enviros®

Prepared for:

Yard Birds Properties
Limited Partnership

Prepared by:

Enviros, Inc.
210 Marina Park Building
25 Central Way
Kirkland, Washington 98033-6156

5122

October 1994 Quarterly Groundwater Monitoring Report of the Yard Birds Property Olympia, Washington

November 4, 1994 ***E1/940109***

Table of Contents

Figures

Tables

1. INTRODUCTION

Enviros has been contracted by Yard Birds Properties Limited Partnership (Yard Birds) to perform groundwater monitoring at the Farmer's Market property located at 500 North Capital Way in Olympia, Washington (Figure 1). The groundwater monitoring is being performed as an interim measure prior to completing cleanup of contamination at the property in 1996. Site cleanup activities have been delayed to accommodate tenants of the Farmer's Market for the duration of their lease. Their business activities would be substantially disrupted by planned remediation activities.

Soil and groundwater contamination remains at the site and is believed to be the result of underground storage tank (UST) leaks and/or historical use of the site as a bulk fuel storage operation. In March, 1994, a 500-gallon heating oil tank was removed from the site and a 2,500-gallon gasoline tank was closed in-place underneath an onsite building. All work was performed according to guidelines set forth by the Washington Department of Ecology (Ecology) UST Program. Completed remediation measures at the site directed at source control include decommissioning of the two on-site USTs, removal of approximately 15 tons of diesel-contaminated soil and pump-out of diesel product in well MW-1 in the southwest corner of the Farmer's Market.

Prior to Enviros' involvement in the project, another environmental consult (ATEC) performed a Phase I Environmental Site Assessment (ESA) of the four block Yard Birds property including the Farmer's Market. Following that investigation, ATEC performed some preliminary soil and groundwater testing to assess potential contamination associated with the onsite USTs and historical property use.

The following quarterly groundwater monitoring report summarizes groundwater conditions at the Farmer's Market site for October 1994. The wells selected for groundwater compliance monitoring include: MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7.

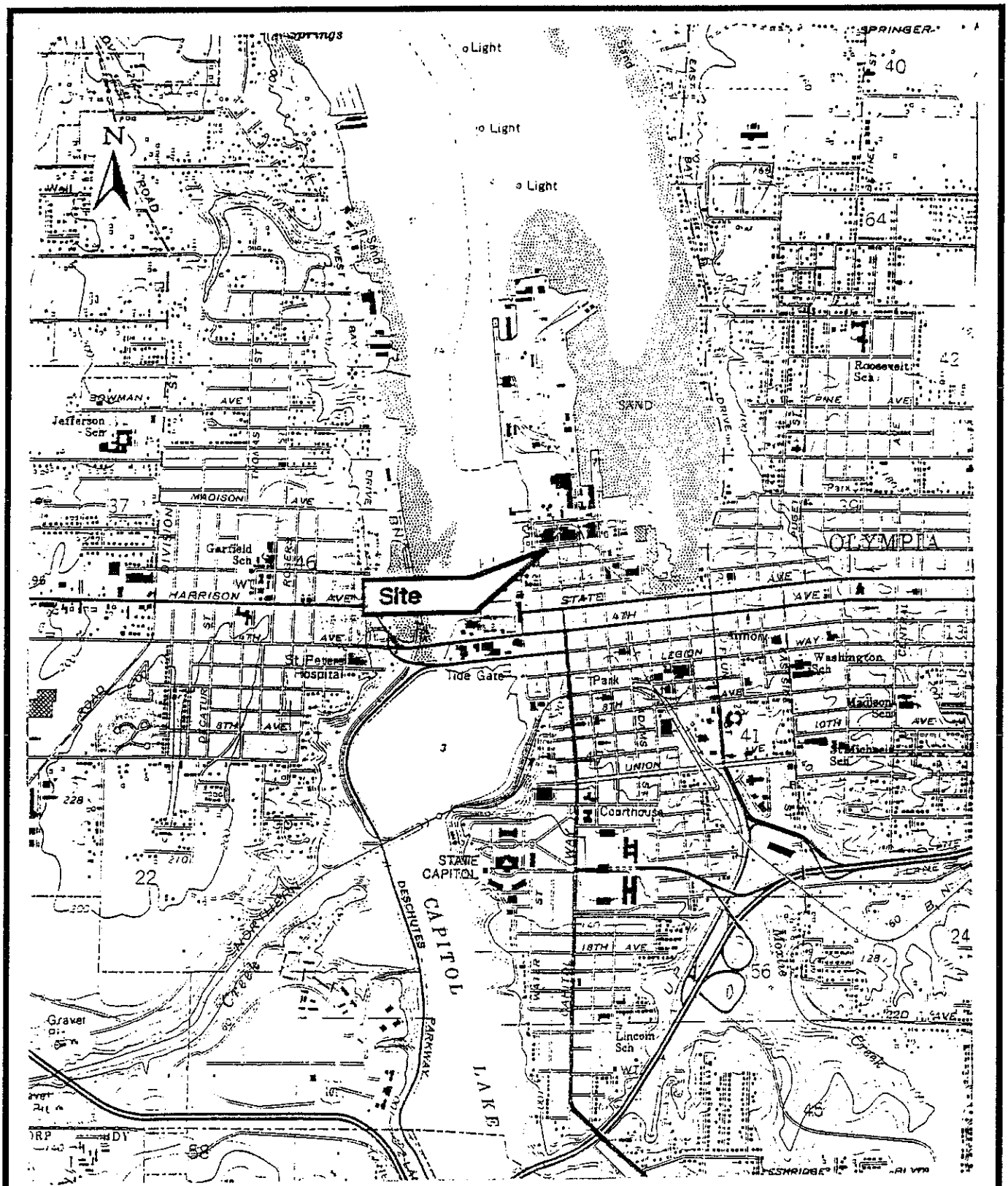
2. FIELD WORK AND METHODS

2.1 Field and Analytical Methods

On October 6, 1994, Trent Smith and Anastasia Speransky of Enviros were present on-site for groundwater sampling of monitoring wells MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7 (see Figure 2). Prior to purging, Enviros opened all the wells and conducted a round of water level measurements using an electronic well probe. The wells were also sounded to verify well construction data, and the probe was decontaminated between measurements to prevent any potential for cross-contamination.

Each well was purged by removing 3 to 5 well volumes of groundwater using a disposable teflon bailer. The bailed water was monitored for temperature, pH, turbidity, and conductivity during bailing, as recommended in Guidance for Site Checks and Site Assessments for Underground Storage Tanks (Ecology, 1992). Bailing continued until these parameters stabilized. Bailed water was placed in labeled, 55-gallon drums that were left on-site.

After well purging, the groundwater samples were collected for analysis of Washington total petroleum hydrocarbons as gasoline (WTPH-G), benzene, toluene, ethylbenzene, and xylenes (BTEX), and Washington total petroleum hydrocarbons as diesel (WTPH-D) extended range.

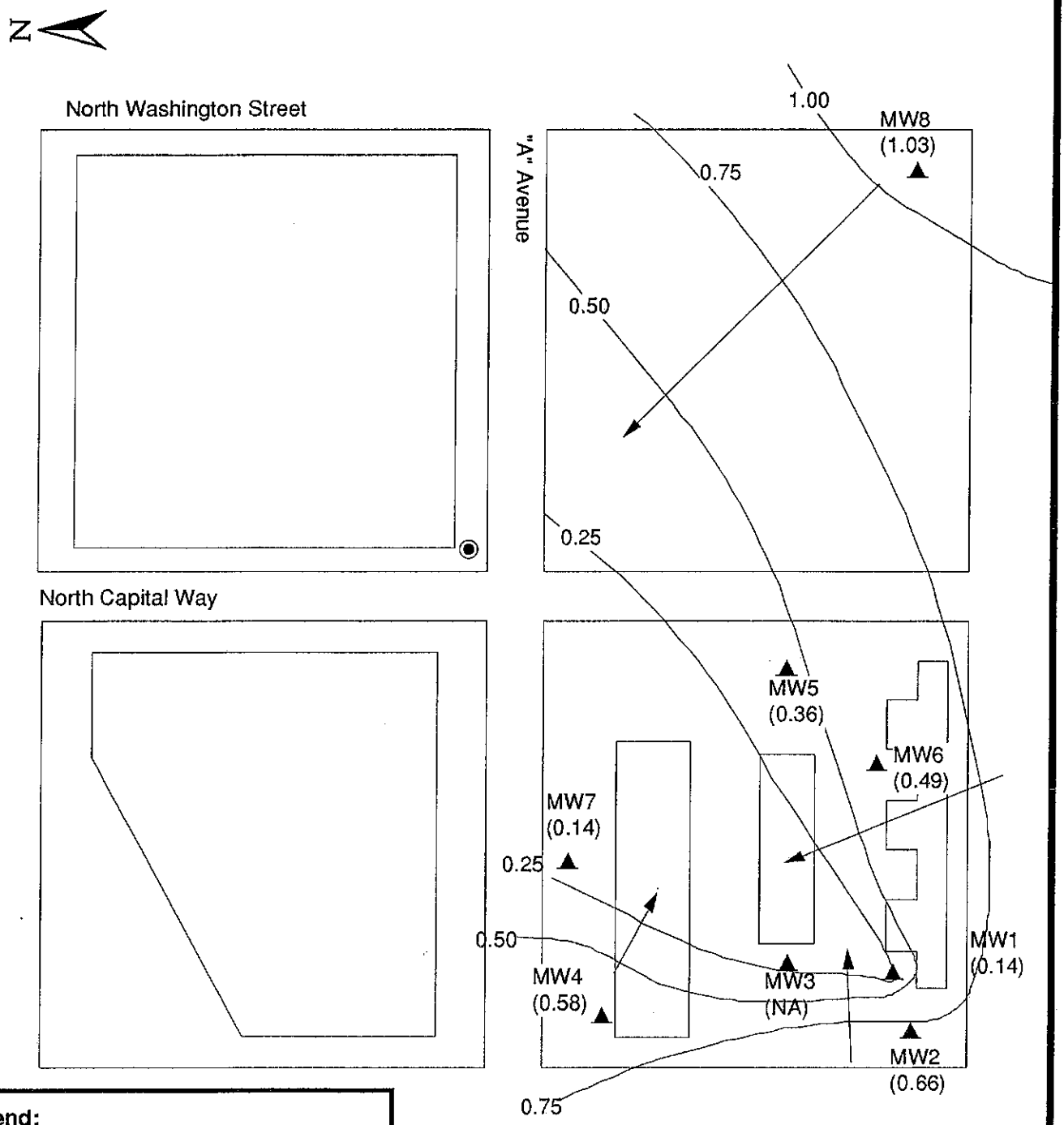


Scale: 1 in. = 2,000 ft. Source: U.S.G.S. 7.5-Minute Topographic Map of Tumwater, WA, dated 1981.

Figure 2. Vicinity Map of the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MSS Date: 11/4/94

enviros®
E1/940109.01



Legend:

▲ Monitoring Well with Elevation in Feet.

→ Estimated groundwater flow direction.

——1.0—— Groundwater Elevation Countour in feet

Approximate Scale: 1" = 100'

Figure 2. Groundwater Elevation Contour Map for Water Level Measurements Taken on October 6, 1994 at the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBS Date: 11/4/94

enviros®
E1/940109.01

2.2 Field Quality Control and Quality Assurance Procedures

For the WTPH-G/BTEX analysis, groundwater samples were poured into two volatile organic analysis glass vials, and for the WTPH-D analysis the groundwater was poured into one-liter, amber, glass bottles. The containers were sealed with a plastic, teflon-lined lids, and no air bubbles were noted in the bottles on inversion. Samples were then delivered to Onsite Environmental, Inc. in Redmond, Washington under standard chain-of-custody procedures.

Disposable bailers were used for sampling of all monitoring wells; therefore it was not necessary to decontaminate bailers. Sampling personnel wore latex gloves that were changed after each sample was collected.

A chain-of-custody was maintained from the time the containers were obtained from the laboratory until they were returned and the analyses were performed. Recorded sample information included: time and date of collection, sample identification number, analysis to be performed, preservative used, and special instructions as appropriate. The laboratory used internal precision and accuracy checks that are reported with the analytical results in Appendix A.

3. SITE GEOLOGY AND GROUNDWATER HYDROLOGY

3.1 Geology

The near-surface geology of the site is largely that of unconsolidated marine-dredged, shell-rich, sandy fill resting on an uneven pre-existing marginally marine ground surface. The marine fill appears to be as deep as 15 feet in the area of well MW-7. The underlying sediment generally consists of brown unconsolidated gravelly sand.

Reportedly, the City of Olympia graded a large quantity of soil on the Farmer's Market Block. No records are available on this activity. The grading of this area may obscure soil and groundwater conditions and trends.

3.2 Groundwater Hydrology

Based on groundwater data obtained to date, it appears that the groundwater flow direction is predominantly toward the east and northeast on the Farmers Market block, and towards the northwest on the block to the east of the Farmers Market (parking lot). An anamalously steep hydraulic gradient is present on the southwest corner of the Farmer's Market Block that may be attributed to grading and filling or an unknown subsurface structure. The geometry of the groundwater contours is consistent with a filled channel.

The subject property is located 200 feet west of Budd Inlet, (Puget Sound) suggesting that tidal influences could affect the water levels in onsite groundwater monitoring wells. Most of the groundwater elevation data, including 6-hour continuous monitoring results for well MW-3, appear to indicate a minimal tidal influence. However, groundwater elevation measurements collected in July 94 quarter indicated that onsite wells in the Farmer's Market could be influenced by extreme tides and large elevation changes between high and low tide. Groundwater elevation measurements collected in October 6, 1994, during a receding tide (+4.0 feet at low tide), were noticeably lower than any previous measurements and may reflect dry season groundwater conditions. Potential tidal effects and low groundwater elevations potentially associated with the dry season do not appear to change the basic configuration of the groundwater contours nor cause a flow direction reversal to occur.

Table 1. Groundwater Elevation Data.

Well Designation	Date of Measurement (time)	Approximate High/Low Tide	Top of Casing Elev. (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-1	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.32	6.75	0.57
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		6.66	0.66
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.35	0.97
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.16	1.16
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.21	1.11
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		7.06	0.26
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		7.18	0.14
MW-2	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.10	5.98	1.12
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		5.99	1.11
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.69	1.41
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.65	1.45
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.61	1.49
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.30	0.80
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		6.44	0.66
MW-3	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.19	6.11	1.08
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		6.08	1.11
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.80	1.39
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		Not Accessible	-
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.66	1.53
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		Not Accessible	-
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		Not Accessible	-
MW-4	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	6.99	8.06	-1.07
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		5.99	1.00
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.79	1.20
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.72	1.27
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.74	1.25
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.30	0.69
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		6.41	0.58

Table 1. Groundwater Elevation Data.

Well Designation	Date of Measurement (time)	Approximate High/Low Tide	Top of Casing Elev. (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-5	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.35	6.76	0.59
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.49	0.86
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.45	0.90
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.49	0.86
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.95	0.40
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		6.99	0.36
MW-6	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.44	6.70	0.74
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.42	1.02
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.40	1.04
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.40	1.04
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.89	0.65
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		6.95	0.49
MW-7	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.48	7.00	0.48
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.78	0.70
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.74	0.74
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.74	0.74
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		7.24	0.24
	10/6/94 (10:30 AM)	7:15 AM/1:10 PM		7.34	0.14
MW-8	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	6.72	5.65	1.07
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.21	1.51
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.18	1.54
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.16	1.56
	7/6/94 (11:30 AM)	3:30 am/11:11 AM		5.66	1.06
	10/6/94 (10:30AM)	7:15 AM/1:10 PM		5.69	1.03

Conventional chemistry data collected to date in onsite wells during well purging indicates that groundwater is generally brackish and mildly acidic, although both conductivity and pH measurements have been variable. Temperature and pH measurements obtained in October 94 were as follows: temperature ranged from 16.0 to 17.5° C and pH from 6.08 to 8.60. Instrument malfunction prevented collection of conductivity readings at the time of sampling on October 6, 1994. Instrument malfunction may have also caused some of the pH measurements to be slightly basic, since elevated pH is not believed to be representative of onsite groundwater conditions.

