



March 21, 2017

Mr. Steve Teel  
Cleanup Project Manager  
Department of Ecology – Toxics Cleanup Program  
Southwest Regional Office

**Re: Focused Groundwater Monitoring Results**  
Former Tacoma Metals Site  
Project No. 160420

Dear Steve:

Aspect Consulting, LLC (Aspect) has prepared this memorandum to summarize groundwater monitoring at the Former Tacoma Metals Site (Site) conducted on December 8, 2016. The groundwater monitoring was conducted to address a Washington State Department of Ecology (Ecology) comment included in Ecology's April 18, 2016, Comments on the Revised Augmented Remedial Investigation and Feasibility Report (Ecology, 2016<sup>1</sup>). The scope of groundwater monitoring was discussed and agreed to during a November 16, 2016, phone call between Aspect (Peter Bannister) and the Ecology Site Manager (Steve Teel). This memo is a record of the monitoring activities and results.

## Methods

The scope of groundwater monitoring included inspection, measurement of water levels and field parameters, and collection of groundwater samples from monitoring wells MW-4R, MW-5, MW-6, MW-9, MW-19, and MW-20. These monitoring wells are located along the property boundary near the Puyallup River (Figure 1). An initial Site visit was conducted on December 6, 2016, to assess well conditions with Ecology. During the Site visit, monitoring wells MW-5 and MW-6 could not be located, appearing to have been destroyed or abandoned, and were removed from the planned sampling scope. Monitoring wells MW-4R, MW-9, MW-19, and MW-20 were observed to be in satisfactory condition for sampling, including having locking monument covers and sealed well caps.

Aspect, represented by Eric Knoedler and Adam Griffin, mobilized to sample during low-tide conditions on December 8, 2016, for groundwater sampling; lower-low tide was predicted to occur at approximately 18:30 according to the NOAA tide station in Commencement Bay. Weather conditions included snow and a light breeze. At each monitoring well, the following procedures were followed:

- Water levels were measured from the top of casing to the nearest 0.01 foot.
- Dedicated tubing was installed to the approximate center of the screen.

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<sup>1</sup> Washington State Department of Ecology (Ecology), 2016, Comments on the *Revised Augmented Remedial Investigation and Feasibility Report*, dated September 2014, prepared by Kennedy/Jenks, Former Tacoma Metals Site, Agreed Order DE 97-5435, Facility/Site No. 1257, Cleanup Site ID No. 3910, Dated April 18, 2016.



- Each well was purged in accordance with U.S. Environmental Protection Agency (EPA) low-flow purge techniques until water quality parameters, recorded on 5-minute intervals, stabilized and turbidity was less than 25 nephelometric turbidity units (NTUs).
- Samples were collected in laboratory-supplied containers. Samples for dissolved metals analysis were collected last using an in-line, 0.45-micron filter.

Field observations and parameters were recorded on field sheets (Appendix A). Table 1 provides field observations and final field parameters summarized by well.

Samples were stored in a cooler under chain-of-custody procedures. Samples were relinquished December 9, 2016, to Friedman & Bruya, Inc., in Seattle, Washington, for laboratory analysis of the following analytes:

- total and dissolved selenium (by EPA 200.8/6020A);
- total chromium (by EPA 200.8/6020A); and
- hexavalent chromium (by EPA 7196/SM 3500 Cr B).

Analysis of hexavalent chromium was subcontracted by Friedman & Bruya to Fremont Analytical in Seattle, Washington.

## Results

The laboratory analytical results are summarized by well in Table 1. The laboratory report is included as Appendix B.

Concentrations of total and dissolved selenium in groundwater were detected from two of the four monitoring wells:

- MW-9 at 1.69 micrograms per liter ( $\mu\text{g/L}$ ) and 2.08  $\mu\text{g/L}$ , respectively; and
- MW-20 at 5.86  $\mu\text{g/L}$  and 3.99  $\mu\text{g/L}$ , respectively.

Concentrations of total and dissolved selenium were not detected above the method reporting limit of 1.0  $\mu\text{g/L}$  in groundwater samples from MW-4R or MW-19.

Concentrations of total chromium ranged from 1.48  $\mu\text{g/L}$  at MW-4R to 5.50  $\mu\text{g/L}$  at MW-20. Concentrations of hexavalent chromium in groundwater were not detected above the method reporting limit (50  $\mu\text{g/L}$ ) at any of the monitoring wells sampled.

## Discussion

The selenium concentration in groundwater was less than the proposed cleanup level of 5  $\mu\text{g/L}$ .

Concentrations of total chromium in groundwater were detected below the proposed cleanup level of 288  $\mu\text{g/L}$ , below the Clean Water Act criterion of 120  $\mu\text{g/L}$  (per Ecology's comments), and below the water quality standard of 50  $\mu\text{g/L}$  (per Washington Administrative Code [WAC] 173-200) at all of the monitoring wells.

The method used to detect hexavalent chromium (EPA Method 7196) has a reporting limit of 50  $\mu\text{g/L}$ , which is greater than the proposed cleanup level of 10  $\mu\text{g/L}$ ; this method does not provide an accurate means to assess concentrations relative to cleanup levels. However, detections of total

chromium, which includes hexavalent chromium, were between 1.48 and 5.50 ug/L (Table 1), indicating that concentrations of hexavalent chromium did not exceed cleanup levels. Therefore, we recommend that Ecology consider the total chromium results for assessing groundwater conditions. Further, we recommend that future hexavalent chromium analysis use EPA Method 7199 to provide detection limits below the proposed cleanup level.

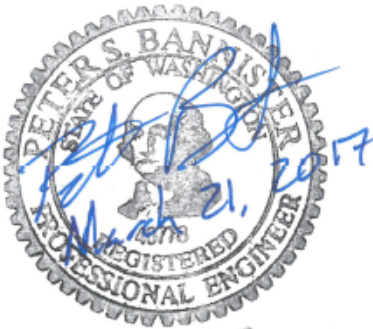
## Limitations

Work for this project was performed for the Estate of Sophie Sussman (Client), and this letter was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This letter does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Sincerely,

**Aspect consulting, LLC**



**Peter Bannister, PE**

Associate Engineer

[pbannister@aspectconsulting.com](mailto:pbannister@aspectconsulting.com)

Attachments: Table 1 – Groundwater Quality Data  
Figure 1 – Sample Location and Affected Soil Area Map (Figure 3, Kennedy/Jenks Consultants)  
Appendix A – Groundwater Sampling Records  
Appendix B – Laboratory Reports

cc: Loren Dunn, Riddell Williams

## Table 1 - Groundwater Quality Data

Project No. 160420, Former Tacoma Metals Site, Tacoma, Washington

### Field Observations

Well ID	Sample Date Time	Sample Tube Intake Depth ft bTOC	Static Depth to Water ft bTOC
MW-4R	12/8/16 19:25	19	9.65
MW-9	12/8/16 19:55	17.5	12.07
MW-19	12/8/16 18:50	20	8.54
MW-20	12/8/16 18:10	25	8.76

### Field Parameters

Well ID	Sample Date Time	Temperature °C	Specific Conductivity µS/cm	Dissolved Oxygen mg/L	pH	Oxidation-Reduction Potential mV	Turbidity NTU
MW-4R	12/8/16 19:25	13.6	200.2	0.31	5.95	29.8	40.1
MW-9	12/8/16 19:55	12.7	1143	0.2	6.53	1	23.7
MW-19	12/8/16 18:50	13.2	297.6	0.23	6.19	-4.9	5.71
MW-20	12/8/16 18:10	12.8	2250	0.32	7.39	-26.5	9.15

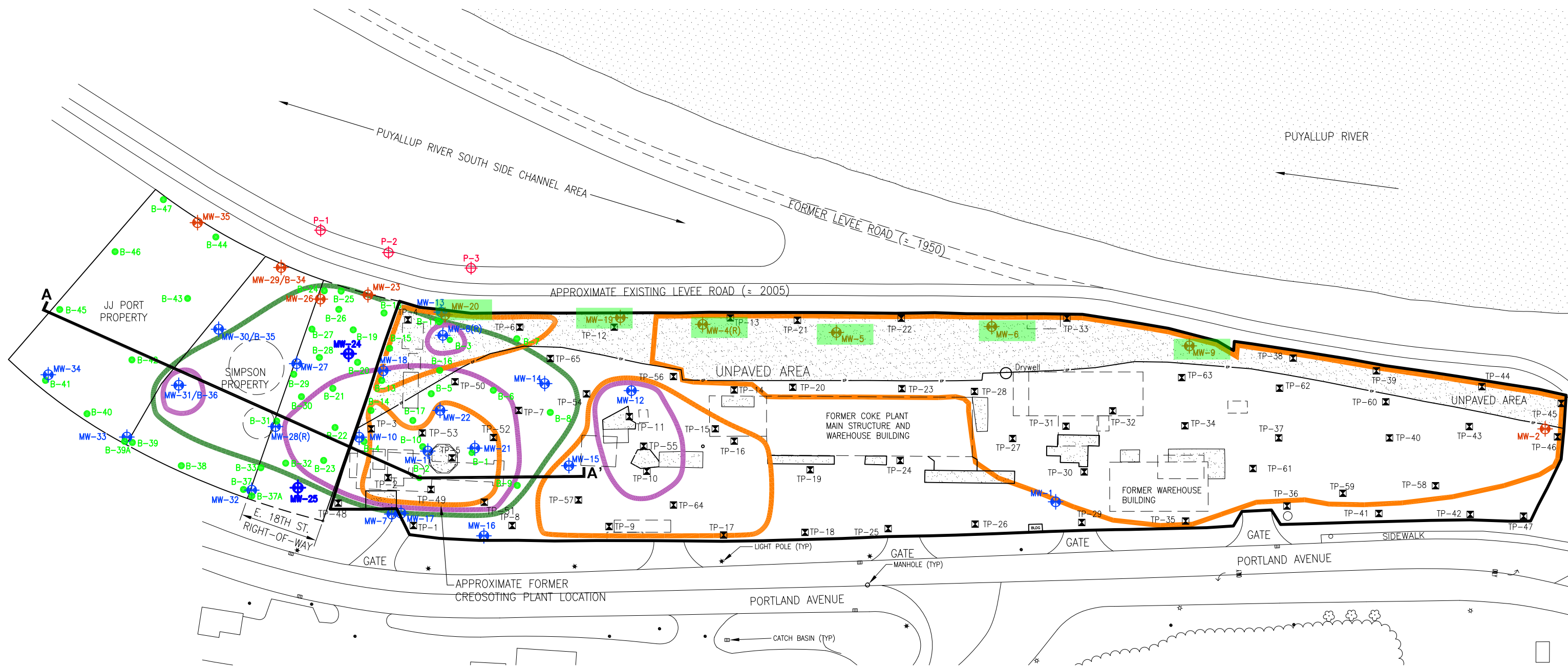
### Laboratory Analytical Results

Well ID	Sample Date Time	Total Chromium µg/L	Hexavalent Chromium µg/L	Total Selenium µg/L	Dissolved Selenium µg/L
MW-4R	12/8/16 19:25	1.48	<50	<1.0	<1.0
MW-9	12/8/16 19:55	1.97	<50	1.69	2.08
MW-19	12/8/16 18:50	3.74	<50	<1.0	<1.0
MW-20	12/8/16 18:10	5.50	<50	<b>5.86</b>	3.99
<b>Proposed Cleanup Level (µg/L)</b>		288	10	5	5

### Notes

Units: ft bTOC = feet below top of casing; C = degrees Celcius; mg/L = micrograms/Liter; mV = millivolts; NTU = nephthalometric turbidity units; µg/L = micrograms/Liter

**BOLD** values exceed Proposed Cleanup Levels provided in the Revised Augemented Remedial Investigation and Feasibility Study Report - Former Tacoma Metals Site (Kennedy/Jenks, 2014).



**LEGEND:**

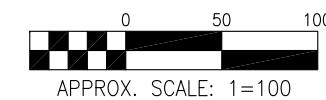
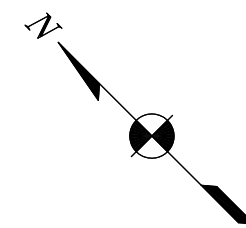
- B-1 SOIL BORING LOCATION
- ⊕ MW-26 PROPOSED POINT OF COMPLIANCE MONITORING WELLS AND PIEZOMETERS
- ⊕ P-1
- ⊕ MW-26 OTHER MONITORING WELL LOCATION
- ⊠ TP-26 TEST PIT LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS) REFER TO FIGURE 1-2 IN APPENDIX C FOR ADDITIONAL INFORMATION
- A A' GENERALIZED CROSS-SECTION LOCATION (SEE FIGURE 6)

ESTIMATED EXTENT OF AFFECTED SOIL:

- AFFECTED SOIL LESS THAN 6' bgs
- AFFECTED SOIL 6 TO 15' bgs
- AFFECTED SOIL GREATER THAN 15' bgs

NOTES:

1. WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. bgs = BELOW GROUND SURFACE.
3. AFFECTED SOIL = SOIL WITH CONTAMINANTS AT CONCENTRATIONS ABOVE PROPOSED SITE CLEANUP LEVELS.
4. REFER TO FIGURES 4-1 THROUGH 4-4 IN APPENDIX C FOR DISTRIBUTION OF SPECIFIC CONTAMINANTS IN SOIL.
5. ALL LOCATIONS AND AREAS ARE APPROXIMATE.



**Kennedy/Jenks Consultants**

FORMER TACOMA METALS FACILITY  
TACOMA, WA

**SAMPLE LOCATION AND  
AFFECTED SOIL AREA MAP**

996098.00\2013 RI UPDATE\FIG\_03

## **APPENDIX A**

### **Groundwater Sampling Records**















## **APPENDIX B**

### **Laboratory Reports**

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

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

3012 16th Avenue West  
Seattle, WA 98119-2029  
(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

December 20, 2016

Adam Griffin, Project Manager  
Aspect Consulting, LLC  
350 Madison Ave. N.  
Bainbridge Island, WA 98110-1810

Dear Mr Griffin:

Included are the results from the testing of material submitted on December 9, 2016 from the Tacoma Metals 160420, F&BI 612153 project. There are 14 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 have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures

c: data@aspectconsulting.com  
ASP1220R.DOC



FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2016 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Tacoma Metals 160420, F&BI 612153 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Aspect Consulting, LLC</u>
612153 -01	MW-20-120816
612153 -02	MW-19-120816
612153 -03	MW-4(R)-120816
612153 -04	MW-9-120816

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-20-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/15/16	Lab ID:	612153-01
Date Analyzed:	12/16/16	Data File:	612153-01.140
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Selenium	3.99
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FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-19-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/15/16	Lab ID:	612153-02
Date Analyzed:	12/16/16	Data File:	612153-02.141
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Selenium	<1
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FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-4(R)-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/15/16	Lab ID:	612153-03
Date Analyzed:	12/16/16	Data File:	612153-03.142
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Selenium	<1
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FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-9-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/15/16	Lab ID:	612153-04
Date Analyzed:	12/16/16	Data File:	612153-04.143
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Selenium	2.08
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FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/15/16	Lab ID:	I6-827 mb
Date Analyzed:	12/16/16	Data File:	I6-827 mb.088
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Selenium	<1
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FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-20-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/14/16	Lab ID:	612153-01
Date Analyzed:	12/14/16	Data File:	612153-01.109
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	5.50
Selenium	5.86

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-19-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/14/16	Lab ID:	612153-02
Date Analyzed:	12/14/16	Data File:	612153-02.110
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	3.74
Selenium	<1



FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-4(R)-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/14/16	Lab ID:	612153-03
Date Analyzed:	12/14/16	Data File:	612153-03.111
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	1.48
Selenium	<1

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-9-120816	Client:	Aspect Consulting, LLC
Date Received:	12/09/16	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/14/16	Lab ID:	612153-04
Date Analyzed:	12/14/16	Data File:	612153-04.112
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	1.97
Selenium	1.69

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Tacoma Metals 160420, F&BI 612153
Date Extracted:	12/14/16	Lab ID:	I6-822 mb
Date Analyzed:	12/14/16	Data File:	I6-822 mb.054
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Selenium	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/20/16

Date Received: 12/09/16

Project: Tacoma Metals 160420, F&BI 612153

**QUALITY ASSURANCE RESULTS  
FOR THE ANALYSIS OF WATER SAMPLES  
FOR DISSOLVED METALS USING EPA METHOD 200.8**

Laboratory Code: 612030-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Selenium	ug/L (ppb)	5	<1	105	108	70-130	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Selenium	ug/L (ppb)	5	108	85-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/20/16

Date Received: 12/09/16

Project: Tacoma Metals 160420, F&BI 612153

**QUALITY ASSURANCE RESULTS  
FOR THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 612125-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	ug/L (ppb)	20	<1	102	98	70-130	4
Selenium	ug/L (ppb)	5	<1	113	109	70-130	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	97	85-115
Selenium	ug/L (ppb)	5	92	85-115

**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.



**Friedman & Bruya**  
Michael Erdahl  
3012 16th Ave. W.  
Seattle, WA 98119

**RE: 612153**  
**Work Order Number: 1612101**

December 13, 2016

**Attention Michael Erdahl:**

Fremont Analytical, Inc. received 4 sample(s) on 12/9/2016 for the analyses presented in the following report.

***Hexavalent Chromium by EPA 7196 / SM 3500 Cr B***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway  
Laboratory Director



Date: 12/13/2016

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**CLIENT:** Friedman & Bruya  
**Project:** 612153  
**Work Order:** 1612101

## Work Order Sample Summary

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Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1612101-001	MW-20-120816	12/08/2016 6:15 PM	12/09/2016 12:49 PM
1612101-002	MW-19-120816	12/08/2016 6:50 PM	12/09/2016 12:49 PM
1612101-003	MW-4(R)-120816	12/08/2016 7:25 PM	12/09/2016 12:49 PM
1612101-004	MW-9-120816	12/08/2016 7:55 PM	12/09/2016 12:49 PM



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**CLIENT:** Friedman & Bruya

**Project:** 612153

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**I. SAMPLE RECEIPT:**

Samples receipt information is recorded on the attached Sample Receipt Checklist.

**II. GENERAL REPORTING COMMENTS:**

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

**III. ANALYSES AND EXCEPTIONS:**

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

### Qualifiers:

- \* - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

### Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



**CLIENT:** Friedman & Bruya  
**Project:** 612153

**Lab ID:** 1612101-001

**Client Sample ID:** MW-20-120816

**Collection Date:** 12/8/2016 6:15:00 PM

**Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Hexavalent Chromium by EPA 7196 / SM 3500 Cr B**

Batch ID: R33326 Analyst: KT

Chromium, Hexavalent	ND	0.0500		mg/L	1	12/9/2016 2:07:00 PM
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**Lab ID:** 1612101-002

**Client Sample ID:** MW-19-120816

**Collection Date:** 12/8/2016 6:50:00 PM

**Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Hexavalent Chromium by EPA 7196 / SM 3500 Cr B**

Batch ID: R33326 Analyst: KT

Chromium, Hexavalent	ND	0.0500		mg/L	1	12/9/2016 2:11:00 PM
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**Lab ID:** 1612101-003

**Client Sample ID:** MW-4(R)-120816

**Collection Date:** 12/8/2016 7:25:00 PM

**Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Hexavalent Chromium by EPA 7196 / SM 3500 Cr B**

Batch ID: R33326 Analyst: KT

Chromium, Hexavalent	ND	0.0500		mg/L	1	12/9/2016 2:15:00 PM
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**CLIENT:** Friedman & Bruya  
**Project:** 612153

**Lab ID:** 1612101-004

**Client Sample ID:** MW-9-120816

**Collection Date:** 12/8/2016 7:55:00 PM

**Matrix:** Water

<b>Analyses</b>	<b>Result</b>	<b>RL</b>	<b>Qual</b>	<b>Units</b>	<b>DF</b>	<b>Date Analyzed</b>
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**Hexavalent Chromium by EPA 7196 / SM 3500 Cr B**

Batch ID: R33326

Analyst: KT

Chromium, Hexavalent

ND

0.0500

mg/L

1

12/9/2016 2:18:00 PM



Client Name: **FB**

 Work Order Number: **1612101**

 Logged by: **Erica Silva**

 Date Received: **12/9/2016 12:49:00 PM**

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present
2. How was the sample delivered? FedEx

### Log In

3. Coolers are present? Yes  No  NA

#### Samples received at appropriate temperature

4. Shipping container/cooler in good condition? Yes  No
5. Custody Seals present on shipping container/cooler?  
(Refer to comments for Custody Seals not intact) Yes  No  Not Required
6. Was an attempt made to cool the samples? Yes  No  NA
7. Were all items received at a temperature of >0°C to 10.0°C\* Yes  No  NA
8. Sample(s) in proper container(s)? Yes  No
9. Sufficient sample volume for indicated test(s)? Yes  No
10. Are samples properly preserved? Yes  No
11. Was preservative added to bottles? Yes  No  NA
12. Is there headspace in the VOA vials? Yes  No  NA
13. Did all samples containers arrive in good condition(unbroken)? Yes  No
14. Does paperwork match bottle labels? Yes  No
15. Are matrices correctly identified on Chain of Custody? Yes  No
16. Is it clear what analyses were requested? Yes  No
17. Were all holding times able to be met? Yes  No

### Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

### Item Information

Item #	Temp °C
Sample	4.2

\* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



