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April 30, 2013

Mr. Norm Hepner
Toxics Cleanup Program - CRO
State of Washington – Department of Ecology
15 W. Yakima Avenue, Suite 200
Yakima, Washington 98902-3152

RE: **Second Semi-Annual 2012 Groundwater Monitoring Report**
John Michael Lease Site
Adjacent to 5640 Sunset Highway, Cashmere, Washington
BNSF File No: WACAS-05-001
Facility/Site No.: 3154383
Cleanup Site No.: 2149
VCP Project No.: CE0278

Dear Mr. Hepner:

On behalf of the BNSF Railway Company (BNSF), TRC is pleased to provide this Second Semi-Annual 2012 Groundwater Monitoring Report documenting the groundwater monitoring activities completed in September and December 2012 at the John Michael Lease Site located in Cashmere, Chelan County, Washington.

Please give me a call if you have any questions regarding this submittal.

Sincerely,

Keith Woodburne, LG
Senior Project Manager

cc: Scott MacDonald, BNSF
Kristin, Darnell, Farallon

TRC
Results you can rely on

SECOND SEMI-ANNUAL 2012 GROUNDWATER MONITORING REPORT

BNSF John Michael Lease Site
Cashmere, Washington

Prepared for:

BNSF Railway Company
2454 Occidental Avenue South, Suite 1A
Seattle, Washington 98134

Prepared by:

TRC

April 2013

SECOND SEMI-ANNUAL 2012 GROUNDWATER MONITORING REPORT

April 30, 2013

BNSF John Michael Lease Site
Cashmere, Washington

TRC Project No. 196947

Prepared For:

BNSF Railway Company
2454 Occidental Avenue South, Suite 1A
Seattle, Washington 98134

By:

Brandon Reed
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State of Washington
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1.0 INTRODUCTION

This second semi-annual groundwater monitoring report has been prepared on behalf of BNSF Railway Company (BNSF) to document the results of the groundwater monitoring conducted by TRC and their subcontractor Farallon Consulting, L.L.C. (Farallon) at the John Michael Lease Property located adjacent to 5640 Sunset Highway in Cashmere, Chelan County, Washington (herein referred to as the Site, Figure 1). The groundwater monitoring events were completed September 12, 2012 and December 12, 2012 in accordance with Chapter 173-350-500 of the Washington Administrative Code (WAC 173-350-500).

The purpose of the groundwater monitoring event was to evaluate the nature and extent of hazardous substances detected above the Washington State Model Toxics Control Act (MTCA) Method A Cleanup Regulation for groundwater. The hazardous substances detected in groundwater at the Site during previous investigations, and collectively referred to herein as the constituents of potential concern (COPCs), include:

- Total petroleum hydrocarbons as diesel-range organics (DRO), oil-range organics (ORO), and as gasoline-range organics (GRO);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX compounds);
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs); and
- Naphthalene.

The results from the initial groundwater investigations in 2004 (EMR, 2005) and in 2008 (Farallon, 2009) showed that TPHs and BTEX compounds were detected in Site groundwater. However, only DRO, ORO, benzene the cPAH benzo(a)pyrene were reported at concentrations above the MTCA Method A cleanup levels during those initial investigations. The results from the groundwater samples collected during the September and December 2012 monitoring events show that COPCs in Site groundwater are not present at concentrations above the MTCA Method A cleanup levels for groundwater.

2.0 GROUNDWATER MONITORING ACTIVITIES

On September 25, 2012 and December 11, 2012, Farallon recorded groundwater elevations and collected groundwater samples from the four Site monitoring wells (MW-1, MW-2, MW-3 and MW-4). During sample collection, Farallon recorded the dissolved oxygen levels, pH, temperature, conductivity and oxidation reduction potential (ORP) using a YSI multimeter and flow-through cell after parameter stabilization. The groundwater samples were submitted to ESC Lab Sciences of Mt. Juliet, Tennessee for analysis of the following COPCs and natural attenuation and water quality parameters:

- DRO by Northwest Method NWTPH-Dx;
- ORO, GRO, and BTEX by Northwest Method NWTPH-Gx;
- Non-carcinogenic PAHs and carcinogenic PAHs (cPAHs) by EPA Method 8270C-S;
- Nitrate and Sulfate by EPA Method 9056;
- Free carbon dioxide by Standard Method (SM) 4500C;
- Ferrous iron by SM 3500-Fe;
- Sulfide by SM 4500-S2; and
- Iron and dissolved iron by EPA 6000/7000 Series Method.

3.0 GROUNDWATER MONITORING RESULTS

3.1 Groundwater Elevations

Groundwater elevations were consistent from August 2008 to December 2012, with little variation in depth to water between events (Table 1). Groundwater flow direction for September and December 2012 were both analogous with flow direction generally eastward towards the Wenatchee River (Figures 3 and 4). Additionally, groundwater gradient remained stable between September and December 2012, at approximately 0.014 feet per foot (ft/ft).

3.2 Constituents of Potential Concern

DRO concentrations in groundwater samples collected from monitoring wells MW-1, MW-2, MW-3 and MW-4, during the September 2012, and December 2012 monitoring events were primarily below laboratory reporting limits (Table 2, Figure 5). During the December 2012 monitoring event, monitoring well MW-1 had a reported detection of DRO at a concentration of 200 micrograms per liter (µg/L), less than the MTCA Method A cleanup level of 500 µg/L.

Concentrations of ORO in groundwater samples collected from the Site monitoring wells during the September 2012 and December 2012 monitoring events were below the laboratory reporting limit (Table 2, Figure 5). During the December 2012 monitoring event, ORO was reported in wells MW-1 and MW-4 at estimated concentrations of 150 µg/L and 170 µg/L, respectively.

Concentrations of GRO and BTEX compounds were below their respective laboratory reporting limits in the samples collected during the September 2012 and December 2012 monitoring events (Table 2, Figure 5).

No cPAHs were detected at concentrations above their laboratory reporting limits in any of the samples collected during the September 2012 and December 2012 monitoring events (Table 3). There were no detections for cPAHs therefore the Total cPAH TEQ values remain the same at a concentration of 0.038 µg/L (Table 3, Figure 5).

Only one of the non-carcinogenic PAHs analyzed was detected at a result above the laboratory reporting limit during the September 2012 and December 2012 monitoring events. In well MW-1 during the December 2012 monitoring event, 1-methyl naphthalene was at a concentration of 0.31 µg/L, well below the MTCA Method A cleanup level of 1.5 µg/L. The remainder of the non-carcinogenic PAHs were below their respective laboratory reporting limits during the September 2012 and December 2012 monitoring events.

3.3 Natural Attenuation and Water Quality Parameters

Natural attenuation is a remediation process that relies on naturally occurring destructive processes (i.e., biodegradation and abiotic degradation) or non-destructive processes (i.e., advection, diffusion sorption, dilution, and volatilization) for the reduction of contaminant mass. Biodegradation is typically the most prevalent destructive mechanism for the natural attenuation of petroleum hydrocarbons and is facilitated via biological oxidation, where electron donors, electron acceptors, and nutrients are combined by microorganisms to produce metabolic by-products and energy for microbial growth. Petroleum hydrocarbons biodegrade naturally when an indigenous population of hydrocarbon-degrading microorganisms is present in the aquifer and sufficient concentrations of electron acceptors and nutrients are available. Biodegradation of petroleum hydrocarbons can occur under aerobic or anaerobic conditions (i.e., in the presence or absence of dissolved oxygen), where hydrocarbons may be used by microbes as an electron donor in both degradation pathways.

Microbial metabolic processes generate energy via oxidation of the electron donor and reduction of the electron acceptor. Aerobic degradation of petroleum hydrocarbons occurs when dissolved oxygen (DO) is used as a terminal electron acceptor by hydrocarbon-degrading microbes that respire aerobically. Reduction of molecular oxygen is the most energetically favorable oxidation-reduction reaction involved in petroleum hydrocarbon degradation.

Analytical and field monitoring data collected at the Site suggest that site conditions are naturally more aerobic, with DO concentrations in groundwater generally in excess of 1 milligram per liter (mg/L) (Table 5). Positive oxidation-reduction potential (ORP) values, ranging from 67.8 to 276.1 mg/L further imply aerobic site conditions (Table 5). Groundwater pH and temperature measurements were within a range deemed adequate for hydrocarbon-degrading microbial populations (Table 5).

To further evaluate the potential for biodegradation, and to quantify the microbial populations present at the Site, BNSF deployed two Bio-Trap® samplers in wells MW-1 and MW-2. The Bio-Trap® samplers were deployed on September 25, 2012 and retrieved on November 1, 2012 and shipped to Microbial Insights for phospholipid fatty acid (PLFA) analysis.

