

#### **TRENCH 4**

TR-4 was placed within the 8.8acre area in the central portion of the project area (see Figure 11, Table I and Appendix A). It measured 5.0 m long by 1.5 m wide by 2.0 m deep and was oriented 340° degrees (Figure 17). This section had been previously grubbed during the harvesting of the sugar cane. Testing revealed a four layer stratigraphic sequence (Figure 18). No cultural materials were observed.

**Layer I** (0-58cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone"..

**Layer II** (40-100cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer appears to be disturbed.

**Layer III** (98-142cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

**Layer IV** (138-200cmbs+) is a gray (10yr 5/1), basalt layer, non plastic, non sticky, massive, indurated. This is the bedrock layer.



**Figure 17. Overview Photograph of Trench 4 (View to North)**



**Figure 18. Photograph of Trench 4 West Wall**

## **TRENCH 5**

TR-5 was placed within the 8.8 acre area in the SE portion of the project area (see Figure 11, Table I and Appendix A). It measured 9.0 m long by 1.5 m wide by 2.0 m deep and was oriented 360° degrees. This section had been previously grubbed during the harvesting of the sugar cane. Testing revealed a four layer stratigraphic sequence (Figures 19 and 20). No cultural materials were observed.

**Layer I** (0-42cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (38-45/102cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (98-184cmbs) is a greyish brown (10YR5/1) and yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

**Layer IV** (180-200cmbs+) is a gray (10yr 5/1), basalt bedrock, non-plastic, non-sticky, massive, indurated. This layer is the bedrock layer and is the target material for the mining operations.



**Figure 19. Overview Photograph of Trench 5 (View to North)**



**Figure 20. Photograph of Trench 5 West Wall**

### **BULLDOZER CUT 1**

BD-1 was placed within the 8.8 acre area in the SW portion of the project area (see Figure 11, Table I and Appendix A). It measured 12.0 m long by 1.5 m wide by 1.4 m deep and was oriented 270° degrees (Figure 21). This section had been previously grubbed during the harvesting of the sugar cane. Testing revealed a four layer stratigraphic sequence (Figure 22). No cultural materials were observed.

**Layer I** (0-32cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (30-50cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (50-136cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

**Layer IV** (136-140cmbs+) is a gray (10yr 5/1), basalt layer, non-plastic, non-sticky, massive, indurated. This layer is the bedrock layer and is the target material for the mining operations.



**Figure 21. Overview Photograph of Bulldozer Cut 1 (View to West)**



**Figure 22. Photograph of Bulldozer Cut 1 North Wall**



## BULLDOZER CUT 2

BD-2 was placed within the 8.8 acre area in the SW portion of the project area (see Figure 11, Table I and Appendix A). It measured 15.0 m long by 1.5 m wide by 1.6 m deep and was oriented 270° degrees. This section had been previously grubbed during the harvesting of the sugar cane. Testing revealed a four layer stratigraphic sequence (Figures 23 and 24). No cultural materials were observed.

**Layer I** (0-38cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

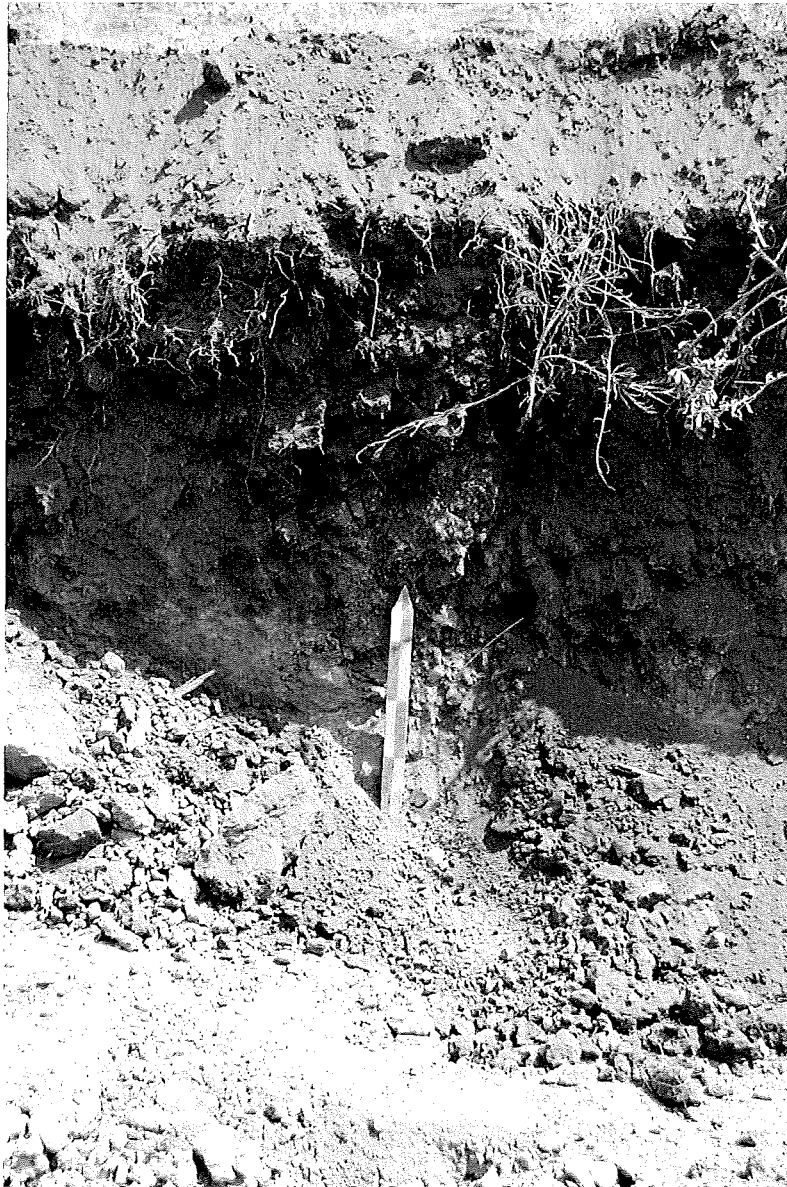
**Layer II** (36-100cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (98-139cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

