Southwest Geotechnical, Inc.
Consulting Engineers & Geologists

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Santa Clarita, California 91350
Tel: (661) 222-9544 - Fax: (661) 222-9549

October 26, 2015
SGI #1509233

Ms. Margo Mandel
Care of Mr. Matt Haines
3002 Sequit Drive
Malibu, California, 90265

Subject: Geotechnical Update Report, 3004 Sequit Drive (formally 2940 Sequit Drive), APN 4457-016-064, Tract 9456, Lots 83 & 84, Malibu Area, County of Los Angeles, California

Reference: "Preliminary Geologic and Geotechnical Engineering Report, Proposed Single-Family Residence, 2940 Sequit Drive, Malibu, California", by Southwest Geotechnical, Inc., dated April 30, 2003, SGI #0105167-B

Dear Ms. Mandel,

At your request, Southwest Geotechnical, Inc. (SGI) has prepared this Update Report for the proposed construction at the subject site. The primary purpose of this letter is to update the referenced report prepared by SGI, as it is more than 10 years old. The recommendations contained within the older referenced report remain applicable, and should be complied with except as modified within this report. Unless it has already been submitted, the referenced preliminary report should be submitted with this report to the County for their review. The proposed construction is reduced from that which was initially planned, but consists of a 3-bedroom, single-family residence constructed on pile and gradebeam foundations bearing into bedrock.

We have conducted work on other projects in the area on numerous occasions since the initial work was completed at this site, including observations during the construction of the adjacent residence to the north (3002 Sequit Drive). Most recently, we conducted a visual reconnaissance of the site on September 28, 2015. Based on this it is apparent that the site has not changed significantly (geotechnically speaking) from what was originally evaluated. During this observation, we noted a large rock located between the proposed residence and Sequit Drive, which could potentially represent a rockfall hazard below the site (see Photograph below).

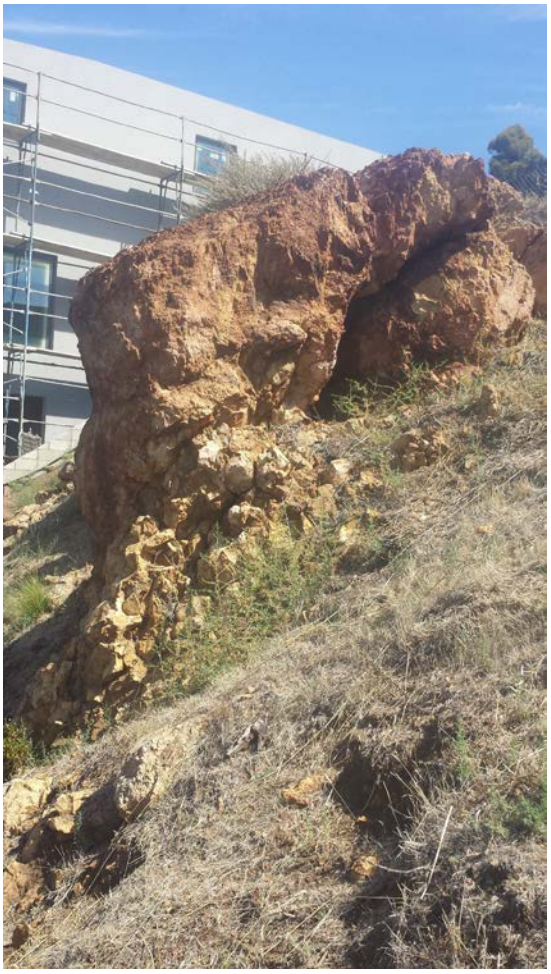


Photo of Rock below proposed residence representing rockfall hazard to Sequit Dr.

We recommend that this rock be 1) removed, or 2) grouted/cemented into place, or 3) rock bolted or strapped to the underlying bedrock.

We conclude that the development of the site remains feasible as stated in the referenced report and as described in the referenced reports. This assumes that the recommendations contained within the above-referenced report prepared by SGI are implemented for the future design and construction phases of the project, and that SGI observes and verifies any planned grading of footing excavations.

Seismic Design Considerations

Future structures should be designed in accordance with the applicable seismic building code as determined by the structural engineer.

The following values of short and long period accelerations are recommended for the Risk-Targeted Maximum Considered Earthquake (MCE_R) based on the ASCE 7-2010 with July 2013 errata. The design spectral response acceleration parameters presented on the following table were generated by the USGS Seismic Design Map Website (https://geohazards.usgs.gov/designmaps.us/application.php). Detailed plots are appended to this report.

CBC SPECTRAL RESPONSE AND COEFFICIENTS	
Latitude	34.0433 degrees north
Longitude	118.7428 degrees west
Site Class	C
0.2 Sec Spectral Response SMs (SDs)	2.358 g (1.572 g)
1.0 Sec Spectral Response SM_1 (SD_1)	1.073 g (0.715 g)
Site Coefficient F_a	1.0
Site Coefficient F_v	1.3

Seismic Wall Pressure

Retaining walls greater than 6 feet in height require seismic design loading per County requirements. Currently, we expect retaining walls will be on the order of 2-3 feet. The method for the determination of seismic wall pressures is prescribed by Los Angeles County in their Residential Code Manual. The seismic pressure coefficient K_h is defined as $S_{DS}/2.5$. The value of SDS as reported in our report is 1.572 which then gives K_h = 1.572/2.5 = 0.623. Because the seismic pressure varies with the wall height, we have tabulated the seismic resultant force for different wall heights:

Wall Height (ft)	Seismic Force (lb)
6	1060
8	1890
10	2950

The seismic resultant force acts at a height of 0.6H above the base of wall. We expect that no walls will require seismic loading, due to heights below 6 feet.

Offsite Wall Surcharge

The project includes a retaining wall that will be constructed adjacent to the north property line. The offsite property to the north is lower than the subject grade by approximately 10 feet, with the elevation difference retained by a retaining wall constructed on the offsite property (see Section B-B'). Retaining walls constructed adjacent to this offsite wall should be constructed on deepened pile foundations that bear below a 1:1 projection up from the base of the existing retaining wall to prevent surcharge from the new wall to the existing offsite retaining wall. The onsite retaining wall will be on the order of 3 feet high.

LIMITATIONS

SGI has attempted to prepare this report in accordance with generally accepted geotechnical engineering methods as practiced in this community at this time. No warranty or guarantee is expressed or implied. This letter has been prepared for the use of the client and their authorized agents.

The statements contained in this Update Report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the conclusions of this letter may be invalidated, wholly or partially, by changes outside of our control, and should therefore be reviewed after one year.

CLOSURE

We expect that this Report meets your current needs. Southwest Geotechnical Incorporated appreciates this opportunity to provide professional Geotechnical engineering services for this project. If you have any questions regarding the information contained in this letter, or if you require additional professional input and services, please contact us.

Respectfully submitted,
SOUTHWEST GEOTECHNICAL, INC.

