Technical Memorandum

TO: Sam Meng and Andy Kallus, Washington State Department of Ecology

FROM: Kathryn F. Hartley and Stephanie Renando

DATE: December 20, 2016

RE: **Third Quarter 2016 Compliance Monitoring Results**
North Marina Bayside/ABW
Everett, Washington
Project No. 147037.030.037

Introduction

This technical memorandum summarizes the field activities and analytical results for the third quarter 2016 groundwater quality monitoring event at the North Marina Bayside/ABW site (Site) in Everett, Washington. Cleanup at the Site was completed through the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP) and Ecology issued a no further action (NFA) determination in October 2015 (Ecology 2015). The NFA and associated environmental covenant require confirmational groundwater monitoring for a period of 5 years in order to demonstrate that concentrations of arsenic in groundwater are above the Model Toxics Control Act (MTCA) Method A cleanup level only where reducing conditions are present, and that concentrations of arsenic in groundwater meet the cleanup level at the downgradient point of compliance (monitoring well P-27). The four monitoring wells identified for groundwater monitoring consist of wells HWA-MW1, HWA-MW2, P-26, and P-27. Monitoring well P-27 was inadvertently paved over during construction activities associated with the adjacent Everett Shipyard Site. With approval from Ecology, monitoring well P-27 was replaced with P-27B, which was installed in mid-March 2016 in the immediate vicinity of monitoring well P-27. The well locations are shown on Figure 1.

Sample Collection and Analysis

The groundwater samples were collected on September 20, 2016 with a peristaltic pump using low-flow groundwater sampling procedures. Prior to collecting samples, depth to groundwater was measured at each location. The wells were then purged and field parameters (temperature in degrees celcius [°C], conductivity [microsiemen per centimeter {µS/cm}], dissolved oxygen [milligrams per liter {mg/L}], pH, and oxygen reduction potential [millivolts {mV}]) were recorded every 3 minutes until stabilization goals were achieved. Field measurements for ferrous iron (mg/L) were also recorded at each monitoring well prior to collecting samples for laboratory analysis.

In accordance with the Confirmational Monitoring Plan (Ecology 2015), samples were collected and analyzed for dissolved arsenic, nitrate, sulfate, and methane at each monitoring well. Samples were submitted to ALS Environmental laboratory in Everett, Washington on the same day as collection. Samples were also tested for ferrous iron in the field. A summary of the analyses for groundwater samples collected at each well and the analytical methods are provided in Table 1.

Quality Assurance

Field and laboratory control samples were used to evaluate data precision, accuracy, representativeness, completeness, and comparability of the analytical results. The quality control samples included collection and analysis of one field duplicate for each analysis performed and analysis of a laboratory duplicate. The field duplicate was collected from monitoring well HWA-MW1 and identified on the chain-of-custody as DUP.

Validation of the analytical data was performed by Landau Associates, Inc. (LAI) following the guidelines in the appropriate sections of the US Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (EPA 1999; 2004) and included evaluation of the following:

- Chain-of-Custody records
- Holding times
- Laboratory method blanks
- Blank spikes/laboratory control samples
- Field duplicate results
- Completeness
- Overall assessment of data quality.

Based on the validation, all of the data were determined to be acceptable for use; therefore, no qualification of the data was necessary.

Results

The analytical results are summarized in Table 1 and the laboratory analytical report is attached (Attachment 1). Groundwater was analyzed for dissolved arsenic at all sample locations. Arsenic was detected in each of the 3Q16 samples at concentrations ranging from 1.5 micrograms per liter (µg/L; P-27B) to 35 µg/L (HWA-MW1). Consistent with Site groundwater monitoring data for 2014, 2015, 1Q16 and 2Q16, detected concentrations of arsenic exceeded the cleanup level (5 µg/L) in the samples from monitoring wells HWA-MW1, HWA-MW2. The 3Q16 sample collected at the point of compliance (downgradient well P-27B) was below the cleanup levels for the Site. The detected concentrations of arsenic at monitoring well P-26 exceeded the cleanup level for the 1Q16 and 2Q16 monitoring events, but the detected concentration (2.8 µg/L) was below the cleanup level for the 3Q16 event.

