ROTHMAN & ASSOCIATES

Groundwater Monitoring Report

Fourth Quarter 2018

Property:

North Lot Property
255 South King Street
Seattle, Washington

Prepared for:

255 S King Street LP
270 South Hanford Street, Suite 100
Seattle, Washington

January 14, 2019

ROTHMAN
&ASSOCIATES

Groundwater Monitoring Report

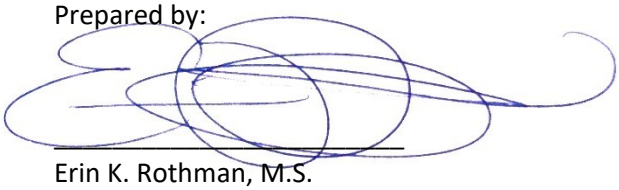
Fourth Quarter 2018

North Lot Property
Washington State Department of Ecology Facility ID 5378137
255 South King Street
Seattle, Washington

Prepared for:

255 S King Street LP
270 South Hanford Street, Suite 100
Seattle, Washington

Prepared by:



Erin K. Rothman, M.S.
Managing Principal

Rothman & Associates
505 Broadway East, Ste 115
Seattle, Washington

January 14, 2019

TABLE OF CONTENTS

1.0 INTRODUCTION

Rothman & Associates has prepared this Fourth Quarter 2018 Groundwater Monitoring Report for the North Lot Property, located at 201 and 255 South King Street in Seattle, Washington (the Site), on behalf of 255 S. King Street LP to demonstrate compliance with the specific requirements of the cleanup action completed at the North Lot Property as part of a Prospective Purchaser Consent Decree.

2.0 BACKGROUND

This section provides a description of the Site features and location, a summary of historical land use, and a description of the local geology and hydrogeology of the Site and adjoining parcels.

2.1 Site Location and Description

The Site, which is located at 201 and 255 South King Street in the Pioneer Square neighborhood of Seattle, Washington, includes two rectangularly-shaped tax parcels (King County Parcel Nos. 766620-4878 and 795300-0000) that cover approximately 168,573 square feet (3.87 acres) of land.

The location of the Site is shown on Figure 1. Figure 2 depicts a plan view/layout of the Site and locations of the compliance monitoring wells.

2.2 Land Use History of the Site

Based on a review of historical records and the findings of the Remedial Investigation (RI) completed by Landau Associates in 2011, the Site was originally undeveloped tide flats of Elliott Bay. The Site was filled in the late 1890s and early 1900s and operated as a rail yard from the late 1800s until the late 1960s. The fill material underlying the Site is composed of remnants of the former rail yard operations and construction debris (i.e., brick, metal, and concrete). Prior to filling, the Site was initially developed with streets, buildings, and railroad tracks elevated on and supported by pilings. Several sets of railroad tracks were formerly present on the Site. Structures associated with the rail yard included engine maintenance buildings, sand houses, coal houses, oil houses, and materials storage areas. King County purchased the Site in the 1970s to facilitate construction of the Kingdome stadium to the south of the Site, which was later demolished and replaced with the current CenturyLink Field and Event Center development. The Site was used as a parking lot since the 1970s. 255 S. King Street LP purchased the Property from NLD in August 2013 and redeveloped it with a high-rise hotel, residential, and commercial/retail buildings with belowground parking in 2014 and 2017. Construction of the hotel was completed in February 2018.

2.3 Regional Hydrogeology

The geology of the region is generally characterized by a thick sequence of glacial soil overlying tertiary bedrock, with local areas of exposed surficial bedrock. In general, the glacial stratigraphic sequence of the Puget Lowland consists of generally fine-grained, low-energy, non- glacial and glacial lacustrine and fluvial deposits overlain by glacial advance sand. The advance sand is overlain by glacial till, which, in turn is locally overlain by glacial recessional sand, where present, as well as organic-rich peat, lacustrine, and alluvial deposits. Where exposed, the glacial soil has been modified by mass wasting, stream erosion and deposition, and anthropogenic modifications (Booth et al. 2009).

