Appendix C.
Geotechnical Investigation

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GEOTECHNICAL INVESTIGATION
PROPOSED 24-UNIT RESIDENTIAL
COMPLEX LOCATED AT
5515 RIVER AVE
NEWPORT BEACH, CALIFORNIA

Presented to:

Schooler & Associates,Inc.
301 E. 17th Street, Suite 204
Costa Mesa, CA 92627

Attention:

Todd Schooler, AIA

Prepared by:

EGA CONSULTANTS, LLC
375-C Monte Vista Avenue
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June 13, 2007
Project No. TS474.1

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June 13, 2007
Project No. TS474.1

Site: PROPOSED 24-UNIT RESIDENTIAL COMPLEX - 5515 RIVER AVENUE
NEWPORT BEACH, CALIFORNIA

Executive Summary to Soils Report

Based on our geotechnical study of the site, our review of available reports and literature and our experience, it is our opinion that the proposed residential development is feasible from a geotechnical standpoint. There appear to be no significant geotechnical constraints on-site that cannot be mitigated by proper planning, design, and utilization of sound construction practices. The engineering properties of the soil and native materials, and surface drainage offer favorable conditions for site development.

The following key elements are conclusions confirmed from this investigation:

- A review of available geologic records indicates that no active faults cross the subject property.
- The site is located in the seismically active Southern California area, and within 2 kilometers of the Type B Newport-Inglewood Fault. As such, the proposed development shall be designed in accordance with seismic considerations specified in the 2001 California Building Code (CBC) and the City requirements.
- Foundation specifications herein include added provisions for potential liquefaction on-site.

SUMMARY OF RECOMMENDATIONS

Design Item	**Recommendations**
Foundations:	
Footing Bearing Pressure	1,800 psf - building, continuous; 2,500 psf - iso./column.
Passive Lateral Resistence	250 psf per foot
Perimeter Footing Widths:	min. 15 inches with two No. 5 bars top and bottom
Perimeter Footing Depths:	min. 24 inches below lowest adjacent grade
Coefficient of Friction	0.35
Soil Expansion	Non-Expansive Beach Sands
Soil Sulfate Content	Negligible
Building Pad Removals:	min. 3 ½ ft. overexcavation

Building Slab:
* Concrete slabs cast against properly compacted fill materials shall be a minimum of 6 inches thick (actual) and reinforced with No. 4 rebar at 12 inches on center in both directions.
* Dowel all footings to slabs with No. 4 bars at 24 inches on center.

Seismic Values:	
Seismic Zone	4
Seismic Zone Factor (Z)	0.40
Soil Profile Type	S_D
Seismic Source Type	B
Near-Source Factor N_a	1.3
Near-Source Factor N_v	1.6

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June 13, 2007
Project No. TS474.1

Schooler & Associates, Inc.
301 E. 17th Street, Suite 204
Costa Mesa, CA 92627

Attention: Todd Schooler, AIA

Subject: **GEOTECHNICAL INVESTIGATION**
PROPOSED MULTI-UNIT RESIDENTIAL COMPLEX LOCATED AT
5515 RIVER AVENUE
NEWPORT BEACH, CALIFORNIA

Dear Todd,

In accordance with your request we have completed our preliminary Geotechnical Investigation of the above mentioned site. This investigation was performed to determine the site soil conditions and to provide geotechnical parameters for the proposed multi-unit Residential Complex.

It is our understanding that the proposed re-development shall include the construction of a new multi-tenant residential complex including three-story single family dwellings and duplexes with attached garages. At this date, a total of 24 units are planned (12 stand-alone structures and 6 duplex structures).

This opportunity to be of service is appreciated. If you have any questions, please call.

Very truly yours,

EGA Consultants, LLC

DAVID A. WORTHINGTON CEG 2124
Principal Engineering Geologist

PAUL DURAND RCE 58364
Sr. Project Engineer

REGISTERED PROFESSIONAL ENGINEER
PAUL H. DURAND, JR.
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CIVIL
STATE OF CALIFORNIA
6/15/07

Copies: (6) Addressee

REGISTERED GEOLOGIST
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STATE OF CALIFORNIA

June 13, 2007
Project No. TS474.1

GEOTECHNICAL INVESTIGATION
PROPOSED 24-UNIT RESIDENTIAL
COMPLEX LOCATED AT
5515 RIVER AVE
NEWPORT BEACH, CALIFORNIA

INTRODUCTION

In response to your request and in accordance with the Uniform Building Code and the City of Newport Beach building requirements, we have completed a preliminary geotechnical investigation at the subject site located at 5515 River Avenue in the City of Newport Beach, California (see Site Location Map, Figure 1).

The purpose of our investigation was to evaluate the existing geotechnical conditions at the subject site and provide recommendations and geotechnical parameters for site development, earthwork, and foundation design for the proposed residential construction. We were also requested to evaluate the potential for on-site geotechnical hazards. This report presents the results of our findings, as well as our conclusions and recommendations.

SCOPE OF STUDY

The scope of our investigation included the following tasks:

- Review of readily available published and unpublished reports;
- Geologic reconnaissance and mapping;
- Excavation and sampling of six (6) exploratory borings to total depths of up to 10 feet below existing grade (b.g.);
- Laboratory testing of representative samples obtained from the exploratory borings;
- Engineering and geologic analysis including liquefaction analysis and seismicity coefficients in accordance with the 2001 CBC;

- Preparation of this report presenting our findings, conclusions, and recommendations.

GENERAL SITE CONDITIONS

The subject property is a semi-rectangular shaped lot located at 5515 River Avenue in the City of Newport Beach, County of Orange, California (see Site Location Map, Figure 1). For the purpose of clarity in this report, the lot is bound by West Newport Park and tennis courts to the west, by River Avenue to the north, by Seashore Drive to the south, and by multi-tenant single family dwellings to the east (see Figure 1).

The subject property consists of a relatively flat, planar lot with no significant slopes on or adjacent to the site.

Currently, the lot is occupied by a three-story structure, 54-unit Apartment Complex known as the "Las Brisas Apartments". Exterior improvements include asphalt parking areas, brick and wood fences and a common area swimming pool. The existing structures and common areas are shown in the Plot Plan, Figure 2.

PROPOSED RESIDENTIAL DEVELOPMENT

It is our understanding that the proposed re-development shall include the construction of a new multi-tenant residential complex including three-story single family dwellings and duplexes with attached garages. At this date, a total of 24 units are planned (12 stand-alone structures and 6 duplex structures).

The proposed structures shall consist of slab-on-grade buildings with perimeter continuous footings.

The proposed building layouts are shown in Figure 3, attached.

We assume that the proposed buildings will consist of wood-frame and masonry block construction or building materials of similar type and load. The building foundations will consist of a combination of isolated and continuous spread footings. Loads on the footings are unknown, but are expected to be less than 2500 and 1800 pounds per square foot on the isolated and continuous footings, respectively. If actual loads exceed these assumed values, we should be contacted to evaluate whether revisions of this report are necessary. It is our understanding that the grade of the site is not expected to vary significantly, with maximum regrades consisting of approximately 2 to 3 feet in the building areas.

SUBSURFACE EXPLORATION

Our subsurface exploration consisted of the excavation of six (6) exploratory borings (B-1 through B-6) to a maximum depth of 10 feet below grade (b.g.). Representative bulk and relatively undisturbed soil samples were obtained for laboratory testing. Geologic logs of the soil borings are included in Appendix A.

The borings were continuously logged by a registered geologist from our firm who obtained soil samples for geotechnical laboratory analysis. The approximate locations of the borings are shown on Figure 2, Plot Plan.

