Subsurface Investigation

Auwaiolimu Congregational Church

Auwaiolimu Street

Honolulu, Oahu, Hawaii

by

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Sept. 27, 1977

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Formerly G.J. Hawaii, Ltd.

September 27, 1977
File 165-1

Auwaiolimu Congregational Church
c/o Mr. Doyle Wilson
410 N. Kalaheo Avenue
Kailua, Hawaii 96734

Subject: SUBSURFACE INVESTIGATION REPORT
Proposed Church Site
Auwaiolimu Congregational Church
Auwaiolimu Street
Honolulu, Oahu, Hawaii

Gentlemen:

In accordance with our August 16, 1977 proposal, we drilled three test borings at the proposed Auwaiolimu Congregational Church site to evaluate the nature of the rock strata within the proposed cut area. This letter summarizes our findings and conclusions.

Site Conditions The proposed site is located on the uphill side of Auwaiolimu Street in the Punchbowl area of Honolulu. The site is located on the northern flank of the Punchbowl crater which is a palagonite cone belonging to the posterosional Honolulu Volcanic Series.

The lower portion of the site is essentially level with the street. A walk way ramp leads up the eastern side of the property to the existing frame structure located on a rock terrace in the south-eastern property corner. The terrace is approximately 15 feet

higher than the front area and extends to the rear slope. The approximate site conditions are shown on Figure 1.

The surface rocks exposed in the vicinity of the terrace are generally tuff (cemented volcanic ash), except in the lower portions along Auwaiolimu Street where the contact between the Punchbowl tuff and the underlying Koolau basalt is exposed.

Proposed Construction - It is our understanding that a two-story column supported structure will be constructed with the lower level used for parking. The area in the vicinity of the existing church will be excavated approximately 15 to 20 feet to match the lower street level.

Subsurface Conditions - Three test borings were drilled during September 6 to 8, 1977 at the locations shown on Figure 1 by J & H Drilling, Inc. Borings 1, 2 and 3 extended to depths of 20, 15 and 25 feet, respectively. With the exception of the 1.5 to 3.0 feet of fill and weathered tuff encountered in Borings 1 and 2, the test borings encountered medium hard, massive welded tuff for their full depths. No basalt layers were encountered within the test borings. The boring logs, Figures 2, 3 & 4, are appended.

The core recoveries generally varied from 90% to 100% which indicates good quality rock with few weathered seams or fracture zones. This is confirmed by the unconfined compressive strengths of approximated 1800 to 2000 p.s.i. for core samples taken from

Borings 2 and 3 which are represenative of the predominant rock types. Some thin seams of very hard welded tuff were encountered between 16.0 and 20.0 feet in Boring 1 and between 13.0 and 14.0 feet in Boring 3. This welded tuff had unconfined strength of up to 11,300 p.s.i. The unconfined compression test results are summarized in Table I.

Conclusions and Recommendations

1) Based upon the rock encountered within the test borings, we believe that the material can be excavated by heavy equipment with rippers.

2) Special methods such as jack hammers or a ram hoe may be needed to remove the hard seams which should be of limited extend.

3) The tuff can be excavated with vertical slopes for heights up to 20 feet. Greater slope heights should be evaluated on an individual basis.

4) The upper weathered tuff should be excavated at slopes of one horizontal to one vertical (1H:1V). The soil portions should be no steeper than 2H:1V.

5) Loose boulders should be removed from the upper slope and the excavated face or securely cemented into place.

6) We do not anticipate that a retaining wall or concrete covering will be required for the excavated slope.

7) The foundations should be designed for allowable bearing pressures of 6,000 pounds per square foot and should be embedded a minimum of 6 inches into undisturbed materials.

8) All foundations should bear upon similiar materials, i.e. all rock or all soil.

9) All foundation excavations should be inspected by the soils engineer prior to the concrete placement to assure that adequate bearing has been obtained.

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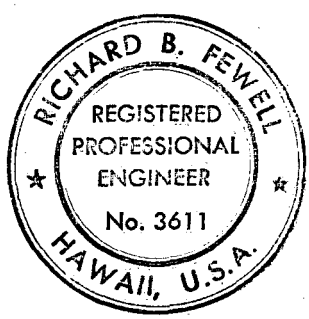
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations for this report are based upon the assumption that the soil conditions do not deviate from those observed. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the present time, FEWELL GEOTECHNICAL ENGINEERING, LTD. should be notified so that supplemental recommendations can be given.

2. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to assure that the information and recommendations contained herein are called to the attention of the engineers for the project and incorporated into the plans, and that the necessary steps are taken to see that the Contractors and Subcontractors carry out such recommendations in the field.

Respectfully submitted,
FEWELL GEOTECHNICAL ENGINEERING, LTD.

