ARCADIS Design & Consultancy for natural and built assets

Ms. Karel Detterman, PG
Hazardous Materials Specialist
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

Arcadis U.S., Inc.
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Subject:
Fourth Quarter 2017 and First Quarter 2018 Semi-Annual Groundwater Monitoring Report
Former BP Station #11109
4280 Foothill Boulevard, Oakland, California
ACDEH Case #RO0000426

ENVIRONMENT

Date:
May 13, 2018

Contact:
Hollis Phillips

Phone:
415.432.6903

Email:
Hollis. Phillips@arcadis.com

Our ref:
GP09BPNA.C106.N0000

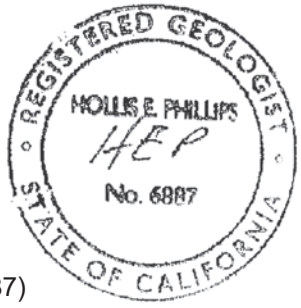
Dear Ms. Detterman:

Arcadis U.S., Inc. (Arcadis) has prepared this *Fourth Quarter 2017 and First Quarter 2018 Semi-Annual Groundwater Monitoring Report* to document the results of groundwater monitoring and sampling at the Former BP Service Station #11109 located at 4280 Foothill Boulevard in Oakland, Alameda County, California.

"I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document submitted on my behalf to the State Water Board's GeoTracker website."

Submitted by:

ARCADIS U.S., Inc.



Hollis E. Phillips, P.G. (No. 6887)
Principal Geologist/Project Manager

Copies:
GeoTracker
Mr. Ed Ralston, ConocoPhillips, 76 Broadway, Sacramento, California 95818 (electronic copy via GeoTracker)

WORK PERFORMED DURING FOURTH QUARTER 2017 AND FIRST QUARTER 2018

- Submitted the *Second and Third Quarter 2017 Semi-Annual Groundwater Monitoring Report,* dated October 31, 2017.
- Submitted the *Supplemental Site Evaluation Work Plan*, dated February 28, 2018, detailing the plans for an additional soil boring investigation, soil vapor assessment, and a preferred pathway study.
- Conducted the First Quarter 2018 semi-annual groundwater monitoring event on March 9, 2018.

WORK PROPOSED DURING SECOND AND THIRD QUARTER 2018

- Submit the *Fourth Quarter 2017 and First Quarter 2018 Semi-Annual Groundwater Monitoring Report,* contained herein.
- Conduct the Third Quarter 2018 semi-annual groundwater monitoring event.
- Perform additional field investigation activities as specified in the *Supplemental Evaluation Work Plan*, dated February 28, 2018 and as approved with comments from the Alameda County Department of Environmental Health (ACDEH) in its letter dated April 27, 2018.

GROUNDWATER MONITORING/SAMPLING ACTIVITIES AND RESULTS

First Quarter 2018 groundwater monitoring was conducted on March 9, 2018 by Blaine Tech Services, Inc. (Blaine Tech) personnel. Groundwater monitoring was also conducted on March 9, 2018 at the adjacent Chevron #9-0076 (ACDEH Case #RO0000427) to further characterize hydrogeology in the vicinity of the Site. Prior to groundwater sampling, depth-to-water (DTW) measurements were collected in wells MW-3 through MW-12 using a water level indicator. Monitoring well MW-2 was noted as dry during well gauging activities. If present, the thickness of light non-aqueous phase liquid (LNAPL) was measured using an interface probe. The Hydrasleeves in monitoring wells MW-3, MW-4, MW-5, MW-6, MW-7 and MW-11 were replaced during the recent sampling event.

Current Phase of Project:	Monitoring
Frequency of Monitoring/Sampling:	Semi-Annual (Q1 and Q3)
Has LNAPL Been Historically Present On-site:	Yes
LNAPL Detected During the First Quarter 2018 (thickness in feet):	None

Approximate Depth to Groundwater (feet below top of casing):	Range: 8.25 (MW-10) to 15.16 (MW-6)
Groundwater Flow Direction:	West and Southwest
Groundwater Flow Magnitude (feet/foot):	0.04 and 0.07
Agency Directive Requirements:	None

LNAPL REMOVAL ACTIVITIES

LNAPL absorbent socks were first placed in monitoring wells MW-5, MW-10, and MW-12 on May 7, 2013 to remove residual LNAPL at each location, as discussed in the *Results of DPE Pilot Test and SPH Removal* summary letter dated June 28, 2013. Following First Quarter 2018 semi-annual gauging and sampling activities, the absorbent socks were replaced in MW-5, MW-10, and MW-12. During the First Quarter 2018 monitoring event, no LNAPL was detected.

RECOMMENDATIONS

Arcadis recommends an additional soil boring investigation, soil vapor assessment, and preferred pathway study as proposed in the *Supplemental Site Evaluation Work Plan*, dated February 28, 2018. Information gathered from additional investigation will support the completion of a *Draft Corrective Action Plan Addendum and Updated SCM* (Draft CAP/SCM) as required by ACDEH in its letters dated July 21, 2017 and April 27, 2018.

LIMITATIONS

The findings presented in this report are based upon observations of field personnel, points investigated, results of laboratory tests performed by ESC Lab Sciences, and our understanding of ACDEH requirements. Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of Arcadis and Atlantic Richfield Company. It is possible that variations in soil or groundwater conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

ENCLOSURES

Tables

1 Current Groundwater Monitoring Data
2 Historical Groundwater Monitoring Data
3 Historical Groundwater Flow Direction and Gradient

Figures

1 Site Location Map
2 Groundwater Elevation Contour Map – March 9, 2018
3 Analytical Summary Map – March 9, 2018

Attachments

1 Field Methods
2 Field Data Sheets
3 Laboratory Report and Chain-of-Custody Documentation

Geotracker Upload Table
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

Report Title	Sample Period	PDF Report	GEO_MAPS	Sample ID	Matrix	GEO_Z	GEO_XY	GEO_BORE	GEO_WELL	EDF
4Q 2017 and 1Q 2018 Semi-Annual GMR	4Q 2017 1Q 2018	☑	☐	MW-2	GW	☐	☐	☐	☑	☑
				MW-3	GW	☐	☐	☐	☑	☑
				MW-4	GW	☐	☐	☐	☑	☑
				MW-5	GW	☐	☐	☐	☑	☑
				MW-6	GW	☐	☐	☐	☑	☑
				MW-7	GW	☐	☐	☐	☑	☑
				MW-8	GW	☐	☐	☐	☑	☑
				MW-9	GW	☐	☐	☐	☑	☑
				MW-10	GW	☐	☐	☐	☑	☑
				MW-11	GW	☐	☐	☐	☑	☑
				MW-12	GW	☐	☐	☐	☑	☑

TABLES

Table 1
Current Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-2	3/9/2018		41.22	DRY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j,l)
MW-3	3/9/2018		42.92	10.45	--	32.47	--	--	--	--	--	1.34	--	--	--	--	--	--	--	4.62	(n)
MW-4	3/9/2018		42.88	14.91	--	27.97	18 (J)	--	--	--	--	7.84	--	--	--	--	--	--	--	3.51	(n)
MW-5	3/9/2018		39.14	9.52	--	29.62	19,700	7,020	300	1,290	518	<125	553 (B,J)	51 J	<125	<125	2.86 (J)	187	<125	1.93	(n,p)
MW-6	3/9/2018		44.37	15.16	--	29.21	--	--	--	--	--	0.587 (J)	--	--	--	--	--	--	--	3.31	(n)
MW-7	3/9/2018		43.10	11.03	--	32.07	1,620	6.71	0.202 (J)	0.607 (J)	1.56 (J)	<1.00	<10	<1.00	<1.00	<1.00	2.84 (J)	<1.00	<1.00	1.49	(n)
MW-8	3/9/2018		40.95	13.20	--	27.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	3/9/2018		44.06	11.05	--	33.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-10	3/9/2018		39.78	8.25	--	31.53	28,100	1,280	582	1,850	4,850	<125	<1,250	<125	<125	<125	<12,500	<125	<125	1.22	(p)
MW-11	3/9/2018		40.04	8.74	--	31.30	4,070 (J)	353	97.2	170	167	<50	100 (B,J)	<50	<50	<50	8.85 (J)	<50	<50	0.77	(n)
MW-12	3/9/2018		40.32	9.56	--	30.76	22,300	2,040	179	2,460	1,510	<125	349 (B, J)	<125	<125	<125	693 (J)	63.9 (J)	<125	1.23	(p)

Notes:
B = Benzene
1,2-DCA = 1,2-Dichloroethane
DIPE = Di-isopropyl ether
DO = Dissolved oxygen
DTW = Depth to water in ft btoc
E = Ethylbenzene
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert butyl ether
GRO = Gasoline range organics, range C6-C12
GW Elev = Groundwater measured in ft msl
LNAPL = Light non-aqueous phase liquid
MTBE = Methyl tert butyl ether
T = Toluene
TAME = Tert-amyl methyl ether
TBA = Tert-butyl alcohol
TOC = Top of casing measured in ft (surveyed)
X = Xylenes, total
µg/L = Micrograms per liter
mg/L = Milligrams per liter
ft = feet
ft btoc = feet below top of casing
ft msl = feet relative to mean sea level
-- = Not analyzed/applicable/measured/ available
< = Not detected at or above reported detection limit
J = Estimated value between the reporting limit and method detection limit
B= The same analyte is found in the associated blank.
(g) Free product in well
(j) Well is dry
(k) GWE adjusted assuming specific gravity of 0.75 for free product
(l) Well not sampled in accordance with groundwater sampling schedule
(n) Replaced hydrosleeve
(o) No hydrosleeve upon arrival, deployed new hydrosleeve to collect sample, no hydrosleeve replaced
(p) Replaced SPH sock
(q) Well was inaccessible

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
B-1	6/19/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	3.1	--	--	--	--	--	--	--	--	
B-6	6/19/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	0.43 (J)	--	--	--	--	--	--	--	--	
B-7	6/22/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	6.2	--	--	--	--	--	--	--	--	
C-1	3/13/2014		38.09	12.13	--	25.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-2	3/13/2014		37.45	12.45	--	25.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-3	3/13/2014		38.00	19.00	--	19.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-4	3/13/2014		36.09	9.97	--	26.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-5	3/13/2014		38.48	20.26	--	18.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-6	3/13/2014		35.36	21.10	--	14.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-7	3/13/2014		35.15	24.90	--	10.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-8	3/13/2014		34.66	25.01	--	9.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-9	3/13/2014		33.64	24.82	--	8.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C-10	3/13/2014		38.36	9.10	--	29.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
DPE-1	7/17/2012		--	--	--	--	28,000	380	400	880	3,000	<50	<400	<50	<50	<50	<25,000	--	--	--	
MW-1	1/31/1990		38.19	15.41	--	22.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	9/16/2010		--	--	--	--	5,500	400	250	320	410	11	<20	<2.5	<2.5	<2.5	<500	<2.5	<2.5	--	
MW-2	2/5/1990		41.22	21.90	--	19.32	1,300	14	<0.1	9	13	--	--	--	--	--	--	--	--	--	
MW-2	2/14/1991		41.22	21.16	--	20.06	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-2	5/13/1991		41.22	21.32	--	19.90	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-2	7/24/1991		41.22	22.92	--	18.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	10/3/1991		41.22	24.90	--	16.32	<50	<0.3	0.8	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-2	10/15/1991		41.22	24.10	--	17.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/16/1991		41.22	23.95	--	17.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	1/6/1992		41.22	23.30	--	17.92	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-2	1/22/1992		41.22	23.14	--	18.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	1/28/1992		41.22	22.99	--	18.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/5/1992		41.22	22.63	--	18.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/12/1992		41.22	22.04	--	19.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/17/1992		41.22	20.84	--	20.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/3/1992		41.22	18.29	--	22.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/8/1992		41.22	18.86	--	22.36	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-2	4/14/1992		41.22	19.45	--	21.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/29/1992		41.22	20.35	--	20.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	5/7/1992		41.22	20.84	--	20.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	7/3/1992		41.22	22.34	--	18.88	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-2	10/8/1992		41.22	23.73	--	17.49	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-2	12/31/1992		41.22	21.12	--	20.10	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-2	4/21/1993		41.22	17.68	--	23.54	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(a)

