FOURTH QUARTER 1999
GROUNDWATER MONITORING
REPORT

TASK ORDER NUMBER 04-952137-ES
CONTRACT NUMBER 43A0012

SIXTH AND CASTRO STREETS
OAKLAND, CALIFORNIA

Prepared for

CALIFORNIA DEPARTMENT OF TRANSPORTATION
District 4
P.O. Box 23660
Oakland, California

Prepared by

Professional Service Industries
1320 West Winton Avenue
Hayward, California 94545
(510) 785-1111

November 22, 1999
575-8G013

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATIONS

Information provided in Professional Services Industries, Inc., (PSI) report number 575-8G013 is intended exclusively for the California Department of Transportation (Caltrans) for the evaluation of groundwater contamination as it pertains to the subject site. PSI is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. The professional services provided have been performed in accordance with practices generally accepted by other geologists, hydrologists, hydrogeologists, engineers, and environmental scientists practicing in this field. No other warranty, either expressed or implied, is made. As with all subsurface investigations, there is no guarantee that the work conducted will identify any or all sources or locations of contamination.

This report is issued with the understanding that Caltrans is responsible for ensuring that the information contained in this report is brought to the attention of the appropriate regulatory agency. This report has been reviewed by a geologist who is registered in the State of California and whose signature and license number appear below.

Frank R. Poss
Senior Hydrogeologist

Jeffrey Friedman, R.G. (5677)
Senior Project Geologist

1.0 INTRODUCTION

This report summarizes the results of the Fourth Quarter 1999 groundwater monitoring activities conducted on October 25, 1999 at the intersection of 6th and Castro Streets located in Oakland, California. The subject site location is presented on Figure 1. The purpose of this project is to comply with quarterly sampling requirements.

2.0 SITE HISTORY

The site is currently a vacant lot that is surrounded by Brush Street to the west, 7th Street to the north, Castro Street to the east, and 6th Street to the south. In 1987, ERM-West Consultants (ERM) conducted an environmental site assessment to identify any environmental concerns resulting from chemical hazardous waste generation at the site. Historical records searches indicated that the site has formerly been occupied by a number of businesses, most notably a gas station, an auto repair garage, Durham Farm Creamery, a machine shop, and a laundry facility. At least four underground storage tanks (USTs) were associated with the former gas station and dairy (IT, 1996). This service station was located at the intersection of 6th Street and Brush Street (Geocon, 1995).

ERM drilled seven soil borings at the site to collect soil samples for analyses. The results from the analyses of the soil samples identified up to 1.3 parts per million (ppm) ethylbenzene, 1.5 ppm toluene, and 7.9 ppm xylenes. The analyses results from groundwater samples collected drilling had concentrations up to 0.5 ppb ethylbenzene, 0.3 ppb toluene, and 5 ppb total xylenes (ACHCSA, 1998).

In a 1995 investigation conducted by Geocon Environmental Consultants (Geocon), soil and groundwater samples were collected from seven additional locations. The results of the analyses of the soil samples identified up to 410 ppm lead and 8,000 ppm oil and grease. The results from two groundwater samples analyzed did not contain detectable concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-G); TPH as Diesel (TPH-D); and Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) (IT,1996).

In a 1996 investigation conducted by International Technology Corporation (IT), soil and groundwater samples were collected from 11 additional borings. The maximum concentration in the soil samples analyzed are presented below:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	1,100 ppm
Benzene	2.6 ppm
Toluene	34 ppm
Ethylbenzene	25 ppm
Total Xylenes	140 ppm
Total Lead	397 ppm

The maximum concentration in the four groundwater samples collected from the above referenced borings are the following:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	1,700 ppb
Benzene	51 ppb
Toluene	200 ppb
Ethylbenzene	59 ppb
Total Xylenes	290 ppb
1,2 Dichloroethane	5.4 ppb

In a 1999 investigation completed by PSI, soil and groundwater samples were collected from 11 additional borings and three groundwater monitoring wells were installed. The maximum concentration in the soil samples analyzed are presented below:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	600 ppm
Benzene	0.2 ppm
Toluene	3.7 ppm
Ethylbenzene	17 ppm
Total Xylenes	67 ppm
Total Lead	1,700 ppm

The maximum concentration in the 14 groundwater samples analyzed are the following:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	58,000 ppb
Benzene	3,900 ppb
Toluene	3,700 ppb
Ethylbenzene	14,000 ppb
Total Xylenes	12,000 ppb
1,2 Dichloroethane	160 ppb

The petroleum hydrocarbon impacted soil and groundwater was primarily found in the southwestern corner of the site.

3.0 GROUNDWATER MONITORING ACTIVITIES

3.1 GROUNDWATER ELEVATION AND HYDRAULIC GRADIENT

On October 25, 1999, static groundwater elevations were measured in wells MW-1, MW-2, and MW-3 (Figure 2). The groundwater depths were measured using a groundwater interface probe. The average groundwater elevation decreased 0.14 meters (0.47 feet) compared to last quarter. A summary of the depth to groundwater data collected during this monitoring event and previous monitoring events is presented in Table 1. Based on the groundwater data, the inferred groundwater flow direction beneath the site is to the south (Figure 2) with a hydraulic gradient of 0.008 meter per meter (0.008 foot per foot).

3.2 GROUNDWATER SAMPLING

Groundwater samples were collected from monitoring wells MW-1, MW-2, and MW-3. Prior to the collection of groundwater samples, the monitoring wells were purged of a minimum of three well volumes of water until pH, conductivity, and temperature stabilized. The wells were allowed to recover to at least 80 percent of their original static groundwater levels prior to sampling.

The following procedures for well monitoring, well purging, and water sampling were implemented while sampling the wells:

1. All equipment was washed prior to entering the well with an Alconox solution, followed by two tap water rinses and a deionized water rinse.

2. Prior to purging the wells, depth-to-water was measured using an Solinst groundwater interface probe to an accuracy of approximately 0.01 foot. The measurements were made to the top of the well casing on the north side.

3. Monitoring wells at the site were prepared for sampling by purging the well of approximately 3 well volumes of water using a 6-inch diameter polyvinyl chloride (PVC) bailer.

4. Water samples were collected with a single-use Teflon bailer after the well had been purged and water in the well had equilibrated to approximately 80 percent of the static water level or 2 hours after well purging, whichever occurred first. The water collected was immediately decanted into laboratory-supplied vials and bottles. The containers were overfilled, capped, labeled, and placed in a chilled cooler prior to delivery to the laboratory for analysis.

5. Chain-of-custody procedures, including chain-of-custody forms, were used to document water sample handling and transport from collection to delivery to the laboratory for analyses.

6. Groundwater samples were delivered to the State-certified hazardous waste laboratory within approximately 48-hours of collection.

7. Purged water was contained in a DOT approved 55-gallon drum. The drum was labeled with the contents, date, well number, client name, and project number.

The groundwater monitoring purge logs are presented in Appendix A.

3.3 LABORATORY ANALYSIS AND RESULTS

The groundwater samples were submitted for analyses to Centrum Analytical of Redlands, California, a State of California certified hazardous waste analytical laboratory. The samples were analyzed for the following:

- EPA Method 418.1 – Total Recoverable Petroleum Hydrocarbons (TRPH)
- EPA 8015 modified - TPH-G;
- EPA 8015 modified - Total Petroleum Hydrocarbons as Diesel (TPH-D);
- EPA 8260 - Volatile Organic Compounds (VOCs).
- EPA 6010 – Soluble Lead.

A summary of the laboratory results for groundwater samples is presented in Table 2. A copy of the laboratory reports and chain of custody records are presented in Appendix B. The following are the results of the groundwater sampling:

- TRPH was detected in Well MW-2 at 4.4 milligrams per liter (mg/L). This concentration is comparable to the previous sampling result of 6.3 mg/L in Well MW-2.

- TPH-G was detected in Well MW-2 at 33 mg/L. This concentration is comparable to the previous sampling result of 26 mg/L in Well MW-2.

- TPH-D was not detected in groundwater samples from the site this quarter. This is comparable to the previous sampling results.

- MTBE was not detected in groundwater samples from the site this quarter. This is comparable to the previous sampling results.

- Benzene was detected in Well MW-2 at 0.88 mg/L. This concentration is comparable to the previous sampling result of 0.78 mg/L in Well MW-2.

- Toluene, ethylbenzene, and xylenes were detected in only Well MW-2 at concentrations comparable to the previous sampling results.

- Concentrations of the gasoline related compounds 1,2 DCA, isopropylbenzene, naphthalene, n-Propylbenzene, 1,2,4 Trimethylbenzene, and 1,3,5 Trimethylbenzene were detected in Well MW-2.

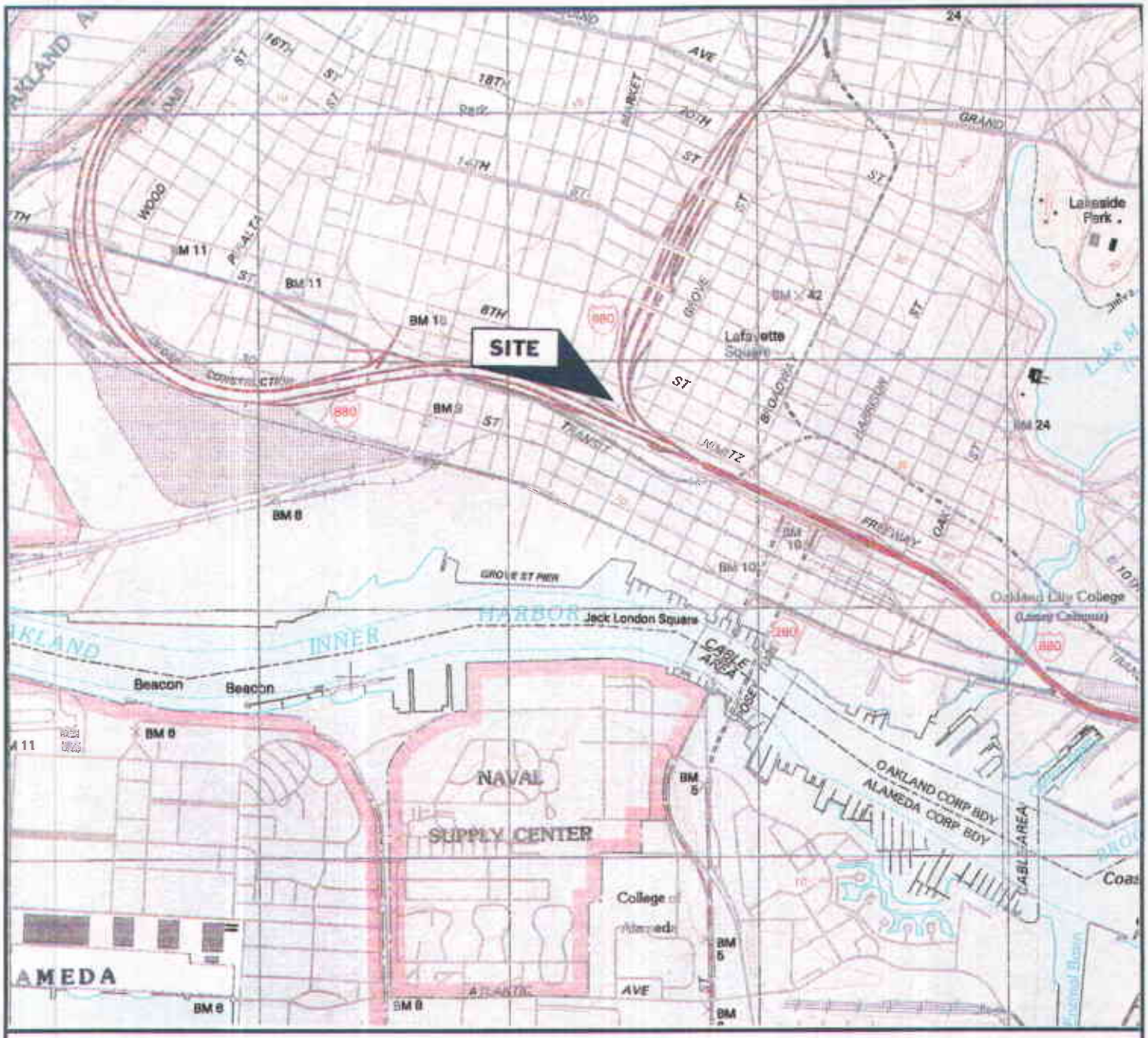
- Lead was not detected in groundwater samples from the site this quarter. This is comparable to the previous sampling results.

The BTEX and 1,2 DCA concentrations are above their respective State of California Primary Drinking Water Standards.

4.0 SUMMARY AND CONCLUSIONS

PSI performed a quarterly monitoring event on October 25, 1999. Groundwater samples were collected from the three monitoring wells. Based on measurements collected and analytical data the following conclusions are provided. Groundwater elevation data indicates the groundwater flow direction beneath the site is towards the northwest, with a hydraulic gradient of 0.08 meter per meter (0.008 foot per foot).

- Average groundwater elevations is approximately 0.14 meters (0.47 feet) higher than the average groundwater elevation measured for the previous sampling event.
- TPH-D and soluble lead were not detected in groundwater samples this quarter.
- TPH-G was detected in the sample collected from Well MW-2 (430 µg/l).
- BTEX concentrations were detected in the sample collected from Well MW-2.
- The oxygenates MTBE, TBA, DIPE, ETBE, and TAME were not detected in the EPA Method 8260 analyses this quarter.
- Concentrations of the gasoline related compounds 1,2 DCA, isopropylbenzene, naphthalene, n-Propylbenzene, 1,2,4 Trimethylbenzene, and 1,3,5 Trimethylbenzene were detected in Well MW-2.
- The BTEX and 1,2 DCA concentrations are above their respective State of California Primary Drinking Water Standards.

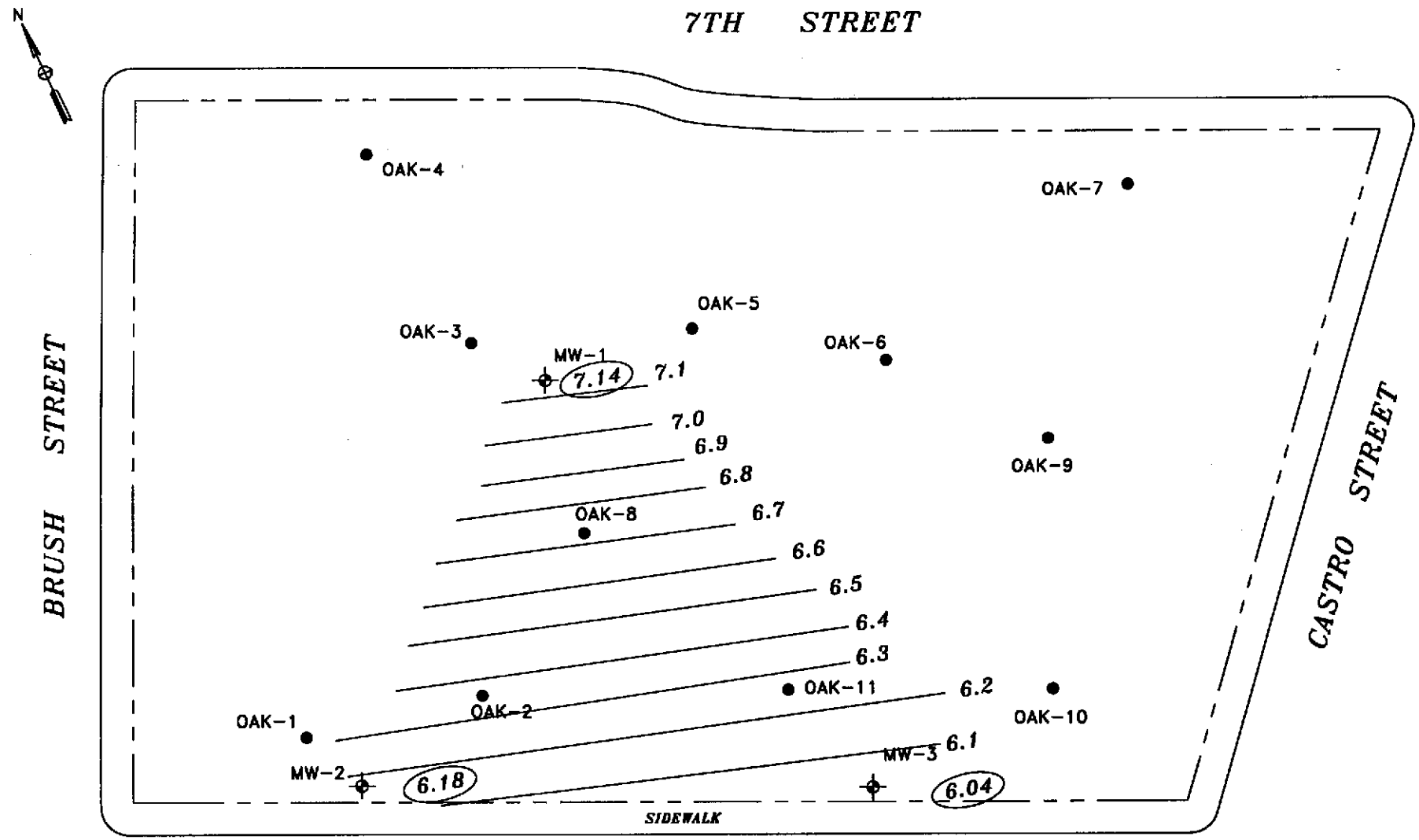


REFERENCE:
U.S.G.S. OAKLAND WEST, CALIFORNIA, 1993

psi ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
CONSULTING • ENGINEERING • TESTING

SITE LOCATION
STATE RIGHT-OF-WAY
SIXTH AND CASTRO STREETS
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-9G034

DATE: 5/05/99	CKD'D BY:	FIGURE NO.: 1
FILE NO.: 9G034-1		DRAWN BY: S. BOWERS



LEGEND

- SOIL BORING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- 7.2 GROUNDWATER ELEVATION CONTOUR
- FENCE

0 50 100

SCALE IN FEET

SOURCE: NORCAL, 1999

ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
CONSULTING • ENGINEERING • TESTING

GROUND-WATER ELEVATION MAP: 10/25/99
STATE RIGHT-OF-WAY
SIXTH AND CASTRO STREETS
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-9G034

DATE: 8/25/99	CKD BY:	FIGURE NO.: 5
FILE NO: 9G034-3		DRAWN BY: S.BOWERS

TABLE 1
SUMMARY OF GROUNDWATER ELEVATIONS
CALTRANS MAINTENANCE STATION
6TH AND CASTRO STREETS, OAKLAND, CA

SAMPLE NUMBER	DATE	GROUND SURFACE ELEVATION	WELL CASING ELEVATION	DEPTH TO GROUNDWATER	GROUNDWATER ELEVATION
MW-1	7/2/99	23.74	26.85	19.89	6.96
MW-1	10/25/99	23.74	26.85	19.71	7.14
MW-2	7/2/99	18.67	21.56	14.21	7.35
MW-2	10/25/99	18.67	21.56	15.38	6.18
MW-3	7/2/99	19.60	21.04	14.57	6.47
MW-3	10/25/99	19.60	21.04	15.00	6.04

NOTES:
All elevation and depth data presented in feet.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
CALTRANS MAINTENANCE STATION
6TH CASTRO STREETS, OAKLAND, CA

All concentrations in mg/l (PPM).											
SAMPLE NUMBER	**DATE**	**OIL & GREASE**	**TPH-G**	**TPH-D**	**MTBE**	**Benzene**	**E-Benzene**	**Toluene**	**Xylenes**	**VOCs***	**LEAD**
MW-1	7/2/99	ND (2.4)	ND (0.5)	ND (0.4)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	ND*	ND (0.10)
MW-1	10/25/99	ND (2.0)	ND (0.5)	ND (0.4)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	ND*	ND (0.10)
MW-2	7/2/99	6.3	26	ND (4.0)	ND (0.001)	0.78	1.3	4.2	5.0	2.83	ND (0.10)
MW-2	10/25/99	4.4	33	ND (0.4)	ND (0.050)	0.88	1.8	4.3	4.8	2.49	ND (0.10)
MW-3	7/2/99	ND (2.3)	ND (0.5)	ND (0.4)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	ND*	ND (0.10)
MW-3	10/25/99	ND (2.0)	ND (0.5)	ND (0.4)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	ND*	ND (0.10)

NOTES
Sample concentrations reported in mg/kg (milligram per kilogram).
TPH-G denotes Total Petroleum Hydrocarbons as Gasoline, TPH-D denotes Total Petroleum Hydrocarbons as Diesel.
MTBE denotes Methyl Tert Butyl Ether, E-Benzene denotes Ethylbenzene, VOCs* denotes Volatile Organic Compounds analyzed by EPA Method 8260.
ND denotes Not Detected, detection limit presented in parentheses.
ND* denotes all anaytes included in EPA Method 8260 analyte list not presented on this table, Not Detected.

FLUID MEASUREMENT FIELD DATA

SHEET: 1 OF 1

DATE: 10/25/99 | PROJECT NAME: CALTRANS 60th + CASTRO | PROJECT NO: 9G034

WATER LEVEL MEASUREMENT INSTRUMENT: SOLINST 20131 → | SERIAL NO:

PRODUCT DETECTION INSTRUMENT: | SERIAL NO:

EQUIP. DECON: ☐ ALCONOX WASH ☐ DIST/DEION 1 RINSE ☐ ISOPROPANOL ☐ ANALYTE FREE FINAL RINSE ☐ TAP WATER FINAL RINSE

☐ TAP WATER WASH ☐ LIQUINOX WASH ☐ DIST/DEION 2 RINSE ☐ OTHER SOLVENT ☐ DIST/DEION FINAL RINSE ☐ AIR DRY

WELL NUMBER	GROUND SURFACE ELEVATION	TOP OF CASING ELEVATION	DEPTH TO PRODUCT BELOW TOC	DEPTH TO WATER BELOW TOC	WELL DEPTH BELOW TOC	PRODUCT THICKNESS	WATER TABLE ELEVATION	ACTUAL TIME
MW-1				19.71	23.22			
MW-3				15.38	22.43			
MW-2				15.00	22.75			

REMEMBER TO CORRECT PRODUCT THICKNESS FOR DENSITY BEFORE CALCULATING WATER TABLE ELEVATION

PREPARED BY:

PSI
Rev. 12/95

WELL PURGING AND SAMPLING DATA

WELL NO: MW-1

DATE: 10/25/99 | PROJECT NAME: CALTRANS 6th + CASTRO | PROJECT NO: 9C034

WEATHER CONDITIONS: SUNNY, WARM

WELL DIAMETER (IN.) ☐ 1 ■ 2 ☐ 4 ☐ 6 ☐ OTHER _____

SAMPLE TYPE: ■ GROUNDWATER ☐ WASTEWATER ☐ SURFACE WATER ☐ OTHER

WELL DEPTH (TOC) 23.22 FT. | DEPTH TO WATER BEFORE PURGING (TOC) 18.71 FT.

LENGTH OF WATER 3.52 FT. | CALCULATED ONE WELL VOLUME[1]: 3.59 GAL.

PURGING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

SAMPLING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

EQUIP. DECON. ☐ TAP WATER WASH ☐ ISOPROPANOL ☐ ANALYTE FREE FINAL RINSE
☐ ALCONOX WASH ☐ DIST/DEION 1 RINSE ☐ OTHER SOLVENT ☐ DIST/DEION FINAL RINSE
☐ LIQUINOX WASH ☐ DIST/DEION 2 RINSE ☐ TAP WATER FINAL RINSE ☐ AIR DRY

CONTAINER PRESERVATION: ■ LAB PRESERVED ☐ FIELD PRESERVED

WATER ANALYZER MODEL & SERIAL NO:

ACTUAL TIME (MIN)	CUMUL. VOLUME PURGED (GAL)	TEMP ☐ °F ☒ °C	SPECIFIC CONDUCT.	pH	DISS. OXYGEN	TURBIDITY (NTUs)	WATER APPEAR CL=CLEAR CO=CLOUDY TU=TURBID	REMARKS (EVIDENT ODOR, COLOR, PID)
1030	INITIAL	20.4	943	6.75				turbidy is clear
1031	0.6	20.0	1065	6.85				
1037	1.2	19.5	1086	6.80				
1041	1.8	19.4	1068	6.76				
	~~2.4~~							

DEPTH TO WATER AFTER PURGING (TOC) FT. | SAMPLE FILTERED ☐ YES ☐ NO SIZE _____

NOTES:

SAMPLE TIME: ID#

DUPLICATE ☐ TIME: ID#:

EQUIP. BLANK: ☐ TIME: ID#:

PREPARED BY:

PSI Rev. 12/95

[1] A 1 FOOT LENGTH OF WATER = 0.05 GAL IN 1" DIA. PIPE 0.17 GAL IN 2" DIA PIPE 0.65 GAL IN 4" DIA PIPE 1.5 GAL IN 6" DIA PIP

WELL PURGING AND SAMPLING DATA

WELL NO: MW-2

DATE: 10/25/99 | PROJECT NAME: CALTRANS 6th & CASTRO | PROJECT NO:

WEATHER CONDITIONS: SUNNY WARM

WELL DIAMETER (IN.) ☐ 1 ■ 2 ☐ 4 ☐ 6 ☐ OTHER _____

SAMPLE TYPE: ■ GROUNDWATER ☐ WASTEWATER ☐ SURFACE WATER ☐ OTHER

WELL DEPTH (TOC) 22.75 FT. | DEPTH TO WATER BEFORE PURGING (TOC) 15.00 FT.

LENGTH OF WATER 7.75 FT. | CALCULATED ONE WELL VOLUME[1]: 1.31 GAL.

PURGING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

SAMPLING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

EQUIP. DECON. ☐ TAP WATER WASH ☐ ISOPROPANOL ☐ ANALYTE FREE FINAL RINSE
☐ ALCONOX WASH ☐ DIST/DEION 1 RINSE ☐ OTHER SOLVENT ☐ DIST/DEION FINAL RINSE
☐ LIQUINOX WASH ☐ DIST/DEION 2 RINSE ☐ TAP WATER FINAL RINSE ☐ AIR DRY

CONTAINER PRESERVATION: ☐ LAB PRESERVED ☐ FIELD PRESERVED

WATER ANALYZER MODEL & SERIAL NO:

ACTUAL TIME (MIN)	CUMUL. VOLUME PURGED (GAL)	TEMP ☐ °F ☒ °C	SPECIFIC CONDUCT.	pH	DISS. OXYGEN	TURBIDITY (NTUs)	WATER APPEAR CL=CLEAR CO=CLOUDY TU=TURBID	REMARKS (EVIDENT ODOR, COLOR, PID)
11:25	INITIAL	20	645.7	6.8		slightly		
11:30	1.3	20.7	777.0	6.62				
11:33	2.6	20.4	765.0	6.8				
11:39	3.9	20.6	791.0	6.53				

DEPTH TO WATER AFTER PURGING (TOC) FT. | SAMPLE FILTERED ☐ YES ☐ NO SIZE _____

NOTES:

SAMPLE TIME: 11:40 ID# MW-3

DUPLICATE ☒ TIME: 12:00 ID#: MW-31

EQUIP. BLANK: ☐ TIME: ID#:

PREPARED BY:

PSI Rev. 12/95

[1] A 1 FOOT LENGTH OF WATER = 0.05 GAL IN 1" DIA. PIPE 0.17 GAL IN 2" DIA PIPE 0.65 GAL IN 4" DIA PIPE 1.5 GAL IN 6" DIA PIP

WELL PURGING AND SAMPLING DATA

WELL NO: MW-3

DATE: 10/25/99 | PROJECT NAME: ~~DGGS~~ CALTRANS 6th + CASTRO | PROJECT NO:

WEATHER CONDITIONS: SUNNY, WARM

WELL DIAMETER (IN.) ☐ 1 ■ 2 ☐ 4 ☐ 6 ☐ OTHER _____

SAMPLE TYPE: ■ GROUNDWATER ☐ WASTEWATER ☐ SURFACE WATER ☐ OTHER

WELL DEPTH (TOC) 22.43 FT. | DEPTH TO WATER BEFORE PURGING (TOC) 15.38 FT.

LENGTH OF WATER FT. | CALCULATED ONE WELL VOLUME[1]: 1.19 GAL.

PURGING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

SAMPLING DEVICE: ☐ DEDICATED ■ DISPOSABLE ☐ DECONTAMINATED

EQUIP. DECON. ☐ TAP WATER WASH ☐ ISOPROPANOL ☐ ANALYTE FREE FINAL RINSE
☐ ALCONOX WASH ☐ DIST/DEION 1 RINSE ☐ OTHER SOLVENT ☐ DIST/DEION FINAL RINSE
☐ LIQUINOX WASH ☐ DIST/DEION 2 RINSE ☐ TAP WATER FINAL RINSE ☐ AIR DRY

CONTAINER PRESERVATION: ■ LAB PRESERVED ☐ FIELD PRESERVED

WATER ANALYZER MODEL & SERIAL NO:

ACTUAL TIME (MIN)	CUMUL. VOLUME PURGED (GAL)	TEMP ☒ °F ☐ °C	SPECIFIC CONDUCT.	pH	DISS. OXYGEN	TURBIDITY (NTUs)	WATER APPEAR CL=CLEAR CO=CLOUDY TU=TURBID	REMARKS (EVIDENT ODOR, COLOR, PID)
12:23	INITIAL	955 → 22.6		7.14				
12:28	1.2	21.8	1003	6.57				
12:33	2.4	21.3	1027	6.52				
12:36	3.6	21.0	1041	6.53				

DEPTH TO WATER AFTER PURGING (TOC) FT. | SAMPLE FILTERED ☐ YES ☐ NO SIZE _____

NOTES:

SAMPLE TIME: ID#

DUPLICATE ☐ TIME: ID#:

EQUIP. BLANK: ☐ TIME: ID#:

PREPARED BY:

PSI Rev. 12/95

[1] A 1 FOOT LENGTH OF WATER = 0.05 GAL IN 1" DIA. PIPE 0.17 GAL IN 2" DIA PIPE 0.65 GAL IN 4" DIA PIPE 1.5 GAL IN 6" DIA PIP

Centrum Analytical Laboratories, Inc.

CERTIFIED HAZARDOUS WASTE TESTING LABORATORY • CHEMICAL AND BIOLOGICAL ANALYSES

Client: PSI
1320 W. Winton Ave.
Hayward, CA 94545

Date Sampled: 10/25/99
Date Received: 10/26/99
Job Number: 15564

Project: Caltrans: 6th & Castro

CASE NARRATIVE

The following information applies to samples which were received on 10/26/99 :

The samples were received at the laboratory chilled and sample containers were intact.

Unless otherwise noted below, the Quality Control acceptance criteria were met for all samples for every analysis requested.

Report approved by:

FOR

Robert R. Clark, Ph.D.
Laboratory Director

ELAP # 1184

DL : Detection Limit – The lowest level at which the compound can reliably be detected under normal laboratory conditions.
ND : Not Detected -- The compound was analyzed for but was not found to be present at or above the detection limit.
NA : Not Analyzed -- Per client request, this analyte was not on the list of compounds to be analyzed for.

Centrum
(800) 798-9336

Lead By ICP

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Digested:	10/26/99
Matrix:	Water	Date Analyzed:	10/28/99
Analyst:	RLB	Batch Number:	6010W1363
		Method Number:	6010

	Detection Limit	Lead
Sample ID	mg/L	mg/L
Method Blank	0.10	ND
MW31	0.10	ND
MW1	0.10	ND
MW2	0.10	ND
MW3	0.10	ND

Centrum
(800) 798-9336

QC Sample Report - Metals

Matrix: Water
Batch #: 6010W1363

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Compound	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Lead	1.0	**101.4**	75 - 125	**Pass**

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: 15561-1

Compound	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Lead	0.914	1.019	**11%**	20%	**Pass**

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

Centrum
(800) 798-9336

EPA 418.1 - Total Recoverable Petroleum Hydrocarbons

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Extracted:	10/26/99
Matrix:	Water	Date Analyzed:	10/26/99
Analyst:	JL	Batch Number:	4181W1108

	Detection Limit	Petroleum Hydrocarbons
Sample ID	mg/L	mg/L
Method Blank	2.0	ND
MW31	2.0	ND
MW1	2.0	ND
MW2	2.0	**4.4**
MW3	2.0	ND

Centrum
(800) 798-9336

QC Report - EPA 418.1 Total Petroleum Hydrocarbons

Matrix: Water
Batch #: 4181W1108

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Reference Oil	10	**92**	72 - 131	**Pass**

Analytical Notes:

Batch Precision Results

Duplicate Sample ID:LCS/LCSD

Analyte	Sample Recovery mg/L	Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Reference Oil	9.20	9.60	**4%**	22%	**Pass**

Analytical Notes:

Insufficient amount of sample available for MS/MSD analysis. An LCS/LCSD pair were analyzed to provide precision data for this batch.

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

Centrum
(800) 798-9336

Modified 8015 - Total Extractable Petroleum Hydrocarbons as Diesel

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Extracted:	10/28/99
Matrix:	Water	Date Analyzed:	10/28-29/99
Analyst:	CP	Batch Number:	8015DW1764

	Detection Limit	Diesel	Surrogate (OTP)
Sample ID	mg/L	mg/L	Limit: 50 - 150%
Method Blank	0.40	ND	75 %
MW-31	0.40	ND	76 %
MW-1	0.40	ND	73 %
MW-2	0.40	ND	61 %
MW-3	0.40	ND	76 %

Centrum
(800) 798-9336

QC Sample Report - EPA 8015M Diesel

Matrix: Water
Batch #: 8015DW1764

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Diesel	0.8	**75**	70 - 130	**Pass**

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Diesel	0.60	0.62	**3%**	25%	**Pass**

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

Centrum
(800) 798-9336

Modified 8015 - Total Volatile Hydrocarbons as Gasoline

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Analyzed:	10/28/99
Matrix:	Water	Batch Number:	8015GW2407
Analyst:	NBP		

	Detection Limit	Petroleum Hydrocarbons as Gasoline
Sample ID	mg/L	mg/L
Method Blank	0.5	ND
MW31	0.5	ND
MW1	0.5	ND
MW2	0.5	33
MW3	0.5	ND

Centrum
(800) 798-9336

QC Sample Report - EPA 8015M Gasoline

Matrix: Water
Batch #: 8015GW2407

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Gasoline	10.0	**95**	70 - 130	**Pass**

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Gasoline	9.51	10.33	**8%**	25%	**Pass**

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

Centrum
(800) 798-9336

EPA 8260 - Volatile Organics with Oxygenates

Client: PSI
Project: Caltrans: 6th & Castro
Job No.: 15564
Matrix: Water
Analyst: GR

Date Sampled: 10/25/99
Date Received: 10/26/99
Date Analyzed: 10/28-29/99
Batch Number: 8260W1886

Sample ID:		Blank	MW31	MW1	MW3
Compounds	DL	µg/L	µg/L	µg/L	µg/L
Acetone	50	ND	ND	ND	ND
tert-Amyl Methyl Ether (TAME)	5.0	ND	ND	ND	ND
Benzene	0.5	ND	ND	ND	ND
Bromobenzene	1.0	ND	ND	ND	ND
Bromochloromethane	1.0	ND	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND	ND
Bromoform	0.5	ND	ND	ND	ND
Bromomethane	0.5	ND	ND	ND	ND
tert-Butanol (TBA)	50	ND	ND	ND	ND
2-Butanone (MEK)	10	ND	ND	ND	ND
n-Butylbenzene	0.5	ND	ND	ND	ND
sec-Butylbenzene	0.5	ND	ND	ND	ND
tert-Butylbenzene	0.5	ND	ND	ND	ND
Carbon disulfide	10	ND	ND	ND	ND
Carbon tetrachloride	0.5	ND	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND	ND
Chloroethane	0.5	ND	ND	ND	ND
Chloroform	0.5	ND	ND	ND	ND
Chloromethane	0.5	ND	ND	ND	ND
2-Chlorotoluene	0.5	ND	ND	ND	ND
4-Chlorotoluene	0.5	ND	ND	ND	ND
Dibromochloromethane	0.5	ND	ND	ND	ND
1,2-Dibromoethane	0.5	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	10	ND	ND	ND	ND
Dibromomethane	0.5	ND	ND	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND	ND	ND
Dichlorodifluoromethane	0.5	ND	ND	ND	ND
1,1-Dichloroethane	0.5	ND	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND	ND
1,1-Dichloroethene	0.5	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND	ND
1,2-Dichloropropane	0.5	ND	ND	ND	ND
1,3-Dichloropropane	0.5	ND	ND	ND	ND
2,2-Dichloropropane	0.5	ND	ND	ND	ND
1,1-Dichloropropene	0.5	ND	ND	ND	ND

Centrum
(800) 798-9336

EPA 8260 - Volatile Organics with Oxygenates

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Analyzed:	10/28-29/99
Matrix:	Water	Batch Number:	8260W1886
Analyst:	GR		

	Sample ID:	Blank	MW31	MW1	MW3
Compounds	**DL**	µg/L	µg/L	µg/L	µg/L
cis-1,3-Dichloropropene	0.5	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND	ND	ND
Diisopropyl Ether (DIPE)	5.0	ND	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND	ND
Ethyl tert-Butyl Ether (EtBE)	5.0	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND
2-Hexanone	10	ND	ND	ND	ND
Isopropylbenzene	0.5	ND	ND	ND	ND
p-Isopropyltoluene	0.5	ND	ND	ND	ND
Methylene chloride	50	ND	ND	ND	ND
4-Methyl-2-pentanone	5.0	ND	ND	ND	ND
Methyl-tert-butyl ether (MtBE)	1.0	ND	ND	ND	ND
Napthalene	0.5	ND	ND	ND	ND
n-Propylbenzene	0.5	ND	ND	ND	ND
Styrene	0.5	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	0.5	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	1.0	ND	ND	ND	ND
Tetrachloroethene	0.5	ND	ND	ND	ND
Toluene	0.5	ND	ND	ND	ND
1,2,3-Trichlorobenzene	0.5	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.5	ND	ND	ND	ND
1,1,1-Trichloroethane	0.5	ND	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND	ND
Trichloroethene	0.5	ND	ND	ND	ND
1,2,3-Trichloropropane	0.5	ND	ND	ND	ND
Trichlorofluoromethane	0.5	ND	ND	ND	ND
Trichlorotrifluoroethane	5.0	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.5	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.5	ND	ND	ND	ND
Vinyl chloride	0.5	ND	ND	ND	ND
Xylenes (total)	1.5	ND	ND	ND	ND

Surrogates (% recovery) Limits: 80 - 130

Sample ID:	Blank	MW31	MW1	MW3
Dibromofluoromethane	105	106	105	105
Toluene-d8	100	100	99	99
Bromofluorobenzene	107	105	106	106

Centrum
(800) 798-9336

EPA 8260 - Volatile Organics with Oxygenates

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Analyzed:	10/28-29/99
Matrix:	Water	Batch Number:	8260W1886
Analyst:	GR		

	Sample ID:	MW2
Compounds	**DL**	**µg/L**
Acetone	2500	ND
tert-Amyl Methyl Ether (TAME)	250	ND
Benzene	25	**880**
Bromobenzene	50	ND
Bromochloromethane	50	ND
Bromodichloromethane	25	ND
Bromoform	25	ND
Bromomethane	25	ND
tert-Butanol (TBA)	2500	ND
2-Butanone (MEK)	500	ND
n-Butylbenzene	25	ND
sec-Butylbenzene	25	ND
tert-Butylbenzene	25	ND
Carbon disulfide	500	ND
Carbon tetrachloride	25	ND
Chlorobenzene	25	ND
Chloroethane	25	ND
Chloroform	25	ND
Chloromethane	25	ND
2-Chlorotoluene	25	ND
4-Chlorotoluene	25	ND
Dibromochloromethane	25	ND
1,2-Dibromoethane	25	ND
1,2-Dibromo-3-chloropropane	500	ND
Dibromomethane	25	ND
1,2-Dichlorobenzene	25	ND
1,3-Dichlorobenzene	25	ND
1,4-Dichlorobenzene	25	ND
Dichlorodifluoromethane	25	ND
1,1-Dichloroethane	25	ND
1,2-Dichloroethane	25	**110**
1,1-Dichloroethene	25	ND
cis-1,2-Dichloroethene	25	ND
trans-1,2-Dichloroethene	25	ND
1,2-Dichloropropane	25	ND
1,3-Dichloropropane	25	ND
2,2-Dichloropropane	25	ND
1,1-Dichloropropene	25	ND

Centrum
(800) 798-9336

EPA 8260 - Volatile Organics with Oxygenates

Client:	PSI	Date Sampled:	10/25/99
Project:	Caltrans: 6th & Castro	Date Received:	10/26/99
Job No.:	15564	Date Analyzed:	10/28-29/99
Matrix:	Water	Batch Number:	8260W1886
Analyst:	GR		

	Sample ID:	MW2
Compounds	**DL**	µg/L
cis-1,3-Dichloropropene	25	ND
trans-1,3-Dichloropropene	25	ND
Diisopropyl Ether (DIPE)	250	ND
Ethylbenzene	25	**1,800**
Ethyl tert-Butyl Ether (EtBE)	250	ND
Hexachlorobutadiene	25	ND
2-Hexanone	500	ND
Isopropylbenzene	25	**54**
p-Isopropyltoluene	25	ND
Methylene chloride	2500	ND
4-Methyl-2-pentanone	250	ND
Methyl-tert-butyl ether (MtBE)	50	ND
Napthalene	25	**600**
n-Propylbenzene	25	**170**
Styrene	25	ND
1,1,1,2-Tetrachloroethane	25	ND
1,1,2,2-Tetrachloroethane	50	ND
Tetrachloroethene	25	ND
Toluene	25	**4,300**
1,2,3-Trichlorobenzene	25	ND
1,2,4-Trichlorobenzene	25	ND
1,1,1-Trichloroethane	25	ND
1,1,2-Trichloroethane	25	ND
Trichloroethene	25	ND
1,2,3-Trichloropropane	25	ND
Trichlorofluoromethane	25	ND
Trichlorotrifluoroethane	250	ND
1,2,4-Trimethylbenzene	25	**1,200**
1,3,5-Trimethylbenzene	25	**360**
Vinyl chloride	25	ND
Xylenes (total)	75	**4,800**

Surrogates (% recovery) Limits: 80 - 130

Sample ID:	MW2
Dibromofluoromethane	106
Toluene-d8	101
Bromofluorobenzene	104

Centrum
(800) 798-9336

QC Sample Report - EPA Method 8260

Matrix: Water
Batch #: 8260W1886

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration µg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
1,1-Dichloroethene	20	**89**	59 - 172	**Pass**
Benzene	20	**92**	66 - 142	**Pass**
Trichloroethene	20	**91**	71 - 137	**Pass**
Toluene	20	**91**	59 - 139	**Pass**
Chlorobenzene	20	**90**	60 - 133	**Pass**

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery µg/L	Spike Duplicate Recovery µg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
1,1-Dichloroethene	17.9	21.1	**17%**	22%	**Pass**
Benzene	18.5	21.2	**14%**	21%	**Pass**
Trichloroethene	18.9	21.9	**15%**	24%	**Pass**
Toluene	18.4	20.8	**12%**	21%	**Pass**
Chlorobenzene	18.0	20.8	**14%**	21%	**Pass**

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

[redacted] Chain-of-Custody / Analytical Request Document

The Right Chemistry, The Right Solution®

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

493423 155564

Page: 1 of 1

Required Client Information: **Section A**	Required Client Information: **Section B**	To Be Completed by Pace Analytical and Client **Section C**
Company: PSI	Report To: FRANK POSS	Quote Reference:
Address: 1320 W. WINTON AVE.	Invoice To: SAME	Project Manager:
HAYWARD CA 94545	P.O.: 96034	Project #:
	Project Name: CALTRANS 6th + CASTRO	Profile #:
Phone: 510 785-1111 Fax: 510 785 1192	Project Number: 96034	Requested Analysis:

Client Information (Check quote/contract):
Requested Due Date: *TAT: 5 DAY

* Under 14 day turnaround subject to laboratory and contractual obligations and may result in a Rush Turnaround Surcharge.

Turn Around Time (TAT) in calender days.

5 DAY NORMAL

Section D Required Client Information:

SAMPLE ID

One character per box.
(A–Z, 0–9 / .–)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
WATER	WT
SOIL	SL
OIL	OL
WIPE	WP
AIR	AR
TISSUE	TS
OTHER	OT

ITEM #	SAMPLE ID	MATRIX CODE	DATE COLLECTED (mm / dd / yy)	TIME COLLECTED (mm : hh a/p)	# Containers	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	OIL AND GREASE EPA 1664	TPHg EPA 8015	TPHd EPA 8015	VOC's w/ OXYGENATES, ETHYLENE DIBROMIDE & ETHYLENE DICHLORIDE EPA 8260	TOTAL Pb EPA 6010			Remarks / Lab ID
1	MW31	WT	10/25/99	1200	10	X			6			X	X	X	X	X			FILTER PO SAMPLES
2	MW1	WT		1100		X						X	X	X	X	X			
3	MW2	WT		1240		X						X	X	X	X	X			
4	MW3	WT		1140		X						X	X	X	X	X			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

Sample Condition		Sample Notes	Item No.	Relinquished By / Company	Date	Time	Accepted By / Company	Date	Time
Temp in °C:		AIRBORNE 1893878420		CHRIS MERRITT / PSI	10/25/99	1700	AIRBORNE	10/25/99	1700
Received on ICE:	(Y) / N						[signature]	10/26/99	10:40
Sealed Cooler:	Y / (N)								
Samples Intact:	(Y) / N								

Additional Comments: FILTER LEAD ANALYSIS WATER PRIOR TO DIGESTION

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed: (MM / DD / YY)

SEE REVERSE SIDE FOR INSTRUCTIONS