Also consistent with previous Site data, the third quarter 2016 groundwater data indicate that conditions are naturally reduced at the Site. Conditions that are at least iron-reducing will release arsenic due to reduction (solubilization) of iron-arsenic (FeAs) complexes. Site data indicate that Site conditions are not only iron-reducing, based on the detection of ferrous iron at all sample locations,

but also indicate sulfate reduction (i.e., conditions are more strongly reducing than required for solubilization of FeAs), based on the low detected concentrations of sulfate (less than 0.26 mg/L to 13 mg/L). In addition, methane is detected at all locations indicating that conditions are also methanogenic (methane producing), which is also indicative of highly reducing conditions.

The low dissolved arsenic concentration at P-27B supports the conclusion that elevated arsenic concentrations at the Site are associated with reducing conditions, and reducing conditions sufficiently dissipate by the time groundwater migrates to the P-27B vicinity for groundwater to achieve the Site cleanup standard for arsenic.

For reference, groundwater monitoring data for 2014 and 2015, as presented in the 2015 Cleanup Report (LAI 2015), are attached (Attachment 2). Monitoring data from 1Q16 and 2Q16 are included in Table 1.

Conclusions

Detected concentrations of arsenic in groundwater at the Site are consistent with previous sampling data and consistent with the source of elevated arsenic conditions being reducing conditions unrelated to Site releases. Arsenic concentrations at the downgradient well (P-27B) continue to be below the cleanup level (5 µg/L) and the September 2016 results were similar to the March and June 2016 monitoring event. Based on these results, Site groundwater does not pose a threat to human health and the environment.

Because groundwater at the Site is not used as drinking water, the pathway of concern is a release to marine surface water. Arsenic has not been detected at concentrations greater than the cleanup level in any of the seven groundwater samples collected from the downgradient monitoring well P-27/P-27B between March of 2014 and September of 2016, indicating that there is no complete pathway to surface water.

In accordance with the NFA and environmental covenant, quarterly compliance monitoring will continue for one additional quarter in 2016. After 2016, compliance monitoring and reporting will be conducted on an annual basis until 2020.

Limitations

This document has been prepared for the exclusive use of the Port of Everett and Ecology for specific application to the North Marina Bayside/ABW Project. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of the Port and Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by the Port and Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been

provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

LANDAU ASSOCIATES, INC.

Kathryn F. Hartley
Project Manager

Larry Beard, LHG
Quality Reviewer

KFH/SAR/tam
P:\147\037\FileRm\R\Quarterly Monitoring Reports\Q3\ABW 3Q16_TM 122016.docx

cc: Elise Gronewald, Port of Everett

Attachments:

Figure 1	Compliance Monitoring Well Locations
Table 1	Quarterly Groundwater Monitoring Results
Attachment 1	Laboratory Analytical Report
Attachment 2	Groundwater Monitoring Data 2014-2015

