

APPENDIX A

REPORT OF THE SEISMIC REFRACTION SURVEY

(PREPARED BY: SUB SURFACE SURVEYS)



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September 18, 1999

ISKCON CULTURAL CENTER
1806 Missouri Street
San Diego, CA 92109

Project Number: 99237
Job Number 99-020

Attn: **Robert Merrill** re: Seismic refraction survey, ISKCON Cultural Ctr, Escondido, CA

This brief letter report is to present the findings of a seismic refraction survey at the Iskcon Temple and Cultural Center at Rincon Avenue just east of Creek Hollow Place in Escondido, California (Fig. 1) on September 7, 1999. The survey was carried out in the mostly open area of the Temple site. Six lines were shot; consisting of one spread each. All lines were 250 feet long, except line 5, which was 200 feet long. Purpose of the survey was to determine depth to bedrock, weathered and unweathered, and its rippability. These values were determined utilizing seismic refraction methodology.

A Bison 9024, 24 channel seismograph system was applied to the task. This instrument has DIFP, digital instantaneous floating point. This translates into a computer-controlled seismograph that records incoming signals at all instrument settings, and these are analyzed by the computer, which then outputs optimum, balanced traces with maximum informational content.

Survey Design - Locations of the six seismic lines, numbered 1 through 6, are illustrated (Fig. 2). It is seen that each of the lines is located so that it is both on and off the building footprint, with some lines off on both sides of the building. Spread lengths are 250 feet from off end shot to off end shot. Geophone interval was 10 feet, and there was a 10 foot offset from off end shots to nearest geophone. There was also a 20 foot gap between geophones 12 and 13 where the split spread shot was fired. The exception, line 5, had a geophone interval of eight feet with eight foot off end shot offsets and a 16 foot gap between geophones 12 and 13 where the split spread shot was fired. The reason for the shortened geophone interval on line 5 was that a topographic and flora barrier to the south effectively prevented further expansion in that direction. These spread lengths allow for an investigation to depths of approximately 75 feet, and 60 beneath line 5. This is significantly deeper than any planned cut slopes. The spreads were shot forward, split spread and reverse. This redundancy aids in determining dip and undulations in layer boundaries.

Source was a heavy duty sledge hammer equipped with an inertial trigger. The accelerated weight drop source was available but was not needed. Vertical stacking was carried out as a noise abatement strategy, and to build energy. Elevations for all shot and geophone locations were surveyed in, as relative elevations, arbitrarily setting the forward end at 100 feet. Then by registration with a detailed topographic map furnish by the client, these relative elevations were



SITE LOCATION MAP

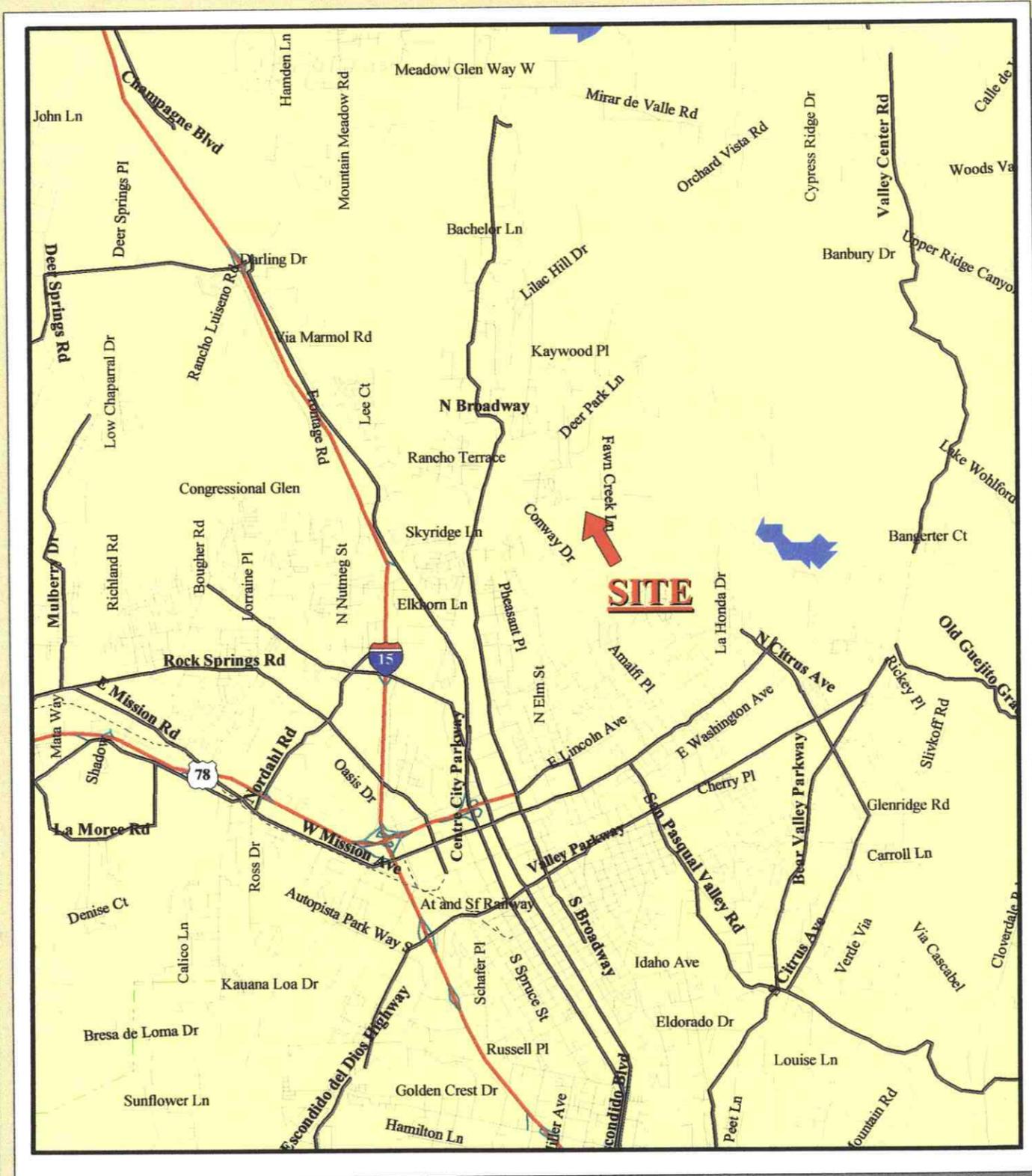


FIGURE 1



LINE LOCATION MAP

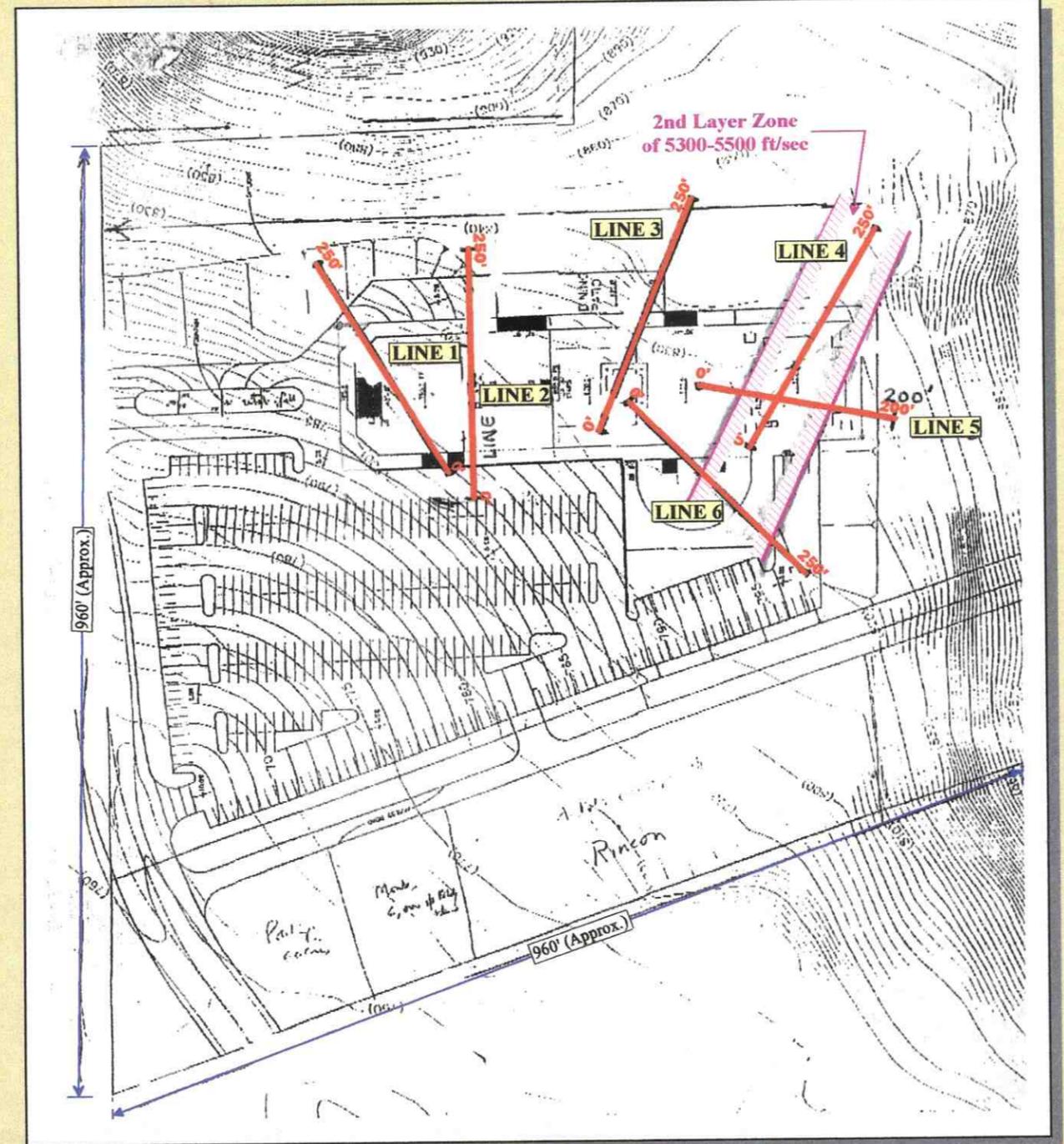
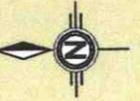


FIGURE 2

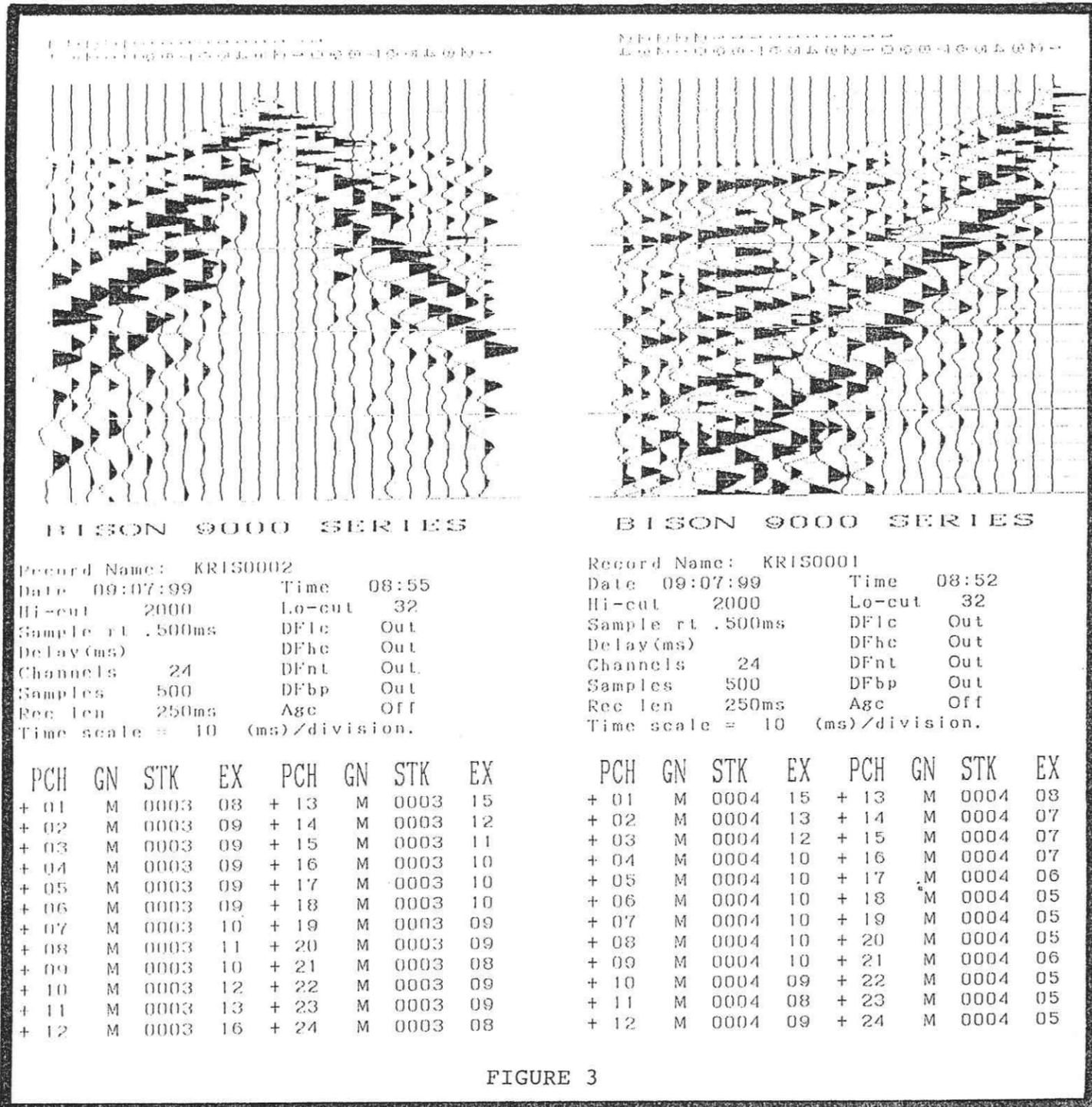


FIGURE 3

converted to absolute.

The site was away from freeways and busy streets; consequently, traffic noise was usually low. Wind noise was no more than a minor problem. Hence, good records were acquired.

Geologic Setting - The site is on the Peninsular Ranges Batholith, consisting of a composite of individual Mesozoic intrusive bodies, mostly granitic clan rocks. Metamorphosed host rocks, Jurassic in age are locally found surrounding edges of intrusive granite bodies and in roof pendants, are found here and there among the granities. Abundant outcrops nearby appear to indicate that the site is entirely on granitic clan rocks, with local veneers of Quaternary alluvium and soil/colluvium. The crystalline rocks are effectively without intergranular porosity.

Seismic surveys in this crystalline rock setting have virtually always revealed a three-layer case in the refraction data. The topmost layer is commonly thin and is composed dominantly of soil and colluvium. The second layer is weathered crystallines and the deepest layer is unweathered crystalline rocks, granities in this instance.

Brief Description of the Geophysical Method Applied - Seismic refraction investigates the subsurface by generating arrival time and offset distance information to determine the path and velocity of an elastic disturbance in the ground. The disturbance is created by shot, hammer, weight drop or some comparable method of putting impulsive energy into the ground. Detectors are laid out at regular intervals in a line to measure the first arrival energy and the time of its arrival. The data are plotted in time-distance graphs, from which velocity of, and depth to, layers can be calculated. This is possible because rays (a continuum point on an expanding wave front) of the disturbance wave follow a direct route, and are refracted across layer boundaries where there is a difference in elastic and density properties. The critically refracted ray travels along the layer interface, at the speed of the lower layer, and continuously "feeds" energy back to the surface, to be successively detected by the line of geophones.

Shots are normally reversed from one end of the line to the other, to determine whether or not the layering is horizontal or dipping. And a split spread shot adds redundancy to improve the interpretation. The acquired data are computationally intense. A ray-tracing computer program, SIPT2 in this instance, is used to iteratively honor all refracting surfaces, velocities, and to be able to consider a large number of layers, where they are present. A first energy arrival picking program, with such features as zoom, filtering, time stretching, separation of traces, AGC and balancing of traces, is also applied.

Interpretation - Monitor records are produced in the field with each shot. These are prints of the raw data as it comes in to the recorder. They show the quality of the data, so that the operator can determine whether or not the data are pickable, or shots need to be repeated. Two representative monitor records, one a split spread shot from line 1 and a forward shot from the same line (Fig. 3) are illustrated.

First energy arrivals are seen to be quite sharp on the raw records, although some very minor wind noise is coming in mostly on the far offset traces. This is not uncommon for off end shot records. Even so, with use of a computer picking program, with zoom, filtering, etc., there was no difficulty in picking the first energy arrivals. There should not be significant variation in picked arrival times should first breaks be picked by several persons independently.

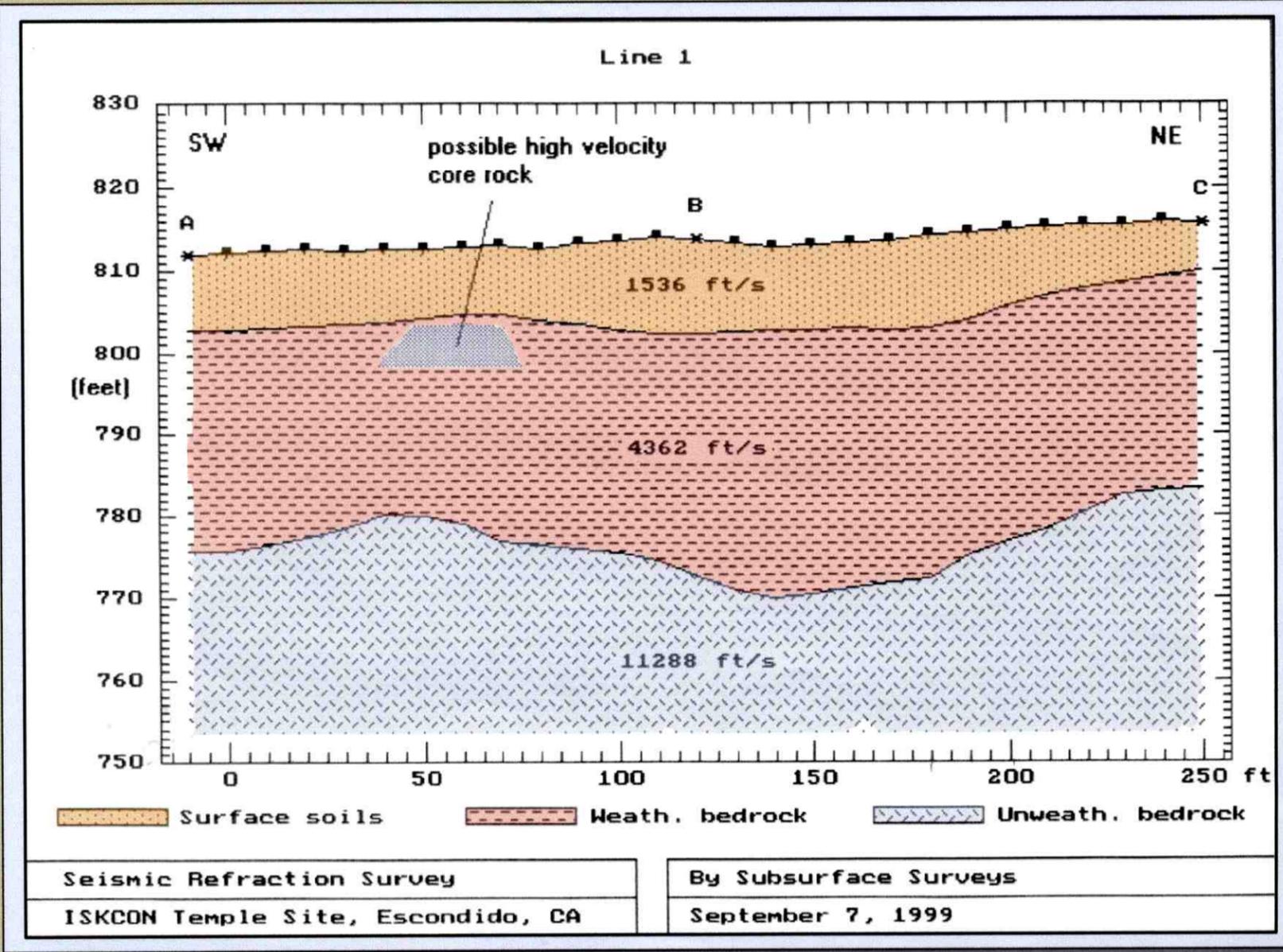


FIGURE 9

SITE PHOTOGRAPHS



FIGURE 5

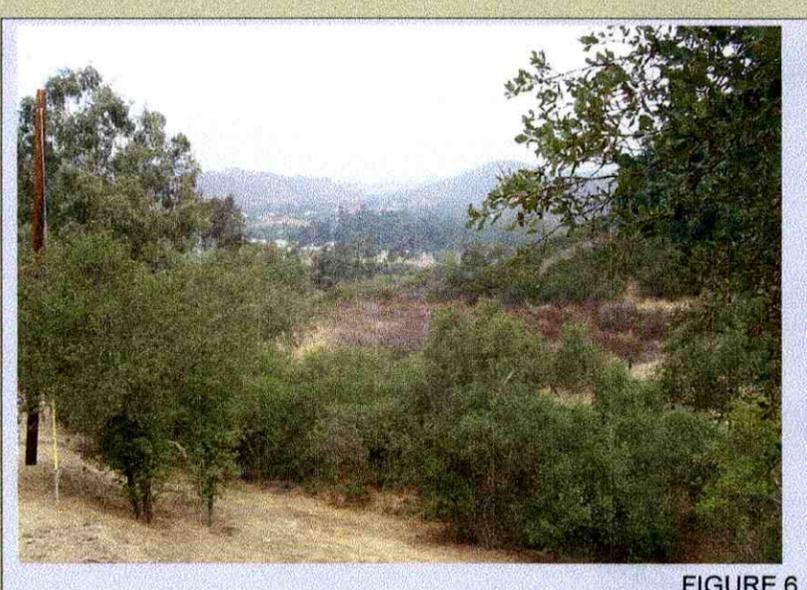


FIGURE 6



FIGURE 7



FIGURE 8

SITE PHOTOGRAPHS



FIGURE 5

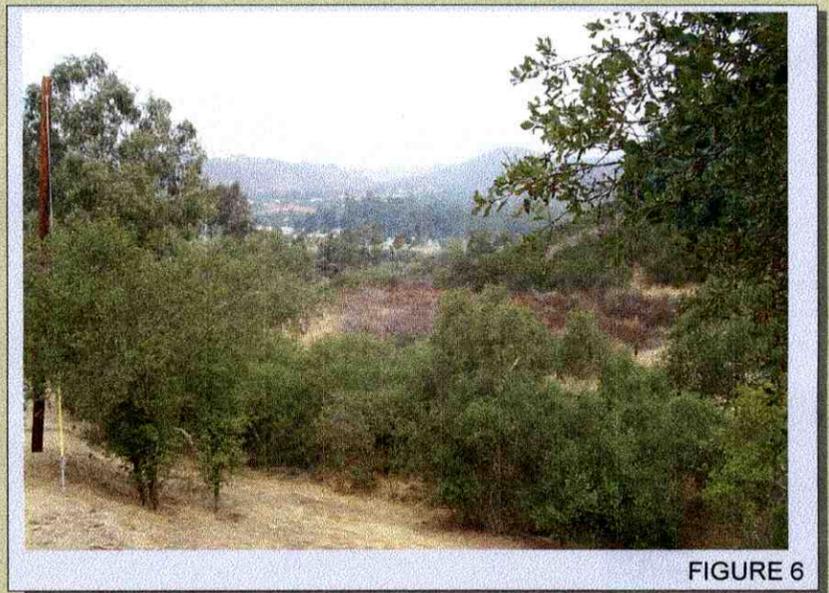


FIGURE 6



FIGURE 7



FIGURE 8

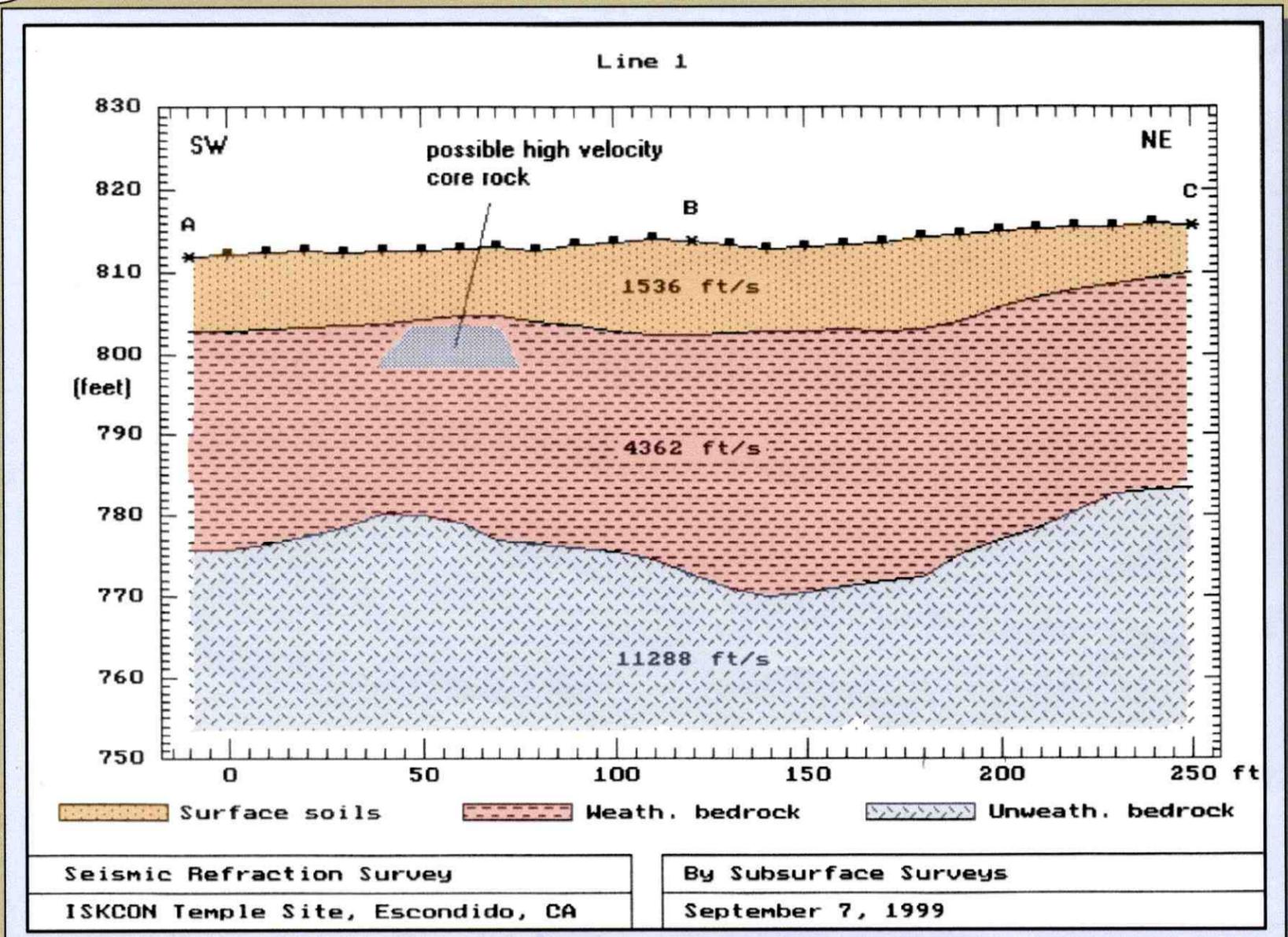
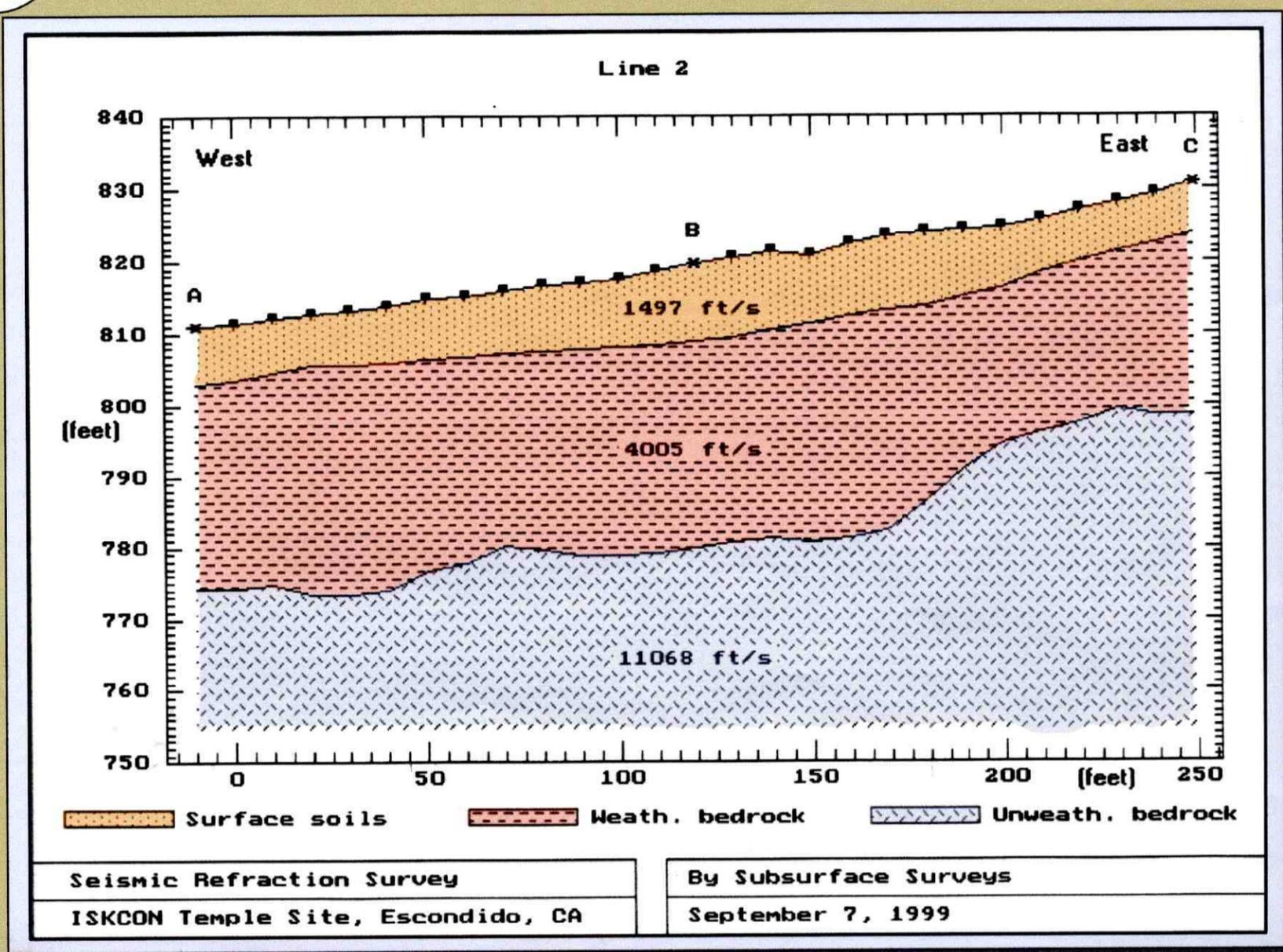
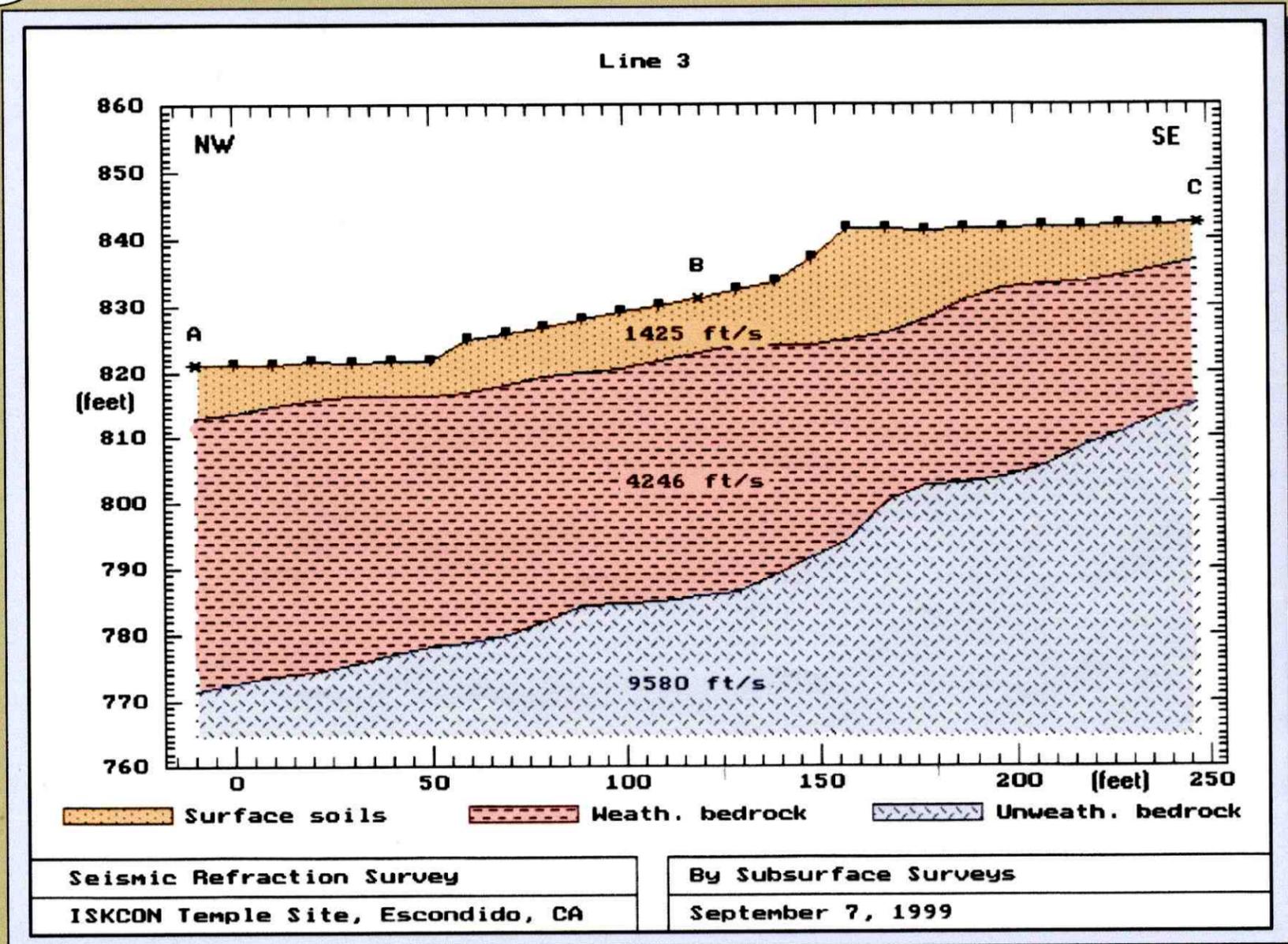


FIGURE 9



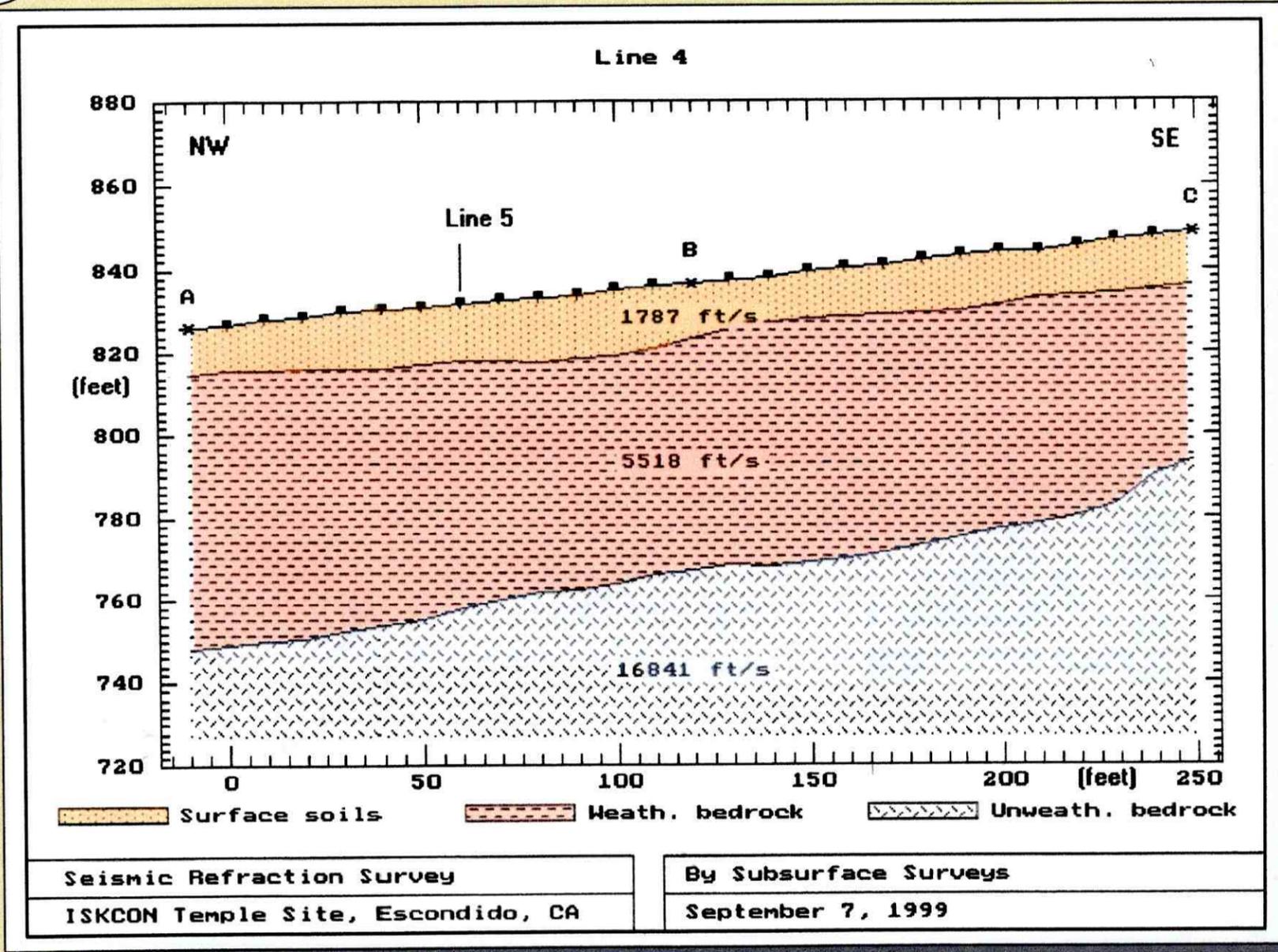
-10-

FIGURE 10



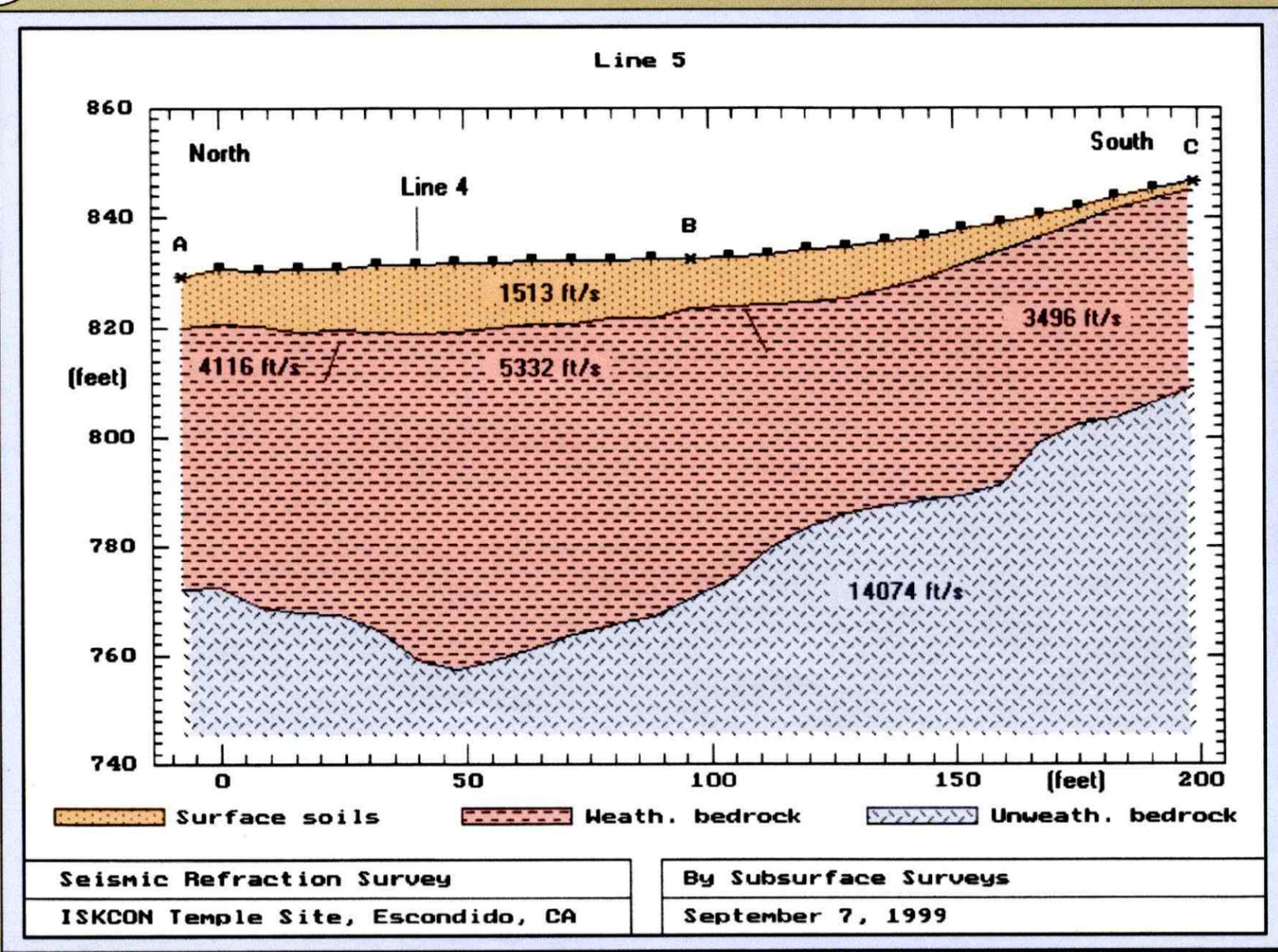
-11-

FIGURE 11



-12-

FIGURE 12



-13-

FIGURE 13

modeling program averaged velocities under these lines, and part of lines 5 & 6 are off this zone. The zone is depicted by color on the line location map (Fig. 2). Line 4, totally within the zone, more closely defines the zone's velocity properties; the velocity analysis of lines 5 & 6 approximately defines its edges.

Although existing geologic maps do not show any unusual rock type in this location, but detailed mapping has not been carried out here. Chemical makeup of the crystalline rock intrusives in these batholithic ranges also tends to be bimodal, although not evenly distributed bimodal. Small bodies of basic intrusives are mapped here and there within the batholith. It seems likely that there is a fairly wide basic rock dike present in the approximate position shown on the line location map. Even so, this is academic in regard to the objective of the seismic investigation. All of the layer three rocks are non-rippable.

The Caterpillar Rippability chart is illustrated (Fig. 15) and is the basis for determining rippability of the rocks encountered in the survey. The chart is empirical, but is based on thousands of field and laboratory samples. It is seen that layers 1 and 2 are easily rippable everywhere sampled. Layer 3, to the extent of sampling, should be considered non-rippable, even with heaviest equipment. Its closest distance from the surface is approximately 25 feet under line 2. Everywhere else, where sampled, it is deeper from the surface. Thus, it appears that non-rippable rock will not be encountered in the foundation work for the Temple and Cultural Center.

There is a very local relatively high velocity zone under line 1 (See Fig. 9). This could be another small dike. There is also a possibility that it is a core rock, but these usually do not occur alone. At any rate it appears to be rippable with heavy equipment.

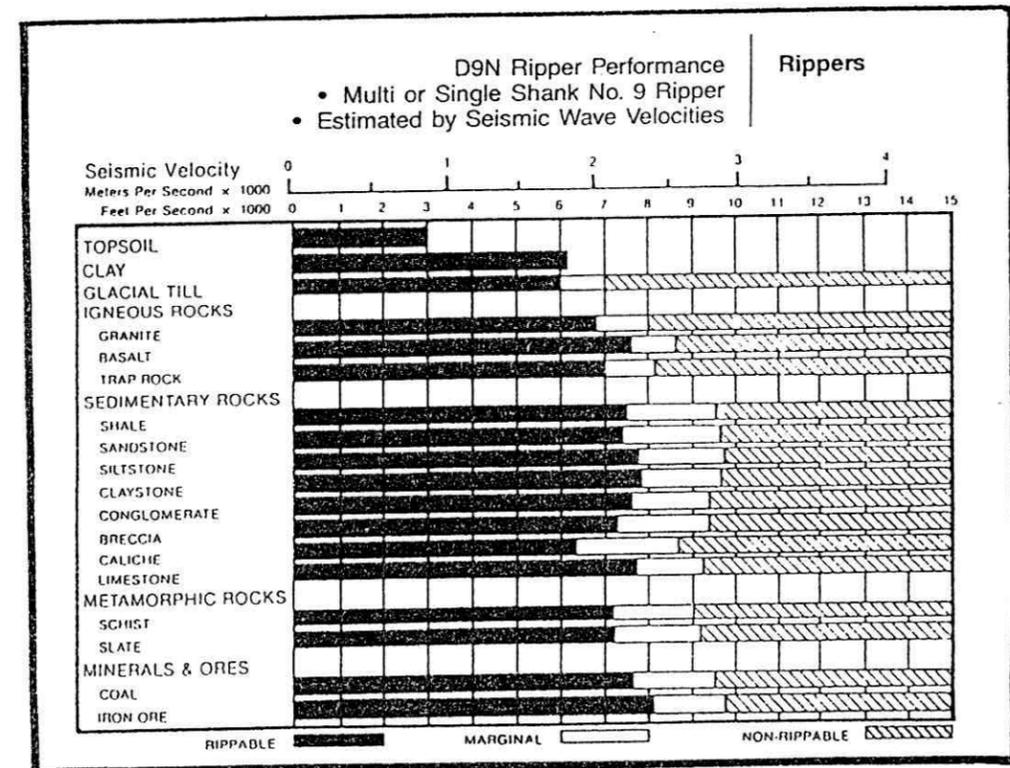
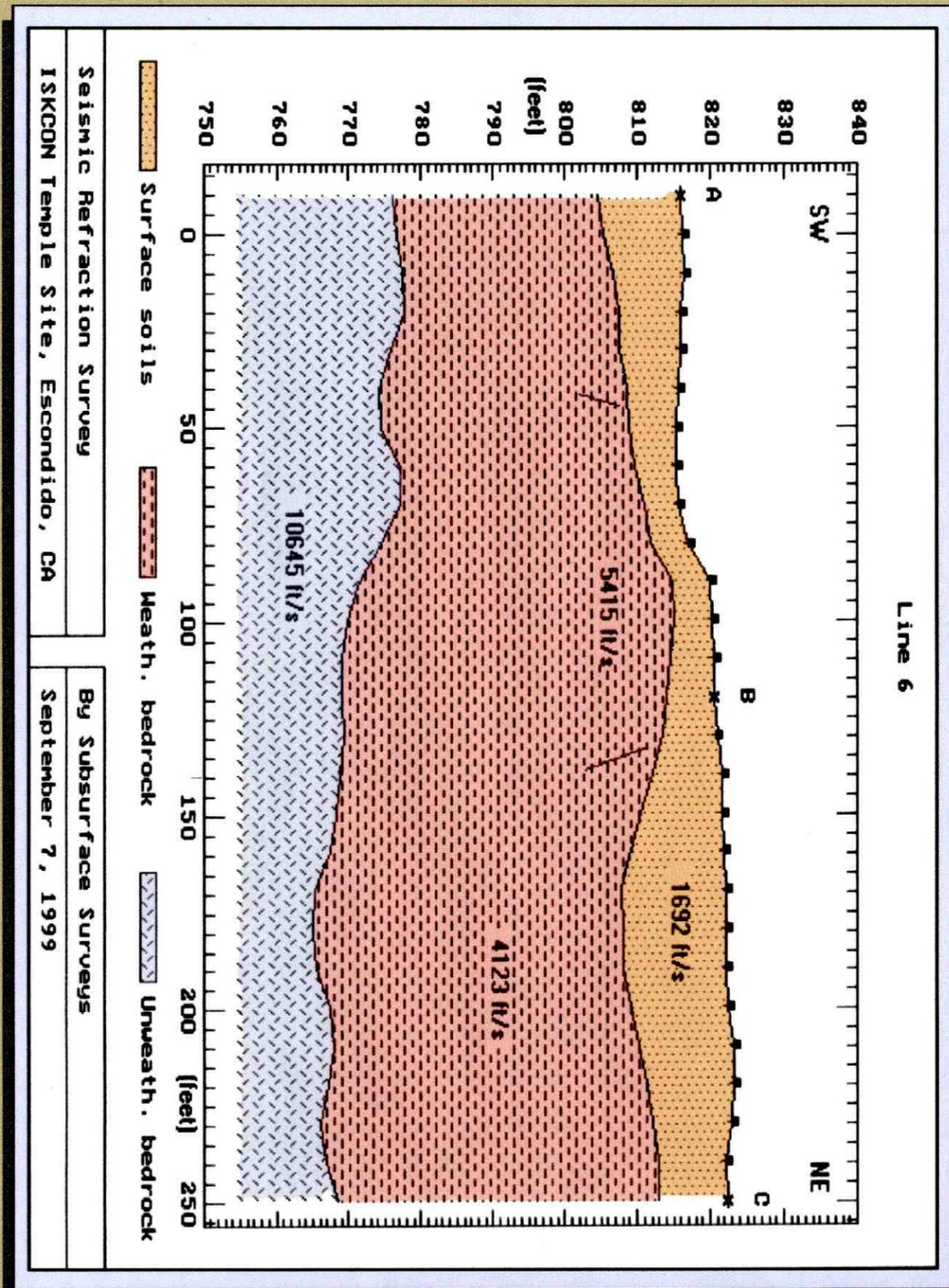
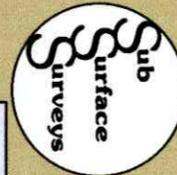


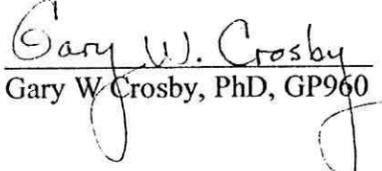
Figure 15. Caterpillar rippability chart

APPENDIX B

BORING LOGS

Conclusions - The shallow subsurface structure, imaged by seismic refraction information, is generally 3 layers typical of the Peninsular batholithic terrain. The velocities determined, however, are on the higher side of "normal" for the crystalline rock terrain. This is apparently explained by a bimodal velocity distribution. Careful analysis indicates that this is very likely a dike occurrence with high velocity basic rock intruding the granites locally under lines 4, 5 & 6. The first two layers are rippable, and the deepest layer revealed is non-rippable, even with heaviest equipment. Inasmuch as these non-rippable rocks come to only within 25 feet of the surface locally, to the extent sampled, they may be a non-factor in planning construction operations.

All data generated on this project are in confidential file in this office, and are available for review by authorized persons at any time. The opportunity to participate in this investigation is very much appreciated. Please call, if there are questions.


Gary W. Crosby, PhD, GP960

GWC:arr

BORING LOG									
LOGGED BY : S.R.			DATE DRILLED : 10/13/99		ELEV.: 801 ft.		BORING NO.		
DRILL RIG: MOBILE B-60			BORING DIA.: 8" HSA		HAMMER WEIGHT: 140 #		BH-1		
DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	BLOW COUNTS (30" drop)	BLOWS/FOOT	GROUND WATER	LOCATION: Approximately 60 feet south of the NW corner of the Cultural Center, 10 feet due west from its west wall			
						DESCRIPTION	REMARKS		
0						0 - 3.5 ft: TOPSOIL dry, medium brown, fine to medium grained, loose, silty sand (SM)	contains rootlets		
	1	CA	6/6/7			---?--- ---?--- ---?--- ---?---			
5						3.5 to 10.5 ft: COLLUVIUM dry to moist, light reddish brown, fine to coarse grained, dense, silty sand (SM)	many pinhole voids		
	2	SPT	12/19/26	45					
	3	CA	40/50 for 5"						
10						---?--- ---?--- ---?--- ---?---			
	4	SPT	23/30/36	66		10.5 to 18.5 ft: WEATHERED GRANITICS dry, light brown to gray, medium grained, dense to very dense, silty sand (SM)			
	5	CA	50 for 6"						
15									
	6	SPT	50 for 3"	>100			minor pinhole voids		
	7	SPT	50 for 3"	>100					
20						18.5 to 20.5 ft: SLIGHTLY WEATHERED GRANITICS dry to moist, medium gray, very dense, silty sand (SM)			
	8	SPT	50 for 3"	>100					
25						Bottom of Boring: 20.5 ft. No groundwater encountered			
30						CA: California Sampler SPT: Standard Penetration Test Bulk samples taken at: 3'-5', 5'-10', and 15'-17' depth intervals —— Well defined soil horizon boundary ---?--- Soil horizon boundary unclear			

Descriptions on this boring log applies to the specified boring at the time the boring was made. The descriptions on this log are not warranted to be representative of subsurface conditions at other locations.

PROJECT NO.: 99-020	PROJECT: ISKCON CULTURAL CENTER	FIGURE: B-1
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APEX GEOTECHNOLOGY, INC.--ENGINEERS AND GEOLOGISTS

BORING LOG									
LOGGED BY : S.R.			DATE DRILLED : 10/13/99		ELEV.: 829 ft.		BORING NO.		
DRILL RIG: MOBILE B-60			BORING DIA.: 8" HSA		HAMMER WEIGHT: 140 #		BH-2		
DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	BLOW COUNTS (30" drop)	BLOWS/FOOT	GROUND WATER	LOCATION: Approximately 190 feet south of the NE corner of the Cultural Center along its east wall			
						DESCRIPTION	REMARKS		
0						0 to 4.5 ft: TOPSOIL/COLLUVIUM dry to moist, medium brown, fine to medium grained, medium dense, silty sand (SM)			
	1	CA	7/9/16			---?--- ---?--- ---?--- ---?---			
5						4.5 to 15.5 ft: COLLUVIUM moist, medium brown, fine to medium grained, slightly micaceous, subrounded grains up to 1/4" max size, dense, silty sand (SM)			
	2	SPT	18/17/15	32					
	3	CA	10/12/15						
10									
	4	SPT	8/8/8	16					
	5	CA	16/18/24						
15									
	6	SPT	6/6/19	25		15.5 to 20.5 ft: WEATHERED GRANITICS moist, light brown to gray, medium grained, very dense, silty sand (SM)	quartzite clasts up to 2.5" max size		
	7	SPT	50 for 2"	>100					
20									
	8	SPT	50 for 5"	>100					
25						Bottom of Boring: 20.5 ft. No groundwater encountered			
30						CA: California Sampler SPT: Standard Penetration Test Bulk samples taken at: 2.5'-5', 5'-10', 10'-12', and 17'-19' depth intervals —— Well defined soil horizon boundary ---?--- Soil horizon boundary unclear			

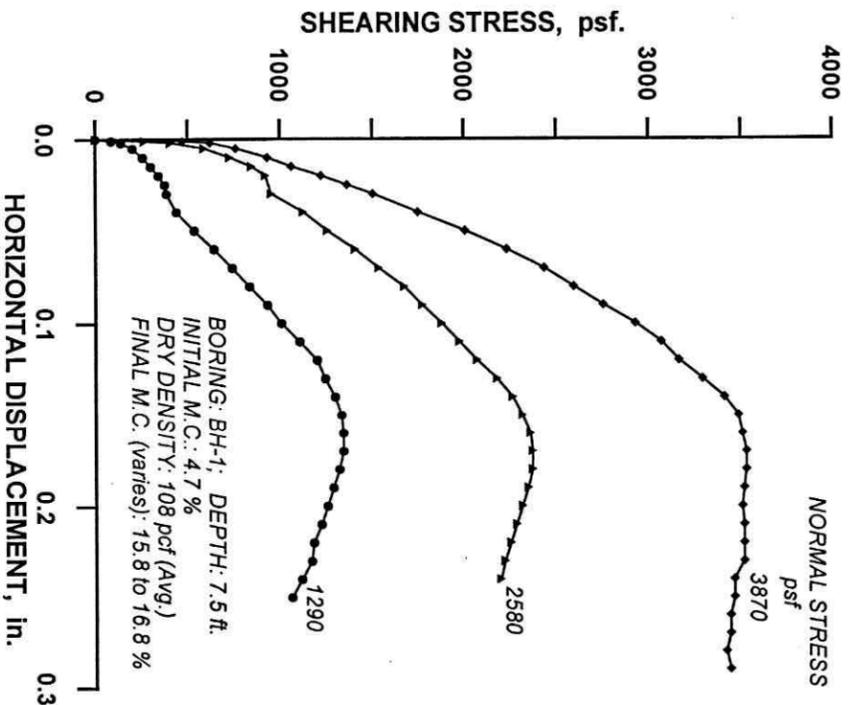
Descriptions on this boring log applies to the specified boring at the time the boring was made. The descriptions on this log are not warranted to be representative of subsurface conditions at other locations.

PROJECT NO.: 99-020	PROJECT: ISKCON CULTURAL CENTER	FIGURE: B-2
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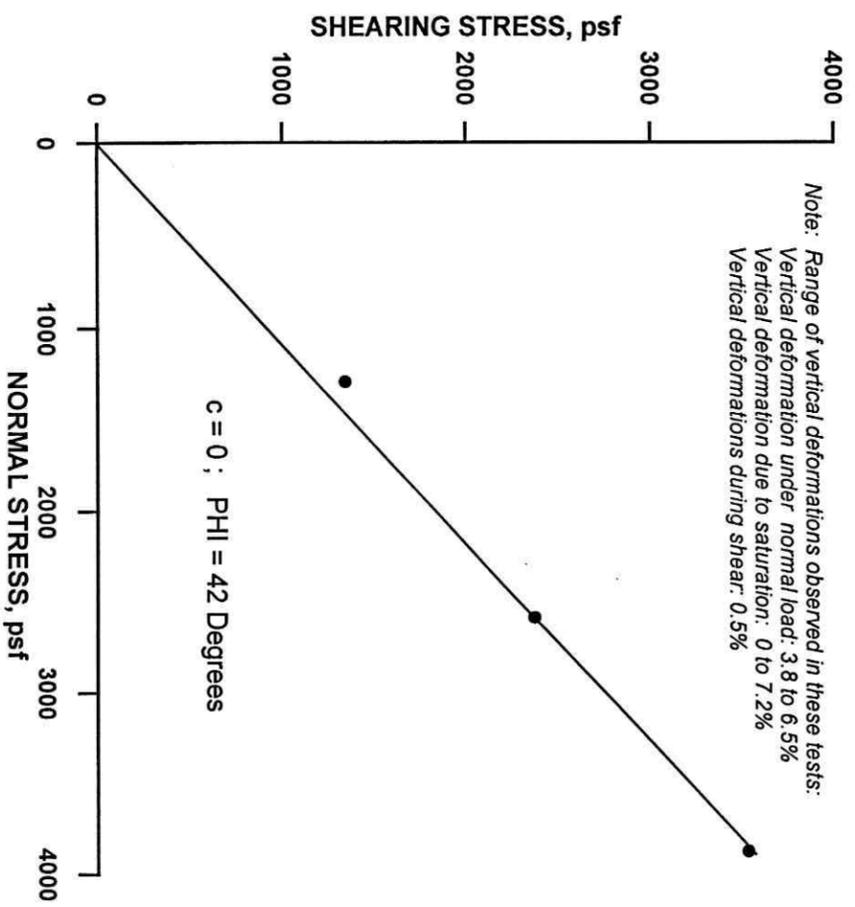
APEX GEOTECHNOLOGY, INC.--ENGINEERS AND GEOLOGISTS

APPENDIX C
RESULTS OF LABORATORY TESTS

BORING LOG						
LOGGED BY : S.R.			DATE DRILLED : 10/13/99		ELEV.: 829 ft.	BORING NO. BH-3
DRILL RIG: MOBILE B-60			BORING DIA.: 8" HSA		HAMMER WEIGHT: 140 #	
DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	BLOW COUNTS (30" drop)	BLOWS/FOOT	GROUND WATER	LOCATION: Approximately 75 feet due north of the SW corner of the Cultural Center along its west wall
						DESCRIPTION
0						0 to 3.5 ft.: TOPSOIL dry, medium to dark brown, fine to medium grained, loose, silty sand (SM)
	1	CA	6/6/16			---?--- ---?--- ---?--- ---?---
5						3.5 to 11.5 ft.: COLLUVIUM dry, reddish brown, fine to medium grained, medium dense, silty sand (SM)
	2	SPT	10/10/9	19		
	3	CA	18/21/26			
10						
	4	SPT	12/15/17	32		
	5	CA	23/37/50			
15						11.5 to 17.5 ft.: WEATHERED GRANITICS moist, light brownish gray, medium grained, very dense, silty sand (SM)
	6	SPT	50 for 5"	>100		
20						Bottom of Boring: 17.5 ft. No groundwater encountered
25						CA: California Sampler SPT: Standard Penetration Test Bulk samples taken at: 2'-4', 4'-8', and 10'-12' depth intervals
30						----- Well defined soil horizon boundary ---?--- Soil horizon boundary unclear
Descriptions on this boring log applies to the specified boring at the time the boring was made. The descriptions on this log are not warranted to be representative of subsurface conditions at other locations.						
PROJECT NO.: 99-020			PROJECT: ISKCON CULTURAL CENTER			FIGURE: B-3
APEX GEOTECHNOLOGY, INC.--ENGINEERS AND GEOLOGISTS						



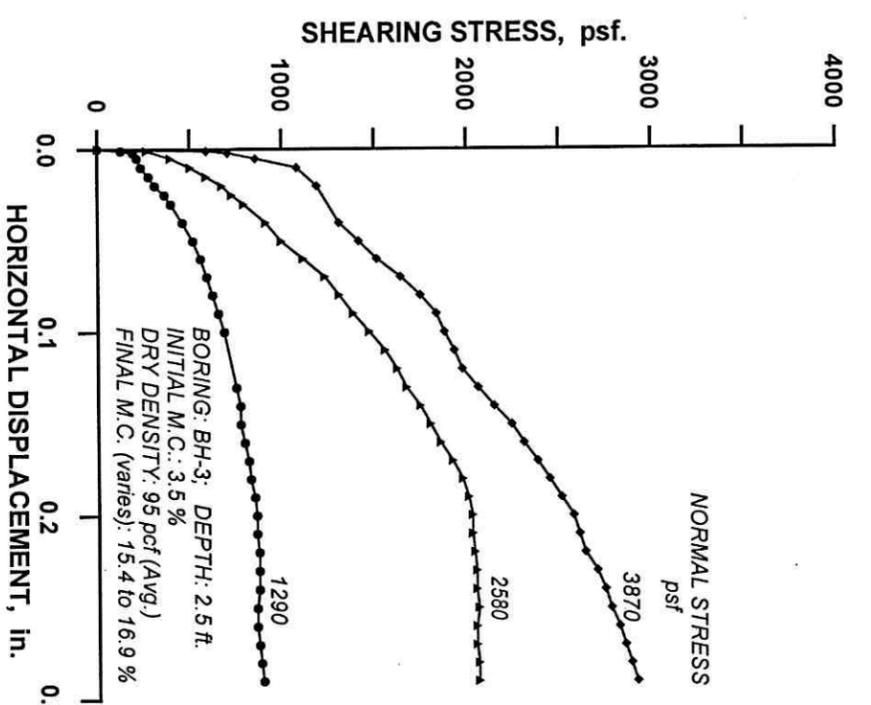
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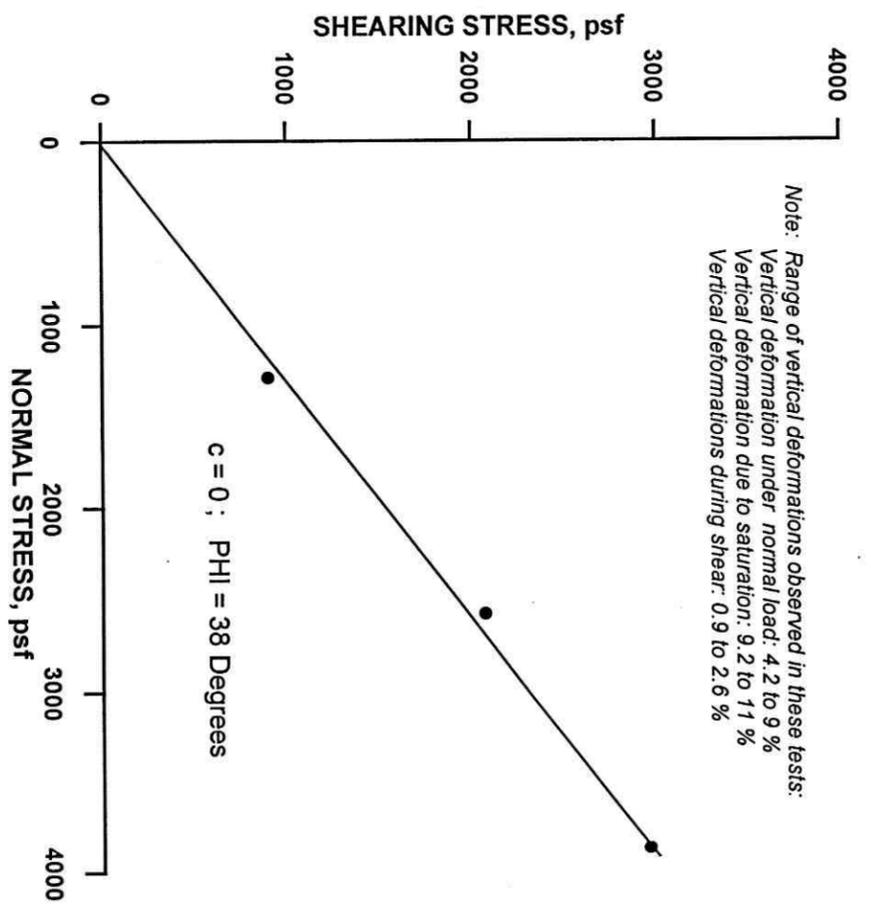
b) STRENGTH ENVELOPE

APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

RESULTS OF DIRECT SHEAR TESTS			
ISKCON CULTURAL CENTER			
Job No.	Date	Drawn By	Figure
99-020	OCT. 1999	B.R.	C-5



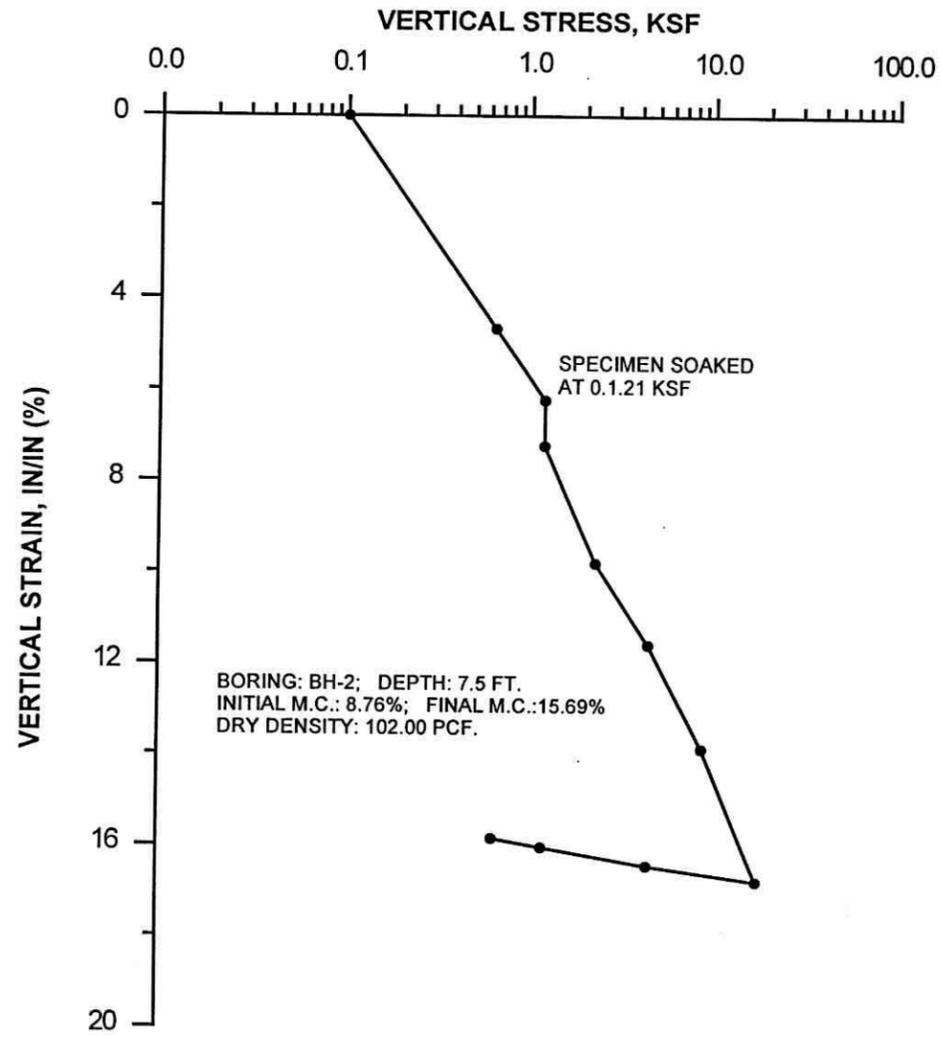
a) SHEARING STRESS / DISPLACEMENT CURVES



b) STRENGTH ENVELOPE

APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

RESULTS OF DIRECT SHEAR TESTS			
ISKCON CULTURAL CENTER			
Job No.	Date	Drawn By	Figure
99-020	OCT. 1999	B.R.	C-4

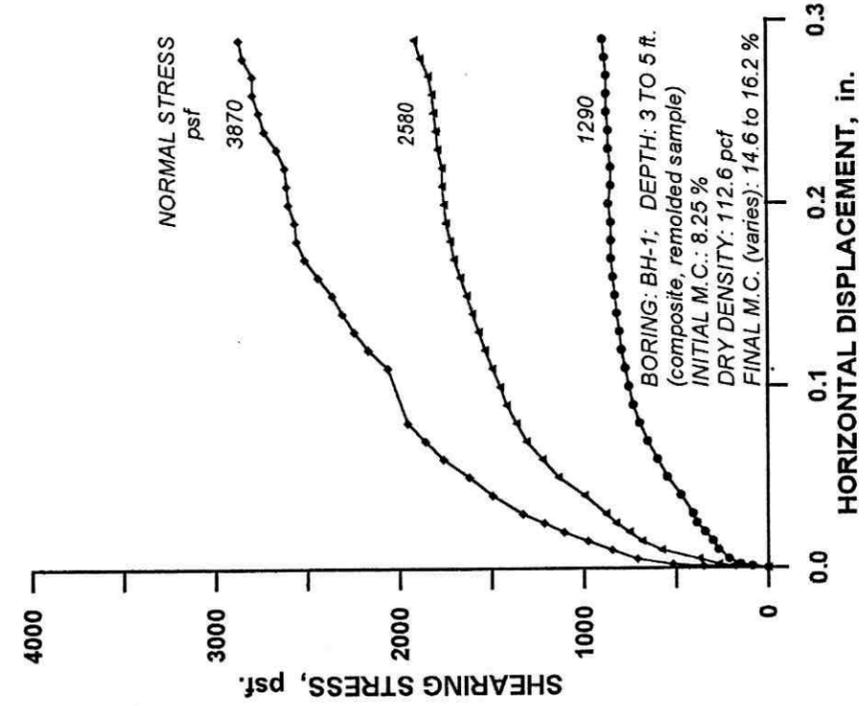


APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

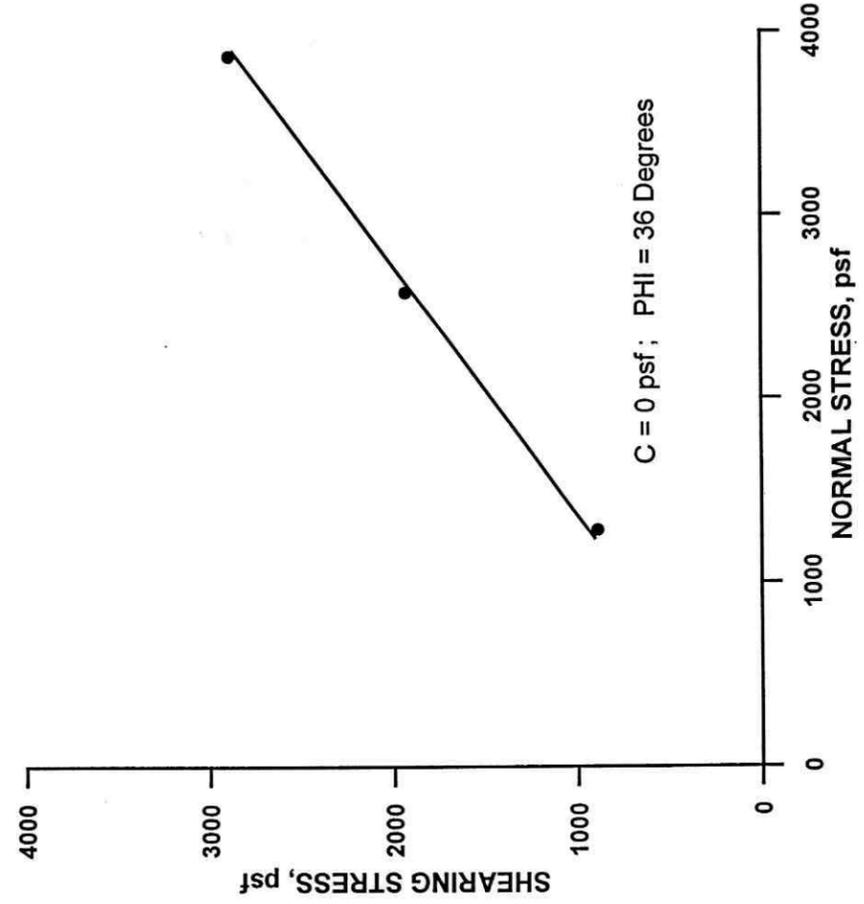
RESULTS OF 1-D COMPRESSION TEST

ISKCON CULTURAL CENTER

Job No.	Date	Drawn By	Figure
99-020	NOV. 1999	K.R.	C-7



a) SHEARING STRESS / DISPLACEMENT CURVES



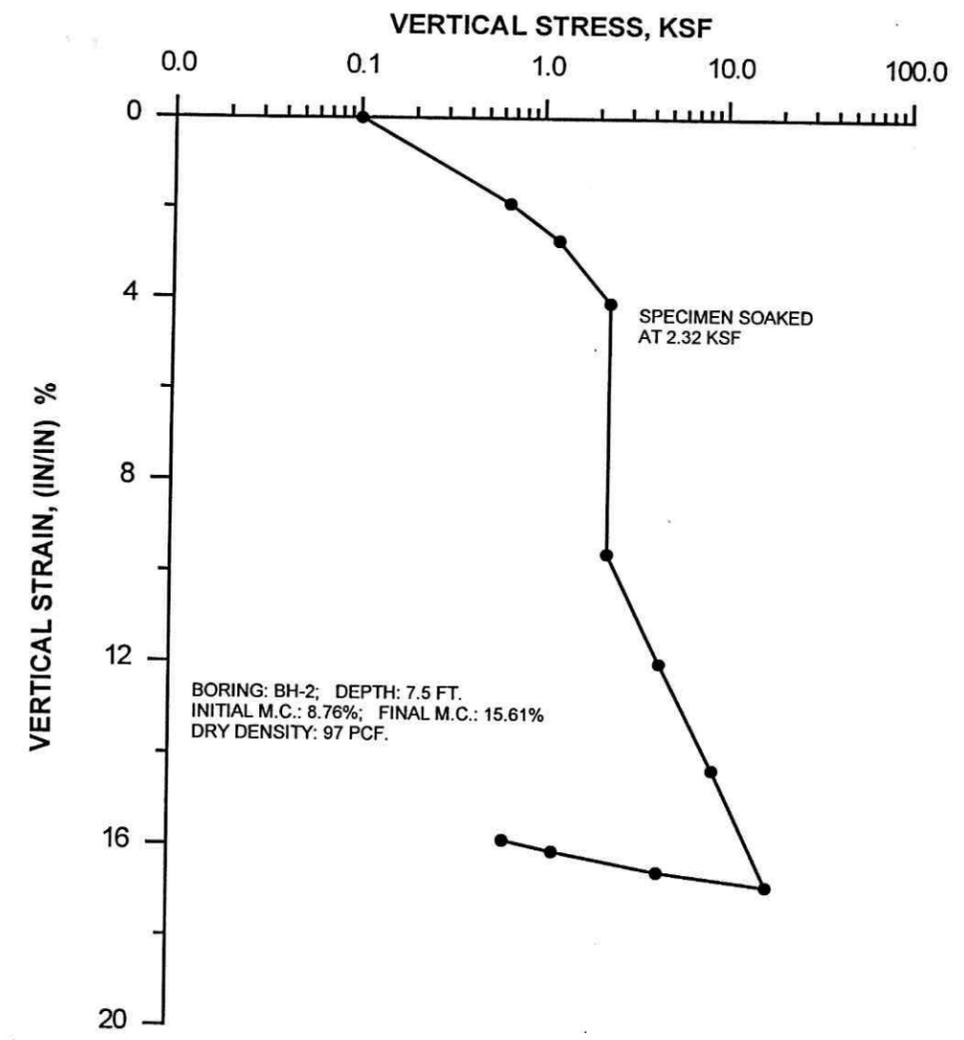
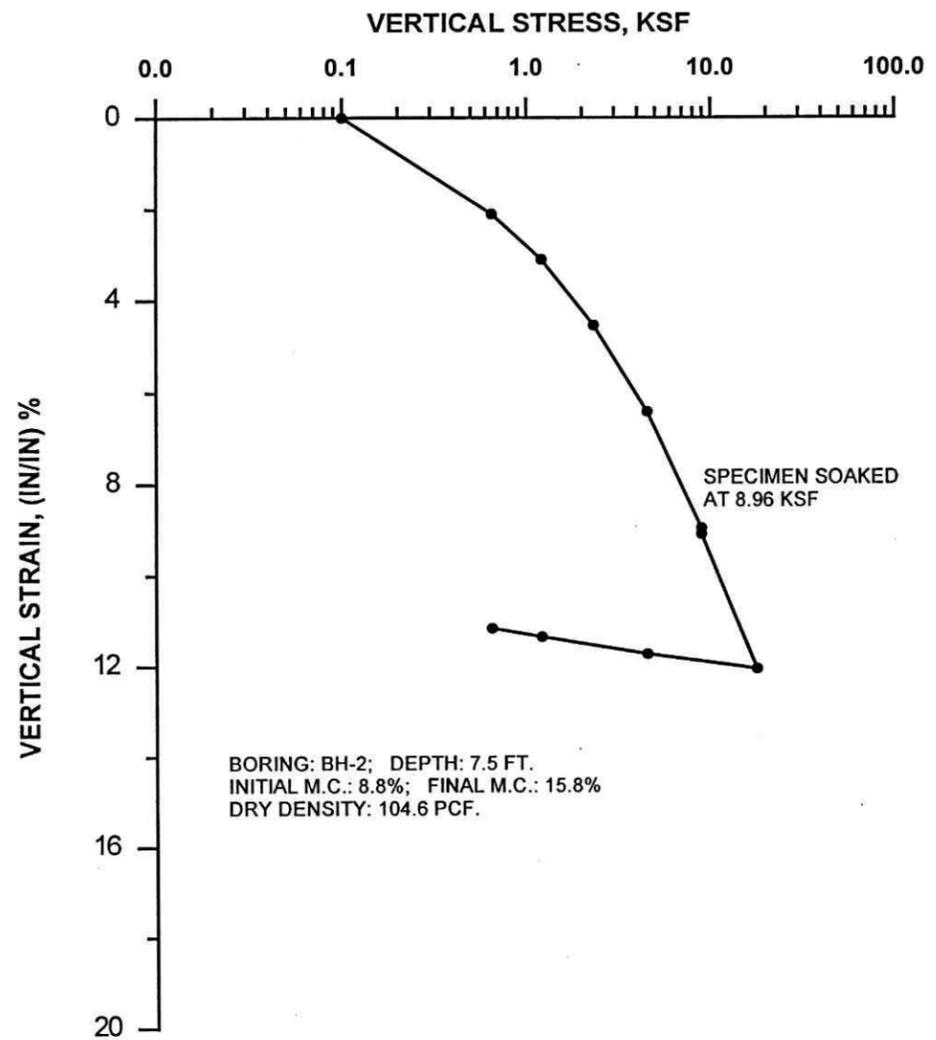
b) STRENGTH ENVELOPE

APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

RESULTS OF DIRECT SHEAR TESTS

ISKCON CULTURAL CENTER

Job No.	Date	Drawn By	Figure
99-020	NOV. 1999	K.R.	C-6



APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

RESULTS OF 1-D COMPRESSION TEST

ISKCON CULTURAL CENTER

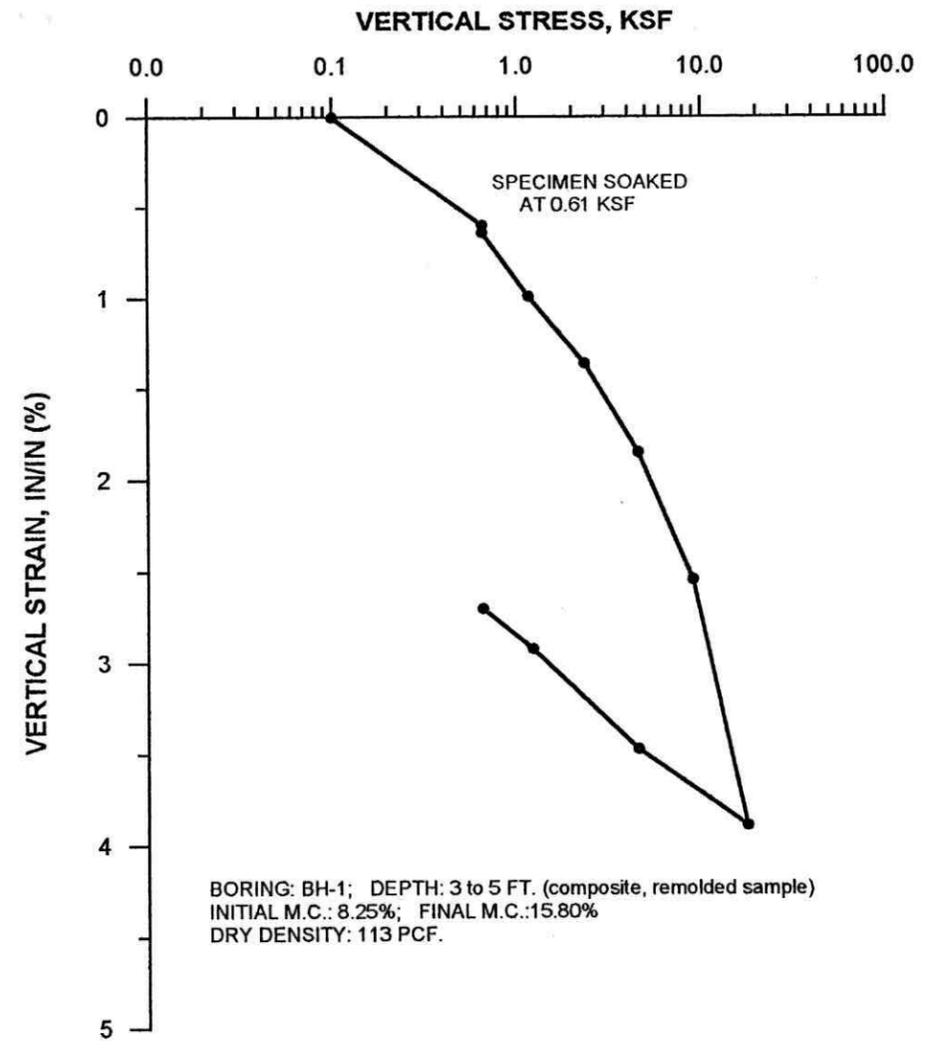
Job No.	Date	Drawn By	Figure
99-020	NOV. 1999	K.R.	C-9

APEX
GEOTECHNOLOGY, INC.
GEOTECHNICAL CONSULTANTS

RESULTS OF 1-D COMPRESSION TEST

ISKCON CULTURAL CENTER

Job No.	Date	Drawn By	Figure
99-020	NOV. 1999	K.R.	C-8



**APEX
 GEOTECHNOLOGY, INC.
 GEOTECHNICAL CONSULTANTS**

RESULTS OF 1-D COMPRESSION TEST

ISKCON CULTURAL CENTER

Job No.	Date	Drawn By	Figure
99-020	NOV. 1999	K.R.	C-10