

TEXACO STATION # 63232 0037

KING Co. - Seattle

LUST# 2298

RECEIVED

JAN 11 1993



emcon

Northwest, Inc.

18912 North Creek Parkway • Suite 210 • Bothell, WA 98011-8016 • Office (206) 485-5000 • FAX (206) 486-9766

December 4, 1992
Project 0368-013.02

Mr. Mike Condon
Texaco Environmental Services
3400 188th Street S.W., Suite 630
Lynnwood, Washington 98037

Re: Ground Water Sampling Report
Texaco Service Station #63232 0037
8701 Greenwood Avenue North
Seattle, Washington

DEPARTMENT OF ECOLOGY	
NWRO/TCP TANK UNIT	
INC# 2298	
INTERIM CLEANUP REPORT	<input checked="" type="checkbox"/>
SITE CHARACTERIZATION	<input type="checkbox"/>
FINAL CLEANUP REPORT	<input type="checkbox"/>
OTHER _____	<input type="checkbox"/>
AFFECTED MEDIA: SOIL	<input type="checkbox"/>
OTHER _____ GW	<input checked="" type="checkbox"/>
INSPECTOR (INIT.) <u>LL</u>	DATE <u>12/5/92</u>

Dear Mr. Condon:

EMCON Northwest, Inc., is pleased to present the results of the ground water sampling and monitoring activities conducted from April 28, to November 6, 1992, at the Texaco service station at 8701 Greenwood Avenue North in Seattle, Washington. All work was performed in accord with the Contract Change Order, dated November 18, 1991, and our proposal for ground water monitoring dated March 4, 1992.

BACKGROUND

The site is an active gasoline service station at 8701 Greenwood Avenue North in Seattle, Washington (Figure 1). Ground water monitoring wells were installed on the subject site in March 1991 as part of a pre-sale site assessment to evaluate the type and extent of potential contamination. A site plan is included as Figure 2. A report entitled "Report on Initial Site Assessment" was prepared by Texaco Environmental Services and forwarded to the Washington State Department of Ecology in August 1991. Since then, Texaco Environmental Services has monitored ground water elevations and conducted ground water sampling at the site. These efforts are summarized in this report.

GROUND WATER CONDITIONS

Depth to ground water was measured in each well on April 28, May 22, June 30, and November 6 of 1992. Depth to water measurements were converted to relative ground water elevations using previous survey data for the top of each well casing. Depth to water measurements and relative

ground water elevation data are provided on Table 1. Relative ground water elevation (potentiometric) maps were prepared, and the ground water gradients were evaluated for each date (Figures 3A, 3B, 3C, and 3D).

Previous boring log data indicate that ground water beneath the site is confined beneath a peat and silt layer that extends to a maximum depth of approximately 10 to 15 feet below ground surface. The presence of the gasoline tank basin appears to influence ground water flow direction by increasing the water level in AGW-2. The direction of the ground water gradient was generally toward the west, but also included a northwest and southwest component on all monitoring dates.

GROUND WATER SAMPLING

Ground water samples were collected from monitoring wells AGW-1, AGW-2, AGW-4, and AGW-5 on November 6, 1992. Monitoring well locations are shown on Figure 2. Prior to sampling, the depth to ground water was measured to the nearest 0.01 foot in each well.

Before ground water samples were collected, each well was visually checked for the presence of free-floating petroleum product by using a clear PVC bailer. No floating product was observed in any of the wells at the time of sampling.

At least three casing volumes of ground water were purged with a suction pump before collecting ground water samples. Ground water temperature, pH, and specific conductance were measured after each casing volume. These data, recorded on the Field Sampling Data Sheets, are provided in Appendix A. Ground water samples were collected when the parameters were within ± 10 percent of the previous reading.

Ground water samples were collected using disposable PVC bailers. Nylon line was used to lower the bailer, and new line and a new bailer were used for each well. Samples were transferred to laboratory-supplied containers, stored in a chilled cooler, and transported under standard chain-of-custody procedures to Columbia Analytical Services, Inc., in Bothell, Washington, for analyses.

LABORATORY ANALYSES

Ground water samples from all wells were submitted for analysis for total petroleum hydrocarbons (TPH) as gasoline by Washington State Department of Ecology Method WTPH-G, for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Methods 5030/8020, and for total lead by EPA Method 7421. Duplicate and field blank samples were submitted for analysis for TPH as gasoline and BTEX. In addition, ground water samples from AGW-4 and AGW-5 were analyzed for ethylene glycol by EPA Method 8020. A ground water sample from AGW-4 was collected to be analyzed for total coliform by SW Method 9221B, but the holding time was exceeded before it could be analyzed.

LABORATORY ANALYTICAL RESULTS

Ground water samples collected November 6, 1992, contained benzene concentrations that exceeded MTCA Method A cleanup Levels in AGW-1, AGW-2, and AGW-4. MTCA Method A cleanup levels were also exceeded for toluene, ethylbenzene, and total xylenes in AGW-1 and AGW-2. TPH as gasoline concentrations exceeded MTCA Method A cleanup levels in samples collected from AGW-1 and AGW-2. Total lead and ethylene glycol were not detected in those samples analyzed.

Ground water analytical results, including those of all previous sampling episodes, are presented in Table 2. Copies of the laboratory report and chain-of-custody form for the current sampling event are included in Appendix B.

CONCLUSIONS

The increase in dissolved hydrocarbon concentrations beginning with the August 1991 sampling results is probably due to a leak in the vicinity of the unleaded tank pump turbine in July 1991. The leak has been repaired. Dissolved hydrocarbon concentrations generally decreased or remained constant from March 1992 to November 1992. The ground water sample collected from AGW-4 showed a reduction in toluene concentration to below MTCA Method A cleanup levels.

Mr. Mike Condon
December 4, 1992
Page 4

Project 0368-013.02

LIMITATIONS

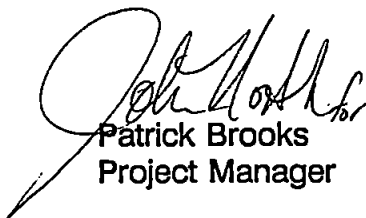
The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

We appreciate the opportunity to be of assistance to you on this project. If you have any questions or if we can be of further assistance to you, please call.

Sincerely,

EMCON Northwest, Inc.



Patrick Brooks
Project Manager



David W. Ashcom, P.E.
Director, Hydrocarbon Services

Table 1

**Survey and Ground Water Elevation Summary
Texaco Service Station
8701 Greenwood Avenue North
Seattle, Washington**

Well	Elevation at Top PVC (ft)	Date Monitored	Depth to Water (ft)	Ground Water Elevation (ft)
AGW - 1	47.36	04/03/91	3.18	44.18
		08/15/91	0.62	46.74
		09/20/91	0.48	46.88
		10/17/91	0.91	46.45
		11/21/91	0.70	46.66
		12/18/91	0.81	46.55
		03/06/92	0.47	46.89
		04/28/92	0.47	46.89
		05/22/92	0.48	46.88
		06/30/92	0.45	46.91
		11/06/92	0.46	46.90
AGW - 2	47.59	04/03/91	3.43	44.16
		08/15/91	1.65	45.94
		09/20/91	1.26	46.33
		10/17/91	1.27	46.32
		11/21/91	1.30	46.29
		12/18/91	1.07	46.52
		03/06/92	1.14	46.45
		04/28/92	1.14	46.45
		05/22/92	1.16	46.43
		06/30/92	1.13	46.42
		11/06/92	1.18	46.41
AGW - 3	49.10	(abnd'd)	(flowing)	(49.10 +)
AGW - 4	47.97	04/03/91	4.61	43.36
		08/15/91	2.76	45.21
		09/20/91	2.20	45.77
		10/17/91	2.40	45.57
		11/21/91	2.45	45.52
		12/18/91	2.86	45.11
		03/06/92	2.45	45.52
		04/28/92	3.08	44.89
		05/22/92	2.74	45.23
		06/30/92	2.80	45.17
		11/06/92	3.21	44.76

