



ENVIROSCIENCE

April 6, 1982

Mr. Richard Michael
Chevron U.S.A.
Marketing Division
2 Annabel Lane, Suite 200
San Ramon, CA 94582

RE: Progress Report #2 (FINAL)
Gasoline Leakage
Chevron Station SS #290
1802 Webster Street
Alameda, CA 94501
WC58X5

Dear Mr. Michael:

This final report for the Chevron Service Station in Alameda, California, summarizes the major factors relating to groundwater contamination assessment. Our conclusions and recommendations presented herein are based on our findings and good engineering judgment.

The site and monitoring well locations are shown in Figures 1 and 2 respectively. Figure 2 has been updated from the first progress report to include the location of the groundwater monitoring wells installed with the new subsurface tankage. Well B-2 was removed during excavation, and well B-1 has been paved over and cannot be found. It is suggested that well B-1 be located using a metal detector and then be placed back into useful service.

The station manager is uncertain as to the amount of product that was lost. He stated that his regular tank began collecting noticeable amounts of water on a daily basis just before Christmas. To keep the station operating, the water layer was removed daily by Chevron for approximately one week. The regular tank was then taken out of service.

Our subsurface investigation began on January 19, 1982, less than one month from the estimated time of leakage. Six monitoring wells were installed. Two additional wells have been installed with the new tanks to monitor the backfill. As indicated in the first progress report, evidence of groundwater contamination was not observed. However, the excavation site did produce a water layer with a slight sheen.

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The soil boring data taken during drilling and a hydrogeologic study are presented in the attached reports. The reports state that the soil permeability is on the order of 2.6×10^{-2} to 10^{-3} cm/sec. A simple groundwater contour map cannot be developed from the data presented in Tables 1 and 2. Table 2 contains the data presented in the first progress report; however, the groundwater level data has been normalized to a horizontal plane through the surface elevation of the top of well B-4. The data presented suggests a northerly gradient.

The hydrogeologic study confirms this finding and quotes a groundwater gradient at a slope of .0043 ft/ft. The study uses a porosity of 20 percent, a permeability of 10^{-2} cm/sec, and concludes that the average regional groundwater flow velocity is approximately 220 ft/yr. Using the range of permeability listed above, the groundwater velocity could range from 572 to 22 ft/yr. During tank replacement, a high flow velocity was demonstrated by the fact that over 5,000 gallons of water had infiltrated the site over night.

Knowing that the groundwater level in the area is relatively high, the hydrostatic pressure should have contained most gasoline within the tank. The excavation area should have provided an excellent cone of depression, which in turn would have produced large quantities of hydrocarbon product if it existed on site.

Four factors remain, however, which cause concern regarding contamination assessment. There is uncertainty as to the amount of product lost by the service station. Well B-4 has consistently shown high levels of combustible gas with readings of greater than 1,000 ppm and 10 LEL. A product layer has never been found in well B-4, but a sheen of gas persisted in spots of the excavation site. The local groundwater velocity is relatively high and is toward a highly commercialized area of the city. If gas remains in the soil, problems with the neighboring areas could result within the next year. Therefore, three additional monitoring wells, shown in Figure 3, are recommended on the service station's northern perimeter. These wells can be installed in approximately one-half of a day. These additional wells, along with B-4 and B-5, will provide Chevron with long-term monitoring capability in a plane normal to the groundwater flow. These wells will also prove valuable in the future if other leaks are suspected.

We trust that the services and information provided for this project have satisfactorily met your needs. Unless specifically requested, no additional assessment work will be performed for this station. It is recommended, however, that you plan to routinely monitor the wells at the site. The wells should be closed if you do not plan any monitoring activities.

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It has been our pleasure serving your needs, and we look forward to assisting with your groundwater contamination assessments in the future.

Sincerely,

A handwritten signature in cursive script that reads "Thomas E. Pearson".

Thomas E. Pearson
Project Manager

TEP:jc

Attachment

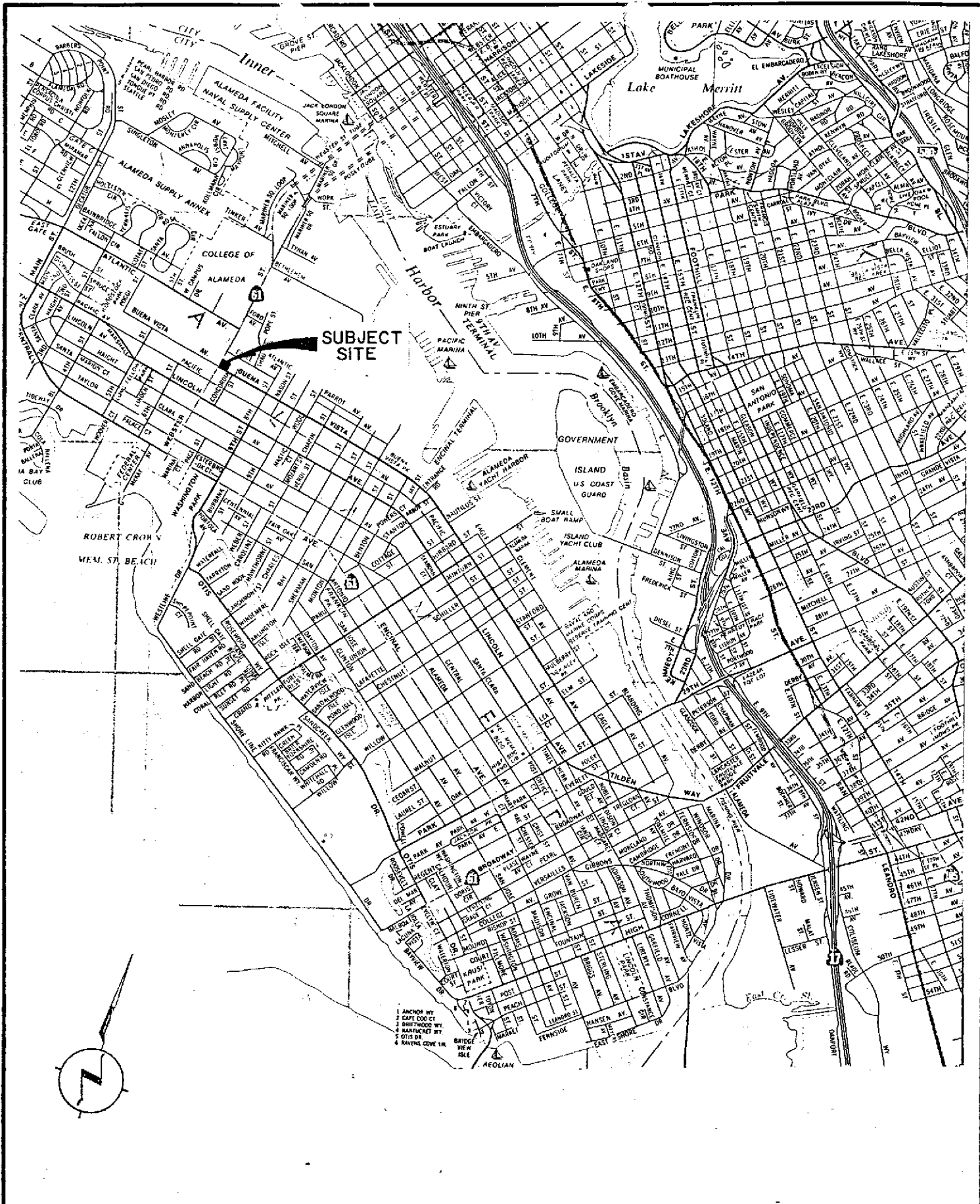
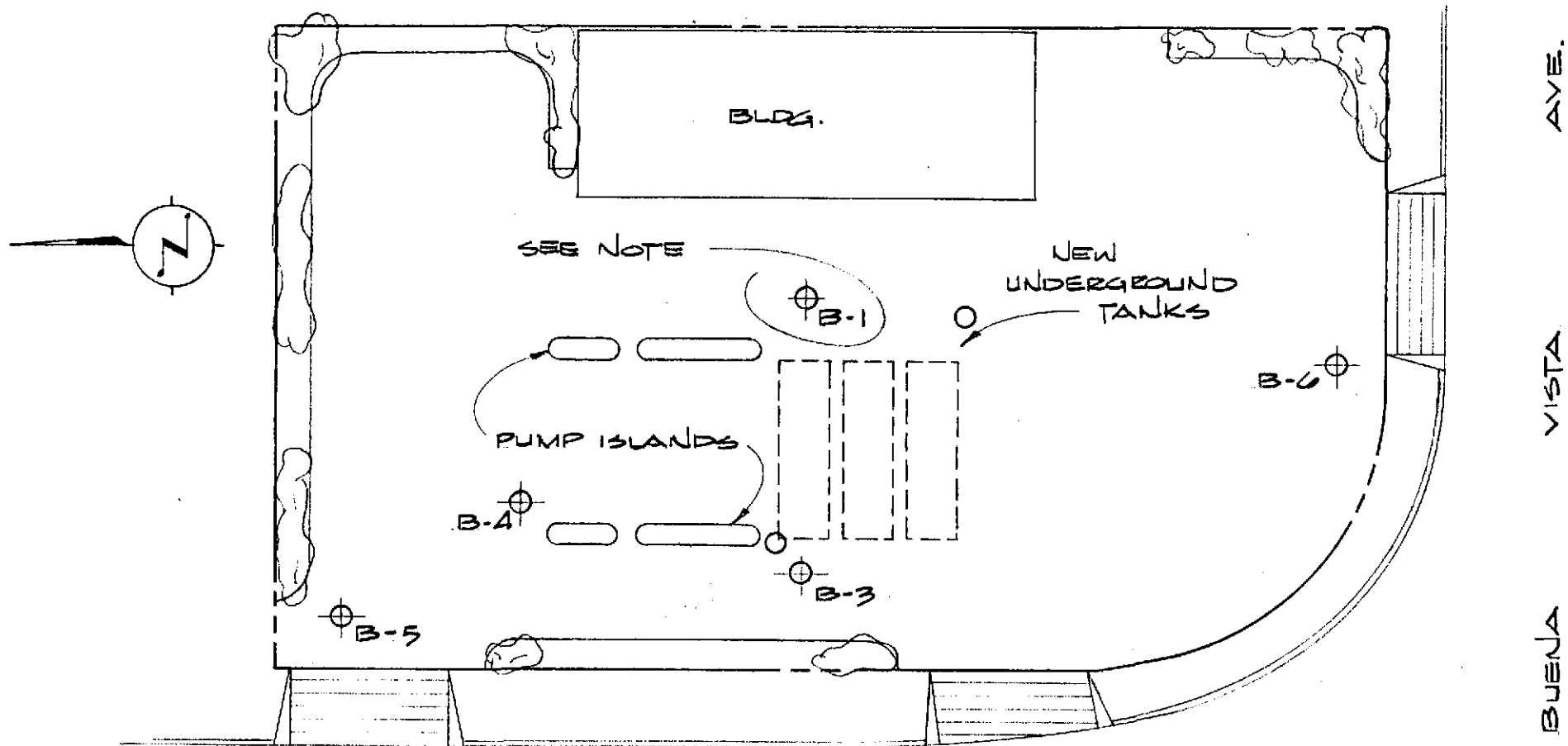


FIGURE 1
 CHEVRON STATION • ALAMEDA, CA.
 LOCATION MAP





NOTE:
 BORING "B-1" HAS
 BEEN PAVED
 OVER AND IS
 INACCESSABLE.
 "B-2" HAS BEEN
 REMOVED.

1	3-1-82	A.P.
REV.	DATE	BY

LEGEND

⊕ : MONITORING WELL

○ : BACKFILL WELL



ENVIROSCIENCE

FIGURE 2
 CHEVRON STATION - ALAMEDA, CA.
 MONITORING WELL LOCATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION	MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel sand mixtures, little or no fines.	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.
		GP	Poorly-graded gravels or gravel sand mixture, little or no fines.			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, gravel-sand-clay mixtures.			OL	Organic silts and organic silt-clays of low plasticity
	SAND AND SANDY SOILS	GC	Clayey gravels, gravel-sand-clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		SW	Well-graded sands or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly-graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity.
		SM	Silty sands, sand-silt mixtures.			Pt	Peat and other highly organic soils.
		SC	Clayey sands, sand-clay mixtures.			HIGHLY ORGANIC SOILS	

- Standard penetration split spoon sample
- Modified California sampler
- Shelby tube sample
- Water level observed in boring
- * No recovery

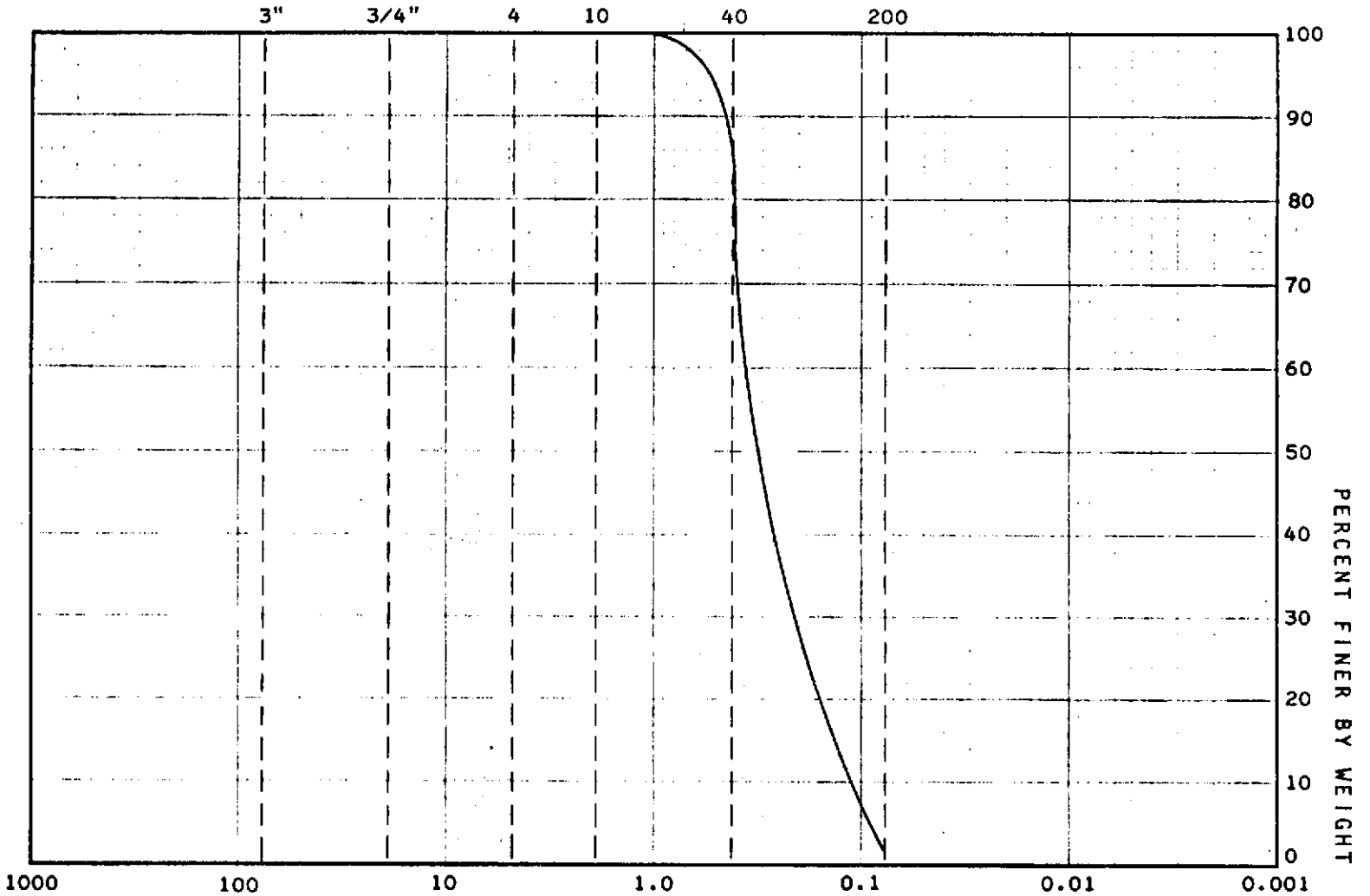
NFWE No free water encountered

NOTE: The lines 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.

J.H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	IT/ALAMEDA CHEVRON ALAMEDA, CALIFORNIA BORING LOG LEGEND	PLATE 1
PREPARED BY: FK DATE: 1/28/82	PROJECT NO. B-1163-1	
CHECKED BY: CRN DATE: 1/28/82		

SAMPLE B-2-4.5

U. S. STANDARD SIEVE SIZE



GRAIN SIZE IN MILLIMETRES

COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

PREPARED BY: FK DATE: 2/1/82
 CHECKED BY: CRN DATE: 2/1/82

J.H. KLEINFELDER & ASSOCIATES
 GEOTECHNICAL CONSULTANTS • MATERIALS TESTING



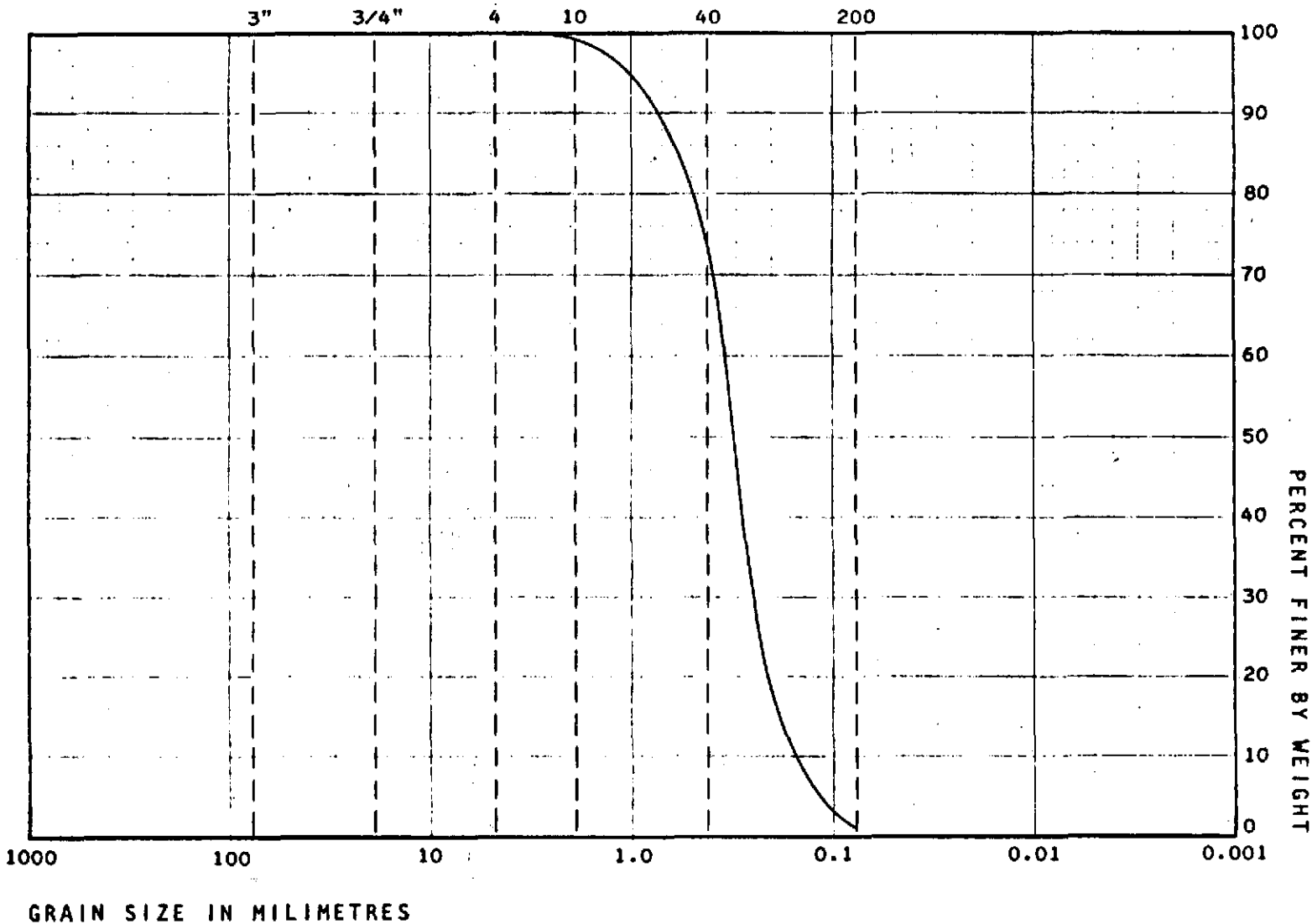
IT/LAMEDA CHEVRON
 ALAMEDA, CALIFORNIA
 GRAIN SIZE DISTRIBUTION
 PROJECT NO. B-1163-1

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PLATE

SAMPLE B-2-18.5

U. S. STANDARD SIEVE SIZE



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 GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: FK DATE: 2/1/82
 CHECKED BY: CRN DATE: 2/1/82

IT/ALAMEDA CHEVRON
 ALAMEDA, CALIFORNIA

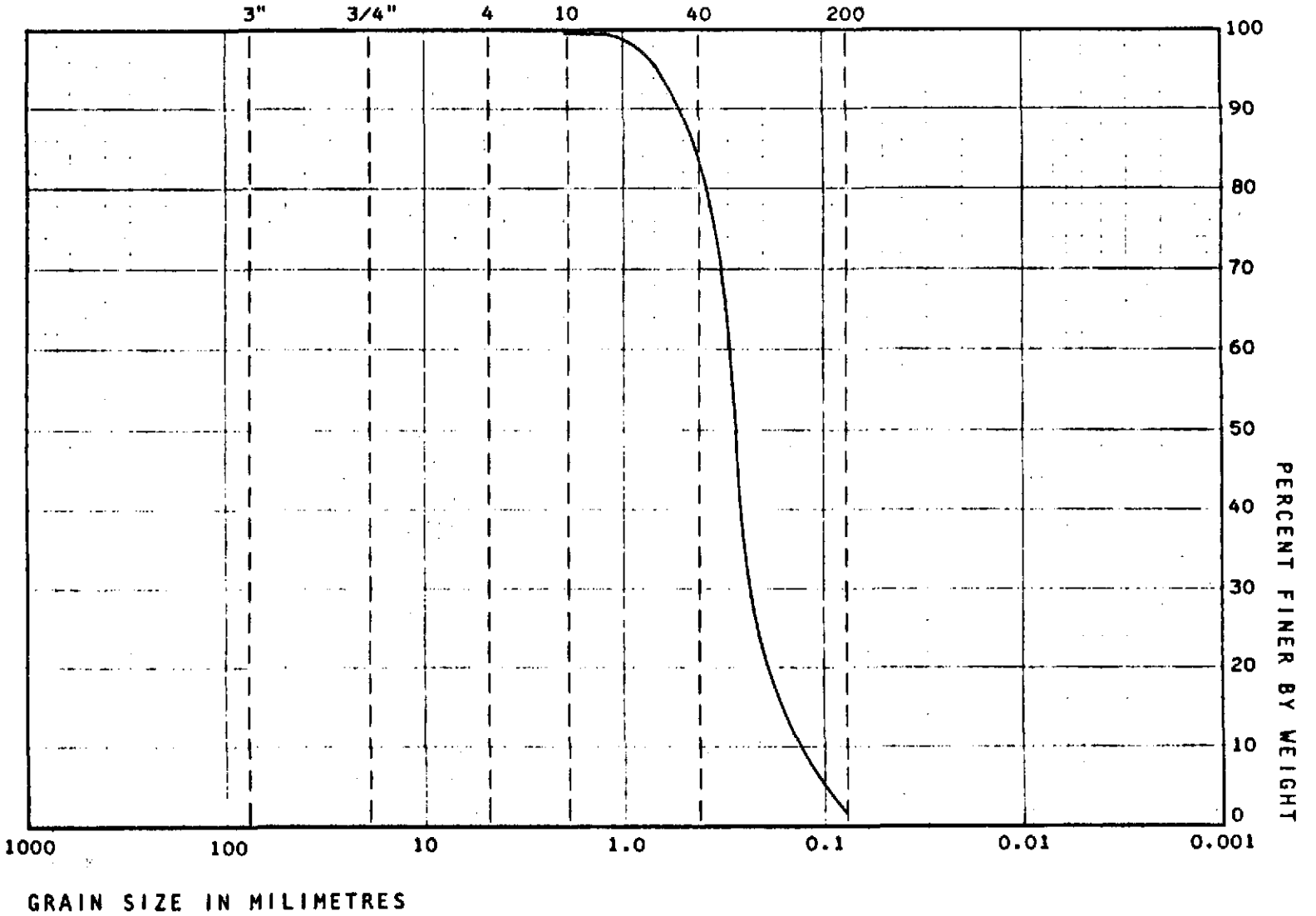
GRAIN SIZE DISTRIBUTION

COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

PLATE
9

SAMPLE B-5-8

U. S. STANDARD SIEVE SIZE



GRAIN SIZE IN MILLIMETRES

COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

J.H. KLEINFELDER & ASSOCIATES
 GEOTECHNICAL CONSULTANTS • MATERIALS TESTING



PREPARED BY: FK DATE: 2/1/82
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IT/LAMEDA CHEVRON
 ALAMEDA, CALIFORNIA

GRAIN SIZE DISTRIBUTION

PROJECT NO. B-1163-1

PLATE
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