State of California Business, Transportation and Housing Agency

M e m o r a n d u m (Revised)

Flex Your Power!
Be energy efficient!

To: Mr. Sam Amen
Design
(M.S. 340)

Date: November 6, 2007
File: 11-SD-79
P.M. 7.5/8.5
EA 11 – 270301

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2, Branch D

Subject: Soil Conditions and Site Rippability Assessment

Introduction and Project Descriptions

In response to your request dated July 30, 2007, we have reviewed the documents that you have submitted with your request to assess the rippabilty condition, at the proposed construction site. The rippability assessment will be incorporated into the planning stage for excavation and grading at the proposed construction site. The proposed project will include drainage improvement of approximately one mile of State Route 79 (SR-79) located north of Cuyamaca Rancho State Park in San Diego County, California.

SR-79 consists of a two-lane highway that runs in the north-south direction winding throughout the mountainous area of Cuymaca Rancho State Park. Cold Stream Creek crosses the highway at approximately half way through the proposed project length. At the creek crossing, water from occasional storm events over tops the highway creating hazardous conditions for traveling motorists. The proposed drainage improvement at the crossing location will consist of constructing a detention basin at the upstream side and replacing and realigning the drainage culvert.

The existing site of the proposed detention basin consists of a slightly sloping area with the bed of the creek formed mostly with rocks and boulders of varying size and shape. The site is covered with tall grass and medium size trees that were stripped and burned in the last fire event that struck the area. Topography of the site consists of a steep hillside on the south side of the creek and a moderately steep hillside on the north side of the creek. The creek bed is nearly flat at the upstream side of the crossing, with cobbles and boulders rising above the highway elevation in some of the areas at the crossing location. The cobbles and boulders seem to blend

with the exposed bedrock of the site.

Field Investigation and Subsurface Descriptions

The Office of Geotechnical Services-South 2 (OGS-S2) conducted a field investigation on September 18, 2007, to assess the rippability conditions at the site. Two test boreholes (Borings R-07-001 and R-07002) were drilled in the turnout area, on both sides of the existing drainage culvert at the locations shown on the Contour Grading and Drainage Plan Sheet G10, which is included in the attachments of this report. Environmental constrains prevented the drilling of locations within the area of the detention basin. The soil borings were advanced using a Mobil drilling rig utilizing wet-drilling techniques. Core samples were extracted using four-inch diameter and five feet long section tubing. During the field investigation samples were logged in the field by the soil engineer in accordance with Caltrans Soil and Rock Logging Manual (June 2007). The two borings (R-07-001 and R-07-002) were advanced to 20 and 30 feet respectively below existing ground surface (EGS). The Boring Records are included in the attachments of this report.

The subsurface conditions of the site as presented in the two borings, consists of a fill layer that is mostly light gray silty sand with gravel and is comprised of the top 3 to 5 feet of the borings. Underneath the sand and gravel an igneous rock zone was encountered. The rock zone consists of light gray to dark gray and brown moderately hard, moderately fractured to intensely weathered granite. The percentage of core recovery value (REC) and rock quality designation value (RQD) varied along the depth of the borings with REC ranging between zero and 80 percent and RQD between zero and 33 percent. The values for the REC, RQD and soils and rock descriptions are presented at their correspondent depths on the Boring Records, which are included in the attachment of this report.

Data Interpretation and Recommendations

The field investigation and site visual inspections concluded that the subsurface of the site is mainly fill, alluvium/colluviums and residual soils. The fill is limited to the area of the pavement of the highway shoulders and is shallow in depth. The alluvium/colluviums is flood deposited and washout from neighboring slope materials. Some of the alluvial/colluvial material deposited on the site is in the form of cobbles and boulders that vary in shape and size. The cobbles and boulders are in large number and specifically on the creek bed of the upstream portion of the creek crossing. The residual materials are in the form of fractured and decomposed granitic rocks that is underlying the alluvial/colluvial layer and extends in some areas to the ground surface. The subsurface materials presented in the boring records also show that the residual materials are extended to the maximum depth explored of 30 feet below EGS. The residual material of granitic rock is varying in the degree of weathering and fracturing throughout the depth of the borings. The site exploration encountered weak zones in the decomposed materials and frequent discontinuity in the bedding of the rock mass. Additionally, low values of RCE and RQD for the residual granitic bedrock were recorded.