Water elevation measurements obtained by Enviros are included above in Table 1. The elevations have been normalized to a relative a datum of 10 feet assigned to a fire hydrant used

as a benchmark when the wells were surveyed. Table 1 summarizes all water level data obtained to date. Figure 2 illustrates the groundwater elevation contours for October 1994.

4. QUARTERLY GROUNDWATER ANALYTICAL SAMPLING RESULTS

Samples were collected from wells MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7 for groundwater analysis. Analytical testing methods included WTPH-G and BTEX (EPA Method 602). In addition, WTPH-D was analyzed in all well water samples. Tabulated analytical results from the previous and most recent sampling events are provided in Table 2.

Table 2: Groundwater Analytical Results

Sample Name and Sampling Date	WTPH-G (ppb)	Benzene (ppb)	Ethyl-benzene (ppb)	Toluene (ppb)	Xylenes (ppb)	WTPH-D (ppb)	418.1 (ppb)
MW-1							
11/04/93	**1,100**	**6.4**	3.0	<0.5	<1.0	**18,000**	NA
02/07/94	<300	<1.0	<1.0	<1.0	<2.0	**280,000**	**2,600,000**
07/06/94	**180,000***	<1.0	<1.0	<1.0	<2.0	**1,900,000**	NA
10/06/94	**3,200**	**17**	5.4	2.2	12	**10,000**[1,y]	NA
MW-2							
11/04/93	<50	<0.5	<0.5	<0.5	<1.0	<250	NA
02/07/94	<300	<1.0	<1.0	<1.0	2.21	900	NA
07/06/94	<300	<1.0	<1.0	<1.0	<2.0	710	NA
10/06/94	<300	<1.0	<1.0	<1.0	<2.0	<500[1]	NA
MW-4							
11/04/93	170	1.5	3.3	<0.5	**25**	**2100**	NA
02/07/94	**6200**	**140**	**530**	**210**	**1440**	<500	NA
07/06/94	**2200**	**57**	**130**	2.4	**285**	**1400**	NA
10/06/94	<300	**26**	5.6	<1.0	12	<500[1]	NA
MW-5							
02/07/94	<300	**11**	1.6	1.3	3.0	890	<500
07/06/94	<300	2.1	2.4	<1.0	2.5	**1300**	NA
10/06/94	<300	**12**	<1.0	<1.0	2.2	77[1]	NA
MW-6							
02/07/94	720	**51**	3.1	3.2	9.3	860	**1,200**
07/06/94	800	**41**	3.3	8.5	5.8	**1100**	NA
10/06/94	490	**15**	<1.0	<1.0	4.8	59[1]	NA
MW-7							
02/07/94	<300	<1.0	2.3	1.5	14.8	<500	<500
07/06/94	<300	<1.0	<1.0	<1.0	<2.0	<500	NA
10/06/94	<300	<1.0	<1.0	<1.0	<2.0	<500[1]	NA
MTCA Method A Cleanup Level	1000	5	30	40	20	1000	1000

ppb = parts per billion Concentrations printed in bold are elevated above MTCA Method A cleanup levels for groundwater.
ND = None detected at or above the analytical method detection limit NA = Not Analyzed
1 = contaminant detected in laboratory blank * No gas present, heavier range petroleum hydrocarbons (diesel) are elevating the gas result. 1 = Quantitated from C12-C30 as diesel fuel #2
y = Free product present in the sample

4.1 Gasoline Contamination

In general, the groundwater sampling results appear to indicate that site-wide concentrations of gasoline constituents are decreasing. Gasoline constituent concentrations near the source area, (well MW-4 adjacent to the decommissioned gasoline UST) have decreased to below MTCA groundwater cleanup levels for all contaminants except benzene. The benzene concentration of 26 ppb is still above the MTCA cleanup level of 5 ppb, but is down from 57 ppb measured during the previous quarterly sampling.

Downgradient well MW-5, which previously had non-detectable gasoline constituent concentrations or levels which were below Ecology cleanup standards, has a slightly elevated benzene concentration of 12 ppb compared to the 5 ppb cleanup level. At the low concentration being measured, the slightly elevated concentration of benzene may reflect system or sampler variability rather than a true increase in concentration.

All gasoline contaminant concentrations in down-gradient well MW-6 have decreased since the previous quarterly sampling episode. Concentrations of benzene in well MW-6 have dropped from 41 ppb to 15 ppb.

Analytical results from product-containing well MW-1 appear to indicate the presence of gasoline contamination above MTCA groundwater cleanup levels. In particular, WTPH-G was present at 3200 ppb and benzene was detected at 17 ppb. Similar concentrations were detected in well MW-1 in November 1993, but not in more recent sampling episodes. It is possible that varying quality or impurities in the predominantly diesel-type product present in the well may be elevating gasoline constituent concentrations.

Downgradient well MW-7 and upgradient well MW-2 have non-detectable WTPH-G and BTEX constituent concentrations as in the previous quarterly sampling event.

Collectively, the analytical results for gasoline contaminants appear to indicate that UST decommissioning performed to control contamination source releases has been effective. Continued reduction in gasoline contaminant concentrations is expected.

4.2 Diesel Contamination

During groundwater sampling, 3-inches of diesel-type product was observed in well MW-1. Previously, product thickness measurements in this well have ranged from a sheen measured shortly after installation of the well, to 4-inches of product during quarterly sampling performed July 6, 1994.

WTPH-D concentrations in wells MW-4, MW-5 and MW-6 have dropped below the groundwater cleanup level of 1000 ppb compared to the results of the previous groundwater sampling episode. Groundwater results for wells MW-2 and MW-7 yielded no detectable diesel concentrations. Based on the current sampling results, only well MW-1 still contains diesel contamination (product) above the MTCA groundwater cleanup level.

It should also be noted that the groundwater chemical data is consistent with hydraulic head measurements and the suspected presence of some anomalous subsurface feature in the area of well MW-1 and MW-2. While diesel product continues to be observed in well MW-1, upgradient well MW-2 located just 30 feet to the southwest had no product and the WTPH-D concentration is below the method detection limit.

5. SUMMARY

Quarterly groundwater sampling was performed on October 6, 1994 at the Farmer's Market site located approximately at 500 North Capital Way, Olympia, Washington. Groundwater elevation measurements indicate no changes in the predominant groundwater flow direction since the last sampling event. However, water elevations were depressed, potentially indicating a dry season low water table condition.

The concentrations of WTPH-G and BTEX gasoline contaminants have decreased in all sampled monitoring wells since the last sampling event except for wells MW-1 and MW-5 where benzene concentrations have increased slightly. These slight increases may be due to natural variability in groundwater and/or product composition.

WTPH-D concentrations have decreased below Ecology groundwater TPH cleanup levels in all wells except MW-1 where three inches of product was measured.

Limitations

No warranty is expressly stated or implied in this report with regard to the condition of the substrate and groundwater at and/or below the surface of the property with the exception of the samples collected and parameters analyzed in this assessment. Due to natural variability of the soil matrix and subsurface geologic and hydrogeologic conditions, the limited sampling performed at the site may not be indicative of general site conditions and potential soil contamination in other areas of the property. Therefore, Enviros cannot guarantee the general conditions of subsurface soils on the property or specify an absence of contamination in potential soil sampling locations not addressed in this assessment.

This report reflects our professional opinions, interpretations, recommendations and observations of property conditions on the days of the assessment only, and does not cover any other conditions subsequently found on the property that were not visible during the assessment.

The findings and conclusions documented in this report have been prepared in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the Exhibit and General Services Agreement executed between Enviros and Client.

Any questions regarding this report should be directed to Mike Surowiec at the phone number specified below.

Respectfully Submitted,

Enviros Incorporated

A. Sp - (Speransky)

Anastasia Speransky
Geologist
(206) 828-2515

Michael S. Surowiec, P.G., P.E.
Associate Geoenvironmental Engineer
(206) 828-2506

enviros®

Prepared for:

Yard Birds Properties
Limited Partnership

Prepared by:

Enviros, Inc.
210 Marina Park Building
25 Central Way
Kirkland, Washington 98033

6122

July 1994 Quarterly Groundwater Monitoring Report of the Yard Birds Property Olympia, Washington

August 23, 1994 ***E1/940109.01***

Table of Contents

Figures

Tables

1. INTRODUCTION

Enviros has been contracted by Yard Birds Properties Limited Partnership (Yard Birds) to perform groundwater monitoring at the Farmer's Market property located at 500 North Capital Way in Olympia, Washington (Figure 1). The groundwater monitoring is being performed as an interim measure prior to completing cleanup of contamination at the property in 1996. Site cleanup activities have been delayed to accommodate tenants of the Farmer's Market for the duration of their lease. Their business activities would be substantially disrupted by planned remediation activities.

Soil and groundwater contamination remains at the site and is believed to be the result of underground storage tank (UST) leaks and/or historical use of the site as a bulk fuel storage operation. In March, 1994, a 500-gallon heating oil tank was removed from the site and a 2,500-gallon gasoline tank was closed in-place underneath an onsite building. All work was performed according to guidelines set forth by the Washington Department of Ecology (Ecology) UST Program. Completed remediation measures at the site directed at source control include decommissioning of the two on-site USTs, removal of approximately 15 tons of diesel-contaminated soil and pump-out of diesel product in well MW-1 in the southwest corner of the Farmer's Market.

Prior to Enviros' involvement in the project, another environmental consult (ATEC) performed a Phase I Environmental Site Assessment (ESA) of the four block Yard Birds property including the Farmer's Market. Following that investigation, ATEC performed some preliminary soil and groundwater testing to assess potential contamination associated with the onsite USTs and historical property use.

The following quarterly groundwater monitoring report summarizes groundwater conditions at the Farmer's Market site for July 1994. The wells selected for groundwater compliance monitoring include: MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7.

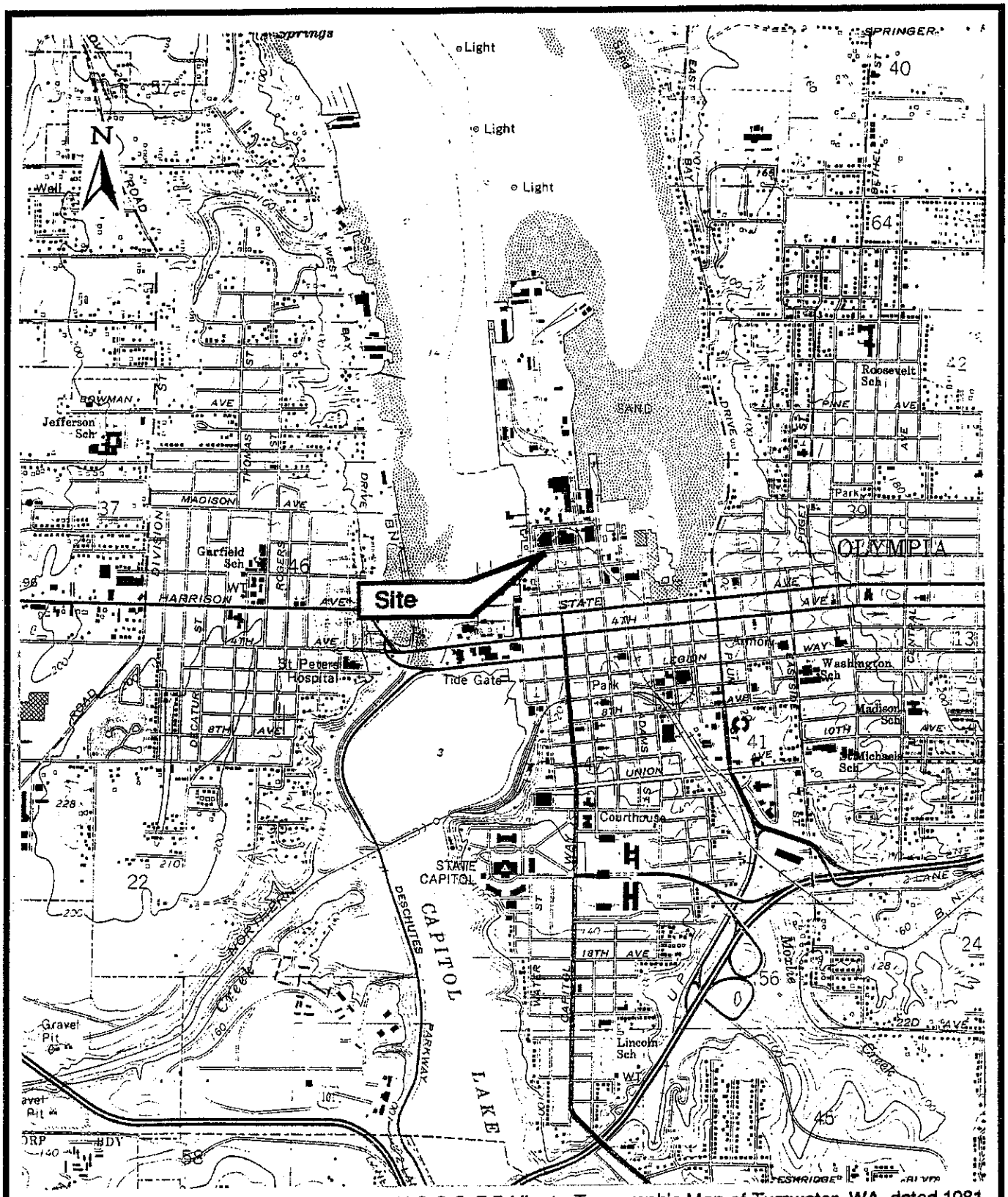
2. FIELD WORK AND METHODS

2.1 Field and Analytical Methods

On July 6, 1994, Mr. Michael Surowiec of Enviros was present on-site for groundwater sampling of monitoring wells MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7 (see Figure 2). Prior to purging, Enviros opened all the wells and conducted a round of water level measurements using an electronic well probe. The wells were also sounded to verify well construction data, and the probe was decontaminated between measurements to prevent any potential for cross-contamination.

Each well was purged by removing 3 to 5 well volumes of groundwater using a disposable teflon bailer. The bailed water was monitored for temperature, pH, turbidity, and conductivity during bailing, as recommended in Guidance for Site Checks and Site Assessments for Underground Storage Tanks (Ecology, 1992). Bailing continued until these parameters stabilized. Bailed water was placed in labeled, 55-gallon drums that were left on-site.

After well purging, the groundwater samples were collected for analysis of Washington total petroleum hydrocarbons as gasoline (WTPH-G), benzene, toluene, ethylbenzene, and xylenes (BTEX), and Washington total petroleum hydrocarbons as diesel (WTPH-D) extended range.

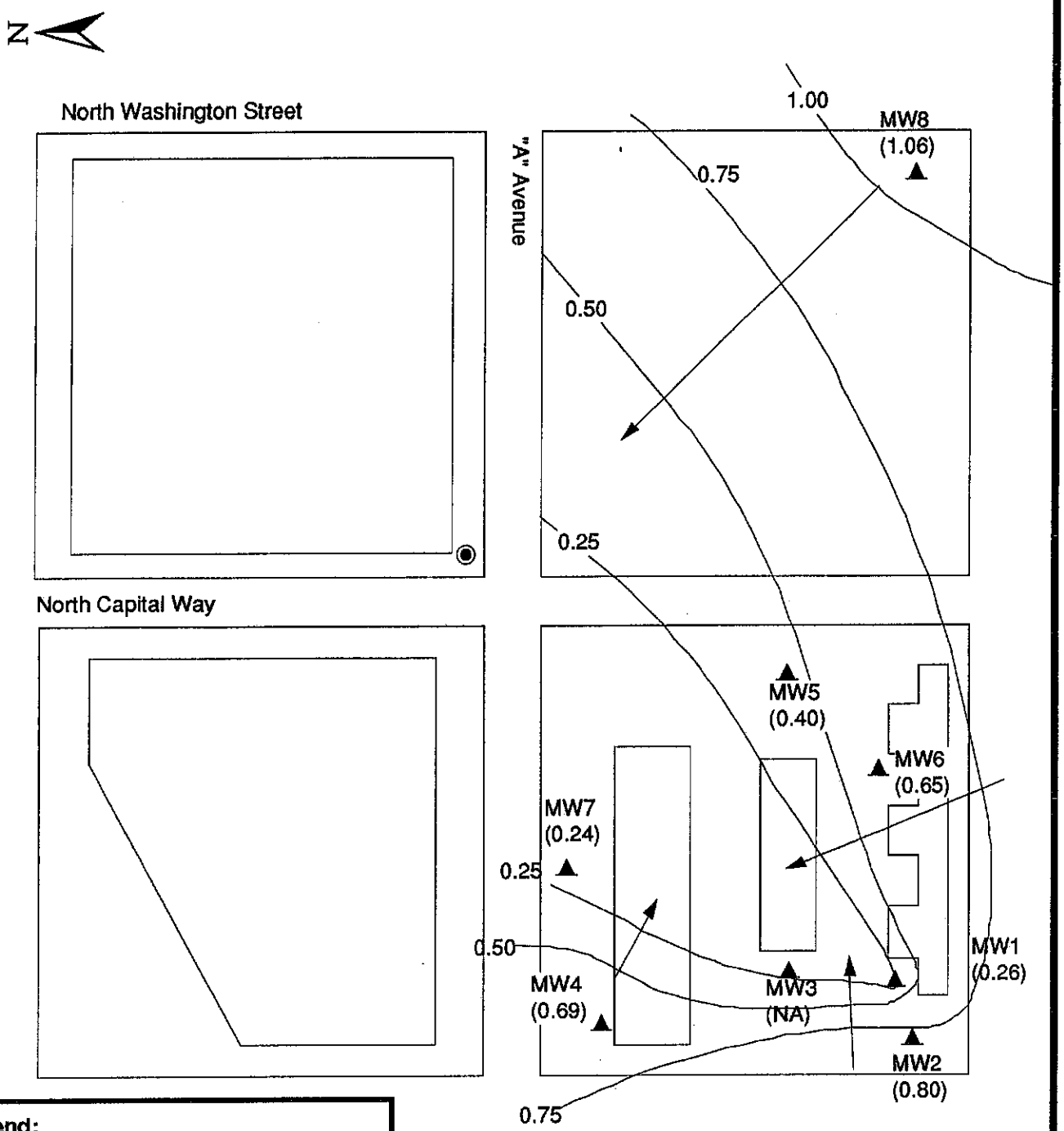


Scale: 1 in. = 2,000 ft. Source: U.S.G.S. 7.5-Minute Topographic Map of Tumwater, WA, dated 1981.

Figure 1. Vicinity Map of the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: [illegible] Date: 8/23/94

enviros®
E1/940109.01



Legend:

▲ Monitoring Well with Elevation in Feet.

→ Estimated groundwater flow direction.

——1.0—— Groundwater Elevation Countour in feet

Approximate Scale: 1" = 100'

Figure 2. Groundwater Elevation Contour Map for Water Level Measurements Taken on July 6, 1994 at the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBB Date: 8/23/94

enviros®
E1/940109.01

2.2 Field Quality Control and Quality Assurance Procedures

For the WTPH-G/BTEX analysis, groundwater samples were poured into two volatile organic analysis glass vials, and for the WTPH-D analysis the groundwater was poured into one-liter, amber, glass bottles. The containers were sealed with a plastic, teflon-lined lids, and no air bubbles were noted in the bottles on inversion. Samples were then delivered to Onsite Environmental, Inc. in Redmond, Washington under standard chain-of-custody procedures.

Disposable bailers were used for sampling of all monitoring wells; therefore it was not necessary to decontaminate bailers. Sampling personnel wore latex gloves that were changed after each sample was collected.

A chain-of-custody was maintained from the time the containers were obtained from the laboratory until they were returned and the analyses were performed. Recorded sample information included: time and date of collection, sample identification number, analysis to be performed, preservative used, and special instructions as appropriate. The laboratory used internal precision and accuracy checks that are reported with the analytical results in Appendix A.

3. SITE GEOLOGY AND GROUNDWATER HYDROLOGY

3.1 Geology

The near-surface geology of the site is largely that of unconsolidated marine-dredged, shell-rich, sandy fill resting on an uneven pre-existing marginally marine ground surface. The marine fill appears to be as deep as 15 feet in the area of well MW-7. The underlying sediment generally consists of brown unconsolidated gravelly sand.

Reportedly, the City of Olympia graded a large quantity of soil on the Farmer's Market Block. No records are available on this activity. The grading of this area may obscure soil and groundwater conditions and trends.

3.2 Groundwater Hydrology

Based on groundwater data obtained to date, it appears that the groundwater flow direction is predominantly toward the east and northeast on the Farmers Market block, and towards the northwest on the block to the east of the Farmers Market (parking lot). An anamalously steep hydraulic gradient is present on the southwest corner of the Farmer's Market Block that may be attributed to grading and filling or an unknown subsurface structure. The geometry of the groundwater contours is consistent with a filled channel.

The subject property is located 200 feet west of Budd Inlet, (Puget Sound) suggesting that tidal influences could affect the water levels in onsite groundwater monitoring wells. Most of the groundwater elevation data, including 6-hour continuous monitoring results for well MW-3, appear to indicate a minimal tidal influence. However, the most recent groundwater elevation measurements collected July 6, 1994 during a -1.0 low tide were noticeably lower than any measurements collected to date. This may indicate that onsite wells in the Farmer's Market are influenced by extreme tides and large elevation changes between high and low tide. These tidal effects do not appear to change the basic configuration of the groundwater contours nor cause a flow direction reversal to occur.

Table 1. Groundwater Elevation Data.

Well Designation	Date of Measurement (time)	Approximate High/Low Tide	Top of Casing Elev. (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-1	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.32	6.75	0.57
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		6.66	0.66
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.35	0.97
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.16	1.16
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.21	1.11
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		7.06	0.26
MW-2	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.10	5.98	1.12
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		5.99	1.11
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.69	1.41
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.65	1.45
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.61	1.49
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.30	0.80
MW-3	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	7.19	6.11	1.08
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		6.08	1.11
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.80	1.39
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		Not Accessible	-
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.66	1.53
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		Not Accessible	-
MW-4	1/31/94 (11:00 AM)	8:12 AM/2:49 PM	6.99	8.06	-1.07
	2/4/94 (10:00 AM)	5:19 AM/11:21 AM		5.99	1.00
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.79	1.20
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.72	1.27
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.74	1.25
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.30	0.69

Table 1. Groundwater Elevation Data.

Well Designation	Date of Measurement (time)	Approximate High/Low Tide	Top of Casing Elev. (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-5	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.35	6.76	0.59
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.49	0.86
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.45	0.90
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.49	0.86
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.95	0.40
MW-6	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.44	6.70	0.74
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.42	1.02
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.40	1.04
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.40	1.04
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		6.89	0.65
MW-7	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	7.48	7.00	0.48
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		6.78	0.70
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		6.74	0.74
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		6.74	0.74
	7/6/94 (11:30 AM)	3:30 AM/11:11 AM		7.24	0.24
MW-8	2/4/94 (10:00 AM)	5:19 AM/11:21 AM	6.72	5.65	1.07
	3/21/94 (8:30 AM)	11:13 AM/6:45 AM		5.21	1.51
	3/22/94 (9:00 AM)	12:29 PM/7:58 AM		5.18	1.54
	3/23/94 (9:00 AM)	1:42 PM/8:53 AM		5.16	1.56
	7/6/94 (11:30 AM)	3:30 am/11:11 AM		5.66	1.06

Conventional chemistry data collected in onsite wells during well purging indicates that groundwater is brackish and mildly acidic. Final temperature, conductivity and pH measurements obtained in July, 94 were as follows: temperature ranged from 16.1 to 16.9° C; conductivity ranged from 4450 to 13,250 µS; and pH was mildly acidic ranging from 6.08 to 6.45. The higher conductivity measurements were generally found in the wells on the west side of the Farmer's Market, closest to the waterfront.

Water elevation measurements obtained by Enviros are included above in Table 1. The elevations have been normalized to a relative a datum of 10 feet assigned to a fire hydrant used as a benchmark when the wells were surveyed. Table 1 summarizes all water level data obtained to date. Figure 2 illustrates the groundwater elevation contours for July, 1994.

4. QUARTERLY GROUNDWATER ANALYTICAL SAMPLING RESULTS

Samples were collected from wells MW-1, MW-2, MW-4, MW-5, MW-6 and MW-7 for groundwater analysis. Analytical testing methods included WTPH-G and BTEX (EPA Method 602). In addition,WTPH-D was analyzed in all well water samples. Tabulated analytical results from the previous and most recent sampling events are provided in Table 2.

Table 2: Groundwater Analytical Results

Sample Name and Sampling Date	WTPH-G (ppb)	Benzene (ppb)	Ethyl-benzene (ppb)	Toluene (ppb)	Xylenes (ppb)	WTPH-D (ppb)	418.1 (ppb)
MW-1							
11/04/93	**1,100**	**6.4**	3.0	<0.5	<1.0	**18,000**	NA
02/07/94	<300	<1.0	<1.0	<1.0	<2.0	**280,000**	**2,600,000**
07/06/94	**180,000***	<1.0	<1.0	<1.0	<2.0	**1,900,000**	NA
MW-2							
11/04/93	<50	<0.5	<0.5	<0.5	<1.0	<250	NA
02/07/94	<300	<1.0	<1.0	<1.0	2.21	900	NA
07/06/94	<300	<1.0	<1.0	<1.0	<2.0	710	NA
MW-4							
11/04/93	170	1.5	3.3	<0.5	**25**	**2100**	NA
02/07/94	**6200**	**140**	**530**	**210**	**1440**	<500	NA
07/06/94	**2200**	**57**	**130**	2.4	**285**	**1400**	NA
MW-5							
02/07/94	<300	**11**	1.6	1.3	3.0	890	<500
07/06/94	<300	2.1	2.4	<1.0	2.5	**1300**	NA
MW-6							
02/07/94	720	**51**	3.1	3.2	9.3	860	**1,200**
07/06/94	800	**41**	3.3	8.5	5.8	**1100**	NA
MW-7							
02/07/94	<300	<1.0	2.3	1.5	14.8	<500	<500
07/06/94	<300	<1.0	<1.0	<1.0	<2.0	<500	NA
MTCA Method A Cleanup Level	1000	5	30	40	20	1000	1000

ppb = parts per billion Concentrations printed in bold are elevated above MTCA Method A cleanup levels for groundwater.
ND = None detected at or above the analytical method detection limit NA = Not Analyzed
1 = contaminant detected in laboratory blank * No gas present, heavier range petroleum hydrocarbons (diesel) are elevating the gas result.

In general, the groundwater sampling results appear to indicate that site-wide concentrations of gasoline constituents are decreasing. Gasoline constituent concentrations near the source area, (well MW-4 adjacent to the decommissioned gasoline UST) are still above Ecology cleanup levels but have dropped by a factor of three or more. Downgradient wells MW-5 and MW-7, which previously were contaminated by gasoline, now have either non-detectable gasoline constituent concentrations or levels which are below Ecology cleanup standards for WTPH-G and BTEX. Concentrations of benzene in down-gradient well MW-6 have also dropped from 51 ppb to 41 ppb. Collectively, these observations appear to indicate that UST decommissioning performed to control contamination source releases has been effective. Continued reduction in gasoline contaminant concentrations is expected.

In contrast, contamination from diesel-range product appears to be increasing slightly in wells MW-4, MW-5 and MW-6 as compared to earlier sampling results. Also, during groundwater sampling, 4-inches of diesel-type product was observed in well MW-1. Previously, product thickness measurements in this well have ranged from a sheen measured shortly after installation of the well, to 3-inches of product during tank decommissioning work performed March 23, 1994.

Based on these observations, diesel product in the area of MW-1 appears to be the source of diesel contamination in wells MW-5 and MW-6. WTPH-D concentrations in wells MW-5 and MW-6 are 1300 ppb and 1100 ppb, respectively, which are slightly above the Ecology cleanup level of TPH of 1000 ppb. The presence of diesel contamination in well MW-4 is somewhat anomalous since the well appears to be upgradient and spatially removed from of the source area at MW-1. Future sampling may clarify whether the slightly elevated concentration of 1400 ppb WTPH-D in that well is a real and significant result.

It should also be noted that the groundwater chemical data is consistent with hydraulic head measurements and the suspected presence of some anomalous subsurface feature in the area of well MW-1 and MW-2. While 4-inches of diesel product were observed in well MW-1, upgradient well MW-2 located just 30 feet to the southwest had no product and only a residual WTPH-D concentration of 720 ppb which is below the Ecology groundwater cleanup level of 1000 ppb.

5. SUMMARY

Quarterly groundwater sampling was performed at the Farmer's Market site located approximately at 500 North Capital Way, Olympia, Washington. The concentrations of WTPH-G and BTEX gasoline contaminants have decreased in all monitoring wells since the last sampling event. This probably indicates that the contaminant plume that was centered over the decommissioned gasoline UST is gradually dissipating. This should be corroborated by further quarterly groundwater monitoring.

In contrast, WTPH-D contamination appears to have increased slightly above Ecology TPH cleanup levels of 1000 ppb in wells MW-4, MW-5 and MW-6 compared to previous sampling results. Four inches of product was measured in well MW-1, the suspected source area of diesel contamination in down-gradient wells MW-5 and MW-6. The presence of diesel contamination in well MW-4 appears anomalous since the well is upgradient and spatially removed from the source area at MW-1. Continued quarterly groundwater sampling will be used to monitor the diesel contaminant plume and assess the significance of uncertain diesel concentrations in well MW-4.

Limitations

No warranty is expressly stated or implied in this report with regard to the condition of the substrate and groundwater at and/or below the surface of the property with the exception of the samples collected and parameters analyzed in this assessment. Due to natural variability of the soil matrix and subsurface geologic and hydrogeologic conditions, the limited sampling performed at the site may not be indicative of general site conditions and potential soil contamination in other areas of the property. Therefore, Enviros cannot guarantee the general conditions of subsurface soils on the property or specify an absence of contamination in potential soil sampling locations not addressed in this assessment.

This report reflects our professional opinions, interpretations, recommendations and observations of property conditions on the days of the assessment only, and does not cover any other conditions subsequently found on the property that were not visible during the assessment.

The findings and conclusions documented in this report have been prepared in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the Exhibit and General Services Agreement executed between Enviros and Client.

Any questions regarding this report should be directed to Mike Surowiec at the phone number specified below.

