

**BLUE SAGE ENVIRONMENTAL, INC.**

198007 E 30<sup>th</sup> Avenue  
Kennewick, WA 99337

December 27, 2016

Carol A. Johnston, R.G., P.Hg.  
TCP-SWRO  
Department of Ecology  
PO Box 47775  
Olympia, WA 98504-7775

RE: 2016 Summary, Conan Fuel, Gig Harbor, Washington, F/S #98998391

Dear Ms. Johnston:

This letter summarizes the groundwater monitoring activities conducted in 2016 at the Conan Fuel site in Gig Harbor, Washington.

Depth to Groundwater measurements were recorded from select monitoring wells on the property in March, November and December of 2016. To determine groundwater flow direction, individual monitoring well depth to water measurements were converted to mean sea level elevations using each well's top of casing elevation (**Table 1**). Water level elevation data was contoured using standard three-point problem analyses. Flow direction across the site in 2016 was generally towards the northeast and east. (See Figures in **Appendix A**.)

The depth to groundwater data from November 17, 2016 created contours with flow direction to the south. The contours were judged to be erroneous and not representative of site conditions. Depth to water in the monitoring wells were measured again on December 17, 2016. The usual northeast - east groundwater flow direction was determined.

Groundwater samples from select monitoring wells were obtained in March and November 2016. They were sent to the ESN-Northwest laboratory for analysis. Laboratory reports are attached (**Appendix B**). Individual samples were analyzed for Gasoline, Benzene, Toluene, Ethylbenzene and Xylenes. Results are attached (**Table 2**).

Groundwater samples from monitoring wells MW-2, MW-4 and MW-8 showed significant increases in gasoline and benzene concentrations from March to November 2016. During this period, the rotary blower for the SVE system stopped functioning. Only the air sparge side of the remediation system is currently operational. At this time, the present effectiveness of this system is unknown.

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Conan Fuel's owner, Dan Root, is applying to PLIA for entry into their revolving loan and grant program. The site will require overhaul of the current SVE/AS system. Soil sampling will need to be completed to assess concentrations of Gasoline Related Organics (GRO) in the saturated zone.

Evaluation of an additional remediation technology, such as chemical injection, may be required to accelerate the degradation of the remaining GRO concentrations that are present in soil and groundwater across the subject property.

If you have any questions, or require any additional information, please do not hesitate to contact us.

This letter is based on site conditions, data, and other information available to Blue Sage as of the date of the letter. Conclusions herein are applicable only to the time frame in which the letter was prepared.

Sincerely,



Alexander H Koch, Project Manager  
Blue Sage Environmental, Inc.



Glenn Hayman, LHg  
Hayman Environmental, LLC

Attachments

## TABLES

CONAN FUEL  
GIG HARBOR, WA

**TABLE 1 Groundwater Elevations**

**Conan Fuel  
10320 Burnham Drive  
Gig Harbor, Washington**

<b>Well ID</b>	<b>Surveyed TOC (feet)</b>	<b>Date Measured</b>	<b>DTW (feet)</b>	<b>Elevation (feet)</b>	
<b>MW-1</b>	175.65	Monitoring well has product recovery piping installed. Not currently being used for depth to water measurements			
<b>MW-2</b>	173.85	9/24/15	8.21	165.64	
		3/24/16	3.88	169.97	
		11/17/16	5.00	168.85	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	6.15	167.70	<i>of site conditions</i>
<b>MW-3</b>	175.33	Monitoring well has been decommissioned and sealed.			
<b>MW-4</b>	176.50	9/24/15	9.35	167.15	
		3/24/16	5.40	171.10	
		11/17/16	8.04	168.46	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	3.84	172.66	<i>of site conditions</i>
<b>MW-5</b>	177.44	9/24/15	-	-	
		3/24/16	7.60	169.84	
		11/17/16	10.20	167.24	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	6.81	170.63	<i>of site conditions</i>
<b>MW-6</b>	174.54	9/24/15	-	-	
		3/24/16	4.05	170.49	
		11/17/16	6.99	167.55	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	6.43	168.11	<i>of site conditions</i>
<b>MW-7</b>	172.07	9/24/15	monument sidewalls rusted through, top of well under water.		
	172.57	9/23/16	added pvc pipe extension - 0.50 foot		
		11/17/16	3.45	169.12	<i>erroneous measurement</i>
		12/17/16	-	-	
<b>MW-8</b>	173.87	9/24/15	9.92	163.95	
		3/24/16	5.63	168.24	
		11/17/16	5.52	168.35	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	6.15	167.72	<i>of site conditions</i>
<b>MW-9</b>	174.83	9/24/15	-	-	
		3/24/16	6.68	168.15	
		11/17/16	6.12	168.71	<i>erroneous measurement, not representative of site conditions</i>
		12/17/16	6.18	168.65	<i>of site conditions</i>

