SOIL SURVEYS INC.

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MONTEREY COUNTY
PLANNING & BUILDING
INSPECTION DEPT.

December 31, 2007
Job #4963

Mr. Luis Osorio, Senior Planner
Monterey County Department of Planning and Building Inspection
168 W. Alisal Street, 2nd Floor
On behalf of Domain Corporation
2716 Park Boulevard
Santa Monica, CA 90405

Dear Mr. Osorio:

Submitted herewith is our Geotechnical Investigation Report for the proposed Ferrini Ranch Subdivision, for single family and multi-family within the property located off Highway 68 between San Benancio Road and Toro Regional Park and between Toro Regional Park and River Road, near Salinas in Monterey County, California.

Background

Kleinfelder, Inc. was retained by PMC, EIR consultant for the proposed project, to prepare an overall geologic and geotechnical investigation of the project site. The Kleinfelder geotechnical field work included soil borings at the project site. Kleinfelder provided preliminary conclusions from their geologic and geotechnical assessment of the project site and proposed that additional geotechnical fieldwork be conducted at selected locations.

The recommendations of the Kleinfelder preliminary geologic and geotechnical analysis identified additional subsurface investigations to be conducted in order to assess the stability of potential landslides in the vicinity of certain lots and infrastructure as part of the EIR analysis. Specifically, the Kleinfelder analysis recommended additional subsurface investigation in the areas near Lots 80 through 85; Lots 32 through 35, and lots 103 through 105 based upon the potential for soil movement from certain areas that may be ancient landslides. The Kleinfelder Report also cited more surficial, younger debris flows or possible landslides located in the vicinity of Lots 22 and 23, Lot 48 and Lots 131 through 133 that would also benefit from additional subsurface analysis.

Our Geotechnical Investigation was made pursuant to recommendations in the **"Preliminary Geologic, Geotechnical, Hydrologic, Erosion, Drainage, and Environmental Phase I Assessment for Proposed Ferrini Ranch Subdivision, Monterey County, California"**, prepared by Kleinfelder, Inc., dated March 14, 2007. In response to that report, additional subsurface investigations were conducted as follows: Two test holes were bored with a truck mounted drill rig near the San Benancio School boundary on June 27, 2007; six test holes were bored with a tracked crawler drill rig above River Road on July 24, 2007, and ten additional test holes were bored with the tracked crawler drill rig on September 13, 2007, at proposed lots where prior test holes were not previously bored by Kleinfelder, Inc. and at mapped slide areas; laboratory tests were subsequently made from the core samples taken from the test holes to determine soil characteristics at potential building sites. A thorough review was also made of the "Preliminary Geologic, Geotechnical, Hydrologic, Erosion, Drainage, and Environmental Phase I Assessment for Proposed Ferrini Ranch Subdivision, Monterey County, California", prepared by Kleinfelder, Inc., dated March 14, 2007.

If you have any questions regarding this report of our Geotechnical Investigation, please contact me.

Very truly yours,

SOIL SURVEYS, INC.

Richard E. Dante

Richard E. Dante, P.E.
R.G.E. 0259
R.C.E. 20251

RED/red

cc. Monterey County Department of Planning and Building Inspection
Denise Duffy and Associates

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GEOTECHNICAL INVESTIGATION

FOR

PROPOSED RESIDENTIAL SUBDIVISION

OFF HIGHWAY 68 BETWEEN SAN BENANCIO ROAD AND RIVER ROAD

NEAR SALINAS, CALIFORNIA

FOR DOMAIN CORPORATION, MR. MARK KELTON

DECEMBER 27, 2007, JOB #4963

I. INTRODUCTION:

Kleinfelder, Inc. was retained by PMC, the EIR consultant for the proposed project to prepare an overall geologic and geotechnical investigation report for the project site; the Kleinfelder geotechnical field work included soil borings at the site. Kleinfelder provided preliminary conclusions from their geologic and geotechnical assessment of the project site and proposed that additional geotechnical field work be conducted at selected locations.

The recommendations of the Kleinfelder preliminary geologic and geotechnical analysis identified additional subsurface investigations to be made in order to assess the stability of potential landslides in the vicinity of certain lots and infrastructure as part of the EIR analysis. Specifically, the Kleinfelder analysis recommended additional subsurface investigations in the areas near Lots 80 through 85; Lots 32 through 35, and Lots 103 through 105, based upon the potential for soil movement from certain areas that may be ancient landslides. The report also cited more surficial, younger debris flows or possible landslides located in the vicinity of Lots 22, 23, 48, and 131 through 133, indicating that these lots would also benefit from additional subsurface analysis.

Based on the Kleinfelder report and our understanding of the proposed project, Soil Surveys made the additional geotechnical investigation and analyses described in this report as follows. Two test holes were bored on June 27, 2007, six test holes were bored on July 24, 2007, with a crawler mounted drill rig, and ten additional test holes were bored September 13, 2007, with a crawler mounted drill rig within the proposed major subdivision at potential building sites which do not have prior nearby test hole data. The project site is located on the southerly side of Highway 68, between the San Benancio School and Toro Regional Park and between Toro Regional Park and River Road near Salinas, California. Driven core samples were taken from the test holes for laboratory testing; the test hole logs and laboratory tests were analyzed to determine the following:

1. **Subsurface soil conditions at the tested building sites.**
2. **Analysis of active slide or debris flow potential at the tested building sites or roadway area.**
3. **Expansive, unsuitable or unstable soil conditions at the building sites, if any.**
4. **Foundation design criteria and retaining wall design criteria.**

5. **Pavement structural design criteria.**
6. **Subsurface groundwater and soil moisture considerations.**
7. **Analysis of seismic hazards and potential for liquefaction.**

II. TEST HOLE LOGS AND TEST DATA:[1]

Seventy-eight moisture density tests were made from the driven core samples; Standard Penetration Tests (SPT) were made with a Terzaghi Split Spoon sampler, and penetration tests were also made using either a 2.5 inch i.d. Modified California sampler or a 2 inch i.d. California sampler; all samplers were driven into the soil with a 140 lb. hammer dropped a vertical distance of 18 inches at each of the sample locations; results of these tests are tabulated as follows:

MOISTURE DENSITY TESTS

Test Hole No.	Depth Ft.	Water Content %	Dry Density p.c.f.	Standard Penetration Blows/Foot	Pocket Penetrometer Tons/S.F.
1	1.9-2.2	6.3	104.8	9*	1.5
1***	2.2-2.5	2.1	106.8	15*	---
1	6-6.5	4.2	119.3	35	1.75
1	11-11.5	6.7	113.5	24	4.25
1	16-16.5	4.9	116.6	55	1.8
1	21-21.5	5.0	119.0	49	3.5
2	2-2.5	3.2	96.6	6	---
2	4-4.5	4.5	116.4	12	---
2	9-9.5	6.9	117.8	28	>4.5
2	14-14.5	4.7	115.4	31	1.5
2	19-19.5	4.4	118.4	58	1.5
3	2-2.5	11.5	94.5	25	>4.5
3	6-6.5	14.7	121.0	46	>4.5
3	11-11.5	11.8	103.0	45	>4.5
3	15.4-15.9	7.7	105.1	50/5"	0.25
4	2-2.5	3.2	97.8	28	---
4	6-6.5	20.0	96.6	23	>4.5

[1]Test Hole Logs are shown in Appendix A

MOISTURE DENSITY TESTS-Continued					
Test Hole No.	Depth Ft.	Water Content %	Dry Density p.c.f.	Standard Penetration Blows/Foot	Pocket Penetrometer Tons/S.F.
4	11-11.5	5.6	101.4	50	0.25
4	16-16.5	9.4	104.0	60	0.75
5	2-2.5	10.2	95.7	35	>4.5
5	6-6.5	5.7	90.2	16	---
5	11-11.5	10.3	106.2	46	1.2
5	16-16.5	7.2	102.1	53	0.25
6	2-2.5	4.6	82.8	29	---
6	6-6.5	12.8	115.1	25	4.25
6	11-11.5	8.6	114.5	53	0.5
7	2-2.5	9.0	98.9	31	>4.5
7	6-6.5	9.3	107.2	50	2.0
7	11-11.5	20.7	112.8	31	2.0
7	16-16.5	6.0	88.7	20	---
7	21-21.5	22.0	94.3	25	1.0
8	2-2.5	5.2	99.0	25	2.75
8	6-6.5	10.8	109.0	50	2.25
8	11-11.5	4.3	80.4	22	---
8	16-16.5	15.4	115.9	28	2.75
9	1.5-2	4.1	107.2	55**	>4.5
9	6-6.5	5.8	114.3	61	0.85
9	11-11.5	8.7	105.8	81	0.25
10	1.5-2	2.4	89.5	8*	0.25
10***	2-2.5	1.6	102.0	11*	0.25
10	3.5-4	2.0	102.1	25	0.25
10	9-9.5	10.6	109.2	41	2.25
11	2-2.5	7.7	109.4	60	>4.5

MOISTURE DENSITY TESTS-Continued

Test Hole No.	Depth Ft.	Water Content %	Dry Density p.c.f.	Standard Penetration Blows/Foot	Pocket Penetrometer Tons/S.F.
11	6-6.5	6.8	108.8	37	>4.5
11	11-11.5	8.1	107.5	27	1.25
11	16-16.5	5.2	108.2	35	0.85
12	2-2.5	1.8	92.3	8	0.25
12	4-4.5	6.9	108.5	70	>4.5
12	9-9.5	4.6	100.8	79	---
13	1.5-2	2.1	106.8	28*	0.25
13***	2-2.5	2.4	111.2	56*	>4.5
13	6-6.5	11.3	108.7	53	>4.5
13	11-11.5	8.9	100.7	50	1.75
13	16-16.5	6.6	96.9	35	1.25
14	2-2.5	11.7	94.6	30	>4.5
14	6-6.5	11.8	92.9	33	1.15
14	11-11.5	14.4	98.2	31	2.5
14	16-16.5	15.9	106.3	27	3.75
14	21-21.5	18.2	94.6	45	1.75
15	2-2.5	3.8	80.3	11	0.25
15	6-6.5	7.6	93.6	10	0.25
15	11-11.5	7.9	97.7	12	0.25
15	16-16.5	5.0	83.5	20	0.25
15	21-21.5	9.1	104.8	14	0.25
16	2-2.5	4.0	80.8	10	0.25
16	6-6.5	11.1	80.8	13	0.25
16	11-11.5	10.3	93.5	11	0.25
16	16-16.5	12.6	115.7	23	1.5
17	2-2.5	3.5	77.3	9*	0.25

MOISTURE DENSITY TESTS-Continued					
Test Hole No.	Depth Ft.	Water Content %	Dry Density p.c.f.	Standard Penetration Blows/Foot	Pocket Penetrometer Tons/S.F.
17	6-6.5	3.5	109.1	8*	2.75
17	7.5-8	11.5	112.3	11	2.25
17	11-11.5	9.4	90.6	17	1.5
17	16-16.5	19.0	88.3	7	1.5
17	21-21.5	27.2	113.1	18*	2.5
17	22.5-23	14.5	110.7	13	0.5
18	6-6.5	14.9	106.7	23*	>4.5
18	11-11.5	14.6	93.6	20	1.45
18	16-16.5	19.0	82.2	22	2.0

* = Not SPT-2" Cal.
** = Not SPT - 2.5" Modified Cal.
*** = Direct Shear sample-Average Dry Density and Moisture % values shown

Six dry Sieve Analysis tests were made from the driven core samples; results of these tests are summarized as follows:

A.S.T.M. D 422 DRY SIEVE ANALYSIS TEST-Percent Passing								
Sample No.	Depth/ Feet	Sieve No. 4	Sieve No. 10	Sieve No. 20	Sieve No. 30	Sieve No. 40	Sieve No. 100	Sieve No. 200
3	2-2.5	99.7	96.6	91	85	74	45	20
5	2-2.5	100	99	95	90	83	54	23
14	2-2.5	99.9	97.8	94	89	83	41.5	16
16	6-6.5	99.9	97.5	97	92	86	41.5	8
17	6-6.5	99	96	86	78	69	59	20.5
18	6-6.5	99.8	98	96	95	93	81	21

Six Plasticity Index (Atterberg Limits) tests were also made from the driven core samples; results of these tests are tabulated as follows:

PLASTICITY INDEX TESTS, CALIFORNIA TEST NO. 204				
Test Hole No.	Depth Ft.	Liquid Limit	Plastic Limit	Plasticity Index
3	2-2.5	34	21	13
5	2-2.5	30	16	14
14	2-2.5	32	16	16
16	6-6.5	non-plastic	n/p	n/p
17	6-6.5	non-plastic	n/p	n/p
18	6-6.5	non-plastic	n/p	n/p

Three Direct Shear tests were made from the driven core samples taken from the test holes; results of these tests are included in Appendix B and are summarized as follows:

Test Hole No.	Depth Feet	Internal Frict. Angle, ϕ^o	Cohesion, C p.s.f.	Soil Weight p.c.f.	Description of soil
1	2-2.5	35.3	179	109.1	Dark grey silty fine sand
10	2-2.5	32.6	202	103.6	Dark grey-brown silty fine sand
13	2-2.5	34.7	216	113.9	Dark grey-brown silty fine sand

Two R-Value tests were made from bulk soil samples; R-Value R-1 is 24 and R-Value R-2 is 25; the soil is described as medium brown silty sand; R-Value test results are located in Appendix C herein.

Full soil descriptions can be found in the Test Hole Logs within Appendix A herein. No free groundwater was encountered in any of the new test holes to a depth of 23 feet prior to backfilling the holes with the soil cuttings; however some moist subsurface soil conditions were found within the proposed clustered small lot building sites behind the existing clustered homes parallel to and along the southeasterly side of Highway 68 opposite Toro Park Estates; however water seepage may be present at times during the wet seasons. It should be noted that winter groundwater fluctuations can occur due to variations in rainfall, temperature and other factors not evident during the time of our investigation.

III. SUITABILITY OF SITES AND EXPANSIVE OR UNSUITABLE SOIL CONDITIONS:

Near surface soil was found to be non-plastic and non-expansive at most of the potential building sites tested by us for this report; however the near surface soil at four of the potential building sites was found to be slightly to moderately expansive clayey sand or silty clay; the proposed lots found to have slightly to moderately expansive near surface soil are Lots 138, 139, 141, and 80.

No unsuitable soil conditions were found for foundation purposes at the larger numbered lots other than the expansive soil condition at those four lots mentioned above. However Soil Surveys shall check all lots for possible expansive clayey soil conditions after rough grading is completed. To mitigate the effects of slightly to moderately expansive near surface soil at any lot, the following measures are recommended:

1. Spread footings shall be constructed a minimum of 18 inches below finished **inside pad soil grade, measured from the low side of the footing**, for both one and two story portions of the new buildings, and continuous footings at **all** building sites shall be reinforced with a minimum of two #4 reinforcing bars placed near the bottom of footing.

2. Foundation excavations shall be flooded with three to four inches of water at least 24 hours prior to pouring concrete, and subgrade for building slabs and foundations should be brought to the low plastic limit range of moisture for a depth of at least eight inches prior to pouring concrete.

3. Concrete floor slabs-on-grade shall be at least five inches thick and shall be reinforced with a minimum of #4 steel rebars placed 18 inches on center, both ways, at the sites having expansive near surface soil conditions.

4. No new tree or high water using shrub should be planted within 15 feet of any building foundation.

5. Any lawns and landscaped strips near the buildings should be well watered and maintained after completion of the project.

6. Roof and site water should be directed away from all building foundations; positive drainage shall be established away from the buildings toward the driveways or down-slope of the buildings toward one of the adjacent drainage swales.

Loose soil conditions were found in Test Holes 17 and 18 to depths of 4 to 7.5 feet at the northerly end of the proposed small lot Parcel E housing units near Highway 68 where seven proposed units are located. The near surface soil at this location resulted from alluvial fan shaped mud flows from the adjacent steep canyon behind the proposed building sites. The soil at these seven proposed clustered housing building pads will have to be subexcavated down to firm competent soil, backfilled and recompacted to 90% relative compaction prior to excavating for the foundation footings, or the buildings will have to be constructed on a special pier and grade beam foundation system.

The proposed building sites were found to be adequate for development provided that building sites which are located downslope of mapped slides or debris flows are protected by debris flow deflector walls. The necessity for and the precise location of the debris flow walls should be determined at the time construction drawings with specific building designs are submitted for any of the affected lots and prior to the issuance of a building permit for any affected lot.

IV. FOUNDATION DESIGN RECOMMENDATIONS:

Spread footings can be used for most of the new single family building foundations at all of the potential building sites investigated, both by Soil Surveys, Inc., and by Kleinfelder, Inc. Continuous footings shall have a minimum depth of 12 inches below (inside) pad **soil** grade for single story buildings and 18 inches below (inside) pad **soil** grade for two story buildings at those sites having non-expansive soil.

Continuous footings shall have a minimum depth of **18 inches for both one and two story buildings at those sites having expansive near surface soil**. Following are design criteria for a spread footing foundation system on a properly prepared subgrade at all of the building sites:

Allowable foundation pressures are:

Continuous footings	**= 1500 p.s.f.**
Isolated rectangular footings	**= 1800 p.s.f.**

All continuous footings shall be reinforced with two #4 steel rebars placed near the bottom of the footing; spread footings shall also meet the minimum requirements of the 1997 Uniform Building Code, the latest edition of the California Building Code and the County of Monterey for width and thickness. The new buildings within all lots shall be designed to comply with the seismic requirements of the 1997 Uniform Building Code and the latest edition of the California Building Code for Seismic Zone 4 with consideration of the near-source geoseismic factors and seismic coefficients. The building pads for the seven northerly clustered housing units will have to be subexcavated and recompacted, or special pier and grade beam foundation systems will have to be designed for these units as discussed in Section III herein.

V. CONCRETE FLOOR SLABS-ON-GRADE:

For a spread footing foundation system on competent native soil or recompacted soil, we recommend the **minimum** thickness of all floor slabs-on-grade be **five** inches, and the minimum reinforcement be #3 steel rebars placed 18 inches on center, each way, at the sites having non-expansive soil conditions and #4 steel rebars placed 18 inches on center, each way, at those sites having expansive soil conditions; the steel rebars shall cross into the perimeter footings. The reinforcing must be firmly held in the vertical center of the slabs during placement and finishing of concrete with pre-cast concrete dobies.

We recommend that any concrete sidewalks and outside flatwork be at least four inches thick. All concrete flatwork should be divided into as nearly square panels as possible. Frequent joints should be installed to provide articulation to the concrete panels. Landscaping and planters adjacent to concrete flatwork should be designed in such a manner that positive drainage away from the project buildings and retaining walls is achieved. It is assumed that the outside concrete flatwork will be subjected only to pedestrian traffic. For the seven northerly Parcel E clustered housing units, we recommend that the building pads be subexcavated and recompacted, or structural concrete slabs-on-grade be designed to span between grade beams.

VI. RETAINING WALL DESIGN CRITERIA:

Some retaining walls may be needed or desired at the project site--especially along the main roads and along some driveways; some buildings may also have basement retaining walls. The shear test data indicates that the soil conditions are fairly consistent for retaining wall design purposes. For project retaining walls, the following conservative design criteria are recommended:

Friction Angle	$\varphi = 33°$
Soil Density,	$w = 115$ *p.c.f.*
Cohesion,	$c = 200$ *p.s.f.*

Equivalent fluid pressure, active	*= 34 pounds per square foot per foot of depth for* ***Level Grade***
Equivalent fluid pressure, active	*= 49 pounds per cubic foot (p.c.f.)* ***with a 2:1 slope above the wall***
Equivalent fluid pressure, passive	*= 400 p.c.f.*
Equivalent fluid pressure, at rest	*= 52 p.c.f. (Restrained condition)*
Sliding friction, f	*= 0.35*
Allowable Footing Toe Pressure	*= 2700 p.s.f. plus ⅓ additional for seismic force*

The estimated seismically generated ground accelerations to be used for this area are:
PAGA = 0.4 g
RGHA = 0.26 g = k_h
The resultant seismic force is calculated by the formula: 3/8 w $H^2 k_h$ per linear foot of retaining wall, or for this case **11.2 H^2** where H is the height of the retaining wall; this force should be applied at a height of 0.6H above the base of the retaining wall and must be combined with the force produced by active soil pressure. The allowable lateral earth pressures are based on a fully drained condition; to achieve a drained condition, we recommend that a four inch diameter perforated NDS or PVC pipe, holes pointed downward, be installed behind the top of footing at each retaining wall; the pipe shall be encased in a 12 inch wide envelope of ½ inch drain rock which shall extend to within 12 inches of the ground surface behind the walls; however no gravel shall be placed below the perforated pipe; the drain rock shall be separated from the soil by a geotextile filter fabric eg., Mirafi 140N. As an alternative to installing drain rock, a composite filter material, eg. Miradrain, can be used with a perforated pipe at the bottom of the filter material. Cleanout risers must be installed on the perforated pipe at the up-stream ends and at 90° angle points; the capped end of the cleanout riser shall be located at the ground surface behind the top of the retaining walls.

VII. LAND USE, DRAINAGE AND EROSION CONTROLS:

The subject property slopes upward to ridges, valleys and plateaus to the east of Highway 68 and to the south of River Road. The Ferrini Ranch is now used for cattle grazing. The ridges, valleys and plateaus are covered with grass and oak trees; steep sided drainage ravine separate the ridges that trend to the south of Highway 68, and several steep ravines rise to the south off River Road. A steep cliff face falls away from the southeasterly edge of the property to the southeast of Lot 40 and to the south of a proposed water storage tank; that steep cliff will not affect any of the proposed building areas or the proposed water storage tanks because of the substantial setbacks from the top of cliff. The main access roadway crosses a steep sided ravine to the east of proposed Lots 40 and 47, then cuts across a steep active slide on the northeasterly side of the steep ravine. We recommend that a culvert with an engineered fill be installed across the ravine and recommend that no cut slopes be constructed into that slide; the sidehill fill across the slide should be keyed into the natural slope through the slide plane on the uphill side; a retaining wall with a footing constructed below the slide plane should be designed on the downhill side of the slide plane to support the roadway. The native vegetation along both sides of the roadway should be preserved as much as possible.

Roof, yard and driveway drainage from the new houses must be carefully controlled so that rainfall runoff from the building sites will not cause erosion on sloping ground. We recommend that the native vegetation outside of the building envelopes be preserved as much as possible. All cut and fill slopes and other areas of disturbed ground shall be seeded with rye grass or landscaped with deep rooted, drought tolerant, soil holding plants. Concentrated drainage must be directed toward paved driveways or discharged onto rocked energy dissipaters within vegetated areas or adjacent natural drainage channels.

VIII. INTERNAL ROAD SYSTEM AND DRAINAGE:

The proposed internal access roads will ascend relatively steep sided swales and the sides of ridges at places. We found dense and stiff to very stiff clayey sand, cemented silty sand and sandstone on the ridge areas and sidehills along the ridges. The access roadways along most areas can be safely constructed in most areas with attention paid to rainfall runoff from the new roadways; energy dissipaters must be constructed at roadway spillway areas on sloping ground and at culvert discharge points in steep ravines. The roadway that is proposed to cross the steep sided ravine and active slide area will require special attention as described in Section VII above.

Based on the results of our soil tests we recommend that the roadway cut and fill slopes be 2:1 or flatter unless steeper cut slopes are allowed and specifically approved by the Geotechnical engineer; sidehill cut slopes as steep as 1:1 may be allowed in sandstone or shale especially to help preserve oak trees. Fills made on natural side slopes which are steeper than 10% shall be properly keyed in with keyway cuts as directed by the Geotechnical engineer; all fill slopes shall be 2:1 or flatter. All cut and fill slopes shall be seeded and mulched for grass at completion of the roadway rough grading operations (see preceding Section VII).

IX. ALTERNATIVE BUILDING SITES:

Viable alternative building sites with dense near surface soil and no site stability problems were found on the ridge lines to the northwest of Lot 42, to the south and southwest of Lot 40 and to the east of Lot 48, to the northeast of Lot 45 and to the east of Lot 78 in the southwesterly section of the property. Viable commercial wine tasting sites and alternative building sites were also observed on the bluff above River Road on the opposite (northeasterly) side of the proposed access road from Lots 138 through 141.

X. RECOMMENDED SPECIFICATIONS:

A. CLEARING AND COMPACTION:

All brush, grass and weeds within the building site and access roadway areas shall be cleared and removed prior to beginning of grading operations. Excavated soil may be used for engineered fill or removed and stockpiled for use in landscaped areas or removed from the site. Engineered fill shall be placed in eight inch loose lifts, moisture conditioned and compacted to 90% relative compaction; the laboratory soils compaction test method shall be *A.S.T.M. D 1557-00.*

B. SUBEXCAVATION AND RECOMPACTION:

If subexcavation and recompaction is to be done at any the seven small northerly clustered building sites, the required depth of subexcavation will be determined in the field by the Geotechnical engineer; the building pad areas shall be subexcavated to the depth recommended by Soil Surveys for a distance of five feet outside the building perimeter; the bottom of the subexcavation shall be recompacted to at least 85% relative compaction, and the soil backfill shall then be replaced in eight inch loose lifts compacted to 90% relative compaction. *Soil Surveys, Inc. shall inspect the subgrade soil to determine the actual depth of subexcavation at any other building area where subexcavation may be required.*

C. ENGINEERED FILLS AND BACKFILL:

Laboratory soils compaction test method shall be *A.S.T.M. D 1557-00.* Areas to support the new buildings shall be cleared of all surface vegetation and organic topsoil before grading the building pads or placing engineered fill. **On-site surface or subsurface grass, roots, trees, brush and stumps (if any) within the building pad areas shall be removed.** Depressions created by the removal of trees or debris shall be backfilled to design grade with suitable fill placed in eight inch loose lifts and compacted to a minimum of 90% relative compaction. *All engineered fill shall also be compacted to 90% relative compaction. Grading, filling and compaction operations shall be inspected and tested by the project Geotechnical engineer.* In Kleinfelder's report a maximum constructed slope of 2.5:1 is discussed as a preliminary design guideline. Based on our test results we recommend that cut and fill slopes shall be 2:1 or flatter–except for steeper allowable cut slopes within cemented soil or sandstone on the steep sidehill of ridges; cut slopes steeper than 2:1 shall be specifically approved by the Geotechnical engineer.

Soil should be moisture conditioned to within 3% of optimum water content before compacting subgrade or fills for building pads and the access roadways. All aggregate base placed beneath driveway pavement or beneath the garage slabs shall be Class 2 Aggregate Base and shall be compacted to 95% relative compaction.

D. CONCRETE FLOOR SLABS:

Subgrade *in recompacted native sandy soil* under concrete floor slabs-on-grade shall be brought to 3% over optimum moisture for a depth of eight inches after placing open graded rock or prior to pouring concrete; subgrade in native clayey soil under concrete floor slabs-on-grade shall be brought to the low plastic limit range of water content after placing open graded rock. It is recommended that mat of clean, open graded rock, four inches thick, be placed below concrete floor slabs and a minimum 15 mil. water-proof membrane (such as Moistop or equal) be placed over the open graded rock. **Neither** Class 2 Aggregate Base **nor** sand shall be used as the capillary break material. Capillary break material shall consist of the following:

1. MATERIAL:

The mineral aggregate for use under concrete floor slabs-on-grade shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination of the above. The aggregate shall be free of adobe, vegetable matter, loam, volcanic tuff and other deleterious materials. It shall be of such quality that the absorption of water in a saturated, surface dry condition does not exceed 3% of the oven dry weight of the sample.

2. GRADING:

The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U.S. Sieves) shall conform to the following grading:

Sieve Size	Percentage Passing Sieve
3/8"	100
No. 4	0-10
No. 200	0-2

3. PLACING:
Subgrade, upon which Class 2 Aggregate Base, gravel or crushed rock is to be placed, shall be prepared by removing grass and roots. Where loose topsoil is present, it shall be removed and cleaned of debris and recompacted to 90% of maximum density.

4. THICKNESS AND STRENGTH:
Concrete floor, and garage slabs-on-grade shall be at least five inches thick, concrete shall have a minimum of five sacks of cement per cubic yard and shall achieve a 28 day compressive strength of at least 2500 p.s.i.; structural slabs spanning between grade beams (if any) shall be at least 6 inches thick, and concrete shall achieve a 28 day compressive strength of at least 3000 p.s.i.

5. REINFORCEMENT:
Concrete floor and garage slabs-on-grade shall be reinforced with a minimum of #3 steel rebars placed 18 inches on center, both ways, for buildings located over non-expansive soil and shall be reinforced with #4 steel rebars placed 18 inches on center, both ways, for buildings located over expansive soil. Structural slabs spanning between grade beams shall be reinforced with a **minimum** of #5 steel rebars placed 12 inches on center, both ways.

XI. SEISMIC HAZARDS, GEOLOGIC AND CONSTRUCTION CONSIDERATIONS:

No known faults have been mapped or projected through the project building sites. The Harper Fault, which is considered currently inactive, transects Toro Regional Park, which divides the northern and southern portions of the Ferrini Ranch property, and that fault is relatively close to the proposed building sites that are close to the boundaries of the regional park. However the project building sites are located relatively close to several other active area faults, some of which are classified as B Faults on the **"Maps of Known Active Fault Near Source Zones In California And Adjacent Portions Of Nevada, To Be Used with the 1997 Uniform Building Code."** The building sites and distances to the nearby faults and the applicable near-source geoseismic factors are provided for groups of proposed lots as follows:

Lots 1-39 Near San Benancio School
These lots are located 5 to 5.3 kilometers southwesterly of the Rinconada Fault and 8.5 to 8.9 kilometers northeasterly of the Monterey Bay-Tularcitos Fault; both faults are B rated Faults. The soil is considered to be **S_D, stiff soil profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient $C_a = 0.44$ Near Source Factor $N_a = 1.0$
Seismic Coefficient $C_v = 0.77$ Near Source Factor $N_v = 1.2$

Lots 40-65
These lots are located 4 to 4.3 kilometers southwesterly of the Rinconada Fault and 9.5 to 9.9 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_C, very dense soil and soft rock profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient $C_a = 0.44$ Near Source Factor $N_a = 1.1$
Seismic Coefficient $C_v = 0.73$ Near Source Factor $N_v = 1.3$

Lots 66-78 and 86-92

These lots are located 3.2 to 3.5 kilometers southwesterly of the Rinconada Fault and 10.3 to 10.6 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_C, very dense soil and soft rock profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient C_a = 0.48 Near Source Factor N_a = 1.2
Seismic Coefficient C_v = 0.78 Near Source Factor N_v = 1.4

Lots 79-85

These lots are located 3.2 kilometers southwesterly of the Rinconada Fault and 10.6 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be The soil is considered to be **S_D, stiff soil profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient C_a = 0.53 Near Source Factor N_a = 1.2
Seismic Coefficient C_v = 0.90 Near Source Factor N_v = 1.4

Lots 93-137

These lots are located 2.5 to 2.8 kilometers southwesterly of the Rinconada Fault and 11 to 11.3 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_C, very dense soil and soft rock profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient C_a = 0.48 Near Source Factor N_a = 1.2
Seismic Coefficient C_v = 0.84 Near Source Factor N_v = 1.5

Lots 138-142

These lots are located 250 to 450 meters northeasterly of the Rinconada Fault and 14.8 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_C, very dense soil and soft rock profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient C_a = 0.52 Near Source Factor N_a = 1.3
Seismic Coefficient C_v = 0.90 Near Source Factor N_v = 1.6

Lots 143, 144 and commercial wine tasting area

These sites are located 250 to 500 meters northeasterly of the Rinconada Fault and 14.9 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_D, stiff soil profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient C_a = 0.57 Near Source Factor N_a = 1.3
Seismic Coefficient C_v = 1.02 Near Source Factor N_v = 1.6

The small clustered PUD lots

These small clustered lots are located 1 to 1.4 kilometers southwesterly of the Rinconada Fault and 12.6 to 13 kilometers northeasterly of the Monterey Bay-Tularcitos Fault. The soil is considered to be **S_D, stiff soil profile.** From the Fault classifications and distances, the following Near Source Factors and Seismic Coefficients should be used:

Seismic Coefficient $C_a = 0.57$ Near Source Factor $N_a = 1.3$
Seismic Coefficient $C_v = 1.02$ Near Source Factor $N_v = 1.6$

Most severe earthquakes in the Toro-San Benancio and River Road areas are centered on the active Monterey Bay-Tularcitos Fault or the San Gregorio Fault ly of the project site or the San Andreas Fault system located some 34 kilometers northeasterly of the project site. It has been estimated that an earthquake with an intensity of 7.0 to 8.0 on the Richter Scale could occur along the San Andreas Fault or 7.0 on the San Gregorio Fault within a 50 year return period.

A major earthquake of these magnitudes, centered nearby, could damage the proposed buildings, but risk of catastrophic failure is considered small if the buildings are designed to withstand the moderate amplitudes expected from moderate ground shaking on the dense sedimentary side hill soil. The proposed buildings, therefore, should be designed with adequate hold-downs and shear panel reinforcement to withstand severe shaking and lateral accelerations in strict compliance with the 1997 Uniform Building Code.

Frame and semi-rigid structures with proper strengthening connections are recommended for the project buildings. With proper design parameters, seismic damage to the structures should be manageable for foreseeable earthquakes centered on the nearby faults. The buildings shall be designed in accordance with the seismic parameters required by the 1997 Uniform Building Code.

Surface rupture, liquefaction, lurch cracking, lateral spreading, and differential settlement are seismic hazards that must be considered at the project site. Surface rupture usually occurs along fault lines and no known fault has been found or traced through the project building sites; therefore, the potential for surface rupture is considered low.

Liquefaction and lateral spreading tend to occur in loose, fine, saturated sands and in places where the liquefied soils can move toward a free face (e.g. a cliff or ravine). No ground water was encountered in any test hole to a depth of 26.5 feet on the day of drilling. Considering the soil conditions, the potential risk for occurrence of damaging liquefaction and the risk for lateral spreading is considered low at the project building site. The risk for seismically induced earth sliding on the slopes outside of the building envelopes is considered to be moderate, especially if an earthquake should occur during wet weather.

Differential compaction and settlement occur generally in loose, granular or unconsolidated semi-cohesive soils during severe ground vibration; the near surface soil at all building sites investigated were found to be medium dense.

XII. DISCUSSION OF MAPPED LANDSLIDES AND DEBRIS FLOWS:

Based on our test hole data and results of our testing the near surface soil within the potential building sites at Lots 22 and 23 appears to be a shallow, long stabilized landslide deposit; however we recommend that the proposed Lot 23 building (and possibly the Lot 22 building) be protected by a debris flow wall upslope of the actual building site. The Lot 27 and Lot 28 buildings may also need to be protected by debris flow walls, depending on the actual building locations with respect to the potential debris flow paths.

Lots 32 through 35 do not appear to be located on a landslide from the subsurface soil conditions found in the test holes; if these lots are located on an old landslide deposit, the deposit is medium dense to dense, and the landslide material appears to be long stabilized.

Lots 80 through 85 also do not appear to be located on a landslide; if the shallow near surface soil is a landslide deposit, the landslide has also been long stabilized.

The mapped landslides upslope of the proposed small clustered PUD sites are small landslides or debris flows; therefore the buildings at the mouth of these small slides and debris flows will need to be protected by debris flow walls.

Lots 138, 139, 141 and 142 are located at the base of mapped mud flows; the building sites within these lots may or may not have to be protected by debris flow walls, depending on the actual location of the proposed buildings with respect to the mud flow paths.

XIII. UNFORESEEN OR UNUSUAL CONDITIONS:

If any unforeseen or unsuitable soils conditions are found at any of the building sites, the Geotechnical engineer shall be notified immediately so that remedial action can be taken. Such unsuitable conditions could include buried debris or pipes, near surface soil with organic material or a high organic content, or wet, loose or unsuitable pockets of soil.

XIV. CONCLUSIONS AND RECOMMENDATIONS:

From our analysis of the project soil and test data, the following are concluded:

1. The project soils at the building sites investigated by us were found to suitable for residential buildings although some of the building sites may need to be protected by upslope debris flow walls, and recompaction of near surface soil will be required at some of the sites. Project near surface soils were generally found to be medium dense to dense. Near surface soils were found to be non-expansive at most of the tested sites and slightly to moderately expansive at other sites as discussed in Sections III herein.

2. The seven northerly clustered P.U.D. lots will require subexcavation and recompaction of loose near-surface soil or special deep foundation systems as discussed in Section III herein.

3. Spread footings can be used for all proposed building foundations; design criteria for spread footings are provided in Section IV herein.