Richard B. Fewell, P. E.
President



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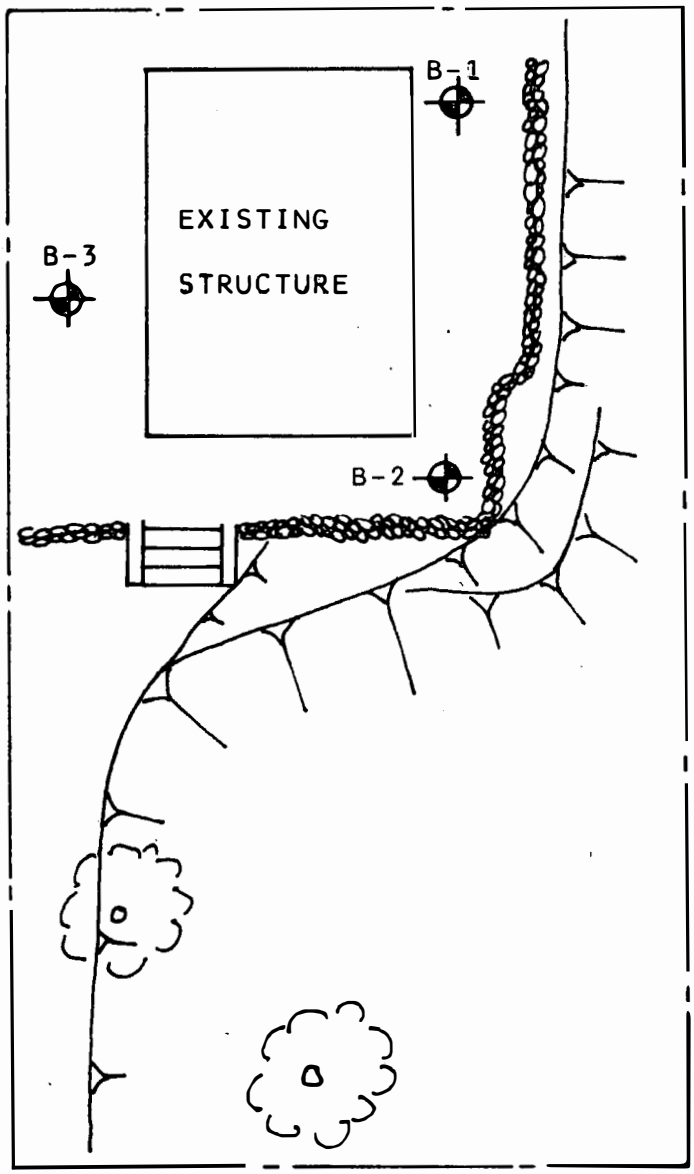
APPENDIX



AUWAIOLIMU STREET

SITE AND BORING LOCATION PLAN

AUWAIOLIMU CONGREGATIONAL

CHURCH

SCHEMATIC - NOT TO SCALE

FIGURE 1

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DEPTH IN FEET	SAMPLE NO.	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f.	IN-PLACE MOISTURE CONTENT % dry wt.
				BORING 1		
0				Fill - Loose decayed Basalt and Tuff Boulders and Cobbles		
				Brown/orange Silty Sand (Weathered Tuff), dense, dry (SM)		
5				Black/grey WELDED TUFF with some fractures, dense, massive (At 5.5', grading without fractures) Nx core: 3.5 - 6.3'; 90% recovery Nx core: 6.3 - 11.0'; 100% recovery		
10				Nx core: 11.0 - 16.0'; 100% recovery		
15				(At 16.0' to 20.0' TUFF becoming very dense, massive) Nx core: 16.0 - 20.0'; 92% recovery		
20				Boring terminated at 20.0'		

FIGURE 2

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DEPTH IN FEET	SAMPLE NO.	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f.	IN-PLACE MOISTURE CONTENT % dry wt.
				BORING 2		
0				Fill - loose cobble - Boulder mixture with a Silty SAND matrix.		
				Brown/orange slightly decomposed WELDED TUFF, dense, massive (At 2.5', grading to brown/grey WELDED TUFF) Nx core: 3.0 - 7.0'; 89% recovery		
5				Nx core: 7.0 - 10.0'; 106% recovery *		
10				Nx core: 10.0'-15.0'; 85% recovery		
				*Retained part of preceding run		
15				Boring terminated at 15.0'		

FIGURE 3

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DEPTH IN FEET	SAMPLE NO.	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f.	IN-PLACE MOISTURE CONTENT % dry wt.
				BORING 3		
0				Brown/yellow slightly weathered WELDED TUFF, dense, massive		
				at 1.5, grading to slightly fractured massive WELDED TUFF, dense		
				Nx core: 3.0 - 8.0'; 80% recovery		
5				(At 8.0', grading with less fractures)		
				Nx core: 8.0 - 13.0'; 100% recovery		
10				Nx core: 13.0 - 14.0'; 100% recovery		
				(At 14.0', TUFF becoming very dense)		
				Nx core: 14.0 - 19.0'; 100% recovery		
15				(At 16.0'; becoming softer)		
				Nx core: 19.0 - 24.0'; 100% recovery		
20						
				Nx core: 24.0 - 25.0'; 100% recovery		
25				Boring terminated at 25.0'		

FIGURE 4

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TABLE I

Summary of Laboratory Compressive Test Results

Sample Location		Description	Unconfined Compressive Strength (p.s.i.)
Boring	Depth (ft.)		
1	16.0 - 16.5	Grey massive fine grained WELDED	9014
1	16.5 - 17.0	TUFF- very dense	11,268
2	5.0 - 5.5	Coarse black WELDED TUFF	1972
3	10.0 - 10.5	Coarse black WELDED TUFF	1831