



April 28, 2020 File: TR20006.01

Sent by email, only

Glen Wakelin Regional SHE Manager (North America) Weir Minerals 2715 18th St N.E Calgary, Alberta, T2E 7E6

Dear Mr. Wakelin:

Re: Weir Canada - 2020 Interim Soil and Stormwater Sampling Results

As per our February 19, 2020 proposal, Teranis Consulting Ltd. (Teranis) was retained Weir Minerals Canada (Weir) to conduct soil and stormwater sampling at the Weir facility located at 18933 34A Avenue, Surrey, BC hereafter referred also to as the Facility, Site or Subject Property. The general location of the subject property is shown on Figure 1 (see Attachment A).

PROJECT BACKGROUND

Teranis was previously retained by the Weir Canada to assess the impact of site operations on soil, surface water and groundwater quality at the Surrey facility. The results of the previous investigation were documented in a letter report to Weir Minerals, dated August 19, 2019.

It is our understanding that a local community group has requested that Weir undertake 2 additional monitoring events to confirm the 2019 findings. This was agreed by the Environmental Appeal Board (EAB) and Weir. This report documents the first of the two sampling events, which was conducted on March 27, 2020. A final report will be issued once the second monitoring event has been completed toward the end of summer/start of autumn 2020, subject to a suitable period of rainfall.

Soil and stormwater samples were collected from previous sample locations and analysed for the following potential contaminants of concern (PCOCs):

Metals			
Aluminium	Barium	Bismuth	Boron
Chromium	Copper	Iron	Lithium
Magnesium	Manganese	Molybdenum	Nickel
Selenium	Titanium	Zinc	Zirconium
Hydrocarbons			
Benzene	Ethylbenzene	Toluene	Xylenes
Total Volatiles			

The following Sampling and Analysis (SAP) was implemented for the sampling program:

Tel: (604) - 681 2888

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Media	PCOC	Assessment Rationale	Sample Analyses
Soil	Metals, BTEX & VPH.	Five (5) surficial soil samples to be collected on two occasions from the stormwater management bioswales at previous sample locations.	5 x Metals 5 x BTEX/VH/VPH
Stormwater	Metals, BTEX & VPH.	Two (2) stormwater samples to be collected during or soon after a rainfall event from the previous sample locations (i.e. roof drains prior to discharge into the infiltration chambers). Samples to be collected during or immediately after rainfall events.	4 x Dissolved Metals 4 x BTEX/VH/VPH

Notes:

Sample numbers do not include duplicates collected for quality control purposes.

PCOC = Potential Contaminant of Concern

BTEX = Benzene, toluene, ethylbenzene, xylenes

VH = Volatile hydrocarbons

VPH = Volatile petroleum hydrocarbon

Sample collection procedures followed typical industry practices and provincial regulatory guidance as detailed in the previous 2019 report. Samples were submitted to CARO Analytical Services (CARO) for analysis. CARO is certified and accredited to perform the required analysis under the Canadian Association for Laboratory Accreditation Inc. (CALA). The results of analysis were compared to applicable Provincial standards as presented in the attached summary tables.

This letter report has been prepared to document the results of the March 27, 2020 soil and stormwater sampling event.

REGULATORY CONTEXT

The results of analysis presented in this report have been compared to applicable environmental standards presented in the BC Contaminated Sites Regulation (CSR) made under the BC Environmental Management Act (EMA), as follows:

Soil Sample Assessment

The subject property is currently used for industrial purposes; therefore the soil sample results were compared to Provincial soil standards for IL use, as follows:

- Schedule 3.1 Part 1 Matrix Numerical Soil Standards;
- Schedule 3.1 Part 2 Generic Numerical Soil Standards to Protect Human Health; and,
- Schedule 3.1 Part 3 Generic Numerical Soil Standards to Protect Ecological Health.

When selecting which Matrix Numerical Standards (Schedule 3.1) apply on the subject property, a number of site specific factors, such as the protection of existing and future drinking water use,



distance to aquatic life and proximity of agricultural uses, must be considered. Based on site specific conditions, the following Matrix Numerical Soil Standards were identified to apply on the subject property:

- Human Health Intake of contaminated soil;
- Human Health Groundwater used for drinking water;
- Environmental Protection Toxicity to soil invertebrates and plants; and,
- Environmental Protection Groundwater flow to surface water used by aquatic (freshwater) life

Where more than one matrix standard applies at a site, the most stringent standard is adopted.

Stormwater Sample Assessment

Stormwater on the subject property is captured and directed to on-site groundwater infiltration galleries, therefore, the stormwater data was compared to applicable <u>groundwater</u> standards presented in the CSR, as outlined below.

- BC Ministry of Environment (ENV) Protocol 21 for Contaminated Sites Water Use Determination (October 31, 2017) provides guidance on determining groundwater use at a site. Once water uses have been determined, the results of analysis can be compared to applicable Provincial groundwater standards presented in CSR Schedule 3.2 Generic Numerical Groundwater Standards. Water use standards are based on Aquatic Life (AW), Irrigation (IW), Livestock (LW) and Drinking Water (DW);
- Protocol 21 evaluates both current and future drinking water use at a site and groundwater data must be compared to DW standards, unless the underlying aquifer is proven to be unsuitable as a drinking water source. Consequently, DW standards apply at the site;
- AW water use standards apply at a site that is located within 500 m of an aquatic receiving environment. There are a number of creeks located within 500 m of the subject property, therefore, freshwater AW standards apply at the site; and,
- Irrigation and livestock watering use applies to groundwater located at sites where groundwater or surface water at or near the site is currently used for livestock or irrigation watering. No agricultural land use is located within 500 m of the subject property, therefore IW and LW standards do not apply on the subject property.

It should be noted that Stage 8 Amendments to the BC CSR came into effect January 24, 2013 and introduced restrictions on the application of groundwater standards for iron and manganese to sites that have historically or are currently using iron and manganese for commercial or industrial purposes. The CSR lists specific Schedule 2 activities for which iron and/or manganese numerical

Mr. Wakelin Page 4 of 9



water standards apply. None of the CSR Schedule 2 Activities listed within the Stage 8 Amendments were identified on the subject property and therefore, numerical standards for iron and manganese in groundwater have not been applied at the Surrey facility.

Background soil and Groundwater Criteria

Recognizing the potential presence of naturally elevated metals concentrations within the receiving environment, the BC ENV provides estimates of background metals concentrations in soil and groundwater for different regions within BC, under Protocol 4 and Technical Bulletin 3, respectively.

Soil and groundwater samples that exceed applicable provincial standards, but are less than the regional background concentrations will be noted as such in the analytical summary tables, if and as applicable.

Soil Vapour Assessment

Stage 6 amendments to the BC CSR specify the need to carry out a soil vapour investigation where volatile contaminants of concern have been identified in soil, sediment or groundwater at detectable concentrations. Regulated vapour phase contaminants are listed in Schedule 3.3 of the CSR.

ASSESSMENT METHODOLOGIES

Soil and water samples were collected in general accordance with BC ENV recommended procedures with specific attention to collecting representative samples, maintaining sample integrity and preventing cross-contamination. Soil and stormwater sample locations are shown on the figures presented in Attachment A.

For details regarding soil and stormwater sampling methodologies and quality control protocols, please refer to the 2019 sampling report.

INVESTIGATION RESULTS

Soil Results

The soil sample results have been summarized and compared to applicable CSR IL soil standards in the following tables (as included in Attachment B):

- Table 1 Metals Concentrations in Soil; and,
- Table 2 BTEX and VPH Concentrations in Soil.

Soil sample locations and exceedances are also shown on Figure 2.

The soil sample results indicate that metals concentrations were all less than applicable CSR standards, except for zinc at sample location 19SS01. The zinc concentration at 19SS01 was



moderately higher than the previous result. However, the difference in concentration falls within a range that may be attributed to standard deviations when repeated measurements are compared and other factors, such as soil heterogeneity and special differences in sample locations, rather than impacts from site operations". Elevated metals concentrations (including cobalt, lead, nickel and/or zinc) were previously identified at 19SS03 and 19SS04. However, during this monitoring event metal concentrations were all less than applicable standards, which suggest that the previous results may have been associated with a nugget effect and/or were highly localized to a small area.

BTEX and VPH concentrations in soil samples collected on March 27, 2020 were all less than laboratory detection limits and therefore less than applicable CSR IL soil standards.

Stormwater Results

The stormwater sample results have been summarized and compared to applicable CSR groundwater standards in the following summary tables:

- Table 3 Dissolved Metals Concentrations in Stormwater; and
- Table 4 VPH and BTEX Concentrations in Stormwater.

Stormwater sampling locations are shown on Figure 2 in Attachment A and copies of the summary tables are included in Attachment B.

The results of analysis indicate that dissolved metals, BTEX and VPH concentrations in both stormwater samples were less than applicable CSR groundwater standards.

Duplicate Results

To assess analytical and sampling precision, relative percent differences (RPD's) between duplicate soil and stormwater samples were compared to data quality objectives (DQOs) recommended by the BC Ministry of Environment (BC MoE, 2015), as follows:

Parameters in Soil and Sediment

- High variability metals: Aluminum, Barium, Lead, Mercury, Molybdenum, Potassium, Silver, Sodium, Strontium, Tin, and Titanium – DQO of 40%;
- Other metals DQO of 30%; and,
- BTEX and VPH DQO of 40%.

Parameters in Water

- Metals DQO of 20%; and,
- BTEX and VPH DQO of 30%.

Duplicate soil and stormwater sample results and associated RPD's are presented in the following tables:



- Tables 5 Metals Concentrations in Soil Duplicates
- Table 6 BTEX and VPH Concentrations in Soil Duplicates
- Table 7 Metals Concentrations in Stormwater Duplicates
- Table 8 BTEX and VPH Concentrations in Stormwater Duplicates

The summary tables are contained within Attachment B. It should be noted that RPDs cannot be calculated when concentrations are less than the laboratory detection limits.

RPDs for the soil duplicate samples met all applicable DQO's. The majority of the stormwater parameters also met applicable RPD DQO's, except for boron and copper. The poor boron RPD was considered to be associated with sample data that was less than 5 times the laboratory detection limit, i.e. where the signal to noise ratio reduces analytical precision. While the copper RPD of 66% was elevated above the DQO of 30%, the copper concentrations (3.6 and 7.2 ug/g) in the stormwater duplicates were well below the most stringent CSR standard of 20 ug/g.

A review of the duplicate sample analyses indicates that sample heterogeneity may have impacted analyte precision to a relatively minor degree. However, while elevated RPD's for boron and copper in the duplicate stormwater sample sets indicate that the results should be considered as estimates, these results are not anticipated to adversely influence data interpretation or the findings of this report.

CONCLUSIONS

The zinc concentration at 19SS01 was moderately higher than the previous result. However, the difference in concentration falls within a range that may be associated with analytical precision, soil sample heterogeneity and/or contaminant distribution at the sample location; rather than impacts from site operations.

Cobalt, lead, nickel, zinc and toluene concentrations at sample locations 19SS01 and 19SS04 were significantly lower than the previous sampling event. These results suggest that the elevated metals and toluene concentrations previously identified at these locations may have been associated with a nugget effect (i.e. with small fragments of waste materials) and/or were localized to relatively small areas.

Concentrations of PCOCs in stormwater were all less than applicable CSR standards and confirm previous findings that site operations and fugitive emissions are not adversely impacting stormwater that is discharged to the infiltration galleries.

In summary, the results of the March 27, 2020 sampling event did not identify any significant increases in metals, BTEX or VPH concentrations in soil or stormwater samples compared to similar samples collected in 2019. Therefore, these findings indicate that site operations are not adversely impacting the underlying groundwater aquifer.





PROFESSIONAL STATEMENT & QUALIFICATIONS

This document has been prepared in manner that is consistent with industry practice and in general accordance with the requirements of the British Columbia Contaminated Sites Regulation (CSR) and Environmental Management Act (EMA). The individuals signing this document have demonstrable experience and expertise in the investigation and remediation of potential contaminants associated with properties of this nature and are familiar with the investigation carried out at the subject property.

Brief synopses of staff who worked on the Soil and Stormwater Sampling Program are presented below:

Ian Collings, B.Sc., P.Chem., - Mr. Collings is a registered Professional Chemist with the Association of the Chemical Profession of British Columbia (ACPBC) and has more than 30 years of experience as an environmental consultant.

Lance Hunt, B.Sc., P.Chem. - Mr. Hunt is a registered Professional Chemist with the Association of the Chemical Profession of British Columbia (ACPBC) and has more than 14 years of experience as an environmental consultant.

Jordan Wu, B.Sc. (Hons.), EP - Mr. Wu has an Honours Bachelor of Science in Earth and Environmental Sciences with just over 5 years of combined field and office experience. His experience includes soil quality and environmental site investigations, surface water and groundwater monitoring programs, soil remediation programs, data analysis, and technical report writing.

Mr. Wakelin Page 8 of 9



LIMITATIONS

This report was prepared for the exclusive use of Weir Minerals Canada and their representatives. Any use by another third party, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Teranis Consulting Ltd. (Teranis) assumes no responsibility for any losses, damages, liabilities or claims, whether direct, indirect, special, incidental, exemplary or consequential, arising from third party use of this report. Third parties accept full responsibility for verifying the accuracy and completeness of the data and conclusions contained therein.

There is no warranty, expressed or implied that this environmental assessment has uncovered all potential environmental liabilities associated with the subject property. The findings of this report were developed in a manner consistent with a level of care and skill normally exercised by members of the environmental science and engineering profession currently practicing under similar conditions in the area.

Some of the findings presented in this report are based on information provided by third parties, which Teranis has relied on in good faith. Teranis accepts no responsibility for any deficiency, misstatements, or inaccuracy contained in this report as a result of omissions or misstatements of persons interviewed or information obtained.

It should be noted that there are limitations that are inherent in any work of this nature. Conditions may vary between sample locations and no representations can be made regarding parameters that were not tested for. A potential remains for the presence of unknown, unidentified, or unforeseen surface and sub-surface environmental impacts. Any evidence of such potential impacts would require appropriate surface and sub-surface exploration and testing.

If new information is developed in future work (which may include excavations, borings, or other studies), Teranis should be requested to re-evaluate the findings in this report, and to provide amendments as required.

This report was prepared to document the results of a soil and stormwater sampling program conducted at the Weir Minerals Canada facility located at 18933 34A Avenue, Surrey, BC. Information presented in this report represents a snapshot in time and reflects conditions on the subject property on March 27, 2020. It should be recognized that conditions are likely to change over time. The findings and conclusions presented in this report are not intended to represent a certification of the property's environmental condition and any use, other than for the purposes specified above, which a third party makes of this report, or any reliance on or decision to be based on it, is the responsibility of such third parties. No warranties or guarantees; express or implied, are made concerning the accuracy or completeness of the data or conclusions contained within this report.

Mr. Wakelin Page 9 of 9



CLOSURE

We trust that this letter report and the information provided meets with your approval and expectations. Please do not hesitate to contact the undersigned should you have any questions or require any additional information or assistance implementing any of the recommendations.

Sincerely,

TERANIS CONSULTING LTD.

I. K. Celling

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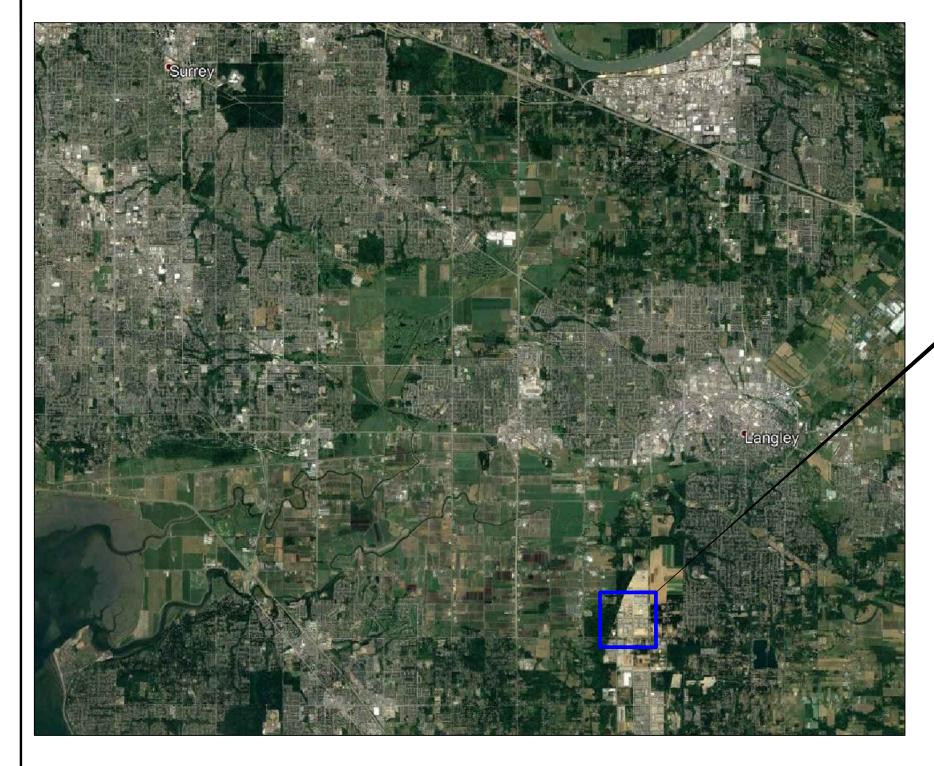
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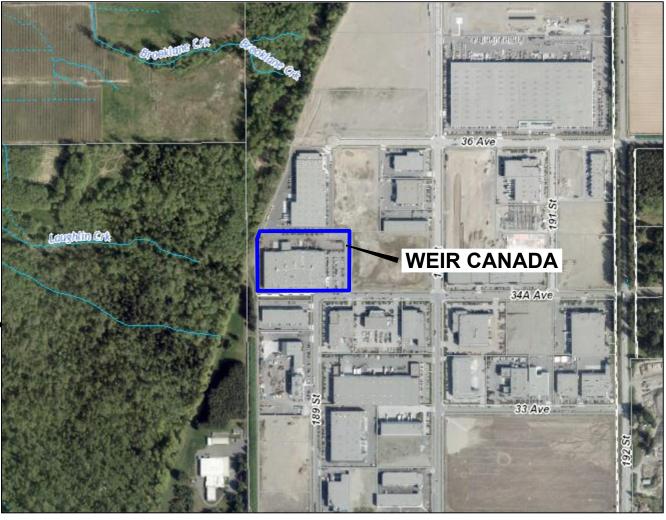
Attachment A - Figures

Attachment B - Analytical Summary Tables

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Attachment AFigures









SUBJECT PROPERTY

STREAMS/DRAINAGE DITCHES

teranis

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WEIR MINERALS CANADA

SITE LOCATION

PROJECT No. DATE. FIGURE No. TR20006.01 APRIL 2020

SCALE: NTS



				100
Sample ID	195503-1	19SS03-1D	20SS03	20SS03D
Date Sampled	8-Apr-19	8-Apr-19	27-Mar-20	27-Mar-20
Depth (m)	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05
Cobalt	27.8	32	9.06	8.9
Lead	1810	1280	142	103
Nickel	64.9	80.4	35.9	34.8
Zinc	499	372	265	238
Toluene	29.3	30.1	<0.127	<0.111

Sample ID	195502-1	20SS02		
Date Sampled	8-Apr-19	20-Mar-27		
Depth (m)	0 - 0.05	0 - 0.05		
Metals	<	<		
BTEX/VPH	<	<		

Sample ID	195501-1	20SS01		
Date Sampled	8-Apr-19	20-Mar-27		
Depth (m)	0 - 0.05	0 - 0.05		
Zinc	241	365		
BTEX/VPH	<	<		

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Sample ID

Date Sampled

19SS05-1

8-Apr-19

20SS05

20-Mar-27

LEGEND



ANALYTICAL RESULT FOR METALS - ANALYTICAL RESULT FOR HYDROCARBONS WATER SAMPLE LOCATION

PARAMETER CONCENTRATIONS LESS THAN APPLICABLE CRITERIA

ANALYTICAL RESULTS LESS THAN APPLICABLE PROVINCIAL GUIDELINES

> ANALYTICAL RESULTS ARE GREATER THAN APPLICABLE PROVINCIAL GUIDELINES

NOTES:

- 1. All soil sample results are in μg/g and water sample results are in μ g/L unless otherwise noted. See analytical summary tables for detailed results.
- 2. Sample symbol flagging represents most recent sampling event results.



Sample ID

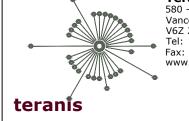
Date Sampled

19SS04-1

8-Apr-19

205504

27-Mar-20



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WEIR MINERALS CANADA

SITE PLAN, SAMPLE LOCATIONS AND ANALYTICAL RESULTS

PROJECT No. DATE. FIGURE No.

APRIL 2020

TR20006.01

Sources - City of Surrey COSMOS - April 2014 Aerial Photograph

Attachment BAnalytical Summary Tables

TABLE 1 METALS CONCENTRATIONS IN SOIL WEIR CANADA TR20006.01



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Arsenic 30-00000 0 1 5.89 63.3 4.6 4.12 6.03 3.74 4.37 4.88 4.3 3.93 7.45 3.43 4.29 3.43 83-100000 1 5.59 63.3 64.8 53.5 89.1 72.5 69.8 64 86.6 54.9 43.6 39.9 Bervillum 1.5500 0.1 0.17 0.18 0.19 0.16 0.13 0.11 0.17 0.17 0.17 0.33 0.17 0.21 0.17 0.21 0.17 0.21 0.17 0.21 0.21 0.21 0.22 0.26 4.1 3.5 5.9 4.2 12 8.3 4.7 4.2 8.9 3.1 4.7 4.2 8.9 3.1 4.7 2.9 0.25 0.20 0.21 0.22 0.26 4.2 12 8.3 4.7 4.2 8.9 3.1 4.7 4.2 8.9 3.1 4.7 2.9 0.25 0.20 0.2 0.24 0.22 0.26 2.0 0.45 0.29 0.25 0.20 0.44 0.05 0.29 0.20 0.44 0.010 0.44 0.041 0.041 0.000 0.2 0.4 0.041 0.041 0.041 0.041 0.000 0.2 0.4 0.041 0.041 0.041 0.041 0.000 0.0 0.0 0.2 0.2 0.2 0.26 0.20 0.24 0.000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		250000	40	7780	8540	8610	8390		5140	8940			8550	9510	8800
Barlium					0.51	1.48	0.39			0.76	0.63	2.35			
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Env. Protection (aquatic, freshwater) 25			0.1	10.1	8.25	9.09	7.41			9.06	8.9	13.9	7.63	7.76	7.54
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Strontium 150000 0.2 29.4 29.3 22.6 32.6 22.8 21 23.2 21.5 34.1 20.3 21 23.7 Thallium 25 0.1 <0.10															
Thallium 25 0.1 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <															
Tin 300-1000000 0.2 0.99 0.94 26.6 0.86 4.4 7.07 1.78 1.46 5.93 0.66 1.3 3.42 Tungsten 200 0.2 0.28 0.28 4.45 0.29 0.58 0.77 0.35 0.31 1.14 <0.20 0.64 <0.20															
Tungsten 200 0.2 0.28 0.28 4.45 0.29 0.58 0.77 0.35 0.31 1.14 <0.20 0.64 <0.20															
	Uranium	30-20000	0.05	0.28	0.28	0.277	0.29	0.373	0.77	0.351	0.342	1.14	0.335	0.806	0.321
Urandium 30-20000 0.05 0.279 0.266 0.277 0.261 0.35 0.362 0.351 0.342 1.36 0.353 0.362 0.371 0.362 0.364 0.362 0.364 0.364 0.364 0.365 0.366 0.3															
															62.2
Human Health (DW) pH 5.5 -< 6.0 300 365	Human Health (DW)		2	241		200	76	455	3/2	203	236	1360	30.3	192	02.2
Env. Protection (soil) 450			1		303			499		1		1380	1		
PH < 6.0 150 241 365			1	241	365					1					
pH 6.5 -< 7.0 350 499 372								499	372	1			ĺ		

All results are in ug/g unless otherwise noted
All analyses completed by CARO Analytics, Richmond, BC
CSR - Contaminated Sites Regulation - January 24, 2019
Human Health (intake) - Standard for human health, intake of contaminated soil
Human Health (DW) - Standard for groundwater used for drinking water
Env. Protection (soil) - Standard for toxicity to soil invertebrates and plants
Env. Protection (aquatic, freshwater) - Standard for groundwater flow to surface water used by aquatic life (freshwater)
Unspecified generic standards are for the protection of human health
ns - No standard or guideline for the specified parameter
"-" No tandlyzed
< - Less than the respective laboratory method detection limit
IL - Industrial Land Use
Coloured shading indicates concentration greater than associated land use standard

Underline Concentration greater than one or more applicable CSR standards, but less than regional background

<u>Underline</u> Concentration greater than one or more applicable CSR standards, but less than regional background

Method Detection Limit greater than applicable CSR standard

TABLE 2 BTEX AND VPH CONCENTRATIONS IN SOIL WEIR CANADA TR20006.01



• • • • • • • • • • • • • • • • • • • •		Project	TR19008.01	TR20006.01	TR19008.01	TR20006.01	TR19008.01	TR19008.01	TR20006.01	TR20006.01	TR19008.01	TR20006.01	TR19008.01	TR20006.01
8000000		Sample ID	19SS01-1	20SS01	19SS02-1	20SS02	19SS03-1	19SS03-1D	20SS03	20SS03D	195504-1	205504	19SS05-1	20SS05
/ 6		Date Sampled		27-Mar-20	08-Apr-19	27-Mar-20	08-Apr-19	08-Apr-19	27-Mar-20	27-Mar-20	08-Apr-19	27-Mar-20	08-Apr-19	27-Mar-20
teranis			9041413-01	0032274-01	9041413-03	0032274-02	9041413-05	9041413-11	0032274-03	0032274-04	9041413-07	0032274-05	9041413-09	0032274-06
		Depth (m-bgs)		0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05
		Sample Type		Surface Soil										
		Duplicate		-	-	-	19SS03-1D	19SS03-1	20SS03D	20SS03	-	-	-	-
		e (ppm hexane)	0	-	0	-	0	0	-	-	0	-	0	-
	CSR	Method												
	IL	Detection												
Parameters	Red	Limit												
Volatile Petroleum Hydrocarbons														
VH ₆₋₁₀	ns	20	<20	<20	<20	<20	41	44	<20	<20	<25	<20	<20	<20
VPH	200	20	<20	<20	<20	<20	<20	<20	<20	<20	<25	<20	<20	<20
Volatile Organic Compounds (VOCs)														
Benzene	0.035-6500	0.02	< 0.024	< 0.022	< 0.023	< 0.022	< 0.024	< 0.020	< 0.025	< 0.022	< 0.034	< 0.020	< 0.020	< 0.020
Ethylbenzene	15-700000	0.05	< 0.060	< 0.055	< 0.057	< 0.054	< 0.059	< 0.050	< 0.064	< 0.055	< 0.086	< 0.050	< 0.050	< 0.050
Styrene	50-1000000	0.05	< 0.060	< 0.055	< 0.057	< 0.054	< 0.059	< 0.050	< 0.064	< 0.055	< 0.086	< 0.050	< 0.050	< 0.050
Toluene	0.5-550000	0.2	< 0.472	< 0.221	< 0.401	< 0.217	29.3	30.1	<0.255	<0.222	< 0.342	< 0.200	< 0.361	< 0.200
Human Health (DW)	6						29.3	30.1						
Env. Protection (aquatic, freshwater)	0.5						29.3	30.1						
Xylenes, Total	6.5-1000000	0.1	< 0.120	< 0.111	< 0.114	<0.108	0.283	0.207	< 0.127	< 0.111	< 0.171	< 0.100	< 0.100	< 0.100

All results are in ug/g unless otherwise noted All analyses completed by CARO Analytics, Richmond, BC CSR - Contaminated Sites Regulation - January 24, 2019 Human Health (intake) - Standard for human health, intake of contaminated soil

Human Health (intake) - Standard for human health, intake of contaminated soil

Human Health (DW) - Standard for groundwater used for drinking water

Env. Protection (soil) - Standard for toxicity to soil invertebrates and plants

Env. Protection (aquatic, freshwater) - Standard for groundwater flow to surface water used by aquatic life (freshwater)

Unspecified generic standards are for the protection of human health

ns - No standard or guideline for the specified parameter

"-" Not analyzed

< - Less than the respective laboratory method detection limit

- IL Industrial Land Use

Coloured shading indicates concentration greater than associated land use standard

Underline
Concentration greater than one or more applicable CSR standards, but less than regional background

RED
Method Detection Limit greater than applicable CSR standard

TABLE 3
DISSOLVED METALS CONCENTRATIONS IN STORM WATER
WEIR CANADA
TR20006.01



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٠	0	-	_	n	п	•

TR19008.01 TR19008.01 STM MH-1 STM M	TR20006.01 STM MH-2 27-Mar-20 0032273-02 STM MH-2D - 6.83 22.4 <0.2 <0.5 <5 <0.1 24.9	TR20006.01 STM MH-2D 27-Mar-20 0032273-03 STM MH-2
CSR	0032273-02 STM MH-2D	0032273-03 STM MH-2 - 6.64 24.5 0.21 - 0.5 9.3
CSR	- 6.83 22.4 <0.2 <0.5 <5	- 6.64 24.5 0.21 <0.5 9.3
CSR	- 6.83 22.4 <0.2 <0.5 <5 <0.1	- 6.64 24.5 0.21 <0.5 9.3
AWF AWM IW LW DW Detection Limit	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
Parameters Limit Physical Tests Section Sectio	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
Physical Tests	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
pH (pH units) ns	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
Hardness (CaCO3) ns ns ns ns ns ns 0.5 3.14 6.44 3.96 Total Metals	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
Total Metals ns 5000 5000 9500 5 15.1 13.2 34.1 Aluminum 90 2500 ns ns 6 0.2 <0.2	22.4 <0.2 <0.5 <5 <0.1	24.5 0.21 <0.5 9.3
Aluminum ns ns 5000 5000 9500 5 15.1 13.2 34.1 Antimony 90 2500 ns ns 6 0.2 <0.2	<0.2 <0.5 <5 <0.1	0.21 <0.5 9.3
Antimony 90 2500 ns ns 6 0.2 <0.2 <0.2 0.48 Arsenic 50 125 100 25 10 0.5 <0.5	<0.2 <0.5 <5 <0.1	0.21 <0.5 9.3
Arsenic 50 125 100 25 10 0.5 <0.5 <0.5 <0.5 Barium 10000 5000 ns ns 1000 5 <5	<0.5 <5 <0.1	<0.5 9.3
Barium 10000 5000 ns ns 1000 5 < 5 8.7 < 5 Beryllium 1.5 1000 100 8 0.1 < 0.1	<5 <0.1	9.3
Beryllium 1.5 1000 100 100 8 0.1 <0.1 <0.1 <0.1 Boron 12000 ns 500 5000 5000 5 7.8 32.8 9.9	< 0.1	
Boron 12000 ns 500 5000 5 7.8 32.8 9.9		
	1 27.3	19.2
	1	17.2
H < 30 0.5 15 5 80 5 0.01 0.02 0.031 0.016	< 0.01	0.015
Calcium ns ns ns 1000000 ns 200 1010 2100 1380	2410	2340
Calculus (18 18 18 190000 18 200 1010 2100 1380 (Chromium (total) 10 15 8 50 50 0.5 <0.5 <0.5 <0.5 0.59	<0.5	<0.5
Cobalt 40 ns 50 1000 1 0.1 0.61 0.65 0.24	0.13	0.14
Copper 1 13 30 1000 1 0.1 0.01 0.03 0.24	0.13	0.17
H < 50 20 20 200 300 1500 3.07 6.62 3.46	3.62	7.21
	3.02	7.21
Iron	50	56
	30	36
	-0.2	0.20
	<0.2 0.25	0.29 0.26
	195	193
Magnesium ns ns ns ns 10 149 289 123 Manganese 0.2 0.	195	193
No Schedule 2 Activities ns ns ns ns ns ns 22 25 14.1	13	12.6
Mercury 0.25 ns 1 2 1 0.01 - <0.01 -	<0.01	<0.01
Melyddenum 10000 10000 10 50 250 0.1 0.13 <0.1 0.25	0.33	0.32
Nickel 10000 10000 10 30 250 0.1 0.13 0.1 0.25	0.33	0.32
H 0 -< 60 250 83 200 1000 80 1.29 2.12 0.92	0.96	1.06
Phosphorus	<50	<50
115 115	350	350
Focasium 18 18 18 18 10 2 100 5 5 5 5 5 5 6 5 6 5 6 6 6 6 6 6 6 6 6	<0.5	<0.5
20 20 20 10 0.5 0.	<1000	<1000
Silver 0.05	11000	11000
H 0 -< 100	< 0.05	< 0.05
Sodium Ion	7600	7520
Strontium	8.8	8.6
Thallium 3 ns ns ns 0.02 <0.02 <0.02 <0.02 <0.02	<0.02	<0.02
Tin ns ns ns ns 2500 0.2 <0.2 <0.2 <0.2 <0.2	<0.2	<0.2
Titanium 1000 1000 ns ns ns 5 <5 <5 <5	<5	<5
Tungsten ns ns ns ns 3 1 <1 <1 <1	<1	<1
Uranium 85 85 10 200 20 0.02 <0.02 <0.02 <0.02	< 0.02	< 0.02
Vanadium ns ns 100 100 20 1 <1 <1 <1	<1	<1
Zinc 4		
H 0 -< 90 75 100 1000 2000 3000 34.5 58.7 42.9	31.7	32.7
Zirconium ns ns ns ns 0.1 - <0.1 -	<0.1	<0.1
Additional Metals	1	
Sulfur ns ns ns ns 3000 - <3000 -	<3000	<3000
Tellurium ns ns ns ns ns 0.5 - <0.5 -	< 0.5	<0.5
Thorium	< 0.1	< 0.1

All results are in ug/L unless otherwise noted
All analyses completed by CARO Analytics, Richmond, BC
CSR - Contaminated Sites Regulation - January 24, 2019
Human Health (DW) - Standard for groundwater used for drinking water

AWF - Standard for the protection of freshwater aquatic life

AWM - Standard for the protection of marine or estuary aquatic life

IW - Standard for the use of groundwater to produce hay, crops, vegetables and fruit

LW - Standard for livestock consuming groundwater

* Regional background based on BC MoE Technical Bulletin 3 ns - No standard or guideline for the specified parameter "-" Not analyzed

< - Less than the respective laboratory method detection limit

Purple Concentration greater than applicable aquatic life standard(s)

Green Concentration greater than applicable irrigation/livestock watering standard(s)

Orange Concentration greater than applicable drinking water standards

Blue Concentration greater than aquatic life and irrigation/livestock standards

Dark Red Concentration greater than aquatic life and drinking water standards

Yellow Concentration greater than irrigation/livestock and drinking water standards

Bright Red Concentration greater than aquatic life, irrigation/livestock, and drinking water standards

Underline Concentration greater than one or more applicable CSR standards, but less than regional background

RED Method Detection Limit greater than applicable CSR standard

TABLE 3 - Page 1 of 1

TABLE 4 BTEX AND VPH CONCENTRATIONS IN STORM WATER WEIR CANADA TR20006.01

(MUST BE PRINTED IN COLOUR)

•						Project	TR19008.01	TR20006.01	TR19008.01	TR20006.01	TR20006.01	
\$ 000 000 000 000 000 000 000 000 000 0						Sample ID		STM MH-1	STM MH-2	STM MH-2	STM MH-2D	
/556/5						Date Sampled		27-Mar-20	27-Jun-19	27-Mar-20	27-Mar-20	
teranis						Lab ID		0032273-01	9062907-02	0032273-02	0032273-03	
						Duplicate	-	-	-	STM MH-2D	STM MH-2	
			CSR			Method						
	AWF	AWM	IW	LW	DW	Detection						
Parameters						Limit						
Volatile Petroleum Hydrocarbons												
Volatile Hydrocarbons (VH ₆₋₁₀)	15000	15000	15000	15000	15000	100	<100	<100	<100	<100	<100	
VPH	1500	1500	ns	ns	ns	100	<100	<100	<100	<100	<100	
Volatile Organic Compounds (VOCs)												
Benzene	400	1000	ns	ns	5	0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Ethylbenzene	2000	2500	ns	ns	140	1	<1.0	<1.0	<1.0	<1.0	<1.0	
Methyl-tert-butyl ether [MTBE]	34000	4400	ns	11000	95	1	<1.0	<1.0	<1.0	<1.0	<1.0	
Styrene	720	ns	ns	ns	800	1	<1.0	<1.0	<1.0	<1.0	<1.0	
Toluene	5	2000	ns	ns	60	1	<1.0	<1.0	<1.0	<1.0	<1.0	
Xylene, ortho-	ns	ns	ns	ns	ns	1	<1.0	<1.0	<1.0	<1.0	<1.0	
Xylene, meta & para-	ns	ns	ns	ns	ns	1	1.7	<1.0	<1.0	<1.0	<1.0	
Xvlenes, Total	300	ns	ns	ns	90	2	<2.0	<2.0	<2.0	<2.0	<2.0	

All results are in ug/L unless otherwise noted All analyses completed by CARO Analytics, Richmond, BC CSR - Contaminated Sites Regulation - January 24, 2019 Human Health (DW) - Standard for groundwater used for drinking water

AWF - Standard for the protection of freshwater aquatic life AWM - Standard for the protection of marine or estuary aquatic life

IW - Standard for the use of groundwater to produce hay, crops, vegetables and fruit

VB - Standard for livestock consuming groundwater
 ns - No standard or guideline for the specified parameter
 "-" Not analyzed
 - Less than the respective laboratory method detection limit

Purple Concentration greater than applicable aquatic life standard(s)

Green Concentration greater than applicable irrigation/livestock watering standard(s)

Orange Concentration greater than applicable drinking water standards

Blue Concentration greater than aquatic life and irrigation/livestock standards

Dark Red Concentration greater than aquatic life and drinking water standards

Yellow Concentration greater than irrigation/livestock and drinking water standards

Bright Red Concentration greater than aquatic life, irrigation/livestock, and drinking water standards

Underline Concentration greater than one or more applicable CSR standards, but less than regional background
RED Method Detection Limit greater than applicable CSR standard

TABLE 4 - Page 1 of 1

TABLE 5
METALS CONCENTRATIONS IN SOIL DUPLICATES
RELATIVE PERCENT DIFFERENCE (RPD)
WEIR CANADA TR20006.01

	Project		TR19008.01		TR20006.01				
8 000 000 000 000 000 000 000 000 000 0	Sample ID	19SS03-1	19SS03-1D	Relative	20SS03	20SS03D	Relative		
0,600/200	Date Sampled	08-Apr-19	08-Apr-19	Percent	27-Mar-20	27-Mar-20	Percent		
/ *	Lab ID	9041413-05	9041413-11	Difference	0032274-03	0032274-04	Difference		
teranis	Depth (m-bgs)	0 - 0.05	0 - 0.05	Difference	0 - 0.05	0 - 0.05	Difference		
	Method	0 - 0.03	0 - 0.03		0 - 0.05	0 - 0.03			
	Detection								
Parameters	Limit								
Physical Tests	Lillit								
pH	0.1	6.57	6.58	0.15	6.78	6.72	0.89		
High Variability Metals - DOO 40%	0.1	0.57	0.36	0.13	0.70	0.72	0.09		
Aluminum	40	6060	5140	16.43	8940	8900	0.45		
Barium	1	89.1	72.5	20.54	69.8	64	8.67		
Lead	0.2	1810	1280	34.30	142	103	31.84		
Mercury	0.04	<0.040	0.073	34.30	0.044	0.052	16.67		
Molybdenum	0.1	9.91	9.72	1.94	1.86	1.55	18.18		
Silver	0.1	0.88	0.86	2.30	0.4	0.35	13.33		
Sodium	50	473	428	9.99	616	786	24.25		
Strontium	0.2	22.8	21	8.22	23.2	21.5	7.61		
Tin	0.2	4.4	7.07	46.56	1.78	1.46	19.75		
Titanium	1	588	561	4.70	679	684	0.73		
Other Metals - DQO 30%		300	301	1.70	073	001	0.75		
Antimony	0.1	3.35	3.25	3.03	0.76	0.63	18.71		
Arsenic	0.3	4.37	4.88	11.03	4.3	3.93	8.99		
Beryllium	0.1	0.13	0.11	16.67	0.17	0.17	0.00		
Boron	2	12	8.3	36.45	4.7	4.2	11.24		
Cadmium	0.04	0.308	0.262	16.14	0.342	0.322	6.02		
Chromium (total)	1	70.7	88.6	22.47	30.2	30.5	0.99		
Cobalt	0.1	27.8	32	14.05	9.06	8.9	1.78		
Copper	0.4	175	89.8	64.35	40.1	39	2.78		
Iron	20	86600	111000	24.70	23000	21300	7.67		
Lithium	0.2	1810	1280	34.30	7.79	7.64	1.94		
Magnesium	10	3050	2570	17.08	5920	6010	1.51		
Manganese	0.4	1160	1390	18.04	481	430	11.20		
Nickel	0.6	64.9	80.4	21.34	35.9	34.8	3.11		
Selenium	0.2	0.45	0.54	18.18	<0.20	<0.20	-		
Thallium	0.1	<0.10	< 0.10	-	<0.10	<0.10	-		
Tungsten	0.2	0.58	0.77	28.15	0.35	0.31			
Uranium	0.05	0.373	0.368	1.35	0.351	0.342	2.60		
Vanadium	1	34.6	34.5	0.29	37.2	38.1	2.39		
Zinc	2	499	372	29.16	265	238	10.74		
Zirconium	2	14.2	14.7	3.46	<2.0	2.4	-		

All results are in ug/g unless otherwise noted
All analyses completed by CARO Analytical Services, Richmond, BC
BC MoE recommended DQOs for duplicate samples (revised October 2015)
"-" Not analyzed or not calculated due to results less than laboratory DL
< - Less then the respective laboratory method detection limit
DQO - Data Quality Objective

RPD - Relative percent difference
RPD BPD RPD > DQO, negligible due to result less than 5x laboratory DL RPD RPD DQO, but does not exceed applicable provincial standards RPD > DQO, likely due to soil heterogeneity

TABLE 5 - Page 1 of 1

BTEX AND VPH CONCENTRATIONS IN SOIL DUPLICATES WEIR CANADA TR20006.01

****	Phase	TR19008.01		TR20006.01			
86 000 000	Sample ID	195503-1	19SS03-1D	Relative	205503	20SS03D	Relative
/ 1	Date Sampled	8-Apr-19	8-Apr-19	Percent	27-Mar-20	27-Mar-20	Percent
teranis	Lab ID	9041413-05	9041413-11	Difference	0032274-03	0032274-04	Difference
terums	Depth (m-bgs)	0 - 0.05	0 - 0.05		0 - 0.05	0 - 0.05	
	Method						
	Detection						
Parameters	Limit						
VPH - DQO 40%							
VH6-10	20	41	44	7.06	<20	<20	-
VPH	20	<20	<20	-	<20	<20	-
VOCs - DQO 40%							
Benzene	0.02	< 0.024	< 0.020	-	< 0.025	< 0.022	-
Ethylbenzene	0.05	< 0.059	< 0.050	-	< 0.064	< 0.055	-
Methyl t-butyl ether (MTBE)	0.04	< 0.047	< 0.040	-	< 0.051	< 0.044	-
Styrene	0.05	< 0.059	< 0.050	-	< 0.064	< 0.055	-
Toluene	0.2	29.3	30.1	2.69	<0.255	<0.222	-
Xylene, ortho-	0.05	< 0.105	< 0.079	-	< 0.064	<0.055	-
Xylene, meta & para-	0.1	< 0.180	< 0.130	-	< 0.127	< 0.111	-
Xylenes, Total	0.1	0.283	0.207	31.02	< 0.127	< 0.111	-

All results are in ug/g unless otherwise noted

- All analyses completed by CARO Analytical Services, Richmond, BC
 BC MoE recommended DQOs for duplicate samples (revised October 2015)
 "-" Not analyzed or not calculated due to results less than laboratory DL
- < Less then the respective laboratory method detection limit

DQO - Data Quality Objective

RPD - Relative percent difference
RPD RPD > DQO, negligible due to result less than 5x laboratory DL
RPD RPD > DQO, but does not exceed applicable provincial standards RPD > DQO, likely due to soil heterogeneity

TABLE 7 METALS CONCENTRATIONS IN STORMWATER DUPLICATES RELATIVE PERCENT DIFFERENCE (RPD) WEIR CANADA TR20006.01

99990
800000000000000000000000000000000000000

000000	Location/APEC				
/	Sample ID			Relative	
teranis	Date Sampled	27-Mar-20	27-Mar-20	Percent	
teranis	Lab ID	0032273-02	0032273-03	Difference	
	Method				
	Detection				
Parameters	Limit				
Physical Tests					
Hardness (CaCO3)	0.5	6.83	6.64	2.82	
Dissolved Metals - DQO 20%	0				
Aluminum				-	
Antimony	5	22.4	24.5	8.96	
Arsenic	0.2	<0.2	0.21	-	
Barium	0.5	<0.5	<0.5	-	
Beryllium	5	<5	9.3	-	
Bismuth	0.1	<0.1	<0.1	-	
Boron	5	24.9	19.2	25.85	
Cadmium	0.01	< 0.01	0.015	-	
Calcium	200	2410	2340	2.95	
Chromium (total)	0.5	<0.5	<0.5	-	
Cobalt	0.1	0.13	0.14	7.41	
Copper	0.4	3.62	7.21	66.30	
Iron	10	50	56	11.32	
Lead	0.2	<0.2	0.29	-	
Lithium	0.1	0.25	0.26	3.92	
Magnesium	10	195	193	1.03	
Manganese	0.2	13	12.6	3.13	
Mercury	0.01	< 0.01	< 0.01	-	
Molybdenum	0.1	0.33	0.32	3.08	
Nickel	0.4	0.96	1.06	9.90	
Phosphorus	50	<50	<50	-	
Potassium	100	350	350	0.00	
Selenium	0.5	< 0.5	<0.5	-	
Silicon	1000	<1000	<1000	-	
Silver	0.05	< 0.05	< 0.05	-	
Sodium Ion	100	7600	7520	1.06	
Strontium	1	8.8	8.6	2.30	
Thallium	0.02	<0.02	<0.02	-	
Tin	0.2	<0.2	<0.2	-	
Titanium	5	<5	<5	-	
Tungsten	1	<1	<1	-	
Uranium	0.02	<0.02	<0.02	-	
Vanadium	1	<1	<1	-	
Zinc	4	31.7	32.7	3.11	
Zirconium	0.1	<0.1	<0.1	-	

All results are in ug/L unless otherwise noted

All analyses completed by CARO Analytical Services, Richmond, BC

BC MoE recommended DQOs for duplicate samples (revised October 2015)

"-" Not analyzed or not calculated due to results less than laboratory $\ensuremath{\mathsf{DL}}$

Less then the respective laboratory method detection limit
DQO - Data Quality Objective
RPD - Relative percent difference

RPD	
RPD	
RPD	

RPD > DQO, negligible due to result less than 5x laboratory DL RPD > DQO, but does not exceed applicable provincial standards

RPD > DQO, duplicate variability unkown. Results should be considered an estimate.

TABLE 8
BTEX AND VPH CONCENTRATIONS IN STORMWATER DUPLICATES
RELATIVE PERCENT DIFFERENCE (RPD) WEIR CANADA TR20006.01



/ 6	Sample ID	STM MH-2	STM MH-2D	Relative
teranis	Date Sampled Lab ID		27-Mar-20 0032273-03	Percent Difference
Parameters	Method Detection Limit			
Volatile Petroleum Hydrocarbons				
Volatile Hydrocarbons (VH6-10)	100	<100	<100	-
VPH	100	<100	<100	-
VOCs - DQO 30%				
Benzene	0.5	< 0.5	< 0.5	-
Ethylbenzene	1	<1.0	<1.0	-
Methyl-tert-butyl ether [MTBE]	1	<1.0	<1.0	-
Styrene	1	<1.0	<1.0	-
Toluene	1	<1.0	<1.0	-
Xylene, ortho-	1	<1.0	<1.0	-
Xylene, meta & para-	1	<1.0	<1.0	-
Xvlenes, Total	2	< 2.0	< 2.0	_

Location/APEC

TR20006.01

All results are in ug/L unless otherwise noted

All analyses completed by CARO Analytical Services, Richmond, BC

BC MoE recommended DQos for duplicate samples (revised October 2015)
"-" Not analyzed or not calculated due to results less than laboratory DL
<- Less then the respective laboratory method detection limit

DQO - Data Quality Objective

RPD - Relative percent difference
RPD RPD - RPD > DQQ, negligible due to result less than 5x laboratory DL

RPD > DQO, but does not exceed applicable provincial standards

RPD > DQO, duplicate variability unkown. Results should be considered an estimate.