Our assessment of site rippability conditions was solely based on our field investigation, site

visual inspection and the data presented in this section. The site may be rippable with difficulty and excavation may require the proper type of equipment. Conventional excavating machinery may experience some difficulties with some over sized boulders that may be wedged in confined space. High power machinery with the proper attachment, such as D10 or D11 bulldozers equipped with rippers, will have better capability of dislodging over sized boulders.

OGDS (South 2) staff will be available for further assistance. Should you have any questions or comments regarding this report, please contact Moussa Jandal at (858) 637-5545.

Moussa H Jandal

Prepared by
Moussa Jandal
TE (civil)

Attachments: Site Location — Figure 1
Boring Location — Contour Grading and Drainage Plan G-10
Boring Records — R-07-001 and R-07-002

cc Brian Hinman BH
File

Boring Records

Hole ID	Date Started	Date Ended	Geologist & Crew	Project Name	EA
R-07-001	9/18/2007	9/18/2007	M Jandal, David Miller	SR-79, Cold Stream Creek	11-270301

Top Hole Elev.	Location	Purpose of work	Dist - Co. - Rte. - PM
4560 FT	Offset & Station 169+46/L22 Ref Line "SD-79"	Drainage Improvement	11-SD-79-7.5/8.5

Groundwater Level: Date Measured — Depth to Water: No Record

Drilling Method	Drilling Equipment
Rotary Mud Drilling	Mobil Drill, 3174785

Lithological Descriptions

1. Group Name
2. Group Symbol
3. Consistancy/Apparent Density
4. Color
5. Moisture
6. Partical Size & Shape
7. Gradation
8. Plasticity
9. Structure
10. Cementation
11. Organics
12. Fill Material
13. Other

Boring Depth (ft)	Boring Depth (meter)	Sample Number	Total Hole Depth: SPT	CA Modified	Coring	Total Recovery	% Recovery	RQD	Lab Work Assigned	SPT Blows per .3 meter: .15 meter	SPT total	Graphic Log	Lithological Description
1													SILTY SAND and GRAVEL (SM), compacted, light brown, slightly moist [FILL]
2													
3	1						32	13					
4													IGNEOUS ROCK (GRANITIC), light gray and gray, slighly weathered, moderately hard, moderately to intensely fractured
5													
6													
7	2												
8							47	10					
9													- light gray with oxidation stains
10	3												
11													- moderately fractured
12													
13	4						80	33					
14													- very intensely fractured to decomposed
15													
16													
17	5												
18							53	0					
19													
20	6												

Bottom of Borehole at 20.0 feet. Boring terminated at planned depth.

Boring Records

Hole ID	Date Started	Date Ended	Geologist & Crew	Project Name	EA
R-07-002	9/18/2007	9/18/2007	M Jandal, David Miller	SR-79, Cold Stream Creek	11-270301

Top Hole Elev.	Location	Purpose of work	Dist - Co. - Rte. - PM
4563 FT.	Offset & Station 170+03/L13 Ref Line "SD-79"	Drainage Improvement	11-SD-79-7.5/8.5

Groundwater Level: Date Measured — Depth to Water: No Record

Drilling Method: Rotary Mud Drilling

Drilling Equipment: Mobil Drill, 3174785

Lithological Descriptions

1. Group Name
2. Group Symbol
3. Consistancy/Apparent Density
4. Color
5. Moisture
6. Partical Size & Shape
7. Gradation
8. Plasticity
9. Structure
10. Cementation
11. Organics
12. Fill Material
13. Other

Boring Depth (ft)	Boring Depth (meter)	Sample Number	Total Hole Depth: SPT	CA Modified	Coring	Total Recovery	% Recovery	RQD	Lab Work Assigned	SPT Blows per .3 meter: .15 meter	SPT total	Graphic Log	Lithological Description
1													SILTY SAND and GRAVEL (SM), compacted, light brown, slightly moist [FILL]
2													
3	1						0	0					
4													
5													
6													IGNEOUS ROCK (GRANITIC), light gray, slighly weathered, moderately hard, moderately to intensely fractured with oxidation stains
7	2												
8							75	25					
9													
10	3												
11													- moderately fractured
12													
13	4						66	15					
14													- dark gray, very intensely fractured to decomposed
15													
16													
17	5												
18							50	0					
19													
20	6												

Bottom of Borehole at 20.0 feet. Boring terminated at planned depth.

