Geosyntec consultants

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August 14, 2018

Adam Harris, LHG
Toxics Cleanup Program
Southwest Regional Office
Washington State Department of Ecology
PO Box 47775
Olympia, WA 98504-7775

Subject: Gordon Trucking Biennial Groundwater Monitoring
151 Stewart Road SW, Pacific, WA
Facility/Site No.: 3393818 VCP Project No: SW0969
Geosyntec Project No: PNR0646

Dear Mr. Harris:

This letter has been prepared by Geosyntec Consultants (Geosyntec) to summarize results from the 2018 groundwater monitoring event at the Gordon Trucking Inc. (GTI) property in Pacific, WA (site). Groundwater monitoring is being conducted under the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP), project number SW0969.

SITE HISTORY

In 2013, GTI was acquired by Heartland Express, Inc. (Heartland). The site remained under the ownership of the Gordon Family and was managed by L&V Properties LLC. Heartland leased the site as an operator until August 2017. Since then, the fuel tanks and island have not been in use. The site is currently being managed by Gordon Truck Centers, Inc. on behalf of L&V Properties LLC.

ENVIRONMENTAL BACKGROUND

In August 2007, GTI discovered petroleum-impacted soil during pipe repair work in the vicinity of a fuel island at their Pacific, Washington property (Figure 1). In response, approximately 150 tons of soil were removed from the site. Soil and groundwater samples were collected to characterize the lateral and vertical extent of soil contamination resulting from the release. In 2008 and 2009, five groundwater monitoring wells (MW-01 through MW-05) were installed at the site (Figure 2). In 2009, GTI implemented a remedial program to address existing petroleum levels in the soil above Ecology Model Toxics Control Act (MTCA) Method A cleanup levels for diesel and heavy oil. Subsequent actions at the site included applying an in-situ microbial inoculant and

the initiation of a groundwater sampling program to evaluate the effectiveness of the in-situ treatment. Additional microbial inoculant was applied in 2010 and oxygen release compound (ORC) filter socks were installed in monitoring wells where petroleum hydrocarbon remained in groundwater (MW-03 and MW-04). These ORC socks were removed in 2011.

Semi-annual groundwater monitoring was performed at the site between 2008 and 2013. On January 4, 2013, Geosyntec submitted a work plan to Ecology ("Gordon Trucking Groundwater Monitoring Work Plan for 2013") recommending that monitoring frequency change from semi-annual to annual, in addition to the installation of ORC socks in three monitoring wells. The work plan was approved on January 25, 2013 and ORC socks were installed in February 2013. Annual groundwater sampling and ORC sock replacement was performed between 2014 and 2016 during seasonal high water levels.

In early 2017, the monitoring frequency was reduced from annual to biennial, following approval from the former Ecology site manager, Thomas Middleton. No groundwater sampling was performed in 2017, however annual ORC sock replacement continued. On March 21, 2017, Geosyntec installed five new ORC filter socks in three monitoring wells (MW-02, MW-03, and MW-04) to aid in continued microbial degradation of the subsurface hydrocarbons. In preparation for the 2018 groundwater sampling event, the socks were removed on May 2, 2018 to allow the groundwater to return to its natural geochemical state.

GROUNDWATER MONITORING

On May 18, 2018, the five groundwater monitoring wells (MW-01 to MW-05) were gauged using an electronic water level probe capable of detecting water depth with a precision of 0.01 foot. Project personnel recorded static water levels prior to sampling (Table 1 and Figure 2). The observed groundwater elevations in the five monitoring wells, were slightly lower but generally comparable to the levels recorded in February 2016. The highest groundwater elevations were observed in MW-03 (62.57 feet above mean sea level [ft AMSL]).

Monitoring wells were sampled using low flow groundwater sampling methodology. Field parameters such as temperature, electrical conductivity, pH, oxidation-reduction potential (ORP), and dissolved oxygen were measured during well purging and are summarized in Table 1. Once field parameters stabilized, groundwater samples were collected, preserved and stored as directed by the analytical laboratory. Equipment decontamination protocols were implemented using low-phosphate detergent and distilled water to prevent cross-contamination between sampling locations. One quality control sample was collected, comprising greater than ten percent of the total sample set submitted for laboratory analysis.

After the collection of groundwater samples was completed, new ORC socks were installed in wells MW-02, MW-03 and MW-04 and will remain in the wells until 2019.

Results

Groundwater samples were submitted to the Analytical Resources, Inc. lab in Tukwila, Washington for analysis of kerosene, diesel and motor oil-range petroleum hydrocarbons by the Northwest Total Petroleum Hydrocarbons diesel-extended method (NWTPH-Dx). The laboratory report is included as Attachment A. Analytical results and the corresponding MTCA cleanup levels are summarized in Table 2, and Figures 3 and 4. Calculated differences between field duplicate groundwater samples were seven percent or less and are considered acceptable. The analytical results were as follows:

- Kerosene-range petroleum hydrocarbons were only detected in wells MW-03 (719 micrograms per liter [µg/L]) and MW-04 (734 µg/L).

- Diesel-range petroleum hydrocarbons were only detected in wells MW-03 and MW-04 (Figures 3 and 4). Diesel-range petroleum hydrocarbons concentrations exceeded the MTCA Method A cleanup level of 500 µg/L in MW-03 (1,620 µg/L) and MW-04 (1,400 µg/L). The concentration of diesel-range constituents in MW-01, MW-02, and MW-05 were not detected above laboratory reporting limits. Diesel-range concentrations were generally similar to results from the 2016 sampling event, with the exception of the increased results in well MW-04. Despite this, the site-wide concentrations have a decreasing trend compared to historical spring groundwater sampling results.

