THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
"Trust the Name You Know"
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November 29, 2000
JB 18457-I

Palisades Landmark LLC
10600 Santa Monica Boulevard
Los Angeles, California 90025

Attention: Ken Kahan

Subject

Addendum Geologic and Soils Engineering Exploration Report
Proposed Landslide Repair and Multi-Unit Condominium and Town Home Buildings
Tentative Tract 52928
17331-17333 Tramonto Drive
Pacific Palisades, California

Grading Section Log # 31587

References: **Report by The J. Byer Group, Inc.:**

Geologic and Soils Engineering Exploration, Proposed Landslide Repair and Multi-Unit Condominium and Town Home Buildings, Tentative Tract 52928, 17331-17333 Tramonto Drive, Pacific Palisades, California, dated August 16, 2000.

City of Los Angeles Department of Building and Safety, Grading Section, review letter, dated September 21, 2000.

Gentlemen:

The J. Byer Group has prepared this addendum report to provide additional information to the Grading Section for the design and construction of the proposed project. This addendum report follows consultation with the reviewing engineering geologist on November 15, 2000 and the chief geotechnical engineer of the Grading Section, on November 16, 2000. The city review letter dated September 21, 2000 is attached for reference.

Copy 2

Item 1 - *Provide exploration data for the area outside of the active landslide between sections L and K to determine if there are any adverse geologic conditions; see item #2 of the referenced Department letter.*

Additional exploration was performed on the site on October 24, 2000. Boring 6 was drilled to a depth of 60 feet with a limited access, bucket-auger drill rig. The 24 inch diameter boring was downhole logged by the undersigned engineering geologist. Earth materials encountered in the boring are described on the Log of Boring 6. Attempts were made to drill the boring on the steep slope outside of the active slide and between Sections L and K. However, the slope gradient in the area of the property outside the slide and between Sections L and K is 1:1 and too steep for a drill rig. The subject slope was manufactured at a 1:1 gradient during site development and has been performing well since the 1960's. It was not considered prudent to grade a drill bench on the cut slope near the northern property line and upslope residences. Geologic mapping of the cut performed by Pacific Soils and Crandall in the 1960's and 1970's indicate that bedding strikes consistently northwest and dips steeply to the northeast.

Soldier piles have been recommended along the property line to protect the upslope properties during grading. It is recommended that the soldier pile excavations be downhole logged by the project engineering geologist to verify that there are no adverse geologic conditions.

Item 2 - *Provide design calculations for the proposed shoring along cross-sections that are oriented to show the steeper slide plane dips that exist along the edges of the landslide; determine the most critical orientation and design load.*

The base of the slide along the margins of the Revello Drive slide is steep to near vertical. Calculation sheet #12 analyzes potential failure surfaces with angles between 20 and 70 degrees. A failure angle of 50 degrees using a shear strength of 140 pounds per square foot (cohesion) and 14 degrees (phi angle) results in the highest thrust (123 kips). The critical shear strength used in the calculation was determined in response to Item 7 below. Also, in response to Item 7, the loads on soldier piles supporting slide debris was re-analyzed using different combinations of phi and cohesion. The recommended design force for temporary soldier piles P1 through P10 (shown on

Geologic Map) is 175 kips per foot. Between piles P10 and P17 (Sections A and C) the design force may decrease linearly from 175 to 145 kips per foot. From P17 to P30, the design force should be 145 kips per foot.

Piles P1 through P30 (see Geologic Map) will support slide debris in the down-failure direction. Remaining piles will support bedrock or slide debris in the up-failure direction (southern property line). Therefore, the recommended design forces for piles P1 through P30 are greater than calculation sheet#12.

Item 3 - *Provide recommendations for stabilization of the portion of the site that extends down to Castellammare Drive and is affected by the active landslide.*

A narrow strip (20 foot wide) of the subject property extends to Castellammare Drive and coincides with the eastern toe of the Revello Drive slide. This strip of property would be the best location for the subdrain system to discharge to the street. The owner of the downslope property (Palmer) is currently processing plans to stabilize and develop the toe of the Revello Drive slide. Ideally, the strip of land would be removed, the subdrain installed, and the void backfilled coeval with construction of the Palmer project. If the downslope property is not re-developed, or if cooperation is not possible, then the subdrain system could be installed within a shored trench. Construction of the subdrain system will remove the slide debris.

Item 4 - *Submit a copy of the report to the Bureau of Engineering Geotechnical Division, 650 S Spring St., Suite 600 for their review.*

It is our understanding that a copy of our preliminary report has been submitted to the Geotechnical Division of the Bureau of Engineering.

Item 5 - *Clarify what are the highest acceptable groundwater levels in the upper and lower landslide for the stability of the proposed temporary excavation, and clarify how those levels will be verified before starting the excavation.*

It is recommended that the removal of the slide not commence until the summer and it can be demonstrated that groundwater is not present above the lower slide plane. The water level can be demonstrated by logging the shoring pile excavations.

Item 6 - *Provide geologic cross-sections for the access driveway at the northeastern edge of the site based upon additional subsurface exploration; it appears that there may be unsupported bedding planes on the steep slope below; Provide slope stability calculations.*

Substantial subsurface exploration has been performed on the adjacent properties below (northeast and east) the subject property. Additional research was performed at the Grading Section to locate boring logs and Geologic Maps. Geotechnical reports for Tentative Tract 52857 and a condominium development at Los Liones Drive and Tramonto Drive were recently submitted to the Department and approved. MAA Engineering Consultants, Inc. is the geotechnical consultant of record for Tentative Tract 52857. The MAA Engineering Consultants report also contains boring logs by the former geotechnical consultant, California Geosystems. Copies of the MAA Engineering Consultants and Geosystems boring logs were provided to The J. Byer Group by the Department. Through the years, Geosoils has performed numerous geotechnical reports for the property located at 17315 Sunset Boulevard (intersection of Sunset Boulevard and Los Liones Drive). The following Geosoils report contains the results of subsurface exploration and geologic mapping, "*Preliminary Geologic and Soils Engineering Investigation, Southwest Corner of Los Liones Drive, Pacific Palisades, California,*" dated March 22, 1978. The Geosoils, California Geosystems, and MAA Consultants borings are plotted on the Geologic Map. The Geologic Map has been updated to reflect the additional information.

Sections O and P have been prepared to show the geologic conditions on the slopes below the proposed access drive. The majority of the slopes are comprised of basalt, which is capped by alluvial terrace. The portion of the access road that crosses the colluvial-filled swale will be supported by friction piles. Colluvium upslope from the piles will be removed and recompacted.

Bedding mapped within the siltstone near the toe of slope is warped and folded. Regionally, bedding strikes northwest and dips steeply toward the northeast. Bedding is not unsupported in the slopes. The enclosed calculations indicate that the eastern portion of the site and the proposed accessed drive will be grossly stable.

Item 7 - *Provide a search for the most critical lateral pressure on the soldier piles using various cohesion and angle of internal friction combinations obtained from the back calculations.*

Based upon numerous calculations of the slide performed to date, Section B is the most critical with respect to stability. Combinations of phi angle and cohesion needed to achieve static equilibrium (Safety Factor = 1.0) were determined for Section B and are shown in the following table. It should be noted that a cohesion of 240 psf and a phi angle of 13 degrees have already been approved by the Department to represent the base of the Revello Drive slide.

PHI ANGLE AND COHESION REQUIRED FOR STATIC EQUILIBRIUM	
Phi Angle (degrees)	Cohesion Intercept (psf)
16	0
15	80
14	120
13	240

Next, the design loads on soldier piles were analyzed for the different combinations of phi and cohesion. For Sections A, B, C, and H, a phi angle of 14 degrees and a cohesion value of 120 psf results in the highest forces on the temporary shoring. For Sections B, C, and H, the force required by the shoring system to raise the safety factor to at least 1.25 is 145 kips. For Section A, the minimum required force is 175 kips. Section A coincides with Pile P10. Therefore, piles

P1 through P10 (shown on Geologic Map) should be designed for a lateral force of 175 kips per foot. Section C coincides with pile number 17. Between piles P10 and P17 (Sections A and C) the design force should decrease linearly from 175 to 145 kips per foot. From P17 to P30, the design force should be 145 kips per foot.

Item 8 - *Provide referenced cross sections D-D, E-E, F-F and O-O.*

Sections D, E, and F were prepared for the downslope property owner, Palmer. The Geologic Maps and Sections for both the Palmer and Palisades Landmark projects have been unified for consistency. As a result, Section O has been renamed Section M. Copies of Sections D, E, F and O are enclosed.

Item 9 - *Provide referenced logs of borings by Harley Tucker, Mourseth-Howe Inc., AAKO, Solus Geotechnical, J.D. Merrill and Public Works. Numbering of borings by Crandall does not match the symbols on the geologic map, provide clarification. Also, the report contains boring logs which can not be identified on the map; please clarify.*

Boring Logs by AAKO were included in our preliminary report. They are included herein again, but better labeled. The locations of the Maurseth-Howe borings were shown on the Geologic Map. However the borings were relatively shallow and their data was not utilized in the interpretation of the slide. Therefore, the borings have been removed from the Geologic Map and their logs are not included. J. D. Merrill did not produce boring logs and the results of his borings are labeled on his Geologic Map and cross sections. Copies of the Harley Tucker, Solus Geotechnical, and Public Works boring logs are enclosed. Copies of the newly found MAA Engineering Consultants, Geosystems, and Geosoils Logs are enclosed

Item 10 - *Provide recommendations for required set back from an ascending slope, as required by the Code.*

The Building Code requires a level yard setback between the toe of an ascending slope and the rear wall of the proposed structure of one half the slope height to a maximum 15 feet clearance for

slopes steeper than 3:1. For retained slopes, the face of the retaining wall is considered the toe of the slope.

Item 11 - *Clarify a statement: Soldier piles along the upslope property lines shall be designed for a permanent equivalent fluid pressure of 30 pounds per cubic foot, which is on page 19. It appears that this statement is in conflict with design recommendations for pile No's #17 - 40.*

Piles 1 through 30 and 30 through 40 will experience two types of loading conditions. During removal and recompaction of the slide debris, piles 1 through 30 will support slide debris. The design load on piles 1 through 30 will range between 145 and 175 kips per foot as described above. Recommended piles 31 through 40 will support bedrock above a 1½:1 plane projected up from the base of the slide. The recommended design fluid pressure on piles P31 through P40 is 65 pounds per cubic foot.

The second loading condition occurs after the slide debris has been removed and replaced with compacted fill. Piles 1 through 30 should be designed for an equivalent fluid pressure of 30 pcf. Piles 31 through 40 are not needed for permanent stability.

Item 12 - *Provide a statement of responsibility for using data from all other consultants.*

The Research - Previous Reports section of our preliminary report (pages 3-6) lists the documents that were reviewed in the preparation of the report. Pertinent boring logs from the referenced reports were included in our August 16, 2000 report or are included herein. In addition, subsurface exploration performed by MAA Engineering Consultants, California Geosystems, and Geosoils were located and utilized for interpreting the geologic conditions offsite from the eastern portion of the study area. The J. Byer Group, concurs with the published findings and accepts geotechnical responsibility for utilizing all the referenced geotechnical and geologic data by AAKO, Public Works, Harley Tucker, Lockwood-Singh, Leroy Crandall, Pacific Soils, California Geosystems, Geosoils, Solus, J.D. Merrill, and MAA Engineering Consultants.

The J. Byer Group appreciates the opportunity to continue as your geotechnical consultants. Any questions regarding this or the referenced report should be directed to the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

Jon A. Irvine
E. G. 1691/R. C. E. 55005

Robert I. Zweigler
E. G. 1210/G. E. 2120

JAI:RIZ:JWB:flh
Y:\FINAL\ADDENDUM\18457-i.add.wpd

Enc: City of Los Angeles Department of Building and Safety, Grading Section review letter dated September 21, 2000 (2 pages)
Calculation Sheets (12)
Log of Boring 6
Appendix A
- Log of Borings by AAKO
- Log of Borings by Public Works
- Log of Borings by MAA Engineering Consultants
- Log of Borings by California Geosystems
- Log of Borings by Geosoils
- Log of Borings by Solus
- Log of Borings by Harley Tucker

In Pocket: Sections A - P
Geologic Map

xc: (3) Addressee
(1) Gary Safronoff
(3) City of Los Angeles Department of Building & Safety, Grading Section

City of Los Angeles
INTER-DEPARTMENTAL CORRESPONDENCE

September 21, 2000

Log No. 31587
(Grading Tentative Tract Doc - 51)

To: Emily Gabel-Luddy, Deputy Advisory Agency
Department of City Planning

From: David T. Hsu, Chief of Grading Section
Department of Building and Safety

Subject: TENTATIVE TRACT: 52928
LOTS: 1 (Condominium)
LOCATION: 17331-17333 Tramonto Dr

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Report	18457	08/16/00	J. Byer Group
Ovrszd Doc	``	``	``

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Report	9082	12/15/99	Crandall Consultant
Department letter	29828	02/07/00	LADBS

The Grading Section of the Department of Building and Safety has reviewed the tentative tract map together with the geologic and soil engineering report. The review of the tentative tract map cannot be completed because the safety or stability of the proposed development cannot be determined at this time. The review will be continued upon submittal of an addendum to the report which includes, but need not be limited to, the following:

1. Provide exploration data for the area outside of the active landslide between sections L and K to determine if there are any adverse geologic conditions; see item #2 of the referenced Department letter.

2. Provide design calculations for the proposed shoring along cross-sections that are oriented to show the steeper slide plane dips that exist along the edges of the landslide; determine the most critical orientation and design load.

3. Provide recommendations for stabilization of the portion of the site that extends down to Castellammare Drive and is affected by the active landslide.

4. Submit a copy of the reports to the Bureau of Engineering, Geotechnical Division, 650 S Spring St., Suite 600 for their review.

5. Clarify what are the highest acceptable groundwater levels in the upper and lower landslide

for the stability of the proposed temporary excavation, and clarify how those levels will be verified before starting the excavation.

6. Provide geologic cross-sections for the access driveway at the northeastern edge of the site based upon additional subsurface exploration; it appears that there may be unsupported bedding planes on the steep slope below; Provide slope stability calculations.

7. Provide a search for the most critical lateral pressure on the soldier piles using various cohesion and angle of internal friction combinations obtained from the back calculations.

8. Provide referenced cross sections D-D, E-E, F-F and G-G.

9. Provide referenced logs of borings by Harley Tucker, Mourseth-Howe Inc., AAKO, Solus Geotechnical, J.D. Merrill and Public Works. Numbering of borings by Crandall does not match the symbols on the geologic map, provide clarification. Also, the report contains boring logs which can not be identified on the map; please clarify.

10. Provide recommendations for required set back from an ascending slope, as required by the Code.

11. Clarify a statement: "Soldier piles along the upslope property lines shall be designed for a permanent equivalent fluid pressure of 30 pounds per cubic foot" which is on page 19. It appears that this statement is in conflict with design recommendations for pile No's #17-40.

12. Provide a statement of responsibility for using data from all other consultants.

DP/ATS : dp/ats
(213) 977-6329
31587

cc: J. Byer Group
Palisades Landmark LLC
WLA District Office

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENT), Windows 95 THIS 1999 VERSION OF REAME IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO The J. Byer Group, Inc.

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION A-A.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000
NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 640 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
1 X COORD.= 0 Y COORD.= 212
2 X COORD.= 65 Y COORD.= 212

NO. OF POINTS ON BOUNDARY LINE 3 = 10
1 X COORD.= 0 Y COORD.= 219
2 X COORD.= 80 Y COORD.= 219
3 X COORD.= 120 Y COORD.= 207
4 X COORD.= 160 Y COORD.= 202
5 X COORD.= 200 Y COORD.= 188
6 X COORD.= 240 Y COORD.= 176
7 X COORD.= 280 Y COORD.= 170
8 X COORD.= 288 Y COORD.= 170
9 X COORD.= 288 Y COORD.= 112
10 X COORD.= 640 Y COORD.= 112

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
1 0.000
2 0.000
3 0.000 -0.300 -0.125 -0.350 -0.300 -0.150
0.000 99999.000 0.000

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	120	14	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 1

SOFT SOIL NUMBER (SSN)= 0
SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	175000.00	300.000	131.330	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 175 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 7

1	X COORD.= 65	Y COORD.= 212
2	X COORD.= 84	Y COORD.= 187
3	X COORD.= 160	Y COORD.= 154
4	X COORD.= 200	Y COORD.= 136
5	X COORD.= 225	Y COORD.= 129
6	X COORD.= 240	Y COORD.= 124
7	X COORD.= 288	Y COORD.= 112

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.255

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	INTERSLICE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	15.000	-1.316	8.593E+03	2.126E+04	-4.577E+03	.18E+05	.34E+05	10.006
3	1	2.512	-1.316	2.186E+03	2.711E+04	-5.835E+03	.45E+04	.95E+04	10.314
4	1	1.488	-1.316	1.374E+03	3.084E+04	-6.638E+03	.28E+04	.60E+04	10.604
5	1	21.344	-0.434	1.787E+04	4.580E+04	-9.860E+03	.24E+05	.34E+05	11.043
6	1	14.656	-0.434	1.308E+04	5.696E+04	-1.226E+04	.18E+05	.25E+05	11.771
7	1	8.176	-0.434	7.717E+03	6.364E+04	-1.370E+04	.11E+05	.15E+05	12.229
8	1	22.832	-0.434	2.405E+04	8.502E+04	-1.830E+04	.33E+05	.48E+05	13.518
9	1	8.992	-0.434	1.048E+04	9.454E+04	-2.035E+04	.14E+05	.21E+05	14.024
10	1	13.840	-0.450	1.680E+04	1.109E+05	-2.388E+04	.23E+05	.35E+05	14.957
11	1	22.832	-0.450	2.868E+04	1.390E+05	-2.993E+04	.39E+05	.60E+05	16.742
12	1	3.328	-0.450	4.279E+03	1.433E+05	-3.084E+04	.59E+04	.89E+04	17.018
13	1	19.504	-0.280	2.523E+04	1.506E+05	-3.241E+04	.33E+05	.34E+05	17.418
14	1	5.496	-0.280	7.078E+03	1.526E+05	-3.285E+04	.92E+04	.94E+04	17.536
15	1	15.000	-0.333	1.929E+04	1.626E+05	-3.500E+04	.26E+05	.30E+05	18.170
16	1	2.336	-0.250	3.050E+03	1.631E+05	-3.511E+04	.39E+04	.36E+04	18.196
17	1	22.832	-0.250	3.048E+04	1.680E+05	-3.616E+04	.39E+05	.36E+05	18.442
18	1	14.832	-0.250	2.044E+04	1.713E+05	-3.687E+04	.26E+05	.24E+05	18.588
19	1	8.000	-0.250	1.862E+04	3.125E-02	0.000E+00	.24E+05	-.15E+06	0.000
		SUM					.36E+06	.28E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.212 AND FACTOR OF SAFETY IS 1.255

CONCLUSIONS: **THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION A SHOULD BE DESIGNED TO RESIST A FORCE OF 175 KIPS, APPLIED AT ⅓ THE RETAINED HEIGHT.**

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION B-B.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 600 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
1 X COORD.= 0 Y COORD.= 215
2 X COORD.= 85 Y COORD.= 215

NO. OF POINTS ON BOUNDARY LINE 3 = 11
1 X COORD.= 0 Y COORD.= 250
2 X COORD.= 43 Y COORD.= 250
3 X COORD.= 80 Y COORD.= 228
4 X COORD.= 110 Y COORD.= 213
5 X COORD.= 128 Y COORD.= 213
6 X COORD.= 160 Y COORD.= 198
7 X COORD.= 200 Y COORD.= 188
8 X COORD.= 240 Y COORD.= 181
9 X COORD.= 254 Y COORD.= 180
10 X COORD.= 254 Y COORD.= 131
11 X COORD.= 600 Y COORD.= 131

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
1 0.000
2 0.000
3 0.000 -0.595 -0.500 0.000 -0.469 -0.250
-0.175 -0.071 99999.000 0.000
UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	120	14	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 1
SOFT SOIL NUMBER (SSN)= 0
SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	145000.00	275.000	145.330	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 145 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 5
1 X COORD.= 85 Y COORD.= 215
2 X COORD.= 87 Y COORD.= 210
3 X COORD.= 123 Y COORD.= 188
4 X COORD.= 240 Y COORD.= 137
5 X COORD.= 254 Y COORD.= 131

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.395

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	10.164	-0.611	3.687E+03	1.286E+04	-3.744E+03	.60E+04	.89E+04	12.543
4	1	12.836	-0.611	5.504E+03	2.044E+04	-5.953E+03	.90E+04	.14E+05	11.230
5	1	4.590	-0.611	2.166E+03	2.356E+04	-6.861E+03	.35E+04	.57E+04	11.113
6	1	8.410	-0.611	4.648E+03	3.068E+04	-8.934E+03	.76E+04	.13E+05	10.909
7	1	5.000	-0.436	3.107E+03	3.373E+04	-9.822E+03	.47E+04	.64E+04	10.612
8	1	4.016	-0.436	2.579E+03	3.629E+04	-1.057E+04	.39E+04	.54E+04	10.423
9	1	17.426	-0.436	1.107E+04	4.723E+04	-1.375E+04	.17E+05	.23E+05	10.232
10	1	10.557	-0.436	6.605E+03	5.372E+04	-1.564E+04	.10E+05	.14E+05	10.426
11	1	6.869	-0.436	4.362E+03	5.803E+04	-1.690E+04	.66E+04	.91E+04	10.606
12	1	17.426	-0.436	1.187E+04	7.002E+04	-2.039E+04	.18E+05	.25E+05	11.088
13	1	15.705	-0.436	1.168E+04	8.212E+04	-2.391E+04	.18E+05	.25E+05	11.553
14	1	1.721	-0.436	1.339E+03	8.353E+04	-2.432E+04	.20E+04	.29E+04	11.605
15	1	17.426	-0.436	1.444E+04	9.891E+04	-2.880E+04	.22E+05	.31E+05	12.119
16	1	17.426	-0.436	1.604E+04	1.164E+05	-3.389E+04	.24E+05	.35E+05	12.622
17	1	3.426	-0.436	3.344E+03	1.201E+05	-3.497E+04	.51E+04	.73E+04	12.721
18	1	14.000	-0.429	2.165E+04	-1.563E-02	0.000E+00	.33E+05	-.97E+05	0.000
		SUM					.19E+06	.14E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.283 AND FACTOR OF SAFETY IS 1.395

CONCLUSIONS: **THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION B SHOULD BE DESIGNED TO RESIST A FORCE OF 145 KIPS, APPLIED AT ⅓ THE RETAINED HEIGHT.**

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION C-C.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 720 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
1 X COORD.= 0 Y COORD.= 209
2 X COORD.= 122 Y COORD.= 209

NO. OF POINTS ON BOUNDARY LINE 3 = 9
1 X COORD.= 0 Y COORD.= 219
2 X COORD.= 120 Y COORD.= 219
3 X COORD.= 160 Y COORD.= 211
4 X COORD.= 200 Y COORD.= 203
5 X COORD.= 240 Y COORD.= 192
6 X COORD.= 280 Y COORD.= 179
7 X COORD.= 295 Y COORD.= 175
8 X COORD.= 295 Y COORD.= 130
9 X COORD.= 720 Y COORD.= 130

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
1 0.000
2 0.000
3 0.000 -0.200 -0.200 -0.275 -0.325 -0.267
99999.000 0.000

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	120	14	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 1
SOFT SOIL NUMBER (SSN)= 0
SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	145000.00	325.000	151.670	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 145 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 5
1 X COORD.= 122 Y COORD.= 209
2 X COORD.= 125 Y COORD.= 200
3 X COORD.= 192 Y COORD.= 172
4 X COORD.= 280 Y COORD.= 136
5 X COORD.= 295 Y COORD.= 130

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.434

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	5.000	-3.000	2.837E+03	7.868E+03	-1.155E+03	.13E+05	.16E+05	8.253
3	1	11.300	-0.418	5.413E+03	1.261E+04	-1.850E+03	.84E+04	.11E+05	7.635
4	1	17.633	-0.418	9.581E+03	2.147E+04	-3.151E+03	.15E+05	.19E+05	8.272
5	1	6.067	-0.418	3.616E+03	2.494E+04	-3.660E+03	.56E+04	.74E+04	8.652
6	1	11.567	-0.418	7.347E+03	3.213E+04	-4.715E+03	.11E+05	.15E+05	9.497
7	1	17.633	-0.418	1.235E+04	4.458E+04	-6.542E+03	.19E+05	.26E+05	10.954
8	1	2.800	-0.418	2.087E+03	4.672E+04	-6.856E+03	.32E+04	.44E+04	11.193
9	1	8.000	-0.409	6.146E+03	5.284E+04	-7.754E+03	.95E+04	.13E+05	11.870
10	1	6.833	-0.409	5.430E+03	5.830E+04	-8.555E+03	.84E+04	.11E+05	12.466
11	1	17.633	-0.409	1.460E+04	7.312E+04	-1.073E+04	.23E+05	.31E+05	14.091
12	1	15.533	-0.409	1.357E+04	8.705E+04	-1.277E+04	.21E+05	.29E+05	15.579
13	1	2.100	-0.409	1.883E+03	8.900E+04	-1.306E+04	.29E+04	.40E+04	15.783
14	1	17.633	-0.409	1.611E+04	1.057E+05	-1.551E+04	.25E+05	.34E+05	17.544
15	1	17.633	-0.409	1.664E+04	1.231E+05	-1.806E+04	.26E+05	.35E+05	19.362
16	1	2.633	-0.409	2.531E+03	1.257E+05	-1.845E+04	.39E+04	.54E+04	19.636
17	1	15.000	-0.400	1.836E+04	0.000E+00	0.000E+00	.28E+05	-.11E+06	0.000
		SUM					.22E+06	.16E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.146 AND FACTOR OF SAFETY IS 1.434

CONCLUSIONS: **THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION C SHOULD BE DESIGNED TO RESIST A FORCE OF 145 KIPS, APPLIED AT ⅓ THE RETAINED HEIGHT.**

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION H-H.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000
NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 500 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
1 X COORD.= 0 Y COORD.= 222
2 X COORD.= 66 Y COORD.= 222

NO. OF POINTS ON BOUNDARY LINE 3 = 10
1 X COORD.= 31 Y COORD.= 251
2 X COORD.= 65 Y COORD.= 230
3 X COORD.= 96 Y COORD.= 216
4 X COORD.= 114 Y COORD.= 216
5 X COORD.= 114 Y COORD.= 211
6 X COORD.= 138 Y COORD.= 198
7 X COORD.= 160 Y COORD.= 192
8 X COORD.= 220 Y COORD.= 178
9 X COORD.= 220 Y COORD.= 133
10 X COORD.= 500 Y COORD.= 133

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
1 0.000
2 0.000
3 -0.618 -0.452 0.000 99999.000 -0.542 -0.273
-0.233 99999.000 0.000

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	110	14	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 1
SOFT SOIL NUMBER (SSN)= 0
SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	145000.00	230.000	148.000	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 145 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 5
1 X COORD.= 66 Y COORD.= 222
2 X COORD.= 68 Y COORD.= 217
3 X COORD.= 71 Y COORD.= 208
4 X COORD.= 214 Y COORD.= 135
5 X COORD.= 220 Y COORD.= 133

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.390

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	3.000	-2.500	1.135E+03	3.423E+03	-1.007E+03	.42E+04	.52E+04	7.705
3	1	3.000	-3.000	1.931E+03	9.055E+03	-2.663E+03	.85E+04	.12E+05	8.505
4	1	6.870	-0.510	3.314E+03	1.295E+04	-3.810E+03	.52E+04	.76E+04	7.205
5	1	15.792	-0.510	7.831E+03	2.226E+04	-6.549E+03	.12E+05	.18E+05	6.888
6	1	2.338	-0.510	1.185E+03	2.369E+04	-6.967E+03	.18E+04	.27E+04	6.965
7	1	13.455	-0.510	7.776E+03	3.343E+04	-9.835E+03	.12E+05	.18E+05	7.415
8	1	4.545	-0.510	3.052E+03	3.742E+04	-1.101E+04	.48E+04	.74E+04	7.554
9	1	11.247	-0.510	6.633E+03	4.579E+04	-1.347E+04	.10E+05	.16E+05	8.380
10	1	12.753	-0.510	7.424E+03	5.512E+04	-1.621E+04	.12E+05	.18E+05	9.482
11	1	3.039	-0.510	1.779E+03	5.736E+04	-1.687E+04	.28E+04	.42E+04	9.755
12	1	15.792	-0.510	9.964E+03	7.018E+04	-2.064E+04	.16E+05	.24E+05	11.072
13	1	3.169	-0.510	2.145E+03	7.299E+04	-2.147E+04	.33E+04	.52E+04	11.316
14	1	12.623	-0.510	9.089E+03	8.508E+04	-2.503E+04	.14E+05	.22E+05	12.240
15	1	15.792	-0.510	1.264E+04	1.023E+05	-3.009E+04	.20E+05	.31E+05	13.303
16	1	15.792	-0.510	1.404E+04	1.218E+05	-3.583E+04	.22E+05	.35E+05	14.308
17	1	9.792	-0.510	9.412E+03	1.351E+05	-3.973E+04	.15E+05	.24E+05	14.914
18	1	6.000	-0.333	1.331E+04	0.000E+00	0.000E+00	.19E+05	-.12E+06	0.000
		SUM					.18E+06	.13E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.286 AND FACTOR OF SAFETY IS 1.390

CONCLUSIONS: **THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION H SHOULD BE DESIGNED TO RESIST A FORCE OF 145 KIPS, APPLIED AT ⅓ THE RETAINED HEIGHT.**

TITLE: CALCULATE THE STABILITY OF SECTION P-P

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000
NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.=-500 Y COORD.= 0
2 X COORD.= 500 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 134 Y COORD.= 135
2 X COORD.= 134 Y COORD.= 1
3 X COORD.= 190 Y COORD.= 1
4 X COORD.= 190 Y COORD.= 88

NO. OF POINTS ON BOUNDARY LINE 3 = 11
1 X COORD.=-500 Y COORD.= 170
2 X COORD.= 45 Y COORD.= 170
3 X COORD.= 93 Y COORD.= 150
4 X COORD.= 93 Y COORD.= 135
5 X COORD.= 145 Y COORD.= 135
6 X COORD.= 160 Y COORD.= 125
7 X COORD.= 186 Y COORD.= 100
8 X COORD.= 190 Y COORD.= 88
9 X COORD.= 199 Y COORD.= 79
10 X COORD.= 240 Y COORD.= 60
11 X COORD.= 500 Y COORD.= 60

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	99999.000	0.000	99999.000	0.000	-0.667	-0.962
3	0.000	-0.417	99999.000	0.000		
	-3.000	-1.000	-0.463	0.000		

MIN. DEPTH OF TALLEST SLICE (DMIN) = 0
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	2

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BEDROCK	1	780	31	120
BEDROCK	2	780	31	120

NO SEEPAGE
USE GRID

NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

INPUT COORD. OF GRID POINTS 1,2,AND 3

POINT 1 X COORD. = 140 Y COORD. = 310
POINT 2 X COORD. = 140 Y COORD. = 160
POINT 3 X COORD. = 260 Y COORD. = 160

X INCREMENT (XINC) = 12 Y INCREMENT (YINC) = 12
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY F. S. AT EACH CENTER WILL BE PRINTED
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID
LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	140.000	170.000	200.000	230.000	260.000
310.000	2.668	2.257	1.984	1.833	1.846
280.000	2.607	2.187	1.928	1.816	1.966
250.000	2.561	2.130	1.892	1.838	1.804
220.000	2.556	2.111	1.899	1.760	1.783
190.000	2.629	2.172	1.915	1.663	2.047
160.000	2.876	2.337	1.770	1.787	3.010

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 3 CENTERS

FACTOR OF SAFETY = 1.816 AT (230.000,280.000)
FACTOR OF SAFETY = 1.663 AT (230.000,190.000)
FACTOR OF SAFETY = 1.770 AT (200.000,160.000)

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE
MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
230	190	8	5	114.297	1.663	0
242	190	8	5	120.951	1.747	0
218	190	8	5	107.692	1.760	0
230	202	8	5	123.650	1.730	0
230	178	8	5	104.977	1.674	0
233	190	8	5	115.961	1.648	0
236	190	8	5	117.624	1.674	0
233	193	8	5	118.291	1.661	0
233	187	8	5	113.631	1.658	0

AT POINT (233 190) RADIUS 115.961
THE MINIMUM FACTOR OF SAFETY IS 1.648

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	SLICE SINE	TOTAL WEIGHT	EFFEC. WEIGHT	RESIS. MOMENT	DRIVING MOMENT
1	2	6.789	5.882	0.000	-.851	.479E+04	.479E+04	.134E+07	.473E+06
2	2	6.789	15.715	0.000	-.793	.128E+05	.128E+05	.155E+07	.118E+07
3	2	0.509	20.220	0.000	-.761	.124E+04	.124E+04	.127E+06	.109E+06
4	2	6.280	21.936	0.000	-.732	.165E+05	.165E+05	.162E+07	.140E+07
5	2	6.789	24.061	0.000	-.675	.196E+05	.196E+05	.184E+07	.154E+07
6	2	1.931	24.952	0.000	-.638	.578E+04	.578E+04	.537E+06	.428E+06
7	2	4.858	24.679	0.000	-.609	.144E+05	.144E+05	.135E+07	.102E+07
8	2	6.789	23.266	0.000	-.558	.190E+05	.190E+05	.184E+07	.123E+07
9	2	6.789	20.975	0.000	-.500	.171E+05	.171E+05	.174E+07	.990E+06
10	2	6.789	18.069	0.000	-.441	.147E+05	.147E+05	.160E+07	.753E+06
11	2	0.774	16.209	0.000	-.409	.151E+04	.151E+04	.172E+06	.714E+05
12	2	4.000	10.873	0.000	-.388	.522E+04	.522E+04	.728E+06	.235E+06
13	1	2.015	5.083	0.000	-.362	.123E+04	.123E+04	.275E+06	.516E+05
14	1	6.789	2.289	0.000	-.324	.187E+04	.187E+04	.772E+06	.701E+05
							SUM	.155E+08	.954E+07

AT CENTER (233.000 , 190.000) WITH RADIUS 115.961 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS **1.648**

CONCLUSIONS: **THE SAFETY FACTOR OF SECTION P IS GREATER THAN 1.5.**

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 FAX: (818) 543-3747

SOLDIER PILES

JB: 18457-I CONSULT: JAI
CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 12

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED SOLDIER PILES. THE RETAINED HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	SLIDE PLANE	RETAINED HEIGHT:	55 feet
SHEAR DIAGRAM:	BACK-CALC.	BACKSLOPE ANGLE:	0 degrees
COHESION:	120 psf	SURCHARGE:	0 pounds
PHI ANGLE:	14 degrees	SURCHARGE TYPE:	P Point
DENSITY:	120 pcf	INITIAL FAILURE ANGLE:	20 degrees
SAFETY FACTOR:	1.5	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	5 feet
CD (C/FS):	80.0 psf	FINAL TENSION CRACK:	70 feet

PHID = ATAN(TAN(PHI)/FS) = 9.4 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFICIENT (k_h) 0 %g

VERTICAL PSEUDO STATIC SEISMIC COEFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	50 degrees
AREA OF TRIAL FAILURE WEDGE	1268.3 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	152201.9 pounds
NUMBER OF TRIAL WEDGES ANALYZED	3366 trials
LENGTH OF FAILURE PLANE	70.0 feet
DEPTH OF TENSION CRACK	1.4 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	45.0 feet
CALCULATED HORIZONTAL THRUST ON SOLDIER PILE	**123008.5 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**81.3 pcf**
DESIGN EQUIVALENT FLUID PRESSURE	**82.0 pcf**

CONCLUSIONS:

THE CALCULATION INDICATES THAT SOLDIER PILES P1 THROUGH P17, WHICH WILL BE SURCHARGED BY EAST-DIPPING BEDDING, WILL HAVE A CALCULATED THRUST THAT IS LESS THAN 145 KIPS PER FOOT. THEREFORE, THE LOAD ON PILES DETERMINED BY SECTIONS A, B, C, AND H CONTROLS.

Project No: JB 18457-I

Client: PALISADES LANDMARK LLC

Location: 17331-17333 Tramonto Drive

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
173	0	Ground Surface								
		SLIDE DEBRIS: Silty Sand, moist, contains construction debris								
172	1									
171	2									
170	3	Silty Sand, mottled tan and orange-brown, structureless, roots up to 1 inch diameter								
169	4									
168	5									
167	6									
166	7									
165	8									
164	9	Siltstone and Sandstone, tan and brown, structureless, very fractured, secondary gypsum								
163	10									
162	11									
161	12									
160	13									
159	14									
158	15									
157	16									
156	17									
155	18									
154	19									
153	20									

Surface: Graded Bench

Drill Method: Hillside Bucket Auger

Drill Date: 10-24-00

Size: 24 Inch

Elevation: 173.0 Feet

Sheet: 1 of 3

Project No: JB 18457-I

Client: PALISADES LANDMARK LLC

Location: 17331-17333 Tramonto Drive

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
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SUBSURFACE PROFILE											
Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
152	21	N70E; 48S and N80E; 30S, Shears, Clay, gouge, moist, slicks Sandstone, gray-brown, hard, weakly cemented, slightly friable, no fractures, coring required								
151	22									
150	23									
149	24									
148	25									
147	26									
146	27									
145	28	crushed Sandstone, roots, secondary gypsum, soft, very moist, N75E; 30S Shear								
144	29	Sandstone, cemented, hard, massive, coring required								
143	30									
142	31									
141	32									
140	33									
139	34									
138	35	N50E; 52N Bedding Sandstone with Siltstone interbeds, dark gray, orange, well bedded, bedding plane shears								
137	36									
136	37									
135	38									
134	39	N40E; 60N Bedding.								
133	40									

Surface: Graded Bench

Drill Method: Hillside Bucket Auger

Drill Date: 10-24-00

Size: 24 Inch

Elevation: 173.0 Feet

Project No: JB 18457-I

Client: PALISADES LANDMARK LLC

Location: 17331-17333 Tramonto Drive

Log of Boring 6

By: JAI

The J. Byer Group, Inc.
1461 E. Chevy Chase Dr., Suite 200
Glendale, CA 91206
(818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
132	41	Seeps within Sandstone layer, Water perched on top of bedding plane shear								
131	42									
130	43									
129	44									
128	45	Base of Slide N40E; 15SE intensely sheared Siltstone, saturated, slicks, no clay gauge								
127	46	**BEDROCK:** interbedded Sandstone and Siltstone, gray-brown, hard, well bedded, slightly weathered								
126	47									
125	48	groundwater								
124	49									
123	50									
122	51									
121	52									
120	53									
119	54									
118	55	Siltstone and Sandstone, dark gray, very hard, coring required								
117	56									
116	57									
115	58									
114	59	End at 60 Feet; No Caving; Water at 48 Feet								
113	60									

Surface: Graded Bench

Drill Method: Hillside Bucket Auger

Drill Date: 10-24-00

Size: 24 Inch

Elevation: 173.0 Feet

Sheet: 3 of 3