4. Design criteria for concrete slabs-on-grade are provided in Sections V and IX herein.

5. Retaining wall design criteria are provided in Section VI herein.

6. Drainage and erosion control measures are recommended in Section VII herein. Native vegetation should be preserved as much as possible.

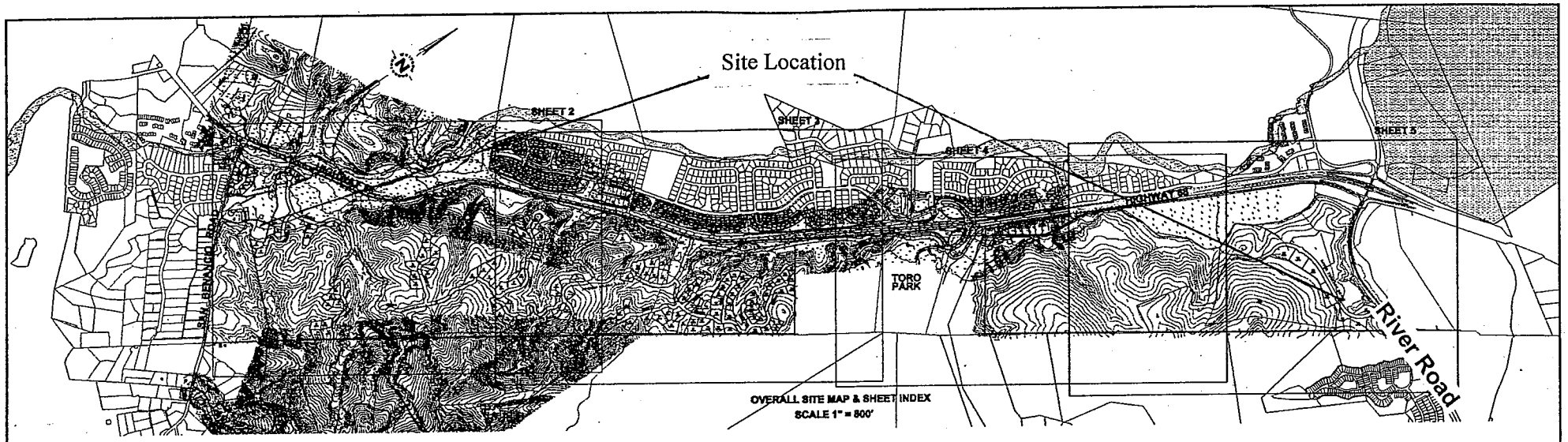
7. Recommendations for the internal roadway system and roadway drainage are made in Section VIII herein.

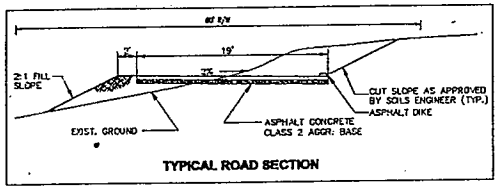
8. Recommendations for grading, engineered fills, possible subexcavation and recompaction, subgrade compaction and moisture control for the building pads and roadways, and for concrete floor slabs-on-grade are made in Section IX herein.

9. Seismic hazards, seismic design criteria and potential for liquefaction are discussed in Section X of this report. It is considered that the risk for liquefaction or lateral spreading is generally low at all sites, except that the risk for liquefaction is considered low to moderate at the seven northerly clustered P.U.D. sites. Geoseismic coefficients and near source factors are provided in Section XII for building design purposes.

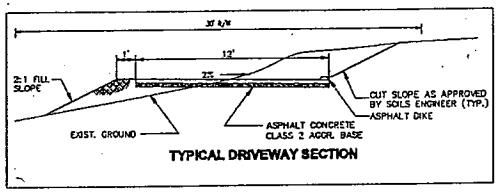
XV. LIMITATIONS:

This report was prepared as a supplement to the preliminary Geologic and Geotechnical analysis by Kleinfelder, Inc., and Soil Surveys, Inc. reserves the right to supplement and amend this report as necessary for use as a construction document.

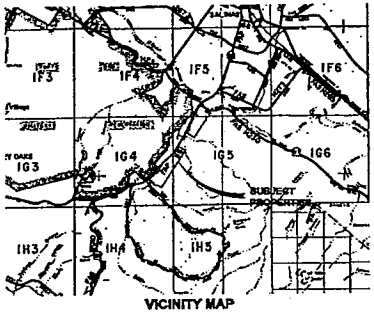




TYPICAL ROAD SECTION



TYPICAL DRIVEWAY SECTION



VICINITY MAP

PROJECT TEAM

OWNER / APPLICANT:

BOLLENBACHER AND KELTON
2716 OCEAN PARK BOULEVARD #2006
SANTA MONICA, CALIFORNIA 90405

LEGAL COUNSEL:

LOMBARDO & GILLES
POST OFFICE BOX 2119
SALINAS, CALIFORNIA 93902

PLANNER/ENVIRONMENTAL:

DENISE DUFFY AND ASSOCIATES
947 CASS STREET, SUITE 5
MONTEREY, CALIFORNIA 93940-4525

CIVIL ENGINEER:

WHITSON ENGINEERS
9692 BLUE LARKSPUR LANE
SUITE 105
MONTEREY, CALIFORNIA 93940

NOTES

SUBDIVIDER'S STATEMENT

A. EXISTING ZONING: LDR/2.4-VS AND LDR/.75-VS.
PROPOSED USES OF THE LAND: RESIDENTIAL SUBDIVISION, AGRICULTURAL/INDUSTRIAL, INCLUSIONARY HOUSING, AND OPEN SPACE.

B. EROSION CONTROL: SHALL BE IN ACCORDANCE WITH MONTEREY COUNTY EROSION CONTROL ORDINANCES AND REGULATIONS, AND IN CONFORMANCE WITH AN APPROVED LANDSCAPING PLAN.

C. WATER SUPPLY: CALIFORNIA WATER SERVICE COMPANY
SEWAGE DISPOSAL: CALIFORNIA UTILITIES SERVICE
ELECTRIC SERVICE: PACIFIC GAS AND ELECTRIC
GAS SERVICE: PACIFIC GAS AND ELECTRIC
TELEPHONE SERVICE: SBC

D. TREE PLANTING: SHALL BE AS SHOWN ON AN APPROVED LANDSCAPING PLAN. TREE REMOVAL: APPROXIMATELY _____ TREES TO BE REMOVED. (LESS THAN __% OF OAKS ON PROPERTY)

E. PUBLIC AREAS TO BE DEDICATED: NONE
SCENIC EASEMENT PROPOSED ON PARCEL A, B & C.
COMMON AREAS PROPOSED: PARCELS A, B & C. THE COMMON AREAS SHALL BE PRIVATELY MAINTAINED BY OWNERS' ASSOCIATION(S), UNDER THE PROVISIONS OF COVENANTS, CONDITIONS AND RESTRICTIONS.

F. MAXIMUM HEIGHT: NOT TO EXCEED COUNTY ZONING LIMITS. LOWER HEIGHT LIMITS WILL BE DETERMINED ON CERTAIN LOTS PRIOR TO FINAL MAP RECORDATION, WHERE REQUIRED FOR VIEWSHED PROTECTION.

G. PROPOSED TYPE OF DEVELOPMENT: RESIDENTIAL SUBDIVISION. RESIDENTIAL PARCELS WILL BE SOLD AS LOTS, WITHOUT HOMES. INCLUSIONARY LOTS WILL BE SOLD AS FULLY DEVELOPED UNITS.

GENERAL NOTES

1. A.P. # 161-011-019 & 030 & 039 & 057 & 058 & 059 &078 & 161-031-016 & -017

2. THE SIZE, LOCATION AND TYPE OF ALL UTILITIES SHOWN HEREON ARE APPROXIMATE ONLY. THE SIZE OF WATER TANKS IS TO BE BASED ON REQUIRED FIRE FLOW, AS DETERMINED BY THE FIRE OFFICIAL.

3. EXISTING OVERHEAD UTILITIES SHALL REMAIN. NEW UTILITIES SHALL BE PLACED UNDERGROUND.

4. TYPICAL ROAD WIDTHS AS SHOWN, ROADS MAY BE NARROWED TO MINIMUM COUNTY STANDARDS TO PRESERVE TREES AND REDUCE IMPACTS.

5. DIVIDED ROADS WILL BE UTILIZED AS APPROPRIATE TO PRESERVE TREES.

6. PROJECT PHASING:

PHASE 1: LOTS 1-12, PARCEL E, LOT 146
PHASE 2: LOTS 88-136
PHASE 3: LOTS 48-85
PHASE 4: LOTS 13-47, 138-145

PHASING MAY BE REVISED WITH APPROVAL OF MONTEREY COUNTY.

PROJECT DATA

PROJECT SUMMARY	AREA (AC)	% OF GROSS AREA
COMMON AREAS		
PARCEL A	385.2	44.3 %
PARCEL B	211.3	24.3 %
PARCEL C	3.9	0.4 %
SUBTOTAL:	600.4	69.0 %
RESIDENTIAL LOTS 1-146		
PARCEL D	178.1	20.5 %
PARCEL D	34.7	4.0 %
PARCEL E	13.4	1.5 %
ROAD PARCELS	43.1	5.0 %
SUBTOTAL:	269.3	31.0 %
TOTAL GROSS AREA IN SUBDIVISION:	869.7 ACRES	100.0 %

LOT SUMMARY

NUMBER OF RESIDENTIAL LOTS:	146
LOT SIZES:	.28 TO 73.85 ACRES
AVERAGE LOT SIZE:	1.22 ACRES
CLUSTERED HOUSING (MARKET RATE)	23
TOTAL MARKET RATE LOTS & UNITS	189
INCLUSIONARY HOUSING: (25%)	43 UNITS
MAXIMUM ALLOWABLE NUMBER OF RESIDENCES PER SLOPE DENSITY FORMULA:	388

LEGEND

- PROPERTY BOUNDARY
- EXISTING ELEVATION CONTOUR
- EXISTING DIRT ROAD
- NEW LOT LINE
- EASEMENT
- ROADWAY PAVEMENT
- STORM DRAIN
- EXISTING STORM DRAIN
- WATER MAIN
- WATER LINE
- RECLAIMED WATER LINE
- SANITARY SEWER
- JOINT UTILITY TRENCH
- TRAIL
- R.U.E. — ROAD & UTILITY EASEMENT
- FH — FIRE HYDRANT
- CB — CATCH BASIN
- P.R.S. — PRESSURE REDUCING STATION
- + 2 % — SLOPE OF ROAD &/OR SANITARY SEWER
- UTILITY POLE
- FEMA ZONE A INUNDATION LIMITS

REGISTERED PROFESSIONAL ENGINEER — T. W. WHITSON — No. 25765 — EXP. 12/31/06 — CIVIL — STATE OF CALIFORNIA

VESTING TENTATIVE MAP

FERRINI RANCH

PROPOSED SUBDIVISION IN
MONTEREY COUNTY, CALIFORNIA

WE WHITSON ENGINEERS
9692 Blue Larkspur Lane • Suite 105 • Monterey, CA 93940
831 649-5225 • Fax 831 373-8402
CIVIL ENGINEERING • LAND SURVEYING • PROJECT MANAGEMENT

0 200 400 600 800
SCALE 1" = 200'

MARCH 15, 2005

SHEET 1 OF 5

FIGURE I

Site Location Map

This map is provided as a matter of accommodation only, and no liability is assumed by its attachment to this report

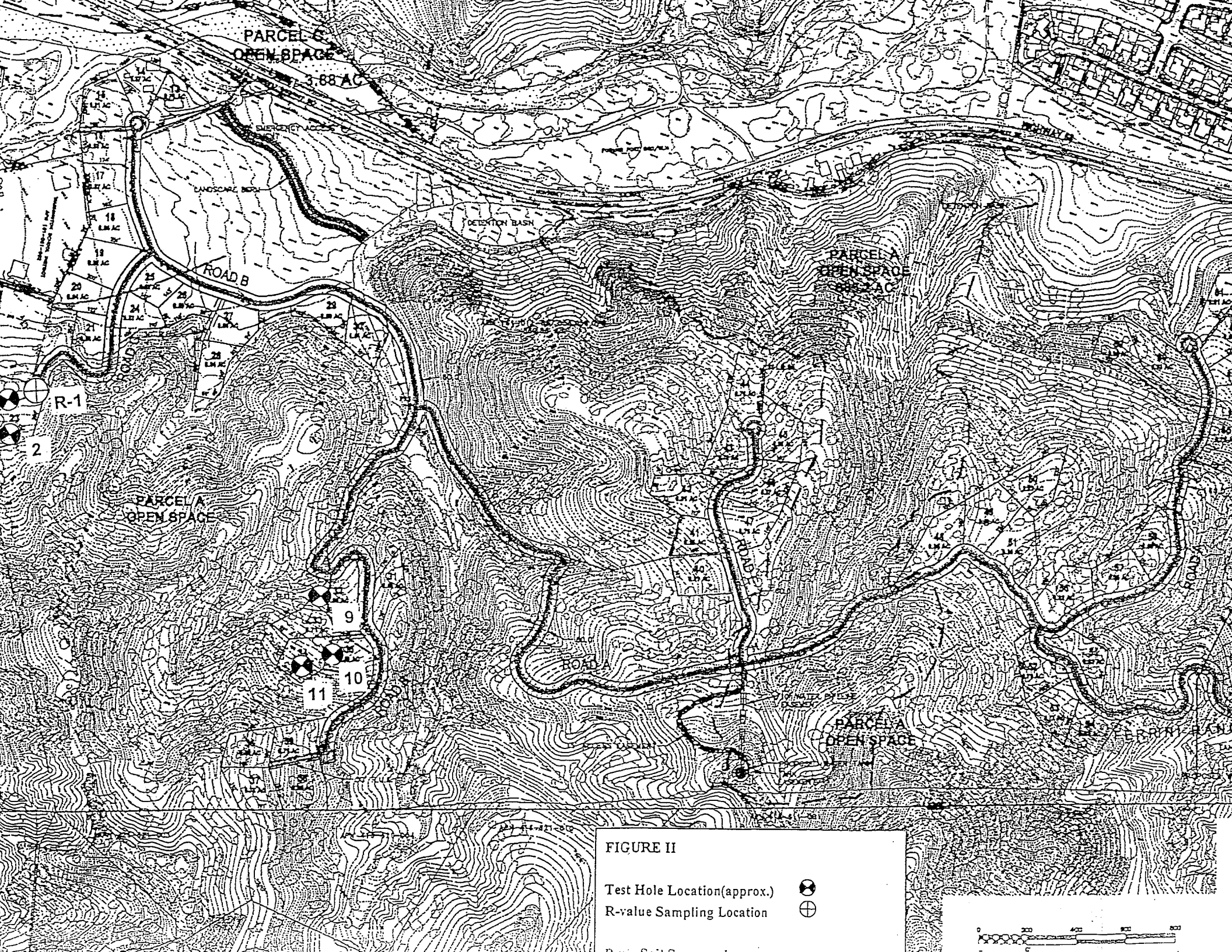


FIGURE II

Test Hole Location(approx.)

R-value Sampling Location

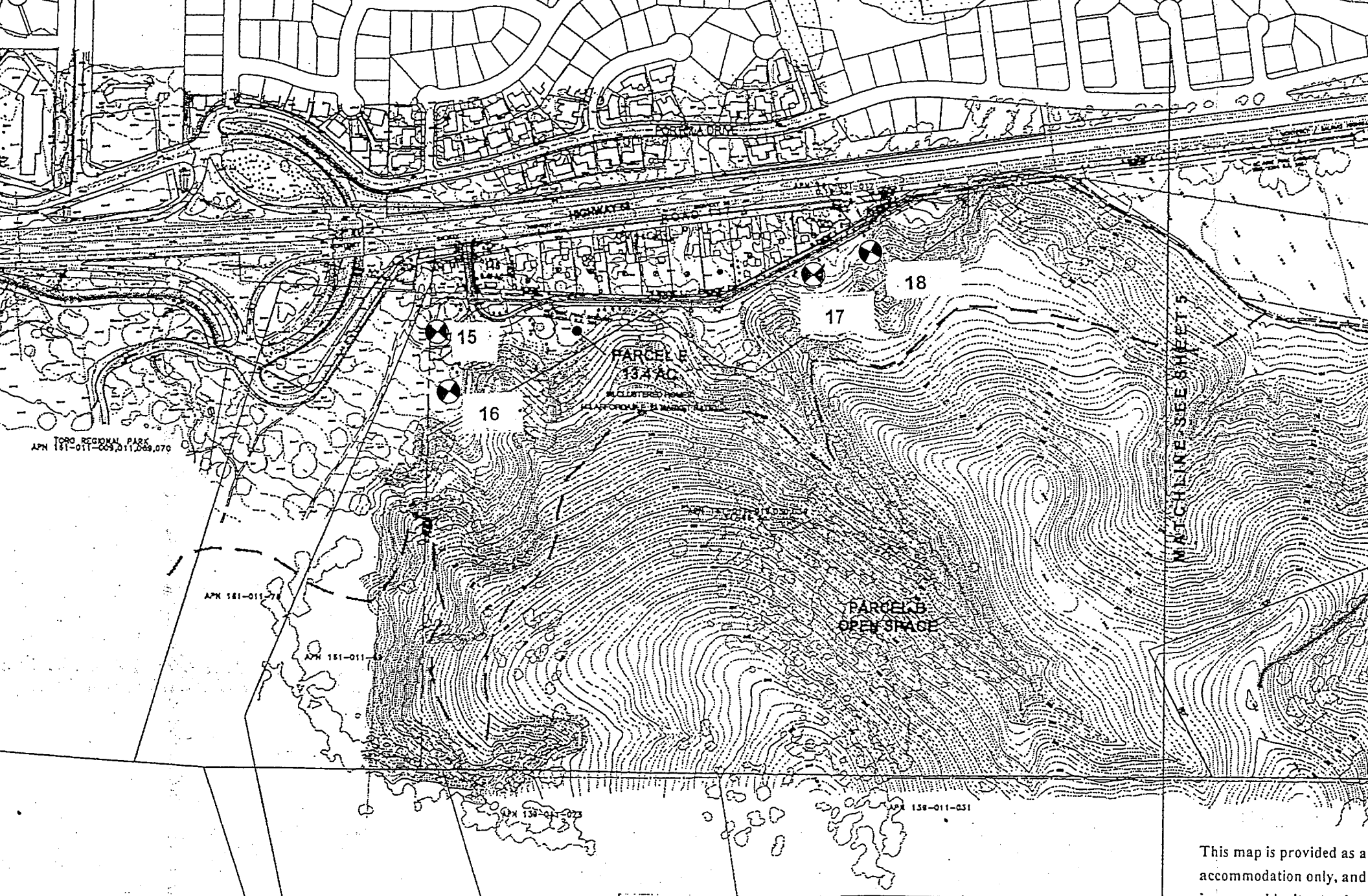
FIGURE III

Test Hole Location(approx.) ⊗

R-value Sampling Location ⊕

By: Soil Surveys, Inc.
103 Church Street

This map is provided as a matter of accommodation only, and no liability is assumed by its attachment to this report



This map is provided as a
accommodation only, and
is assumed by its attachm

FIGURE IV

Test Hole Location(approx.)
R-value Sampling Location

By: Soil Surveys, Inc.
103 Church St

VEST
FER
PRO
MONTE

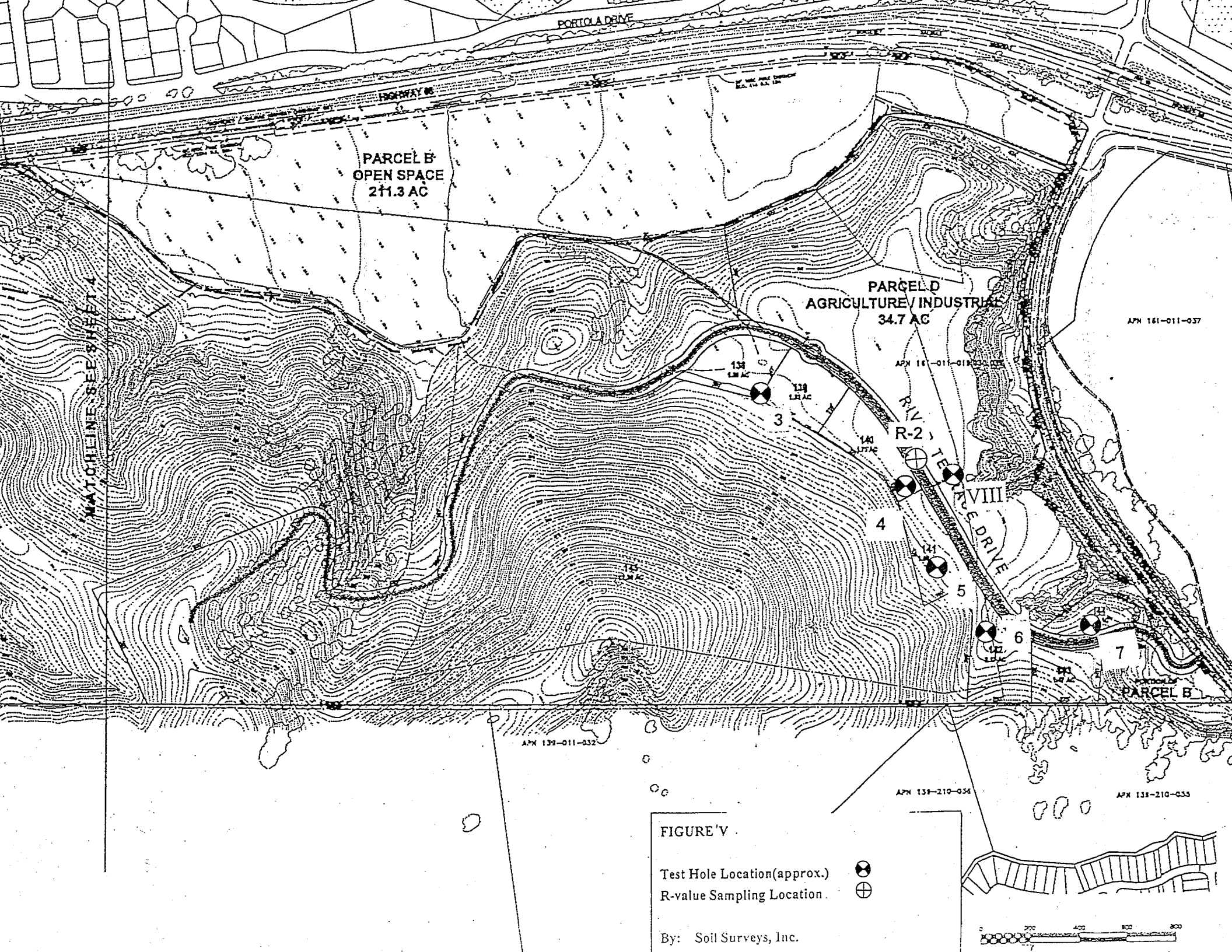


FIGURE V

Test Hole Location(approx.)

R-value Sampling Location

By: Soil Surveys, Inc.

APPENDIX A

TEST HOLE LOGS

EXPLORATION DRILL LOG

HOLE NO. 1

PROJECT Ferrini Ranch Subdivision-Lot 22 Job #4963 DATE 6/27/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration B-24 HOLE DIA. 4" SAMPLER 2" Cal. & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light brown silty sand; dry, loose	SM	1							
			2" Cal.						
	SM	2	XXX	9	104.8	6.3			1.5
Dark brown silty sand; moist, medium dense	SM		XXX	15	106.8	2.1	Shear	sample	---
		3							
		4							
	SM								
Light orange-brown silty medium sand;	SM	5							
slightly moist, dense			SPT						
		6							
			XXX	35	119.3	4.2			1.75
		7							
		8							
Same	SM								
		9							
Clayey sand @ 9'; stiff	SC								
		10							
Orange-brown clayey medium to coarse sand;	SC		SPT						
moist, very stiff, medium dense		11							
			XXX	24	113.5	6.7			4.25
		12							
Increased density @ 12'; less clay content	SM/SC	13							
		14							
		15							
Orange-brown clayey silty medium sand; dense	SM/SC		SPT						
		16							
Pale orange-brown gravelly sand with silt &	SM/SC		XXX	55	116.6	4.9			1.8
clay; hard, very dense		17							
		18							
		19							
Yellow-tan slightly clayey silty sand with trace	SM/SC								
of gravel; moist, very dense		20							

DEPTH 21.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 1 CONTINUED

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Yellow-tan slightly clayey silty sand with trace	SM/SC		SPT						
of gravel; moist, very dense		21							
Bottom of hole @ 21.5'	SM/SC		XXX	49	119.0	5.0			3.5
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							

DEPTH 21.5' Job #4963

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 2

PROJECT Ferrini Ranch Subdivision-Lot 23 Job #4963 DATE 6/27/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration B-24 HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown silty sand; dry, loose	SM	1							
			SPT						
Light brown silty medium grained sand with	SM	2							
scattered coarse grains; damp, loose			XXX	6	96.6	3.2			---
		3							
			SPT						
Same	SM	4							
Grey-tan silty sand; moist, medium dense	SM		XXX	12	116.4	4.5			---
		5							
		6							
Same	SM	7							
		8							
Orange-brown slightly clayey silty medium to	SM/SC		SPT						
coarse sand; moist, medium dense		9							
			XXX	28	117.8	6.9			>4.5
		10							
		11							
		12							
		13							
Light orange-brown silty sand with fine gravel;	SM		SPT						
moist, dense		14							
			XXX	31	115.4	4.7			1.5
		15							
Hard drilling @ 15.5'	SM	16							
		17							
		18							
Light orange-brown silty medium to coarse sand	SM		SPT						
with scattered fine gravel; very dense		19							
Bottom of hole @ 19.5'	SM		XXX	58	118.4	4.4			1.5
		20							

DEPTH 19.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 3

PROJECT Ferrini Ranch Subdivision-Lots 138 & 139 Job #4963 DATE 7/24/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
	SC								
		1							
Tan-brown silty clayey sand; damp, hard	SC		SPT						
		2							
	SC		XXX	25	94.5	11.5	34	21	>4.5
		3							
		4							
Tan brown silty clayey sand; dense	SC	5							
Tan-brown silty sand; damp, dense	SM		SPT						
		6							
			XXX	46	121.0	14.7			>4.5
		7							
		8							
		9							
		10							
Clayey silty sand with orange strata; moist,	SM/SC		SPT						
hard		11							
			XXX	45	103.0	11.8			>4.5
		12							
		13							
Orange-tan silty sand with fragments of shale;	SM								
slightly moist, hard		14							
		15							
			SPT						
Bottom of hole @ 16'	SM	16	XXX	50/5"	105.1	7.7			0.25
		17							
		18							
		19							
		20							

DEPTH 16'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 4

PROJECT Ferrini Ranch Subdivision-Lot 140 Job #4963 DATE 7/24/07 LOGGED BY JG

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light tan-brown silty sand; dry, loose	SM								
		1							
Silty sand; medium dense at 1'	SM		SPT						
		2							
			XXX	28	97.8	3.2			---
		3							
		4							
		5							
Olive-brown silty sand; moist, medium dense	SM		SPT						
		6							
			XXX	23	96.6	20.0			>4.5
		7							
		8							
		9							
		10							
Light tan silty fine sand with granitic grains;	SM		SPT						
dry, dense		11							
			XXX	50	101.4	5.6			0.25
		12							
		13							
		14							
		15	SPT						
Tan silty fine sand; dense to hard	SM	16	XXX	60	104.0	9.4			0.75
Bottom of hole 16.5'	SM								
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 5

PROJECT Ferrini Ranch Subdivision-Lot 141 Job #4963 DATE 7/24/07 LOGGED BY JG

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
	ML/CL								
		1							
Dark brown clayey silt ; damp, hard	ML/CL		SPT						
		2							
Same	ML/CL		XXX	35	95.7	10.2	30	16	>4.5
Light tan silty sand with small granite/shale	SM	3							
gravel									
		4							
		5							
			SPT						
Light tan sand with silt and small gravel;	SM	6							
medium dense			XXX	16	90.2	5.7			---
		7							
		8							
		9							
		10							
Tan-brown & orange silty sand; moist, dense	SM		SPT						
		11							
			XXX	46	106.2	10.3			1.2
		12							
		13							
		14							
		15							
Tan-brown silty sand; moist, dense	SM		SPT						
		16							
Bottom of hole @ 16.5'	SM		XXX	53	102.1	7.2			0.25
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 6

PROJECT Ferrini Ranch Subdivision-Lot 142 Job #4963 DATE 7/24/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
	SM/ML								
		1							
Grey-brown silty fine sand/fine sandy silt; dry,	SM/ML		SPT						
medium dense		2							
			XXX	29	82.8	4.6			---
		3							
	SM/ML	4							
Orange-brown clayey sand; moist	SC								
		5							
			SPT						
Dark orange-brown clayey sand with silt; very	SC	6							
stiff			XXX	25	115.1	12.8			4.25
		7							
		8							
		9							
Orange-brown slightly clayey silty sand with	SM/SC	10							
scattered fine gravel; very dense			SPT						
		11							
Bottom of hole @ 11.5'	SM/SC		XXX	53	114.5	8.6			0.5
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 11.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 7

PROJECT Ferrini Ranch Subdivision-Lot 144 Job #4963 DATE 7/24/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Orange-tan fine sandy silt/silty fine sand	SM	1							
			SPT						
		2							
Dark orange-brown clayey sand; dry, hard	SC		XXX	31	98.9	9.0			>4.5
		3							
Hard drilling	SC	4							
		5							
Orange-brown slightly clayey silt; dry, hard	ML/CL		SPT						
		6							
			XXX	50	107.2	9.3			2.0
		7							
		8							
		9							
		10							
Dark orange-brown clayey silt; very stiff, dense	CL/ML		SPT						
		11							
			XXX	31	112.8	20.7			2.0
		12							
		13							
Same	CL/ML	14							
	CL/ML	15							
Orange-tan silty fine sand; slightly moist,	SM		SPT						
medium dense		16							
			XXX	20	88.7	6.0			---
	SM	17							
Olive-brown clayey silt; moist, very stiff	CL/ML	18							
		19							
Same	CL/ML	20							

DEPTH 21.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 7 CONTINUED

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Olive-brown clayey silt; moist, very stiff	CL/ML		SPT						
		21							
Bottom of hole @ 21.5'	CL/ML		XXX	25	94.3	22.0			1.0
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							

DEPTH 21.5' Job #4963

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 8

PROJECT Ferrini Ranch Subdivision | Job #4963 | DATE 7/24/07 | LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler | HOLE DIA. 4" | SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: | INITIAL --- | FINAL --- | HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown fine sandy silt/silty fine sand; dry,	SM/ML	1							
medium dense			SPT						
Added water		2							
Orange-brown sandy silt with trace of clay;	SM/ML		XXX	25	99.0	5.2			2.75
dry, medium dense		3							
		4							
		5							
Orange-brown silty gravelly sand; dry, very	SM		SPT						
dense		6							
			XXX	50	109.0	10.8			2.25
Very hard drilling	SM	7							
		8							
Added water	SM								
		9							
		10							
Orange-brown silty sand with some fine gravel;	SM		SPT						
moist, medium dense		11							
			XXX	22	80.4	4.3			---
		12							
		13							
Clayey @ 13.5'; very stiff	SC								
		14							
		15							
Orange-brown clayey silty sand; moist, medium	SC		SPT						
dense, very stiff		16							
Bottom of hole @ 16.5'	SC		XXX	28	115.9	15.4			2.75
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 9

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY RED

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER 2 1/2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Tan sandy silt; very stiff	ML								
		1	2 1/2"Cal						
	ML								
Cemented silty granitic sand; medium dense to dense	SM	2	XXX	55	107.2	4.1			>4.5
		3							
	SM/SP	4							
White to tan slightly silty fine to medium sand; very dense		5							
	SM/SP		SPT						
		6							
			XXX	61	114.3	5.8			.85
		7							
		8							
		9							
		10							
			SPT						
White slightly silty fine to medium sand: damp, very dense to hard; Bottom of hole at 11.5'	SM/SP	11							
			XXX	81	105.8	8.7			.25
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 11.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 10

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER 2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light brown sandy silt; dry, loose	ML/SM								
		1							
			2" Cal						
Same	ML/SM	2	XXX	8	89.5	2.4			<.25
			XXX	11	102.0	1.6			<.25
Light orange-brown sandy silt; dry, medium dens	ML/SM	3	SPT						
dense									
		4	XXX	25	102.1	2.0			<.25
		5							
		6							
Same	ML/SM								
		7							
Light orange-brown silty medium coarse granitic	SM/SP								
sand with traces of clay; slightly moist, dense		8							
			SPT						
		9							
Same, Bottom of hole at 9.5'	SM/SP		XXX	41	109.2	10.6			2.25
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 9.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO.11

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light tan brown sandy silt/ silty sand; dry, loose	SM/ML								
		1							
			SPT						
Light orange-brown mottled silty cemented	SM/SP	2							
coarse granitic sand; moist, dense			XXX	60	109.4	7.7			>4.5
		3							
		4							
		5							
Light orange brown silty coarse granitic sand;	SM/SP		SPT						
slightly moist, dense		6							
			XXX	37	108.8	6.8			>4.5
		7							
		8							
		9							
		10							
Light orange-brown silty coarse sand with	SM/SP		SPT						
scattered fine gravel; moist, medium dense		11							
			XXX	27	107.5	8.1			1.25
		12							
	SM/SP	13							
Clayey sand @ 13'-13.5'	SC								
		14							
Olive-tan clayey silty sand; moist, very stiff,									
dense		15							
Same	SC		SPT						
		16							
Bottom of hole at 16.5'	SC		XXX	35	108.2	5.2			.85
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO.12

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light tan-brown silty sand; dry, loose	SM								
		1							
			SPT						
Light orange-brown silty sand; dry, medium	SM	2							
loose			XXX	8	92.3	1.8			<.25
		3							
Dark orange-brown cemented silty granitic sand;	SM/ML		SPT						
slightly moist, hard		4							
			XXX	70	108.5	6.9			>4.5
		5							
		6							
		7							
		8							
Orange-tan silty granitic sand; slightly moist,	SM/ML								
very dense		9	SPT						
Bottom of hole at 9.5'	SM/ML		XXX	79/12"	100.8	4.6			---
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							

'DEPTH 9.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 13

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER 2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light tan-brown silty sand; dry, loose	SM								
		1							
Light orange-brown silty sand; medium dense	SM		2" Cal						
		2	XXX	21	106.8	2.1			<.25
Dark orange-brown cemented silty sand; very	SM/ML		XXX	56	11.2	2.4			>4.5
dense		3							
		4							
		5							
Dark orange-brown silty sand/sandy silt; slightly	SM/ML		SPT						
moist		6							
			XXX	53	108.7	11.3			>4.5
		7							
		8							
		9							
		10							
Orange-brown silty sand with traces of clay;	SM/SC		SPT						
moist, very dense		11							
			XXX	50	100.7				1.75
		12							
		13							
	SM/SC								
		14							
		15							
Orange-brown clayey silty sand; moist, very	SC		SPT						
dense		16							
Bottom of hole at 16.5'	SC		XXX	35	96.9	6.6			1.25
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 14

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Light grey brown silty sand; dry	SM								
		1							
Dark reddish brown cemented clayey silty sand;	SC		SPT						
hard, with some organic content		2							
			XXX	30	94.6	11.7	32	16	>4.5
		3							
	SC								
		4							
	SC								
		5							
Orange-tan clayey silty sand/ sandy silt; moist,	ML/SC		SPT						
very dense		6							
			XXX	33	92.9	11.8			1.15
		7							
		8							
		9							
		10							
Orange-tan clayey silty fine sand; moist, stiff and	ML/SC		SPT						
very dense		11							
			XXX	31	98.2	14.4			2.5
		12							
		13							
Same	ML/SC	14							
		15							
Olive-grey sandy silty clay; moist, very stiff	CL		SPT						
		16							
			XXX	27	106.3	15.9			3.75
		17							
		18							
		19							
Olive-tan clayey silt/silty lean clay; moist, dense	ML/CL								
and very stiff		20							

DEPTH 21.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 14 CONTINUED

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Olive-tan clayey silt/silty lean clay; moist, dense	ML/CL		SPT						
and very stiff		21							
Bottom of hole at 21.5'	ML/CL		XXX	45	94.6	18.2			1.75
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							

DEPTH 21.5' Job #4963

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 15

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Dark grey brown silty sand; loose	SM								
		1							
			SPT						
Grey-brown silty sand/sandy silt; dry, medium	SM/ML	2							
dense			XXX	11	80.3	3.8			<.25
		3							
		4							
Olive-brown silty sand; moist, medium dense	SM		SPT						
		5							
			XXX	10	93.6	7.6			<.25
		6							
		7							
		8							
		9							
		10							
Olive-brown silty medium coarse grained sand;	SM/SP		SPT						
medium dense		11							
			XXX	12	97.7	7.9			<.25
		12							
		13							
		14							
		15							
Tan-brown silty sand; moist, medium dense	SM/SP		SPT						
		16							
			XXX	20	83.5	5.0			<.25
Slightly clayey silty sand at 17' to 17.5'	SM/SC	17							
		18							
		19							
Olive brown slightly silty medium to coarse	SM/SP								
sand; moist, medium dense		20							

DEPTH 21.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO.15 CONTINUED

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Olive brown slightly silty medium coarse sand;	SM/SP		SPT						
moist, medium dense		21							
Bottom of hole at 21.5'	SM/SP		XXX	14	104.8	9.1			<.25
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							

DEPTH 21.5' Job #4963

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 16

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER 2 1/2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown silty sand; dry	SM								
		1							
			SPT						
Grey-brown silty sand/ sandy silt; medium	SM/ML	2							
dense, dry			XXX	10	80.8	4.0			<.25
		3							
		4							
	SM/ML								
		5							
Dark orange-brown silty sand with clay and	SM/SC		SPT						
coarse grained granitic sand; moist, medium		6							
dense			XXX	11	93.5	10.3			<.25
		7							
		8							
		9							
		10							
Dark orange-tan slightly clayey silty sand;	SM/SC		SPT						
medium dense, moist		11							
			XXX	13	80.8	11.1			<.25
		12							
		13							
		14							
		15							
Dark olive-brown clayey silty sand with scattered	SM/SC		SPT						
gravel; very moist, stiff and medium dense		16							
Bottom of hole at 16.5'	SM/SC		XXX	23	115.7	12.6			1.5
		17							
		18							
		19							
		20							

DEPTH 16.5'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 17

PROJECT Ferrini Ranch # 4963 DATE 9/13/07 LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler HOLE DIA. 4" SAMPLER 2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: INITIAL --- FINAL --- HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown silty sand; dry, loose	SM								
		1							
			2" Cal						
Grey-brown silty sand/ sandy silt; moist, loose	SM/ML	2							
			XXX	9	77.3	3.5			<.25
		3							
		4							
		5							
Dark brown silty medium sand with some coarse	SM/SC		2" Cal						
grains and clay; very moist, loose		6							
			XXX	8	109.1	11.5			2.75
		7	SPT						
	SM/SC								
Dark brown silty sand/sandy silt with traces of	ML	8	XXX	11	112.3	9.4			2.25
clay; moist, firm and medium dense									
		9							
	ML								
		10							
Tan-brown silty sand; very moist, medium dense	SM		SPT						
		11							
			XXX	17	90.6	19.0			1.5
		12							
		13							
Increased moisture at 14'	SM	14							
		15							
Dark brown clayey silty sand; wet, firm	SC		SPT						
		16							
			XXX	7	88.3	27.2			.5
		17							
		18							
		19							
Grey-brown clayey silty sand; very moist,	SC								
medium dense		20							

DEPTH 23'

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 17 CONTINUED

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	W A T E R	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown clayey silty sand; very moist,	SC		2" Cal						
medium dense		21							
			XXX	18	113.1	14.5			2.5
		22	SPT						
Dark brown clayey silty sand; very moist, stiff	SC								
and dense; Bottom of hole at 23'		23	XXX	13	110.7	20.2			.5
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							

DEPTH 23' Job #4963

SOIL SURVEYS INC.

EXPLORATION DRILL LOG

HOLE NO. 18

PROJECT Ferrini Ranch # 4963 | DATE 9/13/07 | LOGGED BY MAR

DRILL RIG Cenozoic Exploration Crawler | HOLE DIA. 4" | SAMPLER 2" Cal & Terzaghi Split Spoon (SPT)

GROUNDWATER DEPTH: | INITIAL --- | FINAL --- | HOLE ELEV.

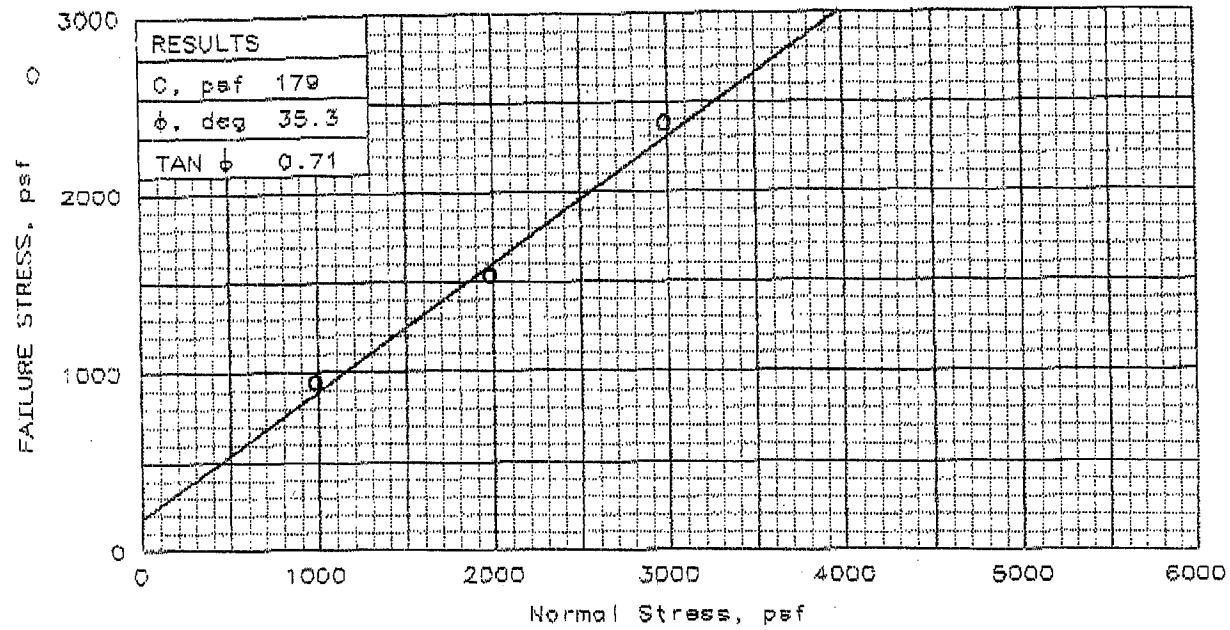
DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER	DRY DENSITY	WATER	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN.
Grey-brown silty sand/sandy silt; loose	SM/ML	1							
		2							
		3							
	SM/ML								
		4							
Dark brown silty sand with coarse grains and scattered fine gravel and traces of clay; moist, medium dense	SM/SC	5							
			2" Cal						
		6							
Same	SM/SC		XXX	23	106.7	14.9			>4.5
		7							
		8							
	SM/SC								
		9							
		10							
Orange brown fine sandy silt with traces of clay; medium dense	ML	11	SPT						
		12	XXX	20	93.6	14.6			1.45
	ML								
		13							
Reddish brown clayey silt/silty lean clay; moist, very stiff	ML/CL	14							
		15							
			SPT						
		16							
Same; Bottom of hole at 16.5'	ML/CL		XXX	22	82.2	19.0			2.0
		17							
		18							
		19							
		20							

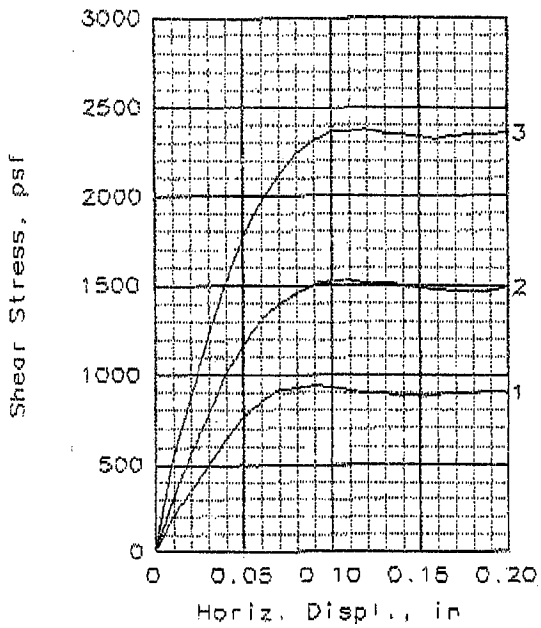
DEPTH 16.5'

SOIL SURVEYS INC.

APPENDIX B

DIRECT SHEAR TESTS





Specimen No.:		1	2	3
INITIAL	WATER CONTENT, %	2.1	2.1	2.1
	DRY DENSITY, pcf	106.9	106.5	107.1
	SATURATION, %	9.9	9.8	9.9
	VOID RATIO	0.577	0.583	0.574
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.2	19.7	18.8
	DRY DENSITY, pcf	107.9	107.7	108.5
	SATURATION, %	92.1	94.3	91.8
	VOID RATIO	0.562	0.566	0.553
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		1000	2000	3000
FAILURE STRESS, psf		941	1530	2379
DISPLACEMENT, in		0.09	0.11	0.12
RESIDUAL STRESS, psf				
DISPLACEMENT, in				
Strain rate, in/min		0.0200	0.0200	0.0200

SAMPLE TYPE: 2" Liner
DESCRIPTION: Dense,"dry",dark gray silty f-SAND(SM)

SPECIFIC GRAVITY= 2.7
REMARKS:

Fig. No.: _____

CLIENT: Soil Surveys,Inc.

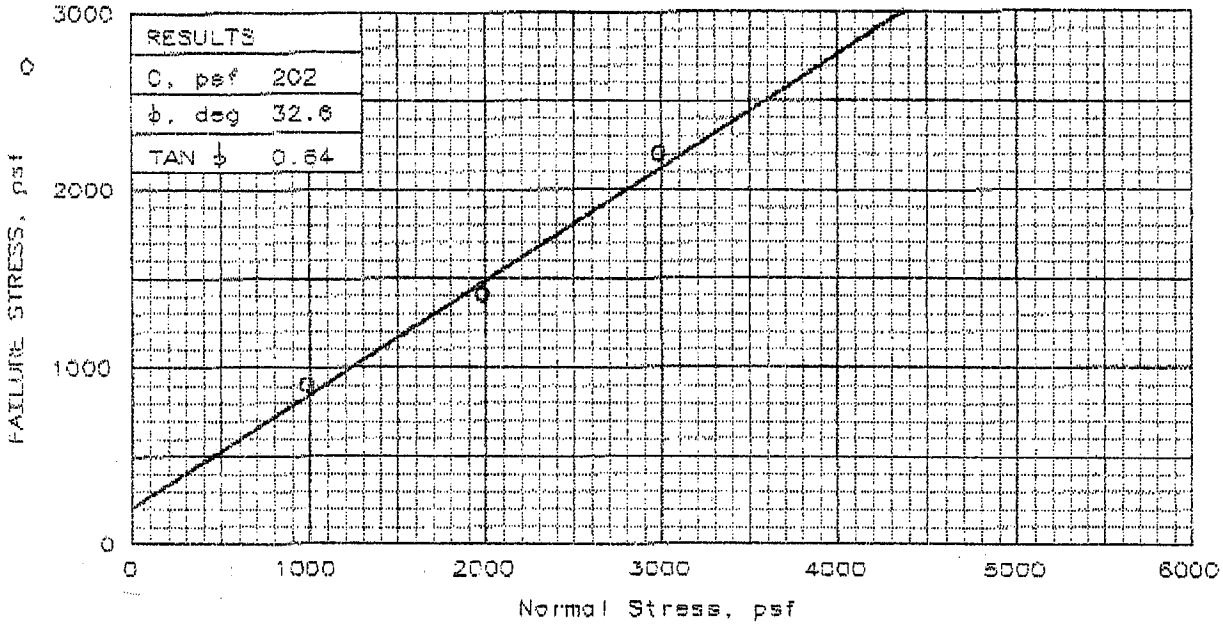
PROJECT:

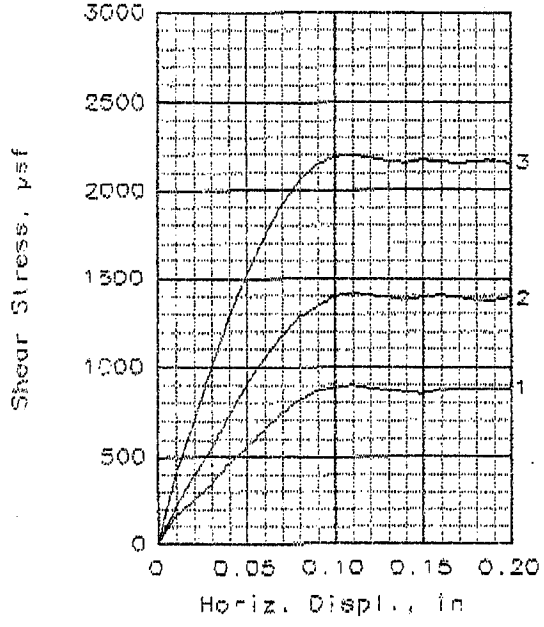
SAMPLE LOCATION: Sample No.1 2-2.5'

PROJ. NO.: 4963 DATE: 7-6-08

DIRECT SHEAR TEST REPORT

Soil Mechanics Lab





Specimen No.:		1	2	3
INITIAL	WATER CONTENT, %	1.6	1.6	1.6
	DRY DENSITY, pcf	102.0	102.6	101.5
	SATURATION, %	6.5	6.6	6.4
	VOID RATIO	0.652	0.644	0.660
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	21.0	20.8	21.1
	DRY DENSITY, pcf	103.2	103.9	103.0
	SATURATION, %	89.6	90.3	89.4
	VOID RATIO	0.634	0.622	0.637
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		1000	2000	3000
FAILURE STRESS, psf		899	1409	2200
DISPLACEMENT, in		0.11	0.11	0.11
RESIDUAL STRESS, psf				
DISPLACEMENT, in				
Strain rate, in/min		0.0200	0.0200	0.0200

SAMPLE TYPE: 2" Liner
DESCRIPTION: Loose(dry),dark gray/brn. silty f-SAND(SM)

SPECIFIC GRAVITY= 2.7
REMARKS:

Fig. No.: _____

CLIENT: Soil Surveys,Inc.

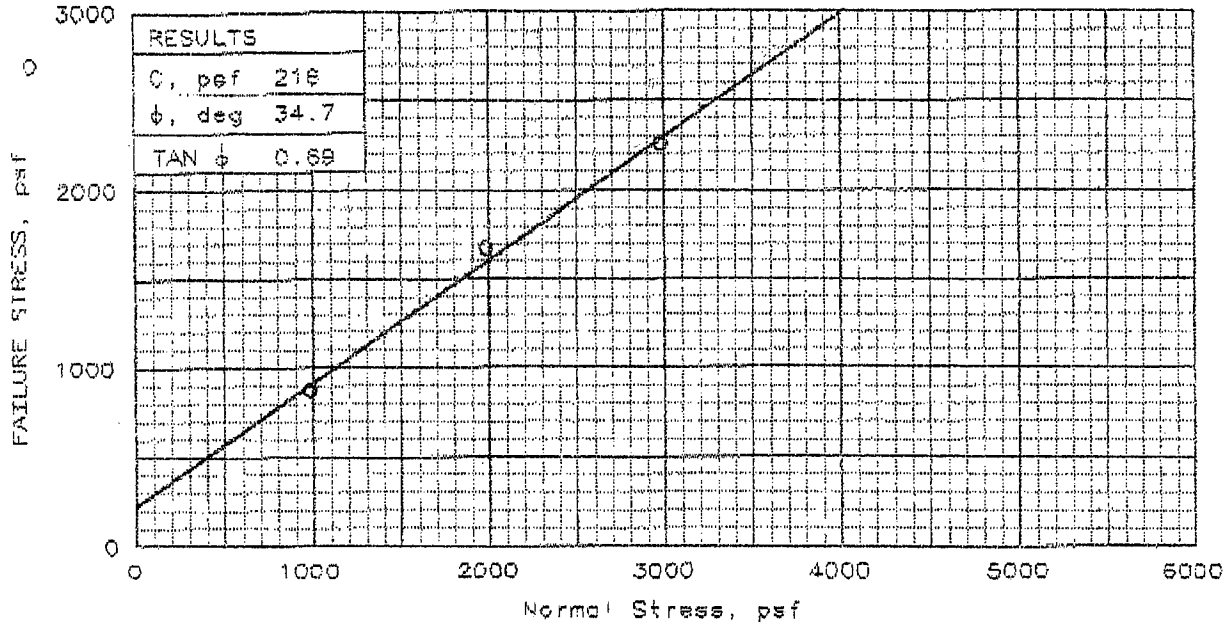
PROJECT:

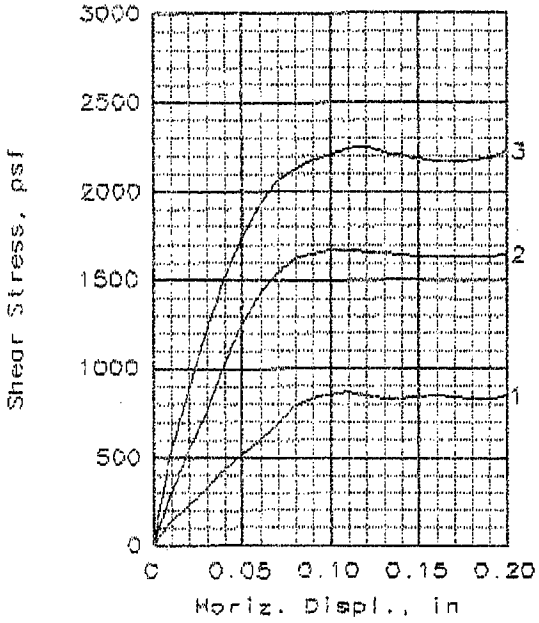
SAMPLE LOCATION: Sample No.10 2-2.5'

PROJ. NO.: 4963 DATE: 10-8-07

DIRECT SHEAR TEST REPORT

Soil Mechanics Lab





Specimen No.:		1	2	3
INITIAL	WATER CONTENT, %	2.4	2.4	2.4
	DRY DENSITY, pcf	111.2	110.7	111.7
	SATURATION, %	12.3	12.2	12.5
	VOID RATIO	0.516	0.523	0.509
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.8	17.0	16.9
	DRY DENSITY, pcf	112.5	112.1	113.3
	SATURATION, %	91.0	91.2	93.4
	VOID RATIO	0.498	0.503	0.488
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		1000	2000	3000
FAILURE STRESS, psf		869	1873	2252
DISPLACEMENT, in		0.11	0.11	0.12
RESIDUAL STRESS, psf				
DISPLACEMENT, in				
Strain rate, in/min		0.0200	0.0200	0.0200

SAMPLE TYPE: 2" Liner
DESCRIPTION: Loose(dry) dark gray/brn. silty f-SAND(SM)

SPECIFIC GRAVITY= 2.7
REMARKS:

Fig. No.: _____

CLIENT: Soil Surveys,Inc.

PROJECT:

SAMPLE LOCATION: Sample No. 13 2-2.5'

PROJ NO.: 4963 DATE: 10-8-07

DIRECT SHEAR TEST REPORT

Soil Mechanics Lab

APPENDIX C

R-VALUE TESTS

D&M CONSULTING ENGINEERS, INC.
A URS CORPORATION COMPANY

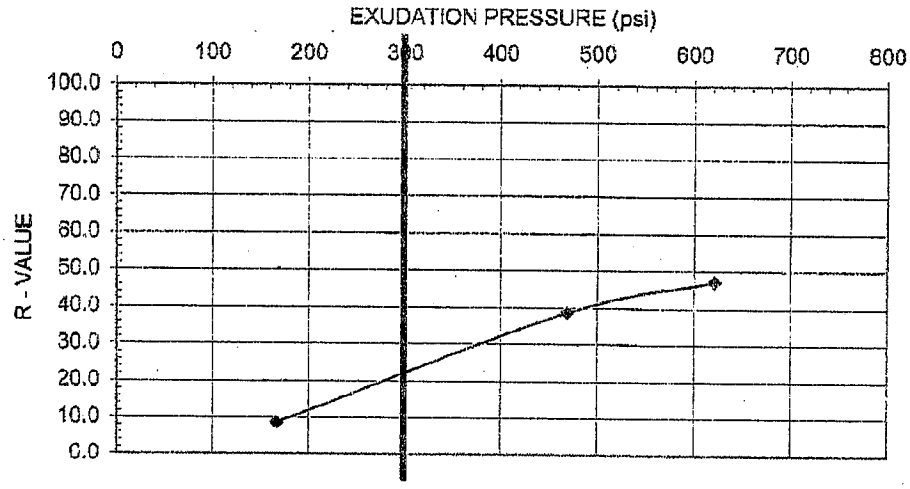
R-VALUE REPORT

ASTM D-2844, C-118

831 372 3716 Tel
831 372 7481 Fax

Project: Soil Surveys, Inc (4963) Farrini Ranch	Date: 7/3/07
Tested By: Cesar	Project #: 3239
Sample #: (4963) R1	Lab #: 5809
Location: Near lots 22+23	Sample Date: 6/27/07
Material: Med Brown Silty Sand	Sampled By: Soil Surveys

R-VALUE



NO.	Compact. Pressure psi	Density pcf	% Moist.	Expansion Pressure PSI	Horizontal Press. Psi @ 160 psi	Sample Heighth in.	Exudation Pressure psi	R Value	Corr. R Value
1	50	127.2	10.6	0.00	140	2.70	167	7.7	8.6
2	300	128.9	8.6	0.00	82	2.61	470	36.2	38.7
3	375	126.8	7.4	0.00	74	2.70	621	42.1	47.2

R-Value @ 300 psi Exudation Pressure = 24

Minimum R-Value Requirement:

Comments:

Reported by: Cesar Ramirez Laboratory Manager

R-ASTM rev. 2/28/07

D&M CONSULTING ENGINEERS, INC.
A URS CORPORATION COMPANY

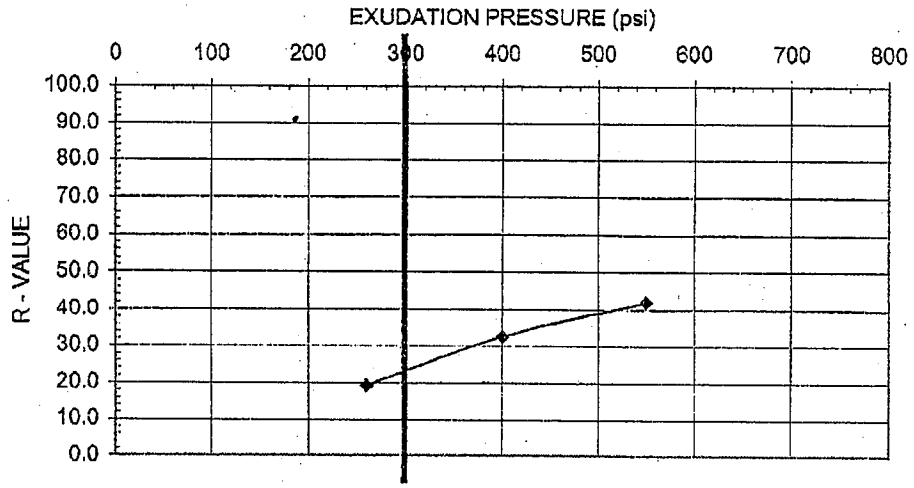
R-VALUE REPORT

ASTM D-2844, C-118

831 372 3716 Tel
831 372 7481 Fax

Project: Soil Surveys, Inc (4963) Ferrini Ranch	Date: 8/20/07
Tested By: Cesar	Project #: 3239
Sample #: (4963) R2	Lab #: 5829
Location:	Sample Date: 7/25/07
Material: Med Brown Silty Sand	Sampled By: Soil Surveys

R-VALUE



NO.	Compact. Pressure psi	Density pcf	% Moist.	Expansion Pressure PSI	Horizontal Press. Psi @ 160 psi	Sample Heighth in.	Exudation Pressure psi	R Value	Corr. R Value
1	60	126.8	11.1	0.00	140	2.65	260	17.2	19.2
2	280	128.5	9.7	0.00	82	2.60	400	31.1	32.5
3	350	127.4	8.5	0.00	74	2.58	550	44.1	42.0

R-Value @ 300 psi Exudation Pressure = 25

Minimum R-Value Requirement:

Comments:

Reported by: Cesar Ramirez Laboratory Manager

R-ASTM Rev. 2/23/01