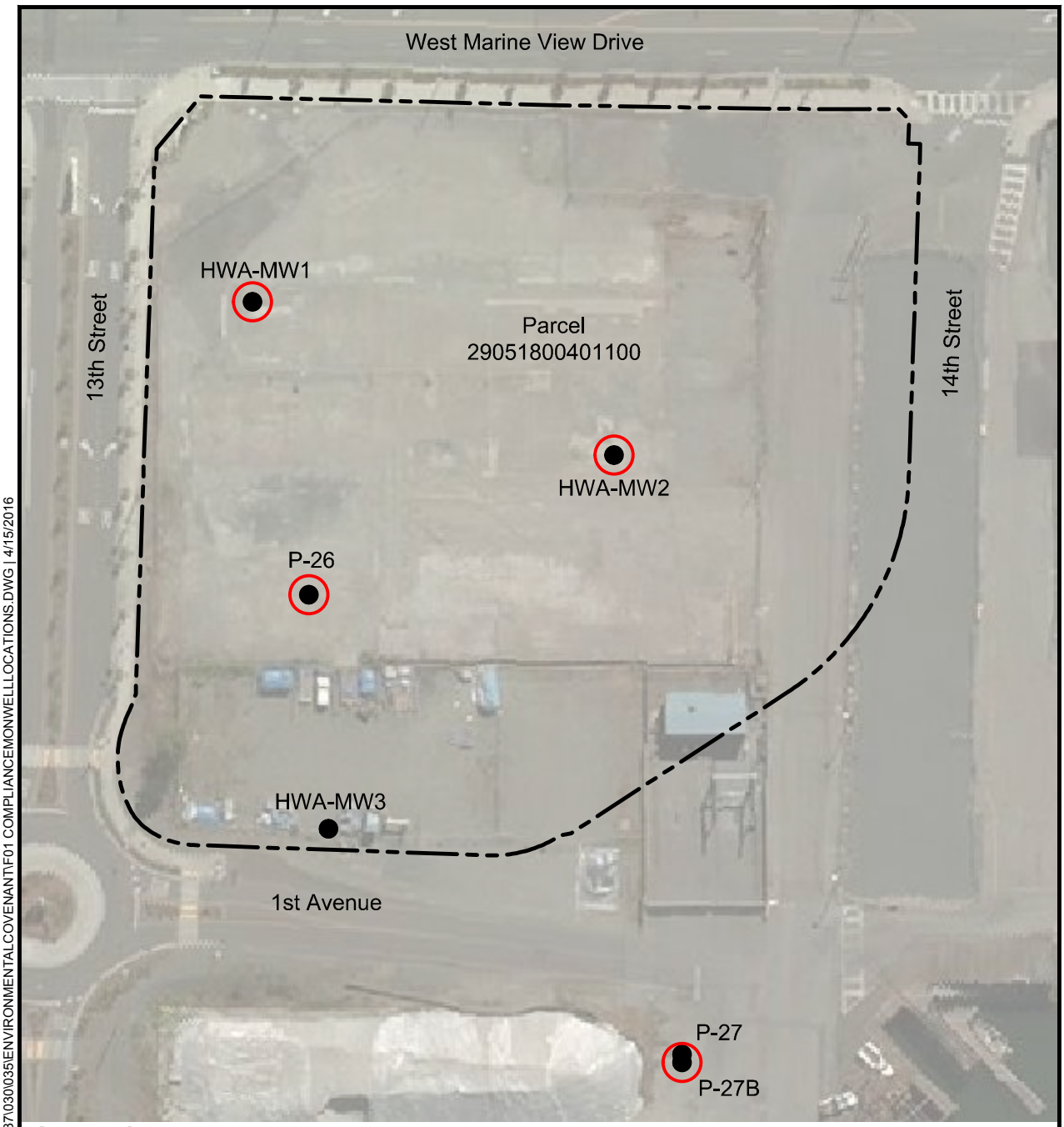
References

Ecology. 2015. Letter: Re: No Further Action at the following Site: North Marina Bayside ABW, 1332 West Marine View Drive, Everett, WA 98201. From Washington State Department of Ecology, to Elise Gronewald, Port of Everett. October 1.

EPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. edited by Office of Emergency and Remedial Response. Washington, DC: US Environmental Protection Agency.

EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. edited by Office of Superfund Remediation and Technology Innovation: US Environmental Protection Agency.

LAI. 2015. Environmental Investigation and Cleanup Documentation, American Boiler Works/Bayside Marine Site, Everett, Washington. Landau Associates, Inc. April 27.



Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- Snohomish County Parcel Line / Area of Groundwater Use Restriction

N

0 80 160

Scale in Feet

Source: ©Bing Imagery, 2015; Snohomish County GIS (parcel data);

LANDAU ASSOCIATES

North Marina
ABW/Bayside Marine VCP Site
Port of Everett, Washington

Compliance Monitoring Well Locations

Figure 1

LANDAU ASSOCIATES, INC. | G:\PROJECTS\147\037\030\035\ENVIRONMENTALCOVENANT\F01 COMPLIANCEMONWELLLOCATIONS.DWG | 4/15/2016

