February 12, 2020

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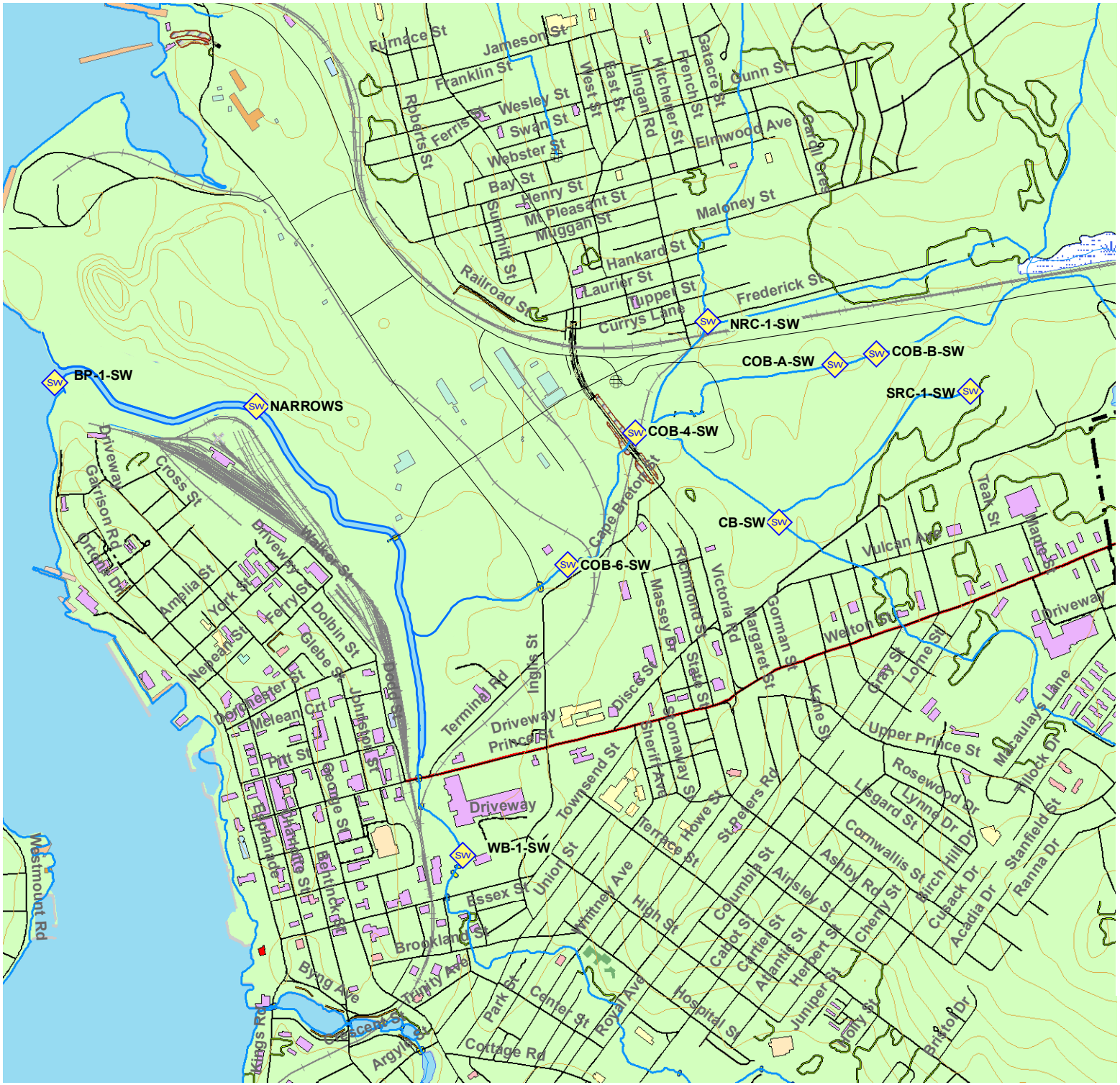
Long Term Maintenance and Monitoring
Semi-Annual Surface Water Quality Monitoring Program – Fall 2019
Final Report

Following completion of the Sydney Tar Ponds and Coke Ovens Remediation Project, surface water quality monitoring was implemented as part of the long term maintenance and monitoring (LTMM) program to provide ongoing data and compliance commitments to regulatory agencies and/or stakeholders. Nova Scotia Lands (NS Lands) is a Crown Corporation of the Province of Nova Scotia responsible for the LTMM semi-annual surface water quality program. NS Lands retained Dillon Consulting Limited (Dillon) to conduct the fall (December 2019) LTMM Surface Water Quality Monitoring Program, the details of which are provided herein.

PROJECT METHODOLOGY

The fall surface water quality monitoring program, which was completed on December 13, 2019, consisted of the collection of surface water samples at ten stations (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW, Narrows and BP-1-SW) (see Figure 1). A GPS unit was used to confirm that the monitoring locations sampled as part of the LTMM surface water quality monitoring program were the same as those used during historical surface water monitoring events (i.e., the Environmental Effects Monitoring and Surface Water Monitoring (EEMSWM) Program associated with the Sydney Tar Ponds remediation and past LTMM program events). Tasks associated with the fall 2019 surface water monitoring included:

- Documenting ecological activity in the surface water bodies, if observed;
- Recording of physical conditions and potential contaminants (i.e., debris, precipitate);
- Measurement of field parameters (i.e., pH, conductivity, temperature, salinity and turbidity);
- Flow calculation; and,
- Collection of surface water samples for polycyclic aromatic hydrocarbons (PAHs), general chemistry and total metals (including mercury) (RCApMS) analysis. As concentrations of petroleum hydrocarbons (PHC) and polychlorinated biphenyls (PCBs) had historically remained below laboratory detection limits, the surface water program was modified in July 2016 to consist of PAH and RCApMS analysis only (following approval from Nova Scotia Environment (NSE) and NS Lands).



NS Lands
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LONG TERM MAINTENANCE
AND MONITORING
SURFACE WATER QUALITY MONITORING PROGRAM
November 2018

SURFACE WATER LOCATIONS 2019
FIGURE 1

LEGEND

SW Surface Water Locations

0 100 200 400 600 m

MAP DRAWING INFORMATION:
Province of Nova Scotia Mapping

MAP CREATED BY: SCM
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\SYDNEY
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DILLON CONSULTING

PROJECT: 14-1360

Date: 2020-01-20

A summary of the surface water stations included in the fall 2019 monitoring program is presented in Table 1.

Table 1 – Surface Water Quality Monitoring Stations

Monitoring Station ID	Water Body	Rationale for Sampling
CB-SW	Cagney Brook	To characterize surface water quality within the urban area of Sydney upstream of CO7/CO8[1].
NRC-1-SW	North Realigned Channel	To characterize surface water quality within the urban area of Whitney Pier upstream of CO7/CO8.
SRC-1-SW	South Realigned Channel	To characterize surface water quality related to runoff from the municipal landfill upstream of CO7/CO8.
COB-A-SW	Coke Ovens Brook - concrete riffles upstream of Stable Drive	To characterize surface water quality from runoff and leachate associated with the municipal landfill upstream of CO1[2], CO6[3] and CO7/CO8.
COB-B-SW[4]	Coke Oven Brook along SPAR Road, east of COB-A-SW	To further characterize the potential for impacts from the municipal landfill to COB-A-SW.
COB-4-SW	COB-A-SW	To characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B[5].
COB-6-SW	Coke Ovens Brook	To further characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B.
WB-1-SW	Coke Ovens Brook	To characterize surface water quality within the urban area of Sydney upstream of TP6B and TP7[6].
NARROWS	Wash Brook	To characterize surface water quality downgradient of the majority of the remediated sites.
BP-1-SW[7]	North Channel, Open Hearth Park	To further characterize surface water quality downgradient of the remediation sites and as it discharges to Sydney Harbour.

Notes:
1 CO7/CO8: Collection System (CO7)/Water Treatment Plant (CO8).
2 CO1: Coke Oven Brook.
3 CO6: Surface Cap.
4 Upstream monitoring station COB-B-SW was added to the monitoring program in 2015 to further characterize the potential for impacts from the municipal landfill to COB-A-SW.
5 TP6B: Solidification/Stabilization/Channel.
6 TP7: Tar Ponds Cap.
7 The LTMM location of surface water station BP-1-SW is similar to the location used during Pre-Construction activities associated with the EEM Program and is approximately 40 meters (m) upstream from the collection point utilized during the Construction period of the EEM Program.

Field data was recorded on site specific data sheets. Stream flow measurements were calculated by measuring the width of the stream at the sampling location and by measuring the depth of the stream at ¼, ½ and ¾ width intervals. The stream flow velocity was also measured at ¼, ½ and ¾ intervals. Using a spreadsheet formula, the approximate stream flow was calculated for each monitoring station. Due to the depth of surface water station BP-1-SW, it was not possible to obtain field measurements across the entire stream width. Dillon personnel collected as much field data at this deeper location as safely possible (i.e., from the stream banks/shoreline). Stream flow velocity for this location was calculated using the Muggah Creek North Channel Survey (CBCL Limited, October 2014) provided by NS Lands.

Sample containers were pre-labelled by the laboratory with the sample identification, analysis required and the project number. The date and time of sample collection were noted on the sample containers in the field at the time of collection. New nitrile gloves were worn by field staff for each sample to avoid cross-contamination between sampling stations. Samples were collected by opening the container facing upstream. Where samples were collected directly into the sample bottles containing preservative, the container was not fully submerged during sampling to avoid washing the preservative out of the container. The sample bottles for metals analysis contained nitric acid preservative so that dissolved metals remained in solution.

WEATHER CONDITIONS

Weather information obtained from Environment Canada's climate station at the Sydney Airport indicates that accumulated precipitation for the 30 days preceding the December 13, 2019 surface water monitoring program was approximately 192.2 millimeters (mm). No significant rainfall was recorded on the day of the sampling event. In the days preceding the sampling event, significant rainfall was recorded for December 10, 2019 (i.e., 23.8 mm), with lesser amounts of rain recorded on December 11, 2019 (i.e., 9.0 mm) and December 12, 2019).

Tidal information obtained from Meteo365 (https://www.tide-forecast.com) for December 13, 2019, indicated a high tide level of 1.3 m and a low tide level of 0. 4 m.

FIELD OBSERVATIONS AND MEASUREMENTS

Observations at the ten surface water stations during the fall 2019 monitoring program are summarized in Table 2. Field measurements are summarized in Table 3.

Table 2 – Fall 2019 Surface Water Quality Monitoring Field Observations

Monitoring Station ID	Field Observations	Corresponding Photograph Numbers
CB-SW	Heavy vegetation in the brook and on the brook banks. Debris (i.e., plastic and pop cans) observed in the brook.	1
NRC-1-SW	Debris (i.e., household garbage, including plastic and fiberboard) observed in the channel and on the channel banks. Some ice cover at channel edges.	2 and 3
SRC-1-SW	Debris (i.e., plastic bags, metal, spray cans) observed in the channel and on the channel banks. Vegetation observed on the channel floor. The concrete channel walls have spray painted graffiti visibly dissolving at the high water point. Ducks observed in the channel.	4 and 5

Table 2 – Fall 2019 Surface Water Quality Monitoring Field Observations

Monitoring Station ID	Field Observations	Corresponding Photograph Numbers
COB-A-SW	Vegetation on the brook banks and within the brook. Some ice cover.	6
COB-B-SW	Orange staining observed on rocks and vegetation lining the brook. Patches of ice cover. Small amount of groundwater observed flowing out of gravel near brook.	7 and 8
COB-4-SW	Vegetation was observed along the brook banks. No debris observed. Some ice coverage on brook edges.	9 and 10
COB-6-SW	Minor vegetation in the brook bottom. No debris observed.	11 and 12
WB-1-SW	Vegetation observed along brook banks. Debris (i.e., metal and wood) observed on the brook banks. Ducks observed in brook. Some ice cover at brook edges.	13 and 14
NARROWS	Seaweed, light algae and snails observed in the channel and on the banks. Ice cover on the channel banks.	15
BP-1-SW	Seaweed, and barnacles observed in the channel and on the banks. Ducks observed in channel. Ice cover on banks.	16 and 17

Note:
1 Photographs are presented in Appendix A.

Table 3 – Fall 2019 Surface Water Quality Monitoring Field Measurements

Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow[1] (m^3/s)
CB-SW	7.74	2.0	0.346	0.18	0.10
NRC-1-SW	8.15	0	0.193	0.04	0.42
SRC-1-SW	7.52	16.2	0.159	0.25	0.09
COB-A-SW	7.72	8.2	0.417	0.20	0.002
COB-B-SW	7.64	0	0.555	0.26	0.07
COB-4-SW	7.68	4.5	0.431	0.20	0.71
COB-6-SW	7.78	0	0.377	0.19	0.35
WB-1-SW	8.05	0	0.119	0.04	3.78
NARROWS	8.39	0	2.94	17.15	7.77
BP-1-SW[2]	6.40	0	37.6	22.22	2.10

Notes:
1 Stream flow is an approximate calculated value.
2 Collected during low tide conditions.

REGULATORY FRAMEWORK

As specified in Section 4.2, page 21 of the NS Lands LTMM Plan, the remedial criteria used for eight of the ten surface water stations included in the LTMM monitoring program (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW and WB-1-SW) were the Nova Scotia Contaminated Sites Regulations (NS CSRs) Tier I Environmental Quality Standards (EQS) (which came into effect July 6, 2013) for surface water (fresh water) and the Canadian Council of Ministers of the Environment (CCME) for the protection of fresh water aquatic life (FWAL) (accessed online 2019). Analytical results for the remaining two surface water stations included in the monitoring program (i.e., Narrows and BP-1-SW) were compared to the NS CSRs Tier I EQS for surface water (marine) and the CCME guidelines for the protection of aquatic life (marine).

Additionally, as specified in Section 4.2, page 21 of the NS Lands LTMM Plan, analytical results for surface water samples collected at the upstream sampling stations were compared to previously calculated 95% upper confidence limits (UCL) of available Pre-Construction/Baseline analytical data from the EEMSWCM Program associated with the Sydney Tar Ponds remediation. Furthermore, analytical results for the upstream sampling stations were also compared to calculated 95% UCLs of available historical upstream analytical data (i.e., the Upstream Calculated 95% UCL). Analytical results for the two sampling stations near Sydney Harbour were compared to the calculated 95% UCLs of available Pre-Construction/Baseline analytical data for the Battery Point sampling station.

SURFACE WATER QUALITY TREND ANALYSIS – MANN KENDALL

Mann-Kendall analysis is a non-parametric statistic test routinely used to assess the stability of a solute plume (i.e., are concentration trends stable, decreasing, or increasing). At least four independent sampling events are required to evaluate surface water quality trends via Mann-Kendall analysis. The Mann-Kendall test procedure starts by comparing the most recent round of water quality data with the results of earlier rounds. Non-detect data values are typically assigned a value that is half the laboratory detection limit. The Mann-Kendall test is not designed to account for seasonal variation in data.

Based on a review of the analytical results from the fall 2019 monitoring event and historical monitoring events, select parameters, with concentrations above (or historically above) applicable guidelines were selected for Mann-Kendall analysis. These include PAH indicator parameters anthracene, pyrene, and benzo(a)pyrene, and inorganic chemistry indicator parameters boron, cadmium, strontium, sulphate, and zinc.

In certain situations, Mann-Kendall analysis results may be biased due to elevated laboratory detection limits. Non-detected data on the Mann-Kendall analysis of indicator parameters was identified and Dillon confirmed that the influence of non-detected data is minimal.

SURFACE WATER RESULTS

The surface water quality results for the fall 2019 event, and available post-remediation surface water data, are presented in the attached Tables B-1 and B-2 in Appendix B. Laboratory certificates of analysis are presented in Appendix C. As stated above, surface water samples were analyzed for PAHs and RCApMS. Samples were delivered to Bureau Veritas Laboratory (formerly Maxxam Analytics Inc.) in Sydney, Nova Scotia for analysis. Bureau Veritas is accredited through the Standard Council of Canada (SCC) and is a member of the Canadian Association for Laboratory Accreditation (CALA).

Review of the December 2019 data indicates PAH parameters analyzed were non-detect and/or below the comparison criteria. A summary of concentrations of select organic parameters (i.e., naphthalene and benzo(a)pyrene) reported at each station relative to the calculated 95% UCLs is provided in Table 4. There were no exceedances of the relative calculated 95% UCLs during the fall 2019 monitoring event.

Review of the general chemistry and metals results indicates:

- Concentrations of aluminum ranging from 6.1 ug/L to 460 ug/L exceeded the Tier I EQS (fresh water) of 5 ug/L in CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-4-SW, COB-6-SW, WB-1-SW and the field duplicate sample of WB-1-SW. Aluminum concentrations ranging from 110 ug/L to 460 ug/L in CB-SW, SRC-1-SW, WB-1-SW, and the field duplicate sample of WB-1-SW, also exceeded the CCME FWAL of 100 ug/L. The aluminum concentrations in CB-SW and SRC-1-SW also exceeded the Upstream Calculated 95% UCL of 220 ug/L;
- Cadmium concentrations ranging from 0.014 ug/L to 0.034 ug/L in CB-SW, NRC-1-SW, SRC-1-SW, COB-4-SW, COB-6-SW, WB-1-SW, and the field duplicate sample of WB-1-SW exceeded the Tier I EQS (fresh water) of 0.01 ug/L;
- The chromium concentrations of 1.3 ug/L and 1.4 ug/L in CB-SW and SRC-1-SW, respectively, exceeded the CCME FWAL of 1 ug/L;
- The copper concentrations of 2.6 ug/L and 2.8 ug/L in CB-SW and SRC-1-SW, respectively, exceeded the Tier I EQS (fresh water) and the CCME FWAL of 2 ug/L. The copper concentration of 2.7 ug/L in the Narrows exceeded the Tier I EQS (marine water) of 2 ug/L;
- Iron concentrations of 830 ug/L and 770 ug/L in CB-SW and SRC-1-SW, respectively, exceeded the Tier I EQS (fresh water) and CCME FWAL guideline of 300 ug/L. The iron concentrations of 290 ug/L and 220 ug/L in the Narrows and Battery Point, respectively, exceeded the Battery Point/Narrows Calculated 95% UCL of 190 ug/L;
- The lead concentrations of 2.0 ug/L and 1.6 ug/L in CB-SW and SRC-1-SW exceeded the Tier I EQS (fresh water) and the CCME FWAL of 1 ug/L. The lead concentration in CB-SW also exceeded the Upstream Calculated 95% UCL of 1.2 ug/L;
- Concentrations of strontium ranging from 150 ug/L to 220 ug/L in COB-A-SW, COB-B-SW, and COB-6-SW exceeded the Upstream Calculated 95% UCL of 132 ug/L. The strontium concentration in COB-A-SW also exceeded the Pre-Construction/Baseline Calculated 95% UCL of 210 ug/L;
- Sulphate concentrations of ranging from 35 ug/L to 120 ug/L in CB-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, and COB-6-SW exceeded the Upstream Calculated 95% UCL of 26 ug/L. The sulphate concentrations in COB-A-SW and COB-B-SW also exceeded the Pre-Construction Baseline Calculated 95% UCL; and,
- The zinc concentrations of 12 ug/L and 7.3 in CB-SW and SRC-1-SW, respectively, exceeded the CCME FWAL of 7 ug/L.

Table 5 provides a summary of concentrations reported for select inorganic parameters relative to the calculated 95% UCLs. Inorganic parameter exceedances of the Upstream Calculated 95% UCLs occurred in CB-SW (aluminum), SRC-1-SW (aluminum and sulphate), COB-A-SW (sulphate and strontium), COB-B-SW (sulphate and strontium), COB-4-SW (sulphate and strontium) and COB-6-SW (sulphate and strontium). Inorganic parameter exceedances of the Pre-Construction/ Baseline Calculated 95% UCL occurred in COB-A-SW (sulphate) and COB-B-SW (sulphate). Exceedances of the Battery Point/Narrows Calculated 95% UCL occurred in the Narrows (iron) and Battery Point (iron).

