JUDD HULL and ASSOCIATES
Geotechnical Consultants

582-1880 AREA CODE 415
22654 WATKINS STREET
HAYWARD, CALIFORNIA 94541

MEMBER FIRM

Project No. 1189-A28-D4
15 November 1983

Bebco Paving Company
4901 Tidewater Avenue
Oakland, California 94601

Subject: Backfill of Tank Excavations
2492 Castro Valley Boulevard
Alameda County, California

Gentlemen:

This letter summarizes results of testing services performed by our firm during backfill placement for an 8-foot excavation of three existing tanks.

Our services were requested by Mr. S. Butler of your firm to verify the 90% compaction requirement of the County of Alameda. Personnel from our firm were present on a routine intermittent basis during fill placement and performed compaction tests when appropriate. No observation was made of the removal of the three tanks. A summary containing results of tests performed by our firm is attached in Tables I and II. The test results indicate that the fill was placed and compacted in substantial conformance with the County's requirements.

Some placement and compaction of the fill was completed at the time our personnel visited the site to perform testing services. We did not observe the excavation prior to placement of fill nor did we observe placement or compaction of the material being tested. As a result we do not have knowledge, nor can we express an opinion, concerning the uniformity of the fill or the conditions in which it was placed. Our opinion as the compaction of the fill is based solely on the test results which may or may not be representative of the entire fill. Our opinion is not intended as a warranty or certification of the work performed by others. Responsibility to perform the work in accordance with the plans and specifications rests with the contractor(s).

If you have any questions about the work performed by our firm, or need additional information, please contact this office.

Yours very truly,

JUDD HULL & ASSOCIATES

Dante P. Moresi
Staff Technician

DPM:ph
Copies: 2 to Client

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	DESCRIPTION OF SOIL	MAXIMUM DRY DENSITY P.C.F.	OPTIMUM MOISTURE CONTENT %
1	GRAY SAND W/BLACK CLAY W/ROCK	122.5	10.2
2	*TAN FINE SAND W/AB (IMPORT)	121.8	8.6
3	TAN-BROWN GRAVELLY SANDY SILT	127.6	10.4
4	RED-BROWN SAN LEANDRO 3/4" AB	126.7	9.7

Another Import, a very moist brown-black silty clay, was substituted for Sample 2. This was then removed and off-hauled because it was too wet to achieve 90% compaction.

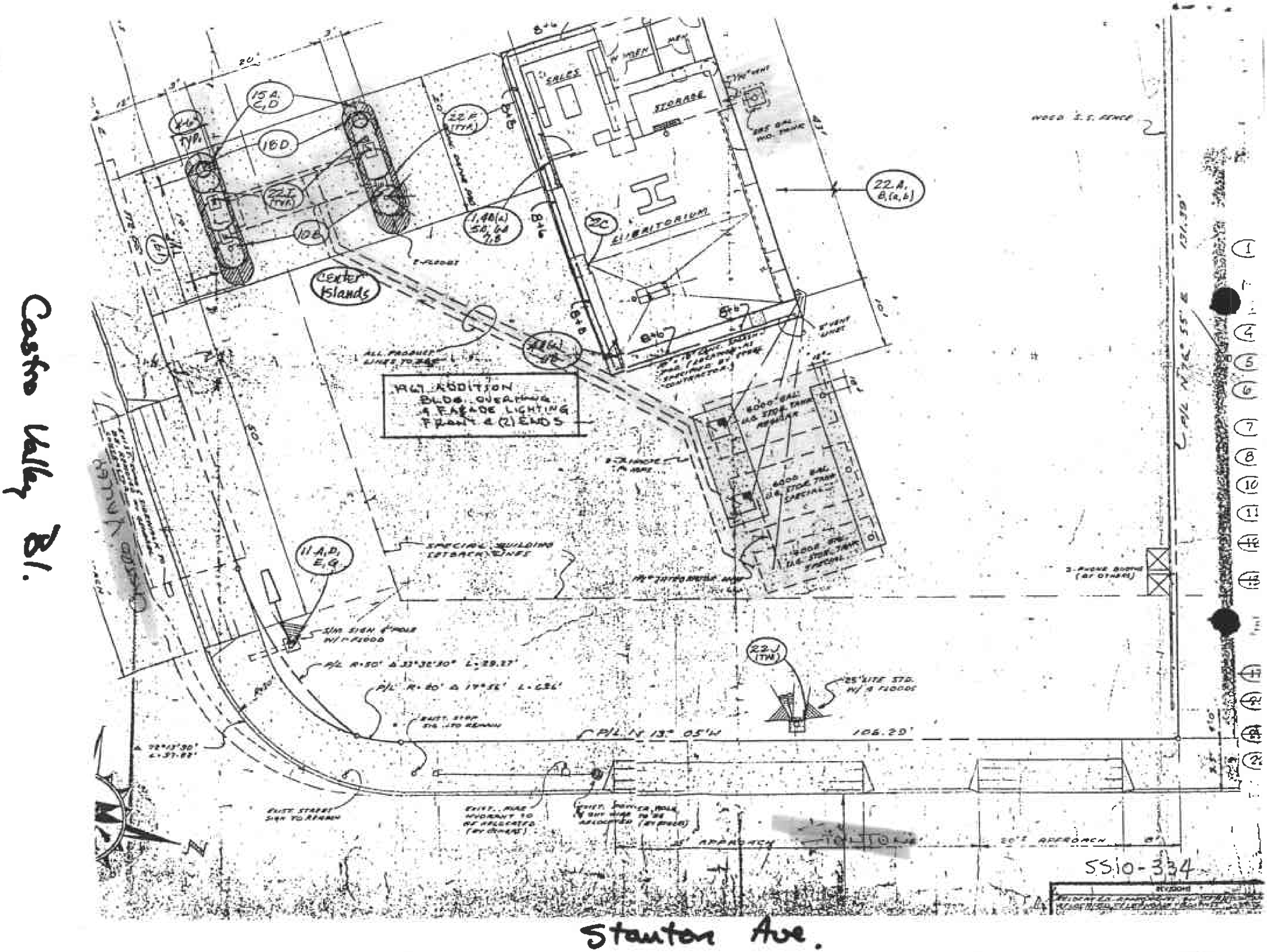
TABLE II

SUMMARY OF FIELD DENSITY TEST RESULTS

NUCLEAR DENSITY METHOD

* Denotes Failing Test
(RT Denotes Retest)

TEST NO.	DATE 1983	LOCATION	ELEV/ LIFT	MOISTURE CONTENT % DRY WEIGHT	SOIL DENSITY P.C.F.	RELATIVE COMPACTION %	SOIL TYPE & REMARKS
1	10/31	NE Corner	4' BRG	15.2	115.3	94	1
2	"	NE Corner	6' BRG	15.9	110.9	91	1
3	"	SW Corner	3' BRG	16.0	113.8	93	1
4	11/4	SE Corner	2½' BRG	11.0	124.6	98	3
5	"	N Side, Mid	2' BRG	12.0	119.3	93	3
6	"	NW Corner	RG	10.7	116.4	92	4
7	"	SE Corner	.5' BRG	12.9	118.2	93	4



Castro Valley Bl.
Stanton Ave.
SALES
STORAGE
ELEVATOR
15 A, C, D
18 D
22.F (TYP.)
22.A, B (a, b)
Center Islands
ALL PRODUCT LINES TO BE
1967 ADDITION
BLDG. OVERHANG
& FACADE LIGHTING
FRONT & (2) ENDS
6000 GAL. U.G. STOR. TANK REGULAR
6000 GAL. U.G. STOR. TANK SPECIAL
SPECIAL BUILDING SETBACK LINES
11 A, D, E, G
S/M SIGN & POLE W/1 FLOOD
22.J (TYP.)
25' SITE STD. W/ 4 FLOODS
WOOD S.S. FENCE
2-PHONE BOOTHS (BY OTHERS)
P/L N 13° 05' W
106.29'
5510-334

GENERAL NOTES

GILES ENGINEERING ASSOCIATES, INC.

SAMPLE IDENTIFICATION

All sample classifications reviewed by Geotechnical Engineer in accordance with Unified Soil Classification System (ASTM D-2487)

DESCRIPTIVE TERM (% BY DRY WEIGHT)	
Trace:	1-10%
Little:	11-20%
Some:	21-35%
And/Adjactive	36-50%

PARTICLE SIZE (DIAMETER)		
Boulders:	8 in and larger	
Cobbles:	3 in to 8 in	
Gravel:	coarse-	3/4 to 3 in
	fine-	No. 4 (4.76mm) to 3/4 in
Sand:	coarse-	No. 4 (4.76mm) to No. 10 (2.0mm)
	medium-	No. 10 (2.0mm) to No. 40 (0.42mm)
	fine-	No. 40 (0.42mm) to No. 200 (0.074mm)
Silt:	No. 200 (0.074mm) and smaller (Non-plastic)	
Clay:	No. 200 (0.074mm) and smaller (Plastic)	

SOIL PROPERTY SYMBOLS

Dd: Dry Density, pcf
LL: Liquid Limit
PL: Plastic Limit
SL: Shrinkage Limit
LI: Liquidity Index[(w - PL)/PI]
PI: Plasticity Index (LL-PL)
Gs: Specific Gravity
K: Coefficient of Permeability
w: Moisture Content
qp: Calibrated Penetrometer Resistance, tsf
qs: Vane-Shear Strength, tsf
qu: Unconfined Compressive Strength, tsf
N: Penetration Resistance per foot or fraction thereof for standard 2 inch O.D., 1 3/8 inch I.D.,split spoon sampler driven with a 140 pound weight free-falling 30 inches, in accordance with Standard Penetration Test Specifications (ASTM D-1586)
Nc: Penetration Resistance per foot or fraction thereof for standard Cone Penetrometer driven with a 140 pound weight free-falling 30 inches
▼: Apparent groundwater level at the time noted after completion
: Depth to which boring caved during water level readings

DRILLING AND SAMPLING SYMBOLS

SS: Split-Spoon
ST: Shelby Tube - 3" O.D. (except where noted)
AU: Auger Sample
DB: Diamond Bit
CB: Carbide Bit
WS: Wash Sample
RB: Rock-Roller Bit
BS: Bag Sample

SOIL STRENGTH CHARACTERISTICS

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
Very Soft	0-2	0 - 0.25
Soft	3-4	0.25 - 0.50
Medium Stiff	5-8	0.50 - 1.00
Stiff	9-15	1.00 - 2.00
Very Stiff	16-30	2.00 - 4.00
Hard	31+	4.00+

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT (N)
Very Loose	0-4
Loose	5-10
Firm	11-30
Dense	31-50
Very Dense	51+

DEGREE OF PLASTICITY	PI	DEGREE OF EXPANSIVE POTENTIAL	PI
None to Slight	0-4	Low	0-15
Slight	5-10	Medium	15-25
Medium	11-30	High	25+
High to Very High	31+		

GEA446/kah