ICF KAISER ENGINEERS

CLEMENT DIVISION

ICF KAISER ENGINEERS, INC.
1800 HARRISON STREET
P.O. BOX 23210
OAKLAND, CALIFORNIA 94612-3430
510/419-6000

November 20, 1992

Ms. Juliet Shin, Hazardous Materials Specialist
Alameda County Department of Environmental Health
Hazardous Materials Division - UST Local Oversight Program
80 Swan Way, Room 200
Oakland, CA 94621

RE: Beck Roofing - 21123 Meekland Avenue Hayward, CA 94541

Dear Ms. Shin:

Enclosed please find a copy of the Third Quarter Groundwater Monitoring Report for the above referenced case. As required by the agency, the report includes groundwater analytical data and groundwater elevation data for the months of June, July, August, and September.

If you have any questions, please feel free to contact me at (510) 419-5507 or Mr. Frank Fenzel at (510) 419-5413.

Sincerely yours,

Robert H. Cheung

Robert H. Cheung
Environmental Analyst

enclosure

cc: Charles and Mary Beck (w/enclosure)
Fred M. Duman, Esq. (w/o enclosure)
Michael S. Brown, Esq. (w/o enclosure)
Chris Whipple (w/o enclosure)
Frank Fenzel (w/o enclosure)
file 05085-001-00

c:\beck\qtr_cvr.ltr

THIRD QUARTERLY GROUNDWATER MONITORING REPORT

FOR

BECK ROOFING

Prepared For:

Beck Roofing
21123 Meekland Avenue
Hayward, California 94541

Prepared By:

ICF Kaiser Engineers, Inc.
Clement International Corporation
1800 Harrison Street
Environmental Group
Oakland, California 94612

November 4, 1992

TABLE OF CONTENTS

1.0 INTRODUCTION

Beck Roofing is an active roofing business located at 21123 Meekland Avenue in Hayward, California. Figure 1 depicts the site location. The owners had a 1,000-gallon capacity gasoline underground storage tank (UST) removed from the property on May 20, 1991. Post-excavation soil sampling results indicated that a possible release of the tank's contents to the surrounding environment had occurred. Because of this, the Alameda County Department of Environmental Health (DEH), in an August 5, 1991 letter to Beck Roofing, required that further site investigation take place, including the installation of groundwater monitoring wells (see Figure 2). Since that date, an environmental consultant for Beck Roofing, L & W Environmental Services, Inc. (L & W), has provided two Quarterly Groundwater Monitoring Reports to the DEH. The reports documented the results of L & W's work up to December 31, 1991; and their work from December 31, 1991 to March 31, 1992.

During the period between April and May, 1992, Beck Roofing terminated their relationship with L & W. Clement International Corporation (Clement) was contracted by Beck Roofing to continue the DEH-required environmental investigations at their former gasoline UST location. This report represents the third Quarterly Groundwater Monitoring Report for the UST site. Because of the delays incurred during the change in consultant from L & W to Clement, the report does not contain any groundwater monitoring data for the months March, April, or May, 1992. This circumstance was acknowledged by the DEH in its letter to Beck Roofing dated June 18, 1992.

2.0 BACKGROUND

Four previous rounds of groundwater sampling had been reported by L & W: November and December, 1991, and January and February, 1992. The previous sampling results from the three onsite wells were inconsistent. No contaminants were detected in the November or January sampling, but traces of gasoline-range hydrocarbons were detected in MW-3 in December, 1991,

and in all three wells in February, 1992.

Clement contracted with Brown and Caldwell Analytical (BCA) to collect monthly groundwater samples from the three onsite monitoring wells installed in 1991 by L & W. The approximate locations of the wells are shown on Figure 2. BCA sampled the wells in the months of June, July, August, and September 1992, and recorded the depth to groundwater in each case.

3.0 SUMMARY OF THIRD QUARTER MONITORING RESULTS

BCA collected groundwater samples from the three onsite wells on June 16, July 15, August 13, and September 9, 1992. The samples were analyzed for the same chemical parameters as in previous sampling rounds: total petroleum hydrocarbons, gasoline-range (TPH-G); benzene, toluene, ethylbenzene, and xylenes (BTEX - aromatic hydrocarbons typical of gasoline); and organic lead (historically, a gasoline additive).

Table 1 summarizes the results of the Third Quarter sampling, and also recapitulates the previous four rounds of groundwater data. The Third Quarter results are highlighted in boldface type. As is evident, gasoline-range hydrocarbons, including BTEX compounds, were present in the samples collected from MW-3. TPH-G was detected at a maximum concentration of 7.4 ppm (September) and benzene at a maximum concentration of 1.20 ppm (September). All other constituents, if present, occurred at concentrations below 0.3 ppm.

MW-2 also showed detectable levels of gasoline-range hydrocarbons in the July sampling event, although the reported concentration was at the method detection limit of 0.050 ppm. The well was free of TPH-G compounds according to the June, August, and September sampling results. Toluene, ethylbenzene, xylenes, and organic lead were not detected in the last four sampling rounds. However, benzene was detected at concentrations from a low of 0.0028 ppm in September to a high of 0.024 in July. The analytical results of samples collected from MW-1 indicate an absence of TPH-G compounds between June and September. As with the results

TABLE 1 GROUNDWATER SAMPLING ANALYTICAL RESULTS

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW-1	11/04/91	ND	ND	ND	ND	ND	ND
MW-1	12/23/91	ND	ND	ND	ND	ND	ND
MW-1	01/22/92	ND	ND	ND	ND	ND	ND
MW-1	02/24/92	0.09	0.0004	0.001	ND	ND	ND
MW-1	**06/16/92**	**ND**	**0.0005**	**ND**	**ND**	**ND**	**ND**
MW-1	**07/15/92**	**ND**	**0.0013**	**ND**	**ND**	**ND**	**ND**
MW-1	**08/13/92**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
MW-1	**09/09/92**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW-2	11/04/91	ND	ND	ND	ND	ND	ND
MW-2	12/23/91	ND	ND	ND	ND	ND	ND
MW-2	01/22/92	ND	ND	ND	ND	ND	ND
MW-2	02/24/92	0.33	0.11	0.002	ND	0.0009	ND
MW-2	**06/16/92**	**ND**	**0.0077**	**ND**	**ND**	**ND**	**ND**
MW-2	**07/15/92**	**0.05**	**0.024**	**ND**	**ND**	**ND**	**ND**
MW-2	**08/13/92**	**ND**	**0.0065**	**ND**	**ND**	**ND**	**ND**
MW-2	**09/09/92**	**ND**	**0.0028**	**ND**	**ND**	**ND**	**ND**

All analytical results in parts per million (ppm).
TPH-G: Total Petroleum Hydrocarbons as Gasoline
ND: Non Detect

TABLE 1 GROUNDWATER SAMPLING ANALYTICAL RESULTS (continued)

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW-3	11/04/91	ND	ND	ND	ND	ND	ND
MW-3	12/23/91	0.15	0.06	0.0005	0.0006	0.0097	ND
MW-3	01/22/92	ND	ND	ND	ND	ND	ND
MW-3	02/24/92	4.36	0.710	0.016	0.069	0.4	ND
MW-3	**06/16/92**	**4.90**	**0.770**	**ND**	**0.061**	**0.240**	**ND**
MW-3	**07/15/92**	**5.50**	**0.840**	**0.010**	**0.085**	**0.290**	**ND**
MW-3	**08/13/92**	**6.60**	**1.10**	**ND**	**0.097**	**0.270**	**ND**
MW-3	**09/09/92**	**7.40**	**1.20**	**0.0077**	**0.095**	**0.170**	**ND**

All analytical results in parts per million (ppm).
TPH-G: Total Petroleum Hydrocarbons as Gasoline
ND: Non Detect

from MW-2, toluene, ethylbenzene, xylenes, and organic lead also were not detected. However, traces of benzene were indicated at a concentration of 0.0005 ppm in the June sample and 0.001 ppm in the July sample. Benzene was not detected in either the August or September sampling rounds.

4.0 GROUNDWATER GRADIENT MEASUREMENTS

Depth-to-water measurements were recorded at each well during each of the sampling events. Table 2 lists the depth-to-water measurements collected to date at the site. Approximate groundwater gradients were calculated for each month and are illustrated in Figures 3 through 11. The groundwater flow direction is approximate because the exact location of the three wells has not yet been surveyed. For this report, Clement relied upon the locations and relative monitoring well elevations used by the previous consultant in their prior submissions to DEH.

5.0 INTERPRETATION OF SITE DATA

The most interesting aspect of the groundwater monitoring data is that the calculated direction of groundwater flow is generally opposite to that previously measured. The flow direction indicated by the June through September depth-to-water measurements is west-to-east; earlier data (excepting February data which is questionable) indicated that the flow direction was east-to-west. This result is significant because it suggests that the former UST location is upgradient of MW-3, the well that has shown the highest concentrations of petroleum hydrocarbons. However, accurate interpretations of the available site data are compromised by the lack of precise site survey measurements. Data evaluation is further hindered by the apparently low hydraulic gradient at the site (< 0.01 vertical ft per 100 horizontal ft) indicated by all depth-to water data except February, which may be in error (a 7.36-foot difference in head between wells MW-1 and MW-3 is difficult to reconcile). To help assess the distribution of TPH constituents in

TABLE 2 GROUNDWATER ELEVATION DATA

WELL	SAMPLE DATE	TOP OF CASING	DEPTH TO GROUNDWATER	GROUNDWATER ELEVATION
MW-1	11/04/91	100.01	32.32	67.69
MW-1	12/23/91	100.01	32.54	67.47
MW-1	01/22/92	100.01	32.08	67.93
MW-1	02/24/92	100.01	37.26	62.75
MW-1	**06/16/92**	**100.01**	**30.31**	**69.7**
MW-1	**07/15/92**	**100.01**	**30.76**	**69.25**
MW-1	**07/28/92**	**100.01**	**30.98**	**69.03**
MW-1	**08/13/92**	**100.01**	**31.23**	**68.78**
MW-1	**09/09/92**	**100.01**	**31.65**	**68.36**

WELL	SAMPLE DATE	TOP OF CASING	DEPTH TO GROUNDWATER	GROUND ELEVATION
MW-2	11/04/91	100.13	32.44	67.69
MW-2	12/23/91	100.13	32.64	67.49
MW-2	01/22/92	100.13	32.19	67.94
MW-2	02/24/92	100.13	32.00	68.13
MW-2	**06/16/92**	**100.13**	**30.42**	**69.71**
MW-2	**07/15/92**	**100.13**	**30.90**	**69.23**
MW-2	**07/28/92**	**100.13**	**31.12**	**69.01**
MW-2	**08/13/92**	**100.13**	**31.26**	**68.87**
MW-2	**09/09/92**	**100.13**	**31.80**	**68.33**

All Groundwater Levels in Feet (ft)

TABLE 2 GROUNDWATER ELEVATION DATA (continued)

WELL	SAMPLE DATE	TOP OF CASING	DEPTH TO GROUNDWATER	GROUNDWATER ELEVATION
MW-3	11/04/91	100.00	32.40	67.60
MW-3	12/23/91	100.00	32.60	67.40
MW-3	01/22/92	100.00	32.14	67.86
MW-3	02/24/92	100.00	29.90	70.10
MW-3	**06/16/92**	**100.00**	**30.25**	**69.75**
MW-3	**07/15/92**	**100.00**	**30.70**	**69.30**
MW-3	**07/28/92**	**100.00**	**30.97**	**69.03**
MW-3	**08/13/92**	**100.00**	**31.22**	**68.78**
MW-3	**09/09/92**	**100.00**	**31.95**	**68.05**

All Groundwater Levels in Feet (ft)

soil and groundwater, Clement has developed a supplemental site investigation plan that is provided as an attachment to this Quarterly Monitoring Report. Part of the plan calls for the installation of a groundwater monitoring well near the former location of the UST. This proposal follows the recommendations of Regional Water Quality Control Board staff, as set forth in the August 10, 1990 document: "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites".

6.0 CONCLUSIONS

The third quarter of groundwater monitoring at the Beck Roofing site has confirmed the presence of gasoline-range petroleum hydrocarbons in the groundwater underlying the site. The majority of detected contamination is associated with monitoring wells MW-2 and MW-3, situated northeast and southwest of the former gasoline UST location. Well MW-1, southeast of the former UST location, has not exhibited significant levels of the contaminants of concern, although benzene was detected at a concentration of 0.0013 ppm in the July sampling.

The depth-to-water measurements taken between June and September indicate that the general groundwater gradient is directed toward the east. This result contradicts previous groundwater elevation data which indicated that groundwater flowed to the west. The slope of the water table is of the order of 0.00001 ft/ft. With such a small gradient, it is not surprising that the direction of the groundwater gradient appears to vary and is difficult to establish. The depth to groundwater appears to be about two feet less than measured previously (with the notable exception of MW-1 in February, 1992). This finding is inconsistent with the change from the wetter, winter months to the drier, summer months.

There remain several unresolved issues at the Beck Roofing site, including the extent of soil contamination and the exact source of the groundwater contamination. Although the range of contaminants present in the groundwater is consistent with a gasoline source, deeper soil and groundwater contamination directly beneath the former UST location has yet to be investigated

demonstrated. The work proposed in the attached supplemental site investigation plan, once implemented, will help better define the source and extent of petroleum hydrocarbon contamination at the Beck Roofing site and will provide a more reliable basis for development of a sitewide remediation plan.

FIGURE 1

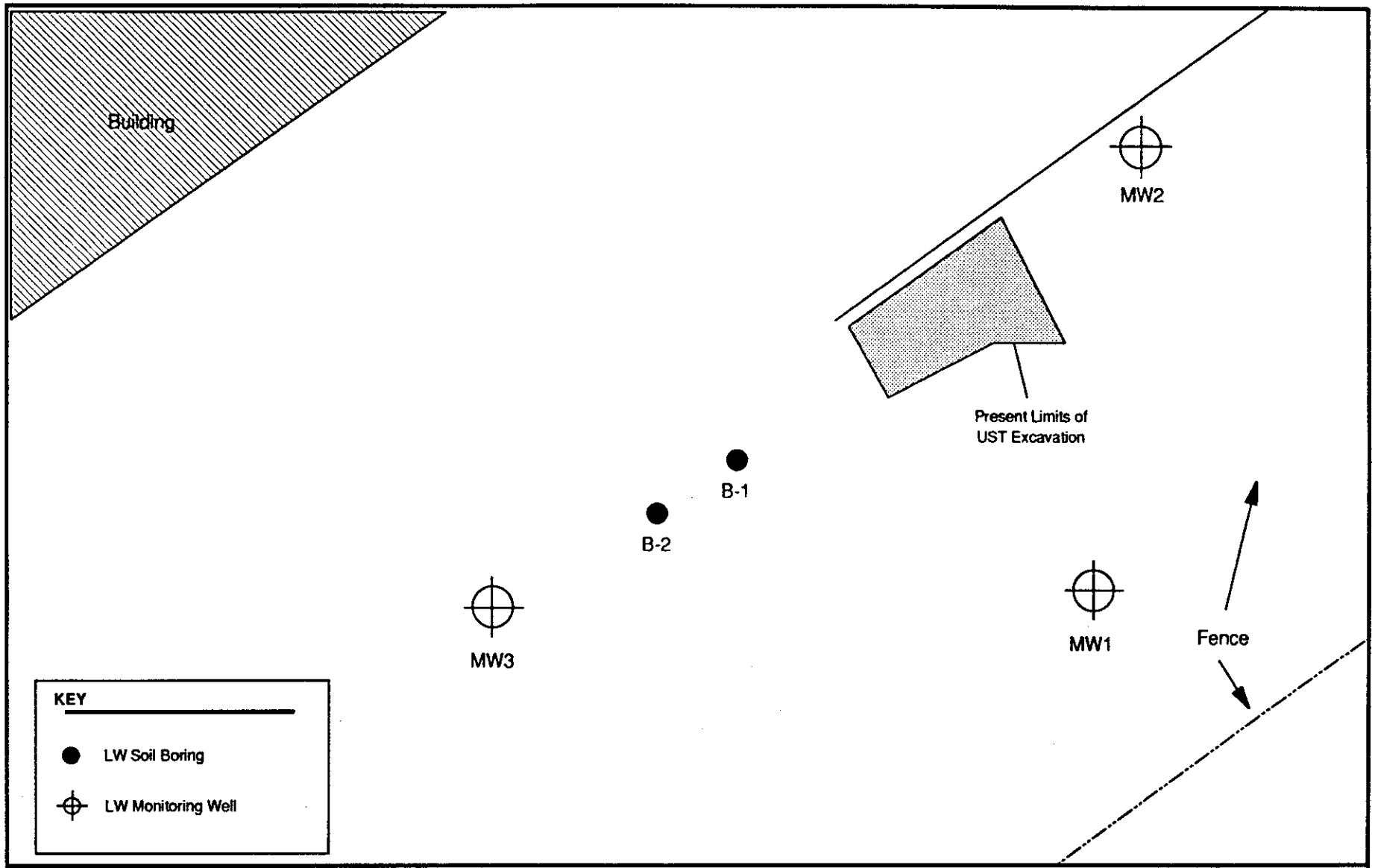
SITE LOCATION MAP

BECK ROOFING

HAYWARD, CALIFORNIA

CLEMENT

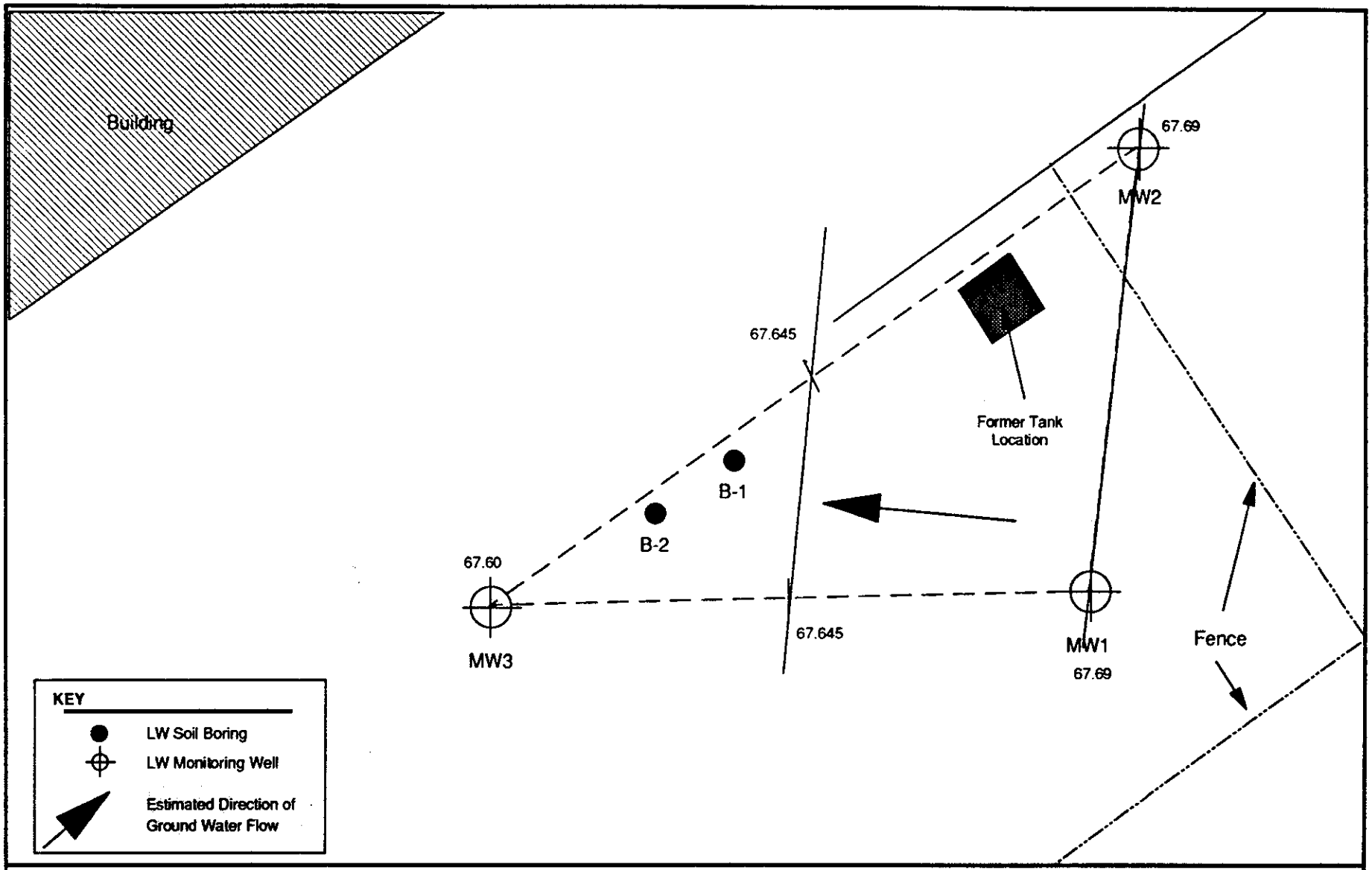
Environmental and Health Science



Approximate Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

FIGURE 2
SITE MAP
BECK ROOFING
HAYWARD, CALIFORNIA



Scale 1" = 20'

FIGURE 3

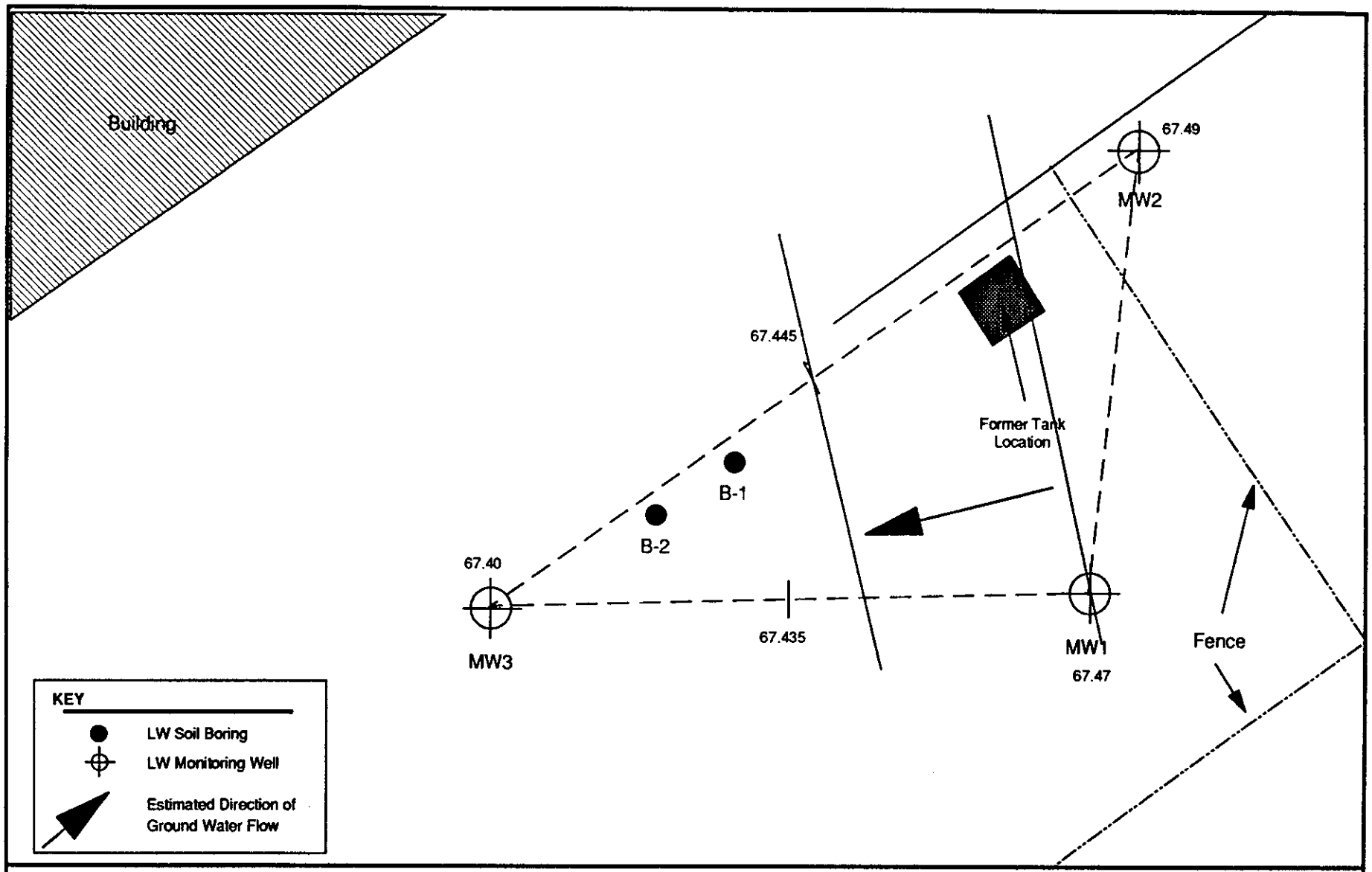
GROUND WATER ELEVATIONS - NOVEMBER 4, 1991

BECK ROOFING

HAYWARD, CALIFORNIA

CLEMENT
INTERNATIONAL CORPORATION

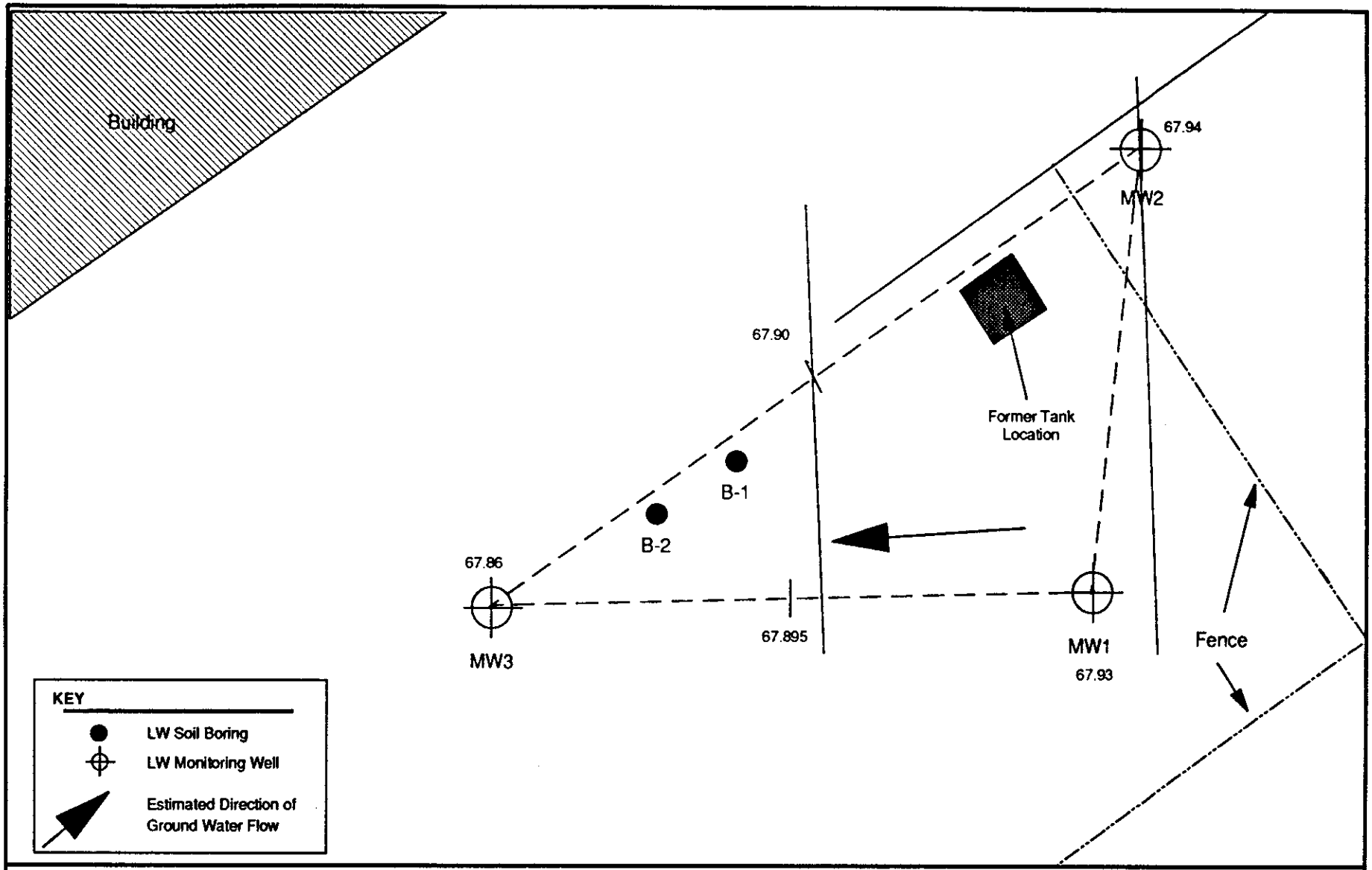
N



Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

FIGURE 4
GROUND WATER ELEVATIONS - DECEMBER 23, 1991
BECK ROOFING
HAYWARD, CALIFORNIA



Scale 1" = 20'

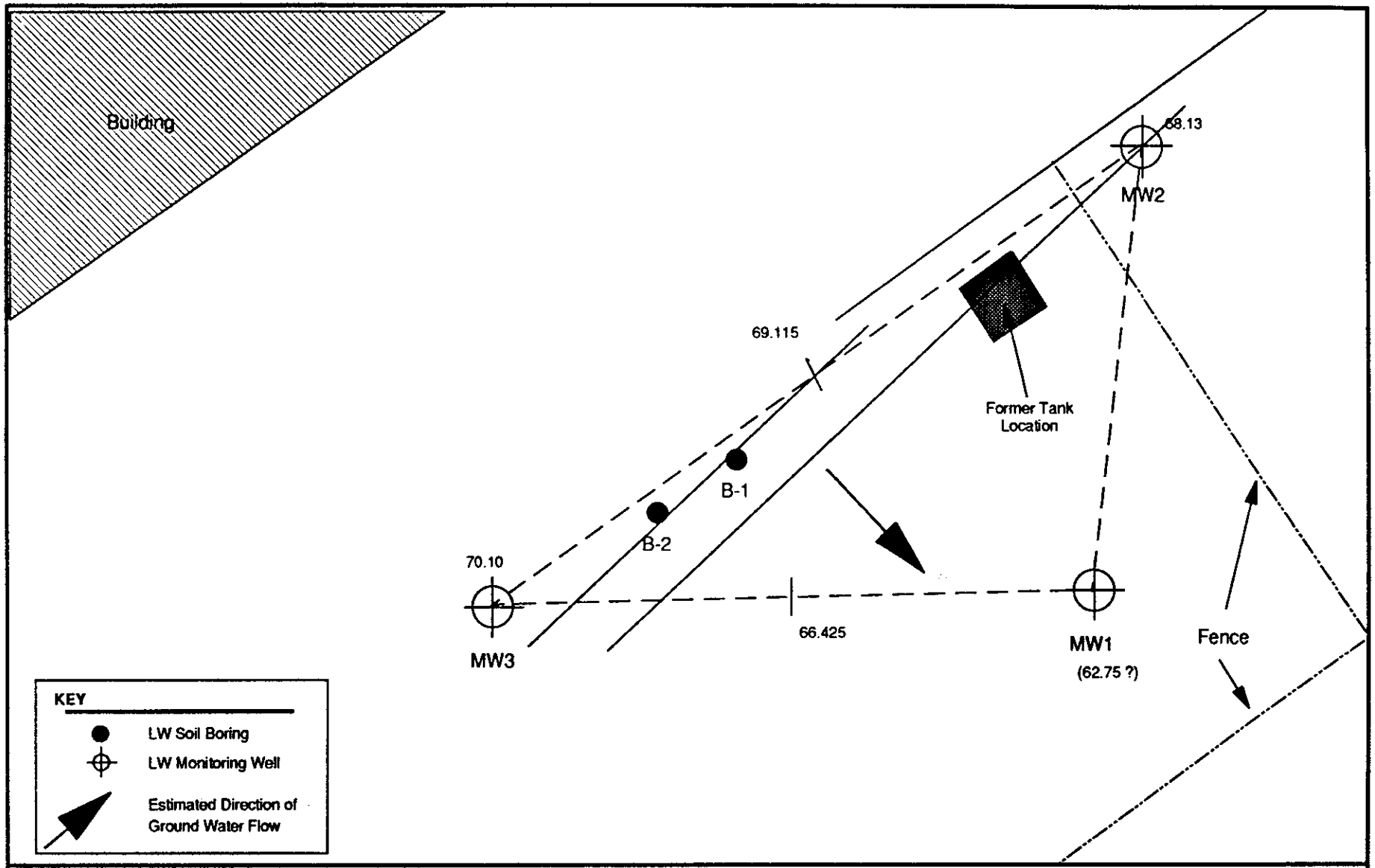
FIGURE 5

GROUND WATER ELEVATIONS - JANUARY 22, 1992

BECK ROOFING

HAYWARD, CALIFORNIA

CLEMENT
INTERNATIONAL CORPORATION



Scale 1" = 20'

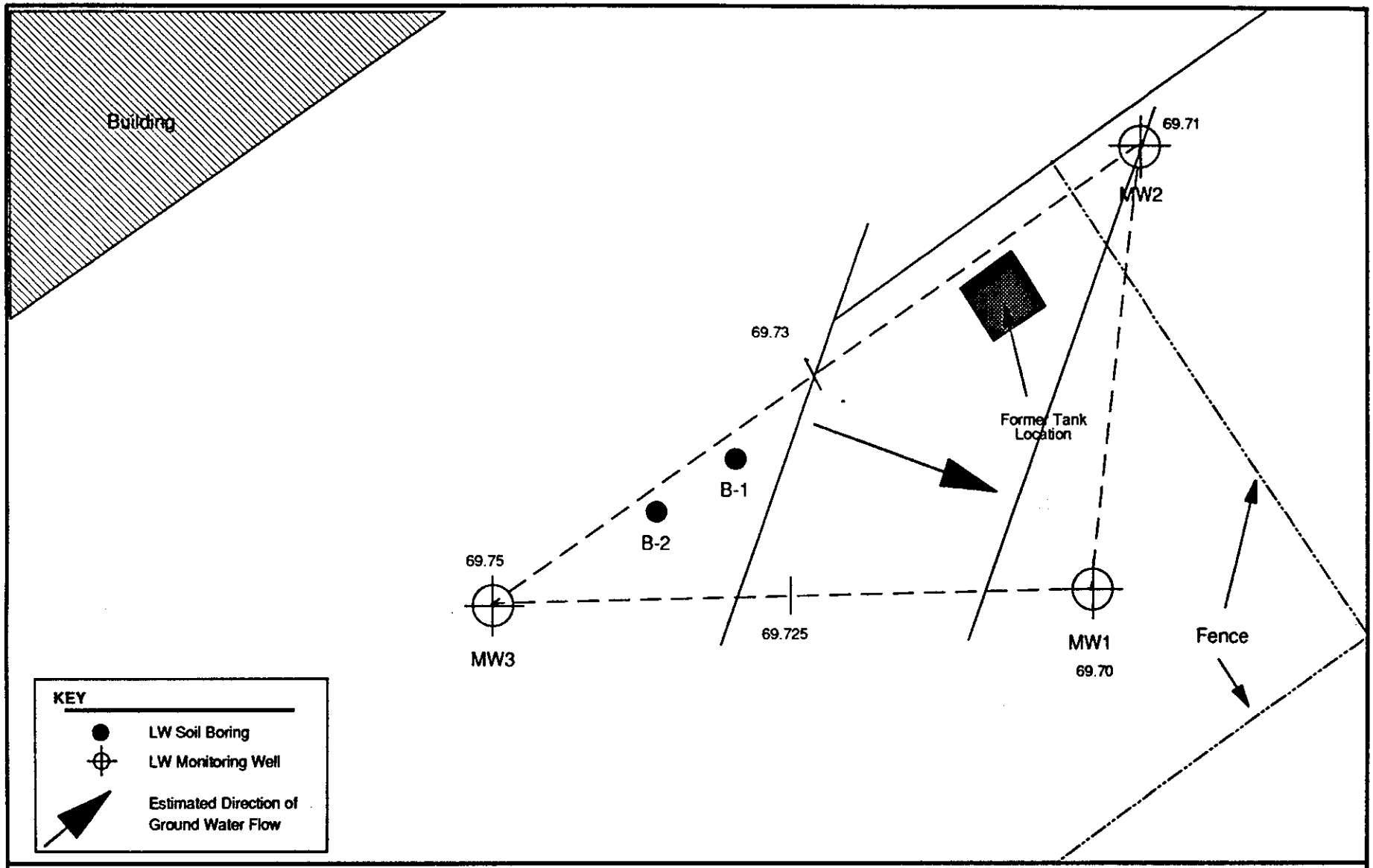
CLEMENT
INTERNATIONAL CORPORATION

FIGURE 6

GROUND WATER ELEVATIONS - FEBRUARY 24, 1992

BECK ROOFING

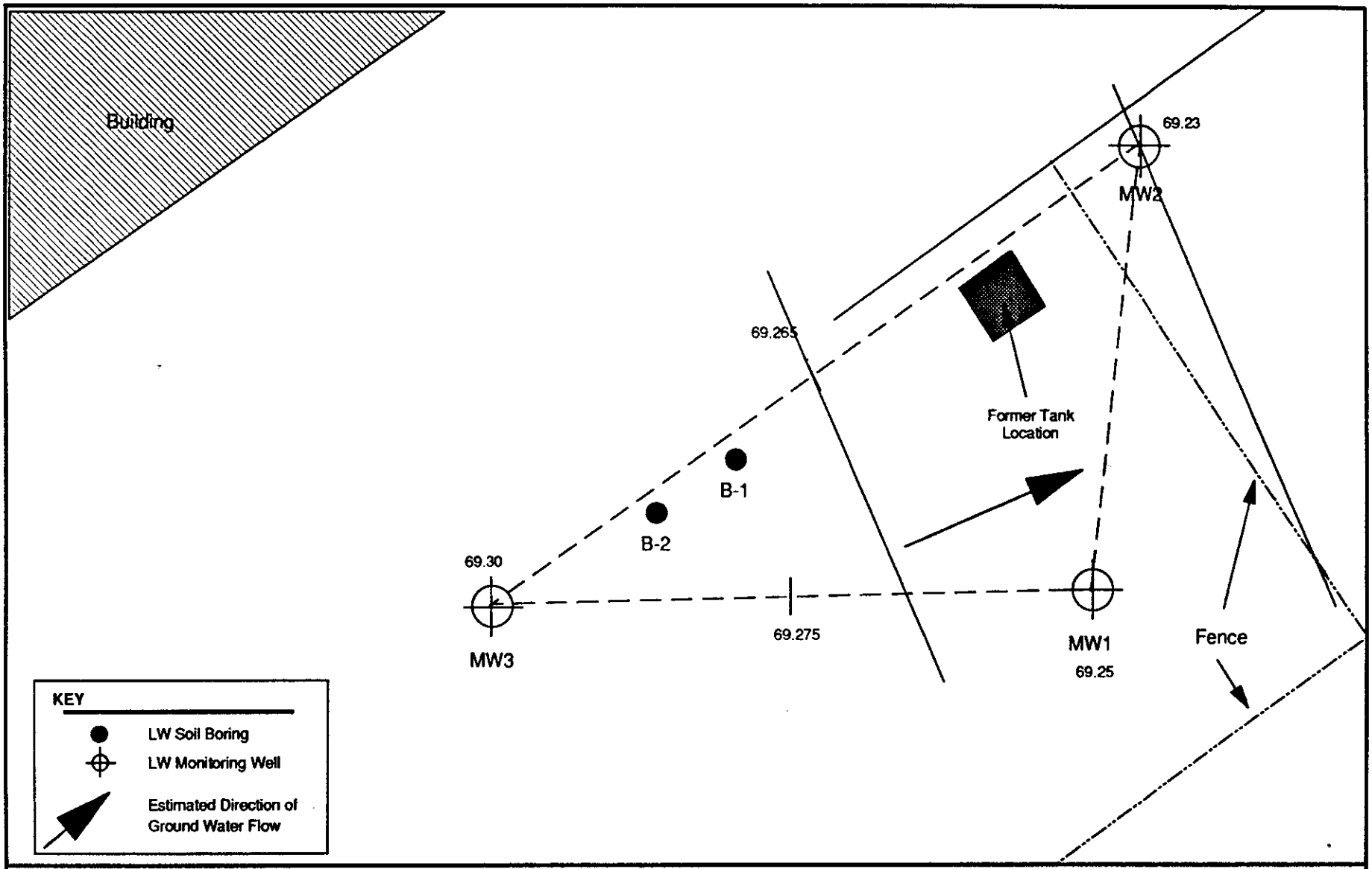
HAYWARD, CALIFORNIA



Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

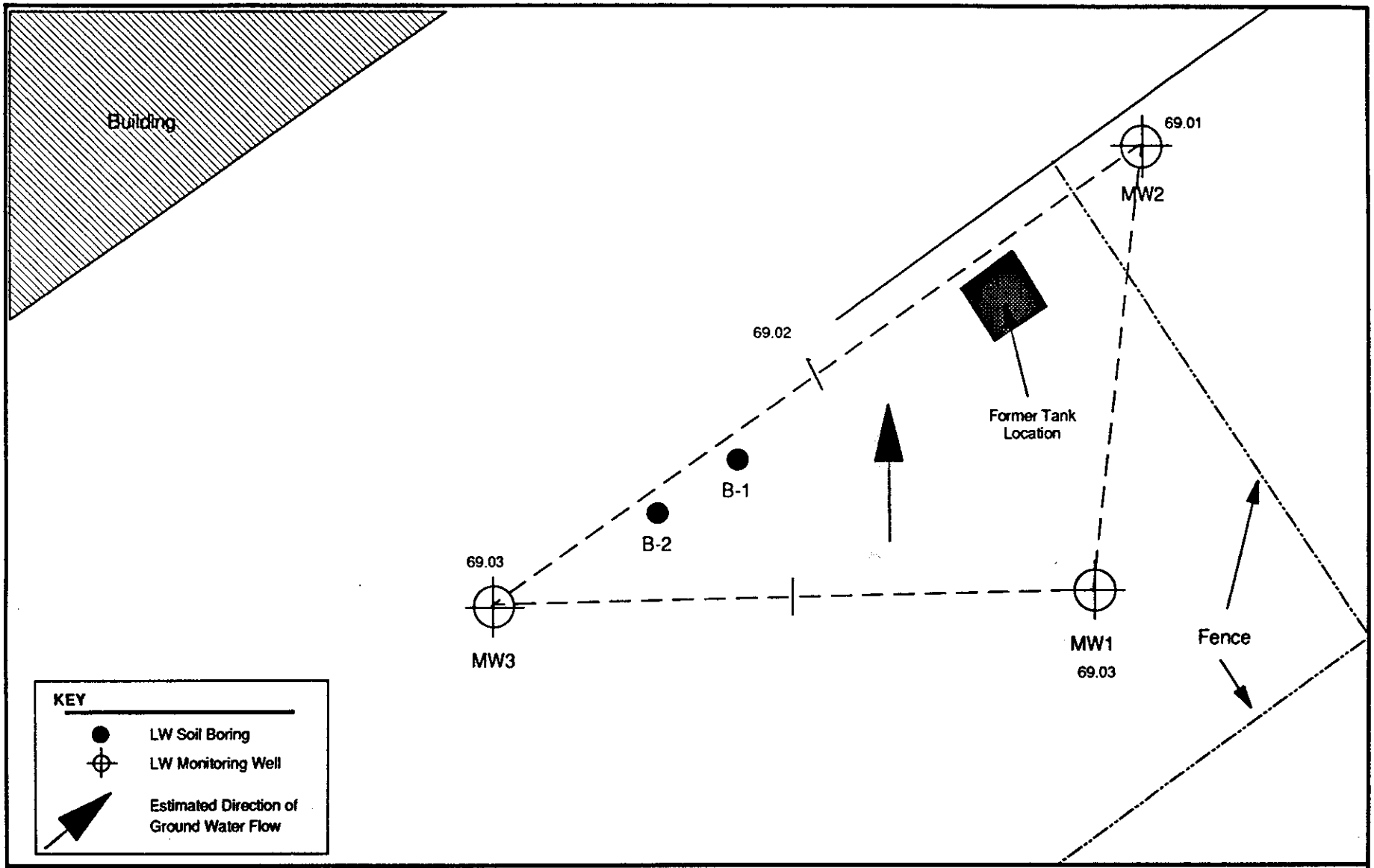
FIGURE 7
GROUND WATER ELEVATIONS - JUNE 16, 1992
BECK ROOFING
HAYWARD, CALIFORNIA



Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

FIGURE 8
GROUND WATER ELEVATIONS - JULY 15, 1992
BECK ROOFING
HAYWARD, CALIFORNIA

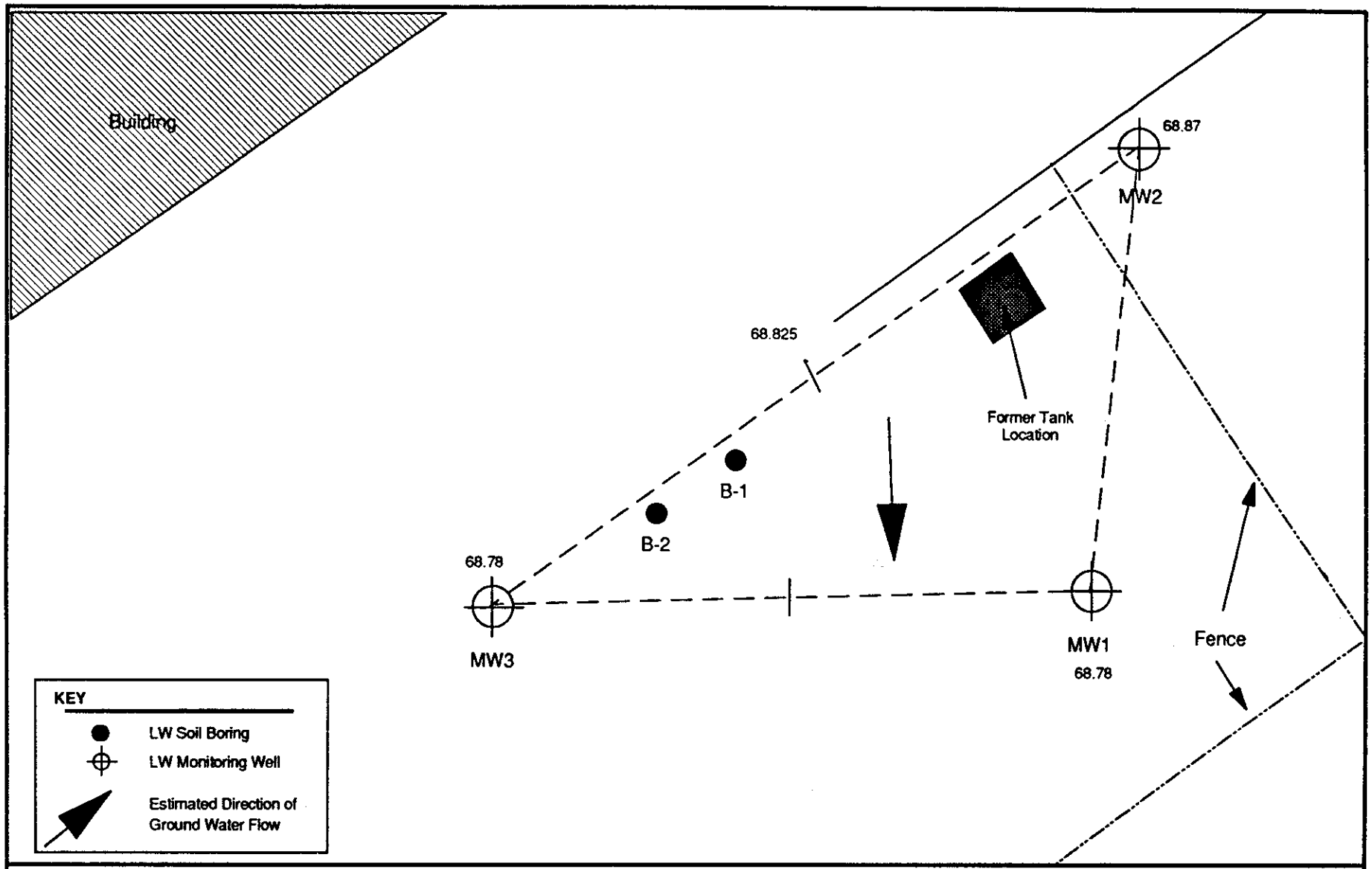


Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

FIGURE 9
GROUND WATER ELEVATIONS - JULY 28, 1992
BECK ROOFING
HAYWARD, CALIFORNIA

N

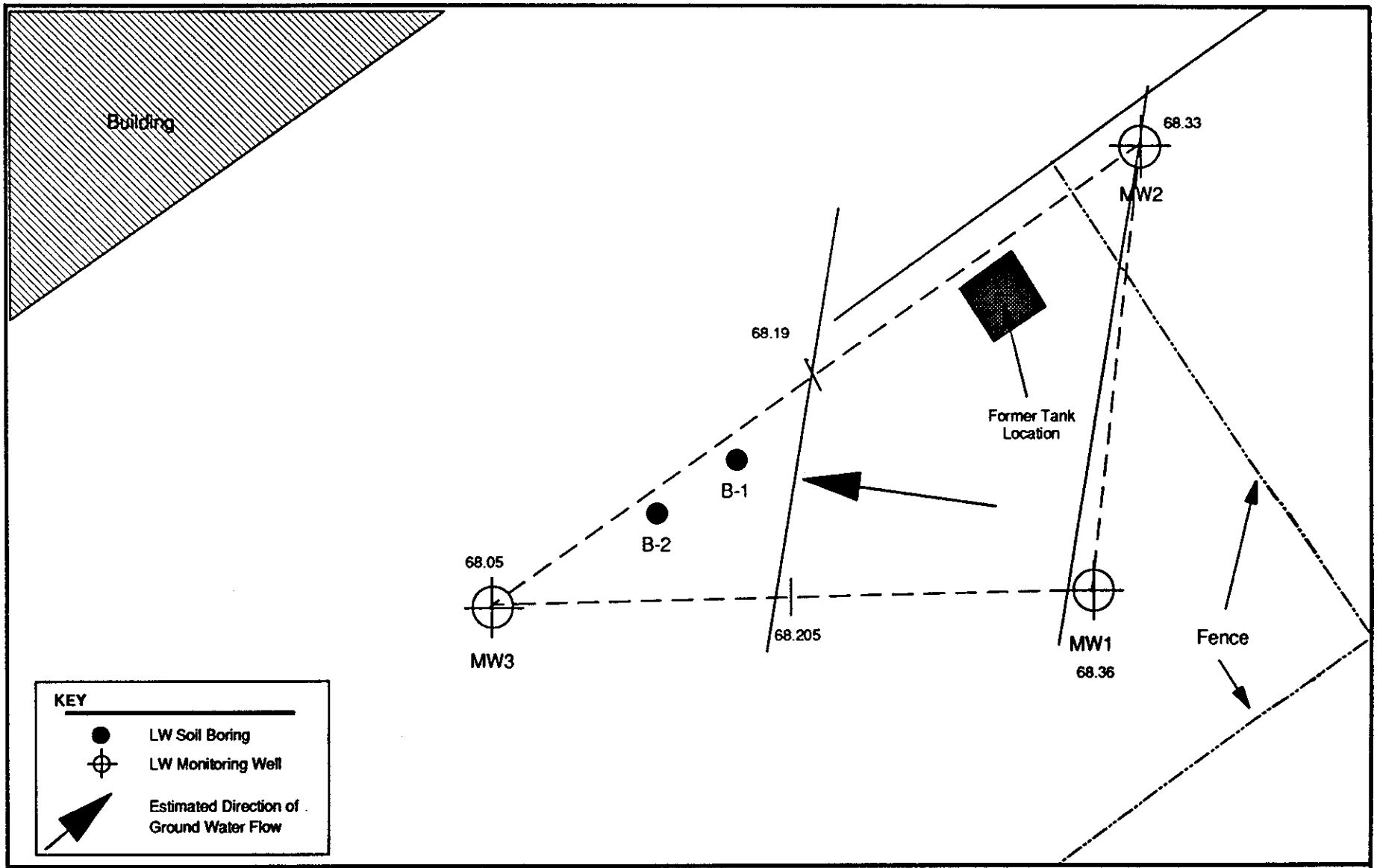


Scale 1" = 20'

CLEMENT
INTERNATIONAL CORPORATION

FIGURE 10
GROUND WATER ELEVATIONS - AUGUST 13, 1992
BECK ROOFING
HAYWARD, CALIFORNIA

N



Scale 1" = 20"

FIGURE 11

GROUND WATER ELEVATIONS - SEPTEMBER 9, 1992

BECK ROOFING

HAYWARD, CALIFORNIA

CLEMENT

INTERNATIONAL CORPORATION

ATTACHMENT A

510 581 1079

B C Analytical

1255 Powell Street
Emeryville, CA 94608
510/428-2300
Fax: 510/547-3643

ANALYTICAL REPORT

LOG NO: E92-06-374

Received: 16 JUN 92

Mailed: JUL 06 1992

Mr. Peter Barrett
Clement Associates
160 Spear Street, Suite 1380
San Francisco, California 94105

Project: 2116

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
06-374-1	MW-3	16 JUN 92
06-374-2	MW-2	16 JUN 92
06-374-3	MW-1	16 JUN 92

PARAMETER	06-374-1	06-374-2	06-374-3
Organic Lead, mg/L	<0.5	<0.5	<0.5
Aromatic Hydrocarbons			
Date Analyzed	06.30.92	06.30.92	06.30.92
Dilution Factor, Times	10	1	1
Benzene, ug/L	770	7.7	0.5
Ethylbenzene, ug/L	61	<0.5	<0.5
Toluene, ug/L	<5	<0.5	<0.5
Total Xylene Isomers, ug/L	240	<0.5	<0.5
TPH - Volatile Hydrocarbons			
Date Analyzed	06.30.92	06.30.92	06.30.92
Dilution Factor, Times	10	1	1
C6 to C14 (as gasoline), ug/L	4900	<50	<50
Approximate Character, .	GASOLINE	NO PATTERN	NO PATTERN

Edward Wilson, Laboratory Director

BCA

: ORDER PLACED FOR CLIENT: Clement Associates 9206374 :
: BC ANALYTICAL : EMVL LAB : 11:27:46 06 JUL 1992 - P. 1 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.... ANALYZED	METHOD.....	EQUIP.	BATCH	ID.NO
9206374*1	MW-3	PB,ORG	06.18.92	LUFT	514-02	9217	7036
		TPHG,BTEX	06.30.92	5030/8015	516-19	92188	7867
		TPHG.5030	06.30.92	5030/8015	516-19	92188	7867
9206374*2	MW-2	PB,ORG	06.18.92	LUFT	514-02	9217	7036
		TPHG,BTEX	06.30.92	5030/8015	516-19	92188	7867
		TPHG.5030	06.30.92	5030/8015	516-19	92188	7867
9206374*3	MW-1	PB,ORG	06.18.92	LUFT	514-02	9217	7036
		TPHG,BTEX	06.30.92	5030/8015	516-19	92188	7867
		TPHG.5030	06.30.92	5030/8015	516-19	92188	7867

***

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9206374

DATE REPORTED : 07/06/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Organic Lead	06.18.92	9217	1.9	2.0	mg/L	95

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9206374

DATE REPORTED : 07/06/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE %DIFF
Organic Lead	06.18.92	9217	1.7	1.7	mg/L	0

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9206374

DATE REPORTED : 07/06/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
Organic Lead	06.18.92	9217	1.7	2.0	<0.5	mg/L	85

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9206374

DATE REPORTED : 07/06/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Organic Lead	06.18.92	9217	0	1	mg/kg	LUFT

CHAIN OF CUSTODY RECORD

BCA Log Number 9206374

Client name	Clement	Project or PO#	2116
Address	160 Spear St Suite 1380	Phone #	(415) 882-3043
City, State, Zip	SF CA 94105	Report attention	Peter Barrett

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by S. Polston — Sample description	Number of containers	TPH as GAS + BTEX	Organic Lead					Hazardous sample Special handling required	Remarks
1	6/16/92	1159	GW	mw-3	4	X	X					X	* please filter
2	2	1230		mw-2	4	X	X					X	
3	1	1300		mw-1	4	X	X					X	

	Signature	Print Name	Company	Date	Time
Relinquished by		Scott Polston	BCA	6/16/92	1351
Received by		Stephen Jones	BCA	6/16/92	1352
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

B C ANALYTICAL

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

B C Analytical

1255 Powell Street
Emeryville, CA 94608
510/428-2300
Fax: 510/547-3643

ANALYTICAL REPORT

LOG NO: E92-07-282

Received: 15 JUL 92

Mailed: JUL 29 1992

Mr. Peter Barrett
Clement Associates
160 Spear Street, Suite 1380
San Francisco, California 94105

Project: 2116

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
07-282-1	W-2	15 JUL 92
07-282-2	W-3	15 JUL 92
07-282-3	W-1	15 JUL 92

PARAMETER	07-282-1	07-282-2	07-282-3
Organic Lead, mg/L	<0.5	<0.5	<0.5
Date Filtered	07.22.92	07.22.92	07.22.92
Aromatic Hydrocarbons			
Date Analyzed	07.17.92	07.18.92	07.17.92
Dilution Factor, Times	1	10	1
Benzene, ug/L	24	840	1.3
Ethylbenzene, ug/L	<0.5	85	<0.5
Toluene, ug/L	<0.5	10	<0.5
Total Xylene Isomers, ug/L	<0.5	290	<0.5
TPH - Volatile Hydrocarbons			
Date Analyzed	07.17.92	07.18.92	07.17.92
Dilution Factor, Times	1	10	1
C6 to C14 (as gasoline), ug/L	50	5500	<50
Approximate Character, .	SINGLEPEAK	GASOLINE	NO PATTERN

Edward Wilson, Laboratory Director

BCA

ORDER PLACED FOR CLIENT: Clement Associates 9207282 :
BC ANALYTICAL : EMVL LAB : 13:08:47 29 JUL 1992 - P. 1 :

AMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.... ANALYZED	METHOD.....	EQUIP.	BATCH	ID.NO
207282*1	W-2	PB,ORG	07.24.92	CA-DOHS	514-02	9218	7391
		TPHG,BTEX	07.17.92	5030/8015	516-19	92210	7258
		TPHG.5030	07.17.92	5030/8015	516-19	92210	7258
		FILT	07.22.92			92774	7701
207282*2	W-3	PB,ORG	07.24.92	CA-DOHS	514-02	9218	7391
		TPHG,BTEX	07.17.92	5030/8015	516-19	92210	7258
		TPHG.5030	07.18.92	5030/8015	516-19	92210	7258
		FILT	07.22.92			92774	7701
9207282*3	W-1	PB,ORG	07.24.92	CA-DOHS	514-02	9218	7391
		TPHG,BTEX	07.17.92	5030/8015	516-19	92210	7867
		TPHG.5030	07.17.92	5030/8015	516-19	92210	7258
		FILT	07.22.92			92774	7701

***

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9207282

DATE REPORTED : 07/29/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Organic Lead	07.24.92	9218	1.9	2.0	mg/L	95
Aromatic Hydrocarbons						
Benzene	07.17.92	92210	19	20	ug/L	95
Ethylbenzene	07.17.92	92210	18	20	ug/L	90
Toluene	07.17.92	92210	19	20	ug/L	95
Total Xylene Isomers	07.17.92	92210	57	60	ug/L	95
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	07.17.92	92210	240	220	ug/L	109

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9207282

DATE REPORTED : 07/29/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE %DIFF
Organic Lead	07.24.92	9218	1.8	1.8	mg/L	0
Aromatic Hydrocarbons						
Benzene	07.17.92	92210	42	39	ug/L	7
Ethylbenzene	07.17.92	92210	19	18	ug/L	5
Toluene	07.17.92	92210	20	19	ug/L	5
Total Xylene Isomers	07.17.92	92210	58	53	ug/L	9
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	07.17.92	92210	290	260	ug/L	11

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9207282

DATE REPORTED : 07/29/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
Organic Lead	07.24.92	9218	1.8	2.0	<0.5	mg/L	90
Aromatic Hydrocarbons							
Benzene	07.17.92	92210	40.5	44	24	ug/L	83
Ethylbenzene	07.17.92	92210	18.5	20	<0.5	ug/L	93
Toluene	07.17.92	92210	19.5	20	<0.5	ug/L	98
Total Xylene Isomers	07.17.92	92210	55.5	60	<0.5	ug/L	93
TPH - Volatile Hydrocarbons							
C6 to C14 (as gasoline)	07.17.92	92210	275	270	50	ug/L	102

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9207282

DATE REPORTED : 07/29/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Organic Lead	07.24.92	9218	0	0.5	mg/L	CA-DOHS
Aromatic Hydrocarbons						
Date Analyzed	07.17.92	92210	7.17.92	NA	Date	5030/8015
Benzene	07.17.92	92210	0	0.5	ug/L	5030/8015
Ethylbenzene	07.17.92	92210	0	0.5	ug/L	5030/8015
Toluene	07.17.92	92210	0.095	0.5	ug/L	5030/8015
Total Xylene Isomers	07.17.92	92210	0.12	0.5	ug/L	5030/8015
TPH - Volatile Hydrocarbons						
Date Analyzed	07.17.92	92210	7.17.92	NA	Date	5030/8015
C6 to C14 (as gasoline)	07.17.92	92210	0.67	50	ug/L	5030/8015

CHAIN OF CUSTODY RECORD

BCA Log Number 9207282

Client name: Clement	Project or PO#: 2156
Address: 160 Spear St	Phone #: 882-3043
City, State, Zip: SF CA 94105	Report attention: Peter Barrett

Sampled by: S. Poston

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	TPH as Gas + BTEX	Oil & Grease + Lead	Hazardous sample Special handling required	Remarks
-1	7/15/92	1104	GW	W-2	4	X	X		* Please
-2	"	1133	"	W-3	4	X	X		Filter
-3	"	1157	"	W-1	4	X	X		

	Signature	Print Name	Company	Date	Time
Relinquished by		Scott Poston	BCA	7/15/92	1336
Received by	Litvak	J. Litvak	BCA	7/15/92	1336
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

B C ANALYTICAL

☐ 1255 Powell Street, Emeryville, CA 94608 (510) 428-2300
☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: WW—Wastewater SU—Surface Water SO—Soil SL—Sludge PE—Petroleum OT—Other NA—Nonaqueous GW—Groundwater AQ—Aqueous

B C Analytical

1255 Powell Street
Emeryville, CA 94608
510/428-2300
Fax: 510/547-3643

ANALYTICAL REPORT

LOG NO: E92-08-295

Received: 13 AUG 92

Mailed: AUG 31 1992

Mr. Peter Barrett
Clement Associates
160 Spear Street, Suite 1380
San Francisco, California 94105

Purchase Order: 2116

Project: Beck Roofing

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
08-295-1	MW-2	13 AUG 92
08-295-2	MW-1	13 AUG 92
08-295-3	MW-3	13 AUG 92

PARAMETER	08-295-1 [2]	08-295-2 [1]	08-295-3 [3]
Organic Lead, mg/L	<0.5	<0.5	<0.5
Aromatic Hydrocarbons			
Date Analyzed	08.21.92	08.21.92	08.21.92
Dilution Factor, Times	1	1	20
Benzene, ug/L	6.5	<0.5	1100
Ethylbenzene, ug/L	<0.5	<0.5	97
Toluene, ug/L	<0.5	<0.5	<10
Total Xylene Isomers, ug/L	<0.5	<0.5	270
TPH - Volatile Hydrocarbons			
Date Analyzed	08.21.92	08.21.92	08.21.92
Dilution Factor, Times	1	1	1
C6 to C14 (as gasoline), ug/L	<50	<50	6600
Approximate Character, .	NO PATTERN	NO PATTERN	GASOLINE

Edward Wilson, Laboratory Director

BCA

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.... ANALYZED	METHOD.....	EQUIP.	BATCH	ID.NO
08295*1	MW-2	PB,ORG	08.25.92	LUFT	514-02	9219	7036
		TPHG,BTEX	08.21.92	5030/8020	516-23	92241	7258
		TPHG.5030	08.21.92	5030/8015	516-23	92241	7258
08295*2	MW-1	PB,ORG	08.25.92	LUFT	514-02	9219	7036
		TPHG,BTEX	08.21.92	5030/8020	516-23	92241	8302
		TPHG.5030	08.21.92	5030/8015	516-23	92241	8302
08295*3	MW-3	PB,ORG	08.25.92	LUFT	514-02	9219	7036
		TPHG,BTEX	08.21.92	5030/8020	516-23	92241	8302
		TPHG.5030	08.21.92	5030/8015	516-23	92241	8302

***

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9208295

DATE REPORTED : 08/28/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Organic Lead	08.25.92	9219	2.00	2.00	mg/L	100
Aromatic Hydrocarbons						
Benzene	08.21.92	92241	20.2	20.0	ug/L	101
Ethylbenzene	08.21.92	92241	20.5	20.0	ug/L	103
Toluene	08.21.92	92241	21.0	20.0	ug/L	105
Total Xylene Isomers	08.21.92	92241	65.8	60.0	ug/L	110
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	08.21.92	92241	228	222	ug/L	103

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9208295

DATE REPORTED : 08/28/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE ZDIFF
Organic Lead	08.25.92	9219	1.8	1.9	mg/L	5
Aromatic Hydrocarbons						
Benzene	08.21.92	92241	21.3	20.7	ug/L	3
Ethylbenzene	08.21.92	92241	21.5	21.0	ug/L	2
Toluene	08.21.92	92241	22.5	21.7	ug/L	4
Total Xylene Isomers	08.21.92	92241	70.0	66.9	ug/L	5
TH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	08.21.92	92241	240	236	ug/L	2

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9208295

DATE REPORTED : 08/28/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
Organic Lead	08.25.92	9219	1.85	2.0	<0.5	mg/L	93
Aromatic Hydrocarbons							
Benzene	08.21.92	92241	21	20.0	<0.5	ug/L	105
Ethylbenzene	08.21.92	92241	21.25	20.0	<0.5	ug/L	106
Toluene	08.21.92	92241	22.1	20.0	<0.5	ug/L	111
Total Xylene Isomers	08.21.92	92241	68.45	60.0	<0.5	ug/L	114
BTEX - Volatile Hydrocarbons							
C6 to C14 (as gasoline)	08.21.92	92241	238	222	<50	ug/L	107

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9208295

DATE REPORTED : 08/28/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Organic Lead	08.25.92	9219	0	0.5	mg/L	LUFT
Aromatic Hydrocarbons						
Date Analyzed	08.21.92	92241	8.21.92	NA	Date	5030/8020
Benzene	08.21.92	92241	0	0.5	ug/L	5030/8020
Ethylbenzene	08.21.92	92241	0	0.5	ug/L	5030/8020
Toluene	08.21.92	92241	0.18	0.5	ug/L	5030/8020
Total Xylene Isomers	08.21.92	92241	0.19	0.5	ug/L	5030/8020
H - Volatile Hydrocarbons						
Date Analyzed	08.21.92	92241	8.21.92	NA	Date	5030/8015
C6 to C14 (as gasoline)	08.21.92	92241	0	50	ug/L	5030/8015

CHAIN OF CUSTODY RECORD

BCA Log Number 9208295

Client name: Clement	Project or PO#: 2116
Address: 160 Spear st	Phone #: (415) 882-3043
City, State, Zip: SF Ca 94105	Report attention: Peter Barrett

Sampled by: S Polstun

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	Analyses required: Btex + TPH as Gas	Oil & Grease	Hazardous sample Special handling required	Remarks
1	8/13/92	1300	GW	MW-2	4	X	X	X	please filter if
2	"	1318	"	MW-1	4	X	X	X	cloudy
3	↓	1332	↓	MW-3	4	X	X	X	

	Signature	Print Name	Company	Date	Time
Relinquished by		Scott Polstun	BCA	8/13/92	
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory		Stephen Jones	BCA	8/13/92	1630

B C ANALYTICAL

- ☐ 1255 Powell Street, Emeryville, CA 94608 (510) 428-2300
- ☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
- ☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: WW—Wastewater SU—Surface Water SO—Soil SL—Sludge PE—Petroleum OT—Other NA—Nonaqueous GW—Groundwater AQ—Aqueous

: ORDER PLACED FOR CLIENT: Clement Associates 9209181 :
: BC ANALYTICAL : EMVL LAB : 17:35:28 24 SEP 1992 - P. 1 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.... ANALYZED	METHOD.....	EQUIP.	BATCH	ID.NO
9209181*1	MW-1	PB,ORG	09.14.92	LUFT	514-02	9220	7036
		TPHG,BTEX	09.11.92	5030/8020	516-19	92253	7258
		TPHG.5030	09.11.92	5030/8015	516-19	92253	7258
9209181*2	MW-2	PB,ORG	09.14.92	LUFT	514-02	9220	7036
		TPHG,BTEX	09.11.92	5030/8020	516-19	92253	7258
		TPHG.5030	09.11.92	5030/8015	516-19	92253	7258
9209181*3	MW-3	PB,ORG	09.14.92	LUFT	514-02	9220	7036
		TPHG,BTEX	09.14.92	5030/8020	516-19	92254	8302
		TPHG.5030	09.14.92	5030/8015	516-19	92254	8302

***

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9209181

DATE REPORTED : 09/24/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Organic Lead	09.14.92	9220	1.72	2.00	mg/L	86
Aromatic Hydrocarbons						
Benzene	09.11.92	92253	15.1	20.0	ug/L	76
Ethylbenzene	09.11.92	92253	16.4	20.0	ug/L	82
Toluene	09.11.92	92253	16.7	20.0	ug/L	84
Total Xylene Isomers	09.11.92	92253	52.4	60.0	ug/L	87
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	09.11.92	92253	241	222	ug/L	109
Aromatic Hydrocarbons						
Benzene	09.14.92	92254	20.1	20.0	ug/L	101
Ethylbenzene	09.14.92	92254	20.9	20.0	ug/L	105
Toluene	09.14.92	92254	21.6	20.0	ug/L	108
Total Xylene Isomers	09.14.92	92254	67.4	60.0	ug/L	112
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	09.14.92	92254	258	222	ug/L	116

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9209181

DATE REPORTED : 09/24/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE %DIFF
Organic Lead	09.14.92	9220	1.65	1.65	mg/L	0
Aromatic Hydrocarbons						
Benzene	09.11.92	92253	89.3	89.6	ug/L	0
Ethylbenzene	09.11.92	92253	31.7	31.5	ug/L	1
Toluene	09.11.92	92253	19.9	19.7	ug/L	1
Total Xylene Isomers	09.11.92	92253	58.6	57.7	ug/L	2
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	09.11.92	92253	644	652	ug/L	1
Aromatic Hydrocarbons						
Benzene	09.14.92	92254	20.0	19.8	ug/L	1
Ethylbenzene	09.14.92	92254	20.8	20.8	ug/L	0
Toluene	09.14.92	92254	21.6	21.5	ug/L	0
Total Xylene Isomers	09.14.92	92254	67.2	67.3	ug/L	0
TPH - Volatile Hydrocarbons						
C6 to C14 (as gasoline)	09.14.92	92254	254	258	ug/L	2

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9209181

DATE REPORTED : 09/24/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
Organic Lead	09.14.92	9220	1.65	2.00	<0.5	mg/L	83
Aromatic Hydrocarbons							
Benzene	09.11.92	92253	89.45	101	81	ug/L	SOR
Ethylbenzene	09.11.92	92253	31.6	36.7	17	ug/L	74
Toluene	09.11.92	92253	19.8	23.3	3.3	ug/L	83
Total Xylene Isomers	09.11.92	92253	58.15	65.9	5.9	ug/L	87
TPH - Volatile Hydrocarbons							
C6 to C14 (as gasoline)	09.11.92	92253	648	643	420	ug/L	102
Aromatic Hydrocarbons							
Benzene	09.14.92	92254	19.9	20.0	<0.5	ug/L	100
Ethylbenzene	09.14.92	92254	20.8	20.0	<0.5	ug/L	104
Toluene	09.14.92	92254	21.55	20.0	<0.5	ug/L	108
Total Xylene Isomers	09.14.92	92254	67.25	60.0	<0.5	ug/L	112
TPH - Volatile Hydrocarbons							
C6 to C14 (as gasoline)	09.14.92	92254	256	222	<50	ug/L	115

SOR = Spike Out of Range
(relative to high sample concentration)

BC ANALYTICAL

BATCH QC REPORT
ORDER: E9209181

DATE REPORTED : 09/24/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Organic Lead	09.14.92	9220	0	0.5	mg/L	LUFT
Aromatic Hydrocarbons						
Date Analyzed	09.11.92	92253	9.11.92	NA	Date	5030/8020
Benzene	09.11.92	92253	0	0.5	ug/L	5030/8020
Ethylbenzene	09.11.92	92253	0	0.5	ug/L	5030/8020
Toluene	09.11.92	92253	0.27	0.5	ug/L	5030/8020
Total Xylene Isomers	09.11.92	92253	0.114	0.5	ug/L	5030/8020
TPH - Volatile Hydrocarbons						
Date Analyzed	09.11.92	92253	9.11.92	NA	Date	5030/8015
C6 to C14 (as gasoline)	09.11.92	92253	4.7	50	ug/L	5030/8015
Aromatic Hydrocarbons						
Date Analyzed	09.14.92	92254	9.14.92	NA	Date	5030/8020
Benzene	09.14.92	92254	0	0.5	ug/L	5030/8020
Ethylbenzene	09.14.92	92254	0	0.5	ug/L	5030/8020
Toluene	09.14.92	92254	0.27	0.5	ug/L	5030/8020
Total Xylene Isomers	09.14.92	92254	0.93	0.5	ug/L	5030/8020
TPH - Volatile Hydrocarbons						
Date Analyzed	09.14.92	92254	9.14.92	NA	Date	5030/8015
C6 to C14 (as gasoline)	09.14.92	92254	0	50	ug/L	5030/8015

CHAIN OF CUSTODY RECORD

BCA Log Number 920918

Client name	Project or PO#
Clement	
Address	**Phone #**
160 Spear ST Suite 1380	
City, State, Zip	**Report attention**
SF CA 94105-1535	Mr. Peter Bennett

Sampled by M. Stinar, S. Polston

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	TPH as Gas + BTEX	Organic Lead	Hazardous sample Special handling required	Remarks
2	9/5/92		GW	MW-2	4	X	X		
1	↓		↓	MW-1	4	X	X		
3	↓		↓	MW-3	4	X	X		

Analyses required

	Signature	Print Name	Company	Date	Time
Relinquished by		Scott Polston	BCA	9/9/92	1310
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory		G. Goyena	BCA	9/9/92	1310

B C ANALYTICAL

☒ 1255 Powell Street, Emeryville, CA 94608 (510) 428-2300
☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: WW—Wastewater SU—Surface Water SO—Soil SL—Sludge PE—Petroleum OT—Other NA—Nonaqueous GW—Groundwater AQ—Aqueous

ATTACHMENT B

BC Brown and Caldwell Consultants

Well No. MW-1

GROUNDWATER SAMPLE COLLECTION RECORD

Project Name: Clement Job No. 2110 Date: 6/16/92

Location: Beck Roofing

Samplers Name: Scott Polstar

Weather Conditions: Sunny

1. WATER LEVEL DATA: (from ToC)

ToC Elevation (from LS) _____

Water Table Elev. _____

Tape Corr. (TC) _____

Well Dia. _____

a. Depth to water (ft) = 30.31

b. Total Well Depth = 36.8

c. Length of Water Column = 6.49 (b. - a.)

d. Casing Volume = 1.03 [c. x (gal/ft casing)]

e. Length of filter pack = _____

f. Filter pack volume = _____ (e. x (gal/ft filter pack)

g. TOTAL WELL VOLUME = _____ (d. + f.)

2-inch casing	=	0.16 gal/ft
4-inch casing	=	0.65 gal/ft
10-inch hole filter pack	=	1.21 gal/ft
12-inch hole filter pack	=	1.8 gal/ft
6-inch casing	=	1.47 gal/ft

2. WELL PURGING DATA:

a. Purge Method Hand bail

b. Required Purge Volume (@ _____ gallons per well volume) = _____

c. Field Testing; Equipment Used _____

Volume Removed	Time	T°	PH	Spec. Conductivity	Turbidity	Color/Description
1.25 g	1250	18.9	7.01	630		
2.25 g	1255	18.9	7.19	630		
3.25 g	1258	18.9	7.22	630		

3. SAMPLE COLLECTION: Method Grab Container 40ml VOA 500ml plastic Preservation HCl non

Analysis TPH as GAS + BTEX organic lead

COMMENTS, REMARKS

Sample Time = 1300

BC Brown and Caldwell Consultants

Well No. MW-2

GROUNDWATER SAMPLE COLLECTION RECORD

Project Name: Clement Job No. 2116 Date: 6/16/92

Location: Beck Roofing

Samplers Name: S. Poiston

Weather Conditions: SUNNY

1. WATER LEVEL DATA: (from ToC)

ToC Elevation (from LS) _____

Water Table Elev. _____

Tape Corr. (TC) _____

Well Dia. _____

a. Depth to water (ft) = 30.42'

b. Total Well Depth = 36.9'

c. Length of Water Column = 6.48 (b. - a.)

d. Casing Volume = 1.03 [c. x (gal/ft casing)]

e. Length of filter pack = _____

f. Filter pack volume = _____ (e. x (gal/ft filter pack)

g. TOTAL WELL VOLUME = _____ (d. + f.)

2-inch casing	=	0.16 gal/ft
4-inch casing	=	0.65 gal/ft
10-inch hole filter pack	=	1.21 gal/ft
12-inch hole filter pack	=	1.8 gal/ft
6-inch casing	=	1.47 gal/ft

2. WELL PURGING DATA:

a. Purge Method Hand bail

b. Required Purge Volume (@ ___ gallons per well volume) = 3.09 = 3 casing vol

c. Field Testing; Equipment Used _____

Volume Removed	Time	T°	PH	Spec. Conductivity	Turbidity	Color/Description
1.25 g	1221	19.2	7.00	840		
2.25 g	1224	18.9	6.84	830		
3.25 g	1227	18.5	6.80	840		

3. SAMPLE COLLECTION: Method TPHA Grab Container 1/2 ℓ plastic (3) 40 mL VOA Preservation none HCl

Analysis TPHd c Gas + BTEX Organic lead

COMMENTS, REMARKS

Sample time = 1230

BC Brown and Caldwell Consultants

Well No. MW-3

GROUNDWATER SAMPLE COLLECTION RECORD

Project Name: Clement Job No. 2116 Date: 6/16/92

Location: Becks Roofing

Samplers Name: Scott Polston

Weather Conditions: Sunny

1. WATER LEVEL DATA: (from ToC)

ToC Elevation (from LS) _____

Water Table Elev. _____

Tape Corr. (TC) _____

Well Dia. 2.0"

a. Depth to water (ft) = 30.25'

b. Total Well Depth = 34.45'

c. Length of Water Column = 4.2 (b. - a.)

d. Casing Volume = .672 [c. x (gal/ft casing)]

e. Length of filter pack = _____

f. Filter pack volume = _____ (e. x (gal/ft filter pack)

g. TOTAL WELL VOLUME = _____ (d. + f.)

2-inch casing	=	0.16 gal/ft
4-inch casing	=	0.65 gal/ft
10-inch hole filter pack	=	1.21 gal/ft
12-inch hole filter pack	=	1.8 gal/ft
6-inch casing	=	1.47 gal/ft

2. WELL PURGING DATA:

a. Purge Method Hand Bailed

b. Required Purge Volume (@ .672 gallons per well volume) = 2.02 gal

c. Field Testing; Equipment Used _____

Volume Removed	Time	T°C	PH	Spec. Conductivity	Turbidity	Color/Description
.75	1138	19.7	6.20	920		cloudy
1.50	1143	19.6	6.80	910		
2.25	1146	19.5	6.78	900		

3. SAMPLE COLLECTION: Method Grab Container (3) 40mL VOA/1 2L/p Preservation HCl/none

Analysis TPHBS GAS + Btex ORganic Pb

COMMENTS, REMARKS

Sample time 11:59

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7/15/92

Well ID. : W-1

Pump Type : Hand Bailed
Dedicated/Portable (circle one)

Chain of Custody Doc. # :

Depth of casing : 36.8

Casing Diameter : 2.0

Depth to water : 30.76

Volume Factor : .17

Water In Casing (ft) : 6.04'

Gallons / Casing Vol. : 1.0 gal/vol

Time Pump on : 1148

Initial Flow Rate
Q = gpm : ~~1.0~~

Time Pump Off :

Meas. by grad. cylinder ~~bucket~~
flow meter-other :

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O²	eh	DTW
1149	N/A	1.0	7.06	19.2	760				
1152		2.0	6.76	18.6	650				
1154		3.0	6.79	18.5	650				
	↓								

Meter	Serial #	Calibrated
pH	#222204	(yes) / no
S.C.	8404054	(yes) / no
Redox		yes / no
D.O²		yes / no
H²O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T °C			
Final S C			

Samplers Initials : SP

Sample I.D. :(verify) W-1

Time Collected : 1157

Requested Analyses : TPH as Gas + BTEX
org. Pb

Sample Container (Size/Preserv.) : (3) 40ml vial / HCl
(1) 500ml plastic / no pres

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7/15/92 | Well ID. : W-2

Pump Type : Hand Bail | Chain of Custody Doc. # :
Dedicated/Portable (circle one)

Depth of casing : 36.9 | Casing Diameter : 2.0

Depth to water : ~~36~~ 30.9 | Volume Factor : .17

Water in Casing (ft) : 6.0' | Gallons / Casing Vol. : 1.0 gal/vol

Time Pump on : 1157 | Initial Flow Rate Q = gpm : N/A

Time Pump Off : | Meas. by grad. cylinder-bucket
flow meter-other :

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O.^{2}	eh	DTW
1058	N/A	1.0	6.89	19.0	1100				
1100		2.0	6.80	18.9	1100				
1102		3.0	6.62	19.1	1000				

Meter	Serial #	Calibrated
pH	0222204	yes / no
S.C.	8904052	yes / no
Redox		yes / no
D.O.^{2}		yes / no
H^2O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T °C			
Final S C			

Samplers Initials : SP

Sample I.D. :(verify) W-2 | Time Collected : 1104

Requested Analyses : TPH as GAS + BTEX
ORG. Pb

Sample Container (Size/Preserv.) (3) 40ml VOA/HCl
(1) 500 ml plastic/no pres

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7/15/92 Well ID. : W-3

Pump Type : HAND BAIL Chain of Custody Doc. # : _____
Dedicated/Portable (circle one)

Depth of casing : 34.45' Casing Diameter : 2.0

Depth to water : 30.7' Volume Factor : .17

Water in Casing (ft) : 3.75' Gallons / Casing Vol. : .63 gal/vol

Time Pump on : 1125 Initial Flow Rate Q = gpm : —

Time Pump Off : _____ Meas. by grad. cylinder ~~bucket~~

flow meter-other : _____

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O²	eh	DTW
1127	N/A	.75	6.59	19.9	1100				
1128		1.5	6.59	19.7	1100				
1130		2.5	6.56	19.2	1100				

Meter	Serial #	Calibrated
pH	0222204	yes / no
S.C.	8904054	yes / no
Redox	_____	yes / no
D.O²	_____	yes / no
H²O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T °C			
Final S C			

Samplers Initials : SP

Sample I.D. :(verify) W-3 Time Collected : 1135

Requested Analyses : TPH as GAS & BTEX ORG. Pb

Sample Container (Size/Preserv.) (3) 40ml vial VOA/HCl (1) 500 ml plastic / nopres

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7.28.92 Well ID. : MW-1

Pump Type : Dedicated/Portable (circle one) Chain of Custody Doc. # :

Depth of casing : 36.91 Casing Diameter : 2"

Depth to water : 30.98 Volume Factor : .16

Water in Casing (ft) : Gallons / Casing Vol. :

Time Pump on : Initial Flow Rate Q = gpm :

Time Pump Off : Meas. by grad. cylinder-bucket flow meter-other :

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O^2	eh	DTW

Meter	Serial #	Calibrated
pH		yes / no
S.C.		yes / no
Redox		yes / no
D.O^2		yes / no
H^2O		yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials :

Sample I.D. :(verify) Time Collected :

Requested Analyses :

Sample Container (Size/Preserv.)

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7.28.92 Well ID. : MW-2

Pump Type : Dedicated/Portable (circle one) Chain of Custody Doc. # :

Depth of casing : ~~37 2 1/4~~ 37.19 Casing Diameter : 2"

Depth to water : 31.12 Volume Factor : .16

Water in Casing (ft) : Gallons / Casing Vol. :

Time Pump on : Initial Flow Rate Q = gpm :

Time Pump Off : Meas. by grad. cylinder-bucket flow meter-other :

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O.^{2}	eh	DTW

Meter	Serial #	Calibrated
pH		yes / no
S.C.		yes / no
Redox		yes / no
D.O.^{2}		yes / no
H^2O		yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials :

Sample I.D. :(verify) Time Collected :

Requested Analyses :

Sample Container (Size/Preserv.)

Ground Water Sampling Data

Version 5: 7/9/92

Date : 7.28.92 Well ID. : MW-3

Pump Type : _____
Dedicated/Portable (circle one)

Chain of Custody Doc. # : _____

Depth of casing : 34.48 Casing Diameter : _____

Depth to water : 30.97 Volume Factor : _____

Water in Casing (ft) : _____ Gallons / Casing Vol. : _____

Time Pump on : _____ Initial Flow Rate
Q = gpm : _____

Time Pump Off : _____ Meas. by grad. cylinder-bucket
flow meter-other : _____

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O^2	eh	DTW

Meter	Serial #	Calibrated
pH	_____	yes / no
S.C.	_____	yes / no
Redox	_____	yes / no
D.O^2	_____	yes / no
H^2O	_____	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T °C			
Final S C			

Samplers Initials : _____

Sample I.D. :(verify) _____ Time Collected : _____

Requested Analyses : _____

Sample Container (Size/Preserv.) _____

_____

_____

_____

_____

_____

_____

Ground Water Sampling Data

Version 5: 7/9/92

Date : 8·13·92 | Well ID. : MW1

Pump Type : Dedicated/Portable (circle one) | Chain of Custody Doc. # :

Depth of casing : 36.91 | Casing Diameter : 2"

Depth to water : 31.23 | Volume Factor : .16

Water in Casing (ft) : 5.68 | Gallons / Casing Vol. : .91

Time Pump on : | Initial Flow Rate Q = gpm :

Time Pump Off : | Meas. by grad. cylinder-bucket flow meter-other :

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O²	eh	DTW
1312		1	7.10	19.4	575				
1314		2	7.20	19.2	570				
1316		3	6.93	19.5	570				

Meter	Serial #	Calibrated
pH	0231980	(yes) / no
S.C.	8904054	(yes) / no
Redox		yes / no
D.O²		yes / no
H²O	14340	(yes) / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials : SP

Sample I.D. :(verify) MW1 | Time Collected : 1318

Requested Analyses : TPH Gas + BTEX; ORG LEAD

Sample Container (Size/Preserv.) : 3x40ml VOA ~~pres~~ no pres w/HCl; 500 ml plas no pres

Ground Water Sampling Data

Version 5: 7/9/92

Date : 8.13.92

Well ID. : MW 2

Pump Type : _____
Dedicated/Portable (circle one)

Chain of Custody Doc. # : _____

Depth of casing : 37.19

Casing Diameter : 2

Depth to water : 31.26

Volume Factor : .16

Water in Casing (ft) : 5.93

Gallons / Casing Vol. : .95

Time Pump on : _____

Initial Flow Rate
Q = gpm : _____

Time Pump Off : _____

Meas. by grad. cylinder-bucket
flow meter-other : _____

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O²	eh	DTW
1254		1	7.88	19.0	820				
1257		2	7.48	18.6	800				
1259		3	6.94	19.6	800				

Meter	Serial #	Calibrated
pH	0231980	yes / no
S.C.	8904054	yes / no
Redox	_____	yes / no
D.O²	_____	yes / no
H²O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials : DP

Sample I.D. :(verify) MW2

Time Collected : 1300

Requested Analyses : TPH Gas + Btex; ORG LEAD

Sample Container (Size/Preserv.) : 3x 40ml VOA w/HCl; 500 ml plas/no pres

Ground Water Sampling Data

Version 5: 7/9/92

Date : 8.13.92

Well ID. : MW 3

Pump Type : _____
Dedicated/Portable (circle one)

Chain of Custody Doc. # : _____

Depth of casing : 34.48

Casing Diameter : 2

Depth to water : 31.22

Volume Factor : .16

Water in Casing (ft) : 3.26

Gallons / Casing Vol. : .52

Time Pump on : _____

Initial Flow Rate
Q = gpm : _____

Time Pump Off : _____

Meas. by grad. cylinder-bucket
flow meter-other : _____

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O²	eh	DTW
1328		.75	7.15	19.9	830				
1329		1.25	6.88	19.6	830				
1331		1.75	6.86	20.6	830				

Meter	Serial #	Calibrated
pH	0231980	yes / no
S.C.	89040054	yes / no
Redox	_____	yes / no
D.O²	_____	yes / no
H²O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials : SP

Sample I.D. :(verify) MW 3

Time Collected : 1332

Requested Analyses : TPH Gas + BTEX
ORG LEAD

Sample Container (Size/Preserv.) : 3x 40ml VOA w/HCl
500 ml plas no pres

Ground Water Sampling Data

Version 5: 7/9/92

Date: 9-9-92

Well ID.: MW-1

Pump Type: Bail
Dedicated/Portable (circle one)

Chain of Custody Doc. # :

Depth of casing: 37.0

Casing Diameter: 2.0

Depth to water: 31.65

Volume Factor: .16

Water in Casing (ft): 5.35

Gallons / Casing Vol.: .85

Time Pump on:

Initial Flow Rate
Q = gpm:

Time Pump Off:

Meas. by grad. cylinder-bucket
flow meter-other:

Time	Q	Gal. Removed	pH	Temp. C°	SC	OG	D.O.²	eh	DTW
1125		1.0	7.38	18.5	740				
1130		2.0	6.98	18.5	640				
1135		3.0	6.82	18.6	740				

Meter	Serial #	Calibrated
pH	0231980	yes / no
S.C.	8904054	yes / no
Redox		yes / no
D.O.²		yes / no
H²O	143340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials:

Sample I.D.. (verify) MW-1

Time Collected: 1145

Requested Analyses: TPH Gas + Btex
Org Pb.

Sample Container (Size/Preserv.)

Ground Water Sampling Data

Version 5: 7/9/92

Date: 9-9-92

Well ID.: MW-2

Pump Type: Dedicated/Portable (circle one)

Chain of Custody Doc.#:

Depth of casing: 37.0

Casing Diameter: 2

Depth to water: 31.80

Volume Factor: .16

Water In Casing (ft): 5.2

Gallons / Casing Vol.: .83

Time Pump on:

Initial Flow Rate Q = gpm:

Time Pump Off:

Meas. by grad. cylinder-bucket flow meter-other:

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O.²	eh	DTW
1100	.3	1.0 gal	10.11	15.5	1020				
1110		2.0	7.22	18.3	960				
1113		3.0	7.46	18.5	980				

Meter	Serial #	Calibrated
pH	0231980	yes / no
S.C.	B9040S4	yes / no
Redox		yes / no
D.O.²		yes / no
H²O	14340	yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T°C			
Final S C			

Samplers Initials:

Sample I.D.: (verify) MW 2

Time Collected: 1115

Requested Analyses: TPH GAS + Btex; Org. Pb

Sample Container (Size/Preserv.): 3x40 ml VOA w/HCL; 500 ml phos.

Ground Water Sampling Data

Version 5: 7/9/92

Date: 9-9-92

Well ID.: MW-3

Pump Type: [redacted]

Dedicated/Portable (circle one)

Chain of Custody Doc. # :

Depth of casing: 34.65

Casing Diameter: 2.0"

Depth to water: 31.95

Volume Factor: 16

Water In Casing (ft): 2.7'

Gallons / Casing Vol.: .432

Time Pump on:

Initial Flow Rate Q = gpm:

Time Pump Off:

Meas. by grad. cylinder-bucket flow meter-other:

Time	Q	Gal. Removed	pH	Temp C°	SC	OG	D.O.²	eh	DTW
1147		.5	6.84	20.5	1200				
1147		1.0	6.84	19.8	1100				
1152		1.5	7.79	19.9	1100				

Meter Serial # Calibrated

	Field	Central	Calibrated
pH	0231980		yes / no
S.C.	8904054		yes / no
Redox			yes / no
D.O.^{2}			yes / no
H^2O	14340		yes / no

	Rep. 1	Rep. 2	Rep. 3
Final pH			
Final T °C			
Final S C			

Samplers Initials : _____

Sample I.D. :(verify) _____ Time Collected : 1153

Requested Analyses : TPH Gas + Btex
Org. Pb

Sample Container (Size/Preserv.) _____

TOTAL P.04