TABLE 1
QUARTERLY GROUNDWATER MONITORING RESULTS
NORTH MARINA BAYSIDE ABW SITE
EVERETT,WASHINGTON

Sample Location	Sample Date	Sample Type	Laboratory Sample ID	EPA 200.8	RSK-175	EPA 300.0		Hach Kit
				Dissolved Arsenic	Methane	Nitrate	Sulfate	Ferrous Iron
				µg/L	mg/L			
			Site Cleanup Level:	5	NA	NA	NA	NA
HWA-MW1	03/29/2016	FD	EV16030229-02	**21**	**3.9 J**	0.15 U	**1.8**	**2.5**
HWA-MW1	03/29/2016	N	EV16030229-03	**22**	**3.0 J**	0.15 U	**1.8**	**2.5**
HWA-MW1	6/13/2016	FD	EV16060085-02	**35**	**3.3**	0.15 U	0.26 U	**1.8**
HWA-MW1	6/13/2016	N	EV16060085-05	**36**	**3.6**	0.15 U	0.26 U	**1.8**
HWA-MW1	9/20/2016	FD	EV16090134-01	**34**	**4.0**	0.15 U	**13**	**2.0**
HWA-MW1	9/20/2016	N	EV16090134-02	**35**	**3.8**	0.15 U	**13**	**2.0**
HWA-MW2	03/29/2016	N	EV16030229-04	**9.8**	**31**	0.15 U	0.26 U	**1.5**
HWA-MW2	6/13/2016	N	EV16060085-03	**11**	**5.1**	0.15 U	0.26 U	**1.0**
HWA-MW2	9/20/2016	N	EV16090134-04	**24**	**4.8**	0.15 U	0.26 U	**2.6**
P-26	03/29/2016	N	EV16030229-01	**18**	**10**	0.15 U	0.26 U	**2.0**
P-26	6/13/2016	N	EV16060085-04	**7.2**	**5.9**	0.15 U	0.26 U	**1.4**
P-26	9/20/2016	N	EV16090134-03	**2.8**	**3.5**	0.15 U	0.26 U	**1.8**
P-27B	03/29/2016	N	EV16030229-05	**1.2**	**3.1**	0.15 U	**17**	**0.5**
P-27B	6/13/2016	N	EV16060085-01	**1.3**	**1.8**	0.15 U	**2.6**	**1.2**
P-27B	9/20/2016	N	EV16090134-05	**1.5**	**4.3**	0.15 U	0.26 U	**3.0**

Notes:

U = The compound was not detected at the reported concentration.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

Bold = detected compound

Green Box = detected concentration is greater than Site Cleanup Level

Abbreviations and Acronyms:

EPA = United States Environmental Protection Agency

FD = field duplicate

ID = identifcation

µg/L = microgram per liter

mg/L = milligram per liter

NA = not applicable

N = primary sample

ATTACHMENT 1

Laboratory Analytical Report

September 30, 2016

Ms. Kathryn Hartley
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Ms. Hartley,

On September 20th, 5 samples were received by our laboratory and assigned our laboratory project number EV16090134. The project was identified as your ABW Marine Groundwater. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	9/30/2016 EV16090134 EV16090134-01
CLIENT CONTACT:	Kathryn Hartley	DATE RECEIVED:	09/20/2016
CLIENT PROJECT:	ABW Marine Groundwater	COLLECTION DATE:	9/20/2016 10:00:00 AM
CLIENT SAMPLE ID	DUP	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	**4.0**	0.050	5	MG/L	09/23/2016	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	09/22/2016	DNT
Sulfate	EPA-300.0	**13**	0.26	1	MG/L	09/22/2016	DNT
Arsenic (Dissolved)	EPA-200.8	**34**	1.0	1	UG/L	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	9/30/2016 EV16090134 EV16090134-02
CLIENT CONTACT:	Kathryn Hartley	DATE RECEIVED:	09/20/2016
CLIENT PROJECT:	ABW Marine Groundwater	COLLECTION DATE:	9/20/2016 11:00:00 AM
CLIENT SAMPLE ID	HWA-MW1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	**3.8**	0.050	5	MG/L	09/23/2016	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	09/22/2016	DNT
Sulfate	EPA-300.0	**13**	0.26	1	MG/L	09/22/2016	DNT
Arsenic (Dissolved)	EPA-200.8	**35**	1.0	1	UG/L	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	9/30/2016 EV16090134 EV16090134-03
CLIENT CONTACT:	Kathryn Hartley	DATE RECEIVED:	09/20/2016
CLIENT PROJECT:	ABW Marine Groundwater	COLLECTION DATE:	9/20/2016 12:45:00 PM
CLIENT SAMPLE ID	P-26	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	**3.5**	0.050	5	MG/L	09/23/2016	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	09/22/2016	DNT
Sulfate	EPA-300.0	U	0.26	1	MG/L	09/23/2016	DNT
Arsenic (Dissolved)	EPA-200.8	**2.8**	1.0	1	UG/L	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	9/30/2016 EV16090134 EV16090134-04
CLIENT CONTACT:	Kathryn Hartley	DATE RECEIVED:	09/20/2016
CLIENT PROJECT:	ABW Marine Groundwater	COLLECTION DATE:	9/20/2016 1:30:00 PM
CLIENT SAMPLE ID	HWA-MW2	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	**4.8**	0.050	5	MG/L	09/23/2016	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	09/22/2016	DNT
Sulfate	EPA-300.0	U	0.26	1	MG/L	09/22/2016	DNT
Arsenic (Dissolved)	EPA-200.8	**24**	1.0	1	UG/L	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	9/30/2016 EV16090134 EV16090134-05
CLIENT CONTACT:	Kathryn Hartley	DATE RECEIVED:	09/20/2016
CLIENT PROJECT:	ABW Marine Groundwater	COLLECTION DATE:	9/20/2016 2:30:00 PM
CLIENT SAMPLE ID	P-27B	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	**4.3**	0.050	5	MG/L	09/23/2016	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	09/22/2016	DNT
Sulfate	EPA-300.0	U	0.26	1	MG/L	09/22/2016	DNT
Arsenic (Dissolved)	EPA-200.8	**1.5**	1.0	1	UG/L	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE:	9/30/2016
		ALS SDG#:	EV16090134
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Kathryn Hartley		
CLIENT PROJECT:	ABW Marine Groundwater		

LABORATORY BLANK RESULTS

MBLK-281850 - Batch R281850 - Water by RSK-175

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	U	MG/L	0.010	09/23/2016	CCN

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-282051 - Batch R282051 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate	EPA-300.0	U	MG/L	0.15	09/22/2016	DNT
Sulfate	EPA-300.0	U	MG/L	0.26	09/22/2016	DNT

U - Analyte analyzed for but not detected at level above reporting limit.

MB-092916W - Batch 108482 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	09/29/2016	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Marine Groundwater

DATE: 9/30/2016
ALS SDG#: EV16090134
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R281850 - Water by RSK-175

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Methane - BS	RSK-175	**96.9**			80	120	09/23/2016	CCN
Methane - BSD	RSK-175	**98.0**	**1**		80	120	09/23/2016	CCN

ALS Test Batch ID: R282051 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate - BS	EPA-300.0	**101**			80	120	09/22/2016	DNT
Nitrate - BSD	EPA-300.0	**102**	**1**		80	120	09/22/2016	DNT
Sulfate - BS	EPA-300.0	**99.0**			80	120	09/22/2016	DNT
Sulfate - BSD	EPA-300.0	**104**	**5**		80	120	09/22/2016	DNT

ALS Test Batch ID: 108482 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**97.4**			89.1	110	09/29/2016	RAL
Arsenic (Dissolved) - BSD	EPA-200.8	**98.7**	**1**		89.1	110	09/29/2016	RAL

APPROVED BY

Laboratory Director

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ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
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http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV16090134

Date 9/20/16 Page 1 Of 1

PROJECT ID: ABW Marine Groundwater
REPORT TO COMPANY: LANDAU ASSOCIATES
PROJECT MANAGER: Kathryn Hartley
ADDRESS: 130 2nd Avenue South
Edmonds, WA 98020
PHONE: (425) 778-0907 FAX: —
P.O. #: 147037.030.03(e E-MAIL: khartley@landauinc.com
INVOICE TO COMPANY: Port of Everett
ATTENTION: Elise Gronewald
ADDRESS:
elises@portofeverett.com

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify) Dissolved As by EPA 200.8	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify): Methane (RSK-175)	Sulfate (EPA 300.0)	Nitrate (EPA 300.0)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. DUP	9/20/16	1000	AQ	1													X		X	X	X			4	
2. HWA-MW1	9/20/16	1100	AQ	2													X		X	X	X			4	
3. P-26	9/20/16	1245	AQ	3													X		X	X	X			4	
4. HWA-MW2	9/20/16	1330	AQ	4													X		X	X	X			4	
5. P-27B	9/20/16	1430	AQ	5													X		X	X	X			4	
6.																									
7.																									
8.																									
9.																									
10.																									

SPECIAL INSTRUCTIONS: * Metals samples were field filtered. / ** Short hold NITRATES.

