LIMITED SOIL INVESTIGATION

FOR

817 SILVERADO STREET

LA JOLLA, CALIFORNIA

For
Matthew Welsh & Associates
817 Silverado Street
La Jolla, California 92037

By
BUCHANAN-RAHILLY, INC.
San Diego, California

September, 1994

File No. 94-110
September 27, 1994

Matthew Welsh & Associates
817 Silverado Street
La Jolla, California 92037

Attention: Mr. Matthew Welsh

Subject: LIMITED SOIL INVESTIGATION
Proposed Townhome Structure
817 Silverado Street
La Jolla, California

Dear Mr. Welsh,

We are pleased to submit the accompanying report which presents the results of our limited soil investigation for the subject project. The investigation was performed in accordance with our proposal dated August 26, 1994.

The report presents our conclusions and recommendations pertaining to site development, as well as the results of the field and laboratory tests upon which they are based.

This opportunity to be of service is appreciated. If you have questions or if we can be of further service, please do not hesitate to call.

Very truly yours,
BUCHANAN-RAHILLY, INCORPORATED

Buck Buchanan
RCE 26876, GE 169

(4) addressee

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San Diego, CA 92110
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LIMITED SOIL INVESTIGATION
817 Silverado Street
La Jolla, California

PURPOSE AND SCOPE OF INVESTIGATION

This report has been prepared exclusively for Mr. Matthew Welsh and your chosen consultants for use in evaluating the property and in project design. It presents our preliminary conclusions and recommendations regarding:

- General subsurface soil conditions;
- Site grading;
- Foundations; and,
- Lateral earth pressures.

DESCRIPTION OF PROPOSED PROJECT

To aid in our study, we have discussed the project with you and we have reviewed the following documents:

- A landscape and site plan (one sheet), prepared by Matthew Welsh & Associates, dated June 21, 1993;
- "Existing Topo And Grading Plan", prepared by Christensen Engineering & Surveying, dated April 2, 1993.
- "City of San Diego Seismic Safety Study", updated June, 1983; and
- "Geology of the San Diego Metropolitan Area, California, Bulletin 200", prepared by the California Division of Mines and Geology, 1975.

We understand that the proposed development involves construction of a three story townhome residential structure supported on continuous and spread foundations. The building will be wood framed with some steel members. The lower level will consist of a parking garage for each of the townhome units. Two levels of living area and deck space will be located above the parking garages. We understand that grading will be limited to a shallow excavation of about 2 to 3 feet to lower grades slightly for the parking garage. The grading plan indicates that the existing elevation in the area to be developed is about 104 Feet. The finish elevation in the garage is shown to be 102.0 Feet and the garage pad grade is indicated to be 101.33 Feet. The perimeter

walls of the parking garage will therefore act as partial retaining walls. The new structure will be bounded by paver tiles on the north and south sides, by sloped driveways on the east side, and by a raised concrete walkway along the west side. A concrete walkway will also extend along the west side of the existing building.

We understand that the existing structure is to remain, except that a small addition off the southwest corner of the structure will be removed.

The approximate location of the existing and proposed structures are shown on the Site Plan, Figure No. 1.

FIELD AND LABORATORY INVESTIGATIONS

The field investigation included a visual reconnaissance of the site to identify and evaluate the soils related features of the property, and advancing two test borings to depths of 10-1/2 feet. The test excavations were logged in the field and representative soil samples were secured. Laboratory tests were performed on selected samples to help evaluate certain physical properties of the soils and to confirm our visual classifications made during the field explorations. Additional details of the Field and Laboratory programs are presented in Appendixes A and B, respectively. The approximate locations of the test borings are shown on the Site Plan, Figure No. 1.

SITE CONDITIONS

The descriptions of the site and the surface and subsurface conditions which follow are based on our field investigation, as well as a review of the referenced documents.

Site Description

The subject site is located on the south side of Silverado Street in the La Jolla area of San Diego, California.

There is an existing two story house that is used as office space on the front portion of the lot and a paved parking lot at the rear of the lot. There is an alley (Bishop Lane) along the east side of the lot and existing structures to the west and south of the lot. The lot is essentially level. We understand that the existing house will remain and that the townhome structure will be constructed in the existing parking lot area. There are overhead power and phone lines that cross the parking lot. There is a power pole along the west side of Bishop Lane at about the mid-point of the eastern property line of the proposed development.

The referenced Bulletin 200 indicates that the general site area

is underlain by soils of the Bay Point Formation. This formation typically provides satisfactory support for foundations. The Seismic Safety Study indicates that no faults are mapped to be present on the lot.

Subsurface Conditions

The site is underlain by formational soils and surficial deposits consisting of fill soils. Each of these soil types is discussed below in general order of increasing age.

Fill Soils- Fill soils, consisting of damp, brown, silty fine sand and clayey sand was encountered in Tests Boring No. 2. No fill soil was encountered in Test Boring No. 1. There was some scattered organic material in the fill soil. The fill soil extended to a depth of about 3-1/2 feet. The fill soils are considered to have "very low" to "low" expansion potential. "Very low" expansive soils have an Expansion Index of between 0 and 20 and "low" expansive soils have an Expansion Index of between 20 and 50 when tested in accordance with UBC Standard No. 29-2.

The fill soils encountered are considered to be potentially compressible and unsuitable in their present condition for the direct support of new structures or additional fill soils. Remedial grading of these soils will be required in areas to receive surface improvements as discussed below under "Grading".

Formational Soils - Formational soils, consisting generally of medium dense to very dense, damp to moist, red-brown and yellow-brown, silty fine to medium sand, was encountered directly below the asphalt concrete in Test Boring No. 1 and below the fill soil in Test Boring No. 2. A thin layer of stiff, sandy clay was encountered within the formational soil at a depth of about 6-1/2 to 7-1/2 feet in Test Boring No. 2.

The formational soils are generally considered to have "very low" expansion potential and should provide satisfactory support for structural loads or additional fill loads if the grading is performed and foundations are designed as recommended below.

Groundwater

No groundwater was encountered in our test excavations. Although no groundwater was encountered during the field investigation, the geologic unit, as well as the surficial deposits, present on the site have permeability characteristics that could result in seepage under certain conditions.

DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

The discussions, conclusions, and recommendations presented in this report are based on the results of our field and laboratory studies, analyses, and professional judgment.

It is our opinion, from a geotechnical standpoint, that the site can be developed as proposed, provided the recommendations contained herein are implemented during design and construction.

Significant adverse geotechnical conditions in the form of existing scattered fill soils are present over the site. Therefore, remedial grading in some areas will be required, as discussed below.

Soil and Excavation Characteristics

The soils encountered on the site consist of scattered fill soils overlying formational soil. The fill soils were encountered in Test Boring No. 2 and are composed of damp, silty fine sand and clayey sand. These soils are considered to have "very low" to "low" expansion potential. These soils are also considered compressible in nature and are not suitable in their present condition for the support of structures or earth loads.

The formational soils, as encountered in our test excavations, consisted generally of medium dense to very dense, damp to moist, silty fine to medium sand. The formational soils are considered suitable for the direct support of structures or additional fill soils, provided the site is graded and foundations are designed as recommended below.

It is anticipated that excavation of the fill soils and formational soils will involve light to moderate effort with normal heavy-duty grading equipment.

Grading

All grading should be performed in accordance with the "Specifications For Site Grading" contained in Appendix C. Where the recommendations of this section conflict with Appendix C, the recommendations of this section take precedence.

It is recommended that a preconstruction conference be held at the site with the owner or developer, grading contractor, civil engineer and soil engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

It is recommended that all earthwork be observed and tested for proper compaction by BUCHANAN-RAHILLY, INCORPORATED.

All loose compressible surficial soil, not removed by planned

grading operations, should be excavated to firm, natural ground and the excavated material then moisturized as necessary and properly compacted. The field investigation indicated that existing fill soils are present in the area of Test Boring No. 2 (and may be present in other scattered areas) and extend to a depth of about 3-1/2 feet. It is recommended that the actual extent and depth of existing fill soils be evaluated in the field by the Soil Engineer at the time of grading. This recommendation applies to areas to receive structures or settlement sensitive concrete flatwork, such as the paver and walkway areas.

It should be noted that the proposed excavation for the parking garage will result in removal of about 2-1/2 to 3 feet of soil to reach design pad grade. Therefore, most of the scattered fill that is present will be removed as part of planned grading. There may be some areas found during grading that require existing fill soil to be removed below pad grade and properly replaced and compacted.

To reduce the potential for differential settlement, it is recommended that the structures not be placed on a cut-fill transition line. It is recommended that all foundations for the proposed structure be founded in the medium dense to very dense formational soils.

Foundations

The following recommendations assume that "very low" to "low" expansive soils (Expansion Index of 50 or less) will be present at foundation grade, as anticipated. If this is not feasible, further recommendations will be provided by this office following grading operations.

The site is suitable for isolated spread and/or continuous strip footings and slabs-on-grade if graded as recommended above. It is recommended that foundations be founded in the medium dense to very dense formational soils. Our test excavations indicate that suitable formational soils are present at depths of about 2 to 3-1/2 feet. Continuous footings should be at least 18 inches in width and should be founded at least 18 inches below lowest adjacent grade and at least 12 inches into formational soils, whichever is greater. Spread footings should be at least 24 inches square. An allowable bearing capacity of 2500 psf may be used for design of foundations founded as recommended. The allowable bearing capacity may be increased by up to one-third for transient loads such as wind or seismic forces.

It is recommended that minimum continuous strip footing reinforcement consist of four No. 4 reinforcing bars placed horizontally in the footings, two near the top of the footing and two near the bottom.

Concrete Slabs-on-Grade

It is recommended that concrete slabs-on-grade have a minimum thickness of 4 inches and be underlain by at least 4 inches of clean sand. Reinforcement should consist of No. 3 reinforcing bars at 24 inches on center each way placed at the slab midpoint throughout. Where moisture sensitive floor covering is planned, it is recommended that an impervious membrane vapor barrier be utilized, covered by at least one-inch of the sand cushion to reduce shrinkage cracking and allow proper curing of the concrete. Consideration should be given to using a fiber concrete additive such as "Fibermesh" or equivalent to further reduce the potential for shrinkage cracking. Concrete slabs should be expected to crack if they are not provided with adequate shrinkage control joints as designed by the structural engineer.

General Foundation Recommendations

It is recommended that foundation excavations be observed by representatives of Buchanan-Rahilly, Incorporated prior to placement of reinforcing steel or concrete to observe that the recommendations presented herein have been properly implemented.

The recommendations for footing and slab-on-grade reinforcement presented above are based on soil characteristics only and are not intended to be in lieu of reinforcement necessary for structural considerations. These recommendations are intended to reduce the effects of minor soil movement.

Lateral Loads

For design, it is recommended that the passive pressure exerted by an equivalent fluid weight of 350 pcf be used to provide resistance to design lateral loads. This value assumes that footings or shear keys are poured neat against properly compacted fill soils or undisturbed formational soils and that the soil mass extends at least 10 feet horizontally from the face of the footing or three times the height of the surface generating the passive pressure, whichever is greater.

If friction is to be used to resist lateral loads, it is recommended that a coefficient of friction of 0.35 between soil and concrete be used for design.

Retaining Walls

We understand that the only retaining walls on the site will be the low foundation walls around the garage structure and that these walls will retain about 2 to 3 feet of soil. Structural considerations, rather than soil lateral loads, will therefore probably control the design of these walls.

It is recommended that unrestrained retaining walls be designed to resist the active pressure exerted by an equivalent fluid weight of 35 pcf. This value assumes that on-site granular material will be utilized for backfill, that the backfill will be level, and that no surcharge loads will be acting on the wall. For walls restrained from movement at the top, such as basement walls, it is recommended that an additional uniform horizontal pressure of 7H psf (where H equals the restraining height of the wall in feet) be applied in addition to the active pressures given above.

Since the proposed retaining walls are very low, it is not considered necessary to install a backfill drainage system to prevent buildup of hydrostatic pressure. However, a backfill drainage system would mitigate the potential for water seepage through the foundation walls. Figure No. 2 presents typical recommendations in this regard in the event that you choose to install a drain behind the perimeter wall of the garage.

Drainage

We recommend that positive measures be taken to properly finish grade the lot after structures and other improvements are in place so that drainage waters from the site and adjacent properties are directed off the site and away from foundations and floor slabs. Even when these measures have been taken, experience has shown that a shallow ground-water or surface-water condition can and may develop in areas where no such ground-water condition existed prior to site development; this is particularly true where a substantial increase in surface-water infiltration results from landscape irrigation.

As with any structure, we recommend that roof gutters be installed around the structure and that the downspouts discharge to buried drain lines that carry water to the street or to concrete flatwork that drains to the street or to other designed drainage facilities. Irrigation in planters that adjoin the structure should be limited to that just necessary to support the plant growth.

Since the garage level will be depressed below the street grade, we understand that a strip drain will be installed at the bottom of each of the driveways and that these drains will be connected to a sump and pump that will lift water to the street grade.

Appendix D presents typical recommendations and considerations for proper maintenance of homesites.

UNCERTAINTY AND LIMITATIONS

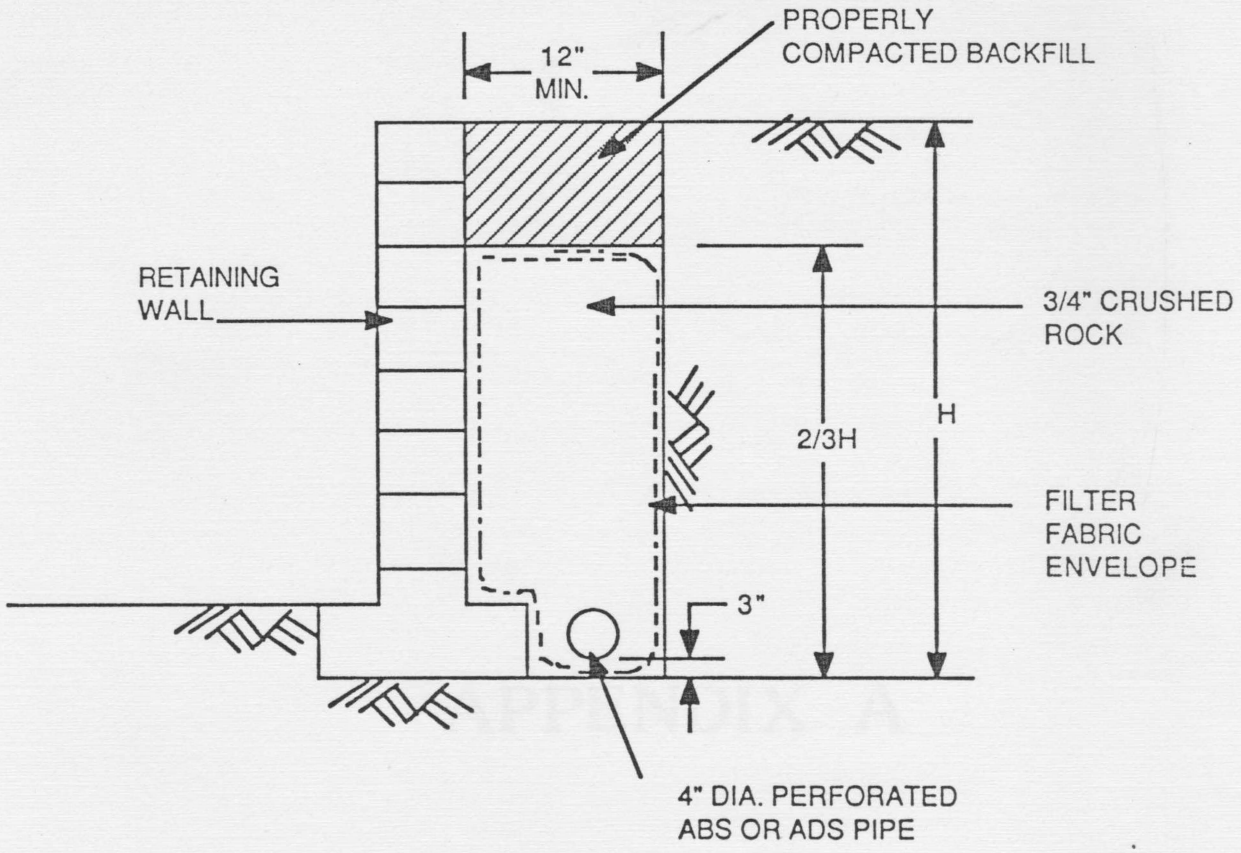
We have observed only a small portion of the pertinent soil and rock conditions. The recommendations made herein are based on the assumption that the site conditions do not deviate appreciably from those found during our field investigation. It is recommended that BUCHANAN-RAHILLY,INC. review the foundation and grading plans to verify that the intent of the recommendations presented herein have been properly interpreted and incorporated into the contract documents. It is also recommended that BUCHANAN-RAHILLY, INC. observe the site grading, subgrade preparation under concrete slabs and paved areas, and foundation excavations. If the plans for site development are changed, or if variations or undesirable geotechnical conditions are encountered during construction, the geotechnical consultant should be consulted for further recommendations.

This report is intended for design purposes only and may not be sufficient to prepare an accurate bid. California, including San Diego, is an area of high seismic risk. It is generally considered economically unfeasible to build a totally earthquake-resistant project; it is therefore possible that a large or nearby earthquake could cause damage at the site.

Geotechnical engineering and the geologic sciences are characterized by uncertainty. Professional judgments presented herein are based partly on our evaluations of the technical information gathered, partly on our understanding of the proposed construction, and partly on our general experience. Our engineering judgment and work rendered herein meet current professional standards; we do not guarantee the performance of the project in any respect.

Inspection services allow the testing of only a very small percentage of the fill placed at the site. Contractual arrangements with the grading contractor should contain the provision that he is responsible for excavating, placing, and compacting all fill in accordance with the project specifications. Inspection and observations by the geotechnical engineer during grading do not relieve the contractor of his primary responsibility to perform all work in accordance with the specifications.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractors operations, and we cannot be responsible for the safety of personnel other than our own on the site; the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.



No Scale

NOTE:
IF CLASS 2 PERMEABLE MATERIAL (PER SEC 68-1.025) CALTRANS STD. SPECS.) IS USED THE FILTER FABRIC MAY BE DELETED.
MIRADRAIN FABRIC (OR EQUIVALENT) MAY SUBSTITUTE FOR THE CRUSHED ROCK OR CLASS 2 PERMEABLE MATERIAL.

TYPICAL RETAINING WALL DRAIN DETAIL
817 SILVERADO STREET

Drawn by:	Checked by:	File No: 94-110	Date: 9/27/94	Figure No: 2

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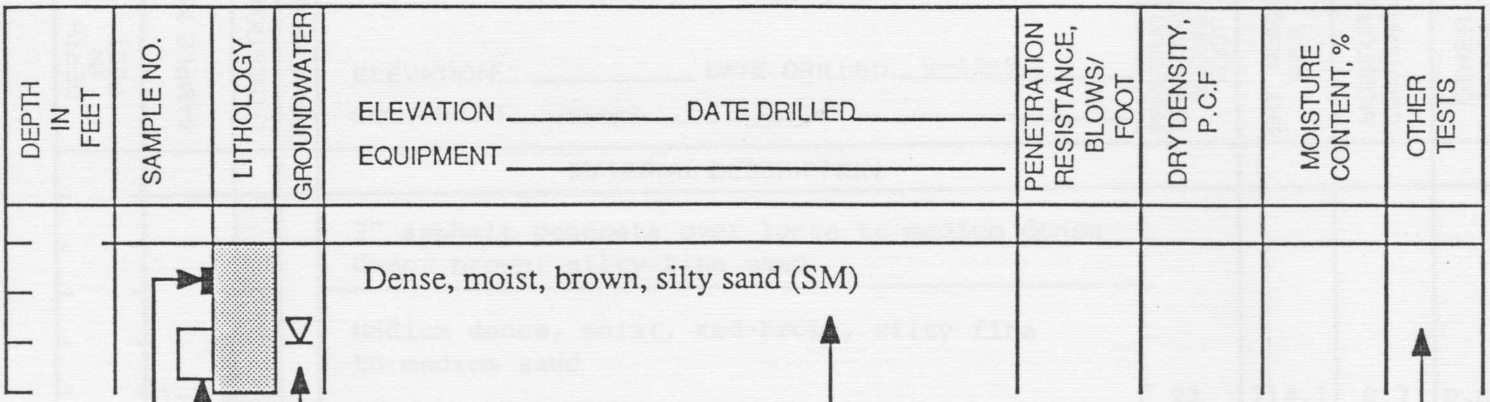
September 27, 1994

APPENDIX A

FIELD INVESTIGATION

The field investigation was performed on September 12, 1994 and consisted of a site reconnaissance and the excavation of two test borings at the approximate locations shown on the Site Plan, Figure No. 1. The drilling was performed with a truck-mounted, 6-inch diameter, hydraulically powered, continuous flight auger. Relatively undisturbed samples were obtained in the test borings by driving a 3-inch O.D. split-tube sampler with blows from a 140-pound hammer falling 30 inches. The sampler was equipped with 2-3/8 inch diameter by 1-inch high brass rings to facilitate sample removal and testing.

The soils encountered in the excavations were visually examined, classified and logged. Logs of the excavations are presented on Figure Nos. A-2 and A-3. A Key To Logs is presented as Figure No. A-1. The logs depict the soil conditions encountered and the depth at which samples were obtained.



WATER LEVEL
At time of drilling

SOIL CLASSIFICATION
Soil Classifications are based on the Unified Soil Classification System and include color, moisture and consistency. Field descriptions have been modified to reflect results of laboratory analyses where appropriate. Symbol is shown only where laboratory tests have been performed to confirm the classification.

LITHOLOGY
Hatching represents changes in soil types.

DISTURBED SAMPLE LOCATION
Obtained by collecting the auger cuttings in a plastic or cloth bag.

UNDISTURBED SAMPLE LOCATION
Split Tube Sampler
Sample with recorded blows per foot was obtained with a split tube (3" outside diameter and 2.5" inside diameter), lined with 1" x 2.375" brass sample rings. The sampler was driven into the soil at the bottom of the hole with a 140 pound hammer falling 30 inches, unless noted otherwise in Appendix A or the text of the report.

LABORATORY TESTING
Indicates sample tested for other properties

GS - Grain Size Distribution	CT - Consolidation Test
LC - Laboratory Compaction Test	UCS - Unconfined Compression Test
PI - Atterberg Limits Test	DS - Direct Shear Test
ST - Loaded Swell Test	SDS - Slow Direct Shear Test
EI - Expansion Index Test	TX - Triaxial Compression Test
CC - Confined Compression Test	

NOTE: In this column the results of these tests may be recorded where applicable

KEY TO LOGS

817 SILVERADO STREET

Drawn by: CB	Checked by: EB	File No: 94-110	Date: 9-24-94	Figure No: A-1

Buchanan-Rahilly, Inc.

ELEVATION _____ DATE DRILLED 9-12-94

EQUIPMENT Simco

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	MATERIAL DESCRIPTION	PENETRATION RESISTANCE, BLOWS/FOOT	DRY DENSITY P.C.F.	MOISTURE CONTENT, %	OTHER TESTS
				2" asphalt concrete over loose to medium dense damp, brown, silty fine sand				
	1-1			Medium dense, moist, red-brown, silty fine to medium sand	23	114.1	8.7	D.S.
5	1-2				33	113.8	8.4	
				Dense, moist, red-brown and yellow-brown, slightly silty fine to medium sand				
				Very dense, moist, yellow-brown, slightly silty fine to medium sand				
10	1-3				100/5"	110.3	9.9	
				Bottom of boring at 10.5 feet				

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST BORING 1
817 SILVERADO STREET

Drawn by CB	Checked by: EB	File No. 94-110	Date: 9-24-94	Figure No. A-2

Buchanan-Rahilly, Inc.

ELEVATION _____ DATE DRILLED 9-12-94

EQUIPMENT Simco

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	MATERIAL DESCRIPTION	PENETRATION RESISTANCE, BLOWS/FOOT	DRY DENSITY P.C.F.	MOISTURE CONTENT, %	OTHER TESTS
				2" asphalt concrete over damp, brown, silty fine sand and clayey sand with minor organic material FILL				
	2-1				31	119.6	9.5	
5				Dense to very dense, moist, red-brown and yellow-brown, slightly silty fine to medium sand				
	2-2				57	114.1	16.3	D.S.
				Stiff, moist, dark brown, sandy clay to clayey sand				
				Very dense, moist, yellow-brown, slightly silty fine to medium sand (cemented)				
10	2-3				100/ 4.5"	107.7	10.2	
				Bottom of boring at 10.5 feet				
15								

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST BORING 2
817 SILVERADO STREET

Drawn by CB	Checked by: JB	File No. 94-110	Date: 9-24-94	Figure No. A-3

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APPENDIX B

LABORATORY TESTING

The materials observed in the test excavations were visually classified and evaluated with respect to strength, swelling, and compressibility characteristics; dry density; and moisture content. Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) and/or other suggested procedures.

The in-place dry density and moisture content of selected relatively undisturbed samples was determined by weighing a specific volume of the undisturbed soil mass before and after oven drying. The strength of the soils was evaluated by considering the density and moisture content of the samples, the penetration resistance of the sampler, and by performing direct shear tests on relatively undisturbed samples of formational soil. The expansion potential of the soils was evaluated by visual examination.

The results of the laboratory tests are presented on the boring logs and/or the following table. The dry density and moisture content of the samples are shown with the penetration resistance of the sampler at the corresponding sample location on the logs. The results of the direct shear tests are shown on Table I.

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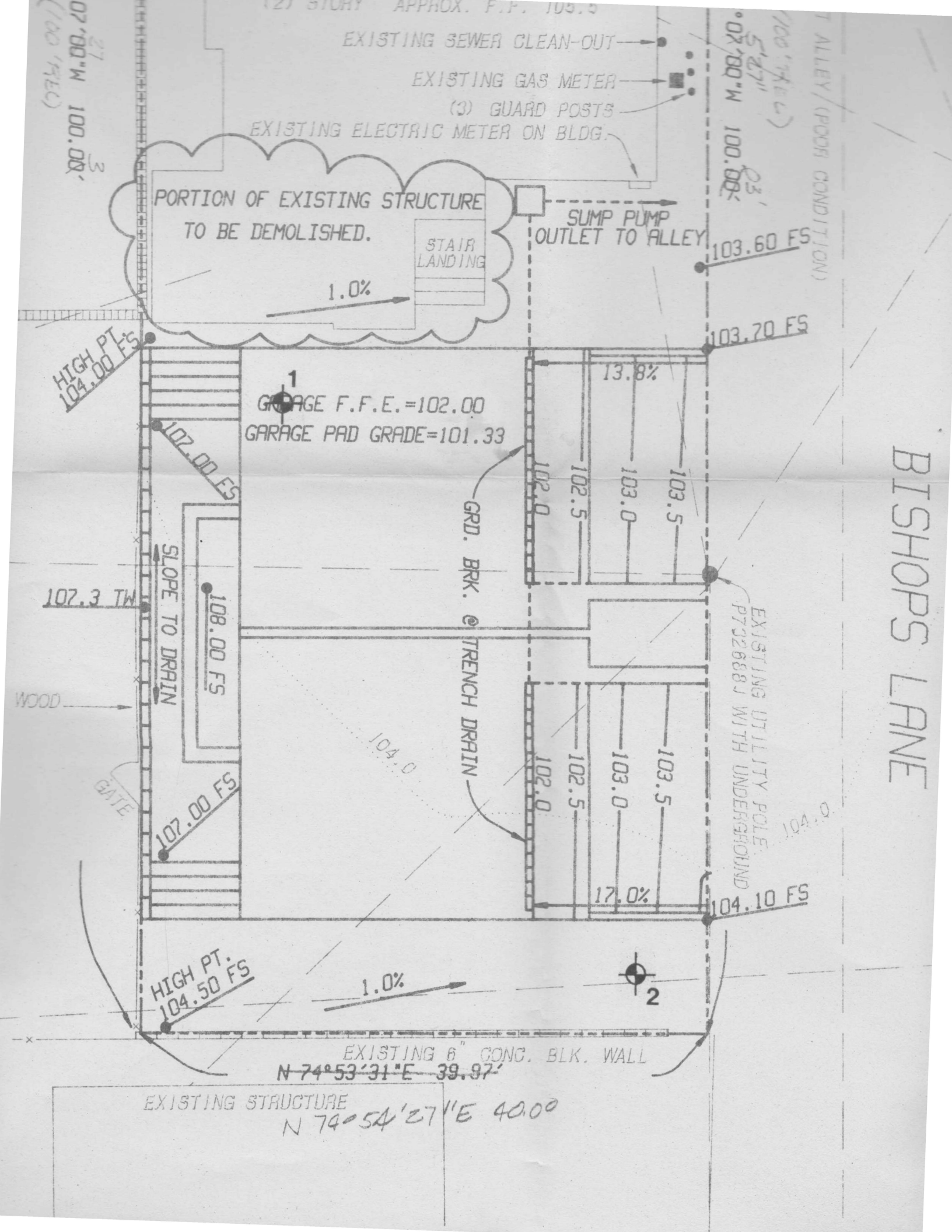
TABLE I

Summary of Direct Shear Test Results

Sample No. No.	Dry Density pcf	Moisture Content %	Cohesion psf	Angle of Shear Resistance Degrees
1-1	114.1	8.7	200	34
2-2	114.1	16.3	800	35


(2) STORY APPROX. F.F. 105.5
EXISTING SEWER CLEAN-OUT
EXISTING GAS METER
(3) GUARD POSTS
EXISTING ELECTRIC METER ON BLDG.
PORTION OF EXISTING STRUCTURE TO BE DEMOLISHED.
STAIR LANDING
1.0%
SUMP PUMP OUTLET TO ALLEY
103.60 FS
103.20 FS
HIGH PT. 104.00 FS
13.8%
1
GARAGE F.F.E.=102.00
GARAGE PAD GRADE=101.33
107.00 FS
102.0
102.5
103.0
103.5
GRD. BRK. @ TRENCH DRAIN
102.3 TW
SLOPE TO DRAIN
108.00 FS
WOOD
GATE
107.00 FS
104.0
EXISTING UTILITY POLE PT326881 WITH UNDERGROUND
17.0%
104.10 FS
HIGH PT. 104.50 FS
1.0%
2
EXISTING 6" CONC. BLK. WALL
N 74°53'31"E 39.97'
EXISTING STRUCTURE
N 74-54'27"E 40.00
BISHOPS LANE
ALLEY (POOR CONDITION)
N 00°07'00" W 100.00'