**TABLE 2 GROUNDWATER ANALYTICAL RESULTS**  
**Conan Fuel**  
**10320 Burnham Dr NW**  
**Gig Harbor, WA 98335**

Blue Sage Environmental, Inc  
 Kennewick, WA  
 (509) 947-4059



Monitoring Well #	Sample Date	Result Units					
			Gasoline (NWTPH-Gx)	Benzene	Toluene	Ethylbenzene	Xylenes
MW-1	6/12/15		Monitoring well piped for product recovery				
MW-2	06/12/15	µg/L	990	nd	4.3	92	93
	09/24/15	µg/L	4,400	nd	25	100	280
	03/24/16	µg/L	nd	5.2	18	nd	4.4
	11/17/16	µg/L	3,100	nd	7	260	250
MW-3	06/12/15		Monitoring well has been decommissioned and sealed				
MW-4	06/12/15	µg/L	490	nd	13	24	128
	09/24/15	µg/L	nd	nd	nd	nd	nd
	03/24/16	µg/L	4,400	1.9	210	140	580
	11/17/16	µg/L	24,000	10	630	530	2,200
MW-5	06/12/15		no sample taken				
	09/24/15		no sample taken				
	03/24/16	µg/L	nd	nd	nd	nd	nd
	11/17/16		no sample taken				
MW-6	06/12/15		no sample taken				
	09/24/15		no sample taken				
	03/24/16	µg/L	nd	nd	nd	nd	nd
	11/17/16		no sample taken				
MW-7	06/12/15		no sample taken				
	09/24/15		no sample taken				
	03/24/16		no sample taken				
	11/17/16		no sample taken				
MW-8	06/12/15	µg/L	nd	nd	nd	nd	nd
	09/24/15	µg/L	140	nd	2	6	16
	03/24/16	µg/L	nd	nd	nd	nd	nd
	11/17/16	µg/L	16000	27	930	440	1600
MW-9	06/12/15		no sample taken				
	09/24/15		no sample taken				
	03/24/16	µg/L	nd	nd	nd	nd	nd
	11/17/16	µg/L	110	nd	10	4	20
<b>MTCA Method A Cleanup Level for GW</b>		<b>µg/L</b>	<b>800</b>	<b>5</b>	<b>1,000</b>	<b>700</b>	<b>1,000</b>