**Layer IV** (136-160cmbs+) is a gray (10yr 5/1), basalt layer, non-plastic, non-sticky, massive, indurated. This layer is the bedrock layer and is the target material for the mining operations.



Figure 23. Overview Photograph of Bulldozer Cut 2 (View to West)



**Figure 24. Photograph of Bulldozer Cut 2 North Wall**

#### **TRENCH 6**

TR-6 was placed within the 33.0 acre area in the central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.1 m long by 1.5 m wide by 1.6 m deep and was oriented 270° degrees (Figure 25 and Table I). This section was an active cane fields and therefore the location of this trench was along a known haul rd. Testing revealed a three layer stratigraphic sequence (Figure 26). No cultural materials were observed.

**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone"..

**Layer II** (18-90cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (86-160+cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".



**Figure 25. Overview Photograph of Trench 6 (View to West)**





**Figure 26. Photograph of Trench 6 South Wall**

### **TRENCH 7**

TR-7 was placed within the 33acre area in the central portion of the project area (see Figure 11, Table I and Appendix A). It measured 3.9 m long by 1.5 m wide by 2.0 m deep and was oriented 270° degrees (Figure 27 and Table I). This section was an active cane fields and therefore the location of this trench was along a known haul rd. Testing revealed a three layer stratigraphic sequence (Figure 28). No cultural materials were observed.

**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone"..

**Layer II** (18-170cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (168-200cmbs+) is a black (7.5yr 2.5/1) cinder and greyish black silty clay, moist, non-plastic, non-sticky, medium grain, firm. This layer/lens was also observed in TR16.



**Figure 27. Overview Photograph of Trench 7 (View to North)**



**Figure 28. Photograph of Trench 7 North Wall**

## TRENCH 8

TR-8 was placed within the haul road in the central portion of the 33.0 acre area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.8 m deep and oriented 270° degrees. TR-8 contained a five layer stratigraphic sequence indicative of alluvial and or flood plain deposits (Figures 29 and 30). No cultural materials were observed.

**Layer I** (0-24cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Lens/Layer II** (21-80cmbs) is a very dark gray (7.5yr 3/1), gravelly silt, non-plastic, non-sticky, crumb, firm. This layer contained low frequencies of water worn igneous basalt pebbles most likely associated with a former stream. Similar to stream deposits.