Table 1

**Survey and Ground Water Elevation Summary
(Continued)**

Well	Elevation at Top PVC (ft)	Date Monitored	Depth to Water (ft)	Ground Water Elevation (ft)
AGW - 5	49.47	04/03/91	2.78	46.69
		08/15/91	1.53	47.94
		09/20/91	<2.06 *	47.41 +
		10/17/91	1.59	47.88
		11/21/91	2.40	47.07
		12/18/91	1.44	48.03
		03/06/92	1.45	48.02
		04/28/92	1.88	47.59
		05/22/92	1.62	47.85
		06/30/92	1.76	47.71
		11/06/92	2.27	47.20
<p>NOTES: Elevations are referenced to an on-site benchmark location; the benchmark was assigned an arbitrary elevation of 50 feet.</p> <p>* Water level continued to rise after one hour; this is last reading and represents a minimum ground water elevation.</p>				

Table 2
Texaco Environmental Services
Ground Water Sample Chemical Analyses
8701 Greenwood Avenue North
Seattle, Washington

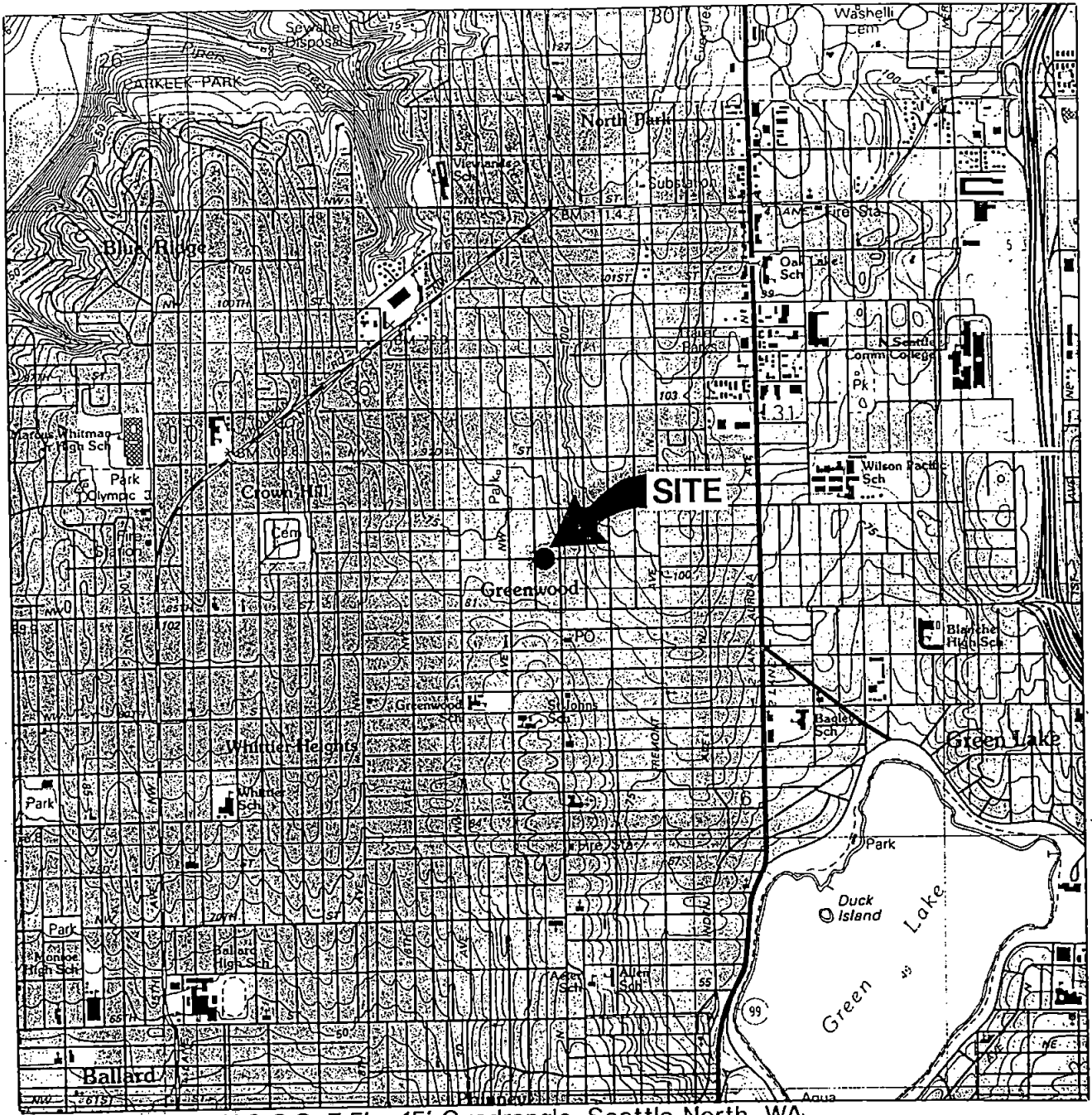
Sample Location	Sample Date	Sample ID	BTEX Compounds ^a (ppb)				418.1 (ppm)	Total Petroleum Hydrocarbons ^b (ppm)			Total Lead ^c (ppb)
			Benzene	Toluene	Ethylbenzene	Total Xylenes		Gasoline	Diesel	Oil	
MTCA Method A Cleanup Levels			5	40	30	20	1	1	1	1	5
AGW-1	4/3/91	AGW-1	ND	ND	ND	ND	---	---	---	---	---
AGW-1	5/15/91	AGW-1	440	1,000	92	670	---	---	---	---	---
AGW-1	8/15/91	AGW-1	1,400	7,400	1,000	8,100	---	361	---	---	ND
AGW-1 (dup)	8/15/91	AGW-7	1,300	6,900	930	7,500	---	340	---	---	ND
AGW-1	11/21/91	AGW-1	680	6,400	2,000	13,000	---	47	ND	ND	---
AGW-1 (dup)	11/21/91	AGW-10	710	6,700	2,100	14,000	---	49	ND	ND	---
AGW-1	3/6/92	01-03-06-92	330	3,200	1,400	8,700	---	48	ND	ND	ND
AGW-1 (dup)	3/6/92	03-03-06-92	333	3,200	1,400	8,900	---	48	---	---	---
AGW-1	11/6/92	01-11-06-92	95.1	260	1,400	8,200	---	37	---	---	ND
AGW-1 (dup)	11/6/92	03-11-06-92	98.0	260	1,400	8,300	---	37	---	---	---
AGW-2	4/3/91	AGW-2	ND	ND	ND	ND	---	---	---	---	---
AGW-2 (dup)	4/3/91	AGW-22	ND	ND	ND	ND	---	---	---	---	---
AGW-2	5/15/91	AGW-2	ND	ND	ND	ND	---	---	---	---	---
AGW-2	8/15/91	AGW-2	250	220	15	86	---	1.03	---	---	ND
AGW-2	11/21/91	AGW-2	910	1,300	260	1,200	---	7.3	ND	1.2	---
AGW-2	3/6/92	02-03-06-92	870	3,700	760	4,900	---	24	ND	1.1	ND
AGW-2 (dup)	3/6/92	08-03-06-92	840	3,500	730	4,700	---	23	ND	0.9	---
AGW-2	11/6/92	02-11-06-92	152	98	175	804	---	3.23	---	---	ND
AGW-3	3/29/91	AGW-3	ND	ND	ND	ND	---	---	---	---	---
AGW-4	4/3/91	AGW-4	2.6	20	2.7	31	---	---	---	---	---
AGW-4	5/15/91	AGW-4	8.4	19	2.4	20	ND	---	---	---	---
AGW-4	8/15/91	AGW-4	11	4	1	7	---	12	3.26	---	4
AGW-4*	11/21/91	AGW-4	660	700	21	133	---	3.5	ND	2.04	---
AGW-4**	3/6/92	04-03-06-92	139	182	3	18	---	ND	ND	0.8	ND
AGW-4***	11/6/92	04-11-06-92	20.9	13	4	17	---	0.09	---	---	ND

Table 2
Texaco Environmental Services
Ground Water Sample Chemical Analyses
8701 Greenwood Avenue North
(Continued)

Sample Location	Sample Date	Sample ID	BTEX Compounds ^a (ppb)				418.1 (ppm)	Total Petroleum Hydrocarbons ^b (ppm)			Total Lead ^c (ppb)
			Benzene	Toluene	Ethylbenzene	Total Xylenes		Gasoline	Diesel	Oil	
MTC A Method A Cleanup Levels			5	40	30	20	1	1	1	1	5
AGW-5	4/3/91	AGW-5	30	10	5	7	--	--	--	--	--
AGW-5	5/15/91	AGW-5	220	53	3.5	12	--	--	--	--	--
AGW-5 (Dup)	5/15/91	AGW-10	190	53	3.5	11	--	--	--	--	--
AGW-5	8/15/91	AGW-5	9.4	ND	ND	ND	--	0.10	--	--	ND
AGW-5	11/21/91	AGW-5	2.5	ND	ND	ND	--	ND	ND	ND	--
AGW-5*	3/6/92	05-03-06-92	0.9	ND	ND	ND	--	ND	ND	ND	ND
AGW-5*	11/6/92	05-11-06-92	ND	ND	ND	ND	--	ND	--	--	ND
Blank	11/6/92	06-11-06-92	ND	ND	ND	ND	--	ND	--	--	--

NOTES: ND No detection
 -- Not analyzed
 AGW4* Total Coliform Bacteria = 110 organisms per liter
 AGW4** Total Coliform Bacteria = ND; Ethylene Glycol = ND
 AGW4*** Ethylene Glycol = ND
 AGW5* Ethylene Glycol = ND
 Dup Duplicate sample
 Shaded cells Shaded cells indicate that values exceed MTC A Method A levels.
 MTC A Model Toxics Control Act, Chapter 173-340 WAC, adopted February 1991.
 Chapter 173-340 WAC, "The Model Toxics Control Act Cleanup Regulations, Method A Cleanup Limits." Amended February 1991. Caution on misusing Method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

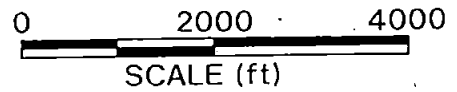
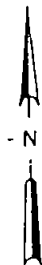
^a Results for analyses of ground water samples for BTEX and ethylene glycol were obtained using EPA Methods 5030/8020 (Purge and Trap) and reported as µg/l (ppb).
^b Results for analyses of ground water samples for total petroleum hydrocarbons were obtained using EPA Methods 5030/8015 Modified (GC/FID), reported as µg/l (ppb), and presented here in ppm.
^c Results for analyses of ground water samples for total lead were obtained using EPA Method 7421 and reported as µg/l (ppb).



SOURCE: U.S.G.S. 7.5' x 15' Quadrangle, Seattle North, WA.