The hydrogeology of the Puget lowland and Quaternary glacial soil includes near-surface, non-glacial alluvial deposits, perched water-bearing zones atop and within the glacial till soil or other consolidated fine-grained or cemented glacial deposits, and more persistent and higher yielding water-bearing zones present within the underlying glacial advance sands and older granular glacial and non-glacial deposits. The advance sands can be an important source of potable water supplies, particularly in suburban and rural locations within the Puget Lowland, while the water-bearing zones within the glacial till are not often exploited as a potable source as a result of significant seasonal fluctuations, low yield, and susceptibility to water quality degradation (Booth et al. 2009).

3.0 GROUNDWATER MONITORING EVENT

The groundwater monitoring event was conducted on December 19 & 20, 2018, and included the sampling of six monitoring wells: MW-16D, MW-18D, MW-19, MW-20, MW-21, and MW-22.

3.1 Depth to Groundwater

Prior to sampling, the wells were opened and allowed to equilibrate to atmospheric pressure. Depth to water in the wells was measured using an electronic interface probe and ranged from 4.76 feet (MW-22) and 10.44 feet (MW-18D) below the top of the well casings (Table 1).

3.2 Groundwater Sampling

All six of the monitoring wells were sampled using a peristaltic pump and single-use polyethylene tubing using low-flow sampling techniques in accordance with *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (U.S. EPA 2017). Samples were collected directly from the sampling equipment and stored on ice in a cooler. Groundwater samples collected from monitoring wells were designated with the well number (e.g., MW-19) and date, and the samples were logged on a chain-of-custody form and submitted to Friedman & Bruya, Inc. in Seattle, Washington, following proper chain-of-custody protocols.

Groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by U.S. Environmental Protection Agency (EPA) Method 8021; gasoline-range total petroleum hydrocarbons (GRPH) and diesel-range total petroleum hydrocarbons (DRPH) by Northwest Total Petroleum Hydrocarbon (NWTPH) Method NWTPH-Gx and NWTPH-Dx; low-level polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270D SIM; and dissolved metals (arsenic, cadmium, chromium, lead, mercury, copper, and zinc) by EPA Method 200.8 or EPA Method 7471 (mercury). Groundwater samples collected for analysis of dissolved metals were field-filtered using a 0.45-micron membrane filter.

A blind duplicate sample was collected for quality control purposes.

3.3 Results

The following subsections summarize the results of the Fourth Quarter 2018 groundwater monitoring event.

3.3.1 Groundwater Elevation and Flow Direction

Groundwater elevations ranged from 6.73 feet (MW-18D) to 12.38 feet (MW-22) above mean sea level. The local groundwater gradient and flow patterns across the Site are variable, which is common within shallow, unconfined aquifers that consist of fill material, especially in urban areas where subgrade constructed features can affect the immediately surrounding groundwater table.

In general, there is a localized area of relatively lower groundwater elevations (i.e., groundwater low) roughly between the corner of South King Street and King Street Station to the east, and an area of relatively higher groundwater elevations (i.e., groundwater high) surrounding monitoring well MW-19 near the central portion of the Site. This is consistent with prior evaluations of groundwater flow and gradient (Landau 2011).

3.3.2 Groundwater Sample Results

None of the groundwater samples contained concentrations of any of the analytes in excess of their respective cleanup levels.

- GRPH, benzene, toluene, ethylbenzene, and total xylenes were not detected in any of the samples submitted for analysis.

- Arsenic was detected in groundwater collected from MW-18, MW-19, MW-21, and MW-22; none of the arsenic concentrations exceeded the cleanup levels. The concentrations of arsenic in groundwater near the western portion of the Site were below 5 micrograms per liter (µg/L), and the concentrations of arsenic in groundwater near the eastern portion of the Site were below 21.3 µg/L.

- DRPH was detected in groundwater collected from MW-20 and MW-22; neither of the concentrations exceeded the cleanup level, and both were flagged as not resembling the fuel standard used for quantitation.

- PAHs were not detected in any of the samples collected.

4.0 CONCLUSIONS

The results of the Fourth Quarter 2018 groundwater monitoring event indicate that the groundwater quality at the point of compliance for the North Lot Property meets the requirements set forth in the Consent Decree.

5.0 LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. No warranty, express or implied, is made regarding the information and recommendations provided in this report.

6.0 REFERENCES

Booth, Troost, Goetz, and Schimel. 2009. Geologic map of northeastern Seattle (part of the Seattle North 7.5' x 15' quadrangle), King County, Washington: U.S. Geological Survey Scientific Investigations Map 3065, scale 1:12000 and database.

