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GEOLABS-HAWAII, Inc.

Soils and Foundation Engineering, Geology
1553 Colburn Street, Suite 203 • Honolulu, Hawaii 96817 • (808) 841-5064

September 5, 1972

W. O. 303-20

Gentry Hawaii, Ltd.
146 Hekili Street
Kailua, Hawaii 96734

Attention: Mr. Joe Ramia

Subject: Final Compaction Report
Haiku Park Subdivision Unit 1
Kaneohe, Hawaii

Reference: Preliminary Soils Investigation
Haiku Park Subdivision Units 1 & 2 (Unit 1A)
TMK: 4-6-16 Portions 1 and 4-6-16-28
Kaneohe, Hawaii
W. O. 303-10 - October 12, 1971

Gentlemen:

Submitted herewith is a supervised compaction report of fill placed on the subject property. Field density results are presented in Table I. The estimated locations of field density tests are shown on the enclosed grading plan, Plate 1.

Laboratory Standard for Maximum Density: ASTM D -1557-70.

Field Density Test Method: ASTM D-1556-64 (Sand Cone Method)

MUNICIPAL REFERENCE & RECORDS CENTER
City & County of Honolulu
City Hall Annex, 358 S. King Street
Honolulu, Hawaii 96813

LABORATORY TEST DATA

<u>Soil Type</u>	<u>Maximum Dry Density, pcf</u>	<u>Optimum Moisture %</u>	<u>Swell %*</u>
MH	81.0	41.0	less than 1
MH	87.0	36.0	3.17

* Swell tests were performed on remolded samples compacted to 90% of maximum density at optimum moisture in a brass ring having an inside diameter of 2.50 inches and a height of 1.0 inch. Surcharge loads (100 psf) were applied and each sample was allowed to consolidate for 1 hour prior to the addition of water. Samples were inundated for 24 hours and the vertical swell recorded as a percentage of the original sample height.

DISCUSSION

1. All deleterious material such as lumber, logs, brush, roots and rubbish were disposed of offsite prior to placing fill.
2. All loose and compressible materials were removed to solid natural ground or bedrock in areas to receive fill.
3. Surfaces to receive fill were scarified and bladed to a depth of 6 to 8 inches, watered and mixed as required to achieve optimum moisture conditions and compacted to at

least 90% of maximum density with a self propelled sheeps-foot roller.

4. Fill consisted of on site materials having the above soil classifications. The fill material was placed in horizontal lifts restricted to six inches in thickness, watered as required to achieve optimum moisture conditions, and compacted to a minimum of 90 percent of maximum density with a self propelled sheepsfoot roller.
5. Field density tests were taken at vertical intervals of approximately 1 foot. Areas of fill which were found to contain insufficient moisture and/or failing tests were reworked until passing test results were obtained.
6. Fill placed on surfaces having a slope gradient steeper than 5:1 were keyed and benched into firm material in accordance with recommendations of the above referenced preliminary report.
7. Compaction on the face of fill slopes was achieved by over-filling, then cutting back to grade.
8. The transition zone of fill over cut slopes was stripped of all topsoil prior to placing fill.
9. The maximum vertical depth of fill is 33 feet, located on

lot 13. The maximum vertical depth of fill in each lot is presented in Table II.

10. Expansive soil conditions have been evaluated. Representative samples of the materials at pad grade were recovered for laboratory swell tests, the results of which are presented below.

<u>Lot Numbers</u>	<u>Classification of pad grade soils</u>	<u>Percent Swell</u>
All	MH	Less than 2

Note: Preliminary soil report reported that material encountered on job site was of a low expansive type.

11. This office assumes no responsibility for any alterations made to the slopes or pads on the subject tract subsequent to the issuance of this report without our knowledge and written approval. All ramps made through slopes and pads and other areas of disturbance which require the placement of compacted fill to restore them to the original condition will not be certified unless such backfilling operations are performed under our inspection and supervision and tested for required compaction. Loose material cast over certified compacted slopes shall negate our certification of slope face compaction unless material is removed in accordance with our instructions.

12. If this office is to certify backfill placed in utility trenches and behind retaining walls, then such backfilling operations must be performed under our inspection and supervision and tested for required compaction. Of major concern are utility trenches beneath or adjacent to structures. Retaining wall backfill shall consist of clean sand jetted in place. Weepholes or an equivalent drainage system shall be provided to prevent the buildup of hydrostatic pressure. A gravel filter shall be provided behind each weephole to prevent the backfill material from being washed out. Subcontractors involved with utility trench and retaining wall backfill should be made aware of the necessity for inspection and testing to avoid any time delays.
13. We recommend that all utility lines be bedded in clean sand to at least one foot above top of conduit. The bedding should be flooded in place to fill all the voids around the conduit. On site material compacted to at least 90% relative compaction may be utilized for backfill above the bedding.

