GROUND WATER MONITORING ANNUAL SUMMARY REPORT

Lakewood Towne Center
5731 Main Street SW
Lakewood, Washington

Prepared for

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Introduction

This report summarizes the results of ground water monitoring and sampling activities conducted at the Lakewood Towne Center site located in Lakewood, Washington as part of a ground water monitoring program associated with release of perchloroethylene (PCE) from a historic dry cleaning establishment. The purpose of the program is to assess whether residual PCE and degradation by-product contamination in ground water is migrating from the source area and if concentrations are decreasing with time. This report describes the sampling locations, collection methods, and analyses for the second year of quarterly sampling events conducted between February and November 2002. The findings and conclusions presented in this report are based on the evaluation of field data and analytical results obtained during previous Phase II field investigations, quarterly monitoring events, and the quarterly ground water monitoring events conducted between February and November 2002.

Site Location and Description

The Lakewood Towne Center (formerly known as Lakewood Mall) site is located at 5731 Main Street SW in the city of Lakewood, Washington, approximately 6 miles southwest of downtown Tacoma (Figure 1). The 100 acre mall property underwent extensive renovations and redevelopment for the Lakewood Towne Center in 2001 and 2002. Prior to this redevelopment, the mall property was divided into two components (Figure 2):

- Lakewood Mall I, composed of eleven separate buildings, was the former Villa Plaza shopping center constructed in 1957, with renovations to buildings made in 1986 and 1989. This portion of the mall was subdivided into three sections, referred to as the North, West, and South Concourses. A fourth section, the original East Concourse, was demolished in 1989 to make way for the Lakewood Mall II complex. The eastern half of the original South Concourse was demolished in spring of 2001 to make way for the new Lakewood City Hall building. The North and West Concourses have been extensively renovated in the last year.

- Lakewood Mall II replaced the East Concourse and consisted of five large individual department store buildings connected by an enclosed mall, constructed in 1989. In addition, the Lakewood Mall II includes a Barnes & Noble bookstore building and a 12-screen Cineplex Odeon movie theater complex, both constructed in 1996. In October 2001, most of Lakewood Mall II had been demolished, with the Target and Gottschalks department store buildings, the movie theater complex, and the bookstore remaining.

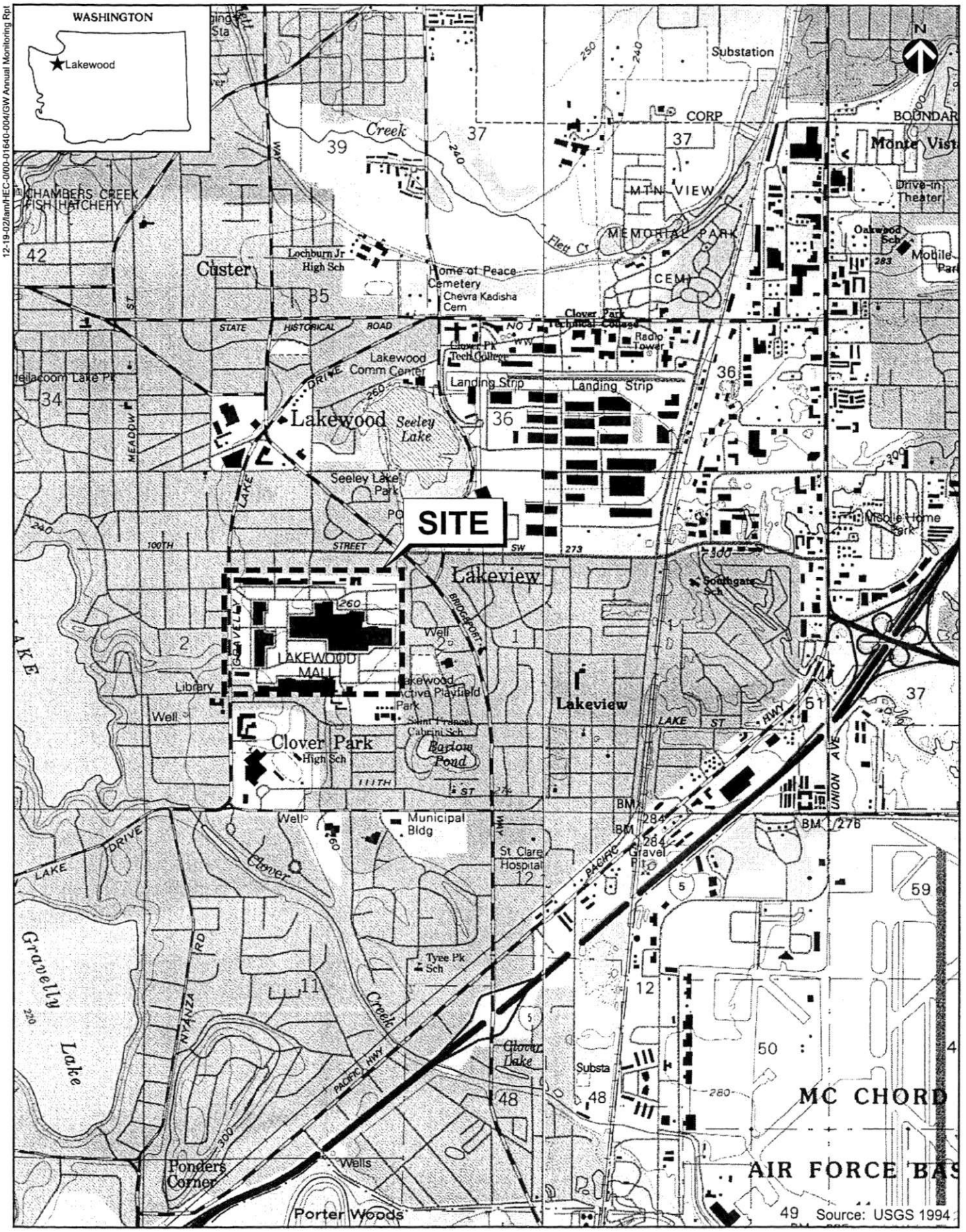

Figure 1. Vicinity map of Lakewood Towne Center (formerly Lakewood Mall), Lakewood, Washington.

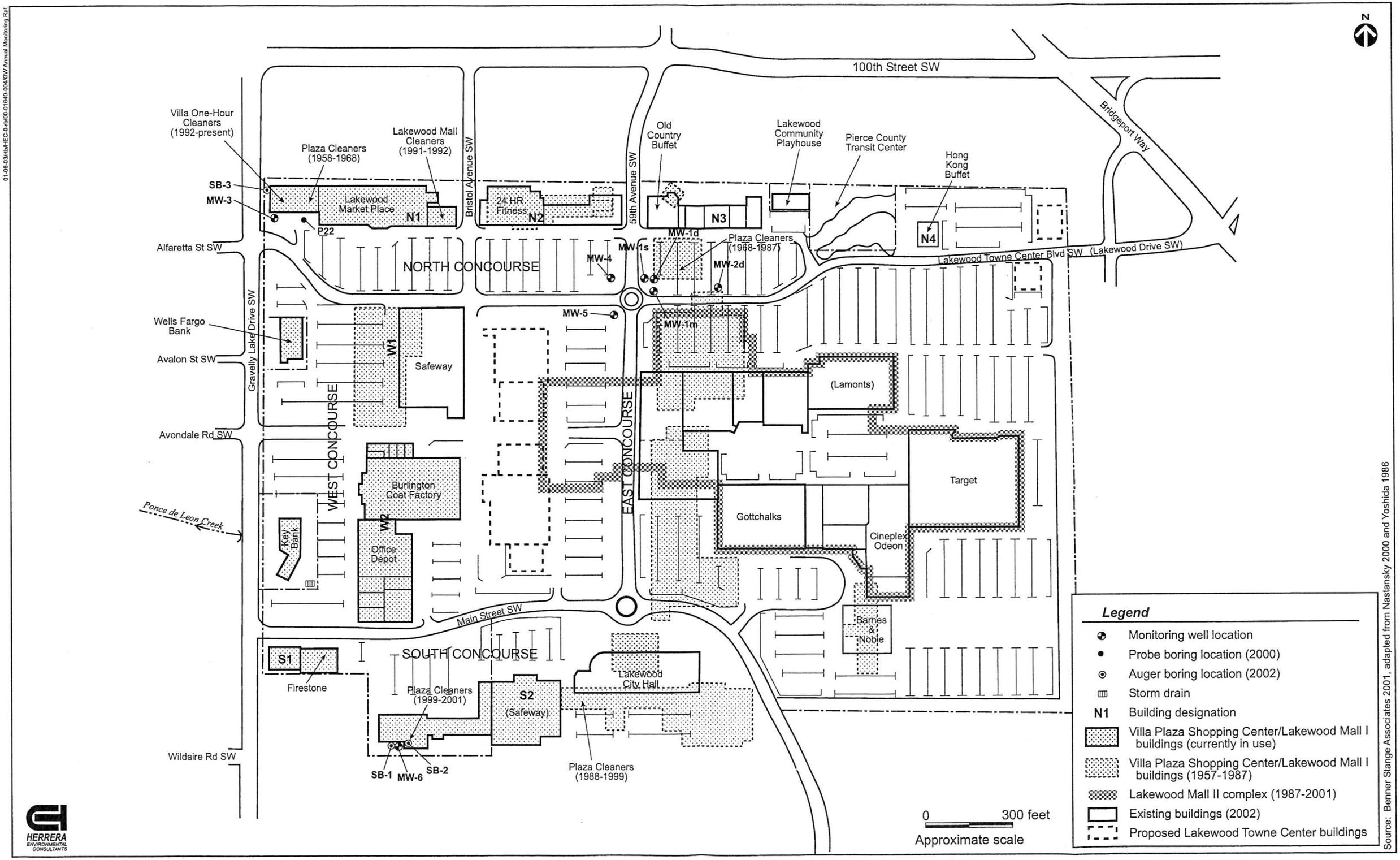

Figure 2. Lakewood Mall configurations (1957 through 2002) and sampling locations, Lakewood, Washington.

Previous Site Investigations

Since the Lakewood Towne Center site characterization project began in the summer of 2000, Herrera Environmental Consultants, Inc. (Herrera) has prepared and provided the following deliverables to Perkins Coie, LLP (legal counsel for previous property owner—Wells Fargo) and MBK Northwest, Inc. (current property owner):

Date	Deliverables
May 2000	Phase I Environmental Site Assessment
February 2001	Phase II Environmental Site Assessment
March 2001	Ground Water Quarterly Status Report (first quarter)
June 2001	Ground Water Quarterly Status Report (second quarter)
September 2001	Ground Water Quarterly Status Report (third quarter)
January 2002	Ground Water Monitoring Annual Summary Report (fourth quarter and first year summary)
February 2002	Updated Phase I Environmental Site Assessment
March 2002	Ground Water Quarterly Status Report (fifth quarter)
June 2002	Limited Phase II Site Investigation and Ground Water Quarterly Status Report (sixth quarter)
October 2002	Ground Water Quarterly Status Report (seventh quarter)

Analytical results of samples collected during these field investigations indicate that a dry cleaner solvent, perchloroethylene (PCE), was detected in ground water across the northwest portion of the site. The main source has been identified by the presence of elevated PCE and its degradation by-products in shallow ground water near the former East Concourse building, which was occupied by a dry cleaner between 1968 and 1987. As part of site characterization activities and the implementation of a ground water monitoring program for the Lakewood Towne Center site, seven ground water monitoring wells were installed across the northwest portion of the mall property to assess contaminant concentrations and migration from the source area (Figure 2). The wells include:

- MW-1s (shallow), MW-1m (mid depth), and MW-1d (deep) in the source area
- MW-2d (deep) upgradient of the source area
- MW-3 (shallow) at the northwest property boundary (approximately 1,300 feet downgradient of the source area)
- MW-4 (shallow) immediately downgradient of the source area
- MW-5 (shallow) immediately downgradient of the source area.

Subsurface soil sampling conducted at six probe locations across the source area found no evidence of residual contamination in the vadose zone; no soil removal or treatment was conducted.

Monitoring and analytical results from quarterly sampling events conducted since the monitoring program began in July/September 2000 indicate continued presence of residual PCE contamination in ground water, particularly within the source area located in the north-central portion of the mall property (Herrera 2002a). PCE and biodegradation by-products exceeding Model Toxics Control Act (MTCA) method A and B ground water cleanup levels continue to be found near the water table with low PCE concentrations found at the deeper wells. PCE degradation has occurred in the source area at shallow depth, as indicated by the increased concentrations of PCE degradation by-products detected in shallow well MW-1s. Low concentrations of some contaminants have spread downgradient across the northwest quadrant of the Lakewood Towne Center site at levels below MTCA method A and B criteria (Herrera 2002a).

In spring of 2002, additional limited Phase II site assessment work was performed to address the potential for recent contamination associated with dry cleaner activities at the northwest and southwest corners of the mall (Herrera 2002b). A release of PCE was identified at the northwest corner of the mall property associated with dry cleaning operations, as evidenced by low level soil contamination beneath the building found during an earlier investigation. Subsequent sampling of ground water from well MW-3 and soil boring SB-3 indicate low concentrations of PCE and two degradation by-products that may be associated with Villa One-Hour Cleaners, the 1968-1987 Plaza Cleaners source, or two other historic dry cleaners located in the North Concourse. The presence of PCE breakdown products, not identified at other non-source sampling locations, indicates a likely source beneath the western portion of Building N1. None of the compounds detected in ground water samples collected at three sampling locations (well MW-3, soil borings P22 and SB-3) exceeded MTCA method A and B cleanup criteria.

A release of PCE also was identified at the southwest corner of the mall property associated with a former dry cleaning facility that occupied the western portion of Building S2 between 2000 and 2001 (Herrera 2002b). Low concentrations of PCE in ground water at levels below the MTCA method A cleanup criteria of 5 µg/L were detected at two soil boring locations drilled in March 2002, with one boring advanced inside tenant space #4 in the dry cleaning operation area, and the other boring advanced immediately outside and downgradient of the building. Monitoring well MW-6 was installed adjacent to the boring to evaluate long-term ground water conditions. No PCE has been detected in ground water for three quarterly sampling events.

At the request of the Tacoma-Pierce County Health Department, a water sample was collected in August to determine whether contaminants of concern have entered the storm drain system servicing the mall property, which discharges to Ponce de Leon Creek. A water sample, designated as "KBSD," was collected from the storm drain located southeast of Key Bank, the last storm drain located onsite before discharging to the creek. Results indicated no PCE or its degradation by-products detected above practical quantitation limits (Herrera 2002c).

Ground Water Monitoring Summary

Monitoring and sampling of ground water from eight wells has been conducted at the Lakewood Towne Center site on a quarterly or annual basis following site characterization efforts conducted in July and September 2000. Samples were collected during the second year of monitoring events on a quarterly basis at wells MW-1s, MW-3, MW-4, and MW-5 on the following dates: February 20, May 20, August 19, and November 20 and 21, 2002. Samples from well MW-6 were collected in May, August, and November 2002 events, since it was installed immediately prior to the May sampling event. Samples were collected on an annual basis from deeper wells MW-1m, MW-1d, and MW-2d during the November 2002 sampling event. Each event consisted of measuring water levels at all eight wells and collecting ground water samples at selected wells for analysis of halogenated volatile organic constituents associated with dry cleaning solvents, and determining ground water quality trends, including potential contaminant migration based on analytical results and field observations.

A detailed description of field procedures, including sample collection, handling, and decontamination, is presented in Appendix A of this report. Complete laboratory analytical reports for ground water samples collected from these wells and a data quality assurance review of all analytical data for each sampling event during the second year are provided in Appendix B. Results of the second year of quarterly ground water monitoring are described in the following sections.

Sample Locations and Methods

Eight ground water monitoring wells are located across the northwest portion of the mall property, as follows:

- Monitoring wells MW-1s (screened from 10 to 15 feet), MW-1m (screened from 23 to 25.5 feet), and MW-1d (screened from 45.5 to 48 feet) were installed within 5 feet of each other at the source area to assess the presence of PCE at shallow depth, mid-depth, and the base of the unconfined aquifer.

- Monitoring well MW-2d (screened from 55 to 57.5 feet) was installed approximately 200 feet east and upgradient from the main dry cleaning source area to assess background ground water quality at the base of the aquifer.

- Monitoring well MW-3 (screened from 25.5 to 28 feet) was installed at the northwest corner of the mall to assess ground water quality at the property boundary and near the existing dry cleaning facility in Building N1.

- Monitoring MW-4 (screened from 11 to 16 feet) and MW-5 (screened from 11 to 16 feet) were installed downgradient approximately 100 feet west and 150 feet southwest, respectively, from the main dry cleaning source area to determine extent of PCE contamination in shallow ground water.

- Monitoring well MW-6 (screened from 14 to 19 feet) was installed downgradient (west) of tenant space #4 at Building S2 to assess ground water quality for potential PCE contamination associated with a former dry cleaning business that occupied this tenant space in 2000/2001.

For each sampling event, ground water samples were collected from the wells using a low-flow purge method with dedicated polyethylene tubing and a peristaltic pump. Wells were first purged at a rate less than 1 liter per minute or at a purge rate that did not increase the rate of drawdown more than 0.5 feet from static water level. If drawdown was greater than 0.5 feet, the well was purged a minimum of three well casing volumes prior to sample collection. Field parameters, including water temperature, pH, specific conductivity, dissolved oxygen, and turbidity were recorded during purging; samples were collected after parameter readings stabilized. Water samples were collected from the same polyethylene tubing used for purging directly into sample containers provided by the laboratory, then labeled and placed into a chilled cooler prior to and during delivery to the laboratory for analysis.

Sample MW-6 was a field duplicate sample collected from well MW-1s during the February 2002 event; sample MW-7 was a field duplicate sample collected from well MW-1s during the May, August, and November 2002 events.

Sample Analyses

Samples collected from each sampling event were analyzed for evidence of dry cleaning solvents by OnSite Environmental, Inc. of Redmond, Washington using U.S. Environmental Protection Agency Method 8260B for analysis of halogenated volatile organic compounds (HVOCs).

Results of ground water samples collected from the original seven wells (MW-6 had not been installed) during the July/September 2000 site characterization efforts, including the laboratory analytical report package, are presented in *Phase II Environmental Site Assessment—Lakewood Mall I & II* (Herrera 2001). Results of ground water samples collected from the original seven wells (excluding MW-6) during quarterly sampling conducted between February and November 2001, including the laboratory analytical report packages for each event, are presented in *Ground Water Monitoring Annual Summary Report—Lakewood Mall* (Herrera 2002a). Complete laboratory analytical packages for February, May, August, and November 2002 sampling events (including MW-6), plus chain-of-custody records and data quality assurance reviews, are presented in Appendix B of this report. All data are summarized and evaluated in the results section of this report.

Results

Ground Water Flow

Ground water surface elevation data collected from each monitoring event since July and September 2000 site characterization efforts are presented in Table 1. Ground water surface elevation data collected from monitoring events between February and November 2002 are illustrated in Figures 3 through 7. The wellhead at MW-6 was not surveyed following installation, and therefore, no ground water surface elevation data is available for this well. Based on interpretation of ground water surface water elevation data collected during each monitoring event, ground water flow direction generally is toward the west, with an average hydraulic gradient of less than 0.01 feet per foot. The seasonal ground water flow direction and gradient appear consistent throughout the year, as well as from year to year.

Field Parameters and Observations

Ground water field parameters recorded from each monitoring event since the July and September 2000 site characterization efforts are presented in Table 2. All wells were purged at each sampling event using the low flow purge method at purge rates ranging from 0.16 to 0.42 liters per minute. All eight wells have been monitored for in-situ dissolved oxygen levels during each sampling event since February 2002. Dissolved oxygen levels in MW-1s have been low compared to levels in other wells, potentially due to increased localized biological activity. Dissolved oxygen levels in MW-3, MW-5, and MW-6 have been consistently higher than levels detected in other wells.

Ground Water Analytical Results

Ground water analytical results since the July/September 2000 site characterization efforts to November 2002 are presented in Table 3; the results for sampling events between February and November 2002 also are illustrated on Figures 3 through 6. Contaminants of concern found at the Lakewood Towne Center site include:

PCE—perchloroethylene or tetrachloroethylene
TCE—trichloroethylene
cis DCE—cis 1,2-dichloroethylene
trans DCE—trans 1,2-dichloroethylene
1,1 DCE—1,1-dichloroethene
1,1 DCA—1,1-dichloroethane
1,4 DCB—1,4-dichlorobenzene
Vinyl chloride
Chloroform

Table 1. Historical ground water surface elevation data from monitoring wells at Lakewood Towne Center site, Lakewood, Washington.

Monitoring Well Identification	Date Sounded	Reference Point Elevation [a] (feet)	Depth to Water [b] (feet)	Water Level Elevation (feet)
MW-1s	9/15/00	93.33	12.32	81.01
	2/12/01		11.00	82.33
	5/17/01		10.91	82.42
	8/15/01		12.28	81.05
	11/15/01		10.62	82.71
	2/20/02		9.82	83.51
	5/20/02		10.40	82.93
	8/19/02		11.76	81.57
	11/20/02		12.54	80.79
MW-1m	7/21/00	93.39	11.44	81.95
	9/15/00		12.37	81.02
	2/12/01		11.05	82.34
	5/17/01		10.95	82.44
	8/15/01		12.42	80.97
	11/15/01		10.68	82.71
	2/20/02		9.90	83.49
	5/20/02		10.50	82.89
	8/19/02		11.86	81.50
	11/20/02		12.63	80.76
MW-1d	7/21/00	93.56	11.63	81.93
	9/15/00		12.57	80.99
	2/12/01		11.25	82.31
	5/17/01		11.16	82.40
	8/15/01		12.52	81.04
	11/15/01		10.85	82.71
	2/20/02		10.06	83.50
	5/20/02		10.63	82.93
	8/19/02		12.02	81.54
	11/20/02		12.80	80.76
MW-2d	7/21/00	92.20	10.64	81.56
	2/12/01		9.58	82.62
	5/17/01		9.47	82.73
	8/15/01		10.90	81.30
	11/15/01		9.22	82.98
	2/20/02		8.23	83.97
	5/20/02		na	na
	8/19/02		10.41	81.79
	11/21/02		11.26	80.94

Table 1. Historical ground water surface elevation data from monitoring wells at Lakewood Towne Center site, Lakewood, Washington (continued).

Monitoring Well Identification	Date Sounded	Reference Point Elevation [a] (feet)	Depth to Water [b] (feet)	Water Level Elevation (feet)
MW-3	7/21/00	97.06	17.09	79.97
	2/12/01		16.79	80.27
	5/17/01		16.76	80.30
	8/15/01		17.67	79.39
	11/15/01		16.39	80.67
	2/20/02		16.00	81.06
	5/20/02		16.38	80.68
	8/19/02		17.33	79.73
	11/20/02		17.91	79.15
MW-4	9/15/00	94.82	13.92	80.90
	2/12/01		12.61	82.21
	5/17/01		12.50	82.32
	8/15/01		13.86	80.96
	11/15/01		12.22	82.60
	2/20/02		11.46	83.36
	5/20/02		12.03	82.79
	8/19/02		13.35	81.47
	11/21/02		14.23	80.59
MW-5	9/15/00	94.37	13.52	80.85
	2/12/01		12.24	82.13
	5/17/01		12.13	82.24
	8/15/01		13.43	80.94
	11/15/01		11.88	82.49
	2/20/02		11.10	83.27
	5/20/02		11.65	82.72
	8/19/02		12.98	81.39
	11/21/02		13.76	80.61

[a] Elevations of reference points (top of well casing were surveyed relative to a temporary datum with an assigned elevation of 100.00 feet.
[b] Depth to water measurements were taken from reference point marks on top of well casing.
na Not available.

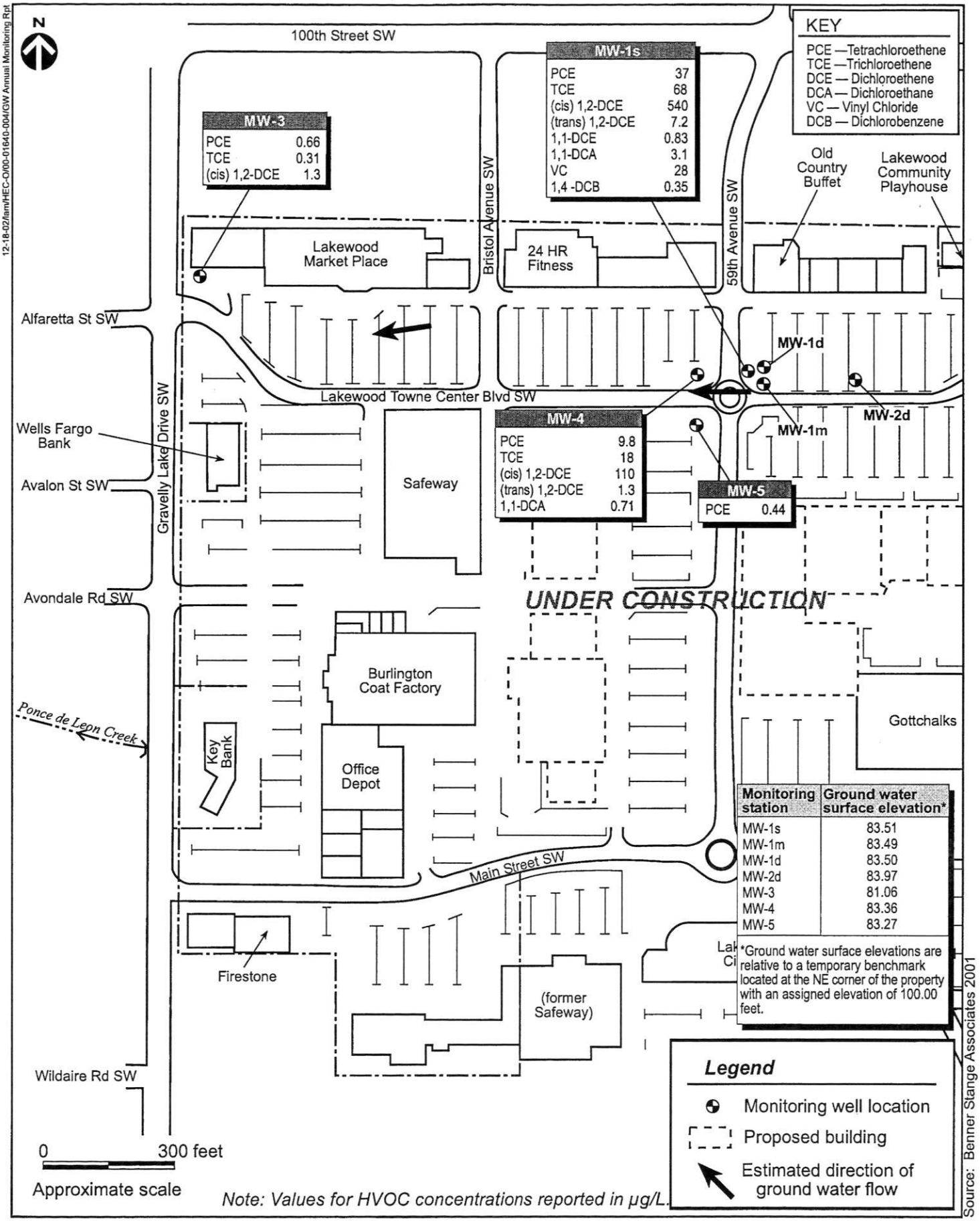

Figure 3. HVOC concentrations in ground water and inferred ground water flow direction, February 20, 2002, Lakewood Towne Center, Lakewood, Washington.

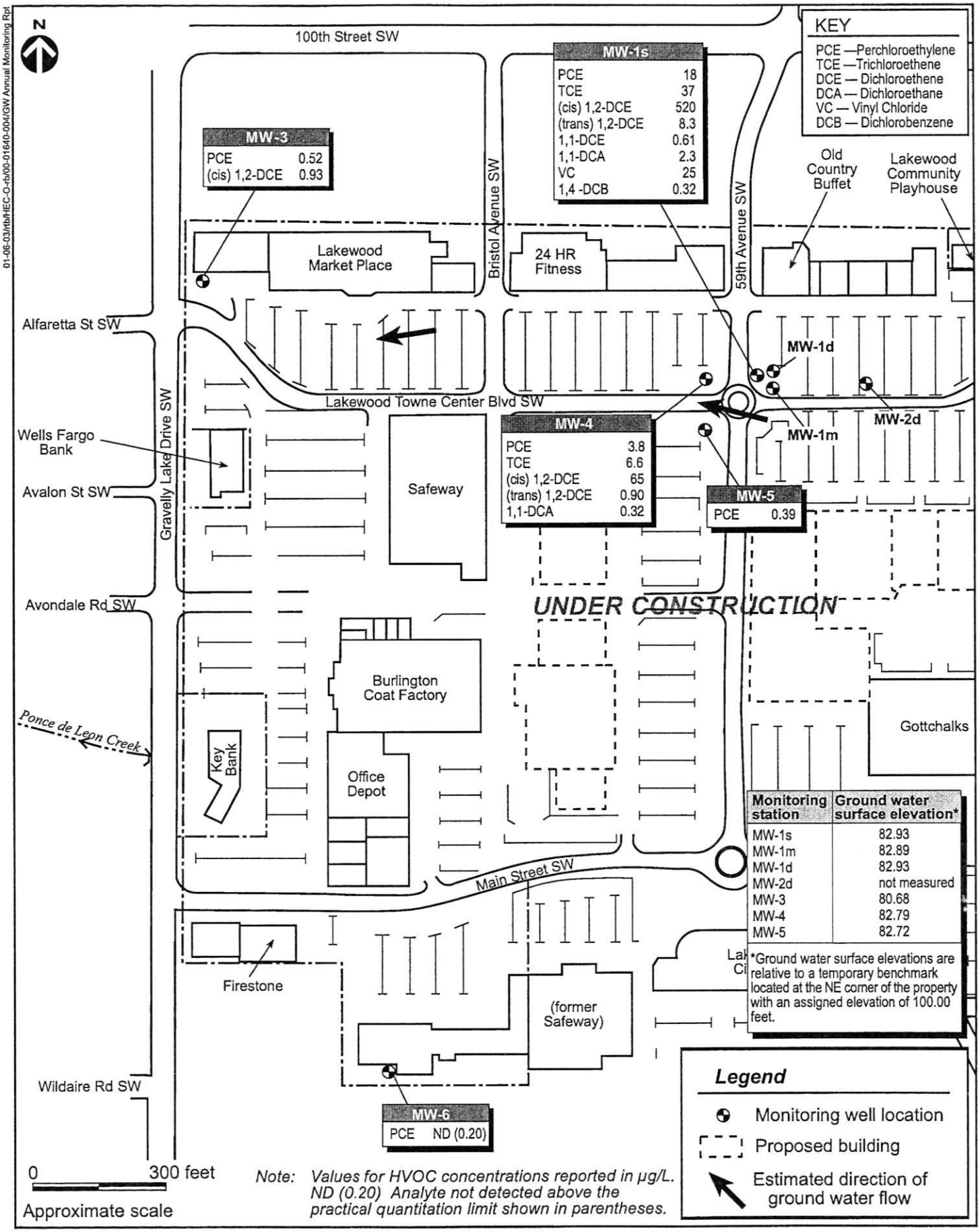

Figure 4. **HVOC concentrations in ground water and inferred ground water flow direction, May 20, 2002, Lakewood Towne Center, Lakewood, Washington.**

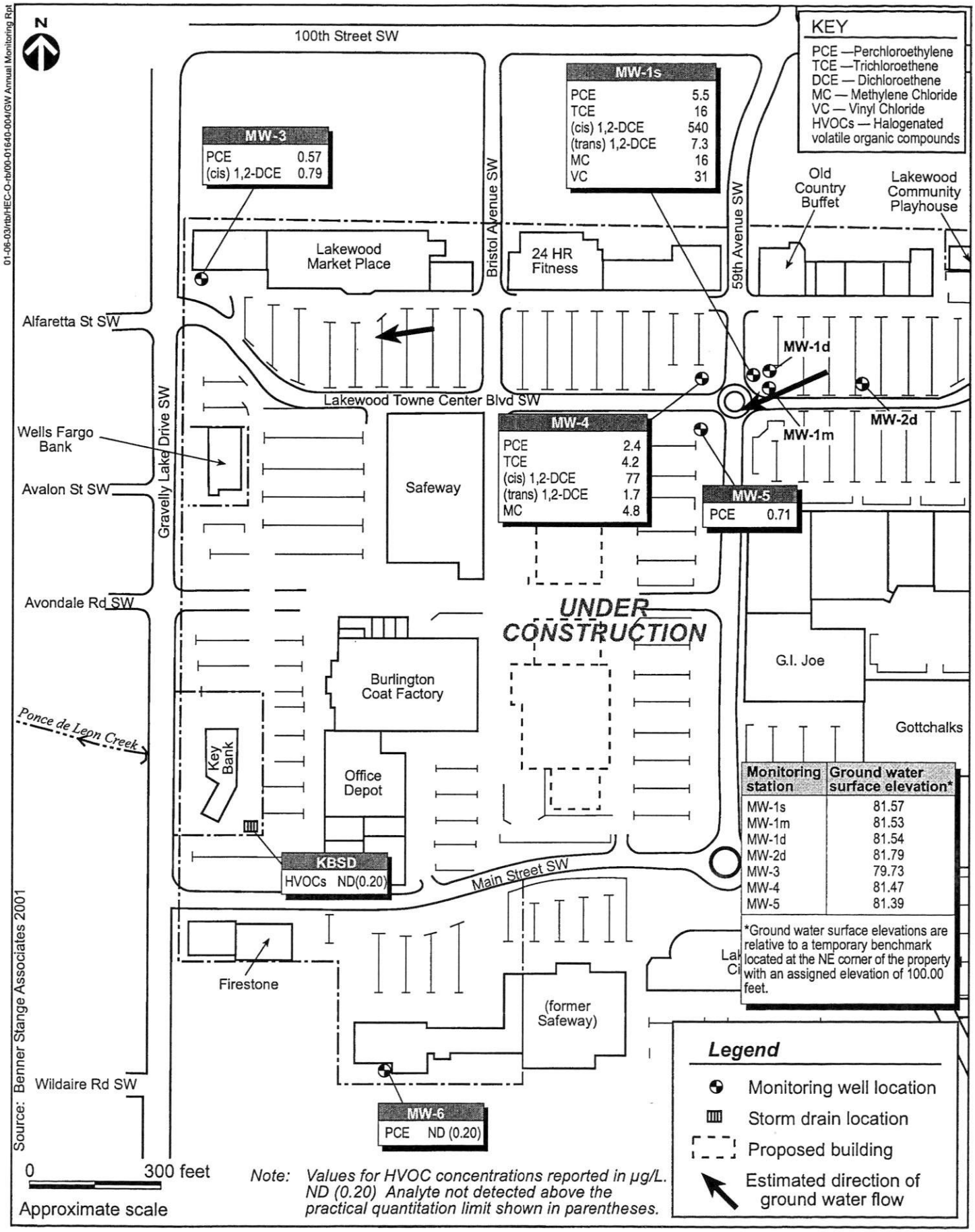

Figure 5. HVOC concentrations in ground water and inferred ground water flow direction, August 19, 2002, Lakewood Towne Center, Lakewood, Washington.

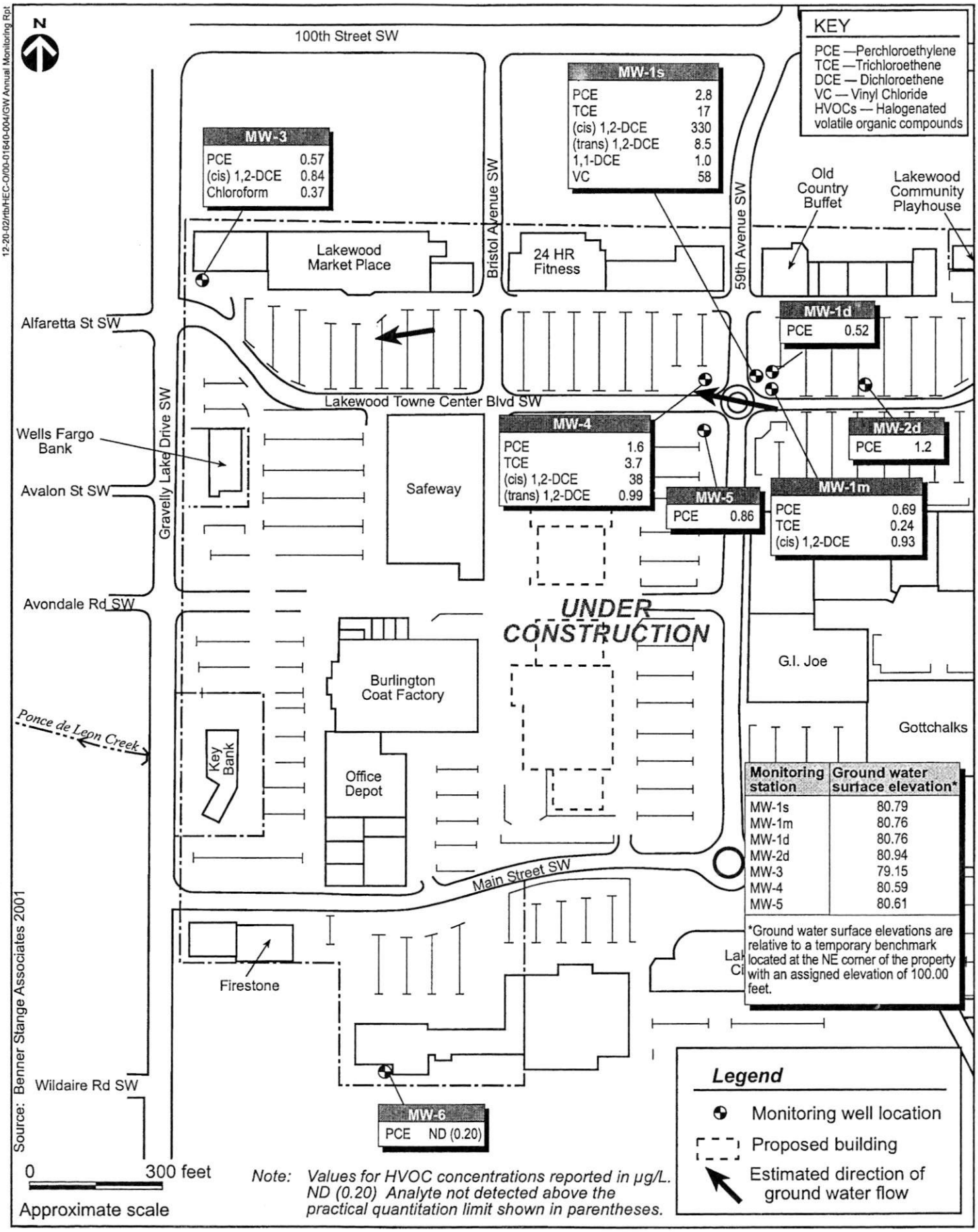

Figure 6. HVOC concentrations in ground water and inferred ground water flow direction, November 20 and 21, 2002, Lakewood Towne Center, Lakewood, Washington.

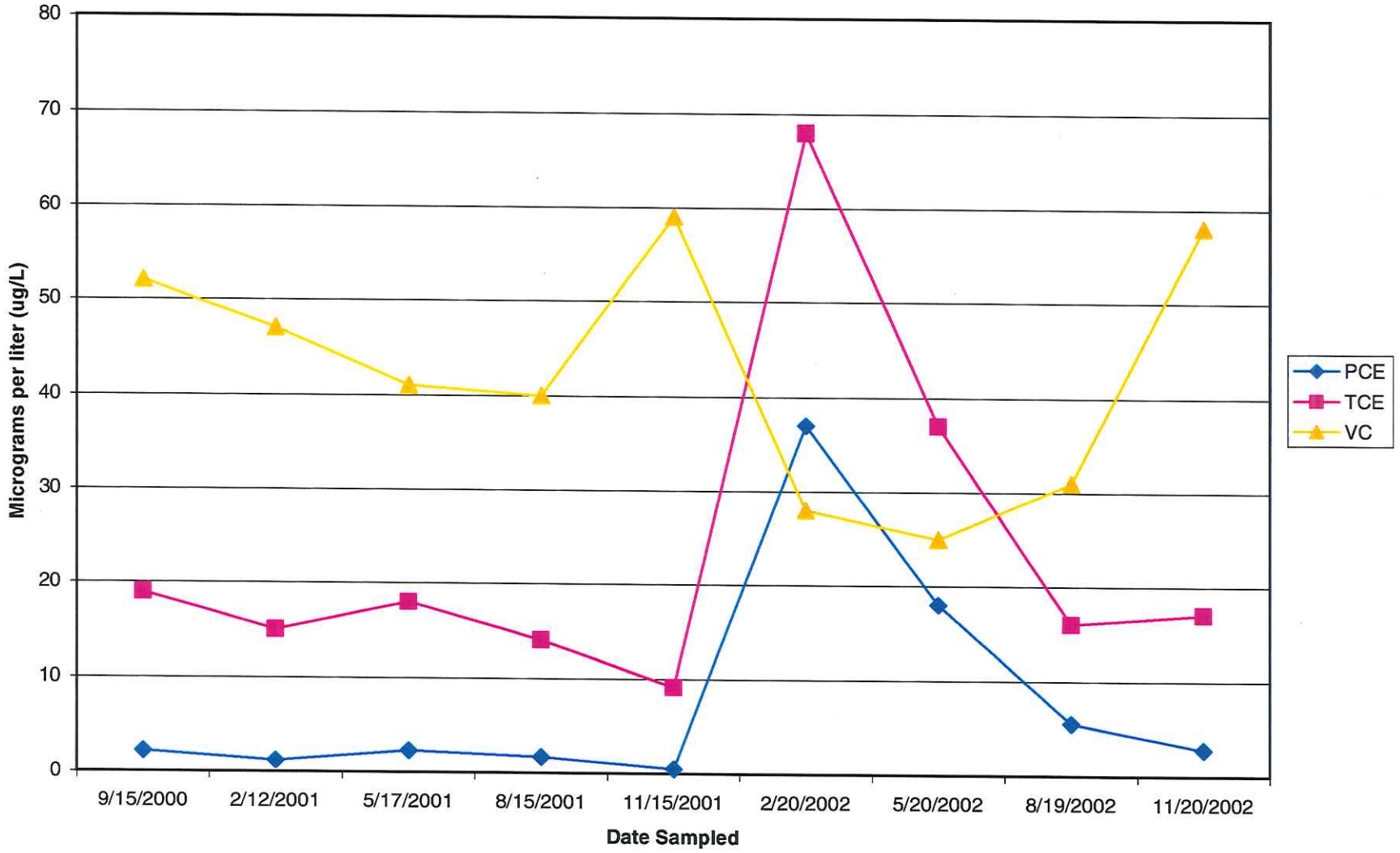

Figure 7. PCE, TCE, and vinyl chloride concentrations in ground water (ug/L) at MW-1s, Lakewood Towne Center, Lakewood, Washington.

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Table 2. Historical ground water field parameters from monitoring wells at the Lakewood Towne Center site, Lakewood, Washington.

Monitoring Well Identification	Date Sampled	Water Temperature (°C)	pH	Specific Conductivity (micromhos/cm)	Dissolved Oxygen (mg/L)	Purge Rate (liters/min.)
MW-1s	9/15/00	15.7	6.20	348		0.26
	2/12/01	12.0	6.16	177		0.27
	5/17/01	12.3	6.07	282		0.28
	8/15/01	15.1	6.06	282		0.25
	11/15/01	14.6	5.90	190		0.25
	2/20/02	12.2	5.70	209	0.15	0.24
	5/20/02	12.1	5.69	259	0.20	0.25
	8/19/02	14.3	6.24	291	0.25	0.26
	11/20/02	15.0	6.15	298	0.11	0.24
MW-1m	7/21/00	14.5	6.13	110		0.35
	11/15/01	13.6	5.83	118		0.25
	11/20/02	14.0	6.27	145	4.81	0.24
MW-1d	7/21/00	13.9	6.18	119		0.42
	11/15/01	12.9	5.85	115		0.25
	11/20/02	13.0	6.31	143	6.32	0.23
MW-2d	7/21/00	13.8	6.81	144		0.40
	11/15/01	12.5	5.94	119		0.26
	11/21/02	12.7	6.40	154	4.57	0.18
MW-3	7/12/00	14.4	6.28	125		0.30
	2/12/01	11.7	6.18	101		0.22
	5/17/01	12.3	6.20	138		0.16
	8/15/01	13.3	6.21	151		0.19
	11/15/01	13.6	5.97	122		0.21
	2/20/02	11.7	5.68	135	7.80	0.24
	5/20/02	12.2	5.76	133	6.00	0.24
	8/19/02	12.9	6.29	147	8.35	0.22
	11/20/02	12.9	6.15	146	5.74	0.23
MW-4	9/15/00	15.3	6.05	165		0.28
	2/12/01	11.7	5.93	109		0.18
	5/17/01	12.2	5.88	160		0.22
	8/15/01	14.9	5.90	165		0.24
	11/15/01	14.5	5.63	142		0.26
	2/20/02	11.8	5.40	132	3.60	0.26
	5/20/02	12.2	5.30	155	3.80	0.25
	8/19/02	14.8	6.18	161	3.55	0.25
	11/21/02	14.2	5.94	176	2.40	0.25

Table 2. Historical ground water field parameters from monitoring wells at the Lakewood Towne Center site, Lakewood, Washington (continued).

Monitoring Well Identification	Date Sampled	Water Temperature (°C)	pH	Specific Conductivity (micromhos/cm)	Dissolved Oxygen (mg/L)	Purge Rate (liters/min.)
MW-5	9/15/00	15.3	6.13	162		0.28
	2/12/01	11.6	6.13	101		0.27
	5/17/01	12.8	6.08	139		0.20
	8/15/01	14.8	6.07	149		0.27
	11/15/01	14.0	5.77	137		0.27
	2/20/02	11.4	5.63	100	7.8	0.26
	5/20/02	12.1	5.70	136	6.7	0.25
	8/19/02	14.4	6.26	147	6.35	0.26
	11/21/02	14.0	6.07	152	5.02	0.25
MW-6	5/20/02	11.6	5.61	119	6.3	0.25
	8/19/02	13.6	6.30	131	6.9	0.22
	11/20/02	12.5	6.24	139	6.12	0.23

Field parameter values reflect the last readings recorded prior to sample collection.

Table 3. HVOC results for ground water samples collected at the Lakewood Towne Center site (µg/L).

Well identification	Date Sampled	PCE	TCE	cis DCE	trans DCE	1,1-DCE	1,1-DCA	Vinyl chloride	1,4-DCB	Chloroform
MTCA method A cleanup level [a]		*5*	*5*	*na*	*na*	*na*	*na*	*0.2*	*na*	*na*
MTCA method B cleanup level [b]		*0.858*	*3.98*	*80*	*160*	*0.0729*	*800*	*0.0292*	*1.82*	*7.17*
MW-1s	9/15/00	2.2	**19**	**670**	14	**0.76**	6.1	**52**	0.25	1.3
	2/12/01	1.2	**15**	**390**	8.2	**0.37**	3.1	**47**	(0.20)	(0.20)
	5/17/01	2.3	**18**	**600**	10	**0.64**	5.5	**41**	0.30	(0.20)
	8/15/01	1.7	**14**	**490**	8.3	**0.56**	4.2	**40**	(0.20)	(0.20)
	11/15/01	0.51	**9.1**	**320**	6.4	**0.47**	2.3	**59**	0.21	(0.20)
	2/20/02	**37**	**68**	**540**	7.2	**0.83**	3.1	**28**	0.35	(0.20)
	5/20/02	**18**	**37**	**520**	8.3	**0.61**	2.3	**25**	0.32	(0.20)
	8/19/02	**5.5**	**16**	**540**	7.3	(2.0) [c]	(2.0) [c]	**31**	(2.0) [c]	(2.0) [c]
	11/20/02	2.8	**17**	**330**	8.5	**1.0**	(0.20)	**58**	(0.20)	(0.20)
MW-1m	7/21/00	0.80	0.45	5.0	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.87	(0.20)	0.95	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/20/02	0.69	0.24	0.93	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-1d	7/21/00	0.50	(0.20)	0.29	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.64	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/20/02	0.52	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-2d	7/21/00	0.73	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/16/01	1.2	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/21/02	1.2	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-3	7/21/00	0.69	(0.20)	1.1	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/12/01	0.66	(0.20)	0.23	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/17/01	0.64	(0.20)	1.3	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/15/01	0.66	(0.20)	0.88	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.57	(0.20)	0.73	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/20/02	0.66	0.31	1.3	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/20/02	0.52	(0.20)	0.93	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/19/02	0.57	(0.20)	0.79	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/20/02	0.57	(0.20)	0.84	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	0.37

Table 3. HVOC results for ground water samples collected at the Lakewood Towne Center site (µg/L) (continued).

Well identification	Date Sampled	PCE	TCE	cis DCE	trans DCE	1,1-DCE	1,1-DCA	Vinyl chloride	1,4-DCB	Chloroform
MW-4	9/15/00	1.6	4.9	**120**	2.8	(0.20)	1.0	(0.20)	(0.20)	(0.20)
	2/12/01	1.0	2.3	48	0.90	(0.20)	0.22	(0.20)	(0.20)	(0.20)
	5/17/01	1.0	3.4	**100**	1.6	(0.20)	1.0	(0.20)	(0.20)	(0.20)
	8/15/01	0.97	2.9	70	1.1	(0.20)	0.68	(0.20)	(0.20)	(0.20)
	11/15/01	0.99	1.6	35	0.57	(0.20)	0.29	(0.20)	(0.20)	(0.20)
	2/20/02	**9.8**	**18**	**110**	1.3	(0.20)	0.71	(0.20)	(0.20)	(0.20)
	5/20/02	3.8	**6.6**	65	0.90	(0.20)	0.32	(0.20)	(0.20)	(0.20)
	8/19/02	2.4	4.2	77	1.7	(0.40) [c]	(0.40) [c]	(0.40) [c]	(0.40) [c]	(0.40) [c]
	11/21/02	1.6	3.7	38	0.99	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-5	9/15/00	1.2	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/12/01	0.70	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/17/01	0.62	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/15/01	0.88	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.90	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/20/02	0.44	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/20/02	0.39	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/19/02	0.71	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/21/02	0.86	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-6	5/20/02	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/19/02	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/20/02	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)

Values in **boldface** type indicate constituent detected above the established MTCA method A or method B cleanup level.
PCE = perchloroethylene; TCE = trichloroethene; cis DCE = (cis) 1,2-dichloroethene; trans DCE = (trans) 1,2-dichloroethene; 1,1-DCE = 1,1-dichloroethene; 1,1-DCA = 1,1-dichloroethane; 1,4-DCB = 1,4-dichlorobenzene.
(0.20) Analyte was not detected above the enclosed practical quantitation limit indicated.
na Established ground water cleanup level for this constituent is not available.
[a] Ecology Publication no. 94-06, Model Toxics Control Act Cleanup Regulation, February 12, 2001.
[b] Ecology Publication no. 94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Regulation, CLARC version 3.0, August 2001.
[c] Practical quantitation limit was elevated for samples MW-1s and MW-4 due to analysis of these samples at a dilution factor of ten- and two-fold, respectively.
Shaded values represent results of the most recent sampling event.

Results from each sampling event are compared to established method A and B ground water cleanup levels for PCE and related constituents listed in the Washington State Department of Ecology Model Toxics Control Act (MTCA) cleanup regulation. All data generated for the four monitoring events are considered acceptable for use; data quality assurance reviews for each of the four events in 2002 are provided in Appendix B.

Overall, concentrations of most contaminants of concern have decreased compared to concentrations detected in samples collected at the beginning of the monitoring program over 2 years ago. The highest concentrations of each contaminant continue to be found in the source area located in the north-central portion of the mall property, represented by shallow well MW-1s. Concentrations of dry cleaning chemicals and breakdown by-products spiked in February 2002 and have generally reduce over the following 9 months (Figure 7). The February 2002 spike is most likely due to removal of the asphalt parking lot during construction, with subsequent paving in the spring of 2002.

PCE concentrations detected in samples collected from deeper wells MW-1m, MW-1d, and MW-2d have either decreased slightly or remained at the same levels compared to those detected in 2001. TCE and cis DCE concentrations detected at MW-1m generally have remained the same over the year.

Water quality at MW-4 represents conditions immediately downgradient of the source area and has consistently exhibited lower chemical concentrations than the source area. Contaminant concentrations detected at MW-4 rose in February 2002 and have generally fallen over the next 9 months to below MTCA method A and B cleanup levels.

PCE and cis DCE continued to be detected at concentrations below MTCA method A and B cleanup levels at MW-3 located in the northwest corner of the site. Chloroform was detected for the first time at MW-3 during the November 2002 event at a concentration of 0.37 µg/L, below the MTCA method B cleanup level of 7.17 µg/L. No TCE has been detected above the practical quantitation limit since it was first detected in February 2002.

MTCA method A and B cleanup levels continue to be exceeded by four compounds in the source area. No exceedences were identified for any compounds downgradient of the source area in the six remaining wells during the November 2002 sampling event.

No contaminants of concern were detected at MW-6 located in the southwest corner of the site during May, August, and November 2002 sampling events.

In August, methylene chloride was detected for the first time since sampling was initiated 2 years ago. Concentrations at MW-1s/7 (duplicate) of 16 and 72 µg/L exceeded the MTCA method A cleanup criterion of 5 µg/L. Methylene chloride, a common laboratory contaminant, was not detected in the QA method blank or in the five remaining water samples during the August 2002 sampling event, nor was it detected in any of the samples and QA method blank during the November 2002 sampling event. The presence of this compound will be tracked during future sampling events.

Conclusions and Recommendations

The highest concentrations of PCE and its degradation by-products continue to be found in the source area located in the north-central portion of the site, represented by shallow well MW-1s. The source of contamination at this location has been identified as Plaza Cleaners that operated at the East Concourse complex between 1968 and 1987. No residual contamination in soil within the vadose zone was found with sampling at 13 boreholes during 2000 field investigations, targeting the historic building and area of the former septic tank. PCE and biodegradation by-products exceeding MTCA method A and B ground water cleanup levels continue to be found near the water table, with low PCE concentrations found at the deeper wells (screened between 45.5 and 48 feet below ground surface for MW-1s and 55 and 57.5 feet below ground surface for MW-2d).

PCE biodegradation appears to be taking place in the source area at shallow depth, as indicated by the increased concentration of vinyl chloride and presence of other PCE degradation by-products in MW-1s. PCE has spread downgradient across the northwest quadrant of the Lakewood Towne Center site at levels below MTCA method A and B criteria; degradation by-products do not appear to be forming or migrating away from the source area. This may be due to low PCE concentrations providing little substrate for biological action.

The increase in concentrations at MW-1s and MW-4 observed during the February 2002 sampling event was likely due to temporary removal of pavement south of Lakewood Towne Center Boulevard, required for redevelopment of the Lakewood Mall II buildings. Although no measurable soil contamination was found during 2000 investigation efforts, exposure to increased rainfall and percolation may have temporarily mobilized contaminants to the shallow ground water. The area was repaved in the spring of 2002 and the results of May, August, and November 2002 sampling indicate a subsequent decrease in PCE and TCE concentrations at MW-1s. The most recent spike in vinyl chloride concentrations at MW-1s indicates the possible result of biodegradation occurring over the previous 6 months.

Low concentrations of PCE and cis DCE, as well as two other related constituents continued to be detected in water samples collected from MW-3 located at the northwest corner of the site. Low PCE contamination in soil beneath the tenant space occupied by Villa One-Hour Cleaners at Building N1 was found during an earlier investigation. Low concentrations of PCE, TCE, and cis DCE were detected in ground water samples collected during the 2000 investigative effort (probe boring P22) and the 2002 limited Phase II site investigation (soil boring SB-3). The presence of PCE and its breakdown by-products may be associated with the 1968-1987 Plaza Cleaners source or separate dry cleaning activities conducted at two other possible locations across the northwest corner of the site (Figure 2). The presence of PCE breakdown by-products, not identified at other non-source sampling locations, indicates a possible source beneath the western portion of Building N1. Although a separate source could not be identified, none of the compounds detected at any of the sample locations in the northwest corner exceeded MTCA method A and B cleanup criteria.

A release of dry cleaning solvent (PCE) was identified at the southwest corner of the mall property associated with a former dry cleaning facility that occupied the western portion of Building S2 between 2000 and 2001 (Herrera 2002b). Low concentrations of PCE in ground water detected at SB-1 and SB-2 in March 2002 were found at levels slightly above the practical quantitation limit of 0.20 µg/L, but below the MTCA method A cleanup criteria of 5 µg/L. No PCE or its degradation by-products were detected above practical quantitation limits in soil collected 5 feet deep at boring SB-2 drilled inside tenant space #4 in the vicinity of the assumed dry cleaning operation area. Following installation of monitoring well MW-6 behind the building, no PCE or any of its breakdown by-products were detected above practical quantitation limits in samples collected during the May, August, and November 2002 sampling events.

Probes used to collect ground water at SB-1 and SB-2 were positioned with approximately 1 foot of screen extending below the water table. Monitoring well MW-6 was positioned with approximately 4 feet of screen below the water table. Although low-flow sampling techniques have been used in both probes and the well, there may be a concentration gradient with depth. Because the probe concentrations were low (0.66 and 0.57 µg/L), it is possible that PCE has not migrated at significant concentrations beyond the ground water surface.

Because detected concentrations of PCE and four of its degradation by-products exceeding MTCA method A and B ground water cleanup criteria continued to be found in the source area, continued monitoring across the site is warranted, including:

- Quarterly monitoring of shallow wells MW-1s, MW-3, MW-4, and MW-5 for HVOCs analysis
- Annual monitoring of deeper wells MW-1m, MW-1d, and MW-2d for HVOCs analysis.

Quarterly sampling should continue for at least two more events at monitoring well MW-6 to provide 1 year of data. If no contaminants are detected, no further sampling will be performed; if contaminants are detected, future sampling will be assessed.

References

Benner Stange Associates. 2001. Development site map of Lakewood Towne Center. Map produced by Benner Stange Associates, Architects of Lake Oswego, Oregon for MBK Northwest, Inc. Mr. Tony Nastansky, Lakewood Towne Center Management, provided a copy of the map to Herrera Environmental Consultants during the January 28, 2002 site visit.

Ecology. 2001a. Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Washington State Department of Ecology, Toxics Cleanup Program. Publication no. 94-06. Amended February 21, 2001.

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Yoshida, Inc. 1986. Site plan of Villa Plaza Shopping Center—Water System Improvements. Prepared for Vyzis Company. Scale 1 inch = 100 feet. Mr. Tony Nastansky, Lakewood Mall Management, provided a copy of the map to Herrera Environmental Consultants.

APPENDIX A

Field Procedures

Field Procedures

This appendix documents the procedures used to perform the ground water monitoring program described in this report, including:

- Ground water sampling procedures
- Sample jars, sample handling, and chain-of-custody procedures
- Field equipment decontamination procedures
- Disposal of investigative-derived waste water.

Field procedures for this monitoring program were implemented in general accordance with U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology-established sample handling protocols.

The quarterly ground water monitoring and sampling program consisted of collecting ground water samples from eight wells at the site for laboratory analysis. Field procedures for performing this work are presented in the following sections.

Sample Designation

Ground water samples collected from monitoring wells were denoted using a prefix "MW-" preceding the sample number. The letters 's,' 'm,' and 'd' denoted the shallow, mid-depth, and deep monitoring wells followed by the sample number. For example:

- MW-3 denotes the ground water sample collected from monitoring well location 3.
- MW-2d denotes the ground water sample collected at deep monitoring well location 2.
- Quality control samples were submitted blindly (i.e., not identified as quality control samples) to the analytical laboratory. Quality control samples were given a fictitious sample name (e.g., MW-6 denotes the field duplicate sample collected at MW-1s during the February 2002 event, and MW-7 denotes the field duplicate sample collected at MW-1s during the May, August, and November 2002 events).

Sampling Procedures

Ground Water Sampling

Ground water samples were collected from all eight monitoring wells using a low-flow purge method utilizing dedicated tubing and a peristaltic pump at the surface according to the following procedure:

1. Remove the well monument cover and inspect the condition of the well and surrounding area. Note observations in the field notebook and well sampling log. Unlock and remove the well casing plug.

2. Using an electronic water level meter, measure the static ground water level to the nearest 0.01 feet. Take measurements relative to the notched survey mark at the top of the PVC well casing. Record the date, time, and measurements in the field notebook and well sampling log.

3. Lower flexible polyethylene tubing into the well with the tube intake located in the middle or slightly above the middle of the screened interval. This will ensure that most of the water pumped will be drawn directly from the formation, with little mixing of casing water or disturbance to the sampling zone.

4. Begin purging the well using the peristaltic pump at a rate less than 1 liter per minute. Monitor the water level and adjust the purge rate to ensure that the drawdown does not exceed 0.5 feet of the static water level. If the drawdown continues to drop below 0.5 feet of the static water level despite lowering the pumping rate, then purge the well a minimum of three well casing volumes prior to sample collection. Once water level has stabilized at the adjusted purge rate, begin measuring pH, water temperature, specific conductivity, turbidity, and the water level in 5-minute intervals. Record the amount of water purged, field measurements, and time collected in the field notebook and well sampling log.

5. Samples are collected when field readings have stabilized within 10 percent of the last set of readings. Samples are collected directly from the tubing into sample containers provided by the analytical laboratory. Care must be taken to ensure that no bubbles or headspace are present. Immediately upon filling, each container is securely capped, labeled, and placed into a chilled cooler for storage prior to delivery to the analytical laboratory. The date and time of each sample collected is recorded in the field notebook and on the chain-of-custody form.

6. Dedicated tubing used for purging and sampling ground water from each well is pulled out and discarded into a plastic garbage bag to be disposed of at a solid waste disposal facility. Replace and lock the well casing plug and secure the well monument cover.

Decontamination Procedures

Decontamination was performed on all sampling equipment potentially exposed to contaminated ground water prior to leaving each area of concern. All sampling equipment, except for

polyethylene tubing, was decontaminated prior to entry in the field. In addition, chemical-resistant gloves worn by sample handlers were changed between sampling locations.

Decontamination of Ground Water Sampling Equipment

The electronic water level indicator, pH, conductivity, dissolved oxygen, and turbidity meters were rinsed with deionized water between uses at different sampling locations. New polyethylene tubing was used at each sampling location and discarded after sampling was completed.

Sample Handling

All samples collected during this investigation were handled according to the procedures described in this section.

Sample Containers and Labeling

Samples were placed in containers supplied by the analytical laboratory appropriate for the analyses to be performed. Sample container labels were completed at the time of collection using a permanent waterproof pen or marker. Sample labels included the following information:

- Project name
- Sample identification (including site designation and sample number)
- Date and time of collection
- Initials of sampling personnel
- General analysis to be performed.

Sample Storage

Immediately following sample collection, sample containers were placed into a chilled cooler for storage prior to delivery to the analytical laboratory. Care was taken to ensure that sample holding times were not exceeded during periods of storage. Sample containers were placed into plastic Ziploc bags to protect labels from moisture in the cooler.

Chain of Custody

Following collection, sample information was recorded on a chain-of-custody form. The purpose of this record is to account for the possession (or custody) of each sample from the time it is collected until laboratory testing and reporting is complete. The signature of each person in possession of the samples must be recorded on the chain-of-custody form. Information recorded on the chain-of-custody record included the following:

- Project name and location
- Project number
- Names of project manager and sampling personnel
- Sample identification
- Sample matrix (water)
- Date and time of collection (for each sample)
- Analysis requested (for each sample)
- Number of sample containers (for each sample)
- Signature, date, and time (for each person releasing or accepting sample custody).

Sample Shipment and Delivery

Ground water samples collected during each sampling event were hand-delivered to OnSite Environmental analytical laboratory in Redmond, Washington.

Sample Documentation

All sampling activities during this investigation were documented in a dedicated field notebook. The notebook was labeled with the project name, project identification number, dates of field activities, and name of the field coordinator. All relevant activities were recorded in the field notebook during the period of the field investigation. Entries into the field notebook were made in permanent ink. Corrections were made by placing a single line through the original entry accompanied by the initials of the person entering the correction. At a minimum, information in the field notebook included:

- Date and atmospheric conditions
- Major activities to be performed
- Names of sampling personnel present
- Time of arrival at site, set-up, sample collection, and completion at each sample station
- General condition of sampling area
- Any unusual events or occurrences.

Disposal of Investigation-Derived Waste

All wastes generated during this investigation were disposed of according to regulatory requirements.

Disposal of Incidental Trash

Incidental trash generated during each ground water quarterly sampling event (including discarded gloves, used Ziploc bags, paper towels, polyethylene tubing, and food packaging) were placed in plastic trash bags and disposed of as solid waste into a dumpster either at the Lakewood Towne Center management office or at Herrera's office in Seattle, Washington.

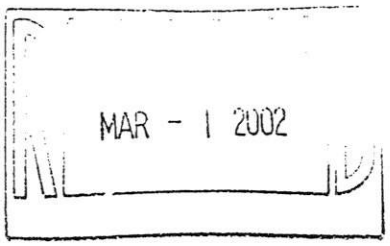
Purge Water Disposal

Development and purge water generated during each sampling event were secured either in a 20- or a 55-gallong drum that was temporarily stored in a mechanical room located in Building N3. All development and purge water generated from each sampling event was collected and transported by Emerald Services, Inc. of Seattle, Washington for treatment and disposal as hazardous waste (F002) at Philip Environmental Services Corporation facility in Renton, Washington (EPA Site No. WAH000012971).

APPENDIX B

Laboratory Analytical Reports and Data Quality Assurance Summary Review

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services



February 28, 2002

Diana Phelan
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 601
Seattle, WA 98121

Re: Analytical Data for Project C00-01640-004
Laboratory Reference No. 0202-108

Dear Diana:

Enclosed are the analytical results and associated quality control data for samples submitted on February 21, 2002.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881 • Fax (425) 885-4603

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-22-02
Date Analyzed:	2-22-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-108-01
Client ID:	**MW-1s**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	28		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.83		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	7.2		0.20
1,1-Dichloroethane	3.1		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	540		4.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	68		4.0
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	37		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-108-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.35		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	103	71-133
Toluene, d8	97	80-151
4-Bromofluorobenzene	79	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-22-02
Date Analyzed:	2-22-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-108-02
Client ID:	**MW-3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	1.3		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	0.31		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.66		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-108-02
Client ID: **MW-3**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	112	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	76	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-22-02
Date Analyzed:	2-22-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-108-03
Client ID:	**MW-4**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	1.3		0.20
1,1-Dichloroethane	0.71		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	110		2.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	18		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	9.8		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-108-03
Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	107	71-133
Toluene, d8	99	80-151
4-Bromofluorobenzene	78	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-22-02
Date Analyzed:	2-22-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-108-04
Client ID:	**MW-5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.44		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-108-04
Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	115	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	78	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-22-02
Date Analyzed:	2-22-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-108-05
Client ID:	**MW-6**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	27		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.79		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	6.9		0.20
1,1-Dichloroethane	2.9		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	550		2.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	70		2.0
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	38		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-108-05
Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.41		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	102	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	79	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 2-22-02
Date Analyzed: 2-22-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0222W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	1.0		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0222W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	108	71-133
Toluene, d8	97	80-151
4-Bromofluorobenzene	79	75-139

Date of Report: February 28, 2002
Samples Submitted: February 21, 2002
Lab Traveler: 02-108
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 2-22-02
Date Analyzed: 2-22-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0222W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	7.13	71	7.55	76	5.8	
Benzene	10.0	10.1	101	9.49	95	6.1	
Trichloroethene	10.0	8.74	87	8.96	90	2.5	
Toluene	10.0	10.0	100	9.36	94	6.9	
Chlorobenzene	10.0	9.09	91	8.60	86	5.5	

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1:____ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeniety. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected at PQL
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)
- ☐ _____ (other)

Company: HERRERA ENVIRONMENTAL CONSULTANTS

Project No.: C00-01640-004

Project Name: LAKEWDM4

Project Manager: DIANA PHELAN

Project Manager: DAVID BAUMEISTER

Laboratory No. 02-108

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Herbicides by 8151A	Total RCRA Metals (8)	Priority Pollutant Metals (13)	TCLP Metals	VPH	EPH				% Moisture
1	MW-1S	2/20/02	11:35	W	3					X														
2	MW-3		09:55	W	3					X														
3	MW-4		14:40	W	3					X														
4	MW-5		13:05	W	3					X														
5	MW-6		11:00	W	3					X														

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Diana M. Phelan	2/21/02	[illegible]	2.21.02
FIRM: HERRERA	TIME: 07:00	FIRM: OSE	TIME: 7:00 AM
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy, Yellow - Report Copy, Pink - Client Copy

OnSite
Environmental Inc.
Analytical Testing and Mobile Laboratory Services

May 29, 2002

Diana Phelan
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 601
Seattle, WA 98121

Re: Analytical Data for Project C00-01640.004
Laboratory Reference No. 0205-141

Dear Diana:

Enclosed are the analytical results and associated quality control data for samples submitted on May 21, 2002.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

Case Narrative

Samples were collected on May 20, 2002. Samples were maintained at the laboratory at 4°C and followed SW846 analysis and extraction methods.

Halogenated Volatiles EPA 8260B Analysis

Any QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 5-24-02
Date Analyzed: 5-24-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-141-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	25		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.61		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	8.3		0.20
1,1-Dichloroethane	2.3		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	520		20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	37		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	18		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.32		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	93	71-133
Toluene, d8	96	80-151
4-Bromofluorobenzene	83	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 5-24-02
Date Analyzed: 5-24-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-141-02
Client ID: MW-3

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.93		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.52		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-02
Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	91	71-133
Toluene, d8	95	80-151
4-Bromofluorobenzene	82	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	5-24-02
Date Analyzed:	5-24-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	05-141-03
Client ID:	**MW-4**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	0.90		0.20
1,1-Dichloroethane	0.32		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	65		2.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	6.6		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	3.8		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-03
Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	91	71-133
Toluene, d8	95	80-151
4-Bromofluorobenzene	84	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	5-24-02
Date Analyzed:	5-24-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	05-141-04
Client ID:	**MW-5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.39		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-04
Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	97	71-133
Toluene, d8	94	80-151
4-Bromofluorobenzene	83	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	5-24-02
Date Analyzed:	5-24-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	05-141-05
Client ID:	**MW-6**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-05
Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	98	71-133
Toluene, d8	96	80-151
4-Bromofluorobenzene	82	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	5-24-02
Date Analyzed:	5-24-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	05-141-06
Client ID:	**MW-7**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	25		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.55		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	7.5		0.20
1,1-Dichloroethane	2.2		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	520		20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	37		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	18		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 05-141-06
Client ID: MW-7

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.33		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	94	71-133
Toluene, d8	95	80-151
4-Bromofluorobenzene	82	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Date Extracted: 5-24-02
Date Analyzed: 5-24-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0524W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0524W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	90	71-133
Toluene, d8	94	80-151
4-Bromofluorobenzene	85	75-139

Date of Report: May 29, 2002
Samples Submitted: May 21, 2002
Lab Traveler: 05-141
Project: C00-01640.004

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 5-24-02
Date Analyzed: 5-24-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0524W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	7.49	75	7.61	76	1.6	
Benzene	10.0	10.0	100	10.3	103	2.4	
Trichloroethene	10.0	9.03	90	9.00	90	0.3	
Toluene	10.0	10.4	104	10.6	106	1.8	
Chlorobenzene	10.0	9.32	93	9.66	97	3.6	

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1:____ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeniety. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected at PQL
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: HERRERA ENVIRONMENTAL CONSULTANTS
Project Number: C00-01640-004
Project Name: LAKEWOOD M4
Project Manager: DIANA M. PHELAN
Sampled by: Diana M. Phelan

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☒ Standard (7 working days)
☐ _____ (other)

Laboratory Number: 05-1415

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	% Moisture
1	MW-1 DUP	5/20/02	12:30	W	3					X											
2	MW-3		09:25	W	3					X											
3	MW-4		14:30	W	3					X											
4	MW-5		10:35	W	3					X											
5	MW-6		16:00	W	3					X											
6	MW-7		11:45	W	3					X											

	Signature	Company	Date	Time
Relinquished by	Diana M. Phelan	HERRERA	5/21/02	0700
Received by		CSE	5/21/02	7:00 AM
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions:

Reviewed by/Date

Reviewed by/Date

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy; Yellow - Report Copy; Pink - Client Copy

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

August 29, 2002

Diana Phelan
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 601
Seattle, WA 98121

Re: Analytical Data for Project C00-01640-004
Laboratory Reference No. 0208-140

Dear Diana:

Enclosed are the analytical results and associated quality control data for samples submitted on August 20, 2002.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

Case Narrative

Samples were collected on August 19, 2002. Samples were maintained at the laboratory at 4°C and followed SW846 analysis and extraction methods.

Halogenated Volatiles EPA 8260B Analysis

Any QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-140-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		2.0
Chloromethane	ND		2.0
Vinyl Chloride	31		2.0
Bromomethane	ND		2.0
Chloroethane	ND		2.0
Trichlorofluoromethane	ND		2.0
1,1-Dichloroethene	ND		2.0
Iodomethane	ND		10
Methylene Chloride	16		10
(trans) 1,2-Dichloroethene	7.3		2.0
1,1-Dichloroethane	ND		2.0
2,2-Dichloropropane	ND		2.0
(cis) 1,2-Dichloroethene	540		20
Bromochloromethane	ND		2.0
Chloroform	ND		2.0
1,1,1-Trichloroethane	ND		2.0
Carbon Tetrachloride	ND		2.0
1,1-Dichloropropene	ND		2.0
1,2-Dichloroethane	ND		2.0
Trichloroethene	16		2.0
1,2-Dichloropropane	ND		2.0
Dibromomethane	ND		2.0
Bromodichloromethane	ND		2.0
2-Chloroethyl Vinyl Ether	ND		10
(cis) 1,3-Dichloropropene	ND		2.0
(trans) 1,3-Dichloropropene	ND		2.0
1,1,2-Trichloroethane	ND		2.0
Tetrachloroethene	5.5		2.0
1,3-Dichloropropane	ND		2.0

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		2.0
1,2-Dibromoethane	ND		2.0
Chlorobenzene	ND		2.0
1,1,1,2-Tetrachloroethane	ND		2.0
Bromoform	ND		10
Bromobenzene	ND		2.0
1,1,2,2-Tetrachloroethane	ND		2.0
1,2,3-Trichloropropane	ND		2.0
2-Chlorotoluene	ND		2.0
4-Chlorotoluene	ND		2.0
1,3-Dichlorobenzene	ND		2.0
1,4-Dichlorobenzene	ND		2.0
1,2-Dichlorobenzene	ND		2.0
1,2-Dibromo-3-chloropropane	ND		10
1,2,4-Trichlorobenzene	ND		2.0
Hexachlorobutadiene	ND		2.0
1,2,3-Trichlorobenzene	ND		2.0

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	105	71-133
Toluene, d8	94	80-151
4-Bromofluorobenzene	103	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-140-02
Client ID: **MW-3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.79		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.57		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-02
Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	109	71-133
Toluene, d8	99	80-151
4-Bromofluorobenzene	107	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-140-03
Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.40
Chloromethane	ND		0.40
Vinyl Chloride	ND		0.40
Bromomethane	ND		0.40
Chloroethane	ND		0.40
Trichlorofluoromethane	ND		0.40
1,1-Dichloroethene	ND		0.40
Iodomethane	ND		2.0
Methylene Chloride	4.8		2.0
(trans) 1,2-Dichloroethene	1.7		0.40
1,1-Dichloroethane	ND		0.40
2,2-Dichloropropane	ND		0.40
(cis) 1,2-Dichloroethene	77		0.40
Bromochloromethane	ND		0.40
Chloroform	ND		0.40
1,1,1-Trichloroethane	ND		0.40
Carbon Tetrachloride	ND		0.40
1,1-Dichloropropene	ND		0.40
1,2-Dichloroethane	ND		0.40
Trichloroethene	4.2		0.40
1,2-Dichloropropane	ND		0.40
Dibromomethane	ND		0.40
Bromodichloromethane	ND		0.40
2-Chloroethyl Vinyl Ether	ND		2.0
(cis) 1,3-Dichloropropene	ND		0.40
(trans) 1,3-Dichloropropene	ND		0.40
1,1,2-Trichloroethane	ND		0.40
Tetrachloroethene	2.4		0.40
1,3-Dichloropropane	ND		0.40

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-03
Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.40
1,2-Dibromoethane	ND		0.40
Chlorobenzene	ND		0.40
1,1,1,2-Tetrachloroethane	ND		0.40
Bromoform	ND		2.0
Bromobenzene	ND		0.40
1,1,2,2-Tetrachloroethane	ND		0.40
1,2,3-Trichloropropane	ND		0.40
2-Chlorotoluene	ND		0.40
4-Chlorotoluene	ND		0.40
1,3-Dichlorobenzene	ND		0.40
1,4-Dichlorobenzene	ND		0.40
1,2-Dichlorobenzene	ND		0.40
1,2-Dibromo-3-chloropropane	ND		2.0
1,2,4-Trichlorobenzene	ND		0.40
Hexachlorobutadiene	ND		0.40
1,2,3-Trichlorobenzene	ND		0.40

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	112	71-133
Toluene, d8	95	80-151
4-Bromofluorobenzene	106	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-140-04
Client ID: MW-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.71		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-04
Client ID: **MW-5**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	110	71-133
Toluene, d8	103	80-151
4-Bromofluorobenzene	102	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	8-26-02
Date Analyzed:	8-26-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-140-05
Client ID:	**MW-6**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-05
Client ID: **MW-6**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	108	71-133
Toluene, d8	97	80-151
4-Bromofluorobenzene	101	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	8-26-02
Date Analyzed:	8-26-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-140-06
Client ID:	**MW-7**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		4.0
Chloromethane	ND		4.0
Vinyl Chloride	33		4.0
Bromomethane	ND		4.0
Chloroethane	ND		4.0
Trichlorofluoromethane	ND		4.0
1,1-Dichloroethene	ND		4.0
Iodomethane	ND		20
Methylene Chloride	72		20
(trans) 1,2-Dichloroethene	8.1		4.0
1,1-Dichloroethane	ND		4.0
2,2-Dichloropropane	ND		4.0
(cis) 1,2-Dichloroethene	540		4.0
Bromochloromethane	ND		4.0
Chloroform	ND		4.0
1,1,1-Trichloroethane	ND		4.0
Carbon Tetrachloride	ND		4.0
1,1-Dichloropropene	ND		4.0
1,2-Dichloroethane	ND		4.0
Trichloroethene	16		4.0
1,2-Dichloropropane	ND		4.0
Dibromomethane	ND		4.0
Bromodichloromethane	ND		4.0
2-Chloroethyl Vinyl Ether	ND		20
(cis) 1,3-Dichloropropene	ND		4.0
(trans) 1,3-Dichloropropene	ND		4.0
1,1,2-Trichloroethane	ND		4.0
Tetrachloroethene	6.3		4.0
1,3-Dichloropropane	ND		4.0

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-06
Client ID: MW-7

Compound	Results	Flags	PQL
Dibromochloromethane	ND		4.0
1,2-Dibromoethane	ND		4.0
Chlorobenzene	ND		4.0
1,1,1,2-Tetrachloroethane	ND		4.0
Bromoform	ND		20
Bromobenzene	ND		4.0
1,1,2,2-Tetrachloroethane	ND		4.0
1,2,3-Trichloropropane	ND		4.0
2-Chlorotoluene	ND		4.0
4-Chlorotoluene	ND		4.0
1,3-Dichlorobenzene	ND		4.0
1,4-Dichlorobenzene	ND		4.0
1,2-Dichlorobenzene	ND		4.0
1,2-Dibromo-3-chloropropane	ND		20
1,2,4-Trichlorobenzene	ND		4.0
Hexachlorobutadiene	ND		4.0
1,2,3-Trichlorobenzene	ND		4.0

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	107	71-133
Toluene, d8	102	80-151
4-Bromofluorobenzene	102	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-140-07
Client ID: KBSD

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 08-140-07
Client ID: **KBSD**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	108	71-133
Toluene, d8	100	80-151
4-Bromofluorobenzene	105	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0826W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Lab ID: MB0826W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	105	71-133
Toluene, d8	100	80-151
4-Bromofluorobenzene	100	75-139

Date of Report: August 29, 2002
Samples Submitted: August 20, 2002
Lab Traveler: 08-140
Project: C00-01640-004

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 8-26-02
Date Analyzed: 8-26-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0826W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	10.4	104	10.2	102	2.0	
Benzene	10.0	9.43	94	9.54	95	1.2	
Trichloroethene	10.0	9.50	95	9.38	94	1.3	
Toluene	10.0	9.44	94	9.59	96	1.6	
Chlorobenzene	10.0	9.90	99	10.2	102	2.8	

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1:____ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeniety. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected at PQL
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: HERRERA ENVIRONMENTAL CONSULTANTS
Project Number: 000-01640-004
Project Name: LAKEWDM4
Project Manager: DIANA M. PHELAN
Sampled by: DIANA M. PHELAN

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ Due 8/29/02 (other)

Laboratory Number: 08-140

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	% Moisture
1	MW-1S	8/19/02	1120	W	3					X											
2	MW-3		0925	W	3					X											
3	MW-4		1340	W	3					X											
4	MW-5		1455	W	3					X											
5	MW-6		1625	W	3					X											
6	MW-7		1200	W	3					X											
7	KBSD	↓	1715	W	3					X											

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by	Diana M. Phelan	HERRERA	8-20-02	0715	
Received by	[illegible]	CSE	8.20.02	7:15AM	
Relinquished by					
Received by					
Relinquished by					
Received by					
Reviewed by/Date		Reviewed by/Date			Chromatograms with final report ☐

DISTRIBUTION LEGEND - White - OnSite Copy - Yellow - Report Copy - Pink - Client Copy

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

December 3, 2002

Diana Phelan
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project C00-01640-004/004-001
Laboratory Reference No. 0211-157

Dear Diana:

Enclosed are the analytical results and associated quality control data for samples submitted on November 21, 2002.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

Case Narrative

Samples were collected on November 20 and 21 2002. Samples were maintained at the laboratory at 4°C and followed SW846 analysis and extraction methods.

Halogenated Volatiles EPA 8260B Analysis

Any QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 12-2-02
Date Analyzed: 12-2-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 11-157-01
Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	58		10
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	1.0		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	8.5		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	330		10
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	17		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 11-157-01
Client ID: MW-1s

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	2.8		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	110	71-133
Toluene, d8	104	80-151
4-Bromofluorobenzene	86	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-02
Client ID:	**MW-1m**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.93		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	0.24		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 11-157-02
Client ID: MW-1m

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.69		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	117	71-133
Toluene, d8	108	80-151
4-Bromofluorobenzene	82	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-03
Client ID:	**MW-1d**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
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Lab ID: 11-157-03
Client ID: MW-1d

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.52		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	118	71-133
Toluene, d8	101	80-151
4-Bromofluorobenzene	84	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-04
Client ID:	**MW-3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.84		0.20
Bromochloromethane	ND		0.20
Chloroform	0.37		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
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Lab ID: 11-157-04
Client ID: MW-3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.57		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	117	71-133
Toluene, d8	109	80-151
4-Bromofluorobenzene	85	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-05
Client ID:	**MW-6**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 11-157-05
Client ID: MW-6

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	114	71-133
Toluene, d8	101	80-151
4-Bromofluorobenzene	84	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-06
Client ID:	**MW-7**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	62		10
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	1.1		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	7.8		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	330		10
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	17		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 11-157-06
Client ID: MW-7

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	2.7		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.21		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	114	71-133
Toluene, d8	108	80-151
4-Bromofluorobenzene	84	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-07
Client ID:	**MW-2d**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

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Lab ID: 11-157-07
Client ID: MW-2d

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.2		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	119	71-133
Toluene, d8	102	80-151
4-Bromofluorobenzene	84	75-139

Date of Report: December 3, 2002
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Date Extracted: 12-2-02
Date Analyzed: 12-2-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: 11-157-08
Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	0.99		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	38		2.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	3.7		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 11-157-08
Client ID: MW-4

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.6		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	110	71-133
Toluene, d8	108	80-151
4-Bromofluorobenzene	83	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

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Date Extracted:	12-2-02
Date Analyzed:	12-2-02
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	11-157-09
Client ID:	**MW-5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

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Lab ID: 11-157-09
Client ID: MW-5

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.86		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	119	71-133
Toluene, d8	102	80-151
4-Bromofluorobenzene	86	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 12-2-02
Date Analyzed: 12-2-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1202W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
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Lab ID: MB1202W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	119	71-133
Toluene, d8	114	80-151
4-Bromofluorobenzene	81	75-139

Date of Report: December 3, 2002
Samples Submitted: November 21, 2002
Lab Traveler: 11-157
Project: C00-01640-004/004-001

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 12-2-02
Date Analyzed: 12-2-02

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB1202W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	10.3	103	10.8	108	69-113	
Benzene	10.0	10.6	106	11.2	112	71-128	
Trichloroethene	10.0	9.18	92	9.71	97	82-122	
Toluene	10.0	10.7	107	10.9	109	54-118	
Chlorobenzene	10.0	9.65	96	9.71	97	85-103	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	5.0	15	
Benzene	5.8	9.6	
Trichloroethene	5.6	12	
Toluene	2.1	15	
Chlorobenzene	0.67	5.8	

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1:____ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeniety. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected at PQL
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

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OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: HERRERA ENVIRONMENTAL CONSULTANTS
Project Number: C00-01640-004/004-001
Project Name: LAKEWD4
Project Manager: DIANA M. PHELAN
Sampled by: DIANA M. PHELAN

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☒ Standard (7 working days)
☐ _____ (other)

Laboratory Number: 11-157

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH					% Moisture
1	MW-1s*	11-20-02	1435	W	3					X															
2	MW-1M	11-20-02	1330	W	3					X															
3	MW-1d	11-20-02	1145	W	3					X															
4	MW-3	11-20-02	0955	W	3					X															
5	MW-6	11-20-02	1550	W	3					X															
6	MW-7*	11-20-02	1400	W	3					X															
7	MW-2d	11-21-02	1255	W	3					X															
8	MW-4*	11-21-02	0915	W	3					X															
9	MW-5	11-21-02	1025	W	3					X															

	Signature	Company	Date	Time
Relinquished by	Diana M. Phelan	HERRERA	11-21-02	1450
Received by		OSE	11/21/02	1450
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions:

* REQUEST 0.2 µg/L PQL - SAMPLES WITH "*" MAY HAVE HIGH HVOC CONCENTRATIONS

Reviewed by/Date

Reviewed by/Date

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - On-Site Copy Yellow - Report Copy Pink - Client Copy

Data Quality Assurance Review Summary

A data quality assurance review was performed on all analytical data from ground water samples collected during four sampling events conducted between February and November 2002 at the Lakewood Towne Center site in Lakewood, Washington. The laboratory's performance was reviewed in accordance with quality control specifications outlined by the analytical methods and the U.S. Environmental Protection Agency (EPA) functional guidelines for organic data review (U.S. EPA 1999).

Five ground water samples (including one field duplicate) were collected for chemical analysis from monitoring wells MW-1s, MW-3, MW-4, and MW-5 on February 20, 2002. Six ground water samples (including one field duplicate) were collected from chemical analysis from the same wells sampled in February 2002 and a newly installed well MW-6 on May 20, August 19, and November 20 and 21, 2002. Three ground water samples were collected from deeper wells MW-1m, MW-1d, and MW-2d only during the November 2002 sampling event. OnSite Environmental Inc. of Redmond, Washington analyzed the ground water samples from each event for halogenated volatile organic compounds (HVOCs) using U.S. Environmental Protection Agency (U.S. EPA) Method 8260B.

Quality control data submitted by the laboratory were reviewed; raw laboratory data were not provided or reviewed. Data validation results are summarized separately below for each sampling effort.

February 2002 HVOC Ground Water Analytical Results

Five ground water samples (including one field duplicate) collected from wells MW-1s, MW-3, MW-4, and MW-5 were analyzed for HVOCs. The water HVOC results were determined to be acceptable for use and no data were qualified, based on the following criteria:

Holding Times—All water samples were preserved with hydrochloric acid and analyzed within the maximum holding time (14 days) for U.S. EPA Method 8260B.

