ExxonMobil
Refining and Supply Company
Downstream - Safety, Health & Environment
Environmental Remediation

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Darin L. Rouse
Senior Engineer
Environmental Remediation

ExxonMobil
Refining & Supply

#245

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ENVIRONMENTAL PROTECTION

October 5, 2000

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

RE: Former Exxon RAS #7-0238/2200 East 12th Street, Oakland, California.

Dear Mr. Chan:

Attached for your review and comment is a document entitled ***Work Plan for Dual-Phase Extraction Pilot Test,*** dated October 2, 2000, for the above referenced site. The Work Plan was prepared by Environmental Resolutions, Inc. (ERI) of Novato, California, and proposes the dual-phase extraction pilot test to evaluate the feasibility of using this system to remediate soil and groundwater beneath the site.

If you have any questions or comments, please contact me at (925) 246-8768.

Sincerely,

Darin L. Rouse
Senior Engineer

Attachment: ERI's Work Plan for Dual-Phase Extraction Pilot Test, dated October 2, 2000.

cc: w/attachment
Mr. Stephen Hill, California Regional Water Quality Control Board-San Francisco Bay Region

w/o attachment
Mr. James F. Chappell, Environmental Resolutions, Inc.

ENVIRONMENTAL RESOLUTIONS, INC.

October 2, 2000
ERI 229304.W01

Mr. Darin L. Rouse
ExxonMobil Refining and Supply
P.O. Box 4032
Concord, California 94524-4032

Subject: Work Plan for Dual-Phase Extraction Pilot Test at Former Exxon Service Station 7-0238, 2200 East 12th Street, Oakland, California.

Mr. Rouse:

At the request of ExxonMobil Refining and Supply (formerly known as Exxon Company, U.S.A.) (ExxonMobil), Environmental Resolutions, Inc. (ERI) performs environmental assessment activities at the subject site. ERI has prepared this Work Plan in response to elevated levels of petroleum (mtbe) hydrocarbons detected in groundwater samples collected at the site and a letter from the Alameda County Health Care Services Agency (the County), dated August 30,2000 (Attachment A).

BACKGROUND

The site is located on the eastern corner of 22nd Avenue and East 12th Street in Oakland, California, as shown on the Site Vicinity Map (Plate 1). The locations of the underground storage tanks (USTs), dispenser islands, groundwater monitoring wells, and other selected site features are shown on the Generalized Site Plan (Plate 2).

The site currently has eight groundwater monitoring wells (MW9A through MW9D, and MW9F through MW9I) and two UST cavity monitoring wells (TP1 and TP2). Based on quarterly groundwater monitoring data, the depth to groundwater across the site has fluctuated from approximately 4 to 9 feet below ground surface (bgs). Groundwater appears to flow predominantly towards the west with a hydraulic gradient ranging from 0.010 to 0.025. A rose diagram depicting historical groundwater flow directions between first quarter 1998 and third quarter 2000 is shown on Plate 3. Historical and recent groundwater monitoring data are summarized in Table 1.

DUAL-PHASE EXTRACTION PILOT TEST

The purpose of the dual-phase extraction (DPE) pilot test is to evaluate the feasibility of using a DPE system to remediate soil and groundwater beneath the site. DPE appears to be the best available technology for this site based on current site conditions. DPE systems are unique because they simultaneously extract groundwater and soil vapor. Utilizing liquid-ring pumps, DPE systems are capable of applying vacuum up to 27 inches of mercury (367 inches of water), and have the potential to remediate sites where typical soil vapor extraction is not feasible. Groundwater monitoring wells MW9B, MW9C, and MW9I will be used as the extraction wells for the DPE test. Two vapor points will be installed at distances of approximately 10 and 20 feet from well MW9B. The vapor points will

27/30 = 0.9 atm

be used to evaluate induced vacuum and groundwater drawdown. ERI anticipates obtaining the following information from the DPE pilot test: vacuum radius of influence (ROI), groundwater capture zone, groundwater drawdown, optimal flow rates, appropriate abatement technology, and estimated petroleum constituent removal rates. The following tasks will be performed as part of the DPE pilot test:

Task 1: Permitting

- ExxonMobil has obtained an approved National Pollutant Discharge Elimination System (NPDES) permit from the California Regional Water Quality Control Board (Regional Board). The permit allows ExxonMobil to treat and discharge water at the site.

- ERI will prepare and submit a notification letter to the Bay Area Air Quality Management District (BAAQMD).

- ERI will prepare and submit well installation permits to the Alameda County Department of Public Works for vapor points VP1 and VP2.

Task 2: Vapor Point Installation

- ERI will observe a licensed well driller install two vapor points (VP1 and VP2) at distances of approximately 10 and 20 feet from MW9B. The approximate locations of the vapor points are shown on Plate 2. Each vapor point will be constructed of 2-inch diameter, schedule 40 polyvinyl chloride (PVC) threaded casing with 0.020-inch machine-slotted casing from 5 feet bgs to 20 feet bgs. A typical vapor point detail is provided on Plate 4. The total depth of the vapor points will be approximately 20 feet bgs. Field work will be performed in general accordance with ERI's standard field protocol (Attachment B).

Task 3: Dual-Phase Extraction Pilot Test

- ERI will perform a five-day (120 hours) DPE pilot test using ERI's mobile DPE trailer. Groundwater monitoring well MW9B will be used as the extraction well for the first 48 hours. Groundwater monitoring wells MW9C and MW9I will be used as the extraction wells for the remainder of the DPE test (approximately 72 hours). Groundwater monitoring wells MW9C, MW9I, and vapor points VP1 and VP2 will be used as observation wells.