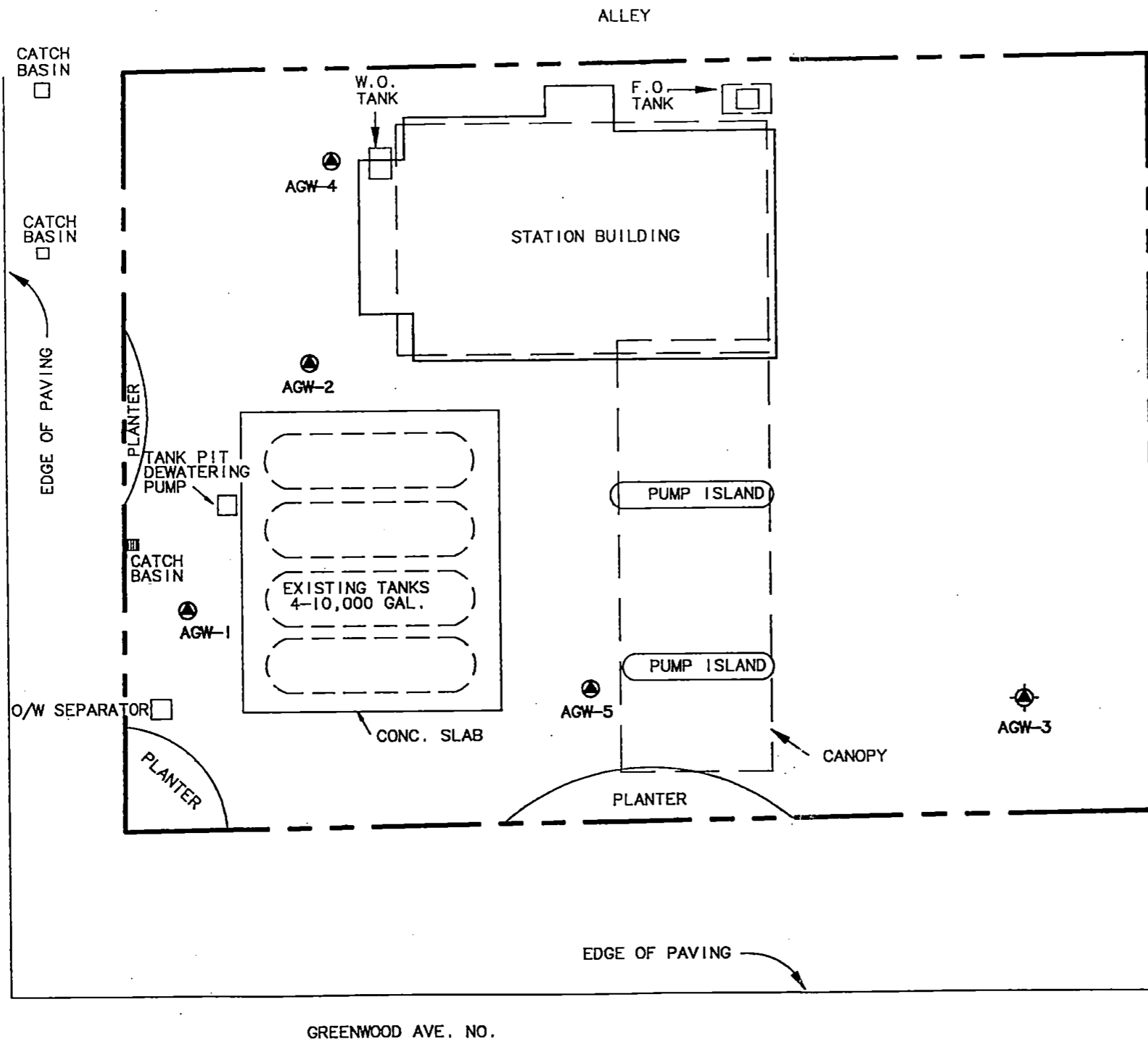




WASHINGTON

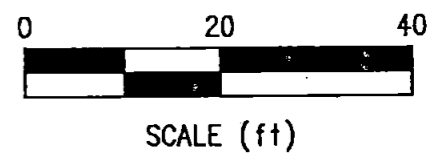


DATE 4/92
 DWN. JA
 APPR. _____
 REVIS. _____
 PROJECT NO. W6813.02

Figure 1
 TEXACO SERVICE STATION
 8701 GREENWOOD AVENUE NORTH
 SEATTLE, WASHINGTON
 SITE LOCATION MAP

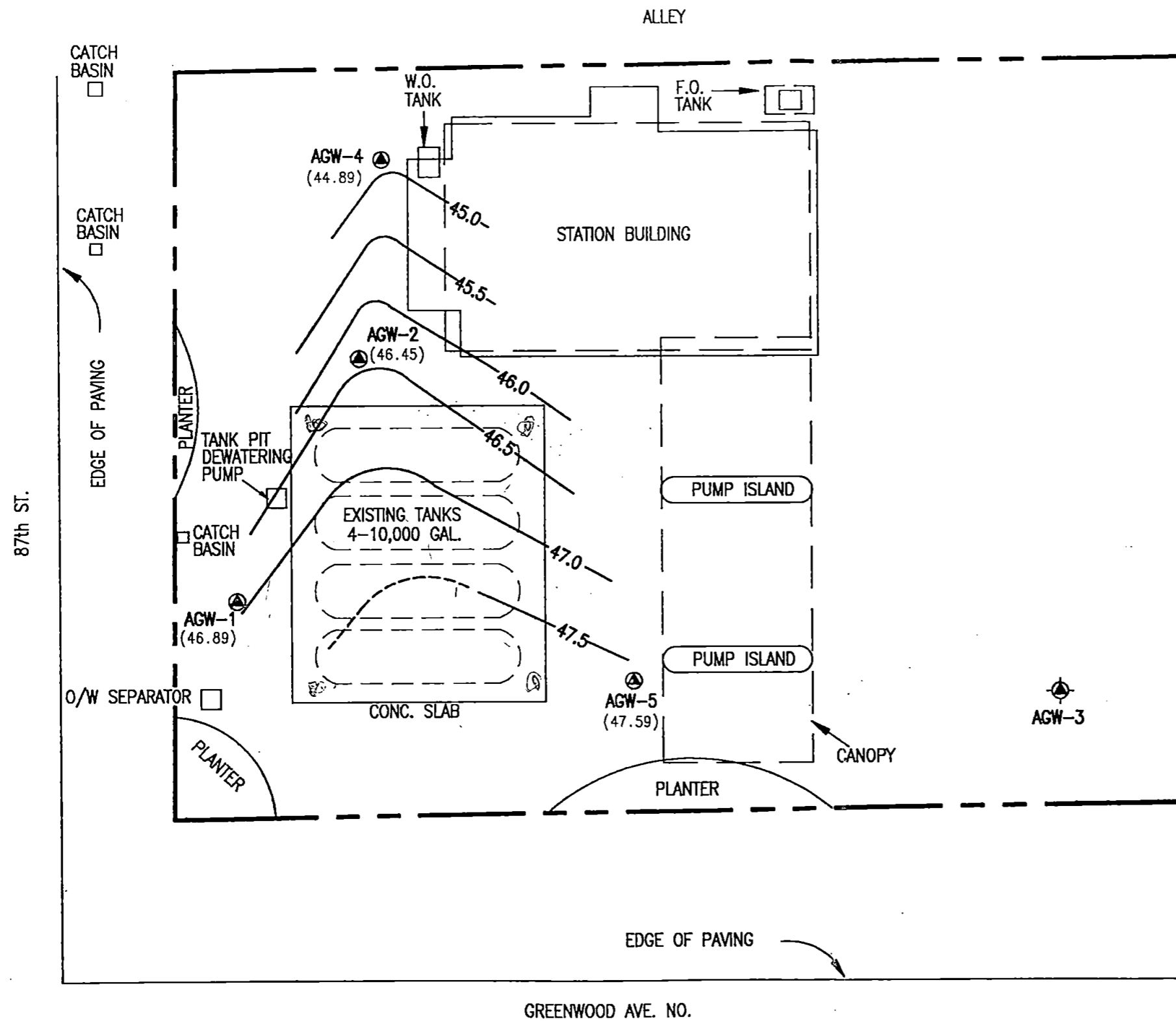


- LEGEND
- 
 AGW-1 MONITORING WELL LOCATION AND WELL NUMBER
 - 
 AGW-3 ABANDONED MONITORING WELL LOCATION AND WELL NUMBER




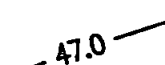


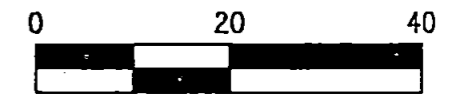
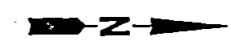
DATE 3/3
 DWN. KLM
 REV. _____
 APPR. _____
 PROJECT NO. _____
 U681302

Figure 2
 87th ST. & GREENWOOD AVE. NO.,
 SEATTLE, WASHINGTON
MONITORING WELL LOCATION MAP



LEGEND:

-  AGW-1 Monitoring Well Location and Well Number
-  AGW-3 Abandoned Monitoring Well Location and Well Number
-  (46.89) Measured Water Level in Monitoring Well on April 28, 1992
-  47.0 Approximate Potentiometric Surface Elevation (Referenced to On-site Benchmark Assigned Arbitrary Elevation of 50.00 Feet)

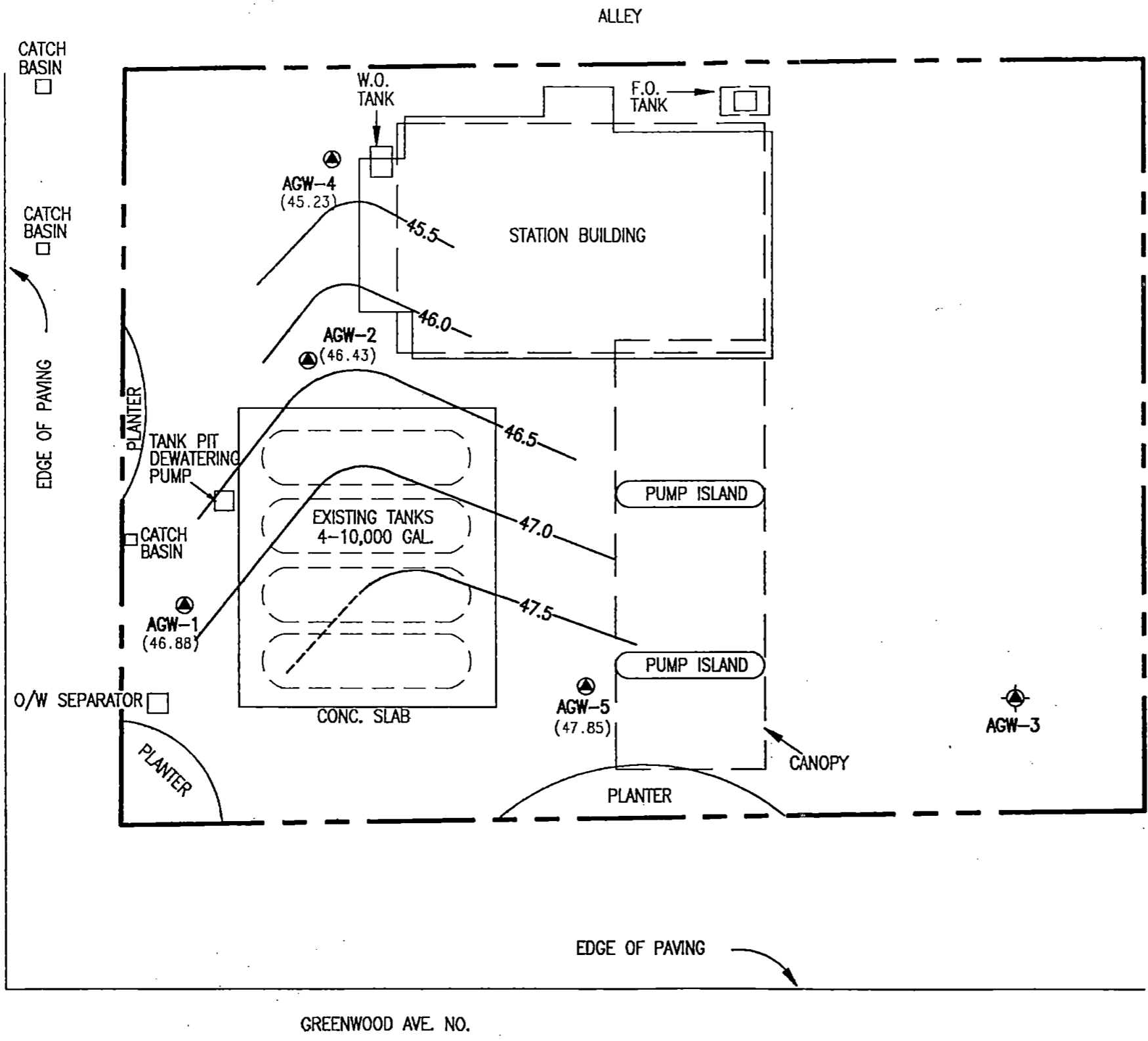


SCALE (ft)



