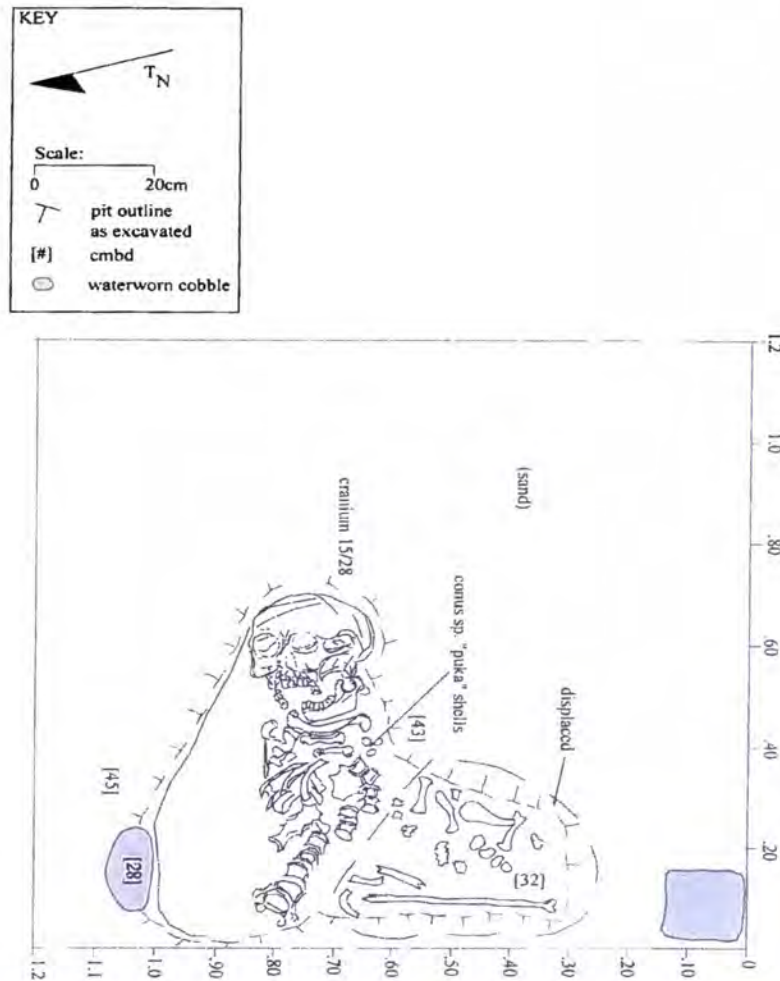


Figure 62. Plan View Map of Site 6679, Feature 34

Features 35a and 35b

Features 35a and 35b consisted of secondarily deposited skeletal fragments situated within the area containing Features 31-41. Feature 35a remains belong to an infant (newborn to 12mos) and Feature 35b is a second infant (approximately 1+/- 12mos). The minimal remains constituting Feature 35a consisted of cranial fragments and both tibia. For Feature 35b was also minimal portions of the cranium (occipital), ribs, left scapula and clavicle, left radius, a partial left Os coxae, and the right tibia. Shovel scraping was performed around the finds but no burial pit or

additional human remains were identified. Features 35a and 35b may have an intact component in the area which has not yet been documented. In particular, because primarily left components of Feature 35b were recovered, Feature 35b may be lying on its right side. Features 35a and 35b will be preserved in the area where they were identified.

Features 36-41

Features 36-41 consists of probable burial pits within the yellowish-brown (Grade A) sand that contained the grayish-brown silty sand pit fill (Figure 65). Most pits were circular in shape containing numerous roots and several contained manuports of small boulders and cobbles. No testing was performed upon the pits to confirm the presence/absence of primary burial features. These features are further discussed below.

Feature 36

Feature 36 is a probable burial pit that is circular-shaped, contains numerous roots in the southern half and measures 0.75m (e/w) by 0.70m (n/s).

Feature 37

Feature 37 is a possible burial pit which is circular in shape and measures 0.85m (e/w) by 0.90m (n/s).

Feature 38

This feature is a possible burial pit that is oval in shape (tear drop) and measures 1.85m (e/w) by 0.45-0.85m (n/s).

Feature 39

Feature 39 is a circular shaped probable burial pit that measures .84m (e/w) by .95m (n/s) and contains loose, grey silty sand pit fill.

Feature 40

Feature 40 is an oval shaped probable burial pit that is unexcavated. It is oval-shaped and measures 0.90m (e/w) by 0.75m (n/s).

Feature 41

This feature is a possible burial pit that is unexcavated. It is oval-shaped and measures 0.85m (e/w) by 0.90m (n/s).

After documenting additional primary burial features (Features 31-34) as well as numerous probable burial pits (Features 36-41) within this central area, grading activities relocated to the north and Features 31-41 will be preserved in place.

Feature 42

Feature 42 was identified during mass excavations and consisted of two isolated cranial fragments of the left and right parietals. Upon the identification of the finding, the area was inspected, raked and blade tested to ascertain the presence of additional skeletal remains. No other skeletal remains were documented, however due to these findings sand mining activities were continued away from this area to the northeast. The Feature 42 cranial fragments are from a young adult based on the pronounced sutures and will be compared with the osteological assemblages collected from this area to determine if they belong to another individual. Upon completion of the bone inventory, Feature 42 will be preserved within this area of Preserve Area 1.

Feature 43

As mining continued a possible burial pit was identified and assigned Feature 43. The burial pit was small measuring approximately 0.30 m long (e/w) by 0.20 m wide. Excavations upon the pit documented a sacrum (dorsal side up) centrally located within the pit at approximately 0.15 cmbs (Figure 63). Due to the presence of skeletal remains within a defined burial pit, no further excavations were warranted. Based on the position of the sacrum, and the small burial pit outline, this individual is presumed to have been placed face down in a fully flexed position. Upon this discovery all grading was discontinued. The stockpile of sand, which had been generated from the grading activities around Features 42 and 43, was pushed further to the west towards the screening operations. Upon moving the sand stockpile, human skeletal remains were identified at the base of the stockpile and assigned Feature 44.

Feature 43 was determined to be a primary burial feature that will be preserved in place within Preservation Area 1 (see Figure 8 and Table I).

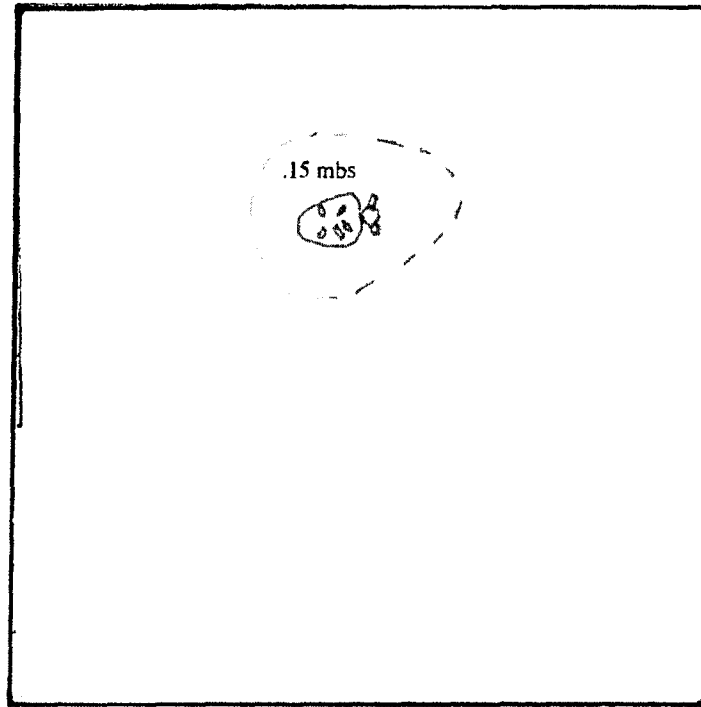


Figure 63. Plan View Map of Feature 43

Feature 44

Feature 44 was disturbed while relocating sand stockpiles created around Features 42 and 44. Upon moving the stockpile further to the west, displaced skeletal remains were identified at the base of the stockpile and consisted of portions of the lower extremities and arm (carpals, radius and ulna). The procedures for disturbed skeletal remains were instituted and a partially intact burial feature was noted. The primary, *in situ* portions of Feature 44 were the vertebral column (except L4 and L5), both humeri, scapulae, clavicle and ribs. The entire cranium was present except for the top of the occipital. The patellae and the distal ends of both the femur, though slightly displaced are positioned anatomically correct for a fully flexed burial. Based on the presence of articulated remains, no further testing was deemed necessary. Feature 44 is designated as a primary burial of a middle adult male that has recently been disturbed. Sex was determined through the sciatic notch of the innominate and size of the humeral and femoral heads. Age was based on epiphyseal fusion and cranial suture closure. Feature 44 was determined to be a partially intact primary burial feature which will be preserved in place at Preserve Area 1.

Feature 45 was not issued.

Feature 46

Feature 46 was identified during monitoring of grading activities within the lithified (Layer III) sand layer. Once skeletal remains were observed, all mechanical excavations were terminated and recovery and testing efforts were undertaken (Figure 65). A 2.0m by 2.0m test unit was placed over the exposed remains (portions of the cranium and some ribs) and determined that a possible burial pit outline and articulation was present along the ribs and pelvic region (lumbar and thoracic vertebrae, innominate and sacrum) (Figures 66-68). Disturbance occurred on both femurs, tibia, right fibula and a few carpals, partial left humerus and an assortment of ribs and vertebra. Analysis of the skeletal remains determined Feature 46 to be a young adult male. Age was based on epiphyseal closure and sex was ascertained by observation of the sciatic notch as well as overall robustness of remains. Feature 46 was determined to be a recently disturbed primary burial feature that will be relocated to Preserve Area 1. Relocation is due to the proposed extension of Kamehameha Avenue into the project area from the Maui Lani to the north.

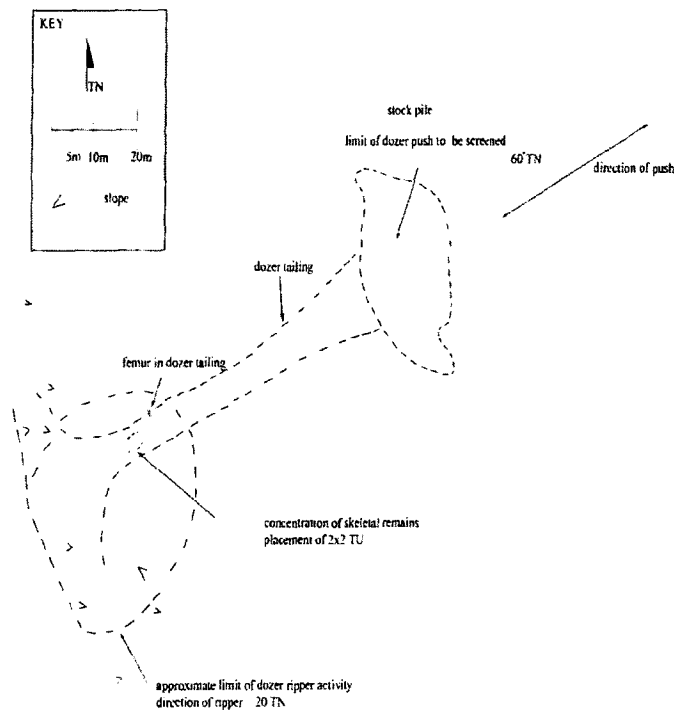


Figure 64. Plan View Map of Site 6679, Feature 46 Scatter and Grading Activities

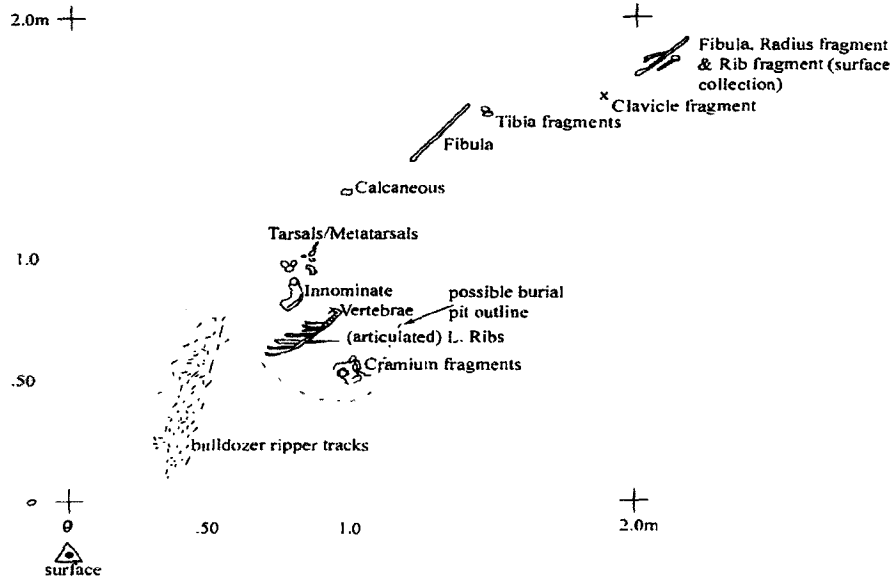
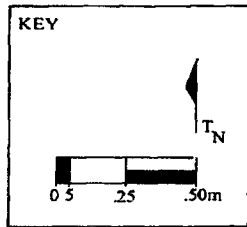