APPENDIX A

WATER CONTOUR FIGURES 2016  
CONAN FUEL  
GIG HARBOR, WA



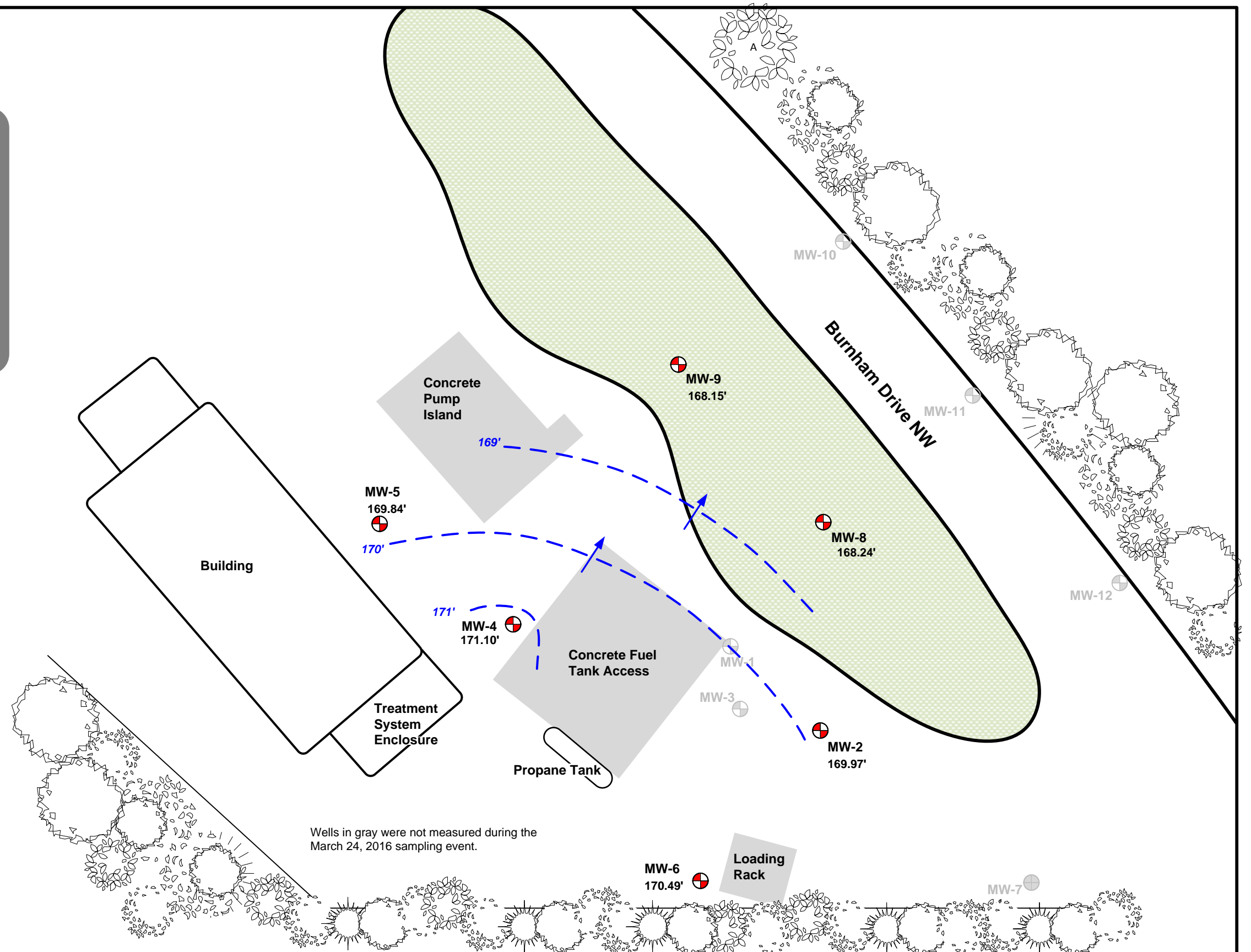
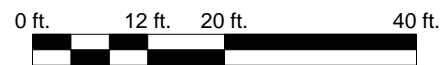
**Legend**

-  Groundwater-Monitoring Well
- 140.44' Groundwater Elevation
- 140' Approx. Groundwater Elevation
- - - - - Approx. Groundwater Contour
-  Approx. Groundwater-Flow Direction

The contours represent an interpretation of available data, for the indicated date. Site groundwater contours may change with additional measurements and/or data points, weather changes, construction activities, and/or other influences.

**Note: This figure contains information in color. Black & white photocopies may not be suitable for review.**

Approximate Drawing Scale: 1" = 20'





Wells in gray were not measured during the March 24, 2016 sampling event.

<p><b>BLUE SAGE ENVIRONMENTAL INC KENNEWICK, WA</b></p>	<p><b>Site Diagram, Groundwater Contours 03/24/16</b> Conan Fuel 10320 Burnham Drive NW Gig Harbor, Washington</p>	<p>Figure <b>3A</b></p>
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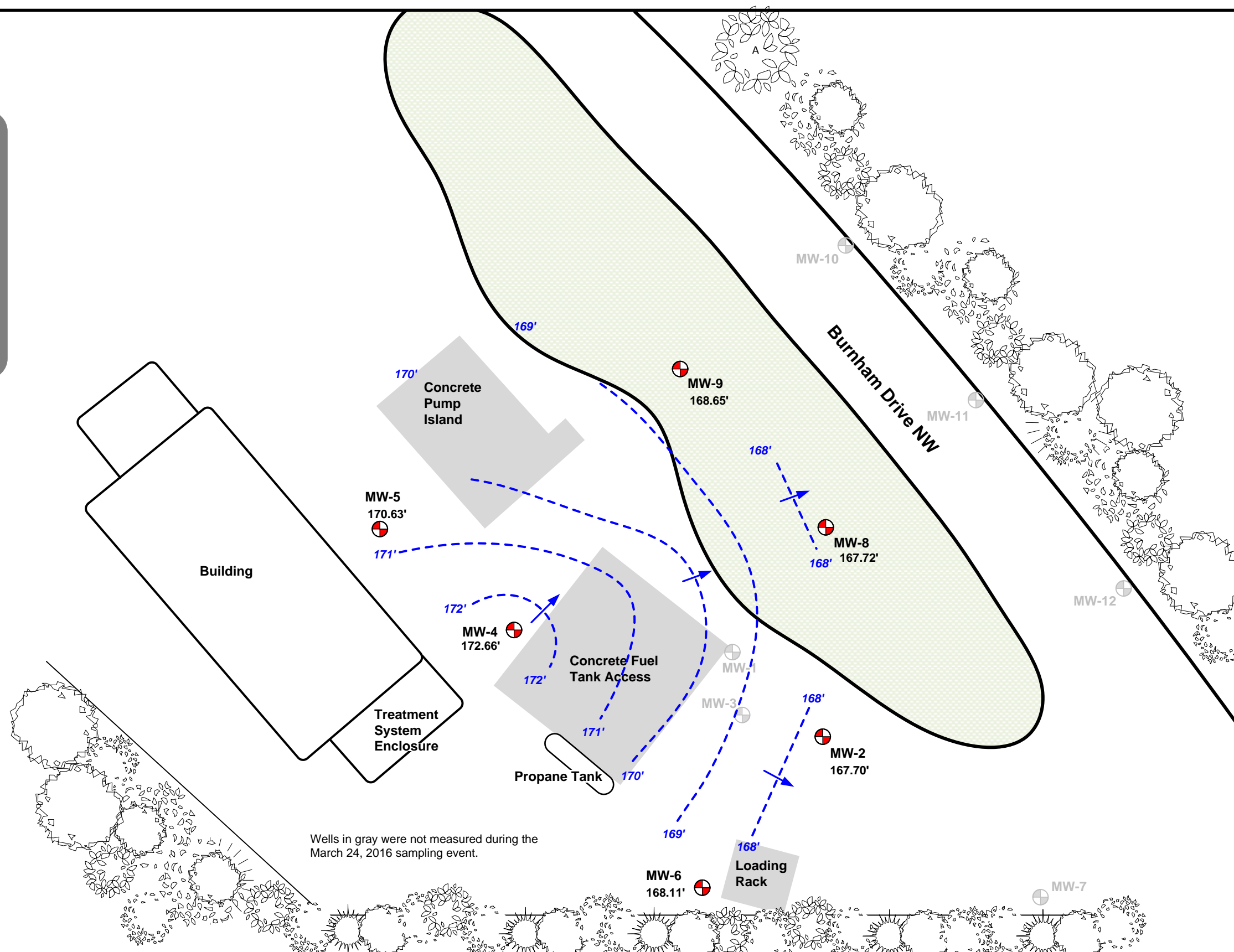
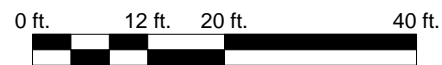
**Legend**

-  Groundwater-Monitoring Well
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Approximate Drawing Scale: 1" = 20'



Wells in gray were not measured during the March 24, 2016 sampling event.

<p><b>BLUE SAGE ENVIRONMENTAL INC KENNEWICK, WA</b></p>	<p><b>Site Diagram, Groundwater Contours 12/17/16</b> Conan Fuel 10320 Burnham Drive NW Gig Harbor, Washington</p>	<p>Figure <b>3B</b></p>
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APPENDIX B

CONAN FUEL  
GIG HARBOR, WA

ESN NORTHWEST LABORATORY REPORT  
2016

April 5, 2016

Alex Koch  
Blue Sage Environmental  
198007 E 30th Ave  
Kennewick, WA 99337

Dear Mr. Koch:

Please find enclosed the analytical data reports for the Conan Fuel GW Monitoring Project in Gig Harbor, Washington. Water samples were analyzed for Gasoline by NWTPH-Gx and BTEX by Method 8260 on March 31, 2016.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. A copy of the invoice for this work is enclosed for your records.

ESN Northwest appreciates the opportunity to have provided these services to Blue Sage Environmental for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,



Michael A. Korosec  
*President*

**ESN NORTHWEST CHEMISTRY LABORATORY**

Blue Sage Environmental  
PROJECT CONAN FUEL GW MONITORING  
Gig Harbor, Washington

ESN Northwest  
1210 Eastside Street SE Suite 200  
Olympia, WA 98501  
(360) 459-4670 (360) 459-3432 Fax  
lab@esnnw.com

**Analysis of Gasoline Range Organics & BTEX in Water by Method NWTPH-Gx/8260**

Sample Number	Date Analyzed	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	3/31/2016	nd	nd	nd	nd	nd	112
LCS	3/31/2016	95%	101%	99%	102%	100%	96
LCSD	3/31/2016	89%	95%	95%	98%	---	101
CF-MW9	4/1/2016	nd	nd	nd	nd	nd	117
CF-MW8	3/31/2016	nd	nd	nd	nd	nd	107
CF-MW6	3/31/2016	nd	nd	nd	nd	nd	105
CF-MW2	3/31/2016	<b>5.2</b>	<b>18</b>	nd	<b>4.4</b>	nd	107
CF-MW4	3/31/2016	<b>1.9</b>	<b>210</b>	<b>140</b>	<b>580</b>	<b>4400</b>	99
CF-MW5	3/31/2016	nd	nd	nd	nd	nd	101
Reporting Limits		1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromofluorobenzene) & LCS: 65% TO 135%



November 29, 2016

Alex Koch  
Blue Sage Environmental  
198007 E 30th Ave  
Kennewick, WA 99337

Dear Mr. Koch:

Please find enclosed the analytical data reports for the Conan Fuel Project in Gig Harbor, Washington. Water samples were analyzed for Gasoline by NWTPH-Gx and BTEX by Method 8260 on November 22, 2016.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. A copy of the invoice for this work is enclosed for your records.

ESN Northwest appreciates the opportunity to have provided these services to Blue Sage Environmental for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,



Michael A. Korosec  
*President*

**ESN NORTHWEST CHEMISTRY LABORATORY**

Conan Fuel (BSE)  
 CONAN FUEL GROUND WATER PROJECT  
 Auburn, WA

ESN Northwest  
 1210 Eastside Street SE Suite 200  
 Olympia, WA 98501  
 (360) 459-4670 (360) 459-3432 Fax  
 lab@esnw.com

**Analysis of Gasoline Range Organics & BTEX in Water by Method NWTPH-Gx/8260**

Sample Number	Date Analyzed	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	11/22/2016	nd	nd	nd	nd	nd	117
LCS	11/22/2016	98%	92%	97%	99%	120%	106
MW-2	11/22/2016	nd	6.7	260	250	3100	101
MW-4	11/22/2016	10	630	530	2200	24,000	108
MW-8	11/22/2016	27	830	440	1600	16,000	109
MW-9	11/22/2016	nd	9.5	4.3	20	110	110
Reporting Limits		1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromofluorobenzene) & LCS: 65% TO 135%

# CHAIN-OF-CUSTODY RECORD

CLIENT: CONAN FUEL (BSE) DATE: 11-18-16 PAGE      OF     

ADDRESS: \_\_\_\_\_ PROJECT NAME: CONAN FUEL GROUND WATER

PHONE: \_\_\_\_\_ LOCATION: 616 HARBOUR

CLIENT PROJECT #: \_\_\_\_\_ PROJECT MANAGER: \_\_\_\_\_ COLLECTOR: \_\_\_\_\_ DATE OF COLLECTION: 11-17-16

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES				NOTES
					TH - HCD	TH - Diesel & Oil	TH - Gasoline	BTX	
1. MW-2	5.0	1053	H7D	VOA	X				
2. MW-4	8.04	1203			Y				
3. MW-8	5.57	1522			Y				
4. MW-9	6.7L	1317			Y				
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

RELINQUISHED BY (Signature) \_\_\_\_\_ DATE/TIME \_\_\_\_\_ RECEIVED BY (Signature) \_\_\_\_\_ DATE/TIME \_\_\_\_\_

RELINQUISHED BY (Signature) (BSE) DATE/TIME 11-18-16 RECEIVED BY (Signature) [Signature] DATE/TIME 11/18/16

TOTAL NUMBER OF CONTAINERS: \_\_\_\_\_

CHAIN OF CUSTODY SEALS Y/N/NA: \_\_\_\_\_

SEALS INTACT? Y/N/NA: \_\_\_\_\_

RECEIVED GOOD COND./COLD: \_\_\_\_\_

LABORATORY NOTES: \_\_\_\_\_