PLFA is a primary component of all microbial membranes; however, some microorganisms produce specific PLFA biomarkers, which enable microbial populations to be classified into specific structural groups. In both samples, Proteobacteria was identified as the most prominent structural group, accounting for 74.08% and 64.55% of the total PLFA population in wells MW-1 and MW-2, respectively (Table 6). A variety of both aerobic and anaerobic microorganisms are classified by the Proteobacteria grouping, including the majority of microbial species capable of degrading hydrocarbons. Proteobacteria are typically characterized as fast-growing, quickly adaptable to a variety of environments, and able to utilize a range of carbon sources.

4.0 RECOMMENDATIONS

Concentrations of COPCs in Site groundwater have been below the MTCA Method A Cleanup levels for groundwater since groundwater monitoring has begun, with only two historical exceptions. The results from the initial groundwater investigations in 2004 (EMR, 2005) and in 2008 (Farallon, 2009) showed that TPHs (DRO and ORO) and BTEX compounds were present in Site groundwater at concentrations above their respective laboratory reporting limits. However, only DRO, ORO, benzene, and the cPAH benzo(a)pyrene were reported at concentrations above the MTCA Method A cleanup levels for groundwater during those initial investigations.

The initial, post-installation sample collected from MW-1 during the August 2008 subsurface investigation (Farallon, 2009) had a reported DRO concentration of 1,110 µg/L. Additionally, ORO and BTEX compounds were detected in that initial sample at elevated concentrations (Table 2, Figure 5). Groundwater samples collected a relatively short time following well installation and development are often not representative of true groundwater conditions.

Consistently low results for all COPCs were reported for all Site wells during the September and December 2012 monitoring events with no reported results above the MTCA Method A cleanup levels for groundwater. Furthermore, cPAHs and benzene results were below the MTCA Method B surface water cleanup levels for carcinogens[i].

Based on the 2012 groundwater data, BNSF does not consider the initial 2008 groundwater results representative of groundwater conditions at the Site. Furthermore, the 2012 monitoring data demonstrate that the low to non-detect concentrations of COPCs in Site groundwater do not pose a

threat to surface waters of the Wenatchee River. Finally, the 2012 monitoring data suggests that any remaining COPCs in groundwater will likely degrade under natural conditions.

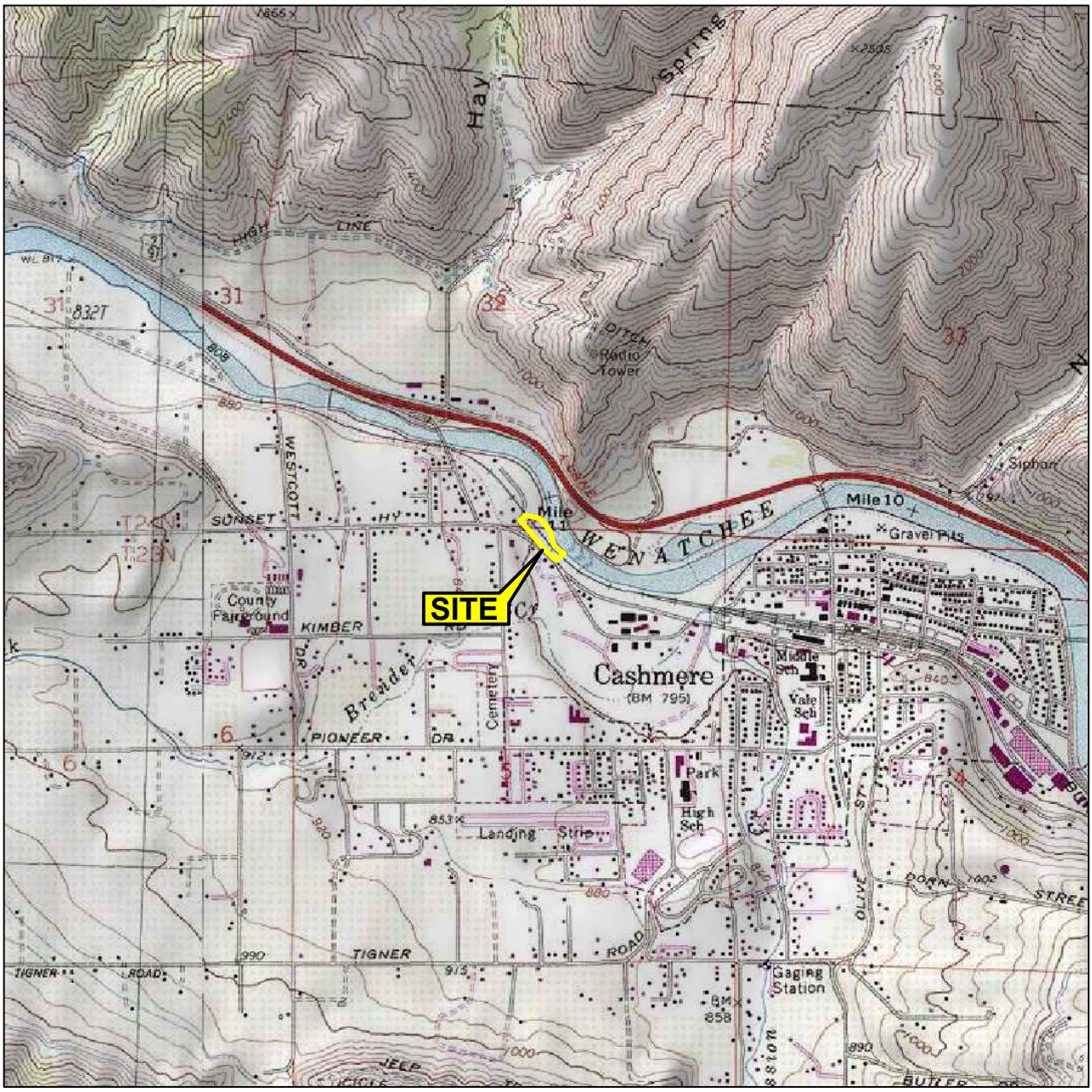
5.0 REFERENCES

EMR, Inc. (EMR), 2005. Letter Report Regarding Phase II Assessment Report – Leased Property No.: 40,250,477, John Michael, Cashmere, Chelan County, Washington. From Andrea Schiller, Staff Geologist and Jeremy Raye, Environmental Manager. To BNSF Railway Company. January 12.

Farllon, 2009. Subsurface Investigation Report, John Michael Lease Site, 5640 Sunset Highway, Cashmere, Washington, March 3.

[i] MTCA Method B Cleanup Levels for Surface Water – Carcinogen, Standard Formula Value, 720(4)(b)(iii)

FIGURES



1 MILE 3/4 1/2 1/4 0 1 MILE

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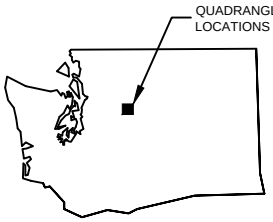
N

SOURCE:

United States Geological Survey
7.5 Minute Topographic Maps:
Cashmere and Peshastin Quadrangles,
Washington