Boring Records

Hole ID	Date Started	Date Ended	Geologist & Crew	Project Name	EA
R-07-002	9/18/2007	9/18/2007	M Jandal, David Miller	SR-79, Cold Stream Creek	11-270301

Top Hole Elev.	Location	Purpose of work	Dist - Co. - Rte. - PM
4563 FT.	Offset & Station 170+03/L13 Ref Line "SD-79"	Drainage Improvement	11-SD-79-7.5/8.5

Groundwater Level: Date Measured — Depth to Water: No Record

Drilling Method	Drilling Equipment
Rotary Mud Drilling	Mobil Drill, 3174785

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6. Partical Size & Shape
7. Gradation
8. Plasticity
9. Structure
10. Cementation
11. Organics
12. Fill Material
13. Other

Boring Depth (ft)	Boring Depth (meter)	Sample Number	Total Hole Depth: SPT	CA Modified	Coring	Total Recovery	% Recovery	RQD	Lab Work Assigned	SPT Blows per .3 meter: .15 meter	SPT total	Graphic Log
21												
22												
23	7						30	27				
24												
25												
26												
27	8											
28							70	13				
29												
30	9											
31												
32												
33	10											
34												
35												
36												
37	11											
38												
39												
40	12											

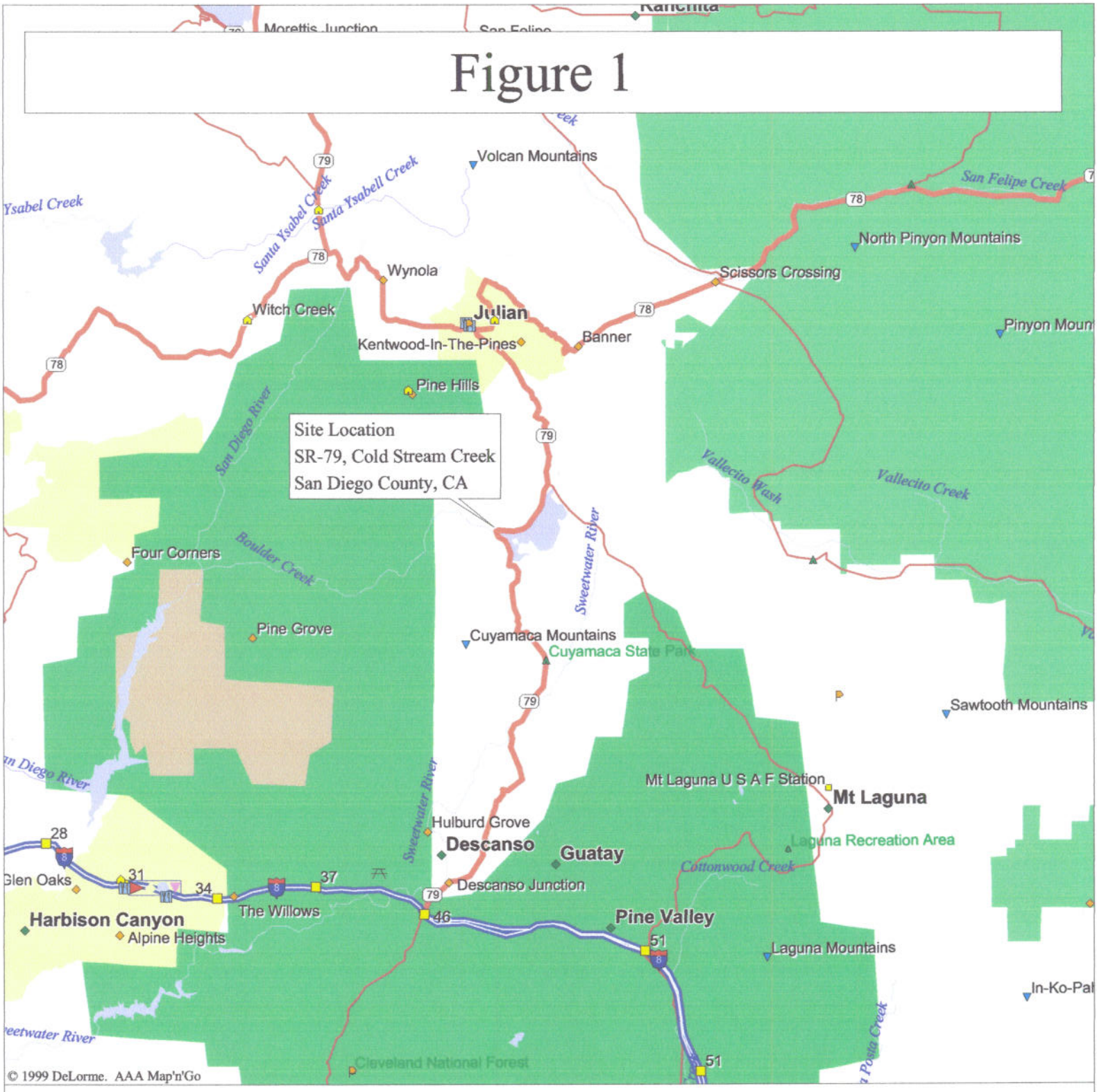
IGNEOUS ROCK (GRANITIC), dark gray, slighly weathered, moderately hard, moderately to intensely fractured