Geotechnical soil samples were obtained using a modified California sampler filled with 2 3/8 inch diameter, 1-inch tall brass rings. Bulk samples were obtained by collecting representative bore hole cuttings. Locations of geotechnical samples and other data are presented on the boring logs in Appendix A.

The soils were visually classified according to the Unified Soil Classification System. Classifications are shown on the boring logs included in Appendix A.

LABORATORY TESTING

Laboratory testing was performed on representative soil samples obtained during our subsurface exploration. The following tests were performed:

* Dry Density and Moisture Content
  (ASTM: D 2216
* Maximum Dry Density and Optimum Moisture Content
  (ASTM: D 1557-02)
* Direct Shear
  (ASTM D3080-72)
* Sulfate Content
  (CA 417)
* Grain Size Distribution
  (ASTM D 422-72)

All laboratory testing was performed by our sub-contractor, Neblett and Associates, Inc., of Huntington Beach, California. Geotechnical laboratory results are shown in Appendix B of this report.

SOIL AND GEOLOGIC CONDITIONS

The site soil and geologic conditions are as follows:

Seepage and Groundwater

Seepage or surface water ponding was not noted on the subject site at the time of our study. Groundwater was encountered in our on-site test excavations at depths of approximately 6 to 8 feet b.g.. Groundwater was encountered at 4 feet b.g. within Boring B-3, located at the River Avenue sidewalk elevation which is approximately 2.5 feet below the site area elevation. According to the Orange County Water District (OCWD), there are no water wells located within the general vicinity of the subject property. Our data indicates that the perched groundwater encountered is subject to tidal fluctuations.

Geologic Setting

According to a United States Geological Survey (USGS) Map of the Newport Beach Quadrangle the site is approximately 13 feet above Mean Sea Level (MSL).

Regionally, the site is located within the western boundary of the Coastal Plain of Orange County. The Coastal Plain lies within the southwest portion of the Los Angeles Basin and consists of semi-consolidated marine and non-marine deposits ranging in age from Miocene to recent. The western boundary of the Coastal Plain, in which the site is located, is referred to as the Tustin Plain. It is bound by the Santa Ana Mountains to the northeast and the San Joaquin Hills to the southeast.

Based on available geologic maps the site is underlain by a thin mantle of residual soils and/or engineered fill. The shallow soil layer is underlain by Quaternary-age terrace marine deposits which are described as clean beach sands (see reference No. 2).

Faulting

A review of available geologic records indicates that no active faults cross the subject property (reference No. 2).

Seismicity

The seismic hazards most likely to impact the subject site is ground shaking following a large earthquake on the Newport-Inglewood (onshore), Palos Verdes (offshore), Whittier-Elsinore, or Cucamonga. The fault distances, probable magnitudes, and horizontal accelerations are listed as follows:

FAULT (Seismic Source Type)	DISTANCE FROM SUBJECT SITE (Kilometers)	MAXIMUM CREDIBLE EARTHQUAKE MAGNITUDE	MAXIMUM HORIZONTAL ROCK ACCELERATION
Newport-Inglewood (B)	2 kilometers southwest	6.9	0.68 g's
Palos Verdes (B)	16 kilometers southwest	7.1	0.38 g's
Chino-Cental Avenue (B)	40 kilometers northeast	6.7	0.14 g's
Elsinore (B)	37 kilometers northeast	6.8	0.16 g's
Cucamonga (A)	50 kilometers north-northeast	7.0	0.14 g's

The maximum anticipated bedrock acceleration on the site is estimated to be less than 0.68, based on a maximum probable earthquake on the Newport-Inglewood Fault. The site is underlain by fill and clean beach sands. For design purposes, two-thirds of the maximum anticipated bedrock acceleration may be assumed for the repeatable ground acceleration. The effects of seismic shaking can be mitigated by adhering to the 2001 California Building Code or the standards of care established by the Structural Engineers Association of California.

With respect to this hazard, the site is comparable to others in this general area in similar geologic settings. The grading specifications and guidelines outlined in Appendix C of the referenced report are in part, intended to mitigate seismic shaking. These guidelines conform to the industry standard of care and from a geotechnical standpoint, no additional measures are warranted.

Based on our review of the "Seismic Zone Map," published by the California Department of Mines and Geology in conjunction with Special Publication 117, there are no earthquake landslide zones on or adjacent to the site. The proposed development shall be designed in accordance with seismic considerations

contained in the 2001 CBC and the City of Newport Beach requirements. Based on Section 1629 of the 1997 UBC and on Maps of Known Active Near-Source Zones in California and Adjacent Portions of Nevada (ICBO, 1998, reference No. 5), the following parameters may be considered:

Based on the Seismic zone Map of the United States (Figure 16-2), the site is located in Zone 4. Based on Table 16-I, the Seismic Zone Factor (Z) for the site is 0.40. The Soil Profile Type of the native soils may be considered S_D based on Table 16-J. The governing Seismic Source Type is B. Based on Tables 16-S and 16-T, the Near-Source Factors N_a and N_v are 1.30 and 1.60 respectively.

Liquefaction

Liquefaction of soils can be caused by strong vibratory motion in response to earthquakes. Both research and historical data indicate that loose, granular sandy soils are susceptible to liquefaction, while the stability of rock, gravels, clays, and silts are not significantly affected by vibratory motion. Liquefaction is generally known to occur only in saturated or near saturated granular soils. The site is underlain by fill and terrace deposits which are characterized by clean beach sands and silty sands. Based on the results of our investigation, the subject site is considered to have a significant potential for liquefaction if subjected to the loads imposed by cyclic loading. Based on our liquefaction analysis, we recommend the following mitigative methods to minimize the effects of liquefaction:

1. Tie all pad footings with grade beams.
2. All footings should be a minimum of 24 inches deep, below grade.
3. Continuous footings should be reinforced with two No. 5 rebar (two at the top and two at the bottom).
4. Concrete slabs cast against properly compacted fill materials shall be a minimum of 6 inches thick (actual) and reinforced with No. 4 rebar at 12 inches on center in both directions. The reinforcement shall be supported on chairs to insure positioning of the reinforcement at mid-center in the slab.
5. Dowel all footings to slabs with No. 4 bars at 24 inches on center.

Other Geologic Hazards

Other geologic hazards such as landsliding, or expansive soils, do not appear to be evident at the subject site.

FINDINGS

Subsurface Soils

As encountered in our test borings, the site is underlain by, fill and native materials as follows:

Fill (Af)

Fill soils were encountered in all test borings (B-1 through B-6) to a depth of approximately 3.0 feet b.g. The fill soils consist generally of dark brown and gray, dry, loose to medium dense sand. The expansion potential of the sandy fill soils was judged to be very low (E.I. 0.0) when exposed to an increase in moisture content.

Native

Underlying the fill materials are Quaternary-age alluvial and marine terrace deposits as encountered in each of the test borings (B-1 through B-6) to the maximum depths explored (10 ft b.g.). The native soils consist generally of light gray, moist, medium dense, non-cemented, fine- to medium-grained, beach sand with occasional shell fragments.

CONCLUSIONS

Based on our geotechnical study of the site, our review of available reports and literature and our experience, it is our opinion that the proposed construction at the site are feasible from a geotechnical standpoint. There appear to be no significant geotechnical constraints on-site that cannot be mitigated by proper planning, design, and utilization of sound construction practices. The engineering properties of the soil and native materials, and the surface drainage offer favorable conditions for construction of the proposed multi-tenant residential development.

RECOMMENDATIONS

The following sections discuss the principle geotechnical concerns which should be considered for proper site re-development.

Site Preparation and Grading

Prior to earthwork or construction operations, the areas of the proposed development should be cleared of surface structures and subsurface obstructions

and stripped of any vegetation. Removed vegetation and debris should then be disposed of off-site. We estimate the maximum depth of over excavation and recompaction will be on the order of 3 ½ feet for the proposed building footprints and extending to a five-feet envelope. Areas to receive exterior improvements shall be underlain by a minimum 2-feet thick fill blanket.

All grading shall be in accordance with the Orange County Grading and Excavation Code, Grading Manual minimum requirements, and with the appropriate sections of the 2001 California Building Code (CBC) .

Fills

The on-site soils are suitable for reuse as compacted fill, provided they are free of organic materials, debris, and materials larger than six (6) inches in diameter. After removal of any loose, compressible soils, all areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 12 inches, brought to at least 2 percent over optimum moisture conditions and compacted to at least 90 percent relative compaction (based on ASTM: D 1557). If necessary, import soils for near-surface fills should be predominately granular, possess a low or very low expansion potential, and be approved by the geotechnical engineer.

Fill should be placed in uniform lifts not exceeding 6 inches. Placement and compaction of fill should be in accordance with local grading ordinances under the observation and testing of the geotechnical consultant. We recommend that fill soils be placed at moisture contents at least 2 percent over optimum (based on ASTM: D 1557).

We recommend that oversize materials (materials over 6 inches) should they be encountered, be stockpiled and removed from the site.

Trench Excavations and Backfill

Shallow excavations to 10 feet at the project site can be excavated with a moderate effort using conventional construction equipment in good operating condition. Based upon the weathered nature of the subsurface soils and to satisfy OSHA requirements for workmen's safety, it will be necessary to shore excavations deeper than 5 feet, or slope back the sides of the excavation at an inclination of 1:1 (horizontal to vertical) if workers are to enter such excavations. The geotechnical consultant should be present during the excavation phase of the project to observe the soil conditions and make additional recommendations if necessary.

The on-site soils may be used as trench backfill provided they are screened of rock sizes over 6 inches in dimension and organic matter. Trench backfill should be

compacted in uniform lifts (not exceeding 8 inches in compacted thickness) by mechanical means to at least 90 percent relative compaction (ASTM: D 1557).

A copy of the Grading and Foundation Plan shall be reviewed and approved by this office prior to construction.

Geotechnical Parameters

The following Geotechnical parameters may used in the design of the proposed structure (also, see "Liquefaction" section, above):

Foundation Design

Structures on properly compacted fill may be supported by conventional, continuous or isolated spread footings. Footings should be a minimum of 24 inches deep by 15 inches wide for the two proposed two-story structures. At this depth, all proposed structures may be designed for an allowable bearing value of 1800 and 2500 psf (for dead-plus-live load) for continuous wall and isolated spread footings, respectively. These values may be increased by one-third for loads of short duration, including wind or seismic forces. Continuous perimeter footings should be reinforced with No. 5 rebar (two at the top and two at the bottom).

These shall be considered minimum requirements and incorporated into the Foundation Plans submitted by the Structural Engineer.

Concrete mix design should be based on sulfate testing with Table 19-A-4 of the 2001 CBC. Preliminary laboratory testing indicates the site soils possess negligible sulfate exposure (14 ppm, or 0.0014 %). Test Results are presented in Appendix B.

New Garage Grade Beams

A grade beam, reinforced continuously with the garage footings, should be constructed across the garage entrance, tying together the ends of the garage footings. This grade beam should be embedded at the same depth as the adjacent perimeter footings. The 6-inch thick garage slab should have a positive separation from the stem walls. The grade beam/slab edge should consist of a clean, cold joint.

Settlement

Utilizing the design recommendations presented herein, we anticipate that the majority of any post-grading settlement will occur during construction activities. We

estimate that the total settlement for the proposed structure will be on the order of 1 inch. Differential settlement is not expected to exceed ½ inch in 30 feet. These settlement values are expected to be within tolerable limits for properly designed and constructed foundations.

Lateral Load Resistance

Footings founded in fill materials may be designed for a passive lateral bearing pressure of 250 pounds per square foot per foot of depth. A coefficient of friction against sliding between concrete and soil of 0.35 may be assumed.

Slabs-on-grade

Concrete slabs cast against properly compacted fill materials shall be a minimum of 6 inches thick (actual) and reinforced with No. 4 rebar at 12 inches on center in both directions. The slabs shall be doweled into the footings using No. 4 bars at 24 inches on center. The reinforcement shall be supported on chairs to insure positioning of the reinforcement at mid-center in the slab. Interior slabs shall be underlain by 2 inches of sand over a 10 mil visqueen moisture barrier, with all laps sealed, over 4 inches of very low or non-expansive materials. The site soils consist of granular beach sands and are considered non-expansive.

Exterior slabs shall conform to the requirements for interior slabs except that the moisture barrier may be omitted and the slab thickness may be reduced to 4 inches and reinforced with welded wire mesh placed at mid- one-third height.

Some slab cracking due to shrinkage should be anticipated. The potential for the slab cracking may be reduced by careful control of water/cement ratios. The contractor should take appropriate curing precautions during the pouring of concrete in hot weather to minimize cracking of slabs. We recommend that a slipsheet (or equivalent) be utilized if crack-sensitive flooring is planned directly on concrete slabs. All slabs should be designed in accordance with structural considerations.

Retaining Wall Design

The following equivalent fluid pressures may be used in the design of site retaining walls assuming a free draining (clean sand or gravel) material is utilized as backfill.

Active Pressures	40 PCF
At-Rest Pressures	60 PCF
Passive Pressures	300 PCF
Coefficient of Friction	0.35

The active earth pressure value provided may be used for cantilevered retaining walls. Restrained retaining walls such as basement walls, that not free to rotate at top, should be designed using the at-rest earth pressures value. Depending on whether the wall is restrained (rigid) or unrestrained (free to deflect), an additional uniform lateral pressure equal to 50 or 33 percent, respectively, of the anticipated maximum surcharge load located within a distance equal to the height of the wall should be used in design.

The retaining walls shall be provided with water proofing in accordance with the architects recommendations and be free draining. Back drains and weepholes shall be installed to collect and divert migrating groundwater. As a minimum, the wall may be drained by placing a 4-inch diameter pipe perforated (faced down) PVC Schedule 40 pipe or approved equivalent, located behind the base of the wall. The pipe shall be covered by 3/4 inch crushed rock at a rate of not less than 2 sq. ft. per linear ft. of pipe surrounded in turn by geofabric such as Supac 4NP or equivalent. All wall backfill shall be compacted to a minimum 90 percent relative compaction in accordance with ASTM D-1557-78. Wall back drains shall outlet separately and not be combined with area drains. This office shall be contacted to provide additional recommendations if actual conditions are different than those assumed above. During construction, drainage devices shall be inspected by a representative of EGA Consultants.

A/C Pavement Subbase

Asphaltic concrete (AC) and Class II rock base should conform to, and be placed in accordance with the latest revision of the California Department of Transportation Standard Specifications. Pavement sections must be based on 'R'-Value tests using appropriate traffic indices or comply with Section 12.5 contained in the Orange County Grading Manual. We assume that Class II base with a minimum R-value of 78 will be used.

RECOMMENDED MINIMUM DESIGN SECTIONS

LOCATION	DESIGN TRAFFIC INDEX	ASPHALTIC CONCRETE	CLASS II AGGREGATE BASE
Car Traffic, Parking Areas	4.0-5.0	3.5"	4.0"
Heavy Truck Traffic Aisles	5.0-6.0	3.5"	6.0"
Trash Pads	5.0-6.0	6.0" (Concrete)	4.0"

The minimum section of 6 inches concrete over 6 inches Class II Base Material applies to the site approaches. If off-site (surrounding roadways) work is anticipated, the Minimum Design Section shall conform with either the City or Caltrans specifications, depending on jurisdiction.

Prior to placing pavement sections, the subbase soil should have a relative compaction of at least 90 percent, based on ASTM: D 1557. We also recommend that the base course be compacted to a minimum of 95 percent relative compaction (based on ASTM: D 1557).

If pavement areas are planned adjacent to landscaped areas, we recommend that the amount of irrigation be kept to a minimum to reduce the possible adverse effects of water on pavement subgrade.

Continuous sections of rigid concrete pavement should be constructed in an approximately 12 foot or less grid system. All longitudinal or transverse control joints should be constructed by saw-cutting, hand forming, or placing a pre-molded filler such as zip strips. Expansion joints should be used to isolate fixed objects abutting within the pavement area. Joints should run continuously and extend through integral curbs and thickened edges. We recommend that joint layout be adjusted to coincide with the corner of objects and structures.

Surface Drainage

Surface drainage shall be controlled at all times. Positive surface drainage should be provided to direct surface water away from structures and toward the street or suitable drainage facilities. Ponding of water should be avoided adjacent to the structures. Recommended minimum gradient is 2 percent for unpaved areas and one percent for concrete/paved areas. Roof gutter discharge should be directed away from the building areas through solid PVC pipes to suitable discharge points. Area drains should be provided for planter areas and drainage shall be directed away from the top of slopes.

PRE-CONSTRUCTION MEETING

It is recommended that no clearing of the site or any grading operation be performed without the presence of a representative of this office. An on site pre-grading meeting should be arranged between the soils engineer and the grading contractor prior to any construction.

LIMITATIONS

The geotechnical services described herein have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the subject locality. Under no circumstance is any warranty, expressed or implied, made in connection with the providing of services described herein. Data, interpretations, and recommendations presented herein are based solely on information available to this office at the time work was performed. EGA Consultants will not be responsible for other parties' interpretations or use of the information developed in this report.

The interpolated subsurface conditions should be checked in the field during construction by a representative of EGA Consultants. We recommend that all foundation excavations and grading operations be observed by a representative of this firm to ensure that construction is performed in accordance with the specifications outlined in this report.

We do not direct the contractor's operations, and we cannot be responsible for the safety of others. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

REFERENCES

1. "USGS Topographic Map, 7.5 minute quadrangle, Newport Beach, California Quadrangle," dated 1965, Photorevised 1981.

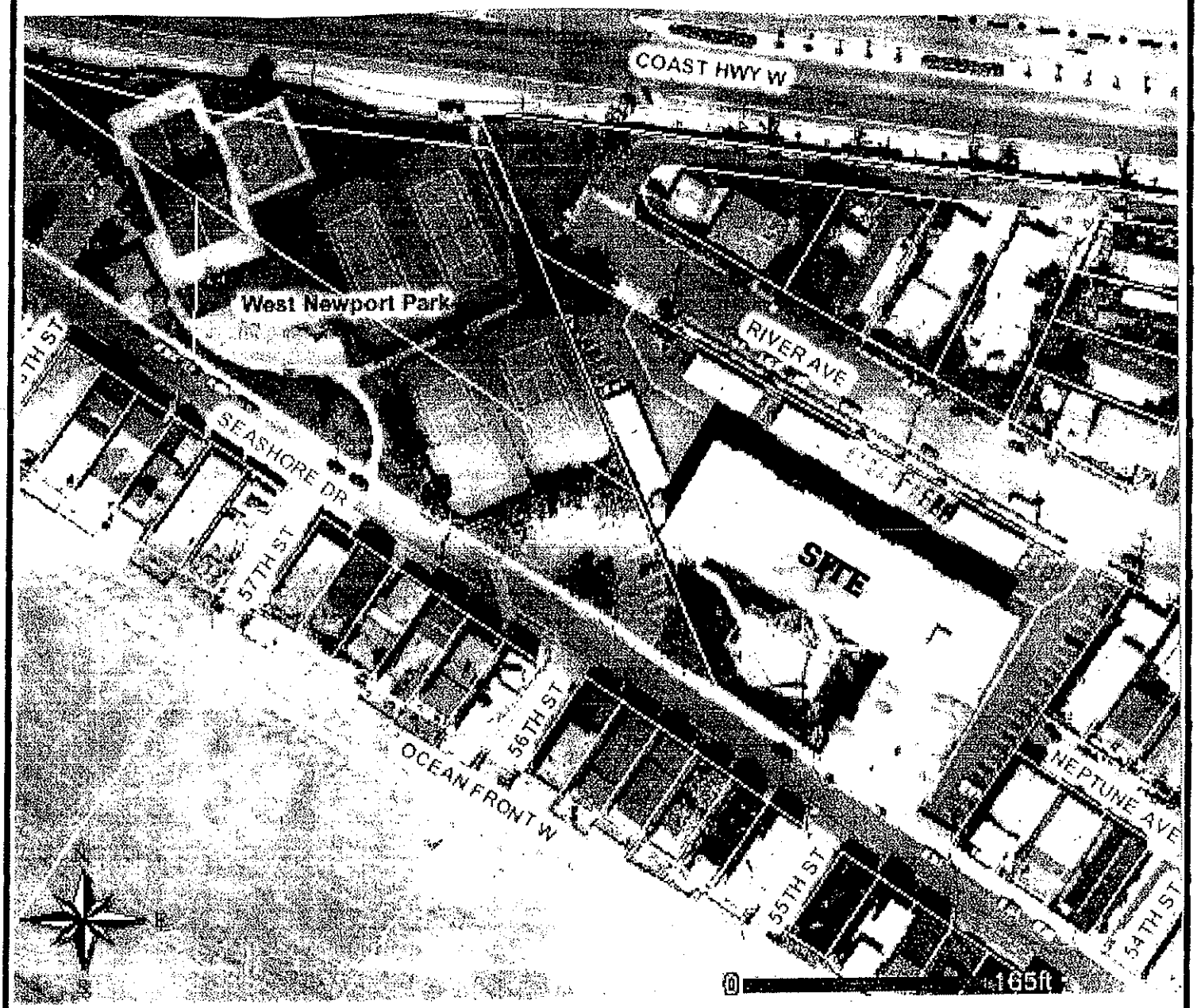
2. "Geologic Map of California, Santa Ana Sheet," Compilation by Thomas H. Rogers, 1965, fifth printing 1985.

3. "Maximum Credible Rock Acceleration from Earthquakes in California," by Roger W. Reensfelder, dated 1974.

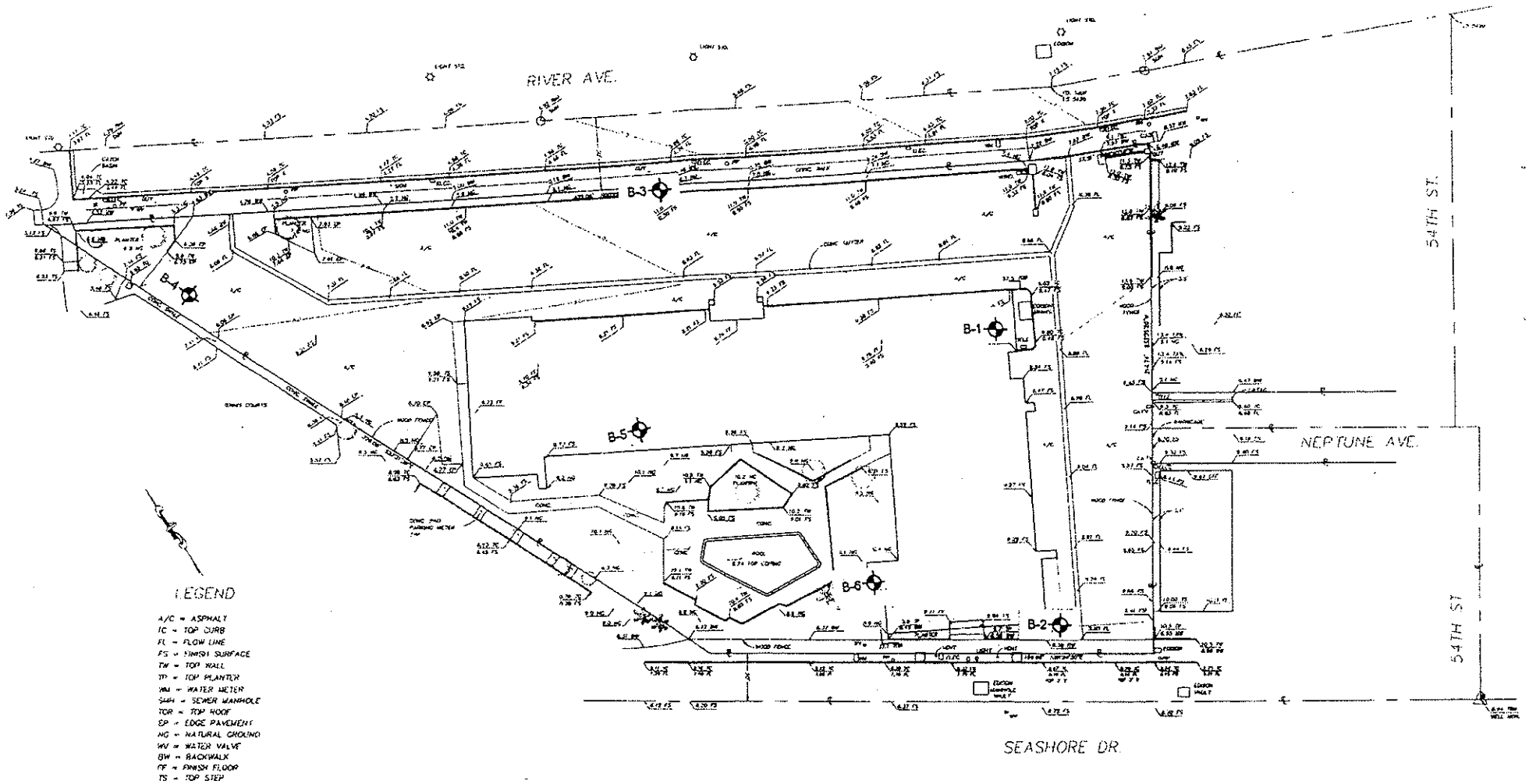
4. "Earthquake Hazards Associated with Faults in the Greater Los Angeles Metropolitan Area, Los Angeles County, California, Including Faults in the Santa Monica-Raymond, Verdugo-Eagle Rock, and Benedict Canyon Fault Zones, DMG Open-file Report 79-16," published by the California Department of Conservation, Division of Mines and Geology, dated 1979.

5. Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," prepared by California Department of Conservation Division of Mines and Geology, published by International Conference of Building Officials, dated February, 1998.

6. "Equations for Estimating Horizontal Response Spectra and Peak Acceleration from Western North American Earthquakes: A Summary of Recent Work: Seismological Research Letters," Volume 68, No. 1, by Boore, Joyner, and Fumal, dated 1997.



EGA *consultants* *engineering geotechnical applications*	**SITE LOCATION MAP** 5515 RIVER AVE NEWPORT BEACH, CALIFORNIA	Project No: TS474.1 Date: JUNE 2007 Figure No: 1



LEGEND

B-3 GEOTECHNICAL BORING by EGA CONSULTANTS

EGA
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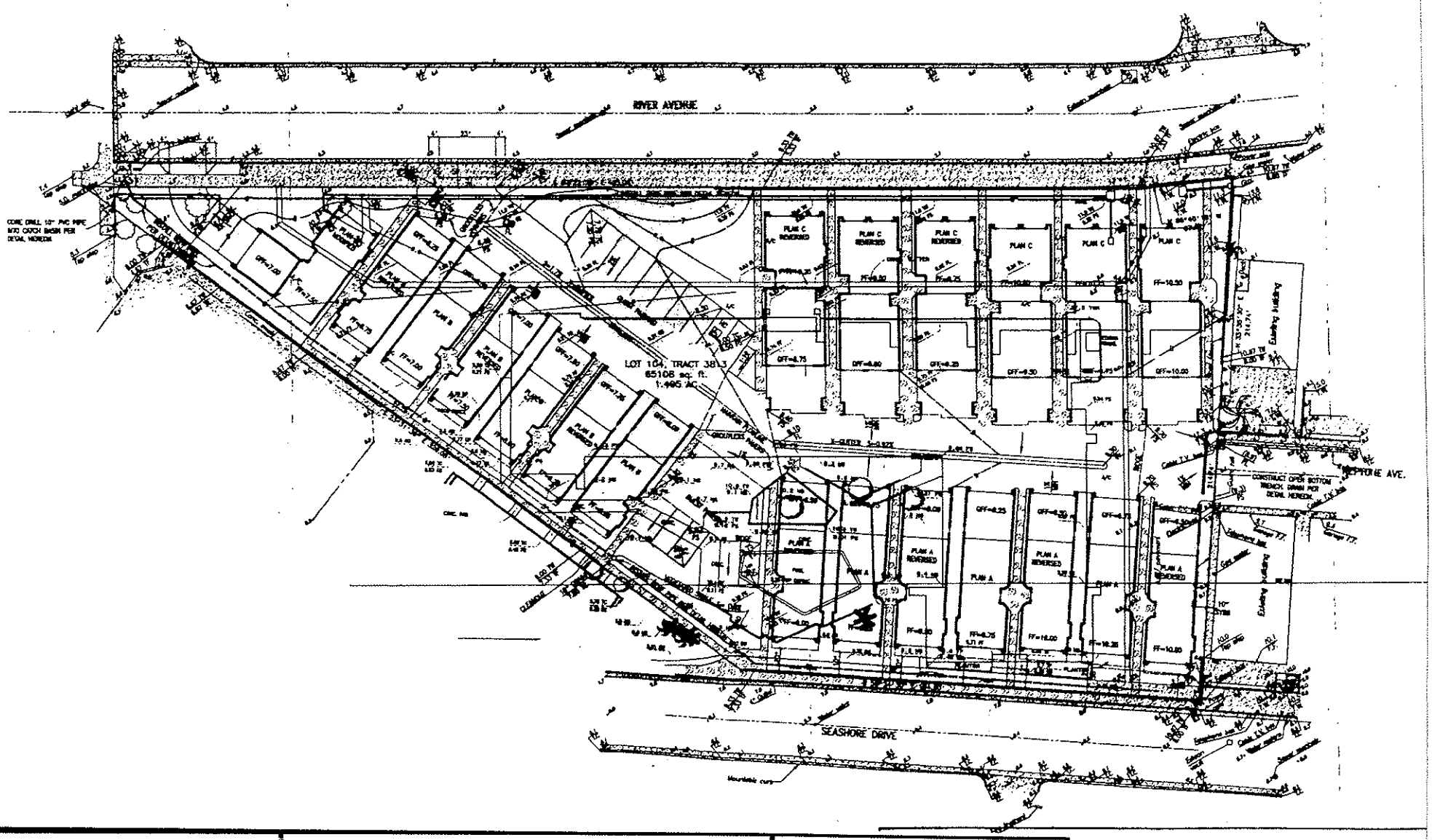
engineering geotechnical applications

PLOT PLAN
5515 RIVER AVENUE
NEWPORT BEACH, CALIFORNIA

Project No: TS474.1
Date: JUNE 2007
Figure No: 2

SU-1

TOPOGRAPHIC MAP
1" SCALE | LOT 104 TRACT NO. 3813
JUNE 05
5515 RIVER AVE. NEWPORT BEACH CA.
SOUTH COAST SURVEYING 1214 OLAY ST. NEWPORT BEACH CA.
OCS BENCHMARK W-766 NGVD29 DATUM ELEV. = 7.281



EGA *consultants* *engineering geotechnical applications*	PROPOSED CONSTRUCTION 5515 RIVER AVENUE NEWPORT BEACH, CALIFORNIA	Project No: TS474.1 Date: JUNE 2007 Figure No: 3

APPENDIX A

GEOLOGIC LOGS

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-1**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev. 13 ft. MSL

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

Depth in Feet	Soil Type	Sample Type: Undisturbed	Sample Type: Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear: ϕ °	Direct Shear: C psf	Other Tests
1	SP	☒		FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags.		4.4						
				at 2.0 ft. Becomes more dense, more moist.		7.7	107.7	0	109.5	33	66	O.M.
	SW			at 3.0 ft. becomes light gray, moist, non-cohesive,		2.8						12.50%
5				medium dense, clean, beach sand w/shell frags.		5.3						
				No Binder. More moist at 4 ft.		8.4						
		▽		at 7.5 ft. becomes wet to saturated.								
						28.7						
10												
				Total Depth: 10 ft								
				Groundwater at 8.0 ft.								
				No Caving								
15				Backfilled and Compacted 5/15/07								
20												
25												
30												
35												
40												

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Figure B-1

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-2**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev. 13 ft. MSL

Sample Type: Undisturbed, Bulk
Thin Wall Tube; 2.5" Ring Sample; Bulk Sample; Standard Split Spoon Sample; Static Water Table

Depth in Feet	Soil Type	Undisturbed	Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear ϕ°	Direct Shear C psf	Other Tests
1	SP	☒		FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags.		2.9						
				at 2.0 ft. Becomes more dense, more moist.		8.9	102.8	0	109.5	33	66	O.M.
	SW			at 3.0 ft. becomes light gray, moist, non-cohesive,		4.1						12.50%
5		▽		medium dense, clean, beach sand w/shell frags. No Binder. More moist at 4 ft.		11.0						
				at 7.5 ft. becomes wet to saturated.		27.6						
10												
				Total Depth: 10 ft								
				Groundwater at 7.0 ft.								
				No Caving								
15				Backfilled and Compacted 5/15/07								
20												
25												
30												
35												
40												

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-3**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev.* 10.5 f MSL

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

Depth in Feet	Soil Type	Sample Type: Undisturbed	Sample Type: Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear: ϕ °	Direct Shear: C psf	Other Tests
1	SP			FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags.		2.7						
	SW			at 2.0 ft. becomes light gray, moist, non-cohesive, medium dense, clean, beach sand w/shell frags.		4.7	102.6	0	109.5	33	66	O.M.
5				No Binder. Becomes wet at 4 ft.		27.3						12.50%

Total Depth: 5 ft
Groundwater at 4.0 ft.
No Caving
Backfilled and Compacted 5/15/07

* Note: Boring located at sidewalk elev., approx. 2.5 ft. below existing pad/parking area elev.

10 15 20 25 30 35 40

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Figure B-3

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-4**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev. 13 ft. MSL

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

Depth in Feet	Soil Type	Sample Type: Undisturbed	Sample Type: Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear: ϕ °	Direct Shear: C psf	Other Tests
1	SP			FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags. at 2.0 ft. Becomes more dense, more moist.		0.9 1.1		0	109.5	33	66	O.M.
5	SW	☒		at 3.0 ft. becomes light gray, moist, non-cohesive, medium dense, clean, beach sand w/shell frags. No Binder. Saturated at 6 ft.		5.8 47.1	102.4					12.50%
10				Total Depth: 7 ft Groundwater at 6.0 ft. No Caving Backfilled and Compacted 5/15/07								
15												
20												
25												
30												
35												
40												

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Figure B-4

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-5**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev. 13 ft. MSL

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

Depth in Feet	Soil Type	Sample Type: Undisturbed	Sample Type: Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear: ϕ °	Direct Shear: C psf	Other Tests
1	SP	☒		FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags.		5.0						
				at 2.0 ft. Becomes more dense, more moist.		10.2	106.5	0	109.5	33	66	O.M.
5	SW	▽		at 3.0 ft. becomes light gray, moist, non-cohesive, medium dense, clean, beach sand w/shell frags. No Binder. Saturated at 6.5 ft.		4.2 5.2 7.3 29.4						12.50%
10				Total Depth: 8.5 ft Groundwater at 7.5 ft. No Caving Backfilled and Compacted 5/15/07								
15												
20												
25												
30												
35												
40												

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Figure B-5

LOG OF EXPLORATORY BORING

Job Number: TS474.1
Project: 5515 River Ave., Newport Bch, CA.

Boring No: **B-6**
Boring Location: See Figure 2

Date Started: 5/15/2007
Date Completed: 5/15/2007

Rig: 4" augers
Grnd Elev. 13 ft. MSL

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

Depth in Feet	Soil Type	Sample Type: Undisturbed	Sample Type: Bulk	SOIL DESCRIPTION	Blows/6"	Moisture Content, %	Dry Density, pcf	Expansion Index	Maximum Density, pcf	Direct Shear: ϕ °	Direct Shear: C psf	Other Tests
1	SP	☒		FILL: Dark brown to gray, dry, loose, sand with abundant rootlets. Fine-grained w/shell frags.		0.8						
						9.8						
				at 2.0 ft. Becomes more dense, more moist.		1.5		0	109.5	33	66	O.M.
5	SW	▽		at 3.0 ft. becomes light gray, dry to moist, medium dense, clean, beach sand w/shell frags. Fine- to coarse-grained. No Binder. Saturated at 7.5 ft.		1.3						12.50%
						2.1						
						15.7						
10				Total Depth: 9 ft Groundwater at 8.0 ft. No Caving Backfilled and Compacted 5/15/07								
15												
20												
25												
30												
35												
40												

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Figure B-6

APPENDIX B

LABORATORY RESULTS

Neblett&Associates

EGA Consultants
375-C Monte Vista Avenue
Costa Mesa, California 92627

May 31, 2007
Project No. 314-112-12

Attention: Mr. David Worthington, C.E.G.

Subject: Laboratory Test Results
5515 River
Newport Beach, California

Dear Mr. Worthington:

Neblett & Associates, Inc. performed the requested laboratory tests on soil specimens delivered to our office for the subject project. The results of these tests are included as an attachment to this report.

We appreciate the opportunity of providing our services to you on this project. Should you have any questions, please contact the undersigned.

Sincerely,

NEBLETT & ASSOCIATES, INC.

By: _____
Todd D. Thiessen
Laboratory Supervisor

Reviewed By: _____
Daniel J. Morikawa, PE, GE
RGE 2726, Reg. Exp. 9/30/08
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. MORIKAWA
No. GE2726
Exp. 9-30-08
GEOTECHNICAL
STATE OF CALIFORNIA

Attachment: Laboratory Test Results
Distribution: Addressee (2 copies)

File: 314-112-12ega@5515river,npb.doc

LABORATORY TEST RESULTS

Summarized below are the results of requested laboratory testing on samples submitted to our office.

Dry Density and Moisture Content

Tabulated below are the requested results of field dry density and moisture contents of undisturbed soils samples retained in 2 3/8–inch inside diameter by one-inch height rings. Moisture only results were obtained from small bulk samples.

TABLE 1

Sample Identification	Dry Density (pcf)	Moisture Content (%)
B-1@ 1.5'	*	4.4
B-1@ 2.5'	107.7	7.7
B-1@ 3.5'	*	2.8
B-1@ 5'	*	5.3
B-1@ 5.5'	*	8.4
B-1@ 7'	*	28.7
B-2@ 2'	*	2.9
B-2@ 2.5'	102.8	8.9
B-2@ 4.5'	*	4.1
B-2@ 5.5'	*	11.0
B-2@ 7'	*	27.6

TABLE 1 continued

Sample Identification	Dry Density (pcf)	Moisture Content (%)
B-3@ 1,5'	*	2.7
B-3@ 3'	102.6	4.7
B-3@ 4'	*	27.3
B-4@ 1.5'	*	0.9
B-4@ 3'	*	1.1
B-4@ 3.5'	102.4	5.8
B-4@ 5'	*	47.1
B-5@ 1.5'	*	5.0
B-5@ 2'	106.5	10.2
B-5@ 2.5'	*	4.2
B-5@ 3'	*	5.2
B-5@ 5'	*	7.3
B-5@ 7.5'	*	29.4
B-6@ 1.5'	*	0.8
B-6@ 2'	*	9.8
B-6@ 2.5'	*	1.5
B-6@ 3'	*	1.3
B -6@ 5'	*	2.1
B-6@ 7.5'	*	15.7

Note: (*) denotes small bulk sample for moisture content testing only.

Sieve Analysis

A sieve analysis test was performed on a bulk soil sample identified as B-4@ 0-4'. This test was performed in accordance with ASTM: D422 and the results are shown graphically on Plate B-1.

Maximum Dry Density and Optimum Moisture Content

A maximum dry density and optimum moisture content test was performed on the requested bulk soil sample in accordance with ASTM: D 1557. The results are shown below:

Sample Identification	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-1@ 0-4'	109.5	12.5

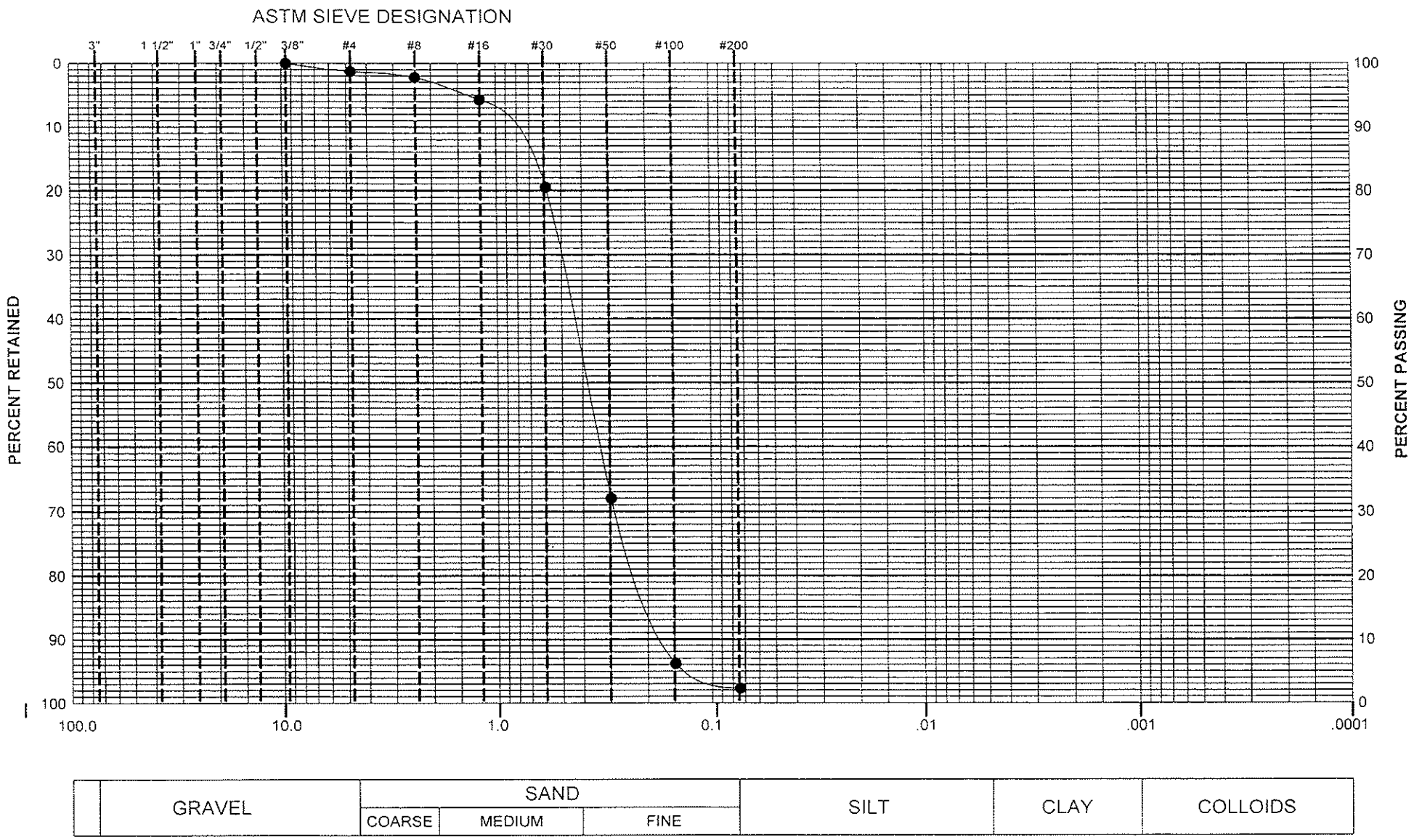
Direct Shear

Direct shear tests were performed on relatively undisturbed ring samples, identified as B-1@ 2.5 feet, with a direct shear machine of the strain-controlled type. The controlled rate of strain is 0.005 inch per minute. The samples were soaked in a confined state prior to shearing. Then the samples where sheared under varied loads ranging from 1.0 ksf to 4.0 ksf. The test results are plotted on Plate B-2.

Sulfate Content

A selected bulk sample was tested for soluble sulfate content in accordance with Hach procedure. The test result is shown below:

Sample Identification	Water Soluble Sulfate In Soil (Percentage by weight (%))	Sulfate Exposure (UBC Table 19-A-4)
B-6@ 0-4'	0.0014	Negligible



	GRAVEL	SAND			SILT	CLAY	COLLOIDS
		COARSE	MEDIUM	FINE			

Symbol	Boring or Trench	Depth (ft.)	L.L.	P.L.	P.I.	% Passing #200 sieve	Group Symbol	Typical Names
●	B-4	0–4				2.3	SP	POORLY GRADED SAND

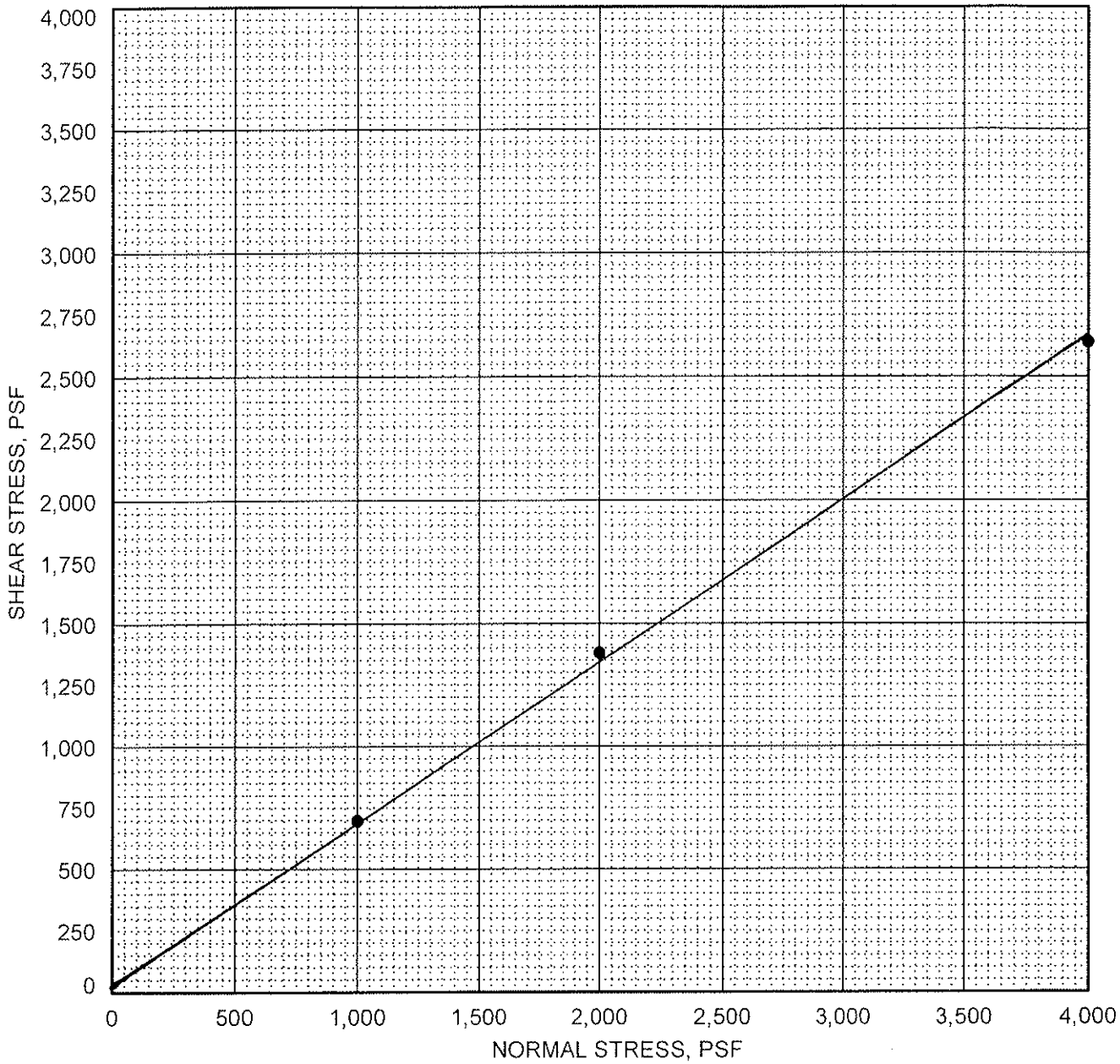
GRAIN SIZE DISTRIBUTION

NEBLETT & ASSOCIATES,INC.
4911 WARNER AVENUE, SUITE 218
HUNTINGTON BEACH, CA, 92649 714 840-8286

P.N. 314-112-12 DATE 5/31/07

PLATE B-1

DIRECT SHEAR TEST
Undisturbed



EGA @ 5515 River, NPB	COHESION	66 psf.
	FRICTION ANGLE	33.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-1	2.5			

DIRECT SHEAR TEST

NEBLETT & ASSOCIATES, INC.
4911 WARNER AVENUE, SUITE 218
HUNTINGTON BEACH, CA, 92649 714 840-8286

P.N. 314-112-12 DATE 5/31/07

PLATE B-2

APPENDIX C

GENERAL EARTHWORKS AND GRADING GUIDELINES

GENERAL EARTHWORK AND GRADING GUIDELINES

I. GENERAL

These guidelines present general procedures and requirements for grading and earthwork including preparation of areas to be filled, placement of fill, installation of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and should supersede the provisions contained herein in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

II. EARTHWORK OBSERVATION AND TESTING

Prior to commencement of grading, a qualified geotechnical consultant should be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. The consultant is to provide adequate testing and observation so that he may determine that the work was accomplished as specified. It should be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that the consultant may schedule his personnel accordingly.

The contractor is to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, and these specifications. If in the opinion of the consultant, unsatisfactory conditions are resulting in a quality of work less than required in these specifications, the consultant may reject the work and recommend that construction be stopped until the conditions are rectified.

Maximum dry density tests used to determine the degree of compaction should be performed in accordance with the American Society for Testing and Materials Test Method ASTM: D 1557-78.

III. PREPARATION OF AREAS TO BE FILLED

1. Clearing and Grubbing: All brush, vegetation, and debris should be removed and otherwise disposed of.

2. Processing: The existing ground which is evaluated to be satisfactory for support of fill should be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory should be overexcavated as specified in the following section. Scarification should continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3. Overexcavation: Soft, dry, spongy, or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, should be over excavated down to firm ground, approved by the consultant.

4. Moisture Conditioning: Over excavated and processed soils should be watered, dried-back, blended, and/or mixed, as necessary to attain a uniform moisture content near optimum.

5. Recompaction: Over excavated and processed soils which have been properly mixed and moisture-conditioned should be recompacted to a minimum relative compaction of 90 percent.

6. Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground should be benched. The lowest bench should be a minimum of 15 feet wide, and at least 2 feet deep, expose firm material, and be approved by the consultant. Other benches should be excavated in firm material for a minimum width of 4 feet. Ground sloping flatter than 5:1 should be benched or otherwise over excavated when considered necessary by the consultant.

7. Approval: All areas to receive fill, including processed areas, removal areas, and toe-of-fill benches should be approved by the consultant prior to fill placement.

IV. FILL MATERIAL

1. General: Material to be placed as fill should be free of organic matter and other deleterious substances, and should be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics should be placed in areas designated by the consultant or mixed with other soils until suitable to serve as satisfactory fill material.

2. Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 10 inches, should not be buried or placed in fill, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations should be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material should not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

3. Import: If importing of fill material is necessary for grading, the import material should be approved by the geotechnical consultant.

V. FILL PLACEMENT AND COMPACTION

1. Fill Lifts: Approved fill material should be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading

procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and should be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

2. Fill Moisture: Fill layers at a moisture content less than optimum should be watered and mixed, and wet fill layers should be aerated by scarification or blended with drier material. Moisture-conditioning and mixing of fill layers should continue until the fill material is at a uniform moisture content at or near optimum.

3. Compaction of Fill: After each layer has been evenly spread, moisture-conditioned, and mixed, it should be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment should be adequately sized and either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

4. Fill Slopes: Compacting of slopes should be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5. Compaction Testing: Field tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests should be at the consultant's discretion. In general, the tests should be taken at an interval not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

VI. SUBDRAIN INSTALLATION

Subdrain systems, if required, should be installed in approved ground and should not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade, or material.

VII. EXCAVATION

Excavations and cut slopes should be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas should be performed, and/or remedial grading of cut slopes performed. Where fill-over-cut slopes are to be graded such as in the southeast portion of the subject site, unless otherwise approved, the cut portion of the slope should be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.