- Motor-oil range constituent concentrations in all wells, MW-01, MW-02, MW-03, MW-04 and MW-05, were not detected above laboratory reporting limits.

- Since 2012 concentrations of diesel- and motor oil-range organics in MW-02 and MW-5 have declined from above MTCA A regulatory cleanup levels to well below regulatory cleanup levels. This indicates that that groundwater plume has contracted to primarily encompass MW-03 and MW-04.

The NWTPH-Dx analytical results were indicative of weathered diesel fuel, consistent with previous monitoring results.

DISCUSSION

Historical groundwater levels at the site vary seasonally between winter and summer by as much as three feet. Together with the high groundwater levels in the winter months, the petroleum

constituents in groundwater also generally increase in the winter. Conversely, during the late summer months when groundwater levels decrease, petroleum constituent concentrations decrease as well. This general pattern has been historically well displayed in MW-03, the monitoring well with the highest petroleum constituent concentrations.

Overall, petroleum constituent concentrations in MW-03 have decreased significantly since 2012 when TPH concentrations were observed at historical maximums (Figure 4). The overall decrease in concentrations, particularly in MW-03, indicates contracting groundwater impacts and suggests that the continued ORC sock implementation is assisting in constituent degradation.

FUTURE ACTIONS

Diesel concentrations continue to exceed MTCA Method A groundwater cleanup levels in MW-03 and MW-04. However, the results from this most recent groundwater sampling event are lower in comparison with historical results for all five wells.

Following the completion of the sampling event on May 18, 2018, new oxygen-release socks were installed in MW-02, MW-03, and MW-04 to aid in continued microbial degradation of the hydrocarbons. The next sampling event is scheduled for the first quarter of 2020, during seasonally high groundwater levels. The currently deployed oxygen-release socks will be removed in 2019 and replaced with new socks until 2020.

Gordon Truck Centers, Inc. is also considering permanent decommissioning of the diesel fueling system in the next few years.

Please contact Dave Parkinson at (206) 496-1446 or Adrianna Jarosz (206) 496-1447 if you have questions regarding this report.

Sincerely,

Dave Parkinson, PhD, L.G.
Senior Scientist

David L. Parkinson

Adrianna Jarosz, PE
Senior Staff Engineer

cc: Dominic Nicandri – Gordon Truck Centers, Inc.

Enclosures:

Table 1: Groundwater Field Parameters
Table 2: Groundwater Analytical Results
Table 3: Duplicate Sample Results

Figure 1: Location Map
Figure 2: Site Map with May 2018 Groundwater Elevations
Figure 3: Plots of MW-02 through MW-05 Monitoring Results
Figure 4: Plot of Groundwater Elevation and Diesel Results

Attachment A: Laboratory Report

Table 1: Groundwater Field Parameters
Gordon Trucking Site in Pacific, Washington

Monitoring Well	Date Measured	TOC Elevation (feet AMSL)	DTW, Measured from TOC (feet)	Groundwater Elevation (feet AMSL)	Water Temperature (°C)	Electrical Conductivity (mS/cm)	pH (standard units)	ORP (mV)	Dissolved Oxygen (mg/L)
MW-01	1/11/2008	67.39	3.92	63.47	9.1	0.187	6.7	12	2.1
	6/24/2009		4.81	62.58	16.7	0.357	6.6	-10	2.2
	9/24/2009		5.56	61.83	19.7	0.184	6.2	-129	1.0
	12/16/2009		3.77	63.62	12.9	0.062	6.6	42	3.8
	3/17/2010		3.94	63.45	11.7	0.072	6.5	100	3.4
	9/30/2010		5.09	62.30	19.0	0.083	5.6	134	3.0
	3/15/2011		2.60	64.79	9.1	0.238	6.0	213	6.2
	9/7/2011		6.01	61.38	18.4	0.057	6.0	109	8.8
	3/22/2012		2.82	64.57	9.7	0.063	5.6	180.1	5.6
	9/25/2012		6.14	61.25	19.4	0.059	5.4	147	0.5
	2/11/2013		4.28	63.11	10.4	0.045	5.6	179	1.8
	2/27/2014		3.27	64.12	11.0	0.080	5.6	206	4.0
	1/20/2015		3.58	63.81	12.2	0.062	5.4	151	1.3
	2/2/2016		3.58	63.81	12.2	0.102	5.3	104	0.0
	5/18/2018		4.93	62.46	15.2	0.146	6.3	-63	3.9
MW-02	1/11/2008	65.60	1.89	63.71	7.2	0.087	5.9	148	6.3
	6/24/2009		3.32	62.28	13.9	0.272	7.0	83	2.9
	9/24/2009		4.06	61.54	18.0	0.385	6.2	17	1.2
	12/16/2009		2.31	63.29	6.7	0.061	6.5	117	9.8
	3/17/2010		2.51	63.09	9.2	0.062	6.1	131	1.5
	9/30/2010		3.70	61.90	16.8	0.288	5.9	21	1.4
	3/15/2011		1.50	64.10	8.2	0.298	6.5	9	4.8
	9/7/2011		4.81	60.79	19.6	0.347	6.6	-39	3.2
	3/22/2012		1.75	63.85	8.6	0.061	5.2	147	6.4
	9/25/2012		4.77	60.83	19.3	0.455	6.0	-17	0.4
	2/11/2013		2.98	62.62	9.2	0.220	9.4	-54	9.6
	2/27/2014		1.90	63.70	9.9	0.048	5.9	182	5.7
	1/20/2015		2.18	63.42	9.7	0.027	5.4	123	4.9
	2/2/2016		2.20	63.40	10.8	0.033	5.5	186	5.7
	5/18/2018		3.57	62.03	13.4	0.052	5.7	112.6	3.7