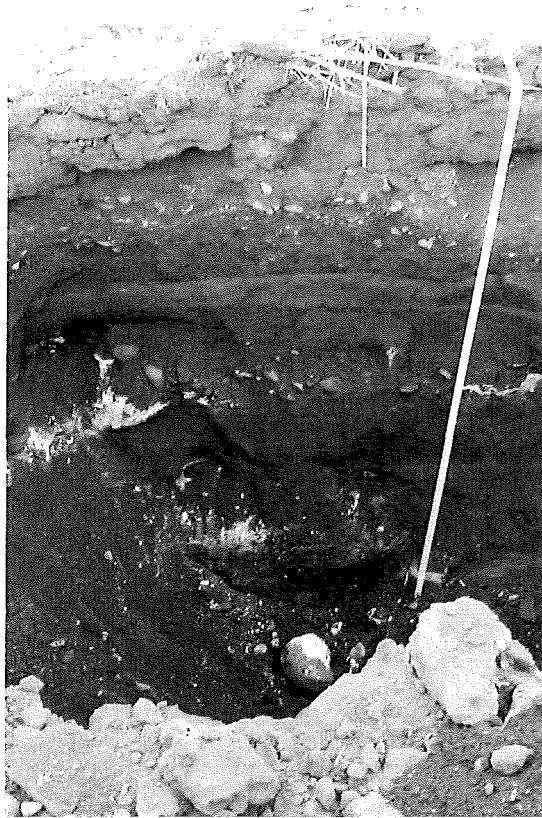
**Lens/Layer III** (79-110cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer/Lens IV** (110-146cmbs) is a very dark gray (7.5yr 3/1), gravelly silt, non-plastic, non-sticky, crumb, firm. This layer contained low frequencies of water worn igneous basalt pebbles most likely associated with a former stream. Similar to stream deposits.

**Layer V** (142-180cmbs+) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".



Figure 29. Overview Photograph of Trench 8 (View to East)



**Figure 30. Photograph of Trench 8 North Wall**

## **TRENCH 9**

TR-9 was placed within the 33.0 acre area in the eastern portion of the project area (see Figure 11, Table I and Appendix A). It measured 3.9 m long by 1.5 m wide by 0.8 m deep and was oriented 270° degrees (Figures 31 and 32). Testing revealed a single stratum that was negative for cultural materials and terminated on decomposing bedrock, Layer II.

**Layer I (0-80cmbs)** is a yellowish brown (10yr 5/4), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone". The bedrock was encountered at base.

**Layer II (80cmbs+)** is yellowish brown (10yr5/4), gravelly, silt loam, slightly plastic, slightly sticky, crumb, friable, with decomposing basalt.



**Figure 31. Overview Photograph of Trench 9 (View to East)**



**Figure 32. Photograph of Trench 9 North Wall**

## TRENCH 10

TR-10 was placed within the 33.0 acre area in the central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.5 m deep, oriented 270° degrees and placed in the cane haul road. Testing revealed a three layer stratigraphic sequence (Figures 33 and 34). No cultural materials were observed.

**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (18-74cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (60-200+cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

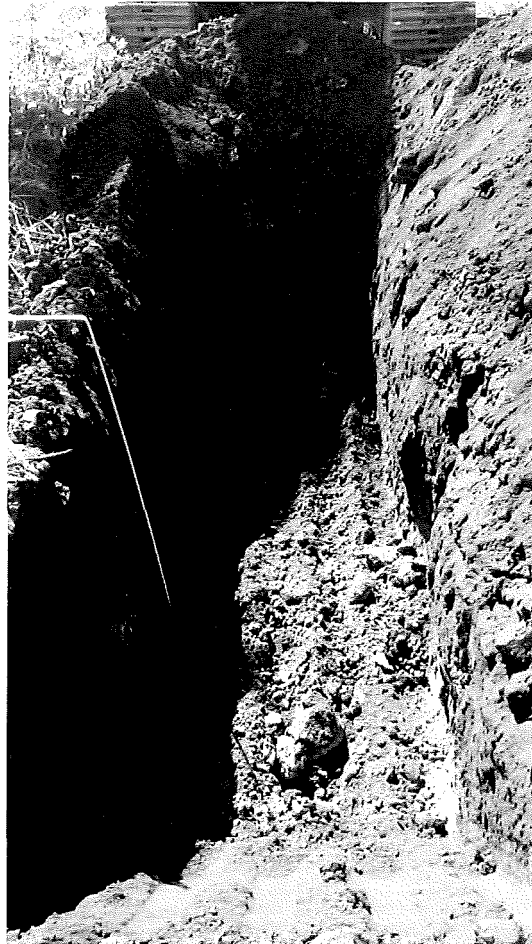
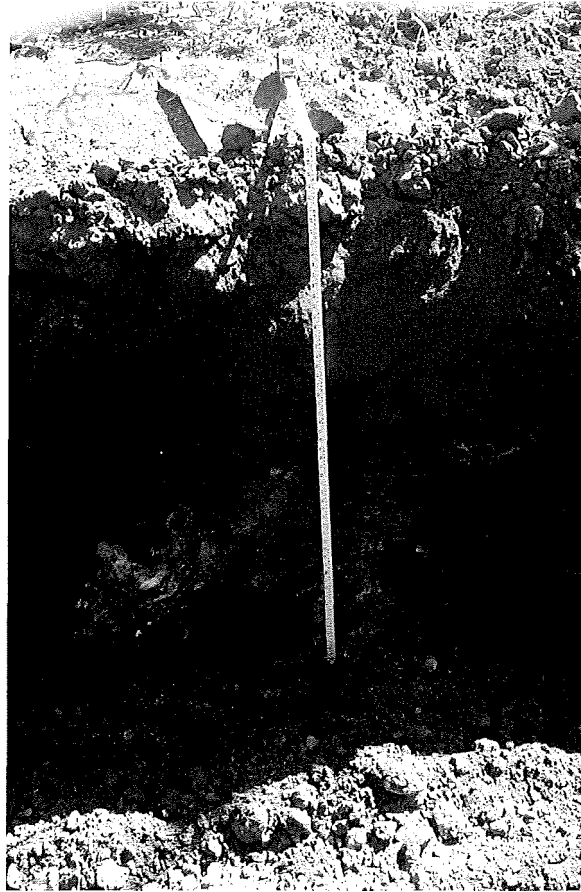