- light gray, dark gray and brown, intensely to moderately weathered

- very intensely weathered to decomposed

Bottom of Boring at 30 feet. Boring was terminated at planned depth.

Figure 1


Site Location
SR-79, Cold Stream Creek
San Diego County, CA
Volcan Mountains
Santa Ysabel Creek
Ysabel Creek
San Felipe Creek
North Pinyon Mountains
Scissors Crossing
Wynola
Julian
Witch Creek
Kentwood-In-The-Pines
Banner
Pine Hills
San Diego River
Vallecito Wash
Vallecito Creek
Sweetwater River
Four Corners
Boulder Creek
Pine Grove
Cuyamaca Mountains
Cuyamaca State Park
Sawtooth Mountains
Mt Laguna U S A F Station
Mt Laguna
Hulburd Grove
Descanso
Guatay
Laguna Recreation Area
Cottonwood Creek
Glen Oaks
Descanso Junction
The Willows
Harbison Canyon
Alpine Heights
Pine Valley
Laguna Mountains
In-Ko-Pah
Cleveland National Forest
© 1999 DeLorme. AAA Map'n'Go
Mag 11.00
Mon Oct 01 13:05 2007
Scale 1:250,000 (at center)
5 Miles
5 KM
Major Connector
State Route
Primary State Route
Rest Area
Interstate/Limited Access
Point of Interest
Small Town
Geographic Feature
Park/Reservation
Exit/Gas
Exit/Lodging
Exit/Food
Exit/Other Services
Locale
Exit
Population Center
Water
Indian Reservation
National Park
State Park/Forest
River/Canal

