

University of California

Santa Barbara

Facilities Management

Supplemental Geologic Investigation  
Proposed Physical Sciences Building

**HOOVER & ASSOCIATES, INC. Geologists - Hydrologists - Soil Engineers**

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March 18, 1988

University of California, Santa Barbara  
Facilities Management  
Office of Planning and Construction  
Santa Barbara, California 93106

Attention: Mr. William Hanna

Subject: Supplemental Geologic Investigation  
Proposed Physical Sciences Building  
Main Campus  
University of California, Santa Barbara

Gentlemen:

**INTRODUCTION**

This letter summarizes the results of our supplemental geologic investigation of a portion of the area proposed for the construction of a new Physical Sciences Building at the University of California, Santa Barbara (Plate 1).

Our investigation focused on determining a more precise location of the Campus fault. A more precise location was required since the proposed building "footprint" on the Ratcliff Architects preliminary plan designated as Option 2 (dated February 2, 1988) includes an area approximately 50 feet closer to the fault than previous options.

The Campus Fault was mapped as a branch of the potentially active More Ranch Fault by Dames and Moore (1972). A geotechnical investigation addressing soils and the location of the Campus Fault, was performed by

Hoover and Associates in June, 1987. This report concluded that the Campus Fault was at least 70 feet northwest of the northwestern most portion of the proposed building footprint.

### FIELD INVESTIGATION

In order to more accurately locate the fault identified by previous investigators (Dames & Moore, 1972), an investigation was performed consisting of analysis of boring log data, in addition to the drilling and evaluation of two new borings.

Two borings (B-1 and B-2) were excavated in the location shown on Plates 2 and 3. The depth to the contact between Pleistocene-age marine terrace materials and the Siquoc Formation was carefully logged in each hole (see boring logs in Appendix). The location and surface elevation of each boring was surveyed, allowing determination of the subsurface elevation of the Siquoc contact.

On the basis of the boring data gathered in this investigation, there appears to be no vertical offset in the Siquoc Formation between the two borings.

### SUMMARY

On the basis of the most recent borings, the Campus Fault is at least 90 feet at its closest point from the northwest corner of the proposed Physical Sciences Building addition as shown in the Ratcliff Architects plot plan

(Option 2) dated February 7, 1988. Therefore, we conclude that ground rupture, should it occur on the Campus Fault as mapped on Plate 3, would not result in soil offsets beneath the proposed structure. It should be kept in mind that data presented in previous reports indicate that the Campus Fault is a potentially active fault rather than an active fault (movement within the next 100,000 years but not within the last 11,000 years), thus ground rupture on this fault within the design life of the structures is considered unlikely.

A discussion of other geologic hazards, including ground shaking, soil stability, and flooding, was presented in the Hoover and Associates report "Geotechnical Investigation of the Proposed Chemistry Building Addition", dated June 16, 1987. The magnitude of those hazards remains unchanged.

### CONCLUSIONS

1) No additional borings are required to determine whether or not the Campus Fault is located beneath or within 50 feet of the proposed structure.

2) Additional borings or trenches will, however, be required if the precise location of the fault is desired, or if a new determination of the age of the fault is required. On the basis of the existing borings the fault appears to be between 90 and 115 feet northwest of the building at its closest point. On the basis of trenching by previous investigators, the fault appears to be potentially active.

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3) Trenching across the fault trace can be performed, although due to the disruption of the area and the presence of concrete and extensive underground utilities, trenching may not be feasible immediately to the north of Buchanan Hall, where the present investigation was performed. An alternate site southwest of Buchanan Hall may be more feasible if more information is desired concerning the activity of the Campus Fault.

\* \* \* \* \*

We trust that this letter adequately addresses the concerns related to the location of the Campus Fault. Please do not hesitate to call us if you have any questions, or if you wish us to perform any additional work on this project.

Sincerely,  
HOOVER & ASSOCIATES INC.

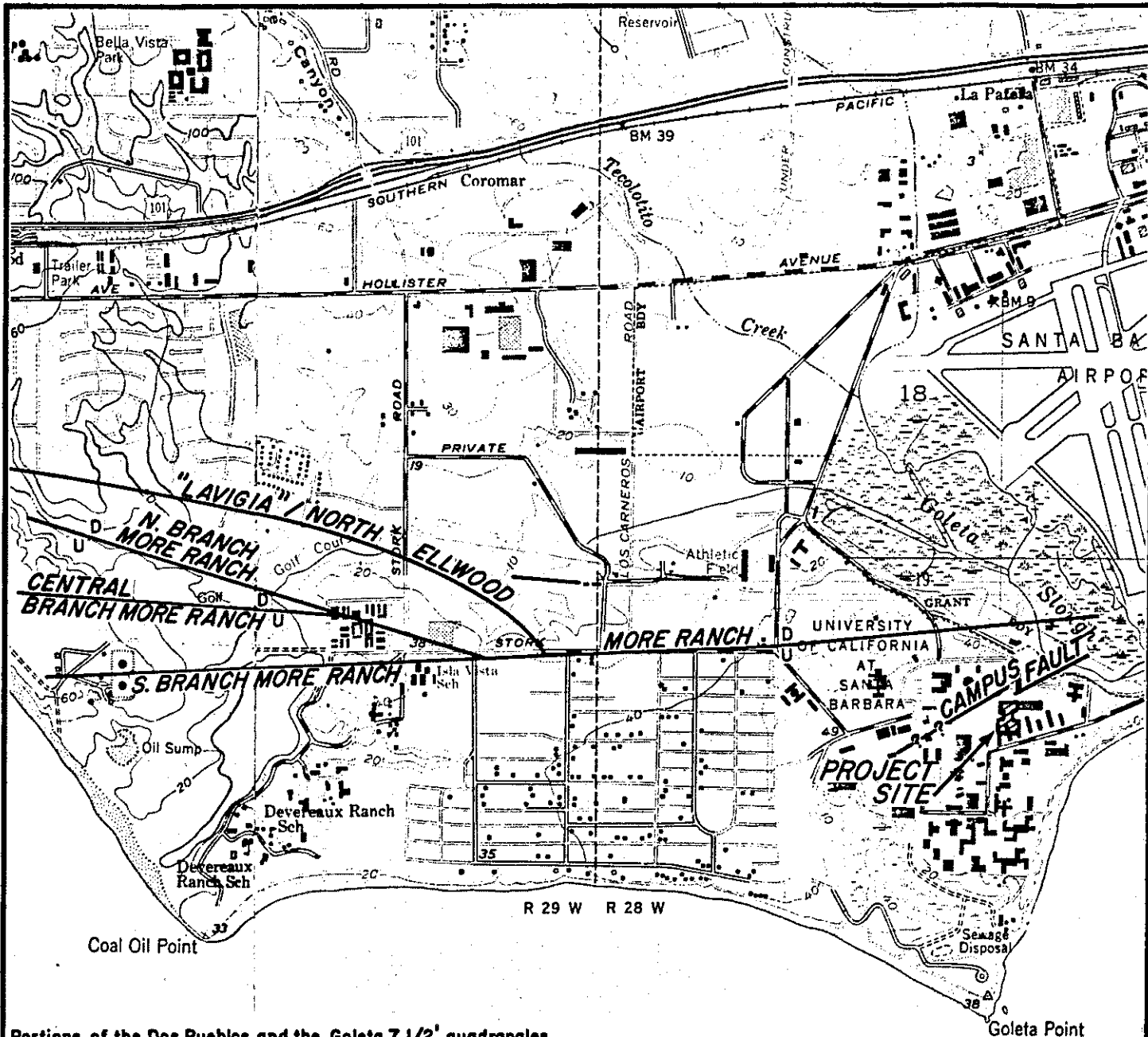


Michael F. Hoover  
President

Steve Campbell  
Staff Geologist

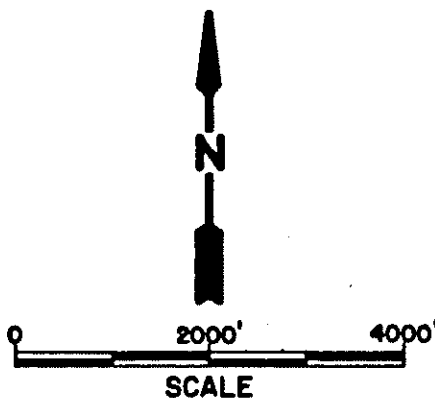
HOOVER & ASSOCIATES, INC.

File



Portions of the Dos Pueblos and the Goleta 7 1/2' quadrangles

**PROJECT LOCATION MAP  
and  
FAULT MAP  
PROPOSED CHEMISTRY BUILDING ADDITION  
UNIVERSITY OF CALIFORNIA, SANTA BARBARA**

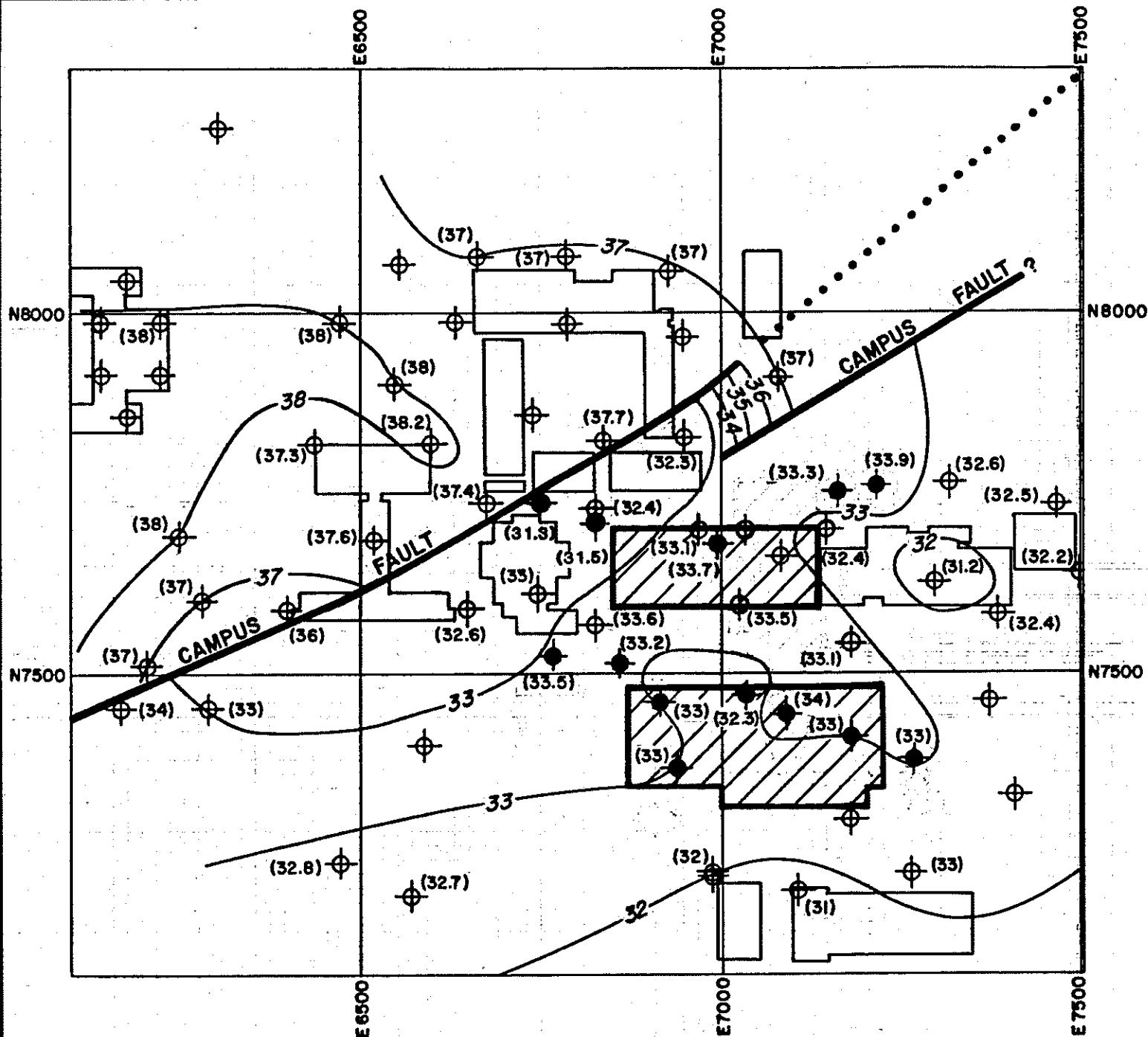


Modified from Crandall (UCSB No. 74031) and  
Hoover & Associates (UCSB No. 216-009)

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**Plate I**

By DAS Date 6/1/87



## STRUCTURAL CONTOUR MAP PROPOSED PHYSICAL SCIENCES BUILDING

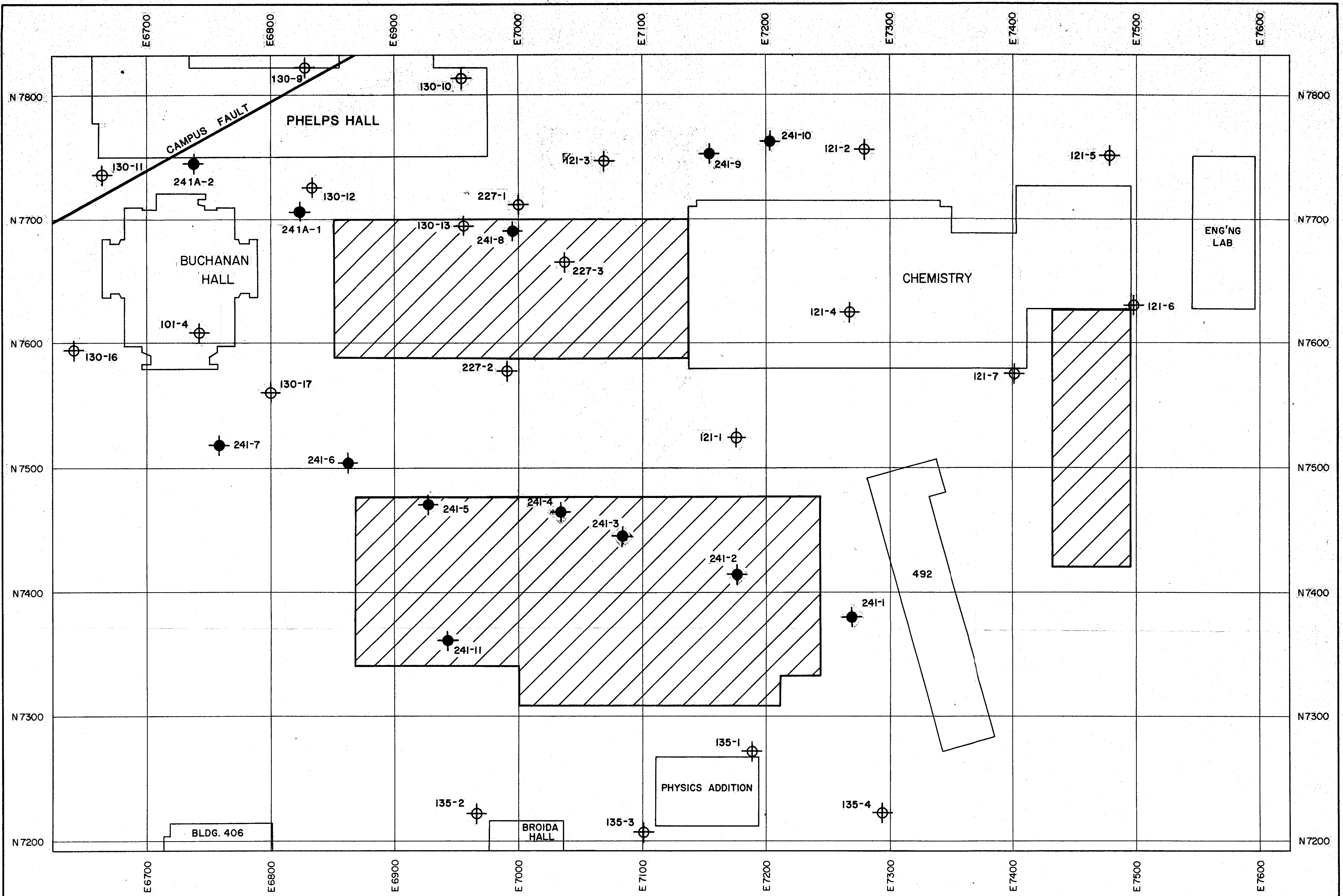


### LEGEND





- 37— Elevation of Surface of Siquoc Shale
- Maximum Building Footprint - Proposed Chemistry Addition Schemes 1-5
- • • — Campus Fault; solid where Quaternary Age Marine Terrace is offset (potentially active), dotted where Marine Terrace is not offset (inactive fault)
- Boring Location; number in parenthesis indicates elevation of Siquoc Shale above sealevel
- (32) ● This Investigation
- (33) ⊕ Previous Investigation



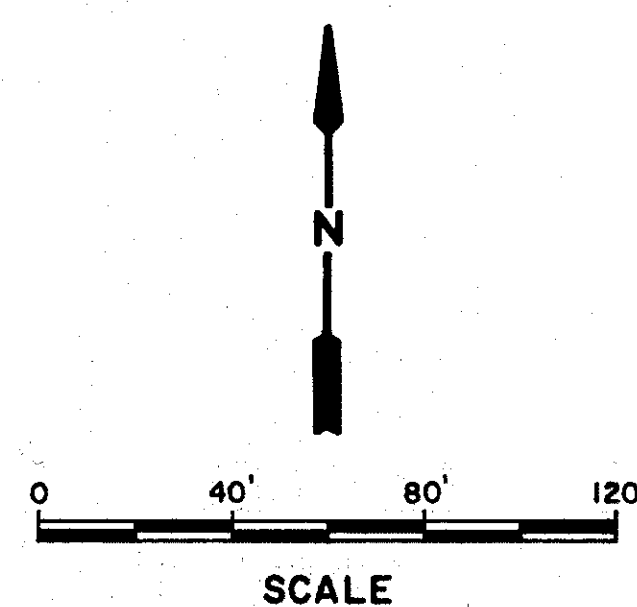
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LEGEND

-  Campus Fault
-  XXX-3 Boring - Previous Investigation  
Numbers denote report and boring number
-  241-4 Boring - Present Investigation
-  Maximum Building Footprint (Option 2)

BORING LOCATION MAP  
PROPOSED PHYSICAL SCIENCE BUILDING











**Appendix**

**Boring Logs**

## KEY TO LOGS OF TEST BORINGS

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	3.0-inch O.D. Modified California Sampler
	Standard Penetration Test
	Bulk Sample
	Pocket Penetrometer, tsf
	Water Level, First Encountered
	Water Level After Drilling
NS	No Sample Recovered
Qtm <sub>1</sub>	Brown Silt
Qtm <sub>2</sub>	Yellow and Brown Silty Sand
Qtm <sub>3</sub>	Gray/Black Sand
Tsq	Sisquoc Formation (Shale)

Note: SOIL CLASSIFICATION SHOWN ON THE LOGS ARE FIELD CLASSIFICATIONS BASED ON UNIFIED SOIL CLASSIFICATION SYSTEM.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO. 241A-1



**Geologists • Hydrologists • Soil Engineers**

DEPTH IN FEET	SAMPLE NO.	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION  Job: UCSB - Physical Sciences Boring Location: NW bldg footprint, in planter Elevation: 51.0	IN-PLACE	
					DRY DENSITY pcf	MOISTURE CONTENT % dry wt.
0.						
1.	12-1B	X		Light brown sandy silt (SM); moist to dry; loose Qtm1		
2.	12-1		84	brown silty sand (SM); firm; dense; dry; Qtm2		
3.				recemented(?); some whit caliche or clay		
4.						
5.	12-2		40	brown silty sand (SM); soft; med dense moist		
6.						
7.				mottled gray, yellow, brown sandy silt (\$M)		
8.				moist; firm; dense		
9.	12-3		40/50 5 1/2"	as above; moist to v.moist; stiff; dense		
10.						
11.				mottled yellow gray silty sand (SM); firm;		
12.				med dense; v.moist to saturated		
13.				Qtm2		
14.				Qtm3		
15.						
16.	12-4		16/50 5"	dark gray sand; (SP); firm; med. dense;		
17.				saturated		
18.						
19.				Qtm3		
20.	12-5		-	gray/green mudstone; hard; v.dense; dry to		
21.				moist		
22.				Tsq		
23.				EOB - 21.5 feet		
24.				Date of drilling 3/2/88		
				Groundwater as noted		

BORING NO. 241A-2



DEPTH IN FEET	SAMPLE NO.	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION Job: UCSB Physical Sciences Boring Location: N of Buchanan Hall, in planter Elevation: 51.2	IN-PLACE	
					DRY DENSITY pcf	MOISTURE CONTENT % dry wt.
0.						
1.				Light brown, sandy silt (SM); moist, med dense; firm; minor pebbles		
2.				2" shell at 2' Qtm1		
3.				Mottled yellow silty sand (SM); moist; med dense; firm; minor pebbles; some concrete debris Qtm2		
4.				Light brown sandy silt (SM); v. moist; dense firm		
5.						
6.						
7.						
8.						
9.				Mottled red, yellow, purple fine silty sand (SM); moist; m. dense; firm		
10.						
11.						
12.						
13.				Yellow silty sand (SM); v. moist; loose to firm; med dense		
14.						
15.					Qtm2	
16.				Blue/gray sand (SP); saturated; loose to firm; med dense becoming siltier	Qtm3	
17.						
18.						
19.					Qtm3	
20.				Blue/gray mudstone; hard	Tsq	
21.						
22.				EOB - 20 feet Date of drilling - 3/2/88 Groundwater as noted		