- ERI will record applied vacuum, soil vapor flow rate, groundwater flow rate, influent soil vapor concentrations, groundwater drawdown, and temperature at the extraction well. Induced vacuum and groundwater drawdown will be recorded at the observation wells. Soil vapor and water samples collected during the pilot test will be submitted to a California state-certified laboratory for analysis of total purgeable petroleum hydrocarbons as gasoline (TPPHg), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and methyl tertiary butyl ether (MTBE).

- Extracted groundwater will be treated on-site with liquid-phase carbon vessels and discharged to the storm sewer under a (NPDES) discharge permit. The soil vapor stream will be abated using vapor-phase carbon vessels. During the test, ERI will monitor the influent and effluent of the vapor stream with a photo-ionization detector (PID).

Task 4: Report Preparation

- ERI will prepare a report for the DPE pilot test. The report will summarize field activities, sample collection, field observations, results of the field investigations, and analytical results for soil vapor and groundwater samples. If additional assessment work is warranted, the proposed work will be described in the report.

SCHEDULE OF OPERATIONS

Upon regulatory approval of this Work Plan, ERI is prepared to implement the work in accordance with the following schedule:

- Within 15 calendar days of receiving written approval of this Work Plan, ERI will prepare and submit applications for the permits included in Task 1 to the appropriate agencies.
- Within 30 calendar days of receiving required permits, ERI will commence Tasks 2 and 3.
- Within 45 calendar days of receiving laboratory analysis results, ERI will submit the report described in Task 4 to the County and the Regional Board.

ERI recommends forwarding copies of this Work Plan to:

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

Mr. Stephen Hill
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Please call Mr. James F. Chappell at (415) 382-4323 with any questions regarding this project.

Sincerely,
Environmental Resolutions, Inc.

James F. Chappell
Assistant Project Manager

John B. Bobbitt
R.G. 4313

Attachments:

Table 1:	Cumulative Groundwater Monitoring and Sampling Data
Plate 1:	Site Vicinity Map
Plate 2:	Generalized Site Plan
Plate 3:	Groundwater Flow Direction Rose Diagram
Plate 4:	Vapor Point Detail
Attachment A:	Alameda County Health Care Services Agency Letter, Dated August 30, 2000
Attachment B:	Field Protocol

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 7-0238
2200 East 12th Street
Oakland, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPPHg	MTBE	B	T	E	X
		<	feet	>	<		ug/L			>
MW9A	11/02/95	NLPH	7.16	4.30	<50	<10	<0.5	<0.5	<0.5	<0.5
(11.46)	04/26/96	NLPH	6.33	5.13	---	---	---	---	---	---
	08/22/96	NLPH	7.02	4.44	---	---	---	---	---	---
	02/24/97	---	---	---	---	---	---	---	---	---
	03/16/98	NLPH	6.14	5.32	<200	40,000	7.9	<2.0	<2.0	<2.0
	04/21/98	NLPH	6.29	5.17	<50	53,000	3.8	<0.5	<0.5	<0.5
(14.53)	07/22/98	NLPH	6.58	7.95	<250	18,000	<2.5	<2.5	<2.5	<2.5
	12/22/98	NLPH	6.47	8.06	<50	5,200	<0.5	<0.5	<0.5	<0.5
	02/26/99	NLPH	6.38	8.15	<100	10,000	<1.0	<1.0	<1.0	<1.0
	5/27/99**	NLPH	6.56	7.97	<5,000	15,300	<50	<50	<50	<50
	08/03/99	NLPH	9.39	5.14	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	12/03/99	NLPH	6.52	8.01	<50	1,400	<0.5	<0.5	<0.5	0.67[A]
	02/29/00	NLPH	5.31	9.22	<50	20,000	1.2	<0.5	<0.5	<0.5
	05/18/00	NLPH	6.31	8.22	<50	14,000/11,000*	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**6.54**	**7.99**	**<50**	**7,400**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
MW9B	11/02/95	NLPH	6.14	3.66	130	<10	3.3	<0.5	<0.5	<0.5
(9.80)	04/26/96	NLPH	5.66	4.14	270	70	130	2.8	6.7	<3
	08/22/96	NLPH	6.16	3.64	210	31	5.7	6.8	1.1	9.2
	02/24/97	NLPH	5.58	4.22	1,400	1,300	76	1.4	4.1	1.2
	03/16/98	NLPH	5.32	4.48	860	1,500	140	2.0	11	<2.0
	04/21/98	NLPH	5.49	4.31	1,800	18,000	300	<5.0	7.9	<5.0
(12.83)	07/22/98	NLPH	5.79	7.04	<500	26,000	13	<5.0	<5.0	<5.0
	12/22/98	NLPH	5.69	7.14	700	21,000	110	3.1	9.1	14
	02/26/99	NLPH	5.10	7.73	8,800	8,000	2,000	<25	52	38
	05/18/99	NLPH	5.65	7.18	<10,000	42,100	158	<100	<100	<100
	08/03/99	NLPH	6.24	6.59	960	24,900	<5.0	<5.0	<5.0	<5.0
	12/03/99	NLPH	5.66	7.17	<50	1,000	<0.5	<0.5	<0.5	<0.5
	02/29/00	NLPH	4.61	8.22	3,100	25,000	900	7	23	7.1
	05/18/00	NLPH	5.54	7.29	780	34,000/26,000*	150	<2.5	4.5	<2.5
	07/24/00	**NLPH**	**8.75**	**4.08**	**<250**	**39,000**	**8**	**<2.5**	**<2.5**	**<2.5**

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 7-0238
2200 East 12th Street
Oakland, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPPHg	MTBE	B	T	E	X
		<	feet	>	<		ug/L			>
MW9C	11/02/95	---	---	---	---	---	---	---	---	---
(11.14)	04/26/96	---	---	---	---	---	---	---	---	---
	08/22/96	---	---	---	---	---	---	---	---	---
	02/24/97	---	---	---	---	---	---	---	---	---
	03/16/98	NLPH	5.51	5.63	<500	150,000	24	<5.0	<5.0	<5.0
	04/21/98	NLPH	5.83	5.31	150	130,000/150,000*	<0.5	<0.5	<0.5	<0.5
(14.19)	07/22/98	NLPH	6.43	7.76	<500	95,000	<5.0	<5.0	<5.0	<5.0
	12/22/98	NLPH	6.16	8.03	<500	84,000	<5.0	<5.0	<5.0	<5.0
	02/26/99	NLPH	5.46	8.73	<250	55,000	<2.5	<2.5	<2.5	<2.5
	05/18/99	NLPH	6.27	7.92	<25,000	68,900	<250	<250	<250	<250
	08/03/99	NLPH	7.13	7.06	210	69,200	<1.0	1.3	<1.0	<1.0
	12/03/99	NLPH	6.17	8.02	290	50,000	<2.5	<2.5	<2.5	<2.5
	02/29/00	NLPH	4.49	9.70	<250	40,000	<2.5	<2.5	<2.5	<2.5
	05/18/00	NLPH	5.96	8.23	<250	46,000/33,000	<2.5	<2.5	<2.5	<2.5
	07/24/00	**NLPH**	**6.47**	**7.72**	**<250**	**44,000**	**<2.5**	**<2.5**	**<2.5**	**<2.5**
MW9D	11/02/95	---	---	---	---	---	---	---	---	---
(12.90)	04/26/96	---	--	--	---	---	---	---	---	---
	08/22/96	---	---	---	---	---	---	---	---	---
	02/24/97	---	---	---	---	---	---	---	---	---
	03/16/98	NLPH	6.94	5.96	<50	10	<0.5	<0.5	<0.5	<0.5
	04/21/98	NLPH	7.22	5.68	<50	12	<0.5	<0.5	<0.5	<0.5
(15.98)	07/22/98	NLPH	7.85	8.13	<50	13	<0.5	<0.5	<0.5	<0.5
	12/22/98	NLPH	7.58	8.40	<50	12	<0.5	<0.5	<0.5	<0.5
	02/26/99	NLPH	6.42	9.56	<50	310	<0.5	<0.5	<0.5	<0.5
	05/18/99	NLPH	6.55	9.43	<2,500	13,500	<25	<25	<25	<25
	08/03/99	NLPH	8.34	7.64	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	12/03/99	NLPH	7.56	8.42	<50	<2	<0.5	<0.5	<0.5	<0.5
	02/29/00	NLPH	4.82	11.16	<50	2.5	<0.5	<0.5	<0.5	<0.5
	05/18/00	NLPH	7.40	8.58	<50	6.2	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**7.91**	**8.07**	**<50**	**14**	**<0.5**	**<0.5**	**0.85**	**0.74**

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 7-0238
2200 East 12th Street
Oakland, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPPHg	MTBE	B	T	E	X
		<.....feet.....>			<.....ug/L.....>					
MW9F	11/02/95	---	---	---	---	---	---	---	---	---
(8.37)	04/26/96	NLPH	---	---	<50	57	<0.5	<0.5	<0.5	<0.5
	08/22/96	NLPH	---	---	<50	5.8	<0.5	<0.5	<0.5	<0.5
	02/24/97	NLPH	---	---	<50	<30	<0.5	<0.5	<0.5	<0.5
	03/16/98	NLPH	---	---	---	---	---	---	---	---
	04/21/98	---	---	---	---	---	---	---	---	---
(11.38)	07/22/98	---	---	---	---	---	---	---	---	---
	12/22/98	NLPH	5.47	5.91	<50	81	<0.5	<0.5	<0.5	<0.5
	02/26/99	NLPH	5.35	6.03	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	05/18/99	NLPH	5.62	5.76	<50	61.6	<0.5	<0.5	<0.5	<0.5
	08/03/99	NLPH	6.32	5.06	<50	3.10	<0.5	<0.5	<0.5	<0.5
	12/03/99	NLPH	5.59	5.79	<50	<2	<0.5	<0.5	0.71	<0.5
	02/29/00	NLPH	4.70	6.68	<50	52	<0.5	<0.5	<0.5	<0.5
	05/18/00	NLPH	5.37	6.01	<50	65	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**5.65**	**5.73**	**<50**	**170**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
MW9G	11/02/95	NLPH	5.92	4.03	<50	<10	<0.5	<0.5	<0.5	<0.5
(9.95)	04/26/96	NLPH	5.28	4.67	<50	18	<0.5	<0.5	<0.5	<0.5
	08/22/96	NLPH	5.57	4.38	<50	18	<0.5	<0.5	<0.5	<0.5
	02/24/97	NLPH	5.30	4.65	<50	240	<0.5	0.57	<0.5	0.62
	03/16/98	---	---	---	---	---	---	---	---	---
	04/21/98	---	---	---	---	---	---	---	---	---
(12.99)	07/22/98	---	---	---	---	---	---	---	---	---
	12/22/98	NLPH	5.28	7.71	<50	1,100	<0.5	<0.5	<0.5	<0.5
	02/26/99	NLPH	5.31	7.68	<50	50	<0.5	<0.5	<0.5	<0.5
	05/18/99	NLPH	5.18	7.81	<1,000	3,990	<10	<10	<10	<10
	08/03/99	NLPH	6.00	6.99	<50	1,340	<0.5	<0.5	<0.5	<0.5
	12/03/99	NLPH	5.27	7.72	<50	<2	<0.5	<0.5	<0.5	0.55[A]
	02/29/00	NLPH	4.60	8.39	<50	7,900	<0.5	<0.5	<0.5	<0.5
	05/18/00	NLPH	5.16	7.83	<50	2,400	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**5.20**	**7.79**	**<50**	**1,000**	**<0.5**	**<0.5**	**<0.5**	**<0.5**

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 7-0238
2200 East 12th Street
Oakland, California

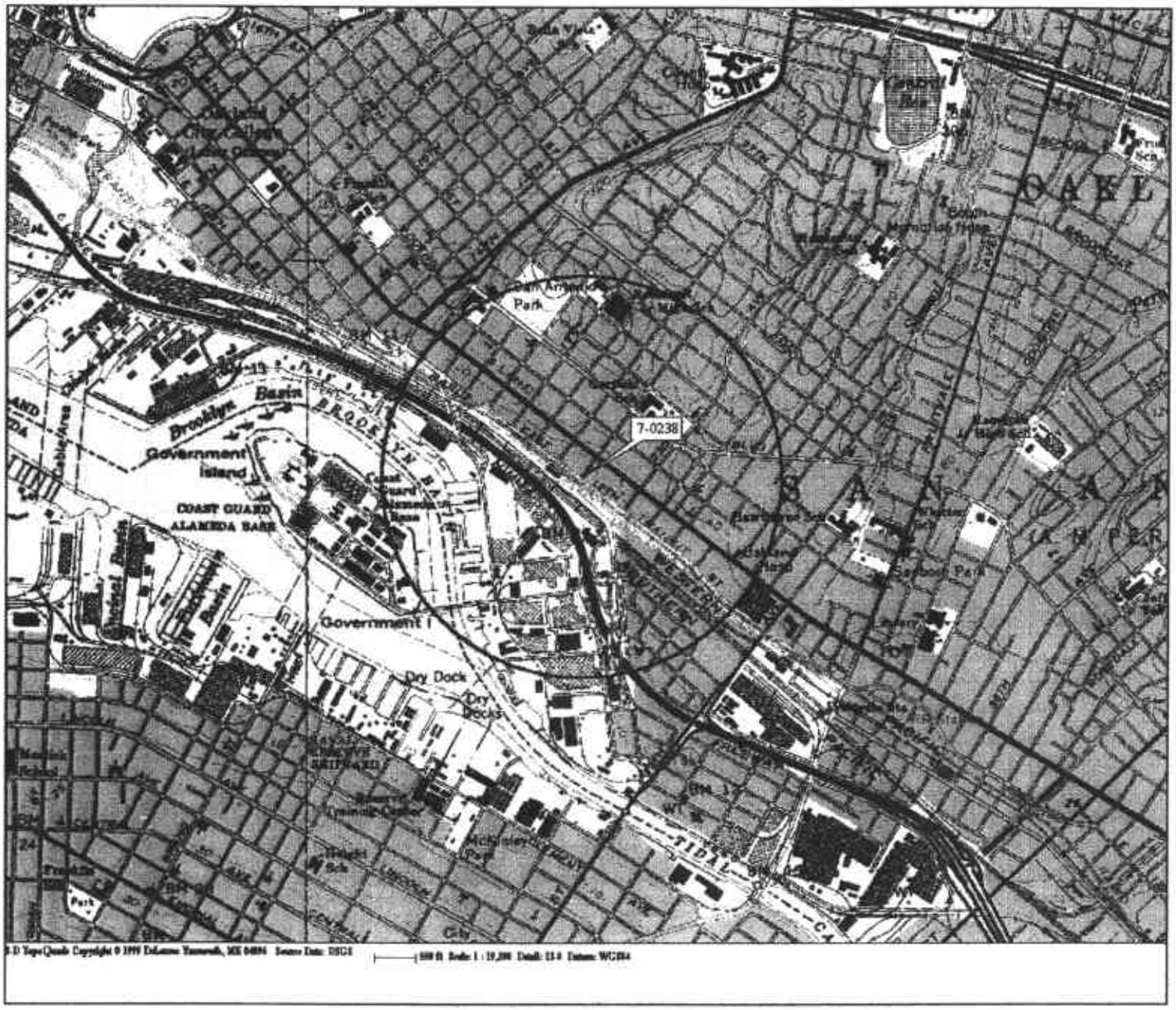
Well ID #	Sampling	SUBJ	DTW	Elev.	TPPHg	MTBE	B	T	E	X
(TOC)	Date	<.....feet.....>			<.....ug/L.....>					
MW9H	11/02/95	NLPH	8.40	0.18	<50	<10	<0.5	<0.5	<0.5	<0.5
(8.58)	04/26/96	NLPH	8.05	0.53	---	---	---	---	---	---
	08/22/96	NLPH	8.17	0.41	---	---	---	---	---	---
	02/24/97	---	---	---	---	---	---	---	---	---
	03/16/98	---	---	---	---	---	---	--	---	---
	04/21/98	---	---	---	---	---	---	---	---	---
(11.61)	07/22/98	---	---	---	---	---	---	---	---	---
	12/22/98	NLPH	7.81	3.80	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	02/26/99	NLPH	7.61	4.00	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	05/18/99	NLPH	8.00	3.61	<50	3.98	<0.5	<0.5	<0.5	<0.5
	08/03/99	NLPH	6.05	5.56	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	12/03/99	NLPH	5.32	6.29	<50	<2	<0.5	<0.5	<0.5	0.57[A]
	02/29/00	NLPH	7.10	4.51	<50	<2	<0.5	<0.5	<0.5	<0.5
	05/18/00	NLPH	7.84	3.77	<50	9.7	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**7.94**	**3.67**	**<50**	**17**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
MW9I	11/02/95	NLPH	6.04	4.07	<50	<10	<0.5	<0.5	<0.5	<0.5
(10.11)	04/26/96	NLPH	5.27	4.84	<50	99	<0.5	<0.5	<0.5	<0.5
	08/22/96	NLPH	5.66	4.45	<50	170	<0.5	<0.5	<0.5	<0.5
	02/24/97	NLPH	5.24	4.87	120	9,100	<0.5	<0.5	<0.5	<0.5
	03/16/98	NLPH	4.91	5.20	<200	59,000	13	<2.0	<2.0	<2.0
	04/21/98	NLPH	5.08	5.03	<500	59,000	<5.0	<5.0	<5.0	<5.0
(13.14)	07/22/98	NLPH	5.44	7.70	<500	62,000	<5.0	<5.0	<5.0	<5.0
	12/22/98	NLPH	5.32	7.82	200	51,000	1.7	<0.5	<0.5	<0.5
	02/26/99	NLPH	4.71	8.43	<500	9,700	<5.0	<5.0	<5.0	<5.0
	05/18/99	NLPH	5.30	7.84	<1,000	3,730	<10	<10	<10	<10
	08/03/99	NLPH	5.98	7.16	<50	21,900	<0.5	0.650	<0.5	<0.5
	12/03/99	NLPH	5.31	7.83	<250	2,000	3.9	2.9	<2.5	14
	02/29/00	NLPH	4.20	8.94	50	16,000	0.74	<0.5	<0.5	<0.5
	05/18/00	NLPH	5.12	8.02	<50	2,900	<0.5	<0.5	<0.5	<0.5
	07/24/00	**NLPH**	**5.41**	**7.73**	**<250**	**43,000**	**<2.5**	**<2.5**	**<2.5**	**<2.5**

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 7-0238
2200 East 12th Street
Oakland, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPPHg	MTBE	B	T	E	X
		<	feet	>	<		ug/L			>

Notes:

SUBJ	=	Results of subjective evaluation.
NLPH	=	No liquid-phase hydrocarbons present in well.
TOC	=	Elevation of top of well casing; relative to mean sea level.
DTW	=	Depth to water.
Elev.	=	Elevation of groundwater surface; relative to mean sea level.
TPPHg	=	Total purgeable petroleum hydrocarbons as gasoline analyzed using EPA method 5030/8015 (modified).
MTBE	=	Methyl tertiary butyl ether analyzed using EPA method 8021B.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA method 8021B.
<	=	Less than the indicated detection limit shown by the laboratory.
---	=	Not measured or sampled.
*	=	MTBE confirmed using EPA method 8260.
**	=	Miscalculation in field. Field technician may have inadvertently monitored and sampled the wrong well. Resampled 5/27/99.
A	=	Analyte detected in the associated Trip Blank at 0.52 ug/L.



FN 2293TOPO

EXPLANATION

1/2-mile radius circle

N

APPROXIMATE SCALE

0 .5 1 mile

SOURCE:
Modified from a map
provided by
DeLorme 3-D TopoQuads

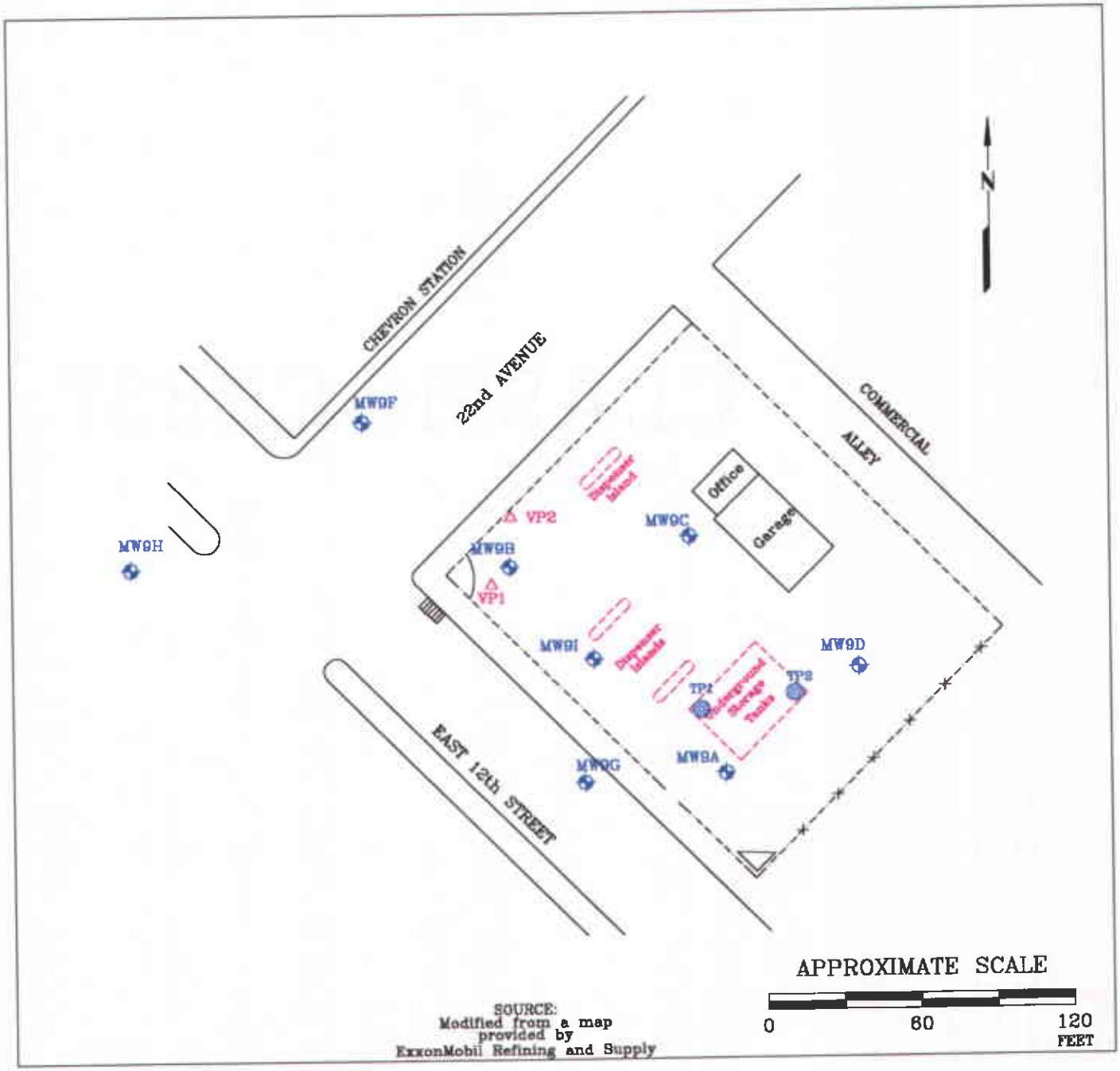
ENVIRONMENTAL RESOLUTIONS, INC.

SITE VICINITY MAP

FORMER EXXON SERVICE STATION 7-0238
2200 East 12th Street
Oakland, California

PROJECT NO.
2293

PLATE
1



SOURCE:
Modified from a map provided by ExxonMobil Refining and Supply

FN 22930002

EXPLANATION

MW9I
Groundwater Monitoring Well

TP2
UST Observation Well

VP1
Proposed Vapor Points

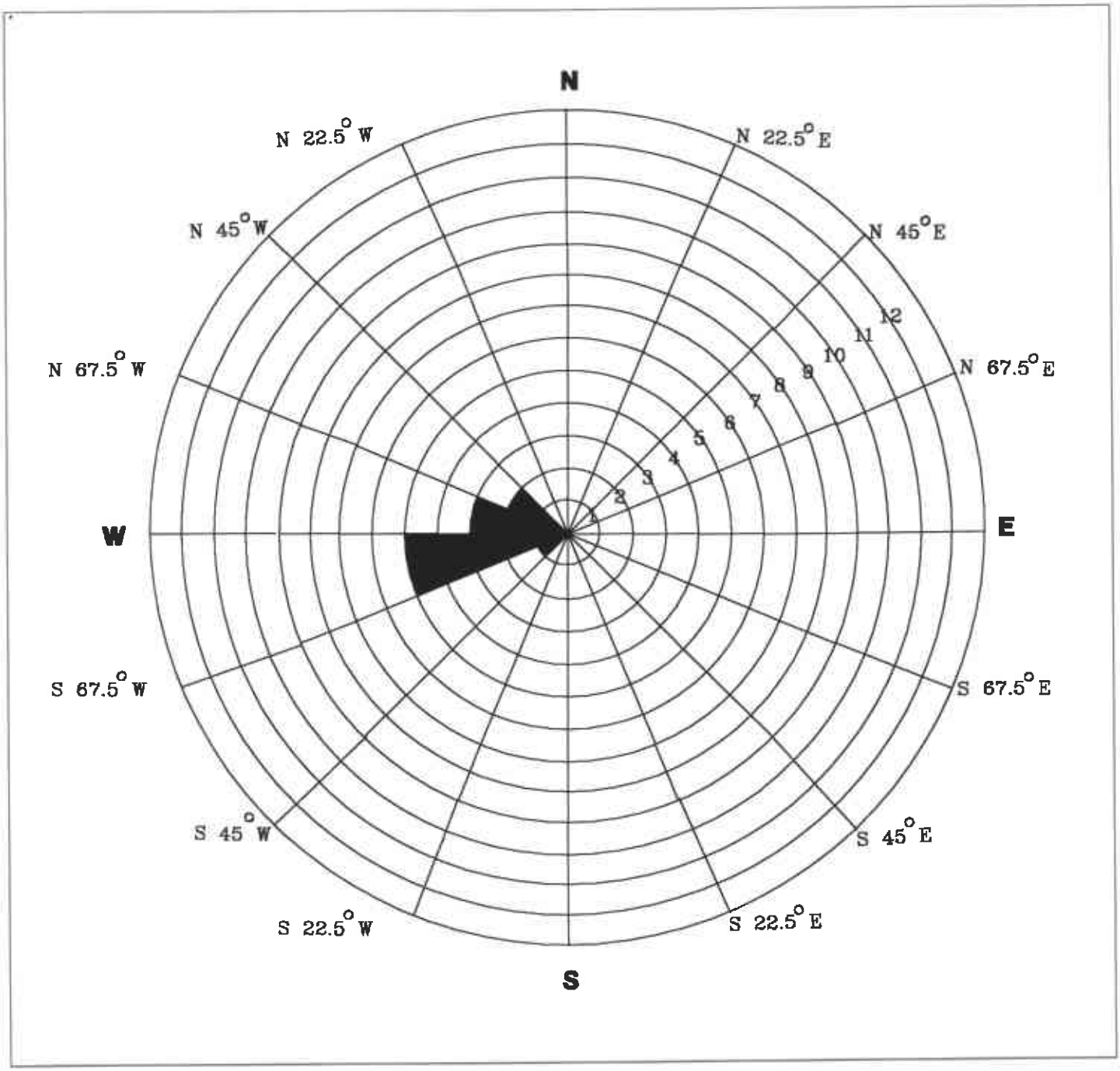
ENVIRONMENTAL RESOLUTIONS, INC.

GENERALIZED SITE PLAN

FORMER EXXON SERVICE STATION 7-0238
2200 East 12th Street
Oakland, California

PROJECT NO. 2293

PLATE 2



FN 22930004

EXPLANATION

N Compass Direction

Rose diagram developed by evaluating the groundwater gradient direction from the quarterly monitoring data. Each circle on the rose diagram represents the number of monitoring events that the gradient plotted in that 22.5 degree sector. For example, five quarterly groundwater gradient directions plotted between west and south 67.5 degrees west. Therefore, the dominant groundwater gradient direction as depicted by the rose diagram is between west and south 67.5 degrees west.

Data obtained from quarterly groundwater monitoring, first quarter 1998 through third quarter 2000. (eleven data points)

ERI ENVIRONMENTAL RESOLUTIONS, INC.

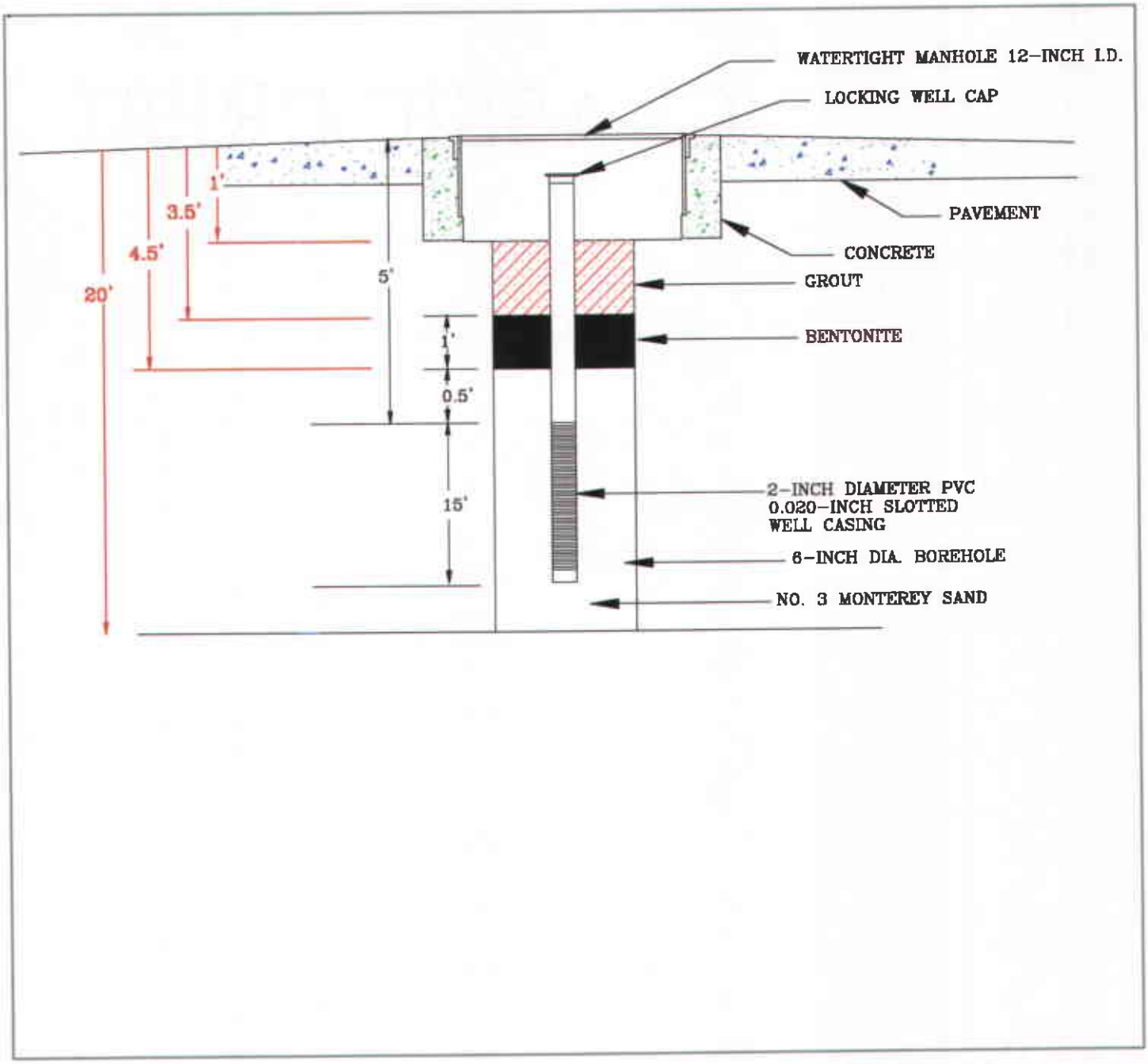
GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

FORMER EXXON SERVICE STATION 7-0238
2200 East 12th Street
Oakland, California

PROJECT NO. 2293

PLATE 3

June 23, 2000



FN 2293vaporpoint

NOT TO SCALE

ENVIRONMENTAL RESOLUTIONS, INC.