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-2	7/7/1993		41.22	20.30	--	20.92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-2	9/21/1993		41.22	21.93	--	19.29	<50	0.9	0.7	0.7	2.6	21.54	--	--	--	--	--	--	--	--	
MW-2	12/17/1993		41.22	21.48	--	19.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.7	--	--	--	--	--	--	--	--	--	
MW-2	4/7/1994		41.22	20.25	--	20.97	<50	<0.5	<0.5	<0.5	<0.5	12.2	--	--	--	--	--	--	--	5.90	
MW-2	7/6/1994		41.22	20.59	--	20.63	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	3.10	
MW-2	10/7/1994		41.22	22.04	--	19.18	<50	<0.5	<0.5	<0.5	<0.5	15.2	--	--	--	--	--	--	--	2.80	
MW-2	1/27/1995		41.22	26.12	--	15.10	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	4.80	
MW-2	3/30/1995		41.22	12.34	--	28.88	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	7.20	
MW-2	6/20/1995		41.22	16.42	--	24.80	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	6.00	
MW-2	10/3/1995		41.22	20.06	--	21.16	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	5.70	
MW-2	12/6/1995		41.22	21.31	--	19.91	<50	<0.50	<0.50	<0.50	<1.0	46	--	--	--	--	--	--	--	5.40	
MW-2	3/21/1996		41.22	12.28	--	28.94	<50	<0.5	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	7.40	
MW-2	6/21/1996		41.22	13.28	--	27.94	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.30	
MW-2	9/6/1996		41.22	13.94	--	27.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.40	
MW-2	12/19/1996		41.22	12.19	--	29.03	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.90	
MW-2	3/17/1997		41.22	11.59	--	29.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	8/12/1997		41.22	13.21	--	28.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/10/1997		41.22	12.34	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/12/1998		41.22	11.04	--	30.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	6/23/1998		41.22	11.77	--	29.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/31/1999		41.22	12.38	--	28.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	8/25/1999		41.22	17.72	--	23.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/9/2000		41.22	11.94	--	29.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/8/2001		41.22	10.31	--	30.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/8/2002		41.22	14.35	--	26.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/18/2002		41.22	13.11	--	28.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/11/2003		41.22	13.24	--	27.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/9/2003		41.22	18.58	--	22.64	350	<0.50	<0.50	0.56	2.8	24	<20	<0.50	<0.50	<0.50	<100	--	--	--	(b)
MW-2	3/9/2004		41.22	12.52	--	28.70	74	<0.50	<0.50	0.83	4.7	27	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-2	9/17/2004		41.22	18.05	--	23.17	59	<0.50	<0.50	<0.50	<0.50	21	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-2	3/7/2005		41.22	2.32	--	38.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-2	9/5/2006		41.22	10.46	--	30.76	79	<0.50	5.1	<0.50	0.73	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-2	3/5/2007		41.22	12.25	--	28.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-2	3/6/2008		41.22	12.33	--	28.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(d)
MW-2	9/5/2012		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/20/2013		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	9/20/2013		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j)
MW-2	3/13/2014		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j)
MW-2	9/25/2014		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j, l)
MW-2	3/10/2015		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j)
MW-2	9/21/2015		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j,l)
MW-2	3/29/2016		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-2	9/29/2016		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j,l)
MW-2	3/7/2017		41.22	9.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-2	9/22/2017		41.22	DRY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j,l)
MW-2	3/9/2018		41.22	DRY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(j,l)
MW-3	2/5/1990		40.74	17.45	--	23.29	1,400	15	<2.5	11	8	--	--	--	--	--	--	--	--	--	
MW-3	2/14/1991		40.74	18.52	--	22.22	320	8	<0.3	8	1	--	--	--	--	--	--	--	--	--	
MW-3	5/13/1991		40.74	19.32	--	21.42	640	13	<0.3	18	1	--	--	--	--	--	--	--	--	--	
MW-3	7/24/1991		40.74	20.69	--	20.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-3	10/3/1991		40.74	19.47	--	21.27	940	21	<0.3	23	2.1	--	--	--	--	--	--	--	--	--	
MW-3	10/15/1991		40.74	20.46	--	20.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/4/1991		40.74	18.29	--	22.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/16/1991		40.74	18.34	--	22.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	1/6/1992		40.74	18.50	--	22.24	580	6.1	1	6.1	7.1	--	--	--	--	--	--	--	--	--	
MW-3	1/22/1992		40.74	17.86	--	22.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	1/28/1992		40.74	15.84	--	24.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/5/1992		40.74	17.53	--	23.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/12/1992		40.74	17.15	--	23.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/17/1992		40.74	16.18	--	24.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/3/1992		40.74	14.80	--	25.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/8/1992		40.74	17.06	--	23.68	1,100	30	4.6	32	11	--	--	--	--	--	--	--	--	--	
MW-3	4/14/1992		40.74	15.22	--	25.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/29/1992		40.74	15.90	--	24.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	5/7/1992		40.74	16.35	--	24.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	7/3/1992		40.74	17.74	--	23.00	1,200	38	<2.5	24	<2.5	--	--	--	--	--	--	--	--	--	
MW-3	10/8/1992		40.74	19.06	--	21.68	1,400	31	<0.5	25	13	--	--	--	--	--	--	--	--	--	
MW-3	12/31/1992		40.74	16.61	--	24.13	820	12	4.1	13	5.9	--	--	--	--	--	--	--	--	--	
MW-3	12/31/1992	Dup	40.74	16.61	--	24.13	960	11	3.6	10	3.8	--	--	--	--	--	--	--	--	--	(e)
MW-3	4/21/1993		40.74	14.24	--	26.50	420	5.6	<0.5	3.9	1.4	--	--	--	--	--	--	--	--	--	
MW-3	4/21/1993	Dup	40.74	14.24	--	26.50	390	5	<0.5	3.7	1.5	--	--	--	--	--	--	--	--	--	(e)
MW-3	7/7/1993		40.13	15.19	--	24.94	54	0.6	0.6	<0.5	<0.5	12.68	--	--	--	--	--	--	--	--	(f)
MW-3	9/21/1993		40.13	16.58	--	23.55	540	7.9	0.9	4.7	2.4	--	--	--	--	--	--	--	--	--	
MW-3	12/17/1993		40.13	15.82	--	24.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/23/1993		--	--	--	--	500	9.8	1.5	3.3	2.1	--	--	--	--	--	--	--	--	--	
MW-3	12/23/1993	Dup	--	--	--	--	480	9.2	<0.5	5.4	5.3	--	--	--	--	--	--	--	--	--	(e)
MW-3	4/7/1994		40.13	28.50	--	11.63	460	20	7.4	8.9	11	18.2	--	--	--	--	--	--	--	--	
MW-3	4/7/1994	Dup	40.13	28.50	--	11.63	460	20	7.7	9	11	--	--	--	--	--	--	--	--	--	(e)
MW-3	7/6/1994		--	--	--	--	300	10	0.6	1.7	6.4	5.54	--	--	--	--	--	--	--	4.80	
MW-3	10/7/1994		40.13	27.65	--	12.48	620	28	<0.5	2.2	12	31.4	--	--	--	--	--	--	--	4.40	
MW-3	1/27/1995		40.13	27.65	--	12.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/30/1995		40.13	26.05	--	14.08	300	10	6	3.4	18	--	--	--	--	--	--	--	--	7.60	
MW-3	6/20/1995		40.13	19.49	--	20.64	170	7.2	3.4	0.85	15	--	--	--	--	--	--	--	--	--	
MW-3	10/3/1995		40.13	24.93	--	15.20	170	2.1	<0.50	0.81	8	6.7	--	--	--	--	--	--	--	--	
MW-3	12/6/1995		40.13	25.14	--	14.99	1,700	6.7	3.1	2.8	210	64	--	--	--	--	--	--	--	--	
MW-3	12/6/1995	Dup	40.13	25.14	--	14.99	1,400	6.1	3	1.7	190	53	--	--	--	--	--	--	--	--	(e)
MW-3	3/21/1996		40.13	9.48	--	30.65	<50	0.5	<1.0	<1.0	1	<10	--	--	--	--	--	--	--	7.30	
MW-3	6/21/1996		40.13	11.60	--	28.53	<50	13	<1.0	<1.0	<1.0	12	--	--	--	--	--	--	--	7.60	
MW-3	9/6/1996		40.13	12.23	--	27.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	9/9/1996		--	--	--	--	<250	6.5	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	7.60	
MW-3	12/19/1996		40.13	10.46	--	29.67	<50	4.1	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	8.40	
MW-3	3/17/1997		40.13	9.86	--	30.27	50	<5.0	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.40	
MW-3	8/12/1997		40.13	12.11	--	28.02	<50	0.79	<1.0	<1.0	<1.0	10	--	--	--	--	--	--	--	6.10	
MW-3	12/10/1997		40.13	10.90	--	29.23	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	3.20	
MW-3	3/12/1998		40.13	10.20	--	29.93	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	6.30	
MW-3	3/12/1998	Dup	40.13	10.20	--	29.93	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	(e)
MW-3	6/23/1998		40.13	10.17	--	29.96	50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	3.40	
MW-3	3/31/1999		40.13	11.45	--	28.68	60	<1.0	<1.0	<1.0	<1.0	6.2	--	--	--	--	--	--	--	--	
MW-3	8/25/1999		40.13	12.52	--	27.61	<50	<1.0	<1.0	<1.0	<1.0	7.7	--	--	--	--	--	--	--	--	
MW-3	3/9/2000		40.13	12.39	--	27.74	<50	<0.5	0.54	<0.5	1.7	6.3	--	--	--	--	--	--	--	--	
MW-3	3/8/2001		40.13	10.41	--	29.72	<50	<0.5	<0.5	<0.5	0.59	7.7	--	--	--	--	--	--	--	--	
MW-3	3/8/2002		40.13	9.83	--	30.30	62	<0.5	<0.5	<0.5	<1.0	11.6	--	--	--	--	--	--	--	--	
MW-3	3/18/2002		40.13	9.20	--	30.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-3	3/11/2003		40.13	10.54	--	29.59	<50	<0.50	<0.50	<0.50	<0.50	6.7	--	--	--	--	--	--	--	--	
MW-3	12/9/2003		40.13	12.88	--	27.25	<50	<0.50	<0.50	<0.50	<0.50	6.4	<20	<0.50	<0.50	<0.50	<100	--	--	--	
MW-3	3/9/2004		40.13	9.49	--	30.64	<50	<0.50	<0.50	<0.50	0.63	6.9	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-3	9/17/2004		40.13	12.76	--	27.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/7/2005		40.13	7.30	--	32.83	<50	<0.50	<0.50	<0.50	0.52	5.1	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-3	9/6/2005		42.92	10.81	--	32.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/6/2006		42.92	8.85	--	34.07	<50	<0.50	<0.50	<0.50	<0.50	6.9	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-3	9/5/2006		42.92	9.86	--	33.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/5/2007		42.92	8.33	--	34.59	<50	<0.50	<0.50	<0.50	<0.50	5.4	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.31	
MW-3	9/7/2007		42.92	11.10	--	31.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/6/2008		42.92	8.92	--	34.00	<50	<0.50	<0.50	<0.50	<0.50	4.2	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.50	
MW-3	9/3/2008		42.92	12.19	--	30.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/4/2009		42.92	8.28	--	34.64	<50	<0.50	<0.50	<0.50	<0.50	4.9	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	1.19	
MW-3	9/30/2009		42.92	11.60	--	31.32	<50	<0.50	<0.50	<0.50	<0.50	6.8	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-3	10/28/2009		42.92	10.40	--	32.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/23/2010		42.92	8.27	--	34.65	<50	<0.50	<0.50	<0.50	<1.0	3.2	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-3	6/10/2010		42.92	9.40	--	33.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	9/16/2010		42.92	11.14	--	31.78	<50	<0.50	<0.50	<0.50	<1.0	5.9	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-3	2/23/2011		42.92	8.71	--	34.21	--	--	--	--	--	0.58	--	--	--	--	--	--	--	--	
MW-3	9/28/2011		42.92	11.14	--	31.78	--	--	--	--	--	3.2	--	--	--	--	--	--	--	--	
MW-3	3/8/2012		42.92	11.01	--	31.91	--	--	--	--	--	<0.50 (*)	--	--	--	--	--	--	--	--	
MW-3	9/5/2012		42.92	11.42	--	31.50	--	--	--	--	--	6.5	--	--	--	--	--	--	--	--	
MW-3	3/20/2013		42.92	10.30	--	32.62	--	--	--	--	--	2.6	--	--	--	--	--	--	--	--	
MW-3	9/20/2013		42.92	11.40	--	31.52	--	--	--	--	--	4.1	--	--	--	--	--	--	--	4.66	
MW-3	3/13/2014		42.92	10.73	--	32.19	--	--	--	--	--	4.2	--	--	--	--	--	--	--	--	
MW-3	9/25/2014		42.92	12.06	--	30.86	--	--	--	--	--	5.5	--	--	--	--	--	--	--	2.33	
MW-3	3/10/2015		42.92	10.16	--	32.76	--	--	--	--	--	4.0	--	--	--	--	--	--	--	2.43	
MW-3	9/21/2015		42.92	13.17	--	29.75	--	--	--	--	--	3.49	--	--	--	--	--	--	--	1.75	
MW-3	3/29/2016		42.92	8.15	--	34.77	--	--	--	--	--	1.52	--	--	--	--	--	--	--	0.56	(i,n)
MW-3	9/29/2016		42.92	13.57	--	29.35	--	--	--	--	--	1.41	--	--	--	--	--	--	--	0.42	(n)
MW-3	3/7/2017		42.92	6.91	--	36.01	--	--	--	--	--	3.25	--	--	--	--	--	--	--	2.90	(n)
MW-3	9/22/2017		42.92	13.06	--	29.86	--	--	--	--	--	5.81	--	--	--	--	--	--	--	1.02	(n)
MW-3	3/9/2018		42.92	10.45	--	32.47	--	--	--	--	--	1.34	--	--	--	--	--	--	--	--	(n)
MW-4	2/5/1990		40.11	20.75	--	19.36	620	<0.5	9	<0.5	10	--	--	--	--	--	--	--	--	--	
MW-4	2/14/1991		40.11	21.73	--	18.38	180	<0.3	<0.3	0.4	2	--	--	--	--	--	--	--	--	--	
MW-4	5/13/1991		40.11	18.55	--	21.56	72	0.7	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-4	7/24/1991		40.11	21.31	--	18.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	10/3/1991		40.11	22.57	--	17.54	57	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-4	10/15/1991		40.11	22.88	--	17.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/4/1991		40.11	22.54	--	17.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/16/1991		40.11	22.59	--	17.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	1/6/1992		40.11	22.00	--	18.11	480	0.8	3.2	1.9	7.7	--	--	--	--	--	--	--	--	--	
MW-4	1/22/1992		40.11	21.58	--	18.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	1/28/1992		40.11	21.42	--	18.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	2/5/1992		40.11	21.10	--	19.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	2/12/1992		40.11	20.74	--	19.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	2/17/1992		40.11	19.78	--	20.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	4/3/1992		40.11	16.80	--	23.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	4/8/1992		40.11	17.13	--	22.98	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-4	4/14/1992		40.11	17.74	--	22.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	4/29/1992		40.11	18.56	--	21.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	5/7/1992		40.11	19.10	--	21.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-4	7/3/1992		40.11	20.71	--	19.40	<50	0.6	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-4	10/8/1992		40.11	22.43	--	17.68	270	<0.5	2.1	2.5	3.2	--	--	--	--	--	--	--	--	--	
MW-4	12/31/1992		40.11	19.58	--	20.53	150	<0.5	<0.5	<0.5	1.3	--	--	--	--	--	--	--	--	--	
MW-4	4/21/1993		40.11	17.79	--	22.32	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-4	7/7/1993		40.11	18.44	--	21.67	160	1.2	5.4	3.8	19	5.51	--	--	--	--	--	--	--	--	
MW-4	9/21/1993		40.11	20.14	--	19.97	71	<0.5	1.9	<0.5	2.1	--	--	--	--	--	--	--	--	--	
MW-4	12/17/1993		40.11	19.80	--	20.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/23/1993		--	--	--	--	<50	3.1	1.6	0.8	3.8	5.7	--	--	--	--	--	--	--	--	
MW-4	4/7/1994		40.11	19.12	--	20.99	<50	<0.5	<0.5	<0.5	<0.5	11.7	--	--	--	--	--	--	--	6.60	
MW-4	7/6/1994		40.11	19.90	--	20.21	62	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	4.10	
MW-4	10/7/1994		40.11	20.07	--	20.04	<50	<0.5	<0.5	<0.5	<0.5	7.38	--	--	--	--	--	--	--	3.60	
MW-4	1/27/1995		40.11	13.72	--	26.39	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	2.70	
MW-4	3/30/1995		40.11	11.46	--	28.65	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	8.30	
MW-4	6/20/1995		40.11	14.78	--	25.33	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	--	
MW-4	10/3/1995		40.11	19.62	--	20.49	<50	<0.50	<0.50	<0.50	<1.0	5	--	--	--	--	--	--	--	5.80	
MW-4	12/6/1995		40.11	19.91	--	20.20	<50	<0.50	<0.50	<0.50	<1.0	47	--	--	--	--	--	--	--	5.70	
MW-4	3/21/1996		40.11	11.12	--	28.99	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.80	
MW-4	6/21/1996		40.11	12.21	--	27.90	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.90	
MW-4	9/6/1996		40.11	12.89	--	27.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.20	
MW-4	12/19/1996		40.11	11.01	--	29.10	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	8.40	
MW-4	3/17/1997		40.11	10.42	--	29.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	8/12/1997		40.11	12.77	--	27.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/10/1997		40.11	11.22	--	28.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/12/1998		40.11	10.81	--	29.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	6/23/1998		40.11	10.61	--	29.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/31/1999		40.11	11.46	--	28.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	8/25/1999		40.11	16.16	--	23.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/9/2000		40.11	12.23	--	27.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/8/2001		40.11	11.04	--	29.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/8/2002		40.11	12.73	--	27.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/18/2002		40.11	11.62	--	28.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/11/2003		40.11	13.44	--	26.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/9/2003		40.11	15.03	--	25.08	<250	<2.5	<2.5	<2.5	<2.5	130	<100	<2.5	<2.5	2.7	<500	--	--	--	
MW-4	3/9/2004		40.11	11.04	--	29.07	<50	<0.50	<0.50	<0.50	<0.50	35	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-4	9/17/2004		40.11	16.75	--	23.36	<250	<2.5	<2.5	<2.5	<2.5	140	<100	<2.5	<2.5	2.6	<500	<2.5	<2.5	--	
MW-4	3/7/2005		40.11	11.02	--	29.09	67	<0.50	<0.50	<0.50	<0.50	42	<20	<0.50	<0.50	0.56	<100	<0.50	<0.50	--	
MW-4	9/6/2005		42.88	14.64	--	28.24	81	<0.50	<0.50	<0.50	<1.5	180	<10	<0.50	<0.50	2.8	<150	<0.50	<0.50	--	
MW-4	3/6/2006		42.88	12.42	--	30.46	<100	<1.0	<1.0	<1.0	<1.0	110	<40	<1.0	<1.0	1.4	<600	<1.0	<1.0	--	
MW-4	9/5/2006		42.88	13.81	--	29.07	130	<1.0	<1.0	<1.0	<1.0	190	<40	<1.0	<1.0	1.7	<600	<1.0	<1.0	--	
MW-4	3/5/2007		42.88	10.63	--	32.25	<50	<0.50	<0.50	<0.50	<0.50	13	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	3.34	
MW-4	9/7/2007		42.88	14.77	--	28.11	90	<0.50	<0.50	<0.50	<0.50	130	<20	<0.50	<0.50	1.7	<300	<0.50	<0.50	1.14	
MW-4	3/6/2008		42.88	11.30	--	31.58	<50	<0.50	<0.50	<0.50	<0.50	170	14	<0.50	<0.50	2.1	<300	<0.50	<0.50	1.76	
MW-4	9/3/2008		42.88	16.11	--	26.77	<50	<5.0	<5.0	<5.0	<5.0	150	<100	<5.0	<5.0	<5.0	<3,000	<5.0	<5.0	1.97	
MW-4	3/4/2009		42.88	10.78	--	32.10	140	<5.0	<5.0	<5.0	<5.0	110	<100	<5.0	<5.0	<5.0	<3,000	<5.0	<5.0	1.31	
MW-4	9/30/2009		42.88	16.48	--	26.40	240	<2.0	<2.0	<2.0	<2.0	140	<40	<2.0	<2.0	<2.0	<1,200	<2.0	<2.0	0.08	
MW-4	10/28/2009		42.88	15.07	--	27.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/23/2010		42.88	10.82	--	32.06	<50	<0.50	<0.50	<0.50	<1.0	84	18	<0.50	<0.50	0.88	<100	<0.50	<0.50	--	
MW-4	6/10/2010		42.88	12.67	--	30.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	9/16/2010		42.88	15.72	--	27.16	120	<0.50	<0.50	<0.50	<1.0	72	8	<0.50	<0.50	0.82	<100	<0.50	<0.50	--	
MW-4	2/23/2011		42.88	11.43	--	31.45	<50	--	--	--	--	55	--	--	--	--	--	--	--	--	
MW-4	9/28/2011		42.88	15.34	--	27.54	150	--	--	--	--	62	--	--	--	--	--	--	--	--	
MW-4	3/8/2012		42.88	15.03	--	27.85	120	--	--	--	--	42	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-4	9/5/2012		42.88	15.90	--	26.98	56	<0.50	<0.50	<0.50	<1.0	47	18	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-4	3/20/2013		42.88	13.80	--	29.08	<50	--	--	--	--	17	--	--	--	--	--	--	--	--	
MW-4	9/20/2013		42.88	15.69	--	27.19	830	--	--	--	--	21	--	--	--	--	--	--	--	4.41	
MW-4	3/13/2014		42.88	15.59	--	27.29	<50	--	--	--	--	19	--	--	--	--	--	--	--	--	
MW-4	9/25/2014		42.88	17.10	--	25.78	190	--	--	--	--	17	--	--	--	--	--	--	--	2.06	(i)
MW-4	3/10/2015		42.88	14.36	--	28.52	90	--	--	--	--	17	--	--	--	--	--	--	--	1.87	
MW-4	9/21/2015		42.88	18.45	--	24.43	953	--	--	--	--	17.8	--	--	--	--	--	--	--	1.89	
MW-4	3/29/2016		42.88	11.30	--	31.58	<100	--	--	--	--	10.9	--	--	--	--	--	--	--	1.30	(i,n)
MW-4	9/29/2016		42.88	19.36	--	23.52	1,300	--	--	--	--	14.6	--	--	--	--	--	--	--	0.89	(n)
MW-4	3/7/2017		42.88	9.26	--	33.62	<100	--	--	--	--	25.1	--	--	--	--	--	--	--	0.18	(n)
MW-4	9/22/2017		42.88	18.40	--	24.48	890	--	--	--	--	22.1	--	--	--	--	--	--	--	0.60	(n)
MW-4	3/9/2018		42.88	14.91	--	27.97	18 (J)	--	--	--	--	7.84	--	--	--	--	--	--	--	0.60	(n)
MW-5	10/3/1991		39.55	18.08	--	21.47	79,000	13,000	7,400	1,400	6,200	--	--	--	--	--	--	--	--	--	
MW-5	10/15/1991		39.55	18.55	--	21.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	12/4/1991		39.55	18.44	0.13	20.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	12/16/1991		39.55	18.66	0.01	20.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	1/6/1992		39.55	19.12	0.11	20.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	1/22/1992		39.55	14.59	--	24.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	1/28/1992		39.55	15.25	--	24.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	2/5/1992		39.55	15.58	--	23.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-5	2/12/1992		39.55	15.54	0.01	24.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	2/17/1992		39.55	13.98	--	25.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-5	4/3/1992		39.55	13.63	0.04	25.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/8/1992		39.55	13.17	0.01	26.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/14/1992		39.55	13.45	0.01	26.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/29/1992		39.55	13.75	0.07	25.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	5/7/1992		39.55	16.15	0.04	23.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	7/3/1992		39.55	17.67	0.08	21.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/1/1992		39.55	17.83	0.50	21.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	10/8/1992		39.55	17.86	0.92	20.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	12/31/1992		39.55	15.20	--	24.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/21/1993		39.55	12.64	0.02	26.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	7/7/1993		39.14	12.68	0.82	25.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,f)
MW-5	9/21/1993		39.14	14.35	--	24.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-5	12/17/1993		39.14	12.61	0.41	26.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/7/1994		39.14	30.00	--	9.14	66,000	3,000	1,700	250	6,800	2,002	--	--	--	--	--	--	--	--	
MW-5	7/6/1994		--	--	--	--	29,000	1,900	330	63	2,700	1,141	--	--	--	--	--	--	--	--	
MW-5	10/7/1994		39.14	28.70	--	10.44	250,000	2,600	660	830	5,200	37.7	--	--	--	--	--	--	--	4.20	
MW-5	10/7/1994	Dup	39.14	28.70	--	10.44	45,000	2,900	540	260	2,600	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	1/27/1995		39.14	28.70	--	10.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/30/1995		39.14	28.95	--	10.19	50,000	7,900	2,600	520	6,400	--	--	--	--	--	--	--	--	5.50	
MW-5	3/30/1995	Dup	39.14	28.95	--	10.19	43,000	7,900	2,500	440	6,200	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	6/20/1995		39.14	22.54	--	16.60	34,000	5,100	1,900	300	3,700	--	--	--	--	--	--	--	--	--	
MW-5	6/20/1995	Dup	39.14	22.54	--	16.60	26,000	3,500	290	<25	3,300	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	10/3/1995		39.14	18.84	--	20.30	12,000	68	42	11	1,600	330	--	--	--	--	--	--	--	--	
MW-5	10/3/1995	Dup	39.14	18.84	--	20.30	12,000	46	39	10	1,600	320	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	12/6/1995		39.14	19.07	--	20.07	16,000	1,200	93	51	700	600	--	--	--	--	--	--	--	--	
MW-5	3/21/1996		39.14	7.43	--	31.71	1,500	89	28	6	250	<10	--	--	--	--	--	--	--	7.20	
MW-5	3/21/1996	Dup	39.14	7.43	--	31.71	1,900	92	30	7	270	<10	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	6/21/1996		39.14	9.87	--	29.27	3,500	740	150	19	400	<100	--	--	--	--	--	--	--	7.10	
MW-5	6/21/1996	Dup	39.14	9.87	--	29.27	2,700	680	140	20	400	<50	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	9/6/1996		39.14	10.52	--	28.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-5	9/9/1996		--	--	--	--	82,000	3,100	1,700	850	9,100	<2,500	--	--	--	--	--	--	--	7.50	
MW-5	9/9/1996	Dup	--	--	--	--	90,000	2,900	1,600	670	6,900	<2,500	--	--	--	--	--	--	--	--	(Dup)
MW-5	12/19/1996		39.14	8.62	--	30.52	41,000	790	820	120	2,040	<500	--	--	--	--	--	--	--	7.70	
MW-5	12/19/1996	Dup	39.14	8.62	--	30.52	26,000	490	430	63	1,140	<500	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	3/17/1997		39.14	8.22	--	30.92	5,500	1.9	2.4	<1.0	<1.0	29	--	--	--	--	--	--	--	6.40	
MW-5	3/17/1997	Dup	39.14	8.22	--	30.92	6,600	2.5	2.7	<1.0	<1.0	28	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	8/12/1997		39.14	12.18	0.22	26.74	33,000	6,400	2,400	680	4,400	<1,000	--	--	--	--	--	--	--	6.80	(g)
MW-5	8/12/1997	Dup	39.14	12.18	0.22	26.74	36,000	6,100	2,500	720	4,500	<500	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	12/10/1997		39.14	10.78	0.06	28.30	31,000	3,000	2,500	560	5,100	500	--	--	--	--	--	--	--	1.80	(g)
MW-5	12/10/1997	Dup	39.14	10.78	0.06	28.30	37,000	2,900	2,500	440	4,800	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	3/12/1998		39.14	10.11	0.22	28.81	100,000	1,600	870	250	2,600	<250	--	--	--	--	--	--	--	6.10	(g)
MW-5	6/23/1998		39.14	10.20	0.02	28.92	27,000	2,500	840	370	2,900	<250	--	--	--	--	--	--	--	2.10	
MW-5	6/23/1998	Dup	39.14	10.20	0.02	28.92	27,000	2,600	840	400	2,950	<500	--	--	--	--	--	--	--	--	(Dup)(e)
MW-5	8/25/1999		39.14	14.69	0.38	24.07	180,000	2,700	400	830	2,800	26	--	--	--	--	--	--	--	--	(g)
MW-5	3/9/2000		39.14	14.83	0.60	23.71	53,000	12,000	2,600	1,900	9,100	<5.0	--	--	--	--	--	--	--	--	(g)
MW-5	3/8/2002		39.14	11.45	1.50	26.19	33,000	8,240	1,080	1,010	2,900	34.3	--	--	--	--	--	--	--	--	(g)
MW-5	3/18/2002		39.14	8.03	--	31.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/11/2003		39.14	9.60	0.45	29.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	12/9/2003		39.14	11.44	0.03	27.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/9/2004		39.14	7.91	--	31.23	31,000	3,900	1,100	780	3,600	<50	<2,000	<50	<50	<50	<10,000	96	<50	--	
MW-5	9/17/2004		39.14	12.13	0.15	27.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/7/2005		39.14	8.62	0.02	30.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/6/2005		39.14	11.16	0.18	27.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/6/2006		39.14	8.60	--	30.54	32,000	7,500	810	1,200	2,300	<50	<2,000	60	<50	<50	<30,000	<50	<50	--	(g,b)
MW-5	9/5/2006		39.14	6.16	0.03	32.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/5/2007		39.14	8.34	--	30.80	90,000	10,000	4,200	1,900	7,900	<50	<2,000	57	<50	<50	<30,000	<50	<50	1.30	(b)
MW-5	9/7/2007		39.14	15.15	0.15	23.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	1/14/2008		39.14	10.30	0.49	28.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	2/27/2008		39.14	13.22	0.12	25.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/6/2008		39.14	12.90	0.14	26.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/3/2008		39.14	12.90	0.99	26.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/4/2009		39.14	8.45	0.16	30.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	4/8/2009		39.14	9.05	0.67	30.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	5/11/2009		39.14	9.10	0.32	30.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	6/16/2009		39.14	9.15	0.02	29.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	7/22/2009		39.14	9.33	0.12	29.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	8/6/2009		39.14	10.05	0.01	29.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/30/2009		39.14	10.55	0.06	28.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	10/28/2009		39.14	10.48	--	28.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/23/2010		39.14	7.10	--	32.04	67,000	1,400	380	620	1,800	<5.0	<40	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	--	
MW-5	6/10/2010		39.14	8.26	--	30.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/16/2010		39.14	9.14	--	30.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	2/23/2011		39.14	8.33	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/28/2011		39.14	10.46	--	28.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/8/2012		39.14	10.27	--	28.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/5/2012		39.14	11.80	1.40	27.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	3/20/2013		39.14	9.73	0.02	29.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-5	9/20/2013		39.14	10.26	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,i)
MW-5	3/13/2014		39.14	9.74	--	29.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-5	9/25/2014		39.14	11.88	--	27.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-5	3/10/2015		39.14	9.89	0.01	29.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-5	9/21/2015		39.14	12.02	--	27.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(i,m)
MW-5	3/29/2016		39.14	6.80	--	32.34	17,200	2,240	178 (J)	626	667	<100	<500	<100	<100	<100	5,640 (J)	<100	<100	0.51	(o,p)

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-5	9/29/2016		39.14	12.65	0.07	26.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,i)
MW-5	3/7/2017		39.14	6.83	--	32.31	19,700	3,320	250	975	633	<100	<500	<100	<100	<100	<10,000	<100	<100	0.23	(p)
MW-5	9/22/2017		39.14	11.98	0.02	27.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,p,k)
MW-5	3/9/2018		39.14	9.52	--	29.62	19,700	7,020	300	1,290	518	<125	553 (B,J)	51 J	<125	<125	2.86 (J)	187	<125	--	(n,p)
MW-6	10/3/1991		41.59	20.73	--	20.86	<50	0.7	0.8	<0.3	1.3	--	--	--	--	--	--	--	--	--	
MW-6	10/15/1991		41.59	21.20	--	20.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/4/1991		41.59	21.26	--	20.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/16/1991		41.59	21.12	--	20.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	1/6/1992		41.59	20.29	--	21.30	<50	<0.5	<0.5	<0.5	1.6	--	--	--	--	--	--	--	--	--	
MW-6	1/22/1992		41.59	20.12	--	21.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	1/28/1992		41.59	20.20	--	21.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/5/1992		41.59	20.09	--	21.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/12/1992		41.59	19.15	--	22.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/17/1992		41.59	18.02	--	23.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/3/1992		41.59	16.62	--	24.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/8/1992		41.59	17.06	--	24.53	<50	0.6	<0.5	0.8	<0.5	--	--	--	--	--	--	--	--	--	
MW-6	4/14/1992		41.59	17.23	--	24.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/29/1992		41.59	18.12	--	23.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	5/7/1992		41.59	18.52	--	23.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	7/3/1992		41.59	19.71	--	21.88	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-6	10/8/1992		41.59	21.22	--	20.37	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-6	10/8/1992	Dup	41.59	21.22	--	20.37	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-6	12/31/1992		41.59	21.33	--	20.26	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-6	4/21/1993		41.59	16.45	--	25.14	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-6	7/7/1993		41.59	18.68	--	22.91	<50	<0.5	<0.5	<0.5	<0.5	28.96	--	--	--	--	--	--	--	--	
MW-6	9/21/1993		41.59	19.64	--	21.95	<50	<0.5	<0.5	<0.5	1.6	--	--	--	--	--	--	--	--	--	
MW-6	12/17/1993		41.59	21.08	--	20.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/23/1993		--	--	--	--	<50	<0.5	0.5	<0.5	0.6	13.95	--	--	--	--	--	--	--	--	
MW-6	4/7/1994		41.59	21.27	--	20.32	<50	<0.5	<0.5	<0.5	<0.5	35.1	--	--	--	--	--	--	--	6.10	
MW-6	7/6/1994		41.59	19.81	--	21.78	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	4.00	
MW-6	7/6/1994	Dup	41.59	19.81	--	21.78	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-6	10/7/1994		41.59	21.25	--	20.34	<50	<0.5	<0.5	<0.5	<0.5	24.3	--	--	--	--	--	--	--	3.50	
MW-6	1/27/1995		41.59	12.39	--	29.20	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	4.20	
MW-6	3/30/1995		41.59	11.34	--	30.25	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	6.10	
MW-6	6/20/1995		41.59	15.12	--	26.47	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	--	
MW-6	10/3/1995		41.59	20.68	--	20.91	<50	<0.50	<0.50	<0.50	<1.0	66	--	--	--	--	--	--	--	6.40	
MW-6	12/6/1995		41.59	23.77	--	17.82	<50	<0.50	<0.50	<0.50	<1.0	45	--	--	--	--	--	--	--	5.70	
MW-6	3/21/1996		41.59	11.55	--	30.04	<50	<0.5	<1.0	<1.0	<1.0	41	--	--	--	--	--	--	--	9.10	
MW-6	6/21/1996		41.59	12.60	--	28.99	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	8.60	
MW-6	9/6/1996		41.59	13.25	--	28.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	22	--	--	--	--	--	--	--	7.90	
MW-6	12/19/1996		41.59	11.45	--	30.14	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.70	
MW-6	3/17/1997		41.59	10.80	--	30.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	8/12/1997		41.59	13.11	--	28.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/10/1997		41.59	13.84	--	27.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/12/1998		41.59	11.17	--	30.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	6/23/1998		41.59	13.27	--	28.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/31/1999		41.59	12.91	--	28.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	8/25/1999		41.59	15.93	--	25.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/9/2000		41.59	11.49	--	30.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/8/2001		41.59	10.81	--	30.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/8/2002		41.59	14.28	--	27.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-6	3/18/2002		41.59	13.10	--	28.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/11/2003		41.59	13.63	--	27.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/9/2003		41.59	14.26	--	27.33	<50	<0.50	<0.50	<0.50	<0.50	12	<20	<0.50	<0.50	<0.50	<100	--	--	--	
MW-6	3/9/2004		41.59	11.87	--	29.72	<50	<0.50	<0.50	<0.50	<0.50	10	<20	<0.50	<0.50	<0.50	<100	0.58	<0.50	--	
MW-6	9/17/2004		41.59	16.45	--	25.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/7/2005		41.59	13.65	--	27.94	<50	<0.50	<0.50	<0.50	<0.50	5.8	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-6	9/6/2005		44.37	14.23	--	30.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/6/2006		44.37	12.89	--	31.48	<50	<0.50	<0.50	<0.50	<0.50	8.1	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-6	9/5/2006		44.37	14.10	--	30.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/5/2007		44.37	11.43	--	32.94	<50	<0.50	<0.50	<0.50	<0.50	5.6	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.57	
MW-6	9/7/2007		44.37	16.00	--	28.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/6/2008		44.37	11.84	--	32.53	<50	<0.50	<0.50	<0.50	<0.50	1.9	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.34	
MW-6	9/3/2008		44.37	16.24	--	28.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/4/2009		44.37	11.68	--	32.69	<50	<0.50	<0.50	<0.50	<0.50	2.8	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	4.66	
MW-6	9/30/2009		44.37	16.83	--	27.54	<50	<0.50	<0.50	<0.50	<0.50	4.4	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	0.10	
MW-6	10/28/2009		44.37	15.63	--	28.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/23/2010		44.37	11.48	--	32.89	<50	<0.50	<0.50	<0.50	<1.0	1	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-6	6/10/2010		44.37	12.54	--	31.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	9/16/2010		44.37	15.95	--	28.42	<50	<0.50	<0.50	<0.50	<1.0	0.8	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-6	2/23/2011		44.37	12.34	--	32.03	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
MW-6	9/28/2011		44.37	15.81	--	28.56	--	--	--	--	--	3.4	--	--	--	--	--	--	--	--	
MW-6	3/8/2012		44.37	15.51	--	28.86	--	--	--	--	--	0.58	--	--	--	--	--	--	--	--	
MW-6	9/5/2012		44.37	15.88	--	28.49	--	--	--	--	--	2.1	--	--	--	--	--	--	--	--	
MW-6	3/20/2013		44.37	14.36	--	30.01	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-6	9/20/2013		44.37	16.02	--	28.35	--	--	--	--	--	2.4	--	--	--	--	--	--	--	4.72	
MW-6	3/13/2014		44.37	15.43	--	28.94	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
MW-6	9/25/2014		44.37	17.15	--	27.22	--	--	--	--	--	2	--	--	--	--	--	--	--	2.67	
MW-6	3/10/2015		44.37	14.66	--	29.71	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	3.57	
MW-6	9/21/2015		44.37	18.54	--	25.83	--	--	--	--	--	1.88	--	--	--	--	--	--	--	2.29	
MW-6	3/29/2016		44.37	11.75	--	32.62	--	--	--	--	--	<1.00	--	--	--	--	--	--	--	0.28	(n)
MW-6	9/29/2016		44.37	19.12	--	25.25	--	--	--	--	--	1.93	--	--	--	--	--	--	--	0.81	(n)
MW-6	3/7/2017		44.37	9.68	--	34.69	--	--	--	--	--	0.597 (J)	--	--	--	--	--	--	--	2.05	(n)
MW-6	9/22/2017		44.37	18.61	--	25.76	--	--	--	--	--	2.46	--	--	--	--	--	--	--	0.88	(o)
MW-6	3/9/2018		44.37	15.16	--	29.21	--	--	--	--	--	0.587 (J)	--	--	--	--	--	--	--	--	(n)
MW-7	10/3/1991		40.64	14.93	--	25.71	360	62	13	3.4	20	--	--	--	--	--	--	--	--	--	
MW-7	10/15/1991		40.64	15.16	--	25.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/4/1991		40.64	15.41	--	25.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/16/1991		40.64	15.21	--	25.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	1/6/1992		40.64	14.56	--	26.08	1,100	170	<0.5	24	23	--	--	--	--	--	--	--	--	--	
MW-7	1/22/1992		40.64	14.63	--	26.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	1/28/1992		40.64	14.73	--	25.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	2/5/1992		40.64	14.58	--	26.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	2/12/1992		40.64	13.94	--	26.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	2/17/1992		40.64	13.10	--	27.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	4/3/1992		40.64	12.66	--	27.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	4/8/1992		40.64	12.77	--	27.87	750	150	<0.5	23	9.9	--	--	--	--	--	--	--	--	--	
MW-7	4/14/1992		40.64	13.02	--	27.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	4/29/1992		40.64	13.59	--	27.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	5/7/1992		40.64	13.95	--	26.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	7/3/1992		40.64	14.73	--	25.91	660	210	<2.5	33	8	--	--	--	--	--	--	--	--	--	
MW-7	10/8/1992		40.64	15.75	--	24.89	320	49	1.4	13	6.2	--	--	--	--	--	--	--	--	--	
MW-7	12/31/1992		40.64	13.57	--	27.07	900	100	<2.5	28	4.3	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-7	4/21/1993		40.64	14.56	--	26.08	510	83	1.2	10	5.8	--	--	--	--	--	--	--	--	--	
MW-7	7/7/1993		40.32	13.40	--	26.92	1,100	160	2	27	4	10.84	--	--	--	--	--	--	--	--	(f)
MW-7	7/7/1993	Dup	40.32	13.40	--	26.92	1,100	170	1.9	29	2.84	9.84	--	--	--	--	--	--	--	--	(Dup)(e)
MW-7	9/21/1993		40.32	14.40	--	25.92	690	150	3.1	26	5.7	--	--	--	--	--	--	--	--	--	
MW-7	9/21/1993	Dup	40.32	14.40	--	25.92	640	140	1.7	23	2.4	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-7	12/17/1993		40.32	13.65	--	26.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/23/1993		--	--	--	--	250	64	1.2	9	1.8	7.81	--	--	--	--	--	--	--	--	
MW-7	4/7/1994		40.32	30.62	--	9.70	140	32	1.4	<0.5	<0.5	6.32	--	--	--	--	--	--	--	--	
MW-7	7/6/1994		40.32	16.88	--	23.44	410	94	1.3	10	3.5	<5.0	--	--	--	--	--	--	--	4.40	
MW-7	10/7/1994		40.32	25.59	--	14.73	<50	9.2	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	4.90	
MW-7	1/27/1995		40.32	9.82	--	30.50	810	570	3	60	17	--	--	--	--	--	--	--	--	0.00	
MW-7	1/27/1995	Dup	40.32	9.82	--	30.50	930	620	4	77	21	--	--	--	--	--	--	--	--	--	(Dup)(e)
MW-7	3/30/1995		40.32	9.15	--	31.17	180	65	0.53	2	<1.0	--	--	--	--	--	--	--	--	7.80	
MW-7	6/20/1995		40.32	11.38	--	28.94	2,800	980	<5.0	<5.0	43	--	--	--	--	--	--	--	--	--	
MW-7	10/3/1995		40.32	29.95	--	10.37	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	
MW-7	12/6/1995		40.32	29.85	--	10.47	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	
MW-7	3/21/1996		40.32	9.76	--	30.56	1,000	390	2	40	13	<10	--	--	--	--	--	--	--	7.40	
MW-7	6/21/1996		40.32	11.01	--	29.31	<250	40	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	7.40	
MW-7	9/6/1996		40.32	11.68	--	28.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	9/9/1996		--	--	--	--	<250	13	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	7.20	
MW-7	12/19/1996		40.32	10.78	--	29.54	70	1.2	<1.0	1	<1.0	<10	--	--	--	--	--	--	--	8.30	
MW-7	3/17/1997		40.32	9.96	--	30.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	8/12/1997		40.32	11.44	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/10/1997		40.32	10.42	--	29.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/12/1998		40.32	9.51	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	6/23/1998		40.32	9.98	--	30.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/31/1999		40.32	10.38	--	29.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	8/25/1999		40.32	12.38	--	27.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/9/2000		40.32	8.48	--	31.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/8/2001		40.32	8.37	--	31.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/18/2002		40.32	9.94	--	30.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/11/2003		40.32	11.26	--	29.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/9/2003		40.32	12.76	--	27.56	270	26	<0.50	<0.50	<0.50	8.7	<20	<0.50	<0.50	<0.50	<100	--	--	--	
MW-7	3/9/2004		40.32	10.91	--	29.41	320	49	0.73	1.8	0.59	6.9	<20	<0.50	<0.50	<0.50	<100	1.2	<0.50	--	
MW-7	9/17/2004		40.32	13.20	--	27.12	330	17	<0.50	<0.50	<0.50	7	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-7	3/7/2005		40.32	8.18	--	32.14	340	41	0.79	0.79	0.73	7.2	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-7	9/6/2005		43.10	11.80	--	31.30	1,100	130	1.2	1.8	<1.5	16	30	0.6	<0.50	<0.50	<150	<0.50	<0.50	--	
MW-7	3/6/2006		43.10	8.39	--	34.71	440	31	0.78	0.74	0.81	8.3	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-7	9/5/2006		43.10	11.45	--	31.65	2,000	260	3.1	5.9	<2.5	12	<100	<2.5	<2.5	<2.5	<1,500	<2.5	<2.5	--	
MW-7	3/5/2007		43.10	9.31	--	33.79	2,200	110	2.2	4	1.8	7.6	<40	<1.0	<1.0	<1.0	<600	<1.0	<1.0	1.06	
MW-7	9/7/2007		43.10	12.18	--	30.92	220	8.4	<0.50	<0.50	<0.50	1.2	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	0.98	
MW-7	3/6/2008		43.10	10.05	--	33.05	1,800	54	1.2	1.1	<1.0	<1.0	<20	<1.0	<1.0	<1.0	<600	<1.0	<1.0	--	
MW-7	9/3/2008		43.10	13.17	--	29.93	540	13	0.69	<0.50	<0.50	5.5	17	<0.50	<0.50	<0.50	<300	<0.50	<0.50	4.77	
MW-7	3/4/2009		43.10	8.25	--	34.85	720	15	0.59	0.53	<0.50	3.4	12	<0.50	<0.50	<0.50	<300	<0.50	<0.50	1.29	
MW-7	9/30/2009		43.10	12.70	--	30.40	1,200	44	1	0.74	0.79	3.3	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	0.11	
MW-7	10/28/2009		43.10	11.17	--	31.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/23/2010		43.10	9.28	--	33.82	610	11	<0.50	<0.50	<1.0	<0.50	12	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-7	6/10/2010		43.10	10.24	--	32.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	9/16/2010		43.10	12.16	--	30.94	4,700	130	<5.0	7.4	<10	<5.0	<40	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	--	
MW-7	2/23/2011		43.10	9.62	--	33.48	2,200	26	1.1	1.4	1.6	4	<4.0	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-7	9/28/2011		43.10	11.80	--	31.30	3,800	380	4.8	28	4.3	9.5	13	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-7	3/8/2012		43.10	11.69	--	31.41	550	1.4	<0.50	<0.50	<1.0	2.3	<4.0	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-7	9/5/2012		43.10	11.60	--	31.50	830	16	1.3	0.66	1.4	3	<4.0	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-7	3/20/2013		43.10	10.88	--	32.22	--	--	--	--	--	3.4	--	--	--	--	--	--	--	--	
MW-7	9/20/2013		43.10	11.50	--	31.60	580	<0.50	<0.50	<0.50	<1.0	2.3	<10	<0.50	<0.50	<0.50	<250	<0.50	<0.50	4.18	
MW-7	3/13/2014		43.10	10.81	--	32.29	100	<0.50	<0.50	<0.50	<1.0	1.3	<10	<0.50	<0.50	<0.50	<250	<0.50	<0.50	--	
MW-7	9/25/2014		43.10	12.15	--	30.95	640	<0.50	<0.50	<0.50	<1.0	2.6	<20	<0.50	<0.50	<0.50	<500	<0.50	<0.50	1.51	(i)
MW-7	3/10/2015		43.10	10.75	--	32.35	310	0.8	<0.50	<0.50	<1.0	1.9	<20	<0.50	<0.50	<0.50	<500	<0.50	<0.50	1.52	
MW-7	9/21/2015		43.10	13.52	--	29.58	3,120	0.351 (J)	<5.00	<1.00	<3.00	2.29	8.53	<1.00	<1.00	<1.00	<100	<1.00	<1.00	2.26	
MW-7	3/29/2016		43.10	9.00	--	34.10	457	2.69	<5.00	0.496 (J)	<3.00	2.7	4.78 (J)	<1.00	<1.00	<1.00	73.0 (J)	<1.00	<1.00	1.92	(i,n)
MW-7	9/29/2016		43.10	13.81	--	29.29	1,400	3.78	<5.00	0.768 (J)	1.43 (J)	3.18	7.41	<1.00	<1.00	<1.00	<100	<1.00	<1.00	1.41	(n)
MW-7	3/7/2017		43.10	7.29	--	35.81	995	14.8	0.52 (J)	1.95	<3.00	2.67	6.99	<1.00	<1.00	<1.00	<100	<1.00	<1.00	0.36	(n)
MW-7	9/22/2017		43.10	13.36	--	29.74	5,530	384	2.63	51.6	3.69	2.04	<5.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	0.42	(o)
MW-7	3/9/2018		43.10	11.03	--	32.07	1,620	6.71	0.202 (J)	0.607 (J)	1.56 (J)	<1.00	<10	<1.00	<1.00	<1.00	2.84 (J)	<1.00	<1.00	--	(n)
MW-8	10/3/1991		38.18	22.37	--	15.81	<50	<0.3	0.6	<0.3	0.9	--	--	--	--	--	--	--	--	--	
MW-8	10/15/1991		38.18	22.70	--	15.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/4/1991		38.18	22.44	--	15.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/16/1991		38.18	22.47	--	15.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	1/6/1992		38.18	21.94	--	16.24	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-8	1/22/1992		38.18	21.44	--	16.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	1/28/1992		38.18	21.20	--	16.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/5/1992		38.18	20.88	--	17.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/12/1992		38.18	20.54	--	17.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/17/1992		38.18	19.99	--	18.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	4/3/1992		38.18	16.75	--	21.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	4/8/1992		38.18	16.57	--	21.61	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-8	4/29/1992		38.18	18.61	--	19.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	5/7/1992		38.18	18.41	--	19.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	7/3/1992		38.18	20.35	--	17.83	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-8	10/8/1992		38.18	21.74	--	16.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/31/1992		38.18	19.09	--	19.09	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-8	4/21/1993		38.18	18.92	--	19.26	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-8	7/7/1993		38.18	17.76	--	20.42	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
MW-8	9/21/1993		38.18	19.71	--	18.47	<50	2.9	2.2	2.2	7.1	--	--	--	--	--	--	--	--	--	
MW-8	12/17/1993		38.18	21.33	--	16.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.6	<5.0	--	--	--	--	--	--	--	--	
MW-8	4/7/1994		38.18	21.51	--	16.67	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	6.60	
MW-8	7/6/1994		38.18	17.41	--	20.77	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	4.40	
MW-8	10/7/1994		38.18	19.20	--	18.98	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	3.70	
MW-8	1/27/1995		38.18	12.25	--	25.93	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	2.90	
MW-8	3/30/1995		38.18	10.35	--	27.83	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	8.30	
MW-8	6/20/1995		38.18	13.37	--	24.81	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	6.90	
MW-8	12/6/1995		38.18	18.42	--	19.76	<50	<0.50	<0.50	<0.50	<1.0	47	--	--	--	--	--	--	--	5.30	
MW-8	6/21/1996		38.18	13.03	--	25.15	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.00	
MW-8	9/6/1996		38.18	13.70	--	24.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.00	
MW-8	12/19/1996		38.18	11.93	--	26.25	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.60	
MW-8	3/17/1997		38.18	11.29	--	26.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	8/12/1997		38.18	13.73	--	24.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/10/1997		38.18	11.88	--	26.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/12/1998		38.18	11.89	--	26.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	6/23/1998		38.18	11.33	--	26.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/31/1999		38.18	12.68	--	25.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	8/25/1999		38.18	14.93	--	23.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/9/2000		38.18	9.14	--	29.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-8	3/8/2001		38.18	8.41	--	29.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/8/2002		38.18	11.18	--	27.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/18/2002		38.18	10.72	--	27.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/11/2003		38.18	10.46	--	27.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/9/2004		38.18	9.79	--	28.39	<50	<0.50	<0.50	<0.50	<0.50	0.5	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-8	9/17/2004		38.18	15.35	--	22.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/7/2005		38.18	7.94	--	30.24	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-8	9/6/2005		40.95	13.06	--	27.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/6/2006		40.95	9.26	--	31.69	<50	<0.50	<0.50	<0.50	<0.50	0.59	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-8	9/5/2006		40.95	12.61	--	28.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/5/2007		40.95	9.12	--	31.83	<50	<0.50	<0.50	<0.50	0.53	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	6.79	
MW-8	9/7/2007		40.95	13.56	--	27.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/6/2008		40.95	9.80	--	31.15	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	4.14	
MW-8	9/3/2008		40.95	14.20	--	26.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/4/2009		40.95	9.51	--	31.44	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.62	
MW-8	9/30/2009		40.95	14.92	--	26.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	10/28/2009		40.95	13.56	--	27.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	6/10/2010		40.95	11.06	--	29.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/16/2010		40.95	14.41	--	26.54	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-8	9/28/2011		40.95	13.87	--	27.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/8/2012		40.95	13.27	--	27.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/5/2012		40.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/20/2013		40.95	11.90	--	29.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/20/2013		40.95	13.88	--	27.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/13/2014		40.95	14.29	--	26.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/25/2014		40.95	15.72	--	25.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-8	3/10/2015		40.95	12.65	--	28.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-8	9/21/2015		40.95	16.85	--	24.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-8	3/29/2016		40.95	9.94	--	31.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-8	9/29/2016		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(q,l)
MW-8	3/7/2017		40.95	7.73	--	33.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-8	9/22/2017		40.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(q,l)
MW-8	3/9/2018		40.95	13.20	--	27.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	10/3/1991		41.25	14.12	--	27.13	<50	<0.3	0.4	<0.3	<0.3	--	--	--	--	--	--	--	--	--	
MW-9	10/15/1991		41.25	14.27	--	26.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/4/1991		41.25	13.84	--	27.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/16/1991		41.25	14.18	--	27.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	1/6/1992		41.25	13.42	--	27.83	<50	<0.5	<0.5	<0.5	0.9	--	--	--	--	--	--	--	--	--	
MW-9	1/22/1992		41.25	13.75	--	27.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	1/28/1992		41.25	14.76	--	26.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/5/1992		41.25	13.38	--	27.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/12/1992		41.25	11.86	--	29.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/17/1992		41.25	10.78	--	30.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/3/1992		41.25	11.63	--	29.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/8/1992		41.25	12.25	--	29.00	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-9	4/14/1992		41.25	12.32	--	28.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/29/1992		41.25	13.07	--	28.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	5/7/1992		41.25	14.43	--	26.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	7/3/1992		41.25	13.85	--	27.40	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-9	10/8/1992		41.25	14.89	--	26.36	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-9	12/31/1992		41.25	11.90	--	29.35	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
MW-9	4/21/1993		41.25	13.68	--	27.57	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-9	7/7/1993		41.25	13.12	--	28.13	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
MW-9	9/21/1993		41.25	14.00	--	27.25	<50	<0.5	<0.5	<0.5	0.9	--	--	--	--	--	--	--	--	--	
MW-9	12/17/1993		41.25	12.98	--	28.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.9	<5.0	--	--	--	--	--	--	--	--	
MW-9	4/7/1994		41.25	13.24	--	28.01	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	4.70	
MW-9	7/6/1994		41.25	13.77	--	27.48	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	3.90	
MW-9	10/7/1994		41.25	14.60	--	26.65	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	3.00	
MW-9	1/27/1995		41.25	8.47	--	32.78	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	2.50	
MW-9	3/30/1995		41.25	8.19	--	33.06	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	8.40	
MW-9	6/20/1995		41.25	11.25	--	30.00	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	8.10	
MW-9	10/3/1995		41.25	14.68	--	26.57	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	6.00	
MW-9	12/6/1995		41.25	16.07	--	25.18	<50	<0.50	<0.50	<0.50	<1.0	46	--	--	--	--	--	--	--	5.40	
MW-9	3/21/1996		41.25	9.60	--	31.65	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	8.00	
MW-9	6/21/1996		41.25	10.86	--	30.39	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.80	
MW-9	9/6/1996		41.25	11.52	--	29.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	21	--	--	--	--	--	--	--	7.30	
MW-9	12/19/1996		41.25	10.43	--	30.82	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.30	
MW-9	3/17/1997		41.25	9.87	--	31.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	8/12/1997		41.25	11.44	--	29.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/10/1997		41.25	10.44	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/12/1998		41.25	9.50	--	31.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	6/23/1998		41.25	10.06	--	31.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/31/1999		41.25	9.06	--	32.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	8/25/1999		41.25	12.00	--	29.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/9/2000		41.25	10.57	--	30.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2001		41.25	9.73	--	31.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2002		41.25	11.89	--	29.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/18/2002		41.25	9.68	--	31.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/11/2003		41.25	9.21	--	32.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/9/2004		41.25	10.99	--	30.26	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-9	9/17/2004		41.25	13.35	--	27.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/7/2005		41.25	8.94	--	32.31	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-9	9/6/2005		44.06	11.99	--	32.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/6/2006		44.06	8.26	--	35.80	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	--	
MW-9	9/5/2006		44.06	11.63	--	32.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/5/2007		44.06	9.33	--	34.73	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.50	<0.50	2.22	
MW-9	9/7/2007		44.06	12.28	--	31.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/6/2008		44.06	10.11	--	33.95	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	3.72	
MW-9	9/3/2008		44.06	13.49	--	30.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/4/2009		44.06	8.15	--	35.91	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	4.03	
MW-9	9/30/2009		44.06	12.98	--	31.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	10/28/2009		44.06	11.98	--	32.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/23/2010		44.06	10.59	--	33.47	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.50	<0.50	--	
MW-9	6/10/2010		44.06	10.25	--	33.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/23/2011		44.06	9.71	--	34.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/28/2011		44.06	11.66	--	32.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2012		44.06	11.56	--	32.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/5/2012		44.06	11.18	--	32.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/20/2013		44.06	10.00	--	34.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/20/2013		44.06	10.91	--	33.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/13/2014		44.06	9.96	--	34.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/25/2014		44.06	11.53	--	32.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(I)
MW-9	3/10/2015		44.06	10.27	--	33.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(I)

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-9	9/21/2015		44.06	13.41	--	30.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	3/29/2016		44.06	10.58	--	33.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	9/29/2016		44.06	13.74	--	30.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	3/7/2017		44.06	6.91	--	37.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	9/22/2017		44.06	13.60	--	30.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-9	3/9/2018		44.06	11.05	--	33.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(l)
MW-10	6/16/2009		39.78	8.60	0.01	31.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	7/22/2009		39.78	9.68	0.01	30.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	8/6/2009		39.78	9.48	--	30.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	9/30/2009		39.78	9.69	0.01	30.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	10/28/2009		39.78	8.53	--	31.25	62,000	8,300	5,300	3,100	12,000	<50	<400	<50	<50	<50	<10,000	<50	<50	--	
MW-10	3/23/2010		39.78	7.70	--	32.08	59,000	6,500	4,800	2,300	9,700	<100	<800	<100	<100	<100	<20,000	<100	<100	--	(b)
MW-10	6/10/2010		39.78	8.93	0.01	30.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	9/16/2010		39.78	9.69	0.01	30.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	2/23/2011		39.78	7.99	--	31.79	61,000	7,000	5,300	2,800	12,000	<100	<800	<100	<100	<100	<50,000	<100	<100	--	
MW-10	9/28/2011		39.78	10.36	0.31	29.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	3/8/2012		39.78	10.51	0.32	29.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	9/5/2012		39.78	10.25	0.01	29.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	3/20/2013		39.78	9.48	0.01	30.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-10	9/20/2013		39.78	10.50	--	29.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,i)
MW-10	3/13/2014		39.78	9.81	--	29.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-10	9/25/2014		39.78	11.08	--	28.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-10	3/10/2015		39.78	9.60	--	30.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(i)
MW-10	9/21/2015		39.78	11.75	--	28.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(i,m)
MW-10	3/29/2016		39.78	7.04	--	32.74	43,800	2,040	1,570	2,850	8,020	<100	<500	<100	<100	<100	5,760 (J)	<100	<100	0.71	(o,p)
MW-10	9/29/2016		39.78	12.17	0.01	27.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,i)
MW-10	3/7/2017		39.78	6.38	--	33.40	33,900	946	576	1,230	5,450	<100	<500	<100	<100	<100	<10,000	<100	<100	0.33	(p)
MW-10	9/22/2017		39.78	10.99	--	28.79	45,800	2,500	786	2,080	4,750	<100	<500	<100	<100	<100	<10,000	<100	<100	0.57	(o)
MW-10	3/9/2018		39.78	8.25	--	31.53	28,100	1,280	582	1,850	4,850	<125	<1,250	<125	<125	<125	<12,500	<125	<125	--	(p)
MW-11	9/30/2009		40.04	10.55	--	29.49	30,000	850	1,400	1,000	3,700	27	<200	<10	<10	<10	<6,000	<10	<10	--	
MW-11	10/28/2009		40.04	8.00	--	32.04	27,000	1,100	2,300	1,500	5,800	<50	<400	<50	<50	<50	<10,000	<50	<50	--	
MW-11	3/23/2010		40.04	7.25	--	32.79	21,000	530	830	790	2,200	<25	<200	<25	<25	<25	<5,000	<25	<25	--	
MW-11	6/10/2010		40.04	9.65	--	30.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-11	9/16/2010		40.04	9.42	--	30.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-11	2/23/2011		40.04	7.60	--	32.44	10,000	380	260	330	540	7.2	<40	<5.0	<5.0	<5.0	<2,500	<5.0	<5.0	--	
MW-11	9/28/2011		40.04	9.88	--	30.16	5,900	230	92	260	370	6.4	26	<2.5	<2.5	<2.5	<1,300	<2.5	<2.5	--	
MW-11	3/8/2012		40.04	9.71	--	30.33	5,000	280	170	250	380	<5.0	<40	<5.0	<5.0	<5.0	<2,500	<5.0	<5.0	--	
MW-11	9/5/2012		40.04	10.60	--	29.44	22,000	1,000	1,600	1,200	4,500	6.2	<40	<5.0	<5.0	<5.0	<2,500	<5.0	<5.0	--	
MW-11	3/20/2013		40.04	9.54	--	30.50	16,000	250	620	680	2,200	<10	<80	<10	<10	<10	<5,000	<10	<10	--	(i)
MW-11	9/20/2013		40.04	10.55	--	29.49	10,000	120	130	320	720	<10	<200	<10	<10	<10	<5,000	<10	<10	4.29	
MW-11	3/13/2014		40.04	9.71	--	30.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-11	9/25/2014		40.04	10.91	--	29.13	1,600	39	14	40	56	0.64	<20	<0.50	<0.50	<0.50	<500	<0.50	<0.50	3.05	(i)
MW-11	3/10/2015		40.04	9.49	--	30.55	7,600	130	90	260	520	<0.50	<20	<0.50	<0.50	<0.50	<500	<0.50	<0.50	1.40	
MW-11	9/21/2015		40.04	11.87	--	28.17	8,610	155	75.1	161	359	1.96	<5.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	2.23	(i)
MW-11	3/29/2016		40.04	6.95	--	33.09	20,000	193	86.1	285	316	1.34	7.03	<1.00	<1.00	<1.00	<100	<1.00	<1.00	0.67	(n)
MW-11	9/29/2016		40.04	12.43	--	27.61	9,380	244 (J3)	73 (J, J3)	173 (J3)	319 (J3)	<20 (J3)	<100	<20 (J3)	<20	<20	<2,000	<20 (J3)	<20 (J3)	0.74	(n)
MW-11	3/7/2017		40.04	6.29	--	33.75	8,570	106	35.6	109	103	<25	<125	<25	<25	<25	<2,500	<25	<25	0.19	(n)
MW-11	9/22/2017		40.04	11.60	--	28.44	4,080	123	34.3	78.6	91.8	1.71	<5.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	0.35	(n)
MW-11	3/9/2018		40.04	8.74	--	31.30	4,070 (J)	353	97.2	170	167	<50	100 (B,J)	<50	<50	<50	8.85 (J)	<50	<50	--	(n)
MW-12	9/30/2009		40.32	11.02	0.02	29.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical Groundwater Monitoring Data
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

ARCADIS Design & Consultancy for natural and built assets

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
MW-12	10/28/2009		40.32	10.40	--	29.92	43,000	5,800	800	2,900	6,800	<50	<400	<50	<50	<50	<10,000	<50	<50	--	(z)
MW-12	3/23/2010		40.32	11.46	--	28.86	39,000	4,800	1,000	3,100	6,400	<25	<200	<25	<25	<25	<5,000	<25	<25	--	(b)
MW-12	6/10/2010		40.32	11.35	--	29.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-12	9/16/2010		40.32	11.54	0.02	28.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	2/23/2011		40.32	10.80	0.10	29.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	9/28/2011		40.32	11.48	0.20	28.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	3/8/2012		40.32	11.92	0.32	28.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	9/5/2012		40.32	11.63	1.43	29.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	3/20/2013		40.32	10.13	0.04	30.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-12	9/20/2013		40.32	10.92	--	29.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,i)
MW-12	3/13/2014		40.32	10.60	--	29.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,k)
MW-12	9/25/2014		40.32	11.42	--	28.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b)
MW-12	3/10/2015		40.32	10.45	--	29.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,i)
MW-12	9/21/2015		40.32	12.04	--	28.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(i,m)
MW-12	3/29/2016		40.32	8.91	--	31.41	30,700	2,840	288	3,600	1,870	<25	<125	<25	<25	<25	1,110 (J)	<25	<25	0.73	(o,p)
MW-12	9/29/2016		40.32	12.53	0.03	27.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g,i)
MW-12	3/7/2017		40.32	7.30	0.02	33.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	9/22/2017		40.32	11.86	--	28.46	30,100	2,680	273	2,860	1,900	<25	<125	<25	<25	<25	<2,500	<25	<25	0.36	(o)
MW-12	3/9/2018		40.32	9.56	--	30.76	22,300	2,040	179	2,460	1,510	<125	349 (B, J)	<125	<125	<125	693 (J)	63.9 (J)	<125	--	(p)
QC-2	10/8/1992		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	12/31/1992		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	7/7/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.6	--	--	--	--	--	--	--	--	--	(h)
QC-2	9/21/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	4/7/1994		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	7/6/1994		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	10/7/1994		--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	(h)
QC-2	1/27/1995		--	--	--	--	<50	<0.5	0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	--	(h)
QC-2	3/30/1995		--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	--	(h)
QC-2	6/20/1995		--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	--	(h)
QC-2	10/3/1995		--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	(h)
QC-2	12/6/1995		--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	(h)
QC-2	3/21/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	(h)
QC-2	6/21/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	(h)

Notes:
B = Benzene
1,2-DCA = 1,2-Dichloroethane
DIPE = Di-isopropyl ether
DO = Dissolved oxygen
DTW = Depth to water in ft btoc
E = Ethylbenzene
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert butyl ether
GRO = Gasoline range organics, range C6-C12
GW Elev = Groundwater measured in ft msl
LNAPL = Light non-aqueous phase liquid
MTBE = Methyl tert butyl ether
T = Toluene
TAME = Tert-amyl methyl ether
TBA = Tert-butyl alcohol
TOC = Top of casing measured in ft (surveyed)

X = Xylenes, total
µg/L = Micrograms per liter
mg/L = Milligrams per liter
ft = feet
ft btoc = feet below top of casing
ft msl = feet relative to mean sea level
Dup = Duplicate sample
SHEEN = Sheen detected in well
-- = Not analyzed/applicable/measured/ available
< = Not detected at or above reported detection limit
J = Estimated value between the reporting limit and method detection limit
J3 = The associated batch QC was outside the established quality control range for precision
(a) Sample exceeded EPA recommended holding time
(b) Sheen in well
(c) Well not sampled due to damage during site construction
(d) Insufficient water to sample
(e) Blind duplicate
(f) TOC lowered
(g) Free product in well
(h) Trip Blank
(i) Hydrocarbon odor observed at wellhead
(j) Well is dry
(k) GWE adjusted assuming specific gravity of 0.75 for free product
(l) Well not sampled in accordance with groundwater sampling schedule
(m) SoakEase present in well, but no NAPL. Replaced SoakEase and no sample collection.
(n) Replaced hydrosleeve
(o) No hydrosleeve upon arrival, deployed new hydrosleeve to collect sample, no hydrosleeve replaced
(p) Replaced SPH sock
(q) Well was inaccessible
(*) Laboratory control sample and/ or laboratory control sample duplicate exceeds the control limits
1. Beginning in the fourth quarter 2003, the laboratory modified the reported analyte list. TPH-g was changed to GRO. The resulting data may be impacted by the potential of non-TPH-g analytes within the requested fuel range resulting in a higher concentration being reported.
2. Beginning in the second quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12.
3. GRO analysis was completed by EPA method 8260B (C4-C12) for samples collected from the time period April 2006 through February 4, 2008. The analysis for GRO was changed to EPA method 8015B (C6-C12) for samples collected from the time period February 5, 2008 through the present.
4. The data within this table collected prior to April 2006 was provided to ARCADIS U.S., Inc. by Atlantic Richfield Company and their previous consultants. ARCADIS U.S., Inc. has not verified the accuracy of this information.

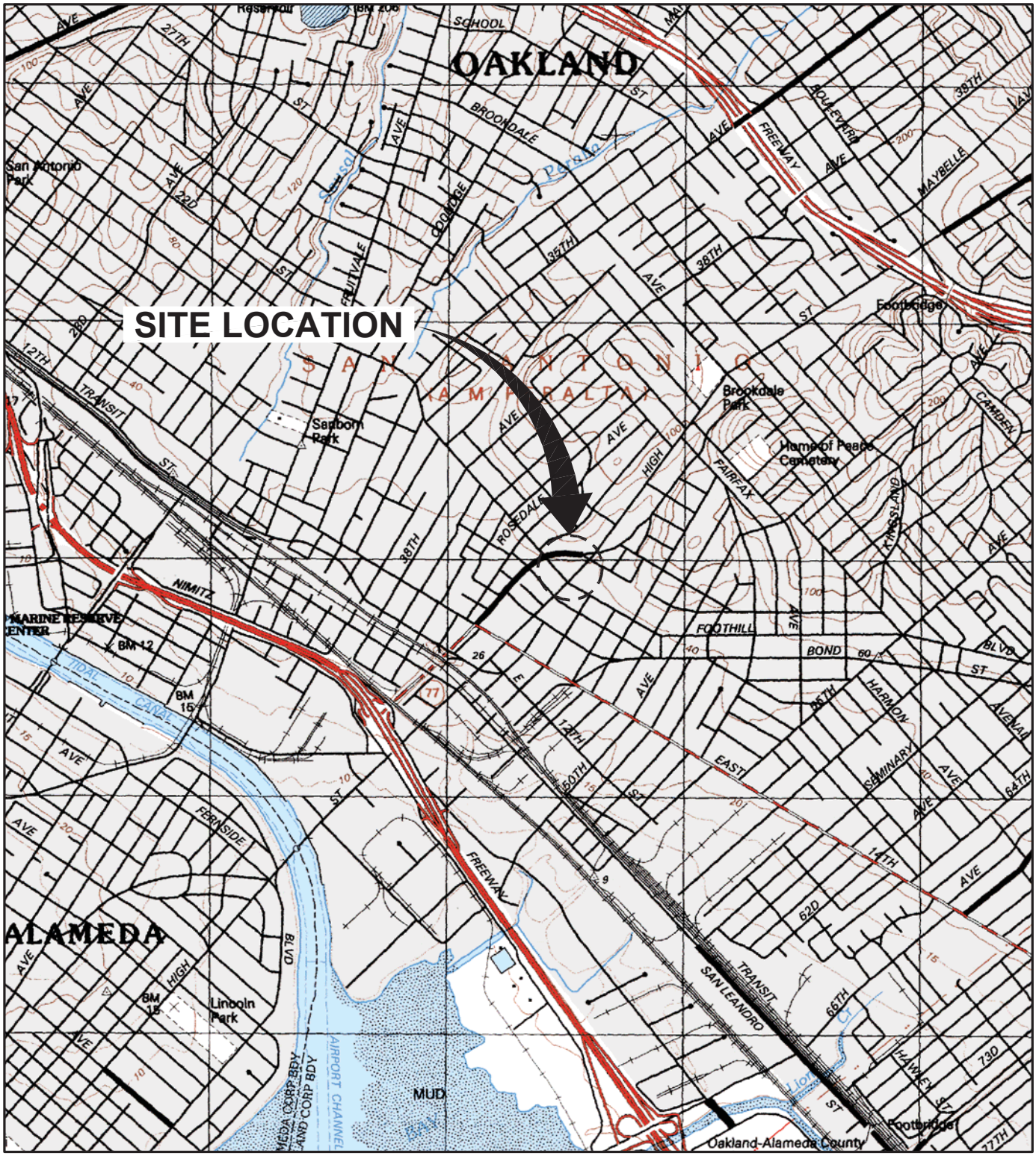
Table 3
Historical Groundwater Flow Direction and Gradient
CA-11109
4280 Foothill Blvd., Oakland, CA

ARCADIS Design & Consultancy for natural and built assets

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
3/6/2006	Southwest	0.05
9/5/2006	Southwest	0.05
2/21/2007	Southwest	0.02
9/7/2007	Southwest	0.03
3/6/2008	Southwest	0.01
9/3/2008	Southwest	0.006
3/4/2009	Southwest	0.02
9/30/2009	Northwest	0.07
10/28/2009	Northwest	0.04
3/23/2010	Northwest	0.03
6/10/2010	Northwest	0.02
9/16/2010	Northwest	0.07
2/23/2011	Northwest	0.04
9/28/2011	Northwest	0.02
3/8/2012	Northwest	0.06
9/5/2012	West-Northwest	0.04
3/20/2013	Southwest	0.03
9/20/2013	Southwest	0.03
3/13/2014	P	0.05
9/25/2014	Southwest	0.05
3/10/2015	Southwest	0.05
9/21/2015	Southwest	0.03
3/29/2016	Southwest	0.07
9/29/2016	Southwest	0.05
3/7/2017	Southwest	0.05
9/22/2017	West-Northwest and Southwest	0.03 and 0.08
3/9/2018	West and Southwest	0.04 and 0.07

Notes:
N/A = Not Available
ft/ft = Feet per foot
Note: All data collected following September 2009 was collected by Arcadis U.S., Inc. (Arcadis). The data within this table collected prior to September 2009 was provided to Arcadis by Atlantic Richfield Company and their previous consultants.

FIGURES



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD.,OAKLAND WEST, CA., 1993, AND SAN LEANDRO, 1993, REVISED 1996.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

FORMER BP STATION #11109
4280 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: B. McKENNA LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Petaluma\ACTIVE\09BPNAC106\E0000\GP09BPNAC106-1.dwg LAYOUT: 1SAVED: 11/20/2009 8:30 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: SETUP1PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/20/2009 8:40 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ---
GP09BX01.tif
GP09BX03.tiff

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: MSI01059 LD: PIC: PM: TM:
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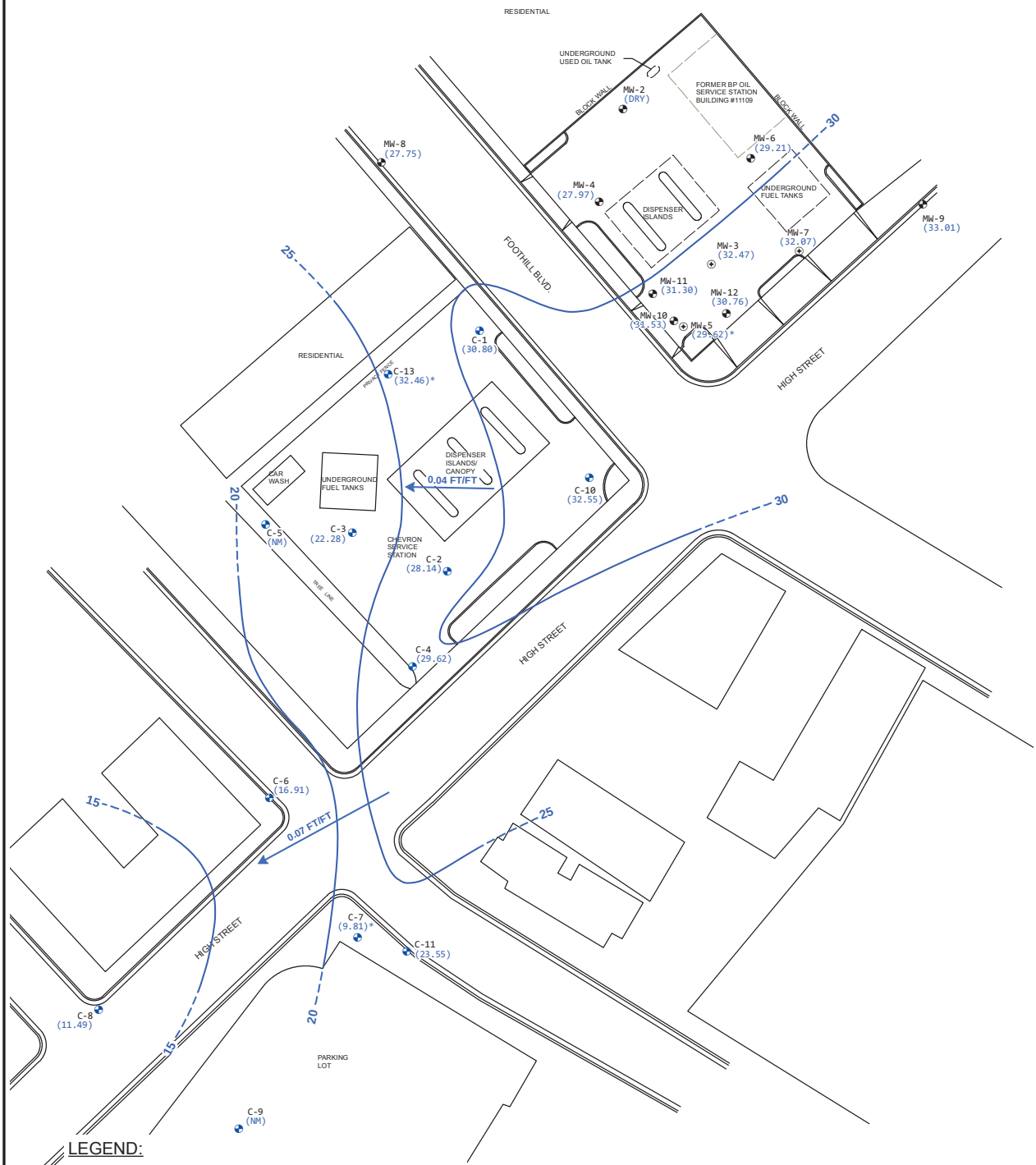


LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL-CHEVRON
- RECOVERY POINT
- (33.01) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 30 GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- 0.07 FT/FT GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)
- (DRY) WELL DRY
- (NM) NOT MEASURED
- * NOT USED FOR CONTOURING

NOTES:
1. GROUNDWATER ELEVATIONS AT ADJACENT CHEVRON SITE CALCULATED BASED ON FIELD DEPTH TO WATER DATA MEASURED ON MARCH 09, 2018 AND PROVIDED BY CHEVRON; TOP OF CASING MEASUREMENTS AVAILABLE ON GEOTRACKER.

0 50 100
SCALE IN FEET

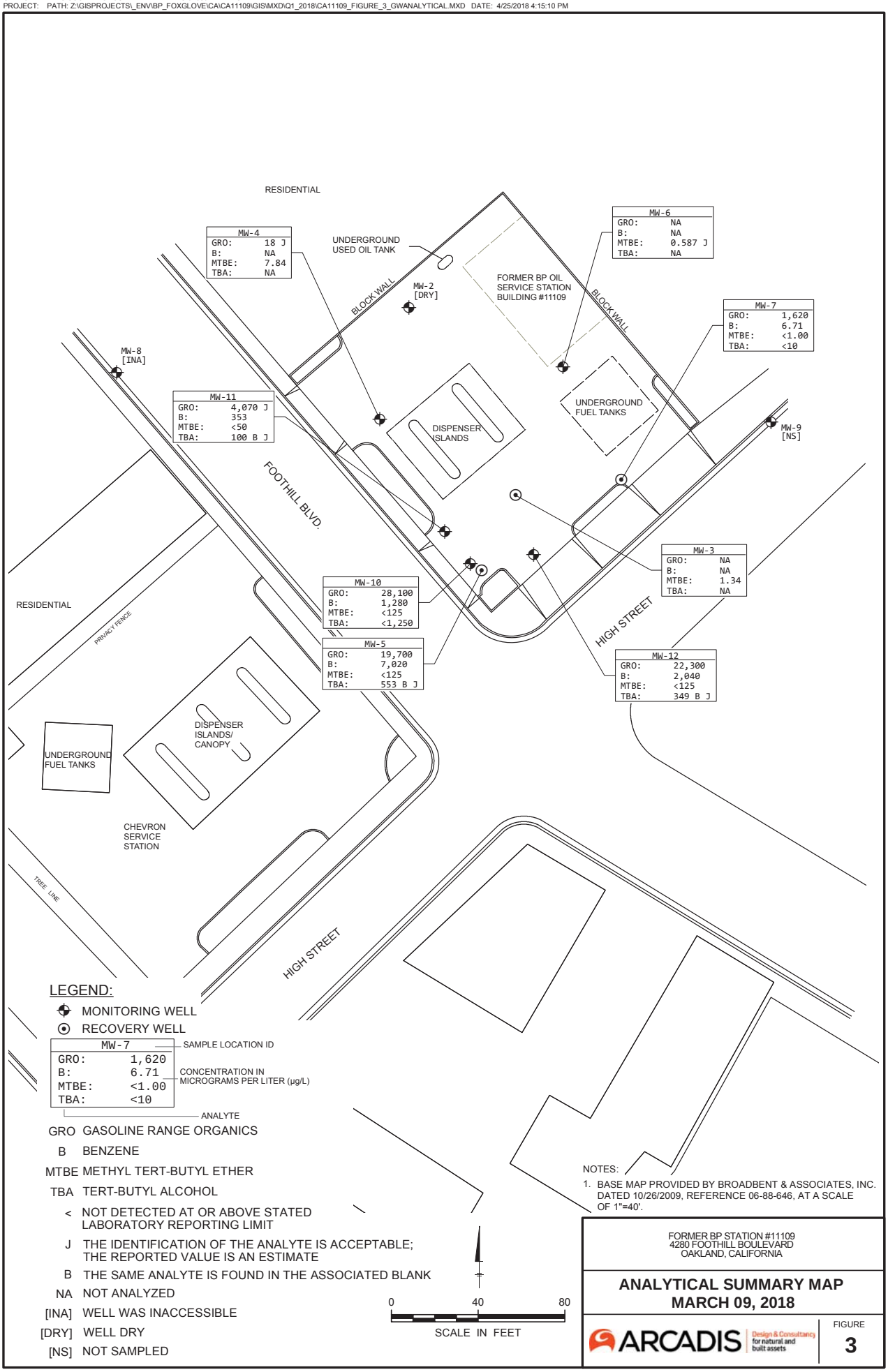
NOTES:
1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC. DATED 10/26/2009, REFERENCE 06-88-646, AT A SCALE OF 1"=40'.

FORMER BP STATION #11109
4280 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP - MARCH 09, 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2



LEGEND:

- MONITORING WELL
- RECOVERY WELL

MW-7	
GRO:	1,620
B:	6.71
MTBE:	<1.00
TBA:	<10

SAMPLE LOCATION ID

CONCENTRATION IN MICROGRAMS PER LITER (µg/L)

ANALYTE

- GRO GASOLINE RANGE ORGANICS
- B BENZENE
- MTBE METHYL TERT-BUTYL ETHER
- TBA TERT-BUTYL ALCOHOL
- < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT
- J THE IDENTIFICATION OF THE ANALYTE IS ACCEPTABLE; THE REPORTED VALUE IS AN ESTIMATE
- B THE SAME ANALYTE IS FOUND IN THE ASSOCIATED BLANK
- NA NOT ANALYZED
- [INA] WELL WAS INACCESSIBLE
- [DRY] WELL DRY
- [NS] NOT SAMPLED

0 40 80

SCALE IN FEET

NOTES:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC. DATED 10/26/2009, REFERENCE 06-88-646, AT A SCALE OF 1"=40'.

FORMER BP STATION #11109
4280 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

ANALYTICAL SUMMARY MAP
MARCH 09, 2018

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

ATTACHMENT 1

Field Methods

QUALITY ASSURANCE/QUALITY CONTROL
FIELD METHODS

Field methods discussed herein were implemented to provide for accuracy and reliability of field activities, data collection, sample collection, and handling. Discussion of these methods is provided below.

1.0 Equipment Calibration

Equipment calibration was performed per equipment manufacturer specifications before use.

2.0 Depth to Groundwater and Light Non-Aqueous Phase Liquid Measurement

Depth to groundwater was measured in wells identified for gauging in the scope of work using a decontaminated water level indicator. The depth to water measurement was taken from a cut notch or permanent mark at the top of the well casing to which the well head elevation was originally surveyed.

Once depth to water was measured, an oil/water interface meter or a new disposable bailer was utilized to evaluate the presence and, if present, to measure the "apparent" thickness of light non-aqueous phase liquid (LNAPL) in the well. If LNAPL was present in the well, groundwater purging and sampling were not performed, unless sampling procedures in the scope of work specified collection of samples in the presence of LNAPL. Otherwise, time allowing, LNAPL was bailed from the well using either a new disposable bailer, or the disposal bailer previously used for initial LNAPL assessment. Bailing of LNAPL continued until the thickness of LNAPL (or volume) stabilized in each bailer pulled from the well, or LNAPL was no longer present. After LNAPL thickness either stabilized or was eliminated, periodic depth to water and depth to LNAPL measurements were collected as product came back into the well to evaluate product recovery rate and to aid in further assessment of LNAPL in the subsurface. LNAPL thickness measurements were recorded as "apparent." If a bailer was used for LNAPL thickness measurement, the field sampler noted the bailer entry diameter and chamber diameter to enable correction of thickness measurements. Recovered LNAPL was stored on-site in a labeled steel drum(s) or other appropriate container(s) prior to disposal.

3.0 Well Purging and Groundwater Sample Collection

Well purging and groundwater sampling were performed in wells specified in the scope of work after measuring depth to groundwater and evaluating the presence of LNAPL. Purging and sampling were performed using one of the methods detailed below. The method used was noted in the field records. Purge water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal or on-site treatment (in cases where treatment using an on-site system is authorized).

3.1 Purging a Predetermined Well Volume

Purging a predetermined well volume is performed per ASTM International (ASTM) D4448-01. This purging method has the objective of removing a predetermined volume of stagnant water from the well prior to sampling. The volume of stagnant water

is defined as either the volume of water contained within the well casing, or the volume within the well casing and sand/gravel in the annulus if natural flow through these is deemed insufficient to keep them flushed out.

This purging method involves removal of a minimum of three stagnant water volumes from the well using a decontaminated pump with new disposable plastic discharge or suction tubing, dedicated well tubing, or using a new disposable or decontaminated reusable bailer. If a new disposable bailer was used for assessment of LNAPL, that bailer may be used for purging. The withdrawal rate used is one that minimizes drawdown while satisfying time constraints.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity[1]. Parameters are considered stable when two (2) consecutive readings recorded three (3) minutes apart fall within ranges provided below in Table 1. In the event that the parameters have not stabilized and five (5) well casing volumes have been removed, purging activities will cease and be considered complete. Once the well is purged, a groundwater sample(s) is collected from the well using a new disposable bailer. If a new disposable bailer was used for purging, that bailer may be used to collect the sample(s). A sample is not collected if the well is inadvertently purged dry.

Table 1. Criteria for Defining Stabilization of Water-Quality Indicator Parameters

Parameter	Stabilization Criterion
Temperature	± 0.2ºC (± 0.36ºF)
pH	± 0.1 standard units
Conductivity	± 3%
Dissolved oxygen	± 10%
Oxidation reduction potential	± 10 mV
Turbidity[1]	± 10% or 1.0 NTU (whichever is greater)

3.2 Low-Flow Purging and Sampling

“Low-Flow”, “Minimal Drawdown”, or "Low-Stress” purging is performed per ASTM D6771-02. It is a method of groundwater removal from within a well’s screened interval that is intended to minimize drawdown and mixing of the water column in the well casing. This is accomplished by pumping the well using a decontaminated pump with new disposable plastic discharge or suction tubing or dedicated well tubing at a low flow rate while evaluating the groundwater elevation during pumping.

[1] As stated in ASTM D6771-02, turbidity is not a chemical parameter and not indicative of when formation-quality water is being purged; however, turbidity may be helpful in evaluating stress on the formation during purging. Turbidity measurements are taken at the same time that stabilization parameter measurements are made, or, at a minimum, once when purging is initiated and again just prior to sample collection, after stabilization parameters have stabilized. To avoid artifacts in sample analysis, turbidity should be as low as possible when samples are collected. If turbidity values are persistently high, the withdrawal rate is lowered until turbidity decreases. If high turbidity persists even after lowering the withdrawal rate, the purging is stopped for a period of time until turbidity settles, and the purging process is then restarted. If this fails to solve the problem, the purging/sampling process for the well is ceased, and well maintenance or redevelopment is considered.

The low flow pumping rate is well specific and is generally established at a volume that is less than or equal to the natural recovery rate of the well. A pump with adjustable flow rate control is positioned with the intake at or near the mid-point of the submerged well screen. The pumping rate used during low-flow purging is low enough to minimize mobilization of particulate matter and drawdown (stress) of the water column. Low-flow purging rates will vary based on the individual well characteristics; however, the purge rate should not exceed 1.0 Liter per minute (L/min) or 0.25 gallon per minute (gal/min). Low-flow purging should begin at a rate of approximately 0.1 L/min (0.03 gal/min)[2], or the lowest rate possible, and be adjusted based on an evaluation of drawdown. Water level measurements should be recorded at approximate one (1) to two (2) minute intervals until the low-flow rate has been established, and drawdown is minimized. As a general rule, drawdown should not exceed 25% of the distance between the top of the water column and the pump in-take.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity[1]. The frequency between measurements will be at an interval of one (1) to three (3) minutes; however, if a flow cell is used, the frequency will be determined based on the time required to evacuate one cell volume. Stabilization is defined as three (3) consecutive readings recorded several minutes apart falling within ranges provided in Table 1. Samples will be collected by filling appropriate containers from the pump discharge tubing at a rate not to exceed the established pumping rate.

3.3 Minimal Purge, Discrete Depth, and Passive Sampling

Per ASTM D4448-01, sampling techniques that do not rely on purging, or require only minimal purging, may be used if a particular zone within a screened interval is to be sampled or if a well is not capable of yielding sufficient groundwater for purging. To properly use these sampling techniques, a water sample is collected within the screened interval with little or no mixing of the water column within the casing. These techniques include minimal purge sampling which uses a dedicated sampling pump capable of pumping rates of less than 0.1 L/min (0.03 gal/min)[2], discrete depth sampling using a bailer that allows groundwater entry at a controlled depth (e.g. differential pressure bailer), or passive (diffusion) sampling. These techniques are based on certain studies referenced in ASTM D4448-01 that indicate that under certain conditions, natural groundwater flow is laminar and horizontal with little or no mixing within the well screen.

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[2] According to ASTM D4448-01, studies have indicated that at flow rates of 0.1 L/min, low-density polyethylene (LDPE) and plasticized polypropylene tubing materials are prone to sorption. Therefore, TFE-fluorocarbon or other appropriate tubing material is used, particularly when tubing lengths of 50 feet or longer are used.

4.0 Decontamination

Reusable groundwater sampling equipment were cleaned using a solution of Alconox or other acceptable detergent, rinsed with tap water, and finally rinsed with distilled water prior to use in each well. Decontamination water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal.

5.0 Sample Containers, Labeling, and Storage

Samples were collected in laboratory prepared containers with appropriate preservative (if preservative was required). Samples were properly labeled (site name, sample I.D., sampler initials, date, and time of collection) and stored chilled (refrigerator or ice chest with ice) until delivery to a certified laboratory, under chain of custody procedures.

6.0 Chain of Custody Record and Procedure

The field sampler was personally responsible for care and custody of the samples collected until they were properly transferred to another party. To document custody and transfer of samples, a Chain of Custody Record was prepared. The Chain of Custody Record provided identification of the samples corresponding to sample labels and specified analyses to be performed by the laboratory. The original Chain of Custody Record accompanied the shipment, and a copy of the record was stored in the project file. When the samples were transferred, the individuals relinquishing and receiving them signed, dated, and noted the time of transfer on the record.

7.0 Field Records

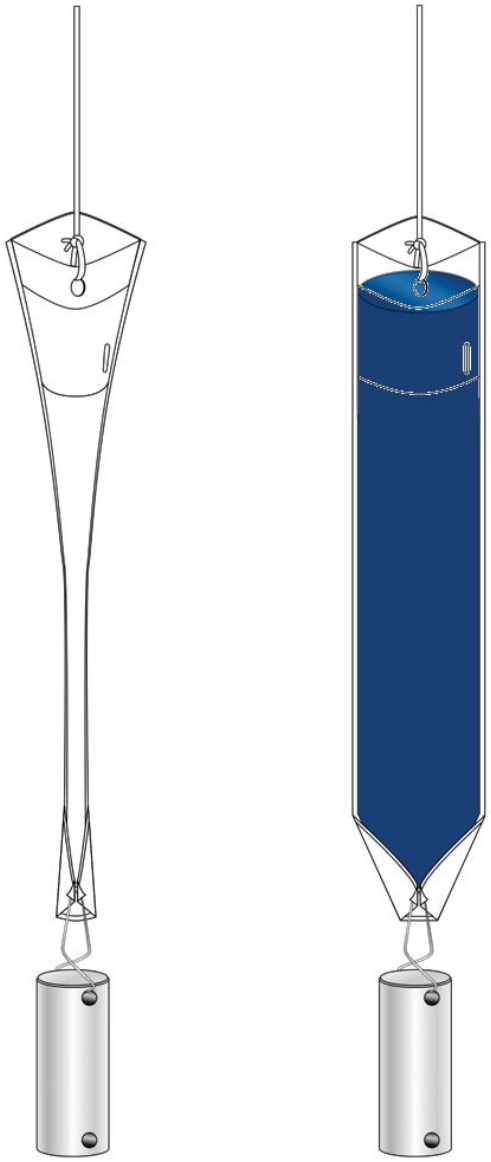
Daily Report and data forms were completed by staff personnel to provide daily record of significant events, observations, and measurements. Field records were signed, dated, and stored in the project file.

HYDRASleeve™

Simple by Design

US Patent No. 6,481,300; No. 6,837,120 others pending

Standard Operating Procedure: Sampling Ground Water with a HydraSleeve



This Guide should be used in addition to field manuals appropriate to sampling device (i.e., HydraSleeve or Super Sleeve).

Find the appropriate field manual on the HydraSleeve website at http://www.hydrasleeve.com.

For more information about the HydraSleeve, or if you have questions, contact: GeoInsight, 2007 Glass Road, Las Cruces, NM 88005, 1-800-996-2225, info@hydrasleeve.com.

Table of Contents

Introduction

The HydraSleeve is classified as a no-purge (passive) grab sampling device, meaning that it is used to collect ground-water samples directly from the screened interval of a well without having to purge the well prior to sample collection. When it is used as described in this Standard Operating Procedure (SOP), the HydraSleeve causes no drawdown in the well (until the sample is withdrawn from the water column) and only minimal disturbance of the water column, because it has a very thin cross section and it displaces very little water (<100 ml) during deployment in the well. The HydraSleeve collects a sample from within the screen only, and it excludes water from any other part of the water column in the well through the use of a self-sealing check valve at the top of the sampler. It is a single-use (disposable) sampler that is not intended for reuse, so there are no decontamination requirements for the sampler itself.

The use of no-purge sampling as a means of collecting representative ground-water samples depends on the natural movement of ground water (under ambient hydraulic head) from the formation adjacent to the well screen through the screen. Robin and Gillham (1987) demonstrated the existence of a dynamic equilibrium between the water in a formation and the water in a well screen installed in that formation, which results in formation-quality water being available in the well screen for sampling at all times. No-purge sampling devices like the HydraSleeve collect this formation-quality water as the sample, under undisturbed (non-pumping) natural flow conditions. Samples collected in this manner generally provide more conservative (i.e., higher concentration) values than samples collected using well-volume purging, and values equivalent to samples collected using low-flow purging and sampling (Parsons, 2005).

Applications of the HydraSleeve

The HydraSleeve can be used to collect representative samples of ground water for all analytes (volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], common metals, trace metals, major cations and anions, dissolved gases, total dissolved solids, radionuclides, pesticides, PCBs, explosive compounds, and all other analytical parameters). Designs are available to collect samples from wells from 1" inside diameter and larger. The HydraSleeve can collect samples from wells of any yield, but it is especially well-suited to collecting samples from low-yield wells, where other sampling methods can't be used reliably because their use results in dewatering of the well screen and alteration of sample chemistry (McAlary and Barker, 1987).

The HydraSleeve can collect samples from wells of any depth, and it can be used for single-event sampling or long-term ground-water monitoring programs. Because of its thin cross section and flexible construction, it can be used in narrow, constricted or damaged wells where rigid sampling devices may not fit. Using multiple HydraSleeves deployed in series along a single suspension line or tether, it is also possible to conduct in-well vertical profiling in wells in which contaminant concentrations are thought to be stratified.

As with all groundwater sampling devices, HydraSleeves should not be used to collect groundwater samples from wells in which separate (non-aqueous) phase hydrocarbons (i.e., gasoline, diesel fuel or jet fuel) are present because of the possibility of incorporating some of the separate-phase hydrocarbon into the sample.

Description of the HydraSleeve

The HydraSleeve (Figure 1) consists of the following basic components:

- A suspension line or tether (A.), attached to the spring clip or directly to the top of the sleeve to deploy the device into and recover the device from the well. Tethers with depth indicators marked in 1-foot intervals are available from the manufacturer.
- A long, flexible, 4-mil thick lay-flat polyethylene sample sleeve (C.) sealed at the bottom (this is the sample chamber), which comes in different sizes, as discussed below with a self-sealing reed-type flexible polyethylene check valve built into the top of the sleeve (B.) to prevent water from entering or exiting the sampler except during sample acquisition.
- A reusable stainless-steel weight with clip (D.), which is attached to the bottom of the sleeve to carry it down the well to its intended depth in the water column. Bottom weights available from the manufacturer are 0.75" OD and are available in three sizes: 5 oz. (2.5" long); 8 oz. (4" long); and 16 oz. (8" long). In lieu of a bottom weight, an optional top weight may be attached to the top of the HydraSleeve to carry it to depth and to compress it at the bottom of the well (not shown in Figure 1);
- A discharge tube that is used to puncture the HydraSleeve after it is recovered from the well so the sample can be decanted into sample bottles (not shown).
- Just above the self-sealing check valve at the top of the sleeve are two holes which provide attachment points for the spring clip and/or suspension line or tether. At the bottom of the sample sleeve are two holes which provide attachment points for the weight clip and weight.

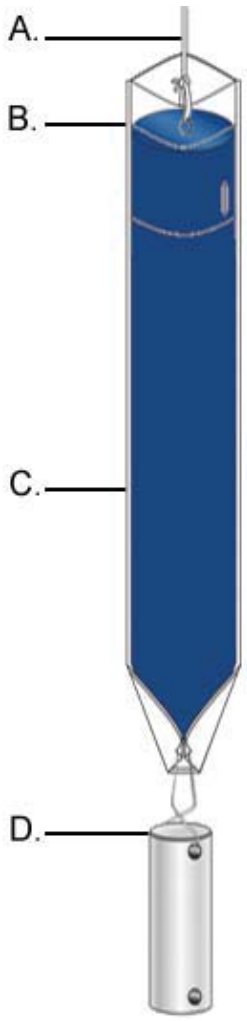


Figure 1. HydraSleeve components.

Note: The sample sleeve and the discharge tube are designed for one-time use and are disposable. The spring clip, weight and weight clip may be reused after thorough cleaning. Suspension cord is generally disposed after one use although, if it is dedicated to the well, it may be reused at the discretion of the sampling personnel.

Selecting the HydraSleeve Size to Meet Site-Specific Sampling Objectives

It is important to understand that each HydraSleeve is able to collect a finite volume of sample because, after the HydraSleeve is deployed, you only get one chance to collect an undisturbed sample. Thus, the volume of sample required to meet your site-specific sampling and analytical requirements will dictate the size of HydraSleeve you need to meet these requirements.

The volume of sample collected by the HydraSleeve varies with the diameter and length of the HydraSleeve. Dimensions and volumes of available HydraSleeve models are detailed in Table 1.

Table 1. Dimensions and volumes of HydraSleeve models.

Diameter	Volume	Length	Lay-Flat Width	Filled Dia.
2-Inch HydraSleeves				
Standard 625-ml HydraSleeve	625 ml	< 30”	2.5”	1.4”
Standard 1-Liter HydraSleeve	1 Liter	38”	3”	1.9”
1-Liter HydraSleeve SS	1 Liter	36”	3”	1.9”
2-Liter HydraSleeve SS	2 Liters	60”	3”	1.9”
4-Inch HydraSleeves				
Standard 1.6-Liter HydraSleeve	1.6 Liters	30”	3.8”	2.3”
Custom 2-Liter HydraSleeve	2 Liters	36”	4”	2.7”

HydraSleeves can be custom-fabricated by the manufacturer in varying diameters and lengths to meet specific volume requirements. HydraSleeves can also be deployed in series (i.e., multiple HydraSleeves attached to one tether) to collect additional sample to meet specific volume requirements, as described below.

If you have questions regarding the availability of sufficient volume of sample to satisfy laboratory requirements for analysis, it is recommended that you contact the laboratory to discuss the minimum volumes needed for each suite of analytes. Laboratories often require only 10% to 25% of the volume they specify to complete analysis for specific suites of analytes, so they can often work with much smaller sample volumes that can easily be supplied by a HydraSleeve.

HydraSleeve Deployment

Information Required Before Deploying a HydraSleeve

Before installing a HydraSleeve in any well, you will need to know the following:

- The inside diameter of the well
- The length of the well screen
- The water level in the well
- The position of the well screen in the well
- The total depth of the well

The inside diameter of the well is used to determine the appropriate HydraSleeve diameter for use in the well. The other information is used to determine the proper placement of the HydraSleeve in the well to collect a representative sample from the screen (see HydraSleeve Placement, below), and to determine the appropriate length of tether to attach to the HydraSleeve to deploy it at the appropriate position in the well.

Most of this information (with the exception of the water level) should be available from the well log; if not, it will have to be collected by some other means. The inside diameter of the well can be measured at the top of the well casing, and the total depth of the well can be measured by sounding the bottom of the well with a weighted tape. The position and length of the well screen may have to be determined using a down-hole camera if a well log is not available. The water level in the well can be measured using any commonly available water-level gauge.

HydraSleeve Placement

The HydraSleeve is designed to collect a sample directly from the well screen, and it fills by pulling it up through the screen a distance equivalent to 1 to 1.5 times its length. This upward motion causes the top check valve to open, which allows the device to fill. To optimize sample recovery, it is recommended that the HydraSleeve be placed in the well so that the bottom weight rests on the bottom of the well and the top of the HydraSleeve is as close to the bottom of the well screen as possible. This should allow the sampler to fill before the top of the device reaches the top of the screen as it is pulled up through the water column, and ensure that only water from the screen is collected as the sample. In short-screen wells, or wells with a short water column, it may be necessary to use a top-weight on the HydraSleeve to compress it in the bottom of the well so that, when it is recovered, it has room to fill before it reaches the top of the screen.

Example

2" ID PVC well, 50' total depth, 10' screen at the bottom of the well, with water level above the screen (the entire screen contains water).

Correct Placement (figure 2): Using a standard HydraSleeve for a 2" well (2.6" flat width/1.5" filled OD x 30" long, 650 ml volume), deploy the sampler so the weight (an 8 oz., 4"-long weight with a 2"-long clip) rests at the bottom of the well. The top of the sleeve is thus set at about 36" above the bottom of the well. When the sampler is recovered, it will be pulled upward approximately 30" to 45" before it is filled; therefore, it is full (and the top check valve closes) at approximately 66" (5 ½ feet) to 81" (6 ¾ feet) above the bottom of the well, which is well before the sampler reaches the top of the screen. In this example, only water from the screen is collected as a sample.

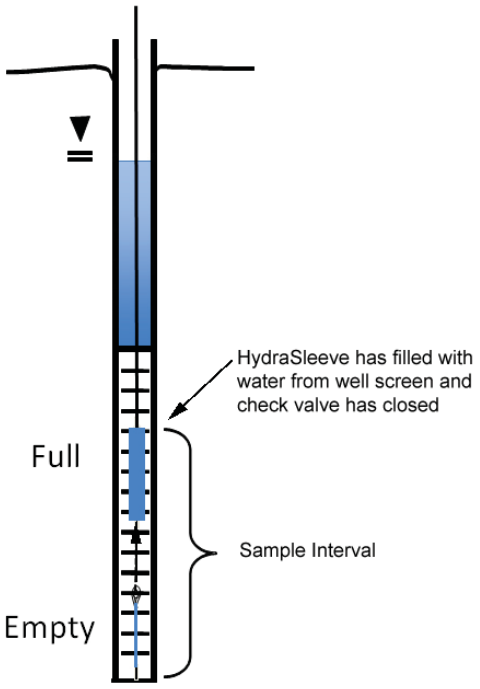


Figure 2. Correct placement of HydraSleeve.

Incorrect Placement (figure 3): If the well screen in this example was only 5' long, and the HydraSleeve was placed as above, it would not fill before the top of the device reached the top of the well screen, so the sample would include water from above the screen, which may not have the same chemistry.

The solution? Deploy the HydraSleeve with a top weight, so that it is collapsed to within 6" to 9" of the bottom of the well. When the HydraSleeve is recovered, it will fill within 39" (3 ¼ feet) to 54" (4 ½ feet) above the bottom of the well, or just before the sampler reaches the top of the screen, so it collects only water from the screen as the sample.

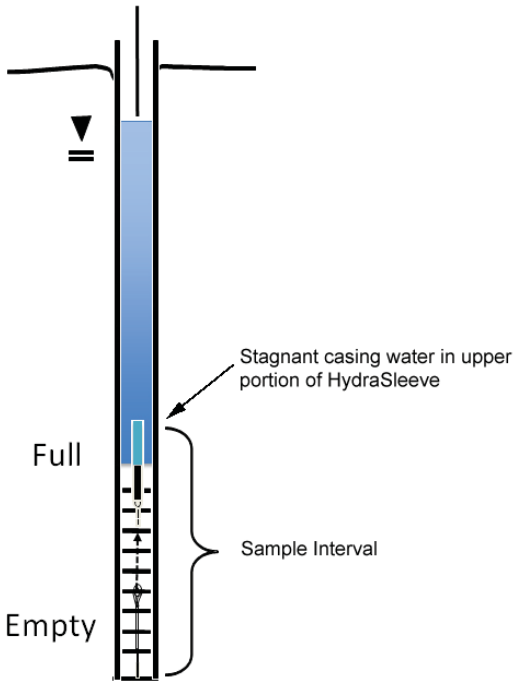


Figure 3. Incorrect placement of HydraSleeve.

This example illustrates one of many types of HydraSleeve placements. More complex placements are discussed in a later section.

Procedures for Sampling with the HydraSleeve

Collecting a ground-water sample with a HydraSleeve is a simple one-person operation.

Note: Before deploying the HydraSleeve in the well, collect the depth-to-water measurement that you will use to determine the preferred position of the HydraSleeve in the well. This measurement may also be used with measurements from other wells to create a ground-water contour map. If necessary, also measure the depth to the bottom of the well to verify actual well depth to confirm your decision on placement of the HydraSleeve in the water column.

Measure the correct amount of tether needed to suspend the HydraSleeve in the well so that the weight will rest on the bottom of the well (or at your preferred position in the well). Make sure to account for the need to leave a few feet of tether at the top of the well to allow recovery of the sleeve

Note: Always wear sterile gloves when handling and discharging the HydraSleeve.

I. Assembling the HydraSleeve

1. Remove the HydraSleeve from its packaging, unfold it, and hold it by its top.

2. Crimp the top of the HydraSleeve by folding the hard polyethylene reinforcing strips at the holes.

3. Attach the spring clip to the holes to ensure that the top will remain open until the sampler is retrieved.

4. Attach the tether to the spring clip by tying a knot in the tether.

Note: Alternatively, attach the tether to one (NOT both) of the holes at the top of the Hydrasleeve by tying a knot in the tether.

5. Fold the flaps with the two holes at the bottom of the HydraSleeve together and slide the weight clip through the holes.

6. Attach a weight to the bottom of the weight clip to ensure that the HydraSleeve will descend to the bottom of the well.

II. Deploying the HydraSleeve

1. Using the tether, carefully lower the HydraSleeve to the bottom of the well, or to your preferred depth in the water column

   During installation, hydrostatic pressure in the water column will keep the self-sealing check valve at the top of the HydraSleeve closed, and ensure that it retains its flat, empty profile for an indefinite period prior to recovery.

Note: Make sure that it is not pulled upward at any time during its descent. If the HydraSleeve is pulled upward at a rate greater than 0.5'/second at any time prior to recovery, the top check valve will open and water will enter the HydraSleeve prematurely.

2. Secure the tether at the top of the well by placing the well cap on the top of the well casing and over the tether.

Note: Alternatively, you can tie the tether to a hook on the bottom of the well cap (you will need to leave a few inches of slack in the line to avoid pulling the sampler up as the cap is removed at the next sampling event).

III. Equilibrating the Well

The equilibration time is the time it takes for conditions in the water column (primarily flow dynamics and contaminant distribution) to restabilize after vertical mixing occurs (caused by installation of a sampling device in the well).

- Situation: The HydraSleeve is deployed for the first time or for only one time in a well

  The HydraSleeve is very thin in cross section and displaces very little water (<100 ml) during deployment so, unlike most other sampling devices, it does not disturb the water column to the point at which long equilibration times are necessary to ensure recovery of a representative sample.

  In most cases, the HydraSleeve can be recovered immediately (with no equilibration time) or within a few hours. In regulatory jurisdictions that impose specific requirements for equilibration times prior to recovery of no-purge sampling devices, these requirements should be followed.

- Situation: The HydraSleeve is being deployed for recovery during a future sampling event

  In periodic (i.e., quarterly or semi-annual) sampling programs, the sampler for the current sampling event can be recovered and a new sampler (for the next sampling event)

deployed immediately thereafter, so the new sampler remains in the well until the next sampling event.

Thus, a long equilibration time is ensured and, at the next sampling event, the sampler can be recovered immediately. This means that separate mobilizations, to deploy and then to recover the sampler, are not required. HydraSleeves can be left in a well for an indefinite period of time without concern.

IV. HydraSleeve Recovery and Sample Collection

1. Hold on to the tether while removing the well cap.

2. Secure the tether at the top of the well while maintaining tension on the tether (but without pulling the tether upwards)

3. Measure the water level in the well.

4. In one smooth motion, pull the tether up between 30" to 45" (36" to 54" for the longer HydraSleeve) at a rate of about 1' per second (or faster).

   The motion will open the top check valve and allow the HydraSleeve to fill (it should fill in about 1 to 1.5 times the length of the HydraSleeve). This is analogous to coring the water column in the well from the bottom up.

   When the HydraSleeve is full, the top check valve will close. You should begin to feel the weight of the HydraSleeve on the tether and it will begin to displace water. The closed check valve prevents loss of sample and entry of water from zones above the well screen as the HydraSleeve is recovered.

5. Continue pulling the tether upward until the HydraSleeve is at the top of the well.

6. Decant and discard the small volume of water trapped in the Hydrasleeve above the check valve by turning the sleeve over.

V. Sample Collection

Note: Sample collection should be done immediately after the HydraSleeve has been brought to the surface to preserve sample integrity.

1. Remove the discharge tube from its sleeve.

2. Hold the HydraSleeve at the check valve.

3. Puncture the HydraSleeve just below the check valve with the pointed end of the discharge tube

4. Discharge water from the HydraSleeve into your sample containers.

Control the discharge from the HydraSleeve by either raising the bottom of the sleeve, by squeezing it like a tube of toothpaste, or both.

5. Continue filling sample containers until all are full.

Measurement of Field Indicator Parameters

Field indicator parameter measurement is generally done during well purging and sampling to confirm when parameters are stable and sampling can begin. Because no-purge sampling does not require purging, field indicator parameter measurement is not necessary for the purpose of confirming when purging is complete.

If field indicator parameter measurement is required to meet a specific non-purging regulatory requirement, it can be done by taking measurements from water within a HydraSleeve that is not used for collecting a sample to submit for laboratory analysis (i.e., a second HydraSleeve installed in conjunction with the primary sample collection HydraSleeve [see Multiple Sampler Deployment below]).

Alternate Deployment Strategies

Deployment in Wells with Limited Water Columns

For wells in which only a limited water column exists to be sampled, the HydraSleeve can be deployed with an optional top weight instead of a bottom weight, which collapses the HydraSleeve to a very short (approximately 6” to 9”) length, and allows the HydraSleeve to fill in a water column only 36” to 45” in height.

Multiple Sampler Deployment

Multiple sampler deployment in a single well screen can accomplish two purposes:

- It can collect additional sample volume to satisfy site or laboratory-specific sample volume requirements.
- It can accommodate the need for collecting field indicator parameter measurements.
- It can be used to collect samples from multiple intervals in the screen to allow identification of possible contaminant stratification.

It is possible to use up to 3 standard 30" HydraSleeves deployed in series along a single tether to collect samples from a 10' long well screen without collecting water from the interval above the screen.

The samplers must be attached to the tether at both the top and bottom of the sleeve. Attach the tether at the top with a stainless-steel clip (available from the manufacturer). Attach the tether at the bottom using a cable tie. The samplers must be attached as follows (figure 4):

- The first (attached to the tether as described above, with the weight at the bottom) at the bottom of the screen
- The second attached immediately above the first
- The third (attached the same as the second) immediately above the second

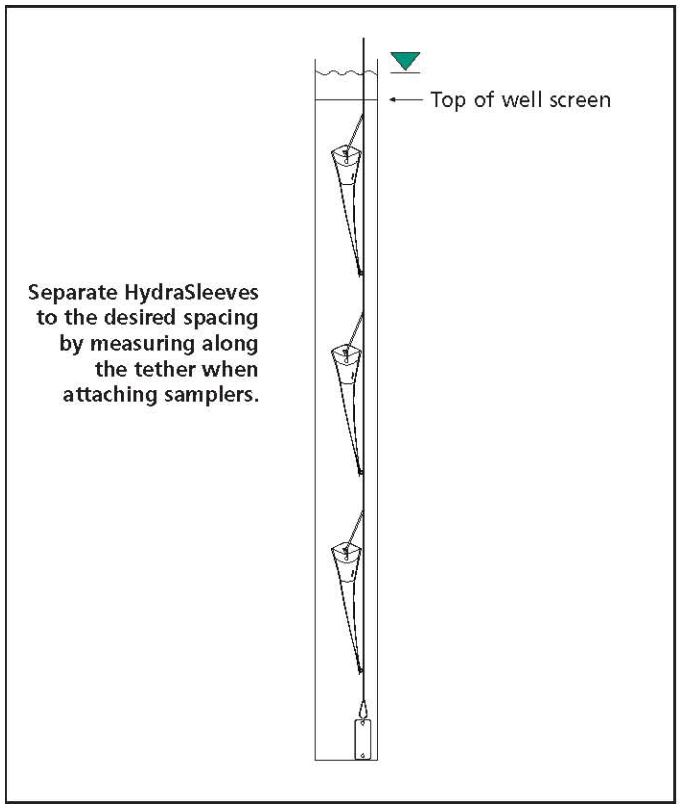


Figure 4. Multiple HydraSleeve deployment.

Alternately, the first sampler can be attached to the tether as described above, a second attached to the bottom of the first using a short length of tether (in place of the weight), and the third attached to the bottom of the second in the same manner, with the weight attached to the bottom of the third sampler (figure 5).

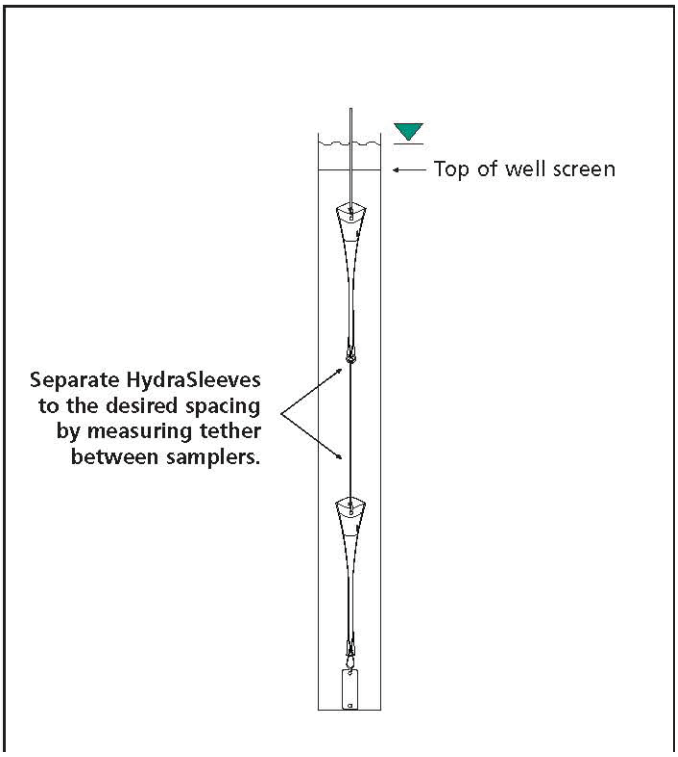


Figure 5. Alternative method for deploying multiple HydraSleeves.

In either case, when attaching multiple HydraSleeves in series, more weight may be required to hold the samplers in place in the well than would be required with a single sampler. Recovery of multiple samplers and collection of samples is done in the same manner as for single sampler deployments.

Post-Sampling Activities

The recovered HydraSleeve and the sample discharge tubing should be disposed as per the solid waste management plan for the site. To prepare for the next sampling event, a new HydraSleeve can be deployed in the well (as described previously) and left in the well until the next sampling event, at which time it can be recovered.

The weight and weight clip can be reused on this sampler after they have been thoroughly cleaned as per the site equipment decontamination plan. The tether may be dedicated to the well and reused or discarded at the discretion of sampling personnel.

References

McAlary, T. A. and J. F. Barker, 1987, Volatilization Losses of Organics During Ground-Water Sampling From Low-Permeability Materials, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 63-68

Parsons, 2005, Results Report for the Demonstration of No-Purge Ground-Water Sampling Devices at Former McClellan Air Force Base, California; Contract F44650-99-D-0005, Delivery Order DKO1, U.S. Army Corps of Engineers (Omaha District), U.S. Air Force Center for Environmental Excellence, and U.S. Air Force Real Property Agency

Robin, M. J. L. and R. W. Gillham, 1987, Field Evaluation of Well Purging Procedures, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 85-93

ATTACHMENT 2

Field Data Sheets

WELL GAUGING DATA

Project # 180309-BK1 Date 03/09/18 Client Arcadis

Site 1280 Foothill Blvd., Oakland, CA

Well ID	Time	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscible s Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	Notes
MW-2	0744	2					DRY	13.17	TOC	
MW-3	0750	4					10.45	31.33		
MW-4	0755	4					14.91	26.58		
MW-5	0815	4					9.52	32.10		
MW-6	0746	4					15.16	34.42		
MW-7	0758	6					11.03	33.26		
MW-8	0734	2					13.20	29.55		
MW-9	0742	2					11.05	29.58		
MW-10	0821	4					8.25	29.69		
MW-11	0800	4					8.74	29.94		
MW-12	0831	4					9.56	30.18	↓	

BP WELL MONITORING DATA SHEET

Project #: 180309 - BK1	Station #: 1109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 31.33	Depth to Water: 10.45
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
- Bailer
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Other: hydrasleeve

Waterra
Peristaltic
Extraction Pump

Model #:

Pump Depth: 27'

Sampling Method:
- Bailer
- Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: hydrasleeve

Instruments Used:
- Myron L Ultrameter
- Durham Geoslope Indicator
- GeoTech Interface Probe
- MMC Interface Probe
- HACH Turbidimeter
- YSI 556 Flow-Thru Cell
- YSI 550 DO Meter
- Other: ___

___(Gals.) X ___ = ___Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
0920	18.7	6.84	4.65	9	GRAB	clear / 10.45
0925	—	NEW	HYDRASLEEVE	INSTALLED	—	—

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 0920 Depth to Water: 10.45

Sample I.D.: MW-3 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	4.62	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	329.2	mV

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 11109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-4	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.58	Depth to Water: 14.91
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer / Disposable Bailer / Positive Air Displacement / Electric Submersible / Other: hydrasleeve
Waterra / Peristaltic / Extraction Pump
Model #: Pump Depth: 22.5'

Sampling Method:
Bailer / Disposable Bailer / Extraction Port / Dedicated Tubing / Other: hydrasleeve

Instruments Used:
Myron L Ultrameter / Durham Geoslope Indicator / GeoTech Interface Probe / MMC Interface Probe
HACH Turbidimeter / YSI 556 Flow-Thru Cell / YSI 550 DO Meter / Other: ___

_____(Gals.) X _____ = _____ Gals.
1 Case Volume / Specified Volumes / Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
0940	18.0	6.84	729	5	GRAB	clear / 14.91
0945	—	NEW HYDRASLEEVE INSTALLED			—	—

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 0940 Depth to Water: 14.91

Sample I.D.: MW-4 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	3.51	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	261.7	mV

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 1109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 32.10	Depth to Water: 9.52
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: ___
Waterra
Peristaltic
Extraction Pump
hydrasleeve
Model #:
Pump Depth: 25.8'

Sampling Method:
Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:
Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: ___

___(Gals.) X ___ = ___ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
1035	20.1	7.24/6.72	747	5	GRAB	odor clear / 9.52
1040	—	—	INSTALLED	NEW HYDRASLEEVE @ 25.8'	—	

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 1035 Depth to Water: 9.52

Sample I.D.: MW-5 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	1.93	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	175.5	mV

SORBENT SOCK EVALUATION FORM

Name:	Date:	Project Number:
BRIAN KEEBLER	03/09/18	180309-BK1
Site Address:	**Well ID:**	**Weather:**
4280 FOOTHILL BLVD	MW-5	CLOUDY

1) Time absorbent sock removed from well for inspection: 1035

2) Condition of sock:

   a. Length of sock showing product saturation: 30%

   b. Length of sock showing dryness: 0%

   c. Color of sock showing product saturation: light brown

   d. Weight of the removed sock (lb): 2lb. 8oz.

   e. Weight of a new/clean/dry sock (lb): 8.25oz.
   (only if new sock is deployed)

   f. Difference in weight (2d-2e) to 0.01 (lb): 1lb 15.75oz
   (only if new sock is deployed)

3) Picture of sock removed from well taken: ☑

4) Sock removed from well deposited in waste drum:

   Is drum labeled? (Y) N How full is the drum?

5) After at least 15 minutes of removing the sock from the well, measure to 0.01 feet from the top of the well casing:

   a. Depth of product:

   b. Depth to water: 9.55

   c. Thickness of product (5b-5a):

6) Size and type of sock installed: 3" Pig Absorbent Sock

7) Comments: NEW SOCK INSTALLED

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 11109
Sampler: BK	Date: ~~03/08/18 BK~~ 03/09/18
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 34.42	Depth to Water: 15.16
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: ~~Waterra~~ hydrasleeve
Waterra
Peristaltic
Extraction Pump
Model #:
~~Pump~~ Depth: 28.5'

Sampling Method:
Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:
Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: ___

___(Gals.) X ___ = ___ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
0900	18.5	5.90	602	4	GRAB	clear / 15.16
0905	—	NEW	HYDRASLEEVE	INSTALLED	—	—

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 0900 Depth to Water: 15.16

Sample I.D.: MW-6 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	3.31	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	312.5	mV

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 1109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-7	Well Diameter: 2 3 4 (6) 8 ___
Total Well Depth: 33.26	Depth to Water: 11.03
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: ~~Waterra~~ ~~Peristaltic~~ Extraction Pump
Model #: hydrasleeve ~~Pump~~ Depth: 27.7'

Sampling Method:
Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:
Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: ___

___(Gals.) X ___ = ___ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
0955	18.5	6.91	632	5	GRAB	clear odor / 11.03
1000	—	NEW HYDRASLEEVE INSTALLED				

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 0955 Depth to Water: 11.03

Sample I.D.: MW-7 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	1.49	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	102.5	mV

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 1109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-10	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 29.69	Depth to Water: 8.25
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: ____
Waterra
Peristaltic
Extraction Pump

Sampling Method:
Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:
Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: ____

Model #: hydrasleeve Pump Depth: 21.5'

____(Gals.) X ____ = ____ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
1220	20.2	6.91	696	25	GRAB	odor clear / 8.25

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 1220 Depth to Water: 8.25

Sample I.D.: MW-10 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: See COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	1.22	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	285.3	mV

SORBENT SOCK EVALUATION FORM

Name:	Date:	Project Number:
BRIAN KEEBLER	03/09/18	180309-BK1
Site Address:	**Well ID:**	**Weather:**
4280 FOOTHILL BLVD	MW-10	CLOUDY

1) Time absorbent sock removed from well for inspection: 1155

2) Condition of sock:

   a. Length of sock showing product saturation: 100%

   b. Length of sock showing dryness: 0%

   c. Color of sock showing product saturation: dispersed black

   d. Weight of the removed sock (lb): 2lb. 9oz.

   e. Weight of a new/clean/dry sock (lb): 7.5oz
   (only if new sock is deployed)

   f. Difference in weight (2d-2e) to 0.01 (lb): 2lb 1.5oz.
   (only if new sock is deployed)

3) Picture of sock removed from well taken: ☑

4) Sock removed from well deposited in waste drum:

   Is drum labeled? (Y) N How full is the drum?

5) After at least 15 minutes of removing the sock from the well, measure to 0.01 feet from the top of the well casing:

   a. Depth of product:

   b. Depth to water: 8.27

   c. Thickness of product (5b-5a):

6) Size and type of sock installed: 3" Pig Absorbent Sock

7) Comments: NEW SOCK INSTALLED

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 11109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-11	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 29.94	Depth to Water: 8.74
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:

Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: ~~_____~~ hydrasleeve
Model #:

Waterra
Peristaltic
Extraction Pump

~~Pump~~ Depth: 21.5'

Sampling Method:

Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:

Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: _____

_____(Gals.) X _____ = _____ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
1015	18.8	6.96	873	19	GRAB	odor black particles / 8.74
1020	—	NEW HYDRASLEEVE			INSTALLED	—

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 1015 Depth to Water: 8.74

Sample I.D.: MW-11 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	0.77 mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	120.6 mV

BP WELL MONITORING DATA SHEET

Project #: 180309-BK1	Station #: 1109
Sampler: BK	Date: 03/09/18
Well I.D.: MW-12	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 30.18	Depth to Water: 9.56
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method:
Bailer
Disposable Bailer
Positive Air Displacement
Electric Submersible
Other: hydrasleeve
Waterra
Peristaltic
Extraction Pump
Model #:
~~Pump~~ Depth: 22.2'

Sampling Method:
Bailer
Disposable Bailer
Extraction Port
Dedicated Tubing
Other: hydrasleeve

Instruments Used:
Myron L Ultrameter
Durham Geoslope Indicator
GeoTech Interface Probe
MMC Interface Probe
HACH Turbidimeter
YSI 556 Flow-Thru Cell
YSI 550 DO Meter
Other: ___

___(Gals.) X ___ = ___Gals.
1 Case Volume | Specified Volumes | Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp (°F)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	Gals. Removed	Observations/ DTW
1245	70.7	6.93	1193	9	GRAB	odor clear / 9.56

Did well dewater? Yes (No) Gallons actually evacuated: —

Sampling Date: 03/09/18 Sampling Time: 1245 Depth to Water: 9.56

Sample I.D.: MW-12 Laboratory: Calscience Other ESC

Analyzed for: GRO BTEX OXYS ETHANOL Other: SEE COC

Duplicate I.D.: Analyzed for: GRO BTEX OXYS ETHANOL Other:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	1.23	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	268.0	mV

SORBENT SOCK EVALUATION FORM

Name:	Date:	Project Number:
BRIAN KEEBLER	03/09/18	180309-RK1
Site Address:	**Well ID:**	**Weather:**
4280 FOOTHILL BLVD.	MW-12	CLOUDY

1) Time absorbent sock removed from well for inspection: 1240

2) Condition of sock:

   a. Length of sock showing product saturation: 30%

   b. Length of sock showing dryness: 0%

   c. Color of sock showing product saturation: LIGHT BROWN

   d. Weight of the removed sock (lb): 3lb

   e. Weight of a new/clean/dry sock (lb): 7.5oz
   (only if new sock is deployed)

   f. Difference in weight (2d-2e) to 0.01 (lb): 2lb 8.5oz
   (only if new sock is deployed)

3) Picture of sock removed from well taken: ☑

4) Sock removed from well deposited in waste drum:

   Is drum labeled? (Y) N How full is the drum?

5) After at least 15 minutes of removing the sock from the well, measure to 0.01 feet from the top of the well casing:

   a. Depth of product:

   b. Depth to water: 9.58

   c. Thickness of product (5b-5a):

6) Size and type of sock installed: 3" Pig Absorbent Sock

7) Comments: NEW SOCK INSTALLED

ARCADIS Design & Consultancy for natural and built assets

Chain of Custody Record

ARCADIS Project Name: CA 11109

Req Due Date (mm/dd/yy): Standard TAT Rush TAT: Yes ___ No x

Lab Work Order Number:

Lab Name: ESC Lab Sciences	Facility Address: 4280 Foothill Blvd.	Consultant/Contractor: Blaine Tech Services, Inc.
Lab Address: 12605 Lebenon Rd., Mt. Juliet, TN 37122	City, State, ZIP Code: Oakland, CA	Blaine Tech Project No: ARCADIS/BP-11109
Lab PM: Jared Willis	Lead Regulatory Agency: Alameda County Env. Health Svcs	Consultant/Contractor Address: 1680 Rogers Ave., San Jose, CA 95112
Lab Phone: 605.773.9678	California Global ID No.: T0600100217	Consultant/Contractor PM: Ross Mikovich
Lab Shipping Accnt:	ARCADIS Project No: GP09BPNA.C106	Phone: 408.573.0555 x206
Lab Bottle Order No:	ARCADIS PM/ Phone: Jamey Peterson	Email EDD To: jamey.peterson@arcadis.com
Other Info:	Email: jamey.peterson@arcadis.com	Invoice To: ARCADIS X Contractor ___

(5) Fule Oxys include: MTBE, TBA, TAME, ETBE, DIPE

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix:	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Methanol		Requested Analyses: GRO 8260B	BTEX 8260B	MTBE 8260B	(5) Oxygenates 8260E	1,2-DCA, EDB 8260B	Ethanol 8260B				
	MW-3	03/09/18	0920		X			3				3					X							
	MW-4		0940		X			3				3			X		X							
	MW-5		1035		X			3				3			X	X		X	X	X				
	MW-6		0900		X			3				3					X							
	MW-7		0955		X			3				3			X	X		X	X	X				
	MW-10		1220		X			3				3			X	X		X	X	X				
	MW-11		1015		X			3				3			X	X		X	X	X				
	MW-12		1245		X			3				3			X	X		X	X	X				
	TB-11109-03092018		0800		X			2				2												

Report Type & QC Level

Standard x

Full Data Package ___

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

ON HOLD

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Brian Keebler	BRIAN KEEBLER Blaine Tech SAMPLE CUSTODIAN	03/09/18	1500	BRIAN KEEBLER Blaine Tech SAMPLE CUSTODIAN	03/09/18	1505
Sampler's Company: Blaine Tech	R. ML C.C. BTS	3-12-18	1010	BJ ESC	3/12/18	1010
Shipment Method: Ship Date:						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

WELLHEAD INSPECTION CHECKLIST

Client Arcadis Date 03/09/18

Site Address 4280 Foothill Blvd

Job Number 180309-BK1 Technician BK

Well ID	Well Inspected - No Corrective Action Required	Water Bailed From Wellbox	Wellbox Components Cleaned	Cap Replaced	Lock Replaced	Other Action Taken (explain below)	Well Not Inspected (explain below)	Repair Order Submitted
MW-2	✓							
MW-3	✓							
MW-4	✓							
MW-5	✓	✓						
MW-6	✓							
MW-7	✓							
MW-8	✓							
MW-9	✓							
MW-10						✓		
MW-11	~~✓~~					✓		
MW-12						✓		

NOTES: MW-10 2 of 2 bolts stripped; MW-12 2 of 2 bolts stripped; MW-11 0 of 2 bolts

TEST EQUIPMENT CALIBRATION LOG

PROJECT NAME 4280 Foothill Blvd				PROJECT NUMBER 180309-BK1			
EQUIPMENT NAME	EQUIPMENT NUMBER	DATE/TIME OF TEST	STANDARDS USED	EQUIPMENT READING	CALIBRATED TO: OR WITHIN 10%:	TEMP.	INITIALS
YSI Pro Plus	16M101750	03/09/18 0840	pH 4.00 7.00 10.00	10.01 7.01 3.99	✓ ✓ ✓	16.4	BK
↓	↓	↓	DO% 100 COND 3900 ORP 243.3	100 3900 243.4	✓ ✓ ✓	16.3	BK

ATTACHMENT 3

Laboratory Report and Chain-of-Custody Documentation

ANALYTICAL REPORT

March 19, 2018

ARCADIS US - San Francisco, CA

Sample Delivery Group:	L976744
Samples Received:	03/12/2018
Project Number:	GP09BPNA.C106
Description:	CA-11109 - GP09BPNA.C106
Site:	4280 FOOTHILL, OAKLAND
Report To:	Hollis Phillips 100 Montgomery Street Suite 300 San Francisco, CA 94104

Entire Report Reviewed By: Brian Ford

Brian Ford
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

MW-3 L976744-01 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 09:20 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	1	03/13/18 14:51	03/13/18 14:51	PP

MW-4 L976744-02 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 09:40 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	1	03/13/18 15:16	03/13/18 15:16	PP

MW-5 L976744-03 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 10:35 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	125	03/15/18 18:19	03/15/18 18:19	PP
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1084492	1	03/14/18 18:23	03/14/18 18:23	PP

MW-6 L976744-04 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 09:00 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	1	03/13/18 16:05	03/13/18 16:05	PP

MW-7 L976744-05 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 09:55 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	1	03/13/18 14:27	03/13/18 14:27	PP
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1084492	1	03/14/18 18:50	03/14/18 18:50	PP

MW-10 L976744-06 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 12:20 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	125	03/15/18 18:44	03/15/18 18:44	PP
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1084492	125	03/15/18 12:25	03/15/18 12:25	PP

MW-11 L976744-07 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 10:15 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	50	03/15/18 17:31	03/15/18 17:31	PP
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1084492	1	03/14/18 19:44	03/14/18 19:44	PP

MW-12 L976744-08 GW

Collected by: Brian Keebler | Collected date/time: 03/09/18 12:48 | Received date/time: 03/12/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1083887	125	03/15/18 17:55	03/15/18 17:55	PP
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1084492	125	03/15/18 11:58	03/15/18 11:58	PP