Figure 33. Overview Photograph of Trench 10 (View to East)





**Figure 34. Photograph of Trench 10 North Wall**

### **TRENCH 11**

TR-11 was placed within the western portion of the 33.0 acre area within a cane haul road (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.2 m deep and was oriented 270° degrees. Testing revealed the same three layer stratigraphic sequence as observed within TR-10 (see Figure 34). No cultural materials were observed.

**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (16-80cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (72-120+cmbs) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".

## **TRENCH 12**

TR-12 was placed within the 33.0 acre area in the NE portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 2.6 m deep, oriented 270° degrees and situated within a haul road (Figures 35 and 36). TR-12 contained a five layer stratigraphic sequence that was devoid of cultural materials.

**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (18-160cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

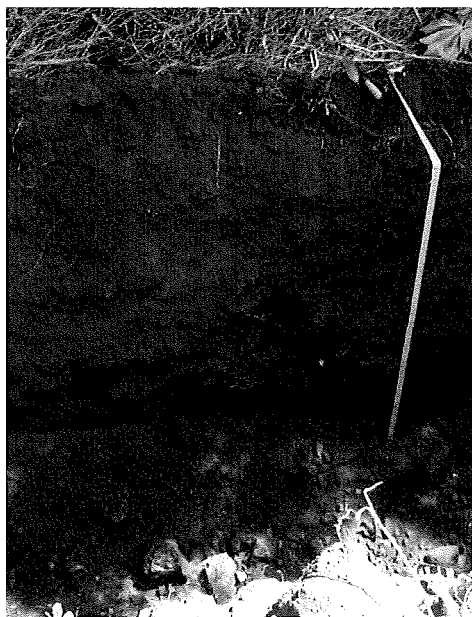
**Layer III** (158-186+cmbs) is a yellowish brown (10yr 5/4), gravelly silt loam, non-plastic, non-sticky, crumb, firm. This layer contained low frequencies of water worn basalt pebbles possibly associated with alluvial deposition.

**Layer IV** (182-190cmbs) is a black cinder (7.5yr 2.5/1), gravelly silt layer, non-plastic, non-sticky, medium grain, firm. This layer occurs in pockets and in some cases as lenses throughout the region.

**Layer V** (189-260cmbs) is a gray (10yr 5/1), basalt layer, non-plastic, non-sticky, massive, indurated. This layer bedrock.



**Figure 35. Overview Photograph of Trench 12 (View to West)**



**Figure 36. Photograph of Trench 12 North Wall**

### TRENCH 13

TR-13 was placed within the 33acre area in the north central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 3.0 m deep and was oriented 270° degrees. This section was an active cane fields and therefore the location of this trench was along a known haul rd. Testing revealed a three layer stratigraphic sequence (Figures 37 and 38). No cultural materials were observed.

**Layer I** (0-18cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (16-295cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (295-300cmbs+) is a gray (10yr 5/1), basalt bedrock layer, non-plastic, non-sticky, massive, indurated.



Figure 37. Overview Photograph of Trench 13 (View to East)



**Figure 38. Photograph of Trench 13 North Wall**

## **TRENCH 14**

TR-14 was placed along haul road within the 33.0 acre area in the north central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 2.05 m deep and was oriented 270° degrees. TR-14 contained a five layer stratigraphic sequence and no cultural materials were observed (Figure 39).