VICINITY MAP

John Michael Lease Site
Adjacent to 5640 Sunset Highway
Cashmere, Washington

TRC | 196947 | **FIGURE 1**

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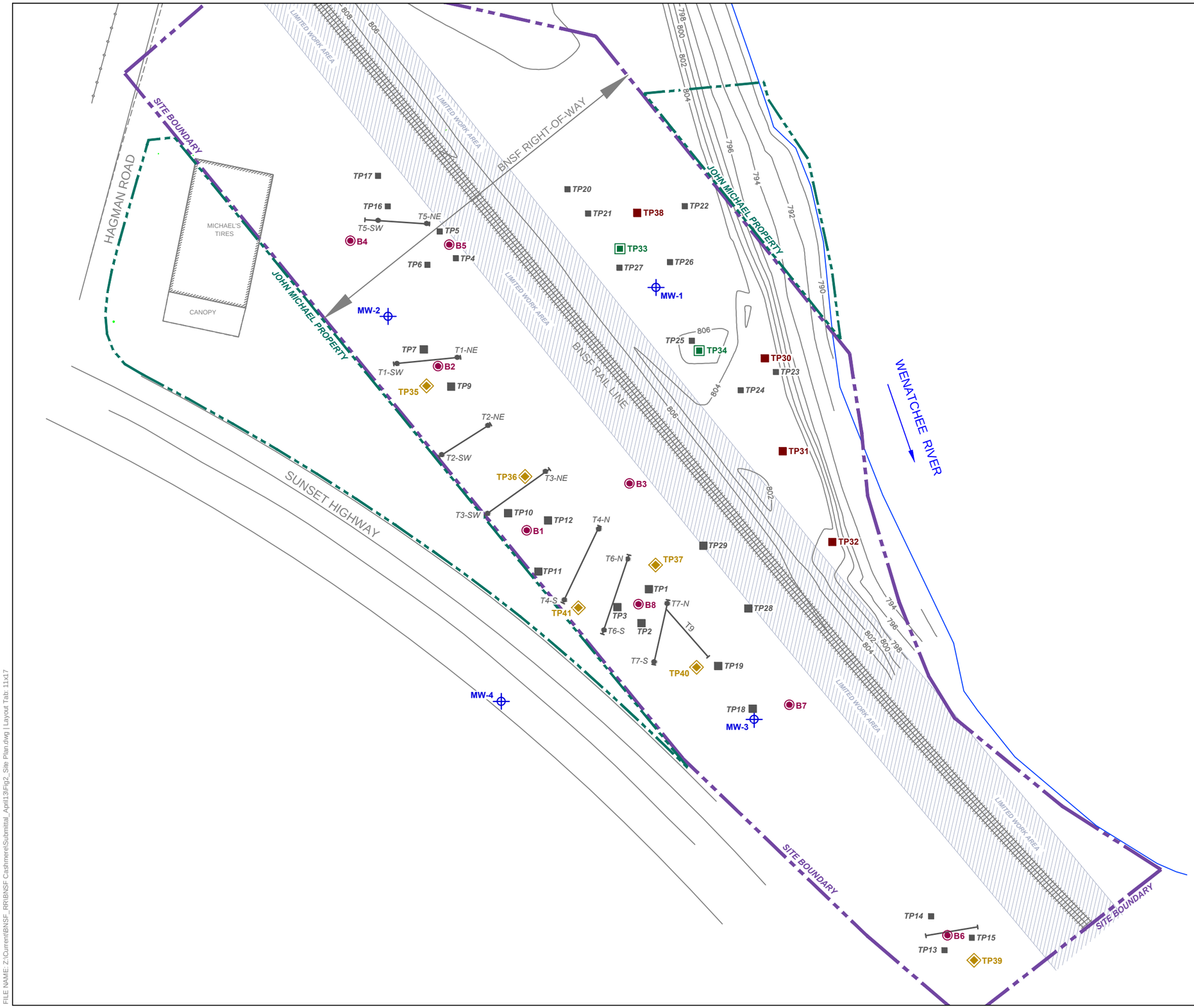


LEGEND

- MW-4 — Monitoring well
- B8 — Boring
- T7-S / T7-N — Trench with soil sample location (Farallon, 2008)
- TP29 — Test pit (historical)
- TP38 — Supplemental investigation, soil sample test pit (Farallon, 2012)
- TP34 — Supplemental investigation, cultural survey and soil sample test pit (Farallon, 2012)
- TP41 — Supplemental investigation, cultural survey test pit (Farallon, 2012)

N

SCALE (FEET)

0 50 100

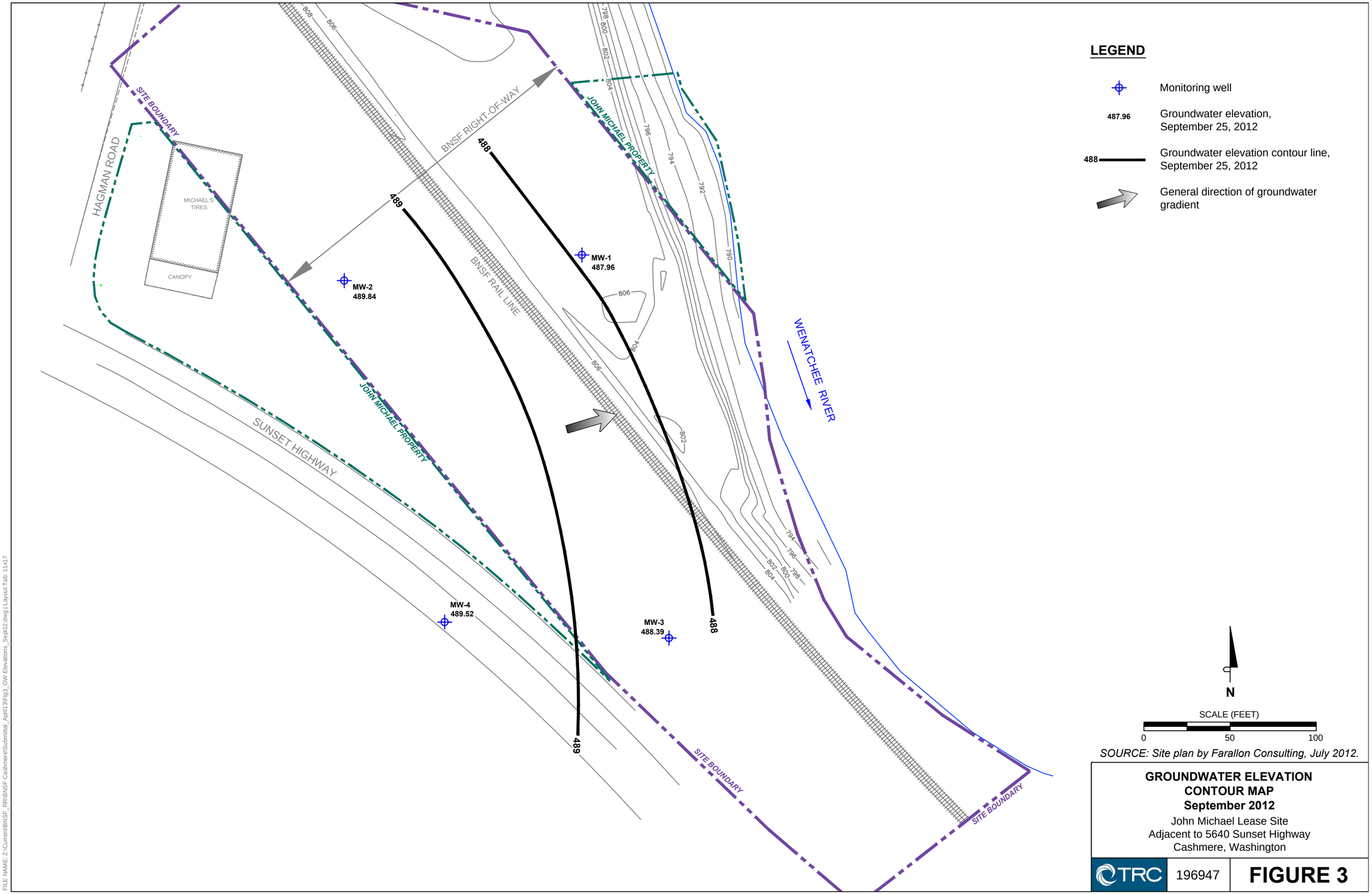
SOURCE: Site plan by Farallon Consulting, July 2012.

SITE PLAN

John Michael Lease Site
Adjacent to 5640 Sunset Highway
Cashmere, Washington

TRC | 196947 | **FIGURE 2**

FILE NAME: Z:\Current\BNSF_RR\BNSF Cashmere\Submittal_April13\Fig2_Site Plan.dwg | Layout Tab: 11x17



SOURCE: Site plan by Farallon Consulting, July 2012.

GROUNDWATER ELEVATION CONTOUR MAP
September 2012
John Michael Lease Site
Adjacent to 5640 Sunset Highway
Cashmere, Washington

TRC | 196947 | **FIGURE 3**

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LEGEND

- Monitoring well
- 488.28 — Groundwater elevation, December 11, 2012
- 489 — Groundwater elevation contour line, December 11, 2012
- General direction of groundwater gradient

N

SCALE (FEET)

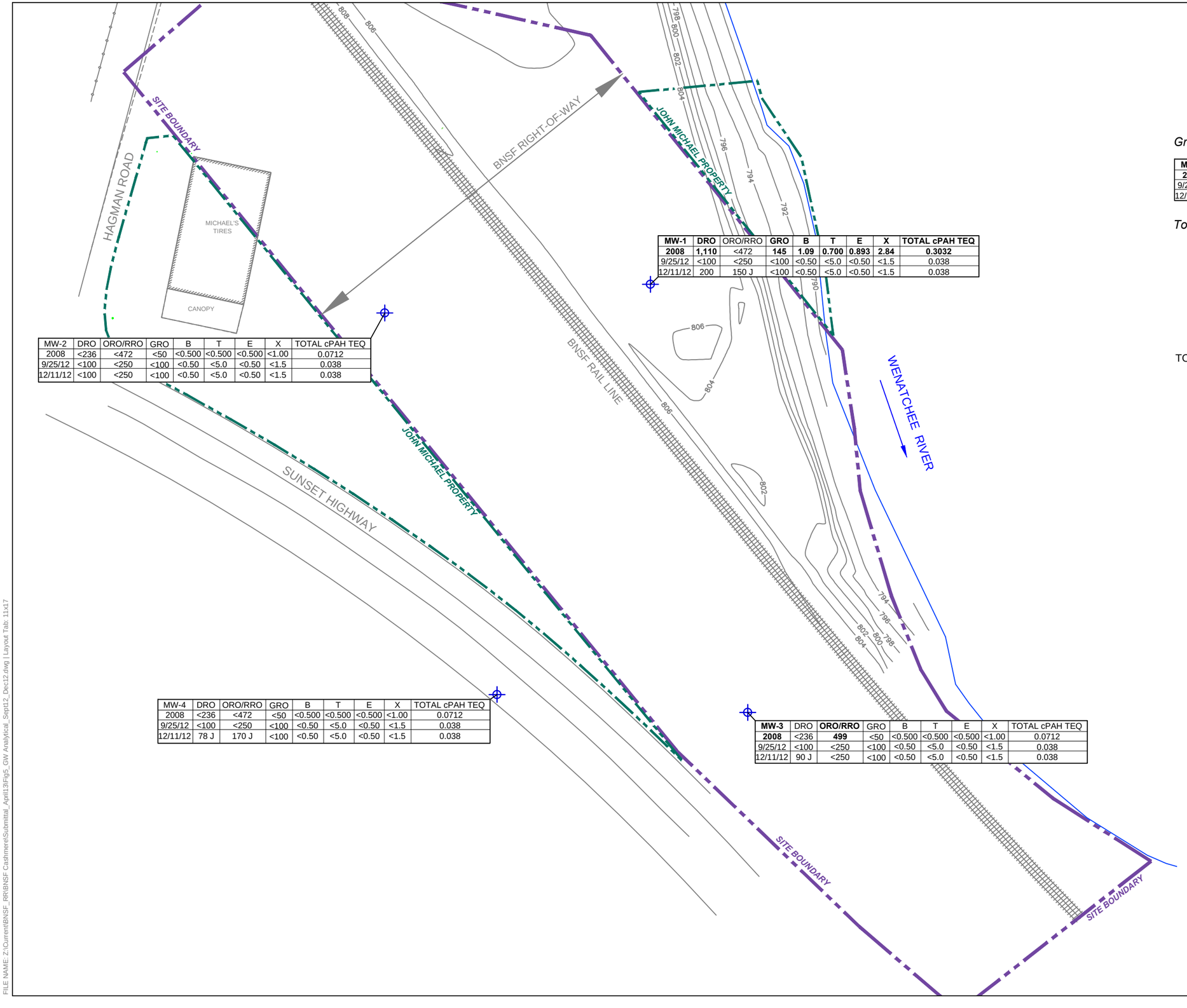
0 50 100

SOURCE: Site plan by Farallon Consulting, July 2012.

GROUNDWATER ELEVATION CONTOUR MAP
December 2012
John Michael Lease Site
Adjacent to 5640 Sunset Highway
Cashmere, Washington

TRC | 196947 | **FIGURE 4**

FILE NAME: Z:\Current\BNSF_RR\BNSF Cashmere\Submittal_April13\Fig4_GW Elevations_Dec12.dwg | Layout Tab: 11x17



MW-2	DRO	ORO/RRO	GRO	B	T	E	X	TOTAL cPAH TEQ
2008	<236	<472	<50	<0.500	<0.500	<0.500	<1.00	0.0712
9/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038
12/11/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038

MW-1	DRO	ORO/RRO	GRO	B	T	E	X	TOTAL cPAH TEQ
2008	**1,110**	<472	**145**	**1.09**	**0.700**	**0.893**	**2.84**	**0.3032**
9/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038
12/11/12	200	150 J	<100	<0.50	<5.0	<0.50	<1.5	0.038

MW-4	DRO	ORO/RRO	GRO	B	T	E	X	TOTAL cPAH TEQ
2008	<236	<472	<50	<0.500	<0.500	<0.500	<1.00	0.0712
9/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038
12/11/12	78 J	170 J	<100	<0.50	<5.0	<0.50	<1.5	0.038

MW-3	DRO	**ORO/RRO**	GRO	B	T	E	X	TOTAL cPAH TEQ
2008	<236	**499**	<50	<0.500	<0.500	<0.500	<1.00	0.0712
9/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038
12/11/12	90 J	<250	<100	<0.50	<5.0	<0.50	<1.5	0.038

LEGEND

Monitoring well

Groundwater analytical results (ug/L):

Total petroleum hydrocarbons as:

DRO	Diesel-range organics
ORO/RRO	Oil-range organics / residual-range organics
GRO	Gasoline-range organics
B	Benzene
T	Toluene
E	Ethyl-benzene
X	Xylenes
TOTAL cPAH TEQ	Total carcinogenic polycyclic aromatic hydrocarbons, toxic equivalence
J	Estimated value below lowest calibration point

N

SCALE (FEET)

0 50 100

SOURCE: Site plan by Farallon Consulting, July 2012.

GROUNDWATER ANALYTICAL RESULTS

John Michael Lease Site
Adjacent to 5640 Sunset Highway
Cashmere, Washington

TRC 196947 **FIGURE 5**

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TABLES

Table 1
Summary of Groundwater Elevation Data
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Monitoring Well	Date Measured	Well Head Elevation (feet)[1]	Depth to Groundwater (feet)[2]	Elevation of Groundwater (feet)[1]
MW-1	08/06/08	501.94	13.94	488.00
	04/07/09		13.96	487.98
	09/25/12		13.98	487.96
	12/11/12		13.66	488.28
MW-2	08/06/08	499.14	9.00	490.14
	04/07/09		9.12	490.02
	09/25/12		9.30	489.84
	12/11/12		8.88	490.26
MW-3	08/06/08	496.09	7.83	488.26
	04/07/09		7.79	488.30
	09/25/12		7.70	488.39
	12/11/12		7.62	488.47
MW-4	08/06/08	495.85	6.39	489.46
	04/07/09		6.45	489.40
	09/25/12		6.33	489.52
	12/11/12		6.30	489.55

NOTES:

[1] Elevations based on an arbitrary 100-foot datum established at the Site.

[2] In feet below top of well casing.

Table 2
Summary of Groundwater Analytical Results -TPH and BTEX
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Monitoring Well	Sample Identification	Sample Date	Analytical Results in micrograms per liter (µg/L)						
			DRO[1]	ORO/RRO[2]	GRO[2]	Benzene[2]	Toluene[2]	Ethyl-benzene[2]	Xylenes[2]
MW-1	MW1-080608	08/06/08	**1,110**	<472	145	1.09	0.700	0.893	2.84
	MW1-092512	09/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5
	MW1-121112	12/11/12	200	150 J	<100	<0.50	<5.0	<0.50	<1.5
MW-2	MW2-080608	08/06/08	<236	<472	<50	<0.500	<0.500	<0.500	<1.00
	MW2-121112	09/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5
	MW2-121112	12/11/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5
MW-3	MW3-080608	08/06/08	<236	499	<50	<0.500	<0.500	<0.500	<1.00
	MW3-121112	09/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5
	MW3-121112	12/11/12	90 J	<250	<100	<0.50	<5.0	<0.50	<1.5
MW-4	MW4-080608	08/06/08	<236	<472	<50	<0.500	<0.500	<0.500	<1.00
	MW4-092512	09/25/12	<100	<250	<100	<0.50	<5.0	<0.50	<1.5
	MW4-121112	12/11/12	78 J	170 J	<100	<0.50	<5.0	<0.50	<1.5
MTCA Method A Cleanup Levels [3]			**500**	**500**	**800[4]/1,000[5]**	**5**	**1,000**	**700**	**1,000**

NOTES:

< denotes analyte not detected at or above the reporting limit listed.

J = estimated value below lowest calibration point

[1] Analyzed by Northwest Method NWTPH-Dx.

[2] Analyzed by Northwest Method NWTPH-Gx.

[3] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Cleanup Levels for Groundwater, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

[4] Benzene present in groundwater

[5] No detectable benzene in groundwater

TPH = total petroleum hydrocarbons

DRO = TPH as diesel-range organics

GRO = TPH as gasoline-range organics

RRO = TPH as residual-range organics

ORO = TPH as oil-range organics

Table 3
Summary of Groundwater Analytical Results - Carcinogenic Polycyclic Aromatic Hydrocarbons
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Monitoring Well	Sample Identification	Sample Date	Analytical Results in micrograms per liter (µg/L) [1]							
			Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h) anthracene	Total cPAH TEQ [2,3]
MW-1	MW1-080608	08/06/08	<0.0943	<0.0943	0.2890	<0.0943	**0.2550**	<0.0943	<0.0943	**0.3032**
	MW1-092512	09/25/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
	MW1-121112	12/11/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
MW-2	MW2-080608	08/06/08	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	0.0712
	MW2-092512	09/25/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
	MW2-121112	12/11/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
MW-3	MW3-080608	08/06/08	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	0.0712
	MW3-092512	09/25/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
	MW3-121112	12/11/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
MW-4	MW4-080608	08/06/08	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	<0.0943	0.0712
	MW4-092512	09/25/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
	MW4-121112	12/11/12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.038
MTCA Method A Cleanup Levels [4]										**0.10 [3]**

NOTES:

< denotes analyte not detected at or above the reporting limit listed.

[1] Analyzed by U.S. Environmental Protection Agency Method 8270C-S.

[2] For concentrations reported at less than the laboratory reporting limit, half the reporting limit was used to calculate the TEQ.

[3] Total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) derived using the total toxicity equivalency (TEQ) method presented in Section 708(8) of Chapter 173-340 of the Washington Administrative Code.

[4] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Cleanup Levels for Groundwater, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised November 2007.

Table 4
Summary of Groundwater Analytical Results - Polycyclic Aromatic Hydrocarbons
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Monitoring Well	Sample Identification	Sample Date	Analytical Results in micrograms per liter (µg/l)[1]						
			Acenaphthene	Anthracene	Fluorene	2-Chloro naphthalene	Phenanthrene	Pyrene	Naphthalene
MW-1	MW1-080608	08/06/08	0.866	<0.0943	1.080	NR	<0.0943	0.266	0.975
	MW1-092512	09/25/12	0.022 J	0.027 J	0.011 J	<0.25	0.0091 J	0.040 J	0.079 J
	MW1-121112	12/11/12	0.026 J	0.016 J	0.014 J	<0.25	<0.050	0.028 J	0.11 J
MW-2	MW2-080608	08/06/08	<0.0943	<0.0943	<0.0943	NR	<0.0943	<0.0943	<0.0943
	MW2-092512	09/25/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.25
	MW2-121112	12/11/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.25
MW-3	MW3-080608	08/06/08	<0.0943	<0.0943	<0.0943	NR	<0.0943	<0.0943	<0.0943
	MW3-092512	09/25/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.25
	MW3-121112	12/11/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.25
MW-4	MW4-080608	08/06/08	<0.0943	<0.0943	<0.0943	NR	<0.0943	<0.0943	<0.0943
	MW4-092512	09/25/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	0.028 J
	MW4-121112	12/11/12	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	0.028 J
MTCA Method B Cleanup Levels - Non-Carcinogen [3]			**960**	**4,800**	**640**	**640**	NR	**480**	**160 [2,4]**

NOTES:

< denotes analyte not detected at or above the reporting limit listed.

J = estimated value below lowest calibration point

NR = Not Reported or Not Researched

[1] Analyzed by U.S. Environmental Protection Agency Method 8270C-S.

[2] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Cleanup Levels for Groundwater, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised November 2007.

[3] MTCA Cleanup Levels and Risk Calculations, Standard Method B Values for Groundwater, https://fortress.wa.gov/ecy/clarc/Reporting/ChemicalQuery.aspx

[4] Method A Cleanup Level based on total naphthalenes (i.e., sum of naphthalene, 1-methyl and 2-methyl naphthalene)

Table 5
Summary of Natural Attenuation and Water Quality Parameter Results
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Monitoring Well	Sample Identification	Sample Date	Nitrate[1]	Sulfate[1]	Free Carbon Dioxide[2]	Ferrous Iron[3]	Sulfide[4]	Iron[5]	Iron, Dissolved[5]	Dissolved Oxygen[6]	pH[6]	Temperature[6] (Celsius)	Conductivity[6] (mS/cm)	ORP[6] (mV)
			Concentrations in milligrams per liter (mg/L)											
MW-1	MW1-092512	09/25/12	2	16	29 T	<0.050 T	<0.050	0.240	<0.100	0.99	6.42	13.29	0.546	110.2
	MW1-121112	12/11/12	3	16	< 20 T	0.037 J T	0.030 J	0.210	<0.100	1.19	6.57	11.13	0.481	67.8
MW-2	MW2-092512	09/25/12	3.8	16	22 T	<0.050 T	<0.050	0.170	<0.100	4.31	6.63	14.83	0.530	145.7
	MW2-121112	12/11/12	3.7	16	< 20 T	0.033 J T	< 0.050	0.050 J	<0.100	4.35	6.38	11.53	0.466	276.1
MW-3	MW3-092512	09/25/12	1.4	9.9	39 T	<0.050 T	<0.050	0.046 J	<0.100	0.81	6.38	16.43	0.534	137.6
	MW3-121112	12/11/12	4.7	17	< 20 T	0.029 J T	0.028 J	0.041 J	<0.100	2.11	6.89	12.44	0.517	145.1
MW-4	MW4-092512	09/25/12	4	14	22 T	<0.050 T	<0.050	0.057 J	<0.100	4.14	6.46	14.30	0.532	157.0
	MW4-121112	12/11/12	4.6	16	< 20 T	<0.050 T	0.026 J	0.028 J	<0.100	4.59	6.99	11.95	0.486	235.0

NOTES:

[1]Analyzed by U.S. Environmental Protection Agency (EPA) Method 9056.
[2]Analyzed by Standard Method (SM) 4500C.
[3]Analyzed by Conventional Chemistry Parameters by EPA Method/American Public Health Association (APHA) Methods, SM 3500-Fe.
[4]Analyzed by SM 4500-S2.
[5]Analyzed by EPA 6000/7000 Series Method.
[6]Measured using a YSI multimeter and flow-through cell after stabilization.

J = estimated value below lowest calibration point
Petroleum-Degrading Bacteria = Bacterial colonies known to result in biodegradation of petroleum hydrocarbons
mg/l = milligrams per liter; equivalent to parts per million
MPN/ml = most probable number per milliliter
mS/cm = milliSiemens per centimeter; specific conductance units
mV = millivolts
ORP = oxidation-reduction potential
T = Sample received past/too close to holding time expiration

Table 6
Summary of Molecular Biological Results
Burlington Northern Santa Fe Railway Company
John Michael Lease Site
Cashmere, Washington

Well ID	Sample Date	PLFA Total Biomass cells/mL	Monos %	BrMonos %	MidBRSats %	TerBRSats %	Nsats %	Polyenoics %
MW-1	11/1/2012	128,000	74.08	0.85	1.83	3.90	17.47	1.88
MW-2	11/1/2012	161,000	64.55	0.97	2.28	5.00	26.49	0.72

Notes and Abbreviations

PLFA: Phospholipid Fatty Acid analysis

PLFA Structural Groups

Monos: Monoenoic - Consists of Proteobacteria with a wide variety of aerobic and anaerobic bacteria

BrMonos: Branched monoenoic - anaerobic sulfate and iron reducers

MidBrSats: Mid-chain branched saturated - anaerobic sulfate and iron reducers

TerBrSats: Terminally branched saturated - includes Firmicutes type bacteria; anaerobic fermenting bacteria

Nsats: Normal saturated - high proportions can indicate less diverse populations

Polyenoics: Eukaryotes - can prey upon contaminant-utilizing bacteria

Relative Biomass Cell Concentration (cells/mL)

Low 10^3 to 10^4 cells

Moderate 10^5 to 10^6 cells

High 10^7 to 10^8 cells

APPENDIX A

LABORATORY ANALYTICAL REPORTS
AND

CHAIN OF CUSTODY RECORDS

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Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

Report Summary

Friday October 05, 2012

Report Number: L597295
Samples Received: 09/26/12
Client Project: TT9206-M03

Description: BNSF - JML - Cashmere, WA

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Alan Harvill

T. Alan Harvill , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-01

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW1-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 08:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	2000	9.1	100	ug/l		9056	09/26/12	1
Sulfate	16000	400	5000	ug/l		9056	09/26/12	1
Free Carbon Dioxide	29000	6600	20000	ug/l	T8	SM4500C	10/03/12	1
Ferrous Iron	U	17.	50.	ug/l	T8	3500Fe-	09/27/12	1
Sulfide	U	19.	50.	ug/l		4500-S2	10/02/12	1
Iron	240	26.	100	ug/l		6010B	10/02/12	1
Iron,Dissolved	U	26.	100	ug/l		6010B	10/02/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	09/28/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	09/28/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	09/28/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	09/28/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	09/28/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	103.			% Rec.		NWTPHGX	09/28/12	1
a,a,a-Trifluorotoluene(FID)	98.8			% Rec.		NWTPHGX	09/28/12	1
Diesel Range Organics (DRO)	U	50.	100	ug/l		NWTPHDX	10/05/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	10/05/12	1
Surrogate Recovery								
o-Terphenyl	97.0			% Rec.		NWTPHDX	10/05/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	0.027	0.0076	0.050	ug/l	J	8270C-S	10/01/12	1
Acenaphthene	0.022	0.0082	0.050	ug/l	J	8270C-S	10/01/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	10/01/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	10/01/12	1
Fluorene	0.011	0.0085	0.050	ug/l	J	8270C-S	10/01/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	10/01/12	1
Naphthalene	0.079	0.020	0.25	ug/l	J	8270C-S	10/01/12	1
Phenanthrene	0.0091	0.0082	0.050	ug/l	J	8270C-S	10/01/12	1
Pyrene	0.040	0.012	0.050	ug/l	J	8270C-S	10/01/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-01

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW1-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 08:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	0.15	0.0082	0.25	ug/l	J	8270C-S	10/01/12	1
2-Methylnaphthalene	0.024	0.0090	0.25	ug/l	J	8270C-S	10/01/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	10/01/12	1
Surrogate Recovery								
Nitrobenzene-d5	107.			% Rec.		8270C-S	10/01/12	1
2-Fluorobiphenyl	104.			% Rec.		8270C-S	10/01/12	1
p-Terphenyl-d14	94.7			% Rec.		8270C-S	10/01/12	1

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-02

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW2-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 08:30

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	3800	9.1	100	ug/l		9056	09/26/12	1
Sulfate	16000	400	5000	ug/l		9056	09/26/12	1
Free Carbon Dioxide	22000	6600	20000	ug/l	T8	SM4500C	10/03/12	1
Ferrous Iron	U	17.	50.	ug/l	T8	3500Fe-	09/27/12	1
Sulfide	U	19.	50.	ug/l		4500-S2	10/02/12	1
Iron	170	26.	100	ug/l		6010B	10/02/12	1
Iron,Dissolved	U	26.	100	ug/l		6010B	10/02/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	09/28/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	09/28/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	09/28/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	09/28/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	09/28/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	09/28/12	1
a,a,a-Trifluorotoluene(FID)	99.2			% Rec.		NWTPHGX	09/28/12	1
Diesel Range Organics (DRO)	U	50.	100	ug/l		NWTPHDX	10/05/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	10/05/12	1
Surrogate Recovery								
o-Terphenyl	101.			% Rec.		NWTPHDX	10/05/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	10/01/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	10/01/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	10/01/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	10/01/12	1
Naphthalene	U	0.020	0.25	ug/l		8270C-S	10/01/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-02

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW2-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 08:30

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	0.0085	0.0082	0.25	ug/l	J	8270C-S	10/01/12	1
2-Methylnaphthalene	0.012	0.0090	0.25	ug/l	J	8270C-S	10/01/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	10/01/12	1
Surrogate Recovery								
Nitrobenzene-d5	105.			% Rec.		8270C-S	10/01/12	1
2-Fluorobiphenyl	110.			% Rec.		8270C-S	10/01/12	1
p-Terphenyl-d14	99.7			% Rec.		8270C-S	10/01/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-03

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW4-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 09:20

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	4000	9.1	100	ug/l		9056	09/26/12	1
Sulfate	14000	400	5000	ug/l		9056	09/26/12	1
Free Carbon Dioxide	22000	6600	20000	ug/l	T8	SM4500C	10/03/12	1
Ferrous Iron	U	17.	50.	ug/l	T8	3500Fe-	09/27/12	1
Sulfide	U	19.	50.	ug/l		4500-S2	10/02/12	1
Iron	57.	26.	100	ug/l	J	6010B	10/02/12	1
Iron,Dissolved	U	26.	100	ug/l		6010B	10/02/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	09/28/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	09/28/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	09/28/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	09/28/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	09/28/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	09/28/12	1
a,a,a-Trifluorotoluene(FID)	99.4			% Rec.		NWTPHGX	09/28/12	1
Diesel Range Organics (DRO)	U	50.	100	ug/l		NWTPHDX	10/05/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	10/05/12	1
Surrogate Recovery								
o-Terphenyl	98.3			% Rec.		NWTPHDX	10/05/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	10/01/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	10/01/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	10/01/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	10/01/12	1
Naphthalene	0.028	0.020	0.25	ug/l	J	8270C-S	10/01/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-03

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW4-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 09:20

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	U	0.0082	0.25	ug/l		8270C-S	10/01/12	1
2-Methylnaphthalene	0.011	0.0090	0.25	ug/l	J	8270C-S	10/01/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	10/01/12	1
Surrogate Recovery								
Nitrobenzene-d5	108.			% Rec.		8270C-S	10/01/12	1
2-Fluorobiphenyl	109.			% Rec.		8270C-S	10/01/12	1
p-Terphenyl-d14	102.			% Rec.		8270C-S	10/01/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-04

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW3-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 10:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	1400	9.1	100	ug/l		9056	09/26/12	1
Sulfate	9900	400	5000	ug/l		9056	09/26/12	1
Free Carbon Dioxide	39000	6600	20000	ug/l	T8	SM4500C	10/03/12	1
Ferrous Iron	U	17.	50.	ug/l	T8	3500Fe-	09/27/12	1
Sulfide	U	19.	50.	ug/l		4500-S2	10/02/12	1
Iron	46.	26.	100	ug/l	J	6010B	10/02/12	1
Iron,Dissolved	U	26.	100	ug/l		6010B	10/02/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	09/28/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	09/28/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	09/28/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	09/28/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	09/28/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	09/28/12	1
a,a,a-Trifluorotoluene(FID)	99.5			% Rec.		NWTPHGX	09/28/12	1
Diesel Range Organics (DRO)	U	50.	100	ug/l		NWTPHDX	10/05/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	10/05/12	1
Surrogate Recovery								
o-Terphenyl	94.3			% Rec.		NWTPHDX	10/05/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	10/01/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	10/01/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	10/01/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	10/01/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	10/01/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	10/01/12	1
Naphthalene	U	0.020	0.25	ug/l		8270C-S	10/01/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	10/01/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	10/01/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

October 05, 2012

ESC Sample # : L597295-04

Site ID :

Project # : TT9206-M03

Date Received : September 26, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW3-092512

Collected By : Jon Peterson
Collection Date : 09/25/12 10:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	0.0086	0.0082	0.25	ug/l	J	8270C-S	10/01/12	1
2-Methylnaphthalene	0.011	0.0090	0.25	ug/l	J	8270C-S	10/01/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	10/01/12	1
Surrogate Recovery								
Nitrobenzene-d5	101.			% Rec.		8270C-S	10/01/12	1
2-Fluorobiphenyl	105.			% Rec.		8270C-S	10/01/12	1
p-Terphenyl-d14	95.1			% Rec.		8270C-S	10/01/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 10/05/12 13:28 Printed: 10/05/12 16:32

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L597295-01	WG615955	SAMP	Free Carbon Dioxide	R2374259	T8
	WG614841	SAMP	Ferrous Iron	R2368776	T8
	WG615059	SAMP	Anthracene	R2371994	J
	WG615059	SAMP	Acenaphthene	R2371994	J
	WG615059	SAMP	Fluorene	R2371994	J
	WG615059	SAMP	Naphthalene	R2371994	J
	WG615059	SAMP	Phenanthrene	R2371994	J
	WG615059	SAMP	Pyrene	R2371994	J
	WG615059	SAMP	1-Methylnaphthalene	R2371994	J
	WG615059	SAMP	2-Methylnaphthalene	R2371994	J
L597295-02	WG615955	SAMP	Free Carbon Dioxide	R2374259	T8
	WG614841	SAMP	Ferrous Iron	R2368776	T8
	WG615059	SAMP	1-Methylnaphthalene	R2371994	J
	WG615059	SAMP	2-Methylnaphthalene	R2371994	J
L597295-03	WG615955	SAMP	Free Carbon Dioxide	R2374259	T8
	WG615730	SAMP	Iron	R2373174	J
	WG614841	SAMP	Ferrous Iron	R2368776	T8
	WG615059	SAMP	Naphthalene	R2371994	J
	WG615059	SAMP	2-Methylnaphthalene	R2371994	J
L597295-04	WG615955	SAMP	Free Carbon Dioxide	R2374259	T8
	WG615730	SAMP	Iron	R2373174	J
	WG614841	SAMP	Ferrous Iron	R2368776	T8
	WG615059	SAMP	1-Methylnaphthalene	R2371994	J
	WG615059	SAMP	2-Methylnaphthalene	R2371994	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods,it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

G113

Chain of Custody

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Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

Billing information:
Mark Engdahl
2454 Occidental Ave S, Ste 1A
Seattle, WA 98134-1451

Report to: **Kristin Darnell**

Email: **kjdarnell@farallonconsulting**

Project Description: **BNSF - JML - Cashmere, WA**

City/State Collected:

Phone: **(425) 295-0811**

FAX:

Client Project #: **TT9206-M03**

Lab Project #: **BNSF1FAR-CASHMERE**

Collected by (print): Jon Peterson

Site/Facility ID#:

P.O.#:

Collected by (signature): [signature]

Immediately Packed on Ice N___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? __No X Yes
FAX? __No __Yes

Analysis/Container/Preservative

Acctnum: **BNSF1FAR** (lab use only)
Template/Prelogin: **T81876/ P406327**
Cooler #: JB 9/19
Shipped Via: **FedEX Saver**

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	***NO3***, SO4 125mlHDPE-NoPres	CO2 40mlAmb-NoPres	Dissolved Metals 500mlHDPE-NoPres	Ferrous Iron 250mlAmb-HCl <2	NWTPHDX 40mlAmb-HCl-BT	NWTPHGXBTEX 40mlAmb HCl	SULFIDE 500mlHDPE-NaOH+ZnAc 7/12	SVPAHSIMLVI 40mlAmb-NoPres-WT	Remarks/Contaminant	Sample # (lab only)
MW1-092512	Grab	GW		9/25/12	800	13	X	X	X	X	X	X	X	X		L597295-01
MW2-092512	Grab	GW		9/25/12	830	13	X	X	X	X	X	X	X	X		-02
MW4-092512	Grab	GW		9/25/12	920	13	X	X	X	X	X	X	X	X		-03
MW3-092512	Grab	GW		9/25/12	1000	13	X	X	X	X	X	X	X	X		-04
~~		GW				13	X	X	X	X	X	X	X	X~~		
~~		GW				13	X	X	X	X	X	X	X	X~~		

*Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other________

pH __________ Temp __________

Flow __________ Other __________

Remarks:

5413 4724 5067

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via:	Condition: (lab use only)
[signature]	9/25/12	1300		☐ UPS ☑ FedEx ☐ Courier ☐ ____	ok MS
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.2° Bottles Received: 52+2TB	COC Seal Intact: ___Y ___N ___NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) [signature]	Date: 9-26-12 Time: 0900	pH Checked: <2, 7/12 NCF:

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Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

Report Summary

Thursday December 20, 2012

Report Number: L610583
Samples Received: 12/12/12
Client Project: TT9206-M03

Description: BNSF - JML - Cashmere, WA

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-01

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW2-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 06:50

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	3700	23.	100	ug/l		9056	12/12/12	1
Sulfate	16000	77.	5000	ug/l		9056	12/12/12	1
Free Carbon Dioxide	U	6600	20000	ug/l	T8	SM4500C	12/19/12	1
Ferrous Iron	33.	17.	50.	ug/l	JT8	3500Fe-	12/13/12	1
Sulfide	U	19.	50.	ug/l		4500-S2	12/13/12	1
Iron	50.	14.	100	ug/l	J	6010B	12/19/12	1
Iron,Dissolved	U	14.	100	ug/l		6010B	12/18/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	12/13/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	12/13/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	12/13/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	12/13/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	12/13/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	12/13/12	1
a,a,a-Trifluorotoluene(FID)	97.0			% Rec.		NWTPHGX	12/13/12	1
Diesel Range Organics (DRO)	U	50.	100	ug/l		NWTPHDX	12/18/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	12/18/12	1
Surrogate Recovery								
o-Terphenyl	114.			% Rec.		NWTPHDX	12/18/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	12/13/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	12/13/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	12/13/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	12/13/12	1
Naphthalene	U	0.020	0.25	ug/l		8270C-S	12/13/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-01

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW2-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 06:50

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	U	0.0082	0.25	ug/l		8270C-S	12/13/12	1
2-Methylnaphthalene	U	0.0090	0.25	ug/l		8270C-S	12/13/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	12/13/12	1
Surrogate Recovery								
Nitrobenzene-d5	114.			% Rec.		8270C-S	12/13/12	1
2-Fluorobiphenyl	103.			% Rec.		8270C-S	12/13/12	1
p-Terphenyl-d14	99.2			% Rec.		8270C-S	12/13/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 12/20/12 12:48 Printed: 12/20/12 12:49

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-02

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW4-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 07:45

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	4600	23.	100	ug/l		9056	12/12/12	1
Sulfate	16000	77.	5000	ug/l		9056	12/12/12	1
Free Carbon Dioxide	U	6600	20000	ug/l	T8	SM4500C	12/19/12	1
Ferrous Iron	U	17.	50.	ug/l	T8	3500Fe-	12/13/12	1
Sulfide	26.	19.	50.	ug/l	J	4500-S2	12/13/12	1
Iron	28.	14.	100	ug/l	J	6010B	12/19/12	1
Iron,Dissolved	U	14.	100	ug/l		6010B	12/18/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	12/13/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	12/13/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	12/13/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	12/13/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	12/13/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	103.			% Rec.		NWTPHGX	12/13/12	1
a,a,a-Trifluorotoluene(FID)	96.9			% Rec.		NWTPHGX	12/13/12	1
Diesel Range Organics (DRO)	78.	50.	100	ug/l	J	NWTPHDX	12/18/12	1
Residual Range Organics (RRO)	170	120	250	ug/l	J	NWTPHDX	12/18/12	1
Surrogate Recovery								
o-Terphenyl	112.			% Rec.		NWTPHDX	12/18/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	12/13/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	12/13/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	12/13/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	12/13/12	1
Naphthalene	0.028	0.020	0.25	ug/l	J	8270C-S	12/13/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-02

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW4-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 07:45

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	U	0.0082	0.25	ug/l		8270C-S	12/13/12	1
2-Methylnaphthalene	U	0.0090	0.25	ug/l		8270C-S	12/13/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	12/13/12	1
Surrogate Recovery								
Nitrobenzene-d5	114.			% Rec.		8270C-S	12/13/12	1
2-Fluorobiphenyl	102.			% Rec.		8270C-S	12/13/12	1
p-Terphenyl-d14	97.3			% Rec.		8270C-S	12/13/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-03

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW3-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 09:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	4700	23.	100	ug/l		9056	12/12/12	1
Sulfate	17000	77.	5000	ug/l		9056	12/12/12	1
Free Carbon Dioxide	U	6600	20000	ug/l	T8	SM4500C	12/19/12	1
Ferrous Iron	29.	17.	50.	ug/l	JT8P1	3500Fe-	12/13/12	1
Sulfide	28.	19.	50.	ug/l	J	4500-S2	12/13/12	1
Iron	41.	14.	100	ug/l	J	6010B	12/19/12	1
Iron,Dissolved	U	14.	100	ug/l		6010B	12/18/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	12/13/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	12/13/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	12/13/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	12/13/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	12/13/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	12/13/12	1
a,a,a-Trifluorotoluene(FID)	97.1			% Rec.		NWTPHGX	12/13/12	1
Diesel Range Organics (DRO)	90.	50.	100	ug/l	J	NWTPHDX	12/18/12	1
Residual Range Organics (RRO)	U	120	250	ug/l		NWTPHDX	12/18/12	1
Surrogate Recovery								
o-Terphenyl	112.			% Rec.		NWTPHDX	12/18/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	U	0.0076	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/13/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	12/13/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l		8270C-S	12/13/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	12/13/12	1
Fluorene	U	0.0085	0.050	ug/l		8270C-S	12/13/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l		8270C-S	12/13/12	1
Naphthalene	U	0.020	0.25	ug/l		8270C-S	12/13/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	12/13/12	1
Pyrene	U	0.012	0.050	ug/l		8270C-S	12/13/12	1

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-03

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW3-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 09:00

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	U	0.0082	0.25	ug/l		8270C-S	12/13/12	1
2-Methylnaphthalene	U	0.0090	0.25	ug/l		8270C-S	12/13/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	12/13/12	1
Surrogate Recovery								
Nitrobenzene-d5	116.			% Rec.		8270C-S	12/13/12	1
2-Fluorobiphenyl	104.			% Rec.		8270C-S	12/13/12	1
p-Terphenyl-d14	94.9			% Rec.		8270C-S	12/13/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-04

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW1-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 10:20

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Nitrate	3000	23.	100	ug/l		9056	12/12/12	1
Sulfate	16000	77.	5000	ug/l		9056	12/12/12	1
Free Carbon Dioxide	U	6600	20000	ug/l	T8	SM4500C	12/19/12	1
Ferrous Iron	37.	17.	50.	ug/l	JT8	3500Fe-	12/13/12	1
Sulfide	30.	19.	50.	ug/l	JP1	4500-S2	12/13/12	1
Iron	210	14.	100	ug/l		6010B	12/19/12	1
Iron,Dissolved	U	14.	100	ug/l		6010B	12/18/12	1
Gasoline Range Organics-NWTPH	U	50.	100	ug/l		NWTPHGX	12/13/12	1
Benzene	U	0.19	0.50	ug/l		NWTPHGX	12/13/12	1
Toluene	U	0.18	5.0	ug/l		NWTPHGX	12/13/12	1
Ethylbenzene	U	0.16	0.50	ug/l		NWTPHGX	12/13/12	1
Total Xylene	U	0.51	1.5	ug/l		NWTPHGX	12/13/12	1
Surrogate Recovery(%)								
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		NWTPHGX	12/13/12	1
a,a,a-Trifluorotoluene(FID)	97.0			% Rec.		NWTPHGX	12/13/12	1
Diesel Range Organics (DRO)	200	50.	100	ug/l		NWTPHDX	12/18/12	1
Residual Range Organics (RRO)	150	120	250	ug/l	J	NWTPHDX	12/18/12	1
Surrogate Recovery								
o-Terphenyl	108.			% Rec.		NWTPHDX	12/18/12	1
Polynuclear Aromatic Hydrocarbons								
Anthracene	0.016	0.0076	0.050	ug/l	J	8270C-S	12/18/12	1
Acenaphthene	0.026	0.0082	0.050	ug/l	J	8270C-S	12/18/12	1
Acenaphthylene	U	0.0068	0.050	ug/l		8270C-S	12/18/12	1
Benzo(a)anthracene	U	0.012	0.050	ug/l		8270C-S	12/18/12	1
Benzo(a)pyrene	U	0.012	0.050	ug/l		8270C-S	12/18/12	1
Benzo(b)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/18/12	1
Benzo(g,h,i)perylene	U	0.011	0.050	ug/l		8270C-S	12/18/12	1
Benzo(k)fluoranthene	U	0.014	0.050	ug/l		8270C-S	12/18/12	1
Chrysene	U	0.011	0.050	ug/l		8270C-S	12/18/12	1
Dibenz(a,h)anthracene	U	0.0040	0.050	ug/l	L1	8270C-S	12/18/12	1
Fluoranthene	U	0.016	0.050	ug/l		8270C-S	12/18/12	1
Fluorene	0.014	0.0085	0.050	ug/l	J	8270C-S	12/18/12	1
Indeno(1,2,3-cd)pyrene	U	0.015	0.050	ug/l	L1	8270C-S	12/18/12	1
Naphthalene	0.11	0.020	0.25	ug/l	J	8270C-S	12/18/12	1
Phenanthrene	U	0.0082	0.050	ug/l		8270C-S	12/18/12	1
Pyrene	0.028	0.012	0.050	ug/l	J	8270C-S	12/18/12	1

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REPORT OF ANALYSIS

Kristin Darnell
Farallon Consulting - BNSF Region 1
975 5th Avenue Northwest
Issaquah, WA 98027

December 20, 2012

ESC Sample # : L610583-04

Site ID :

Project # : TT9206-M03

Date Received : December 12, 2012
Description : BNSF - JML - Cashmere, WA

Sample ID : MW1-121112

Collected By : Jon Peterson
Collection Date : 12/11/12 10:20

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
1-Methylnaphthalene	0.31	0.0082	0.25	ug/l		8270C-S	12/18/12	1
2-Methylnaphthalene	0.031	0.0090	0.25	ug/l	J	8270C-S	12/18/12	1
2-Chloronaphthalene	U	0.0065	0.25	ug/l		8270C-S	12/18/12	1
Surrogate Recovery								
Nitrobenzene-d5	98.1			% Rec.		8270C-S	12/18/12	1
2-Fluorobiphenyl	108.			% Rec.		8270C-S	12/18/12	1
p-Terphenyl-d14	109.			% Rec.		8270C-S	12/18/12	1

U = ND (Not Detected)
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
MDL = Minimum Detection Limit = LOD = TRRP SDL
Note:
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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L610583-01	WG628714	SAMP	Free Carbon Dioxide	R2485678	T8
	WG628498	SAMP	Iron	R2485158	J
	WG627849	SAMP	Ferrous Iron	R2475937	JT8
L610583-02	WG628714	SAMP	Free Carbon Dioxide	R2485678	T8
	WG628498	SAMP	Iron	R2485158	J
	WG627849	SAMP	Ferrous Iron	R2475937	T8
	WG628018	SAMP	Diesel Range Organics (DRO)	R2484277	J
	WG628018	SAMP	Residual Range Organics (RRO)	R2484277	J
	WG627799	SAMP	Naphthalene	R2477304	J
	WG627851	SAMP	Sulfide	R2477037	J
L610583-03	WG628714	SAMP	Free Carbon Dioxide	R2485678	T8
	WG628498	SAMP	Iron	R2485158	J
	WG627849	SAMP	Ferrous Iron	R2475937	JT8P1
	WG628018	SAMP	Diesel Range Organics (DRO)	R2484277	J
	WG627851	SAMP	Sulfide	R2477037	J
L610583-04	WG628714	SAMP	Free Carbon Dioxide	R2485678	T8
	WG627849	SAMP	Ferrous Iron	R2475937	JT8
	WG628018	SAMP	Residual Range Organics (RRO)	R2484277	J
	WG627800	SAMP	Anthracene	R2484797	J
	WG627800	SAMP	Acenaphthene	R2484797	J
	WG627800	SAMP	Dibenz(a,h)anthracene	R2484797	L1
	WG627800	SAMP	Fluorene	R2484797	J
	WG627800	SAMP	Indeno(1,2,3-cd)pyrene	R2484797	L1
	WG627800	SAMP	Naphthalene	R2484797	J
	WG627800	SAMP	Pyrene	R2484797	J
	WG627800	SAMP	2-Methylnaphthalene	R2484797	J
	WG627851	SAMP	Sulfide	R2477037	JP1

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
L1	(ESC) The associated batch LCS exceeded the upper control limit, which indicates a high bias; The sample analyte was "not detected" and is therefore unaffected.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods,it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
12/20/12 at 12:49:18

TSR Signing Reports: 134
R5 - Desired TAT

Sample: L610583-01 Account: BNSF1FAR Received: 12/12/12 09:00 Due Date: 12/19/12 00:00 RPT Date: 12/20/12 12:48

Sample: L610583-02 Account: BNSF1FAR Received: 12/12/12 09:00 Due Date: 12/19/12 00:00 RPT Date: 12/20/12 12:48

Sample: L610583-03 Account: BNSF1FAR Received: 12/12/12 09:00 Due Date: 12/19/12 00:00 RPT Date: 12/20/12 12:48

Sample: L610583-04 Account: BNSF1FAR Received: 12/12/12 09:00 Due Date: 12/19/12 00:00 RPT Date: 12/20/12 12:48

Farallon Consulting - BNSF Region 1

975 5th Avenue Northwest
Issaquah, WA 98027

Billing information:

Mark Engdahl
2454 Occidental Ave S, Ste 1A

Seattle, WA 98134-1451

Report to: **Kristin Darnell**

Email: **kjdarnell@farallonconsulting**

Project Description: **BNSF - JML - Cashmere, WA**

City/State Collected: CASHMERE, WA

Phone: **(425) 295-0811**
FAX:

Client Project #: **TT9206-M03**

Lab Project #: **BNSF1FAR-CASHMERE**

Collected by (print): Jon Peterson

Site/Facility ID#:

P.O.#: 283006

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day.....100%
___ Two Day.....50%
___ Three Day.....25%

Date Results Needed

Email? __No X__Yes
FAX? __No __Yes

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	***NO3***, SO4 125mlHDPE-NoPres	CO2 40mlAmb-NoPres	Dissolved Metals 500mlHDPE-NoPres	Ferrous Iron 250mlAmb-HCl	NWTPHDX 40mlAmb-HCl-BT	NWTPHGXBTEX 40mlAmb HCl	PAHSIMLVI 40mlAmb-NoPres-WT	SULFIDE 500mlHDPE-NaOH+ZnAc	Remarks/Contaminant	Sample # (lab only)
MW2 - 121112		GW		12-11-12	0650	14	X	X	X	X	X	X	X	X		L610563-01
MW4 - 121112		GW			0745	14	X	X	X	X	X	X	X	X		-02
MW3 - 121112		GW			0900	14	X	X	X	X	X	X	X	X		-03
MW1 - 121112		GW			1020	14	X	X	X	X	X	X	X	X		-04
		GW				14	X	X	X	X	X	X	X	X		

*Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Chain of Custody
Page ___ of ___

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Mt. Juliet, TN 37122

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Phone: (615) 758-5858
Fax: (615) 758-5859

E151

Acctnum: **BNSF1FAR** (lab use only)
Template/Prelogin: **T81876 P414765**
Cooler #: JB 1217
Shipped Via: **FedEx Priority**

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	12-11-12		
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

5435551095375

Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐

Temp: 3.1° Bottles Received: 56+TB

Date: 12/12/12 Time: 0900

Condition: OK (lab use only) N

COC Seal Intact: ___ Y ___ N 1 NA

pH Checked: 2,7/12 NCF: