ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway Suite 250
Alameda CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

REMEDIAL ACTION COMPLETION CERTIFICATION

August 29, 1997

Mr. John Margowski
Wickland Properties
P.O. Box 13648
Sacramento, CA 95853

Re: Former Regal Station #404, 5901 MacArthur Blvd.,
Oakland, CA 94605

STID 3534

Dear Mr. Margowski:

This letter confirms the completion of a site investigation and remedial action for the underground storage tanks formerly located at the above described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tanks are greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground tank release is required.

This notice is issued pursuant to a regulation contained in Section 2721(e) of Title 23 of the California Code of Regulations.

Please contact our office if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung
Director of Environmental Health Services

c: Chief, Hazardous Materials Division - files
Larry Seto, ACDEH
Kevin Graves, RWQCB
Lori Casias, SWRCB (w/ Case Closure Summary)

01-407

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION

Date: June 12, 1997

Agency name: **Alameda County-HazMat**
Address: **1131 Harbor Bay Pkwy.**
City/State/Zip: **Alameda, CA 94502**
Phone: **(510) 567-6700**
Responsible staff person: **Juliet Shin**
Title: **Senior HMS**

II. CASE INFORMATION

Site facility name: **Former Regal Station #404**
Site facility address: **5901 MacArthur Blvd., Oakland, CA 94605**
RB LUSTIS Case No: **N/A** Local Case No./LOP Case No.: **3534**
URF filing date: **11/17/92** SWEEPS No: **N/A**

Responsible Parties:	Addresses:	Phone Numbers:
Wickland Properties **Contact: John Margowski**	**P.O. Box 13648** **Sacramento, CA 95853**	**(916) 978-2485**

Tank No:	Size in gal.:	Contents:	Closed in-place or removed?:	Date:
1	10,000	gasoline	removed	5/18/87
2	8,000	gasoline	removed	5/18/87
3	6,000	gasoline	removed	5/18/87
4	550	waste oil	removed	2/24/93

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: **Unknown for gasoline underground storage tanks, however, holes were noted in the waste oil tank during the removal.**

Leaking Underground Fuel Storage Tank Program

Monitoring Wells installed? **Yes** Number: **Four**

Site characterization complete? **YES**

Date approved by oversight agency: **June 19, 1997**

Proper screened interval? **Yes**

Highest GW depth below ground surface: **13.2 feet** Lowest depth: **19.02 feet**

Flow direction: **southwest**

Most sensitive current use: **Commercial**

Are drinking water wells affected? **No** Aquifer name: **Aquifer name unknown. Shallow sand-gravel aquifer, approximately 2-feet thick, located roughly 15-feet below ground surface.**

Is surface water affected? **No** Nearest affected SW name: ---

Off-site beneficial use impacts (addresses/locations): **None**

Report(s) on file? **YES** Where is report(s) filed? **Alameda County**
1131 Harbor Bay Pkwy.
Alameda, CA 94502

Treatment and Disposal of Affected Material:

Material	Amount (include units)	Action (Treatment or Disposal w/destination)	Date
Tanks	**one 10,000-, one 6,000-, and one 4,000-gallon UST**	**Disposal destination unknown**	**5/18/87**
Tank	**one 550-gallon waste oil tank**	**H&H Ship Service Co. 220 China Basin St. San Francisco, CA**	**2/24/93**

III. RELEASE AND SITE CHARACTERIZATION INFORMATION (Continued)

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm)		Water (ppb)	
	Before [1]	After	Before[4]	After[5]
TPH (Gas)	310	310	1,900	1,200
TPH (Diesel)	27[2]	27	610	420
Kerosine	4[2]	4	NA	NA
Benzene	6.4	6.4	210	120
Toluene	10	10	2	1.5
Total Xylenes	15	15	7.5	2
Ethylbenzene	NA		0.6	7.7
SVOC compounds	ND[3]		NA	
Chlorinated hydrocarbons	ND		NA	
Heavy Metals[2]				
Cr	52	52	NA	
Cd	1.2	1.2	NA	
Pb	12	12	NA	
Ni	170	170	NA	
Zn	40	40	NA	

NA- Not Analyzed
ND- Not Detected
SVOC-Semi-Volatile Organic Compounds (Method 8270)

1-Sample B-1 collected from beneath the gasoline underground storage tanks.
2-Sample #1 collected beneath the waste oil tank. Soil was excavated another 0.5 feet vertically, down to ~10-feet bgs, after this soil sample was collected.
3-Except for 0.47ppm bis(2-ethylhexyl)phthalate.
4-Initial groundwater sample collected from Well MW-1 on November 4, 1993.
5-Groundwater sample collected from Well MW-1 on June 11, 1996.

Comments (Depth of Remediation, etc.): See "Additional Comments" section.

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? _____

Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? _____

Does corrective action protect public health for current land use? **YES**

Site management requirements: **If excavation is ever conducted out at the site, a health & safety plan must be prepared for workers addressing potential exposures to residual soil and groundwater contaminants at the site. If a building is placed over the residual soil contamination, then you will be required to contact the local oversight agency and address any new potential health risks to the occupants of the building.**

Should corrective action be reviewed if land use changes? **YES. If the site is ever used for residential purposes, a risk assessment must be prepared to address the potential threat of the residual soil and groundwater contaminant concentrations to the occupants of that residence.**

List enforcement actions taken: **None**

List enforcement actions rescinded:

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: **Juliet Shin** Title: **Senior HMS**
Signature: Date: 7/22/97

Reviewed by
Name: **Eva Chu** Title: **Hazardous Materials Specialist**
Signature: Date: 7/22/97

Name: **Thomas Peacock** Title: **Supervising HMS**
Signature: Date: 7-24-97

VI. RWQCB NOTIFICATION

Date Submitted to RB: RB Response: Approved
RWQCB Staff Name: Kevin Graves Title: San. Engineering Asso. Date: 8/12/97

VII. ADDITIONAL COMMENTS, DATA, ETC.

The site is located in projected section 10; T2S; R3W; MDB&M at approximately 95 feet above mean sea level. The site is situated at the base of northwest-southeast trending foothills of the Coast Range. The site is located at the intersection of MacArthur Boulevard and Seminary and was formerly occupied by Regal Service Station #404 (refer to attached Figure 1). All buildings, underground storage tanks, etc., associated with the former service station were removed, and the site is currently a vacant lot. The site is zoned as a commercial site.

Three gasoline underground storage tanks (USTs), (one 10,000-gallon, one 8,000-gallon, and one 6,000-gallon gasoline UST), was removed from the site on May 18, 1987. A total of six soil samples (A1, A2, B1, B2, C1, and C2) were

collected from beneath the three USTs - two samples beneath each of these USTs. Sample depths ranged from 14- to 17.5-feet below ground surface (bgs) and the samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and xylenes (BTEX). Soil samples B1 and C1 identified the highest contaminant concentrations, with benzene concentrations at 6.4 parts per million (ppm) and 5.9ppm (refer to attached Figure 2 and Table 1 for sample locations and results).

On February 24, 1993, one 550-gallon waste oil tank was removed from the site. The west side of the tank had a 3-inch by 3-inch hole, and the east side of the tank had a small hole near the top of the tank. The tank excavation was approximately 7-1/2 feet deep by 12-feet long and 10-feet wide. The waste oil pit was excavated down to 9-1/2 feet deep. One soil sample was collected from beneath this tank at 9.5-feet bgs and analyzed for TPHg, kerosine, TPH as diesel (TPHd), Oil & Grease, BTEX, chlorinated hydrocarbons, semi-volatile hydrocarbons, and heavy metals. Analysis of this sample identified low levels of kerosine and TPHd at 4ppm and 27ppm, and 0.012ppm toluene. Metal concentrations were below human health protective threshold values. No other contaminants were identified (refer to attached Figure 3 and Table 2 for sample locations and results).

On October 27, 1993, one monitoring well, MW-1, was installed five feet southwest of the former gasoline UST pit. This well was drilled down to 30-feet bgs and screened from 9- to 24-feet bgs. Groundwater was first encountered at 15.5-feet bgs. Three soil samples were collected from this location at 10-, 15-, and 20-feet bgs, and analyzed for TPHg and BTEX. Three monitoring wells from a nearby site, located at 6001 MacArthur Blvd, were used together with Well MW-1 to calculate groundwater gradient directions (refer to attached Figure 4 and 5 and Table 3 for well location(s) and sample results).

MW1 penetrates a small confined aquifer at approximately 15 feet bgs. This aquifer is composed of a medium to coarse sand and subrounded to subangular gravel which is confined by an over and underlying stiff brown clay (refer to boring log). A similar stratigraphic sequence was noted in the monitor well boreholes at 6001 MacArthur Blvd. Well MW-1 was sampled on a quarterly basis from November 1993 to June 1995. Benzene concentrations appear to have stabilized at ~210ppb.

Wells MW-2, MW-3, and MW-4 were installed at the site on October 4, 1995. Soil samples were collected from these well locations at 10- and 15-feet bgs, and analyzed for TPHg, TPHd, and BTEX. Initial groundwater samples were collected from MW-2 and MW-3 on October 18, 1995. Due to insufficient recharge in Well MW-4 after purging, a groundwater sample was collected from this well on November 2, 1995, without purging. All three wells were screened from 10- to 20-feet bgs. Analysis of soil samples identified 29ppm TPHg and 2ppm TPHd in the 10-feet sample collected from Well MW-2; 100ppm TPHd in the 15-foot sample from Well MW-3; and 5,100ppm TPHg, 840ppm TPHd, 7.7ppm toluene, 13ppm ethylbenzene, and 9.3ppm xylenes in the 10-foot sample from Well MW-4. No other samples identified any contaminants above detection limits. Wells MW-2, MW-3, and MW-4 have been sampled on a quarterly basis from October 1995 to June 1996 (refer to attached Figure 6 and Table 2; and boring logs).

Groundwater concentrations identified in the site's wells have been consistent, and not necessarily attenuating, throughout the sample period (refer to attached Table 4 for summary of analytical results). Based on a review of all the soil and groundwater sampling data, the groundwater contaminant concentrations at the site exceed the 10-5 excess cancer risk threshold value established by the American Society for Testing and Materials' (ASTM) Risk-Based Corrective Action (RBCA) guidelines (E1739-95) for Groundwater Vapor Intrusion into Buildings for a commercial site, however, it does not exceed the 10-4 excess cancer risk threshold. Soil concentrations out at the site do not exceed the 10^{-4} human health threshold value for Outdoor Vapor Inhalation given in the ASTM RBCA document.

Based on investigations conducted by Western Geo-Engineers in 1995, a culvert was noted to be running through the site (refer to attached figure of culvert location). The culvert is a buried portion of Lions Creek that drains surface water from areas west and north of the site within the boundaries of Mills College. The culvert opens into an above ground pond approximately 300 feet south of the site. The concrete lined culvert varies from eight to twelve feet in width and 6.75 to 8-feet in height. The roof on the culvert is approximately 8- to 10-feet bgs in the vicinity of the site. An inspection of the inside of the culvert was conducted and no holes were identified in the culvert. However, no investigations were ever conducted to determine whether the gravel trench backfill material surrounding the culvert may be acting as a preferential flow path for the groundwater contaminant plume. Although the contaminant plume may be migrating off site onto the downgradient property, this adjacent property is also zoned as commercial, so groundwater contaminant concentrations on this property would not exceed the 10-4 excess cancer risk value established by ASTM (refer to Figure 7 for culvert).

In summary, this office is recommending that this case be closed for the following reasons:

- Groundwater contaminant concentrations remaining at the site are not increasing and do not appear to be posing a human health threat for the current commercial use, based on the Tier 1 table in the referenced ASTM guidelines.

- Although there were a couple of soil samples exceeding the human health protective threshold values given in ASTM's guidelines, this soil contamination appears to be limited in extent and the soil vapor tests conducted out at the site did not identify any concentrations using field monitoring equipment.

FIGURES

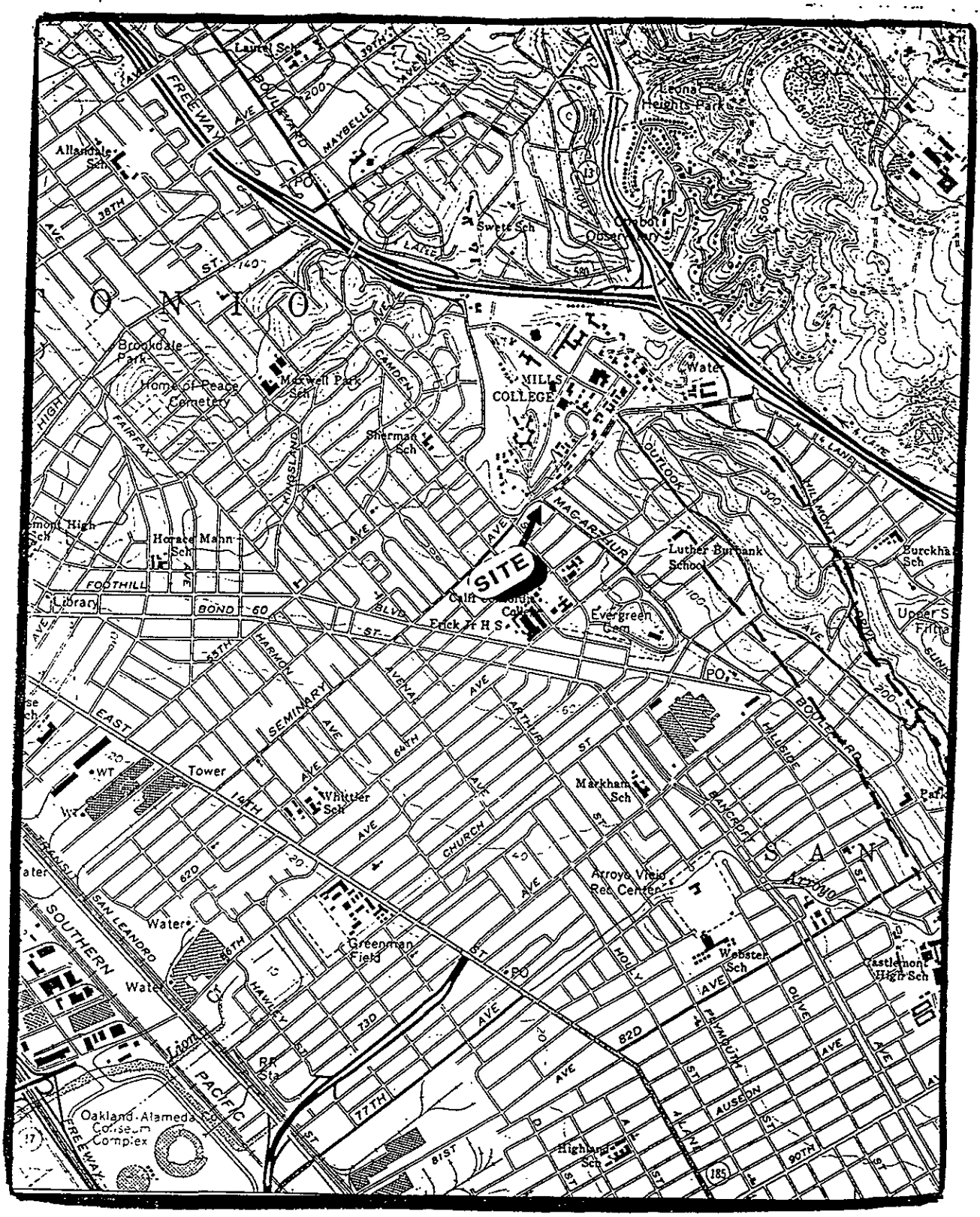
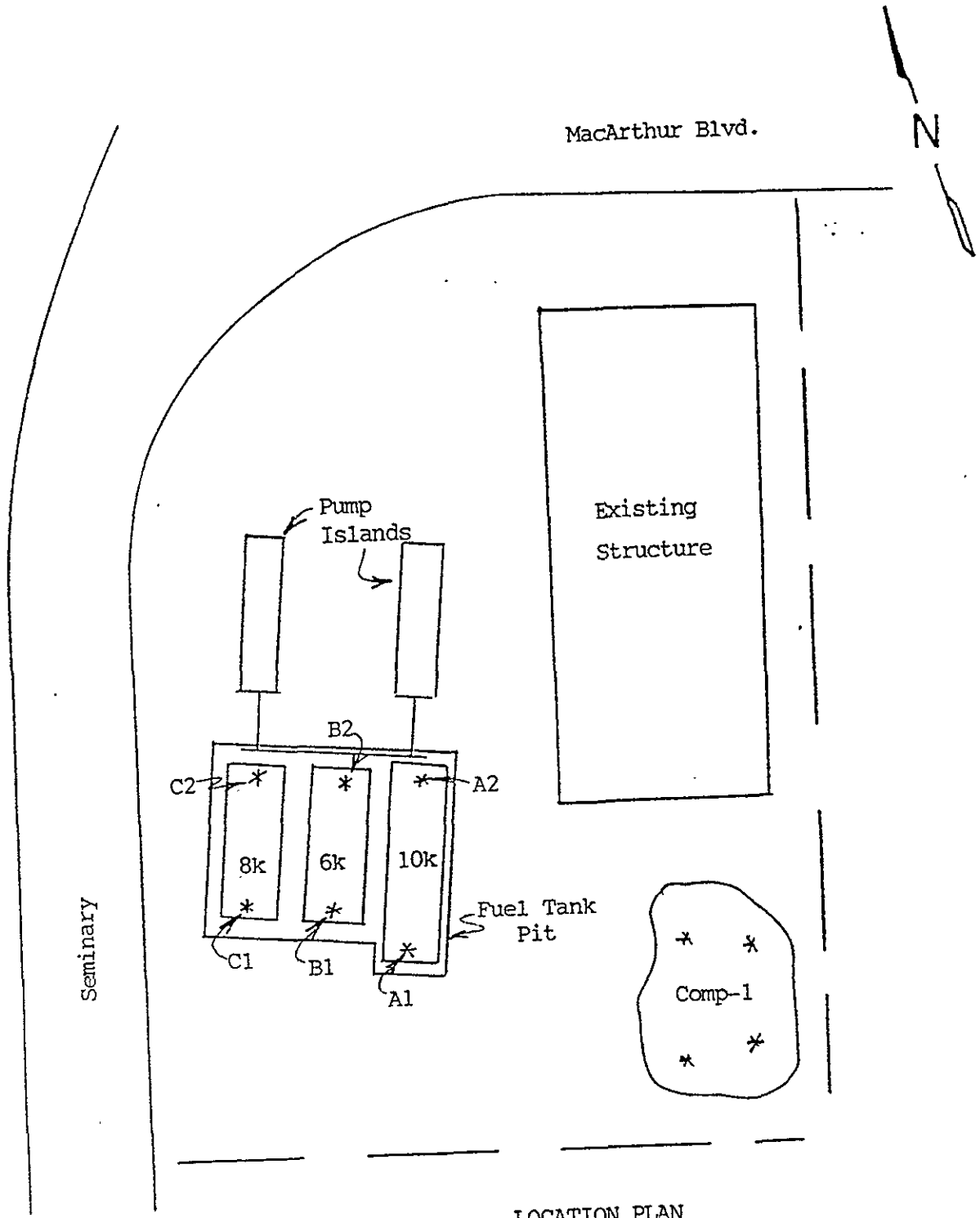


FIGURE 2

Location (USGS Topographic Map)

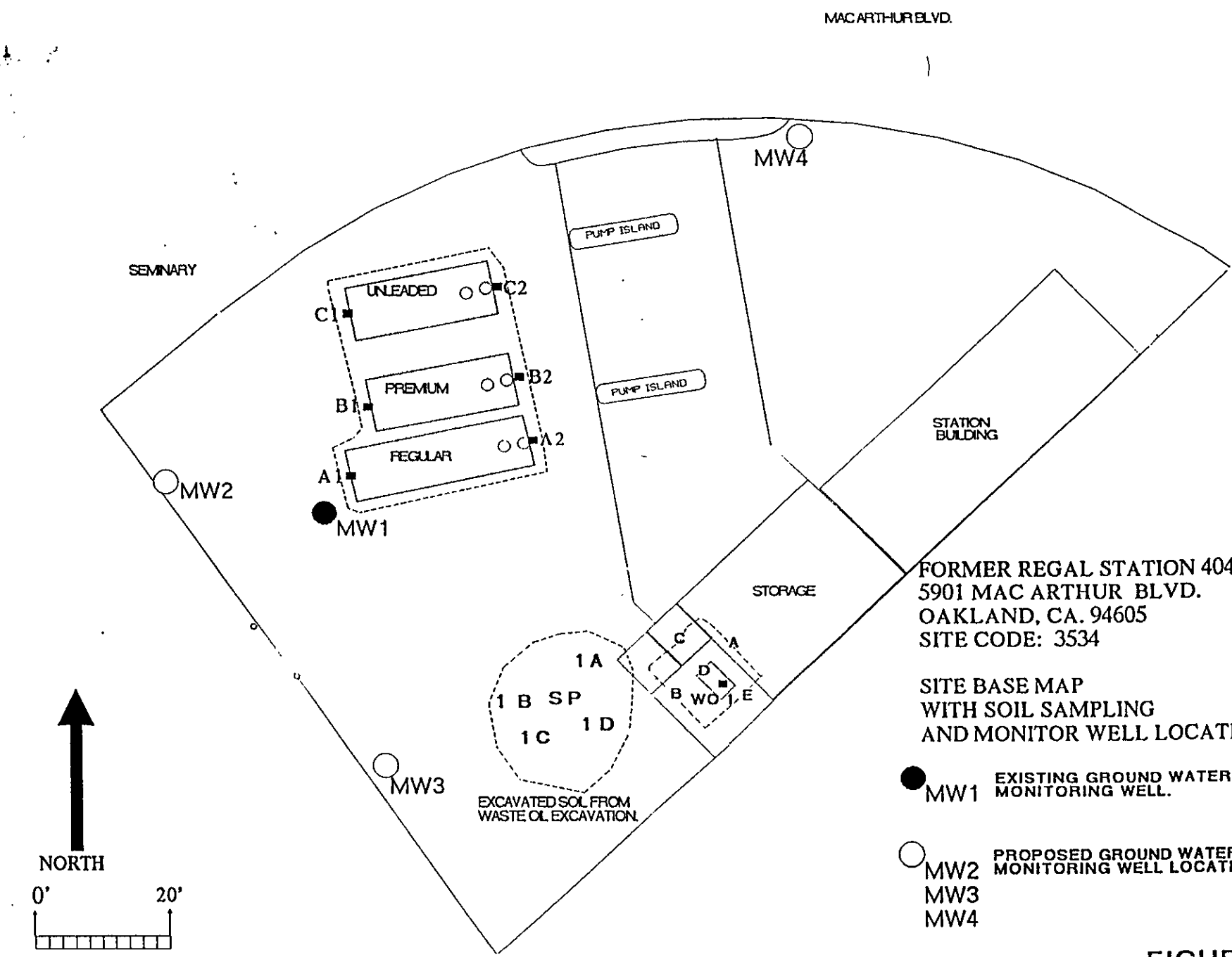


LOCATION PLAN

(not to scale)

* soil sample location

FORMER REGAL SERVICE STATION
5901 MacArthur Blvd.
Oakland, CA



FORMER REGAL STATION 404
5901 MAC ARTHUR BLVD.
OAKLAND, CA. 94605
SITE CODE: 3534

SITE BASE MAP
WITH SOIL SAMPLING
AND MONITOR WELL LOCATIONS

● MW1 EXISTING GROUND WATER MONITORING WELL.

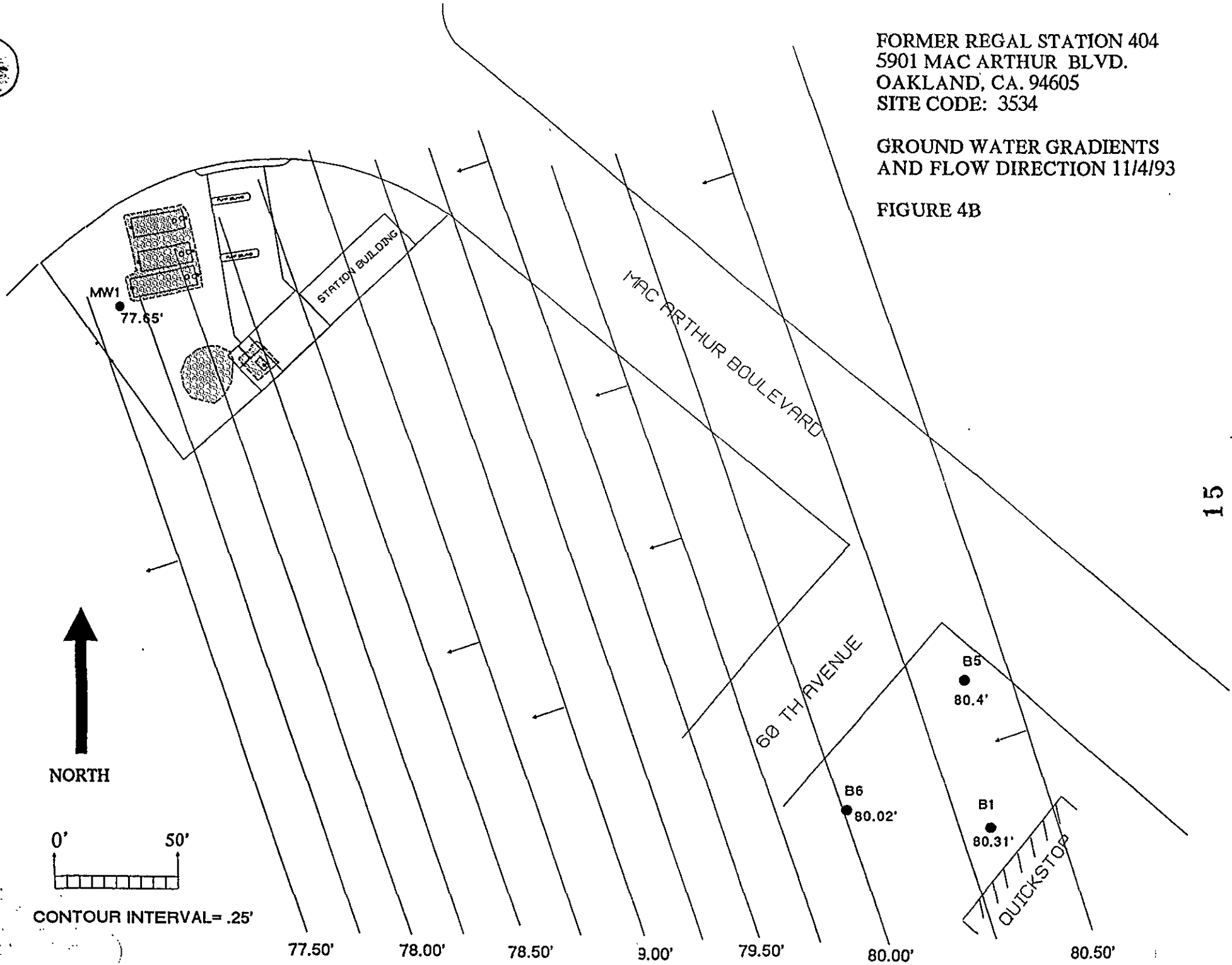
○ MW2 MW3 MW4 PROPOSED GROUND WATER MONITORING WELL LOCATIONS.

FIGURE 3

FORMER REGAL STATION 404
5901 MAC ARTHUR BLVD.
OAKLAND, CA. 94605
SITE CODE: 3534

GROUND WATER GRADIENTS
AND FLOW DIRECTION 11/4/93

FIGURE 4B



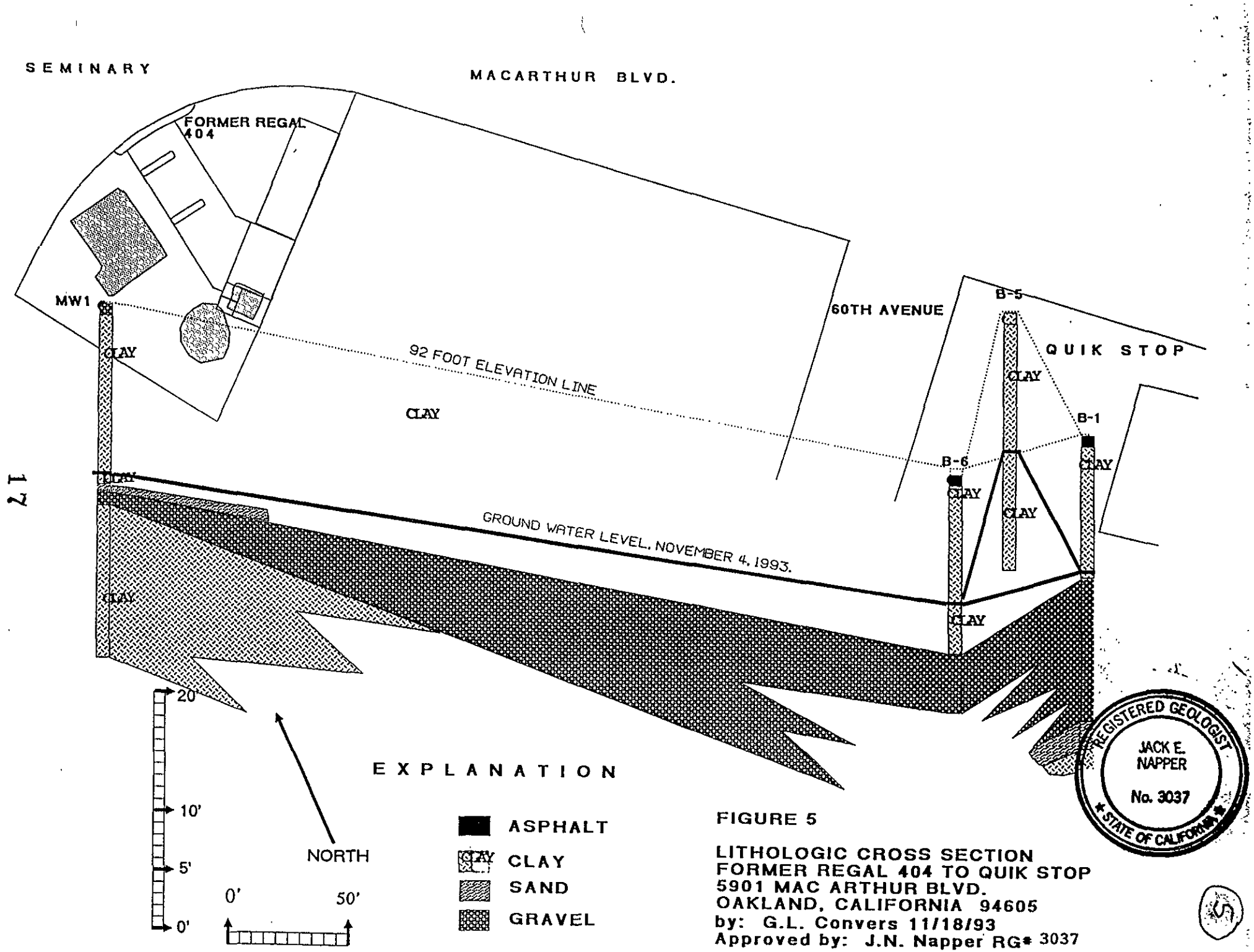


FIGURE 5

LITHOLOGIC CROSS SECTION
FORMER REGAL 404 TO QUIK STOP
5901 MAC ARTHUR BLVD.
OAKLAND, CALIFORNIA 94605
by: G.L. Convers 11/18/93
Approved by: J.N. Napper RG# 3037

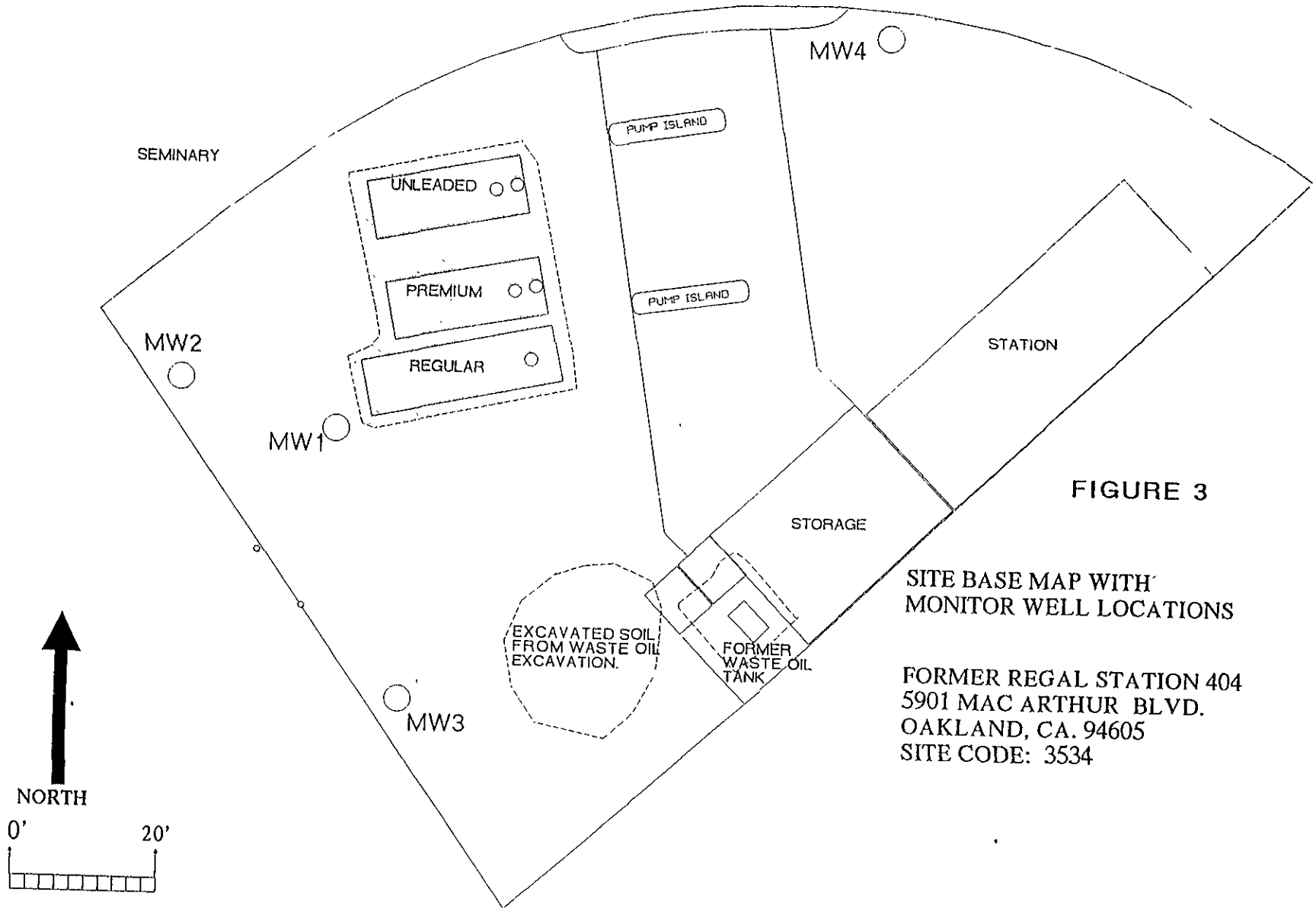


FIGURE 3

SITE BASE MAP WITH MONITOR WELL LOCATIONS

FORMER REGAL STATION 404
5901 MAC ARTHUR BLVD.
OAKLAND, CA. 94605
SITE CODE: 3534

16

MILLS COLLEGE

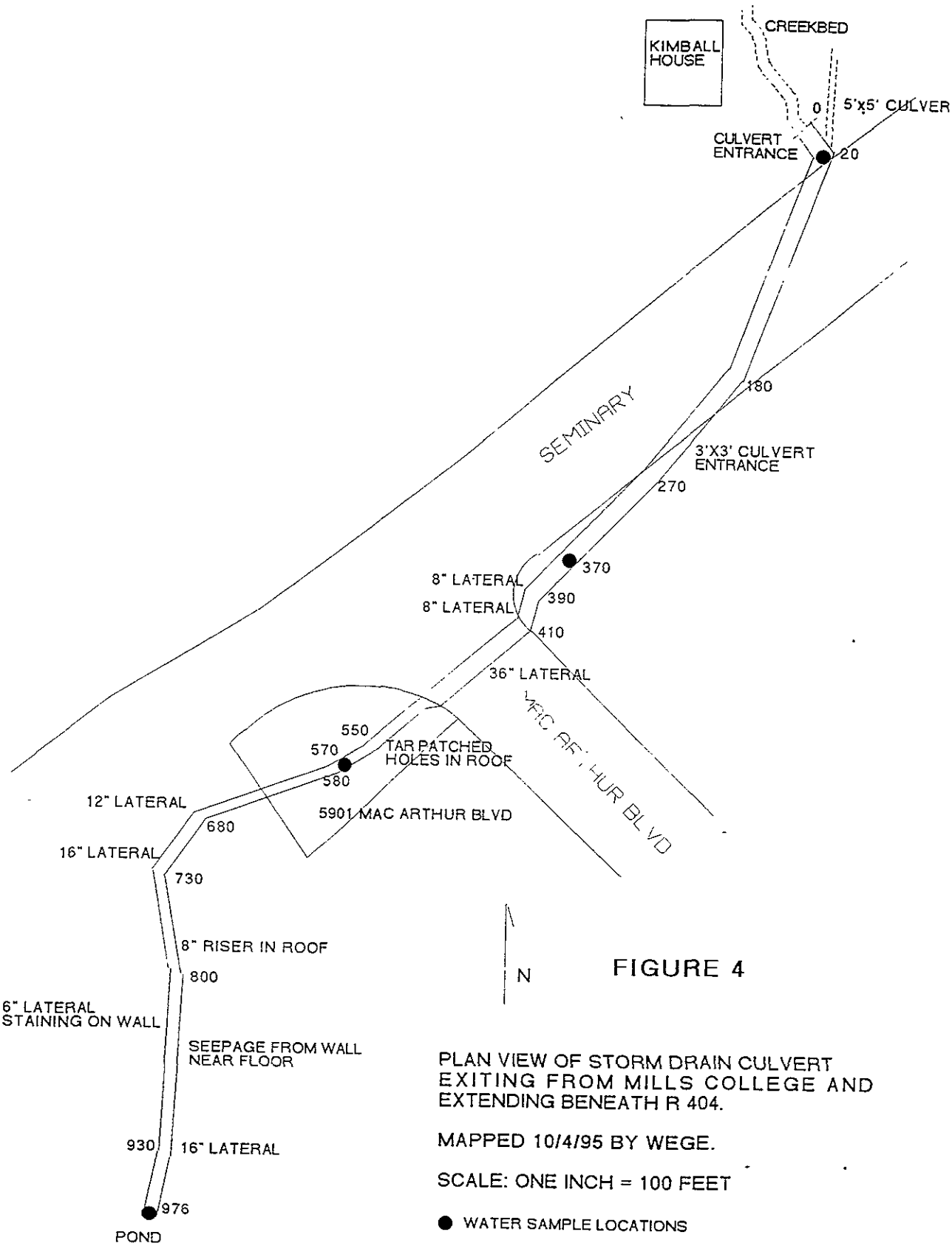


FIGURE 4

PLAN VIEW OF STORM DRAIN CULVERT EXITING FROM MILLS COLLEGE AND EXTENDING BENEATH R 404.

MAPPED 10/4/95 BY WEGE.

SCALE: ONE INCH = 100 FEET

● WATER SAMPLE LOCATIONS

TABLES

TABLE 1

SUMMARY OF LABORATORY ANALYSES
(analyses are in parts per million, depths are in feet)

Sample #	Depth	Total Hydrocarbon	Benzene	Toluene	Xylene
A1	17.5	6.2	<0.1	<0.1	<0.1
A2	17	1.5	<0.1	<0.1	<0.1
B1	14	310	6.4	10	15
B2	17	2.3	<0.1	<0.1	<0.1
C1	14	50	5.9	2.7	7.7
C2	17	2.4	<0.1	<0.1	<0.1
Comp-1		84	1.6	2.3	11

TABLE 1

CERTIFIED LABORATORY RESULTS FROM SOIL SAMPLES

FORMER REGAL STATION 404

5901 MACARTHUR BLVD.

OAKLAND, CALIFORNIA 94605

ALAMEDA COUNTY HEALTH SITE CODE ID# 3534

SAMPLE LOCATION	SAMPLE ID#	DATE SAMPLED	DEPTH IN FEET BELOW SURFACE	LABORATORY METHOD 8015M GASOLINE 5030 mg/Kg	KEROSINE mg/Kg	DIESEL mg/Kg	5520 OIL AND GREASE mg/Kg	8020 AND 8240 BENZENE mg/Kg	TOLUENE mg/Kg	ETHYL-BENZENE mg/Kg	XYLENES mg/Kg	8270 BIS (2-ETHYLHEXYL) PHTHALATE mg/Kg	CAM METALS TTLC CADMIUM mg/Kg	CHROMIUM mg/Kg	LEAD mg/Kg	NICKEL mg/Kg	ZINC mg/Kg	pH
TANK	A1	5/18/87	17 5	6 2				<0 1	<0.1		<0.1							
EXCAVATION	A2	5/18/87	17	1.5				<0.1	<0.1		<0.1							
	B1	5/18/87	14	310				6.4	10		15							
	B2	5/18/87	17	2.3				<0 1	<0 1		<0.1							
	C1	5/18/87	14	50				5.9	2.7		7 7							
	C2	5/18/87	17	2 4				<0.1	<0.1		<0.1							
COMPOSITED SOIL PILE	COMP-1	5/18/87		84				1.6	2.3		11							
EXCAVATION BELOW PILLUP WASTE OIL	W.O.#1	02/24/93	9.5	<1	4	27	<100	<0 005	0 012	<0 005	<0.015	<0 3	1.2	52	12	170	40	5.2
WASTE OIL SOIL PILE	SP-A	02/24/93	2	COMPOSITED INTO ONE SAMPLE														
	SP-B	02/24/93	2															
	SP-C	02/24/93	2	17	20	52	<100	<0.005	0.0078	0.0054	0.06	0.47	1.3	40	22	140	72	6.1
	SP-D	02/24/93	2															
MW1 BOREHOLE	MW1-10	10/27/93	10	27				0.081	0.055	0.36	0.099							
	MW1-15	10/27/93	15	7				0.052	0.019	0.12	0.13							
	MW1-20	10/27/93	20	13				0 014	0.033	0.15	0.11							
MW2 BOREHOLE	MW2-10	10/4/95	10	29		2		< 0 01	< 0.01	< 0.01	< 0.03							
	MW2-15	10/4/95	15	< 0.2		< 1		< 0 005	< 0.005	< 0.005	< 0.005							

TABLE 1

CERTIFIED LABORATORY RESULTS FROM SOIL SAMPLES

FORMER REGAL STATION 404

5901 MACARTHUR BLVD.

OAKLAND, CALIFORNIA 94605

ALAMEDA COUNTY HEALTH SITE CODE ID# 3534

SAMPLE LOCATION	SAMPLE ID#	DATE SAMPLED	DEPTH IN FEET BELOW SURFACE	LABORATORY METHOD 8015M : GASOLINE 5030 mg/Kg	KEROSINE mg/Kg	DIESEL mg/Kg	5520 OIL AND GREASE mg/Kg	8020 AND 8240 : BENZENE mg/Kg	TOLUENE mg/Kg	ETHYL-BENZENE mg/Kg	XYLENES mg/Kg	8270 : BIS (2-ETHYLHEXYL) PHTHALATE mg/Kg	CAM METALS TTLC : CADMIUM mg/Kg	CHROMIUM mg/Kg	LEAD mg/Kg	NICKEL mg/Kg	ZINC mg/Kg	pH
MW3	MW3-10	10/4/95	10	< 0.2		< 1		< 0.005	< 0.005	< 0.005	< 0.005							
BOREHOLE	MW3-15	10/4/95	15	< 0.2		100		< 0.005	< 0.005	< 0.005	< 0 005							
MW4	MW4-10	10/4/95	10	5100		840		< 1	7 7	13	9.3							
BOREHOLE	MW4-15	10/4/95	15	< 0.2		< 1		< 0.005	< 0.005	< 0 005	< 0.005							

mg/Kg milligrams/Kilogram, parts per million (ppm)

TABLE 2
GROUND WATER CERTIFIED LABORATORY CHEMICAL RESULTS
FORMER REGAL STATION 404
5901 AND 6001 MAC ARTHUR BLVD.
OAKLAND, CALIFORNIA 94605
ALAMEDA COUNTY HEALTH SITE CODE ID# 3534

SAMPLE LOCATION	SAMPLE ID#	DATE SAMPLED	CASING ELEVATION FT. ABOVE MSL	DEPTH TO WATER FEET	GROUND WATER ELEVATION FEET	LABORATORY METHOD 8015M GASOLINE 5030 ug/L	KEROSINE ug/L	DIESEL ug/L	8020 BENZENE ug/L	TOLUENE ug/L	ETHYL-BENZENE ug/L	XYLENES ug/L	CA mg/L	MG mg/L	K mg/L	NA mg/L	BORON mg/L	pH	TURBIDITY N.T.U.
MW1, 5901 MAC ARTHUR	MW1 WATER	11/4/93	91.89	14.24	77.65	1900		610	210	2	0.6	7.5	42	56	2	49	0.3	7.21	340
B1, 6001 MAC ARTHUR	B1 WATER	11/4/93	91.84	11.53	80.31								31	29	1	26	0.1	7.48	140
B5, 6001 MAC ARTHUR	B5 WATER	11/4/93	91.91	11.51	80.4								69	34	3	40	0.1	7.91	1300
B6, 6001 MAC ARTHUR	B6 WATER	11/4/93	90.88	10.86	80.02								100	68	2	60	0.2	7.6	320

Table 1

TABLE 1
GROUND WATER CERTIFIED LABORATORY CHEMICAL RESULTS
FORMER REGAL STATION 404
5901 MAC ARTHUR BLVD.
OAKLAND, CALIFORNIA 94605
ALAMEDA COUNTY HEALTH SITE CODE ID# 3534

Avg-Conc = 182 ppb Benzene

MONITOR WELL	DATE SAMPLED	CASING ELEVATION FT. ABOVE MSL	DEPTH TO WATER (FEET)	GROUND WATER ELEVATION: (FEET)	TPH GASOLINE 5030 (ug/L)	TPH KEROSINE (ug/L)	TPH DIESEL (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL-BENZENE (ug/L)	XYLENES (ug/L)
MW1	11/4/93	91.89	14.24	77.65	1900		610	210	2	0.6	7.5
MW1	2/4/94	91.89	13.9	77.99	1700		610	220	4.9	2.9	10
MW1	6/30/94	91.89	14.07	77.82	2200		<50	200	2	60	21
MW1	7/27/94	91.89	14.15	77.74							
MW1	8/31/94	91.89	13.63	78.26							
MW1	9/6/94	91.89	13.96	77.93	2200		960	210	56	55	48
MW1	9/15/94	91.89	13.92	77.97							
MW1	10/26/94	91.89	14.45	77.44							
MW1	11/30/94	91.89	14.29	77.6							
MW1	1/12/95	91.89	13.68	78.21	500		500	13	<0.5	15	4
MW1	2/17/95	91.89	13.95	77.94							
MW1	3/13/95	91.89	13.2	78.69	50		400	8	<0.5	2	<2
MW1	4/11/95	91.89	13.84	78.05							
MW1	6/15/95	91.89	13.92	77.97	2000		<50	210	2	83	14
MW1	10/18/95	91.89	14.22	77.67	1200		<50	110	5	8	6
MW1	11/02/95	91.89	14.24	77.65							
MW1	12/28/95	91.89	13.92	77.97	2600		200	320	4	180	55
MW1	03/27/96	91.89	13.82	78.07	3500			380	6.3	400	280
MW1	04/18/96	91.89					250				
MW1	06/11/96	91.89	13.83	78.06	1200		420	120	1.5	7.7	2
MW2	10/18/95	91.77	14.36	77.41	500		650	59	1	28	13
MW2	11/02/95	91.77	14.4	77.37							
MW2	12/28/95	91.77	13.87	77.9	300		200	5	0.8	0.9	< 2
MW2	03/27/96	91.77	13.76	78.01	< 50			<0.5	<0.5	<0.5	< 2
MW2	04/18/96	91.77					230				
MW2	06/11/96	91.77	13.90	77.87	< 50		130	<0.5	<0.5	<0.5	< 2
MW3	10/18/95	92.42	14.57	77.85	100		300	< 0.5	< 0.5	< 0.5	< 2
MW3	11/02/95	92.42	14.6	77.82							
MW3	12/28/95	92.42	13.85	78.57	< 50		< 50	< 0.5	< 0.5	< 0.5	< 2
MW3	03/27/96	92.42	13.35	79.07	< 50			< 0.5	< 0.5	< 0.5	< 2
MW3	04/18/96	92.42					< 50				
MW3	06/11/96	92.42	14.10	78.32	< 50		< 50	< 0.5	< 0.5	< 0.5	< 2
MW4	10/18/95	92.32	19.02	73.3	NS		NS	NS	NS	NS	NS
MW4	11/02/95	92.32	19.02	73.3	2100		2200	20	0.9	5.8	8.4
MW4	12/28/95	92.32	12.14	80.18	2000		300	17	1	4	7
MW4	03/27/96	92.32	12.15	80.17	430			0.6	< 0.5	0.8	< 2
MW4	04/18/96	92.32					240				
MW4	06/11/96	92.32	12.70	79.62	370		200	1.9	< 0.5	1	< 2

MTBE = 170 ppb

GROUND WATER ELEVATIONS MEASURED IN FEET ABOVE MEAN SEA LEVEL
< LESS THAN SYMBOL INDICATES THAT CONCENTRATIONS ARE BELOW STATED LABORATORY DETECTION LIMITS
NS = NOT SAMPLED

BORING LOGS

WEGE WELL CONSTRUCTION LOG

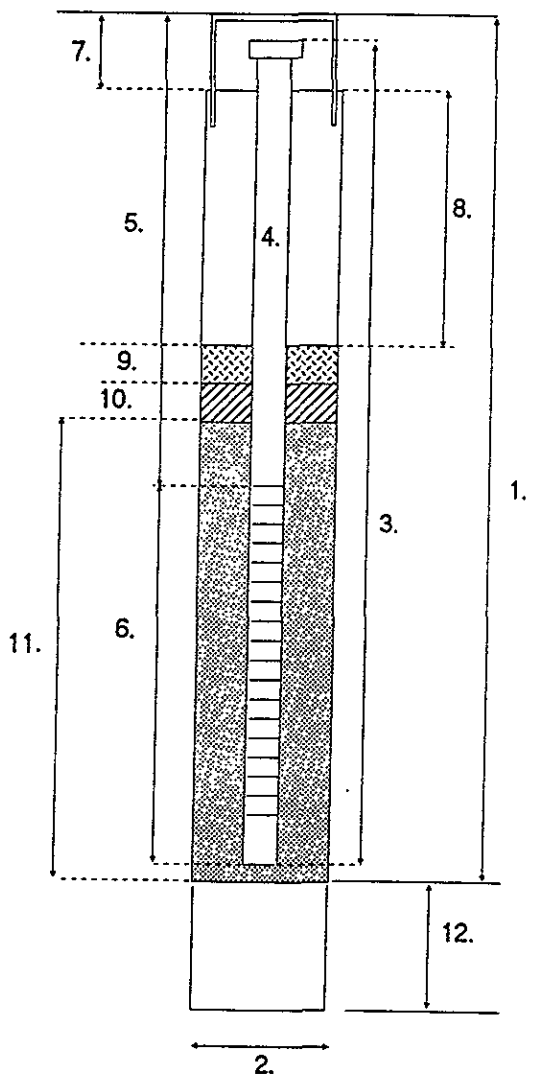
PROJECT NAME R 404
5901 MAC ARTHUR BLVD., OAKLAND, CA
PROJECT NUMBER R 404

MONITOR WELL NUMBER MW 1
TOP OF CASING ELEVATION 91.89'
DATE COMPLETED 10/27/93

WELL TYPE Ground Water Monitoring Well

REMARKS: Drilled with truck mounted hollow stem auger rig using 10" augers. Threaded bottom cap with 4" locking cap and12" steel traffic box. Bottom 5' of borehole (25'-30') plugged with bentonite chips before installation of casing.

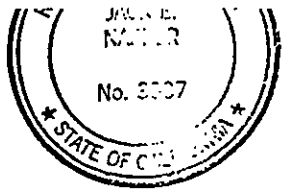
TYPICAL MONITORING WELL



WELL CONSTRUCTION

1. Total Depth of hole 30.0'
2. Diameter of boring 10"
3. Casing length 25'
4. Diameter of casing 4"
5. Depth to top of screen 9'
6. Length of screen 15'
   screen interval 9' - 24'
   screen type machine slotted
   screen size .020 '
7. Surface seal 1.5'
   seal material 12" Traffic Box
8. Backfill 0' - 5.5'
   seal material neat cement + 5% bentonite
9. Upper seal 5.5'-7'
   seal material Bentonite
10. Lower seal 7' - 8'
    seal material 0/30 Sand
11. Annulus 8' - 26'
    material clean, bagged 3# sand
12. Bottom Plug 26'-30'
    material Bentonite chips

-WEGE-
WESTERN GEO-ENGINEERS



BORING: MW 1
DATE DRILLED: 10/27/93

▌ SAMPLE INTERVAL

▼ WATER

BORE HOLE LOG

PROJECT: R 404	GEOLOGIST: G. CONVERSE	SURFACE ELEVATION:
LOCATION: 5901 MAC ARTHUR BVLD.	DRILLER: E. FORSTROM	TOTAL DEPTH: 30.0'
DRILLING CONTRACTOR: WOODWARD DRILLING COMPANY	DEPTH TO WATER: 15.5'	CASING: 4" PVC
REMARKS:		

DEPTH (FT)	SAMPLE No.	BLOWS/FT.	PPM TVO VAPOR		CORE DESCRIPTION	GRAPHIC LOG	REMARKS
					GRAVEL		SURFACE GRAVEL
			15	ML	SILT WITH CONCRETE FILL		EARTHY ODOR
				CH	CLAY, BRWN, MOIST, STICKY		
5				CL	CLAY, DRK BRW, WITH MINOR SAND, SL MOIST		
			10				
			11	CL	CLAY, BLK TO CHOCOLATE, DECREASE IN SILT.		TR HEAVY PETR ODOR
10	MW1 10'	2 2 6	0 1 TR	CL	CLAY, BLK TO CHOCOLATE		
				CL	CLAY, BLK TO CHOCOLATE		
15	MW1 15'	6 13 15	2 2 1	SP GP	SAND, MED TO COARSE, ▼ GRAVEL, SUBRND TO SUBANG		TR HEAVY PETR ODOR Water first encountered at 15.5' BGS
				CL	CLAY, BRWN, STIFF, DRY		NO ODOR
20	MW1 20'	6 16 19	0 0 0	CL	CLAY, BRWN, FRM, SLIGHT MOISTURE, TR SILT.		NO ODOR
25	MW1 25'	5 8 11	0 0 0	CL	CLAY, BRWN, FRM, SLIGHT MOISTURE, NO ODOR.		NO ODOR
30	MW1 30'	6 9 14	0 0 0	CL	CLAY, BRWN, FRM, SLIGHT MOISTURE, MINOR SILT.		NO ODOR

-WEGE-
WESTERN GEO-ENGINEERS

BORING: MW2
DATE DRILLED: 10/4/95

▌ SAMPLE INTERVAL
▼ WATER

BORE HOLE LOG

PROJECT: R 404	GEOLOGIST: G. CONVERSE	SURFACE ELEVATION: 92.03' AMSL
LOCATION: 5901 MAC ARTHUR BVLD. OAKLAND, CA	DRILLER: E. FORSTROM	TOTAL DEPTH: 20.0'
DRILLING CONTRACTOR: WOODWARD DRILLING COMPANY	DEPTH TO WATER: NONE	CASING: 4" PVC

REMARKS: MONITOR WELL BORING DRILLED WITH MOBIL RIG EQUIPPED WITH 10" DIAMETER HOLLOW STEM AUGERS. SOIL SAMPLES COLLECTED WITH THE AID OF A SPLIT SPOON SAMPLER AND 140 LB. DOWN HOLE SLIDE HAMMER.

DEPTH (FT)	SAMPLE No.	BLOWS/FT.	PPM TVO VAPOR	CORE DESCRIPTION	GRAPHIC LOG	REMARKS
				GW GRAVEL		SURFACE GRAVEL
5	MW2 5'	11 8 9	11 PPM	CL CLAY, DRK BRWN, WITH OCCASIONAL GRAVEL		
10	MW2 10'	6 7 9	2 PPM	SC CLAY, BRWN, WITH SAND AND MINOR GRAVEL		NO FREE WATER ENTERED BOREHOLE DURING WELL INSTALLATION
15	MW2 15'	8 11 13	4 PPM	CL BROWN CLAY		
20						TOTAL DEPTH 20' BGS

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

WEGE WELL CONSTRUCTION LOG

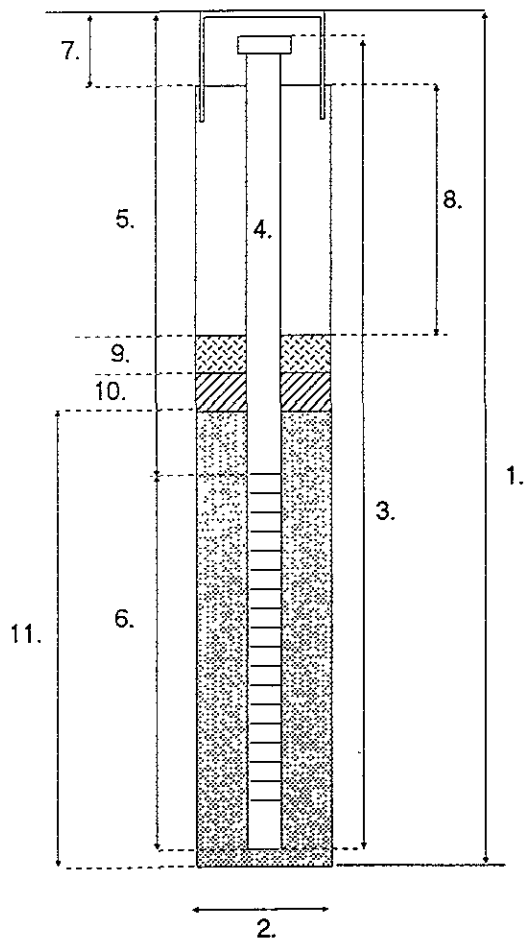
PROJECT NAME R 404
5901 MAC ARTHUR BLVD., OAKLAND, CA
PROJECT NUMBER R 404

MONITOR WELL NUMBER MW 2
TOP OF CASING ELEVATION 91.77'
DATE COMPLETED 10/4/95

WELL TYPE Ground Water Monitoring Well

REMARKS: Drilled with truck mounted hollow stem auger rig using 10" augers.
Threaded bottom cap with 4" locking cap and12" steel traffic box.

TYPICAL MONITORING WELL



WELL CONSTRUCTION

1. Total Depth of hole 20.0'
2. Diameter of boring 10"
3. Casing length 20'
4. Diameter of casing 4"
5. Depth to top of screen 10'
6. Length of screen 10'
   screen interval 10' - 20'
   screen type machine slotted
   screen size .010 '
7. Surface seal 1.0'
   seal material 12" Traffic Box
8. Backfill 0' - 6'
   seal material neat cement + 5% bentonite
9. Upper seal 6' - 8'
   seal material Bentonite pellets
10. Lower seal 8' - 9'
    seal material 0/30 Sand
11. Annulus 9' - 20'
    material clean, bagged 2/12 sand

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

-WEGE-
WESTERN GEO-ENGINEERS

BORING: MW3
DATE DRILLED: 10/4/95

▌ SAMPLE INTERVAL
▼ WATER

BORE HOLE LOG

PROJECT: R 404	GEOLOGIST: G. CONVERSE	SURFACE ELEVATION: 92.77' AMSL
LOCATION: 5901 MAC ARTHUR BVLD. OAKLAND, CA	DRILLER: E. FORSTROM	TOTAL DEPTH: 20.0'
DRILLING CONTRACTOR: WOODWARD DRILLING COMPANY	DEPTH TO WATER: 14' BGS	CASING: 4" PVC

REMARKS: MONITOR WELL BORING DRILLED WITH MOBIL RIG EQUIPPED WITH 10" DIAMETER HOLLOW STEM AUGERS. SOIL SAMPLES COLLECTED WITH THE AID OF A SPLIT SPOON SAMPLER AND 140 LB. DOWN HOLE SLIDE HAMMER.

DEPTH (FT)	SAMPLE No.	BLOWS/FT.	PPM TVO VAPOR	CORE DESCRIPTION	GRAPHIC LOG	REMARKS
				GW GRAVEL		SURFACE GRAVEL
5	MW3 5'	10 11 19	3 PPM	ML/CL DARK BRWN CLAY WITH SAND SILT, AND GRAVEL		
10	MW3 10'	9 10 15	15 PPM	ML/CL SAME AS ABOVE		
15	MW3 15'	6 7 9	30 PPM	CL CLAY WITH GRAVEL, SHARP VOLANIC FRAGMENTS VARYING FROM GREEN - RED BRWN MODERATE DIESEL ODOR	▼	FIRST WATER 14' BGS
20	MW3 20'	9 12 14	1 PPM	CL CLAY, BRWN, STIFF NO ODOR		TOTAL DEPTH 20' BGS

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

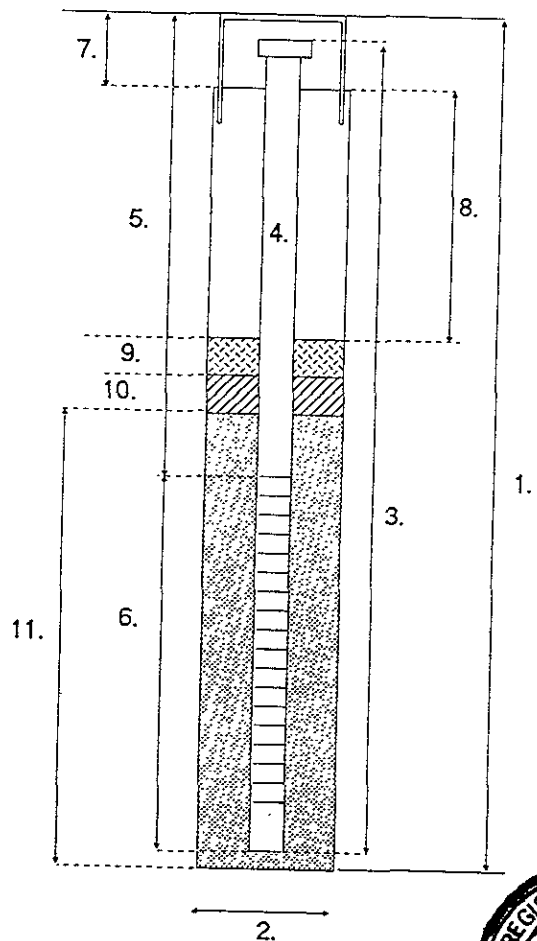
WEGE WELL CONSTRUCTION LOG

PROJECT NAME R 404
5901 MAC ARTHUR BLVD., OAKLAND, CA
PROJECT NUMBER R 404
MONITOR WELL NUMBER MW 3
TOP OF CASING ELEVATION 92.42'
DATE COMPLETED 10/4/95

WELL TYPE Ground Water Monitoring Well

REMARKS: Drilled with truck mounted hollow stem auger rig using 10" augers.
Threaded bottom cap with 4" locking cap and12" steel traffic box.

TYPICAL MONITORING WELL



WELL CONSTRUCTION

1. Total Depth of hole 20.0'
2. Diameter of boring 10"
3. Casing length 20'
4. Diameter of casing 4"
5. Depth to top of screen 10'
6. Length of screen 10'
   screen interval 10' - 20'
   screen type machine slotted
   screen size .010 '
7. Surface seal 0-1.0'
   seal material 12" Traffic Box
8. Backfill 0' - 6'
   seal material neat cement + 5% bentonite
9. Upper seal 6' - 8'
   seal material Bentonite pellets
10. Lower seal 8' - 9'
    seal material 0/30 Sand
11. Annulus 9' - 20'
    material clean, bagged 2/12 sand

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

-WEGE-
WESTERN GEO-ENGINEERS

BORING: MW4
DATE DRILLED: 10/4/95

▌ SAMPLE INTERVAL
▼ WATER

BORE HOLE LOG

PROJECT: R 404	GEOLOGIST: G. CONVERSE	SURFACE ELEVATION: 92.51' AMSL
LOCATION: 5901 MAC ARTHUR BVLD. OAKLAND, CA	DRILLER: E. FORSTROM	TOTAL DEPTH: 20.0'
DRILLING CONTRACTOR: WOODWARD DRILLING COMPANY	DEPTH TO WATER: NONE	CASING: 2" PVC

REMARKS: MONITOR WELL BORING DRILLED WITH MOBIL RIG EQUIPPED WITH 8" DIAMETER HOLLOW STEM AUGERS. SOIL SAMPLES COLLECTED WITH THE AID OF A SPLIT SPOON SAMPLER AND 140 LB. DOWN HOLE SLIDE HAMMER.

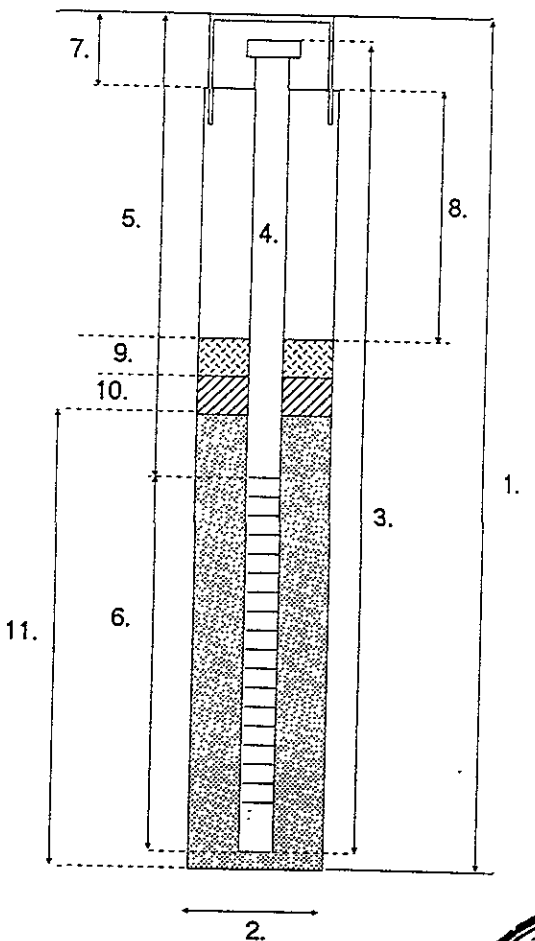
DEPTH (FT)	SAMPLE No.	BLOWS/FT.	PPM TVO VAPOR		CORE DESCRIPTION	GRAPHIC LOG	REMARKS
					RUBBLE AND FILL		SURFACE GRAVEL
5	MW4 5'	19 22 18	35 PPM		ROCK AND CLAY FILL		
10	MW4 10'	14 22 23	400 PPM	CL/ML	DRK GREY CLAY AND SILTY SANDS, STRONG PETR ODOR		
15	MW4 15'	10 17 18	20 PPM	CL	BRWN CLAY WITH BLUE GREY VERTICAL STRIATIONS		NO FREE WATER ENTERED BOREHOLE DURING WELL INSTALLATION
				SW	THIN SAND LENS		
20	MW4 20'	8 9 13	14 PPM	CL	CLAY, BRWN, WITH MINOR SAND		TOTAL DEPTH 20' BGS

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

WEGE WELL CONSTRUCTION LOG

PROJECT NAME R 404
5901 MAC ARTHUR BLVD., OAKLAND, CA
PROJECT NUMBER R 404
MONITOR WELL NUMBER MW 4
TOP OF CASING ELEVATION 92.32'
DATE COMPLETED 10/4/95
WELL TYPE Ground Water Monitoring Well
REMARKS: Drilled with truck mounted hollow stem auger rig using 8" augers.
Threaded bottom cap with 2" locking cap and12" steel traffic box.

TYPICAL MONITORING WELL



WELL CONSTRUCTION

1. Total Depth of hole 20.0'
2. Diameter of boring 8"
3. Casing length 20'
4. Diameter of casing 2"
5. Depth to top of screen 10'
6. Length of screen 10'
   screen interval 10' - 20'
   screen type machine slotted
   screen size .010 '
7. Surface seal 0-1.0'
   seal material 12" Traffic Box
8. Backfill 0' - 6'
   seal material neat cement + 5% bentonite
9. Upper seal 6' - 8'
   seal material Bentonite pellets
10. Lower seal 8' - 9'
    seal material 0/30 Sand
11. Annulus 9' - 20'
    material clean, bagged 2/12 sand