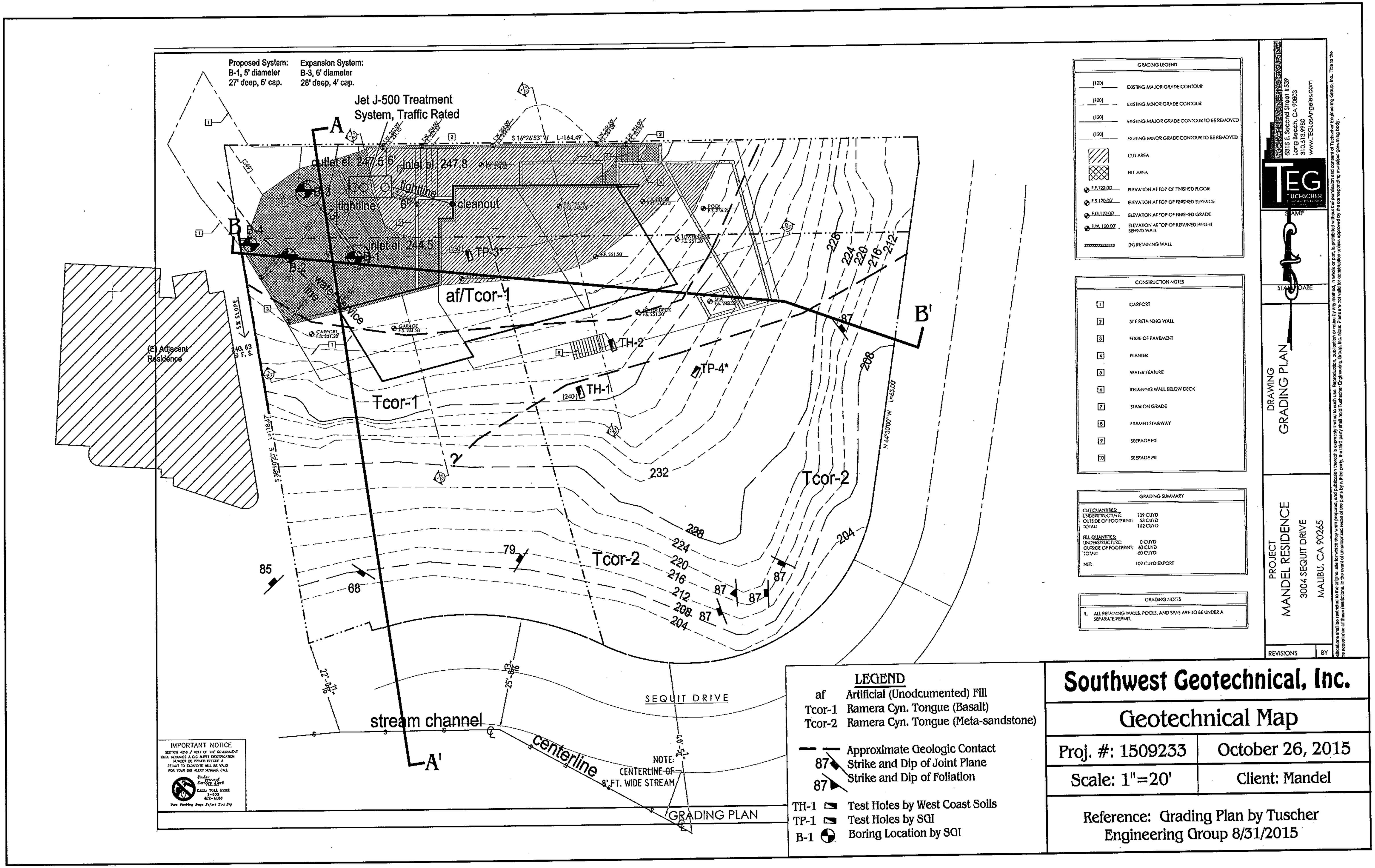
Karl J. Schwartz
Project Engineer
PE #C78281

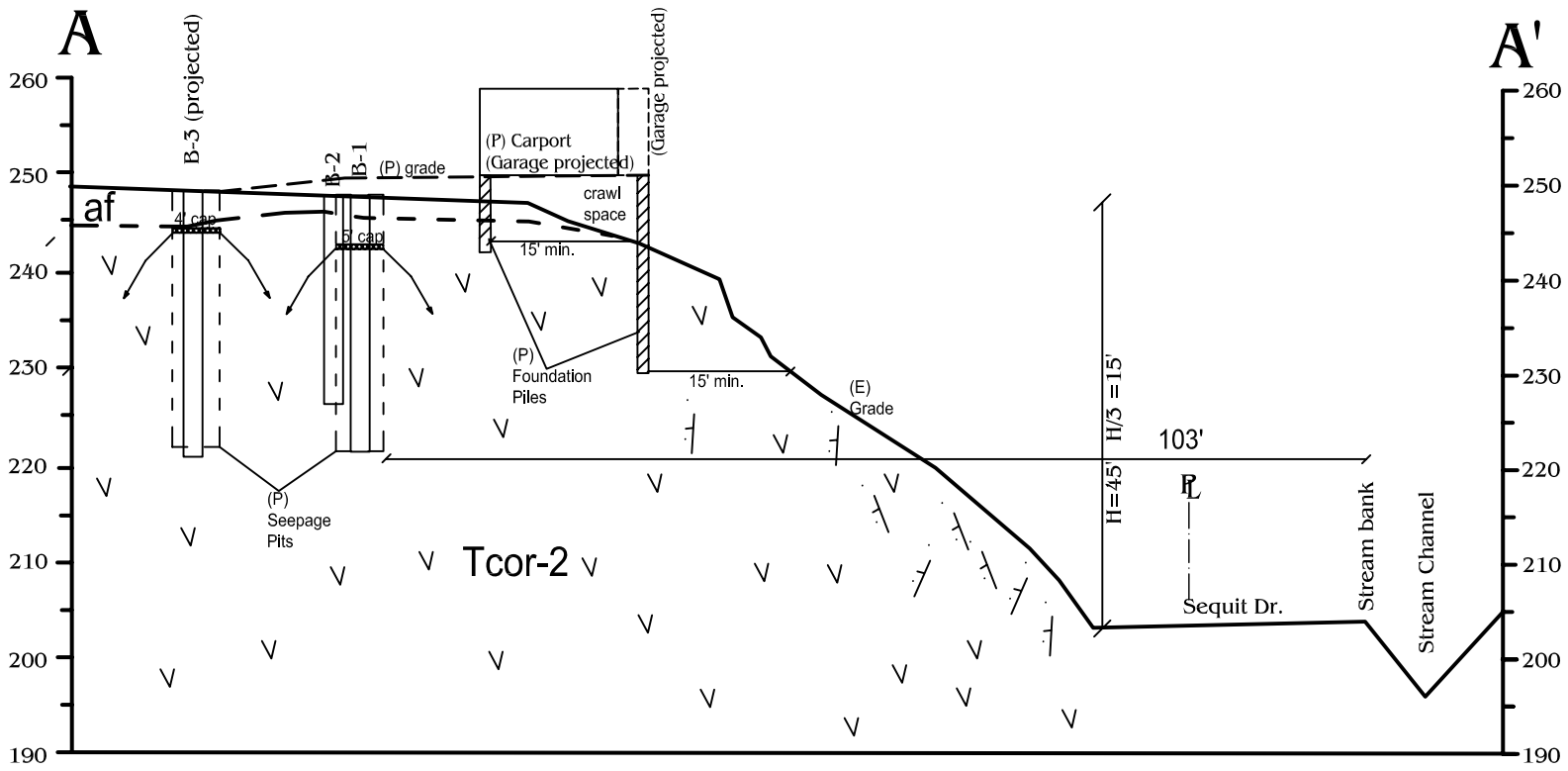
Conrad Carrle
Engineering Geologist
CEG #2359

KJS/CC:ss
Mandel 1509233 Geotechnical Update.doc

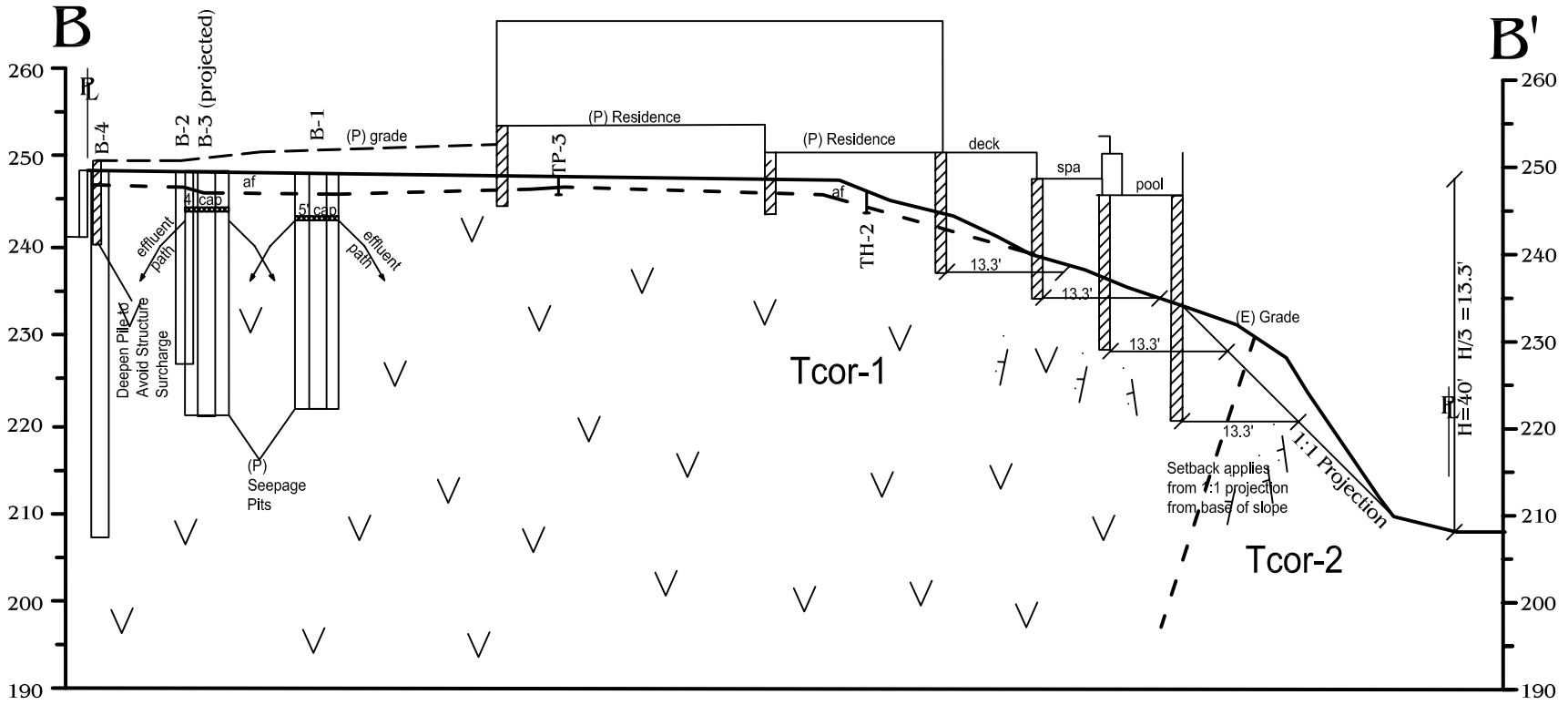
Distribution: Client (5)

Attachments: Geotechnical Map
Cross Sections A & B
USGS Design Maps Summary Report
USGS Design Maps Detailed Report (6)


Proposed System:
B-1, 5' diameter
27' deep, 5' cap.
Expansion System:
B-3, 6' diameter
28' deep, 4' cap.
Jet J-500 Treatment
System, Traffic Rated
outlet el. 247.5
inlet el. 247.8
tightline
cleanout
inlet el. 244.5
water service line
af/Tcor-1
Tcor-1
Tcor-2
TH-1
TH-2
TP-3*
TP-4*
B-1
B-2
B-3
B-4
A
A'
B
B'
(E) Adjacent Residence
stream channel
centerline
SEQUIT DRIVE
NOTE: CENTERLINE OF 8' FT. WIDE STREAM
GRADING PLAN
IMPORTANT NOTICE
GRADING LEGEND
EXISTING MAJOR GRADE CONTOUR
EXISTING MINOR GRADE CONTOUR
EXISTING MAJOR GRADE CONTOUR TO BE REMOVED
EXISTING MINOR GRADE CONTOUR TO BE REMOVED
CUT AREA
FILL AREA
ELEVATION AT TOP OF FINISHED FLOOR
ELEVATION AT TOP OF FINISHED SURFACE
ELEVATION AT TOP OF FINISHED GRADE
ELEVATION AT TOP OF RETAINED HEIGHT BEHIND WALL
(N) RETAINING WALL
CONSTRUCTION NOTES
1 CARPORT
2 SITE RETAINING WALL
3 EDGE OF PAVEMENT
4 PLANTER
5 WATER FEATURE
6 RETAINING WALL BELOW DECK
7 STAIRS ON GRADE
8 FRAMED STAIRWAY
9 SEEPAGE PIT
10 SEEPAGE PIT
GRADING SUMMARY
CUT QUANTITIES:
UNDERSTRUCTURE: 109 CUYD
OUTSIDE OF FOOTPRINT: 53 CUYD
TOTAL: 162 CUYD
FILL QUANTITIES:
UNDERSTRUCTURE: 0 CUYD
OUTSIDE OF FOOTPRINT: 60 CUYD
TOTAL: 60 CUYD
NET: 102 CUYD EXPORT
GRADING NOTES
1. ALL RETAINING WALLS, POOLS, AND SPAS ARE TO BE UNDER A SEPARATE PERMIT.
TEG TUCHSCHER
TUCHSCHER ENGINEERING GROUP INC.
5318 E. Second Street #539
Long Beach, CA 90803
www.TEGLosAngeles.com
DRAWING
GRADING PLAN
PROJECT
MANDEL RESIDENCE
3004 SEQUIT DRIVE
MALIBU, CA 90265
REVISIONS
BY
LEGEND
af Artificial (Unodcumented) Fill
Tcor-1 Ramera Cyn. Tongue (Basalt)
Tcor-2 Ramera Cyn. Tongue (Meta-sandstone)
Approximate Geologic Contact
87 Strike and Dip of Joint Plane
87 Strike and Dip of Foliation
TH-1 Test Holes by West Coast Soils
TP-1 Test Holes by SGI
B-1 Boring Location by SGI
Southwest Geotechnical, Inc.
Geotechnical Map
Proj. #: 1509233
October 26, 2015
Scale: 1"=20'
Client: Mandel
Reference: Grading Plan by Tuscher Engineering Group 8/31/2015