Figure 65. Plan View Map of Primary Burial Feature 46, Site 6679

Scale: KEY
 0 .10m
 (#) Depth in cm.
 Below Surface

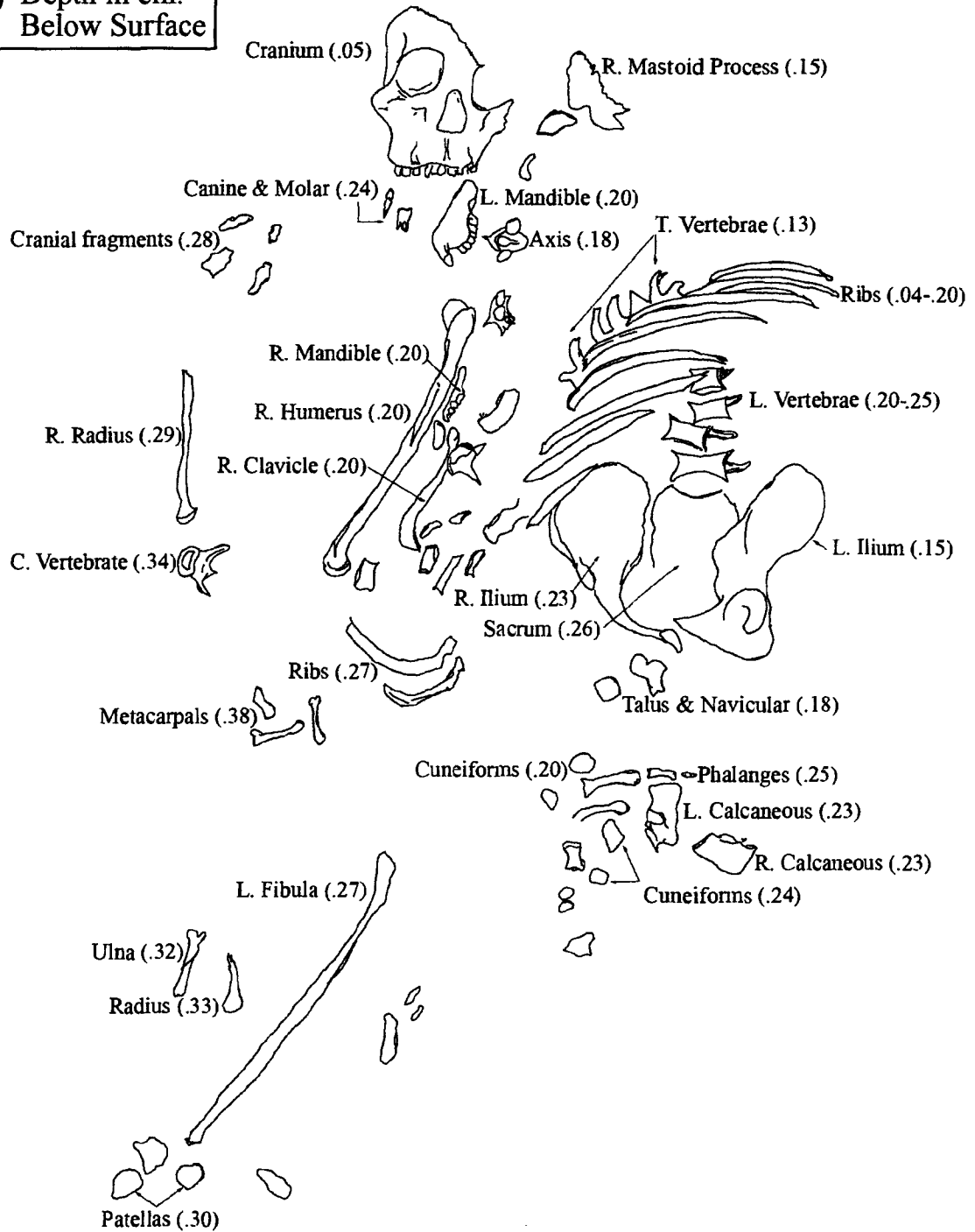


Figure 66. Plan View of Site 6679, Feature 46

After the discovery of Features 42-44 and 46, grading activities were relocated to the southern portion of the project area, where Features 47-53 were identified.

Feature 47 a and b

Features 47a and b are comprised of a secondary deposit of skeletal remains of two individuals. The skeletal remains of Feature 47a belong to an adolescent to young adult female and one infant designated 47b. The skeletal remains were observed during a field inspection and were located along the edge of the knoll containing Features 5-11. The area has been raked and hand screened to collect all displaced human skeletal remains. No *in situ*, primary portion of these remains has been identified. During testing of Features 5-11, this area had been significantly altered prior to the sand mining activities, thus Features 47a and 47b were designated as previously and possibly recently disturbed scatters.

Laboratory analysis of the collected remains identified Feature 47a as an adolescent/young adult female approximately 19-23 years of age based on observation of active fusion in the distal end of radius and right clavicle/sternal facet. Sex was determined through observation of the acetabulum and pre-auricular sulcus. Feature 47b is an infant approximately 6 months to 1 year old. Estimated age is based on non-fused epiphyses. Sex determination could not be established at this time. Features 47a and b are secondary scatters that will be preserved in the southern area of Preservation Area 1 (see Figure 8 and Table I).

Feature 48

Feature 48 consists of a secondary deposit of human skeletal remains which were recently and previously disturbed. The remains were dispersed across a 33.0 meter long by 3.0 meter wide tract, and consisted of ribs, cranial, scapulae, cervical and thoracic vertebrae as well as small long bone shaft fragments (Figures 67 and 68). Procedures for displaced skeletal remains were instituted however no primary and or articulated portion of Feature 48 was identified. Based on dentition (occlusal wear and alveolar resorption) and cranial suture closure, Feature 48 was determined to be an older adult female and the skeletal remains shall be preserved within Preservation Area 4.

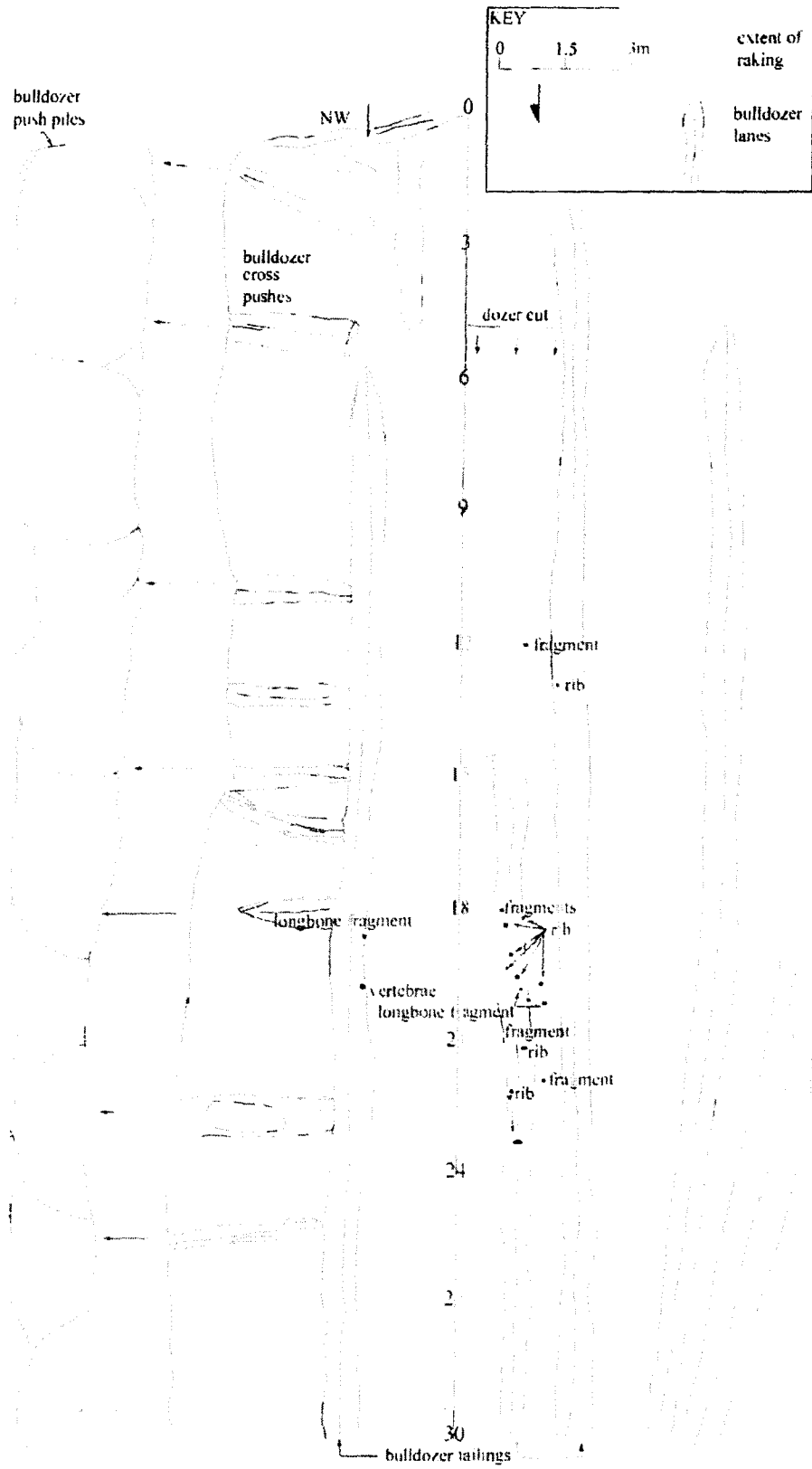


Figure 67. Plan View Map of Activity Area of Feature 48, from 0-30 m

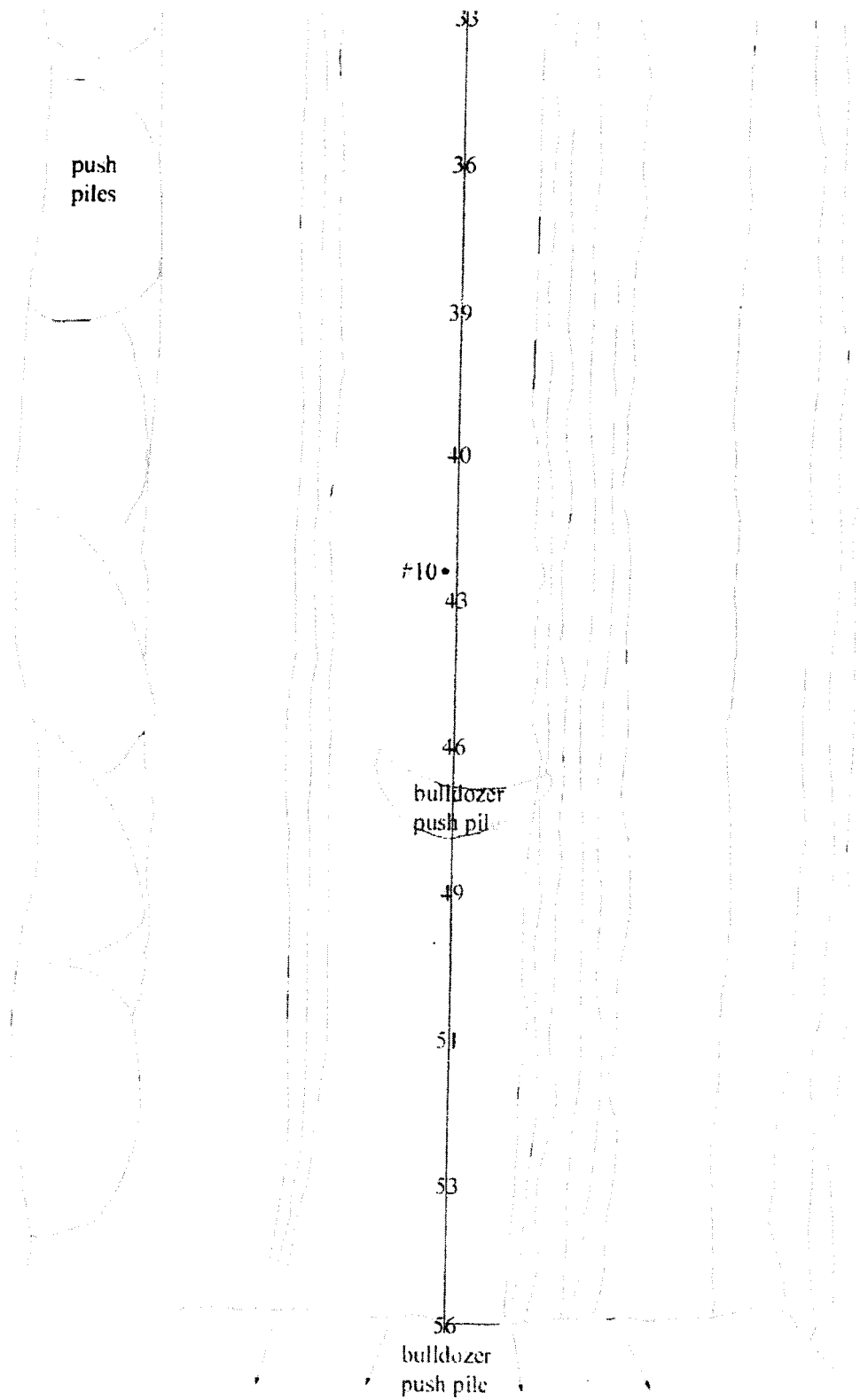


Figure 68. Plan View Map of Activity Area of Feature 48, From 33.0-56. m

Features 49 a-c

Features 49a-c was identified during a field inspection along a low small knoll approximately 2.0-6.0 ft. higher than the surrounding graded area. Several skeletal fragments were exposed and all mechanical activities were terminated. A plan view map was drawn and hand testing was initiated documenting a partially articulated, primary individual designated Feature 49a (Figure 69).

Articulation was noted along the vertebral column and left arm which was slightly displaced from its original position (Figure 70). Additionally, no defined burial pit was apparent in the test unit however both tibia (though disturbed) appeared to be anatomically correct for a fully flexed burial. Upon completion of testing, Feature 49a was designated as a partially intact primary burial of a robust middle adult male. Determination of age and sex for Feature 49a was based on size of the clavicle and cranial suture closure. Analysis of the osteological assemblage collected around Feature 49a identified extraneous remains belonging to a child 7-10 years of age (Feature 49b) and a young adult female, Feature 49c. Collected from Feature 49b, were portions of the cranium, tibia and metatarsals and age was based on the size and stage of epiphyseal fusion. For Feature 49c, age and sex was based on epiphyseal fusion and cranial suture closure. These extraneous remains were in a secondary context and thus contained no intact component.

Based on the above testing and analysis, Feature 49a was designated as a recently and possibly previously disturbed partially intact, primary burial feature and Features 49b and 49c were determined to be secondarily deposited human remains.

Due to the necessity for lateral access into the eastern portion of the proposed development, Feature 49a will be reinterred into Preservation Area 4 and all scattered skeletal remains from Features 49b and c will also be relocated to Preservation Area 4 (see Figure 8 and Table I).