Table 4 - Summary of Organic Surface Water Indicator Parameter Concentrations relative to Calculated 95% (ug/L)

Parameter	Pre-Construction/ Baseline Calculated 95% UCL[1]	Date	Sample Location									
			CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW[2]	COB-4-SW	COB-6-SW	WB-1-SW	NARROWS	BP-1-SW
Naphthalene	1.8	2014-12-22	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	0.22	<0.20
		2015-07-27	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		2015-11-18	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
		2016-07-22	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		2016-12-08	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	0.38	<0.20	0.21	<0.20
		2017-08-03	<0.20	Dry	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		2017-12-18	<0.20	<0.20	<0.20	Dry	<0.20	<0.20	0.54	<0.20	0.30	0.33
		2018-07-25	Dry	<0.20	<0.20	<0.20	Dry	<0.20	<0.20	<0.20	0.41	<0.20
		2018-11-23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.49	<0.20	0.22	0.20
		2019-07-29	Dry	<0.20	Insufficient Water to Sample	<0.20	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		2019-12-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.75	<0.20	0.36	0.53
Benzo(a)pyrene	0.05	2014-12-22	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
		2015-07-27	<0.010	<0.010	<0.010	Dry	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		2015-11-18	<0.010	**0.068**	<0.010	<0.010	<0.010	**0.39**	0.015	<0.010	<0.010	<0.010
		2016-07-22	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	<0.010	<0.010
		2016-12-08	<0.010	0.011	<0.010	<0.010	<0.010	0.028	0.027	<0.010	<0.010	<0.010
		2017-08-03	<0.010	Dry	<0.010	Dry	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		2018-12-18	<0.010	<0.010	0.016	Dry	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
		2018-07-25	Dry	<0.010	0.034	<0.010	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		2018-11-23	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**1.3**	<0.010	<0.010
		2019-07-29	Dry	<0.010	Insufficient Water to Sample	<0.010	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		2019-12-13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Notes:

[1] Pre-Construction/Baseline Calculated 95% UCL are from the EEMSWCM Program

[2] Added to the program in July 2015

Bold indicates the concentration exceeds the Pre-Construction/Baseline Calculated 95% UCL

Table 5 – Summary of Inorganic Surface Water Indicator Parameter Concentrations relative to Calculated 95% UCLs

Sample Location	Date	SO4	Al	As	Cd	Cr	Co	Fe	Pb	Mn	Se	Sr
	Units	(mg/L)	(ug/L)									
	Upstream Calculated 95% UCL[1]	26	220	1.6	0.1	8.3	-	3,318	1.2	583	1.9	132
	Pre-Construction/Baseline Calculated 95% UCL[1]	84	-	1.98	-	-	1.3	1,900	-	800	-	210
CB-SW	12/22.2014	26	110	<1.0	0.018	<1.0	<0.40	290	<0.50	190	<1.0	130
	2015-07-27	16	28	<1.0	<0.010	<1.0	<0.40	260	<0.50	61	<1.0	**320**
	2015-11-18	24	130	<1.0	0.011	<1.0	<0.40	280	<0.50	140	<1.0	**140**
	2016-07-22	10	55	1.4	<0.010	<1.0	<0.40	640	<0.50	71	<1.0	**160**
	2016-12-08	23	84	<1.0	0.017	<1.0	<0.40	330	<0.50	310	<1.0	110
	2017-08-03	12	150	1.4	<0.010	1.0	<0.40	750	0.61	380	<1.0	**340**
	2017-12-18	24	91	<1.0	0.015	<1.0	<0.40	300	<0.50	200	<1.0	130
	2018-07-25						Dry					
	2018-11-23	**32**	91	<1.0	0.014	<1.0	<0.40	210	<0.50	210	<1.0	77
	2019-07-29						Dry					
	2019-12-13	**35**	**430**	<1.0	0.026	1.3	0.52	830	**2**	270	<0.50	78
NRC-1-SW	12/22.2014	20	58	<1.0	0.022	<1.0	<0.40	150	<0.50	85	<1.0	32
	2015-07-27	22	45	<1.0	0.019	<1.0	<0.40	1,300	<0.50	75	<1.0	54
	2015-11-18	15	**1,500**	**3.5**	**0.14**	1.9	1.5	**3,800**	**9.5**	**1,100**	<1.0	36
	2016-07-22	15	31	<1.0	0.016	<1.0	<0.40	970	0.61	47	<1.0	52
	2016-12-08	16	110	<1.0	0.025	<1.0	<0.40	360	0.8	200	<1.0	34
	2017-08-03						Dry					
	2017-12-18	21	34	<1.0	0.016	<1.0	<0.40	140	<0.50	87	<1.0	31
	2018-07-25	12	**270**	<1.0	0.012	<1.0	<0.40	460	0.99	62	<1.0	60
	2018-11-23	17	36	<1.0	0.015	<1.0	<0.40	130	<0.50	61	<1.0	35
	2019-07-29	15	46	<1.0	0.018	<1.0	<0.40	1400	<0.50	130	<1.0	55
	2019-12-13	18	92	<1.0	0.020	<1.0	<0.40	270	<0.50	150	<0.50	34
SRC-1-SW	12/22.2014	**54**	**290**	<1.0	0.035	<1.0	<0.40	340	1.2	190	<1.0	**150**
	2015-07-27	**47**	51	1.0	0.013	<1.0	<0.40	210	1.1	260	<1.0	**150**
	2015-11-18	**43**	**240**	<1.0	0.023	1.2	<0.40	310	0.75	230	<1.0	**150**
	2016-07-22	**51**	50	**1.9**	0.018	<1.0	<0.40	350	<0.50	350	<1.0	**170**
	2016-12-08	**42**	**300**	<1.0	0.039	1.0	<0.40	400	**1.6**	200	<1.0	**140**
	2017-08-03	**54**	24	**1.8**	<0.010	<1.0	<0.40	150	<0.50	91	<1.0	**190**
	2017-12-18	**50**	**3,000**	**4.1**	**0.31**	4.9	1.7	**4,600**	**10**	**2,200**	<1.0	**140**
	2018-07-25	**43**	**2,500**	**4.9**	**0.26**	4.0	1.9	**5,500**	**12**	**2,600**	<1.0	**170**
	2018-11-23	**46**	**320**	<1.0	0.027	<1.0	<0.40	420	**1.3**	160	<1.0	130
	2019-07-29					Insufficient Water Present - No Sample						
	2019-12-13	**47**	**460**	1.2	0.034	1.4	<0.40	770	**1.6**	150	<0.50	130
COB-A-SW	2014-12-22	**160**	16	<1.0	<0.010	<1.0	<0.40	51	<0.50	25	<1.0	**260**
	2015-07-27						Dry					
	2015-11-18	**170**	5.1	<1.0	<0.010	<1.0	<0.40	82	<0.50	74	<1.0	**260**
	2016-07-22						Dry					
	2016-12-08	**150**	8.5	<1.0	<0.010	<1.0	<0.40	68	<0.50	92	<1.0	**250**
	2017-08-03						Dry					
	2017-12-18						Dry					
	2018-07-25	**100**	**300**	**2.6**	0.058	<1.0	1.6	**9,100**	**1.4**	**2,900**	<1.0	**270**
	2018-11-23	**110**	46	<1.0	<0.010	<1.0	<0.40	810	<0.50	300	<1.0	**210**
	2019-07-29	**100**	10	<1.0	<0.010	<1.0	<0.40	240	<0.50	290	<1.0	**240**
	2019-12-13	**120**	7.5	<1.0	<0.010	<1.0	<0.40	<50	<0.50	35	<0.50	**220**
COB-B-SW[2]	2015-07-27						Dry					
	2015-11-18	**190**	7.9	<1.0	<0.010	<1.0	<0.40	<50	<0.50	21	<1.0	**250**
	2016-07-22						Dry					
	2016-12-08	**440**	13	<1.0	0.027	<1.0	0.90	130	<0.50	**1,400**	<1.0	**480**
	2017-08-03						Dry					
	2017-12-18	**120**	6.7	<1.0	<0.010	<1.0	0.42	110	<0.50	490	<1.0	**190**
	2018-07-25						Dry					
	2018-11-23	**110**	7.0	<1.0	<0.010	<1.0	0.46	200	<0.50	500	<1.0	**200**
	2019-07-29						Dry					
	2019-12-13	**120**	6.1	<1.0	<0.010	<1.0	<0.40	78	<0.50	190	<0.50	**200**
COB-4-SW	12/22.2014	**47**	82	<1.0	0.014	<1.0	<0.40	210	<0.50	95	<1.0	**140**
	2015-07-27	**100**	51	<1.0	<0.010	<1.0	<0.40	460	<0.50	110	<1.0	**250**
	2015-11-18	**41**	**7,100**	**13**	**0.29**	8.0	4.6	**14,000**	**37**	**1,500**	<1.0	**150**
	2016-07-22	**74**	28	<1.0	<0.010	<1.0	<0.40	300	<0.50	140	<1.0	**270**
	2016-12-08	**39**	120	<1.0	0.014	<1.0	<0.40	390	0.99	180	<1.0	110
	2017-08-03	**110**	14	<1.0	0.011	<1.0	<0.40	83	<0.50	130	<1.0	**450**
	2017-12-18	**42**	53	<1.0	0.010	<1.0	<0.40	270	<0.50	120	<1.0	110
	2018-07-25	**100**	43	1.0	<0.010	<1.0	<0.40	51	0.75	23	<1.0	**430**
	2018-11-23	**41**	140	<1.0	0.014	<1.0	<0.40	230	0.55	99	<1.0	130
	2019-07-29	**69**	28	<1.0	<0.010	<1.0	<0.40	370	<0.50	150	<1.0	**230**
	2019-12-13	**43**	35	<1.0	0.015	<1.0	<0.40	170	<0.50	130	<0.50	**110**

Table 5 – Summary of Inorganic Surface Water Indicator Parameter Concentrations relative to Calculated 95% UCLs

Sample Location	Date	SO4	Al	As	Cd	Cr	Co	Fe	Pb	Mn	Se	Sr
	Units	(mg/L)	(ug/L)									
Upstream Calculated 95% UCL[1]		**26**	**220**	**1.6**	**0.1**	**8.3**	**-**	**3,318**	**1.2**	**583**	**1.9**	**132**
Pre-Construction/Baseline Calculated 95% UCL[1]		**84**	**-**	**1.98**	**-**	**-**	**1.3**	**1,900**	**-**	**800**	**-**	**210**
COB-6-SW	12/22.2014	**56**	61	<1.0	0.01	<1.0	<0.40	170	<0.50	56	<1.0	**180**
	2015-07-27	**91**	39	<1.0	<0.010	<1.0	<0.40	160	<0.50	23	<1.0	**300**
	2015-11-18	**44**	220	<1.0	0.018	<1.0	<0.40	490	**1.5**	79	<1.0	**180**
	2016-07-22	**64**	46	1.0	<0.010	<1.0	<0.40	180	<0.50	37	<1.0	**300**
	2016-12-08	**41**	200	<1.0	0.015	<1.0	<0.40	360	1.0	110	<1.0	**160**
	2017-08-03	**110**	42	1.3	0.011	<1.0	<0.40	<50	<0.50	35	<1.0	**500**
	2017-12-18	**48**	130	<1.0	0.010	<1.0	<0.40	260	<0.50	73	<1.0	**160**
	2018-07-25	**95**	23	<1.0	<0.010	<1.0	<0.40	140	<0.50	110	<1.0	**350**
	2018-11-23	**45**	150	<1.0	0.015	<1.0	<0.40	360	0.87	130	<1.0	**140**
	2019-07-29	**76**	37	<1.0	<0.010	<1.0	<0.40	130	<0.50	31	<1.0	**300**
	2019-12-13	**49**	88	<1.0	0.014	<1.0	<0.40	220	<0.50	88	<0.50	**150**
WB-1-SW	12/22.2014	7.9	160	<1.0	0.038	<1.0	<0.40	270	0.71	95	<1.0	53
	2015-07-27	10	89	<1.0	0.012	<1.0	<0.40	480	<0.50	41	<1.0	100
	2015-11-18	8.3	63	<1.0	<0.010	<1.0	<0.40	200	<0.50	43	<1.0	73
	2016-07-22	**410**	87	<1.0	0.035	<1.0	<0.40	590	0.56	160	<1.0	**1300**
	2016-12-08	8.4	100	<1.0	0.026	<1.0	<0.40	220	<0.50	100	<1.0	61
	2017-08-03	**230**	28	1.0	0.027	<1.0	<0.40	680	<0.50	450	<1.0	**940**
	2017-12-18	8.0	110	<1.0	0.022	<1.0	<0.40	190	<0.50	63	<1.0	49
	2018-07-25	**71**	120	<1.0	0.024	<1.0	<0.40	330	**1.8**	140	<1.0	**320**
	2018-11-23	6.5	**1200**	**4.3**	**0.15**	3.5	1.2	**3700**	**28**	200	<1.0	50
	2019-07-29	14	69	<1.0	0.02	<1.0	<0.40	290	<0.50	64	<1.0	120
	2019-12-13	6.6	110	<1.0	0.027	<1.0	<0.40	210	<0.50	67	<0.50	39
Battery Point/Narrows Calculated 95% UCL[1]		**2,180**	**-**	**-**	**-**	**-**	**0.9**	**190**	**-**	**70**	**-**	**7,000**
NARROWS	12/22.2014	270	110	<1.0	0.027	<1.0	<0.40	***250***	<0.50	63	<1.0	610
	2015-07-27	1,500	86	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***100***	<10	5,400
	2015-11-18	110	76	<1.0	0.012	<1.0	<0.40	***320***	<0.50	45	<1.0	370
	2016-07-22	1,400	51	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***120***	<10	5,400
	2016-12-08	270	75	<1.0	0.029	<1.0	<0.40	***250***	<0.50	***110***	<1.0	890
	2017-08-03	2,000	<50	<10	<0.10	<10	*<4.0*	<500	<5.0	***110***	<10	6,100
	2017-12-18	150	110	<1.0	0.018	<1.0	<0.40	***280***	<0.50	***72***	<1.0	450
	2018-07-25	1,700	56	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***100***	<10	5,000
	2018-11-23	180	86	<1.0	0.021	<1.0	<0.40	***220***	<0.50	52	<1.0	500
	2019-07-29	1,700	110	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***120***	<10	5000
	2019-12-13	120	110	<1.0	0.021	<1.0	<0.40	***290***	<0.50	65	<0.50	340
BP-1-SW	12/22.2014	170	110	<1.0	0.028	<1.0	<0.40	***240***	<0.50	61	<1.0	950
	2015-07-27	1,300	140	<10	<0.10	<10	*<4.0*	*<500*	<5.0	59	<10	5,300
	2015-11-18	190	140	<1.0	0.014	<1.0	<0.40	***410***	<0.50	57	<1.0	580
	2016-07-22	1,600	63	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***71***	<10	5,500
	2016-12-08	290	86	<1.0	0.025	<1.0	<0.40	***280***	<0.50	***100***	<1.0	1,000
	2017-08-03	2,000	<50	<10	<0.10	<10	*<4.0*	<500	<5.0	***110***	<10	6,100
	2017-12-18	210	95	<1.0	0.020	<1.0	<0.40	***220***	<0.50	60	<1.0	630
	2018-07-25	1,900	58	<10	<0.10	<10	*<4.0*	***1,000***	<5.0	***94***	<10	5,900
	2018-11-23	250	86	<1.0	0.024	<1.0	<0.40	***240***	<0.50	50	<1.0	730
	2019-07-29	1,700	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	50	<10	5,000
	2019-12-13	250	88	<1.0	0.021	<1.0	*<0.40*	***220***	<0.50	51	<0.50	660

Notes:

[1] Upstream, Pre-Construction/Baseline and Battery Point/Narrows Calculated 95% UCLs are from the EEMSWCM Program

[2] Added to the program in July 2015

Bold indicates the concentration exceeds the Upstream Calculated 95% UCL

Underline indicates exceedance of the Pre-Construction/Baseline Calculated 95% UCL

Italics Bold indicates exceedance of the Battery Point/Narrows Calculated 95% UCL

Italics indicates that the laboratory detection limit is greater than the comparison criteria

TREND ANALYSIS

The surface water quality trend analysis for the fall 2019 monitoring event was based on the available analytical results (i.e., four rounds of sampling events are required) for select parameters, including:

- PAH indicator parameters anthracene, pyrene, and benzo(a)pyrene; and,
- Inorganic chemistry indicator parameters boron, cadmium, strontium, sulphate, and zinc.

Trend analysis results for these select parameters were generally stable or indicated fluctuations with no trend, with the exception of sulphate at CB-SW and pyrene at the Narrows, which indicated potentially increasing concentration trends. These potentially increasing trends need to be verified with future data. Strontium at CB-SW, strontium and sulphate at COB-A-SW, pyrene and zinc at COB-4-SW, and zinc at the Narrows each indicated a declining trend.

Mann-Kendall results are presented in Appendix D.

QUALITY CONTROL PROCESS

The laboratory analytical certificate has been reviewed for quality assurance/quality control purposes. The laboratory completed quality control analysis including duplicates, blanks, spikes, surrogate recoveries and spiked blanks to assess accuracy and precision as well as the potential for bias, contamination and degradation or matrix effects. Review of the laboratory report indicated no concern relative to data quality.

One field duplicate of sample WB-1-SW was collected during the fall 2019 monitoring event. The relative percent difference (RPD) was calculated between the sample and associated field duplicate results. The RPD was not calculated for those parameters where one or both of the results associated with the original and/or field duplicate sample exhibited concentrations less than five times the laboratory reportable detection limit (RDL). Calculations indicate that the RPDs of the analyzed parameters were within the acceptable RPD range (i.e., 40% for organics and 25% for inorganics) with calculated RPDs ranging from 0% to 17%. The data quality is considered acceptable and the results representative. There were no holding time exceedances.

SUMMARY

Analytical results of the fall 2019 surface water monitoring program indicate that concentrations of the analyzed parameters are generally below the applicable criteria and respective 95% UCLs. Criteria and 95% UCL exceedances are summarized in Table 6.

Table 6 - Summary of Surface Water Station Criteria and 95% UCL Exceedances Fall 2019

Parameter	Location (Criteria and/or 95% UCL Exceedance)
General Chemistry and Metals	
Aluminum	• CB-SW (Tier I EQS (fresh water), CCME FWAL and Upstream Calculated 95% UCL) • NRC-1-SW (Tier I EQS (fresh water)) • SRC-1-SW (Tier I EQS (fresh water), CCME FWAL and Upstream Calculated 95% UCL) • COB-A-SW (Tier I EQS (fresh water)) • COB-4-SW (Tier I EQS (fresh water)) • COB-6-SW (Tier I EQS (fresh water))

Table 6 - Summary of Surface Water Station Criteria and 95% UCL Exceedances Fall 2019

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Aluminum	• WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water) and CCME FWAL)
Cadmium	• CB-SW (Tier I EQS (fresh water)) • NRC-1-SW (Tier I EQS (fresh water)) • SRC-1-SW (Tier I EQS (fresh water)) • COB-4-SW (Tier I EQS (fresh water)) • COB-6-SW (Tier I EQS (fresh water)) • WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water))
Chromium	• CB-SW (CCME FWAL) • SRC-1-SW (CCME FWAL)
Copper	• CB-SW (Tier I EQA (fresh water) and CCME FWAL) • SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) • Narrows (Tier I EQS (marine water))
Iron	• CB-SW (Tier I EQS (fresh water) and CCME FWAL) • SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) • Narrows (Battery Point/Narrows Calculated 95% UCL) • Battery Point (Battery Point/Narrows Calculated 95% UCL)
Lead	• CB-SW (Tier I EQS (fresh water), CCME FWAL and Upstream Calculated 95% UCL) • SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Strontium	• COB-A-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) • COB-B-SW (Upstream 95% UCL) • COB-6-SW (Upstream 95% UCL)
Sulphate	• CB-SW (Upstream 95% UCL) • SRC-1-SW (Upstream 95% UCL) • COB-A-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) • COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) • COB-4-SW (Upstream 95% UCL) • COB-6-SW (Upstream 95% UCL)
Zinc	• CB-SW (CCME FWAL) • SRC-1-SW (CCME FWAL)

Review of the surface water analytical data from the fall 2019 monitoring event indicates findings are generally consistent with past LTMM events, with the following exceptions:

- CB-SW: The chromium exceedance of the CCME FWAL at CB-SW is the first exceedance for this parameter since 2013. The copper and lead exceedances of the Tier I EQS and CCME FWAL in CB-SW are the first observed at this location since monitoring commenced. The iron concentration, which exceeded the Tier I EQS and the CCME FWAL, is the highest concentration for this parameter observed since 2011. The zinc exceedance of the CCME FWAL is the first exceedance for this parameter since 2015.

RECOMMENDATIONS

The next semi-annual surface water monitoring event will be conducted in the summer (e.g., July 2020). It is recommended that summer 2020 sampling program include the collection of surface water samples at ten stations (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW, Narrows and BP-1-SW) for PAH and RCApMS analysis.

DISCLAIMER

This report was prepared exclusively for the purposes, project and site location outlined in the report. The report is based on information provided to, or obtained by Dillon Consulting Limited ("Dillon") as indicated in the report, and applies solely to site conditions existing at the time of the site investigation. Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site. Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule and budget. It is therefore possible that currently unrecognized contamination or potentially hazardous materials may exist at the site, and that the levels of contamination or hazardous materials may vary across the site. Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

CLOSING

We trust this information is adequate for your needs. Please, however, contact the undersigned if you have any comments or questions regarding the content of this report.

Yours truly,

DILLON CONSULTING LIMITED

Nadine J. Wambolt, B.Tech., CET
Project Manager/Associate

NJW:kme

APPENDIX A
SITE PHOTOGRAPHS

PHOTO 1: View of CB-SW looking southeast.

PHOTO 2: View of NRC-1-SW looking north.

PHOTO 3: View of NRC-1-SW looking southeast.

PHOTO 4: View of SRC-1-SW looking southwest.

PHOTO 5: View of SRC-1-SW looking northeast.

PHOTO 6: View of COB-A-SW looking southwest.

PHOTO 7: View of nearby groundwater surface seepage northwest of COB-B-SW.

PHOTO 8: View of COB-B-SW looking northeast.

PHOTO 9: View from COB-4-SW looking southwest.

PHOTO 10: View from COB-4-SW looking northeast.

PHOTO 11: Downstream view of COB-6-SW looking west.

PHOTO 12: Upstream view from COB-6-SW looking northeast.

PHOTO 13: Downstream view of WB-1-SW looking northwest.

PHOTO 14: Upstream view of WB-1-SW looking southwest.

PHOTO 15: View of the NARROWS looking northwest.

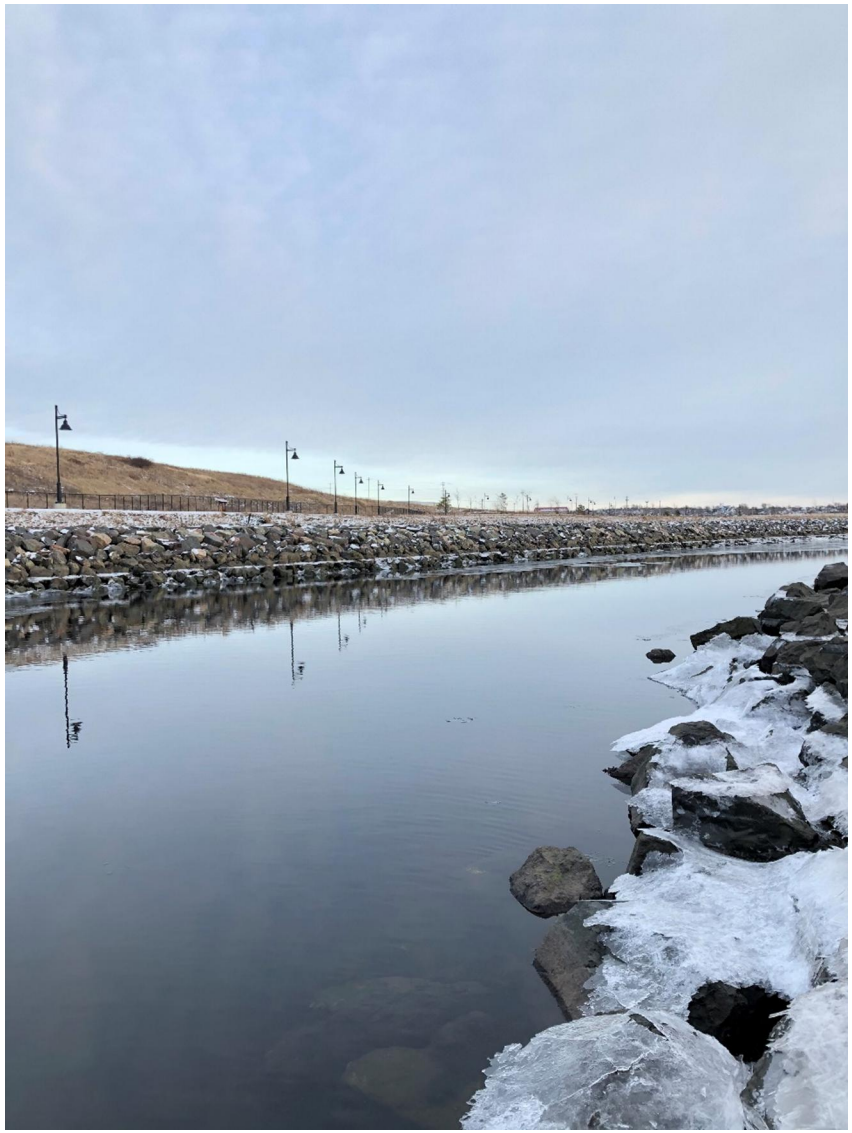

PHOTO 16: View of NARROWS looking southeast.

PHOTO 17: View from BP-1-SW looking northwest.

PHOTO 18: View of BP-1-SW looking east.

APPENDIX B
TABLES

TABLE B-1
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - PAHs

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Fresh Water [1]		5.8	4.6	0.012	0.018	0.015	0.48 [3]	0.17	0.48 [3]	0.48 [3]	1.4	0.26	0.04	3	0.21	2	2	1.1	-	0.4	0.025
CCME FWAL [2]		5.8	-	0.012	0.018	0.015	-	-	-	-	-	-	0.04	3	-	-	-	1.1	-	0.4	0.025
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-
CB-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.028	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.012
	07/27/15	0.066	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.039	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.016
	11/18/15	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	0.027	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.019
	07/22/16	0.11	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	0.051	<0.010	<0.050	<0.050	<0.20	<0.010	0.05	0.017
	12/8/16	0.056	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.028	<0.010	<0.050	<0.050	<0.20	<0.010	0.028	0.014
	8/3/17	0.071	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.062**	0.048	<0.010	<0.050	<0.050	<0.20	<0.010	0.037	**0.033**
	12/18/17	0.042	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.020	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	0.011
	07/25/18	DRY - NO SAMPLE																			
	11-23-18	0.026	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.050	<0.050	<0.20	<0.010	0.015	<0.010
	07/29/19	DRY - NO SAMPLE																			
	12/13/19	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	0.018	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.019
NRC-1-SW	07/23/13	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.025	0.015	<0.010	<0.20	<0.050	<0.05	<0.010	0.025	0.019
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	11/18/15	0.022	<0.010	**0.037**	**0.075**	**0.068**	0.068	0.039	0.038	0.032	0.091	0.017	**0.18**	0.021	0.041	<0.050	<0.050	<0.20	0.017	0.13	**0.14**
	07/22/16	0.028	<0.010	**0.021**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	<0.010
	12/8/16	0.059	<0.010	0.010	0.011	0.011	0.011	<0.010	<0.010	<0.010	0.016	<0.010	0.03	0.036	<0.010	<0.050	0.056	0.20	<0.010	0.066	**0.027**
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/25/18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.01
	11-23-18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/29/19	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.020 *	0.016	<0.010
	12/13/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
SRC-1-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14 [FD]	<0.010	<0.010	<0.010	<0.010	0.013	0.013	0.010	<0.010	<0.010	0.011	<0.010	0.021	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	0.018
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15 [FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.013	0.011
	8/3/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	<0.010	<0.010	<0.010	0.015	**0.016**	0.018	0.012	<0.010	<0.010	0.024	<0.010	0.040	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.021	**0.035**
	7/25/2018 [FD]	<0.010	<0.010	<0.010	0.018	0.013	0.023	0.017	0.014	0.012	0.028	<0.010	**0.052**	<0.010	0.013	<0.050	<0.050	<0.20	<0.010	0.032	**0.048**
	07/25/18	<0.010	<0.010	<0.010	**0.024**	**0.034**	0.036	0.028	0.019	0.022	0.034	<0.010	**0.073**	<0.010	0.018	<0.050	<0.050	<0.20	<0.010	0.047	**0.06**
	11-23-18	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	0.011
	07/29/19	INSUFFICIENT WATER PRESENT - NO SAMPLE																			
	12/13/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.014

TABLE B-1
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - PAHs

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Fresh Water [1]		5.8	4.6	0.012	0.018	0.015	0.48 [3]	0.17	0.48 [3]	0.48 [3]	1.4	0.26	0.04	3	0.21	2	2	1.1	-	0.4	0.025
CCME FWAL [2]		5.8	-	0.012	0.018	0.015	-	-	-	-	-	-	0.04	3	-	-	-	1.1	-	0.4	0.025
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-
COB-A-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.01
	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	DRY - NO SAMPLE																			
	12/8/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	DRY - NO SAMPLE																			
	07/25/18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11-23-18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/29/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.020 *	<0.010	<0.010
	12/13/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-B-SW	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	DRY - NO SAMPLE																			
	12/8/16	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/25/18	DRY - NO SAMPLE																			
	11-23-18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/29/19	DRY - NO SAMPLE																			
	12/13/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-4-SW	12/22/14	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.010	0.012
	11/18/15	0.14	0.027	**0.12**	**0.43**	**0.39**	0.33	**0.24**	0.20	0.19	0.48	0.073	**0.88**	0.078	**0.22**	<0.050	<0.050	<0.20	0.10	**0.48**	**0.74**
	07/22/16	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16 [FD]	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	0.059	<0.010	**0.013**	**0.021**	**0.028**	0.026	0.018	0.017	0.014	0.031	<0.010	**0.043**	0.036	0.013	<0.050	<0.050	<0.20	<0.010	0.065	**0.04**
	8/3/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	8/3/17 [FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/25/18	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11-23-18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	<0.010
	07/29/19	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.050	<0.050	<0.20	<0.020 *	0.013	<0.010
	12/13/19	0.031	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010

TABLE B-1
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - PAHs

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Fresh Water [1]		5.8	4.6	0.012	0.018	0.015	0.48 [3]	0.17	0.48 [3]	0.48 [3]	1.4	0.26	0.04	3	0.21	2	2	1.1	-	0.4	0.025
CCME FWAL [2]		5.8	-	0.012	0.018	0.015	-	-	-	-	-	-	0.04	3	-	-	-	1.1	-	0.4	0.025
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-
COB-6-SW	07/23/13	0.073	0.025	**0.015**	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.034	0.034	<0.010	<0.20	<0.050	<0.05	<0.010	0.048	**0.026**
	12/22/14	0.089	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	0.026	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.013
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	0.016	<0.010	<0.010	0.015	0.015	0.016	0.019	<0.010	<0.010	0.018	<0.010	0.030	<0.010	0.016	<0.050	<0.050	<0.20	<0.010	0.014	**0.030**
	07/22/16	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	0.11	0.012	0.01	0.018	**0.027**	0.025	0.019	0.016	0.013	0.029	<0.010	**0.043**	0.052	0.013	0.083	<0.050	0.38	0.011	0.049	0.038
	8/3/17	0.052	0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.036	0.024	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	0.017
	12/18/17	0.13	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.048	<0.010	0.14	0.057	0.54	<0.010	0.030	0.012
	07/25/18	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11-23-18	0.15	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.076	<0.010	0.13	0.062	0.49	<0.010	0.043	0.01
	07/29/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.020 *	<0.010	<0.010
	12/13/19	0.19	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.091	<0.010	0.18	0.083	0.75	<0.010	0.049	0.015
WB-1-SW	07/23/13	0.11	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.018	0.054	<0.010	<0.20	<0.050	<0.05	<0.010	0.066	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15[FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	0.019	<0.010	<0.010	<0.010	**0.025**	0.029	0.012	0.013	0.017	0.15	<0.010	**0.16**	0.011	0.011	<0.050	<0.050	<0.20	<0.010	0.07	**0.092**
	12/8/16[FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	8/3/17	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	**0.044**	0.016	<0.010	<0.050	<0.050	<0.20	<0.010	0.035	**0.027**
	12-18-17[FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/25/18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.023	<0.010
	11-23-18	0.25	0.12	**0.84**	**1.6**	**1.3**	**1.1**	**0.69**	**0.61**	**0.67**	**1.7**	0.20	**3.3**	0.33	**0.64**	0.059	0.063	<0.20	0.31	**2.3**	**2.5**
	11-23-18 FD	0.22	0.11	**0.97**	**1.6**	**1.1**	**0.99**	**0.60**	**0.56**	**0.59**	**1.7**	0.17	**3.1**	0.30	**0.58**	<0.050	0.057	<0.20	0.27	**2.1**	**2.5**
	07/29/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.020 *	<0.010	<0.010
	07-29-19 [FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	<0.010
	12/13/19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12-13-19[FD]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010

TABLE B-1
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - PAHs

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Marine Water [1]		6	6	-	-	0.01	-	-	-	-	0.1	-	11	12	-	1	2	1.4	-	4.6	0.02
CCME MAL [2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	0.02	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.012	0.025	<0.010	<0.20	<0.050	<0.05	<0.03	0.034	0.01
	12/22/14	0.069	0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.041	0.083	<0.010	0.094	<0.050	<0.20	<0.010	0.065	0.036
	07/27/15	0.014	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.015	<0.010
	11/18/15	0.052	0.067	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.058	<0.010	0.057	<0.050	<0.20	<0.010	0.042	0.022
	07/22/16	0.014	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	<0.010
	12/8/16	0.059	0.055	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.046	<0.010	0.072	<0.050	<0.20	<0.010	0.03	0.016
	8/3/17	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	0.071	0.071	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.058	<0.010	0.091	<0.050	0.33	<0.010	0.044	0.018
	07/25/18	0.028	0.033	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.036	<0.010	<0.050	<0.050	<0.20	<0.010	0.028	<0.010
	11-23-18	0.071	0.067	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	0.063	<0.010	0.064	<0.050	0.20	<0.010	0.048	0.031
	07/29/19	0.017	<0.020 **	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.016	<0.010	<0.050	<0.050	<0.20	<0.020 *	0.016	<0.010
	12/13/19	0.088	0.080	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.077	<0.010	0.11	<0.050	0.53	<0.010	0.050	0.025
NARROWS	12/22/14	0.10	0.11	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.089	<0.010	0.013	<0.050	0.22	<0.51	0.065	0.030
	07/27/15	0.035	0.037	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	0.033	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.014
	11/18/15	0.074	0.099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.023	0.071	<0.010	0.068	<0.050	<0.20	<0.010	0.041	0.019
	07/22/16	0.024	0.02	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.021	<0.010	<0.050	<0.050	<0.20	<0.010	0.016	<0.010
	12/8/16	0.078	0.058	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.049	<0.010	0.069	<0.050	0.21	<0.010	0.031	0.016
	8/3/17	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	0.10	0.099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	0.080	<0.010	0.12	<0.050	0.30	<0.010	0.048	0.018
	07/25/18	0.11	0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.03	0.098	<0.010	0.085	<0.050	0.41	<0.010	0.067	0.013
	11-23-18	0.077	0.069	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.062	<0.010	0.065	<0.050	0.22	<0.010	0.052	0.035
	07/29/19	0.031	0.023	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	0.035	0.028	<0.010	<0.050	<0.050	<0.20	<0.020 *	0.029	0.029
	12/13/19	0.090	0.075	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.074	<0.010	0.097	0.050	0.36	<0.010	0.047	0.019

NOTES:

FD - Field Duplicate

NM - Not Measured or not analyzed

mg/L - milligrams per liter

UCL - Upper Concentration Limit

* Elevated RDL(s) due to detected levels in the method blank

**Elevated PAH RDL(s) due to Matrix/co-extractive interference

- No applicable guideline criteria

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013

2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014

3 - Guideline values for benzo(b)fluoranthene, benzo(j)fluoranthene and benzo(k)fluoranthene are to be compared to the sum of the parameters

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
Underline	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
Double Underline	Concentration exceeds Upstream Calculated 95% Upper Concentration Limit
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Na	K	Ca	Mg	ALK	SO4	Cl	SiO2	OPO4	P	NO3	NO2	NO2-NO3	NH3	Colour	TOC	TURBIDITY	CONDUCTIVITY	pH	HARDNESS	BICARB ALKALINITY	CARB ALKALINITY	TDS	Anion Sum	Ion Balance	Langelier Index (@20C)	Langelier Index (@4C)	Sat. pH (@20C)	Sat. pH (@4C)
Units		µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	TCU	mg/L	NTU	µS/cm	pH	mg/L	mg/L	mg/L	mg/L	me/L	%	unitless	unitless	unitless	unitless
NSE Tier 1 EQS Fresh Water [1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCME FWAL [2]		-	-	-	-	-	-	120	-	-	-	13	0.06	-	1 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-	-
Upstream Calculated 95% UCL		-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-SW	07/23/13	41100	1710	52000	5620	140	6.5	67	8.7	<0.010	<100	<0.05	<0.010	<0.05	<0.05	24	4.4	0.5	500	7.63	150	140	<1.0	270	4.81	0.93	0.08	-0.17	7.55	7.8
	12/22/14	20000	1400	27000	3700	62	26	30	7.3	0.046	110	0.18	<0.010	0.18	0.081	29	4.4	1.1	270	7.74	82	61	<1.0	150	2.65	1.53	-0.418	-0.669	8.16	8.41
	07/27/15	38000	1800	33000	4300	96	16	55	10.0	0.12	210	<0.050	<0.010	<0.050	0.087	9	2.0	1.1	380	7.95	99	95	<1.0	220	3.81	1.60	0.0480	-0.201	7.90	8.15
	11/18/15	27000	1700	28000	3800	72	24	43	7.6	0.048	110	0.12	<0.010	0.12	<0.050	20	5.3	2.1	320	7.81	84	72	<1.0	180	3.17	4.11	-0.271	-0.521	8.08	8.33
	07/22/16	27000	1400	27000	3500	75	10	40	8.6	0.096	140	0.11	0.012	0.12	0.052	65	9.8	1.6	270	7.88	82	75	<1.0	160	2.86	0	-0.188	-0.439	8.07	8.32
	12/8/16	22000	1400	26000	3400	65	23	48	7.1	0.033	<100	0.19	<0.010	0.19	<0.050	30	4.9	1.9	280	7.46	78	65	<1.0	170	3.12	9.86	-0.694	-0.944	8.15	8.4
	8/3/17	33000	2200	30000	3900	97	12	56	10	0.15	330	<0.010	0.06	0.06	0.071	<5.0	1.9	0.88	370	7.99	92	96	<1.0	210	3.76	5.92	0.065	-0.185	7.93	8.18
	12/18/17	22000	1300	26000	3500	66	24	38	7.3	0.038	<100	0.13	<0.01	0.13	<0.050	26	5.7	2.1	280	7.79	80	65	<1.0	160	2.89	5.47	-0.345	-0.595	8.14	8.39
	07-25-18	DRY - NO SAMPLE																												
	11-23-18	68000	1300	29000	3500	58	32	130	6.5	<0.010	<100	0.19	<0.010	0.19	0.059	36	5.8	1.2	550	7.70	88	58	<1.0	300	5.38	6.11	-0.494	-0.743	8.19	8.44
	07/29/19	DRY - NO SAMPLE																												
	12/13/19	24000	1400	31000	3900	66	35	42	7.3	0.011	<100	0.21	<0.010	0.21	0.053	27	4.6	10	310	7.93	94	66	<1.0	190	3.24	3.68	-0.139	-0.389	8.07	8.32
NRC-1-SW	07/23/13	27800	1560	16600	1370	46	19	27	9.6	0.022	<100	0.092	0.011	0.1	0.098	19	3.9	1.3	220	8.31	47	45	<1.0	131	2.09	2.56	-0.172	-0.423	8.48	8.73
	07/23/13[L]	NM	NM	NM	NM	NM	19	27	9.5	0.028	NM	NM	0.011	0.1	NM	16	NM	NM	220	8.22	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	12/22/14	13000	640	12000	1500	17	20	20	5.1	<0.010	<100	0.21	<0.010	0.21	<0.050	10	2.2	0.51	140	7.28	36	17	<1.0	84	1.34	0.37	-1.75	-2.01	9.03	9.28
	07/27/15	20000	480	19000	2100	44	22	29	6.0	<0.010	<100	0.077	<0.010	0.077	0.077	42	5.8	2.4	220	7.47	56	44	<1.0	130	2.16	2.61	-0.963	-1.21	8.43	8.68
	11/18/15	14000	1000	12000	1800	25	15	25	5.7	<0.010	130	0.10	<0.010	0.10	<0.050	15	4.2	21	160	7.37	38	25	<1.0	95	1.51	0.980	-1.49	-1.74	8.86	9.11
	07/22/16	20000	690	18000	2200	49	15	25	5.8	0.012	<100	0.13	<0.010	0.13	<0.050	42	8.1	1.6	200	7.96	55	48	<1.0	120	2	0.25	-0.447	-0.698	8.41	8.66
	12/8/16	15000	680	12000	1600	21	16	26	5.3	<0.010	<100	0.19	<0.010	0.19	0.1	11	2.2	2.3	160	7.21	36	21	<1.0	90	1.49	3.47	-1.74	-1.99	8.95	9.2
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	15000	730	12000	1700	21	21	25	5.7	<0.010	<100	0.21	<0.010	0.21	<0.050	6.7	3.3	0.71	170	7.22	36	21	<1.0	94	1.57	6.44	-1.74	-1.99	8.95	9.2
	07-25-18	25000	770	20000	2400	48	12	39	5.5	<0.010	<100	0.12	<0.010	0.12	<0.050	24	6.4	1.7	260	7.73	59	48	<1.0	140	2.32	0.22	-0.657	-0.907	8.38	8.63
	11-23-18	49000	710	12000	1700	21	17	87	5.0	<0.010	<100	0.14	<0.010	0.14	<0.050	12	2.7	0.89	350	6.98	38	21	<1.0	190	3.24	5.37	-1.99	-2.24	8.97	9.22
	07/29/19	24000	630	19000	2400	52	15	34	6.6	<0.010	<100	<0.010	0.077	0.077	<0.050	49	6.2	2.7	220	7.86	57	52	<1.0	130	2.32	1.98	-0.508	-0.759	8.37	8.62
	12/13/19	17000	680	13000	1700	26	18	29	5.5	<0.010	<100	0.17	<0.010	0.17	<0.050	11	2.4	0.87	160	7.11	38	26	<1.0	100	1.71	5.88	-1.71	-1.96	8.82	9.07
SRC-1-SW	07/23/13	39700	2290	51700	7230	110	40	59	6.7	<0.010	<100	<0.05	<0.010	<0.05	<0.05	14	4.9	0.46	500	8.37	160	110	2.4	272	4.67	3.11	0.7	0.451	7.67	7.92
	12/22/14[FD]	34000	2700	46000	4800	87	53	56	8.3	<0.010	<100	0.24	0.025	0.26	0.20	16	4.6	5.0	450	7.92	130	86	<1.0	260	4.44	2.42	0.108	-0.141	7.81	8.06
	12/22/14	34000	2600	46000	4800	86	54	56	7.6	<0.010	<100	0.23	0.023	0.25	0.21	16	4.8	5.4	440	7.80	140	85	<1.0	260	4.43	1.84	-0.01	-0.259	7.81	8.06
	07/27/15[FD]	40000	1900	42000	4700	95	46	55	6.6	<0.010	<100	0.092	<0.010	0.092	0.084	17	5.0	1.5	430	7.79	120	94	<1.0	250	4.41	1.73	-0.024	-0.273	7.81	8.06
	07/27/15	38000	1800	41000	4300	95	47	57	6.7	<0.010	<100	0.092	<0.010	0.092	0.079	16	5.0	1.6	430	7.66	120	95	<1.0	250	4.49	4.54	-0.157	-0.407	7.82	8.07
	11/18/15	32000	2700	41000	4600	94	43	51	5.7	<0.010	<100	0.076	<0.010	0.076	<0.050	13	5.0	4.4	430	7.87	120	93	<1.0	240	4.22	3.94	0.0500	-0.200	7.82	8.07
	07/22/16	33000	2900	48000	5600	100	51	46	8.9	0.013	<100	0.08	<0.010	0.08	<0.050	22	7.3	1.8	420	7.99	140	100	<1.0	260	4.39	0	0.266	0.016	7.73	7.98
	12/8/16	51000	2300	42000	4500	86	42	110	7.8	0.012	<100	0.15	0.012	0.16	0.17	19	4.3	7.3	520	7.58	120	86	<1.0	310	5.58	7.72	-0.29	-0.539	7.87	8.12
	8/3/17	50000	2800	51000	5400	120	54	85	10	<0.010	<100	0.014	<0.050	0.055	0.073	14	5.7	1.2	580	8.15	150	110	1.5	330	5.83	5.42	0.492	0.243	7.66	7.91
	12/04/08	24000	5200	110000	22000	86	290	25	13	<0.3	<100	0.17	<0.06	0.17	0.2	72	2.6	17	740	7.7	380	85	<1	545	8.39	2.1	0.214	-0.034	7.49	7.73
	07-25-18[FD]	45000	2700	50000	6000	120	43	63	1.8	<0.010	140	0.066	<0.010	0.066	<0.050	19	8.5	250	530	8	150	120	1.1	290	5.06	1.65	0.348	0.099	7.65	7.9
	07-25-18	48000	2700	48000	2600	110	43	69	2.0	<0.010	180	0.085	<0.010	0.085	<0.050	18	11	140	540	8.14	140	110	1.4	290	5.09	0.1	0.447	0.197	7.69	7.94
	11-23-18	50000	2200	40000	4400	91	46	90	7.7	<0.010	<100	0.19	0.011	0.20	0.41	22	5.3	6.8	530	7.71	120	91	<1.0	300	5.32	6.61	-0.152	-0.401	7.86	8.11
	07/29/19	INSUFFICIENT WATER PRESENT - NO SAMPLE																												
	12/13/19	48000	2300	42000	4400	89	47	74	7.6	<0.010	<100	0.19	0.012	0.21	0.24	23	4.9	18	500	7.72	120	88	<1.0	280	4.87	2.10	-0.117	-0.366	7.84	8.09
COB-A-SW	07/23/13	94700	27000	336000	34900	150	740	150	22	<0.010	<100	3.5	<0.010	3.5	<0.05	5.3	4.8	0.1	2000	7.90	980	150	1.1	1510	22.8	3.51	1	0.756	6.9	7.14
	12/22/14	23000	3300	88000	13000	97	160	37	13	<0.010	<100	0.4	<0.010	0.4	<0.050	5.4	2	0.41	640	7.68	270	96	<1.0	400	6.32	1.94	0.165	-0.084	7.52	7.76
	07/27/15	DRY - NO SAMPLE																												
	11/18/15	24000	3700	88000	13000	120	170	33	12	0.013	<100	0.25	<0.010	0.25	<0.050	<5.0	2.6	0.25	640	7.95	270	120	<1.0	420	6.88	2.38	0.505	0.257	7.44	7.69
	07/22/16	DRY - NO SAMPLE																												
	12/8/16	22000	4000	81000	11000	110	150	47	13	0.015	<100	0.49	0.012	0.51	0.59	6.3	2.8	0.35	640	7.75	250	100	<1.0	400	6.65	4.64	0.235	-0.014	7.52	7.77
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	DRY - NO SAMPLE																												
	07-25-18	27000	1600	80	9300	140	100	37	16	<0.010	0.16	<0.05	<0.010	<0.05	<0.050	8.2	3.3	2.4	600	8.05	240	140	1.5	370	5.99	2.44	0.658	0.409	7.39	7.64
	11-23-18	21000	2300	70000	10,000	110	110	32	13	<0.010	<100	0.24	<0.010	0.24	0.050	6.2	2.3	14	540	7.78	220	110	<1.0	330	5.42	0.840	0.216	-0.033	7.56	7.81
	07/29/19	29000	1700	75000	9,000	140	100	40	15	<0.010	<100	<0.010	<0.050	<0.050	<0.050	9.2	2.6	0.84	550	8.02	220	140	1.4	360	6.09	2.78	0.611	0.363	7.41	7.66
	12/13/19	21000	2100	71000	9700	110	120	33	13	<0.010	<100	0.21	0.011	0.22	<0.050	5.1	2.5	0.21	510	7.95	220	110	<1.0	330	5.58	2.48	0.405	0.156	7.54	7.79