Southwest Geotechnical, Inc.	
Cross Section A-A'	
Proj. #: 1509233	October 26, 2015
Scale: 1"=20'	Client: Mandel
Reference: Grading Plan by Tucher Engineering Group, dated 8/31/15	

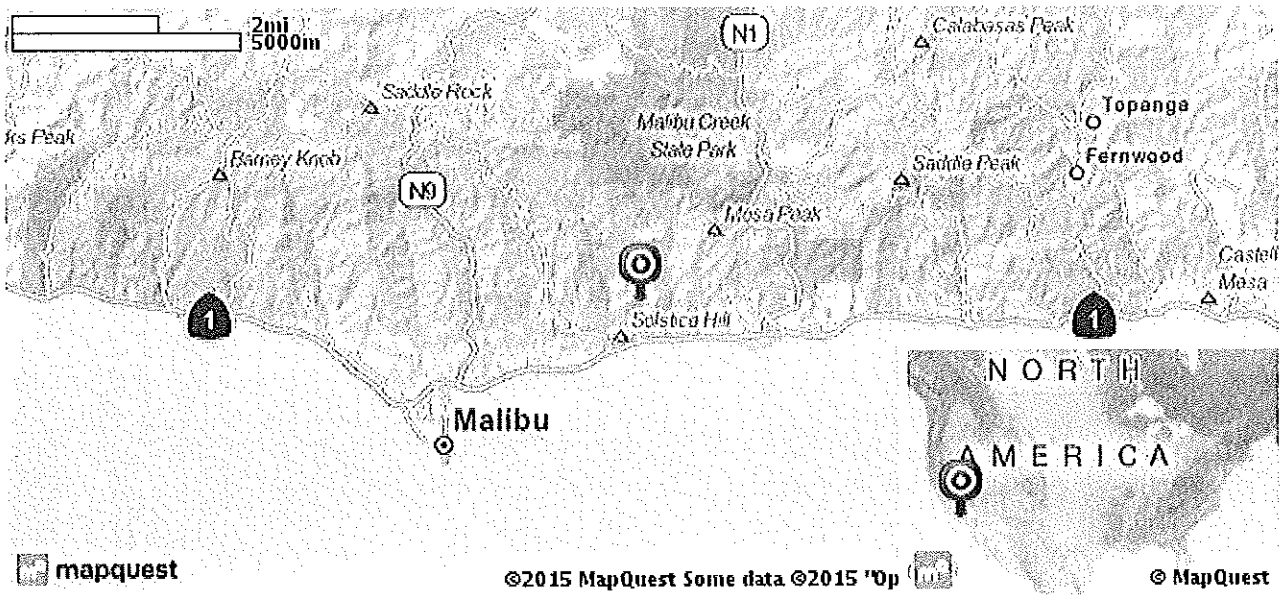


Southwest Geotechnical, Inc.	
Cross Section B-B'	
Proj. #: 1509233	October 26, 2015
Scale: 1"=20'	Client: Mandel
Reference: Grading Plan by Tucher Engineering Group, dated 8/31/15	