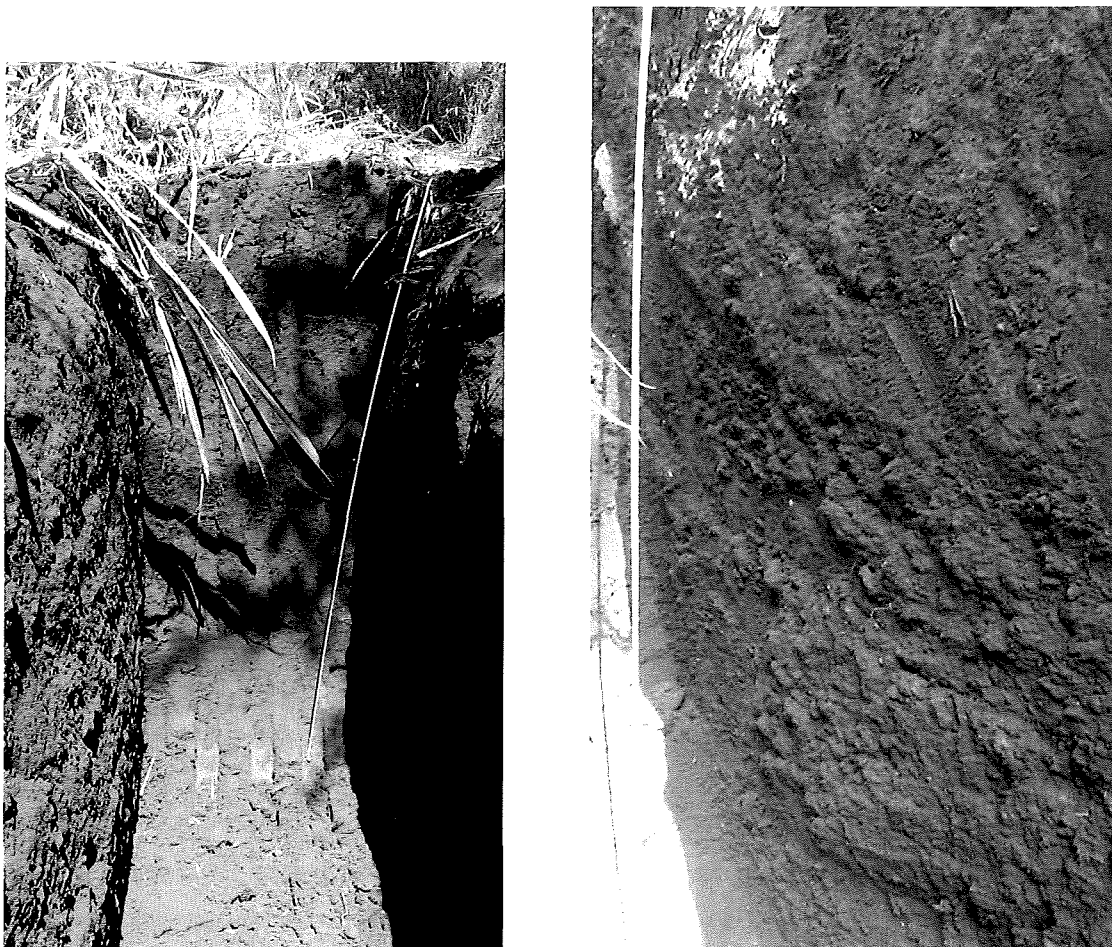
**Layer I** (0-9cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (8-160cmbs+) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Lens/Layer III** (160-1.85cmbs+) is a reddish brown (5yr4/6), pebbly silt loam, non-plastic, non-sticky, crumb, firm. This layer contained low frequencies of water worn igneous basalt pebbles most likely associated with a former stream.

**Layer IV** (185-195cmbs+) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer V** (195-205cmbs+) is a dark yellowish brown (10yr5/4), gravelly silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.



**Figure 39. Overview Photograph of Trench 14 (View to West) (Left); and Photograph of North Wall Trench 14**

#### **TRENCH 15**

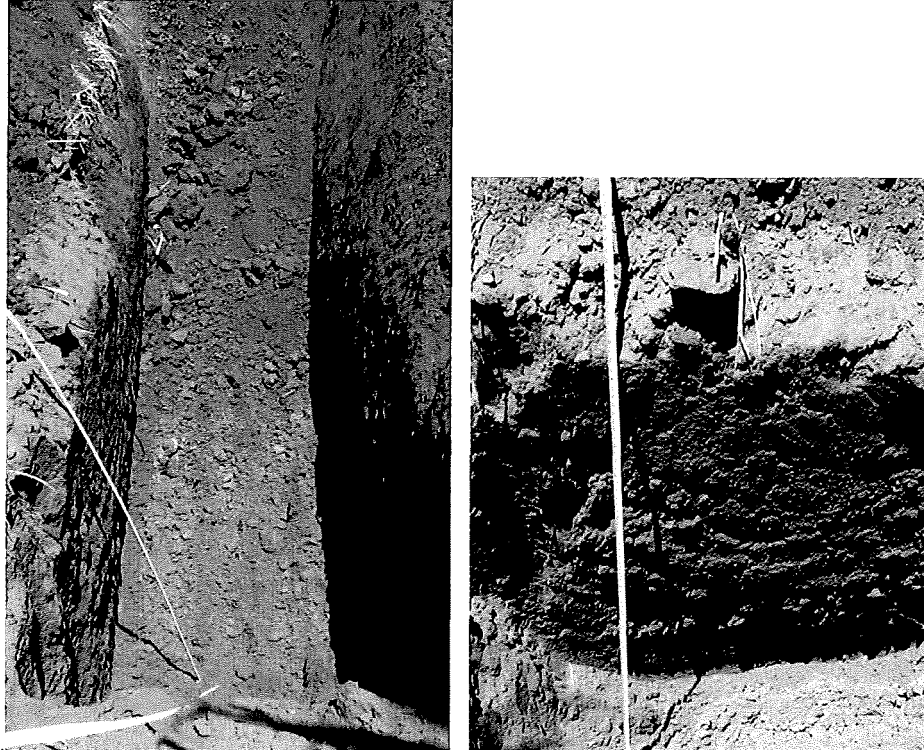
TR-15 was placed within the 33.0 acre area within the cane haul road located in the eastern portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.2 m deep, oriented 270° degrees and contained a three layer stratigraphic sequence that was negative for cultural materials (Figure 40).



**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (18-81cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (81-120cmbs+) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".



**Figure 40. Photographs of TR-15 Overview (View to West) (left); and South Wall (right)**

## **TRENCH 16**

TR-16 was placed within the 33.0 acre area in the south central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.45 m deep, oriented 270° degrees and situated within a haul road. Trench-16 contained a three layer stratigraphic sequence (Figures 41 and 42). No cultural materials were observed.

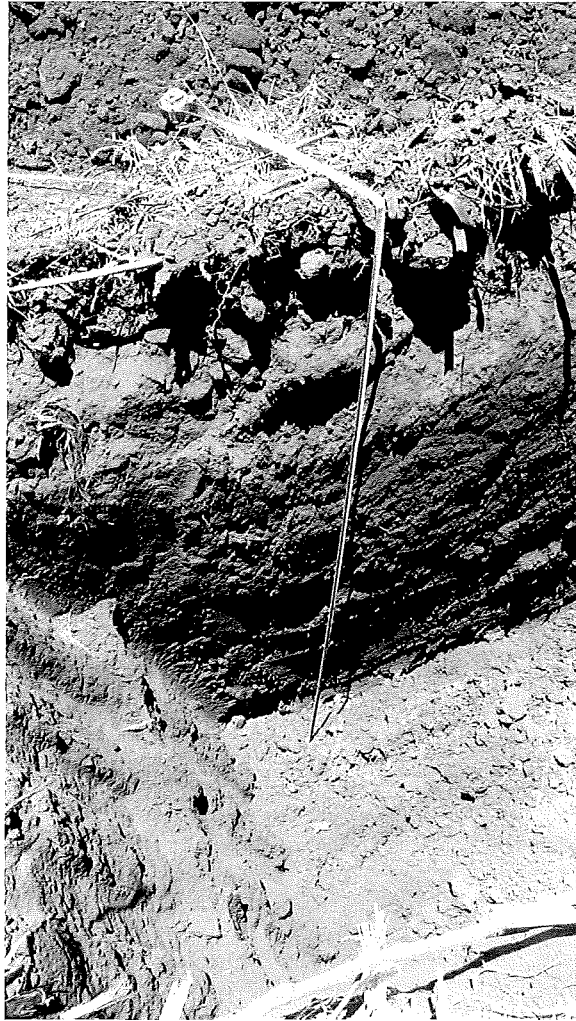
**Layer I** (0-20cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (20-78cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer does not appear to be disturbed.

**Layer III** (68-150cmbs+) is a (7.5yr 2.5/1), greyish black silty clay, non-plastic, non-sticky, medium grain, firm. This layer occurs in pockets and in some cases as lenses throughout the layer (similar to Layer III TR7).



**Figure 41. Overview Photograph of Trench 16 (View to West)**



**Figure 42. Photograph of Trench 16 North Wall**

### **TRENCH 17**

TR-17 was placed along the haul road within the 33.0 acre area in the south central portion of the project area (see Figure 11, Table I and Appendix A). It measured 4.0 m long by 1.5 m wide by 1.0 m deep and was oriented 270° degrees. Testing revealed a three layer stratigraphic sequence (Figures 43 and 44). No cultural materials were observed.

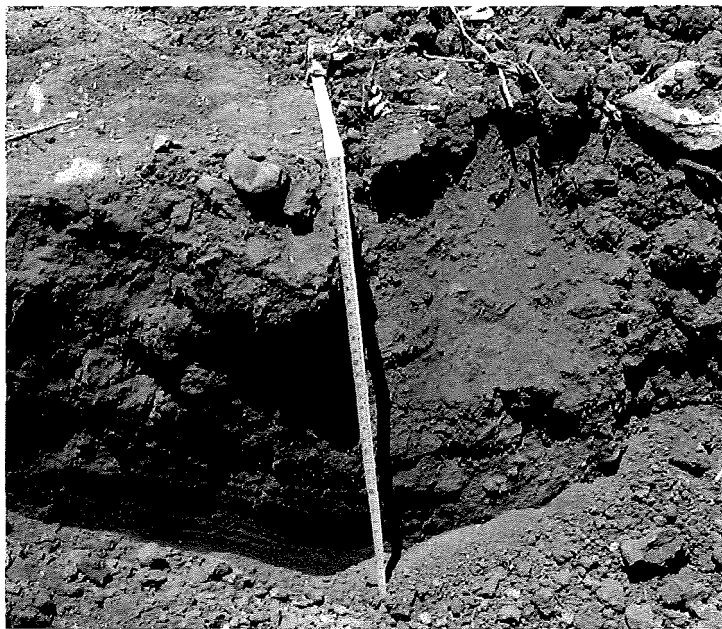
**Layer I** (0-13cmbs) is a dark brown (7.5yr 3/3), silty loam, slightly plastic, slightly sticky, crumb, friable, with moderate frequency of roots and rootlets. Inclusions consisted of black plastic irrigation. This heavily disturbed layer is commonly referred to as the "till zone".

**Layer II** (10-90cmbs) is a dark reddish brown (5yr3/4), silt loam, slightly plastic, slightly sticky, crumb, friable. This layer appears to be disturbed

**Layer III** (85-105cmbs+) is a yellowish brown (10yr5/4), silt loam, slightly plastic, slightly sticky, crumb, friable, with a high frequency of decomposing basalt. This layer is undisturbed and referred to as the "saprolitic layer".



**Figure 43. Overview Photograph of Trench 17 (View to West)**



**Figure 44. Photograph of Trench 17 South Wall**

## **DISCUSSIONS AND RECOMMENDATIONS**

To ascertain the presence absence of historic properties that could be adversely affected by proposed rock mining activities, inventory level procedures comprised of a pedestrian survey and subsurface testing was performed at the subject parcel. During the survey, no surface structural remains were recorded; however irrigation materials consisting of plastic sheeting, black irrigation tubing, PVC pipes and etc. were observed and scattered and due to the compounded disturbances from sugar cane cultivation. Similarly, subsurface testing comprised of 17 backhoe trenches (TR's 1-17) and 2 bulldozer cuts (BD's 1 and 2) was executed across the subject parcel and negative for buried cultural remains. The excavations revealed that the 41.968 acre project area had been disturbed by continuous agricultural activities where the agricultural till zone (Layer I) extended from 0.10 m to 0.80 mbs, and averaged 0.40 m deep and the saprolytic (decomposing) basalt was identified was observed from 0.46 m to 2.90 mbs and averaged 0.80 m deep.

Documentation of the soil profiles exhibited a predominant three to four layer stratigraphic sequence comprised of two soil layers overlying one or two rock layers. Layer I was the disturbed agricultural till zone, Layer II was generally undisturbed and consisted of a dark reddish brown silt loam, Layer III was decomposing bedrock and Layer IV the basalt bedrock. This soil sequence was recorded at eleven of the excavations. The remaining eight trenches contained a similar stratigraphic record; however the overall sequence was interrupted by prior disturbances, alluvial deposits and geologic events. TR9 contained a single disturbed layer comprised of Layer III from the project wide stratigraphic sequence. The presence of Layer III at the surface indicated that Layers I and II were removed by prior grading activities. TR's 8, 12 and 14 contained water worn pebbles indicative of alluvial events; however the deposition within TR's 12 and 14 was marginal and the water worn pebbles were mixed within a gravelly silt loam. TR8 contained a thick gravelly silt layer with few pebble inclusions contained a thick alluvial layer, approximately 90 cm similar to flood plain deposits. Within TR's 7 and 12, cinder lenses comprised of small cobble sized pyroclastic material were noted near the base of excavations. Pockets of imported sand were also observed and is utilized as a soil conditioner providing nutrients (phosphorus) for the sugarcane.

The subject parcel and other localities such as the Central Maui Landfill (off Pūlehu Road by Pu'unene Sugar Mill) have exhibited similar depositional environments with relatively shallow soils overlying dense bedrock. The geology of these areas is one of the main reasons for establishing rock quarries and subsequent landfills (if applicable).

Although the background research, exemplified that Pūlehu Nui was populated during the traditional and historic periods within the *mauka* and *makai* sections of the *ahupua`a*; no evidence of habitation was observed during the subsurface investigations. It is important to note, that two Plantation Camps (Kihei Camp 3 and Camp 13) were formerly located to the south and north of the subject parcel; however they were positioned 2500 to 7500 ft. away. The negative findings documented during this survey and the 2011 investigations (Rotunno-Hazuka et. al) was anticipated within this marginal zone and no further archaeological work including monitoring is warranted. Nonetheless, SHPD is the historic preservation regulatory agency and shall be afforded the opportunity to review all permits for these proposed expansion areas.



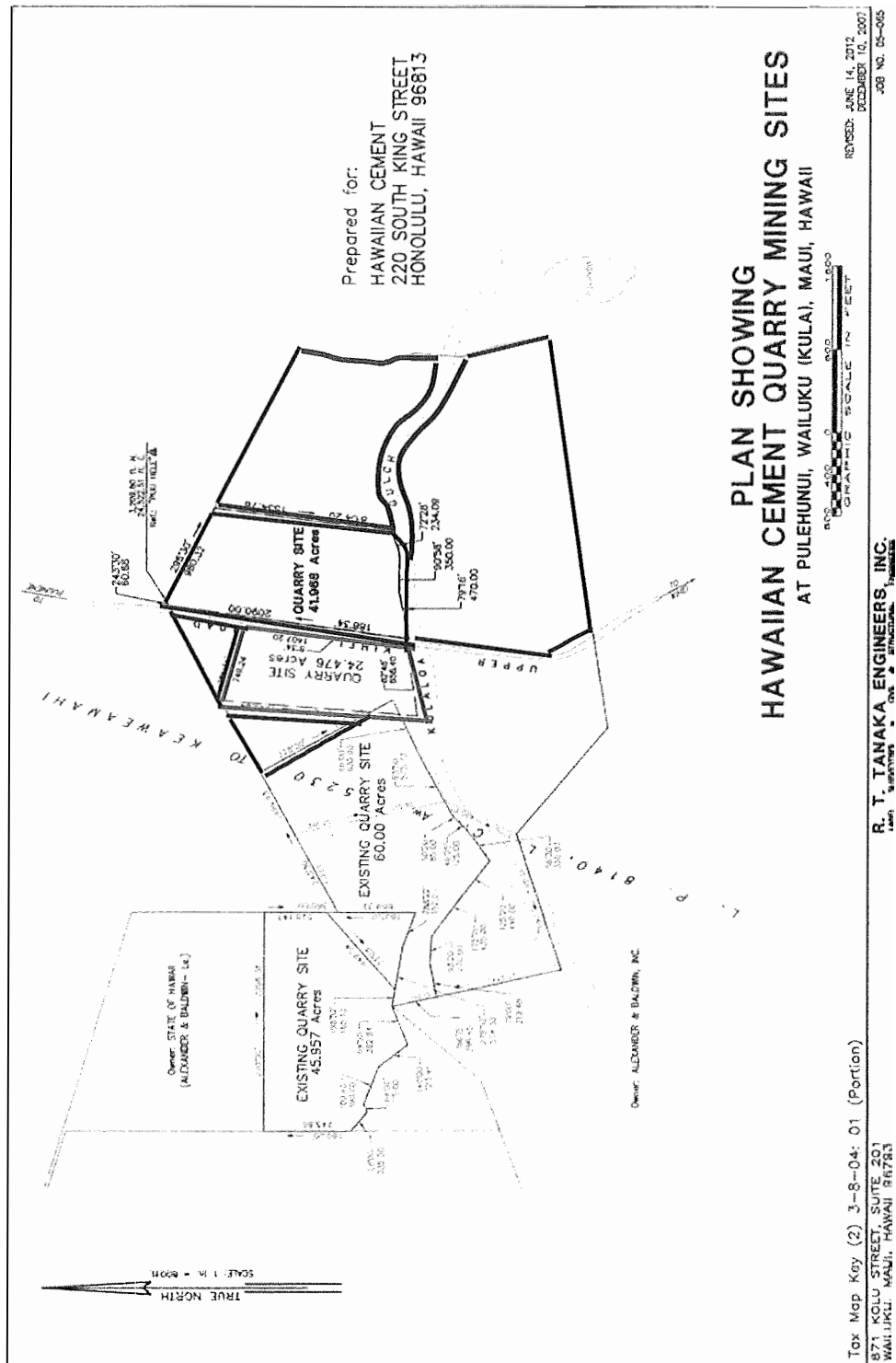


Figure 45. Development Map Showing Project Area (Red), Former A.A. Parcel (Green) and Possible Future Expansion Areas (Purple)

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