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Technical Service Representative

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methyl tert-butyl ether	1.34		0.105	1.00	1	03/13/2018 14:51	WG1083887
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*		*03/13/2018 14:51*	WG1083887
(S) Toluene-d8	*99.2*			*75.0-125*		*03/13/2018 14:51*	WG1083887
(S) 4-Bromofluorobenzene	*95.3*			*75.0-125*		*03/13/2018 14:51*	WG1083887

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH (GC/MS) Low Fraction	18.0	J	16.0	100	1	03/13/2018 15:16	WG1083887
Methyl tert-butyl ether	7.84		0.105	1.00	1	03/13/2018 15:16	WG1083887
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*03/13/2018 15:16*	WG1083887
(S) 4-Bromofluorobenzene	*94.9*			*75.0-125*		*03/13/2018 15:16*	WG1083887
(S) Toluene-d8	*99.3*			*75.0-125*		*03/13/2018 15:16*	WG1083887

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Ethanol	2.86	J	2.00	100	1	03/14/2018 18:23	WG1084492
TPH (GC/MS) Low Fraction	19700		2000	12500	125	03/15/2018 18:19	WG1083887
1,2-Dibromoethane	U		14.2	125	125	03/15/2018 18:19	WG1083887
1,2-Dichloroethane	187		27.2	125	125	03/15/2018 18:19	WG1083887
Benzene	7020		12.8	125	125	03/15/2018 18:19	WG1083887
Di-isopropyl ether	51.0	J	15.2	125	125	03/15/2018 18:19	WG1083887
Ethylbenzene	1290		11.9	125	125	03/15/2018 18:19	WG1083887
Ethyl tert-butyl ether	U		13.0	125	125	03/15/2018 18:19	WG1083887
Methyl tert-butyl ether	U		13.1	125	125	03/15/2018 18:19	WG1083887
tert-Amyl Methyl Ether	U		16.0	125	125	03/15/2018 18:19	WG1083887
tert-Butyl alcohol	553	B J	235	1250	125	03/15/2018 18:19	WG1083887
Toluene	300		13.0	125	125	03/15/2018 18:19	WG1083887
Xylenes, Total	518		36.0	375	125	03/15/2018 18:19	WG1083887
(S) 1,2-Dichloroethane-d4	*72.2*			*70.0-130*		*03/14/2018 18:23*	WG1084492
(S) 1,2-Dichloroethane-d4	*98.6*			*70.0-130*		*03/15/2018 18:19*	WG1083887
(S) 4-Bromofluorobenzene	*94.5*			*75.0-125*		*03/15/2018 18:19*	WG1083887
(S) Toluene-d8	*95.5*			*75.0-125*		*03/15/2018 18:19*	WG1083887

Sample Narrative:

L976744-03 WG1083887: Elevated RL due to sample matrix.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methyl tert-butyl ether	0.587	J	0.105	1.00	1	03/13/2018 16:05	WG1083887
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*03/13/2018 16:05*	WG1083887
(S) Toluene-d8	*99.0*			*75.0-125*		*03/13/2018 16:05*	WG1083887
(S) 4-Bromofluorobenzene	*96.0*			*75.0-125*		*03/13/2018 16:05*	WG1083887

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Ethanol	2.84	J	2.00	100	1	03/14/2018 18:50	WG1084492
TPH (GC/MS) Low Fraction	1620		16.0	100	1	03/13/2018 14:27	WG1083887
1,2-Dibromoethane	U		0.114	1.00	1	03/13/2018 14:27	WG1083887
1,2-Dichloroethane	U		0.218	1.00	1	03/13/2018 14:27	WG1083887
Benzene	6.71		0.102	1.00	1	03/13/2018 14:27	WG1083887
Di-isopropyl ether	U		0.122	1.00	1	03/13/2018 14:27	WG1083887
Ethylbenzene	0.607	J	0.0955	1.00	1	03/13/2018 14:27	WG1083887
Ethyl tert-butyl ether	U		0.104	1.00	1	03/13/2018 14:27	WG1083887
Methyl tert-butyl ether	U		0.105	1.00	1	03/13/2018 14:27	WG1083887
tert-Amyl Methyl Ether	U		0.128	1.00	1	03/13/2018 14:27	WG1083887
tert-Butyl alcohol	U		1.88	10.0	1	03/13/2018 14:27	WG1083887
Toluene	0.202	J	0.104	1.00	1	03/13/2018 14:27	WG1083887
Xylenes, Total	1.56	J	0.288	3.00	1	03/13/2018 14:27	WG1083887
(S) 1,2-Dichloroethane-d4	*89.9*			*70.0-130*		*03/14/2018 18:50*	WG1084492
(S) 1,2-Dichloroethane-d4	*99.4*			*70.0-130*		*03/13/2018 14:27*	WG1083887
(S) 4-Bromofluorobenzene	*102*			*75.0-125*		*03/13/2018 14:27*	WG1083887
(S) Toluene-d8	*98.4*			*75.0-125*		*03/13/2018 14:27*	WG1083887

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Ethanol	U		250	12500	125	03/15/2018 12:25	WG1084492
TPH (GC/MS) Low Fraction	28100		2000	12500	125	03/15/2018 18:44	WG1083887
1,2-Dibromoethane	U		14.2	125	125	03/15/2018 18:44	WG1083887
1,2-Dichloroethane	U		27.2	125	125	03/15/2018 18:44	WG1083887
Benzene	1280		12.8	125	125	03/15/2018 18:44	WG1083887
Di-isopropyl ether	U		15.2	125	125	03/15/2018 18:44	WG1083887
Ethylbenzene	1850		11.9	125	125	03/15/2018 18:44	WG1083887
Ethyl tert-butyl ether	U		13.0	125	125	03/15/2018 18:44	WG1083887
Methyl tert-butyl ether	U		13.1	125	125	03/15/2018 18:44	WG1083887
tert-Amyl Methyl Ether	U		16.0	125	125	03/15/2018 18:44	WG1083887
tert-Butyl alcohol	U		235	1250	125	03/15/2018 18:44	WG1083887
Toluene	582		13.0	125	125	03/15/2018 18:44	WG1083887
Xylenes, Total	4850		36.0	375	125	03/15/2018 18:44	WG1083887
(S) 1,2-Dichloroethane-d4	*97.4*			*70.0-130*		*03/15/2018 12:25*	WG1084492
(S) 1,2-Dichloroethane-d4	*100*			*70.0-130*		*03/15/2018 18:44*	WG1083887
(S) 4-Bromofluorobenzene	*96.0*			*75.0-125*		*03/15/2018 18:44*	WG1083887
(S) Toluene-d8	*96.8*			*75.0-125*		*03/15/2018 18:44*	WG1083887

Sample Narrative:

L976744-06 WG1084492, WG1083887: IS/SURR failed on lower dilution.

L976744-06 WG1084492, WG1083887: Elevated RL due to sample matrix.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Ethanol	8.85	J	2.00	100	1	03/14/2018 19:44	WG1084492
TPH (GC/MS) Low Fraction	4070	J	800	5000	50	03/15/2018 17:31	WG1083887
1,2-Dibromoethane	U		5.70	50.0	50	03/15/2018 17:31	WG1083887
1,2-Dichloroethane	U		10.9	50.0	50	03/15/2018 17:31	WG1083887
Benzene	353		5.10	50.0	50	03/15/2018 17:31	WG1083887
Di-isopropyl ether	U		6.10	50.0	50	03/15/2018 17:31	WG1083887
Ethylbenzene	170		4.78	50.0	50	03/15/2018 17:31	WG1083887
Ethyl tert-butyl ether	U		5.20	50.0	50	03/15/2018 17:31	WG1083887
Methyl tert-butyl ether	U		5.25	50.0	50	03/15/2018 17:31	WG1083887
tert-Amyl Methyl Ether	U		6.40	50.0	50	03/15/2018 17:31	WG1083887
tert-Butyl alcohol	100	B J	94.0	500	50	03/15/2018 17:31	WG1083887
Toluene	97.2		5.20	50.0	50	03/15/2018 17:31	WG1083887
Xylenes, Total	167		14.4	150	50	03/15/2018 17:31	WG1083887
(S) 1,2-Dichloroethane-d4	*81.3*			*70.0-130*		*03/14/2018 19:44*	WG1084492
(S) 1,2-Dichloroethane-d4	*98.4*			*70.0-130*		*03/15/2018 17:31*	WG1083887
(S) 4-Bromofluorobenzene	*93.9*			*75.0-125*		*03/15/2018 17:31*	WG1083887
(S) Toluene-d8	*97.3*			*75.0-125*		*03/15/2018 17:31*	WG1083887

Sample Narrative:

L976744-07 WG1083887: Elevated RL due to sample matrix.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Ethanol	693	J	250	12500	125	03/15/2018 11:58	WG1084492
TPH (GC/MS) Low Fraction	22300		2000	12500	125	03/15/2018 17:55	WG1083887
1,2-Dibromoethane	U		14.2	125	125	03/15/2018 17:55	WG1083887
1,2-Dichloroethane	63.9	J	27.2	125	125	03/15/2018 17:55	WG1083887
Benzene	2040		12.8	125	125	03/15/2018 17:55	WG1083887
Di-isopropyl ether	U		15.2	125	125	03/15/2018 17:55	WG1083887
Ethylbenzene	2460		11.9	125	125	03/15/2018 17:55	WG1083887
Ethyl tert-butyl ether	U		13.0	125	125	03/15/2018 17:55	WG1083887
Methyl tert-butyl ether	U		13.1	125	125	03/15/2018 17:55	WG1083887
tert-Amyl Methyl Ether	U		16.0	125	125	03/15/2018 17:55	WG1083887
tert-Butyl alcohol	349	B J	235	1250	125	03/15/2018 17:55	WG1083887
Toluene	179		13.0	125	125	03/15/2018 17:55	WG1083887
Xylenes, Total	1510		36.0	375	125	03/15/2018 17:55	WG1083887
(S) 1,2-Dichloroethane-d4	*98.7*			*70.0-130*		*03/15/2018 11:58*	WG1084492
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*03/15/2018 17:55*	WG1083887
(S) 4-Bromofluorobenzene	*93.5*			*75.0-125*		*03/15/2018 17:55*	WG1083887
(S) Toluene-d8	*96.5*			*75.0-125*		*03/15/2018 17:55*	WG1083887

Sample Narrative:

L976744-08 WG1084492, WG1083887: IS/SURR failed on lower dilution.

L976744-08 WG1084492, WG1083887: Elevated RL due to sample matrix.

Method Blank (MB)

(MB) R3293407-4 03/13/18 11:11

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH (GC/MS) Low Fraction	U		16.0	100
1,2-Dibromoethane	U		0.114	1.00
1,2-Dichloroethane	U		0.218	1.00
Benzene	U		0.102	1.00
Di-isopropyl ether	U		0.122	1.00
Ethylbenzene	U		0.0955	1.00
Ethyl tert-butyl ether	U		0.104	1.00
Methyl tert-butyl ether	U		0.105	1.00
tert-Amyl Methyl Ether	U		0.128	1.00
tert-Butyl alcohol	2.75	J	1.88	10.0
Toluene	U		0.104	1.00
Xylenes, Total	U		0.288	3.00
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*
(S) 4-Bromofluorobenzene	*92.4*			*75.0-125*
(S) Toluene-d8	*99.0*			*75.0-125*

Laboratory Control Sample (LCS)

(LCS) R3293407-1 03/13/18 09:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
1,2-Dibromoethane	40.0	41.7	104	75.0-125	
1,2-Dichloroethane	40.0	38.9	97.3	75.0-125	
Benzene	40.0	40.6	101	75.0-125	
Di-isopropyl ether	40.0	41.2	103	75.0-125	
Ethylbenzene	40.0	42.2	106	75.0-125	
Ethyl tert-butyl ether	40.0	41.4	104	75.0-125	
Methyl tert-butyl ether	40.0	40.6	101	75.0-125	
tert-Amyl Methyl Ether	40.0	41.7	104	75.0-125	
Toluene	40.0	40.8	102	75.0-125	
Xylenes, Total	120	128	107	75.0-125	
(S) 1,2-Dichloroethane-d4			*97.4*	*70.0-130*	
(S) 4-Bromofluorobenzene			*105*	*75.0-125*	
(S) Toluene-d8			*99.8*	*75.0-125*	

Laboratory Control Sample (LCS)

(LCS) R3293407-2 03/13/18 09:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
tert-Butyl alcohol	400	364	91.0	75.0-125	
(S) 1,2-Dichloroethane-d4			*97.4*	*70.0-130*	
(S) 4-Bromofluorobenzene			*105*	*75.0-125*	
(S) Toluene-d8			*99.8*	*75.0-125*	

Laboratory Control Sample (LCS)

(LCS) R3293407-3 03/13/18 09:56

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/MS) Low Fraction	500	465	93.0	70.0-130	
(S) 1,2-Dichloroethane-d4			*100*	*70.0-130*	
(S) 4-Bromofluorobenzene			*97.2*	*75.0-125*	
(S) Toluene-d8			*101*	*75.0-125*	

L976744-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L976744-05 03/13/18 14:27 • (MS) R3293407-5 03/13/18 12:24 • (MSD) R3293407-6 03/13/18 12:49

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
1,2-Dibromoethane	40.0	U	43.2	41.1	108	103	1	75.0-125			5.09	30
1,2-Dichloroethane	40.0	U	39.5	35.5	98.7	88.8	1	75.0-125			10.7	30
Benzene	40.0	6.71	47.5	46.2	102	98.6	1	75.0-125			2.90	30
Di-isopropyl ether	40.0	U	41.1	39.9	103	99.8	1	75.0-125			2.92	30
Ethylbenzene	40.0	0.607	42.5	41.8	105	103	1	75.0-125			1.47	30
Ethyl tert-butyl ether	40.0	U	41.5	40.8	104	102	1	75.0-125			1.76	30
Methyl tert-butyl ether	40.0	U	40.9	40.3	102	101	1	75.0-125			1.50	30
tert-Amyl Methyl Ether	40.0	U	42.1	40.3	105	101	1	75.0-125			4.35	30
Toluene	40.0	0.202	41.8	39.4	104	98.1	1	75.0-125			5.82	30
Xylenes, Total	120	1.56	130	127	107	105	1	75.0-125			2.41	30
(S) 1,2-Dichloroethane-d4					*96.1*	*96.1*		*70.0-130*				
(S) 4-Bromofluorobenzene					*102*	*102*		*75.0-125*				
(S) Toluene-d8					*102*	*98.6*		*75.0-125*				

L976744-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L976744-05 03/13/18 14:27 • (MS) R3293407-7 03/13/18 13:13 • (MSD) R3293407-8 03/13/18 13:38

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/MS) Low Fraction	500	1620	2270	2260	129	126	1	70.0-130			0.531	30
(S) 1,2-Dichloroethane-d4					*99.4*	*97.9*		*70.0-130*				
(S) 4-Bromofluorobenzene					*101*	*103*		*75.0-125*				
(S) Toluene-d8					*98.3*	*98.1*		*75.0-125*				

Method Blank (MB)

(MB) R3293420-5 03/14/18 17:56

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Ethanol	U		2.00	100
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3293420-2 03/14/18 15:20

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ethanol	100	102	102	54.0-144	
(S) 1,2-Dichloroethane-d4			*102*	*70.0-130*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

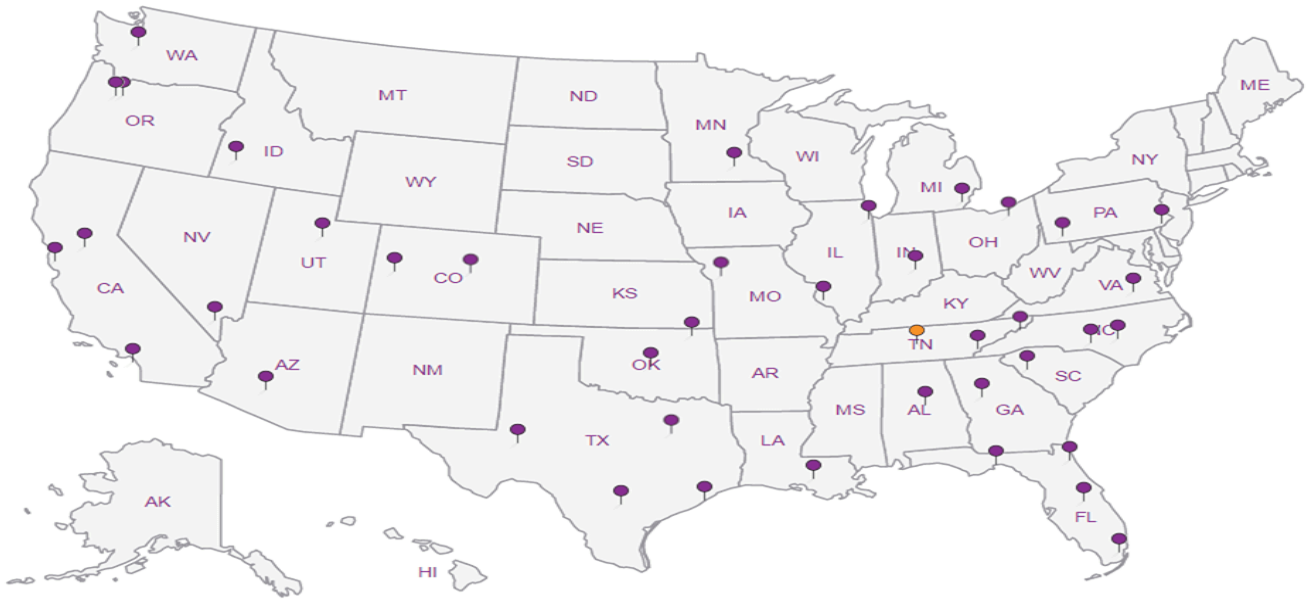
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



ARCADIS Design & Consultancy for natural and built assets

Chain of Custody Record

L976744

Page 1 of 1

ARCADIS Project Name: CA 11109

Req Due Date (mm/dd/yy): Standard TAT Rush TAT: Yes ___ No X

Lab Work Order Number:

Lab Name: ESC Lab Sciences	Facility Address: 4280 Foothill Blvd.	Consultant/Contractor: Blaine Tech Services, Inc.
Lab Address: 12065 Lebanon Rd., Mt. Juliet, TN 37122	City, State, ZIP Code: Oakland, CA	Blaine Tech Project No: ARCADIS/BP-11109
Lab PM: Jared Wills	Lead Regulatory Agency: Alameda County Env. Health Svcs	Consultant/Contractor Address: 1680 Rogers Ave., San Jose, CA 95112
Lab Phone: 805.773.9678	California Global ID No.: T0600100217	Consultant/Contractor PM: Ross Mikovich
Lab Shipping Acct:	ARCADIS Project No: GP08BPNA.C108	Phone: 408.573.0555 x206
Lab Bottle Order No:	ARCADIS PM/ Phone: Jamey Peterson	Email EDD To: jamey.peterson@arcadis.com
Other Info:	Email: jamey.peterson@arcadis.com	Invoice To: ARCADIS X Contractor ___

(5) Fule Oxys include: MTBE, TBA, TAME, ETBE, DIPE

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	No. Containers / Preservative: Total Number of Containers	Unpreserved	H_2SO_4	HNO_3	HCl	Methanol	Requested Analyses: GRO 8260B	BTEX 8260B	MTBE 8260B	(5) Oxygenates 8260B	1,2-DCA, EDB 8260B	Ethanol 8260B
	MW-3	03/09/18	0920		X		3				3				X			
	MW-4		0940		X		3				3		X		X			
	MW-5		1035		X		3				3		X	X		X	X	X
	MW-6		0900		X		3				3				X			
	MW-7		0955		X		3				3		X	X		X	X	X
	MW-10		1220		X		3				3		X	X		X	X	X
	MW-11		1015		X		3				3		X	X		X	X	X
	MW-12		1245		X		3				3		X	X		X	X	X
	TB-11109-030918		0800		X		2				2							

Report Type & QC Level

Standard X

Full Data Package ___

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

ON HOLD

Sampler's Name: Brian Keebler	
Sampler's Company: Blaine Tech	
Shipment Method:	Ship Date:
Shipment Tracking No:	
Special Instructions:	

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
BRIAN KEEBLER BK — SAMPLE CUSTODIAN	03/09/18	1500	BRIAN KEEBLER BK — SAMPLE CUSTODIAN	03/09/18	1505
R-ML (U.P.S.) BTS	3-12-18	1010	BK / ESC	3/12/18	1010
ESC	3/12/18	1400	ESC	3/12/18	1400
ESC	03/13/18	1520	ESC	03/13/18	1520

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes (No) | Temp Blank: Yes (No) | Cooler Temp on Receipt: 1.7 °F/C | Trip Blank: Yes (No) | MS/MSD Sample Submitted: Yes (No)

ARCADIS COC Rev. 06282012

ESC LAB SCIENCES
Cooler Receipt Form

Client: Arcadis		SDG#	976744
Cooler Received/Opened On: 031218	1520	Temperature:	1.7
Received By: E. Gaddes			
Signature:			

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	X		
COC Signed / Accurate?		X	
Bottles arrive intact?		X	
Correct bottles used?		X	
Sufficient volume sent?		X	
[illegible]			
VOA Zero headspace?		X	
Preservation Correct / Checked?		X	