Monitoring Well	Date Measured	TOC Elevation (feet AMSL)	DTW, Measured from TOC (feet)	Groundwater Elevation (feet AMSL)	Water Temperature (°C)	Electrical Conductivity (mS/cm)	pH (standard units)	ORP (mV)	Dissolved Oxygen (mg/L)
MW-03	1/11/2008	67.82	4.17	63.65	10.6	1.127	6.9	-64	0.5
	6/24/2009		5.31	62.51	14.6	2.213	6.6	-134	0.4
	9/24/2009		6.11	61.71	17.6	1.295	6.5	-125	0.2
	12/16/2009		4.51	63.31	13.3	1.263	6.6	-108	1.0
	3/17/2010		4.48	63.34	11.4	1.676	6.7	-106	1.1
	9/30/2010		5.92	61.90	17.1	1.310	6.2	-76	1.1
	3/15/2011		3.77	64.05	9.4	2.179	6.5	-87	1.6
	9/7/2011		6.87	60.95	19.1	1.310	6.6	-48	1.8
	3/22/2012		3.52	64.30	9.5	3.385	6.5	-75	2.7
	9/25/2012		6.46	61.36	17.6	1.38	6.5	-91	0.3
	2/11/2013		4.89	62.93	10.4	1.52	6.7	-78	0.4
	2/27/2014		3.90	63.92	11.7	1.28	6.3	-134	2.3
	1/20/2015		4.20	63.62	12.2	0.71	6.6	-183	2.3
	2/2/2016*		4.11	63.71	12.3	1.29	5.8	-116	2.3
	5/18/2018		5.25	62.57	13.5	0.810	6.4	-76	3.4
MW-04	1/11/2008	67.29	3.68	63.61	11.2	0.887	6.3	-16	2.1
	6/24/2009	67.31	4.72	62.59	14.2	1.394	6.4	-106	0.8
	9/24/2009		5.59	61.70	18.3	1.295	6.5	-123	0.2
	12/16/2009		3.97	63.32	12.9	0.967	6.4	-56	1.5
	3/17/2010		4.00	63.29	11.1	0.965	6.5	-82	2.0
	9/30/2010		5.22	62.07	17.0	0.983	6.1	-66	1.0
	3/15/2011		2.83	64.46	9.6	0.860	6.2	-75	1.5
	9/7/2011		5.91	61.38	19.0	0.685	6.6	-64	8.4
	3/22/2012		3.06	64.23	9.6	1.028	6.4	-75	3.1
	9/25/2012		6.12	61.17	17.9	0.735	6.5	-92	2.2
	2/11/2013		4.47	62.82	9.9	0.811	6.7	-66	0.8
	2/27/2014		3.36	63.93	10.1	0.561	6.2	-99	0.8
	1/20/2015		3.67	63.62	10.8	0.349	6.4	-163	2.0
	2/2/2016		3.59	63.70	11.3	0.789	6.6	-97	0.7
	5/18/2018		4.91	62.38	13.6	0.515	6.4	-99	3.4

Monitoring Well	Date Measured	TOC Elevation (feet AMSL)	DTW, Measured from TOC (feet)	Groundwater Elevation (feet AMSL)	Water Temperature (°C)	Electrical Conductivity (mS/cm)	pH (standard units)	ORP (mV)	Dissolved Oxygen (mg/L)
MW-05	6/24/2009	67.79	5.20	62.59	13.3	1.746	6.5	-111	1.3
	9/24/2009		5.99	61.80	16.2	1.142	6.5	-96	0.5
	1/21/2010		3.75	64.04	12.7	1.128	6.6	-103	0.9
	3/17/2010		4.36	63.43	12.3	1.132	6.6	-103	1.4
	9/30/2010		5.58	62.21	16.0	1.121	6.2	-116	0.8
	3/15/2011		3.17	64.62	11.3	1.101	6.2	-80	3.8
	9/7/2011		6.23	61.56	16.5	0.705	6.7	-64	7.8
	3/22/2012		3.39	64.40	11.2	1.002	6.5	-90	3.1
	2/11/2013		5.05	62.74	11.6	0.847	6.8	-104	1.1
	2/27/2014		3.73	64.06	12.0	1.01	6.5	-153	3.5
	1/20/2015		3.97	63.82	11.3	0.652	6.3	-171	3.3
	2/2/2016		3.91	63.88	13.4	1.17	6.1	-134	3.5
	5/18/2018		5.47	62.32	13.7	0.829	6.4	-125	3.4

Notes:

* MW-03 was gauged on 2/2/16 but water quality parameters were collected on 2/4/16 due to sampling equipment failure.

TOC - Top of Casing

AMSL - Above Mean Sea Level

DTW - Depth to Water

ORP - Oxygen Reduction Potential (mV = millivolts)

mS/cm - microSiemens per centimenter

Table 2: Groundwater Analytical Results
Gordon Trucking Site in Pacific, Washington

Well Name	Date Sampled	Kerosene (µg/L)	#2 Diesel (µg/L)	Motor Oil (µg/L)
MW-01	1/11/2008	<500	<236	<472
	6/24/2009	--	<236	<472
	9/24/2009	<120	<120	<240
	12/16/2009	<120	<120	240
	3/18/2010	<120	<120	<240
	9/30/2010	<120	<120	<240
	3/15/2011	<120	<120	<240
	9/7/2011	<120	130	<240
	3/22/2012	<120	<120	<240
	9/25/2012	<120	<120	<240
	2/13/2013	<120	<120	<240
	2/27/2014	<130	<130	270
	1/20/2015	130	<130	<260
	2/2/2016	<110	<110	<250
	5/18/2018	<100	<100	<200
MW-02	1/11/2008	<500	<236	<472
	6/24/2009	--	387	<472
	9/24/2009	280	490	450
	12/16/2009	<120	270	**500**
	3/18/2010	<120	270	**550**
	9/30/2010	<120	<120	<240
	3/15/2011	<120	200	<240
	9/7/2011	**710**	**1100**	**980**
	3/22/2012	120	260	<240
	9/25/2012	**730**	**1,300**	**940**
	2/13/2013	310	440	330
	2/27/2014	120	190	290
	1/20/2015	140	140	<240
	2/2/2016	<110	<110	<250
	5/18/2018	<100	<100	<200
MW-03	1/11/2008	**920**	**958**	<472
	6/24/2009	--	**9,200**	<472
	9/24/2009	**4,700**	**6,000**	**1,000**
	12/16/2009	**3,500**	**5,300**	**1,300**
	3/18/2010	**8,400**	**15,000**	**3,200**
	9/30/2010	**1,600**	**2,500**	<240
	3/15/2011	**9,000**	**13,000**	**2,500**
	9/7/2011	**4,200**	**5,100**	**1,500**
	3/22/2012	**10,000**	**17,000**	**4,900**
	9/25/2012	**3,000**	**4,300**	**1,700**
	2/13/2013	**6,100**	**8,700**	**2,500**
	2/27/2014	**1,700**	**2,100**	**720**
	1/20/2015	**3,500**	**4,200**	**1,000**
	2/25/2016	**1,400**	**2,000**	360
	5/18/2018	**719**	**1,620**	<200

Well Name	Date Sampled	Kerosene (µg/L)	#2 Diesel (µg/L)	Motor Oil (µg/L)
MW-04	1/11/2008	<500	<236	<472
	6/24/2009	--	**836**	<472
	9/24/2009	**950**	**1,300**	**700**
	12/16/2009	**850**	**1,400**	**820**
	3/18/2010	**1,300**	**2,200**	**1,300**
	9/30/2010	130	200	<240
	3/15/2011	**1,500**	**2,000**	<1200
	9/7/2011	**2,000**	**2,300**	**1,100**
	3/22/2012	**1,600**	**2,300**	**1,000**
	9/25/2012	**1,700**	**2,100**	**810**
	2/13/2013	**1,700**	**1,900**	**720**
	2/27/2014	**770**	**950**	**500**
	1/20/2015	**1,200**	**1,400**	**530**
	2/2/2016	**540**	**750**	<250
	5/18/2018	**734**	**1,400**	<200
MW-05	6/24/2009	--	448	<472
	9/24/2009	370	490	420
	12/16/2009	370	**670**	**710**
	1/21/2010	300	**540**	**550**
	3/18/2010	300	**570**	**760**
	9/30/2010	<120	<120	<240
	3/15/2011	**810**	**1,200**	500
	9/7/2011	390	500	460
	3/22/2012	480	**840**	**550**
	9/25/2012	370	**590**	**620**
	2/13/2013	280	390	370
	2/27/2014	240	300	310
	2/20/2015	300	340	<240
	2/2/2016	180	300	<250
	5/18/2018	<100	<100	<200
Method A Cleanup Levels		**500**	**500**	**500**

Notes:

1 - Sample analyzed per NWTPH-Dx Method

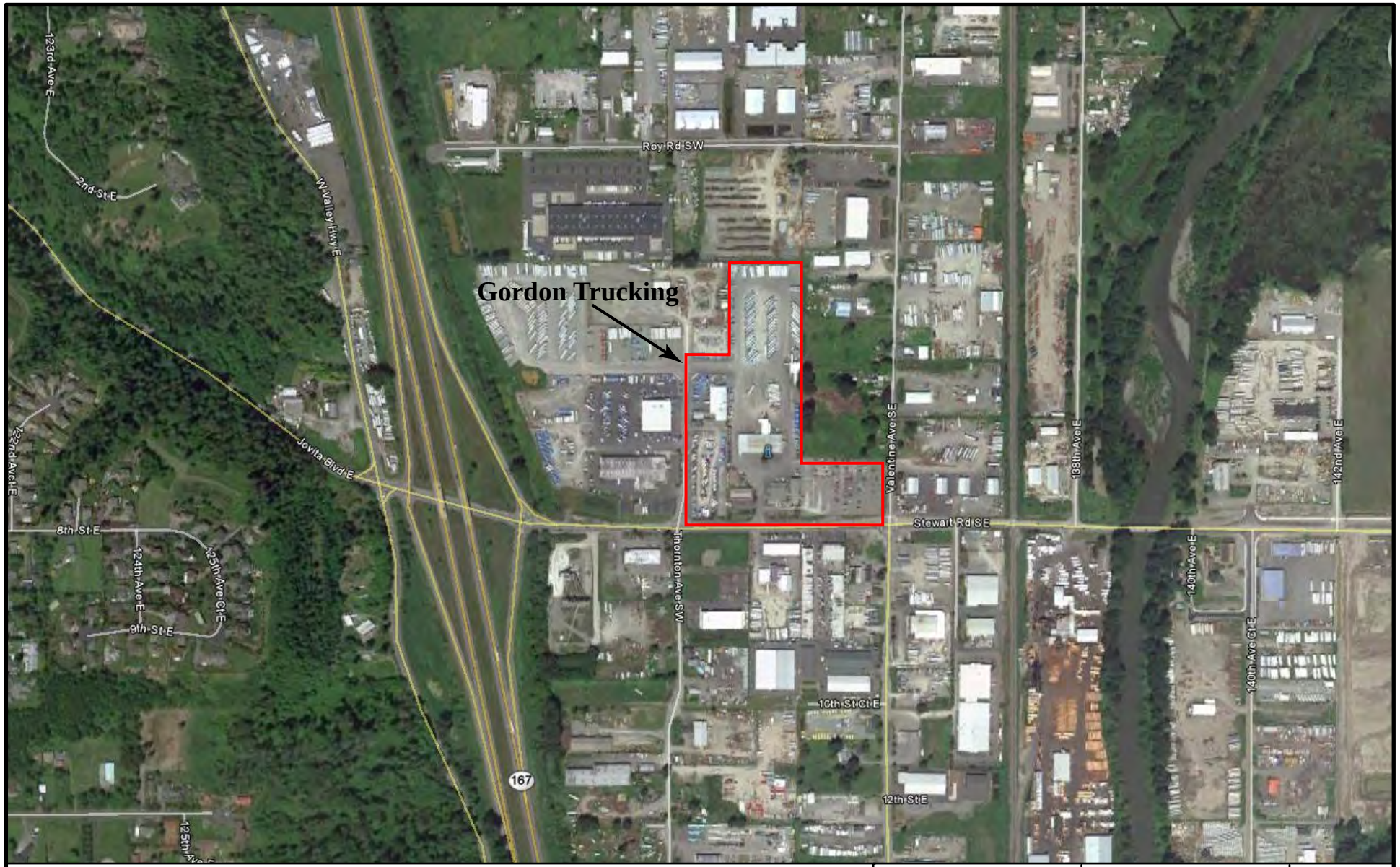
2 - Cleanup Levels per Table 720-1, WAC 173-340-900

bold - Result concentration exceeds Method A Cleanup Levels

Table 3: Duplicate Sample Results
Gordon Trucking Site in Pacific, Washington

Sample Name	Date Sampled	Kerosene (µg/L)	#2 Diesel (µg/L)	Motor Oil (µg/L)
MW-03	5/18/2018	**719**	**1,620**	<200
MW-DUP	5/18/2018	**735**	**1,730**	215
RPD[1]		2%	7%	NA[1]

Notes:
RPD - Relative Percent Difference
1 - Not applicable due to nondetectable concentrations



N

Location Map, Gordon Trucking, Inc.
151 Stewart Road SW, Pacific, Washington 98047

Scale

1,350 675 0 1,350 Feet

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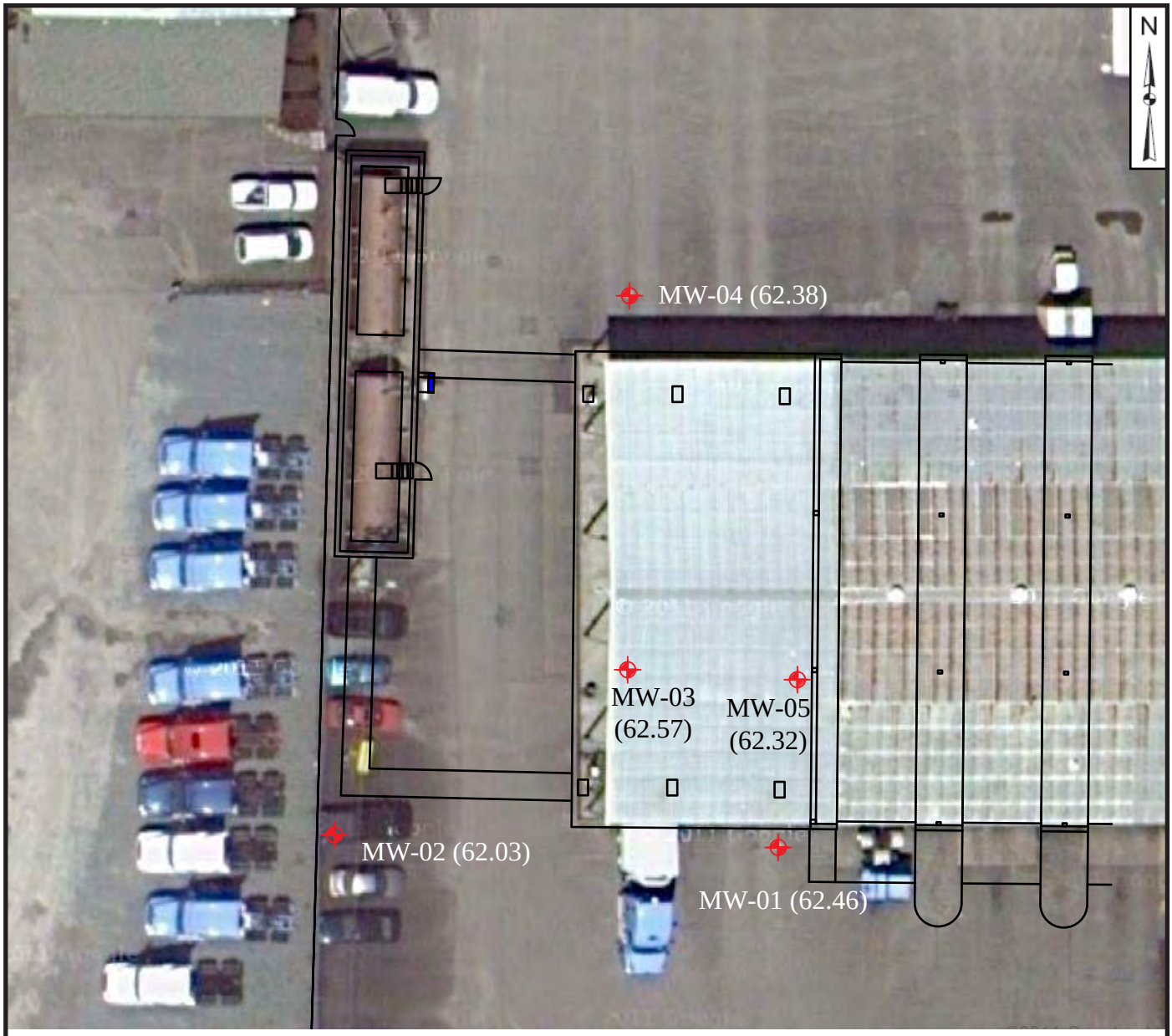
Seattle, WA

June 2018

Figure 1



Legend

Monitoring well location
(water elevation in feet above mean sea level)

Groundwater Monitoring Locations with Groundwater Elevations for May 2018 Gordon Trucking Inc.

45 22.5 0 45 Feet

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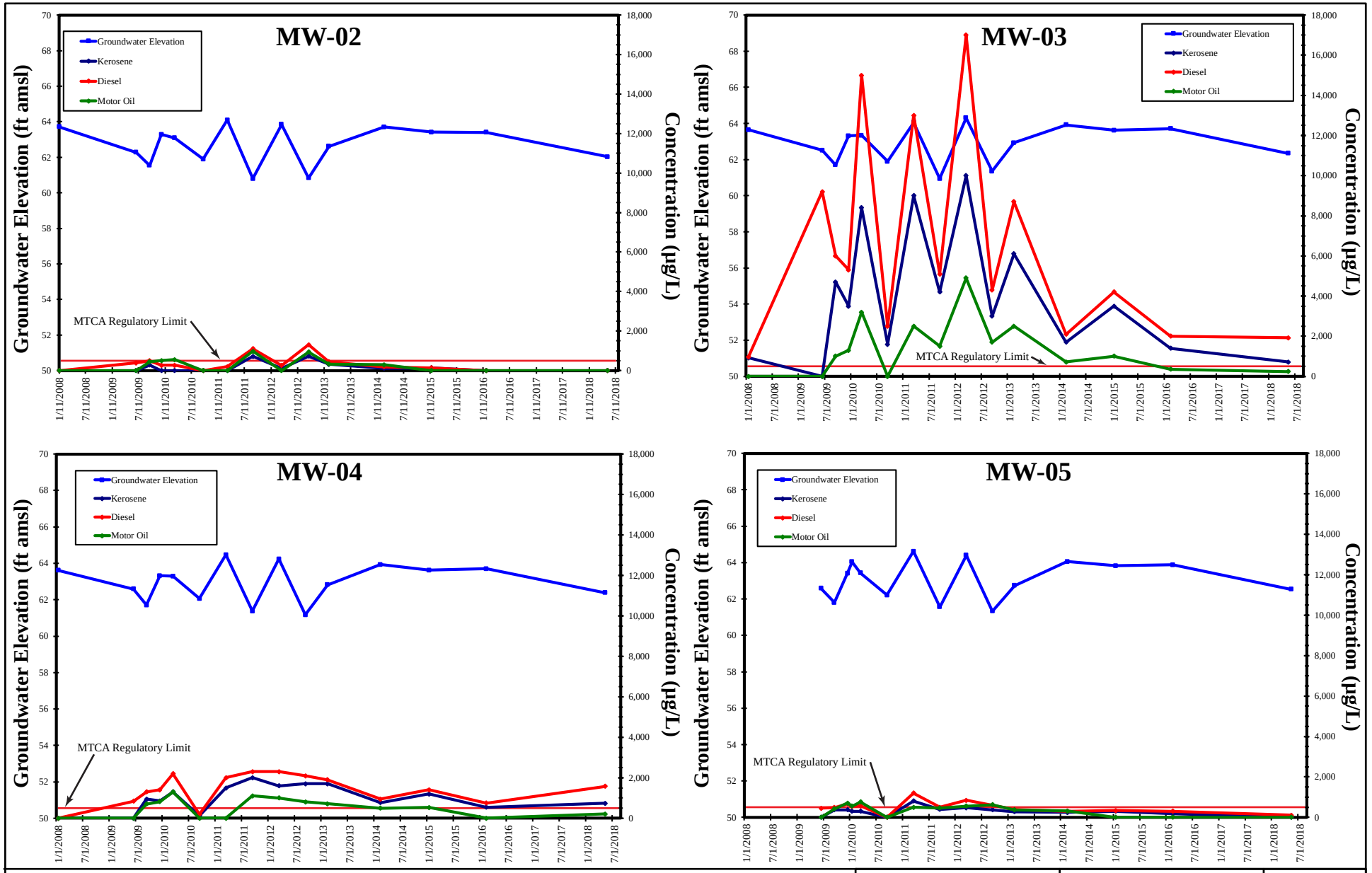
June 2018

Figure 2



Plots of MW-02 through MW-05 Monitoring Results
Gordon Trucking, Pacific, WA
May 18, 2018

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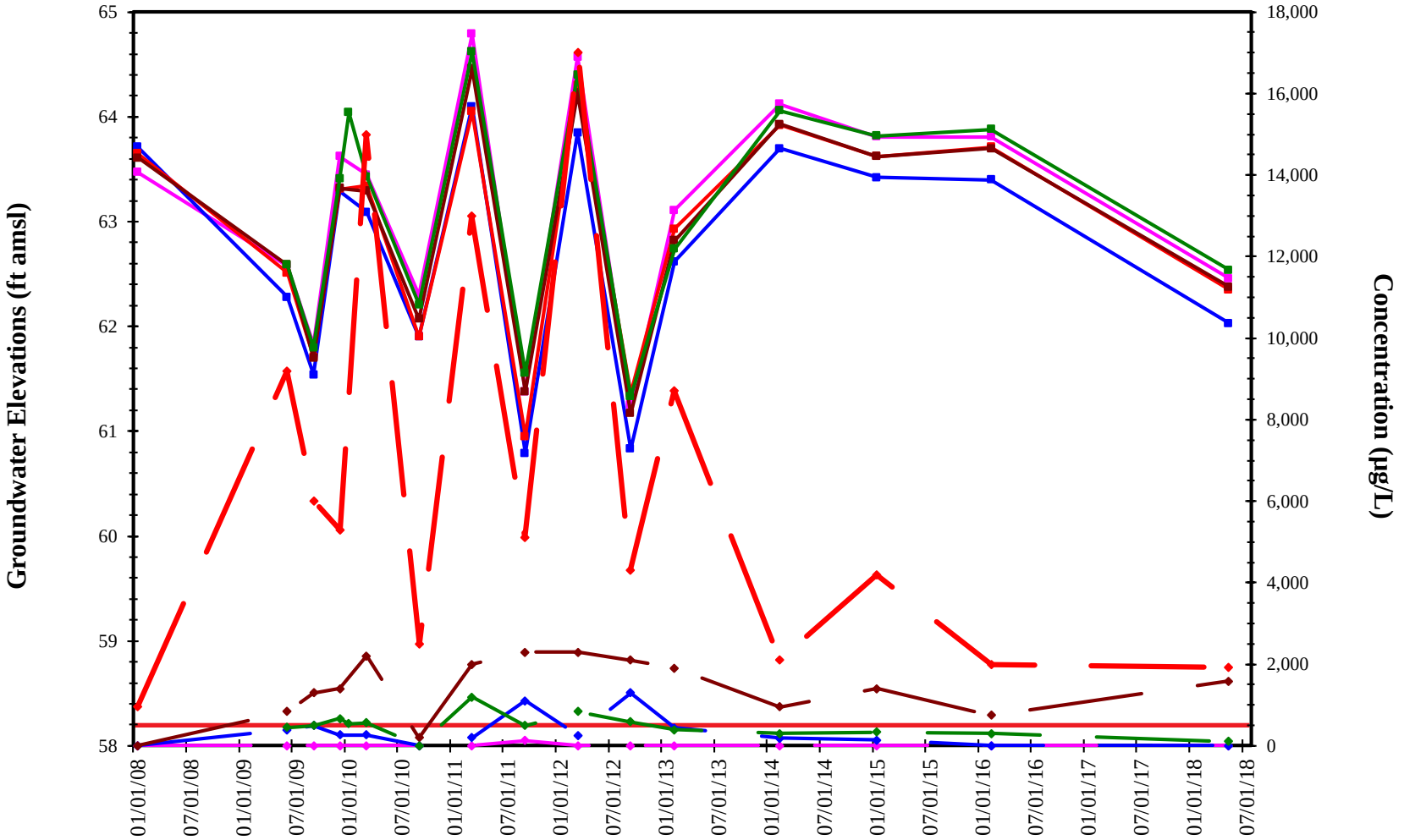
Seattle, WA

June 2018

Figure 3



Legend

Groundwater Elevations
- MW-01
- MW-02
- MW-03
- MW-04
- MW-05

MTCA A Regulatory Limit

Diesel Concentrations
- MW-01
- MW-02
- MW-03
- MW-04
- MW-05

Plot of Water Elevation and Diesel Results Through May 18, 2018

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Seattle, WA

June 2018

Figure 4

Analytical Resources, Incorporated
Analytical Chemists and Consultants

04 June 2018

Adrianna Jarosz
Geosyntec Consultants
520 Pike Street, Suite 1375
Seattle, WA 98101

RE: Gordon Trucking

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
18E0307	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 18E0307	Turn-around Requested: STANDARD	Page: 1 of 1	
ARI Client Company: GEOSYNTEC CONSULTANTS	Phone: 206-496-1447	Date: 5/18/18	Ice Present? Yes
Client Contact: ADRIANNA JAROSZ		No. of Coolers: 1	Cooler Temps: 1.6°C
Client Project Name: GORDON TRUCKING			
Client Project #: PNR0646/01	Samplers: AJ		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-DX	Notes/Comments
MW01-051818	5/18/18	1125	W	2	X	
MW02-051818	"	1225	"	"	"	
MW05-051818	"	1325	"	"	"	
MW04-051818	"	1430	"	"	"	
MW03-051818	"	1525	"	"	"	
MWDup-051818	"	1200	"	"	"	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: ADRIANNA JAROSZ	Printed Name: Jacob Haile	Printed Name:	Printed Name:
	Company: GEOSYNTEC	Company: ARI	Company:	Company:
	Date & Time: 5/18/18 17:37	Date & Time: 05/18/18 1737	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Geosyntec Consultants	Project: Gordon Trucking	
520 Pike Street, Suite 1375	Project Number: PNR0646/01	**Reported:**
Seattle WA, 98101	Project Manager: Adrianna Jarosz	04-Jun-2018 16:48

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01-051818	18E0307-01	Water	18-May-2018 11:25	18-May-2018 17:37
MW02-051818	18E0307-02	Water	18-May-2018 12:25	18-May-2018 17:37
MW05-051818	18E0307-03	Water	18-May-2018 13:25	18-May-2018 17:37
MW04-051818	18E0307-04	Water	18-May-2018 14:30	18-May-2018 17:37
MW03-051818	18E0307-05	Water	18-May-2018 15:25	18-May-2018 17:37
MWDUP-051818	18E0307-06	Water	18-May-2018 12:00	18-May-2018 17:37

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Case Narrative

Sample receipt

Samples as listed on the preceding page were received May 18, 2018 under ARI work order 18E0307. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: BioSynTec

COC No(s): _____ NA

Assigned ARI Job No: 18E0307

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 1.6°C

Time: 1737

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0052036

Cooler Accepted by: JSW Date: 05/18/18 Time: 1737

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SCF Date: 5/22/18 Time: 1107

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

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MW01-051818

18E0307-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 11:25

Instrument: FID3 — Analyzed: 01-Jun-2018 19:35

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			*50-150 %*	*85.8*	*%*	

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MW02-051818

18E0307-02 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 12:25

Instrument: FID3 — Analyzed: 01-Jun-2018 19:54

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			*50-150 %*	*87.4*	*%*	

Geosyntec Consultants	Project: Gordon Trucking	
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MW05-051818

18E0307-03 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 13:25

Instrument: FID3 — Analyzed: 01-Jun-2018 20:13

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	**0.106**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			*50-150 %*	*83.7*	*%*	

Geosyntec Consultants	Project: Gordon Trucking	
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MW04-051818

18E0307-04 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 14:30

Instrument: FID3 — Analyzed: 01-Jun-2018 20:32

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	**1.58**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	**0.206**	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*80.7*	*%*	

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Seattle WA, 98101	Project Manager: Adrianna Jarosz	04-Jun-2018 16:48

MW03-051818

18E0307-05 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 15:25

Instrument: FID3 — Analyzed: 01-Jun-2018 20:51

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	**1.92**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	**0.237**	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*82.8*	*%*	

Geosyntec Consultants	Project: Gordon Trucking	
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MWDUP-051818

18E0307-06 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 05/18/2018 12:00

Instrument: FID3 — Analyzed: 01-Jun-2018 21:10

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGE0586 — Sample Size: 500 mL
Prepared: 23-May-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	**1.92**	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	**0.227**	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*77.4*	*%*	

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Petroleum Hydrocarbons - Quality Control

Batch BGE0586 - EPA 3510C SepF

Instrument: FID3 Analyst: JGR

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGE0586-BLK1)				Prepared: 23-May-2018 Analyzed: 01-Jun-2018 18:37						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.375		mg/L	*0.450*		*83.2*	*50-150*			
LCS (BGE0586-BS1)				Prepared: 23-May-2018 Analyzed: 01-Jun-2018 18:56						
Diesel Range Organics (C12-C24)	2.44	0.100	mg/L	3.00		81.5	56-120			
Surrogate: o-Terphenyl	0.363		mg/L	*0.450*		*80.7*	*50-150*			
LCS Dup (BGE0586-BSD1)				Prepared: 23-May-2018 Analyzed: 01-Jun-2018 19:16						
Diesel Range Organics (C12-C24)	2.52	0.100	mg/L	3.00		83.9	56-120	3.00	30	
Surrogate: o-Terphenyl	0.374		mg/L	*0.450*		*83.0*	*50-150*			

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Certified Analyses included in this Report

Analyte	Certifications
NWTPH-Dx in Water	
Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	02/07/2019
CALAP	California Department of Public Health CAELAP	2748	06/30/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

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Notes and Definitions

*	Flagged value is not within established control limits.
U	This analyte is not detected above the applicable reporting or detection limit.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.