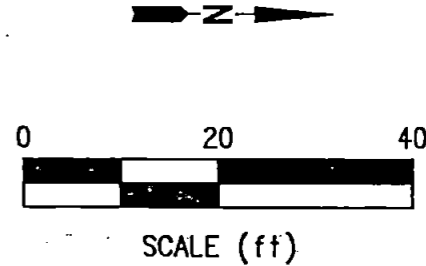
DATE 3/3
 DWN. JBG
 REV. _____
 APPR. _____
 PROJECT NO. _____
 0368-013.02

Figure 3A
 87th ST. AND GREENWOOD AVE. NORTH
 SEATTLE, WASHINGTON
POTENTIOMETRIC SURFACE MAP 04/28/92



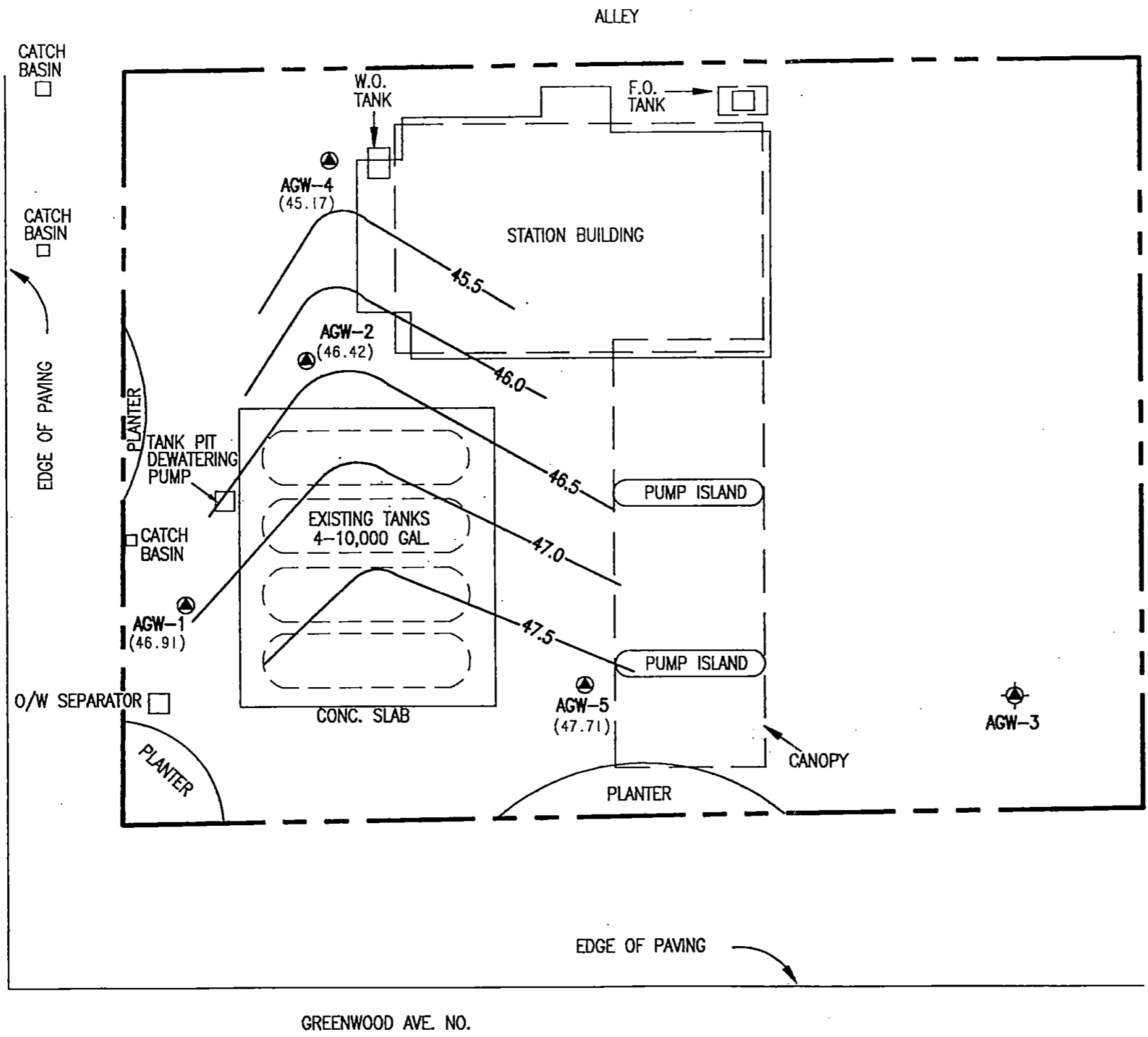
LEGEND:

- AGW-1 Monitoring Well Location and Well Number
- ⊙ AGW-3 Abandoned Monitoring Well Location and Well Number
- (46.88) Measured Water Level in Monitoring Well on May 22, 1992
- 47.0 — Approximate Potentiometric Surface Elevation (Referenced to On-site Benchmark Assigned Arbitrary Elevation of 50.00 Feet)






DATE 3/3
DWN. JBG
REV. _____
APPR. _____
PROJECT NO. _____
0368-013.02

Figure 3B
87th ST. AND GREENWOOD AVE. NORTH
SEATTLE, WASHINGTON
POTENTIOMETRIC SURFACE MAP 05/22/92



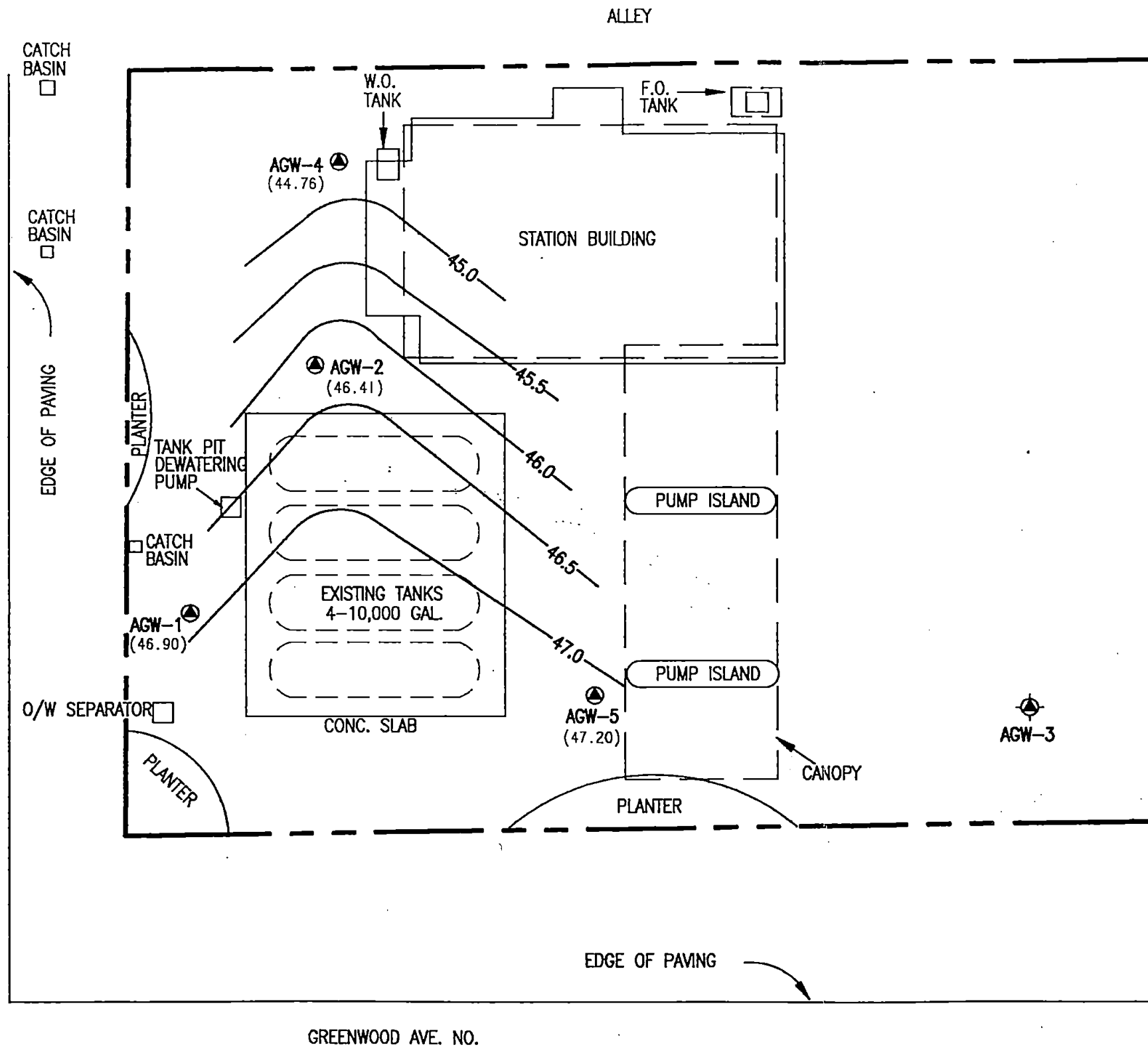
LEGEND:

- 
 AGW-1
 Monitoring Well Location and Well Number
- 
 AGW-3
 Abandoned Monitoring Well Location and Well Number
- (46.91)
 Measured Water Level in Monitoring Well on June 30, 1992
- 
 47.0
 Approximate Potentiometric Surface Elevation (Referenced to On-site Benchmark Assigned Arbitrary Elevation of 50.00 Feet)

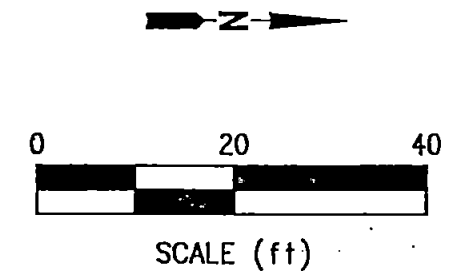


DATE 3/3
 OWN. JBG
 REV.
 APPR.
 PROJECT NO.
 0368-013.02

Figure 3C
 87th ST. AND GREENWOOD AVE. NORTH
 SEATTLE, WASHINGTON
POTENTIOMETRIC SURFACE MAP 06/30/92



- LEGEND:**
- AGW-1 Monitoring Well Location and Well Number
 - AGW-3 Abandoned Monitoring Well Location and Well Number
 - (46.90) Measured Water Level in Monitoring Well on November 6, 1992
 - 47.0 Approximate Potentiometric Surface Elevation (Referenced to On-site Benchmark Assigned Arbitrary Elevation of 50.00 Feet)



DATE 3/3
 DWN. JBG
 REV. _____
 APPR. _____
 PROJECT NO. 0368-013.02

Figure 3D
 87th ST. AND GREENWOOD AVE. NORTH
 SEATTLE, WASHINGTON
POTENTIOMETRIC SURFACE MAP 11/08/92

Appendix A
FIELD SAMPLING DATA



EMCON Northwest, Inc.

18912 Northcreek Parkway #100
Bothell, Washington 98011-8016

Job Number: 0368-013,02

Field Report Number: -

Page: 1 of 1

Date: 11-6-92

FIELD REPORT

PROJECT: Texaco Greenwood ARRIVAL TIME: 09:35
8701 Greenwood Ave N.

LOCATION: Seattle, WA DEPARTURE TIME: 16:37

CLIENT: Texaco WEATHER: cloudy, rain, 50's

PURPOSE OF WORK/OBSERVATIONS: collect ground water measurements samples; well maintenance

EMCON REPRESENTATIVE: Tom Bodle EMCON PROJECT MANAGER: Pat Brooks

Any conclusions and/or recommendations in this field report are subject to review by the EMCON Project Manager

COMMENTS: Measured depth to water, pH, conductivity, temperature in monitoring wells AGW-1, AGW-2, AGW-4, AGW-5. Collected ground water samples from same wells, delivered, on ice, to CAS lab in Bothell for analyses: ① TPH-G, BTEX for all wells, trip blank, field blank "06-11-06-92" and duplicate of AGW-1 as "07-11-06-92"; ② total lead for all wells and duplicate, ③ ethylene glycol for wells AGW-4, AGW-5 and ④ total coliform for well AGW-4.

Used ARO Pump with compressor to purge all wells of combined total of 135.5 gallons groundwater, stored in 3 labeled 55 gallon drums, n.w. corner of site.

Observed sheen in AGW-1, AGW-2.

Replaced wellcap and lock on AGW-2, AGW-4. Observed monument cover bolt housing missing (x1) on AGW-1, AGW-2

Chain of custody, field sampling data sheets attached.

Polyethylene tubing left in all wells for future purge pump efficiency

By:

Tom Bodle

EMCON Representative

Reviewed By:

Pat Brooks

EMCON Project Manager



EMCON
Northwest, Inc.

18912 North Creek Parkway, Suite 210 • Bothell, WA 98011
Office (206) 485-5000 • FAX (206) 486-9766

Field Sampling Data

LOCATION/ADDRESS 8701 Greenwood Ave N, Seattle WA
PROJECT NAME Texaco Greenwood #038 013 02 task 2
CLIENT/CONTACT _____

Well or Surface Site Number AGW-1
Sample Designation 01-11-06-92
Date, Time 11-6-92 12:50
Weather cloudy, mist SOs

HYDROLOGY MEASUREMENTS: 4"

(Nearest .01 ft.)	Elevation	Date, Time	Method Used (M-Scope Number or Other)
<u>dtw = 5.5" = .46'</u>	<u>top = 47.36</u>	<u>11-6-92 10:49</u>	<u>Soiltest #2</u>
<u>dtb = 11.90 (3-6-12)</u>	<u>rel = 46.90</u>		
<u>A = 18.94</u>			

WELL EVACUATION: 1 pv = 12.37 gallon

Gallons	Pore Volumes	Method Used	Rinse Method	Date, Time
<u>37.5</u>	<u>3+</u>	<u>pump</u>	<u>N/A</u>	<u>11-6-92 12:37</u>
Surface Water Flow Speed	Measurement Method			Date, Time
			<u>N/A</u>	<u>N/A</u>

SAMPLING:

Sample	Date, Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preservative	Iced (yes,no)	Sampler/Cleaning Method
<u>TPH</u>	<u>11-6-92</u>	<u>d.b =</u>	<u>3x 40</u>	<u>VOA</u>	<u>N/A</u>	<u>N</u>	<u>HCl</u>	<u>Y</u>	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
<u>BTEX</u>		<u>disposable</u>							
<u>Total Pb</u>	<u>"</u>	<u>boiler</u>	<u>1000/pt</u>	<u>plastic</u>	<u>"</u>	<u>"</u>	<u>HNO3</u>	<u>"</u>	

FIELD WATER QUALITY TESTS: coming check meter 90

Pore Vol. Number	pH	Conductivity	Temp	time FH
<u>1</u>	<u>6.48</u>	<u>303 uS</u>	<u>14.6°C</u>	<u>12:18</u>
<u>2</u>	<u>6.79</u>	<u>307</u>	<u>14.9</u>	<u>12:28</u>
<u>3</u>	<u>6.70</u>	<u>292</u>	<u>14.7</u>	<u>12:37</u>

NOTES:

purge water observed steen in well
clear, with pv #2, to slightly silty
musty odor, possibly hydrocarbon like (h.c.)
exc. recovery
bolt housing on manov. cover broken (1 of 2)

Total # of Bottles: 4 (also dup 03-11-06-92) Signature: T. Ball



EMCON
Northwest, Inc.

18912 North Creek Parkway, Suite 210 • Bothell, WA 98011
Office (206) 485-5000 • FAX (206) 486-9766

Field Sampling Data
duplicate

LOCATION/ADDRESS _____
PROJECT NAME Texaco Greenwood # _____
CLIENT/CONTACT _____

Well or Surface Site Number AGW-1
Sample Designation 03-11-06-92
Date, Time 11-6-92 "1200"
Weather _____

HYDROLOGY MEASUREMENTS:

(Nearest .01 ft.)	Elevation	Date, Time	Method Used (M-Scope Number or Other)
_____	_____	_____	_____
_____	_____	_____	_____

WELL EVACUATION:

Gallons	Pore Volumes	Method Used	Rinse Method	Date, Time
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Surface Water Flow Speed _____ Measurement Method _____ Date, Time _____

SAMPLING:

Sample	Date, Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preservative	Iced (yes,no)	Sampler Cleaning Method
<u>WPHG</u>	<u>11-6-92</u>	_____	_____	_____	_____	_____	_____	_____	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
<u>BTEX</u>	<u>12:00</u>	_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	_____	_____	

FIELD WATER QUALITY TESTS:

Pore Vol. Number	pH	Conductivity	Temp	Eh	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

NOTES:

Duplicate of AGW-1, see AGW-1 field sampling data sheet.

Total # of Bottles: 4

Signature: Bode



EMCON

Northwest, Inc.

18912 North Creek Parkway, Suite 210 • Bothell, WA 98011
Office (206) 485-5000 • FAX (206) 486-9766

Field Sampling Data

LOCATION/ADDRESS 8701 Greenwood Ave N
PROJECT NAME Toxico Greenwood # 0268-013-02
CLIENT/CONTACT _____

Well or Surface Site Number AGW-2
Sample Designation 02-11-06-92
Date, Time 11-6-92 14:00
Weather cloudy misty 50's

HYDROLOGY MEASUREMENTS:

(Nearest .01 ft.) Elevation Date, Time Method Used (M-Scope Number or Other)
dhw = 4.18 tp = 47.99 11-6-92 10:55 Solinst (#2)
dth = 19.65 (3-6-92) rel. = 46.41
A = 18.47

WELL EVACUATION: 1 p.v. = 2.06 gallon

Gallons 37 Pore Volumes 3+ Method Used pump Rinse Method N/A Date, Time 11-6-92 13:49

Surface Water Flow Speed N/A Measurement Method N/A Date, Time N/A

SAMPLING:

Sample	Date, Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preservative	Iced (yes,no)	Sampler Cleaning Method
TPH	<u>11-6-92</u>	<u>d.b.</u>	<u>2x40</u>	<u>N/A</u>	<u>N/A</u>	<u>N</u>	<u>HCl</u>	<u>Y</u>	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
BTEX	<u>14:00</u>								
Total Pb	<u>"</u>		<u>10.02</u>	<u>plastic</u>	<u>"</u>	<u>"</u>	<u>HNO3</u>	<u>"</u>	

FIELD WATER QUALITY TESTS:

Pore Vol. Number	pH	Conductivity	Temp	time Eh				
<u>1</u>	<u>6.43</u>	<u>577 uS</u>	<u>11.7°C</u>	<u>13:28</u>				
<u>2</u>	<u>6.73</u>	<u>435</u>	<u>11.2</u>	<u>13:37</u>				
<u>3</u>	<u>6.97</u>	<u>426</u>	<u>13.9</u>	<u>13:49</u>				

NOTES:

purple water observed seen in well
slightly silty, olive brown
sewage odor also possibly h.c. like
mod. to heavily silted at end of p.v. #2, going dry?
mod silty at end p.v. #3
replaced well cap and lock as in poor shape, seal may be bad
one bolt housing missing in monument cover assembly

Signature: [Signature]



EMCON
Northwest, Inc.

18912 North Creek Parkway, Suite 210 • Bothell, WA 98011
Office (206) 485-5000 • FAX (206) 486-9766

Field Sampling Data

LOCATION/ADDRESS 8701 Greenwood
PROJECT NAME Tex. Greenwood
CLIENT/CONTACT _____

Well or Surface Site Number AGW-5
Sample Designation 05-11-06-92
Date, Time 11-06-92 14:40
Weather cloudy misty 50's

HYDROLOGY MEASUREMENTS: 4"
(Nearest .01 ft.) Elevation Date, Time Method Used (M-Scope Number or Other)
dtw = 2.27 top = 49.47 11-6-92 10:53 Solinst (#2)
dtb = 11.50 (36-92) rel = 47.20
Δ = 17.23

WELL EVACUATION: 1 p.v. = 11.25 gallon
Gallons Pore Volumes Method Used Rinse Method Date, Time
34 3+ pump N/A 11-6-92 14:25
Surface Water Flow Speed N/A Measurement Method N/A Date, Time N/A

SAMPLING:

Sample	Date, Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preservative	Iced (yes,no)	Sampler Cleaning Method
<u>TTH</u>	<u>11-6-92</u>	<u>d.b</u>	<u>3x40</u>	<u>JOA</u>	<u>N/A</u>	<u>N</u>	<u>HCl</u>	<u>Y</u>	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
<u>BTEX</u>	<u>14:40</u>								
<u>total Pb</u>	<u>"</u>	<u>"</u>	<u>16oz</u>	<u>plastic</u>	<u>"</u>	<u>"</u>	<u>N/A</u>	<u>"</u>	
<u>chloroform</u>	<u>"</u>	<u>"</u>	<u>3x40</u>	<u>JOA</u>	<u>"</u>	<u>"</u>	<u>none</u>	<u>"</u>	

FIELD WATER QUALITY TESTS:

Pore Vol. Number	pH	Conductivity	Temp	time				
<u>1</u>	<u>6.27</u>	<u>262 μS</u>	<u>14.9</u>	<u>11:53</u>				
<u>2</u>	<u>7.01</u>	<u>258 μS</u>	<u>13.5</u>	<u>14:20</u>				
<u>3</u>	<u>7.11</u>	<u>259 μS</u>	<u>13.8</u>	<u>14:25</u>				

NOTES:

purge water: clear to slightly silty cannot distinguish color
observed a musty odor cannot discern if hydrocarbon like
well going dry at ~ 1.5 p.v (i.e. pv# 1.5)
clear at end of pv# 2
slightly silty at end of pv# 3



EMCON
Northwest, Inc.

18912 North Creek Parkway, Suite 210 • Bothell, WA 98011
Office (206) 485-5000 • FAX (206) 486-9766

Field Sampling Data
* field blank *

LOCATION/ADDRESS (Texaco) 8701 Greenwood N. Seattle
PROJECT NAME Texaco Greenwood # 0368 013 02
CLIENT/CONTACT _____

Well or Surface Site Number N/A
Sample Designation 06-11-06-92
Date, Time 11-6-92 15:00
Weather cloudy mst 50s

HYDROLOGY MEASUREMENTS:

(Nearest .01 ft.) Elevation Date, Time Method Used (M-Scope Number or Other)
N/A _____ _____ _____

WELL EVACUATION:

Gallons Pore Volumes Method Used Rinse Method Date, Time
N/A _____ _____ _____

Surface Water Flow Speed _____ Measurement Method _____ Date, Time _____

SAMPLING:

Sample	Date, Time	Method	Volume (ml)	Container Type	Depth Taken (feet)	Field Filtered (yes,no)	Preservative	Iced (yes,no)	Sample Cleaning Method
<u>11-6-92</u>	<u>11-6-92</u>	<u>d.b</u>	<u>2 x 40</u>	<u>VOA</u>	<u>N/A</u>	<u>N</u>	<u>HCl</u>	<u>Y</u>	Non-Phosphatic detergent wash H2O rinse MeOH rinse Distilled H2O rinse
<u>WPH-G</u>	<u>1500</u>	_____	_____	_____	_____	_____	_____	_____	
<u>ISTEX</u>	_____	_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	_____	_____	

FIELD WATER QUALITY TESTS: N/A

Pore Vol. Number	pH	Conductivity	Temp	Eh
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

NOTES:

Field blank collected after 3x rinse of plastic trailer with "certified" distilled water (1 gallon jug)

Total # of Bottles: 2

Signature: [Signature]

Appendix B

LABORATORY REPORTS AND CHAIN-OF-CUSTODY FORM



COPIES
IN PROJECT
FILING

November 18, 1992 -

Work Order No.: B920622

Pat Brooks
EMCON Northwest
18912 N Creek Parkway
Suite 210
Bothell, WA 98011

Re: Texaco Greenwood/Project #0368-013-02

Dear Pat:

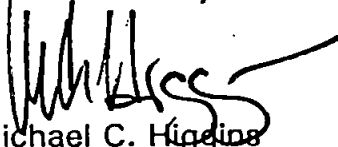
Enclosed are the results of the samples submitted to our laboratory on November 6, 1992. For your reference, this service request has been assigned our work order number B920622.

All analyses were performed in accordance with our laboratory's quality assurance program.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.



Michael C. Higgins
Laboratory Manager

MCH/bdr

COLUMBIA ANALYTICAL SERVICES, INC..

Analytical Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Work Order No.: B920622

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
 $\mu\text{g/L}$ (ppb)

Sample Name:	01-11-06-92	02-11-06-92	03-11-06-92
Lab Code:	B0622-1	B0622-2	B0622-3
Date Analyzed:	11/11/92	11/10/92	11/11/92

Analyte	MRL			
Benzene	0.5	95.1	152	98.0
Toluene	1	260	98	260
Ethylbenzene	1	1,400	175	1,400
Total Xylenes	1	8,200	804	8,300
TPH as Gasoline	50	37,000	3,230	37,000

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by



Date

9/2/11/9

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Work Order No.: B920622

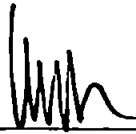
BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
 $\mu\text{g/L}$ (ppb)

Sample Name:	04-11-06-92	05-11-06-92	06-11-06-92
Lab Code:	B0622-4	B0622-5	B0622-6
Date Analyzed:	11/10/92	11/10/92	11/10/92

Analyte	MRL			
Benzene	0.5	20.9	ND	ND
Toluene	1	13	ND	ND
Ethylbenzene	1	4	ND	ND
Total Xylenes	1	17	ND	ND
TPH as Gasoline	50	90	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by



Date



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Work Order No.: B920622

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
μg/L (ppb)

Sample Name:
Lab Code:
Date Analyzed:

Trip Blank
B0622-7
11/10/92

Method Blank
B0622-MB
11/10/92

Analyte	MRL		
Benzene	0.5	ND	ND
Toluene	1	ND	ND
Ethylbenzene	1	ND	ND
Total Xylenes	1	ND	ND
TPH as Gasoline	50	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by



Date

9/21/92

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Date Analyzed: 11/10,11/92
Work Order No.: B920622

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020
Washington DOE Method WTPH-G

Sample Name	Lab Code	Spike Level (ug/L)	Percent Recovery α,α,α -Trifluorotoluene
01-11-06-92	B0622-1	500	116
02-11-06-92	B0622-2	500	101
03-11-06-92	B0622-3	500	117
04-11-06-92	B0622-4	500	101
05-11-06-92	B0622-5	500	100
05-11-06-92	B0622-5MS	500	100
06-11-06-92	B0622-6	500	100
Trip Blank	B0622-7	500	101
Method Blank	B0622-MB	500	101
Laboratory Control Sample	B0622-LCS	500	111

CAS Acceptance Criteria

50-130

TPH Total Petroleum Hydrocarbons

Approved by



Date

11/11/92

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Date Analyzed: 11/10/92
Work Order No.: B920622

Duplicate Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
 $\mu\text{g/L}$ (ppb)

Sample Name: Batch QC
Lab Code: B0617-2

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	112	108	110	4
Toluene	1	1	ND	--	--
Ethylbenzene	1	1	1	1	<1
Total Xylenes	1	7	7	7	<1
TPH as Gasoline	50	50	50	50	<1

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by



Date

9/21/19

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood
Sample Matrix: Water

Date Collected: 11/06/92
Date Received: 11/06/92
Date Analyzed: 11/10/92
Work Order No.: B920622

Matrix Spike Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
 $\mu\text{g/L}$ (ppb)

Sample Name: 05-11-06-92
Lab Code: B0622-5

Analyte	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	100	ND	98	98	51-159
Toluene	100	ND	97	97	50-156
Ethylbenzene	100	ND	98	98	49-157

ND None Detected at or above the method reporting limit

Approved by



Date

11/11/92

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood
LCS Matrix: Water

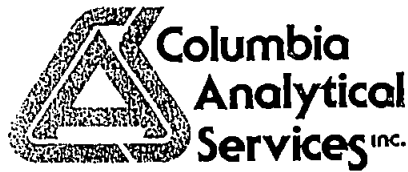
Date Analyzed: 11/10/92
Work Order No.: B920622

Laboratory Control Sample Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020
Washington DOE Method WTPH-G
 $\mu\text{g/L}$ (ppb)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Gasoline	4,900	4,670	95	70-140

TPH Total Petroleum Hydrocarbons

Approved by  Date 



ANALYSIS
IN PROGRESS
FILING

November 28, 1992

Pat Brooks
EMCON Northwest, Inc.
18912 North Creek Parkway, Suite 210
Bothell, WA 98011

Re: Texaco - Greenwood/Project #0368-013-02/B920622

Dear Pat:

Enclosed are the results of the samples submitted to our laboratory on November 6, 1992. For your reference, these analyses have been assigned our work order number K927092B.

All analyses were performed in accordance with our laboratory's quality assurance program. Reproduction of reports is allowed only in whole, not in part. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in cursive script that reads "Colin B. Elliott".

Colin B. Elliott
Senior Project Chemist

CBE/akn

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
Sample Matrix: Water

Date Received: 11/06/92
Date Analyzed: 11/13/92
Work Order No.: K927092B

Total Lead
EPA Method 7421
 $\mu\text{g/L}$ (ppb)

Sample Name	Lab Code	MRL	Result
01-11-06-92	K7092-1	2	ND
02-11-06-92	K7092-2	2	ND
03-11-06-92	K7092-3	2	ND
04-11-06-92	K7092-4	2	ND
05-11-06-92	K7092-5	2	ND
Method Blank	K7092-MB	2	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Colin Elliott Date 11/30/92

0001

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
Sample Matrix: Water

Date Received: 11/06/92
Date Analyzed: 11/23/92
Work Order No.: K927092B

Ethylene Glycol
EPA Method Modified 8015
mg/L (ppm)

Sample Name	Lab Code	MRL	Result
04-11-06-92	K7092-4	10	ND
05-11-06-92	K7092-5	10	ND
Method Blank	K7092-MB	10	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Cheri Elliott Date 11/30/92

00002

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
Sample Matrix: Water

Date Received: 11/06/92
Date Analyzed: 11/13/92
Work Order No.: K927092B

Duplicate Summary
Total Lead
EPA Method 7421
 $\mu\text{g/L}$ (ppb)

Sample Name	Lab Code	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
01-11-06-92	K7092-1	2	ND	2	NC	NC

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
NC Not Calculated

Approved by Alan Elliott Date 11/30/92

00004

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
Sample Matrix: Water

Date Received: 11/06/92
Date Analyzed: 11/13/92
Work Order No.: K927092B

Matrix Spike Summary
Total Lead
EPA Method 7421
 $\mu\text{g/L}$ (ppb)

Sample Name	Lab Code	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
01-11-06-92	K7092-1	2	20	ND	21	105	75-125

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Cobin Ellert Date 11/30/92

0005

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
Sample Matrix: Water

Date Received: 11/06/92
Date Analyzed: 11/23/92
Work Order No.: K927092B

Matrix Spike/Duplicate Matrix Spike Summary
Ethylene Glycol
EPA Method Modified 8015
mg/L (ppm)

Sample Name: 05-11-06-92
Lab Code: K7092-5

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery		Relative Percent Difference
	MS	DMS		MS	DMS	MS	DMS	
Ethylene Glycol	25	25	7J	33	31	104	96	6

J Estimated value below the method reporting limit, but above the instrument detection limit.

Approved by Colin Elliott Date 4/30/92

0006

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco - Greenwood
LCS Matrix: Water

Date Analyzed: 11/23/92
Work Order No.: K927092B

Laboratory Control Sample Summary
Ethylene Glycol
EPA Method Modified 8015
mg/L (ppm)

Analyte	True Value	Result	Percent Recovery
Ethylene Glycol	50	49	98

Approved by

Colin Elliott

Date

11/30/92

0007