USGS Design Maps Summary Report

User–Specified Input

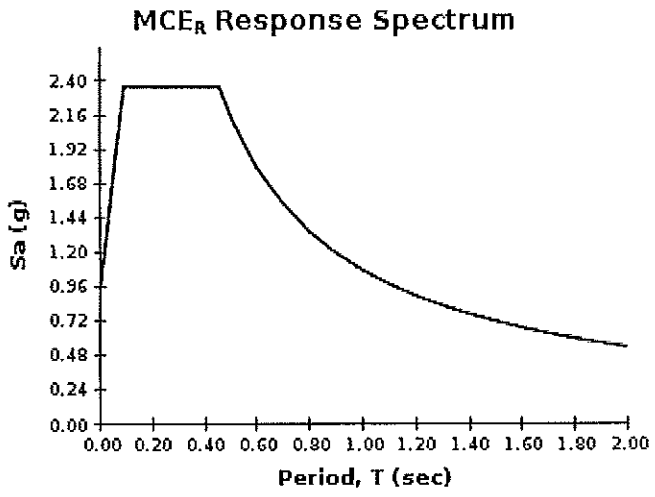
Report Title	3004 Sequit Drive Thu October 22, 2015 15:54:43 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.0433°N, 118.7428°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"
Risk Category	I/II/III

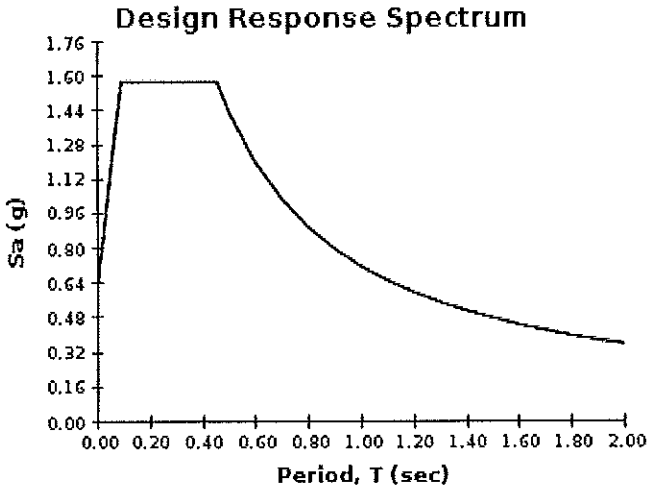


USGS–Provided Output

S_S =	2.358 g	S_{MS} =	2.358 g	S_{DS} =	1.572 g
S_1 =	0.825 g	S_{M1} =	1.073 g	S_{D1} =	0.715 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.0433°N, 118.7428°W)

Site Class C – "Very Dense Soil and Soft Rock", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 2.358$ g

From Figure 22-2 [2] $S_1 = 0.825$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class C, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = C and S_S = 2.358 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = C and S_1 = 0.825 g, F_v = 1.300

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.358 = 2.358$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.300 \times 0.825 = 1.073$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