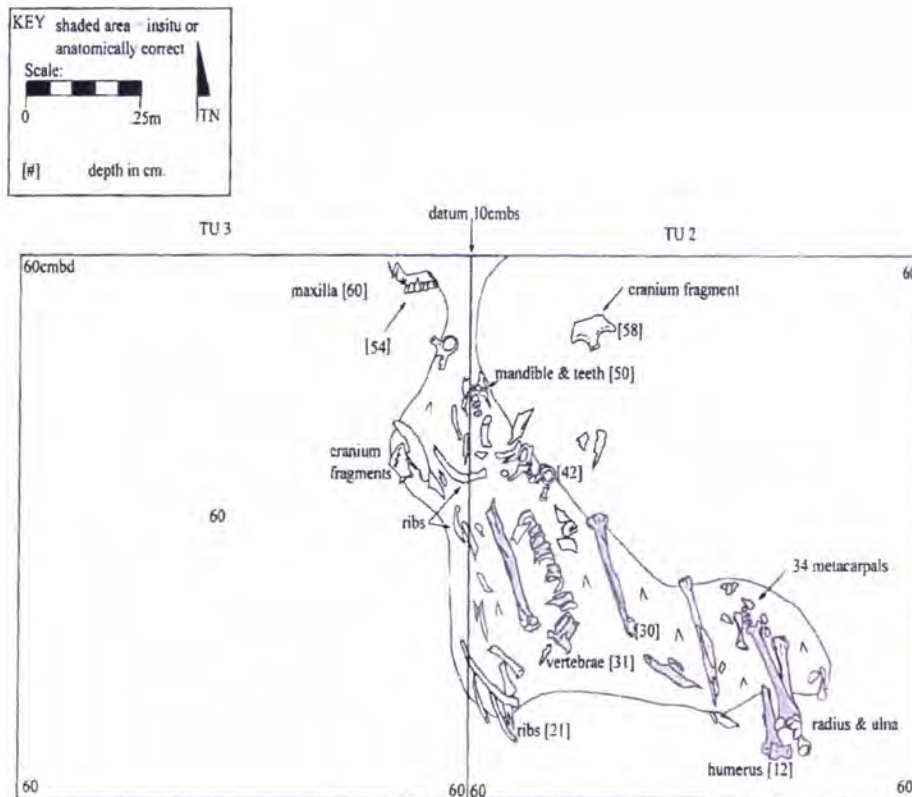


Figure 70. Plan View Map of Site 6679, Feature 49a showing Partial Articulation (shaded area)

Feature 50

Feature 50 consisted of human skeletal remains which were identified along the bulldozer tract and subsequent push pile. This inadvertent finding consisted of the frontal portion of the cranium, carpals/metacarpals of the right hand, clavicle, vertebrae, two complete ribs, both humeri and both innominate. A plan view map was created documenting the activity area (Figure 73). Raking of the initial findings was executed where several bones were recovered at the beginning of the tract along the western edge. A test unit was subsequently placed in this area however no burial pit or intact portion of Feature 50 was identified. Test excavation was halted at 0.35m bs as a hardened brown silt layer (undisturbed) was reached. Raking and shovel scraping was continued along the tract where no concentration of skeletal remains was documented. Laboratory analysis of the osteological assemblage belonging to Feature 50 determined this individual to be a middle adult female. Sex was determined upon examination of the sciatic notch of the innominate. Estimated age was based on cranial suture closure, eruption of all permanent teeth, as well as

observation of dentine present in molars, which suggests individual to be between the ages of 20-30 years old (White & Folkens, 2000). Based on the linear spread and amount of skeletal remains collected, this feature was likely partially intact in a primary context and recently disturbed. Feature 50 will be preserved within the area it was identified. Prior to the reinterment ceremony, additional testing will be undertaken to ascertain if an *in situ* portion of this feature is extant. Feature 50 will be preserved within Preservation Area 4 along with primary burial Feature 54 and reinterred features (Features 49a-c).

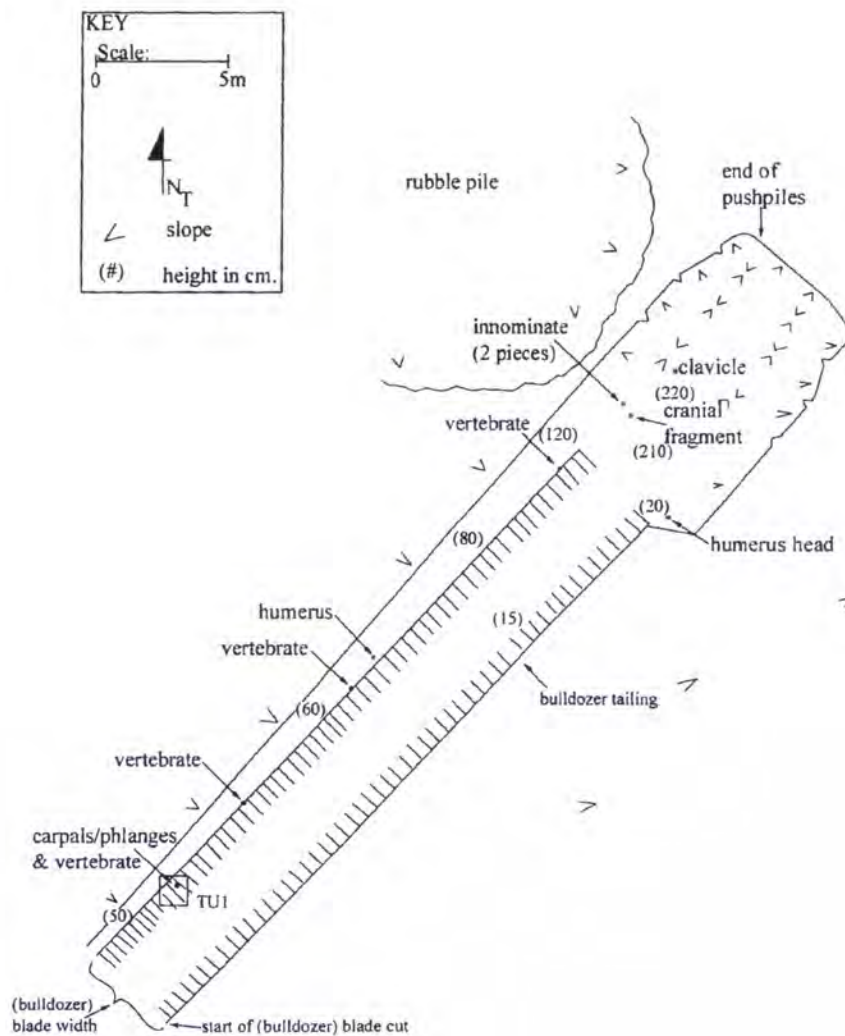


Figure 71. Plan View Map of Surface Scatter at Site 6679, Feature 50

Feature 51

Feature 51 was discovered during a field inspection of a previously grubbed and lightly graded area that had recently been subjected to heavy rainfall. During the inspection, a small concentration of skeletal remains consisting of portions of the innominate, carpals of the right hand, tarsals and metatarsals of the feet, the distal end of the tibia and a rib were identified and situated at approximately .15 m bs (6 inches). A plan view map was created documenting the recent activity in the area and subsequent surface scatter of remains (Figure 72). All dozer tracks and the previously grubbed vegetation was inspected and raked. Upon completion of these testing strategies around the periphery of the concentration, hand testing was then initiated on the surface scatter. A 3.0 m long by 2.0 m wide test unit (TU1) was placed over the concentration to ascertain the context. No intact component was observed during testing however fragmented portions of the left femur were collected. Also noted during the testing were depressions within the lithified sand (Figure 73). The depressions contained a loose silty humic sand in which the skeletal remains were mixed within. As this surface was just below the vegetation line, it is likely that the depressions were due to floralturbation (root intrusion) or bioturbation (animal intrusion) exemplifying that the skeletal remains were at least partially disturbed by root activity.

Laboratory analysis of recovered remains identified them as belonging to a middle adult male based on fused epiphyses of long bones. Sex was determined through observation of sciatic notch on the innominate. Feature 51 is a secondary scatter of skeletal remains that will be preserved within Preservation Area 4.

Feature 52

Feature 52 consists of one displaced long bone identified on the surface within Preservation Area 1. No other human remains have been identified with this isolated find to date.

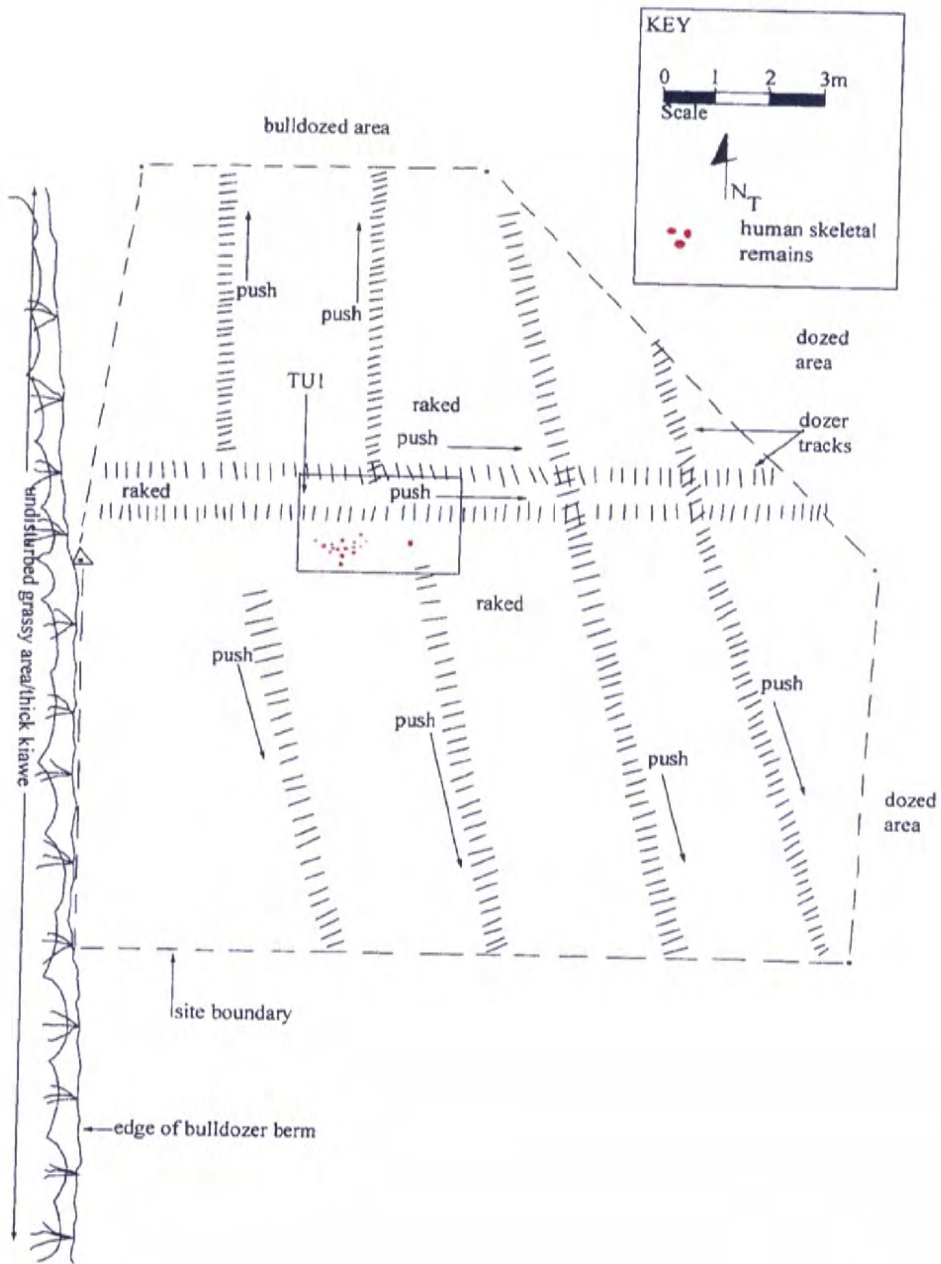


Figure 72. Plan View Map of Surface Scatter at Site 6679, Feature 51

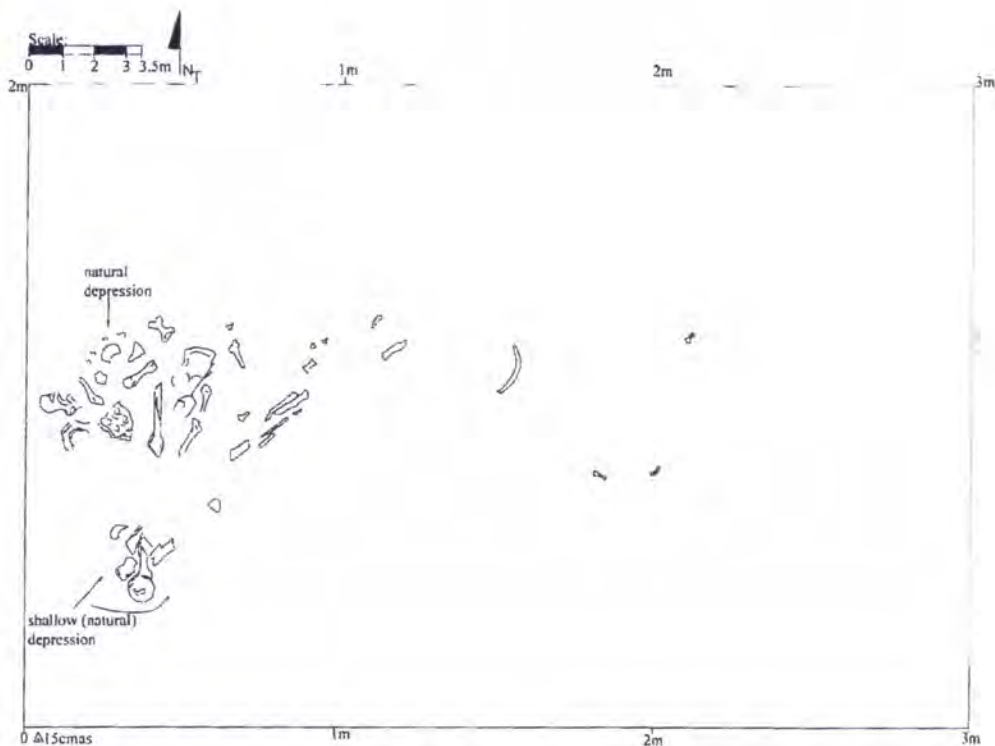


Figure 73. Plan View Map of Site 6679, Feature 1, Test Unit 1

Features 53a-c

Feature 53a was identified near Feature 12 during a field inspection and was comprised of a surface scatter of human remains consisting of two metatarsals, a talus, and the innominate. As no activity had occurred in this area for over a year, the skeletal remains were likely exposed from natural erosional forces (wind and rain). Per consultation with the SHPD and MLIBC, hand testing (TU1) was implemented to ascertain if a primary, *in situ* portion of Feature 53a was extant. Testing revealed the displaced right innominate approximately .40 m south of the surficial remains (left innominate, phalanges, talus) and no apparent burial pit (Figure 74). Since Feature 53a was situated along the western and northern sides of the test unit, a second test unit (TU 2) was placed adjacent and to TU1 along the north to ascertain the extent of Feature 53a and or additional skeletal remains. Testing at TU2 identified a displaced cranium and calcaneus within a concentration of roots at approximately .12 m bs (Figure 75). Disturbance to the cranium was evident due to a missing mandible and that the cranium exhibited evidence of burning. Although these remains were not articulated to those in TU 1, they may belong to Feature 53a. Based on cranial suture closure, dentition and the condition of the auricular and periauricular area, as well as the shape of the sciatic notch, the skeletal remains of Feature 53a from TU1 and TU2 belong to

a middle adult male. Testing re-commenced and TU3 was placed to the east of TU2. This test unit was excavated to .15 m bs where a possible burial pit designated Feature 53b was noted in the northern half of the unit (Figure 76). This hemispherical shaped pit measured .60 m long by .45 m wide and contained several rootlet inclusions. Due to the proximity of this pit to known primary burial features and per direction of Mr. Hinano Rodrigues, SHPD Cultural Historian and Ms. Dana Naone Hall, MLIBC, testing of this pit was not warranted.

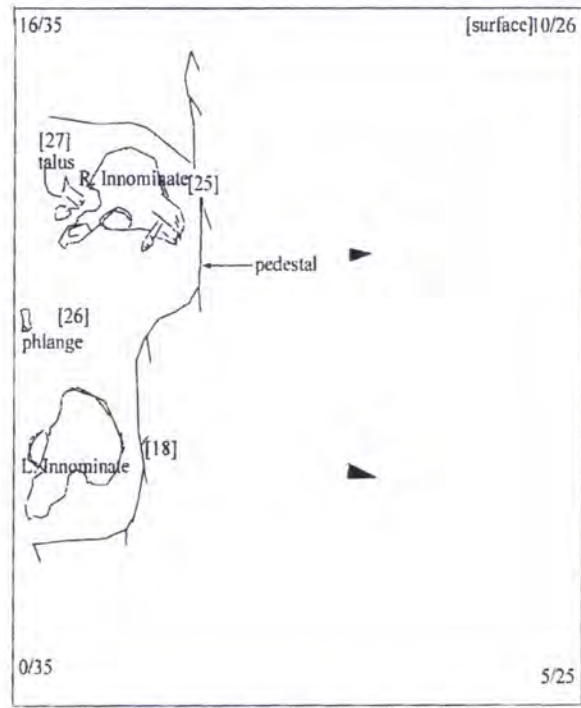
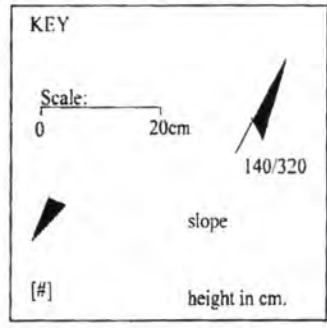


Figure 74. Plan View Map of Test Unit 1, Site 6679 Feature 53a

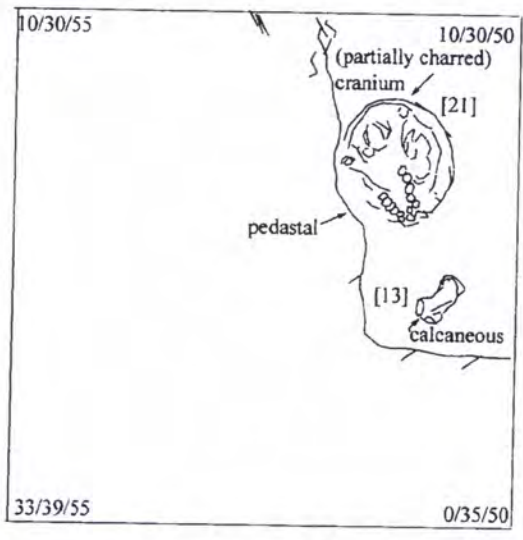
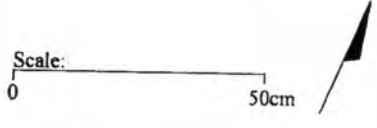


Figure 75. Plan View Map of Test Unit 2, Site 6679 Feature 53a

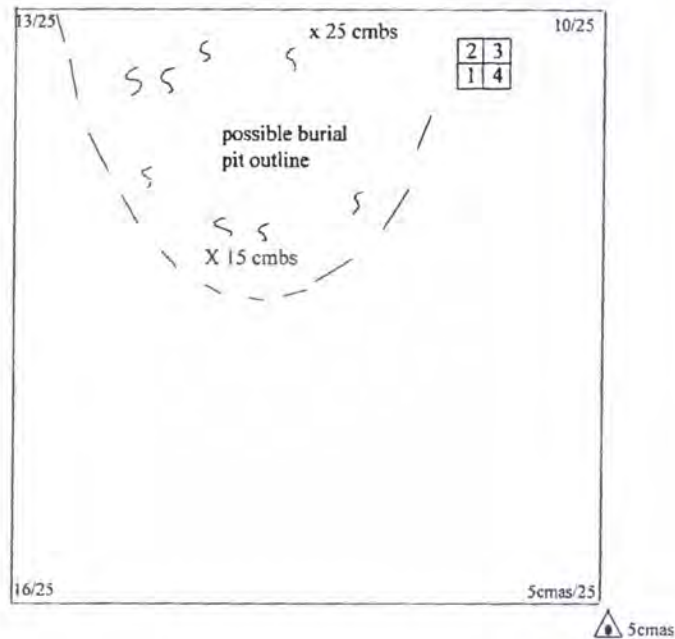
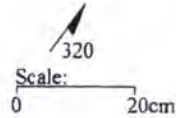


Figure 76. Plan View Map of Test Unit 3, Feature 53b

Proceeding south of TU3, TU4 was placed adjacent to and east of TU1. Within this test unit, a cranium, the proximal end of the humerus, a portion of a clavicle and scapula within a pit was identified at approximately .12 m bs. As these skeletal remains were determined to be anatomically correct and articulated, they were assigned Feature 53c and no further testing was deemed necessary (Figure 77). A fifth test unit, TU5, was placed adjacent to and west of TU1 to ascertain presence and or absence of additional human skeletal remains. Excavations were negative and terminated at approximately .25 m bs. Testing was then relocated to the north of TU5 and excavations terminated within this last unit (TU6) from to .26-.29 m bs. No human remains were identified in TU6 and all testing for the Feature 53 area was complete. Features 53a-c shall be preserved in place.

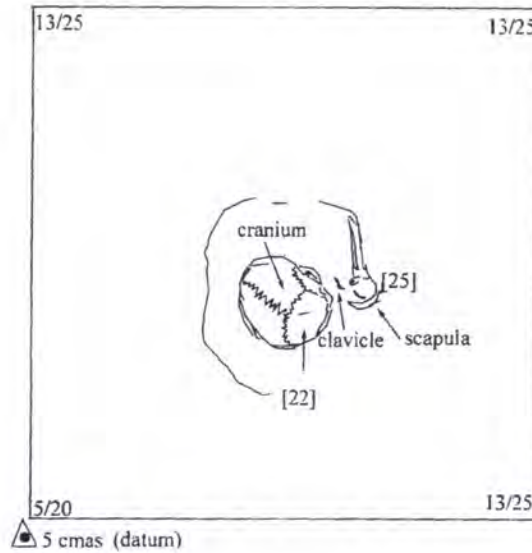
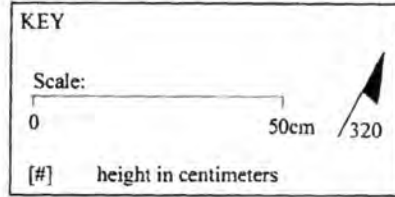


Figure 77. Plan View Map Test Unit 4, Feature 53c.

Feature 54

Feature 54 was identified during monitoring of the removal of stock piles. As grading activities reached the bottom of the spoil pile, concentrated remains as well as disturbed remains (portion of cranium, left scapula, left innominate and left femur) were observed. Hand testing was initiated and consisted of a 1.0m by 1.0m test unit designated TU1. At .10 m below the current surface a burial pit outline containing articulated remains with a large water worn cobble placed in the pelvic region was identified. Feature 54 was orientated at 240°/80° in a fully flexed position on the right side with the cranium face up (Figure 78). The remains belong to a middle adult male individual where sex was determined by the shape of the sciatic notch and the mastoid process. Age was estimated on cranial suture closure and the overall condition of the remains. Feature 54

has been designated as a primary burial feature which was minimally disturbed and will be preserved in place. Preservation Area 4 was created around Features 50 and 54 and is situated within the southern portion of Phase A.

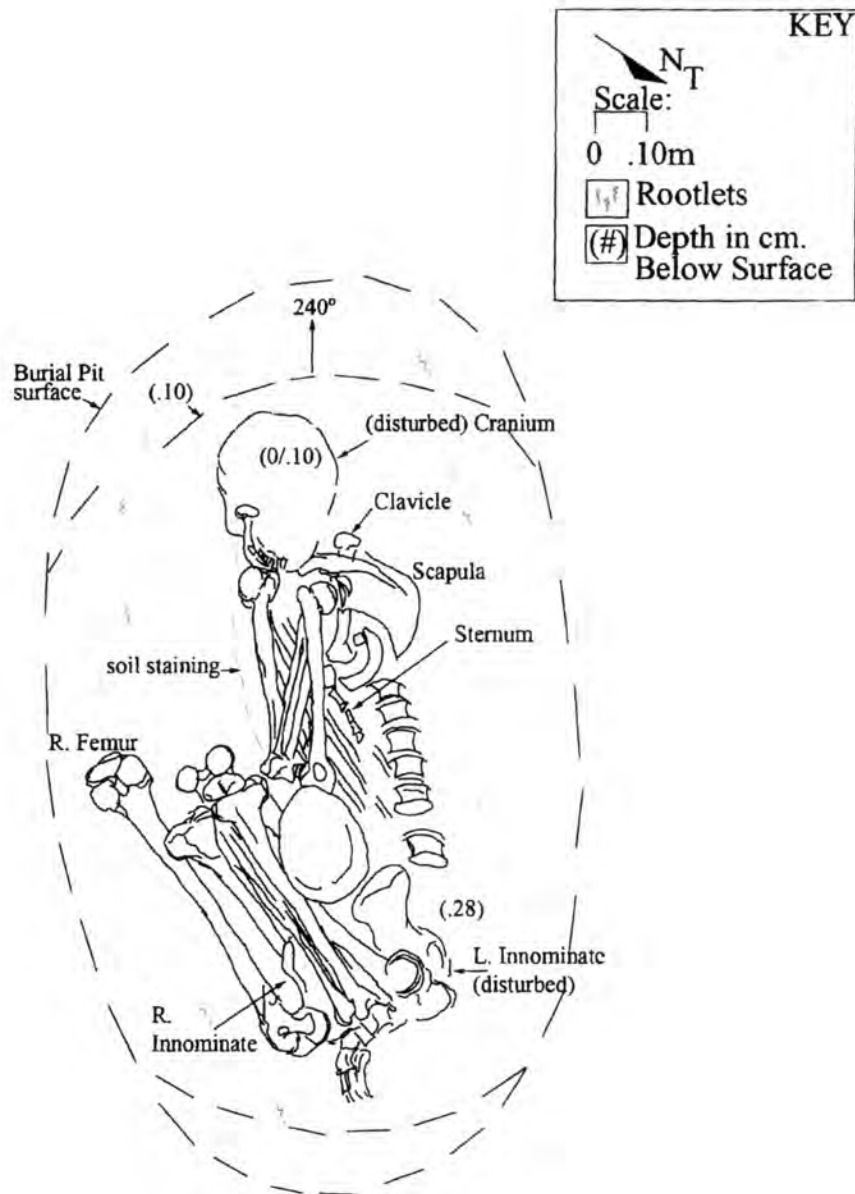


Figure 78. Plan View Map of Site 6679, Feature 54

After the discovery of these features and due to the concentration of human remains identified within Phase A, sand grading activities commenced within Phase C upon the completion of addendum inventory survey procedures. A total of test trenches were executed within the 50-acre Phase C area which were negative for cultural remains. Additionally, during the monitoring program within Phase C, no burial features were documented.

Upon completion of mining activities within Phase C, additional inventory survey procedures were executed within Phase D and resulted in negative findings. Thus, grading activities commenced within this 15-acre area.

PHASE D

Phase D is situated within the southeastern portion of the project area adjacent and east of Phase C. It is comprised of 15 acres which contain low undulating sand dunes. After approximately 5.0 acres had been graded, several burial sites and secondary scatters of human remains were identified within a 1.0 acre section. A total of three partially intact primary burials (Features 56-58), a burial pit (Feature 59), a recently disturbed possible intact burial (Feature 55) and the displaced skeletal remains of a minimum of seventeen individuals (Features 56a-q) were recorded. Upon the identification of this concentration, all grading activities were terminated within Phase D.

Feature 55

Feature 55 was inadvertently exposed during grading of sand to create separate stockpiles of "Grade B" and "Grade A" sand. Upon the identification of skeletal remains within the tailing and stockpile, all grading was halted (Figure 79). Recovery and testing was performed and no intact component of Feature 55 was identified. The remains were in a linear scatter at the transition between the Grade B and A soil horizons (Figure 80). Based on the osteological assemblage, it appears that this feature was likely recently intact and displaced during sand mining activities. Feature 55 is the remains of a child 6 years +/- 24 mos based on the stage of epiphyseal fusion of long bones and dentition. Sex at this age is indeterminate. The burial was lying on the border of the B/A horizon. The left side of a juvenile mandible was observed on the surface, as well as a concentration of long bones at the base of the stockpile. Since Feature 55 was determined to be a recently disturbed probable primary/*in situ* burial feature, it will be preserved in the place where it likely originated. A Preservation area has been established at this location and designated as Preservation Area 3 (see Figure 8 and Table I).

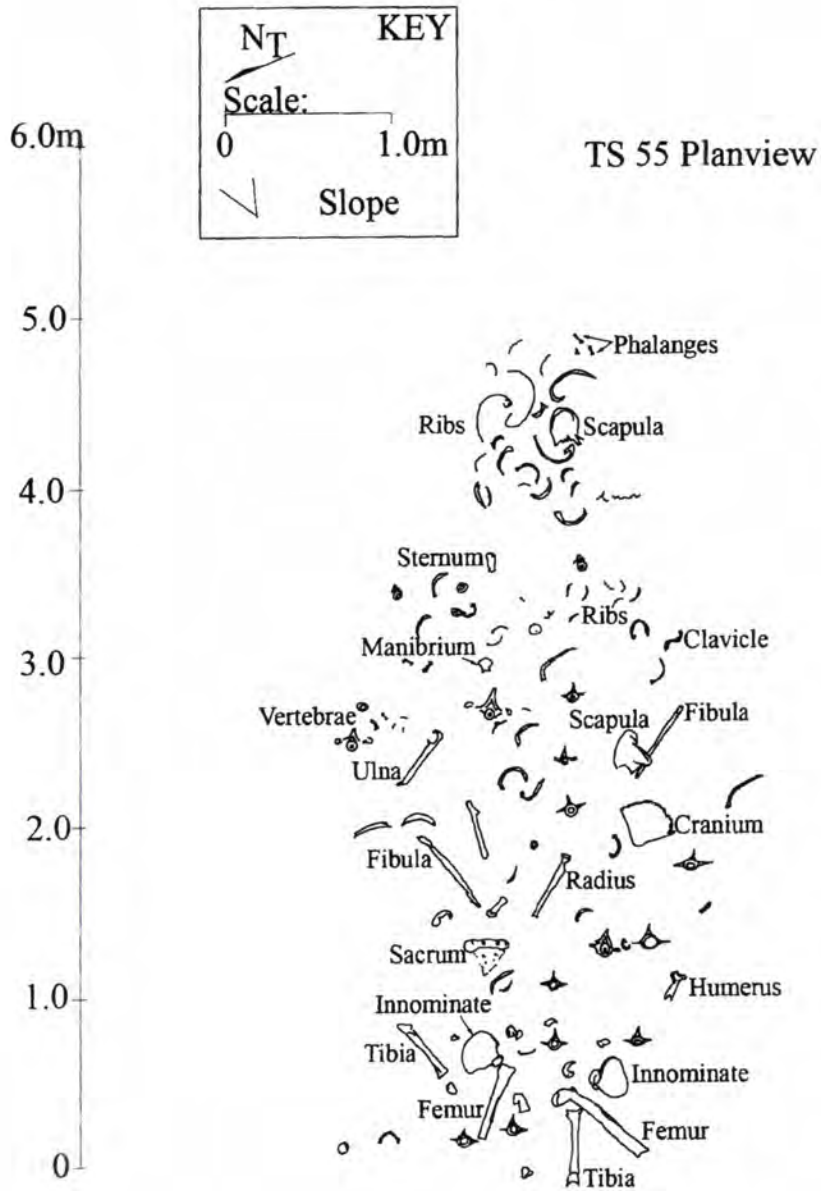
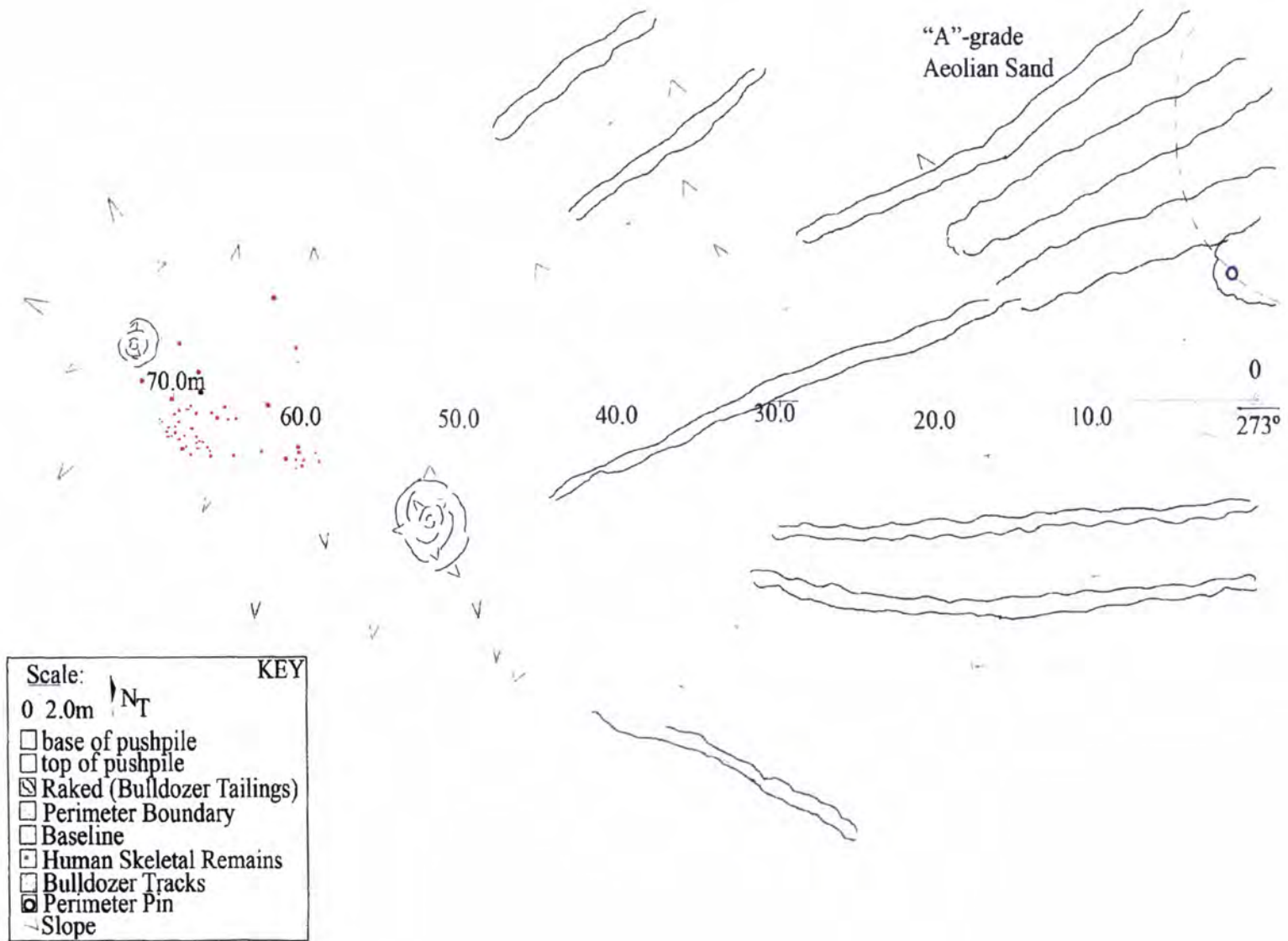


Figure 80. Plan View Map of Scatter for Site 6679, Feature 55 (Inset A on Figure 81)

Features 56-59

Features 56-59 were identified during monitoring of grading activities approximately 30 m (100.00 ft.) east of Feature 55. While creating a large stockpile, the monitor identified a linear pattern of scattered remains within the tailing leading up to the stockpile. A closer inspection noted skeletal remains on top of the stockpile and around the edges. A plan view map was created to document the activities (Figures 81 and 82) and resultant initial surface scatter of remains. Raking of the dozer tailings and around the top and sides of stockpile was initiated first. As the skeletal remains were collected, it was apparent that there were several individuals and artifacts represented in the assemblage as well as possible intact burials and burial pit outlines. Thus to collect all the displaced skeletal remains and to determine the presence of primary, intact burial features, areal excavations utilizing a grid system were instituted. The grid system consisted of fifty 2.0m by 2.0m units to be raked, shovel scraped and or hand-tested (Figure 83). The raking, screening and hand testing at the grid system documented three partially intact primary burial features (Features 56 and 58), and a probable burial pit containing a primary burial feature (Feature 59). Raking, shovel scraping and screening of the tailings and stockpile recovered additional skeletal remains in a secondary context (Features 56a-q). One additional intact burial feature was noted just outside the activity area and is designated as Feature 57. Features 56-59 are further discussed below.

Figure 81. Plan View Map of Site 6679, Feature 56-59 Area



Scale:	KEY
0 1.0m	
MC Metacarpal	
LB Long Bone	
CV Cervical Vertebrae	
C Carpal	
T Tarsal	
R Rib	
MT Metatarsal	
AI Artifact:Basalt Adze	
P Phalange	
LV Lumbar Vertebrae	

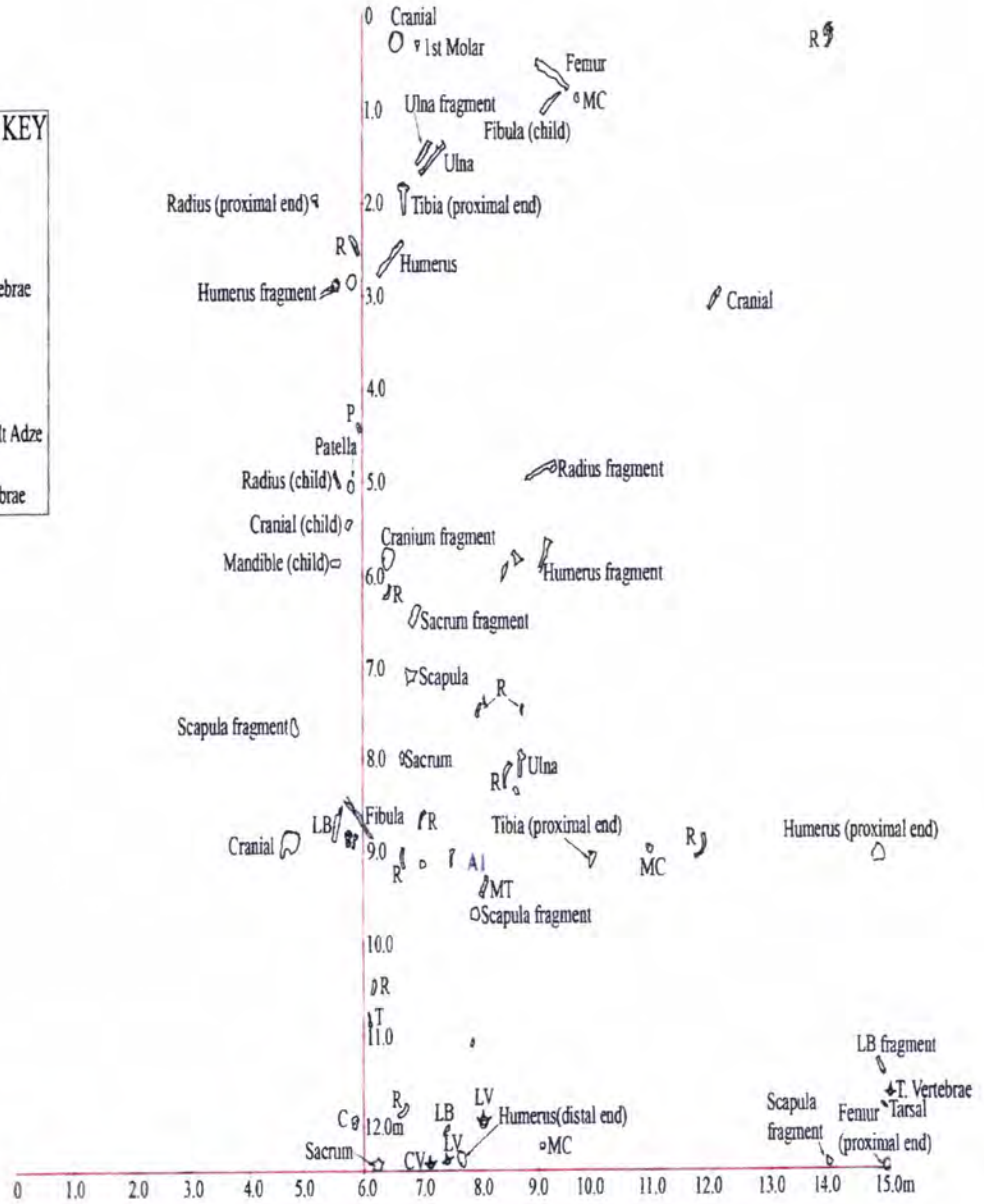


Figure 82. Plan View Map of Scatter within Dozer Tailing

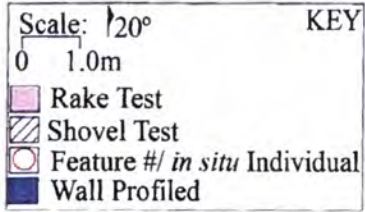


Figure 83. Plan View of Grid System for Areal Excavations

Feature 56

Feature 56 was documented within TU 33 grid and initially consisted of cranial fragments surrounded by a faint burial pit outline within the southeastern quadrant of the test unit (see Figures 84 and 85). As excavations continued, the burial pit became more defined at .10 m bs and was excavated into the lithified sandstone layer. The pit measured .90m long n/s by .70m wide, was oriented north/south and contained pitfill of the grayish brown "Grade B" sand with numerous roots, sandstone peds and articulated human skeletal remains. This individual was placed on their back, face up, head tilted slightly to the right in a fully flexed position (Figure 86). The hands, feet and pelvic region were not excavated in order to keep disturbance at a minimum. Feature 56 was determined to be a primary burial feature of a young adult female. As the burial was not fully exposed (particularly the innominate), sex determination was therefore based on observation of the brow ridge as well as the overall 'gracile' appearance of the skeletal remains. Estimated age was based on the stage of cranial suture closure and epiphyseal fusion. Feature 56 will be preserved in place within Preservation Area 3.

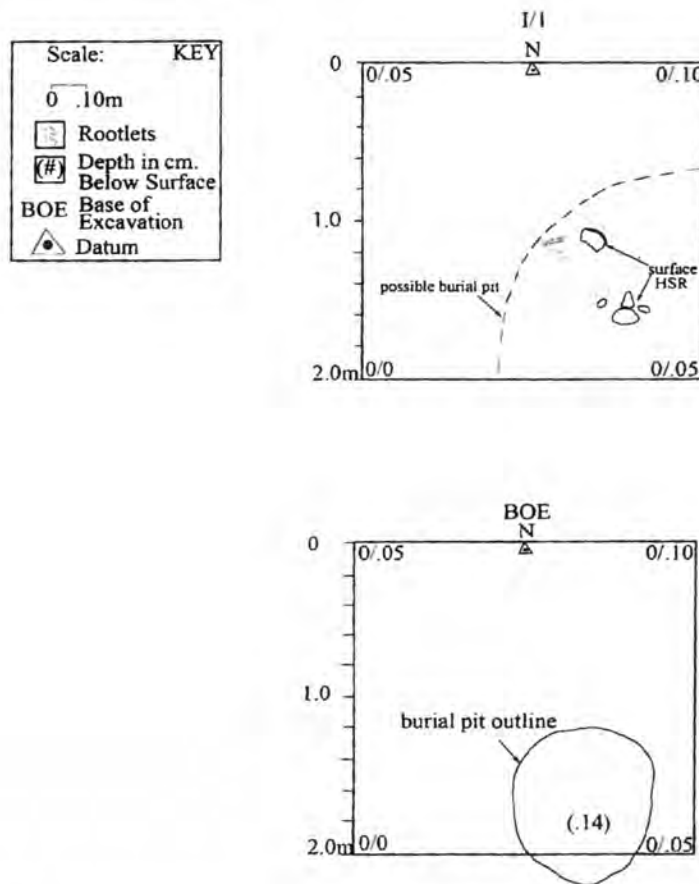


Figure 84. Plan View Map of Test Unit for Site 6679, Feature 56

The secondary deposit of human skeletal remains collected through raking and screening was analyzed and separated at the ASH lab. Initial results have identified seventeen individuals from this assemblage. As some of the skeletal remains have old breaks and do not constitute a great percentage of that individual, it is evident that these skeletal remains were disturbed prior to the sand mining activities. What is not evident is how these remains were secondarily deposited within this confined location and what degree of disturbance occurred during the current grading activities. As discussed in the methods section, the one assumption concerning recent disturbances is that if greater than 90% of this individual has been collected, and that the skeletal remains contain no old breaks, this individual would be categorized as recently disturbed probable primary burial. Additionally, several quality artifacts were recovered in a secondary context and are presumed to be grave goods.

The following are descriptions for Features 56a through 56q and are the result of the laboratory analysis discussed above. These features will be preserved in the area where they were found which has been designated Preservation Area 3.

Feature 56a

Feature 56a represents an older adult male individual aged 50+ years. Age was ascertained through observation of cranial sutures being obliterated, as well as dentition showing extreme occlusal wear. Sex was based on the sciatic notch, as well as the size of the nuchal crest and supra-orbital ridge of the cranium. When comparing the left and right ulna, which were fragmented, the skeletal remains were different colors indicative of differing depositional context and possible prior disturbance to the individual. Darker hues on skeletal remains may be attributed to decomposing organic materials (roots) and or intentionally placed organic grave goods and or *kapa*. White or bleached bone is almost always synonymous with prior exposure to the elements thus indicating previous disturbance. Approximately 70% of Feature 56a has been recovered.

Feature 56b

Feature 56b is an older adult male individual aged 50+ years. Sex was established through observation of the gonial angle as well as the supra-orbital ridge. Estimated age was established through alveolar reabsorption of both the maxilla and mandible, and extreme occlusal wear, as well as cranial suture closure. Approximately 66% of Feature 56b has been recovered.

Feature 56c

Feature 56c is also an older adult male individual. Characteristics consisting of the sciatic notch, size of humeral head and gonial angle of the mandible determined sex. Estimated age was established through cranial suture closure and osteophytes observed on the remains.

Approximately 38% of Feature 56c has been recovered and the skeletal remains exhibited old breaks.

Feature 56d

Feature 56d is an older adult male individual. Age was determined through observation of cranial sutures being almost obliterated, as well as general condition of dentition being worn down from use. Sex determination was based on the size of the nuchal crest located in the occipital region of the skull, the shape of the brow ridge, and orbital margin. Approximately 44% of Feature 56d has been recovered.

Feature 56e

Feature 56e is an older adult female individual. Observation of the gonial angle, mastoid process and mental eminence determined sex. Estimated age was based on obliterated cranial sutures and extreme occlusal wearing on the teeth. Approximately 62% of Feature 56e has been recovered.

Feature 56f

Feature 56f is a middle adult male individual. Observation of the gonial angle of the mandible and supra-orbital ridge determined sex. Estimated age was based on dentition showing moderate occlusal wear, as well as cranial suture closure being very apparent. Old breaks were noted on some of the remains. Approximately 66% of Feature 56f has been recovered.

Feature 56g

Feature 56g is a middle adult male individual. Age was established through observation of cranial suture closure being fairly prominent, as well as moderate wearing on dentition. Sex determination was based on the gonial angle of the mandible, size of the mastoid process, and supra-orbital ridge. Old breaks were noted on some of the remains in this assemblage.

Approximately 76% of Feature 56g has been recovered.

Feature 56h

Feature 56h is an older adult female individual. Extreme occlusal wearing on dentition was noted and established age. Sex was determined based on observation of the gonial angle of the mandible as well as the size of the mental eminence. Approximately 66% of Feature 56h has been recovered.

Feature 56i

Feature 56i is an older adult female individual. Age determination was established through observation of alveolar reabsorption and cranial suture closure. Sex was based on size/shape of the gonial angle, mastoid process and mental eminence. Old breaks as well as staining or discoloration was noted on some of the skeletal remains. Approximately 59% of Feature 56i has been recovered.

Feature 56j

Feature 56j is a middle adult male individual. The presence of obvious cranial sutures as well as observation of moderate occlusal wearing on dentition established estimated age. Sex was determined through analysis of mandibular condyle, gonial angle shape/size, mastoid process, nuchal crest and size of the brow ridge. Approximately 63% of Feature 56j has been recovered.

Feature 56k

Feature 56k is an older adult male aged 50+ years. Cranial sutures were noted as being almost obliterated, and alveolar reabsorption was noted on both maxilla and mandible. These determined estimated age of the individual. Sex was determined through observation of size of mandibular condyle, gonial angle of the mandible, mastoid process and nuchal crest. Approximately 63% of Feature 56k has been recovered.

Feature 56l

Feature 56l is a young adult female approximately 20-35 years of age at death. Estimated age was established through observation of prominent cranial sutures. Sex was determined from shape of the sciatic notch in the left innominate, shape/size of mandibular condyle, gonial angle of the mandible, mastoid process and nuchal crest. Approximately 58% of Feature 56l has been recovered.

Feature 56m

Feature 56m is an older adult female aged 50+ years at death. Estimated age was established through observation of cranial sutures being almost obliterated or faded. Sex was determined through shape/size of nuchal crest located in the occipital region of the skull. Approximately 51% of Feature 56m has been recovered.

Feature 56n

Feature 56n is a middle adult male individual. Overall robusticity of the remains and size of femoral head helped establish the sex and age was based on cranial suture closure and epiphyseal fusion. Approximately 62% of Feature 56n has been recovered.

Feature 56o

Feature 56o is a middle adult male individual. Sex was determined through size of the nuchal crest located in the occipital region of the skull. Estimated age was established through prominence of cranial suture closure and epiphyseal fusion. Approximately 62% of Feature 56o has been recovered.

Feature 56p

Feature 56p is a child approximately 7 years +/- 24 mos. Estimated age was based on size of remains and dentition. Sex determination could not be established at this time. Approximately 72% of Feature 56 has been recovered.

Feature 56q

Feature 56q is an infant represented by fragmented cranial remains that appears to be approximately 1 year +/- 6 months. Estimated age was based on size of the remains. Only 3% of Feature 56q has been recovered and as such there may be a primary component to this individual within the Preservation Area 3.

Discussion of 56a-q

As previously discussed, a total of seventeen individuals have been recovered from a secondary context within a confined area of Phase D. Displaced artifacts which are presumed grave goods consisted of two Lei Niho Palaoa, one bone fishhook, two perforated cowrie shells (octopus lure) and three small adzes were collected at the 56a-q area (Appendix A). Unfortunately, these artifacts were recovered in a secondary context and it is indeterminate which burial(s) these grave goods were associated. The presence of the Lei Niho may indicate a higher status individual (s)

and the fishhook and perforated cowrie shells were likely placed with an important fisherman. The adzes are small and may have been with one or a couple of burial features. These artifacts will be more fully discussed and analyzed in the monitoring report, however as they are likely grave goods, they will be reinterred adjacent to or with the Features 56a-q assemblage

Feature 57

Feature 57 appeared to be a primary burial feature within a burial pit excavated into the lithified sandstone. This feature was exposed on the existing surface, which was approximately 3.0 ft. below the original surface and was comprised of a cranium (which was slightly disturbed) within a pit. Due to the presence of numerous burial features within the immediate area, no testing was undertaken and Feature 57 shall be preserved in place

Feature 58

Feature 58 was identified during excavation of a series of test units within the grid system. Grid numbers 25, 26 and 36 were excavated, uncovering the primary/*in situ* portion of Feature 58. At the top of Layer I, Level 1 a possible burial pit outline was observed, however as excavations continued, it appeared that the pit had been disturbed along the southwestern side during the mechanical activity (Figure 86). At approximately .20 m bs the intact component of Feature 58 was identified. Articulation was observed in multiple areas; the mid to lower vertebral column, partial pelvic girdle, the entire left leg, and metacarpals of both left and right hands as well as the metatarsals of the left foot. The individual was orientated north/south, was fully flexed, placed on their left side, with both knees near the chest and both hands between the thighs (Figure 87). Disturbance occurred to the cranium and right side of the individual. The remains belong to a middle adult female individual. Sex was determined upon observation of the sciatic notch of the left innominate. Estimated age was based on observation of fused epiphyses of long bones. No other cultural materials were recovered with this individual. Feature 58 was determined to be a recently disturbed, primary partially intact burial feature which will be preserved in place within Preservation Area 3.

Scale:		KEY
0	.10m	
(#)	Depth in cm. Below Surface	
△	Datum	
TS	Temporary Site	
TU	Test Unit	
B.O.E.	Base of Excavation	

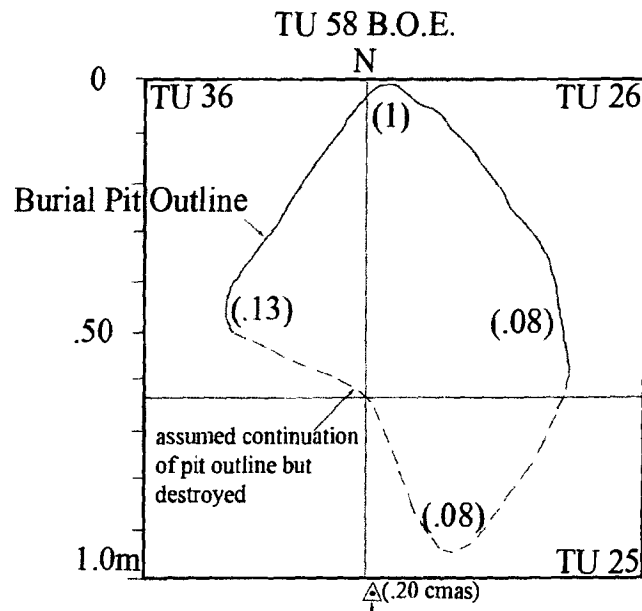
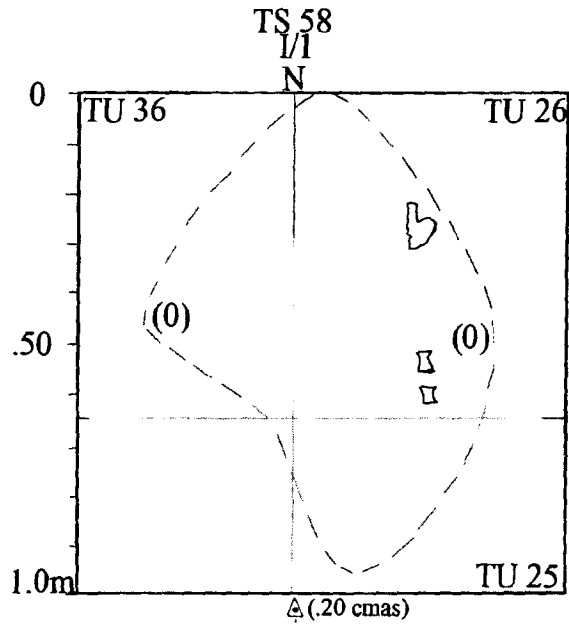


Figure 86. Plan View of Test Unit for Feature 58

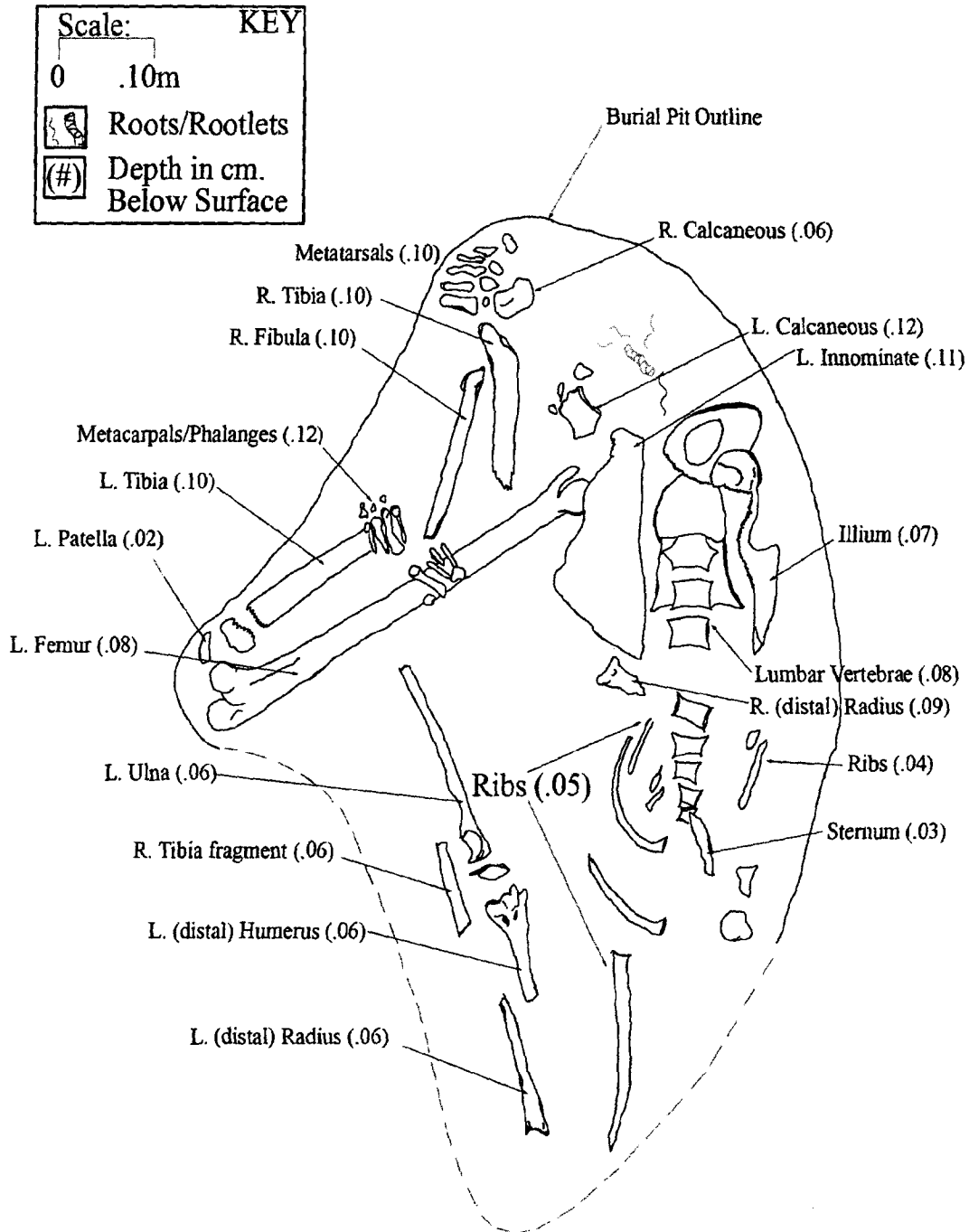


Figure 87. Plan View Map of Site 6679, Feature 58

Feature 59

Feature 59 was documented while testing grid numbers TU17 and TU27 and consists of a possible burial pit outline within the Layer III "Grade A" sand (see Figure 83). It is comprised of a circular area containing many rootlets and a grayish brown "Grade B" sand pit fill which is surrounded by the yellowish brown "Grade A" sand. Also noted along the edge of the possible pit outline is larger roots and small waterworn cobbles (Figure 90). No testing was conducted upon this possible burial pit as it will be preserved in place within Preservation Area 3.

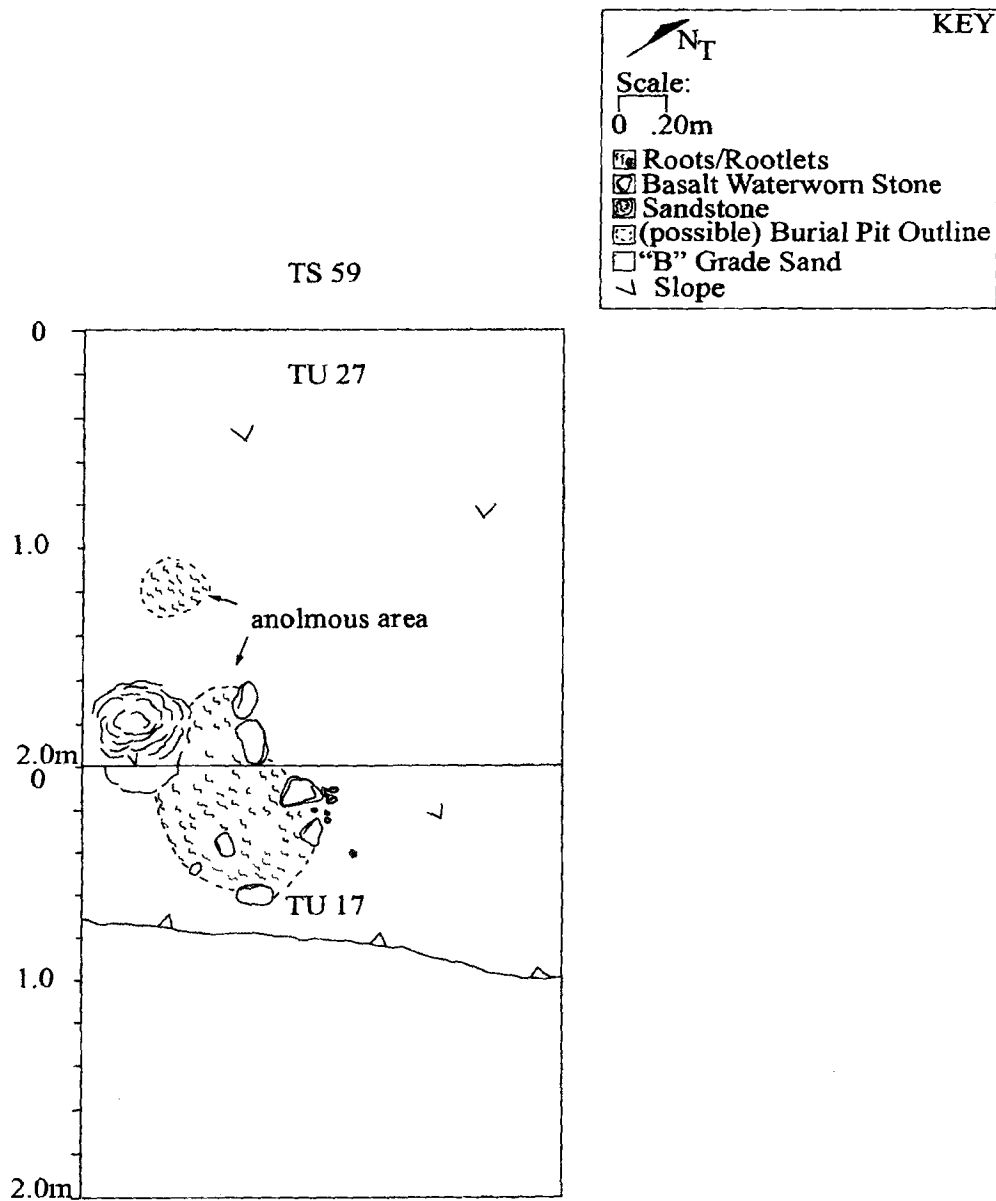


Figure 88. Plan View Map of Site 6679, Feature 59

PHASE B

Phase B which is located along the western side of the access road was the first area to be monitored. Only two burial features, Features 60 (formerly Fe.1b) and 61 (formerly Fe.2b) were identified within the 30 acres. Feature 60 was previously and recently displaced and Feature 61, a partially intact primary burial feature which will be preserved in place. A preservation area has been established around Feature 61 and is designated Preservation Area 2. The disturbed skeletal remains of Feature 60 will be reinterred within Preservation Area 2 (see Figure 8 and Table I).

Feature 60

Feature 60 was identified during grading activities near the slope adjacent to the County of Maui landfill. The remains though concentrated appeared to be from a previously disturbed burial, although the concentration was disturbed during the recent activities (Figures 88 and 89). Raking and several hand controlled excavations were initiated and recovered approximately 90% of the skeletal elements, however no primary component was documented. Missing skeletal elements from Feature 60 consisted of portions of the maxillae (nasal and sphenoid) and innominate. Feature 60 may have had an *in situ* component prior to the recent activities, however due to the prior disturbances the context was indeterminate. The skeletal remains of Feature 60 belong to a middle adult male. Sex determination was made by observation of the sciatic notch and overall size of remains. Age was based on cranial suture closure as well as minimal occlusal wear on dentition. Feature 60 will be reinterred with Feature 61 at Preservation Area 2.

Feature 61

Feature 61 is a partial primary burial feature of an older adult male that will be preserved in place. This inadvertent burial was identified during sand grading activities. Upon the identification of skeletal remains, hand testing was initiated. Feature 61 was placed on its back in a fully flexed position, slightly oriented towards the southeast. Although the humeri were displaced, the left ulna and radius indicated the left arm was fully extended along left side. The right ulna and radius appear to be semi-flexed, across left clavicle and under left tibia. The legs are fully flexed up towards the torso. This individual was determined to be an older adult male that will be preserved within Preservation Area 2.

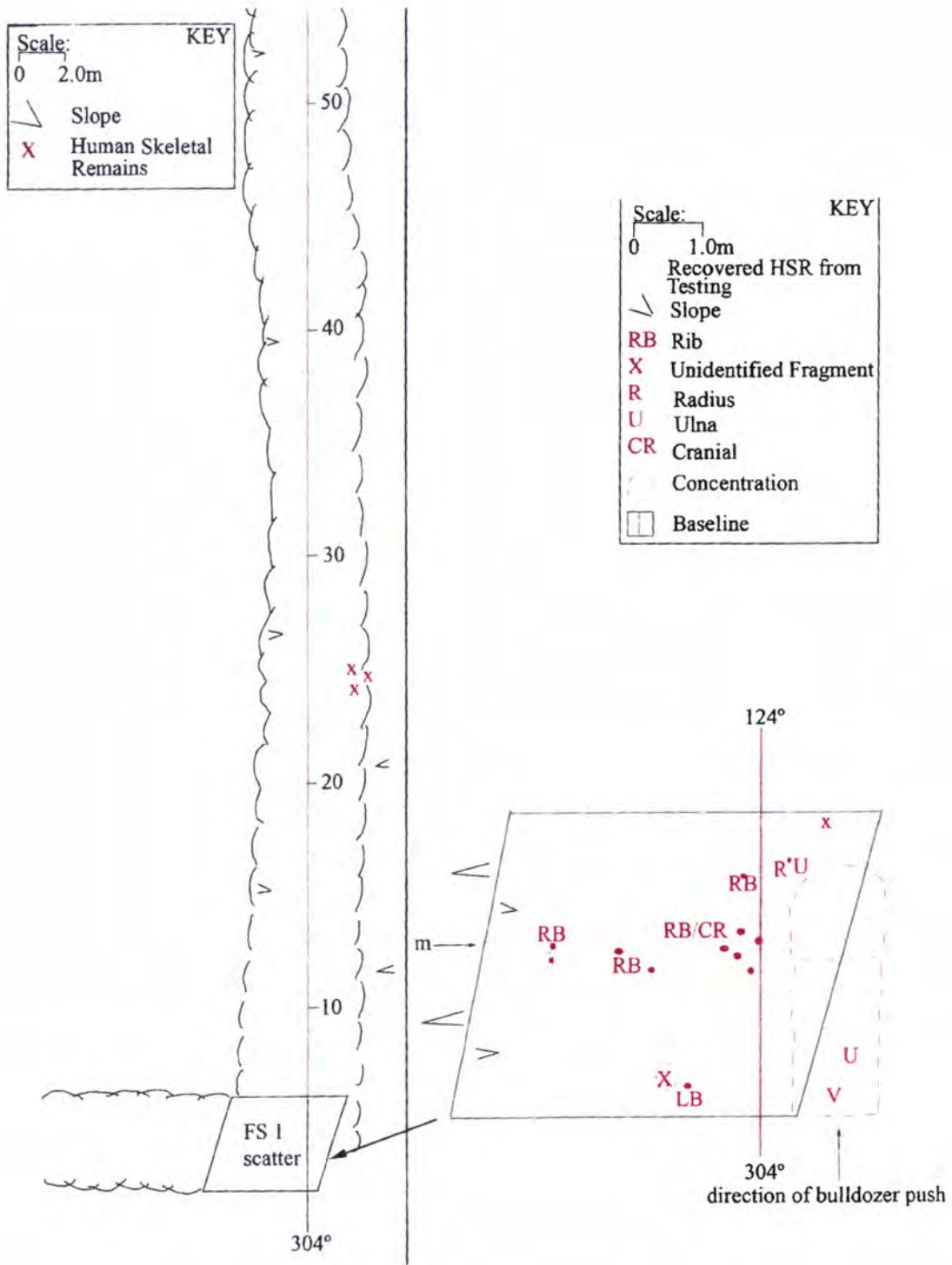


Figure 89. Plan View Map of Surface Scatter at Site 6679, Feature 60, Phase B

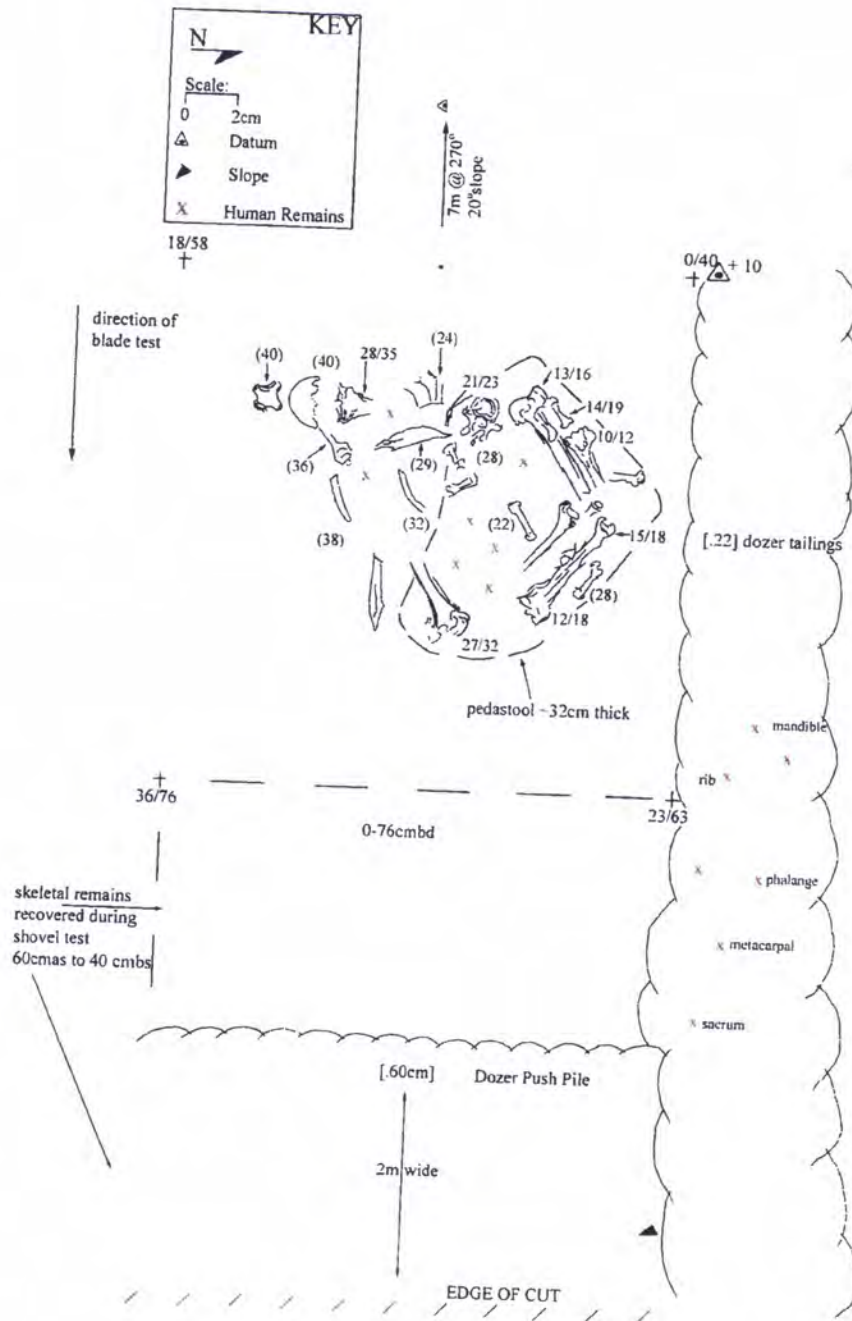


Figure 90. Plan View Map of Feature 60 Showing Concentration of Skeletal Remains

KUIHELANI HIGHWAY

Site 50-50-04-5504

Site 5504 is situated along Kuihelani Highway and comprised of a partially intact primary burial feature. This burial was disturbed during un-monitored activity by H.C.& S. The purpose of grading along Kuihelani Highway was to create a berm to prevent trespassers from entering and using this open space as a land fill. After the grading activities were observed, a field inspection was conducted where disturbed skeletal remains were collected, and a concentration of remains which appeared to be intact and articulated. Testing was conducted upon the concentration and exemplified a fully flexed individual placed on their left side where the middle and lower torso were partially intact. Disturbance to this individual occurred along portions of the right side, scapula, clavicles and cranium (Figure 92). Based on the sciatic notch and size of long bones, this individual is presumed to be a middle adult male. Age was based on stage of epiphyseal fusion and lipping of vertebrae centrum. Site 5504 will be preserved in place within Preservation Area 5 which has been established around this burial feature.



Figure 91. Plan View Map of Site 5504

DISCUSSION

The resultant data exemplified that this area, like adjoining parcels, was utilized during the traditional period as a cemetery. As discussed in the various burial descriptions, much of the area exhibited prior disturbances (before Hawaiian Cement grading) from past un-monitored sand mining, pastureland and nursery activities as evidenced by previously disturbed burial features, inverted stratigraphy and conversations with construction personnel. Although the project area was previously disturbed, a total of ninety-five locations containing inadvertently discovered human skeletal remains and burial pits were documented within the project area and assigned Sites 5504 and 6679. Site 6679 consisted of fifty-three primary and possible primary burial features (34 primary, 13 burial pits and 6 recently disturbed probable primary) and forty-one individuals in a secondary context. Site 5504 consisted of one primary burial. Due to the proposed development plan, the majority of the burial features will be preserved in place within five preservation areas totaling over thirty acres. Based on the location of Kamehameha Avenue extension and a lateral access road, two partially intact primary burial features and five secondary deposits of skeletal remains will be relocated into the closest preservation area.

The burial features were found at varying elevations ranging from 142.0 ft. to 255.00 ft amsl and identified along the tops, sides and toe of slopes. As such, there was no distinct pattern to the interment of these individuals. Three primary burials were interred with grave goods consisting of basalt flakes (Fe. 21) and perforated conus shells (Fes. 31a and 34). Unfortunately, the majority of artifacts were recovered in a secondary context at Phase D and consisted of basalt adzes, perforated cowrie shells, a bone fishhook, a bone Lei Niho and a Lei Niho Palaoa (whale tooth-Appendix A). Besides intentionally placed artifacts, several contained manuports of waterworn cobbles and boulders and a few had lithified slabs placed over the burial feature. Lastly, and most notably, two areas appeared to contain high status individuals based on the mode of interment (Features. 18c and 18d) and artifacts documented at the area (Features 56-58).

The treatment, preservation in place and or relocation, for Sites 5504 and 6679 has been previously accepted by the State Historic Preservation Division. As previously mentioned, the overwhelming majority of burial features will be preserved in place and the long-term preservation measures to protect these features in perpetuity are presented in the following Preservation Plan.

PRESERVATION PLAN

Short-Term Measures

Short-term protective measures are implemented at preservation areas during the interim period before and during construction. The burial features of Site 5504 and 6679 are currently protected by erecting orange caution fencing 50 ft. around the burial site. Additionally, each burial feature is covered with a layer of sand, tarp and plywood or wooden grate. To ensure the protection of the remnant sand dune feature containing the burials, a 2:1 slope must be maintained if grading occurs outside the temporary buffer zone (50 ft.). Periodic field inspections are performed to ensure that burial features are protected from the elements. All collected, displaced human skeletal remains are curated at the offices of ASH.

Any burials to be disinterred will be performed utilizing all accepted methods and procedures. As human skeletal remains are removed, they will be documented on Burial Inventory forms and placed into cardboard boxes lined with *kapa* and *ti* leaves. The disinterred burials will be curated at the ASH offices, where they will be prepared for reinterment by appropriate personnel.

Long-Term Preservation Measures

Long-term measures are a mitigation strategy to protect the site in perpetuity. These measures may not be adjusted and or changed without prior consultation and acceptance by the SHPD in consultation with the appropriate MLIBC members.

The proposed reinterment location for the burial features is within the preservation areas established around existing intact primary burials. Preservation Area 1 is the largest and comprised of 28.4 acres. It is situated within the northwestern quadrant of the project area. Preservation Area 1 contains the majority of the burial features and secondarily deposited human remains, Feature 46 shall be reinterred into Preservation Area 1. Preservation Area 2 consists of .2 acres and is situated within Phase B surrounding Feature 61. Feature 60 will be reinterred within Preservation Area 2. Preservation Area 3 measuring 1.7 acres is located south east of Preservation 1 and has been erected around Features 55-58. Preservation Area 4 comprised of 1.2 acres contains Features 50 and 54 and lies just south of Preservation Area 1. Secondary scatters, Features 48, 49b/c and 51, as well as a partial intact primary burial Feature 49a will be relocated and interred within Preservation Area 4. Preservation Area 5 contains Site 5504, a primary burial feature, and is comprised of .115 acres situated along Kuihelani Highway. All preservation areas

will be protected in perpetuity by a combination of landscaping, signage, recordation, buffer zones and surface demarcation. These measures are discussed in detail below.

Surface Demarcation-All primary, *in situ* burial sites and reinterred human skeletal remains shall be marked on the surface by cobbles and or small boulders. For reinterred burials, a reinterment pit measuring approximately 4.0 ft. by 4.0 ft. by 3.0 ft. deep will be excavated adjacent to the *in situ* burial features. The bundles of human skeletal remains will be placed in the bottom of the pit and the remainder of the pit will be filled with clean sand. A concrete cap measuring approximately 4 inches thick or some other acceptable form of cover shall be placed over all burial features and inscribed with the SIHP number and KAPU. Soil and or sand will cover the concrete so that vegetation can be established. A large boulder and or several cobbles will be placed on the surface over the burial to demarcate its location.

Preservation Area/Buffer Zone-The preservation area includes the burial site, the surface demarcation and the buffer zone which surrounds the burials. The buffer zone is a protective area for the buried human remains in which temporary or permanent structures shall not be placed or built. Subsurface utilities and other uses shall be routed outside of the buffer zone. A minimum 50-100 ft. buffer zone will be established from the outer most burials within each preservation area. The buffer zone will be delineated by a combination of aligned boulders, fencing and vegetated berms as applicable and appropriate to each preservation area. Along the outside perimeter of these preservation areas will be clearly marked walking trails. The trails will encircle each preservation area and are envisioned to be utilized by the general public and those wishing to visit the preservation areas.

Only traditional and customary activities associated with Native Hawaiian burial sites shall be allowed within the preservation area. At this time, no access is afforded inside the preservation area except for maintenances purposes. For continued protection of the burials, Preservation Areas 1-5 will be clearly identified on all construction plans, as built plans and etc.

Landscaping-The interior of all preservation areas will be maintained with existing vegetation or landscaped with appropriate dryland Native plants to stabilize the sand dune formation. The Native plantings will be a combination of ground cover and shrubs that are not deeply rooted. Appropriate trees for ceremonial and religious areas such as Milo may be planted but must be placed away from any known burials. If existing non-native trees are removed or new trees planted, all excavations for proposed trees must be monitored by the archaeologist. Generally, trees that require removal are clear cut and the base is poisoned in place. Native plantings may consist of drought tolerant native plantings such as *naio papa, ililma* or other appropriate native plants found in the central Maui area. The landscaping shall be maintained so that the burial markers and signage are visible. Several openings not more than 3.0 ft. wide will be provided for maintenance purposes. To establish the native plantings, temporary irrigation may be installed on the surface. Within the preservation area, no trenching for subsurface irrigation will be permitted.

Signage-Bronze plaques measuring 18 inches by 10 inches shall be permanently affixed at two locations along the exterior of the preservation area. Signage would consist of the following:

Native Hawaiian Burial Sites
KAPU
State Site Number 50-50-04-6679
Please Respect This Area

Maintenance-The plaques, burial markers, landscaping and buffer zone delineation (aligned boulders, vegetated berms, fencing, landscaping) shall be maintained by the landowner, homeowners association or other applicable entity with such responsibilities. If any of these protective measures should deteriorate or are damaged over time, the landowner, homeowners association or applicable entity shall be responsible for the repair or replacement of these measures; however no changes may be made without written authorization by SHPD

To ensure perpetual protection of this burial site, periodic site inspections by the SHPD may be conducted to verify that the signage, platform and all long-term measures are in place and the site is adequately protected. Site inspections will be performed at mutually agreed upon times between the landowner, homeowners association or applicable entity and the SHPD staff.

Recordation- The preservation area shall be surveyed by a licensed surveyor and a metes and bounds description of the preservation area shall be recorded by the landowner, along with the Burial Treatment and Preservation Plan at the State of Hawaii Bureau of Conveyances within 90 days of written acceptance of the Burial Treatment and Preservation Plan by the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD). The DLNR-SHPD and the Maui/Lanai Islands Burial Council (MLIBC) shall be provided with copies of the recorded Burial Treatment and Preservation Plan.

Access- Burial sites may be viewed from the walking trails at the preservation area. Access within the preservation areas for lineal and or cultural descendants is not afforded at this time, as no lineal and or cultural descendant claims have been received by the SHPD for these burial features. In the event that a future lineal or cultural descendancy claim is recognized by the MLIBC, access to the burial site within the preservation area shall be permitted at reasonable dates and times mutually agreed upon by the landowner and lineal and cultural descendants.

REFERENCES

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2009 *Field Methods in Archaeological*, Academic Press, San Diego.
- Steele, D.G., & C. Bramblett
1988 *The Anatomy and Biology of the Human Skeleton*. Texas A&M University Press. College Station.
- White, T.D., & P.A. Folkens
Human Osteology. Academic Press. San Diego, Ca.

APPENDIX A

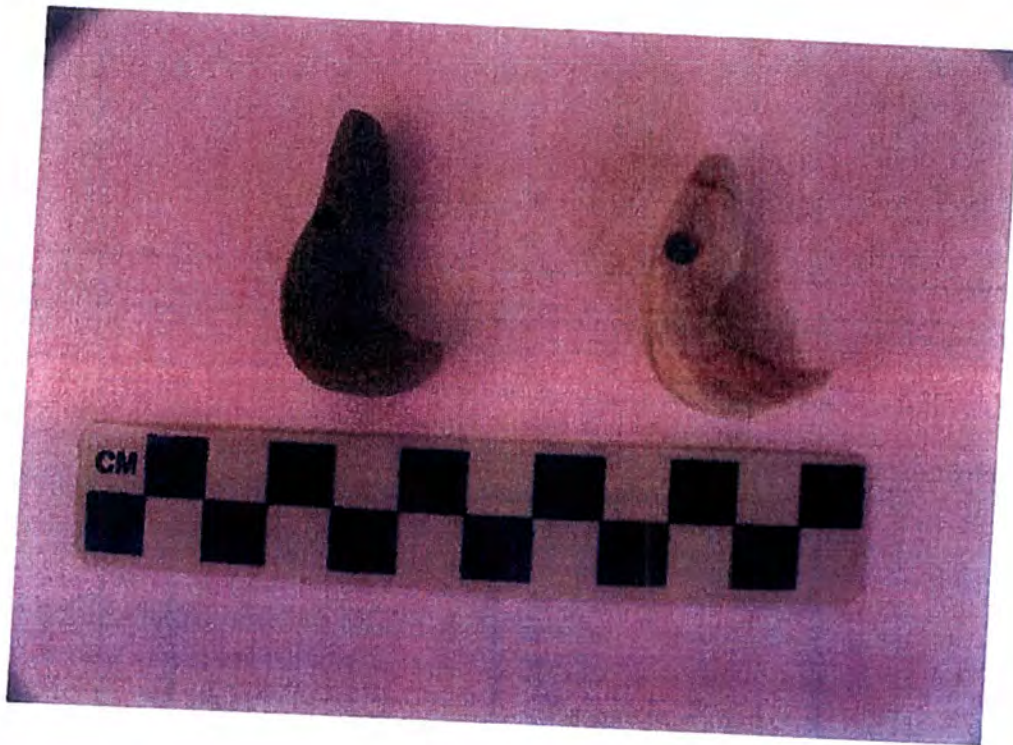


Figure 92. Artifacts Recovered From Site 6679, Features 56-58



Figure 93. Artifacts Recovered From Site 6679, Features 56-58



Figure 94. Artifacts Recovered From Site 6679, Features 56-58