Respectfully Submitted,

Enviros, Incorporated

Michael S. Surowiec, P.G., P.E.
Associate Geoenvironmental Engineer
(206) 828-2506

enviros®

Prepared for:

Yard Birds Properties
Limited Partnership

Prepared by:

Enviros, Inc.
210 Marina Park Building
25 Central Way
Kirkland, Washington 98033

~~1010~~ SK
~~5600~~ 5122

Environmental Site Assessment Final Report of the Yard Birds Property Olympia, Washington

June 1, 1994 *E1/940109.01*

Table of Contents

TABLES:

APPENDICES:

EXECUTIVE SUMMARY

Of the four blocks involved in the environmental assessment and property transfer process, three of the blocks (all except the Farmer's Market block) have achieved substantial closure or resolution of environmental concerns. Remaining environmental concerns on the Farmer's Market have been addressed by thorough site characterization and implementation of preliminary remediation measures directed at source control. Completed remediation measures include decommission of the two on-site USTs, removal of approximately 15 tons of diesel-contaminated soil and pump-out of diesel product in a well in the southwest corner of the Farmer's Market.

The results from the soil testing indicated that contamination in the Farmer's Market block was less widespread than initially suspected based on non-detectable contaminant concentrations for soil samples collected by Enviros. It was also discovered that contamination trends may have been obscured by excavation and site grading activities conducted approximately 10 years ago by the City of Olympia in preparation of construction of the Farmer's Market.

Groundwater assessment results indicated that water flows from the west and south toward the northeast and that a very steep groundwater gradient exists at the southwestern end of the Farmer's Market. Groundwater transport may be quite rapid in this area based on the steep gradient and the sandy soil/fill conditions on the site. Changes in groundwater elevations with respect to tides monitored over an 8 hour period appeared minimal even though Puget Sound (Budd Inlet) is located approximately 200 feet west of the Farmer's Market.

Floating petroleum hydrocarbon product was observed in a well within the Farmer's Market and diesel contaminant concentrations were above Ecology cleanup levels. Gasoline contamination above Ecology cleanup levels was also observed in the well adjacent to the gasoline UST of the Treasure Chest and in one down-gradient well.

The results of sampling on the north end of the Farmer's Market block indicated that the gasoline contamination was likely attributable to the former operation of the gasoline UST in the Treasure Chest building. The contamination in this area of the property also appeared to be limited to gasoline contaminants since no heavy oil or diesel contamination was detected in the groundwater. Soil samples collected immediately adjacent to the tank had gasoline contaminant concentrations well above Ecology soil cleanup levels. The total volume of remaining contaminated soil in this area is estimated to be 230 cubic yards and appears to localized around the groundwater table boundary.

The results of sampling on the south end of the Farmer's Market block indicated that diesel product contamination might be attributable to former operation of the heating fuel (diesel) UST adjacent to the Warehouse building, and/or historical operation of a bulk fuel transfer/storage facility on the south end of the block. Contamination on the west end of the Farmer's Market area appeared to be limited to diesel contaminants since no gasoline constituents were detected in the groundwater. Contamination on the east end of the Farmer's Market area near North Capital Way appeared to be a mixture of diesel and gasoline.

The total volume of remaining contaminated soil in the Farmer's Market area is not accurately known but may range from 405 to 810 cubic yards depending on the actual thickness of the contamination which appears to be localized around the groundwater table boundary. Based on available field data and observations, the thickness of contaminated soil in the Farmer's Market appears to be approximately 2 feet and the lateral extent may cover an area of approximately 11,000 square feet. There also appears to be a substantial overburden of non-contaminated soils resting above the contamination zone which may be related to historical site grading activities.

In addition to tank decommissioning activities, the well in the Farmer's Market that contained floating diesel product was pumped down several times during the course of field activities to remove product. Product and oily water was disposed by vacuum truck. The product was observed to recharge into the well on collection of subsequent groundwater measurements. The estimated volume of product is very approximate and may range from 3100 to 4600 gallons assuming a 2 to 3 -inch product layer, an affected area of 110 by 75 feet and a soil porosity of 0.30 (30%).

1.0 INTRODUCTION

Enviros was contracted by the Yard Birds Properties Limited Partnership (Yard Birds) to perform assessment of soil and groundwater at the Yard Birds property. As a result of the assessment, Enviros supervised the decommissioning of a 500-gallon heating oil tank located on the west end of the warehouse on the Farmers Market block, and the in-place closure of a 2,500-gallon gasoline tank underneath the Treasure Chest building. Enviros conducted a site assessment according to guidelines set by the Washington Department of Ecology (Ecology) UST Program. The Yard Bird's property is located at 500 North Capital Way in Olympia, Washington (Figure 1).

2.0 PREVIOUS ENVIRONMENTAL WORK

2.1 Phase I Environmental Site Assessment (ESA)

Prior to Enviros' involvement in the project, another environmental consult (ATEC) performed a Phase I Environmental Site Assessment (ESA) of the four block Yard Birds property. The findings from that investigation revealed the presence of two out-of-service underground storage tanks (USTs) and historical operation of a bulk fuel transfer/storage terminal by Associated Oil and/or Tidewater Oil Company on the Farmer Market block of the property. One of the USTs is located underneath the Treasure Chest Building and formerly contained gasoline product. The other UST is located outside and just west of the warehouse building and formerly contained heating fuel.

Another concern identified in the Phase I ESA was the reported presence of asbestos-containing materials in buildings on the block north of the Farmer's Market. A full asbestos survey has been conducted by Prezant Associates of the entire 4-block area and is available under separate cover. Off-site concerns identified in the Phase I ESA included a gasoline and fuel oil distributor (Unocal) with an aboveground storage tank farm 100 feet southwest of the Farmer's Market and a former bulk fuel transfer facility on the block just north of B Avenue.

2.2 Phase II ESA

A Phase II ESA was conducted by ATEC following the initial investigation to evaluate soil and groundwater conditions on the Farmer's Market block. The scope of work included installation of four shallow groundwater monitoring wells and groundwater sampling in six locations through a temporary soil vapor probe adapted for shallow groundwater sampling. The depth to groundwater was determined to be approximately 5 to 7 feet below ground surface, but groundwater flow direction was not determined.

Sampling locations were biased to the two on-site USTs and the former bulk fuel transfer/storage operation on the south end of the Farmer's Market block. The results of their investigation revealed groundwater contamination by gasoline, diesel and heavy oil above Ecology groundwater cleanup levels. Soil contamination was also noted in a well boring within the Farmer's Market, but the concentration was not quantified. The gasoline contamination was found primarily in the area of the UST located within the Treasure Chest and the heavy oil/diesel contamination was found in the Farmer's Market. Free oil was discovered in a temporary probe sample collected within the Farmer's Market.

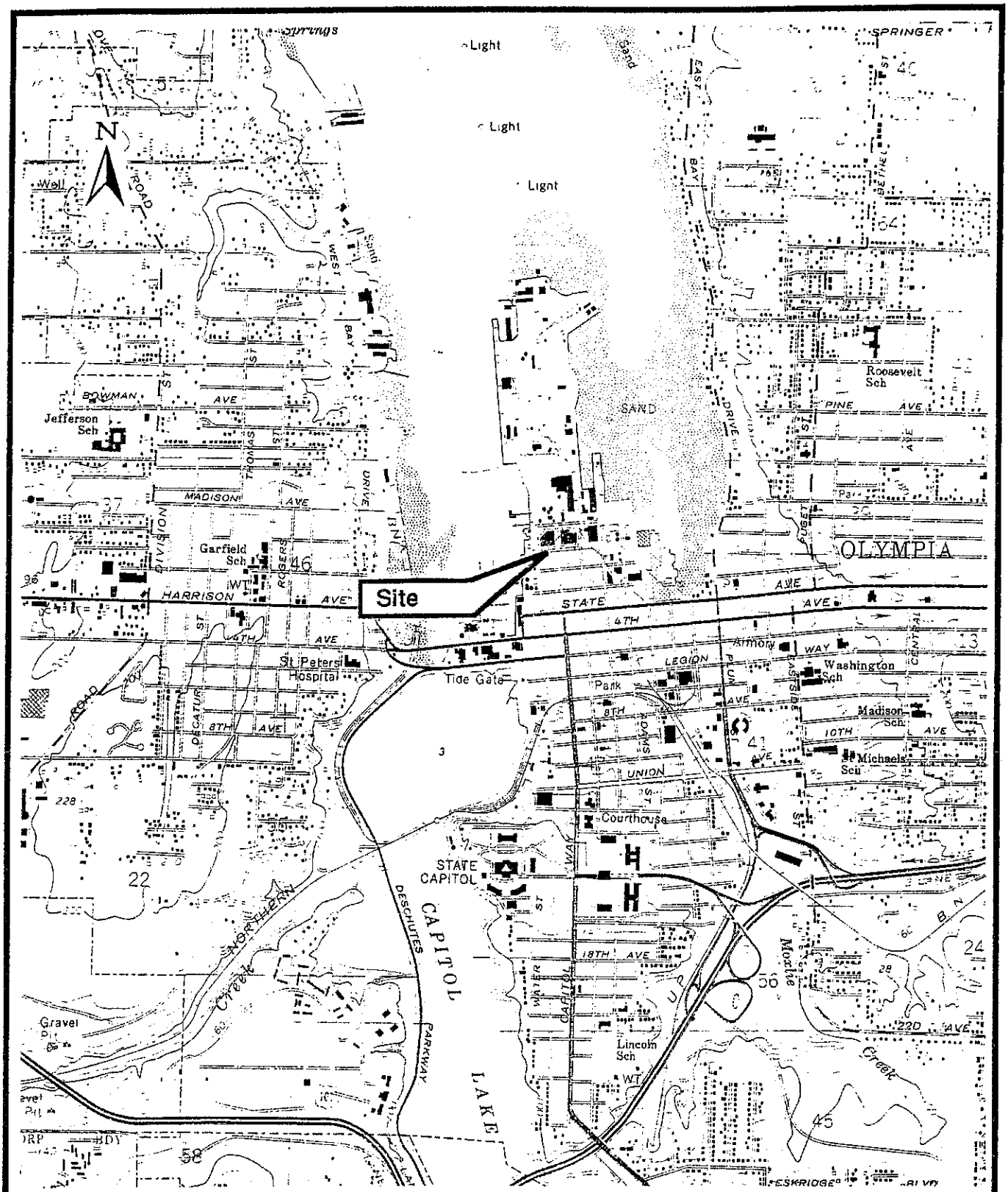


Figure 2. Vicinity Map of the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MDS Date: 6/1/94

enviros®
E1/940109.01

3.0 GEOLOGY

The near-surface geology of the site, as determined from the shallow borings conducted in this project, is largely that of unconsolidated marine-dredged, shell-rich, sandy fill resting on an uneven pre-existing marginally marine ground surface. On the southeastern quarter of the project area (parking lot) the fill was generally less than eight feet-thick and was often found to rest on an organic-rich soil horizon or non-shell-containing sand or gravelly sediment.

On the southwestern block of the property (Farmers Market), the marine fill appeared similar in thickness to that of the southeastern quarter except that the fill in MW7 existed to a depth of 15 feet. The underlying sediment in most of the area consisted of brown unconsolidated gravelly sand. In MW7, a wood debris layer with plant roots was noted at six feet and gray sandy silt was present below 15 feet. This may indicate that this area was previously under marine influence and was later filled in two separate phases.

Reportedly, the City of Olympia graded a large quantity of soil on the Farmers Market Block. No records are available on this activity. The grading of this area may have obscured soil and groundwater conditions and trends.

On the northwestern block of the property, only one 6.5-foot boring was drilled. The sediment in this boring consisted entirely of shell-rich sand fill material.

4.0 FIELD WORK

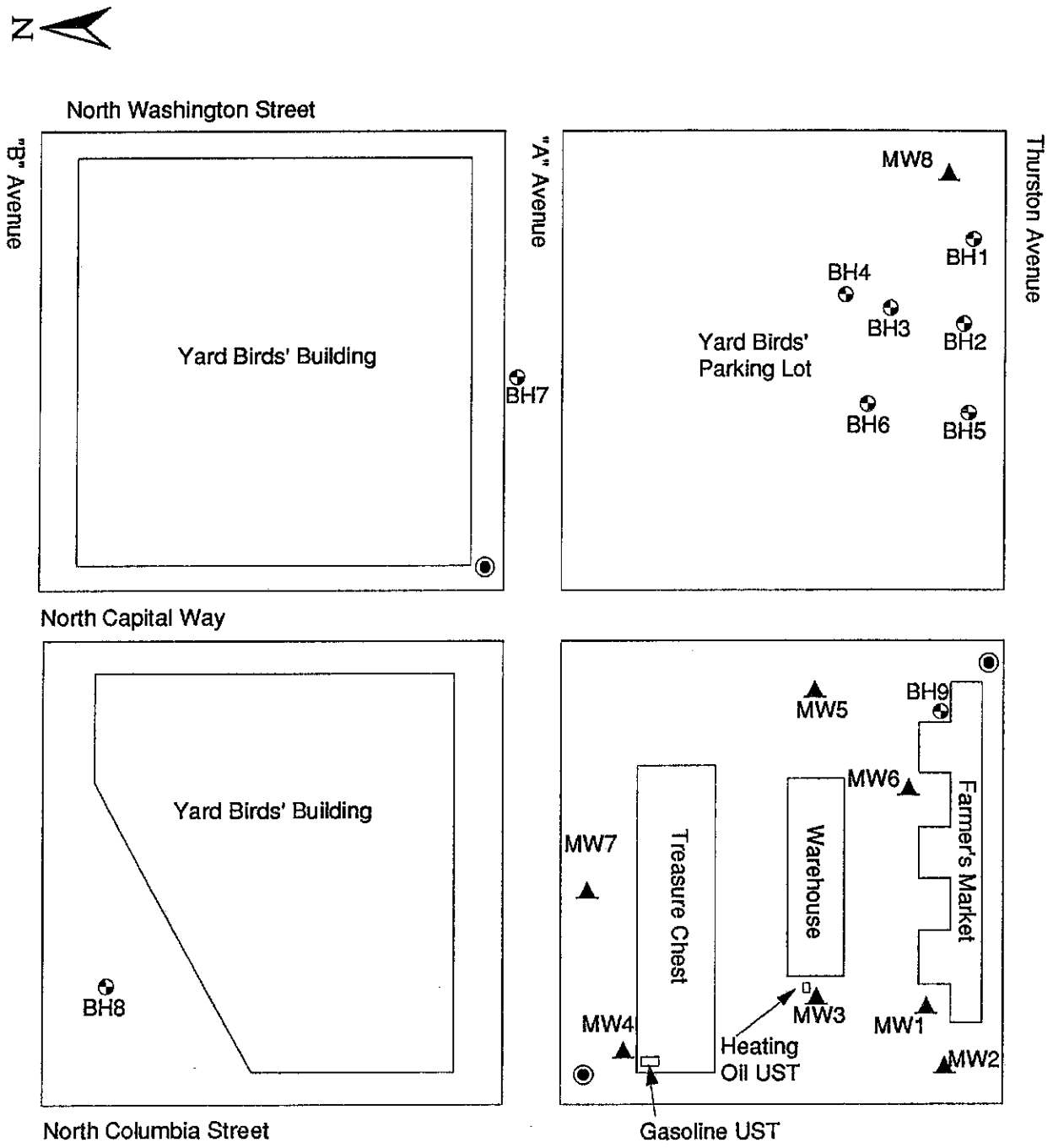
4.1 Phase III Assessment Work

Enviros was contracted by Yard Birds to perform additional environmental site assessment (Phase III ESA) of areas of concern identified in the previous assessment work and to evaluate potential environmental concerns not addressed by the previous consultant. The Phase III ESA scope of work was designed to address concerns in the Farmers Market block, evaluate potential environmental concerns in the three other blocks of the Yard Birds property and determine the potential impact of off-site concerns. The information derived from the Phase III ESA was intended to be sufficient to proceed directly into site remediation work.

4.1.1 Well Drilling and Soil Sampling

From January 31, 1994 through February 3, 1994, Lance Robert of Enviros supervised the drilling of 13 soil borings. Four soil borings were completed as groundwater monitoring wells. The boring logs and well completion diagrams from all borings are included in this report as Appendix A. Detailed notes were taken in the field and soil samples were collected from each boring; the field notes were used to construct logs and well completion diagrams.

Holt Drilling (Holt) provided a B-61 hollow-stem auger drill rig with a 300-pound hammer for sampling. The sampler used was a four-inch outer diameter Dames & Moore split-spoon. Soil vapors were screened for hydrocarbons using a *Microtip MP100* Photo Ionization Detector (PID).



Legend:

- Soil Boring Location
- Fire Hydrant Location
- Groundwater Monitoring Well Location

Approximate Scale: 1" = 100'

Figure 2. Site Sketch with Groundwater Monitoring Well and Soil Boring Locations at the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBS Date: 6/1/94

enviros®
E1/940109.01

Drilling

The nine soil borings were sequentially labeled BH1 through BH9 and monitoring wells were labeled MW5 through MW8. The locations of the borings and wells are presented in Figure 2. Borings BH1 through BH6 were drilled in the parking lot on the southeastern block of the project area; boring BH7 was drilled on the south side of the shopping mall; BH8 on the north side of the hardware store; and BH9 was drilled on the east side of the Farmers Market area. The borings were drilled to a depth of 6.5 feet below the surface, except borings BH3 and BH7 which were drilled to 9 feet (See Figure 2 for boring and well locations).

Four of the 13 soil borings were completed as monitoring wells to assess groundwater quality. Three of the wells (MW5, MW6, and MW7) are located on the Farmer's Market block of the project area. Well MW6 was placed on the eastern extent of the Farmers Market building, MW5 was near the east entrance of the Treasure Chest, and MW7 was placed on the north side of the Treasure Chest. Well MW8 was placed on the eastern extent of the parking lot on the southeastern block of the project area.

Sampling

While drilling the soil borings, samples were collected at intervals of 2.5 or 5 feet using an 18-inch Dames & Moore split spoon sampler. Samples were logged in detail, photographed when necessary, and collected in 4-ounce glass jars and stored on ice until delivery to the laboratory. In addition to the laboratory samples, sediment was collected in ziplock bags for vapor analysis.

4.1.2 Groundwater Sampling

On February 4, 1994, MaryBeth Gilbrough and Anastasia Speransky of Enviros were present on-site for groundwater sampling of the eight monitoring wells present on-site. Prior to purging, Enviros opened all the wells and conducted a round of water level measurements using an electronic water level probe. The wells were also sounded to verify well construction data, and the probe was decontaminated between measurements to prevent any potential for cross-contamination. Enviros then surveyed the top of casing elevations of the four newly installed groundwater monitoring wells. The original monitoring wells MW-1 through MW-4 were surveyed on January 31, 1994.

Each well was purged by removing 3 to 5 well volumes of groundwater using a disposable teflon bailer. The bailed water was monitored for temperature, pH, turbidity, and conductivity during bailing, as recommended in Guidance for Site Checks and Site Assessments for Underground Storage Tanks (Ecology, 1992). Bailing continued until these parameters stabilized. Bailed water was placed in 55-gallon drums present on-site.

After well purging, the groundwater samples were collected for analysis of total petroleum hydrocarbons as gasoline, diesel, and heavy oil and benzene, toluene, ethylbenzene, and xylenes (BTEX). For the Gas/BTEX analysis, groundwater was funneled into two volatile organic analysis (VOA) vials. For the diesel and heavy oils analysis, groundwater was funneled into two 1-liter amber bottles. Samples were then delivered to On-Site Environmental in Redmond, Washington.

4.2 UST Removal and Closure Activities

MaryBeth Gilbrough of Enviros and Foss Environmental were on-site to remove a heating oil UST from the west end of the warehouse building adjacent and to the north of the Farmer's Market, and to close in-place a gasoline UST that is located in a storage area on the west end of the Treasure Chest building. Enviros was responsible for overseeing Foss Environmental's work, performing site assessment in the area of the two USTs, and collecting water level measurements from each of the eight wells on-site. Foss Environmental was responsible for decommissioning the heating oil UST, closing in-place the gasoline UST, all required permitting, backfilling the excavation from the heating oil tank, and pumping floating product from groundwater monitoring well MW-1 on two consecutive days.

On March 21, 1994, Foss Environmental pumped and rinsed out both USTs. A test pit was excavated near the heating oil UST, in order to get an indication of whether the tank had leaked, and the extent of contamination. A soil sample was collected from this test pit (northeast of the heating oil tank), and was analyzed for gasoline, BTEX, diesel, and heavy oil. In addition, two hand auger borings were advanced adjacent to the east and west sides of the gasoline tank. Samples collected from these two borings were analyzed for gasoline and BTEX. Free product from monitoring well MW-1 was pumped down using Foss Environmental's vacuum truck.

On March 22, 1994, a large hole was cut in the top of the gasoline tank after approval from a marine chemist. The gasoline tank was cleaned and triple rinsed. Hand auger borings were advanced to the north, south, and east of the tank, in order to estimate the extent of the contaminant plume originating from the gasoline tank.

Also on March 22, 1994, the heating oil UST was removed from the west end of the warehouse building adjacent and to the north of the Farmer's Market. Corrosion holes were noticed on the tank. A layer of contaminated soil was observed at approximately 5.5 feet below ground surface. An additional 15 tons of soil was removed from the excavation in an attempt to remove the most severely contaminated soil. Two composite soil samples were collected from the four sidewalls, and a soil sample was collected from the bottom of the excavation. Free product from monitoring well MW-1 was pumped down using Foss Environmental's vacuum truck.

On March 23, 1994, Foss transported 55-gallon drums from the Farmer's Market area to a fenced-off area near the former heating oil UST. Foss filled the gasoline UST with concrete slurry. Foss also paved the surface on top of the gasoline tank.

5.0 METHODS

5.1 Analytical Methods

Enviros had soil and groundwater analyzed for the following petroleum constituents: BTEX by Environmental Protection Agency (EPA) Method 8020, gasoline by Ecology Method WTPH-G, diesel by Ecology Method WTPH-D, and heavy oil by Ecology Method WTPH-418.1. Soil collected from borings to the north and west of the Farmer's Market block were analyzed for the following metals: arsenic, cadmium, chromium, lead, selenium, silver, copper, nickel, zinc, antimony, thallium, and beryllium by EPA Method 6010, and mercury by EPA Method 7071. All soil and groundwater samples collected for the Phase III Environmental Assessment performed by Enviros were delivered to On-Site Environmental in Redmond, Washington. All soil samples collected for the decommissioning of the heating oil UST and the gasoline UST were delivered to Transglobal Environmental Geosciences Northwest, Inc. in Olympia, Washington.

5.2 Field Quality Control/Quality Assurance Procedures

Soil that was collected for analysis was transferred to 4-ounce glass containers that were sealed with plastic, teflon-lined lids. The soil samples were packed into glass containers to minimize the head space volume of each sample. The samples were then delivered to the laboratory to be analyzed in the appropriate holding times.

Collected water samples were poured from the bailer into VOA vials, and 1-liter amber glass bottles. The containers were sealed with plastic, teflon-lined lids. No air bubbles were noted in the VOA vials on inversion. All sample jars were labeled and stored on ice until delivered to the analytical laboratory with a chain-of-custody.

Disposable bailers were used for sampling of all monitoring wells; therefore it was not necessary to decontaminate bailers. Sampling personnel wore latex gloves that were changed after each sample was collected. All soil sampling equipment and the water level probe were decontaminated prior to, and between, periods of sample collection. The decontamination procedure was as follows:

- Initial detergent/distilled water rinse;
- Second detergent/distilled water rinse;
- Distilled water rinse;
- 10 % Methanol Solution Rinse;
- Distilled water rinse; and
- Air Dry.

A chain-of-custody was maintained from the time the containers were obtained from the laboratory, until they were returned and the analyses were performed. Recorded sample information included: time and date of collection, sample identification number, analysis to be performed, preservative used, and special instructions as appropriate. The laboratory used internal precision and accuracy checks that are reported with the analytical results in Appendix A.

6.0 RESULTS AND DISCUSSION

This section is organized as follows:

- Hydrogeologic Results
- Sampling Analytical Results from the Southeast Block
- Sampling Analytical Results from the Northeast Block (Former Yard Birds Store)
- Sampling Analytical Results from the Northwest Block (Former Yard Birds Store)
- Sampling Analytical Results from the Farmer's Market Block

6.1 Hydrogeologic Results

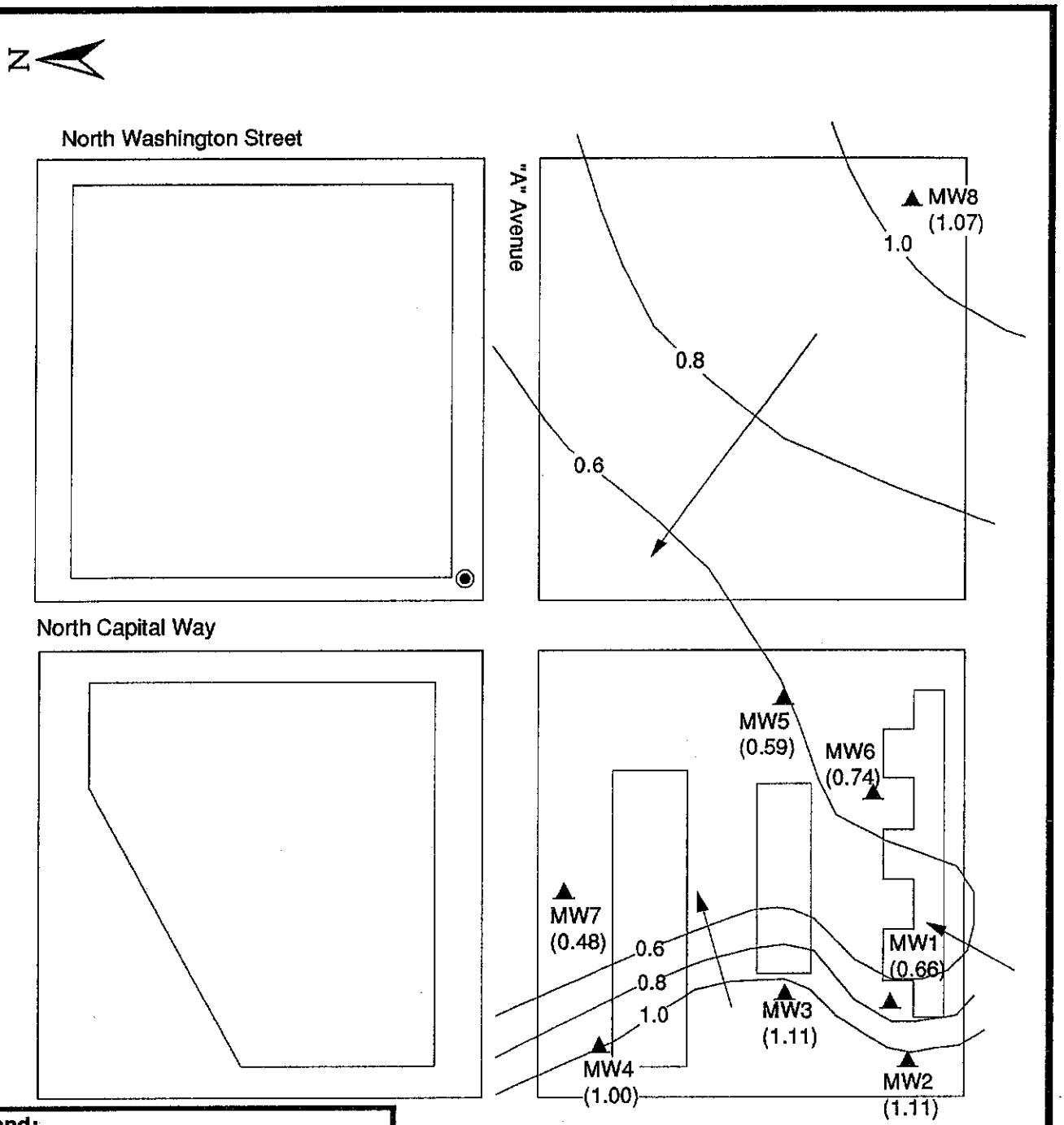
Previously existing groundwater monitoring wells were surveyed for top of casing elevations on January 31, 1994. The monitoring wells installed by Enviros were surveyed for top of casing elevations on February 4, 1994. Depth to groundwater was measured using a electric water level probe on January 31, 1994, February 4, 1994, March 21, 1994, March 22, 1994, and March 23, 1994.

From the groundwater data obtained during Enviros assessment, it appears that the groundwater flow direction is towards the east and northeast on the Farmers Market block, and towards the northwest on the block to the east of the Farmers Market (parking lot). A steep hydraulic gradient anomaly is present on the southwest corner of the Farmer's Market Block that may be attributed to grading and filling by the City of Olympia a few years ago. All elevations are based on a relative datum of 10 feet at the top of a fire hydrant on the northwest corner of the Farmers Market block. Table 1 summarizes the water level data obtained during Enviros assessment activities. Figures 3 and 4 illustrate groundwater elevation contours (see Figures 3 and 4 for groundwater elevation contours).

Because the subject property is 200 feet west of Budd Inlet, Enviros suspected that tidal influences may be affecting the water levels in groundwater monitoring wells on-site. In order to evaluate the affect of the tide on water levels on-site, an electric transducer was placed in monitoring well MW-3 with an attached data logger to record water levels every 10 minutes. On February 7, 1994, water levels were recorded from 10:50 am to 2: 20 pm. The greatest variance during this study was 0.08 feet which is negligible. Therefore, Enviros concluded that the tide does not significantly influence water levels on-site.

Table 1. Groundwater Elevation Data.

Well Designation	Date of Measurement	Top of Casing Elev. (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-1	1/31/94	7.32	6.75	0.57
	2/4/94		6.66	0.66
	3/21/94		6.35	0.97
	3/22/94		6.16	1.16
	3/23/94		6.21	1.11
MW-2	1/31/94	7.10	5.98	1.12
	2/4/94		5.99	1.11
	3/21/94		5.69	1.41
	3/22/94		5.65	1.45
	3/23/94		5.61	1.49
MW-3	1/31/94	7.19	6.11	1.08
	2/4/94		6.08	1.11
	3/21/94		5.80	1.39
	3/22/94		Covered with stockpiled soil.	
	3/23/94		5.66	1.53
MW-4	1/31/94	6.99	8.06	-1.07
	2/4/94		5.99	1.00
	3/21/94		5.79	1.20
	3/22/94		5.72	1.27
	3/23/94		5.74	1.25
MW-5	2/4/94	7.35	6.76	0.59
	3/21/94		6.49	0.86
	3/22/94		6.45	0.90
	3/23/94		6.49	0.86
MW-6	2/4/94	7.44	6.70	0.74
	3/21/94		6.42	1.02
	3/22/94		6.40	1.04
	3/23/94		6.40	1.04
MW-7	2/4/94	7.48	7.00	0.48
	3/21/94		6.78	0.70
	3/22/94		6.74	0.74
	3/23/94		6.74	0.74
MW-8	2/4/94	6.72	5.65	1.07
	3/21/94		5.21	1.51
	3/22/94		5.18	1.54
	3/23/94		5.16	1.56



Legend:

▲ Groundwater monitoring well location with elevation in feet.