Landau Associates. 2011a. Remedial Investigation Report, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. May 23.

Landau Associates. 2011b. Feasibility Study Report, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. May 23.

Landau Associates. 2011c. Cleanup Action Plan, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. July 1.

Landau Associates. 2011d. Engineering Design Report, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. July 5.

Landau Associates. 2012. Feasibility Study Addendum, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. September 27.

Landau Associates. 2013. Cleanup Action Plan Addendum, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. September 18.

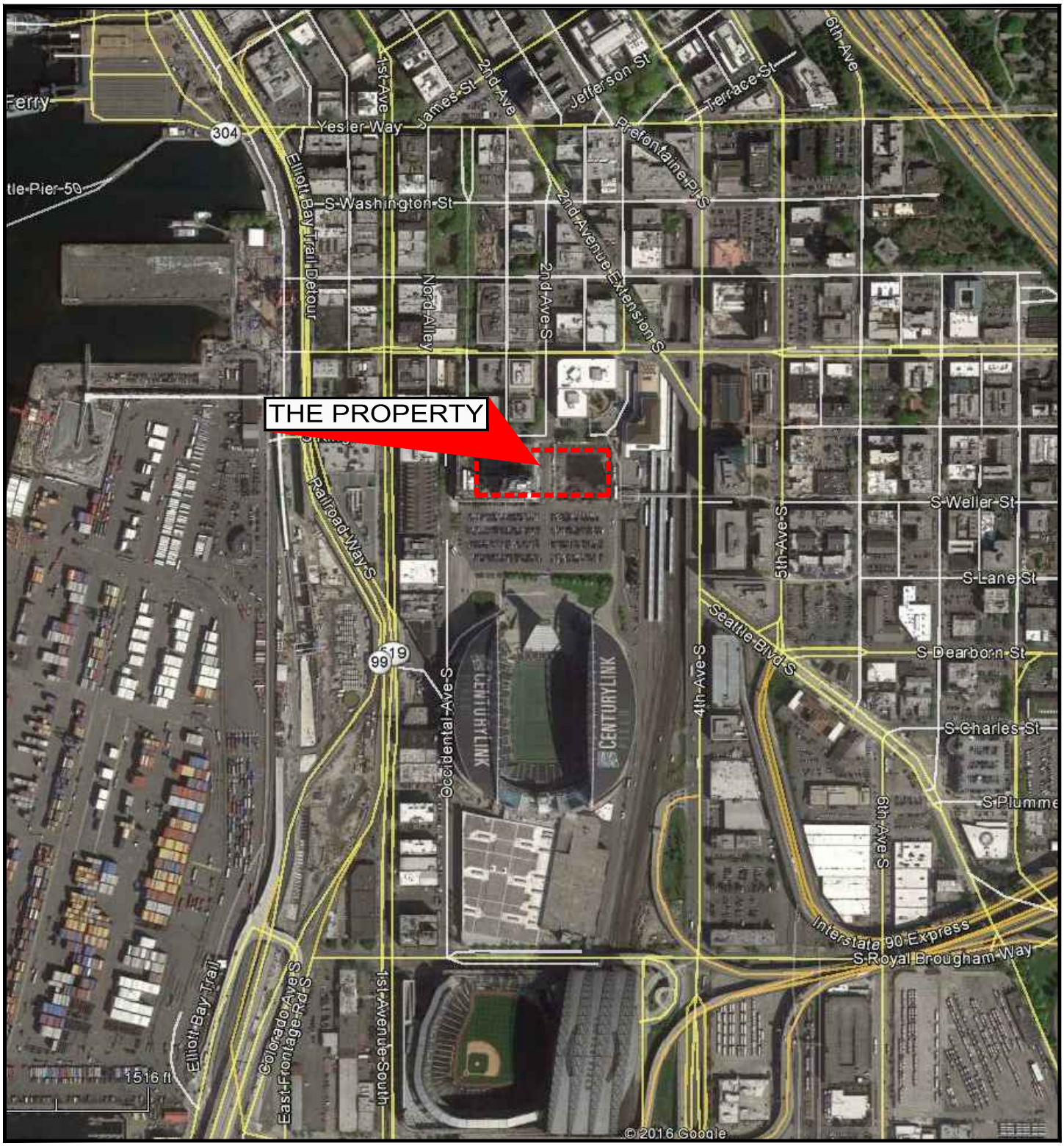
Landau Associates. 2014. Engineering Design Report Addendum, North Lot Development, Seattle, Washington. Prepared for North Lot Development, LLC. February 28.

United States Environmental Protection Agency. 2017. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. EQASOP-GW4 Region 1 Low-Stress (Low-Flow) SOP, Revision Number 4. September 19.

Washington Department of Ecology. 2014. Table D-1 of the Consent Decree, Cleanup Action Schedule, North Lot Property, Seattle, Washington. January 14.

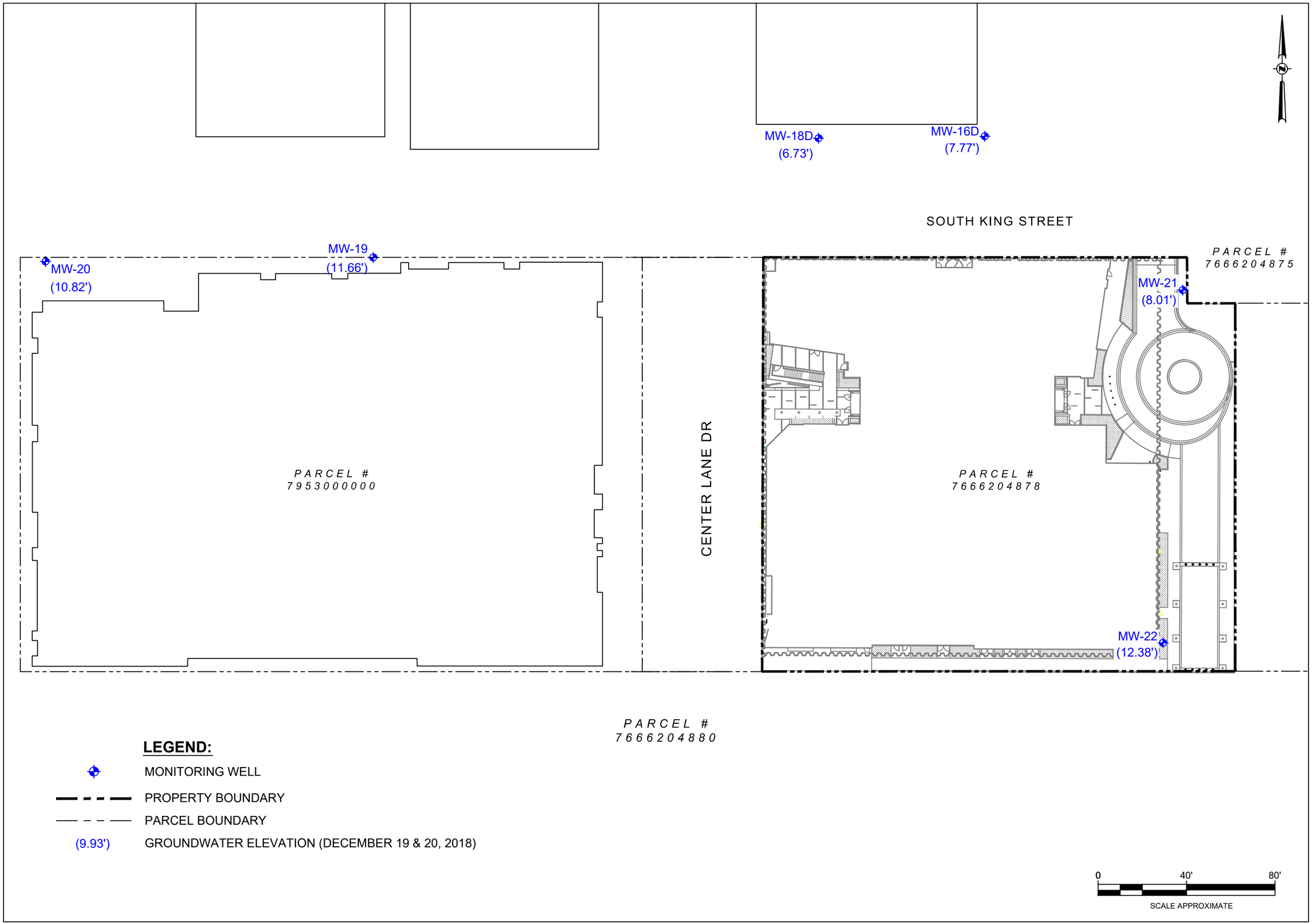
Washington State Department of Ecology. 2015. Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs). Implementation Memo #10. April 20.

FIGURES



Reference: Google Earth

ROTHMAN & ASSOCIATES	**TITLE** PROPERTY LOCATION MAP	**PROJECT** 255 SOUTH KING STREET SEATTLE, WASHINGTON **PROJECT NO.** 1008.001	**PREPARED FOR** 255 S KING STREET LP 270 SOUTH HANFORD STREET SUITE 100 SEATTLE, WASHINGTON 98134	**PREPARED BY** ROTHMAN & ASSOCIATES 505 BROADWAY EAST, STE 115 SEATTLE, WA 98102	**SCALE** NO SCALE **DATE** 08.21.2017	**FIGURE** 1



LEGEND:

- MONITORING WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- (9.93') GROUNDWATER ELEVATION (DECEMBER 19 & 20, 2018)

0 40' 80'

SCALE APPROXIMATE

ROTHMAN & ASSOCIATES

PREPARED BY
ROTHMAN & ASSOCIATES
505 BROADWAY EAST STE 115
SEATTLE, WASHINGTON 98102

PREPARED FOR
255 S. KING STREET LP
270 SOUTH HANFORD STREET, STE 100
SEATTLE, WASHINGTON 98134

PROJECT
255 S. KING STREET
SEATTLE, WASHINGTON

PROJECT NO.
1008.001

TITLE
GROUNDWATER ELEVATIONS
(DEC. 19 & 20, 2018)

FIGURE
2

SCALE 1"=40'

DATE
01.14.2019

TABLE

Table 1
Groundwater Data
North Lot Property
201 and 255 South King Street
Seattle, Washington

Monitoring Well ID	Sample Date	Depth to Groundwater (feet)	Groundwater Elevation (feet msl)	DRPH[1]	ORPH[1]	GRPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	PAHs[4]	Arsenic[5]
MW-16D	08/04/17	10.39	7.21	<50	<250	<100	<0.8	<1	<1	<3	*0.0693*	<1
TOC: 17.60'	11/08/17	10.12	7.48	<60	<300	<100	<0.8	<1	<1	<3	*0.00655*	<1
	02/08/18	9.50	8.10	<30	<150	<100	<0.8	1.0	<1	<3	*0.00655*	<1
	05/10/18	10.15	7.45	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
	09/28/18	10.07	7.53	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
	12/19/18	9.83	7.77	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
MW-18D	08/02/17	11.09	6.08	<50	<250	<100	<0.8	<1	<1	<3	*0.0693*	7.01
TOC: 17.17'	11/08/17	10.71	6.46	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.87
	02/08/18	10.64	6.53	<30	<150	<100	<0.8	1.1	<1	<3	*0.00655*	1.25
	05/10/18	10.75	6.42	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.44
	09/28/18	10.66	6.51	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
	12/19/18	10.44	6.73	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	1.83
MW-19	08/02/17	6.32	11.17	<50	<250	<100	<0.8	<1	<1	<3	*0.0693*	2.61
TOC: 17.49'	11/08/17	6.18	11.31	<65	<320	<100	<0.8	<1	<1	<3	***0.01335***	2.14
	02/08/18	7.65	9.84	36x	150	<100	<0.8	1.2	<1	<3	***0.02668***	2.42
	05/10/18	6.01	11.48	<50	<250	<100	<0.8	<1	<1	<3	***0.019914***	2.10
	09/28/18	5.99	11.50	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.10
	12/19/18	5.83	11.66	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.10
MW-20	08/02/17	7.58	9.93	62x	<250	<100	<0.8	<1	<1	<3	*0.0693*	<1
TOC: 17.51'	11/08/17	7.59	9.92	<75	<380	<100	<0.8	<1	<1	<3	*0.00655*	<1
	02/08/18	9.45	8.06	42x	<150	<100	<0.8	<1	<1	<3	*0.00655*	<1
	05/10/18	7.33	10.18	92x	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
	09/28/18	7.49	10.02	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
	12/19/18	6.69	10.82	53x	<250	<100	<0.8	<1	<1	<3	*0.00655*	<1
MW-21	08/02/17	9.73	7.44	<50	<250	<100	<0.8	<1	<1	<3	*0.0693*	6.23
TOC: 17.17'	11/08/17	9.45	7.72	<60	<300	<100	<0.8	<1	<1	<3	*0.00655*	4.34
	02/08/18	9.34	7.83	<30	<150	<100	<0.8	1.0	<1	<3	*0.00655*	1.74
	05/10/18	9.53	7.64	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.06
	09/28/18	9.43	7.74	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	5.42
	12/20/18	9.16	8.01	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	2.64
MW-22	08/02/17	6.51	10.63	180x	<250	<100	<0.8	<1	<1	<3	*0.0693*	7.21
TOC: 17.14'	11/08/17	6.10	11.04	330	<300	<100	<0.8	<1	<1	<3	*0.00655*	5.97
	02/08/18	5.27	11.87	***640***	310x	<100	<0.8	<1	<1	<3	*0.00655*	1.72
	05/10/18	5.97	11.17	***520***x	480x	<100	<0.8	<1	<1	<3	*0.00655*	1.34
	09/28/18	6.43	10.71	<50	<250	<100	<0.8	<1	<1	<3	*0.00655*	4.58
	12/20/18	4.76	12.38	180x	<250	<100	<0.8	<1	<1	<3	*0.00655*	1.53
Site-Specific Cleanup Levels for Groundwater[6]				**500**	**500**	**800**	**0.8**	**80**	**275**	**1,600**	**0.012**[a]	**5/21.3**[b]