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Al	Sb	As	Ba	Be	Bi	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Tl	Sn	Ti	U	V	Zn
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	NSE Tier 1 EQS Fresh Water [1]	5	20	5.0	1000	5.3	-	1200	0.01	-	10	2	300	1	820	0.026	73	25	1.0	0.1	21000	0.8	-	-	300	6	30
	CCME FWAL [2]	100 [5]	-	5	-	-	-	1500	0.09	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	7
	Upstream Calculated 95% UCL	220	-	1.6	-	-	-	-	0.1	8.3	-	-	3318	1.2	583	-	-	-	1.9	-	132	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	1.98	-	-	-	-	-	-	1.3	-	1900	-	800	-	-	-	-	-	210	-	-	-	-	-	-
CB-SW	07/23/13	**28.5**	<1.0	1.4	61.9	<1.0	<2.0	<50	**0.016**	1.3	<0.40	2.0	**454**	<0.50	**3690**	NM	<2.0	<2.0	<1.0	<0.10	**196**	<0.10	<2.0	<2.0	0.37	<2.0	<5
	12/22/14	**110**	<1.0	<1.0	27	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	<2.0	290	<0.50	190	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	3.5	0.17	<2.0	6.0
	07/27/15	**28**	<1.0	<1.0	52	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	260	<0.50	61	<0.013	<2.0	<2.0	<1.0	<0.10	320	<0.10	<2.0	<2.0	<0.10	<2.0	9.0
	11/18/15	**130**	<1.0	<1.0	29	<1.0	<2.0	<50	**0.011**	<1.0	<0.40	<2.0	280	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	4.3	0.12	<2.0	6.1
	07/22/16	**55**	<1.0	1.4	30	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	**640**	<0.50	71	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	5.6	<0.10	<2.0	<5.0
	12/8/16	**84**	<1.0	<1.0	25	<1.0	<2.0	<50	**0.017**	<1.0	<0.40	<2.0	**330**	<0.50	310	<0.013	<2.0	<2.0	<1.0	<0.10	110	<0.10	<2.0	<2.0	0.14	<2.0	<5.0
	8/3/17	**150**	<1.0	1.4	87	<1.0	<2.0	<50	<0.010	1.0	<0.40	<2.0	**750**	0.61	380	<0.013	<2.0	<2.0	<1.0	<0.10	340	<0.10	<2.0	2.9	<0.10	2.6	<5.0
	12/18/17	**91**	<1.0	<1.0	28	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**300**	<0.50	200	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	2.4	0.11	<2.0	<5.0
	07-25-18	DRY - NO SAMPLE																									
	11-23-18	**91**	<1.0	<1.0	16	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	210	<0.50	210	<0.013	<2.0	<2.0	<1.0	<0.10	77	<0.10	<2.0	2.4	0.19	<2.0	5.5
	07/29/19	DRY - NO SAMPLE																									
	12/13/19	**430**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.026**	1.3	0.52	**2.6**	**830**	**2.0**	270	<0.013	<2.0	<2.0	<0.50	<0.10	78	<0.10	<2.0	11	0.22	2.5	12
NRC-1-SW	07/23/13	**131**	<1.0	1.4	11.8	<1.0	<2.0	<50	**0.021**	<1.0	<0.40	**3.1**	148	**1.53**	69.1	NM	<2.0	<2.0	<1.0	<0.10	64.7	<0.10	<2.0	2.4	0.21	2.2	5.3
	07/23/13[L]	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	12/22/14	**58**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.022**	<1.0	<0.40	<2.0	150	<0.50	85	<0.013	<2.0	<2.0	<1.0	<0.10	32	<0.10	<2.0	<2.0	<0.10	<2.0	9.1
	07/27/15	**45**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.019**	<1.0	<0.40	<2.0	**1300**	<0.50	75	<0.013	<2.0	<2.0	<1.0	<0.10	54	<0.10	<2.0	<2.0	<0.10	<2.0	11
	11/18/15	**1500**	<1.0	3.5	29	<1.0	<2.0	<50	**0.14**	1.9	1.5	**5**	**3800**	**9.5**	**1100**	<0.013	<2.0	3.3	<1.0	<0.10	36	<0.10	<2.0	34	0.14	3	27
	07/22/16	**31**	<1.0	<1.0	10	<1.0	<2.0	<50	**0.016**	<1.0	<0.40	<2.0	**970**	0.61	47	<0.013	<2.0	<2.0	<1.0	<0.10	52	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/8/16	**110**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.025**	<1.0	<0.40	<2.0	**360**	0.8	200	<0.013	<2.0	<2.0	<1.0	<0.10	34	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	**34**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.016**	<1.0	<0.40	<2.0	140	<0.50	87	<0.013	<2.0	<2.0	<1.0	<0.10	31	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-25-18	**270**	<1.0	<1.0	14	<1.0	<2.0	<50	**0.012**	<1.0	<0.40	**2.5**	**460**	0.99	62	<0.013	<2.0	<2.0	<1.0	<0.10	60	<0.10	<2.0	7.0	0.10	<2.0	<5.0
	11-23-18	**36**	<1.0	<1.0	13	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	130	<0.50	61	<0.013	<2.0	<2.0	<1.0	<0.10	35	<0.10	<2.0	<2.0	<0.1	<2.0	6.7
	07/29/19	**46**	<1.0	<1.0	9.7	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	0.77	**1400**	<0.50	130	<0.013	<2.0	<2.0	<1.0	<0.10	55	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/13/19	**92**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.020**	<1.0	<0.40	0.82	270	<0.50	150	<0.013	<2.0	<2.0	<0.50	<0.10	34	<0.10	<2.0	2.1	<0.10	<2.0	5.1
SRC-1-SW	07/23/13	**29**	<1.0	1.2	10.2	<1.0	<2.0	57	<0.01	<1.0	<0.40	<2.0	69	<0.50	41.4	NM	<2.0	<2.0	<1.0	<0.10	**174**	<0.10	<2.0	<2.0	0.38	<2.0	<5
	12/22/14[FD]	**350**	<1.0	<1.0	17	<1.0	<2.0	110	**0.042**	<1.0	<0.40	**2.8**	**350**	**1.2**	200	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	6.8	0.40	<2.0	7.0
	12/22/14	**290**	<1.0	<1.0	17	<1.0	<2.0	110	**0.035**	<1.0	<0.40	**2.6**	**340**	**1.2**	190	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	6.6	0.40	<2.0	6.9
	07/27/15[FD]	**51**	<1.0	1.0	17	<1.0	<2.0	64	**0.015**	1.5	<0.40	<2.0	190	<0.50	260	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	<2.0	0.32	<2.0	8.4
	07/27/15	**51**	<1.0	1.0	16	<1.0	<2.0	63	**0.013**	<1.0	<0.40	**24**	210	**1.1**	260	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	2.4	0.29	<2.0	9.5
	11/18/15	**240**	<1.0	<1.0	16	<1.0	<2.0	57	**0.023**	1.2	<0.40	**2.2**	**310**	0.75	230	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	5.3	0.33	<2.0	<5.0
	07/22/16	**50**	<1.0	**1.9**	11	<1.0	<2.0	91	**0.018**	<1.0	<0.40	<2.0	**350**	<0.50	350	<0.013	<2.0	<2.0	<1.0	<0.10	**170**	<0.10	<2.0	2.1	0.38	<2.0	<5.0
	12/8/16	**300**	<1.0	<1.0	18	<1.0	<2.0	54	**0.039**	1.0	<0.40	**2.7**	**400**	**1.6**	200	<0.013	<2.0	<2.0	<1.0	<0.10	**140**	<0.10	<2.0	13	0.35	<2.0	5.7
	8/3/17	**24**	<1.0	**1.8**	19	<1.0	<2.0	130	<0.010	<1.0	<0.40	<2.0	150	<0.50	91	<0.013	<2.0	<2.0	<1.0	<0.10	**190**	<0.10	<2.0	<2.0	0.4	<2.0	<5.0
	12/04/08	17	<0.4	<0.6	25	<0.5	<2	<100	0.017	2.8	2.1	<2	**1400**	<1	1500	<0.013	<4	<3	<1	<0.1	350	<0.8	<20	<3	0.31	<2	6.2
	07-25-18[FD]	**1600**	<1.0	3.5	45	<1.0	<2.0	120	**0.18**	2.5	1.2	**5.3**	**3400**	**9.5**	**2600**	**0.04**	<2.0	2.1	<1.0	<0.10	**180**	<0.10	<2.0	34	0.54	4.9	**30**
	07-25-18	**2500**	1.1	4.9	58	<1.0	<2.0	120	**0.26**	4.0	1.9	**7.9**	**5500**	**12**	**2600**	**0.04**	<2.0	3.4	<1.0	<0.10	**170**	<0.10	<2.0	50	0.56	**7.4**	**47**
	11-23-18	**320**	<1.0	<1.0	16	<1.0	<2.0	74	**0.027**	<1.0	<0.40	**2.7**	**420**	**1.3**	160	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	9.3	0.32	<2.0	6.2
	07/29/19	INSUFFICIENT WATER PRESENT - NO SAMPLE																									
	12/13/19	**460**	<1.0	1.2	19	<1.0	<2.0	74	**0.034**	1.4	<0.40	**2.8**	**770**	**1.6**	150	<0.013	<2.0	<2.0	<0.5	<0.10	130	<0.10	<2.0	13	0.39	<2.0	7.3
COB-A-SW	07/23/13	**17.2**	<1.0	<1.0	56.2	<1.0	<2.0	415	**0.015**	<1.0	<0.40	<2.0	56	<0.50	27.9	NM	<2.0	<2.0	<1.0	<0.10	671	<0.10	<2.0	<2.0	2.14	<2.0	<5
	12/22/14	**16**	<1.0	<1.0	14	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	51	<0.50	25	<0.013	<2.0	<2.0	<1.0	<0.10	260	<0.10	<2.0	<2.0	0.38	<2.0	<5.0
	07/27/15	DRY - NO SAMPLE																									
	11/18/15	**5.1**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	82	<0.50	74	<0.013	<2.0	<2.0	<1.0	<0.10	260	<0.10	<2.0	<2.0	0.42	<2.0	<5.0
	07/22/16	DRY - NO SAMPLE																									
	12/8/16	**8.5**	<1.0	<1.0	12	<1.0	<2.0	85	<0.010	<1.0	<0.40	<2.0	68	<0.50	92	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	<2.0	0.32	<2.0	<5.0
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	DRY - NO SAMPLE																									
	07-25-18	**300**	<1.0	2.6	73	<1.0	<2.0	58	**0.058**	<1.0	1.6	**2.2**	**9100**	**1.4**	**2900**	<0.013	<2.0	3	<1.0	<0.10	270	<0.10	<2.0	4.6	0.5	<2.0	14
	11-23-18	**46**	<1.0	<1.0	16	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	**810**	<0.50	300	<0.013	<2.0	<2.0	<1.0	<0.10	210	<0.10	<2.0	2	0.31	<2.0	<5.0
	07/29/19	**10**	<1.0	<1.0	18	<1.0	<2.0	53	<0.010	<1.0	<0.40	<0.50	240	<0.50	290	<0.013	<2.0	<2.0	<1.0	<0.10	240	<0.10	<2.0	<2.0	0.49	<2.0	<5.0
	12/13/19	**7.5**	<1.0	<1.0	13	<1.0	<2.0	57	<0.010	<1.0	<0.40	<0.50	<50	<0.50	35	<0.013	<2.0	<2.0	<0.5	<0.10	220	<0.10	<2.0	<2.0	0.31	<2.0	<5.0

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Na	K	Ca	Mg	ALK	SO4	Cl	SiO2	OPO4	P	NO3	NO2	NO2-NO3	NH3	Colour	TOC	TURBIDITY	CONDUCTIVITY	pH	HARDNESS	BICARB ALKALINITY	CARB ALKALINITY	TDS	Anion Sum	Ion Balance	Langelier Index (@20C)	Langelier Index (@4C)	Sat_ pH (@20C)	Sat_ pH (@4C)
	Units	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	TCU	mg/L	NTU	µS/cm	pH	mg/L	mg/L	mg/L	mg/L	me/L	%	unitless	unitless	unitless	unitless
	NSE Tier 1 EQS Fresh Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME FWAL [2]	-	-	-	-	-	-	120	-	-	-	13	0.06	-	1 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-	-
	Upstream Calculated 95% UCL	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COB-B-SW	07/27/15	DRY - NO SAMPLE																												
	11/18/15	25000	3800	89000	13000	110	190	35	11	0.013	<100	0.35	<0.010	0.35	<0.050	<5.0	2.4	<0.10	670	7.86	280	110	<1.0	430	7.13	3.03	0.393	0.144	7.46	7.71
	07/22/16	DRY - NO SAMPLE																												
	12/8/16	68000	20000	200000	21000	170	440	140	17	0.017	<100	0.56	0.017	0.58	8.1	9.7	6.2	0.4	1600	7.4	590	170	<1.0	1000	16.7	2.77	0.378	0.132	7.02	7.27
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	21000	2400	63000	9800	96	120	34	12	<0.010	<100	0.31	<0.010	0.31	0.06	<5.0	3.4	0.77	510	7.47	200	96	<1.0	320	5.37	4.07	-0.179	-0.428	7.65	7.89
	07-25-18	DRY - NO SAMPLE																												
	11-23-18	21000	2200	65000	9200	95	110	32	11	<0.010	<100	0.30	<0.010	0.30	0.065	6.2	2.2	1.1	520	7.41	200	94	<1.0	310	5.10	1.29	-0.229	-0.478	7.64	7.88
	07/29/19	DRY - NO SAMPLE																												
	12/13/19	21000	2100	69000	9000	98	120	34	11	<0.010	<100	0.29	<0.010	0.29	<0.050	<5.0	2.2	0.32	530	7.56	210	98	<1.0	330	5.44	2.74	-0.04	-0.289	7.60	7.85
COB-4-SW	12/22/14	20000	1600	34000	3600	53	47	31	7.4	<0.010	<100	0.26	<0.010	0.26	0.057	12	3	1.5	300	7.70	99	52	<1.0	180	2.92	0.17	-0.431	-0.681	8.13	8.38
	07/27/15	37000	2900	60000	6300	94	100	58	8.5	<0.010	<100	0.31	0.013	0.33	<0.050	11	4.1	1.8	530	7.72	180	93	<1.0	330	5.65	4.15	0.036	-0.213	7.68	7.93
	11/18/15	21000	2800	33000	4600	58	41	33	7.5	0.012	390	0.18	<0.010	0.18	<0.050	14	9.3	140	310	7.56	100	58	<1.0	190	2.96	8.50	-0.540	-0.790	8.10	8.35
	07/22/16	34000	2400	55000	5300	98	74	54	9.2	0.015	<100	0.15	<0.010	0.15	<0.050	19	5.2	1.3	460	7.91	160	98	<1.0	300	5.06	3.27	0.223	-0.026	7.69	7.94
	07/22/16 [FD]	36000	2500	55000	5700	99	72	49	9.1	0.016	<100	0.15	<0.010	0.15	<0.050	18	4.8	1.2	460	7.85	160	99	<1.0	290	4.89	0.31	0.169	-0.081	7.68	7.93
	12/8/16	19000	1300	28000	2900	49	39	34	7.4	0.012	<100	0.27	<0.010	0.27	0.083	8.8	2.6	2.7	270	7.76	81	49	<1.0	160	2.79	5.08	-0.477	-0.727	8.24	8.49
	8/3/17	44000	3300	78000	7600	130	110	72	11	<0.010	<100	<0.010	0.12	0.12	0.061	<5.0	2.6	0.46	690	7.98	230	130	1.2	410	6.98	3.41	0.543	0.295	7.44	7.68
	8/3/17 [FD]	46000	3500	81000	7700	140	110	71	11	<0.010	<100	<0.010	0.1	0.1	0.11	<5.0	2.5	0.34	700	8.15	230	130	1.8	410	6.98	1.45	0.73	0.482	7.42	7.67
	12/18/17	20000	1200	28000	3000	45	42	32	7.8	<0.010	<100	0.22	<0.010	0.22	0.07	7.8	2.7	1.30	280	7.72	81	45	<1.0	160	2.71	3.24	-0.560	-0.810	8.28	8.53
	07-25-18	64000	2500	60000	5200	76	100	110	7.9	<0.010	<100	<0.05	<0.010	<0.05	<0.050	12	4.0	0.42	720	8.84	170	71	4.6	400	6.68	3.01	1.02	0.772	7.81	8.06
	07-25-18	64000	2500	60000	5200	76	100	110	7.9	<0.010	<100	<0.05	<0.010	<0.05	<0.050	12	4.0	0.42	720	8.84	170	71	4.6	400	6.68	3.01	1.02	0.772	7.81	8.06
	11-23-18	56000	1800	38000	4200	73	41	97	7.1	<0.010	<100	0.26	<0.010	0.26	0.21	23	5.0	2.0	520	7.85	110	72	<1.0	290	5.07	3.79	-0.130	-0.379	7.98	8.23
	07/29/19	35000	1700	51000	5000	97	69	53	10	<0.010	<100	<0.010	0.11	0.11	0.074	18	4.1	1.4	470	7.80	150	96	<1.0	280	4.88	3.61	0.0810	-0.168	7.72	7.97
	12/13/19	20000	1100	29000	2900	52	43	35	8	<0.010	<100	0.2	<0.010	0.2	0.061	9.8	2.4	1.3	270	7.66	84	52	<1.0	170	2.93	5.97	-0.542	-0.792	8.20	8.45
COB-6-SW	07/23/13	69200	5110	98900	9820	81	170	110	11	<0.010	<100	0.35	<0.010	0.35	<0.05	7.2	2.4	0.38	890	8.36	290	79	1.7	520	8.18	4.1	0.78	0.532	7.58	7.83
	12/22/14	22000	1800	39000	3800	58	56	35	8.3	<0.010	<100	0.28	0.011	0.29	0.1	11	2.6	0.87	340	7.86	110	57	<1.0	200	3.33	0.76	-0.173	-0.423	8.04	8.29
	07/27/15	39000	2600	57000	5000	93	91	61	8.4	<0.010	<100	0.18	0.015	0.19	<0.050	10	3.7	0.98	520	8.46	160	91	2.5	320	5.5	4.46	0.75	0.501	7.71	7.96
	11/18/15	27000	2100	37000	3700	70	44	42	7.6	0.012	<100	0.16	<0.010	0.16	<0.050	10	3.7	4.9	360	7.96	110	69	<1.0	210	3.51	1.89	-0.023	-0.273	7.98	8.23
	07/22/16	40000	2400	55000	4700	99	64	67	8.2	0.015	<100	0.081	<0.010	0.081	<0.050	23	5.3	1	490	8.05	160	98	1.0	300	5.21	2.46	0.365	0.116	7.69	7.94
	12/8/16	26000	1700	34000	3400	60	41	53	7.9	0.014	<100	0.27	0.01	0.28	<0.050	12	2.9	3.4	340	7.87	100	60	<1.0	210	3.56	5.33	-0.203	-0.453	8.08	8.33
	8/3/17	74000	3300	61000	5300	72	110	130	9.9	<0.010	<100	<0.010	0.082	0.082	0.093	6.3	3.1	0.29	760	8.83	170	67	4.3	430	7.29	3.7	0.989	0.74	7.84	8.09
	12/18/17	26000	1600	34000	3400	60	48	44	8.4	<0.010	<100	0.26	<0.010	0.26	0.05	13	3.5	2.7	350	7.6	99	60	<1.0	200	3.46	4.22	-0.473	-0.723	8.08	8.33
	07-25-18	43000	2800	72000	6600	130	95	67	9.7	<0.010	<100	0.14	<0.010	0.14	<0.050	12	4.1	0.6	640	7.99	210	120	1.1	370	6.41	2.56	0.499	0.25	7.49	7.74
	11-23-18	44000	1500	33000	3400	56	45	76	7.6	<0.010	<100	0.20	<0.010	0.20	0.084	15	3.5	1.8	440	7.95	96	55	<1.0	240	4.19	3.71	-0.191	-0.440	8.14	8.39
	07/29/19	44000	2100	56000	4300	100	76	72	8.9	<0.010	<100	<0.010	0.064	0.06	<0.050	16	4.1	1.0	530	8.68	160	96	4.3	320	5.63	4.65	0.986	0.737	7.70	7.95
	12/13/19	29000	1600	36000	3400	68	49	54	8.3	<0.010	<100	0.24	0.013	0.25	0.058	13	3.2	2.8	370	7.78	100	67	<1.0	220	3.91	6.68	-0.228	-0.478	8.01	8.26
WB-1-SW	07/23/13	5750000	210000	323000	667000	83	1500	11000	2	<0.010	<1000	0.051	<0.010	0.051	0.2	9.6	<5	6	31000	7.65	3600	82	<1.0	19000	330	0.43	0.178	-0.059	7.47	7.71
	12/22/14	12000	700	7500	1400	17	7.9	21	3.4	0.011	<100	0.14	<0.010	0.14	0.12	32	3.7	0.83	120	7.19	25	17	<1.0	65	1.1	2.33	-2.04	-2.29	9.23	9.48
	07/27/15	19000	860	12000	2200	28	10	32	3.6	0.023	<100	0.16	0.016	0.18	0.18	51	6.3	0.82	170	7.44	39	28	<1.0	98	1.68	0.00	-1.37	-1.62	8.82	9.07
	11/18/15 [FD]	14000	760	9200	1600	23	8.3	26	3.9	0.012	<100	0.098	<0.010	0.098	<0.050	30	4.5	0.18	140	7.42	29	23	<1.0	77	1.36	6.25	-1.59	-1.84	9.01	9.26
	11/18/15	14000	760	9600	1600	23	8.3	24	3.9	0.012	<100	0.11	<0.010	0.11	<0.050	30	4.3	0.67	140	7.45	31	23	<1.0	77	1.32	3.13	-1.54	-1.79	8.99	9.24
	07/22/16	1600000	54000	79000	190000	62	410	2900	4.2	0.024	<100	0.22	0.021	0.24	0.084	37	16	2.2	8500	7.52	980	62	<1.0	5300	92.8	2.21	-0.583	-0.823	8.11	8.35
	12/8/16 [FD]	14000	770	9400	1700	22	8.5	24	3.7	0.03	<100	0.15	<0.010	0.15	0.13	26	3.7	1.1	140	7.29	30	22	<1.0	76	1.3	1.56	-1.71	-1.97	9.01	9.26
	12/8/16	14000	800	9700	1600	22	8.4	25	3.8	0.03	<100	0.15	<0.010	0.15	0.14	27	3.6	1.2	140	7.46	31	22	<1.0	77	1.33	3.1	-1.54	-1.79	9	9.25
	8/3/17	940000	35000	82000	110000	97	230	1600	5.2	<0.010	<100	<0.010	0.055	0.055	0.075	9	2.6	1.8	5900	7.73	660	96	<1.0	3100	52	2.7	-0.088	-0.33	7.81	8.06
	12-18-17 [FD]	11000	610	7400	1400	19	8.3	21	3.4	<0.010	<100	0.11	<0.010	0.11	<0.050	32	4.9	0.78	120	7.18	24	19	<1.0	66	1.16	7.91	-1.99	-2.24	9.17	9.42
	12/18/17	11000	590	7600	1400	19	8.0	21	3.4	<0.010	<100	0.11	<0.010	0.11	<0.050	30	4.8	0.75	110	7.28	25	19	<1.0	65	1.13	6.10	-1.88	-2.14	9.17	9.42
	07-25-18	220000	8500	33000	26000	63	71	460	4.0	<0.010	<100	0.16	0.013	0.17	0.051	21	4.3	1.3	1800	7.96	190	63	<1.0	870	15.8	7.17	-0.25	-0.497	8.21	8.46
	11-23-18	15000	820	7700	1600	17	6.5	26	3.0	<0.010	160	0.091	<0.010	0.091	<0.050	38	6.3	83	130	7.63	26	17	<1.0	75	1.21	4.35	-1.58	-1.83	9.21	9.47
	11-23-18 [FD]	15000	780	8000	1500	16	6.5	26	3.0	<0.010	<100	0.12	<0.010	0.12	0.41	39	6.2	50	130	7.29	26	16	<1.0	75	1.20	6.25	-1.93	-2.18	9.22	9.47
	07/29/19	33000	1500	16000	3900	35	14	67	4.0	<0.010	<100	<0.010	0.091	0.091	<0.050	43	5.3	0.79	300	7.55	55	35	<1.0	160	2.89	5.28	-1.09	-1.34	8.64	8.89
	07-29-19 [FD]	39000	1500	16000	4800	36	16	77	3.9	<0.010	<100	<0.010	0.13	0.13	<0.050	40	5.2	0.91	320	7.54	60	36	<1.0	180	3.23	4.70	-1.08	-1.33	8.62	8.87
	12-13-19	12000	500	6700	1300	16	6.6	23	3.2	<0.010	<100	0.1	<0.010	0.1	<0.050	33	3.9	1.3	110	7.22	22	16	<1.0	64	1.12	6.16	-2.08	-2.33	9.29	9.55
	12-13-19 [FD]	12000	490	6200	1200	16	7.5	24	3.2	<0.010	<100	0.098	<0.010	0.1	<0.050	31	3.9	1.1	110	7.13	21	16	<1.0	65	1.16	10.5	-2.19	-2.44	9.31	9.57

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Al	Sb	As	Ba	Be	Bi	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Tl	Sn	Ti	U	V	Zn
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	NSE Tier 1 EQS Fresh Water [1]	5	20	5.0	1000	5.3	-	1200	0.01	-	10	2	300	1	820	0.026	73	25	1.0	0.1	21000	0.8	-	-	300	6	30
	CCME FWAL [2]	100 [5]	-	5	-	-	-	1500	0.09	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	7
	Upstream Calculated 95% UCL	220	-	1.6	-	-	-	-	0.1	8.3	-	-	3318	1.2	583	-	-	-	1.9	-	132	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	1.98	-	-	-	-	-	-	1.3	-	1900	-	800	-	-	-	-	-	210	-	-	-	-	-	-
COB-B-SW	07/27/15	DRY - NO SAMPLE																									
	11/18/15	**7.9**	<1.0	<1.0	18	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	<50	<0.50	21	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	<2.0	0.42	<2.0	<5.0
	07/22/16	DRY - NO SAMPLE																									
	12/8/16	**13**	<1.0	<1.0	52	<1.0	<2.0	540	**0.027**	<1.0	0.90	<2.0	130	<0.50	**1400**	<0.013	<2.0	2.8	<1.0	<0.10	480	<0.10	<2.0	<2.0	0.68	<2.0	<5.0
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	**6.7**	<1.0	<1.0	14	<1.0	<2.0	<50	<0.010	<1.0	0.42	<2.0	110	<0.50	490	<0.013	<2.0	<2.0	<1.0	<0.10	190	<0.10	<2.0	<2.0	0.18	<2.0	<5.0
	07-25-18	DRY - NO SAMPLE																									
	11-23-18	**7.0**	<1.0	<1.0	17	<1.0	<2.0	<50	<0.010	<1.0	0.46	<2.0	200	<0.50	500	<0.013	<2.0	<2.0	<1.0	<0.1	200	<0.10	<2.0	<2.0	0.27	<2.0	<5.0
	07/29/19	DRY - NO SAMPLE																									
	12/13/19	**6.1**	<1.0	<1.0	16	<1.0	<2.0	67	<0.010	<1.0	<0.40	<0.50	78	<0.50	190	<0.013	<2.0	<2.0	<0.5	<0.10	200	<0.10	<2.0	<2.0	0.29	<2.0	<5.0
COB-4-SW	12/22/14	**82**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	210	<0.50	95	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	3.2	0.18	<2.0	7.2
	07/27/15	**51**	<1.0	<1.0	32	<1.0	<2.0	60	<0.010	<1.0	<0.40	<2.0	**460**	<0.50	110	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	2.1	0.35	<2.0	10
	11/18/15	**7100**	<1.0	13	77	<1.0	<2.0	<50	**0.29**	8.0	4.6	**17**	14000	**37**	1500	**0.082**	<2.0	9.5	<1.0	<0.10	150	0.18	<2.0	200	0.53	**14**	**96**
	07/22/16	**28**	<1.0	<1.0	24	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	300	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	270	<0.10	<2.0	<2.0	0.32	<2.0	<5.0
	07/22/16[FD]	**42**	<1.0	<1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	2	**310**	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	280	<0.10	<2.0	<2.0	0.33	<2.0	<5.0
	12/8/16	**120**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	**390**	0.99	180	<0.013	<2.0	<2.0	<1.0	<0.10	110	<0.10	<2.0	<2.0	0.18	<2.0	<5.0
	8/3/17	**13**	<1.0	<1.0	36	<1.0	<2.0	58	**0.011**	<1.0	<0.40	<2.0	83	<0.50	120	<0.013	<2.0	<2.0	<1.0	<0.10	440	<0.10	<2.0	<2.0	0.5	<2.0	<5.0
	8/3/17[FD]	**14**	<1.0	<1.0	37	<1.0	<2.0	63	<0.010	<1.0	<0.40	<2.0	83	<0.50	130	<0.013	<2.0	<2.0	<1.0	<0.10	450	<0.10	<2.0	<2.0	0.54	<2.0	<5.0
	12/18/17	**53**	<1.0	<1.0	18	<1.0	<2.0	<50	0.010	<1.0	<0.40	<2.0	270	<0.50	120	<0.013	<2.0	<2.0	<1.0	<0.10	110	<0.10	<2.0	<2.0	0.16	<2.0	5.1
	07-25-18	**43**	<1.0	1.0	33	<1.0	<2.0	57	<0.010	<1.0	<0.40	<2.0	51	0.75	23	<0.013	<2.0	<2.0	<1.0	<0.10	430	<0.10	<2.0	<2.0	0.48	<2.0	<5.0
	07-25-18	**43**	<1.0	1.0	33	<1.0	<2.0	57	<0.010	<1.0	<0.40	<2.0	51	0.75	23	<0.013	<2.0	<2.0	<1.0	<0.10	430	<0.10	<2.0	<2.0	0.48	<2.0	<5.0
	11-23-18	**140**	<1.0	<1.0	17	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	2.0	230	0.55	99	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	3.6	0.27	<2.0	<5.0
	07/29/19	**28**	<1.0	<1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.2	**370**	<0.50	150	<0.013	<2.0	<2.0	<1.0	<0.10	230	<0.10	<2.0	<2.0	0.35	<2.0	<5.0
	12/13/19	**35**	<1.0	<1.0	18	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	0.70	170	<0.50	130	<0.013	<2.0	<2.0	<0.5	<0.10	110	<0.10	<2.0	<2.0	0.21	<2.0	<5.0
COB-6-SW	07/23/13	**65.7**	<1.0	1.0	66.6	<1.0	<2.0	66	<0.01	<1.0	<0.40	<2.0	61	<0.50	30.3	NM	<2.0	<2.0	<1.0	<0.10	645	<0.10	<2.0	<2.0	0.68	<2.0	<5
	12/22/14	**61**	<1.0	<1.0	22	<1.0	<2.0	<50	0.01	<1.0	<0.40	<2.0	170	<0.50	56	<0.013	<2.0	<2.0	<1.0	<0.10	180	<0.10	<2.0	<2.0	0.22	<2.0	6.0
	07/27/15	**39**	<1.0	<1.0	29	<1.0	<2.0	52	<0.010	<1.0	<0.40	**2.2**	160	<0.50	23	<0.013	<2.0	<2.0	<1.0	<0.10	300	<0.10	<2.0	<2.0	0.34	<2.0	7.4
	11/18/15	**220**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	<2.0	**490**	**1.5**	79	<0.013	<2.0	<2.0	<1.0	<0.10	180	<0.10	<2.0	4	0.22	<2.0	<5.0
	07/22/16	**46**	<1.0	1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	180	<0.50	37	<0.013	<2.0	<2.0	<1.0	<0.10	300	<0.10	<2.0	<2.0	0.3	<2.0	<5.0
	12/8/16	**200**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**360**	1.0	110	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	3	0.23	<2.0	<5.0
	8/3/17	**42**	<1.0	1.3	38	<1.0	<2.0	59	**0.011**	<1.0	<0.40	<2.0	<50	<0.50	35	<0.013	<2.0	<2.0	<1.0	<0.10	500	<0.10	<2.0	<2.0	0.43	<2.0	<5.0
	12/18/17	**130**	<1.0	<1.0	20	<1.0	<2.0	<50	0.010	<1.0	<0.40	<2.0	260	<0.50	73	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	3.0	0.19	<2.0	<5.0
	07-25-18	**23**	<1.0	<1.0	35	<1.0	<2.0	62	<0.010	<1.0	<0.40	<2.0	140	<0.50	110	<0.013	<2.0	<2.0	<1.0	<0.10	350	<0.10	<2.0	<2.0	0.5	<2.0	<5.0
	11-23-18	**150**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**360**	0.87	130	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	4.8	0.22	<2.0	6.4
	07/29/19	**37**	<1.0	<1.0	25	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.2	130	<0.50	31	<0.013	<2.0	<2.0	<1.0	<0.10	300	<0.10	<2.0	<2.0	0.39	<2.0	<5.0
	12/13/19	**88**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	1.1	220	<0.50	88	<0.013	<2.0	<2.0	<0.5	<0.10	150	<0.10	<2.0	<2.0	0.24	<2.0	<5.0
WB-1-SW	07/23/13	*<50*	<10	<10	280	<10	<20	**2470**	**0.6**	*<10*	*<4.0*	*<20*	**936**	*<5*	**1920**	NM	*<20*	*<20*	*<10*	*<1.0*	4660	*<1*	<20	<20	1.6	<20	*<50*
	12/22/14	**180**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.038**	<1.0	<0.40	<2.0	270	0.71	95	<0.013	<2.0	<2.0	<1.0	<0.10	53	<0.10	<2.0	4.6	<0.10	<2.0	10
	07/27/15	**89**	<1.0	<1.0	18	<1.0	<2.0	<50	**0.012**	<1.0	<0.40	<2.0	**480**	<0.50	41	<0.013	<2.0	<2.0	<1.0	<0.10	100	<0.10	<2.0	<2.0	<0.10	<2.0	7.9
	11/18/15[FD]	**63**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	200	<0.50	41	<0.013	<2.0	<2.0	<1.0	<0.10	70	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	11/18/15	**63**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	200	<0.50	43	<0.013	<2.0	<2.0	<1.0	<0.10	73	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07/22/16	**87**	<1.0	<1.0	39	<1.0	<2.0	690	**0.035**	<1.0	<0.40	<2.0	**590**	0.56	160	<0.013	<2.0	<2.0	<1.0	<0.10	1300	<0.10	<2.0	<2.0	0.47	<2.0	11
	12/8/16[FD]	**140**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.025**	<1.0	<0.40	<2.0	220	<0.50	98	<0.013	<2.0	<2.0	<1.0	<0.10	59	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/8/16	**100**	<1.0	<1.0	16	<1.0	<2.0	<50	**0.026**	<1.0	<0.40	<2.0	220	<0.50	100	<0.013	<2.0	<2.0	<1.0	<0.10	61	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	8/3/17	**28**	<1.0	1.0	73	<1.0	<2.0	430	**0.027**	<1.0	<0.40	<2.0	**680**	<0.50	450	<0.013	<2.0	<2.0	<1.0	<0.10	940	<0.10	<2.0	<2.0	0.43	<2.0	<5.0
	12-18-17[FD]	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.027**	<1.0	<0.40	<2.0	190	<0.50	62	<0.013	<2.0	<2.0	<1.0	<0.10	48	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/18/17	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.022**	<1.0	<0.40	<2.0	190	<0.50	63	<0.013	<2.0	<2.0	<1.0	<0.10	49	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-25-18	**120**	<1.0	<1.0	35	<1.0	<2.0	110	**0.024**	<1.0	<0.40	**4.7**	**330**	**1.8**	140	<0.013	<2.0	<2.0	<1.0	<0.1	320	<0.10	<2.0	2.7	0.18	<2.0	6.0
	11-23-18	**1800**	<1.0	4.3	37	<1.0	<2.0	<50	**0.14**	3.5	1.2	**9.7**	**3500**	**29**	210	**0.037**	<2.0	2.8	<1.0	**1.7**	50	<0.10	<2.0	25	0.17	**6.8**	**79**
	11-23-18[FD]	**1200**	<1.0	3.9	40	<1.0	<2.0	<50	**0.15**	3.3	1.2	**9.2**	**3700**	**28**	200	**0.033**	<2.0	2.3	<1.0	**1.5**	50	<0.10	<2.0	23	0.15	5.2	**160**
	07/29/19	**69**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.020**	<1.0	<0.40	0.94	290	<0.50	64	<0.013	<2.0	<2.0	<1.0	<0.10	120	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-29-19[FD]	**71**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.021**	<1.0	<0.40	0.89	**310**	<0.50	71	<0.013	<2.0	<2.0	<1.0	<0.10	120	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12-13-19	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.027**	<1.0	<0.40	<0.50	210	<0.50	67	<0.013	<2.0	<2.0	<0.5	<0.10	39	<0.10	<2.0	<2.0	<0.10	<2.0	5.0
	12-13-19[FD]	**110**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.029**	<1.0	<0.40	<0.50	180	<0.50	61	<0.013	<2.0	<2.0	<0.5	<0.10	37	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Na	K	Ca	Mg	ALK	SO4	Cl	SiO2	OPO4	P	NO3	NO2	NO2-NO3	NH3	Colour	TOC	TURBIDITY	CONDUCTIVITY	pH	HARDNESS	BICARB ALKALINITY	CARB ALKALINITY	TDS	Anion Sum	Ion Balance	Langelier Index (@20C)	Langelier Index (@4C)	Sat_ pH (@20C)	Sat_ pH (@4C)
	Units	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	TCU	mg/L	NTU	µS/cm	pH	mg/L	mg/L	mg/L	mg/L	me/L	%	unitless	unitless	unitless	unitless
	NSE Tier 1 EQS Fresh Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME FWAL [2]	-	-	-	-	-	-	120	-	-	-	13	0.06	-	1 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-	-
	Upstream Calculated 95% UCL	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NSE Tier 1 EQS Marine Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME MAL [2]	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	7.0-8.7	-	-	-	-	-	-	-	-	-	-
	Battery Point/Narrows Calculated 95% UCL	-	-	-	-	-	2180	-	-	-	-	-	-	-	-	-	-	88	-	-	-	-	-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	8480000	304000	343000	1000000	84	2000	14000	<0.5	<0.010	<1000	<0.05	<0.010	<0.05	<0.05	<5	<5	7.2	41000	8.07	5000	83	<1.0	26000	434	4.66	0.664	0.425	7.41	7.65
	12/22/14	1000000	38000	68000	120000	56	270	1900	5.5	0.012	<100	0.19	0.019	0.21	0.11	18	2.3	1.1	6300	8.42	680	54	1.3	3500	60.8	1.58	0.248	0.007	8.17	8.41
	07/27/15	7100000	260000	300000	870000	88	1500	13000	1.1	0.018	<1000	0.11	0.011	0.12	0.05	6.8	<5.0	0.6	37000	7.83	4300	87	<1.0	23000	393	0.97	0.369	0.131	7.46	7.7
	11/18/15	650000	27000	52000	71000	58	190	1200	5.4	0.015	<100	0.14	<0.010	0.14	0.064	25	3.3	1.0	4200	8.00	420	57	<1.0	2200	38.8	1.80	-0.189	-0.432	8.19	8.44
	07/22/16	7500000	280000	300000	910000	92	1600	13000	1	0.026	<1000	0.092	0.01	0.1	0.088	8.3	<5.0	1.2	36000	7.99	4500	91	<1.0	24000	411	1.77	0.559	0.321	7.43	7.67
	12/8/16	1200000	45000	70000	150000	52	290	2300	4.8	0.015	<100	0.21	<0.010	0.21	0.088	20	<5.0	2.1	7000	7.56	780	52	<1.0	4100	72.9	3.02	-0.642	-0.883	8.2	8.44
	11/26/12	2500000	84000	130000	300000	68	650	4400	5.8	0.011	<100	0.17	0.02	0.19	0.091	14	<5	29	15000	7.8	1600	67	<1	8190	140	1.16	-0.131	-0.37	7.93	8.17
	11/26/12 [FL]	2600000	98000	130000	330000	NM	NM	NM	6.7	NM	<100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/26/12 [F]	2400000	110000	150000	350000	64	660	4500	6.1	0.011	<100	0.16	0.02	0.18	0.13	14	<5	19	14000	7.8	1800	64	<1	8230	143	0.07	-0.083	-0.321	7.88	8.12
	8/3/17	8400000	300000	340000	1000000	98	2000	13000	0.78	0.01	<1000	<0.010	0.057	0.057	0.13	<5.0	<5.0	1.5	40000	8.05	5000	97	1	25000	405	7.68	0.698	0.46	7.35	7.59
	12/18/17	720000	28000	50000	85000	52	210	1300	5.4	0.011	<100	0.20	<0.010	0.20	0.098	21	3.5	1.6	4500	8.10	480	52	<1.0	2400	42	0.51	-0.166	-0.409	8.26	8.51
	07-25-18	8300000	290000	330000	980000	98	1900	12000	0.81	0.022	<1000	0.051	0.012	0.063	0.076	9	2.4	1.1	39,000	8.14	4800	96	1.3	24,000	377	10.3	0.767	0.529	7.37	7.61
	11-23-18	860000	33,000	62000	98000	60	250	1600	5	<0.010	<100	0.16	0.011	0.17	0.075	24	3.9	1.8	5500	8.74	560	56	2.9	3000	52.7	3.16	0.573	0.331	8.17	8.41
	07/29/19	6900000	250,000	280000	860000	94	1700	12000	0.69	<0.010	<1000	<0.010	<0.050	<0.050	0.060	8.7	2.6	0.96	36000	8.26	4200	92	1.6	22000	382	1.23	0.788	0.55	7.47	7.71
	12/13/19	800000	30000	55000	92000	57	250	1600	5.2	<0.010	<100	0.16	0.016	0.18	0.068	16	3.5	2.6	5100	8.68	520	55	<1.0	2900	51.3	5.67	0.452	0.21	8.23	8.47
NARROWS	12/22/14	600000	24000	58000	74000	57	170	1100	5.6	0.013	<100	0.22	0.016	0.24	0.11	16	2	1	3900	8.56	450	55	1.9	2100	36	0.1	0.403	0.16	8.15	8.4
	07/27/15	7200000	270000	300000	900000	91	1300	13000	1.2	<0.010	<1000	0.067	<0.010	0.067	0.067	7.4	<5.0	0.36	37000	7.96	4400	90	<1.0	23000	383	3.36	0.502	0.265	7.45	7.69
	11/18/15	330000	15000	38000	36000	55	110	640	5.8	0.016	<100	0.15	<0.010	0.15	0.053	21	3.7	1.7	2400	7.86	240	55	<1.0	1200	21.6	4.13	-0.398	-0.643	8.26	8.50
	07/22/16	7500000	270000	300000	900000	93	1400	12000	1.3	0.017	<1000	0.05	0.01	0.06	0.08	9.9	2.3	1.2	36000	7.97	4400	92	<1.0	23000	378	5.2	0.533	0.295	7.44	7.68
	12/8/16	1000000	38000	72000	130000	61	270	1900	6.1	0.016	<100	0.21	<0.010	0.21	0.082	21	<5.0	1.2	6200	7.67	700	61	<1.0	3500	60.8	0.65	-0.418	-0.66	8.09	8.33
	8/3/17	8300000	300000	340000	990000	97	2000	12000	1.1	0.016	<1000	<0.010	0.077	0.077	0.21	<5.0	<5.0	1.4	40000	7.8	4900	97	<1.0	24000	392	8.83	0.45	0.213	7.36	7.59
	12/18/17	440000	18000	45000	53000	52	150	820	6.0	0.010	<100	0.21	<0.010	0.21	0.076	21	3.5	2.1	2900	7.82	330	52	<1.0	1600	27	2.06	-0.428	-0.672	8.25	8.49
	07-25-18	6600000	240000	300000	780000	97	1700	11000	2.0	0.018	<1000	0.064	0.012	0.076	0.09	8.3	<5	0.73	34000	8.08	3900	96	1.1	20000	334	5.38	0.641	0.404	7.44	7.68
	11-23-18	530000	21,000	50000	60000	58	180	1100	5.3	<0.010	<100	0.18	<0.010	0.18	0.076	28	4.1	1.7	3700	8.78	370	54	3.1	1900	34.5	5.13	0.574	0.331	8.21	8.45
	07/29/19	6800000	250,000	280000	850000	93	1700	12000	1.3	<0.010	<1000	<0.010	<0.050	<0.050	0.088	7.8	<5.0 *	1.4	35000	7.88	4200	93	<1.0	22000	376	1.51	0.415	0.177	7.47	7.70
	12/13/19	350000	14000	36000	43000	45	120	660	5.2	<0.010	<100	0.14	0.017	0.15	0.056	27	3.7	2.3	2300	8.13	270	45	<1.0	1300	22.2	2.5	-0.246	-0.491	8.38	8.62

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - FALL 2019
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Al	Sb	As	Ba	Be	Bi	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Tl	Sn	Ti	U	V	Zn
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	NSE Tier 1 EQS Fresh Water [1]	5	20	5.0	1000	5.3	-	1200	0.01	-	10	2	300	1	820	0.026	73	25	1.0	0.1	21000	0.8	-	-	300	6	30
	CCME FWAL [2]	100 [5]	-	5	-	-	-	1500	0.09	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	7
	Upstream Calculated 95% UCL	220	-	1.6	-	-	-	-	0.1	8.3	-	-	3318	1.2	583	-	-	-	1.9	-	132	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	1.98	-	-	-	-	-	-	1.3	-	1900	-	800	-	-	-	-	-	210	-	-	-	-	-	-
	NSE Tier 1 EQS Marine Water [1]	-	500	12.5	500	100	-	1200	0.12	-	-	2	-	2	-	0.016	-	8.3	2	1.5	-	21.3	-	-	100	50	10
	CCME MAL [2]	-	-	12.5	-	-	-	-	0.12	1.5 [5]	-	-	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-	-
	Battery Point/Narrows Calculated 95% UCL	-	-	-	-	-	-	-	-	-	0.9	-	190	-	70	0.189	-	-	-	-	7000	-	-	-	-	-	-
BP-1-SW	07/23/13	168	<10	<10	41	<10	<20	3700	0.14	*<10*	*<4.0*	*<20*	1990	*<5.0*	109	<0.013	<20	*<20*	*<10*	<1.0	6130	<1	<20	<20	2.6	<20	*<50*
	12/22/14	110	<1.0	<1.0	19	<1.0	<2.0	480	0.028	<1.0	<0.40	<2.0	240	<0.50	61	<0.013	<2.0	<2.0	<1.0	<0.10	950	<0.10	<2.0	<2.0	0.41	<2.0	7.2
	07/27/15	86	<10	<10	19	<10	<20	2900	<0.10	*<10*	*<4.0*	<20	*<500*	*<5.0*	59	<0.013	<20	*<20*	*<10*	<1.0	5300	<1.0	<20	<20	2.1	<20	*<50*
	11/18/15	140	<1.0	<1.0	16	<1.0	<2.0	330	0.014	<1.0	<0.40	<2.0	410	<0.50	57	0.070	<2.0	<2.0	*<1.0*	<0.10	580	<0.10	<2.0	<2.0	0.29	<2.0	41
	07/22/16	63	<10	<10	23	<10	<20	3600	<0.10	<10	*<4.0*	<20	*<500*	*<5.0*	71	<0.013	<20	*<20*	*<10*	<1.0	5500	<1.0	<20	<20	2.4	<20	*<50*
	12/8/16	86	<1.0	<1.0	20	<1.0	<2.0	520	0.025	<1.0	<0.40	<2.0	280	<0.50	100	<0.013	<2.0	<2.0	<1.0	<0.10	1000	<0.10	<2.0	<2.0	0.48	<2.0	<5.0
	11/26/12	310	<1	6.3	47	<0.5	<2	1200	0.053	1	<1	<2	310	1.2	100	0.017	<4	<3	7	2.4	2300	<0.8	<20	5.5	0.98	<2	5.4
	11/26/12 [FL]	530	<1	6.4	53	<0.5	<2	1200	0.054	1.5	<1	<2	650	1.5	120	NM	<4	<3	6	1.8	2300	<0.8	<20	12	0.99	<2	6.9
	11/26/12 [F]	350	<1	6.2	49	<0.5	<2	1200	0.052	2	<1	<2	340	1.3	110	0.018	<4	<3	5.7	2	2300	<0.8	<20	6.6	0.97	<2	6.2
	8/3/17	<50	<10	<10	25	<10	<20	3600	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	110	<0.013	<20	*<20*	*<10*	<1.0	6100	<1.0	<20	<20	2.5	<20	*<50*
	12/18/17	95	<1.0	<1.0	17	<1.0	<2.0	340	0.020	<1.0	<0.40	<2.0	220	<0.50	60	<0.013	<2.0	<2.0	<1.0	<0.10	630	<0.10	<2.0	3.6	0.35	<2.0	<5.0
	07-25-18	58	<10	<10	23	<10	<20	3500	<0.10	*<10*	*<4.0*	*<20*	1000	*<5.0*	94	<0.013	<20	*<20*	*<10*	<1.0	5900	<1.0	<20	<20	2.5	<20	*<50*
	11-23-18	86	<1.0	<1.0	18	<1.0	<2.0	420	0.024	<1.0	<0.40	<2.0	240	<0.50	50	<0.013	<2.0	<2.0	<1.0	<0.10	730	<0.10	<2.0	<2.0	0.4	<2.0	<5.0
	07/29/19	<50	<10	<10	18	<10	<20	3100	<0.10	*<10*	*<4.0*	5.6	*<500*	*<5.0*	50	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2.4	<20	*<50*
	12/13/19	88	<1.0	<1.0	13	<1.0	<2.0	360	0.021	<1.0	<0.40	0.96	220	<0.50	51	<0.013	<2.0	<2.0	<0.5	<0.10	340	<0.10	<2.0	<2.0	0.35	<2.0	<5.0
NARROWS	12/22/14	110	<1.0	<1.0	19	<1.0	<2.0	300	0.027	<1.0	<0.40	<2.0	250	<0.50	63	<0.013	<2.0	<2.0	<1.0	<0.10	610	<0.10	<2.0	2.4	0.32	<2.0	7.3
	07/27/15	140	<10	*<10*	21	<10	<20	3100	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	100	<0.013	<20	*<20*	*<10*	<1.0	5400	<1.0	<20	<20	2.2	<20	*<50*
	11/18/15	76	1.8	<1.0	15	<1.0	<2.0	180	0.012	<1.0	<0.40	<2.0	*320*	<0.50	45	<0.013	<2.0	<2.0	*<1.0*	<0.10	370	<0.10	<2.0	<2.0	0.22	<2.0	63
	07/22/16	51	<10	*<10*	28	<10	<20	3500	<0.10	<10	*<4.0*	*<20*	*<500*	*<5.0*	120	<0.013	<20	*<20*	*<10*	<1.0	5400	<1.0	<20	<20	2.1	<20	*<50*
	12/8/16	75	<1.0	<1.0	20	<1.0	<2.0	460	0.029	<1.0	<0.40	<2.0	250	<0.50	110	<0.013	<2.0	<2.0	<1.0	<0.10	890	<0.10	<2.0	<2.0	0.58	<2.0	15
	8/3/17	<50	<10	*<10*	26	<10	<20	3600	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	110	<0.013	<20	*<20*	*<10*	<1.0	6100	<1.0	<20	<20	2.4	<20	*<50*
	12/18/17	110	<1.0	<1.0	17	<1.0	<2.0	210	0.018	<1.0	<0.40	<2.0	280	<0.50	72	<0.013	<2.0	<2.0	<1.0	<0.10	450	<0.10	<2.0	3.6	0.27	<2.0	5.8
	07-25-18	56	<10	*<10*	29	<10	<20	2800	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	100	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2	<20	*<50*
	11-23-18	86	<1.0	<1.0	17	<1.0	<2.0	260	0.021	<1.0	<0.40	<2.0	220	<0.50	52	<0.013	<2.0	<2.0	<1.0	<0.10	500	<0.10	<2.0	<2.0	0.32	<2.0	8.8
	07/29/19	110	<10	*<10*	21	<10	<20	3000	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	120	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2.0	<20	*<50*
	12/13/19	110	<1.0	<1.0	15	<1.0	<2.0	180	0.021	<1.0	<0.40	2.7	290	<0.50	65	<0.013	<2.0	<2.0	<0.5	<0.10	660	<0.10	<2.0	<2.0	0.22	<2.0	7.2

NOTES:
FD - Field Duplicate
NM - Not Measured or not analyzed
mg/L - milligrams per liter
UCL - Upper Concentration Limit
- No applicable guideline criteria
* Elevated reporting limit due to sample matrix

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013
2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2017
3 - Guideline value for NH3 is based on a pH value of 8 and a temperature of 10 C
4 - Guideline for chromium is based on CR6+
5 - Guideline value for aluminum based on a pH >6.5
6 - CCME FWAL guideline value for copper is based on a hardness value. If value is unknown, the guideline is 2µg/L
7 - CCME FWAL guideline value for lead is based on a hardness value. If value is unknown, the guideline is 1µg/L
8 - CCME FWAL guideline value for lead is based on a hardness value. If value is unknown, the guideline is 25µg/L

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
Underline	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
Double Underline	Concentration exceeds Upstream Calculated 95% UCL
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit
italics	Laboratory detection limit is higher than guideline criteria

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

APPENDIX C
LABORATORY CERTIFICATE

Your Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
CANADA B1P 1C6

Report Date: 2019/12/24
Report #: R6018269
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9Z2136
Received: 2019/12/13, 15:25

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Carbonate, Bicarbonate and Hydroxide (1)	11	N/A	2019/12/20	N/A	SM 23 4500-CO2 D
Alkalinity (1)	11	N/A	2019/12/23	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water) (1)	11	N/A	2019/12/19	N/A	Auto Calc.
Chloride (1)	11	N/A	2019/12/23	ATL SOP 00014	SM 23 4500-Cl- E m
Colour (1)	11	N/A	2019/12/23	ATL SOP 00020	SM 23 2120C m
Conductance - water (1)	11	N/A	2019/12/20	ATL SOP 00004	SM 23 2510B m
Hardness (calculated as CaCO3) (1)	11	N/A	2019/12/20	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL) (1)	5	2019/12/18	2019/12/20	ATL SOP 00026	EPA 245.1 R3 m
Mercury - Total (CVAA,LL) (1)	6	2019/12/19	2019/12/20	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	8	2019/12/19	2019/12/19	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS (1)	3	2019/12/19	2019/12/20	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference) (1)	11	N/A	2019/12/24	N/A	Auto Calc.
Anion and Cation Sum (1)	11	N/A	2019/12/20	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	11	N/A	2019/12/19	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	11	N/A	2019/12/23	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite (1)	11	N/A	2019/12/23	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	11	N/A	2019/12/24	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM) (1)	11	2019/12/18	2019/12/19	ATL SOP 00103	EPA 8270E R6 m
pH (1, 2)	11	N/A	2019/12/20	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho (1)	11	N/A	2019/12/20	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C) (1)	11	N/A	2019/12/24	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	11	N/A	2019/12/24	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	11	N/A	2019/12/23	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	11	N/A	2019/12/23	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc) (1)	11	N/A	2019/12/24	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	1	N/A	2019/12/19	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (1, 3)	3	N/A	2019/12/20	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (1, 3)	3	N/A	2019/12/23	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (1, 3)	4	N/A	2019/12/24	ATL SOP 00203	SM 23 5310B m
Turbidity (1)	11	N/A	2019/12/20	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

Your Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
CANADA B1P 1C6

Report Date: 2019/12/24
Report #: R6018269
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9Z2136
Received: 2019/12/13, 15:25

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Bedford
(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Natalie MacAskill, Key Account Specialist
Email: Natalie.MacAskill@bvlabs.com
Phone# (902)567-1255 Ext:17
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Z2136
Report Date: 2019/12/24

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

BV Labs ID		LOM096		LOM109		LOM110			LOM111		
Sampling Date		2019/12/13		2019/12/13		2019/12/13			2019/12/13		
	UNITS	CB-SW	QC Batch	NRC-1-SW	QC Batch	SRC-1-SW	RDL	QC Batch	COB-A-SW	RDL	QC Batch
Calculated Parameters											
Anion Sum	me/L	3.24	6498905	1.71	6498905	4.87	N/A	6498905	5.58	N/A	6498905
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	66	6498900	26	6498900	88	1.0	6498900	110	1.0	6498900
Calculated TDS	mg/L	190	6498915	100	6498915	280	1.0	6498915	330	1.0	6498915
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6498900	<1.0	6498900	<1.0	1.0	6498900	<1.0	1.0	6498900
Cation Sum	me/L	3.01	6498905	1.52	6498905	4.67	N/A	6498905	5.31	N/A	6498905
Hardness (CaCO3)	mg/L	94	6496824	38	6496824	120	1.0	6496824	220	1.0	6496824
Ion Balance (% Difference)	%	3.68	6498903	5.88	6498903	2.10	N/A	6498903	2.48	N/A	6498903
Langelier Index (@ 20C)	N/A	-0.139	6498911	-1.71	6498911	-0.117		6498911	0.405		6498911
Langelier Index (@ 4C)	N/A	-0.389	6498913	-1.96	6498913	-0.366		6498913	0.156		6498913
Nitrate (N)	mg/L	0.21	6498907	0.17	6498907	0.19	0.050	6498907	0.21	0.050	6498907
Saturation pH (@ 20C)	N/A	8.07	6498911	8.82	6498911	7.84		6498911	7.54		6498911
Saturation pH (@ 4C)	N/A	8.32	6498913	9.07	6498913	8.09		6498913	7.79		6498913
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	66	6509186	26	6509186	89	5.0	6509186	110	25	6509186
Dissolved Chloride (Cl-)	mg/L	42	6509275	29	6509275	74	1.0	6509275	33	1.0	6509275
Colour	TCU	27	6509278	11	6509278	23	5.0	6509278	5.1	5.0	6509278
Nitrate + Nitrite (N)	mg/L	0.21	6509283	0.17	6509283	0.21	0.050	6509283	0.22	0.050	6509283
Nitrite (N)	mg/L	<0.010	6509288	<0.010	6509288	0.012	0.010	6509288	0.011	0.010	6509288
Nitrogen (Ammonia Nitrogen)	mg/L	0.053	6506685	<0.050	6506685	0.24	0.050	6506685	<0.050	0.050	6506685
Total Organic Carbon (C)	mg/L	4.6	6511627	2.4	6508352	4.9	0.50	6505873	2.5	0.50	6508342
Orthophosphate (P)	mg/L	0.011	6509282	<0.010	6509282	<0.010	0.010	6509282	<0.010	0.010	6509282
pH	pH	7.93	6508311	7.11	6508311	7.72	N/A	6508252	7.95	N/A	6508311
Reactive Silica (SiO2)	mg/L	7.3	6509277	5.5	6509277	7.6	0.50	6509277	13	0.50	6509277
Dissolved Sulphate (SO4)	mg/L	35	6509276	18	6509276	47	2.0	6509276	120	10	6509276
Turbidity	NTU	10	6508362	0.87	6508362	18	0.10	6508363	0.21	0.10	6508362
Conductivity	uS/cm	310	6508312	160	6508312	500	1.0	6508253	510	1.0	6508312

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: B9Z2136
Report Date: 2019/12/24

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

BV Labs ID		LOM112			LOM113		LOM114		LOM115		
Sampling Date		2019/12/13			2019/12/13		2019/12/13		2019/12/13		
	UNITS	COB-B-SW	RDL	QC Batch	COB-4-SW	QC Batch	COB-6-SW	QC Batch	WB-1-SW	RDL	QC Batch
Calculated Parameters											
Anion Sum	me/L	5.44	N/A	6498905	2.93	6498905	3.91	6498905	1.12	N/A	6496424
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	98	1.0	6498900	52	6498900	67	6498900	16	1.0	6498900
Calculated TDS	mg/L	330	1.0	6498915	170	6498915	220	6498915	64	1.0	6496432
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	6498900	<1.0	6498900	<1.0	6498900	<1.0	1.0	6498900
Cation Sum	me/L	5.15	N/A	6498905	2.60	6498905	3.42	6498905	0.990	N/A	6496424
Hardness (CaCO3)	mg/L	210	1.0	6496824	84	6496824	100	6496824	22	1.0	6496824
Ion Balance (% Difference)	%	2.74	N/A	6498903	5.97	6498903	6.68	6498903	6.16	N/A	6496422
Langelier Index (@ 20C)	N/A	-0.0400		6498911	-0.542	6498911	-0.228	6498911	-2.08		6498911
Langelier Index (@ 4C)	N/A	-0.289		6498913	-0.792	6498913	-0.478	6498913	-2.33		6498913
Nitrate (N)	mg/L	0.29	0.050	6498907	0.20	6498907	0.24	6498907	0.10	0.050	6498907
Saturation pH (@ 20C)	N/A	7.60		6498911	8.20	6498911	8.01	6498911	9.29		6498911
Saturation pH (@ 4C)	N/A	7.85		6498913	8.45	6498913	8.26	6498913	9.55		6498913
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	98	5.0	6509186	52	6509186	68	6509186	16	5.0	6509186
Dissolved Chloride (Cl-)	mg/L	34	1.0	6509275	35	6509275	54	6509275	23	1.0	6509275
Colour	TCU	<5.0	5.0	6509278	9.8	6509278	13	6509278	33	5.0	6509278
Nitrate + Nitrite (N)	mg/L	0.29	0.050	6509283	0.20	6509283	0.25	6509283	0.10	0.050	6509283
Nitrite (N)	mg/L	<0.010	0.010	6509288	<0.010	6509288	0.013	6509288	<0.010	0.010	6509288
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	6506691	0.061	6506693	0.058	6506685	<0.050	0.050	6506691
Total Organic Carbon (C)	mg/L	2.2	0.50	6508342	2.4	6508352	3.2	6508342	3.9	0.50	6508352
Orthophosphate (P)	mg/L	<0.010	0.010	6509282	<0.010	6509282	<0.010	6509282	<0.010	0.010	6509282
pH	pH	7.56	N/A	6508252	7.66	6508311	7.78	6508255	7.22	N/A	6508252
Reactive Silica (SiO2)	mg/L	11	0.50	6509277	8.0	6509277	8.3	6509277	3.2	0.50	6509277
Dissolved Sulphate (SO4)	mg/L	120	10	6509276	43	6509276	49	6509276	6.6	2.0	6509276
Turbidity	NTU	0.32	0.10	6508362	1.3	6508362	2.8	6508362	1.3	0.10	6508362
Conductivity	uS/cm	530	1.0	6508253	270	6508312	370	6508256	110	1.0	6508253

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: B9Z2136
Report Date: 2019/12/24

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

BV Labs ID		LOM116			LOM117			LOM118		
Sampling Date		2019/12/13			2019/12/13			2019/12/13		
	UNITS	NARROWS	RDL	QC Batch	BP-1-SW	RDL	QC Batch	FD-21	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	22.2	N/A	6496424	51.3	N/A	6496424	1.16	N/A	6496424
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	45	1.0	6498900	55	1.0	6496419	16	1.0	6496419
Calculated TDS	mg/L	1300	1.0	6496432	2900	1.0	6496432	65	1.0	6496432
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	6498900	2.4	1.0	6496419	<1.0	1.0	6496419
Cation Sum	me/L	21.1	N/A	6496424	45.8	N/A	6496424	0.940	N/A	6496424
Hardness (CaCO3)	mg/L	270	1.0	6496824	520	1.0	6496824	21	1.0	6496824
Ion Balance (% Difference)	%	2.50	N/A	6496422	5.67	N/A	6496422	10.5	N/A	6496422
Langelier Index (@ 20C)	N/A	-0.246		6498911	0.452		6496428	-2.19		6496428
Langelier Index (@ 4C)	N/A	-0.491		6498913	0.210		6496430	-2.44		6496430
Nitrate (N)	mg/L	0.14	0.050	6498907	0.16	0.050	6498907	0.098	0.050	6498907
Saturation pH (@ 20C)	N/A	8.38		6498911	8.23		6496428	9.31		6496428
Saturation pH (@ 4C)	N/A	8.62		6498913	8.47		6496430	9.57		6496430
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	45	5.0	6509186	57	5.0	6509186	16	5.0	6509186
Dissolved Chloride (Cl-)	mg/L	660	15	6509275	1600	50	6509275	24	1.0	6509275
Colour	TCU	27	5.0	6509278	16	5.0	6509278	31	5.0	6509278
Nitrate + Nitrite (N)	mg/L	0.15	0.050	6509283	0.18	0.050	6509283	0.098	0.050	6509283
Nitrite (N)	mg/L	0.016	0.010	6509288	0.017	0.010	6509288	<0.010	0.010	6509288
Nitrogen (Ammonia Nitrogen)	mg/L	0.056	0.050	6506691	0.068	0.050	6506691	<0.050	0.050	6506685
Total Organic Carbon (C)	mg/L	3.7	0.50	6511627	3.5	0.50	6508352	3.9	0.50	6508352
Orthophosphate (P)	mg/L	<0.010	0.010	6509282	<0.010	0.010	6509282	<0.010	0.010	6509282
pH	pH	8.13	N/A	6508311	8.68	N/A	6508311	7.13	N/A	6508252
Reactive Silica (SiO2)	mg/L	5.2	0.50	6509277	5.2	0.50	6509277	3.2	0.50	6509277
Dissolved Sulphate (SO4)	mg/L	120	10	6509276	250	10	6509276	7.5	2.0	6509276
Turbidity	NTU	2.3	0.10	6508362	2.6	0.10	6508363	1.1	0.10	6508363
Conductivity	uS/cm	2300	1.0	6508312	5100	1.0	6508312	110	1.0	6508253

RDL = Reportable Detection Limit
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N/A = Not Applicable

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MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		LOM096	LOM109	LOM110	LOM111	LOM112	LOM113	LOM114		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Metals										
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	6506066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		LOM115	LOM116	LOM117	LOM118		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-21	RDL	QC Batch
Metals							
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	0.013	6506066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

BV Labs ID		LOM096	LOM109	LOM110	LOM111	LOM112	LOM113	LOM114		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug/L	430	92	460	7.5	6.1	35	88	5.0	6505772
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Arsenic (As)	ug/L	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Barium (Ba)	ug/L	15	12	19	13	16	18	19	1.0	6505772
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Boron (B)	ug/L	<50	<50	74	57	67	<50	<50	50	6505772
Total Cadmium (Cd)	ug/L	0.026	0.020	0.034	<0.010	<0.010	0.015	0.014	0.010	6505772
Total Calcium (Ca)	ug/L	31000	13000	42000	71000	69000	29000	36000	100	6505772
Total Chromium (Cr)	ug/L	1.3	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Cobalt (Co)	ug/L	0.52	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6505772
Total Copper (Cu)	ug/L	2.6	0.82	2.8	<0.50	<0.50	0.70	1.1	0.50	6505772
Total Iron (Fe)	ug/L	830	270	770	<50	78	170	220	50	6505772
Total Lead (Pb)	ug/L	2.0	<0.50	1.6	<0.50	<0.50	<0.50	<0.50	0.50	6505772
Total Magnesium (Mg)	ug/L	3900	1700	4400	9700	9000	2900	3400	100	6505772
Total Manganese (Mn)	ug/L	270	150	150	35	190	130	88	2.0	6505772
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	<100	100	6505772
Total Potassium (K)	ug/L	1400	680	2300	2100	2100	1100	1600	100	6505772
Total Selenium (Se)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6505772
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6505772
Total Sodium (Na)	ug/L	24000	17000	48000	21000	21000	20000	29000	100	6505772
Total Strontium (Sr)	ug/L	78	34	130	220	200	110	150	2.0	6505772
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6505772
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Titanium (Ti)	ug/L	11	2.1	13	<2.0	<2.0	<2.0	2.2	2.0	6505772
Total Uranium (U)	ug/L	0.22	<0.10	0.39	0.31	0.29	0.21	0.24	0.10	6505772
Total Vanadium (V)	ug/L	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Zinc (Zn)	ug/L	12	5.1	7.3	<5.0	<5.0	<5.0	<5.0	5.0	6505772

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

BV Labs ID		LOM115	LOM116	LOM117	LOM118		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-21	RDL	QC Batch
Metals							
Total Aluminum (Al)	ug/L	110	110	88	110	5.0	6505772
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Barium (Ba)	ug/L	12	15	13	11	1.0	6505772
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Boron (B)	ug/L	<50	180	360	<50	50	6505772
Total Cadmium (Cd)	ug/L	0.027	0.021	0.021	0.029	0.010	6505772
Total Calcium (Ca)	ug/L	6700	36000	55000	6200	100	6505772
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6505772
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6505772
Total Copper (Cu)	ug/L	<0.50	2.7	0.96	<0.50	0.50	6505772
Total Iron (Fe)	ug/L	210	290	220	180	50	6505772
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6505772
Total Magnesium (Mg)	ug/L	1300	43000	92000	1200	100	6505772
Total Manganese (Mn)	ug/L	67	65	51	61	2.0	6505772
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	100	6505772
Total Potassium (K)	ug/L	500	14000	30000	490	100	6505772
Total Selenium (Se)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6505772
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	6505772
Total Sodium (Na)	ug/L	12000	350000	800000	12000	100	6505772
Total Strontium (Sr)	ug/L	39	340	660	37	2.0	6505772
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	6505772
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Uranium (U)	ug/L	<0.10	0.22	0.35	<0.10	0.10	6505772
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6505772
Total Zinc (Zn)	ug/L	5.0	7.2	<5.0	<5.0	5.0	6505772

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		LOM096	LOM109	LOM110	LOM111	LOM112	LOM113	LOM114		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.18	0.050	6503348
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.083	0.050	6503348
Acenaphthene	ug/L	0.029	<0.010	<0.010	<0.010	<0.010	0.031	0.19	0.010	6503348
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.010	6503348
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6496287
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Chrysene	ug/L	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Fluoranthene	ug/L	0.018	<0.010	0.011	<0.010	<0.010	<0.010	0.017	0.010	6503348
Fluorene	ug/L	0.015	<0.010	<0.010	<0.010	<0.010	0.015	0.091	0.010	6503348
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.75	0.20	6503348
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Phenanthrene	ug/L	0.017	<0.010	<0.010	<0.010	<0.010	0.011	0.049	0.010	6503348
Pyrene	ug/L	0.019	<0.010	0.014	<0.010	<0.010	<0.010	0.015	0.010	6503348
Surrogate Recovery (%)										
D10-Anthracene	%	94	96	91	98	95	94	91		6503348
D14-Terphenyl	%	95	97	93	100	97	97	92		6503348
D8-Acenaphthylene	%	91	94	85	97	92	91	88		6503348

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		LOM115	LOM116	LOM117	LOM118		
Sampling Date		2019/12/13	2019/12/13	2019/12/13	2019/12/13		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-21	RDL	QC Batch
Polyaromatic Hydrocarbons							
1-Methylnaphthalene	ug/L	<0.050	0.097	0.11	<0.050	0.050	6503348
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	6503348
Acenaphthene	ug/L	<0.010	0.090	0.088	<0.010	0.010	6503348
Acenaphthylene	ug/L	<0.010	0.075	0.080	<0.010	0.010	6503348
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	6496287
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Fluoranthene	ug/L	<0.010	0.019	0.019	<0.010	0.010	6503348
Fluorene	ug/L	<0.010	0.074	0.077	<0.010	0.010	6503348
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Naphthalene	ug/L	<0.20	0.36	0.53	<0.20	0.20	6503348
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	6503348
Phenanthrene	ug/L	<0.010	0.047	0.050	<0.010	0.010	6503348
Pyrene	ug/L	<0.010	0.019	0.025	<0.010	0.010	6503348
Surrogate Recovery (%)							
D10-Anthracene	%	93	91	89	95		6503348
D14-Terphenyl	%	95	92	92	97		6503348
D8-Acenaphthylene	%	92	88	85	91		6503348

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Sample LOM109 [NRC-1-SW] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample LOM113 [COB-4-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample LOM114 [COB-6-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample LOM115 [WB-1-SW] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample LOM117 [BP-1-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample LOM118 [FD-21] : Poor RCAp Ion Balance due to sample matrix.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6503348	LGE	Matrix Spike [LOM096-06]	D10-Anthracene	2019/12/19		91	%	50 - 130
			D14-Terphenyl	2019/12/19		96	%	50 - 130
			D8-Acenaphthylene	2019/12/19		89	%	50 - 130
			1-Methylnaphthalene	2019/12/19		88	%	50 - 130
			2-Methylnaphthalene	2019/12/19		88	%	50 - 130
			Acenaphthene	2019/12/19		96	%	50 - 130
			Acenaphthylene	2019/12/19		93	%	50 - 130
			Anthracene	2019/12/19		86	%	50 - 130
			Benzo(a)anthracene	2019/12/19		72	%	50 - 130
			Benzo(a)pyrene	2019/12/19		89	%	50 - 130
			Benzo(b)fluoranthene	2019/12/19		91	%	50 - 130
			Benzo(g,h,i)perylene	2019/12/19		89	%	50 - 130
			Benzo(j)fluoranthene	2019/12/19		65	%	50 - 130
			Benzo(k)fluoranthene	2019/12/19		64	%	50 - 130
			Chrysene	2019/12/19		97	%	50 - 130
			Dibenzo(a,h)anthracene	2019/12/19		65	%	50 - 130
			Fluoranthene	2019/12/19		88	%	50 - 130
			Fluorene	2019/12/19		96	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/12/19		86	%	50 - 130
			Naphthalene	2019/12/19		89	%	50 - 130
			Perylene	2019/12/19		81	%	50 - 130
			Phenanthrene	2019/12/19		95	%	50 - 130
			Pyrene	2019/12/19		89	%	50 - 130
6503348	LGE	Spiked Blank	D10-Anthracene	2019/12/18		101	%	50 - 130
			D14-Terphenyl	2019/12/18		102	%	50 - 130
			D8-Acenaphthylene	2019/12/18		97	%	50 - 130
			1-Methylnaphthalene	2019/12/18		96	%	50 - 130
			2-Methylnaphthalene	2019/12/18		97	%	50 - 130
			Acenaphthene	2019/12/18		108	%	50 - 130
			Acenaphthylene	2019/12/18		102	%	50 - 130
			Anthracene	2019/12/18		96	%	50 - 130
			Benzo(a)anthracene	2019/12/18		78	%	50 - 130
			Benzo(a)pyrene	2019/12/18		99	%	50 - 130
			Benzo(b)fluoranthene	2019/12/18		103	%	50 - 130
			Benzo(g,h,i)perylene	2019/12/18		100	%	50 - 130
			Benzo(j)fluoranthene	2019/12/18		73	%	50 - 130
			Benzo(k)fluoranthene	2019/12/18		71	%	50 - 130
			Chrysene	2019/12/18		104	%	50 - 130
			Dibenzo(a,h)anthracene	2019/12/18		71	%	50 - 130
			Fluoranthene	2019/12/18		95	%	50 - 130
			Fluorene	2019/12/18		108	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/12/18		95	%	50 - 130
			Naphthalene	2019/12/18		100	%	50 - 130
			Perylene	2019/12/18		90	%	50 - 130
			Phenanthrene	2019/12/18		106	%	50 - 130
			Pyrene	2019/12/18		97	%	50 - 130
6503348	LGE	Method Blank	D10-Anthracene	2019/12/18		101	%	50 - 130
			D14-Terphenyl	2019/12/18		104	%	50 - 130
			D8-Acenaphthylene	2019/12/18		96	%	50 - 130
			1-Methylnaphthalene	2019/12/18	<0.050		ug/L	
			2-Methylnaphthalene	2019/12/18	<0.050		ug/L	
			Acenaphthene	2019/12/18	<0.010		ug/L	
			Acenaphthylene	2019/12/18	<0.010		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Anthracene	2019/12/18	<0.010		ug/L	
			Benzo(a)anthracene	2019/12/18	<0.010		ug/L	
			Benzo(a)pyrene	2019/12/18	<0.010		ug/L	
			Benzo(b)fluoranthene	2019/12/18	<0.010		ug/L	
			Benzo(g,h,i)perylene	2019/12/18	<0.010		ug/L	
			Benzo(j)fluoranthene	2019/12/18	<0.010		ug/L	
			Benzo(k)fluoranthene	2019/12/18	<0.010		ug/L	
			Chrysene	2019/12/18	<0.010		ug/L	
			Dibenzo(a,h)anthracene	2019/12/18	<0.010		ug/L	
			Fluoranthene	2019/12/18	<0.010		ug/L	
			Fluorene	2019/12/18	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/12/18	<0.010		ug/L	
			Naphthalene	2019/12/18	<0.20		ug/L	
			Perylene	2019/12/18	<0.010		ug/L	
			Phenanthrene	2019/12/18	<0.010		ug/L	
			Pyrene	2019/12/18	<0.010		ug/L	
6503348	LGE	RPD	1-Methylnaphthalene	2019/12/19	NC		%	40
			2-Methylnaphthalene	2019/12/19	NC		%	40
			Acenaphthene	2019/12/19	NC		%	40
			Acenaphthylene	2019/12/19	NC		%	40
			Anthracene	2019/12/19	NC		%	40
			Benzo(a)anthracene	2019/12/19	NC		%	40
			Benzo(a)pyrene	2019/12/19	NC		%	40
			Benzo(b)fluoranthene	2019/12/19	NC		%	40
			Benzo(g,h,i)perylene	2019/12/19	NC		%	40
			Benzo(j)fluoranthene	2019/12/19	NC		%	40
			Benzo(k)fluoranthene	2019/12/19	NC		%	40
			Chrysene	2019/12/19	NC		%	40
			Dibenzo(a,h)anthracene	2019/12/19	NC		%	40
			Fluoranthene	2019/12/19	NC		%	40
			Fluorene	2019/12/19	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/12/19	NC		%	40
			Naphthalene	2019/12/19	NC		%	40
			Perylene	2019/12/19	NC		%	40
			Phenanthrene	2019/12/19	NC		%	40
			Pyrene	2019/12/19	NC		%	40
6505772	MLB	Matrix Spike [LOM112-02]	Total Aluminum (Al)	2019/12/19		101	%	80 - 120
			Total Antimony (Sb)	2019/12/19		108	%	80 - 120
			Total Arsenic (As)	2019/12/19		100	%	80 - 120
			Total Barium (Ba)	2019/12/19		102	%	80 - 120
			Total Beryllium (Be)	2019/12/19		101	%	80 - 120
			Total Bismuth (Bi)	2019/12/19		101	%	80 - 120
			Total Boron (B)	2019/12/19		100	%	80 - 120
			Total Cadmium (Cd)	2019/12/19		97	%	80 - 120
			Total Calcium (Ca)	2019/12/19		NC	%	80 - 120
			Total Chromium (Cr)	2019/12/19		100	%	80 - 120
			Total Cobalt (Co)	2019/12/19		97	%	80 - 120
			Total Copper (Cu)	2019/12/19		96	%	80 - 120
			Total Iron (Fe)	2019/12/19		104	%	80 - 120
			Total Lead (Pb)	2019/12/19		101	%	80 - 120
			Total Magnesium (Mg)	2019/12/19		102	%	80 - 120
			Total Manganese (Mn)	2019/12/19		NC	%	80 - 120
			Total Molybdenum (Mo)	2019/12/19		108	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2019/12/19		99	%	80 - 120
			Total Phosphorus (P)	2019/12/19		103	%	80 - 120
			Total Potassium (K)	2019/12/19		104	%	80 - 120
			Total Selenium (Se)	2019/12/19		99	%	80 - 120
			Total Silver (Ag)	2019/12/19		100	%	80 - 120
			Total Sodium (Na)	2019/12/19		98	%	80 - 120
			Total Strontium (Sr)	2019/12/19		NC	%	80 - 120
			Total Thallium (Tl)	2019/12/19		102	%	80 - 120
			Total Tin (Sn)	2019/12/19		104	%	80 - 120
			Total Titanium (Ti)	2019/12/19		103	%	80 - 120
			Total Uranium (U)	2019/12/19		107	%	80 - 120
			Total Vanadium (V)	2019/12/19		104	%	80 - 120
			Total Zinc (Zn)	2019/12/19		96	%	80 - 120
6505772	MLB	Spiked Blank	Total Aluminum (Al)	2019/12/19		101	%	80 - 120
			Total Antimony (Sb)	2019/12/19		103	%	80 - 120
			Total Arsenic (As)	2019/12/19		98	%	80 - 120
			Total Barium (Ba)	2019/12/19		102	%	80 - 120
			Total Beryllium (Be)	2019/12/19		100	%	80 - 120
			Total Bismuth (Bi)	2019/12/19		100	%	80 - 120
			Total Boron (B)	2019/12/19		98	%	80 - 120
			Total Cadmium (Cd)	2019/12/19		95	%	80 - 120
			Total Calcium (Ca)	2019/12/19		105	%	80 - 120
			Total Chromium (Cr)	2019/12/19		98	%	80 - 120
			Total Cobalt (Co)	2019/12/19		98	%	80 - 120
			Total Copper (Cu)	2019/12/19		97	%	80 - 120
			Total Iron (Fe)	2019/12/19		102	%	80 - 120
			Total Lead (Pb)	2019/12/19		101	%	80 - 120
			Total Magnesium (Mg)	2019/12/19		104	%	80 - 120
			Total Manganese (Mn)	2019/12/19		101	%	80 - 120
			Total Molybdenum (Mo)	2019/12/19		103	%	80 - 120
			Total Nickel (Ni)	2019/12/19		99	%	80 - 120
			Total Phosphorus (P)	2019/12/19		103	%	80 - 120
			Total Potassium (K)	2019/12/19		104	%	80 - 120
			Total Selenium (Se)	2019/12/19		96	%	80 - 120
			Total Silver (Ag)	2019/12/19		99	%	80 - 120
			Total Sodium (Na)	2019/12/19		100	%	80 - 120
			Total Strontium (Sr)	2019/12/19		100	%	80 - 120
			Total Thallium (Tl)	2019/12/19		101	%	80 - 120
			Total Tin (Sn)	2019/12/19		103	%	80 - 120
			Total Titanium (Ti)	2019/12/19		102	%	80 - 120
			Total Uranium (U)	2019/12/19		106	%	80 - 120
			Total Vanadium (V)	2019/12/19		103	%	80 - 120
			Total Zinc (Zn)	2019/12/19		96	%	80 - 120
6505772	MLB	Method Blank	Total Aluminum (Al)	2019/12/19	<5.0		ug/L	
			Total Antimony (Sb)	2019/12/19	<1.0		ug/L	
			Total Arsenic (As)	2019/12/19	<1.0		ug/L	
			Total Barium (Ba)	2019/12/19	<1.0		ug/L	
			Total Beryllium (Be)	2019/12/19	<1.0		ug/L	
			Total Bismuth (Bi)	2019/12/19	<2.0		ug/L	
			Total Boron (B)	2019/12/19	<50		ug/L	
			Total Cadmium (Cd)	2019/12/19	<0.010		ug/L	
			Total Calcium (Ca)	2019/12/19	<100		ug/L	
			Total Chromium (Cr)	2019/12/19	<1.0		ug/L	
			Total Cobalt (Co)	2019/12/19	<0.40		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Copper (Cu)	2019/12/19	<0.50		ug/L	
			Total Iron (Fe)	2019/12/19	<50		ug/L	
			Total Lead (Pb)	2019/12/19	<0.50		ug/L	
			Total Magnesium (Mg)	2019/12/19	<100		ug/L	
			Total Manganese (Mn)	2019/12/19	<2.0		ug/L	
			Total Molybdenum (Mo)	2019/12/19	<2.0		ug/L	
			Total Nickel (Ni)	2019/12/19	<2.0		ug/L	
			Total Phosphorus (P)	2019/12/19	<100		ug/L	
			Total Potassium (K)	2019/12/19	<100		ug/L	
			Total Selenium (Se)	2019/12/19	<0.50		ug/L	
			Total Silver (Ag)	2019/12/19	<0.10		ug/L	
			Total Sodium (Na)	2019/12/19	<100		ug/L	
			Total Strontium (Sr)	2019/12/19	<2.0		ug/L	
			Total Thallium (Tl)	2019/12/19	<0.10		ug/L	
			Total Tin (Sn)	2019/12/19	<2.0		ug/L	
			Total Titanium (Ti)	2019/12/19	<2.0		ug/L	
			Total Uranium (U)	2019/12/19	<0.10		ug/L	
			Total Vanadium (V)	2019/12/19	<2.0		ug/L	
			Total Zinc (Zn)	2019/12/19	<5.0		ug/L	
6505772	MLB	RPD [LOM111-02]	Total Aluminum (Al)	2019/12/19	1.2		%	20
			Total Antimony (Sb)	2019/12/19	NC		%	20
			Total Arsenic (As)	2019/12/19	NC		%	20
			Total Barium (Ba)	2019/12/19	1.5		%	20
			Total Beryllium (Be)	2019/12/19	NC		%	20
			Total Bismuth (Bi)	2019/12/19	NC		%	20
			Total Boron (B)	2019/12/19	0.81		%	20
			Total Cadmium (Cd)	2019/12/19	NC		%	20
			Total Calcium (Ca)	2019/12/19	1.9		%	20
			Total Chromium (Cr)	2019/12/19	NC		%	20
			Total Cobalt (Co)	2019/12/19	NC		%	20
			Total Copper (Cu)	2019/12/19	NC		%	20
			Total Iron (Fe)	2019/12/19	NC		%	20
			Total Lead (Pb)	2019/12/19	NC		%	20
			Total Magnesium (Mg)	2019/12/19	2.5		%	20
			Total Manganese (Mn)	2019/12/19	3.3		%	20
			Total Molybdenum (Mo)	2019/12/19	NC		%	20
			Total Nickel (Ni)	2019/12/19	NC		%	20
			Total Phosphorus (P)	2019/12/19	NC		%	20
			Total Potassium (K)	2019/12/19	4.3		%	20
			Total Selenium (Se)	2019/12/19	NC		%	20
			Total Silver (Ag)	2019/12/19	NC		%	20
			Total Sodium (Na)	2019/12/19	4.7		%	20
			Total Strontium (Sr)	2019/12/19	6.2		%	20
			Total Thallium (Tl)	2019/12/19	NC		%	20
			Total Tin (Sn)	2019/12/19	NC		%	20
			Total Titanium (Ti)	2019/12/19	NC		%	20
			Total Uranium (U)	2019/12/19	7.8		%	20
			Total Vanadium (V)	2019/12/19	NC		%	20
			Total Zinc (Zn)	2019/12/19	NC		%	20
6505873	SSI	Matrix Spike [LOM110-04]	Total Organic Carbon (C)	2019/12/19		94	%	85 - 115
6505873	SSI	Spiked Blank	Total Organic Carbon (C)	2019/12/19		101	%	80 - 120
6505873	SSI	Method Blank	Total Organic Carbon (C)	2019/12/19	<0.50		mg/L	
6505873	SSI	RPD [LOM110-04]	Total Organic Carbon (C)	2019/12/19	3.6		%	15

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6506066	NHU	Matrix Spike [LOM096-05]	Total Mercury (Hg)	2019/12/20		102	%	80 - 120
6506066	NHU	Spiked Blank	Total Mercury (Hg)	2019/12/20		103	%	80 - 120
6506066	NHU	Method Blank	Total Mercury (Hg)	2019/12/20	<0.013		ug/L	
6506066	NHU	RPD	Total Mercury (Hg)	2019/12/20	NC		%	20
6506685	EMT	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/12/19		111	%	80 - 120
6506685	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19		103	%	80 - 120
6506685	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19	<0.050		mg/L	
6506685	EMT	RPD	Nitrogen (Ammonia Nitrogen)	2019/12/19	2.8		%	20
6506691	EMT	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/12/19		112	%	80 - 120
6506691	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19		105	%	80 - 120
6506691	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19	<0.050		mg/L	
6506691	EMT	RPD	Nitrogen (Ammonia Nitrogen)	2019/12/19	NC		%	20
6506693	EMT	Matrix Spike [LOM113-03]	Nitrogen (Ammonia Nitrogen)	2019/12/20		115	%	80 - 120
6506693	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19		110	%	80 - 120
6506693	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/12/19	<0.050		mg/L	
6506693	EMT	RPD [LOM113-03]	Nitrogen (Ammonia Nitrogen)	2019/12/20	18		%	20
6508252	SHW	QC Standard	pH	2019/12/20		101	%	97 - 103
6508252	SHW	RPD	pH	2019/12/20	0.41		%	N/A
6508253	SHW	Spiked Blank	Conductivity	2019/12/20		104	%	80 - 120
6508253	SHW	Method Blank	Conductivity	2019/12/20	<1.0		uS/cm	
6508253	SHW	RPD	Conductivity	2019/12/20	2.4		%	10
6508255	SHW	QC Standard	pH	2019/12/20		101	%	97 - 103
6508255	SHW	RPD [LOM114-01]	pH	2019/12/20	1.2		%	N/A
6508256	SHW	Spiked Blank	Conductivity	2019/12/20		106	%	80 - 120
6508256	SHW	Method Blank	Conductivity	2019/12/20	1.0, RDL=1.0		uS/cm	
6508256	SHW	RPD [LOM114-01]	Conductivity	2019/12/20	0.00046		%	10
6508311	SHW	QC Standard	pH	2019/12/20		101	%	97 - 103
6508311	SHW	RPD	pH	2019/12/20	0.53		%	N/A
6508312	SHW	Spiked Blank	Conductivity	2019/12/20		100	%	80 - 120
6508312	SHW	Method Blank	Conductivity	2019/12/20	1.1, RDL=1.0		uS/cm	
6508312	SHW	RPD	Conductivity	2019/12/20	0.069		%	10
6508342	SSI	Matrix Spike	Total Organic Carbon (C)	2019/12/20		97	%	85 - 115
6508342	SSI	Spiked Blank	Total Organic Carbon (C)	2019/12/20		101	%	80 - 120
6508342	SSI	Method Blank	Total Organic Carbon (C)	2019/12/20	<0.50		mg/L	
6508342	SSI	RPD	Total Organic Carbon (C)	2019/12/20	1.2		%	15
6508352	SSI	Matrix Spike	Total Organic Carbon (C)	2019/12/23		93	%	85 - 115
6508352	SSI	Spiked Blank	Total Organic Carbon (C)	2019/12/23		102	%	80 - 120
6508352	SSI	Method Blank	Total Organic Carbon (C)	2019/12/23	<0.50		mg/L	
6508352	SSI	RPD	Total Organic Carbon (C)	2019/12/23	1.5		%	15
6508362	SHW	QC Standard	Turbidity	2019/12/20		103	%	80 - 120
6508362	SHW	Spiked Blank	Turbidity	2019/12/20		99	%	80 - 120
6508362	SHW	Method Blank	Turbidity	2019/12/20	<0.10		NTU	
6508362	SHW	RPD [LOM114-01]	Turbidity	2019/12/20	5.6		%	20
6508363	SHW	QC Standard	Turbidity	2019/12/20		103	%	80 - 120
6508363	SHW	Spiked Blank	Turbidity	2019/12/20		99	%	80 - 120
6508363	SHW	Method Blank	Turbidity	2019/12/20	<0.10		NTU	
6508363	SHW	RPD	Turbidity	2019/12/20	NC		%	20
6509186	EMT	Matrix Spike [LOM114-01]	Total Alkalinity (Total as CaCO3)	2019/12/23		NC	%	80 - 120
6509186	EMT	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/12/23		116	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6509186	EMT	Method Blank	Total Alkalinity (Total as CaCO3)	2019/12/23	<5.0		mg/L	
6509186	EMT	RPD [LOM114-01]	Total Alkalinity (Total as CaCO3)	2019/12/23	5.7		%	25
6509275	EMT	Matrix Spike [LOM114-01]	Dissolved Chloride (Cl-)	2019/12/23		NC	%	80 - 120
6509275	EMT	Spiked Blank	Dissolved Chloride (Cl-)	2019/12/23		101	%	80 - 120
6509275	EMT	Method Blank	Dissolved Chloride (Cl-)	2019/12/23	<1.0		mg/L	
6509275	EMT	RPD [LOM114-01]	Dissolved Chloride (Cl-)	2019/12/23	10		%	25
6509276	EMT	Matrix Spike [LOM114-01]	Dissolved Sulphate (SO4)	2019/12/23		92	%	80 - 120
6509276	EMT	Spiked Blank	Dissolved Sulphate (SO4)	2019/12/23		108	%	80 - 120
6509276	EMT	Method Blank	Dissolved Sulphate (SO4)	2019/12/23	<2.0		mg/L	
6509276	EMT	RPD [LOM114-01]	Dissolved Sulphate (SO4)	2019/12/23	0.20		%	25
6509277	EMT	Matrix Spike [LOM114-01]	Reactive Silica (SiO2)	2019/12/23		96	%	80 - 120
6509277	EMT	Spiked Blank	Reactive Silica (SiO2)	2019/12/23		99	%	80 - 120
6509277	EMT	Method Blank	Reactive Silica (SiO2)	2019/12/23	<0.50		mg/L	
6509277	EMT	RPD [LOM114-01]	Reactive Silica (SiO2)	2019/12/23	0.52		%	25
6509278	EMT	Spiked Blank	Colour	2019/12/23		99	%	80 - 120
6509278	EMT	Method Blank	Colour	2019/12/23	<5.0		TCU	
6509278	EMT	RPD [LOM114-01]	Colour	2019/12/23	2.7		%	20
6509282	EMT	Matrix Spike [LOM114-01]	Orthophosphate (P)	2019/12/20		87	%	80 - 120
6509282	EMT	Spiked Blank	Orthophosphate (P)	2019/12/20		93	%	80 - 120
6509282	EMT	Method Blank	Orthophosphate (P)	2019/12/20	<0.010		mg/L	
6509282	EMT	RPD [LOM114-01]	Orthophosphate (P)	2019/12/20	NC		%	25
6509283	EMT	Matrix Spike [LOM114-01]	Nitrate + Nitrite (N)	2019/12/23		95	%	80 - 120
6509283	EMT	Spiked Blank	Nitrate + Nitrite (N)	2019/12/23		101	%	80 - 120
6509283	EMT	Method Blank	Nitrate + Nitrite (N)	2019/12/23	<0.050		mg/L	
6509283	EMT	RPD [LOM114-01]	Nitrate + Nitrite (N)	2019/12/23	8.1		%	25
6509288	EMT	Matrix Spike [LOM114-01]	Nitrite (N)	2019/12/23		101	%	80 - 120
6509288	EMT	Spiked Blank	Nitrite (N)	2019/12/23		106	%	80 - 120
6509288	EMT	Method Blank	Nitrite (N)	2019/12/23	<0.010		mg/L	
6509288	EMT	RPD [LOM114-01]	Nitrite (N)	2019/12/23	11		%	20
6511627	SSI	Matrix Spike	Total Organic Carbon (C)	2019/12/23		94	%	85 - 115
6511627	SSI	Spiked Blank	Total Organic Carbon (C)	2019/12/23		100	%	80 - 120
6511627	SSI	Method Blank	Total Organic Carbon (C)	2019/12/23	<0.50		mg/L	
6511627	SSI	RPD	Total Organic Carbon (C)	2019/12/23	3.2		%	15

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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APPENDIX D
MANN-KENDALL TABLES

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.000005	0.000012	0.000016	0.000019	0.000017	0.000014	0.000033	0.000011	0.000005	0.000019	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	0	1	8
Row 2: Compare to Event 2:			1	1	1	1	1	-1	-1	1	4
Row 3: Compare to Event 3:				1	1	-1	1	-1	-1	1	1
Row 4: Compare to Event 4:					-1	-1	1	-1	-1	0	-3
Row 5: Compare to Event 5:						-1	1	-1	-1	1	-1
Row 6: Compare to Event 6:							1	-1	-1	1	0
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **7**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							X
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
	X	CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.000016	0.000018	0.000005	0.000011	0.000005	0.000017	0.000005	0.000015	0.000014	0.000026	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	-1	-1	1	-1	-1	-1	1	-3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	1	-6
Row 3: Compare to Event 3:				1	0	1	0	1	1	1	5
Row 4: Compare to Event 4:					-1	1	-1	1	1	1	2
Row 5: Compare to Event 5:						1	0	1	1	1	4
Row 6: Compare to Event 6:							-1	-1	-1	1	-2
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **4**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							X
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	0.196	0.13	0.32	0.14	0.16	0.11	0.34	0.13	0.077	0.078	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	-1	-1	1	-1	-1	-1	-5
Row 2: Compare to Event 2:			1	1	1	-1	1	0	-1	-1	1
Row 3: Compare to Event 3:				-1	-1	-1	1	-1	-1	-1	-5
Row 4: Compare to Event 4:					1	-1	1	-1	-1	-1	-2
Row 5: Compare to Event 5:						-1	1	-1	-1	-1	-3
Row 6: Compare to Event 6:							1	1	-1	-1	0
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = -18

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							X
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	0.0025	0.006	0.009	0.0061	0.0025	0.0025	0.0025	0.0025	0.0055	0.012	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		1	1	1	0	0	0	0	1	1	5
Row 2: Compare to Event 2:			1	1	-1	-1	-1	-1	-1	1	-2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	1	-5
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	1	-4
Row 5: Compare to Event 5:						0	0	0	1	1	2
Row 6: Compare to Event 6:							0	0	1	1	2
Row 7: Compare to Event 7:								0	1	1	2
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							X
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Suphate	0.0065	0.026	0.016	0.024	0.01	0.023	0.012	0.024	0.032	0.035	
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	1	1	9
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	1	1	-4
Row 3: Compare to Event 3:				1	-1	1	-1	1	1	1	3
Row 4: Compare to Event 4:					-1	-1	-1	0	1	1	-1
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	1	1	2
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **20**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							X
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
X	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.037	0.021	0.01	0.005	0.005	0.005	0.005	0.005	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	1	1	0	0	0	0	0	3
Row 2: Compare to Event 2:			1	1	1	0	0	0	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-12**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							X
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.005	0.14	0.005	0.027	0.005	0.01	0.005	0.005	0.005	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	1	0	1	0	0	0	3
Row 2: Compare to Event 2:			1	0	1	0	1	0	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							X
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.068	0.005	0.011	0.005	0.005	0.005	0.005	0.005	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	1	0	0	0	0	0	2
Row 2: Compare to Event 2:			1	0	1	0	0	0	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-7**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							X
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.022	0.019	0.14	0.016	0.025	0.016	0.012	0.015	0.018	0.02	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2:			1	-1	1	-1	-1	-1	-1	1	-2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	0	-1	-1	1	1	1
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							-1	-1	1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-12**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							X
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	32	54	36	52	34	31	60	35	55	34	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	1	1	1	-1	1	1	1	1	7
Row 2: Compare to Event 2:			-1	-1	-1	-1	1	-1	1	-1	-4
Row 3: Compare to Event 3:				1	-1	-1	1	-1	1	-1	-1
Row 4: Compare to Event 4:					-1	-1	1	-1	1	-1	-2
Row 5: Compare to Event 5:						-1	1	1	1	0	2
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **2**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	9.1	11	27	2.5	2.5	2.5	2.5	6.7	2.5	5.1	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	1	-1	-1	-1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2:			1	-1	-1	-1	-1	-1	-1	-1	-6
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					0	0	0	1	0	1	2
Row 5: Compare to Event 5:						0	0	1	0	1	2
Row 6: Compare to Event 6:							0	1	0	1	2
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-11**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							X
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	25	25	25	25	25	25	25	25	25	25	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Suphate	20	22	15	15	16	21	12	17	15	18	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	-1	-1	1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				0	1	1	-1	1	0	1	3
Row 4: Compare to Event 4:					1	1	-1	1	0	1	3
Row 5: Compare to Event 5:						1	-1	1	-1	1	1
Row 6: Compare to Event 6:							-1	-1	-1	-1	-4
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							X
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
	X	CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.000018	0.000005	0.000005	0.000005	0.000011	0.000005	0.000035	0.00006	0.000011	0.000014	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	1	1	-1	-1	-5
Row 2: Compare to Event 2:			0	0	1	0	1	1	1	1	5
Row 3: Compare to Event 3:				0	1	0	1	1	1	1	5
Row 4: Compare to Event 4:					1	0	1	1	1	1	5
Row 5: Compare to Event 5:						-1	1	1	0	1	2
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								1	-1	-1	-1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **14**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							X
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.000013	0.000005	0.000005	0.000005	0.000005	0.000005	0.000016	0.000034	0.000005	0.000005	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	1	1	-1	-1	-5
Row 2: Compare to Event 2:			0	0	0	0	1	1	0	0	2
Row 3: Compare to Event 3:				0	0	0	1	1	0	0	2
Row 4: Compare to Event 4:					0	0	1	1	0	0	2
Row 5: Compare to Event 5:						0	1	1	0	0	2
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								1	-1	-1	-1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **2**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
	X	CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.000035	0.000015	0.000023	0.000018	0.000039	0.000005	0.000017	0.00026	0.000027	0.000034	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	-1	1	-1	-1	-5
Row 2: Compare to Event 2:			1	1	1	-1	1	1	1	1	6
Row 3: Compare to Event 3:				-1	1	-1	-1	1	1	1	1
Row 4: Compare to Event 4:					1	-1	-1	1	1	1	2
Row 5: Compare to Event 5:						-1	-1	1	-1	-1	-3
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **7**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							X
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	0.15	0.15	0.15	0.17	0.14	0.19	0.35	0.18	0.13	0.13	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		0	0	1	-1	1	1	1	-1	-1	1
Row 2: Compare to Event 2:			0	1	-1	1	1	1	-1	-1	1
Row 3: Compare to Event 3:				1	-1	1	1	1	-1	-1	1
Row 4: Compare to Event 4:					-1	1	1	1	-1	-1	0
Row 5: Compare to Event 5:						1	1	1	-1	-1	1
Row 6: Compare to Event 6:							1	-1	-1	-1	-2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							X
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	0.007	0.0095	0.0025	0.0025	0.0057	0.0025	0.0062	0.047	0.0062	0.0073	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	-1	-1	-1	-1	1	-1	1	-3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	-1	-6
Row 3: Compare to Event 3:				0	1	0	1	1	1	1	5
Row 4: Compare to Event 4:					1	0	1	1	1	1	5
Row 5: Compare to Event 5:						-1	1	1	1	1	3
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **9**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							X
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SCR-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	0.11	0.064	0.057	0.091	0.054	0.13	0.05	0.12	0.074	0.074	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	-1	1	-1	1	-1	-1	-5
Row 2: Compare to Event 2:			-1	1	-1	1	-1	1	1	1	2
Row 3: Compare to Event 3:				1	-1	1	-1	1	1	1	3
Row 4: Compare to Event 4:					-1	1	-1	1	-1	-1	-2
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	-1	-1	-1	-4
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = -2

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Suphate	0.054	0.047	0.043	0.051	0.042	0.054	0.29	0.043	0.046	0.047	
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	-1	0	1	-1	-1	-1	-6
Row 2: Compare to Event 2:			-1	1	-1	1	1	-1	-1	0	-1
Row 3: Compare to Event 3:				1	-1	1	1	0	1	1	4
Row 4: Compare to Event 4:					-1	1	1	-1	-1	-1	-2
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							1	-1	-1	-1	-2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = -2

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	18/1123	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		1	0	0	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	0	0	-6
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.015	0.005	0.005	0.005	0.058	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	-1	-1	0	0	-5
Row 2: Compare to Event 2:			0	0	1	0	0	0	0	0	1
Row 3: Compare to Event 3:				0	1	0	0	0	0	0	1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	671	260	260	250	270	210	240	250			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			0	-1	1	-1	-1	-1	0	0	-3
Row 3: Compare to Event 3:				-1	1	-1	-1	-1	0	0	-3
Row 4: Compare to Event 4:					1	-1	-1	0	0	0	-1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-14**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14					X		
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	2.5	2.5	2.5	2.5	14	2.5	2.5	2.5			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		0	0	0	1	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	0	1	0	0	0	0	0	1
Row 3: Compare to Event 3:				0	1	0	0	0	0	0	1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1					X		
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	415	25	25	85	58	25	53	57			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			0	1	1	0	1	1	0	0	4
Row 3: Compare to Event 3:				1	1	0	1	1	0	0	4
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-A-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	740	160	170	150	100	110	100	120			
	23-Jul-13	22-Dec-14	18-Nov-15	8-Dec-16	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	-1	-1	-1	-1	-1	0	0	-4
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	0	0	-5
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						1	0	1	0	0	2
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-17**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17					X		
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.000005	0.000005	0.000005	0.000005	0.000005						
	11-18-15	16-Aug-12	12-18-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0		X					
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.000005	0.000005	0.000005	0.000005	0.000005						
	11-18-15	16-Aug-12	12-18-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0		X					
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.000005	0.000005	0.000005	0.000005	0.000005						
	11-18-15	16-Aug-12	12-18-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0		X					
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.000005	0.027	0.000005	0.000005	0.000005						
	18-Nov-15	8-Dec-16	18-Dec-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		1	0	0	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			-1	-1	-1	0	0	0	0	0	-3
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-2**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2		X					
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	250	480	190	200	200						
	18-Nov-15	8-Dec-16	18-Dec-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		1	-1	-1	-1	0	0	0	0	0	-2
Row 2: Compare to Event 2:			-1	-1	-1	0	0	0	0	0	-3
Row 3: Compare to Event 3:				1	1	0	0	0	0	0	2
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3		X					
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24		Not Physically possible					
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	2.5	2.5	2.5	2.5	2.5						
	18-Nov-15	8-Dec-16	18-Dec-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0		X					
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	25	540	25	25	67						
	18-Nov-15	8-Dec-16	18-Dec-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		1	0	0	1	0	0	0	0	0	2
Row 2: Compare to Event 2:			-1	-1	-1	0	0	0	0	0	-3
Row 3: Compare to Event 3:				0	1	0	0	0	0	0	1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1		X					
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-B-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Suphate	190	440	120	110	120						
	18-Nov-15	8-Dec-16	18-Dec-17	23-Nov-18	13-Dec-19						
Row 1: Compare to Event 1:		1	-1	-1	-1	0	0	0	0	0	-2
Row 2: Compare to Event 2:			-1	-1	-1	0	0	0	0	0	-3
Row 3: Compare to Event 3:				-1	0	0	0	0	0	0	-1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart

S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5		X					
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
X		CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.12	0.005	0.013	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	0	0	0	0	0	0	2
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-11**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							X
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.012	0.74	0.005	0.04	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	1	-1	-1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-18**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							X
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.39	0.005	0.028	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	0	0	0	0	0	0	2
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-11**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							X
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.005	0.29	0.005	0.014	0.011	0.01	0.005	0.014	0.005	0.015	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	1	1	0	1	0	1	6
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	0	1	0	1	5
Row 4: Compare to Event 4:					-1	-1	-1	0	-1	1	-3
Row 5: Compare to Event 5:						-1	-1	1	-1	1	-1
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **2**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	250	150	280	110	450	110	430	130	230	110	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	-1	-1	-3
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	1	-1	0
Row 3: Compare to Event 3:				-1	1	-1	1	-1	-1	-1	-3
Row 4: Compare to Event 4:					1	0	1	1	1	0	4
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	0	3
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							X
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	10	96	2.5	2.5	2.5	5.1	2.5	2.5	2.5	2.5	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	-1	-1	-1	-1	-1	-1	-1	-7
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				0	0	1	0	0	0	0	1
Row 4: Compare to Event 4:					0	1	0	0	0	0	1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	-1	-1	-1	-4
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-16**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							X
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	60	25	25	25	63	25	57	25	25	25	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	-1	-1	-1	-1	-7
Row 2: Compare to Event 2:			0	0	1	0	1	0	0	0	2
Row 3: Compare to Event 3:				0	1	0	1	0	0	0	2
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							X
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	100	41	74	39	110	42	100	41	69	43	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	0	-1	-1	-1	-6
Row 2: Compare to Event 2:			1	-1	1	1	1	0	1	1	5
Row 3: Compare to Event 3:				-1	1	-1	1	-1	-1	-1	-3
Row 4: Compare to Event 4:					1	1	1	1	1	1	6
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	1	1	2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							X
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							X
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.03	0.005	0.038	0.017	0.012	0.005	0.01	0.005	0.015	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	1	1	0	1	0	1	6
Row 2: Compare to Event 2:			-1	1	-1	-1	-1	-1	-1	-1	-6
Row 3: Compare to Event 3:				1	1	1	0	1	0	1	5
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							-1	-1	-1	1	-2
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							X
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.015	0.005	0.027	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	0	0	0	0	0	0	2
Row 2: Compare to Event 2:			-1	1	-1	-1	-1	-1	-1	-1	-6
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-9**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							X
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.005	0.018	0.005	0.015	0.011	0.01	0.005	0.015	0.005	0.014	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	1	1	0	1	0	1	6
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	0	1	0	1	5
Row 4: Compare to Event 4:					-1	-1	-1	0	-1	-1	-5
Row 5: Compare to Event 5:						-1	-1	1	-1	1	-1
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-2**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	300	180	300	160	500	160	350	140	300	150	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	0	-1	1	-1	1	-1	0	-1	-3
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	1	-1	0
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	-1	-2
Row 4: Compare to Event 4:					1	0	1	-1	1	-1	1
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	1	-1	0
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-11**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							X
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	7.4	2.5	2.5	2.5	2.5	2.5	2.5	6.4	2.5	2.5	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Row 2: Compare to Event 2:			0	0	0	0	0	1	0	0	1
Row 3: Compare to Event 3:				0	0	0	0	1	0	0	1
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							X
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	52	25	25	25	59	25	62	25	25	25	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	1	-1	-1	-1	-5
Row 2: Compare to Event 2:			0	0	1	0	1	0	0	0	2
Row 3: Compare to Event 3:				0	1	0	1	0	0	0	2
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	1	-1	-1	-1	-3
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							X
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	91	44	64	41	110	48	95	45	76	49	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	-1	-1	1	-1	1	-1	-1	-1	-5
Row 2: Compare to Event 2:			1	-1	1	1	1	1	1	1	6
Row 3: Compare to Event 3:				-1	1	-1	1	-1	1	-1	-1
Row 4: Compare to Event 4:					1	1	1	1	1	1	6
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	1	1	2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							X
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.025	0.005	0.005	0.005	0.005	0.97	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	0	0	0	1	0	0	2
Row 2: Compare to Event 2:			1	0	0	0	0	1	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	1	-1	-1	-5
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							X
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.005	0.092	0.005	0.027	0.005	0.005	2.5	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	1	0	0	1	0	0	3
Row 2: Compare to Event 2:			1	0	1	0	0	1	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	-1	1	-1	-1	-5
Row 4: Compare to Event 4:					1	0	0	1	0	0	2
Row 5: Compare to Event 5:						-1	-1	1	-1	-1	-3
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.025	0.005	0.005	0.005	0.005	1.3	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	0	0	0	1	0	0	2
Row 2: Compare to Event 2:			1	0	0	0	0	1	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	1	-1	-1	-5
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							X
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.012	0.005	0.035	0.026	0.27	0.27	0.024	0.15	0.021	0.027	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-09	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	1	1	1	1	1	1	1	7
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	1	1	-1	1	-1	-1	-1
Row 4: Compare to Event 4:					1	1	-1	1	-1	1	2
Row 5: Compare to Event 5:						0	-1	-1	-1	-1	-4
Row 6: Compare to Event 6:							-1	-1	-1	-1	-4
Row 7: Compare to Event 7:								1	-1	1	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **8**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							X
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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NS Lands
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	100	73	1300	61	940	49	320	50	120	39	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	1	-1	-1
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	1	-1	0
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	-1	2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-15**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							X
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	7.9	2.5	11	2.5	2.5	2.5	6	160	2.5	5	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	-1	-1	-1	1	-1	-1	-5
Row 2: Compare to Event 2:			1	0	0	0	1	1	0	1	4
Row 3: Compare to Event 3:				-1	-1	-1	-1	1	-1	-1	-5
Row 4: Compare to Event 4:					0	0	1	1	0	1	3
Row 5: Compare to Event 5:						0	1	1	0	1	3
Row 6: Compare to Event 6:							1	1	0	1	3
Row 7: Compare to Event 7:								1	-1	-1	-1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							X
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	25	25	690	25	430	25	110	25	25	25	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	1	0	1	0	1	0	0	0	3
Row 2: Compare to Event 2:			1	0	1	0	1	0	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							X
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	10	8.3	410	8.5	230	8	71	6.5	16	6.6	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	1	-1	-1
Row 2: Compare to Event 2:			1	1	1	-1	1	-1	1	-1	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	-1	-7
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	1	-1	0
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-13**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							X
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.011	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	1	0	0	1
Row 2: Compare to Event 2:			0	0	0	0	0	1	0	0	1
Row 3: Compare to Event 3:				0	0	0	0	1	0	0	1
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							X
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.022	0.005	0.016	0.005	0.018	0.005	0.031	0.005	0.025	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	1	0	1	0	1	0	1	5
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	1	-4
Row 3: Compare to Event 3:				1	0	1	0	1	0	1	4
Row 4: Compare to Event 4:					-1	1	-1	1	-1	1	0
Row 5: Compare to Event 5:						1	0	1	0	1	3
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **9**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							X
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.05	0.014	0.05	0.025	0.05	0.02	0.05	0.024	0.05	0.021	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	0	-1	0	-1	0	-1	0	-1	-5
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	0	-1	0	-1	0	-1	-4
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	0	-1	0	-1	-3
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							X
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	5300	580	5500	1000	6100	630	5900	730	5000	340	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	-1	-1	-3
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	-1	6
Row 3: Compare to Event 3:				-1	1	-1	1	-1	-1	-1	-3
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	-1	2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-7**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							X
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	25	41	25	2.5	25	2.5	25	2.5	25	2.5	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	-1	0	-1	0	-1	0	-1	-3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				-1	0	-1	0	-1	0	-1	-4
Row 4: Compare to Event 4:					1	0	1	0	1	0	3
Row 5: Compare to Event 5:						-1	0	-1	0	-1	-3
Row 6: Compare to Event 6:							1	0	1	0	2
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	0	1
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-15**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							X
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	2900	330	3600	520	3600	340	3500	420	3100	360	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	1	-1	-1
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	0	-1	-1	-1	-1	-1	-6
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							X
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	1500	190	1600	290	2000	210	1900	250	1700	250	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	1	-1	-1
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	1	-1	1	-1	1	-1	-1
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									1	0	1
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **2**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.11	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	1	0	0	1
Row 2: Compare to Event 2:			0	0	0	0	0	1	0	0	1
Row 3: Compare to Event 3:				0	0	0	0	1	0	0	1
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							X
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.014	0.019	0.005	0.016	0.005	0.018	0.13	0.035	0.029	0.019	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	-1	1	-1	1	1	1	1	1	5
Row 2: Compare to Event 2:			-1	-1	-1	-1	1	1	1	0	-1
Row 3: Compare to Event 3:				1	0	1	1	1	1	1	6
Row 4: Compare to Event 4:					-1	1	1	1	1	1	4
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **17**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							X
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
X	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.05	0.012	0.05	0.029	0.05	0.018	0.05	0.021	0.05	0.021	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	0	-1	0	-1	0	-1	0	-1	-5
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	0	-1	0	-1	0	-1	-4
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	0	-1	0	-1	-3
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	0	1
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-2**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							X
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
	X	CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	5400	370	5400	890	6100	450	5000	500	5000	660	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	0	-1	1	-1	-1	-1	-1	-1	-6
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	1	-1	-1	-1	-1	-1	-5
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							X
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	25	63	25	15	25	5.8	25	8.8	25	7.2	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		1	0	-1	0	-1	0	-1	0	-1	-3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				-1	0	-1	0	-1	0	-1	-4
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	0	-1	0	-1	-3
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-17**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							X
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	3100	180	3500	460	3600	210	2800	260	3000	180	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	0	7
Row 3: Compare to Event 3:				-1	1	-1	-1	-1	-1	-1	-5
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	-1	2
Row 7: Compare to Event 7:								-1	1	-1	-1
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							X
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	1300	110	1400	270	2000	150	1700	180	1700	120	
	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	1	-1	1	-1	-1
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				-1	1	-1	1	-1	1	-1	-1
Row 4: Compare to Event 4:					1	-1	1	-1	1	-1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	-1	2
Row 7: Compare to Event 7:								-1	0	-1	-2
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							X
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
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± 20							
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± 22							
± 23							
± 24	Not Physically possible						
± 25							
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± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume