Prepared For: Chevron U.S.A., Inc.

Groundwater Monitoring Well Installation Report
Chevron USA
Livermore, California

March 11, 1985

J. H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING
LAND AND WATER RESOURCES

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March 1, 1985
File: B-1458-1

Mr. John Randall
Chevron U.S.A., Inc.
2 Annabel Lane
Suite 200
San Ramon, CA 94583

Dear Mr. Randall:

Enclosed is a report summarizing the installation of two groundwater monitoring wells at Chevron U.S.A.'s service station at 4904 South Front Street in Livermore, California.

Please contact us if you have any questions.

Very truly yours,

J. H. KLEINFELDER & ASSOCIATES

Michael S. Bonkowski
Project Geologist

Edward E. Rinne
Engineering Manager

MSB:EER:tms

Enclosure

GROUNDWATER MONITORING WELL INSTALLATION REPORT
CHEVRON USA
LIVERMORE, CALIFORNIA

I. INTRODUCTION

The following report summarizes the geotechnical services performed at Chevron USA's Service Station at 4904 South Front Street in Livermore, California. Chevron USA contracted J. H. Kleinfelder & Associates to install two groundwater monitoring wells for a water quality site investigation. On January 9, 1985, J. H. Kleinfelder & Associates completed two soil borings and installed two monitoring wells under this contract. This report describes the work elements associated with the monitoring well installation, and discusses the results of our field observations.

II. SITE LOCATION

Chevron's service station is located at 4909 South Front Street in Livermore, California, as shown on Plate 1. The station is situated at the northeast corner of the intersection of South Front Street and Highway 84, and across the street from Mobil Oil Company's Service Station located at 4707 First Street.

III. SCOPE OF WORK

Two monitoring wells (K-10 and K-11) were installed offsite of Chevron's service station. The well locations and depths were specified by Chevron U.S.A. Monitoring well K-11 was placed in the backfill along the east edge of a drainage culvert which runs along the western perimeter of Chevron Service Station's and under Mobil Oil Company's Service Station. Monitoring well K-12 was placed in South

Front Street just north of Mobil Oil Company's Service Station. Both monitoring wells are situated downgradient of Chevron's Service Station. The locations of these wells are shown on Plate 2.

IV. FIELD ACTIVITIES/OBSERVATIONS

A. Soil Borings

The location of the two soil borings in which the monitoring wells were installed is shown on Plate 2. The borings were drilled using a truck-mounted CME 75 drill rig equipped with 10-inch hollow stem augers. A description of the soils encountered is presented on Plate 4 and 5, with a copy of the Unified Soils Classification System (used to identify the soils) included as Plate 3. The soils encountered during drilling consisted of thin interbeds of clay, silty clay, gravelly clay, silt, clayey silt, and sand. In monitoring well K-11, groundwater was encountered 20.6 feet below grade in a 5 foot thick unit of clay. In monitoring well K-12, groundwater was encountered 17.5 feet below grade in a 14 foot thick unit of clay.

B. Monitoring Wells

Both groundwater monitoring wells were constructed in the soil borings at the completion of drilling and logging. Monitoring well K-11 was completed with a 3-inch inside diameter PVC pipe, with well screen sections perforated with 0.020-inch slots from 5 to 35 feet below the ground surface. The annular space between the pipe and the wall of the boring was backfilled with #3 Monterey sand to approximately one foot above the top of the perforated section. A one-foot bentonite plug was placed above the sand pack to provide a seal against surface water infiltration. Monitoring well K-12 was completed with a 3-inch inside diameter PVC pipe, with well screen sections perforated with 0.020-inch slots from 4 to 30 feet below the ground surface. The annular space between the pipe and the wall of the boring was backfilled with #3 Monterey sand to approximately one foot above the top of the perforated section. A one-foot bentonite plug was placed

above the sand pack to provide a seal against surface water infiltration.

Concrete was placed in the annular space of both monitoring wells from the bentonite plug to the surface. Both monitoring wells were completed with locking screw caps inside a Christy Box.

C. Sampling Procedure

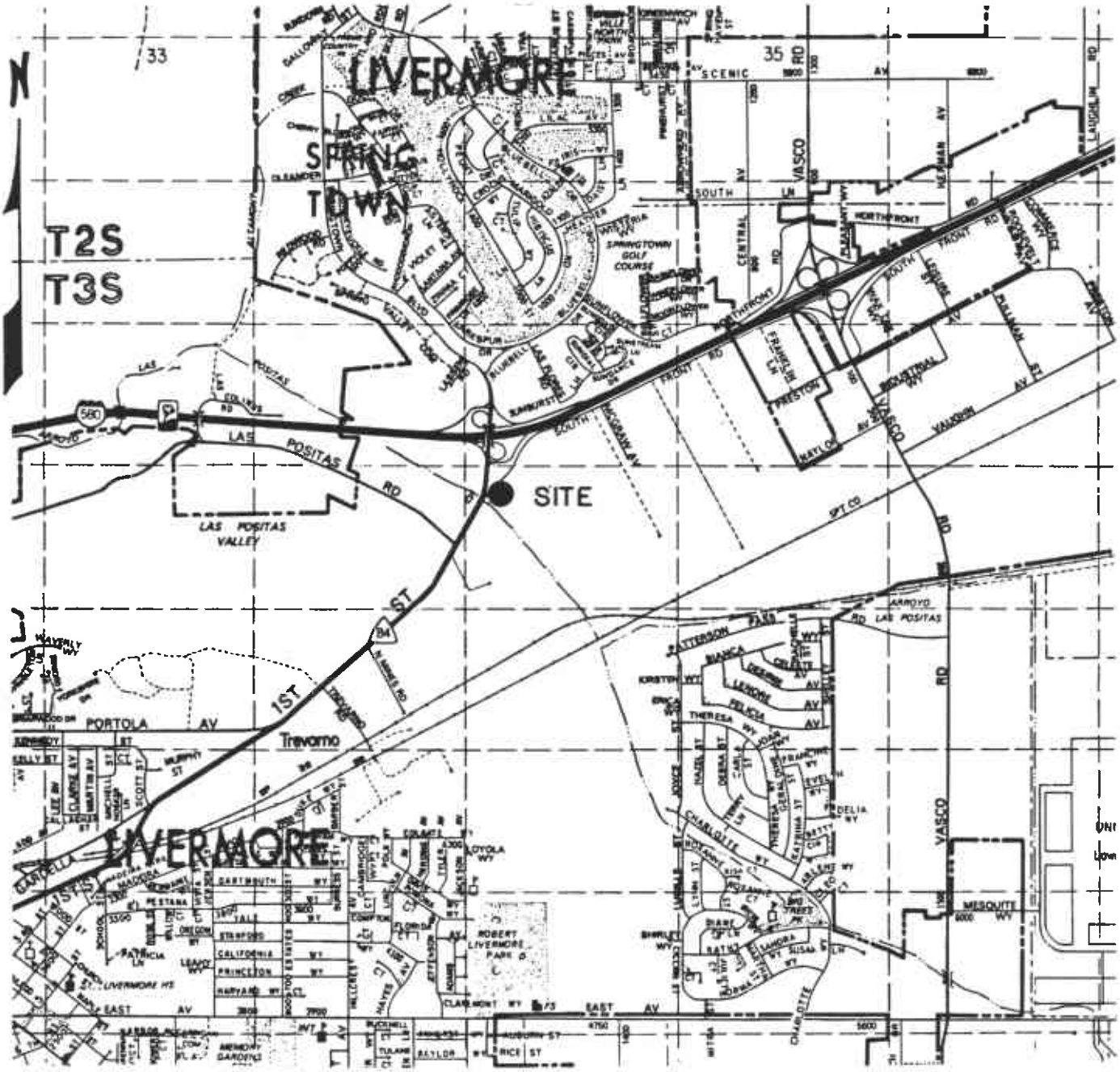
Soil samples were collected and logged with a standard penetration split spoon sampler. Samples were collected every 2.5 feet until water was encountered, and every 5 feet thereafter. Sampling started at a depth of 7.5 feet in well K-10 and at a depth of 5 feet in well K-11.

IV. DISCUSSION

No odor of gasoline was detected in monitoring well K-10 at Mobil Oil Company's Service Station. A slight odor of gasoline was detected in the samples collected at 12.5 feet and 15 feet in monitoring well K-11.

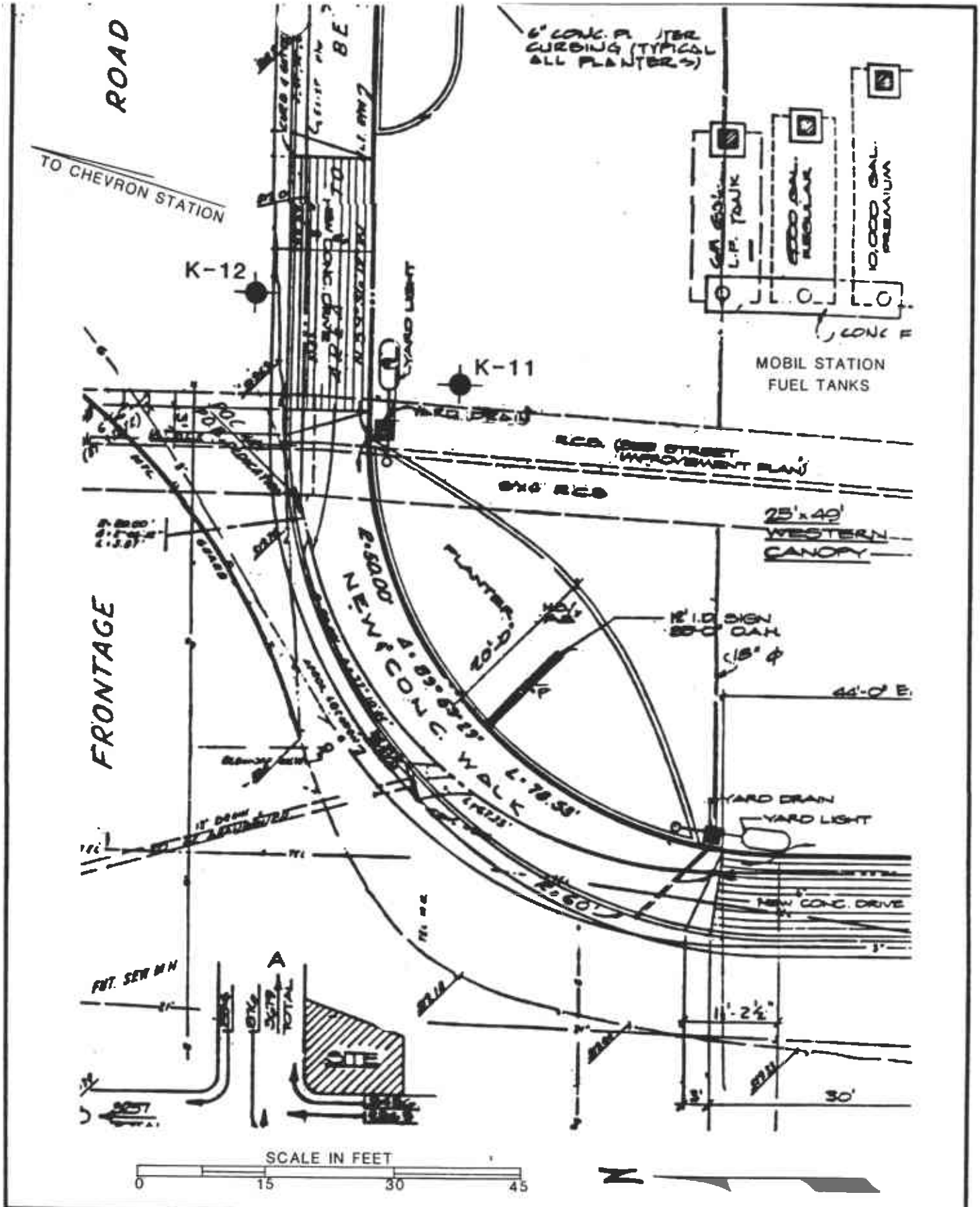
V. LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in Northern California at the time the investigation was performed. It should be recognized that definition and evaluation of geologic conditions is a difficult and inexact art. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface conditions present. More extensive studies including additional subsurface investigation can tend to reduce the inherent uncertainties associated with subsurface modeling. If the client wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder and Associates should be notified for additional consultation.



SCALE: 1" = 1/2 mile

J H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	CHEVRON USA 4904 S. FRONT STREET LIVERMORE, CA SITE LOCATION MAP	PLATE 1
PROJECT NO. B-1458-1		



J.H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	CHEVRON USA 4904 S. FRONT STREET LIVERMOORE, CA	PLATE 2
PROJECT NO. B-1458-1	BORING LOCATION MAP	

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel sand mixture, little or no fines.
		GM	Silty gravels, gravel-sand-clay mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.

MAJOR DIVISIONS		LTR	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silt-clays of low plasticity
	SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

Standard penetration split spoon sample

Modified California Sampler

Shelby tube sample

Water level observed in boring

* No recovery

NFWE No free water encountered

NOSC No odor, scent, or fluid cut

NOTE: Blow count represents the number of blows of a 140-pound hammer falling 30 inches per blow required to drive a sampler through the last 12 inches of an 18-inch penetration.

NOTE: The line separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

Blank casing

Screened casing

Cement grout

Bentonite

Sand pack

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CHEVRON USA
4904 S. FRONT STREET
LIVERMOORE, CA
BORING LOG LEGEND

PLATE
3

Depth in Feet	Blow/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
0				Asphalt 4"	
1					
2			ML	SILT - brown, little clay, little gravel, 1" rounded, stiff, low plasticity, moist, NOSC	
3					
4					
5					
6			CH	CLAY - brown, little silt, soft, high plasticity, moist, NOSC	
7					
8	2 2 3		CH	CLAY - brown, trace fine gravel, 1/4" angular, soft, high plasticity, moist, NOSC	
9					
10	1 0 2		CH	CLAY - dark brown, trace fine gravel, 1/4" rounded, poorly sorted, soft, high plasticity, moist, NOSC	
11					
12					
13	5 6 9		CL	SILTY CLAY - tan, little fine gravel, 1/2" subrounded, poorly sorted, trace black organics, stiff, low plasticity, moist, NOSC	
14					
15	9 10		CL	GRAVELLY CLAY - tan with light grey mottling, fine gravel, 1/4" rounded, poorly sorted	

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PROJECT NO. B-1458-1

CHEVRON USA
4904 S. FRONT STREET
LIVERMOORE, CA
LOG OF BORING NO. K-11

PLATE
4

Depth In Feet	Blow/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
16	16			Little silt, very stiff, low plasticity, NOSC	
17					
18	4 6 9		CL	SILTY CLAY - tan, rust staining, stiff, medium plasticity, moist NOSC	
19					
20	4	▽	ML	CLAYEY SILT - tan, rust staining, trace fine gravel, 1/8" subangular, very stiff, medium plasticity, slightly wet, NOSC	
21	6 12				
22					
23					
24					
25	6		ML	SANDY SILT - tan, fine sand, stiff, medium plasticity	
26	9 23		SP	SAND - tan, trace fine gravel, ½" poorly sorted, fine to medium sand, some silt, medium dense, wet, NOSC	
27					
28					
29					
30			CH	CLAY - tan, trace black organics, stiff, high plasticity, wet, NOSC	
31	4 6 9				

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PROJECT NO. B-1458-1

CHEVRON USA
4904 S. FRONT STREET
LIVERMOORE, CA
LOG OF BORING NO. K-11

PLATE
4

Depth In Feet	Blow/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
32					
33					
34					
35	4 19 37		SP	SAND - gray, fine to medium sand, very dense, wet, NOSC	
36					
				Total depth = 36.5 ' Logged By: Eric Findlay	

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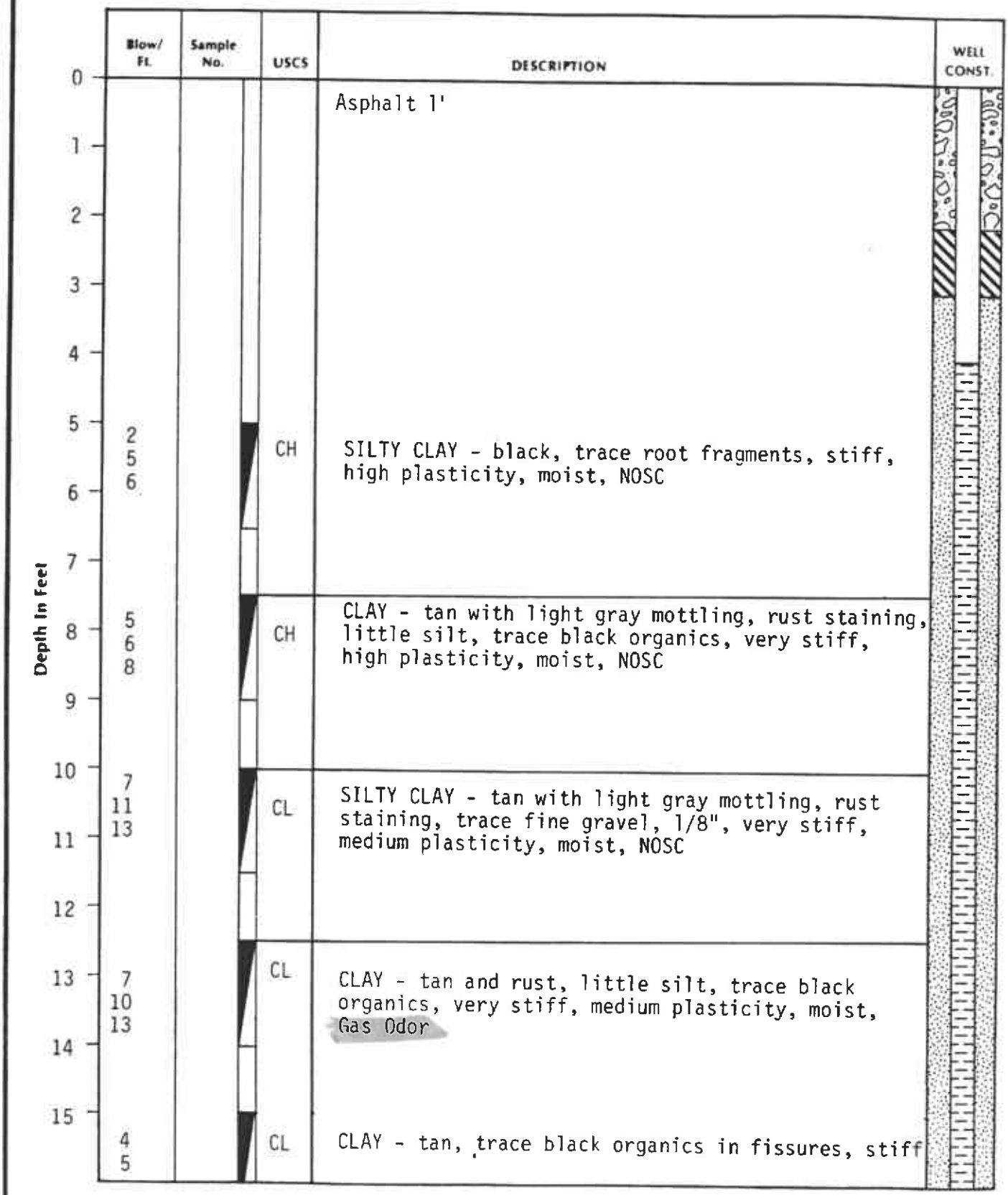
PROJECT NO. B-1458-1

CHEVRON USA
4904 S. FRONT STREET
LIVERMOORE, CA
LOG OF BORING NO. K-11

PLATE
4



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PROJECT NO. B-1458-1

CHEVRON USA
4904 S. FRONT STREET
LIVERMOORE, CA
LOG OF BORING NO. K-12

PLATE
5