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	79	7.5 / 8.5		

REGISTERED CIVIL ENGINEER DATE

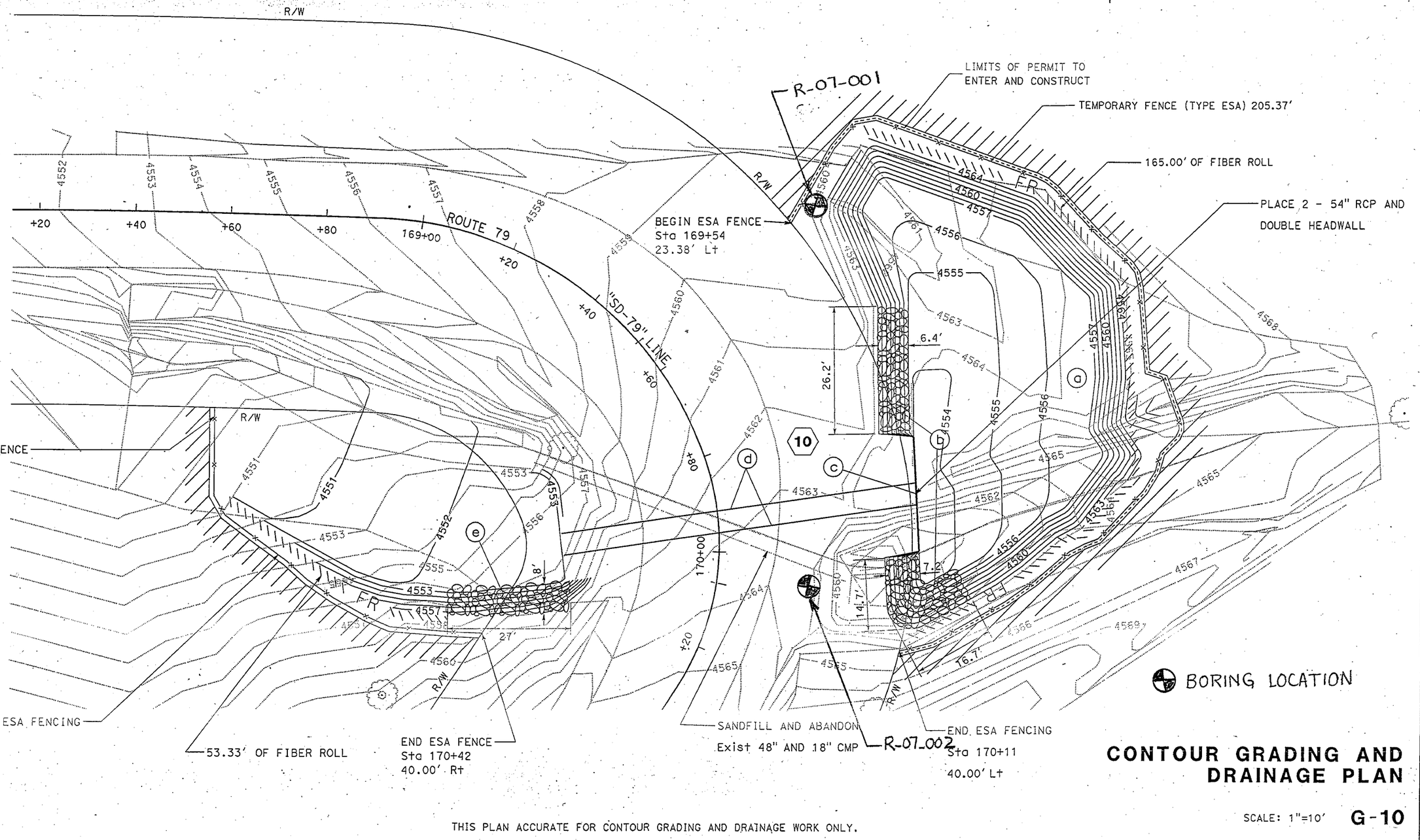
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER — S. SOROURBAKHSH — No. 52814 — Exp 12-31-08 — CIVIL — STATE OF CALIFORNIA

DRAINAGE SYSTEM No. 10

Sta 169+95



CONTOUR GRADING AND DRAINAGE PLAN

SCALE: 1"=10'

G-10

THIS PLAN ACCURATE FOR CONTOUR GRADING AND DRAINAGE WORK ONLY.

CALCULATED-DESIGNED BY	M. NAKAJIMA	REVISED BY	
CHECKED BY	S. SOROURBAKHSH	DATE REVISED	
FUNCTIONAL SUPERVISOR	S. AMEN		
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	DESIGN		

LAST REVISION 04-25-07 | DATE PLOTTED => 31-AUG-2007 | TIME PLOTTED => 15:52

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