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: SA Lund, LAI, 9/20/16, 1521
   Received By: ALS 9/20/16 1521
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: (10 Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard 3 1 SAME DAY

OTHER: Specify:

*Turnaround request less than standard may incur Rush Charges

ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1609013 4

Project: ABW Marine Groundwater

Received Date: 9/20/16 Received Time: 1521 By: RB

Type of shipping container: Cooler X Box ___ Other ___

Shipped via: FedEx Ground ___ UPS ___ Mail ___ Courier ___ Hand Delivered X
FedEx Express ___

	Yes	No	N/A
Were custody seals on outside of shipping container?	___	X	___
If yes, how many? ___ Where? ___			
Custody seal date: ___ Seal name: ___			
Was Chain of Custody properly filled out (ink, signed, dated, etc.)?	X	___	___
Did all bottles have labels?	X	___	___
Did all bottle labels and tags agree with Chain of Custody?	X	___	___
Were samples received within hold time?	X	___	___
Did all bottles arrive in good condition (unbroken, etc.)?	X	___	___
Was sufficient amount of sample sent for the tests indicated?	X	___	___
Was correct preservation added to samples?	X	___	___

If no, Sample Control added preservative to the following:

Sample Number	Reagent	Analyte

Were VOA vials checked for absence of air bubbles?	X	___	___
Bubbles present in sample #: None			

Temperature of cooler upon receipt: 4.7°C on Ice (Cold) Cool Ambient N/A

Explain any discrepancies: ___

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: ___

ATTACHMENT 2

Groundwater Monitoring Data 2014-2015

GROUNDWATER ANALYTICAL DATA (2014-2015)
NORTH MARINA ABW/BAYSIDE MARINE VCP SITE
PORT OF EVERETT, WASHINGTON

Sample ID Laboratory ID Date Collected	Preliminary Cleanup Level (a)	P-26 7/24/2014	P-26 8/18/2014	P-26 9/3/2014	P-26 ZN28F 12/3/2014	P-26 ZZ75C 3/10/2015	P-27 YC90A 3/13/2014	Dup of P-27 DUP-1 YC90B 3/13/2014	P-27 7/24/2014	P-27 9/3/201	P-27 ZN28A 12/3/2014	Dup of P-27 DUP1 ZN28B 12/3/2014	P-27 AC91A/ZZ75G 3/26/2015	Dup of P-27 DUP-2 ZZ75F 3/10/2015	HWA-MW1 7/24/2014	HWA-MW1 8/18/2014	HWA-MW1 9/3/2014	HWA-MW1 ZN28D 12/3/2014
DISSOLVED METALS (µg/L)																		
Method SW6000-7000																		
Arsenic	5	**15**	**9.8**	**6.3**	**18.6**	**12.8**	0.5 U	**0.6**	1 U	1 U	**3.0**		**1.7**		**64**	**77**	**91**	**65.1**
Cadmium		1 U		1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U		0.1 U		1 U		1 U	0.1 U
Chromium	240,000	2 U		2 U	**2**	**1**			2 U	2 U	1 U		0.5 U		**2.1**		**2.2**	**3**
Copper	2.4	2 U		2 U	**0.5**	0.5 U	0.5 U	**0.6**	2 U	2 U	**0.8**		**0.5**		2 U		2 U	**0.7**
Lead		1 U		1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U		0.1 U		1 U		1 U	0.1 U
Mercury		0.2 U		0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U		0.1 U		0.2 U		0.2 U	0.1 U
Silver																		
Zinc	81	2.5 U		**5.7**	4 U	4 U	4 U	**5**	2.5 U	**8.2**	**5**		4 U		2.5 U		**7.6**	**8**
NWTPH-Dx (mg/L)																		
Diesel-Range	0.5	**0.14**		**0.18**	0.10 U	0.10 U	0.13 U	0.11 U	0.13 U	0.13 U	0.10 U		0.10 U		**0.15**		**0.13**	0.10 U
Motor Oil-Range	0.5	0.25 U		0.25 U	0.20 U	0.20 U	0.27 U	0.23 U	0.25 U	0.25 U	0.20 U		0.20 U		0.25 U		0.25 U	0.20 U
NWTPH-Gx (mg/kg)																		
Gasoline-Range	0.8										0.25 U	0.25 U	0.25 U	0.25 U				
DISSOLVED GASES (µg/L)																		
RSK-175																		
Methane					**8980**	**15100**					**503**	**536**	**5780**					**15000**
CONVENTIONALS (mg/L)																		
Method EPA300.0																		
Nitrate			**0.18**	**0.19**	0.1 U	**0.1**				0.15 U	0.1 U		0.1 U			0.15 U	**0.27**	**0.1**
Sulfate			0.26 U	**0.37**	0.1 U	**0.2**				**0.58**	**9.1**		**4.1**			0.26 U	0.26 U	**0.5**
Field Parameters																		
pH		6.42	7.01	7.14	6.71	6.04	6.39	6.33	7.05	7.21	7.3		6.37		6.59	6.87	6.8	6.74
Conductance (µS/cm)		1112	989	968	4.59	404	856	856	3430	481	460		421		1259	1204	968	736
Temperature (°C)		18.3	17.6	20.7	13.07	11.94	11.79	11.79	18.5	20.2	10.9		11.54		20.6	17.9	22.7	11.93
Dissolved Oxygen (mg/l)		3	0.33	0.39	0.49	4.41	1.92	1.92	0.23	0.63	0.95		1.19		0.27	0.54	0.39	0.51
ORP (mV)			95	120	-92.2	-82	-84.7	-84.7		39	-42.6		-28			50	49	-114.6
Ferrous Iron (mg/L)			1.2	1	1.2	1.8				0.4	1.5		1.4			1.6	1.5	1.6
Turbidity (NTU)					87.87	12.3	2.57	2.57			0.27		1.66					1.72