Table 1
Groundwater Data
North Lot Property
201 and 255 South King Street
Seattle, Washington

Monitoring Well ID	Sample Date	Depth to Groundwater (feet)	Groundwater Elevation (feet msl)	DRPH[1]	ORPH[1]	GRPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	PAHs[4]	Arsenic[5]

640 = bold italics indicated that the concentration exceeds the cleanup level
Analytical data presented in micrograms per liter (µg/L)
DRPH = diesel-range petroleum hydrocarbons
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
msl = mean sea level
ORPH = oil-range petroleum hydrocarbons
PAHs = polycyclic aromatic hydrocarbons
TOC = top of casing elevation (feet) relative to mean sea level as measured by D.R. Strong Consulting Engineers on August 18, 2017

Laboratory Notes:
x=the sample chromatographic pattern does not resemble the fuel standard used for quantitation

[1]Analyzed by Northwest Method NWTPH-Dx.

[2]Analyzed by Northwest Method NWTPH-Gx.

[3]Analyzed by EPA Method 8021B.

[4]Analyzed by EPA Method 8071D SIM for low-level analysis of PAHs. While the reporting/detection limits for individual cPAHs, including benzo(a)pyrene, are below the site-specific cleanup level, it is not feasible to achieve a reporting limit/detection limit that can demonstrate a TEF (note a, below) below the site-specific cleanup level.

[5]Analyzed by EPA Method 200.8.

[6]Site-Specific Cleanup Levels established in Cleanup Plan Addendum, North Lot Property, Seattle, Washington. Prepared by Landau Associates on September 18, 2013.

[a]The total concentration that all cPAHs meet using the toxicity equivalency methodology in WAC 173-340-708(8). Italics indicate a toxicity equivalency based entirely or in part upon non-detectable concentrations of PAHs. For those PAHS that have not been detected at the Site and are below detection limits, a value of 0 was used for the TEF calculations (Washington State Department of Ecology. 2015. Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs). Implementation Memo #10. April 20.). Data were corrected relative to the recommendations provided in the memo, and the table was updated in May 2018. If concentrations of detected benzo(a)pyrene and/or TEFs of additional detected PAHs exceed the cleanup level, results are presented in bold italic font.

[b]A cleanup level of 5 µg/L was agreed upon by Ecology for the western portion of the Site (MW-19 and MW-20). A background concentration of 21.3 µg/L will be used as the cleanup level for the eastern portion of the Site (MW-16D, MW-18D, MW-21, and MW-22).

APPENDIX A

Laboratory Analytical Results

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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January 2, 2019

Erin Rothman, Principal
Rothman & Associates
505 Broadway E., Suite 115
Seattle, WA 98102

Dear Ms Rothman:

Included are the results from the testing of material submitted on December 20, 2018 from the North Lot 1009.001, F&BI 812294 project. There are 23 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
RAA0102R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 20, 2018 by Friedman & Bruya, Inc. from the Rothman & Associates North Lot 1009.001, F&BI 812294 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Rothman & Associates
812294 -01	MW-18D-20181218
812294 -02	MW-16D-20181218
812294 -03	MW-20-20181218
812294 -04	MW-19-20181218
812294 -05	MW-21-20181218
812294 -06	MW-22-20181218
812294 -07	Blind Duplicate

Phenanthrene was detected in the 8270D method blank at a level greater than one tenth the concentration detected in sample MW-16D-20181218. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 01/02/19
Date Received: 12/27/18
Project: Coleman Yakima 41392, F&BI 812356
Date Extracted: 12/20/18
Date Analyzed: 12/20/18

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (52-124)
Blind Duplicate 812294-07	<0.8	<1	<1	<3	91
Method Blank 08-2828 MB	<0.8	<1	<1	<3	86

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294
Date Extracted: 12/20/18
Date Analyzed: 12/20/18

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW-18D-20181218 812294-01	<0.8	<1	<1	<3	<100	92
MW-16D-20181218 812294-02	<0.8	<1	<1	<3	<100	90
MW-20-20181218 812294-03	<0.8	<1	<1	<3	<100	91
MW-19-20181218 812294-04	<0.8	<1	<1	<3	<100	89
MW-21-20181218 812294-05	<0.8	<1	<1	<3	<100	90
MW-22-20181218 812294-06	<0.8	<1	<1	<3	<100	90
Method Blank 08-2828 MB	<0.8	<1	<1	<3	<100	86

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294
Date Extracted: 12/21/18
Date Analyzed: 12/21/18

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-18D-20181218 812294-01	<50	<250	135
MW-16D-20181218 812294-02	<50	<250	132
MW-20-20181218 812294-03	53 x	<250	143
MW-19-20181218 812294-04	<50	<250	118
MW-21-20181218 812294-05	<50	<250	129
MW-22-20181218 812294-06	180 x	<250	115
Method Blank 08-2811 MB2	<50	<250	135

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-18D-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-01
Date Analyzed:	12/21/18	Data File:	812294-01.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.83
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-16D-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-02
Date Analyzed:	12/21/18	Data File:	812294-02.056
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Chromium	1.07
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-20-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-03
Date Analyzed:	12/21/18	Data File:	812294-03.057
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	6.03
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-19-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-04
Date Analyzed:	12/21/18	Data File:	812294-04.060
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.10
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-21-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-05
Date Analyzed:	12/21/18	Data File:	812294-05.061
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.64
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-22-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	812294-06
Date Analyzed:	12/21/18	Data File:	812294-06.062
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.53
Cadmium	<1
Chromium	1.17
Copper	17.6
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Rothman & Associates
Date Received:	NA	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/21/18	Lab ID:	I8-879 mb
Date Analyzed:	12/21/18	Data File:	I8-879 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-18D-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-01 1/0.5
Date Analyzed:	12/27/18	Data File:	122709.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	85	31	160
Benzo(a)anthracene-d12	80	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	0.14
Fluorene	0.032
Phenanthrene	0.036
Anthracene	<0.01
Fluoranthene	0.012
Pyrene	0.011
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-16D-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-02 1/0.5
Date Analyzed:	12/27/18	Data File:	122710.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	78	31	160
Benzo(a)anthracene-d12	51	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	0.10
Fluorene	<0.01
Phenanthrene	0.011 fb
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-20-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-03 1/0.5
Date Analyzed:	12/27/18	Data File:	122711.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	78	31	160
Benzo(a)anthracene-d12	72	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-19-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-04 1/0.5
Date Analyzed:	12/27/18	Data File:	122712.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	86	31	160
Benzo(a)anthracene-d12	83	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-21-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-05 1/0.5
Date Analyzed:	12/27/18	Data File:	122713.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	88	31	160
Benzo(a)anthracene-d12	78	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW-22-20181218	Client:	Rothman & Associates
Date Received:	12/20/18	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	812294-06 1/0.5
Date Analyzed:	12/27/18	Data File:	122714.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	64	31	160
Benzo(a)anthracene-d12	35	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Rothman & Associates
Date Received:	Not Applicable	Project:	North Lot 1009.001, F&BI 812294
Date Extracted:	12/26/18	Lab ID:	08-2898 mb 1/0.5
Date Analyzed:	12/27/18	Data File:	122706.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	92	31	160
Benzo(a)anthracene-d12	93	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 812294-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	108	65-118
Toluene	ug/L (ppb)	50	107	72-122
Ethylbenzene	ug/L (ppb)	50	105	73-126
Xylenes	ug/L (ppb)	150	103	74-118
Gasoline	ug/L (ppb)	1,000	89	69-134

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	88	92	63-142	4

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 812294-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	1.83	113	110	75-125	3
Cadmium	ug/L (ppb)	5	<1	103	102	75-125	1
Chromium	ug/L (ppb)	20	<1	104	103	75-125	1
Copper	ug/L (ppb)	20	<5	94	94	75-125	0
Lead	ug/L (ppb)	10	<1	92	92	75-125	0
Mercury	ug/L (ppb)	5	<1	94	95	75-125	1
Zinc	ug/L (ppb)	50	<5	94	95	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	108	80-120
Cadmium	ug/L (ppb)	5	105	80-120
Chromium	ug/L (ppb)	20	105	80-120
Copper	ug/L (ppb)	20	105	80-120
Lead	ug/L (ppb)	10	111	80-120
Mercury	ug/L (ppb)	5	104	80-120
Zinc	ug/L (ppb)	50	103	80-120

Date of Report: 01/02/19
Date Received: 12/20/18
Project: North Lot 1009.001, F&BI 812294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/0.5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	0.5	90	91	67-116	1
Acenaphthylene	ug/L (ppb)	0.5	104	103	65-119	1
Acenaphthene	ug/L (ppb)	0.5	98	98	66-118	0
Fluorene	ug/L (ppb)	0.5	109	108	64-125	1
Phenanthrene	ug/L (ppb)	0.5	91	91	67-120	0
Anthracene	ug/L (ppb)	0.5	96	95	65-122	1
Fluoranthene	ug/L (ppb)	0.5	97	98	65-127	1
Pyrene	ug/L (ppb)	0.5	100	100	62-130	0
Benz(a)anthracene	ug/L (ppb)	0.5	96	95	60-118	1
Chrysene	ug/L (ppb)	0.5	93	92	66-125	1
Benzo(b)fluoranthene	ug/L (ppb)	0.5	105	99	55-135	6
Benzo(k)fluoranthene	ug/L (ppb)	0.5	91	95	62-125	4
Benzo(a)pyrene	ug/L (ppb)	0.5	102	98	58-127	4
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	0.5	109	104	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	0.5	99	87	37-133	13
Benzo(g,h,i)perylene	ug/L (ppb)	0.5	99	92	34-135	7

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

812294

SAMPLE CHAIN OF CUSTODY

ME 12/20/18 VW3/AIG/EO4

Page # 1 of 1

Report To Erin Rothman

Company Rothman Associates

Address

City, State, ZIP

Phone (206) 795-0978 Email Erin@RothmanAssociates LLC.com

SAMPLERS (*signature*)

PROJECT NAME	PO #
North Lot	1009,001
REMARKS	INVOICE TO
	Erin

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Dissolved Metals (As, Cd, Cr, Pb, Hg, Cu, Zn)				Notes
						ANALYSES REQUESTED											
MW-18D-20181218	01 A-G	12/19/18	845	Water	7		X	X	X			X	X				Benzene
MW-16D-20181218	02	12/19/18	1530														RL=0.5 µg/L
MW-20-20181218	03	12/19/18	1150														
MW-19-20181218	04	12/19/18	1255														
MW-21-20181218	05	12/20/18	1055														
MW-22-20181218	06	12/20/18	1225														
Blind Duplicate	07 A-C			#3													

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Jack Taylor	EHS1	12/20/18	1335
Received by:	Nhan Phan	FeBI	12/20/18	1335
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282