RECOMMENDATIONS

1) Foundations

The recommendations presented in the preliminary soils report are applicable.

2) Setback

The outside edge of any footing should not be closer than the minimum distance specified below from any descending slope, measuring horizontally from the bottom outside edge of the footing to the slope face.

<u>Vertical Height of slope, feet</u>	<u>Minimum Setback Distance, feet</u>
0 - 10	5
10 - 30	7
Over - 30	10

If these setbacks require relatively deep footings, we suggest that drilled caissons be used as an alternate foundation method along the slope as this provides more satisfactory foundation conditions.

3) Slopes

All slopes should be dressed and planted as soon as possible to protect against erosion and drying.

4) Settlement Readings

Settlement plate readings for lots 1 thru 9, 11, 12, 13 and 74 thru 77 should continue as recommended in our letter dated June 5, 1972. The results should be

submitted to us immediately for evaluation. A report will be submitted after the rate of settlement has become negligible.

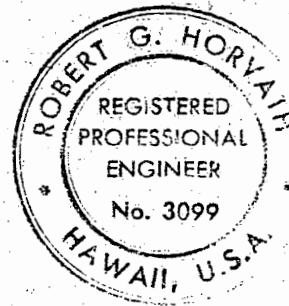
If you have any questions concerning this report, please call at your convenience.

Respectfully submitted,
GEOLABS-HAWAII, INC.

Robert G. Horvath

Robert G. Horvath P. E.

Peter S.C. Chan
Peter S.C. Chan
President



Encl: Site Plan, Plate 1
Table I, Plate 2

xc: (4) Addressee
(1) Alex Ho
(1) Chuck Root
(1) FHA c/o Gentry Hawaii



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LIMIT OF GRADING

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GRADING NOTES

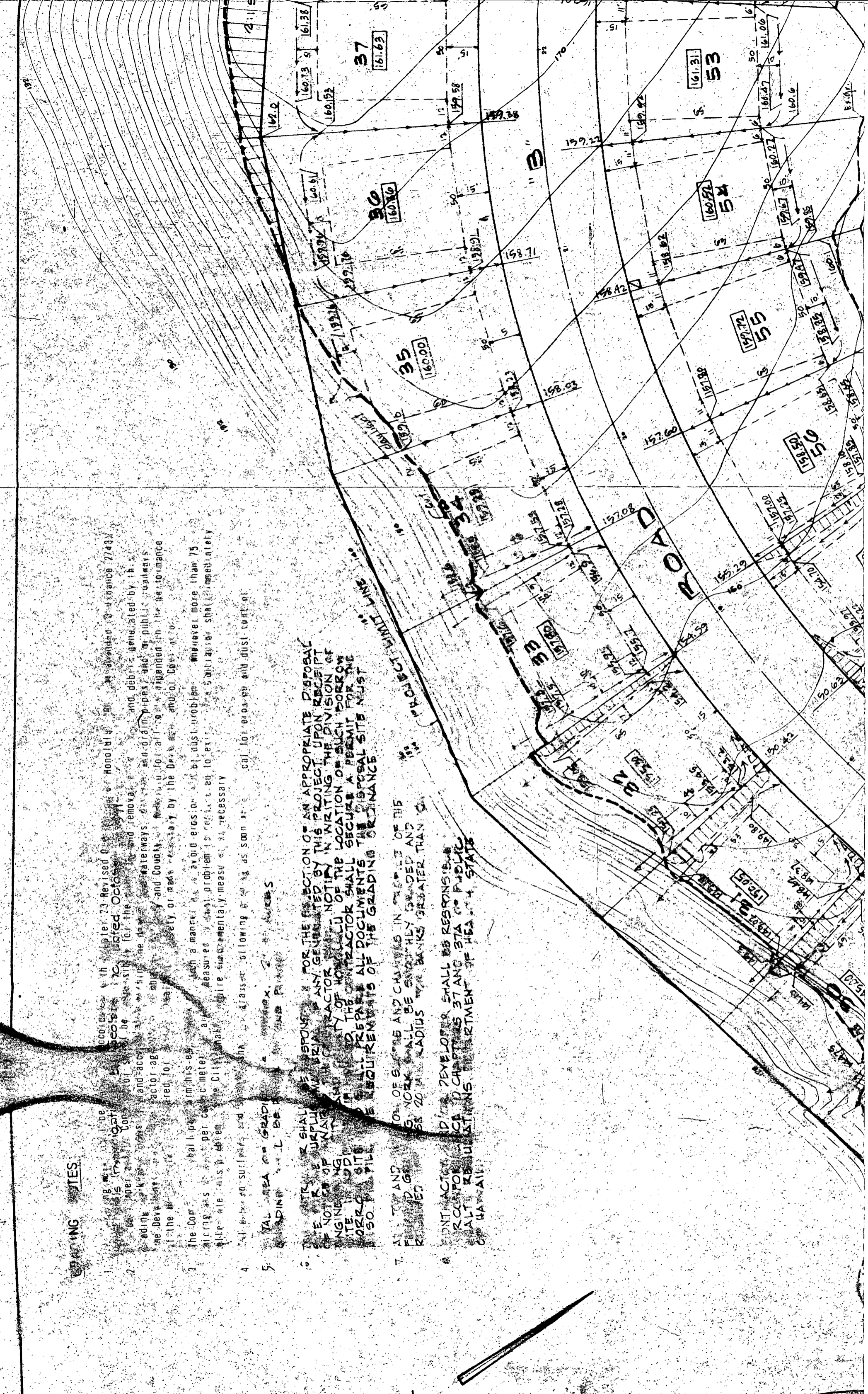
1. All grading shall be in accordance with Chapter 23 Revised Ordinances of the City of Cleveland, Ohio, and shall be subject to the approval of the City Engineer.
2. The contractor shall be responsible for the design and construction of all drainage structures, including catch basins, manholes, and culverts, and shall provide for the proper disposal of all storm water.
3. The contractor shall be responsible for the design and construction of all retaining walls, and shall provide for the proper disposal of all storm water.
4. All grading shall be done in accordance with the approved grading plan, and shall be subject to the approval of the City Engineer.
5. The contractor shall be responsible for the design and construction of all drainage structures, including catch basins, manholes, and culverts, and shall provide for the proper disposal of all storm water.

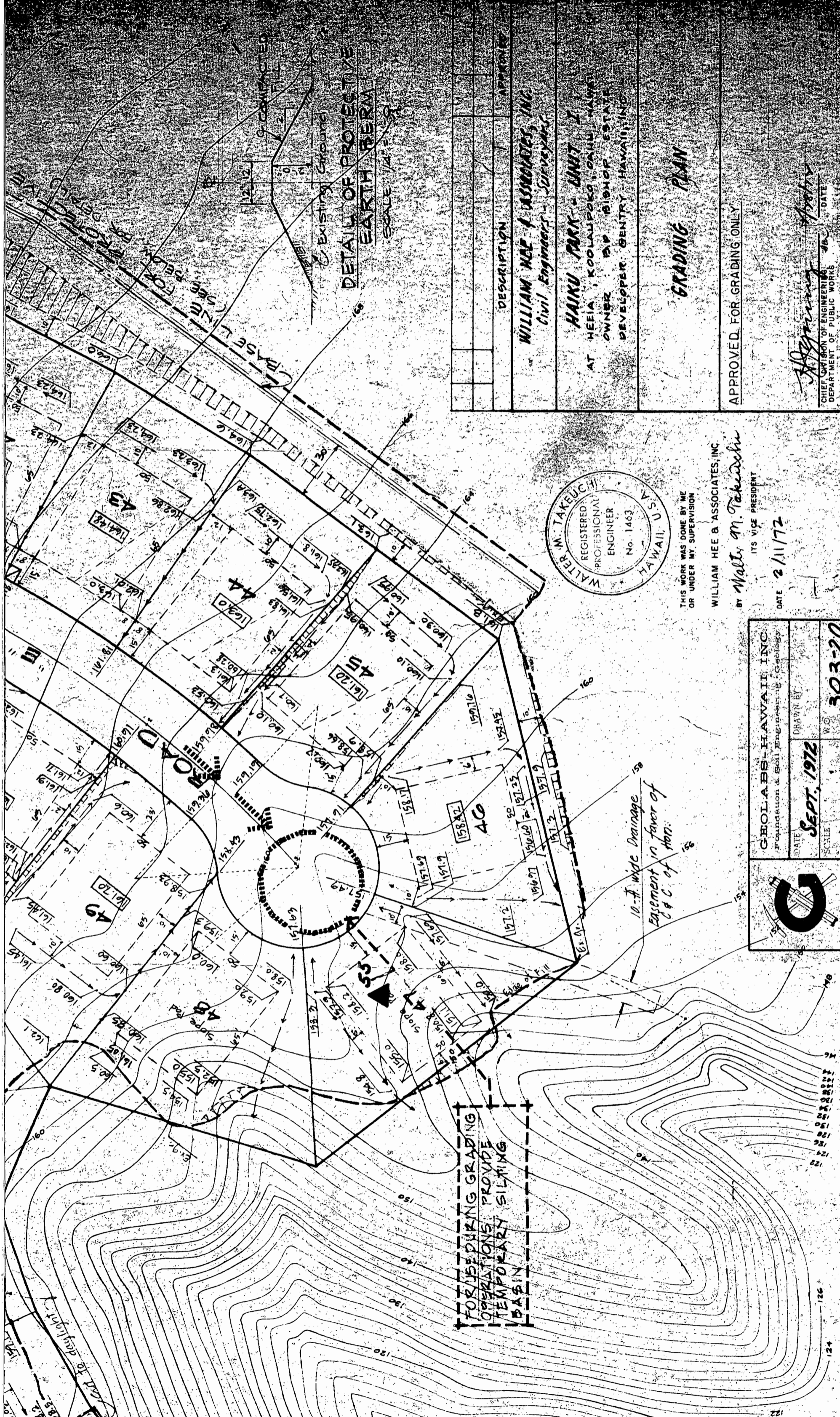
FOR THE PROTECTION OF AN APPROPRIATE DISPOSAL OF ANY DEBRIS OR MATERIALS GENERATED BY THIS PROJECT UPON RECEIPT OF NOTICE OF WORK, THE CONTRACTOR SHALL NOTIFY IN WRITING THE DIVISION OF ENGINEERING AND CONSTRUCTION OF THE LOCATION OF SUCH BORROW PITS AND STOCKPILES. THE CONTRACTOR SHALL SECURE A PERMIT FOR THE BORROW PITS AND STOCKPILES FROM THE DIVISION OF ENGINEERING AND CONSTRUCTION. ALL PERMITS MUST BE OBTAINED PRIOR TO THE START OF WORK.

ALL CURBS AND CHANGING IN THE COURSE OF THIS PROJECT SHALL BE SMOOTHLY BLENDED AND SHALL BE CONSTRUCTED TO A MINIMUM RADIUS OF 20 FEET.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ALL DRAINAGE STRUCTURES, INCLUDING CATCH BASINS, MANHOLES, AND CULVERTS, AND SHALL PROVIDE FOR THE PROPER DISPOSAL OF ALL STORM WATER.

TRUE NORTH
1/4" = 20' ±





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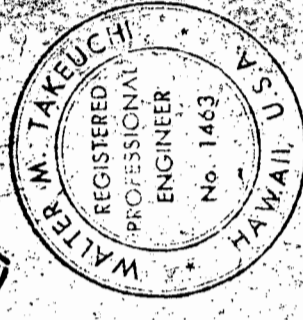
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WILLIAM HEE B ASSOCIATES, INC Civil Engineers - Surveyors	

HAINU PARK - UNIT I
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OWNER: DP BISHOP ESTATE
DEVELOPER: GENTRY - HAWAII, INC

GRADING PLAN

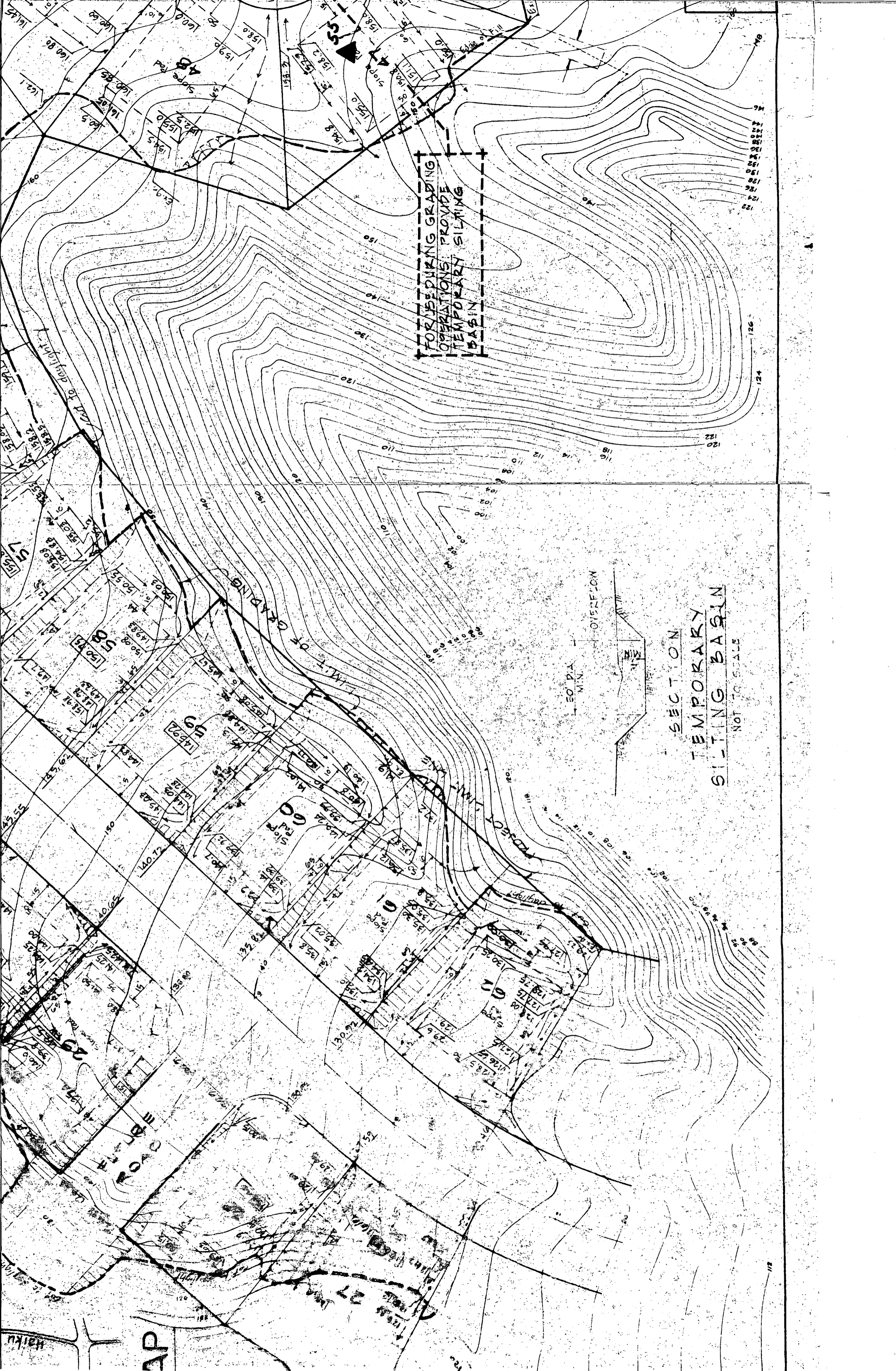
APPROVED FOR GRADING ONLY

Walter M. Takeuchi
CHIEF DIVISION OF ENGINEERING
DEPARTMENT OF PUBLIC WORKS
DATE 2/11/72



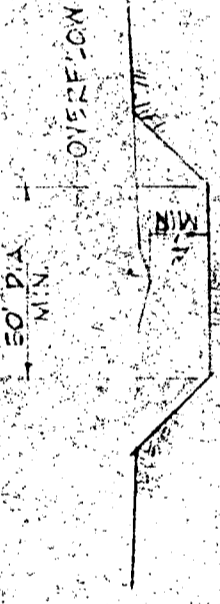
THIS WORK WAS DONE BY ME
OR UNDER MY SUPERVISION
WILLIAM HEE B ASSOCIATES, INC
BY *Walter M. Takeuchi* ITS VICE PRESIDENT
DATE 2/11/72

	GEOLABS-HAWAII, INC. Foundation & Soil Engineering - Geology	DRAWN BY DATE SEPT. 1972	W.C. NO. 303-20
	SCALE		



FOR BEDDING GRADING
OPERATIONS PROVIDE
TEMPORARY SILTING
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SECTION
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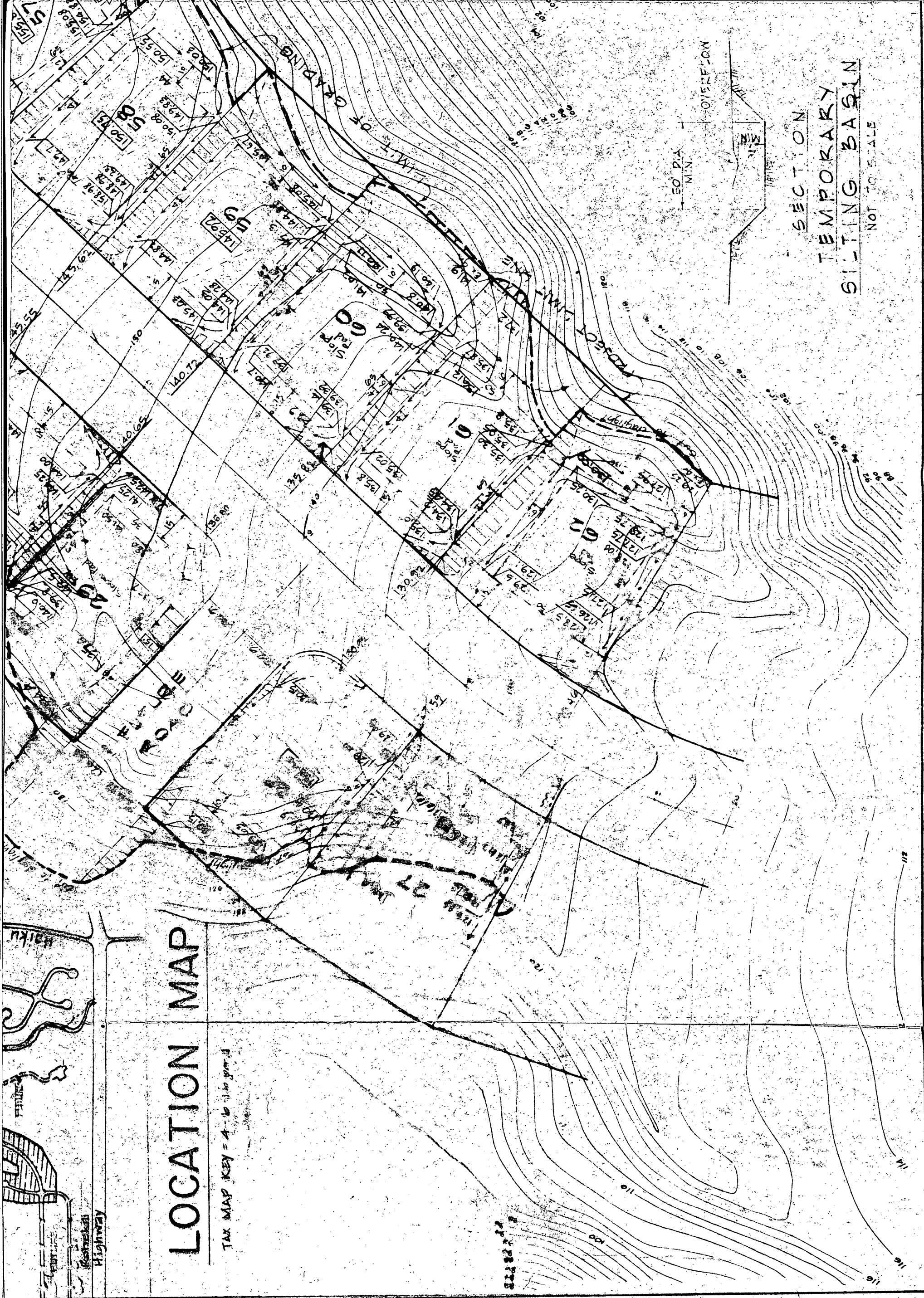
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SECTION
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OVERFLOW

LOCATION MAP

TAX MAP KEY - 4 - 10 - 15

W. O. 303-20
September 5, 1972

TABLE II

Maximum Depth of Fill

<u>Lot No.</u>	<u>Fill Depth</u>
1	15 ft.
2	16 ft.
3	12 ft.
4	10 ft.
5	16 ft.
6	18 ft.
7	21 ft.
8	18 ft.
9	20 ft.
10	6 ft.
11	20 ft.
12	25 ft.
13	25 ft.
14	13 ft.
21	3 ft.
22	3 ft.
47	4 ft.
48	3 ft.
63	3 ft.
67	2 ft.

W. O. 303-20
September 5, 1972

TABLE II (continued)

<u>Lot No.</u>	<u>Fill Depth</u>
68	3 ft.
69	8 ft.
70	7 ft.
71	4 ft.
73	2 ft.
74	18 ft.
75	18 ft.
76	10 ft.
77	18 ft.
78	10 ft.