GROUNDWATER ANALYTICAL DATA (2014-2015)
NORTH MARINA ABW/BAYSIDE MARINE VCP SITE
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Sample ID Laboratory ID Date Collected	Preliminary Cleanup Level (a)	Dup of HWA-MW1 DUP2 ZN28E 12/3/2014	HWA-MW1 ZZ75B 3/10/2015	Dup of HWA-MW1 DUP-1 ZZ75A 3/10/2015	HWA-MW2 7/24/2014	HWA-MW2 9/3/2014	HWA-MW2 ZN28G 12/3/2014	HWA-MW2 ZZ75D 3/10/2015	HWA-MW3 7/24/2014	HWA-MW3 9/3/2014	HWA-MW3 ZN28C 12/3/2014	HWA-MW3 ZZ75E 3/10/2015
DISSOLVED METALS (µg/L)												
Method SW6000-7000												
Arsenic	5	**66.3**	**51.5**	**52.5**	**2.7**	**8.2**	**9.6**	**8.1**	**2.1**	1 U	**2.4**	**3.2**
Cadmium		0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U
Chromium	240,000	**2**	**1.8**	**1.8**	**2.1**	**2.8**	**2**	**1.4**	2 U	2 U	**1**	**1.1**
Copper	2.4	**0.7**	**0.8**	**0.7**	2 U	2 U	**0.6**	0.5 U	2 U	2 U	**0.6**	**0.5**
Lead		**0.2**	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U
Mercury		0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U
Silver												
Zinc	81	**8**	**4**	4 U	2.5 U	**13**	**4**	4 U	2.5 U	**10**	**6**	4 U
NWTPH-Dx (mg/L)												
Diesel-Range	0.5	0.10 U	0.10 U	0.10 U	**0.22**	**0.14**	0.10 U	0.10 U	0.13 U	0.13 U	0.10 U	0.10 U
Motor Oil-Range	0.5	0.20 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U
NWTPH-Gx (mg/kg)												
Gasoline-Range	0.8											
DISSOLVED GASES (µg/L)												
RSK-175												
Methane		**14000**	**17700**	**16900**			**13300**	**25200**			**3480**	**9550**
CONVENTIONALS (mg/L)												
Method EPA300.0												
Nitrate		**0.1**	0.1 U	0.1 U		0.61	0.1 U	0.1 U		0.17	0.1 U	0.1 U
Sulfate		**0.4**	**0.2**	**0.3**		0.26 U	0.1 U	**0.8**		0.26 U	**0.1**	**0.5**
Field Parameters												
pH		6.75	6.19		6.42	6.38	6.15	6.22	6.71	7.13	6.82	6.78
Conductance (µS/cm)		736	663		1400	847	389	326	1031	938	406	334
Temperature (°C)		11.94	11.95		17.7	20.5	13.23	11.46	15.4	17	11.87	11.09
Dissolved Oxygen (mg/l)		0.52	5.05		0.21	0.66	0.36	2.37	0.26	0.41	0.54	1.54
ORP (mV)		-114.6	-105			75	-13.8	-70		143	-63.5	-80
Ferrous Iron (mg/L)		1.6	1.4			0.6	5	1.8		1.7	1.8	1.4
Turbidity (NTU)		2.05	8.82				104.2	62.1			26.7	70.9

Box indicates exceedance of cleanup level.
Bold indicates detected value.
ND = Not Detected
µg/L = micrograms per liter
mg/L = milligrams per liter
mg/kg = milligrams per kilogram

U = Indicates the compound was undetected
UJ = The analyte was not detected in the sample; the reported sample detection limit is an estimate.