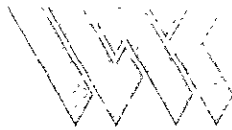


**ENVIRONMENTAL SITE EVALUATION**  
*KING KNIGHT PROPERTY*  
6202 Christie Avenue  
Emeryville, California  
WKA No. 1301.01

Prepared  
February 12, 1991



**WALLACE • KUHL & ASSOCIATES, INC.**

GEOTECHNICAL ENGINEERING • FOUNDATIONS • GEOLOGY  
ENVIRONMENTAL CONSULTING • GEOTECHNOLOGY

**ENVIRONMENTAL SITE EVALUATION**  
*KING KNIGHT PROPERTY*  
6202 Christie Avenue  
Emeryville, California  
WKA No. 1301.01  
February 12, 1991

**INTRODUCTION**

**Purpose and Scope**

We have completed an environmental site evaluation of the subject property located at 6202 Christie Avenue, Emeryville, California. The purpose of our work was to evaluate the subsurface soils and ground water for petroleum hydrocarbon contamination in the vicinity of the previously-existing underground fuel and waste oil tanks.

The scope of our work included:

- drilling six soil borings (B1 through B6) and converting three of the soil borings (B1, B2 and B3) to ground water monitoring wells to a maximum depth of 15 feet below grade;
- developing the ground water monitoring wells;
- collecting soil boring samples for laboratory analyses;
- collecting ground water samples from the monitoring wells for laboratory analyses;
- determining hydraulic gradient and flow direction; and,
- preparing this report.

A plan view of the site showing the locations of soil borings and monitoring wells appears on Plate 1. Boring logs and well construction diagrams are contained on Plates 2 through 7. Chain-of-custody documents and laboratory reports are provided in Appendix A.

## PROJECT REVIEW

### Subsurface Fuel Tanks

One 1,000-gallon diesel and one 550-gallon underground waste oil tank were removed from the northeast corner of the subject property in February, 1990. Ground water was reportedly encountered at a depth of approximately three feet below grade during the tank removal process. Analytical results of water samples taken from the tank excavation indicate ground water contamination as total petroleum hydrocarbons (TPH) and oil to be 12,000  $\mu\text{g/L}$  and 14,000  $\mu\text{g/L}$ , respectively. Analytical results of soil samples collected from the north and south end of the tank excavation were non-detectable. A soil sample collected from the west sidewall of the excavation revealed 21 mg/kg as oil.

## SITE DESCRIPTION

### Physiographic Setting

The subject site is located in the City of Emeryville, on the west side of Christie Avenue (Plate 1A). Surface elevation is approximately 8 feet above sea level. Local terrain is flat with less than two feet of relief across the site. The site is bounded to the north by a parking lot, beyond which is a movie theatre, to the east by a parking lot and the Emeryville Public Market, to the south by a vacant lot, and to the west by Christie Avenue. The San Francisco Bay is located within 1,000 feet west of the property.

## FIELD INVESTIGATION

### Soil Borings and Monitoring Wells

Six soil borings (B1 through B6) were drilled on the subject property using a Mobile B53 drill-rig equipped with six-inch diameter hollow-stem augers. The soil borings were drilled to a maximum depth of four feet below grade. All soil borings were backfilled with a cement/bentonite slurry after drilling.

Three of the borings (B1, B2 and B3) were deepened to a maximum depth of 15 feet below grade and converted to ground water monitoring wells. The lower ten feet of each well was screened (approximately 3 to 13 feet) and the zone above sealed with bentonite and a cement/bentonite mix. Boring logs and well construction diagrams are provided on Plates 2 through 7; field procedures for monitoring well installation are contained in Appendix B.

### Soil Sampling

Soil boring samples were collected at selected intervals beginning at 2.5 feet below grade with a modified California sampler equipped with two-inch diameter brass sleeves. Samples were capped with foil and plastic caps, sealed with tape immediately after collection and stored on ice.

Samples were handled and transported according to EPA protocol, following chain-of-custody procedures. The samples were delivered to a California state-certified analytical laboratory. Laboratory analyses of soil samples included total petroleum hydrocarbons (TPH) and benzene, toluene, xylene and ethyl benzene (BTX&E). Samples from Boring B5 and B6 were additionally analyzed for semi-volatile organics (EPA method 8270). Samples from B6 were also analyzed for lead, cadmium, chromium, zinc and nickel. These additional analyses were due to the proximity of Borings B5 and B6 to the former waste oil tank. Copies of chain-of-custody documents and analytical results are included in Appendix A.

### Ground Water Sampling

The monitoring wells were developed, purged and sampled as described in Appendix B. Laboratory analyses of ground water samples from the wells (B1, B2 and B3) included TPH and BTX&E.

## FINDINGS

### Soil Conditions

Boring and well logs (Plates 2 through 7) indicate that soils beneath the site are imported backfill consisting predominantly of a mixture of sand and silt with some lesser amounts of gravel and clay. The gravel encountered exhibited sharp angles suggesting crushed rock. A minor amount of debris was encountered which consisted of metal, wood and brick fragments.

Selected soil samples from borings and the water wells were analyzed in the laboratory when visual and olfactory observations indicated hydrocarbon contamination of the soils. Analytical results revealed detectable concentrations of TPH in soil samples from Borings B1, B2, B5 and B6. The TPH concentrations ranged from 0.54 mg/kg as gasoline in a sample from Boring B1 to 300 mg/kg characterized as motor oil in a sample from Boring B5. No detectable concentrations of BTX&E were found in Borings B2 and B6. Only trace concentrations of toluene and xylene were encountered in samples from Borings B1, B3, B4 and B5. Concentrations did not exceed 0.011 mg/kg as xylene or 0.008 mg/kg as toluene in these samples. All metals were well below the total threshold limit concentration (TTLIC) as described in Title 22 of the California Code of Regulations for the sample from Boring B6. All



results for semi-volatile organics analysis (EPA method 8270) for the soil samples from Borings B5 and B6 were below detection limits.

A summary of hydrocarbon analytical results for soils is presented in Table 1. Complete laboratory analytical reports and chain-of-custody documents for all soil samples are included in Appendix A.

**TABLE 1**  
**SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**  
**(mg/kg)**

Sample Designation	Depth (feet)	EPA METHOD 8015 MODIFIED Total Petroleum Hydrocarbons		EPA METHOD 8020			
		Gasoline	Diesel	Benzene	Toluene	Ethyl Xylenes	Benzene
B1-1I	2.5	0.59	ND	ND	ND	0.0087	ND
B1-2I	4.5	ND	< 110 (M.O.)	ND	ND	0.011	ND
B2-1I	2.5	0.54	ND	ND	ND	ND	ND
B2-2I	4.5	1.1	ND	ND	ND	ND	ND
B3-1I	2.5	ND	ND	ND	ND	0.0075	ND
B3-2I	4.5	ND	ND	ND	ND	ND	ND
B4-1II	3.5	ND	ND	ND	ND	0.0072	ND
B5-1II	3.5	ND	< 150 (300 M.O.)	ND	0.008	ND	ND
B6-1I	3.5	ND	16 (M.O.)	ND	ND	ND	ND

ND = Not Detected      Detection Limits =  
 M.O. = Motor Oil

TPH Diesel	-	10	mg/kg
TPH Gasoline	-	0.5	mg/kg
Benzene	-	0.005	mg/kg
Toluene	-	0.005	mg/kg
Xylenes	-	0.005	mg/kg
Ethyl Benzene	-	0.005	mg/kg

**Ground Water Conditions**

Ground water was initially encountered at approximately five feet below grade in most borings. Latest ground water measurements are shown on Table 2. Ground water measurements indicate direction of ground water flow to be to the northwest with a relatively flat hydraulic gradient of 0.005 feet/feet. However, given the proximity of the site to San Francisco Bay, the ground water flow direction and gradient are likely to vary considerable.

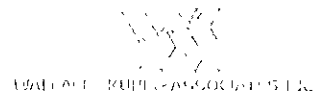


TABLE 2  
GROUND WATER ELEVATION DATA

<u>Monitoring Well</u>	<u>Date</u>	<u>Well Casing Elevation*</u>	-	<u>Ground Water Depth**</u>	=	<u>Ground Water Elevation*</u>
B1	12/07/90	8.80	-	5.57	=	3.23
B2	12/07/90	8.72	-	5.32	=	3.40
B3	12/07/90	8.63	-	5.21	=	3.42

\*Feet (Mean Sea Level)

\*\*Feet below top of casing

Analytical results revealed no detectable levels of hydrocarbons in the water samples from each well. Laboratory analytical reports and chain-of-custody documents for the monitoring wells are included in Appendix A.

### CONCLUSIONS

The results of our investigation indicate that subsurface soil contamination by hydrocarbon components has occurred in the vicinity of the former underground fuel tank and waste oil tank. Laterally, soil contamination is not defined, however, soils to the east and south of the tank excavation are not observed to have TPH concentrations greater than 16 mg/kg. Soil contamination greater than 100 mg/kg TPH appears limited to the soils north and west of the tank excavation. The source of the trace amount of TPH as gasoline is unknown, but the concentrations observed are lower than allowable levels indicated in the LUFT manual.

Ground water was encountered at a depth of approximately five feet during drilling and sampling. Based on analytical results from the previous tank removal investigation, the ground water appeared to be contaminated with petroleum hydrocarbons. Our current investigation reveals the ground water quality has not been impacted by petroleum hydrocarbons and suggests the previous contaminated water sample may have been a result of excavation activities.

### RECOMMENDATIONS

The most cost-effective remedial options for the contaminated soil may be excavation due to the apparent localized area of contaminated soil. Additional soil borings are recommended to determine the lateral extent of the observed contamination. Once the lateral extent is determined, a decision can be made as to the best remedial option for the contaminated soils. We recommend that a meeting be held with representatives from the regulatory agencies so that we can agree on the amount of additional work that may be required to define the extent of contamination.

Possible options available for the disposal/treatment of hydrocarbon contaminated soils may include excavation of contaminated soils to ground water, and on-site treatment or disposal of the excavated soil.

### LIMITATIONS

The above conclusions are based on our assessment of conditions indicated to exist as of the dates of our field reconnaissance, November 29, December 3, 6 and 7, 1990. The results of this investigation do not preclude the possibility of substances that are currently or in the future defined as hazardous being present on the property because of activities we did not identify. This report is applicable only to the investigated portion of the property and should not be used for any other area of the property.

Wallace - Kuhl & Associates, Inc.

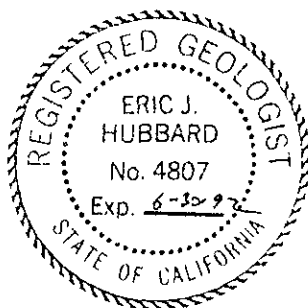


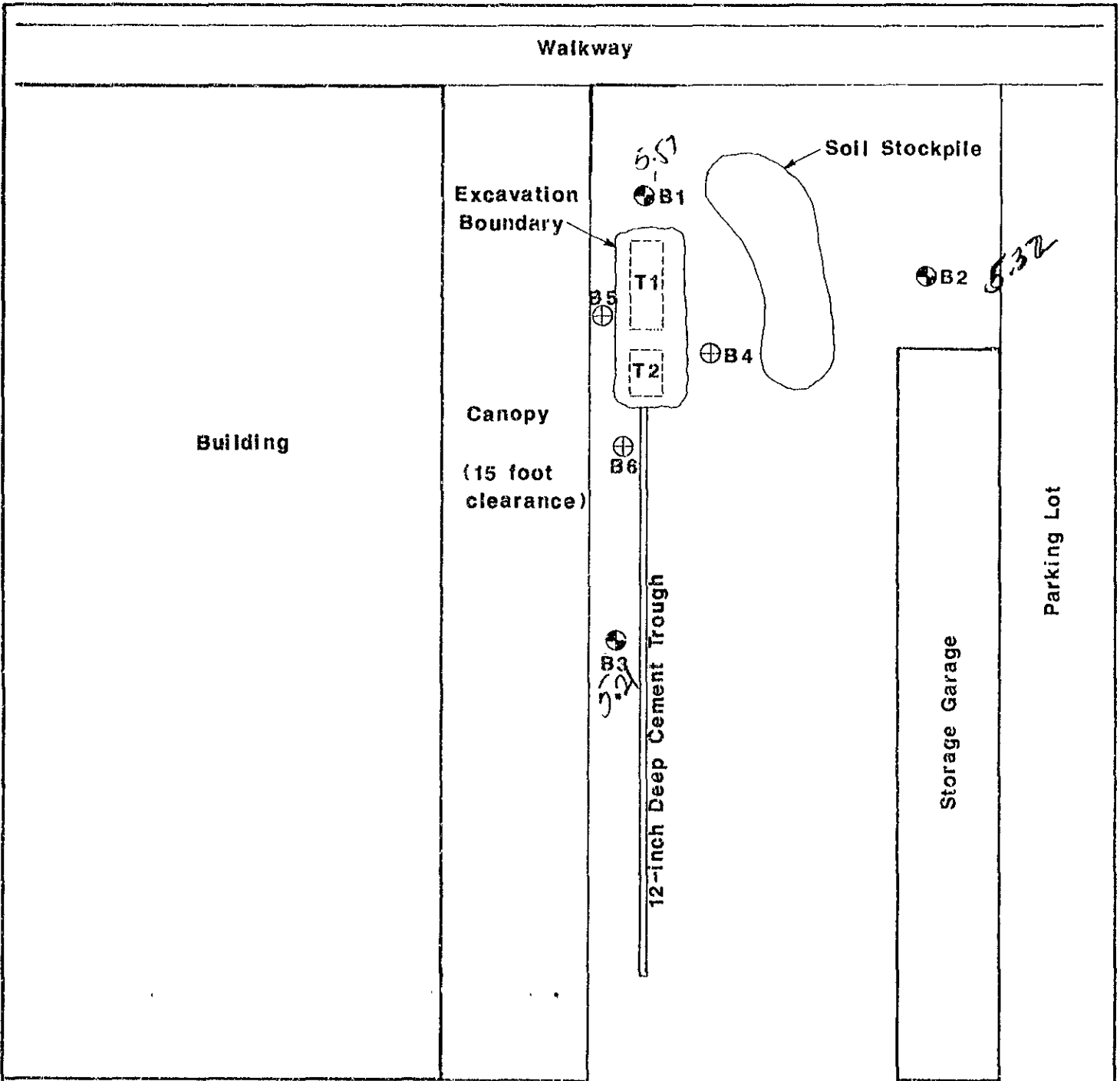
Richard Premzic  
Senior Staff Geologist



Eric Hubbard  
Project Geologist

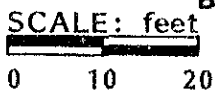
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**KEY:**

- T1 = Former 1,000-gallon underground diesel tank
- T2 = Former 550-gallon underground waste oil tank
- B1 ⊕ = WKA ground water monitoring well
- B4 ⊕ = WKA soil boring



**SITE PLAN**  
**KING KNIGHT PROPERTY**  
 6202 Christie Avenue  
 Emeryville, California

PROJECT NO: 1301.01  
 DATE: 1/90  
 PLATE NO: 1





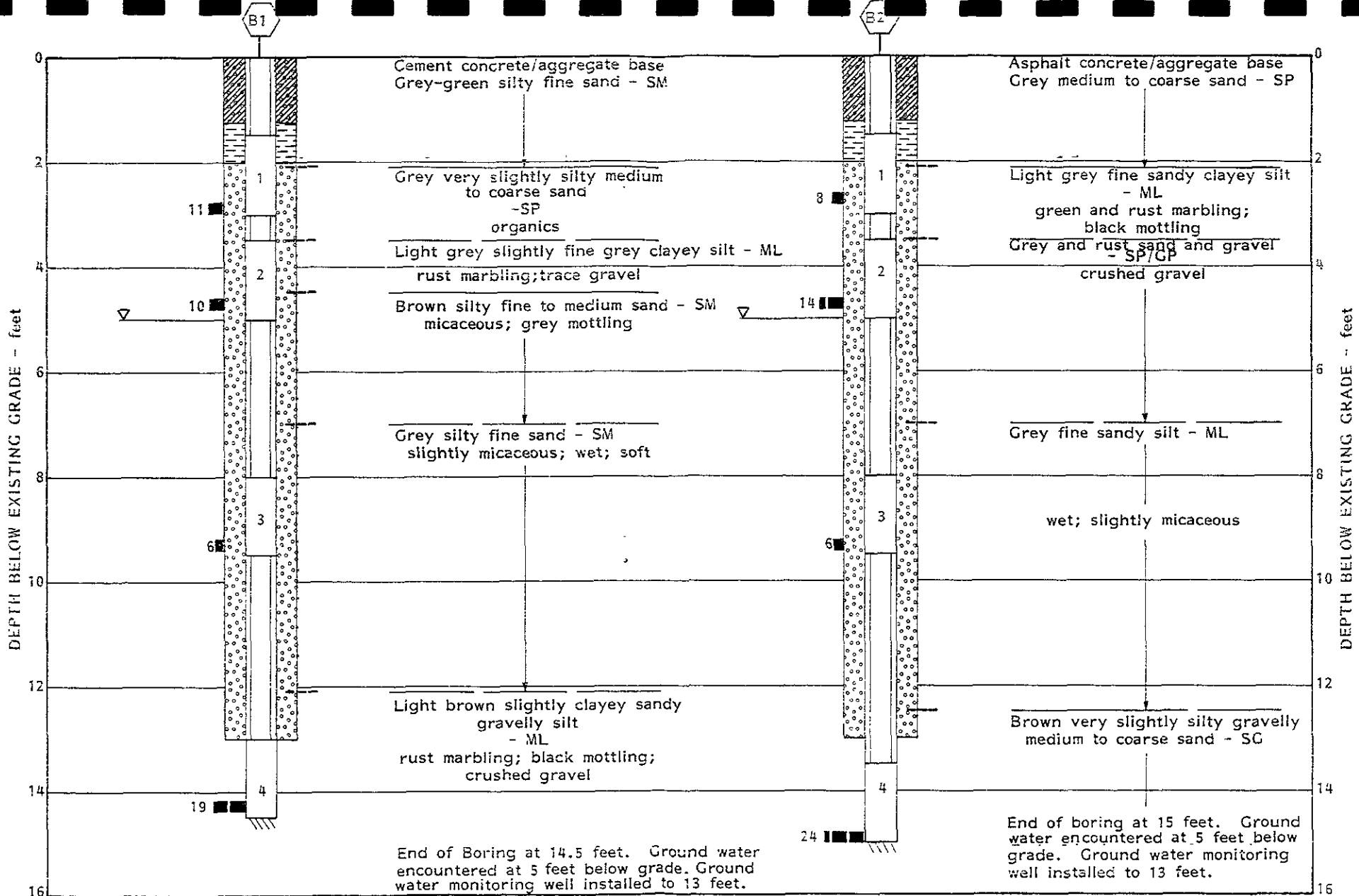
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Adapted from U.S.G.S. 7-1/2 minute series  
 Oakland West Quadrangle, photo revised, 1980.



**SITE VICINITY MAP**  
 King Knight Property  
 6202 Christie Avenue  
 Emeryville, California

PROJECT NO: 1301.01  
 DATE: 1/91  
 PLATE NO: 1A



- NOTES: 1) These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 29, 1990.  
 2) Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 8.

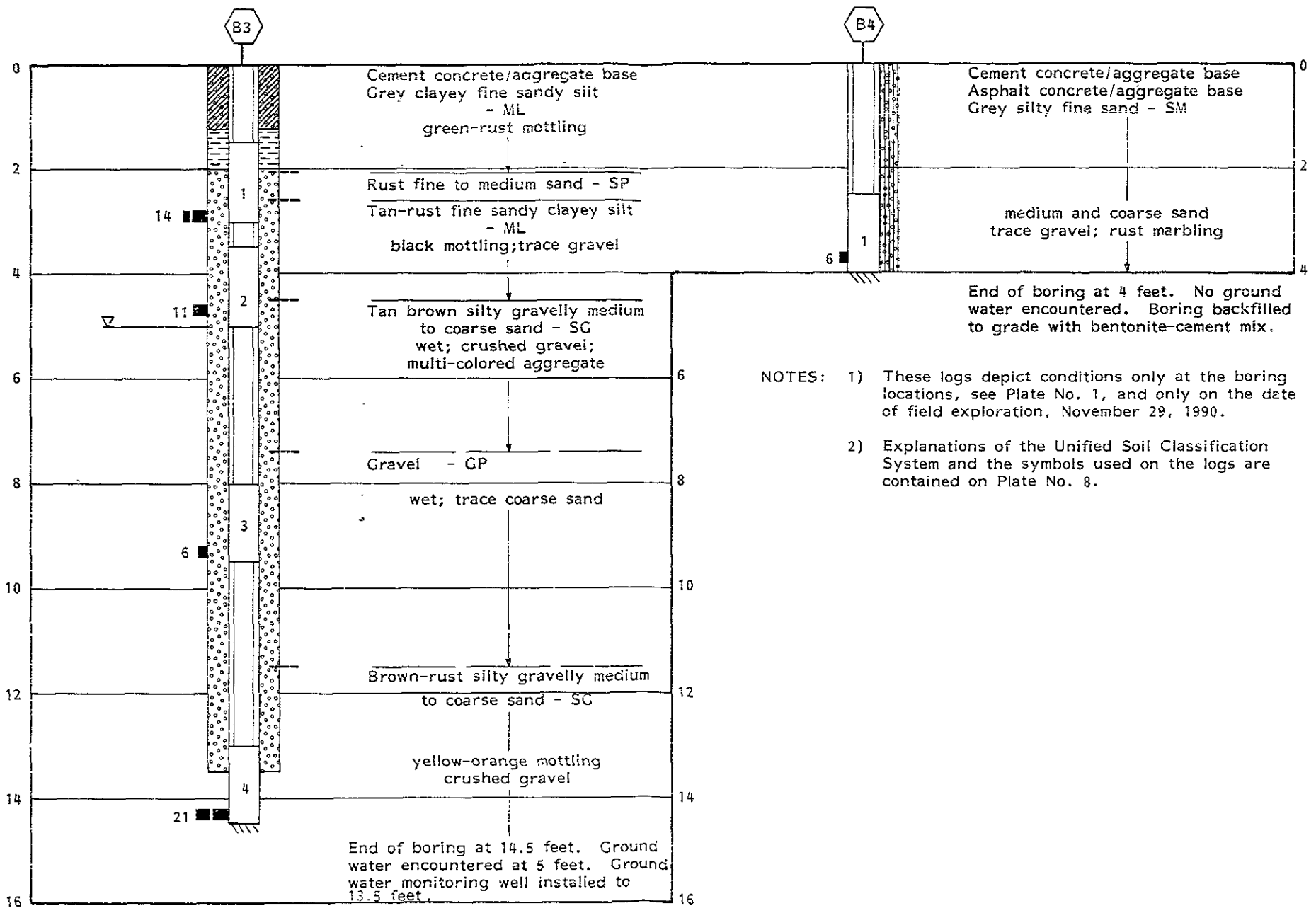
**WALLACE · KUHL & ASSOCIATES**  
 INCORPORATED  
 Geotechnical Consultants / Construction Testing

DRAWN BY: W GK  
 CHECKED BY: R P

KING KNIGHT PROPERTY  
 6202 Christie Avenue  
 Emeryville, California



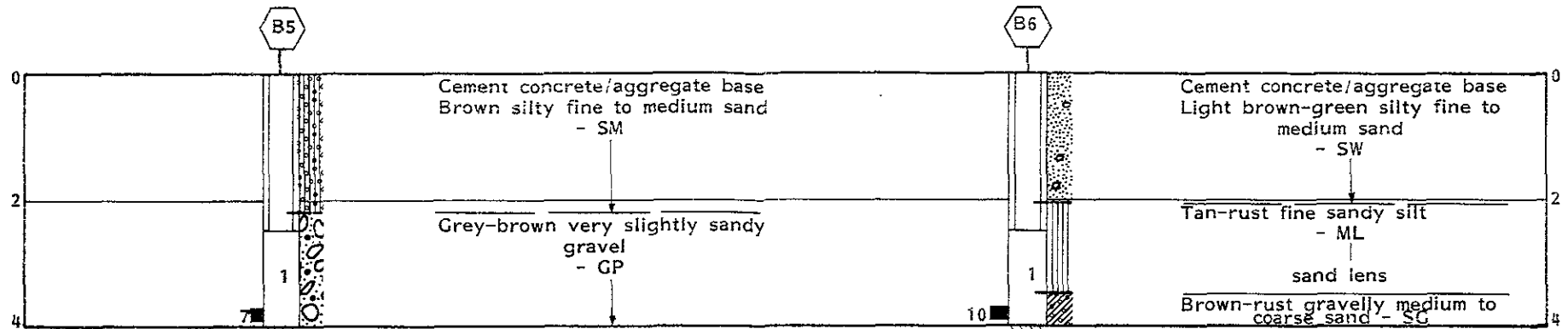
PROJECT NO: 1301.01  
 DATE 1/91  
 PLATE NO: 2



- NOTES: 1) These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 29, 1990.
- 2) Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 8.



DEPTH BELOW EXISTING GRADE - feet



DEPTH BELOW EXISTING GRADE - feet

End of boring at 4 feet. No ground water encountered, boring backfilled to grade with bentonite-cement mix.

End of boring at 4 feet. No ground water encountered. Boring backfilled to grade with bentonite-cement mix.

- NOTES:
- 1) These logs depict conditions only at the boring locations, see Plate No. 1, and only on the date of field exploration, November 29, 1990.
  - 2) Explanations of the Unified Soil Classification System and the symbols used on the logs are contained on Plate No. 8.

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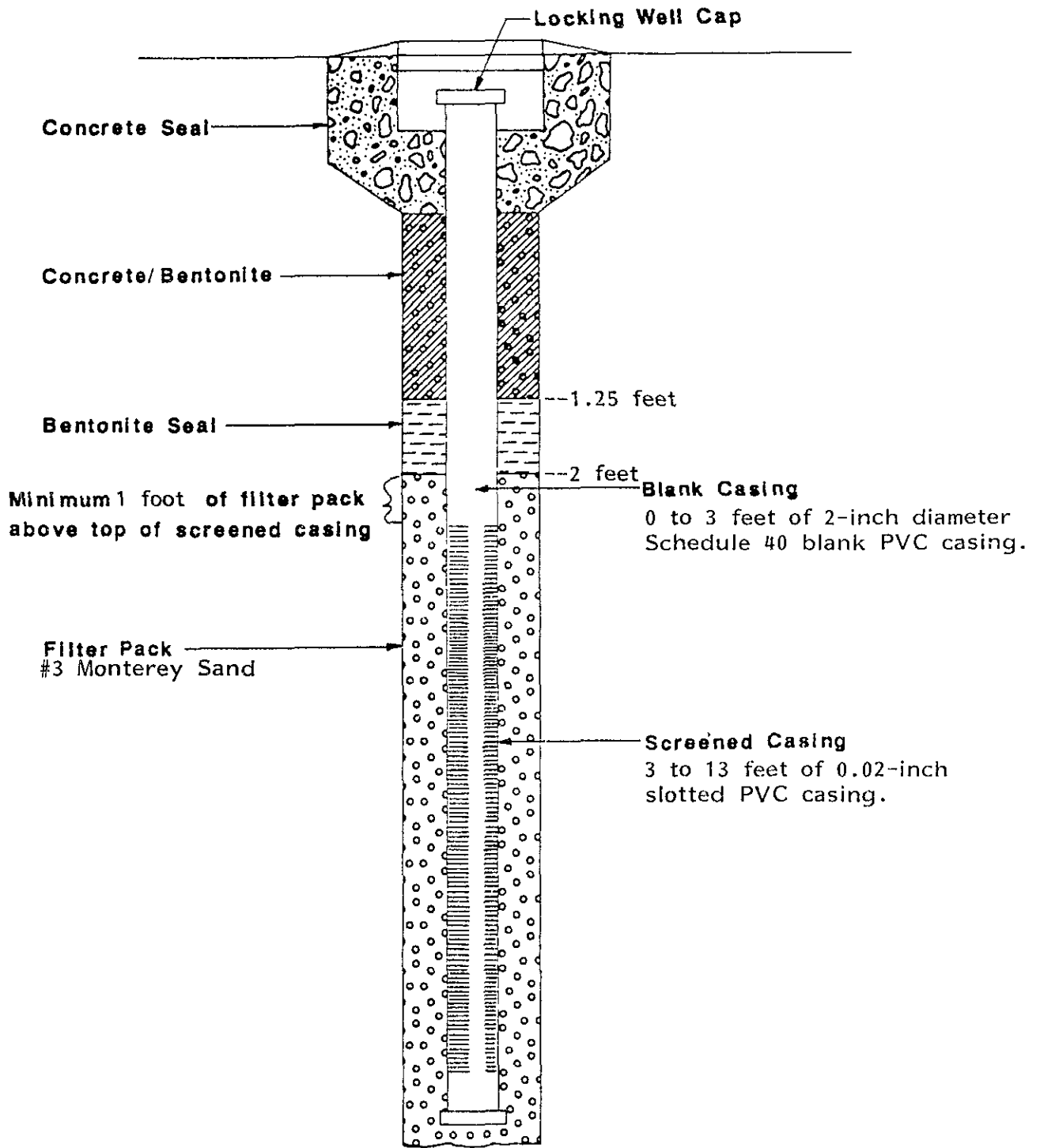
Geotechnical Consultants / Construction Testing

DRAWN BY: WCK  
CHECKED BY: RP

KING KNIGHT PROPERTY  
6202 Christie Avenue  
Emeryville, California



PROJECT NO: 1301.01  
DATE: 1/91  
PLATE NO 4



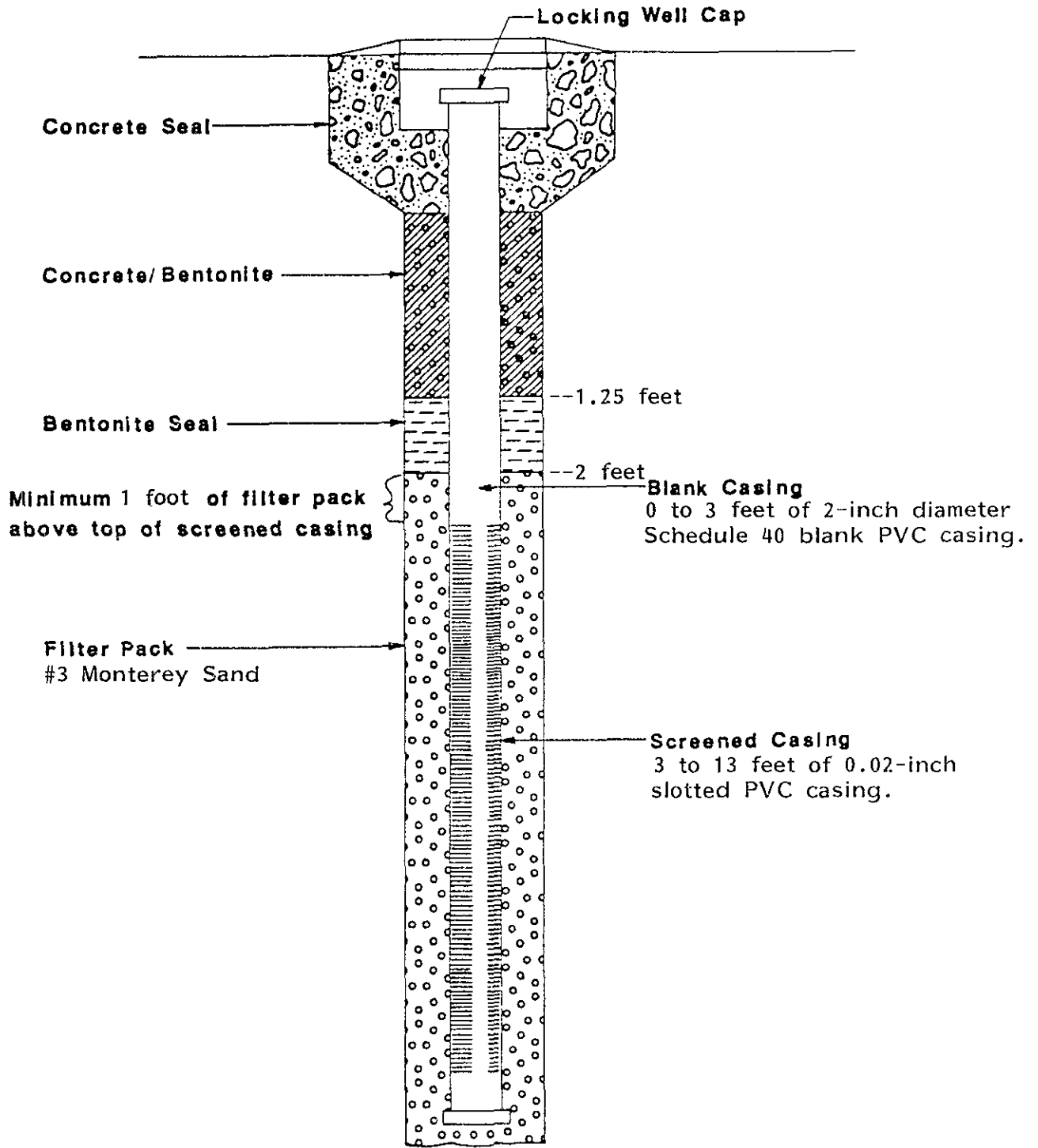
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### Groundwater Monitoring Well B1



KING KNIGHT PROPERTY  
6202 Christie Avenue  
Emeryville, California

PROJECT NO: 1301.01  
DATE: 1/91  
PLATE NO: 5



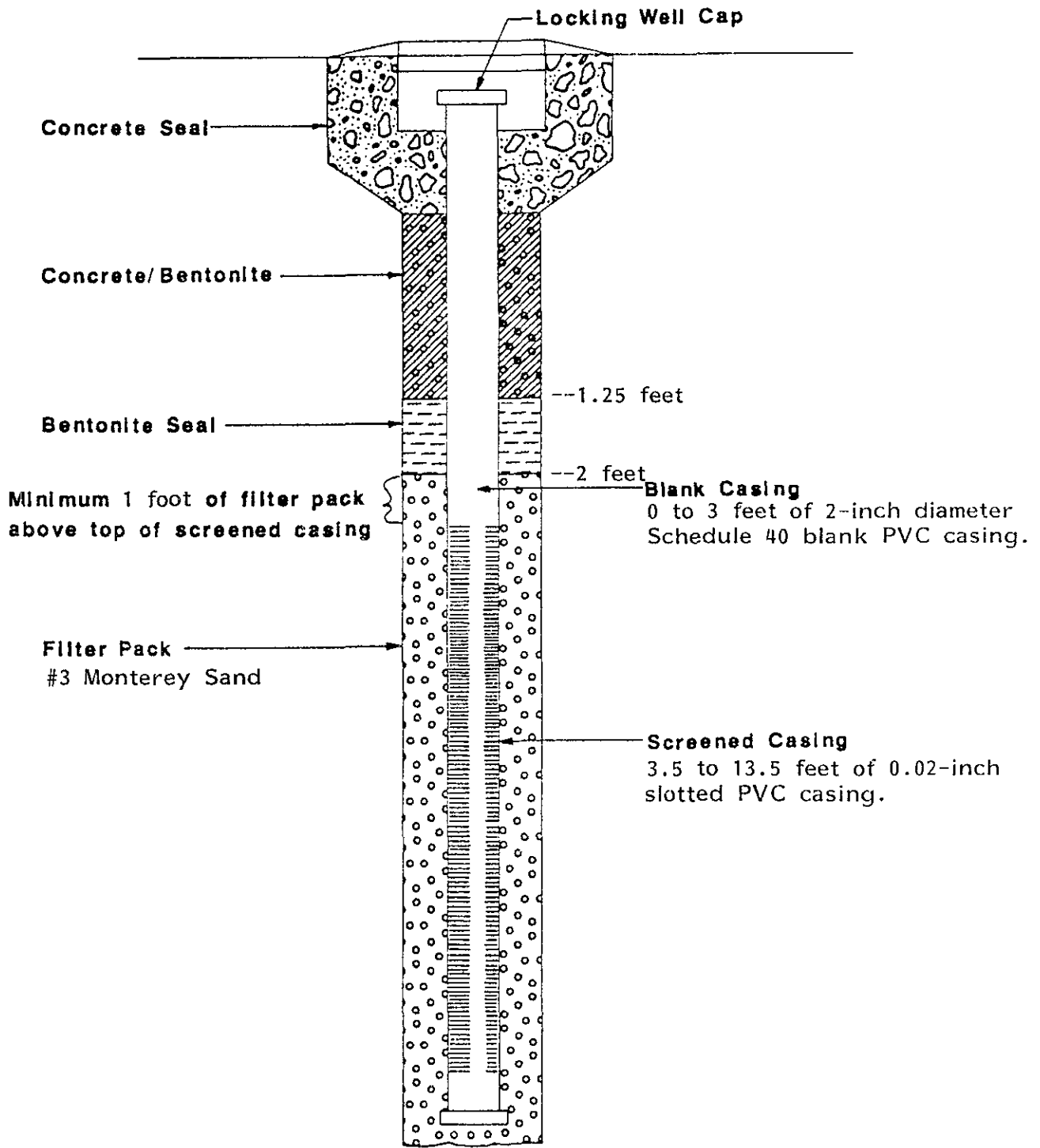
(Not to Scale)

**Groundwater Monitoring Well B2**



KING KNIGHT PROPERTY  
 6202 Christie Avenue  
 Emeryville, California

PROJECT NO: 1301.01  
 DATE: 1/91  
 PLATE NO: 6



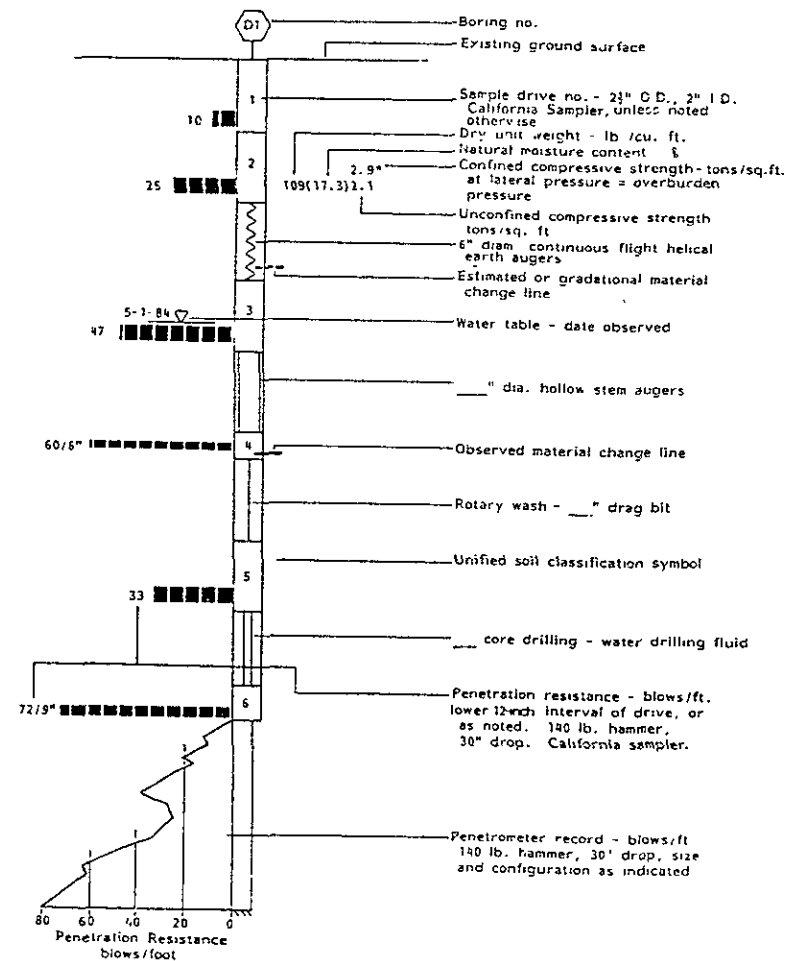
(Not to Scale)

**Groundwater Monitoring Well B3**



KING KNIGHT PROPERTY  
6202 Christie Avenue  
Emeryville, California

PROJECT NO: 1301.01  
DATE: 1/91  
PLATE NO: 7



MAJOR DIVISIONS		SYMBOLS	CODE	TYPICAL NAMES
COARSE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	<u>GRAVELS</u> (More than 1/2 of coarse fraction > no. 4 sieve size)	GW		Well graded gravels or gravel-sand mixtures, little or no fines
		GP		Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM		Silty gravels, gravel-sand-silt mixtures
	<u>SANDS</u> (More than 1/2 of coarse fraction < no. 4 sieve size)	GC		Clayey gravels, gravel-sand-clay mixtures
		SW		Well-graded sands or gravelly sands, little or no fines
		SP		Poorly graded sands or gravelly sands, little or no fines
FINE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	<u>SILTS &amp; CLAYS</u> <u>LL &lt; 50</u>	SM		Silty sands, sand-silt mixtures
		SC		Clayey sands, sand-clay mixtures
		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	<u>SILTS &amp; CLAYS</u> <u>LL &gt; 50</u>	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL		Organic silts and organic silty clays of low plasticity
		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
HIGHLY ORGANIC SOILS	PI			Peat and other highly organic soils
		CH		Inorganic clays of high plasticity, fat clays
		OH		Organic clays of medium to high plasticity, organic silty clays, organic silts

### UNIFIED SOIL CLASSIFICATION SYSTEM

COHESIVE SOILS		GRANULAR SOILS	
Description	Blows/ft.	Description	Blows/ft.
Very Soft	< 3	Very Loose	< 5
Soft	3-5	Loose	5-15
Medium (firm)	6-10	Medium Dense	16-40
Stiff	11-20	Dense	41-65
Very Stiff	21-40	Very Dense	> 65
Hard	> 40		

### CONSISTENCY CLASSIFICATION

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
	coarse (c) 3" to 3/4"	76.2 to 19.1
	fine (f) 3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
	coarse (c) No. 4 to No. 10	4.76 to 2.00
	medium (m) No. 10 to No. 40	2.00 to 0.420
	fine (f) No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

### GRAIN SIZE CLASSIFICATION

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CHECKED BY: RP

KING KNIGHT PROPERTY  
6202 Christie Avenue  
Emeryville, California



PROJECT NO. 1301.01  
DATE: 1/91  
PLATE NO. 8



**APPENDIX A**  
**ANALYTICAL REPORTS**  
**CHAIN-OF-CUSTODY DOCUMENTS**



January 2, 1991  
Sample Log 2048

Eric Hubbard  
Wallace-Kuhl Associates  
P.O. Box 1137  
West Sacramento, CA 95691

Subject: Analytical Results for 9 Soil Sample(s)  
Identified as: Project # 1301.01 ("Felix")  
Received: 11/30/90

Dear Mr. Hubbard:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on January 2, 1991 and describes procedures used to analyze the samples.

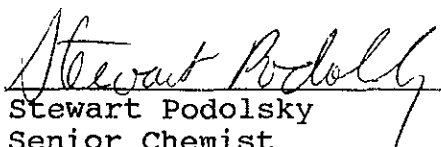
Sample(s) were received in brass sleeves that were sealed with aluminum foil and plastic endcaps. Each sample was transported and received under documented chain of custody and stored at 4 degrees C until analysis was performed.

Sample(s) were analyzed using the following method(s):

- "BTEX" (EPA Method 8020/Purge-and-Trap)
- "TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)
- "TPH as Diesel, Motor Oil, Jet/Kerosene" (Mod. 8015/Extraction)
- "Metals by Atomic Absorption" (EPA Method 7000)
- "Semi-Volatile Organic Priority Pollutants" (EPA Method 8270)

Please refer to the following table(s) for summarized analytical results and contact us if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

  
Stewart Podolsky  
Senior Chemist



January 2, 1991  
Sample Log 2048

Table 1: 'BTEX' Results for 8 Soil Sample(s) Identified as  
Project # 1301.01 ("Felix")  
Received 11/30/90

--all concentrations are units of mg/kg--

Sample	Benzene	Toluene	Ethylbenzene	Xylenes
B1-1I	<.005	<.005	<.005	.0087
B1-2I	<.005	<.005	<.005	.011
B2-1I	<.005	<.005	<.005	<.005
B2-2I	<.005	<.005	<.005	<.005
B3-1I	<.005	<.005	<.005	.0075
B3-2I	<.005	<.005	<.005	<.005
B4-1II	<.005	<.005	<.005	.0072
B5-1I	<.005	.0080	<.005	<.005
(Reporting Limit	.005	.005	.005	.005)



January 2, 1991  
Sample Log 2048

Table 2: TPH Results for 8 Soil Sample(s)  
From : Project # 1301.01 ("Felix")  
Received 11/30/90

--all concentrations are units of mg/kg--

Sample	TPH as Gasoline	TPH (Semi-Volatile)
B1-1I	.59	Diesel : <10 Motor Oil : <10
B1-2I	<.5	Diesel : <10 Motor Oil : 110
B2-1I	.54	Diesel : <10 Motor Oil : <10
B2-2I	1.1	Diesel : <10 Motor Oil : <10
B3-1I	<.5	Diesel : <10 Motor Oil : <10
B3-2I	<.5	Diesel : <10 Motor Oil : <10
B4-1II	<.5	Diesel : <10 Motor Oil : <10
B5-1I	<.5	Diesel : 150 Motor Oil : 300
(Reporting Limit	.5	10)



January 2, 1991  
Sample Log 2048

Sample: B5-1I

From : Project # 1301.01 ("Felix")  
Received 11/30/90  
Matrix : Soil

--all concentrations are units of mg/kg--

8270 - Semi Volatile Organic Priority Pollutants

Parameter /	(Reporting Limit)	Measured Value
Acenaphthene	(0.30)	<0.30
Acenaphthalene	(0.30)	<0.30
Anthracene	(0.30)	<0.30
Benzo (a) anthracene	(0.30)	<0.30
Benzo (b) fluoranthene	(0.30)	<0.30
Benzo (k) fluoranthene	(0.30)	<0.30
Benzo (a) pyrene	(0.30)	<0.30
Benzo (ghi) perylene	(0.30)	<0.30
Benzyl butyl phthalate	(0.30)	<0.30
bis (2-chloroethyl) ether	(0.30)	<0.30
bis (2-chloroethoxy) methane	(0.30)	<0.30
bis (2-ethylhexyl) phthalate	(0.30)	<0.30
bis (2-chloroisopropyl) ether	(0.30)	<0.30
4-Bromophenyl phenyl ether	(0.30)	<0.30
2-Chloronaphthalene	(0.30)	<0.30
4-Chlorophenyl phenyl ether	(0.30)	<0.30
Chrysene	(0.30)	<0.30
Dibenzo (ah) anthracene	(0.30)	<0.30
Di-n-butyl phthalate	(0.30)	<0.30
Di-n-octyl phthalate	(0.30)	<0.30
1,3-Dichlorobenzene	(0.30)	<0.30
1,2-Dichlorobenzene	(0.30)	<0.30
1,4-Dichlorobenzene	(0.30)	<0.30
3,3-Dichlorobenzidine	( 3.0)	< 3.0
Diethyl phthalate	(0.30)	<0.30
Dimethyl phthalate	(0.30)	<0.30
2,4-Dinitrotoluene	(0.30)	<0.30



January 2, 1991  
Sample Log 2048

Sample: B5-1I

From : Project # 1301.01 ("Felix")  
Received 11/30/90  
Matrix : Soil

--all concentrations are units of mg/kg--

8270 - Semi Volatile Organic Priority Pollutants

Parameter /	(Reporting Limit)	Measured Value
2,6-Dinitrotoluene	(0.30)	<0.30
Fluoranthene	(0.30)	<0.30
Fluorene	(0.30)	<0.30
Hexachlorobenzene	(0.30)	<0.30
Hexachlorobutadiene	(0.30)	<0.30
Hexachloroethane	(0.30)	<0.30
Indeno (123-cd) pyrene	(0.30)	<0.30
Isophorone	(0.30)	<0.30
Naphthalene	(0.30)	<0.30
Nitrobenzene	(0.30)	<0.30
n-Nitrosodi-n-propylamine	(0.30)	<0.30
Phenanthrene	(0.30)	<0.30
Pyrene	(0.30)	<0.30
1,2,4-Trichlorobenzene	(0.30)	<0.30
Benzidine	( 3.0)	< 3.0
Hexachlorocyclopentadiene	(0.30)	<0.30
n-Nitrosodimethylamine	(0.30)	<0.30
n-Nitrosodiphenylamine	(0.30)	<0.30
4-Chloro-3-methylphenol	(0.30)	<0.30
2-Chlorophenol	(0.30)	<0.30
2,4-Dichlorophenol	(0.30)	<0.30
2,4-Dimethylphenol	(0.30)	<0.30
2,4-Dinitrophenol	(0.30)	<0.30
2-Methyl-4,6-dinitrophenol	(0.30)	<0.30
2-Nitrophenol	(0.30)	<0.30
4-Nitrophenol	(0.30)	<0.30
Pentachlorophenol	(0.30)	<0.30
Phenol	(0.30)	<0.30
2,4,6-Trichlorophenol	(0.30)	<0.30



January 2, 1991  
Sample Log 2048

Sample: B6-1I

From : Project # 1301.01 ("Felix")  
Received : 11/30/90  
Matrix : Soil

--all concentrations are units of mg/kg--

Parameter / (Reporting Limit)		Measured Value
Benzene	(.005)	<.005
Toluene	(.005)	<.005
Ethylbenzene	(.005)	<.005
Total Xylenes	(.005)	<.005
TPH as Gasoline	(.5)	<.5
Extractable TPH	(10)	Diesel : <10 Motor Oil : 16
Cadmium	(0.5)	.20
Chromium	(1.0)	54
Lead	(5.0)	<5
Zinc	(0.5)	62
Nickel	(1.0)	23



January 2, 1991  
Sample Log 2048

Sample: B6-1I

From : Project # 1301.01 ("Felix")  
Received 11/30/90  
Matrix : Soil

--all concentrations are units of mg/kg--

8270 - Semi Volatile Organic Priority Pollutants

Parameter /	(Reporting Limit)	Measured Value
Acenaphthene	(0.30)	<0.30
Acenaphthalene	(0.30)	<0.30
Anthracene	(0.30)	<0.30
Benzo (a) anthracene	(0.30)	<0.30
Benzo (b) fluoranthene	(0.30)	<0.30
Benzo (k) fluoranthene	(0.30)	<0.30
Benzo (a) pyrene	(0.30)	<0.30
Benzo (ghi) perylene	(0.30)	<0.30
Benzyl butyl phthalate	(0.30)	<0.30
bis (2-chloroethyl) ether	(0.30)	<0.30
bis (2-chloroethoxy) methane	(0.30)	<0.30
bis (2-ethylhexyl) phthalate	(0.30)	<0.30
bis (2-chloroisopropyl) ether	(0.30)	<0.30
4-Bromophenyl phenyl ether	(0.30)	<0.30
2-Chloronaphthalene	(0.30)	<0.30
4-Chlorophenyl phenyl ether	(0.30)	<0.30
Chrysene	(0.30)	<0.30
Dibenzo (ah) anthracene	(0.30)	<0.30
Di-n-butyl phthalate	(0.30)	<0.30
Di-n-octyl phthalate	(0.30)	<0.30
1,3-Dichlorobenzene	(0.30)	<0.30
1,2-Dichlorobenzene	(0.30)	<0.30
1,4-Dichlorobenzene	(0.30)	<0.30
3,3-Dichlorobenzidine	( 3.0)	< 3.0
Diethyl phthalate	(0.30)	<0.30
Dimethyl phthalate	(0.30)	<0.30
2,4-Dinitrotoluene	(0.30)	<0.30





January 2, 1991  
Sample Log 2048

Sample: B6-1I

From : Project # 1301.01 ("Felix")  
Received 11/30/90  
Matrix : Soil

--all concentrations are units of mg/kg--

8270 - Semi Volatile Organic Priority Pollutants

Parameter /	(Reporting Limit)	Measured Value
2,6-Dinitrotoluene	(0.30)	<0.30
Fluoranthene	(0.30)	<0.30
Fluorene	(0.30)	<0.30
Hexachlorobenzene	(0.30)	<0.30
Hexachlorobutadiene	(0.30)	<0.30
Hexachloroethane	(0.30)	<0.30
Indeno (123-cd) pyrene	(0.30)	<0.30
Isophorone	(0.30)	<0.30
Naphthalene	(0.30)	<0.30
Nitrobenzene	(0.30)	<0.30
n-Nitrosodi-n-propylamine	(0.30)	<0.30
Phenanthrene	(0.30)	<0.30
Pyrene	(0.30)	<0.30
1,2,4-Trichlorobenzene	(0.30)	<0.30
Benzidine	( 3.0)	< 3.0
Hexachlorocyclopentadiene	(0.30)	<0.30
n-Nitrosodimethylamine	(0.30)	<0.30
n-Nitrosodiphenylamine	(0.30)	<0.30
4-Chloro-3-methylphenol	(0.30)	<0.30
2-Chlorophenol	(0.30)	<0.30
2,4-Dichlorophenol	(0.30)	<0.30
2,4-Dimethylphenol	(0.30)	<0.30
2,4-Dinitrophenol	(0.30)	<0.30
2-Methyl-4,6-dinitrophenol	(0.30)	<0.30
2-Nitrophenol	(0.30)	<0.30
4-Nitrophenol	(0.30)	<0.30
Pentachlorophenol	(0.30)	<0.30
Phenol	(0.30)	<0.30
2,4,6-Trichlorophenol	(0.30)	<0.30



1046 Olive Drive, Suite 3  
Davis, CA 95616

916-753-9500  
FAX #: 916-753-6091

# CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Eric Hubbard Phone #: 372-1434

Address: 3050 Industrial Blvd. FAX #: 372-2565

Project Number: 1301.01 Project Name: "Felix"

Project Location: Emeryville, CA Sampler Signature: *[Signature]*

## ANALYSIS REQUEST

## OTHER

## SPECIAL HANDLING

Sample ID	Lab # (Lab use only)	# CONTAINERS	Volume/Amount	Matrix					Method Preserved					Sampling		BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/8015)	TPH as Diesel (8015 or 8270)	TPH as Jetfuel (8015 or 8270)	Total Oil & Grease (413.1)	Total Oil & Grease (413.2)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010	EPA 602/8020	EPA 608/8080	EPA 608/8080-PCBs Only	EPA 624/8240	EPA 625/8270	CAM - 17 Metals	Waste Extraction Test (WET)	EPA - Priority Pollutant Metals	LEAD(7420/7421/239.2)	ORGANIC LEAD	<u>Cd, Cr, Pb, Zn, Ni</u>	RUSH SERVICE (12 hr) or (24 hr)	EXPEDITED SERVICE (48 hr) or (1 wk)	VERBALS/FAX	SPECIAL DETECTION LIMITS (SPECIFY)	SPECIAL REPORTING REQUIREMENTS
				WATER	SOIL	AIR	SLUDGE	OTHER	HCl	HNO <sub>3</sub>	ICE	NONE	OTHER	DATE	TIME																								
B1-1I ✓		1		/							/																												
B1-2I ✓		1		/							/																												
B2-1I ✓		1		/							/																												
B2-2I ✓		1		/							/																												
B3-1I ✓		1		/							/																												
B3-2I ✓		1		/							/																												
B4-1I ✓		1		/							/																												
B5-1I ✓		1		/							/																X												
B5-1II ✓		1		/							/															X													
B6-1I ✓		1		/							/																												
B6-1II ✓		1		/							/																												

Relinquished by: *[Signature]* Date Time: 11/30/14 4:45

Received by: \_\_\_\_\_

Remarks: pg. 1 of 1

Relinquished by: \_\_\_\_\_ Date Time: \_\_\_\_\_

Received by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date Time: 11/30/14 4:45

Received by Laboratory: Joy D. Furpan

2 week TAT

PL243



December 18, 1990  
Sample Log 2088

Eric Hubbard  
Wallace-Kuhl Associates  
P.O. Box 1137  
West Sacramento, CA 95691

Subject: Analytical Results for 4 Water Sample(s)  
Identified as: Project # 1301.01 (Felix)  
Received: 12/07/90

Dear Mr. Hubbard:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on December 18, 1990 and describes procedures used to analyze the samples.

The sample(s) were received in:

VOA vials  
11 I-Chem amber bottles  
Acid washed polyethylene bottles

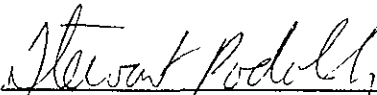
Each sample was transported and received under documented chain of custody, assigned a consecutive log number and stored at 4 degrees Celsius until analysis commenced.

Sample(s) were analyzed using the following method(s):

"BTEX" (EPA Method 602/Purge-and-Trap)  
"TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)  
"TPH as Diesel, Motor Oil, Jet/Kerosene" (Mod. 8015/Extraction)

Please refer to the following table(s) for summarized analytical results and contact us if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

  
Stewart Podolsky  
Senior Chemist



December 18, 1990  
Sample Log 2088

Table 1: 'BTEX' Results for 4 Water Sample(s) Identified as  
Project # 1301.01 (Felix)  
Received 12/07/90

--all concentrations are units of ug/L--

Sample	Benzene	Toluene	Ethylbenzene	Xylenes
MWB1	<.5	<.5	<.5	<.5
MWB2	<.5	<.5	<.5	<.5
MWB3	<.5	<.5	<.5	<.5
Travel Blank	<.5	<.5	<.5	<.5
(Reporting Limit	.5	.5	.5	.5)



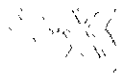
December 18, 1990  
Sample Log 2088

Table 2: 'TPH' Results for 4 Water Sample(s) Identified as  
Project # 1301.01 (Felix)  
Received 12/07/90

--all concentrations are units of ug/L--

Sample	TPH as Gasoline	TPH (Extractable)
MWB1	<50	<50
MWB2	<50	<50
MWB3	<50	<50
Travel Blank	<50	
Reporting Limit	50	50





**APPENDIX B**  
**FIELD PROCEDURES**

## APPENDIX

### FIELD PROCEDURES

#### Soil Sampling

Soil samples were collected during the drilling of each boring and well using a modified California sampler containing two-inch diameter, six-inch long brass tubes, cleaned with trisodium phosphate. Samples were screened in the field using an organic vapor analyzer (OVA) at a maximum of five foot intervals from surface to total depth. Sample tubes were sealed with aluminum foil, plastic caps and wrapped with tape. All samples were preserved on ice and selected samples were submitted under chain-of-custody to a California-certified analytical laboratory for analyses. Soil samples were analyzed according to EPA test methods 8015 modified and 8020 for detection of total petroleum hydrocarbons (TPH) and for aromatics benzene, toluene, xylene, and ethyl benzene (BTX&E). Soil samples in the vicinity of the waste oil tank were also analyzed for semi-volatile organics (EPA method 8270), and lead, cadmium, chromium, zinc and nickel.

#### Monitoring Wells

Three monitoring wells were drilled using a truck-mounted drill-rig equipped with hollow-stem augers. Well construction utilized two-inch diameter PVC casing with a screened interval extending from approximately 3 feet to 13 feet (see as-built diagrams; Plates 5, 6 and 7). The slot size of the two-inch casing was 0.02 inches for the wells. Number 3 Monterey sand was used as the filter pack on the wells. The filter packs extend from the bottom of the screened interval to approximately one foot above the top of the screened interval. A one-foot bentonite seal was placed above the filter pack and a grout seal placed from the bentonite seal to the surface. A locking well cap was installed along with a flush-mounted traffic-rated well cover. After installation and completion of the ground water monitoring wells, they were surveyed to mean sea level for determination of the hydraulic gradient.

#### Ground Water Development, Purging and Sampling

Upon well completion, the water level was measured using an electrical tape (E-tape), and the wells checked for free product using a clear bailer. The wells were developed by surging with a two-inch diameter surge block for a minimum of fifteen minutes. Approximately three casing volumes of water were then removed by use of a suction pump until the parameters of pH, turbidity, and conductivity had stabilized and the water had cleared of sediment. After a minimum of 24 hours from the time of development, the water level in the wells was measured again and the water checked for visual signs of free product using a clear bailer. The wells were then purged of an additional three to five casing volumes using the cleaned suction pump. Water samples were then collected using new polyethylene disposable bailers. All samples were preserved on ice and selected samples submitted under chain-of-custody to a California-certified analytical laboratory for analyses. The water samples were analyzed according to EPA test methods 8015 modified and 602 for detection of total petroleum hydrocarbons (TPH) and for aromatics benzene, toluene, xylene, and ethyl benzene (BTX&E). Test results revealed no detectable BTX&E for a trip blank sample.

Pumping equipment was cleaned prior to use with trisodium phosphate and distilled water to minimize the potential for cross contamination. All water removed during development and purging operations was stored in sealed 55-gallon drums.