→ Estimated groundwater flow direction.

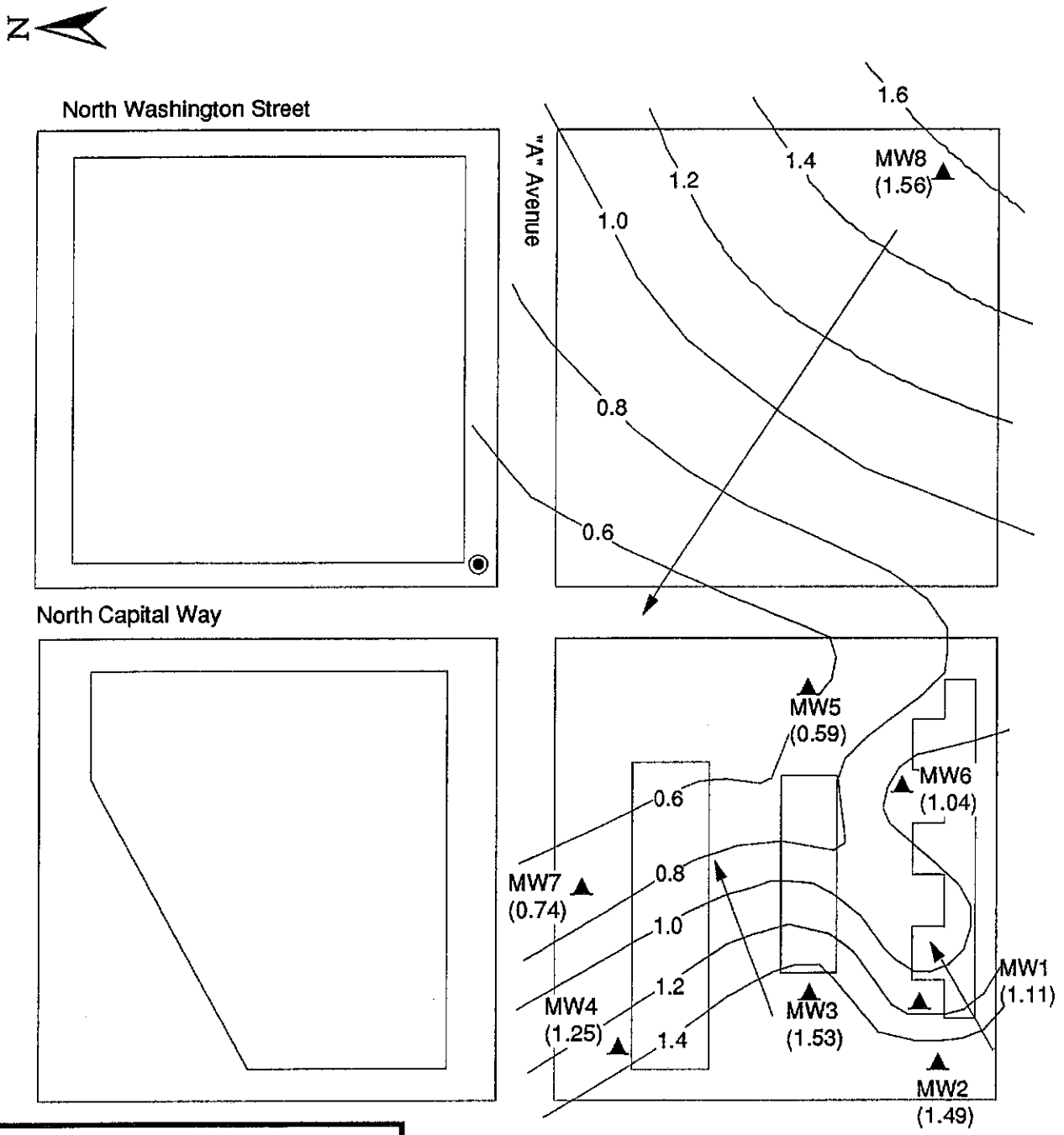
—1.0— Groundwater elevation contour in feet.

Approximate Scale: 1" = 100'

Figure 3. Groundwater Elevation Contour Map for Water Level Measurements Taken on February 4, 1994 at the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBS Date: 6/1/94

enviros®
E1/940109.01



Legend:

▲ Monitoring Well with Elevation in Feet.

——► Estimated groundwater flow direction.

——1.0—— Groundwater Elevation Countour in feet

Approximate Scale: 1" = 100'

Figure 4. Groundwater Elevation Contour Map for Water Level Measurements Taken on March 23, 1994 at the Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBB Date: 6/1/94

enviros®
E1/940109.01

6.2 Sample Results for the Southeast Block

Enviros drilled and sampled six, 5-foot soil borings in the southeast block of the Yard Bird's property (parking lot) to assess potential environmental impacts from the former foundry operation at this location. Potential heavy oil petroleum hydrocarbons contaminants and heavy metal concentrations were either not detected or were found to be below Ecology soil cleanup levels. Based on these results, evidence of environmental impact from the former foundry were not found.

The six soil samples from the block east of the Farmer's Market Block were analyzed for priority pollutant metals: arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), selenium (Se), silver (Ag), copper (Cu), nickel (Ni), zinc (Zn), antimony (Sb), thallium (Tl), and beryllium (Be). In general, these soil samples had concentrations that were below MTCA Method A or B cleanup levels; although, low background concentrations of cadmium, chromium, lead, copper, nickel, and zinc were detected. A sample collected from boring BH-5 at 3 feet below the ground surface had a concentration of cadmium (2.2 ppm) slightly above the MTCA Method A cleanup level of 2.0 ppm. By utilizing Land's upper confidence level statistical analysis for all six samples, the average cadmium concentration was found to be statistically below the MTCA Method A Cleanup level. Tables 2 and 3 summarize these soil analytical results, and Appendix B contains all analytical reports from Enviros assessment and remediation activities.

Enviros drilled and sampled a 15-foot well boring (MW8) in the southeast corner of the parking lot block to assess potential environmental impacts from a former service station that was located to the east of the subject property. No petroleum hydrocarbons were detected in the soil samples collected. The groundwater flow direction in this area appears to place the former service station upgradient of the parking lot. Groundwater sampling results indicated low levels of gasoline contaminants that were well below Ecology groundwater cleanup levels. Based on these results, there appears to be little or no environmental impact from the former service station to the southeast Yard Birds block.

Table 2. Soil Sampling Results for City Blocks North and East of Farmers Market

Sample Number	Depth (feet)	Date Analyzed	Diesel	Heavy Oil
BH1	3	2/8/94	NA	<25
BH1	6	2/4/94	NA	NA
BH3	3	2/8/94	NA	<25
BH3	6	2/4/94	NA	<25
BH3	8	2/8/94	NA	NA
BH4	3	2/8/94	NA	<25
BH5	3	2/8/94	NA	<25
BH6	3	2/8/94	NA	<25
BH7	6	2/4/94	<25	NA
BH8	6	2/4/94	<25	NA
MW8	7	2/4/94	<25	NA
Method Blank		2/8/94	<25	NA

Soil sample results are expressed in ppm.
"NA" - Not Analyzed

Table 3. Priority Pollutant Metals Soil Sampling Results for City Blocks North and East of the Farmers Market

Sample No.	Depth (feet)	Date Analyzed	As	Cd	Cr	Pb	Se	Ag	Cu	Ni	Zn	Sb	Tl	Be	Hg
BH1	3	2/8/94	4.6	1.5	11	6.7	<5.8	<0.39	20	13	25	<2.3	<5.8	<0.2	<0.07
BH3	3	2/8/94	<4.9	1.2	16	4.4	<7.4	<0.49	9.0	16	25	<2.9	<7.4	<0.24	<0.08
BH3	8	2/8/94	5.6	1.3	15	4.7	<7.0	<0.47	12	20	21	<2.8	<7.0	<0.23	<0.09
BH4	3	2/8/94	<4.0	1.2	10	3.2	<6.1	<0.40	8.1	13	20	<2.4	<6.1	<0.2	<0.08
BH5	3	2/8/94	8	2.2	22	6.5	<8	0.7	19	20	34	<3.2	<8	<0.27	<0.08
BH6	3	2/8/94	<6.6	1.9	13	4	<6.6	<1.1	10	17	25	<2.7	<6.6	<0.22	<0.08
Method Blank		2/8/94	<5	<0.25	<5	<2.5	<7.5	<0.5	<1.2	<2	<1	<3.0	<7.5	<0.25	<1.0
Cleanup Level A or B			20	2	100	250	400**	240**	2,960**	1,600**	24,000**	32**	7.2**	400**	1

All sample results are given in ppm

** Method B Cleanup Levels were used for compounds for which there are no established Method A levels

6.3 Sample Results for the Northeast Block - Former Yard Bird's Store

An asbestos-wrapped steam line pipe is suspected to be present on the northeast block of the property. Asbestos materials were not encountered in any of the borings drilled by Enviros, although the purpose of the assessment did not include a specific search for the pipe insulation.

Enviros drilled and sampled a ten foot soil boring (BH7) in the estimated location of a former UST just south of the Yard Birds store (edge of A Avenue) to assess potential environmental impacts from the suspected former UST. No petroleum hydrocarbons were detected in the soil samples collected. Based on these results, evidence of environmental impact from the suspected UST was not found.

6.4 Sample Results for the Northwest Block - Former Yard Bird's Store

Enviros drilled and sampled a ten foot soil boring (BH8) in the Yard Birds block just south of B Avenue to assess potential environmental impacts from the former Chevron bulk fuel transfer operation located across the street to the north. No petroleum hydrocarbons were detected in the soil samples collected. Based on these results, the Chevron operation does not appear to have impacted the Yard Birds Block.

6.5 Sample Results for the Farmers Market Block

6.5.1 Soil and Groundwater Assessment Results

ATEC Results

Analytical results from the previous assessment performed by ATEC Associates indicate that monitoring wells MW-1 and MW-4 have been affected by both diesel and gasoline. Monitoring wells MW-2 and MW-3 had no detectable levels of gasoline, BTEX, diesel, or heavy oil. ATEC also performed some groundwater sampling using a modified soil vapor probe. From these groundwater samples, gasoline-affected groundwater is evident to the northeast of MW-1, which is consistent with the groundwater elevation data (See Figure 5 for an illustration of groundwater sample results from the modified soil vapor probe and monitoring wells MW-1 through MW-4). Table 4 summarizes previous analytical results of monitoring wells MW-1, MW-2, MW-3, and MW-4, and the modified soil vapor probe groundwater sample results.

Enviros Results

Soil samples were collected from four soil borings designated BH9, MW5, MW6, and MW7 on the Farmer's Market block as part of Enviros' assessment. Soil samples from these borings were analyzed for gasoline, BTEX, diesel, and heavy oil. The soil samples collected from this area had no detectable levels of the suspected contaminants. Table 5 summarizes the analytical results.

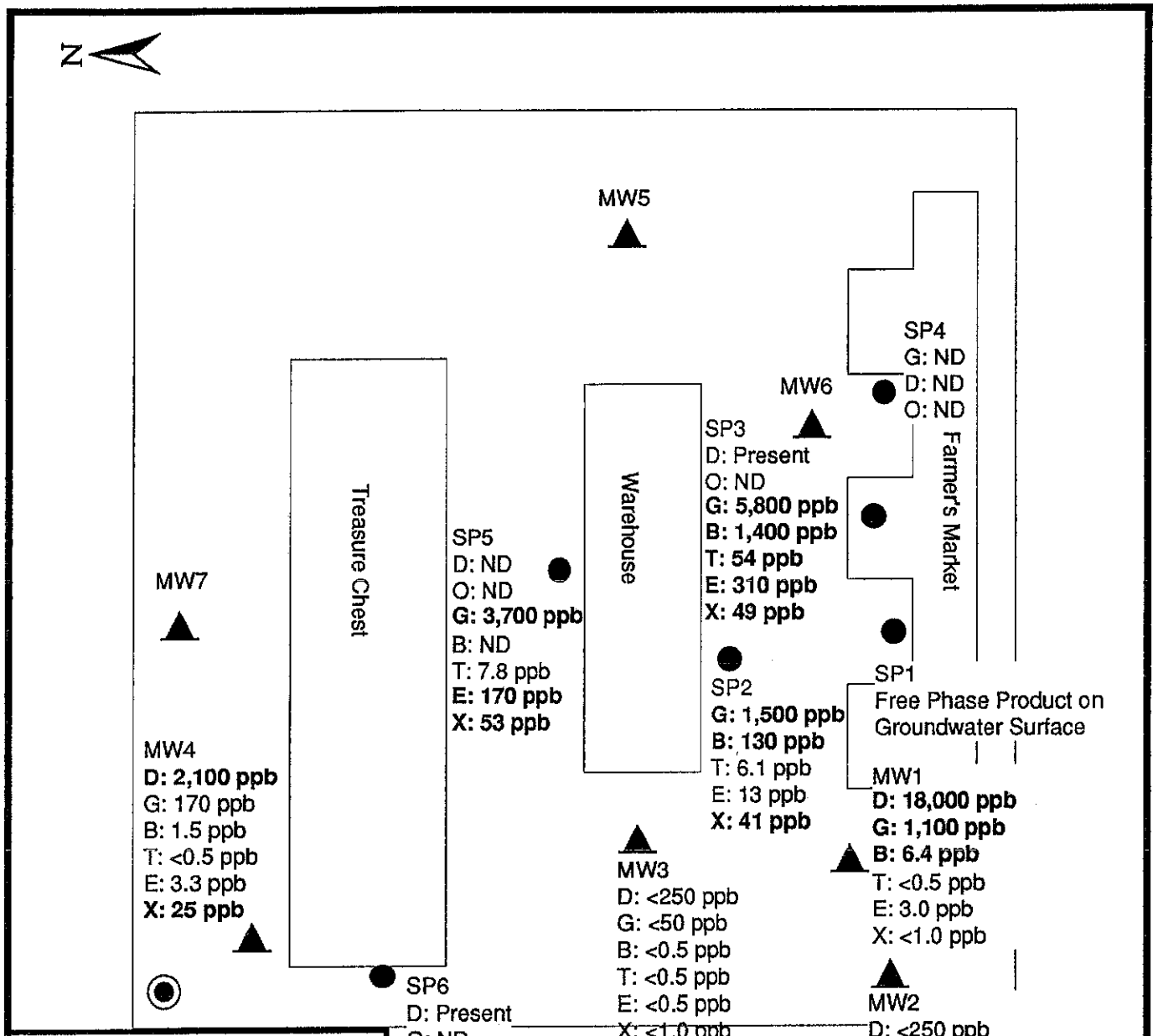


Figure 5. Map of Previous Sampling Locations and Analytical Results at Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MBS Date: 6/1/94

enviros®
E1/940109.01

Table 4. Previous Environmental Assessment Results

Sample Number	Date Sampled	Matrix	Diesel	Heavy Oil	Gasoline	B	E	T	X
MW-1	11/4/93	water	**18,000**	NA	**1,100**	**6.4**	3.0	<0.5	<1.0
MW-2	11/4/93	water	<250	NA	<50	<0.5	<0.5	<0.5	<1.0
MW-3	11/4/93	water	<250	NA	<50	<0.5	<0.5	<0.5	<1.0
MW-4	11/4/93	water	**2,100**	NA	170	1.5	3.3	<0.5	**25**
MW-1	10/20/93	soil	**Present**	**Present**	**Present**	**1.83**	1.39	1.03	6.5
MW-2	10/20/93	soil	<50	<100	<20	<0.3	<0.3	<0.3	<0.3
MW-3	10/20/93	soil	<50	<100	<20	<0.3	<0.3	<0.3	<0.3
MW-4	10/20/93	soil	<50	<100	<20	<0.3	<0.3	<0.3	<0.3
SP-1	12/1/93	water	NS	Free Phase	NS	NS	NS	NS	NS
SP-2	12/1/93	water	NA	NA	**1,500**	**130(E)**	13	6.1	**40.6**
SP-3	12/1/93	water	**Present**	<1,000	**5,800**	**1,400**	**310**	**54**	**49**
SP-4	12/6/93	water	<500	<1,000	<200	NA	NA	NA	NA
SP-5	12/6/93	water	<500	<1,000	**3,700**	<1.0	**170**	7.8	**53**
SP-6	12/6/93	water	**Present**	<1,000	**9,300**	**1,300**	**1,200**	**21**	**1,512**

All groundwater sample results are given in ppb and all soil sample results are given in ppm.
NA - Not Analyzed
NS - Not Sampled
(E) - Value reported is an estimate
B - Benzene
T - Toluene
E - Ethylbenzene
X - Total Xylenes

Table 5. Soil Sample Results for the Farmers Market Block

Sample No.	Depth (feet)	Date Analyzed	Heavy Oil	Diesel	Gasoline	B	T	E	X
MW5	5	2/4/94	NA	<25	<0.1	<0.1	<0.1	<0.001	<0.002
MW6	3	2/4/94	<25	<25	<0.1	<0.1	<0.1	<0.001	<0.002
MW6	6	2/4/94	NA	<25	<0.1	<0.1	<0.1	<0.001	<0.002
MW6	8	2/6/94	<25	NA	NA	NA	NA	NA	NA
MW7	6	2/4/94	NA	<25	<0.1	<0.1	<0.1	<0.001	<0.002
BH-9	3	2/3/94	<25	<25	<0.1	<0.1	<0.1	<0.001	<0.002
BH-9	6	2/3/94	<25	NA	NA	NA	NA	NA	NA
MTCA Method A Cleanup			200	200	100	0.5	40	20	20

B - Benzene
T - Toluene
E - Ethylbenzene
X - Total Xylenes
All soil sample results are given in ppm.
"NA"-Not Analyzed

Groundwater samples were collected from the seven wells on the Farmer's Market block and were analyzed for gasoline, BTEX, diesel, and heavy oil. Floating product was observed in monitoring well MW1. The analysis of the groundwater sample collected from MW1 indicated the floating product is either diesel or heavy oil. Gasoline and BTEX were detected in a sample from monitoring well MW4 above MTCA Method A cleanup levels. Elevated levels of benzene (11 and 51 ppb) were detected in samples from monitoring wells MW5 and MW6 Levels of heavy oil (1,200 ppb) slightly above the MTCA Method A cleanup level were detected in monitoring well MW6. See Figure 6 for an illustration of the analytical results. Table 6 summarizes the analytical data.

Table 6. Enviros Groundwater Sampling Results (in ppb)

Sample No.	Date Analyzed	Diesel	Heavy Oil	Gasoline	B	T	E	X
MW1	2/7/94	**280,000**	**2,600,000**	<300	<1.0	<1.0	<1.0	<2.0
MW2	2/7/94	900	NA	<300	<1.0	<1.0	<1.0	2.2
MW3	2/7/94	<500	<500	<300	<1.0	<1.0	<1.0	2.2
MW4	2/7/94	<500	NA	**6,200**	**140**	**210**	**530**	**1,440**
MW5	2/7/94	890	<500	<300	**11**	1.3	1.6	3.0
MW6	2/7/94	860	**1,200**	720	**51**	3.2	3.1	9.3
MW7	2/7/94	<500	<500	<300	<1.0	1.5	2.3	14.8
MW8	2/7/94	<500	NA	<300	<1.0	<1.0	1.0	3.5
Method Blank	2/7/94	<500	<500	<300	<1.0	<1.0	<1.0	2.3
MTCA Method A Cleanup Levels		1,000	1,000	1,000	5	40	30	20

Groundwater sample results are provided in ppb.
"NA" - Not Analyzed
B - Benzene
T - Toluene
E - Ethylbenzene
X - Total Xylenes

6.5.2 Ecology File Review of Former Fuel Bulk Storage Facilities

Historically, Shell Oil and Unocal operated a bulk storage facility to the southwest of the Farmers Market block. This site is present on Ecology's Confirmed and Suspected Contaminated Sites list. The City of Olympia has been interested in purchasing this property for construction of a park; therefore, the City of Olympia had an environmental site assessment performed on the property. According to a report written by Rittenhouse-Zeman and Associates, Inc. (RZA) dated October 20, 1989, petroleum hydrocarbon affected soils were encountered in vadose zone soils that appear to have been the result of isolated surface spills. Groundwater contamination was not encountered during this assessment. The groundwater flow direction at this property was determined to be towards the west during low tide and towards southwest during high tide.

Two USTs were removed from this site on July 11, 1989. Applied Geotechnology, Inc. (AGI) was on-site to assess the environmental impact of these tanks. AGI concluded that much of the property appeared to be underlain by soil and groundwater contaminated by petroleum hydrocarbons. The source of contamination may have been surface spills or leaks associated with one or more underground or above-ground storage tanks on or off-site. The TPH analysis indicated the contamination was gasoline and similar hydrocarbons with little or no diesel or heavy oil constituents.

From the two reports reviewed regarding this property, it appears that the groundwater flow is not in the direction of the Farmers Market. In addition, the groundwater on this site is contaminated by gasoline, and not diesel as was detected in monitoring well MW-1 on the southwest corner of the Farmers Market (closest to the former bulk plant). In conclusion, it does not appear that this site has affected the Yard Birds property.

6.5.3 Tank Removal Results

Soil samples collected in the vicinity of the heating oil UST were analyzed for diesel, except for the first sample collected from a test pit southwest of the tank which was analyzed for diesel, heavy oil, and gasoline. This sample indicated diesel-contaminated soil. After the tank was removed from the excavation three samples were collected: a composite sample from the north and west sidewalls (N&W Sidewall), a composite sample from the south and east sidewalls (S&E Sidewall), and a sample from the bottom of the excavation (Bottom). The analytical results of these samples indicated that diesel-affected soils above the MTCA Method A Cleanup level exist to the southeast of the former heating oil UST. The sample collected from the bottom of the excavation had detectable levels of diesel below MTCA Method A cleanup levels. The samples collected from the stockpile indicated that the stockpile has significant levels of diesel. Figure 7 illustrates the sample locations and the associated analytical results.

Soil samples collected in the vicinity of the gasoline UST were analyzed for gasoline and BTEX. Hand auger samples were collected around the gasoline UST that was closed in place in order to determine the extent of the gasoline-affected soil and groundwater. From the analytical results, it appears that gasoline has migrated via groundwater to the north and east. Figure 8 illustrates the sample locations and the associated analytical results. Table 7 summarizes all analytical results related to the heating oil tank and the gasoline tank.

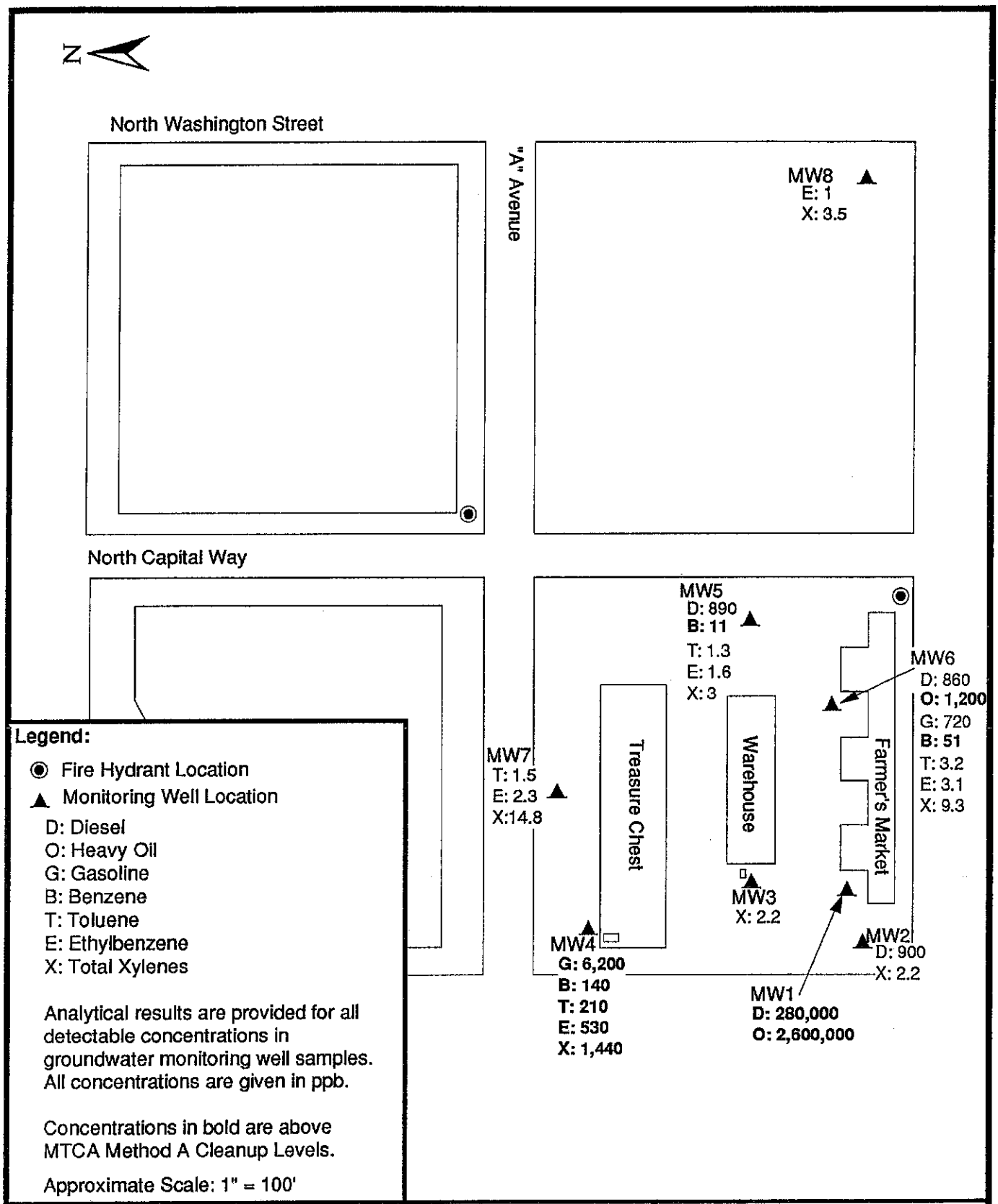


Figure 6. Groundwater Analytical Results
Yard Birds Property in Olympia, WA.

Drawn by: MBG Approved by: MdS Date: 6/1/94

enviros®
E1/940109.01

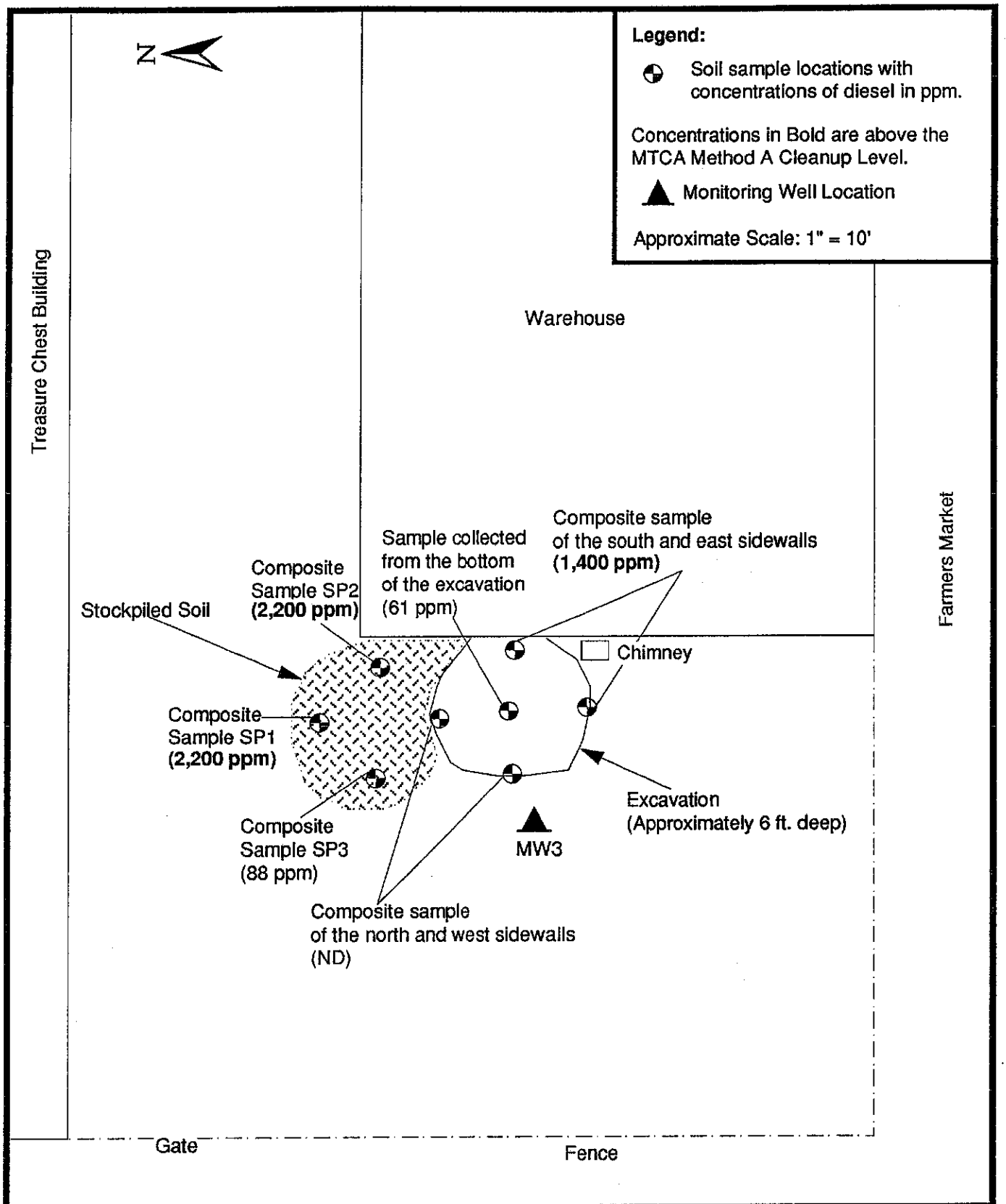


Figure 7. Sampling Locations and Analytical Results from the Heating Oil UST Excavation at the Yardbirds Property in Olympia, WA.

Drawn by: MBG Approved by: [illegible] Date: 6/1/44

enviros®
E1/940109.01

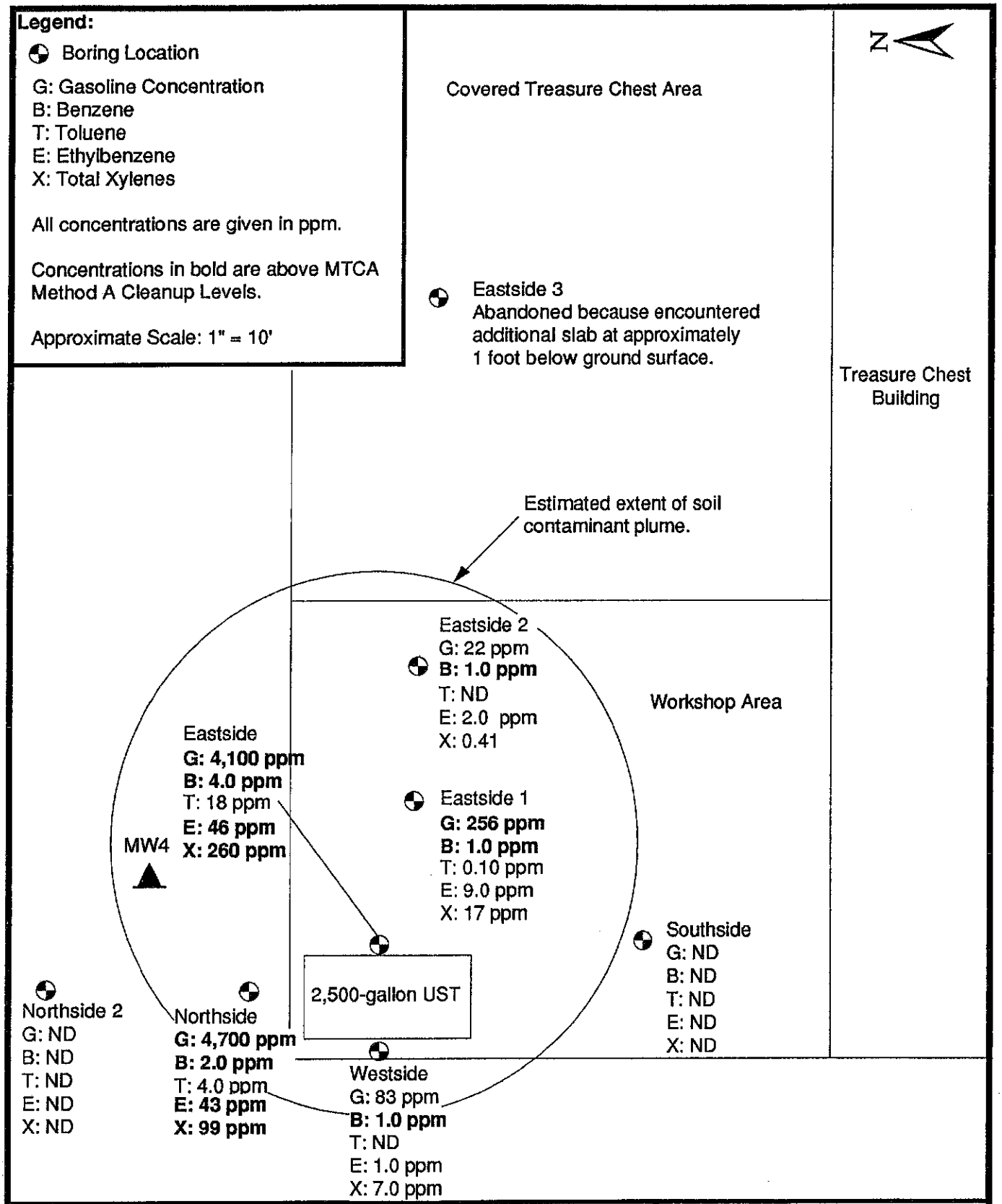


Figure 8. Sample Locations and Analytical Results in the Vicinity of the Gasoline Tank at the Yard Birds Property in Olympia, WA

Drawn by: MBG Approved by: _____ Date: 6/1/94

enviros®
E1/940109.01

Table 7. Soil Analytical Results for Samples Collected in the Vicinity of the Gasoline and Heating Oil USTs

Sample Name	Date	Depth (feet)	Diesel	Heavy Oil	Gasoline	B	T	E	X
Test Pit	3/21/94	5	**270**	**207**	<10	<0.05	<0.05	<0.05	<0.05
N&W Sidewall	3/22/94	4	<20	NA	<10	<0.05	<0.05	<0.05	<0.05
S&E Sidewall	3/22/94	4	**1,373**	NA	<10	<0.05	<0.05	<0.05	<0.05
Bottom	3/22/94	6	61	NA	<10	<0.05	<0.05	<0.05	<0.05
SP-1	3/22/94	-	**2,157**	NA	<10	<0.05	<0.05	<0.05	<0.05
SP-2	3/22/94	-	**2,188**	NA	<10	<0.05	<0.05	<0.05	<0.05
SP-3	3/22/94	-	80	NA	<10	<0.05	<0.05	<0.05	<0.05
Northside	3/22/94	5.5	NA	NA	**4,690**	**1.58**	4.45	**43.04**	**98.84**
Northside 2	3/22/94	6	NA	NA	<10	<0.05	<0.05	<0.05	<0.05
Southside	3/22/94	6	NA	NA	<10	<0.05	<0.05	<0.05	<0.05
Westside	3/21/94	5	NA	NA	83	0.05	<0.05	1.48	6.87
Eastside	3/21/94	5	NA	NA	**4,136**	**4.03**	17.92	**45.64**	**259.20**
Eastside 1	3/23/94	6	NA	NA	**256**	**1.14**	0.08	8.99	17.04
Eastside 2	3/23/94	6	NA	NA	<10	<0.05	<0.05	<0.05	<0.05
Method Blank	2/7/94	-	<20	<20	<10	<0.05	<0.05	<0.05	<0.05
MTCA Method A Cleanup Levels			200	200	100	0.5	40.0	20.0	20.0

All soil sample results are provided in ppm.
"NA" - Not Analyzed
B - The analyte indicated was also found in the blank sample

7.0. SUMMARY AND CONCLUSIONS

7.1 Summary

Of the four blocks involved in the environmental assessment and property transfer process, three of the blocks (all except the Farmer's Market block) have achieved substantial closure or resolution of environmental concerns. Remaining environmental concerns on the Farmer's Market have been addressed by thorough site characterization and implementation of preliminary remediation measures directed at source control. Completed remediation measures include decommission of the two on-site USTs, removal of approximately 15 tons of diesel-contaminated soil and pump-out of diesel product in a well in the southwest corner of the Farmer's Market.

7.2 Conclusions

The results from the soil testing indicated that contamination in the Farmer's Market block was less widespread than initially suspected based on non-detectable contaminant concentrations for soil samples collected by Enviros. It was also discovered that contamination trends may have been obscured by excavation and site grading activities conducted approximately 10 years ago by the City of Olympia in preparation of construction of the Farmer's Market.

Groundwater assessment results indicated that water flows from the west and south toward the northeast and that a very steep groundwater gradient exists at the southwestern end of the Farmer's Market. Groundwater transport may be quite rapid in this area based on the steep gradient and the sandy soil/fill conditions on the site. Changes in groundwater elevations with respect to tides monitored over an 8 hour period appeared minimal even though Puget Sound (Budd Inlet) is located approximately 200 feet west of the Farmer's Market.

Floating petroleum hydrocarbon product was observed in a well within the Farmer's Market and diesel contaminant concentrations were above Ecology cleanup levels. Gasoline contamination above Ecology cleanup levels was also observed in the well adjacent to the gasoline UST of the Treasure Chest and in one down-gradient well.

The results of sampling on the north end of the Farmer's Market block indicated that the gasoline contamination was likely attributable to the former operation of the gasoline UST in the Treasure Chest building. The contamination in this area of the property also appeared to be limited to gasoline contaminants since no heavy oil or diesel contamination was detected in the groundwater. Soil samples collected immediately adjacent to the tank had gasoline contaminant concentrations well above Ecology soil cleanup levels. The total volume of remaining contaminated soil in this area is estimated to be 230 cubic yards and appears to localized around the groundwater table boundary.

The results of sampling on the south end of the Farmer's Market block indicated that diesel product contamination might be attributable to former operation of the heating fuel (diesel) UST adjacent to the Warehouse building, and/or historical operation of a bulk fuel transfer/storage facility on the south end of the block. Contamination on the west end of the Farmer's Market area appeared to be limited to diesel contaminants since no gasoline constituents were detected in the groundwater. Contamination on the east end of the Farmer's Market area near North Capital Way appeared to be a mixture of diesel and gasoline.

The total volume of remaining contaminated soil in the Farmer's Market area is not accurately known but may range from 405 to 810 cubic yards depending on the actual thickness of the contamination which appears to be localized around the groundwater table boundary. Based on available field data and observations, the thickness of contaminated soil in the Farmer's Market appears to be approximately 2 feet and the lateral extent may cover an area of approximately 11,000 square feet. There also appears to be a substantial overburden of non-contaminated soils resting above the contamination zone which may be related to historical site grading activities.

In addition to tank decommissioning activities, the well in the Farmer's Market that contained floating diesel product was pumped down several times during the course of field activities to remove product. Product and oily water was disposed by vacuum truck. The product was observed to recharge into the well on collection of subsequent groundwater measurements. The estimated volume of product is very approximate and may range from 3100 to 4600 gallons assuming a 2 to 3 -inch product layer, an affected area of 110 by 75 feet and a soil porosity of 0.30 (30%).

7.3 Recommendations

The overall strategy for final cleanup of the Yard Birds Property is to perform source control by removal and/or treatment of contaminated soils and long-term monitoring of groundwater which is currently contaminated above Ecology cleanup levels. Soil removal/treatment of diesel-contaminated soils in the Farmer's Market area has been deferred until 1996 by arrangement with the City of Olympia in consideration of their desire to maintain operation of the Farmer's Market in its current location. Soil removal/treatment of gasoline-contaminated soil in the Treasure Chest area is also proposed to be deferred until 1996 to coordinate with cleanup activities in the Farmer's Market and thereby provide a cost savings on mobilization and field activities. Remediation of contaminated soil in the Treasure Chest building area by soil removal is not currently feasible without destroying the west end of the building and potentially damaging the building foundation.

Active treatment of groundwater contamination is not proposed at this time for the following reasons: contaminated on-site groundwater should not pose a threat to human health since it is not likely to be used for drinking water purposes due to proximity to brackish water of Budd Inlet; the water table is within 5 to 7 feet of the ground surface such that subsurface construction activities which would cause exposure of contaminated groundwater is unlikely; and aggressive treatment and cleanup of groundwater does not appear practical or consistent with the current industrial land use practices in the immediate area.

Accordingly, groundwater compliance monitoring is proposed for both the interim period when the Farmer's Market will be operating and after source control measures have been completed. This monitoring will serve the purpose of verifying groundwater conditions so that corrective actions can be taken if groundwater sampling indicates rapid spread of contaminants or increasing levels of contaminants.

Proposed corrective actions for floating product will either consist of: episodic pump-out of a proposed recovery well, soil excavation area or the existing wells; or installation and operation of a well pump and oil/water separator system.

8.0 ASSESSMENT LIMITATIONS

No warranty is expressly stated or implied in this report with regard to the condition of the substrate and groundwater at and/or below the surface of the property with the exception of the samples collected and parameters analyzed in this assessment. Due to natural variability of the soil matrix and subsurface geologic and hydrogeologic conditions, the limited sampling performed at the site may not be indicative of general site conditions and potential soil contamination in other areas of the property. Therefore, Enviros cannot guarantee the general conditions of subsurface soils on the property or specify an absence of contamination in potential soil sampling locations not addressed in this assessment.

This report reflects our professional opinions, interpretations, recommendations and observations of property conditions on the days of the assessment only, and does not cover any other conditions subsequently found on the property that were not visible during the assessment.

The findings and conclusions documented in this report have been prepared in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the Exhibit and General Services Agreement executed between Enviros and Client.

It has been a pleasure to work with you on this project, and if you have any questions regarding this report, please call. Enviros will be happy to discuss site future regulatory requirements or remediation alternatives.

Sincerely,

Enviros, Inc.

MaryBeth Gilbrough
Civil Engineer
(206) 828-2511

Mike Surowiec, P.E., P.G.
Senior Geoenvironmental Engineer
(206) 828-2506

cc: Files

Initial Investigation Close-Out Router

ERTS # 9207 Site Name Yardbirds, Olympia

Date Completed 4/14/94 Closed 4/14/94

1	Recommended Action: *Circle the appropriate categories.* NFA? Listing on SMIS/SIS? High Priority SHA? Initial Investigator
2	Unit Supervisor 10-31-94
3	Final Action: *Circle the appropriate categories.* NFA? Listing on SMIS/SIS? High Priority SHA? Section Supervisor 10/31/94
	NFAs GO DIRECTLY TO THE INCIDENT TRACKER, AND THEN THE FILE ROOM; OTHERS FOLLOW THE PROCESS BELOW:
4	Entered on SMIS/SIS: Date _____ Site Number _____ Date Early Notice Letter Sent _____ Signed-SMIS/SIS Coordinator
5	Turned Over to SHA Manager: SHA Manager
6	Incident Tracker: Date _____ Signed
7	File Room: County _____ File Type: _____

S W R O
DEPARTMENT OF ECOLOGY ENVIRONMENTAL REPORT

RECORDER: KATHY WEATHER: TIDE: ID#: 59207

DATE: 12/10/93 TIME: 14:20:00 COUNTY: THURSTON WATERWAY:

REPORTED BY: GARY PETERS
BUS NAME: ATEC ASSOC
ADDRESS:
CITY: STATE:
ZIP: HOME PHONE:
BUS PHONE: (206)-486-7176
ANONYMOUS: BEST TIME TO CALL:

LOC DESC: SITE INTERSECTION, COLUMBIA & THURSTON AVE CURRENT FARMERS MARKET, WESTEND.
CITY: OLYMPIA

ALLEGED VIOLATOR: YARDBIRDS SHOPPING CENTER (OWNER)
ADDRESS: 500 N CAPITOL WAY
CITY: OLYMPIA STATE: EXT:
ZIP: PHONE:
CONTACT: PHONE:

MEDIUM: GROUND WATER MAT TYPE: AST & UST

MATERIAL: OIL/PETROLEUM SOURCE: INDUSTRIAL SITE

QUANTITY: ACTUAL QUANTITY: Unk.

PROGRAM: TCP SECTION HD WHITE INSPECTOR: GOODING/POST

DATE INVEST: 4/14/94 DATE CLOSED: 4/14/94 IMPACT: Env.
NONPOINT: POINT: LUST:
ACTION TAKEN: Site Inspection CAUSE:

REFERRAL TO OUTSIDE ENTITY:
ENTITY NAME: _____ CONTACT: _____
DATE REFERRED / / PHONE ( ) -

NARRATIVE: PROCESS PHASE 1 & 2 INVESTIGATION. SOIL SURFACE PENATRATION. PLUME OF GASOLINE AND DIESEL FOUND. ALSO UST NORTH ON SAME PROPERTY - BELEIVE RELEASING PRODUCT. STILL IN GROUND.

Site is a LUST site and has been placed on LUST database

CONTAMINATION FOUND AT FARMERS MARKET (WEST END). TPH - GAS 5,800 PPB (WATER). USED SIGNAL? OIL. 2 USTS AT TREASURE CHEST SOIL N OF TREASURE W/IN 30 FT OF TANK. WATER SAMPLE AT BORDERLINE. GROUND WATER SAMPLE RESULTS ONLY. SOIL SAMPLES NOT IN YET.

Will wait until LUST is confirmed before entry into database.

SAMPLES YES OR NO REPORT REQUESTED YES OR NO PICTURES YES OR NO