VAPOR POINT DETAIL

Former Exxon Service Station 7–0238
2200 East 12th Street
Oakland, California

PROJECT NO.
2293

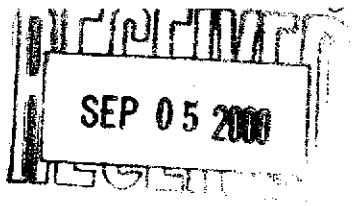
PLATE
4

September 20, 2000

ATTACHMENT A

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY LETTER, DATED AUGUST 30, 2000

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



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

August 30, 2000
StID # 245

Mr. Darin Rouse
ExxonMobil - Environmental Remediation
2300 Clayton Road, Suite 1250
P.O. Box 4032
Concord, CA 94524-4032

Re: Former Exxon RAS #7-0238, 2200 E. 12th St., Oakland CA 94606

Dear Mr. Rouse:

Our office has received and reviewed the second and third quarter 2000 groundwater monitoring reports for the above referenced site. As you may recall, this site has experienced a significant MTBE release, which is the main chemical of concern. There is also indication that the MTBE plume has migrated off-site. Concentrations up to 44,000 ppb MTBE were reported in MW9C in the 7/00 monitoring event. Elevated concentrations have been detected in this well since the beginning of testing the wells for MTBE, 3/98. These concentrations will require remediation to remove the MTBE source as recommended in the SWRCB's final draft of the **Guidelines for Investigation and Cleanup of MTBE and Other Ether-Based Oxygenates**.

In the second quarter groundwater monitoring report, you stated that a site conceptual model (SCM) is being developed for this site. In addition, you stated that ERI had submitted a groundwater discharge permit for feasibility testing, which was to be implemented during the third quarter. In the third quarter report, you stated that the dual-phase pilot test is scheduled for October 2000. I have since spoke with Mr. James Chappell of ERI. My concern is that our office has not been notified of the details of the proposed dual-phase pilot test. A Corrective Action Plan (CAP) or Feasibility Study (FS) has never been provided. It was assumed that this information would be incorporated into your SCM. Mr. Chappell was not certain on the details of the pilot test, therefore, I am requesting the submittal of your work plan for the dual-phase pilot test. You should also provide your rationale for selecting this remediation approach.

Please submit your work plan to our office within 30 days or no later than October 2, 2000.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, files
Mr. J. Chappell, ERI, 73 Digital Drive, Suite 100, Novato, CA 94949-5791

PTwp2200 E12

ATTACHMENT B

FIELD PROTOCOL

FIELD PROTOCOL

Site Safety Plan

Fieldwork will be performed by ERI personnel in accordance with a Site Safety Plan developed for the site. This plan describes the basic safety requirements for the subsurface investigation and the drilling of soil borings at the work site. The Site Safety Plan is applicable to personnel and subcontractors of ERI. Personnel at the site are informed of the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is kept at the work site and is available for reference by appropriate parties during the work. The ERI geologist will act as the Site Safety Officer.

Drilling of Soil Borings

Prior to the drilling of soil borings, ERI will acquire necessary permits from the appropriate agency(ies). ERI will also contact Underground Service Alert (USA) and a private underground utility locator (per ExxonMobil protocol) before drilling to help locate public utility lines at the site. ERI will clear the proposed locations to a depth of approximately 4 or 8 feet (depending on the location) before drilling to reduce the risk of damaging underground structures.

The soil borings will be drilled with a B57 (or similar) drill rig with hollow-stem auger. Auger flights and sampling equipment will be steam-cleaned before use to minimize the possibility of crosshole contamination. The rinseate will be containerized and stored on site. ERI will coordinate with ExxonMobil for appropriate disposal of the rinseate.

Drilling will be performed under the observation of a field geologist, and the earth materials in the boring will be identified using visual and manual methods, and classified as drilling progresses using the Unified Soil Classification System. Vapor points VP1 and VP2 will be drilled to approximately 10 feet below first-encountered groundwater or 5 feet into any competent clay layer (aquitard) encountered beneath the water-bearing zone. If an aquitard is encountered, the boring will be terminated and backfilled with bentonite before installing a groundwater monitoring well.

During drilling, soil samples will be collected every five feet or at significant changes in lithology. Samples will be collected with a California-modified, split-spoon sampler equipped with laboratory-cleaned brass sleeves. Samples will be collected by advancing the auger to a point just above the sampling depth and driving the sampler into the soil. The sampler will be driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows required to drive the sampler each successive 6-inch interval will be counted and recorded to give an indication of soil consistency.

Soil samples will be monitored with a photoionization detector (PID), which measures hydrocarbon concentrations in the ambient air or headspace above the soil sample. Field instruments such as the PID are useful for indicating relative levels of hydrocarbon vapors, but do not detect concentrations of hydrocarbons with the same precision as laboratory analyses. Soil samples selected for possible chemical analysis will be sealed promptly with Teflon® tape and plastic caps. The samples will be labeled and placed in iced storage for transport to the laboratory. Chain of Custody Records will be initiated by the geologist in the field, updated throughout handling of the samples, and sent with the samples to the laboratory. Copies of these records will be in the final report. Cuttings generated

during drilling will be placed on plastic sheeting and covered and left at the site. ERI will coordinate with ExxonMobil for the soil to be removed to an appropriate disposal facility.

Well Construction

The vapor points will be constructed in the boring using thread-jointed, 2-inch inner diameter, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents will be used in well construction. The screened portion of the wells will consist of factory-perforated casing with 0.020-inch wide slots. If unconfined aquifer conditions exist, the well screen will be installed from the total depth of each well to approximately 5 feet above the uppermost water-bearing unit. If confined conditions exist, the uppermost water-bearing unit will be screened exclusively. Unperforated casing will be installed from the top of each screen to the ground surface. The annular space in the wells will be packed with number 3 sand to approximately one foot above the slotted interval and a surged and refilled bentonite plug will be added above the sand pack to prevent cement from entering the well pack. The remaining annulus will be backfilled to grade with a slurry of cement and bentonite powder.

The wells will be protected with a locking cap and a traffic-rated, cast-steel utility box equipped with a steel skirt. The box has a watertight seal to protect against surface-water infiltration.