Laboratory Reporting Limits— The laboratory reporting (practical quantitation) limits for HVOC constituents in water are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. The MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L (Ecology 2001). Therefore, the usability of 1,1-DCE data is limited for all samples except for project samples MW-1s and MW-6 (field duplicate of sample MW-1s), which contained concentrations of 1,1-DCE above the practical quantitation limit. The practical quantitation limits for (cis) 1,2-dichloroethene and trichlorethene in project samples MW-1s and MW-6 were elevated by a factor of 4 and 2, respectively, because these samples were diluted.

Blank Analysis—One method blank was analyzed with the project samples. Methylene chloride was detected at the practical quantitation limit of 1.0 µg/L. No methylene chloride was detected in any of the project samples. Methylene chloride detected in the method blank at a low concentration indicates that it likely is a laboratory contaminant, since it is a common laboratory solvent. No other HVOC constituents were detected in the method blank. No field blanks were collected.

Surrogate Analysis—Three surrogate compounds were analyzed with the project samples and the method blank in accordance with the U.S. EPA Method 8260B. As shown in Table C-1, surrogate recovery values for each compound were within their respective laboratory control limit ranges. No samples required dilution.

Table C-1. Water HVOC surrogate recovery results (February 2002).

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	102-115	108	71-133
Toluene-d8	97-99	97	80-151
4-Bromofluorobenzene	76-79	79	75-139

Spike Blank Analysis—Five HVOC compounds were analyzed in a spike blank/spike blank duplicate (SB/SBD). Blank spike levels ranged from 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table C-2, percent recovery and RPD values for the five HVOC constituents were within the respective laboratory control limit ranges.

Table C-2. Water HVOC spike blank results (February 2002).

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD Results	Laboratory RPD QC Limits
1,1-Dichloroethene	71	76	69-113	5.8	0-15
Benzene	101	95	72-128	6.1	0-9.6
Trichloroethene	87	90	82-122	2.5	0-12
Toluene	100	94	54-118	6.9	0-15
Chlorobenzene	91	86	85-103	5.5	0-5.8

Field Duplicate Analysis—A field duplicate (water sample MW-6) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table C-3, RPD values of all detected compounds did not exceed 30 percent.

Table C-3. Water HVOC field duplicate results (February 2002).

Compound	Project Sample MW-1s	Field Duplicate Sample MW-6	Relative Percent Difference
Tetrachloroethene (PCE)	37	38	2.7
Trichloroethene (TCE)	68	70	2.9
(cis) 1,2-Dichloroethene	540	550	1.8
(trans) 1,2-Dichloroethene	7.2	6.9	4.3
1,1-Dichloroethene	0.83	0.79	4.9
1,1-Dichloroethane	3.1	2.9	6.7
Vinyl chloride	28	27	3.6
1,4-Dichlorobenzene	0.35	0.41	15.8

May 2002 HVOC Ground Water Analytical Results

Six ground water samples (including one field duplicate) collected from wells MW-1s, MW-3, MW-4, MW-5, and MW-6 were analyzed for HVOCs. The water HVOC results were determined to be acceptable for use and no data were qualified, based on the following criteria:

Holding Times—All water samples were preserved with hydrochloric acid and analyzed within the maximum holding time (14 days) for U.S. EPA Method 8260B.

Laboratory Reporting Limits— The laboratory reporting (practical quantitation) limits for HVOC constituents in water are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. The MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L (Ecology 2001). Therefore, the usability of 1,1-DCE data is limited for all samples except for project samples MW-1s and MW-7 (field duplicate of sample MW-1s), which contained concentrations of 1,1-DCE above the practical quantitation limit. Water samples collected from MW-1s and its field duplicate MW-7 required dilution for (cis) 1,2-dichloroethene, due to high concentrations of this compound, which increased the laboratory reporting (practical quantitation) limit by a factor of 100 for both samples.

Blank Analysis—One method blank was analyzed with the water samples. The method blank did not contain reportable levels of HVOC constituents above their practical quantitation limits (0.20 µg/L and 1.0 µg/L, respectively) and no data have been qualified. No field blanks were collected.

Surrogate Analysis—Three surrogate compounds were analyzed with the project samples and the method blank in accordance with the method. As shown in Table C-4, surrogate recovery values for each compound were within their respective laboratory control limit ranges. No samples required dilution.

Table C-4. Water HVOC surrogate recovery results (May 2002).

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	91-98	90	71-133
Toluene-d8	94-96	94	80-151
4-Bromofluorobenzene	82-84	85	75-139

Spike Blank Analysis—A spike blank sample (SB0524W1) was analyzed as the SB/SBD. Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table C-5, percent recovery values for the five HVOC constituents were within their respective laboratory control limit ranges. All RPD values were within their respective laboratory control limit ranges.

Table C-5. Water HVOC spike blank results.

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD Results	Laboratory RPD QC Limits
1,1-Dichloroethene	75	76	69-113	1.6	0-15
Benzene	100	103	72-128	2.4	0-10
Trichloroethene	90	90	82-122	0.3	0-12
Toluene	104	106	54-118	1.9	0-15
Chlorobenzene	93	97	86-103	3.6	0-6

Field Duplicate Analysis—A field duplicate (water sample MW-7) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table C-6, duplicate results of the eight HVOC analytes exhibited RPD values within the laboratory control limits (less than 30 percent).

Table C-6. Water HVOC field duplicate results (May 2002).

Compound	MW-1s Results	MW-7 Results	RPD
Tetrachloroethene (PCE)	18	18	0.0
Trichloroethene (TCE)	37	37	0.0
(cis) 1,2-Dichloroethene	520	520	0.0
(trans) 1,2-Dichloroethene	8.3	7.5	10.1
1,1-Dichloroethene	0.61	0.55	10.3
1,1-Dichloroethane	2.3	2.2	4.4
Vinyl chloride	25	25	0.0
1,4-Dichlorobenzene	0.32	0.33	3.1

August 2002 HVOC Ground Water Analytical Results

Seven water samples collected from wells MW-1s, MW-3, MW-4, MW-5, and MW-6, and from a storm drain catchment near Key Bank onsite (sample designated as "KBSD") were analyzed for HVOCs. The water HVOC results were determined to be acceptable for use and no data were qualified, based on the following criteria:

Holding Times—All water samples were preserved with hydrochloric acid and analyzed within the maximum holding time (14 days) for U.S. EPA Method 8260B.

Laboratory Reporting Limits—The laboratory reporting (practical quantitation) limits for HVOC constituents in water are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. The MTCA method B ground water cleanup criterion for 1,1-DCE is 0.0729 µg/L (Ecology 2001), but the practical quantitation limit ranged from 0.20 to 4.0 µg/L in the samples. Therefore, the usability of 1,1-DCE data is limited for all samples. Samples from MW-1s, MW-4, and MW-7 had high laboratory reporting (practical quantitation) limits due to analysis of each sample at a dilution factor of 10, 2, and 20 fold, respectively.

Blank Analysis—One method blank was analyzed with the water samples. The method blank did not contain reportable levels of HVOC constituents above practical quantitation limits, and no data have been qualified. No field blanks were collected.

Surrogate Analysis—Three surrogate compounds were analyzed with the project samples and method blank in accordance with the U.S. EPA Method 8260B. As shown in Table C-7, surrogate recovery values for each compound were within their respective laboratory control limit ranges.

Table C-7. Water HVOC surrogate recovery results (August 2002).

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	105-112	105	71-133
Toluene-d8	94-103	100	80-151
4-Bromofluorobenzene	101-107	100	75-139

Spike Blank Analysis—A spike blank sample (SB0826W1) was analyzed as the spike blank/spike blank duplicate (SB/SBD). Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table C-8, percent

recovery and RPD values for the five HVOC constituents are within their respective laboratory control limit ranges.

Table C-8. Water HVOC spike blank results (August 2002).

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD Results	Laboratory RPD QC Limits
1,1-Dichloroethene	104	102	69-113	2.0	0-15
Benzene	94	95	72-128	1.2	0-10
Trichloroethene	95	94	82-122	1.3	0-12
Toluene	94	96	54-118	1.6	0-15
Chlorobenzene	99	102	86-103	2.8	0-6

Field Duplicate Analysis—Water sample MW-7 was analyzed as the field duplicate of water sample MW-1s. As shown in Table C-9, the difference between results of detected compounds was within 30 percent (which applies to results that are greater than 5 times the practical quantitation limit) or within the practical quantitation limit (which applies to results that are less than the practical quantitation limit). One exception is that the duplicate results for methylene chloride exhibit a difference of 2.8 times the practical quantitation limit. No data were qualified due to field duplicate results.

Table C-9. Water HVOC field duplicate results (August 2002).

Compound	Project Water Sample MW-1s (µg/L)	Field Duplicate Water Sample MW-7 (µg/L)	Relative Percent Difference	Difference/ PQL [a]
Tetrachloroethene (PCE)	**5.5**	**6.3**	NA	0.2
Trichloroethene (TCE)	16	**16**	NA	0.0
cis 1,2-Dichloroethene (cis DCE)	540	540	0.0	NA
trans 1,2-Dichloroethene (trans DCE)	**7.3**	**8.1**	NA	0.2
Vinyl chloride	31	33	6.3	NA
Methylene chloride	**16**	**72**	NA	2.8

Boldface type values are less than 5 times the practical quantitation limit (PQL), which are 2 times higher for sample MW-7 than sample MW-1s.

[a] The difference between duplicate results divided by the PQL is used to assess results if either the result is less than 5 times the PQL.

NA Not applicable.

November 2002 HVOC Ground Water Analytical Results

Nine ground water samples (including one field duplicate) collected from wells MW-1s, MW-1m, MW-1d, MW-2d, MW-3, MW-4, MW-5, and MW-6 were analyzed for HVOCs. The water HVOC results were determined to be acceptable for use and no data were qualified, based on the following criteria:

Holding Times—All water samples were preserved with hydrochloric acid and analyzed within the maximum holding time (14 days) for U.S. EPA Method 8260B.

Laboratory Reporting Limits— The laboratory reporting (practical quantitation) limits for HVOC constituents in water were below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-dichloroethene (1,1-DCE). The MTCA method B ground water cleanup criterion for 1,1-DCE is 0.0729 µg/L (Ecology 2001), but the practical quantitation limit was 0.20 µg/L. Therefore, the usability of 1,1-DCE data is limited for all samples except project samples MW-1s and MW-7 (field duplicate of sample MW-1s), which contained concentrations of 1,1-DCE above the practical quantitation limit.

Blank Analysis— One method blank was analyzed with the water samples. The method blank did not contain reportable levels of HVOC constituents above practical quantitation limits, and no data have been qualified. No field blanks were collected.

Surrogate Analysis—Three surrogate compounds were analyzed with the project samples and method blank in accordance with the U.S. EPA Method 8260B. As shown in Table C-10, surrogate recovery values for each compound were within their respective laboratory control limit ranges.

Table C-10. Water HVOC surrogate recovery results (November 2002).

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	110-119	119	71-133
Toluene-d8	101-109	114	80-151
4-Bromofluorobenzene	82-86	81	75-139

Spike Blank Analysis—A spike blank sample (SB1202W1) was analyzed as the spike blank/spike blank duplicate (SB/SBD). Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table C-11, percent recovery and RPD values for the five HVOC constituents are within the respective laboratory control limit ranges.

Table C-11. Water HVOC spike blank results (November 2002).

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD Results	Laboratory RPD QC Limits
1,1-Dichloroethene	103	108	69-113	5.0	0-15
Benzene	106	112	72-128	5.8	0-9.6
Trichloroethene	92	97	82-122	5.6	0-12
Toluene	107	109	54-118	2.1	0-15
Chlorobenzene	96	97	86-103	0.67	0-5.8

Field Duplicate Analysis—Water sample MW-7 was analyzed as the field duplicate of water sample MW-1s. As shown in Table C-12, the RPD values between results of detected compounds were within the 30 percent control limit (or within the practical quantitation limit if either result is less than 5 times the practical quantitation limit). No data were qualified due to field duplicate results.

Table C-12. Water HVOC field duplicate results (November 2002).

Compound	Project Water Sample MW-1s (µg/L)	Field Duplicate Water Sample MW-7 (µg/L)	Relative Percent Difference	Difference/ PQL [a]
Tetrachloroethene (PCE)	2.8	2.7	3.6	NA
Trichloroethene (TCE)	17	17	0.0	NA
cis 1,2-Dichloroethene (cis DCE)	330	330	0.0	NA
trans 1,2-Dichloroethene (trans DCE)	8.5	7.8	8.6	NA
1,1-Dichloroethene (1,1-DCE	1.0	1.1	9.5	NA
Vinyl chloride	58	62	6.7	NA
1,4-Dichlorobenzene	**<0.20**	**0.21**	NA	<0.05

Boldface type values are less than 5 times the practical quantitation limit (PQL).
[a] The difference between duplicate results divided by the PQL is used to assess results if either the result is less than 5 times the PQL.
NA Not applicable.

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