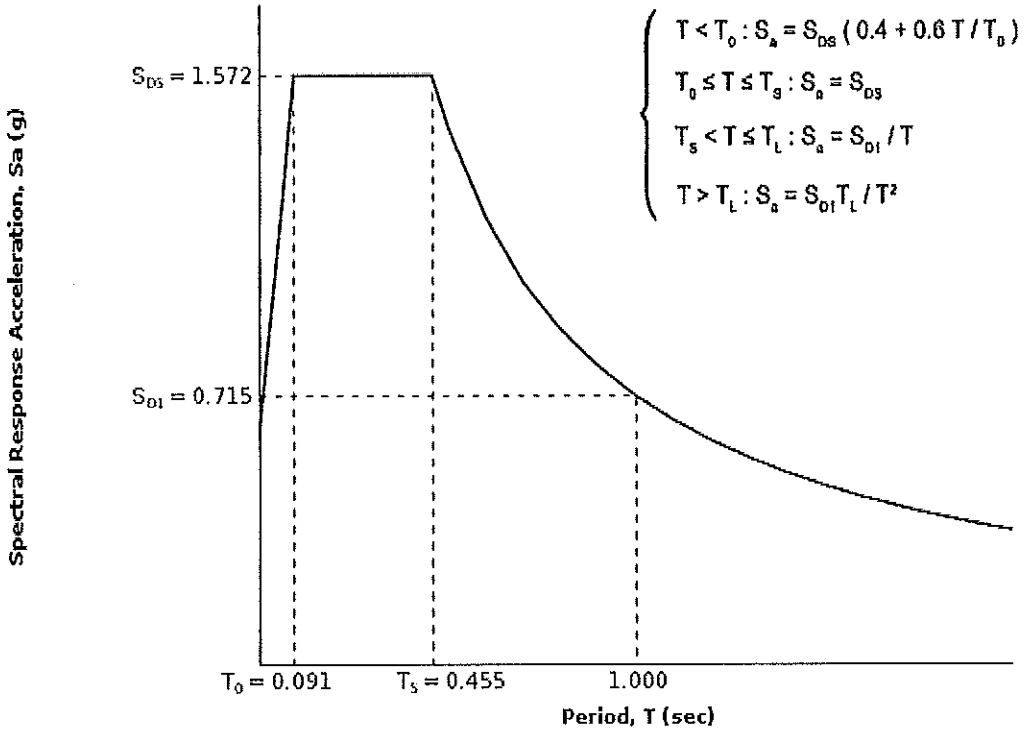
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.358 = 1.572$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.073 = 0.715$ g

Section 11.4.5 — Design Response Spectrum

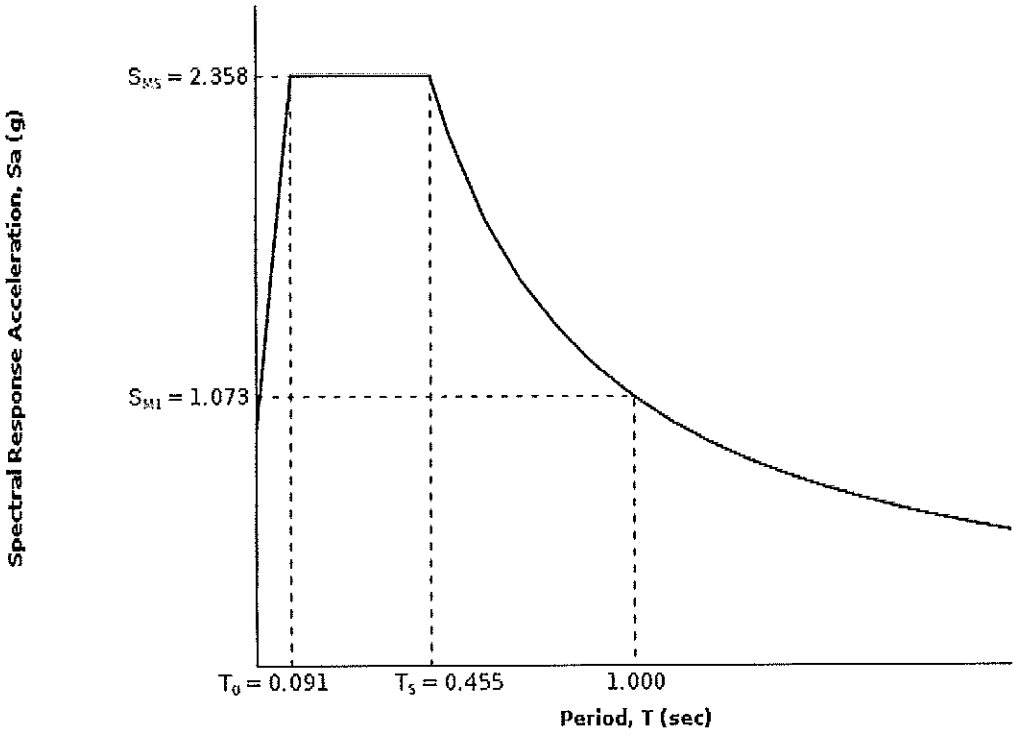
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.990

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.990 = 0.99$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = C and PGA = 0.990 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.853

From Figure 22-18 [6] C_{R1} = 0.865

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.572 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.715 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf