FINAL REPORT

2024 Water Quality Monitoring Program - Bedford West

Bedford West Subdivision and Papermill Lake Watershed

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Executive Summary

WSP Canada Inc. (WSP, previously Wood E&I) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for 11 surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill Lake and Bedford West watersheds to detect any impacts on and/or changes to water quality.

In June 2020, Wood (now WSP) was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020, with an additional two years (i.e., 2023 and 2024) later added to the scope of work. The results of the 2024 surface water monitoring program are detailed herein. Sample collection in 2024 was completed during Spring (April), Summer (July), and Fall (October) events.

Field Measurements

- **Water Temperature:** There are no applicable CCME, HC, or NSECC guidelines for recreational water temperature. Recorded temperatures ranged from 2.2°C at HWY-102-02 during the fall resampling event to 22.8°C at KL-5 during the summer event.
- **Dissolved Oxygen**: In-situ dissolved oxygen levels fell below the CCME FWAL guideline of >5.5 mg/L during the spring, summer, and fall events. In the spring resampling event, three locations were measured to have DO concentrations below the CCME FWAL criterion (KL-2, HWY-102-2, and LSD); in the summer event, five locations were below the criterion (KL-2, KL-3, KL-4, HWY-102-1, and LSD); in the summer resampling event, four locations were below the criterion (KL-2, HWAY-102-1, HWY-102-2, and LSD); and in the fall sampling event, one location was below the criterion (HWY-102-1). All sampling stations were measured to have DO concentrations above 5.5 mg/L during the spring event and the fall resampling event. The minimum DO concentration of 1.82 mg/L was measured at HWY-102-1 during the fall sampling event, while the maximum DO concentration of 13.30 mg/L was recorded at KL-3 during the fall resampling event.
- **pH Levels**: During the 2024 program, several stations recorded field pH levels outside (i.e., below) the acceptable range of 5.0 – 11.0 for Recreational Water Quality and 6.5 – 9.0 for CCME-FWAL guidelines. In the spring event, five stations (KL-2, KL-4, HWY-102-2, LSD, and PML-1) reported pH values ranging from 5.93 to 6.48; in the spring resampling event, one station (KL-2) reported a pH value of 6.40; in the summer event, all stations were within the regulated guidelines; in the summer resampling event, two locations (KL-2 and HWY-102-1) reported pH values of 6.46 and 6.45, respectively; in the fall event, three stations (KL-1, KL-2 and LSD) recorded values ranging from 6.30 to 9.84; and during the fall resampling event, all stations were within the acceptable range.
- **Specific Conductivity:** No CCME, HC, or NSECC guidelines apply for recreational water conductivity. Specific conductivity levels ranged from 1.92 µS/cm at KL-2 during the summer event to 771.4 µS/cm at LU during the fall event.
- **Total Dissolved Solids**: No CCME, HC, or NSECC guidelines apply for recreational water TDS. However, TDS levels ranged from 9 mg/L at KL-2 during the summer event to 429 mg/L at HWY102-1 during the fall event.

Total Phosphorus

All eleven monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criterion of 0.01 mg/L in Spring, Summer and Fall events (including resampling events) of 2024. The maximum concentration reported was 0.088 mg/L at location HWY-102-1 during the fall sampling event. This may be an indication of a decline in surface water quality, which could be due to activities such as nutrient loading, wastewater discharge and stormwater runoff.

General Chemistry

- During the spring and fall events, laboratory-reported pH measurements at all 11 locations were outside the acceptable range of 5.0 – 11.0 for Recreational Water Quality and 6.5 – 9.0 for CCME-FWAL guidelines. In the spring event, all stations reported pH values ranging from 6.05 to 6.28, while in the fall event, pH values ranged from 6.12 to 6.48. All stations remained within the acceptable range during the summer event.
- During the summer and fall events, three sampling stations reported chloride concentrations exceeding the CCME long-term FWAL and NSECC EQS limit of 120 mg/L. In the summer, one exceedance was recorded at LU with a concentration of 139 mg/L, while in the fall, two stations (HWY102-1 and LU) recorded concentrations of 141 mg/L and 149 mg/L, respectively.
- Four sampling stations recorded exceedances of fluoride concentrations during the fall sampling event, surpassing the CCME long-term FWAL and NSECC EQS limit of 0.12 mg/L. The stations exceeding the limit were KL-1, KL-5, PML-1, and PML-2, with concentrations ranging from 0.14 to 0.17 mg/L. No exceedances were recorded during the spring or summer events.
- Six sampling stations recorded nitrite exceedances during the spring and fall sampling events, exceeding the CCME long-term FWAL and NSECC EQS limit of 0.06 mg/L. In the spring, exceedances occurred at KL-3, HWY102-1, and LU, with concentrations ranging from 0.06 to 0.09 mg/L at these locations. In the fall, exceedances were observed at KL-1, PML-1, and PML-2, with concentrations ranging from 0.07 to 0.18 mg/L at these locations. No exceedances were recorded during the summer event.

Metals

- **Aluminium**: Aluminium concentrations exceeded the CCME long-term FWAL and NSECC EQS of 5 µg/L (when pH is below 6.5) or 100 µg/L (when pH is above 6.5) across the spring, summer, and fall events. In the spring, exceedances were observed at all stations, with concentrations ranging from 60 to 686 µg/L. In the summer, four stations (KL-1, HWY-102-2, LSD, and LU) exceeded the limit, with exceeding concentrations ranging from 125 to 2,240 µg/L. In the fall, exceedances occurred at all stations, with concentrations ranging from 43 to 136 µg/L.
- Cadmium: The cadmium concentration exceeded the NSECC EQS of 1 µg/L at LSD during the summer event, where the concentration was 0.15 µg/L. It is noted that the reportable detection limit of 0.09 µg/L exceeds the CCME FWAL hardness-related criteria for all cadmium results where corresponding hardness was reported below 54 mg/L.
- **Cobalt**: Cobalt concentrations exceeded the NSECC EQS of 2 µg/L at LSD during the summer event, where the concentration was 4 µg/L. No other stations recorded cobalt exceedances during this event.

- **Copper**: Copper concentrations exceeded the CCME long-term FWAL and NSECC EQS of 2 µg/L (a hardness-dependent parameter) at two stations during the summer and fall events. In the summer, an exceedance was observed at LSD, while in the fall, an exceedance was reported at HWY-102-2. Detectable concentrations ranged from 2 to 15 µg/L. No copper exceedances were recorded during the spring event.
  - **Iron**: Iron concentrations exceeded the CCME long-term FWAL and NSECC EQS of 300 µg/L at eight stations across all three sampling events. In the spring, exceedances were recorded at KL-2, HWY102-2, and LSD, ranging from 417 to 971 µg/L. In the summer, exceedances occurred at HWY102-2, LSD, and LU, with concentrations ranging from 397 to 4,740 µg/L. In the fall, exceedances were observed at HWY102-1 and LSD, with concentrations ranging from 363 to 2,240 µg/L.
  - **Lead**: Lead concentrations exceeded the CCME long-term FWAL and NSECC EQS of 1 µg/L (a hardness-dependent parameter) at three stations across the spring and summer events. In the spring, exceedances occurred at KL-2 and LU, ranging from 2.4 to 6.9 µg/L. In the summer, lead exceeded the limit at LSD, with a concentration of 6.3 µg/L. No lead exceedances were recorded during the fall event.
  - **Zinc:** Zinc concentrations exceeded the CCME long-term FWAL and NSECC EQS of 7 µg/L at six stations across all sampling events. In the spring, LU exceeded the limit with a concentration of 8 µg/L. In the summer, exceedances were recorded at KL-5, LSD, and LU, with concentrations ranging from 9 to 26 µg/L. In the fall, exceedances were observed at LU and PML-2, with concentrations ranging from 7 to 97 µg/L.

Microbiology

- None of the stations exceeded the HC *E. Coli* guideline of 235 CFU/100 mL, nor did the geometric mean of any five samples exceed this criterion (although the geometric mean is no longer a component of the HC guidelines for *E. Coli*). It is noted that during the summer sampling event, the upper reportable detection limit used for total coliforms and *E. Coli* was erroneously reported at 200 CFU/100 mL, preventing comparison to the guideline of 235 CFU/100 mL; upon resampling, the maximum *E. Coli* concentration reported for the locations previously reported as >200 CFU/100 mL was 190 CFU/100 mL (LSD).
- HC does not have a recreational water quality guideline for Total Coliform. However, concentrations ranged from 165 CFU/100 mL to >1,000 CFU/100 mL throughout the 2024 monitoring program.

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1.0 INTRODUCTION

WSP Canada Inc. (WSP, previously Wood E&I) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for 11 surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill Lake and Bedford West watersheds to detect any impacts on and/or changes to water quality.

In June 2020, Wood (now WSP) was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020, with an additional two years (i.e., 2023 and 2024) later added to the scope of work. The results of the 2024 surface water monitoring program are detailed herein. Sample collection in 2024 was completed during Spring (April), Summer (July), and Fall (October) events.

1.1 Background

HRM has designated the Bedford West area as one of the primary locations for urban growth through 2031. The Bedford West Secondary Planning Strategy (SPS) was approved by Regional Council in 2006 and divides the Bedford West area into 12 sub-areas. The SPS provides direction for land use, environmental protection, and other activities across the area. It also enables development, primarily through the development agreement (DA) process. DAs for eight of the 12 Sub-Areas (2, 3+4, 5, 7+8, 9, and 10) have been approved by Council; DAs for the remaining areas are anticipated to be negotiated and approved at various points between 2020 and 2030.

Environmental protection policy in the SPS requires water quality testing to determine the impact of development on the Papermill Lake watershed. Each DA approved under the SPS identifies specific requirements for water quality monitoring, including the location of testing sites and required testing parameters. Water quality monitoring in the Bedford West area has been ongoing since 2009.

The goal of this contract is to fulfill the legislative requirement for water quality monitoring in Bedford West for a period of three years (with the sampling scope extended through 2024 for a total of five years) to determine the potential impact of development activities within the affected watershed, in accordance with the terms of applicable DAs.

Water quality monitoring is required by HRM in spring (typically in May), summer (August), and fall (October) from the 11 locations identified on the Bedford West Sampling Location Map (included in Appendix A).

1.2 Purpose

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to ongoing development projects to detect any impacts on and/or changes to water quality.

The 2024 sampling stations are summarized in Table 1 and shown in Figure 1 of Appendix A. The horizontal positions are expressed in the Universal Transverse Mercator coordinate system, Zone 20T (North American Datum of 1983, NAD83).

Table 1: Bedford West Water Quality Sampling Stations

Watercourse	Sampling Location	Easting (metres)	Northing (metres)
Kearney Lake	KL-1	0445718	4948496
Kearney Lake	KL-2	0443942	4949803
Kearney Run	KL-3	0444390	4950406
Kearney Run	KL-4	0444463	4950571
Kearney Lake	KL-5	0445280	4949142
Creek Above Highway	HWY-102-1	0444708	4951644
Creek Below Highway	HWY-102-2	0444829	4951778
Lake Shore Drive	LSD	0442583	4950431
Larry Uteck Off-Ramp	LU	0442583	4949891
Paper Mill Lake	PML-1	0445129	4951154
Paper Mill Lake	PML-2	0445363	4951740

2.0 METHODOLOGY

The 2024 water quality sampling events included measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory, subdivided into the groups noted above.

Table 2: Analytical Parameter Groups

Field Parameters (A)	Inorganics (B)	Calculated Parameters (C)	Standard Metals (D)	Microbial (E)
– pH – TDS – Dissolved Oxygen – Temperature – Secchi Depth – Conductance	– Total Alkalinity (as CaCO3) – Dissolved Chloride – Total Kjeldahl Nitrogen – Nitrate + Nitrite	– Anion Sum – Cation Sum – Ion Balance – Bicarbonate Alkalinity (as CaCO3)	– Calcium – Copper – Iron – Magnesium – Manganese – Potassium	– *E. coli* – Total Coliform

Field Parameters (A)	Inorganics (B)	Calculated Parameters (C)	Standard Metals (D)	Microbial (E)
– Air Temperature – Cloud Cover – Incidental Wildlife Sightings	– Nitrate – Nitrite – Nitrogen (as NH4) – Total Organic Carbon – Orthophosphate (P) – pH – Low Total Phosphorus – Reactive Silica – Total Suspended Solids – Dissolved Sulphate – Turbidity – Conductivity	– Carbonate Alkalinity (as CaCO3) – Hardness – Total Dissolved Solids – Saturation pH (@4°C & 20°C) – Langelier Index (@4°C & 20°C)	– Sodium – Zinc	

The spring water quality monitoring event at Bedford West was completed on April 25th & 26th, followed by the summer monitoring event on June 19th & 20th, and the fall event on October 29th and 30th, 2024. After each sampling event, a resampling event took place at all sampling stations for select parameters. The resampling events took place on June 19th (spring), September 23rd (summer), and December 5th, 2024 (fall).

Field measurements of pH, dissolved oxygen, specific conductance, and water temperature were taken at each station using a YSI Professional Plus multi-meter probe. An initial instrument calibration by the supplier was confirmed prior to delivery to WSP; during the field program, daily calibration checks and adjustments were performed using standardized buffer solutions. The calibration log detailing the results for all monitoring is included in this report as Appendix B Field measurements and documentation of cloud cover, wildlife sightings, and wind and wave observations were recorded on Standard Project Field Reports, which are included in Appendix C. Samples were collected from the shore at eight stations (KL-2, KL-3, KL-4, KL-5, HWY-102-1, HWY-102-2, LSD, and LU); a non-motorized boat was used to access three stations KL-1, PML-1, and PML-2. Photos of the stations for each sampling event are included in Appendix D.

Surface water sampling followed WSP's Standard Operating Procedures (SOP), included in Appendix E. A new pair of nitrile gloves was used at each sampling location. Water samples and field parameter readings were collected at a depth of 1.0m below the surface, if possible. Surface water grab samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Samples were sent to AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC). Canadian Association of Laboratory Accreditation (CALA) and ISO9011:2015. AGAT utilized an accredited sub-contracted laboratory, InnoTech Alberta, to analyze Chlorophyll-A samples using a phytoplankton method.

3.0 APPLICABLE GUIDELINES

For this water quality program, the Federal and Provincial Water Quality Guidelines being used for the assessment of surface water quality results are as follows:

- Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – freshwater (FWAL) (Version, 2019);
- Health Canada (HC) guidelines for Recreational Water Quality (February 2024); and
- Table 3 Nova Scotia Environment and Climate Change (NSECC) Environmental Quality Standards (EQS) for Contaminated Sites (NSECC, 2021) for Surface Water (µg/L) for Fresh Water.

It is noted that the HC guidelines listed above were updated in 2024, and the 2024 sampling results have been compared to these criteria. The guidelines were to gauge whether a tested parameter exceeded relevant regulatory criteria. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below.

3.1 Canadian Council of Ministers of the Environment (CCME) Guidelines

The CCME FWAL guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), chloride, nitrate, nitrite, nitrogen, as well as for total metals such as aluminum, arsenic, boron, cadmium, copper, iron, lead, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc.

There is no CCME recommended value for Total Suspended Solids (TSS); however, the following CCME narrative for TSS as high flow was applied: “maximum increase of 25 mg/L [milligrams per litre] from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L.”

According to CCME, 10 micrograms per litre (µg/L) of total phosphorus is the threshold between oligotrophic and mesotrophic classifications. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorus management threshold value of 10 µg/L, or 0.01 mg/L, for this monitoring program.

3.2 Health Canada (HC) Guidelines

The Health Canada guidelines for Canadian Recreational Water Quality were applied. The pH guidelines range from 5.0 to 11.0, with a turbidity limit of <50 Nephelometric Turbidity Units (NTU). For *E. coli*, the maximum allowable concentration (i.e., the beach action value) is 235 *E. coli* colony-forming units (CFU) per 100 mL for a single sample, consistent with the HRM Beach Monitoring Program guidelines. Summarizing fecal indicator data using geometric means was historically used in addition to single-sample data as a means of monitoring chronic contamination; while this metric remains useful for assessing water quality trends, it is no longer required by the HC guidelines.

3.3 Nova Scotia Environment and Climate Change (NSECC) Guidelines

The NSECC Table 3 Tier 1 surface water EQS were used for assessment of total metals such as aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, vanadium, and zinc. It should be noted that NSECC updated their surface water EQSs for pH, chloride, nitrate as N, nitrite as N, sulphate, antimony, beryllium, boron, cadmium, total chromium, cobalt, manganese, silver, uranium, vanadium, and zinc in September 2021.

4.0 FIELD OBSERVATIONS

The 2024 site conditions were recorded for all 11-surface water quality monitoring stations during the Spring, Summer, and Fall monitoring events and are included in the field data sheets in Appendix C. Site condition observations include weather, cloud cover, air temperature, wildlife sightings, and site accessibility.

5.0 FIELD MEASUREMENTS

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity, and Secchi depth (where applicable) were recorded on field data sheets. Field collected data is included in Appendix C.

Field measurements are also tabulated in Appendix : Table F-1 to F-4.

5.1 In-situ pH

The acceptable pH range varies depending on the applicable guidelines. According to the CCME Freshwater Aquatic Life (FAL) Guidelines and NSECC Tier I Environmental Quality Standards (EQS) for surface water and groundwater discharging to surface water, the acceptable pH range is 6.5 to 9.0. However, Health Canada's Guidelines for Recreational Water Quality specify a broader acceptable pH range of 5.0 to 11.0. It is noted that the normal range of surface water pH in Nova Scotia may span below the lower limit of CCME FWAL and NSECC guidelines.

Field pH readings were obtained using a YSI multimeter at all 11 locations during each sampling event. The readings were compared against federal and provincial guidelines. The summary of results has been provided below.

- Spring event: Five out of the 11 locations were found to be outside of the range of the CCME FWAL and NSECC guidelines. Exceeding locations (i.e., outside of the guideline range) were KL-2, KL-4, HWY-102-2, LSD, and PML-1. The pH readings ranged from 5.93 to 6.99.
- Spring Resampling event: One out of the 11 locations was found to be outside of the range of the CCME FWAL and NSE guidelines. The exceeding location was KL-2. The pH readings ranged from 6.40 to 7.35.
- Summer event: No exceedances were recorded at the 11 sampling locations. The pH readings ranged from 6.62 to 8.61.
- Summer Resampling event: Two out of the 11 locations were found to be outside of the range of the CCME FWAL and NSE guidelines. Exceeding locations were KL-2 and HWY-102-1. The pH readings ranged from 6.45 to 7.14.
- Fall event: Three out of the 11 locations were found to be outside of the range of the CCME FWAL and NSE guidelines. Exceeding locations were KL-1, KL-2, and LSD. The pH readings ranged from 6.30 to 9.84.

- Fall resampling event: No exceedances were recorded at the 11 sampling locations. The pH readings ranged from 6.57 to 8.84.

Laboratory measurements of pH were also collected. These are discussed in Section 6.0 and shown in Appendices C and D.

5.2 Dissolved Oxygen

Field dissolved oxygen readings were obtained using a YSI multimeter at all 11 locations during each sampling event. The readings were compared against federal and provincial guidelines, where the lowest acceptable concentration for warm water biota (the most sensitive receptor) in freshwater is 5.5 mg/L. The summary of results has been provided below.

- Spring event: No locations were found to have concentrations below the CCME FWAL guidelines.
- Spring resampling event: Three locations found to be below the CCME FWAL guidelines. Locations which did not meet the criterion were KL-2, HWY-102-2, and LSD. Readings ranged from 2.54 to 8.25 mg/L.
- Summer event: Five locations were found to be below the CCME FWAL guidelines. Locations which did not meet the criterion were KL-2, KL-3, KL-4, HWY-102-1, and LSD. Readings ranged from 1.88 to 7.12 mg/L.
- Summer resampling event: Four locations were found to be below the CCME FWAL guidelines. Locations which did not meet the criterion were KL-2, HWAY-102-1, HWY-102-2, and LSD. Readings ranged from 2.20 to 8.28 mg/L.
- Fall event: One location, HWY-102-1, was measured below the CCME FWAL guidelines. Readings ranged from 1.82 to 10.05 mg/L. It is noted that the water quality instrument was not calibrated for DO on October 29, 2024 (affecting all stations except for KL-1); however, DO measurements were consistent with typical seasonal DO concentrations and the absence of a calibration check for this field parameter is not considered a quality concern.
- Fall resampling event: No locations were found to have concentrations below the CCME FWAL guidelines.

It is typical for dissolved oxygen concentrations in freshwater to be lower during the winter months or eutrophication. Dissolved oxygen below 5.5 mg/L has potential physiological and behavioural effects for various organisms, particularly for fish species (CCME, 1999).

5.3 Water Temperature

There are no applicable CCME, HC, or NSECC guidelines for recreational water temperature. Water temperatures ranged during each sampling event and are summarized below.

- Spring event: Water temperature ranged from 8.2 to 13.2 degrees Celsius.
- Spring resampling event: Water temperature ranged from 17.2 to 24.4 degrees Celsius.
- Summer event: Water temperature ranged from 17.3 to 22.8 degrees Celsius.
- Summer resampling event: Water temperature ranged from 12.5 to 18.5 degrees Celsius.
- Fall event: Water temperature ranged from 4.6 to 11.6 degrees Celsius.
- Fall resampling event: Water temperature ranged from 2.2 to 6.0 degrees Celsius.

Surface water temperatures are related to seasonal changes in ambient air temperature.

5.4 Specific Conductivity

There are no applicable CCME, HC, or NSECC guidelines for specific conductivity in recreational water. Specific conductivity measurements (i.e., conductivity compensated to a reference temperature of 25 degrees Celsius) ranged during each sampling event and are summarized below.

- Spring event: Specific conductivity ranged from 100.8 to 642.0 microsiemens per centimetre (µS/cm).
- Spring resampling event: Specific conductivity ranged from 103.8 to 638.0 µS/cm.
- Summer event: Specific conductivity ranged from 1.92 to 518 µS/cm.
- Summer resampling event: Specific conductivity ranged from 141.1 to 658.0 µS/cm.
- Fall event: Specific conductivity ranged from 141.0 to 771.4 µS/cm.
- Fall resampling event: Specific conductivity ranged from 104.5 to 523.0 µS/cm.

Laboratory measurements of conductivity are also reported in Appendices C and D.

5.5 Secchi Disk

A Secchi disc was deployed at each sampling location to measure the clarity of the water. Secchi depth measurements were not successful at any locations as the disc was visible at the bottom of the watercourse or the sample location was too shallow for Secchi depth use.

6.0 ANALYTICAL RESULTS

Analytical results for the 2024 spring, summer, and fall monitoring programs and applicable reference guidelines are tabulated in Table F1 to F3., included in Appendix F. Additionally, historical water quality results from 2009 through to 2023 for each sample location are summarized and included in Appendix F Tables F4.

Laboratory certificates of analysis for the 2024 sampling events are provided in Appendix H.

6.1 Total Phosphorus

HRM's Total Phosphorus (TP) management threshold criterion is 0.01 mg/L. Based on the laboratory results, the TP exceedances were as follows:

- Spring event: Total phosphorus exceeded at all 11 locations and ranged from 0.015 to 0.028 mg/L. The highest concentration was identified at KL-4.
- Spring resampling event: Total phosphorus exceeded at 9 locations and ranged from 0.009 to 0.072 mg/L. The highest concentration was identified at HWY-102-1.
- Summer event: Total phosphorus exceeded at all 11 locations and ranged from 0.011 to 0.058 mg/L. The highest concentration was identified at KL-5.
- Summer resampling event: Total phosphorus exceeded at all 11 locations and ranged from 0.013 to 0.028 mg/L. The highest concentration was identified at KL-4.

- Fall event: Total phosphorus exceeded at all 11 locations and ranged from 0.020 to 0.088 mg/L. The highest concentration was identified at HWY-102-1.
- Fall resampling event: Total phosphorus exceeded at one location and ranged from <0.002 to 0.013 mg/L. The highest concentration was identified at KL-3.

6.2 General Chemistry

Several other inorganic and calculated parameters were reported outside or above the applicable guidelines, including chloride, fluoride, pH, and nitrite. Parameters of interest are summarized by the following sections.

6.2.1 Chloride

The CCME FWAL threshold criterion for chloride is 120 mg/L. Chloride levels were analyzed during the spring, summer, and fall sampling events. According to the laboratory results, the following exceedances were observed:

- Spring event: No exceedances were identified during this sampling event.
- Summer event: Chloride exceeded at one location (LU) and was reported at 139 mg/L.
- Fall event: Chloride exceeded at one location (HWY-102-1) and was reported at 141 mg/L.

6.2.2 pH

Laboratory pH readings were conducted on samples from all 11 locations during each sampling event. The readings were compared against CCME FWAL and NSECC recommended range of 6.5-9.0. The summary of results has been provided below.

- Spring event: All 11 locations were found to be outside of the range of the CCME FWAL and NSECC guidelines for pH. The pH readings ranged from 6.05 to 6.28.
- Summer event: No exceedances were identified during this sampling event.
- Fall event: All 11 locations were found to be outside of the range of the CCME FWAL and NSECC guidelines for pH. The pH readings ranged from 6.12 to 6.48.

6.3 Metals

The surface water samples were analyzed for the following metals: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. In all cases, total metals were reported. The following sections describe exceedances identified in the spring, summer, and fall sampling events.

6.3.1 Aluminium

CCME FAL guidelines for aluminium are related to pH. If pH is less than 6.5, the guideline value is 5 µg/L, and if the pH is higher than 6.5, then the guideline value is 100 µg/L. Aluminium exceedances were as follows:

- Spring event: All 11 locations reported aluminium exceedances (all laboratory-reported pH values were less than 6.5). Concentrations ranged from 60 to 686 µg/L. The highest concentration was located at KL-2.

- Summer event: Four of the 11 locations reported aluminium exceedances exceedances (all laboratory-reported pH values were above 6.5). Concentrations ranged from 27 to 2,240 µg/L. The highest concentration was located at LSD.
- Fall event: All 11 locations reported aluminium exceedances exceedances (all laboratory-reported pH values were less than 6.5). Concentrations ranged from 43 to 136 µg/L. The highest concentration was located at HWY-102-1.

6.3.2 Cadmium

The CCME FWAL guidelines for cadmium are related to water hardness. It is noted that the reportable detection limit of 0.09 µg/L exceeds the CCME FWAL hardness-related criteria for all cadmium results where corresponding hardness was reported below 54 mg/L. Based on cadmium concentrations detected at the reportable detection limit, the following exceedance were identified:

- Spring event: No exceedances were identified for cadmium during this sampling event.
- Summer event: One (1) out of the 11 locations recorded an exceedance. Location LSD reported a concentration of 0.15 µg/L.
- Fall event: No exceedances were identified for cadmium during this sampling event.

6.3.3 Cobalt

The NSECC guideline for cobalt is 1 µg/L. The following exceedances were identified:

- Spring event: No exceedances were identified for cobalt during this sampling event.
- Summer event: One out of the 11 locations reported an exceedance. Location LSD reported a concentration of 4 µg/L. This was the only location where cobalt was detectable at the laboratory's reportable detection limit of 1 µg/L.
- Fall event: No exceedances were identified for cobalt during this sampling event.

6.3.4 Copper

The NSECC guideline for copper is 2 µg/L; the CCME guidelines are related to water hardness, with the CCME guideline for copper being 2 µg/L for the range of water hardness reported during the 2024 monitoring program. The following exceedances were identified:

- Spring event: No exceedances were identified for copper during this sampling event.
- Summer event: One location, LSD, reported an exceedance. The concentration at this location was 5 µg/L.
- Fall event: One location, HWY-102-2, reported an exceedance. The concentration at this location was 15 µg/L.

6.3.5 Iron

The CCME FWAL and NSECC guidelines for iron are both 300 µg/L. The following exceedances were identified:

- Spring event: Three out of the 11 locations reported an exceedance. Concentrations ranged from 104 to 971 µg/L, with the highest concentration recorded at KL-2.

- Summer event: Three out of the 11 locations reported an exceedance. Concentrations ranged from 85 to 4,740 µg/L, with the highest concentration recorded at LSD.
- Fall event: Two out of the 11 locations reported an exceedance. Concentrations ranged from 61 to 2,240 µg/L, with the highest concentration recorded at HWY-102-1.

6.3.6 Lead

The CCME FWAL and NSECC guidelines for lead are both 1 µg/L. The following exceedances were identified:

- Spring event: Two out of the 11 locations reported an exceedance. Concentrations ranged from 2.4 to 6.9 µg/L, with the highest concentration recorded at LU.
- Summer event: One out of the 11 locations reported an exceedance. The concentration of lead at location LSD was 6.3 µg/L.
- Fall event: No exceedances were reported for lead during this sampling event.

6.3.7 Zinc

The CCME FWAL and NSECC guidelines for zinc are both 7 µg/L. The following exceedances were identified:

- Spring event: One out of the 11 locations reported an exceedance. Concentrations ranged from <5 to 8 µg/L, with the highest concentration reported at LU.
- Summer event: Three out of the 11 locations reported an exceedance. Concentrations ranged from <5 to 26 µg/L, with the highest concentration reported at LSD.
- Fall event: Two out of the 11 locations reported an exceedance. Concentrations ranged from <5 to 97 µg/L, with the highest concentration reported at LU.

6.4 Microbiological

Microbiological analyses were conducted for Total Coliforms and *E. Coli*. Results for *E. Coli* were compared against the HC Guidelines for Recreational Water Quality; there is no corresponding guideline for Total Coliforms. The beach action value of 235 CFU/100 mL for a single sample is the current HC guideline value for *E. Coli*; however, it is noted that recreational water areas where the *E. coli* geometric mean concentrations are consistently higher than 126 CFU/100mL may represent a greater level of risk to human health and may not be suitable for primary contact recreation. The following exceedances were identified:

- Spring event: Nine out of the 11 locations reported total coliform concentrations greater than 235 CFU/100 mL; however, no *E. Coli* exceedances were reported. *E. Coli* was detected above 1 CFU/100 mL in 8 of the 11 locations, with a maximum concentration of 5 CFU/100 mL reported at location KL-4.
- Summer event: During this sampling event, the upper reportable detection limit used for total coliforms and *E. Coli* was erroneously reported at 200 CFU/100 mL, preventing comparison to the guideline of 235 CFU/100 mL. Total coliform concentrations above 200 CFU/100 mL was reported at all 11 sampling locations, while *E. Coli* concentrations above 200 CFU/100 mL were reported at three locations. When using the reportable detection limit for those locations, the geometric mean of the *E. Coli* concentrations was 29 CFU/100 mL.

- Summer resampling event: The three locations where *E. Coli* was reported above 200 CFU/100 mL during the summer sampling event were resampled and analyzed. Total coliform concentrations ranged between 380 and >1,000 CFU/100 mL, with *E. Coli* concentrations ranging between 60 and 190 CFU/100 mL (maximum concentration at location LSD). The geometric mean of the *E. Coli* concentrations was 117 CFU/100 mL.
- Fall event: Eight out of the 11 locations reported total coliform concentrations greater than 235 CFU/100 mL, with concentrations ranging between 196 and 396 CFU/100 mL; however, no *E. Coli* exceedances were reported. *E. Coli* was detected above 1 CFU/100 mL in all locations, with a maximum concentration of 26 CFU/100 mL reported at location HWY-102-1.

7.0 STATISTICAL PRESENTATION

A summary of the water quality data from June 2009 through October 2024 for all 11 water quality monitoring stations is included in Appendix F. Seasonal statistics for each monitoring location are presented in Table 3 to Table 13, below, for the following 6 key water quality parameters selected by HRM:

- Total Phosphorus (mg/L);
- Dissolved Chloride (mg/L);
- pH;
- Total Suspended Solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll-A (µg/L).

The historical values shown in Table 3 do not include the 2024 results. Where analytical results were reported as less than the laboratory reportable detection limit (RDL), the measures of central tendency (i.e., median and geomean) were calculated using half the laboratory RDL limit (1/2 RDL value) as a conservative approach. It should be noted that the number of decimal places presented for each listed parameter is based on the precision of the concentrations and/or RDL reported by the laboratory.

In many cases, anomalous elevated concentrations skew the sample data distributions; in such cases, the median and the geomean differ noticeably, and the median should be relied upon as the most appropriate measure of central tendency. Certain parameters, such as Total Suspended Solids and chloride, appear susceptible to skewness, while others, such as pH, have relatively normal frequency distributions. Anomalous elevated concentrations are reviewed graphically and in detail in Section 8.

The analytical method used for Chlorophyll-A in this report was Spectrophotometer, which was changed from 2018 which used acidification by fluorometric (Holm-Hansen) and non-acidification by fluorometric (Welschmeyer). For the graphical representation of Chlorophyll-A, the results from the Welschmeyer method were graphed until August 2019, after which Spectrophotometer results were graphed. Historical samples had been submitted to Dalhousie prior to 2018; however, it was determined that the local laboratory was not an approved vendor for 17025 accreditation, thus following 2018, AGAT Laboratories subcontracted analysis to InnoTech in Alberta for Chlorophyll-A analysis by Spectrophotometer.

Table 3: KL-1 – Statistical Presentation of Key Water Quality Parameters

KL-1	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2024	0.002	0.027	0.003	0.037	0.010	0.010
Summer 2024	0.002	0.041	0.002	0.298	0.010	0.012
Fall 2024	0.002	0.071	0.001	0.030	0.008	0.008
Chloride (mg/L)						
Spring 2024	1	49	49	84	66	65.8
Summer 2024	1	53	30	76	59	58.4
Fall 2024	1	44	31	67	53	50
pH						
Spring 2024	N/A	6.05	6.48	6.94	6.70	6.72
Summer 2024	N/A	7.11	6.36	7.31	6.95	6.88
Fall 2024	N/A	6.31	6.23	7.07	6.81	6.77
Total Suspended Solids (mg/L)						
Spring 2024	5	<5	0.5	38	2.5	2.7
Summer 2024	5	<5 *	1	17	2.5	2.6
Fall 2024	5	<5	0.5	5	2.5	2.5
Conductivity (µS/cm)						
Spring 2024	1	203	205	313	259	257
Summer 2024	1	228	140	339	260	246
Fall 2024	1	214	129	257	226	208
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2024	0.3	1.1	0.9	4.4	1.4	1.8
Summer 2024	0.3	1.5	1.7	2.4	2.3	2.1
Fall 2024	0.3	1.3	0.9	1.5	1.1	1.1

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 4: KL-2 – Statistical Presentation of Key Water Quality Parameters

KL-2	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.021	0.008	0.021	0.013	0.013
Summer 2023	0.002	0.015	0.001	0.063	0.020	0.017
Fall 2023	0.002	0.020	0.004	0.031	0.013	0.014
Chloride (mg/L)						
Spring 2023	1	49	12	48	17	19
Summer 2023	1	25	8	48	19	19
Fall 2023	1	15	10	48	14	16
pH						
Spring 2023	N/A	6.05	6.27	7.70	6.50	6.58
Summer 2023	N/A	6.95	6.40	7.04	6.78	6.74
Fall 2023	N/A	6.42	5.89	7.04	6.29	6.35
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	1	103	3	3
Summer 2023	5	<5*	1	135	3	5
Fall 2023	5	12	1	103	3	3
Conductivity (µS/cm)						
Spring 2023	1	87	64	350	83	101
Summer 2023	1	171	66	121	97	104
Fall 2023	1	126	45	212	81	83
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.7	0.5	0.9	0.6	0.6
Summer 2023	0.3	0.3	0.6	4.2	2.0	1.7
Fall 2023	0.3	0.3	0.1	3.1	0.6	0.6

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 5: KL-3 – Statistical Presentation of Key Water Quality Parameters

KL-3	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.019	0.003	0.019	0.008	0.008
Summer 2023	0.002	0.012	0.001	0.045	0.009	0.008
Fall 2023	0.002	0.062	0.0012	0.148	0.007	0.009
Chloride (mg/L)						
Spring 2023	1	54	49	79	56	58
Summer 2023	1	58	30	73	56	52
Fall 2023	1	70	33	65	52	50
pH						
Spring 2023	N/A	6.09	6.38	6.97	6.70	6.70
Summer 2023	N/A	6.92	6.50	7.28	6.96	6.88
Fall 2023	N/A	6.48	6.30	7.10	6.87	6.82
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	3	3	2
Summer 2023	5	<5*	1	3	3	2
Fall 2023	5	<5	1	3	3	2
Conductivity (µS/cm)						
Spring 2023	1	216	115	275	220	217
Summer 2023	1	238	140	291	242	230
Fall 2023	1	226	128	252	220	205
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.7	0.4	1.1	1.1	0.8
Summer 2023	0.3	1.4	1.4	1.6	1.6	1.5
Fall 2023	0.3	0.9	0.4	13.1	6.8	2.6

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 6: KL-4 – Statistical Presentation of Key Water Quality Parameters

KL-4	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.028	0.003	0.038	0.009	0.011
Summer 2023	0.002	0.014	0.001	2.4	0.010	0.012
Fall 2023	0.002	0.064	0.001	0.030	0.006	0.006
Chloride (mg/L)						
Spring 2023	1	55	50	80	56	59
Summer 2023	1	66	30	75	59	53
Fall 2023	1	52	33	91	53	52
pH						
Spring 2023	N/A	6.09	6.57	6.83	6.69	6.69
Summer 2023	N/A	6.89	6.30	7.13	6.93	6.83
Fall 2023	N/A	6.18	6.30	7.13	6.86	6.83
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	12	3	3
Summer 2023	5	<5*	0.5	7	3	2
Fall 2023	5	<5	0.5	10	3	2
Conductivity (µS/cm)						
Spring 2023	1	219	200	289	220	234
Summer 2023	1	280	141	300	241	233
Fall 2023	1	226	158	254	229	214
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.3	2.0	8.3	5.2	4.1
Summer 2023	0.3	1.5	0.6	1.8	0.6	0.9
Fall 2023	0.3	0.6	0.3	5.3	0.5	0.8

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 7: KL-5 – Statistical Presentation of Key Water Quality Parameters

KL-5	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.027	0.003	0.031	0.009	0.009
Summer 2023	0.002	0.058	0.004	0.040	0.013	0.012
Fall 2023	0.002	0.062	0.003	0.135	0.006	0.008
Chloride (mg/L)						
Spring 2023	1	211	50	80	59	59
Summer 2023	1	223	29	72	56	52
Fall 2023	1	226	34	65	53	50
pH						
Spring 2023	N/A	6.12	6.56	7.24	6.70	6.74
Summer 2023	N/A	6.90	6.34	7.16	6.94	6.87
Fall 2023	N/A	6.12	6.30	7.47	6.89	6.83
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	3.0	2.5	2.2
Summer 2023	5	<5*	2.5	3.0	2.5	2.5
Fall 2023	5	<5	1.0	3.0	2.5	2.3
Conductivity (µS/cm)						
Spring 2023	1	211	208	290	233	236
Summer 2023	1	223	140	284	247	235
Fall 2023	1	209	160	286	226	217
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.5	0.4	1.1	0.8	0.7
Summer 2023	0.3	1.3	0.9	2.3	1.9	1.6
Fall 2023	0.3	1.3	0.3	63.1	0.8	1.9

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 8: HWY-102-1 – Statistical Presentation of Key Water Quality Parameters

HWY-102-1	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.026	0.005	0.070	0.011	0.012
Summer 2023	0.002	0.016	0.001	0.284	0.029	0.031
Fall 2023	0.002	0.088	0.002	0.031	0.011	0.012
Chloride (mg/L)						
Spring 2023	1	51	24	171	71	70
Summer 2023	1	109	19	101	54	52
Fall 2023	1	141	12	92	48	41
pH						
Spring 2023	N/A	6.28	4.54	7.34	6.84	6.55
Summer 2023	N/A	7.08	5.24	7.75	6.91	6.87
Fall 2023	N/A	6.31	5.31	7.20	6.67	6.40
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	9.0	2.5	2.5
Summer 2023	5	<5*	1.0	80.0	2.5	4.6
Fall 2023	5	<5	0.5	3.0	2.5	2.1
Conductivity (µS/cm)						
Spring 2023	1	457	100	573	298	292
Summer 2023	1	460	100	469	315	255
Fall 2023	1	425	88	365	231	192
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	1.8	0.005	0.070	0.011	0.012
Summer 2023	0.3	1.8	0.007	0.284	0.029	0.031
Fall 2023	0.3	2.8	0.002	0.031	0.011	0.012

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 9: HWY-102-2 – Statistical Presentation of Key Water Quality Parameters

HWY-102-2	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.016	0.001	0.222	0.016	0.017
Summer 2023	0.002	0.030	0.002	1.560	0.034	0.032
Fall 2023	0.002	0.054	0.003	0.201	0.018	0.021
Chloride (mg/L)						
Spring 2023	1	51	21	260	113	103
Summer 2023	14	105	21	226	101	100
Fall 2023	1	98	17	199	64	57
pH						
Spring 2023	N/A	6.26	5.43	7.20	6.41	6.40
Summer 2023	N/A	6.99	5.96	6.86	6.61	6.50
Fall 2023	N/A	6.37	5.47	7.07	6.37	6.36
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	342	3	5.9
Summer 2023	5	<5*	2.5	3,000	15	19
Fall 2023	5	<5	2.5	194	2.5	5.8
Conductivity (µS/cm)						
Spring 2023	1	462	85	920	444	406
Summer 2023	1	432	100	952	422	393
Fall 2023	1	402	94	546	216	239
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	2.3	1.1	8.2	2.9	3.0
Summer 2023	0.3	13.8	0.7	206	1.2	5.8
Fall 2023	0.3	1.3	0.3	4.9	0.8	1.1

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 10: LSD – Statistical Presentation of Key Water Quality Parameters

LSD	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.015	0.001	1.250	0.020	0.028
Summer 2023	0.002	0.054	0.015	0.501	0.059	0.060
Fall 2023	0.002	0.078	0.003	0.146	0.017	0.021
Chloride (mg/L)						
Spring 2023	1	51	22	60	38	35
Summer 2023	1	31	14	45	33	32
Fall 2023	1	28	20	3	25	26
pH						
Spring 2023	N/A	6.27	6.20	7.35	6.91	6.81
Summer 2023	N/A	7.05	6.54	7.30	6.92	6.90
Fall 2023	N/A	6.36	6.34	7.15	6.72	6.72
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	2.5	138	6	10
Summer 2023	5	25*	6.0	9,020	98	100
Fall 2023	5	<5	2.5	69	5	5.9
Conductivity (µS/cm)						
Spring 2023	1	124	96	243	151	155
Summer 2023	1	174	6	9,020	98	100
Fall 2023	1	155	2	69	5	6
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.3	4.200	5.060	4.420	4.546
Summer 2023	0.3	2.4	2.300	12.500	3.000	4.418
Fall 2023	0.3	1.6	0.320	0.790	0.500	0.502

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. Data from the 2023 fall resampling event for low-level phosphorus has been included in the statistics. Resampling results with a lower detection limit are considered more representative.
4. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 11: LU – Statistical Presentation of Key Water Quality Parameters

LU	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.026	0.006	0.260	0.015	0.019
Summer 2023	0.002	0.026	0.009	0.062	0.019	0.021
Fall 2023	0.002	0.035	0.008	0.160	0.026	0.023
Chloride (mg/L)						
Spring 2023	1	51	51	297	190	176
Summer 2023	1	139	52	221	132	131
Fall 2023	1	149	34	258	93	93
pH						
Spring 2023	N/A	6.25	6.250	7.370	6.950	6.936
Summer 2023	N/A	7.27	6.350	7.460	7.280	7.157
Fall 2023	N/A	6.48	6.410	7.380	6.995	6.885
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.50	626	4	8
Summer 2023	5	<5*	3	165	6	7
Fall 2023	5	<5	3	1	2.5	3
Conductivity (µS/cm)						
Spring 2023	1	621	518	1,030	758	739
Summer 2023	1	574	433	928	613	623
Fall 2023	1	541	190	840	422	421
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	1.7	1.7	10.9	5.0	4.3
Summer 2023	0.3	9.2	3.4	9.2	4.9	5.2
Fall 2023	0.3	1.1	1.1	6.1	3.1	2.8

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 12: PML-1 – Statistical Presentation of Key Water Quality Parameters

PML-1	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.24	0.003	0.173	0.015	0.015
Summer 2023	0.002	0.015	0.002	0.104	0.011	0.016
Fall 2023	0.002	0.035	0.001	0.099	0.020	0.016
Chloride (mg/L)						
Spring 2023	1	227	39	86	59	59
Summer 2023	1	269	30	269	61	63
Fall 2023	1	242	18	242	52	50
pH						
Spring 2023	N/A	6.13	6.36	7.01	6.71	6.70
Summer 2023	N/A	7.34	6.50	7.28	6.98	6.95
Fall 2023	N/A	6.26	6.58	7.18	6.85	6.86
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	1	531	3	4
Summer 2023	5	6*	1	149	3	3
Fall 2023	5	<5	1	104	3	5
Conductivity (µS/cm)						
Spring 2023	1	277	170	320	240	236
Summer 2023	1	269	145	334	256	249
Fall 2023	1	242	100	256	227	199
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	<0.3	0.470	1.890	0.900	0.928
Summer 2023	0.3	1	1.100	2.900	1.100	1.520
Fall 2023	0.3	0.7	0.001	0.700	0.020	0.020

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. Data from the 2023 fall resampling event for low-level phosphorus has been included in the statistics. Resampling results with a lower detection limit are considered more representative.
4. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

Table 13: PML-2 – Statistical Presentation of Key Water Quality Parameters

PML-2	RDL (2024)	Seasonal Result	Historical Seasonal Minimum	Historical Seasonal Maximum	Historical Seasonal Median	Historical Seasonal Mean
Total Phosphorus (mg/L)						
Spring 2023	0.002	0.015	0.003	0.047	0.010	0.011
Summer 2023	0.002	0.011	0.002	0.026	0.010	0.009
Fall 2023	0.002	0.045	0.001	0.030	0.008	0.008
Chloride (mg/L)						
Spring 2023	1	60	44	245	63	67
Summer 2023	1	75	31	82	59	57
Fall 2023	1	60	34	69	58	52
pH						
Spring 2023	N/A	6.14	6.37	7.13	6.81	6.77
Summer 2023	N/A	7.02	6.54	7.29	7.02	6.93
Fall 2023	N/A	6.26	6.29	7.17	6.87	6.84
Total Suspended Solids (mg/L)						
Spring 2023	5	<5	0.5	45	3	3
Summer 2023	5	<5*	1.0	14	3	3
Fall 2023	5	<5	0.5	11	3	2
Conductivity (µS/cm)						
Spring 2023	1	237	170	777	257	270
Summer 2023	1	276	170	335	268	258
Fall 2023	1	257	150	277	238	227
Chlorophyll-A Spectrophotometer (µg/L)						
Spring 2023	0.3	0.5	1.3	2.8	1.9	1.9
Summer 2023	0.3	0.9	0.6	1.3	1.1	0.9
Fall 2023	0.3	1.9	0.4	1.1	0.8	0.7

Notes:

1. The statistics (i.e. minimum, maximum, median, and geomean) were calculated using half the laboratory Reportable Detection Limit (RDL) (1/2 RDL value) where analytical results were found to be less than the laboratory RDL for phosphorus and total suspended solids.
2. The statistics for Chlorophyll-A (i.e. minimum, maximum, median, and average) were calculated from analytical data from November 2019 to October 2023, since the method of detection was changed to Spectrophotometer.
3. *Denotes estimated concentration. See attached memo in Appendix G for discussion.

8.0 GRAPHS AND HISTORICAL TRENDS

This section presents graphs that illustrate seasonal concentrations of the following six key water quality parameters selected by HRM:

- Dissolved chloride (mg/L);
- Chlorophyll-A (µg/L);
- Conductivity (µS/cm);
- Laboratory pH;
- Total Phosphorus (mg/L); and
- Total Suspended Solids (mg/L).

Graphs were completed for all 11 water quality monitoring stations, including all data collected from June 2009 to October 2024. The graphs allow for comparison between water quality sampling stations and identification of concentration increases and associated guideline exceedances. Many parameters show seasonal concentration fluctuations. Seasonal data points have been connected using solid lines to assist in interpreting changes at each sampling location; however, solid lines should not be interpreted as being representative of concentrations between sampling events. It should be noted that where results were found to be less than the laboratory RDL (<RDL), results were graphed as half the RDL (1/2 RDL value) as a conservative approach.

8.1 Chloride

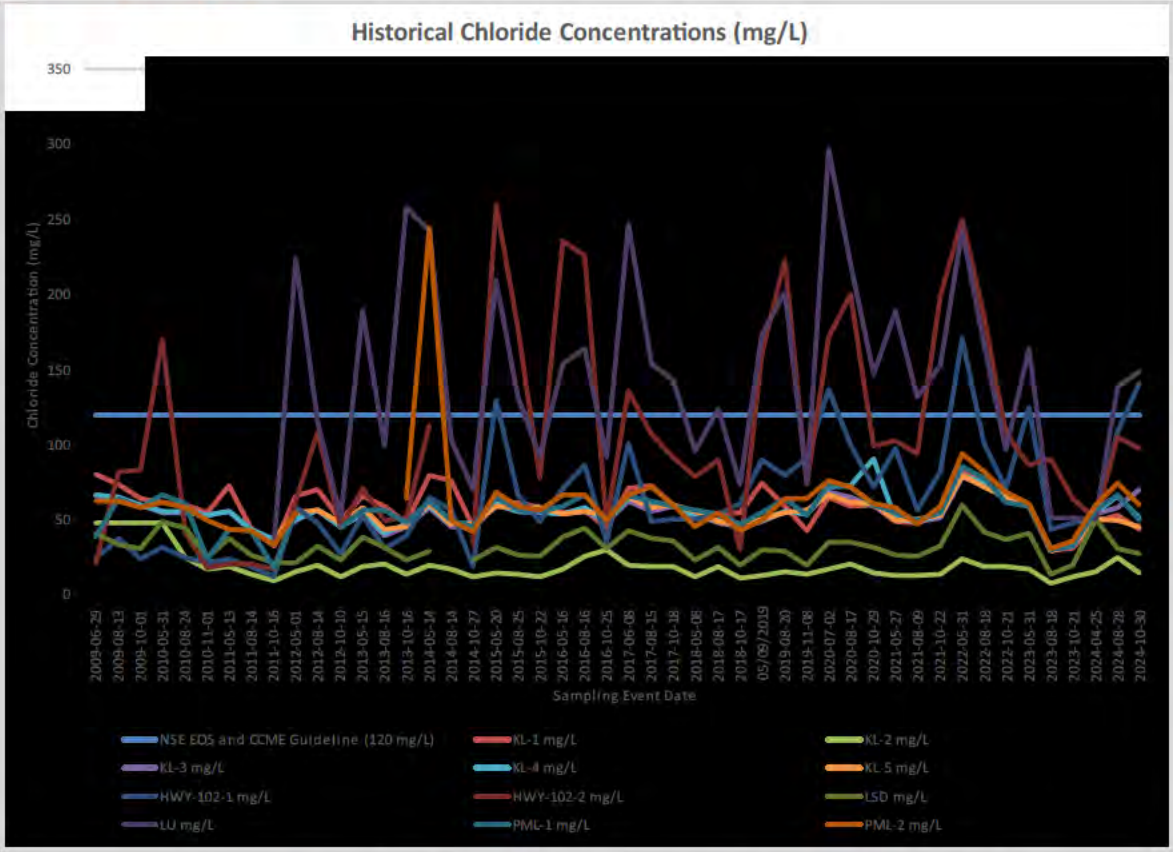

Figure 1: Historical Chloride Concentrations at all Monitoring Sites

The historical chloride concentrations shown on Figure 1 illustrate a typical seasonal increase in chloride during spring monitoring events. This trend is discernible at all monitoring locations, but is most pronounced at stations HWY-102-1, HWY-102-2, and LU, where spring concentrations of chloride are typically elevated above the NSECC EQS and CCME Guideline of 120 mg/L and persist above this threshold into the summer. It is inferred that elevated chloride concentrations in spring are related to road maintenance activities during the winter season. Concentrations above 120 mg/L often persist year-round at LU and HWY-102-2.

It is expected that seasonal fluctuations in chloride concentrations will continue to be observed at all monitoring stations, with larger magnitudes of seasonal change occurring at HWY-102-1, HWY-102-2, and LU. These stations are in closest proximity to Highway 102 and may be most sensitive to winter road maintenance activities. Any development activities which increase the probability of chloride-laden (e.g., roadway) runoff reaching the freshwater system may contribute to the magnitudes of seasonal fluctuations in chloride concentrations.

8.2 Chlorophyll-A

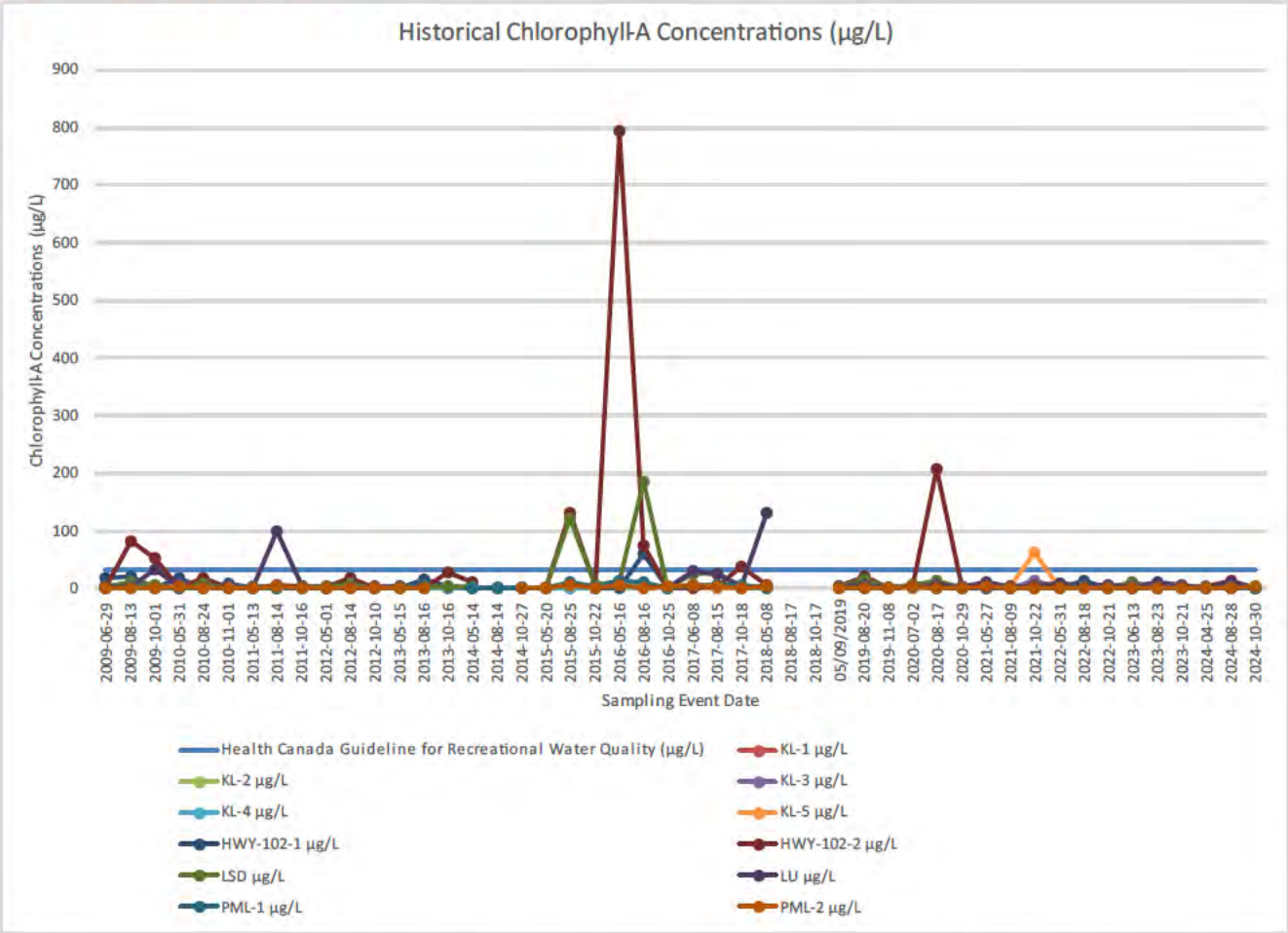

Figure 2: Historical Chlorophyll-A Concentrations at All Monitoring Stations

Figure 2 illustrates that Chlorophyll-A concentrations generally remain low, averaging below 10 µg/L, with occasional peaks observed since 2009. Stations HWY-102-2, LSD, and LU are particularly susceptible to these anomalies, where sporadic significant increases in Chlorophyll-A levels have been recorded. No such anomalies were detected during the 2024 monitoring period. The historical spikes in Chlorophyll-A concentrations may be associated with isolated increases in algal content in the related surface water bodies; however, this correlation has not been confirmed in this study. Furthermore, an analysis of development activities over time and their proximity to the monitoring stations has not been performed. Currently, there are no discernible trends suggesting a future rise in Chlorophyll-A concentrations, although stations HWY-102-2, LSD, and LU remain the most likely to experience occasional elevated levels.

8.3 Conductivity

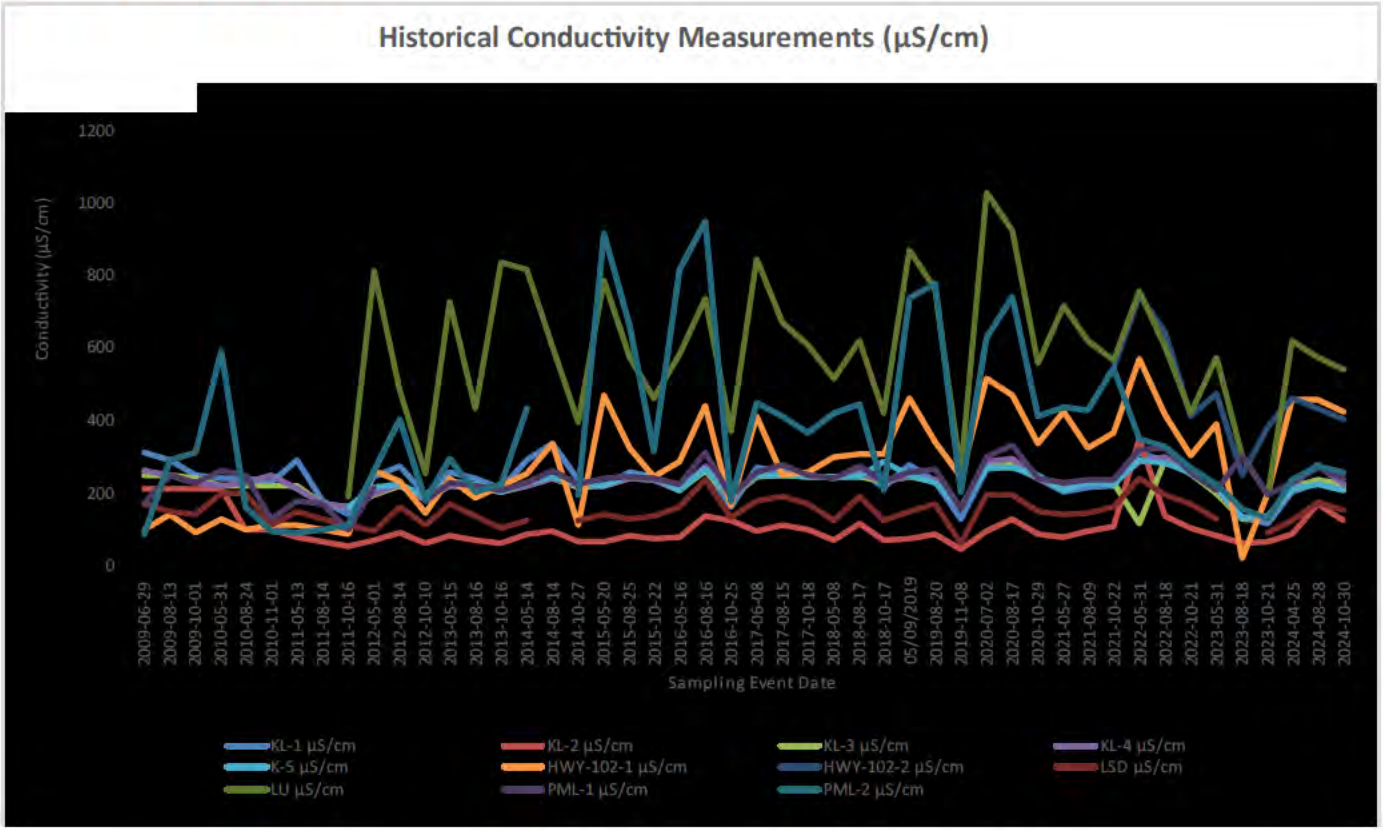

Figure 3: Historical Conductivity Measurements at All Monitoring Stations

Figure 3 illustrates that conductivity measurements typically exhibit seasonal fluctuations, with elevated levels observed during spring monitoring events, often persisting into the summer. Stations HWY-102-1, HWY-102-2, and LU consistently record the highest conductivity values (exceeding 400 µS/cm either seasonally or year-round); however, these levels are considered moderate for surface water bodies and are not indicative of salinity. The seasonal increase in conductivity is likely driven by various inorganic ions entering the surface water system through runoff from annual snowmelt. Historical data suggests that seasonal conductivity fluctuations will continue across all monitoring stations, with more pronounced seasonal changes expected at HWY-102-1, HWY-102-2, and LU.

8.4 pH

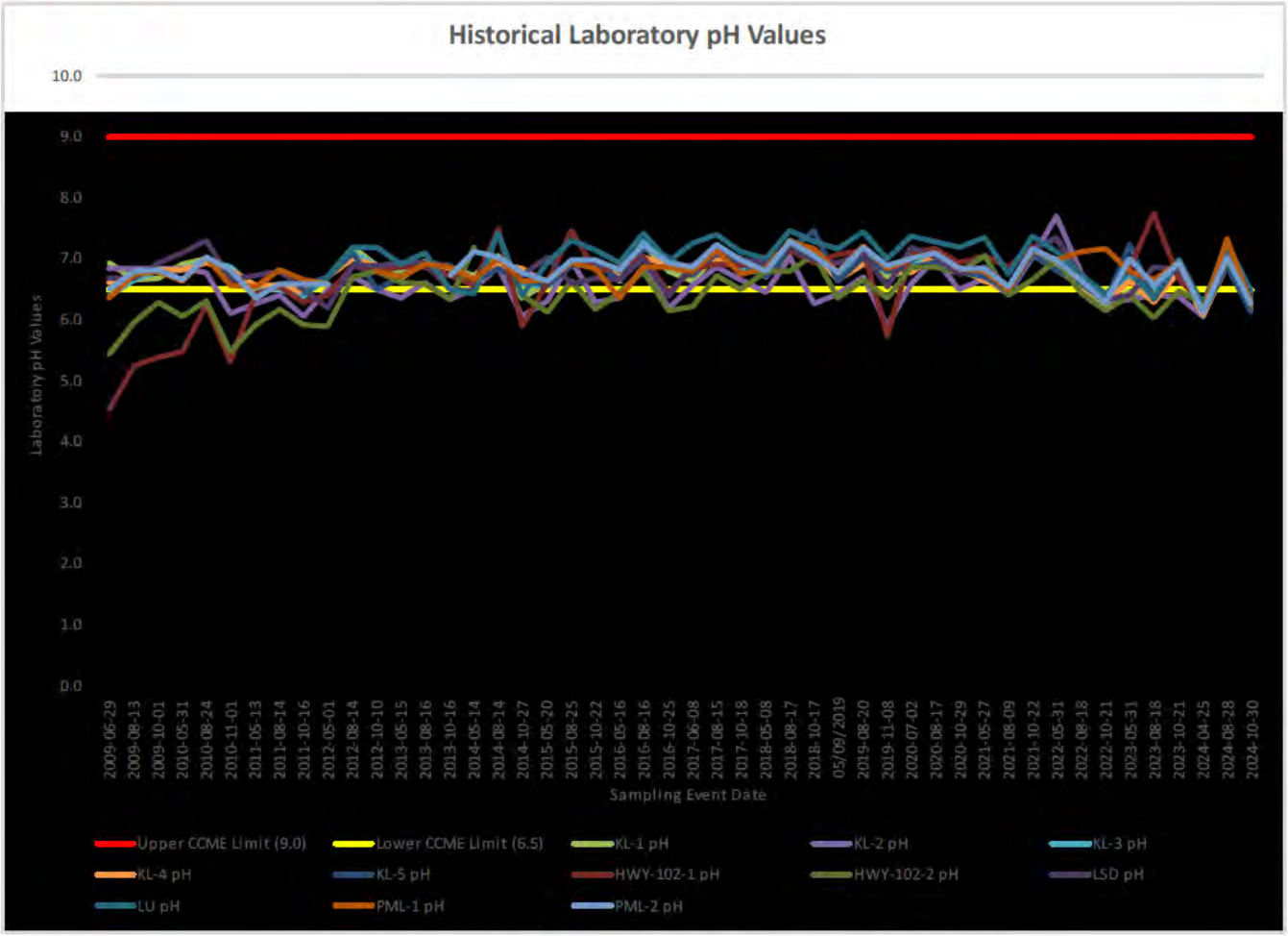

Figure 4: Historical pH Measurements at All Monitoring Stations

Since 2009, pH levels have generally remained consistent, predominantly ranging between 6.0 and 7.5. No values have exceeded the Upper CCME Limit of 9.0; however, occasional drops below the Lower CCME Limit of 6.5 have been recorded at all locations, with stations HWY-102-1, HWY-102-2, and KL-2 being the most frequently affected. Figure 4 displays both the Upper and Lower CCME Limits alongside the historical pH data. Based on historical trends, pH levels at all monitoring stations are expected to remain approximately neutral, with occasional instances of values falling below the Lower CCME Limit.

8.5 Phosphorus

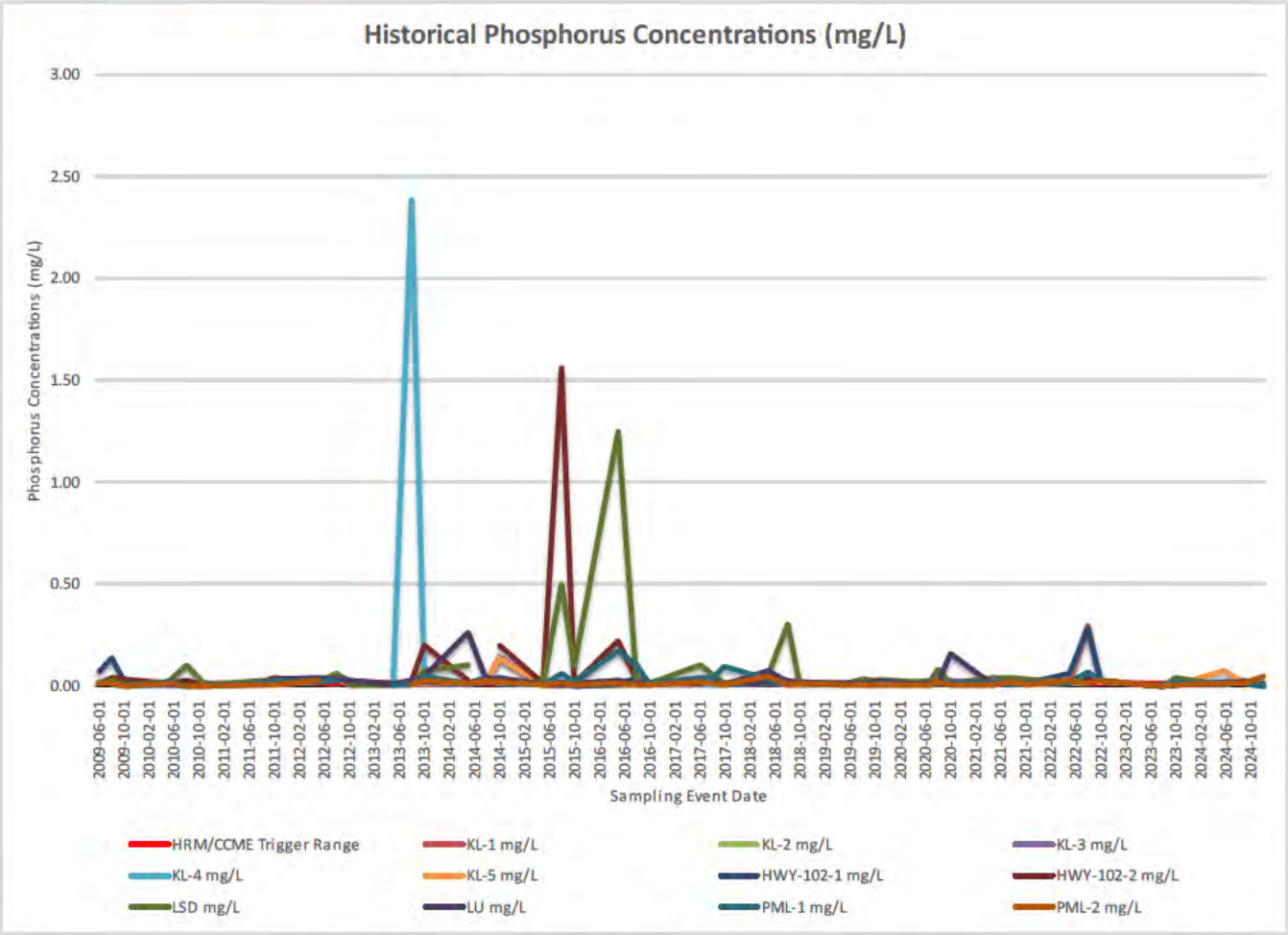

Figure 5: Historical Phosphorus Concentrations at All Monitoring Stations

Figure 5 indicates that phosphorus concentrations at all locations have been recorded above the threshold CCME FAL Phosphorus Trigger Range of 0.01 mg/L. Elevated concentrations have been recorded since 2009, with levels reaching up to 2.390 mg/L (observed at KL-4 in August 2013). Historically, elevated concentrations have been most frequent at station LSD. No such anomalies were observed during the 2024 monitoring period at any station; however, phosphorus was reported above 0.01 mg/L during the spring and/or summer at all locations except for PML-2, with concentrations dropping below the Trigger Range threshold in the winter at all locations except for KL-2. It is noted that initial phosphorus sampling at all locations tended to be more elevated than resampling results (which are the ones shown in the graph). Resampling for phosphorus was conducted during each 2024 monitoring event and samples were analyzed using a low-level detection methodology to best represent phosphorus levels.

Based on historical data, there is no indication that elevated phosphorus concentrations will occur consistently at the monitoring stations. However, isolated instances of elevated concentrations may continue to be observed. These spikes are likely linked to nutrient influxes from surrounding land use, potentially triggered by precipitation

events that mobilize phosphorus from adjacent areas. Development activities may also contribute to the mobilization of phosphorus-laden runoff, particularly in areas where overland flow passes through or originates from lands with current or historical phosphorus application, such as agricultural lands.

8.6 Total Suspended Solids

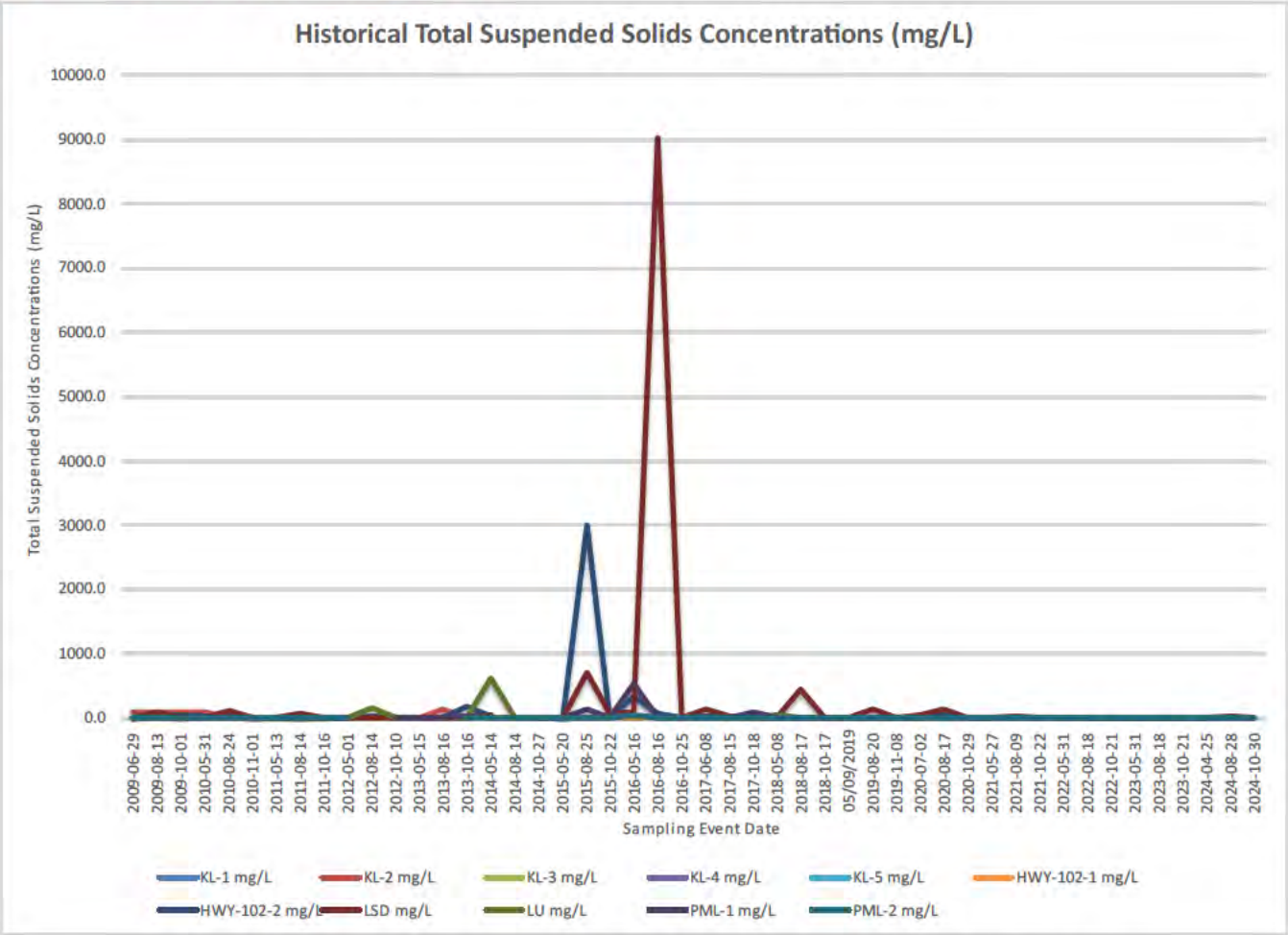

Figure 6: Historical Total Suspended Solids Concentrations at All Monitoring Stations

Total suspended solids (TSS) concentrations have generally remained low across all stations, with most measurements below 100 mg/L. Occasionally, concentrations have exceeded 500 mg/L, with two notable instances: 3,000 mg/L at HWY-102-2 in August 2015 and 9,020 mg/L at LSD in August 2016. Over the past three years, no TSS concentrations have exceeded 12 mg/L. As detailed in Appendix G, TSS concentrations for the summer 2024 monitoring event were estimated based on historical relationships between TSS, turbidity, and true colour.

The causes of the elevated TSS levels recorded in 2015 and 2016 are not evident from the current dataset, but these instances appear to be anomalies. Under normal conditions, TSS concentrations are not expected to rise significantly, and there is no apparent trend indicating future changes. It is notable that these anomalies occurred

during summer monitoring (August), and other moderately elevated concentrations (approximately 500 mg/L) have also been observed during spring and summer monitoring events.

9.0 CONCLUSIONS

The 2024 water quality monitoring program involved the collection of surface water samples from 11 sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological elements, and additional metals. Field parameters recorded at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, air temperature, cloud cover, and wildlife observations. Secchi depth measurements were not collected during the 2024 program due to unsuitable conditions, either because the water depths at the monitoring stations were too shallow or the Secchi disc remained visible when lowered to the bottom.

Historical trends reviewed in this report suggest that seasonal fluctuations in key surface water quality parameters are likely to persist. Notably, chloride and conductivity exhibit pronounced seasonal variations. Other parameters remain relatively stable, with occasional elevated concentrations observed over the years and seasons. These anomalies may be linked to specific climatic conditions, land disturbances, or other factors; however, these correlations have not been specifically examined in this report. Ongoing monitoring of development activities within the watershed and near the freshwater system is recommended to assess their potential impact on the six key water quality parameters.

9.1 Field Measurements

- **Water Temperature:** There are no applicable CCME, HC, or NSECC guidelines for recreational water temperature. Recorded temperatures ranged from 2.2°C at HWY-102-02 during the fall resampling event to 22.8°C at KL-5 during the summer event.
- **Dissolved Oxygen**: In-situ dissolved oxygen levels fell below the CCME FWAL guideline of >5.5 mg/L during the spring, summer, and fall events. In the spring resampling event, three locations were measured to have DO concentrations below the CCME FWAL criterion (KL-2, HWY-102-2, and LSD); in the summer event, five locations were below the criterion (KL-2, KL-3, KL-4, HWY-102-1, and LSD); in the summer resampling event, four locations were below the criterion (KL-2, HWAY-102-1, HWY-102-2, and LSD); and in the fall sampling event, one location was below the criterion (HWY-102-1). All sampling stations were measured to have DO concentrations above 5.5 mg/L during the spring event and the fall resampling event. The minimum DO concentration of 1.82 mg/L was measured at HWY-102-1 during the fall sampling event, while the maximum DO concentration of 13.30 mg/L was recorded at KL-3 during the fall resampling event.
- **pH Levels**: During the 2024 program, several stations recorded field pH levels outside (i.e., below) the acceptable range of 5.0 – 11.0 for Recreational Water Quality and 6.5 – 9.0 for CCME-FWAL guidelines. In the spring event, five stations (KL-2, KL-4, HWY-102-2, LSD, and PML-1) reported pH values ranging from 5.93 to 6.48; in the spring resampling event, one station (KL-2) reported a pH value of 6.40; in the summer event, all stations were within the regulated guidelines; in the summer resampling event, two locations (KL-2 and HWY-102-1) reported pH values of 6.46 and 6.45, respectively; in the fall event, three stations (KL-1, KL-2 and LSD) recorded values ranging from 6.30 to 9.84; and during the fall resampling event, all stations were within the acceptable range.
- **Specific Conductivity:** No CCME, HC, or NSECC guidelines apply for recreational water conductivity. Specific conductivity levels ranged from 1.92 µS/cm at KL-2 during the summer event to 771.4 µS/cm at LU during the fall event.

- **Total Dissolved Solids**: No CCME, HC, or NSECC guidelines apply for recreational water TDS. However, TDS levels ranged from 9 mg/L at KL-2 during the summer event to 429 mg/L at HWY102-1 during the fall event.

9.2 Total Phosphorus

All eleven monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criterion of 0.01 mg/L in Spring, Summer and Fall events (including resampling events) of 2024. The maximum concentration reported was 0.088 mg/L at location HWY-102-1 during the fall sampling event. This may be an indication of a decline in surface water quality, which could be due to activities such as nutrient loading, wastewater discharge and stormwater runoff.

9.3 General Chemistry

- During the spring and fall events, laboratory-reported pH measurements at all 11 locations were outside the acceptable range of 5.0 – 11.0 for Recreational Water Quality and 6.5 – 9.0 for CCME-FWAL guidelines. In the spring event, all stations reported pH values ranging from 6.05 to 6.28, while in the fall event, pH values ranged from 6.12 to 6.48. All stations remained within the acceptable range during the summer event.
- During the summer and fall events, three sampling stations reported chloride concentrations exceeding the CCME long-term FWAL and NSECC EQS limit of 120 mg/L. In the summer, one exceedance was recorded at LU with a concentration of 139 mg/L, while in the fall, two stations (HWY102-1 and LU) recorded concentrations of 141 mg/L and 149 mg/L, respectively.
- Four sampling stations recorded exceedances of fluoride concentrations during the fall sampling event, surpassing the CCME long-term FWAL and NSECC EQS limit of 0.12 mg/L. The stations exceeding the limit were KL-1, KL-5, PML-1, and PML-2, with concentrations ranging from 0.14 to 0.17 mg/L. No exceedances were recorded during the spring or summer events.
- Six sampling stations recorded nitrite exceedances during the spring and fall sampling events, exceeding the CCME long-term FWAL and NSECC EQS limit of 0.06 mg/L. In the spring, exceedances occurred at KL-3, HWY102-1, and LU, with concentrations ranging from 0.06 to 0.09 mg/L at these locations. In the fall, exceedances were observed at KL-1, PML-1, and PML-2, with concentrations ranging from 0.07 to 0.18 mg/L at these locations. No exceedances were recorded during the summer event.

9.4 Metals

- **Aluminium**: Aluminium concentrations exceeded the CCME long-term FWAL and NSECC EQS of 5 µg/L (when pH is below 6.5) or 100 µg/L (when pH is above 6.5) across the spring, summer, and fall events. In the spring, exceedances were observed at all stations, with concentrations ranging from 60 to 686 µg/L. In the summer, four stations (KL-1, HWY-102-2, LSD, and LU) exceeded the limit, with exceeding concentrations ranging from 125 to 2,240 µg/L. In the fall, exceedances occurred at all stations, with concentrations ranging from 43 to 136 µg/L.
- Cadmium: The cadmium concentration exceeded the NSECC EQS of 1 µg/L at LSD during the summer event, where the concentration was 0.15 µg/L. It is noted that the reportable detection limit of 0.09 µg/L exceeds the CCME FWAL hardness-related criteria for all cadmium results where corresponding hardness was reported below 54 mg/L.

- **Cobalt**: Cobalt concentrations exceeded the NSECC EQS of 2 µg/L at LSD during the summer event, where the concentration was 4 µg/L. No other stations recorded cobalt exceedances during this event.
- **Copper**: Copper concentrations exceeded the CCME long-term FWAL and NSECC EQS of 2 µg/L (a hardness-dependent parameter) at two stations during the summer and fall events. In the summer, an exceedance was observed at LSD, while in the fall, an exceedance was reported at HWY-102-2. Detectable concentrations ranged from 2 to 15 µg/L. No copper exceedances were recorded during the spring event.
- **Iron**: Iron concentrations exceeded the CCME long-term FWAL and NSECC EQS of 300 µg/L at eight stations across all three sampling events. In the spring, exceedances were recorded at KL-2, HWY102-2, and LSD, ranging from 417 to 971 µg/L. In the summer, exceedances occurred at HWY102-2, LSD, and LU, with concentrations ranging from 397 to 4,740 µg/L. In the fall, exceedances were observed at HWY102-1 and LSD, with concentrations ranging from 363 to 2,240 µg/L.
- **Lead**: Lead concentrations exceeded the CCME long-term FWAL and NSECC EQS of 1 µg/L (a hardness-dependent parameter) at three stations across the spring and summer events. In the spring, exceedances occurred at KL-2 and LU, ranging from 2.4 to 6.9 µg/L. In the summer, lead exceeded the limit at LSD, with a concentration of 6.3 µg/L. No lead exceedances were recorded during the fall event.
- **Zinc**: Zinc concentrations exceeded the CCME long-term FWAL and NSECC EQS of 7 µg/L at six stations across all sampling events. In the spring, LU exceeded the limit with a concentration of 8 µg/L. In the summer, exceedances were recorded at KL-5, LSD, and LU, with concentrations ranging from 9 to 26 µg/L. In the fall, exceedances were observed at LU and PML-2, with concentrations ranging from 7 to 97 µg/L.

9.5 Microbiology

- None of the stations exceeded the HC *E. Coli* guideline of 235 CFU/100 mL, nor did the geometric mean of any five samples exceed this criterion (although the geometric mean is no longer a component of the HC guidelines for *E. Coli*). It is noted that during the summer sampling event, the upper reportable detection limit used for total coliforms and *E. Coli* was erroneously reported at 200 CFU/100 mL, preventing comparison to the guideline of 235 CFU/100 mL; upon resampling, the maximum *E. Coli* concentration reported for the locations previously reported as >200 CFU/100 mL was 190 CFU/100 mL (LSD).
- HC does not have a recreational water quality guideline for Total Coliform. However, concentrations ranged from 165 CFU/100 mL to >1,000 CFU/100 mL throughout the 2024 monitoring program.

10.0 CLOSURE

This report was prepared for the exclusive use of Halifax Regional Municipality and is intended to provide water quality results for the program. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from WSP Canada Inc. will be required. With respect to third parties, WSP Canada Inc. has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The report is based on data and information collected during the 2024 Bedford West Water Quality Monitoring Program conducted by WSP Canada Inc. It is based solely on the conditions of the Site encountered during field investigations conducted in April, June, August, September, October, and December, 2024. Except as otherwise maybe specified, WSP Canada Inc. disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to WSP Canada Inc. after the time during which WSP Canada Inc. conducted the Water Quality Monitoring program.

WSP Canada Inc. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

11.0 REFERENCES

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Nova Scotia Environment, September 2021. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

Signature Page

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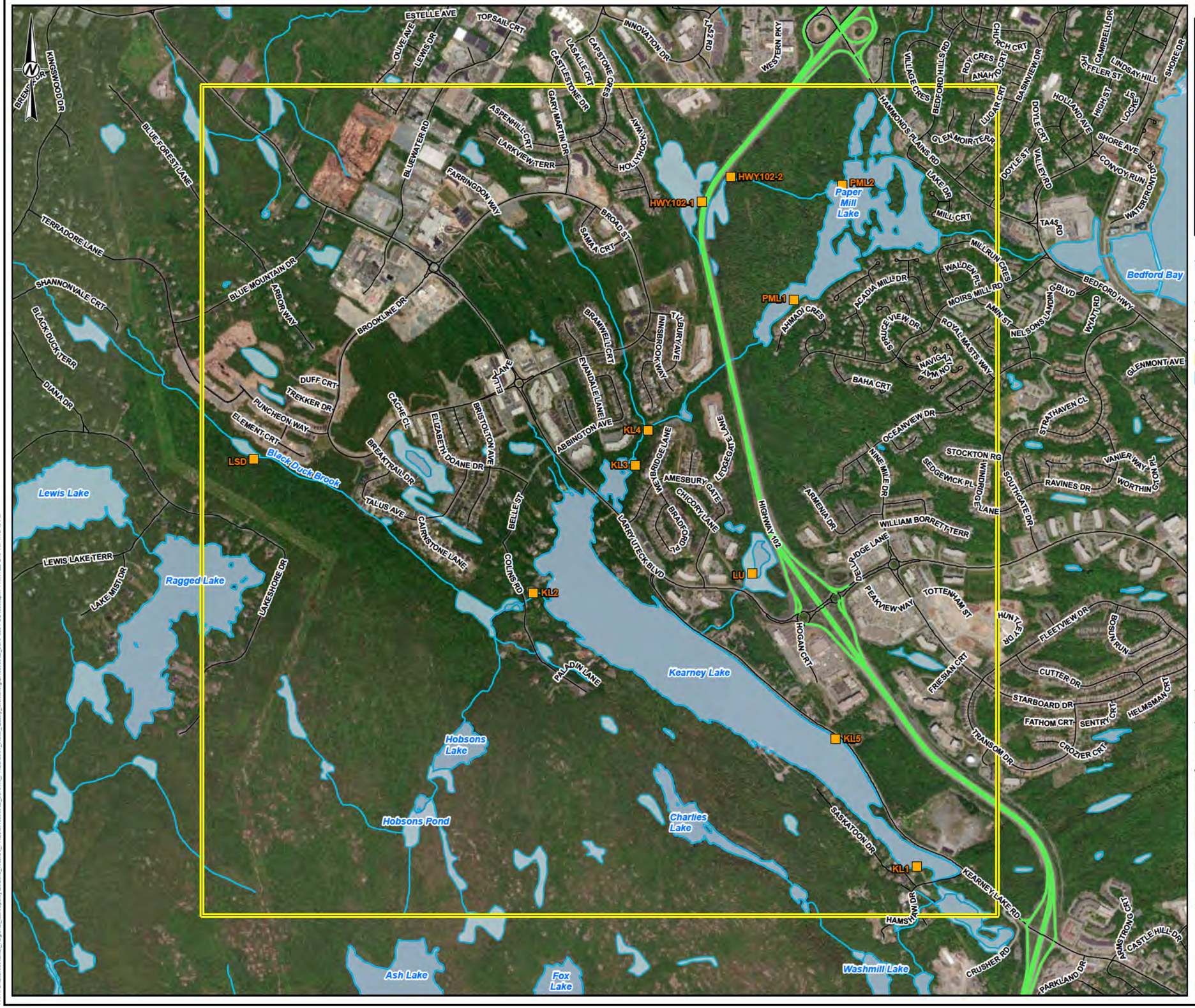
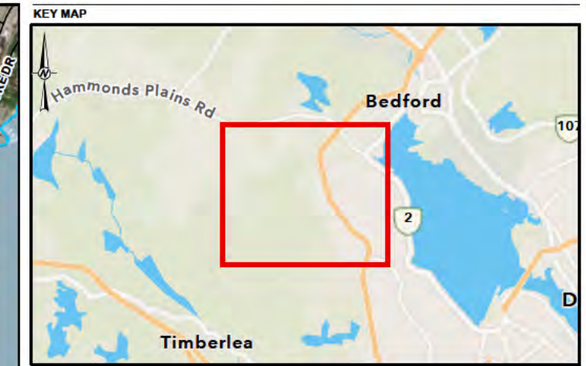
https://wsponlinecan.sharepoint.com/sites/ca-ca00339820870/shared documents/06. deliverables/02_final report/ca0033982.0870-r-rev0_2024_wqmp_report_250206.docx

APPENDIX A

Figures



KEY MAP



SCALE: 1:200,000

LEGEND

- BEDFORD WEST WATER QUALITY MONITORING LOCATIONS
- HIGHWAY
- LOCAL ROAD
- RIVERS/STREAMS
- APPROXIMATE SAMPLING AREA
- LAKES/BEDFORD BASIN

0 200 400 800

1:18,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: PROVINCE OF NOVA SCOTIA, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, METI/NASA, USGS, NRCAN, PARKS CANADA, MAXAR
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 20N

CLIENT

HALIFAX REGIONAL MUNICIPALITY

PROJECT

HRM BEDFORD WEST WATER QUALITY MONITORING
BEDFORD WEST, HALIFAX, NOVA SCOTIA

TITLE

SAMPLING LOCATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2025-02-04
DESIGNED	—
PREPARED	RSM
REVIEWED	NG
APPROVED	NL

PROJECT NO.	CONTROL	REV.	FIGURE
CA0033982.0870	0001	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

PATH: S:\Clients\Halifax_Regional_Municipality\Bedford_West\99_PROJ\CA0033982_0870\40_PROD\0001_Water_Quality_Monitoring\CA0033982_0870-0001-CS-xxxx.aprx PRINTED ON AT: 1:10:46 PM

APPENDIX B

Calibration Certificates

YSI Calibration Log

Date	User Name	Project No.	WSP Equip. #	Temp. (°C)	Accurate ? Y/N	DO Membrane Changed? Y/N	SPC (µs/cm) pre/post cal.	DO (mg/L) pre/post cal.	pH 7 pre/post cal	pH 4 pre/post cal	pH 10 pre/post cal
25-Apr-24	Julie Ellsworth	CA0033982.0870	WSP-023	18.8	Y	Y	1442/1414	96.3/100	6.94/7.00	3.77/4.00	NR/10.00
18-Jun-24	Naomi Giles	CA0033982.0870	WSP-023	19.8	Y	N	1425/1413	95.2/100	6.85/7.00	4.04/4.00	9.67/10.00
28-Aug-24	Naomi Giles	CA0033982.0870	WSP-023	20.1	Y	N	1440/1416	96.4/100	6.95/7.00	4.01/4.00	NR/10.00
23-Sep-24	Jihan Omar	CA0033982.0870	WSP-023	19.3	Y	N	1413/1423	99.6/100	7.04/7.01	4.02/4.00	10.08/10.00
29-Oct-24	Jordan Henry	CA0033982.0870	WSP-023	8.9	Y	Y	1538/1416	-	6.9/7.00	5.22/4.00	10.71/10.00
04-Dec-24	Jordan Henry	CA0033982.0870	WSP-023	15.9	Y	N	1356/1413	105.9/100	6.76/7.00	4.22/4.00	10.07/10.00

NR - Not recorded
Dissolved oxygen calibration was not performed during the October 29, 2024 sampling event. Further discussion of dissolved oxygen concentrations for this event is included in the report and in Appendix F.

Calibration video: https://www.youtube.com/watch?v=SCnAVq2lb5s
Frequency: Beginning of a project. Once per week if used in similar conditions and for same project. DO should be calibrated throughout the day (a.m. and p.m.)

APPENDIX C

Field Reports

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Paper Mill Lake	Site ID:	PML-2
Watercourse:	Paper Mill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	8'C
Cloud Cover:	Slight - 10%
Wildlife Sightings:	None.
Site Accessibility:	Canoe from Millrun Crescent
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	26th April 2024
Time (hh:mm):	11:15AM
Sample Depth (m):	1.00m
pH:	6.73
Dissolved Oxygen (mg/L):	97.2% / 11.00 mg/L
Secchi Depth (m):	Test failed as disk is still observed at the base. 1.10m
Water Temp (degrees C):	10.3
Conductivity (µs/cm):	233.1
TDS (mg/L)	151.1

Additional Comments/Notes

Water is clear with low flow, no turbidity or stratification was observed. Wind is calm with slight rippling on the water. Secchi disk test failed as the water was clear and diskcould still be seen at the base on the lake.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Brook flowing into Papermill Lake	Site ID:	HWY-102-1
Watercourse:	Brook flowing into Papermill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	6
Cloud Cover:	None
Wildlife Sightings:	None
Site Accessibility:	Access from Highway 102
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	1:40PM
Sample Depth (m):	0.50m
pH:	6.99
Dissolved Oxygen (mg/L):	97.8% / 10.64 mg/L
Secchi Depth (m):	Too shallow and clear to conduct - 0.50m
Water Temp (degrees C):	11.8
Conductivity (µs/cm):	458
TDS (mg/L)	297.8

Additional Comments/Notes

Water is clear with a slight brown tinge. Water flow is little to no flow. No turbidity or stratification observed. Organic matter observed at the base. Garbage observed along the waters edge but no trash observed within the water itself.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Brook flowing into Papermill Lake	Site ID:	HWY102-2
Watercourse:	Brook flowing into Papermill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	5
Cloud Cover:	None
Wildlife Sightings:	None
Site Accessibility:	Access of Highway 102
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	12:40PM
Sample Depth (m):	0.50m
pH:	6.39
Dissolved Oxygen (mg/L):	74.6% / 8.39 mg/L
Secchi Depth (m):	Too shallow and clear to conduct test. 0.50m
Water Temp (degrees C):	10.2
Conductivity (µs/cm):	460.1
TDS (mg/L)	297.3

Additional Comments/Notes

Water is clear with low flow. No turbidity or stratification observed. Green algae observed within the water.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	2 'C
Cloud Cover:	0%
Wildlife Sightings:	None Observed
Site Accessibility:	Sampled from dock.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	10:07AM
Sample Depth (m):	0.80m
pH:	6.7
Dissolved Oxygen (mg/L):	100% / 11.49 mg/L
Secchi Depth (m):	Too shallow to conduct secchi disk test.
Water Temp (degrees C):	9.70 'C
Conductivity (µs/cm):	207.9
TDS (mg/L)	133.4

Additional Comments/Notes

Water colour is clear, no turbidity or stratification in the Water column was observed, high to medium flow. No trash or debris were noted at this location.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear with slight cloud cover
Air Temperature:	10'C
Cloud Cover:	30-40% cloud cover
Wildlife Sightings:	Birds - Blackbirds
Site Accessibility:	Off Colins Road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	26th April 2024
Time (hh:mm):	1:15 PM
Sample Depth (m):	1.00m
pH:	5.93
Dissolved Oxygen (mg/L):	64.4% / 763 mg/L
Secchi Depth (m):	Test failed as water body was too shallow. Disk at base at 1.00m
Water Temp (degrees C):	8.2
Conductivity (µs/cm):	100.8
TDS (mg/L)	65.5

Additional Comments/Notes

Water appears clear with slight brown tinge. Brown colour could be a result of tannins from all the organic matter noted within the water body. Flow is low and steady and no turbidity or stratification was observed. No trash/debris were observed at this location.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-3
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear with some clouds
Air Temperature:	9'C
Cloud Cover:	30%
Wildlife Sightings:	Squirrels
Site Accessibility:	Public trail off Amesbury Gate
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	26th April 2024
Time (hh:mm):	12:15 PM
Sample Depth (m):	1.00 m
pH:	6.8
Dissolved Oxygen (mg/L):	101.4% / 11.89 mg/L
Secchi Depth (m):	Failed test as secchi disk is at the base of water body and can be seen. 1.10m
Water Temp (degrees C):	8.9
Conductivity (µs/cm):	216.2
TDS (mg/L)	140.6

Additional Comments/Notes

Water is clear with some bubbles, flow is moderate with no stratification. Some garbage noted within and on the side of the water body.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-4
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Slight Overcast
Air Temperature:	9
Cloud Cover:	50% cloud cover
Wildlife Sightings:	Squirrel and crows
Site Accessibility:	Public trail accessed of Amesbury Gate.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	26th April 2024
Time (hh:mm):	12:35m
Sample Depth (m):	0.95m
pH:	6.42
Dissolved Oxygen (mg/L):	104.7% / 12.20 mg/L
Secchi Depth (m):	Test failed as depth was too shallow. 0.95m
Water Temp (degrees C):	9.3
Conductivity (µs/cm):	219
TDS (mg/L)	142.3

Additional Comments/Notes

Water is clear, with organic matter accumulating at the bottom. Patches of bubble/foam seen flowing along the surface of the water. Water flow is moderate and no stratification was observed. Garbaged noted around the edge of the water body.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-5
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	3'C
Cloud Cover:	None
Wildlife Sightings:	None
Site Accessibility:	From Kearney Lake Road.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	11:15AM
Sample Depth (m):	1.00m
pH:	6.65
Dissolved Oxygen (mg/L):	101.2% / 11.53 mg/L
Secchi Depth (m):	Test failed as location was too shallow and disk could be seen at the base. 1.00m
Water Temp (degrees C):	9.3
Conductivity (µs/cm):	220.1
TDS (mg/L)	137.2

Additional Comments/Notes

Water is clear with a slight brown tinge. Water flow is medium to high and waves are choppy. Debris and garbage is built up at this locations in the form of broken docks, plastics, rope. White foam was observed along the edges of the water.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Black Duck Brook	Site ID:	LSD
Watercourse:	Black Duck Brook	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	7'C
Cloud Cover:	None
Wildlife Sightings:	None
Site Accessibility:	Off Element Cresent
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	4:50PM
Sample Depth (m):	0.50m
pH:	6.48
Dissolved Oxygen (mg/L):	85.2% / 9.05 mg/L
Secchi Depth (m):	Too shallow and clear to conduct test. 0.50m
Water Temp (degrees C):	13.2
Conductivity (µs/cm):	126.04
TDS (mg/L)	82.2

Additional Comments/Notes

Water is clear with a brown tinge. Lots of organic matter and tree trunks built up in the brook. Organic matter is deep and field staff sunk 0.50m when walking through. Flow is low to moderate and no stratification was noted. No debris observed at this location.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Amesbury Gate Park Lake	Site ID:	LU
Watercourse:	Amesbury Gate Park Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	7
Cloud Cover:	None
Wildlife Sightings:	Muskrat
Site Accessibility:	Public footpath, then trek through bog to reach sample location.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	25th April 2024
Time (hh:mm):	3:40PM
Sample Depth (m):	0.50 m
pH:	6.82
Dissolved Oxygen (mg/L):	69.2% / 7.31 mg/L
Secchi Depth (m):	Too shallow and clear to successfully conduct test. 0.50m
Water Temp (degrees C):	13
Conductivity (µs/cm):	642
TDS (mg/L)	417.2

Additional Comments/Notes

Water is clear with a slight brown tinge. Water is calm and no turbidity or stratification was observed. Bog is very peaty with large amount of organic matter built up. Field staff sank 0.50m with each step into the water. No debris or trash observed.

HRM Bedford West - Field Report Event: 2024 Spring Event

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Paper Mill Lake	Site ID:	PML-1
Watercourse:	Paper Mill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Clear
Air Temperature:	10'C
Cloud Cover:	Few clouds - 10%
Wildlife Sightings:	Canadian Geese, Ducks, Crows.
Site Accessibility:	Canoe off Millrun Crescent
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	26th April 2024
Time (hh:mm):	10:40AM
Sample Depth (m):	1.00m
pH:	6.38
Dissolved Oxygen (mg/L):	97.0 % / 11.13 mg/L
Secchi Depth (m):	1.20m
Water Temp (degrees C):	9.5
Conductivity (µs/cm):	227.9
TDS (mg/L)	148.3

Additional Comments/Notes

Water is clear and calm, no stratification or turbidity was noted. No debris noted in or alongside the lake.

HRM Bedford West - Field Report

Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	KL1
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	27°C
Cloud Cover:	0%
Wildlife Sightings:	Birds, Ducks, Geese, Flys
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	1:45pm
Sample Depth (m):	0.7m
pH:	7.02
Dissolved Oxygen (mg/L):	87.8% , 7.80 mg/L
~~Secchi Depth (m)~~:	——
Water Temp (degrees C):	21.5°C
TDS	132.5

Specific conductivity us/cm 208.3

Additional Comments/Notes

- Clear water Brown hue
- no Trash in area, little bit or trash
- Some ripples / flow in lake.
- Some flin near edges, Some bubbles
- Popular swimming spot.

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Colins Rd	Site ID:	KL2
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	28°C
Cloud Cover:	0%
Wildlife Sightings:	Birds, Black flys, Water Bugs
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	2:30 pm
Sample Depth (m):	0.7 m
pH:	6.40
Dissolved Oxygen (mg/L):	39%, 3.61 mg/L
Secchi Depth (m):	—
Water Temp (degrees C):	17.9°C
TDS	83.4

Conductivity 103.8

Additional Comments/Notes

- Clear water, slight dark Brown hue.
- Some Leaves and pollen on top of water
- Some Ripples, Low flow.
- Water Bugs
- lots of Pine needles floating on water
- no Trash/scum.

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	KL-3
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	29°C
Cloud Cover:	0%
Wildlife Sightings:	Squirrels, Black Flys
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	3:00pm
Sample Depth (m):	1.10m
pH:	7.02
Dissolved Oxygen (mg/L):	93.8%, 7.98 mg/L
Secchi Depth (m):	—
Water Temp (degrees C):	24.1°C
TDS	142.9

Conductivity 218.8

Additional Comments/Notes

- Some Trash in water, Some Pollen in water.
- Leaves and Bio debris floating in water.
- Clear water, Slight Brown hue.

HRM Bedford West - Field Report

Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	KL4
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	29°C
Cloud Cover:	0%
Wildlife Sightings:	Fish, Blackflys, Birds, Dragon fly, Squirrles, Bees.
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	3:30PM
Sample Depth (m):	0.4m
pH:	6.75
Dissolved Oxygen (mg/L):	63.5%, 5.53mg/L
~~Secchi Depth (~~m):	—
Water Temp (degrees C):	21.9°C
TDS	161.0

conductivity 221.5

Additional Comments/Notes

- Clear water, no hue.
- Some Bio Films, Very Mild, Pollen on top of water
- Medium flow, with ripples.
- No Trash.

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	KLS
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	/
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	27°c
Cloud Cover:	0%.
Wildlife Sightings:	flys, birds,
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	2:00PM
Sample Depth (m):	0.55m
pH:	7.04
Dissolved Oxygen (mg/L):	79.5%, 6.61 mg/L
Secchi Depth (m):	—
Water Temp (degrees C):	24.4°c
TDS	139.5

conductivity 221.7

Additional Comments/Notes

- Trash in area, Clear Water with brown hue.
- Ripples, low flow in Lake
- Pollen around edges of Lake.
- Some Algae on rocks

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	HW4 102-1
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	27°C
Cloud Cover:	0%
Wildlife Sightings:	birds, flys, dragonfly, spiders,
Site Accessibility:	off highway 102
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	12:20
Sample Depth (m):	0.2m
pH:	6.80
Dissolved Oxygen (mg/L):	65.4% 5.57mg/L
~~Secchi Depth (m)~~:	—
Water Temp (degrees C):	23.1°C
TDS	274.6

Conductivity 461.3

Additional Comments/Notes

- Trash about the area
- Biofilms on water / Algae / pollen
- water is relitivly clear, very shallow Area
- ~~No~~ Low flow, Some bubbles
- Huh Brown water

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Highway 102	Site ID:	HWY-102-2
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	clear
Air Temperature:	26°C
Cloud Cover:	0%
Wildlife Sightings:	Dragonflies, frogs, flies.
Site Accessibility:	from Highway 102
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	11:58 Am.
Sample Depth (m):	0.70m.
pH:	6.59.
Dissolved Oxygen (mg/L):	36.2%. 3.48 mg/L.
Secchi Depth (m):	—
Water Temp (degrees C):	17.2°C
TDS	293.7

Conductivity 455.20

Additional Comments/Notes

- clear with brown hue.
- sediment.
- biofilms / algae on surface.
- trash observed.
- no waves or ripples.
- bubbles on surface
- scum build up around rocks / sides.
- some algae.

HRM Bedford West - Field Report

Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Element crescent	Site ID:	LSD
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	24°C
Cloud Cover:	0%
Wildlife Sightings:	Dragonflies, frogs.
Site Accessibility:	walk from Element crescent.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	9:30 AM
Sample Depth (m):	0.80m.
pH:	6.72
Dissolved Oxygen (mg/L):	29.4 %, 2.54 mg/L.
Secchi Depth (m):	—
Water Temp (degrees C):	21.5°C
TDS mg/L.	103.0

conductivity 127.2

Additional Comments/Notes

- Little to no flow.
- water generally clear with brown hue.
- organics + wood seen at base of river/stream.
- slight bubbling/scum noted along edges of water.
- No trash observed.
- water is calm.
- Biofilm seen in some areas.

HRM Bedford West - Field Report

Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:		Site ID:	L4
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny
Air Temperature:	23°C
Cloud Cover:	0%
Wildlife Sightings:	May flies, dragon flys, tadpoles, frogs, fish, Muskrat birds
Site Accessibility:	Mosquitos
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	9:00 AM
Sample Depth (m):	0.5M
pH:	7.36
Dissolved Oxygen (mg/L):	86.3%, 7.31 mg/L
~~Secchi Depth (m)~~:	—
Water Temp (degrees C):	23.1°C
TDS	398.6

Conductivity 638.0

Additional Comments/Notes

- No Trash, Clear water, Slight rippling on water
- Sulfur Smell

HRM Bedford West - Field Report Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Paper mill lake	Site ID:	PML-1
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sunny / clear.
Air Temperature:	23°C
Cloud Cover:	mostly sunny
Wildlife Sightings:	Ducks, flys
Site Accessibility:	Canoe from edge of Paper mill lake
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	10:55AM
Sample Depth (m):	1m
pH:	6.97
Dissolved Oxygen (mg/L):	80.7% 7.80 mg/L
Secchi Depth (m):	1.7m
Water Temp (degrees C):	20.3°C
TDS	156.7

Conductivity 212.6

Additional Comments/Notes

secchi depth can be seen at base of the lake
- light / slight ripple in waves, no signs of Algae, pollen floating on top of water, Water is very clear.
- no notable Trash in area,
- no scum / foam build up in Area

HRM Bedford West - Field Report

Event: 2024 Spring Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Paper mill lake	Site ID:	BPML-2
Watercourse:		Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	clear
Air Temperature:	24°C
Cloud Cover:	0%
Wildlife Sightings:	Dragonfly/damselfly / birds Prey/flies/frogs.
Site Accessibility:	Edge of Paper mill lake
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	19th June 2024
Time (hh:mm):	11:10 AM
Sample Depth (m):	0.80m
pH:	7.07
Dissolved Oxygen (mg/L):	95.0% 8.25 mg/L
Secchi Depth (m):	1.0m (failed)
Water Temp (degrees C):	22.6°C
TDS mg/L	160.5
conductivity	235.6

Additional Comments/Notes

- water appears clear.
- no sediment in water observed.
- Small ripples.
- pollen on surface.
- no trash observed.
- no foam/scum.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Raining
Air Temperature:	20°C
Cloud Cover:	100%
Wildlife Sightings:	None
Site Accessibility:	Off of Hamshaw Drive
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/8/2024
Time (hh:mm):	15:15
Sample Depth (m):	0.50m
pH:	7.36
Dissolved Oxygen (mg/L):	5.93
Dissolved Oxygen (%):	69.2
Specific Conductivity (us/cm):	210.4
Secchi Depth (m):	0.50m (failed, too shallow)
Water Temp (degrees C):	22.6°C
TDS (mg/L)	136.8

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Cloudy, overcast, cool, slight breeze.
Air Temperature:	18°C
Cloud Cover:	100%
Wildlife Sightings:	No
Site Accessibility:	Easily accessed.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	9:40
Sample Depth (m):	0.80m
pH:	8.61
Dissolved Oxygen (mg/L):	1.88
Dissolved Oxygen (%):	21.0
Specific Conductivity (us/cm):	1.92
Secchi Depth (m):	0.80m - reached bottom (failed, too shallow)
Water Temp (degrees C):	19.6°C
TDS (mg/L)	109.0

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-3
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Cloudy, overcast, slight breeze, cool.
Air Temperature:	18°C
Cloud Cover:	100%
Wildlife Sightings:	Yes - red squirrel, robin.
Site Accessibility:	Easily accessed.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	10:05
Sample Depth (m):	0.80m
pH:	7.79
Dissolved Oxygen (mg/L):	5.34
Dissolved Oxygen (%):	61.3
Specific Conductivity (us/cm):	218.5
Secchi Depth (m):	0.80m (failed, too shallow)
Water Temp (degrees C):	21.8°C
TDS (mg/L)	141.8

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-4
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Overcast.
Air Temperature:	19°C
Cloud Cover:	100%
Wildlife Sightings:	Fish, birds.
Site Accessibility:	Off managed path.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	10:30
Sample Depth (m):	0.75
pH:	7.41
Dissolved Oxygen (mg/L):	3.75
Dissolved Oxygen (%):	34.7
Specific Conductivity (us/cm):	289.6
Secchi Depth (m):	0.75m (failed, too shallow)
Water Temp (degrees C):	20.5°C
TDS (mg/L)	188.1

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-5
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Raining.
Air Temperature:	20°C
Cloud Cover:	100%
Wildlife Sightings:	No.
Site Accessibility:	Off of Kearney Lake Road.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	15:00
Sample Depth (m):	0.80m
pH:	7.41
Dissolved Oxygen (mg/L):	5.88
Dissolved Oxygen (%):	68.8
Specific Conductivity (us/cm):	205.5
Secchi Depth (m):	0.80m - reached the bottom - failed, too shallow.
Water Temp (degrees C):	22.8°C
TDS (mg/L)	133.6

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HWY-102-01
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Cloudy with some sun.
Air Temperature:	21°C
Cloud Cover:	90%
Wildlife Sightings:	Damselfly/dragonfly.
Site Accessibility:	Off highway.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	13:30
Sample Depth (m):	0.10m
pH:	7.07
Dissolved Oxygen (mg/L):	3.90
Dissolved Oxygen (%):	46.1
Specific Conductivity (us/cm):	415.0
Secchi Depth (m):	0.10m (failed, too shallow)
Water Temp (degrees C):	21.4°C
TDS (mg/L)	269.7

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HWY-102-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Warm, overcast.
Air Temperature:	21°C
Cloud Cover:	90%
Wildlife Sightings:	Some bugs.
Site Accessibility:	Off highway.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/08/2024
Time (hh:mm):	13:50
Sample Depth (m):	0.50m
pH:	6.62
Dissolved Oxygen (mg/L):	5.52
Dissolved Oxygen (%):	59.1
Specific Conductivity (us/cm):	419.3
Secchi Depth (m):	0.50m (failed, too shallow)
Water Temp (degrees C):	17.3°C
TDS (mg/L)	272.6

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LSD
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Overcast
Air Temperature:	20°C
Cloud Cover:	100%
Wildlife Sightings:	Frogs
Site Accessibility:	
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/8/2024
Time (hh:mm):	12:00 PM
Sample Depth (m):	0.20m
pH:	7.2
Dissolved Oxygen (mg/L):	2.75
Dissolved Oxygen (%):	29.3
Specific Conductivity (us/cm):	165.5
Secchi Depth (m):	0.20m (failed, too shallow)
Water Temp (degrees C):	19.2°C
TDS (mg/L)	107.6

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LU
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JH		

Site Conditions

Weather:	Cloudy
Air Temperature:	22°C
Cloud Cover:	100%
Wildlife Sightings:	Frogs, ducks, damselflies.
Site Accessibility:	As before from trail.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	28/8/2024
Time (hh:mm):	2:20 PM
Sample Depth (m):	0.40m
pH:	6.99
Dissolved Oxygen (mg/L):	5.55
Dissolved Oxygen (%):	63.7
Specific Conductivity (us/cm):	518
Secchi Depth (m):	0.4m (failed, too shallow)
Water Temp (degrees C):	21.5°C
TDS (mg/L)	336.9

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	PMC-1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sun and cloud.
Air Temperature:	21°C
Cloud Cover:	70%
Wildlife Sightings:	Ducks
Site Accessibility:	Off Paper Mill Lake.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/08/2024
Time (hh:mm):	10:30
Sample Depth (m):	1.00m
pH:	7.61
Dissolved Oxygen (mg/L):	7.12
Dissolved Oxygen (%):	80.3
Specific Conductivity (us/cm):	259.2
Secchi Depth (m):	1.20m - failed, can see dish at bottom.
Water Temp (degrees C):	20.9°C
TDS (mg/L)	168.5

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	PMC-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	6
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/EB		

Site Conditions

Weather:	Sun and cloud.
Air Temperature:	18°C
Cloud Cover:	80%
Wildlife Sightings:	Ducks, lilys, squirrel, bluejays.
Site Accessibility:	Off Paper Mill Lake.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/08/2024
Time (hh:mm):	11:10
Sample Depth (m):	0.80m
pH:	7.31
Dissolved Oxygen (mg/L):	6.96
Dissolved Oxygen (%):	81.8
Specific Conductivity (us/cm):	266.0
Secchi Depth (m):	0.90m (failed, too shallow)
Water Temp (degrees C):	22.2°C
TDS (mg/L)	172.7

Additional Comments/Notes

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Clear
Air Temperature:	11°C
Cloud Cover:	0%
Wildlife Sightings:	Ducks
Site Accessibility:	As before
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	Sept 23rd
Time (hh:mm):	8:45AM
Sample Depth (m):	0.50m
Secchi Depth (m):	–
Water Temp (degrees C):	17°C
pH:	7.14
Dissolved Oxygen (mg/L):	7.13
Dissolved Oxygen (%):	74.1
Specific Conductivity (us/cm):	214.6
TDS (mg/L)	140.4

Additional Comments/Notes

- water looks clear
- no trash
- vegetation
- no stratigraphy
- slight rippling

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + Cloud
Air Temperature:	19°C
Cloud Cover:	30%
Wildlife Sightings:	none observed
Site Accessibility:	from road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept
Time (hh:mm):	2:45pm
Sample Depth (m):	0.80
Secchi Depth (m):	—
Water Temp (degrees C):	15.1
pH:	6.46
Dissolved Oxygen (mg/L):	3.16
Dissolved Oxygen (%):	31.8
Specific Conductivity (us/cm):	141.1
TDS (mg/L)	9.17

Additional Comments/Notes

- water appears clear, slight brown hue from tannins.
- no flow.
- no trash / debris.
- no stratification.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-3
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + cloud
Air Temperature:	19°C
Cloud Cover:	30%
Wildlife Sightings:	Squirrels + ducks.
Site Accessibility:	from trail
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept
Time (hh:mm):	2:11pm
Sample Depth (m):	0.50m
Secchi Depth (m):	—
Water Temp (degrees C):	18.5
pH:	6.78
Dissolved Oxygen (mg/L):	7.02
Dissolved Oxygen (%):	74.7
Specific Conductivity (us/cm):	229.5
TDS (mg/L)	149.2

Additional Comments/Notes

- water appears slightly
- some bubbles.
- no trash.
- Light flow.
- no observed stratigraphy.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-4
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + cloud
Air Temperature:	19 °C
Cloud Cover:	20%
Wildlife Sightings:	flies.
Site Accessibility:	from trail.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept
Time (hh:mm):	2:22pm
Sample Depth (m):	0.80m
Secchi Depth (m):	—
Water Temp (degrees C):	18.2
pH:	6.88
Dissolved Oxygen (mg/L):	6.77
Dissolved Oxygen (%):	76.4
Specific Conductivity (us/cm):	236.1
TDS (mg/L)	153.4

Additional Comments/Notes

- water is cloudy.
- no trash
- Vegetation
- slight sheen
- low flow

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-5
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	clear
Air Temperature:	11°C
Cloud Cover:	0%
Wildlife Sightings:	none noted.
Site Accessibility:	from road.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept
Time (hh:mm):	9:00AM
Sample Depth (m):	0.60
Secchi Depth (m):	—
Water Temp (degrees C):	18.5°C
pH:	7.08
Dissolved Oxygen (mg/L):	7.51
Dissolved Oxygen (%):	74.6
Specific Conductivity (us/cm):	219.0
TDS (mg/L)	141.9

Additional Comments/Notes

- water is clear and calm
- some trash, - lost body board, debris from old deck.
- no stratigraphy
- no wildlife.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HWM-1021
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + cloud
Air Temperature:	16°C
Cloud Cover:	50%
Wildlife Sightings:	None observed
Site Accessibility:	off highway
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd September.
Time (hh:mm):	11:52 AM
Sample Depth (m):	0.30
Secchi Depth (m):	—
Water Temp (degrees C):	16.3
pH:	6.45
Dissolved Oxygen (mg/L):	2.82
Dissolved Oxygen (%):	27.7
Specific Conductivity (us/cm):	422.4
TDS (mg/L)	274.6

Additional Comments/Notes

- Water appears cloudy.
- metals sheen.
- stagnant water - no flow
- Debris present, trash along highway.
- no stratification observed.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HW1-102-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	sun and cloud
Air Temperature:	15c
Cloud Cover:	60%
Wildlife Sightings:	none noted.
Site Accessibility:	from highway.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept
Time (hh:mm):	11:30 AM.
Sample Depth (m):	0.50 m
Secchi Depth (m):	/
Water Temp (degrees C):	12.5
pH:	6.85
Dissolved Oxygen (mg/L):	2.74
Dissolved Oxygen (%):	25.7
Specific Conductivity (us/cm):	456.2
TDS (mg/L)	296.5

Additional Comments/Notes

- metals sheen on water
- water appear cloudy.
- Lots of algae.
- Some trash / cans.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LSD
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + cloud
Air Temperature:	18°C
Cloud Cover:	30%
Wildlife Sightings:	none observed
Site Accessibility:	from road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd sept 24.
Time (hh:mm):	1:11pm
Sample Depth (m):	0.30m
Secchi Depth (m):	—
Water Temp (degrees C):	16.8°C
pH:	6.76
Dissolved Oxygen (mg/L):	2.20
Dissolved Oxygen (%):	22.6
Specific Conductivity (us/cm):	153.4
TDS (mg/L)	99.6

Additional Comments/Notes

- Stagnant water
- Metals sheen.
- Some debris
- Algae film.
- wood debris in water
- Possible beaver dam
- Slight turbidity

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LU
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sun + cloud.
Air Temperature:	16 °C
Cloud Cover:	50 %
Wildlife Sightings:	frogs, ducks, lilys
Site Accessibility:	from trail
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	23rd Sept 24
Time (hh:mm):	12:24
Sample Depth (m):	0.50m
Secchi Depth (m):	—
Water Temp (degrees C):	17.1
pH:	7.03
Dissolved Oxygen (mg/L):	8.24
Dissolved Oxygen (%):	86.5
Specific Conductivity (us/cm):	658
TDS (mg/L)	427.8

Additional Comments/Notes

- water appears clear.
- no trash
- light rippling
- Low flow

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	PMK-1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sunny
Air Temperature:	14°C
Cloud Cover:	light cover (20%)
Wildlife Sightings:	None
Site Accessibility:	Boat sample
Site Access Detail :	Same as previous events. Same as prev.

Field Parameter Data

Date (d.m.y):	2024/09/23
Time (hh:mm):	10:15
Sample Depth (m):	1.00 m
Secchi Depth (m):	1.20 m (failed)
Water Temp (degrees C):	17.1
pH:	6.87
Dissolved Oxygen (mg/L):	8.28
Dissolved Oxygen (%):	86.5
Specific Conductivity (us/cm):	245.4
TDS (mg/L)	159.5

Additional Comments/Notes

- No debris/garbage
- clear water, no stratigraphy,
- light ripples/gentle waves
- no wildlife
- No additional comments

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	PM2-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	2
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Sunny
Air Temperature:	14°C
Cloud Cover:	50%
Wildlife Sightings:	None
Site Accessibility:	Canoe
Site Access Detail :	Same as previous events. Same as previous

Field Parameter Data

Date (d.m.y):	2024/09/23
Time (hh:mm):	10:36
Sample Depth (m):	~1.00m
Secchi Depth (m):	1.1m (full)
Water Temp (degrees C):	17.7
pH:	6.88
Dissolved Oxygen (mg/L):	8.02
Dissolved Oxygen (%):	84.8%
Specific Conductivity (us/cm):	251.8
TDS (mg/L)	162.9

Additional Comments/Notes

- water is clear
- No debris
→ shipping dock approx 50 m from sampling point (along shore line)
→ light / gentle waves
→ no stratigraphy.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HWY - 102 - 1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NGUBO~~ EB, JH		

Site Conditions

Weather:	same.
Air Temperature:	8 °C
Cloud Cover:	Same
Wildlife Sightings:	red dragonflies.
Site Accessibility:	side of hwy - hikable.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29 - Oct - 2024
Time (hh:mm):	13:30
Sample Depth (m):	0.5m
Secchi Depth (m):	0.5m
Water Temp (degrees C):	6.9 °C
pH:	6.63
Dissolved Oxygen (mg/L):	1.82
Dissolved Oxygen (%):	14.7
Specific Conductivity (us/cm):	~~431.9~~ 661 (SPC used)
TDS (mg/L)	429.6

Additional Comments/Notes

- High TSS, low turb, hydrocarbon odor, sheen present on water,
No sheen noticed in sample containers,
Yellow Hue.

HRM Bedford West - Field Report Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-4
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ ~~TB~~/JH		

Site Conditions

Weather:	clear + sunny, slight breeze, cool but warming up
Air Temperature:	6°C
Cloud Cover:	5%
Wildlife Sightings:	N/A
Site Accessibility:	walkable
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/10/2024
Time (hh:mm):	11:50
Sample Depth (m):	0.25
Secchi Depth (m):	0.25
Water Temp (degrees C):	9.1
pH:	7.09
Dissolved Oxygen (mg/L):	9.11
Dissolved Oxygen (%):	77.4
~~Specific~~ Conductivity (us/cm):	174.3 * YSI was reading "conductivity" will adjust for future samples
TDS (mg/L)	162.7

Additional Comments/Notes

- med flow to the east
- water quality: colourless/ odourless/ low TURB/ low TSS/ no sheen
- no garbage, no algae, no wildlife
- no observed stratification
- bed coverage = boulders w thin layer of sediment

$$SPC = C / [1 + \%C (temp - temp_{ref})]$$

$$= 174.3 / [1 + 0.0191 (9.1 - 25)$$

$$= 174.3 / 0.696 = \boxed{250.43 \text{ us/cm}}$$

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL5
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~4~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	NG/JSO		

Site Conditions

Weather:	Same
Air Temperature:	"
Cloud Cover:	"
Wildlife Sightings:	Chick-a-dee
Site Accessibility:	Walk-able / Climb-able
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29 Oct 2024
Time (hh:mm):	14:40
Sample Depth (m):	0.3 ←
Secchi Depth (m):	0.3 ←
Water Temp (degrees C):	11.6 °C
pH:	7.20
Dissolved Oxygen (mg/L):	8.79
Dissolved Oxygen (%):	79.5
Specific Conductivity (us/cm):	233.8 (SPC used)
TDS (mg/L)	151.9

Additional Comments/Notes

- No odor, no sheen, no algae, no foam,
- clear, colourless
- No garbage, some planks.

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LSD
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NSDSO~~ EB + JH		

Site Conditions

Weather:	clear + sunny, slight breeze, cool but warming up.
Air Temperature:	8 °C
Cloud Cover:	5%
Wildlife Sightings:	small fish (resembled tadpoles)
Site Accessibility:	hike-able, development progressing - Future ability to reach site?
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29 - Oct - 2024
Time (hh:mm):	12:50
Sample Depth (m):	~~0.3m~~ 0.15 m
Secchi Depth (m):	~~0.3m~~ 0.15 m
Water Temp (degrees C):	4.6
pH:	6.30
Dissolved Oxygen (mg/L):	8.19
Dissolved Oxygen (%):	62.5
Specific Conductivity (us/cm):	175.8 (SPC used)
TDS (mg/L)	114.3

Additional Comments/Notes

- No flow
- Thin layer of ice across river
- colourless, odourless, no sheen
- No garbage - no algae? Thick layer of organics at bottom.
  ↳ high turbidity when disturbed.

tlb

HRM Bedford West - Field Report

Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	LU
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ JH + EB		

Site Conditions

Weather:	clear, sunny, no wind, cold
Air Temperature:	5°C
Cloud Cover:	none - clear
Wildlife Sightings:	none
Site Accessibility:	walk to
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/10/2024
Time (hh:mm):	11:00
Sample Depth (m):	0.25
Secchi Depth (m):	0.25
Water Temp (degrees C):	8.6
pH:	6.91
Dissolved Oxygen (mg/L):	8.56
Dissolved Oxygen (%):	72.1
~~Specific~~ Conductivity (us/cm):	411.9
TDS (mg/L)	390.1

Additional Comments/Notes

- low flow
- water quality: colourless / odourless / low TURB / low TSS / no sheen
  - sheen observed on sampling surface
  - smelled sulphur - but no sample odour
- no garbage, no wildlife, no algae
- bed cover = sediment + vines for lillypads, some leaves

$$SPC = C / [1 + \%c (temp - temp_{ref})]$$

$$= 411.9 / [1 + 0.0191 (8.6 - 25)]$$

$$= 411.9 / 0.534 = \boxed{771.35\ \mu s/cm}$$

HRM Bedford West - Field Report Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	~~Kearney Lake~~ Papermill Lake	Site ID:	PML-1
Watercourse:	~~Kearney Lake~~ Papermill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ EB + JH		

Site Conditions

Weather:	sunny, clear, cold, no wind
Air Temperature:	1°C
Cloud Cover:	none - clear skies
Wildlife Sightings:	none - heard birds / crows
Site Accessibility:	canoe across
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/10/2024
Time (hh:mm):	09:15
Sample Depth (m):	1.10m
Secchi Depth (m):	1.10m
Water Temp (degrees C):	8.9°C
pH:	6.93
Dissolved Oxygen (mg/L):	10.05
Dissolved Oxygen (%):	— VSI probe did not display % DO - will rectify for next samples
~~Specific~~ Conductivity (us/cm):	186.5
TDS (mg/L)	175.0

~~SPC = C / [1 + %/C (T - Tref)] = 186.5 / [(1 + 0.0191) (~~ *see below*

Additional Comments/Notes

- Sample colour/quality: colourless / clear, no sheen, odourless
- Flow: low flow
- stratification: none observed
- other notes (trash, debris, turbidity, wildlife, etc):
  - no trash, water was clear - low TURB, low TSS - no algae
  - bed coverage = sediment, small boulders, leaves

* SPC = C / [1 + %C (temp (c) - temp(ref))]

= 186.5 / [1 + 0.0191 (8.9 - 25)]

= 186.5 / (1 - 0.308) = 186.5 / 0.692 = ***SPC* 269.51 µS/cm**

HRM Bedford West - Field Report Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	~~Kearney Lake~~ Papermill Lake	Site ID:	PML-2
Watercourse:	~~Kearney Lake~~ Papermill Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ JH + EB		

Site Conditions

Weather:	Sunny, clear, cold, no wind
Air Temperature:	1°C
Cloud Cover:	none- clear
Wildlife Sightings:	no usual observations, birds heard
Site Accessibility:	canoe access
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	09/10/2024
Time (hh:mm):	09:50
Sample Depth (m):	0.9m
Secchi Depth (m):	0.9m
Water Temp (degrees C):	9.4°C
pH:	6.86
Dissolved Oxygen (mg/L):	9.53
Dissolved Oxygen (%):	—
~~Specific~~ Conductivity (us/cm):	197.8
TDS (mg/L)	183.0

Additional Comments/Notes

- water quality: colourless/odourless/no sheen / low TURB / low TSS
- no wildlife observed, no trash, no algae
- low flow
- bed coverage = sediment, boulders, leaves, grasses
- no observed stratification

$$SPC = C / [1 + \%C(\text{temp}(C) - \text{temp}(ref))]$$

$$= 197.8 / [1 + 0.0191(9.4 - 25)]$$

$$= 197.8 / 0.702 = \boxed{281.77\ \mu s/cm}$$

HRM Bedford West - Field Report Event: 2024 Summer

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	HWY-102-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~4~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NGXJO~~ EB+JH		

Site Conditions

Weather:	Same.
Air Temperature:	Same
Cloud Cover:	Same
Wildlife Sightings:	None
Site Accessibility:	Hikable, climbable,
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29 Oct 2029
Time (hh:mm):	13:50
Sample Depth (m):	~~0.3~~ 0.15 cm
Secchi Depth (m):	~~0.3~~ 0.15 cm
Water Temp (degrees C):	7.9 °C
pH:	6.92
Dissolved Oxygen (mg/L):	5.64
Dissolved Oxygen (%):	46.6
Specific Conductivity (us/cm):	447.9 (SPC used)
TDS (mg/L)	291.1

depth 0.3=0.15?

Additional Comments/Notes

- Hydrocarbon odor, No sheen, no flow,
- clear, colourless,
- Lots of garbage along ditch

HRM Bedford West - Field Report Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-1
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ JH + EB		

Site Conditions

Weather:	sunny, cold, no wind
Air Temperature:	3°C
Cloud Cover:	25% - clear skies over site, clouds along periphery
Wildlife Sightings:	none
Site Accessibility:	walkable
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	~~29/10/2024~~ 30/10/2024
Time (hh:mm):	09:50
Sample Depth (m):	0.5m
Secchi Depth (m):	0.5m
Water Temp (degrees C):	9.4°C
pH:	9.84
Dissolved Oxygen (mg/L):	8.02
Dissolved Oxygen (%):	69.4
Specific Conductivity (us/cm):	232.2
TDS (mg/L)	147.3

Additional Comments/Notes

- bed coverage = sand and leaves
- no flow - water calm
- no observed stratification

*saw a duck as we were leaving

*water quality = colourless / low TURB / low TSS / no sheen / odourless

- no wildlife, no garbage, no algae

1-2 small pieces on shore.

HRM Bedford West - Field Report Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-2
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ JH + EB		

Site Conditions

Weather:	sunny and cold, no wind
Air Temperature:	4°C
Cloud Cover:	none - clear skies
Wildlife Sightings:	none visual observation - could hear multiple crows / red squirrel
Site Accessibility:	walkable
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	30/10/2024
Time (hh:mm):	10:15
Sample Depth (m):	0.5
Secchi Depth (m):	0.5 - towards the center of the sampling area looked very dark, not clear like other sites ↓ lots of sediment / leaves but were able to see secchi in the area sampled
Water Temp (degrees C):	~~6.6~~ 5.9
pH:	9.60
Dissolved Oxygen (mg/L):	5.93
Dissolved Oxygen (%):	46.5
Specific Conductivity (us/cm):	141.0
TDS (mg/L)	~~922~~ 91.7

Additional Comments/Notes

- bed coverage = ~~small~~ gravel (lots of infill present on site - see photos)
- no flow in sample area, small stream flowing from the west side east into SWB
- no algae, no garbage, no visual observation of wildlife - multiple crows heard throughout sampling and heard a red squirrel
- no observed stratification

* water quality: colourless / odourless / no sheen / med TSS / low TURB

HRM Bedford West - Field Report

Event: 2024 ~~Summer~~ FALL

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake	Site ID:	KL-3
Watercourse:	Kearney Lake	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	~~2~~ 8
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	~~NG/JSO~~ JH / EB		

Site Conditions

Weather:	some clouds, sunny, slight wind, warming up
Air Temperature:	6°C
Cloud Cover:	5% - still very clear
Wildlife Sightings:	ducks, small birds, crows, red squirrels
Site Accessibility:	walkable
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	29/10/2024
Time (hh:mm):	11:40
Sample Depth (m):	0.5 m
Secchi Depth (m):	0.5 m
Water Temp (degrees C):	9.6
pH:	7.05
Dissolved Oxygen (mg/L):	9.81
Dissolved Oxygen (%):	84.5%
~~Specific~~ Conductivity (us/cm):	174.5
TDS (mg/L)	160.5

Additional Comments/Notes

- slight flow east due to dam on the west side
- colourless/odourless/ low TURB/ low-med TSS / no sheen
  water quality = ✓
  ↳ some sediment
- no garbage, some wildlife, no algae
- bed coverage = boulders w/ thin layer of sediment
- no observed stratification

$$SPC = C / [1 + \%C (temp - temp_{ref})]$$

$$= 174.5 / [1 + 0.0191 (9.6 - 25)]$$

$$= 174.5 / 0.706 = \boxed{247.17\ \mu s/cm}$$

HRM Bedford West - Field Report

Event: 2024 Autumn Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	KL1
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	rainy, cold
Air Temperature:	2°C
Cloud Cover:	100%
Wildlife Sightings:	none
Site Accessibility:	parking off of road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	05/12/24
Time (hh:mm):	10:00
Sample Depth (m):	0.2 m
Secchi Depth (m):	0.2 m
Water Temp (degrees C):	3.8
pH:	7.24
Dissolved Oxygen (mg/L):	12.72
Dissolved Oxygen (%):	97.0
Specific Conductivity (us/cm):	204.1
TDS (mg/L)	132.6

Additional Comments/Notes

- no colour
- no odor
- no sheen
- garbage around water
- dock is pulled out / different than previous

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	KL-2
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Cloudy
Air Temperature:	-2
Cloud Cover:	90 %
Wildlife Sightings:	none
Site Accessibility:	off of road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	12:05
Sample Depth (m):	0.3m
Secchi Depth (m):	0.3m
Water Temp (degrees C):	3.1°C
pH:	7.05
Dissolved Oxygen (mg/L):	10.23
Dissolved Oxygen (%):	75.6
Specific Conductivity (us/cm):	104.5
TDS (mg/L)	67.9

Additional Comments/Notes

- no odor
- no sheen
- yellowish colour
- flow - 0.3 m/s from inlet
- low tss
- rocky stream bed

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	KL3
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	I
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Rainy, cold
Air Temperature:	2°C
Cloud Cover:	100%
Wildlife Sightings:	none
Site Accessibility:	path from road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	05/12/24
Time (hh:mm):	9:05
Sample Depth (m):	0.3m
Secchi Depth (m):	0.3m
Water Temp (degrees C):	5.2°C
pH:	7.74
Dissolved Oxygen (mg/L):	13.30
Dissolved Oxygen (%):	105.2
Specific Conductivity (us/cm):	244.7
TDS (mg/L)	159.0

Additional Comments/Notes

- no colour
- no odor
- no sheen
- ~~[illegible]~~
- 3 m/s flow
- higher water level than previous

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	KL4
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Rainy, cold
Air Temperature:	2°C
Cloud Cover:	100%
Wildlife Sightings:	none
Site Accessibility:	path from road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	05/12/24
Time (hh:mm):	9:10
Sample Depth (m):	0.5
Secchi Depth (m):	0.5
Water Temp (degrees C):	5.1°C
pH:	7.36
Dissolved Oxygen (mg/L):	11.95
Dissolved Oxygen (%):	94.1
Specific Conductivity (us/cm):	245.6
TDS (mg/L)	159.7

Additional Comments/Notes

- no odor
- no color
- no sheen
- 5 m/s flow
- rocky river bed
- higher water level than previous

HRM Bedford West - Field Report

Event: 2024 Autumn Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	KL5
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Rainy, cold
Air Temperature:	2°C
Cloud Cover:	100%
Wildlife Sightings:	none
Site Accessibility:	Off side of road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	05/12/24
Time (hh:mm):	9:40
Sample Depth (m):	0.2
Secchi Depth (m):	0.2
Water Temp (degrees C):	6.0
pH:	6.91
Dissolved Oxygen (mg/L):	11.49
Dissolved Oxygen (%):	92.8
Specific Conductivity (us/cm):	214.6
TDS (mg/L)	139.5

Additional Comments/Notes

- no sheen
- no color
- no odor
- moderate tss
- garbage/debris around water
- rocky lake bed

HRM Bedford West - Field Report

Event: 2024 Autumn Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	HWY 102-1
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Cloudy
Air Temperature:	-2°C
Cloud Cover:	90%
Wildlife Sightings:	none
Site Accessibility:	side of highway
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	10:20
Sample Depth (m):	0.3 m
Secchi Depth (m):	0.3 m
Water Temp (degrees C):	7.2°C
pH:	7.87
Dissolved Oxygen (mg/L):	9.45
Dissolved Oxygen (%):	61.0
Specific Conductivity (us/cm):	388.5
TDS (mg/L)	257.3

Additional Comments/Notes

- methane smell near site; no odor in sample
- no sheen
- no colour
- medium tss
- low turbidity
- lots of garbage
- low flow
- 3 m. width of stream

* water level ~5cm higher vs previous sampling event
- 10cm

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	HW4102-2
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Cloudy
Air Temperature:	-2
Cloud Cover:	90%
Wildlife Sightings:	none
Site Accessibility:	off highway
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	12:20
Sample Depth (m):	0.5m
Secchi Depth (m):	0.5
Water Temp (degrees C):	3.5
pH:	6.57
Dissolved Oxygen (mg/L):	7.89
Dissolved Oxygen (%):	59.1
Specific Conductivity (us/cm):	439.4
TDS (mg/L)	285.3

Additional Comments/Notes

- no sheen
- methane smell
- slightly yellow colour
- ice covered

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	LU
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	cloudy
Air Temperature:	-2
Cloud Cover:	90%
Wildlife Sightings:	none
Site Accessibility:	side of road; walk in
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	10:55
Sample Depth (m):	0.3
Secchi Depth (m):	0.3
Water Temp (degrees C):	4.2
pH:	8.84
Dissolved Oxygen (mg/L):	10.33
Dissolved Oxygen (%):	78.9
Specific Conductivity (us/cm):	~~[illegible]~~ 523
TDS (mg/L)	340.0

Additional Comments/Notes

- no colour
- no odor
- no sheen
- low flow
- ~~[illegible]~~

- medium tss

*portions of sampling surface are low
* water level is high vs previous sampling event

Event: 2024 Autumn Resample

HRM Bedford West - Field Report

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	LSD
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	sunny
Air Temperature:	-2
Cloud Cover:	80%
Wildlife Sightings:	none
Site Accessibility:	Off of Road
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	11:35
Sample Depth (m):	0.3 *was getting caught on roots - potentially deeper
Secchi Depth (m):	0.3 * sediment kicked up during sampling, hard to see in photo but could see it on the "bottom"
Water Temp (degrees C):	2.9°C
pH:	7.52
Dissolved Oxygen (mg/L):	9.91
Dissolved Oxygen (%):	73.1
Specific Conductivity (us/cm):	157.6
TDS (mg/L)	102.5

Additional Comments/Notes

- No colour, no sheen, low TURB
- med TSS - lots of sediment kicked up while sampling

*sample surface covered in layer of ice

- No flow, width = ~4m
- Bed coverage = roots, lots of sediment (decaying organics)

HRM Bedford West - Field Report

Event: 2024 Autumn Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	PML 1
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	1
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	Snowing, cloudy
Air Temperature:	-2
Cloud Cover:	90%
Wildlife Sightings:	ducks
Site Accessibility:	canoe access
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	09:10
Sample Depth (m):	2.5
Secchi Depth (m):	2.5
Water Temp (degrees C):	5°C
pH:	6.13
Dissolved Oxygen (mg/L):	12.81
Dissolved Oxygen (%):	99.5
Specific Conductivity (us/cm):	251.3
TDS (mg/L)	163.2

Additional Comments/Notes

- odourless
- colourless
- no sheen
- low turbidity
- calm surface water
- residential areas on land
- frozen edges of lake

HRM Bedford West - Field Report Event: 2024 Autumn Resample

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	Kearney Lake and surrounding	Site ID:	PML 2
Watercourse:	Kearney Lake and surrounding	Location:	Bedford
Sample Type:	Surface Water	No. of bottles:	
GPS Coordinates:	Same as previous events		
Wood Field Personnel:	JH/MO		

Site Conditions

Weather:	snowing, cloudy
Air Temperature:	-2
Cloud Cover:	90 %
Wildlife Sightings:	ducks
Site Accessibility:	canoe access
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	04/12/24
Time (hh:mm):	09:30
Sample Depth (m):	1.2
Secchi Depth (m):	1.2
Water Temp (degrees C):	3.8°C
pH:	8.16
Dissolved Oxygen (mg/L):	12.51
Dissolved Oxygen (%):	94.5
Specific Conductivity (us/cm):	260.7
TDS (mg/L)	169.4

Additional Comments/Notes

- shopping cart (garbage)
- calm surface water
- odourless
- colourless
- no sheen
- frozen edges of lake

APPENDIX D

Site Photographs

SPRING SAMPLING EVENT

HWY-102-1 – View of sampling station HWY-102-1 during the spring event (photo taken on April 25th, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the spring event (photo taken April 25th, 2024).

KL-1 – View from sampling station KL-1 during the spring event (photo taken April 25th, 2024).

KL-1 – View of Secchi disk test at sampling station KL-1 during the spring event (photo taken April 25th, 2024).

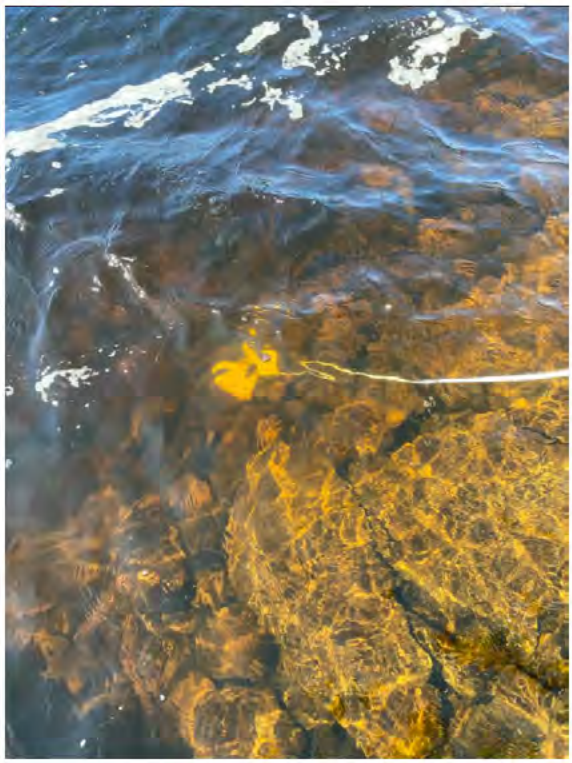
KL-2 – View of sampling station KL-2 during the spring event (photo taken April 26th, 2024).

KL-3 – View of sampling station KL-3 during the spring event (photo taken April 26th, 2024).

KL-3 – View of water at sampling station KL-3 during the spring event (photo taken April 26th, 2024).

KL-4 – View of sampling station KL-4 during the spring event (photo taken April 26th, 2024).

KL-5 – View of sampling station KL-5 during the spring event (photo taken April 25th, 2024).



KL-5 – View of Secchi disk test at sampling station KL-5 during the spring event (photo taken April 25th, 2024).

LSD – View of sampling station LSD during the spring event (photo taken April 25th, 2024).

LU – View walking northeast towards sampling station LU taken during the spring event (photo taken April 25th, 2024).

PML-1 – View from sampling station PML-1 during the spring event (photo taken on April 26th, 2024).

PML-1 – Secchi disk from sampling station PML-1 during the spring event (photo taken on April 26th, 2024)

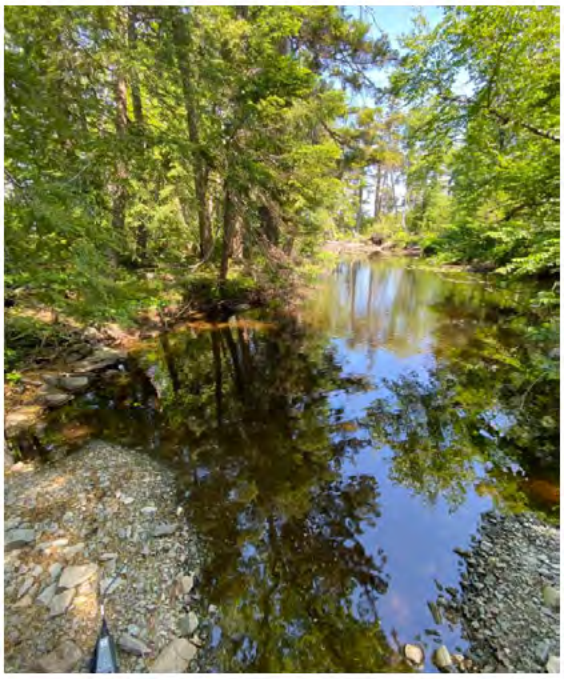
PML-2 – View from sampling station PML-2 during the spring event (photo taken on April 26th, 2024).

SPRING RE-SAMPLING EVENT

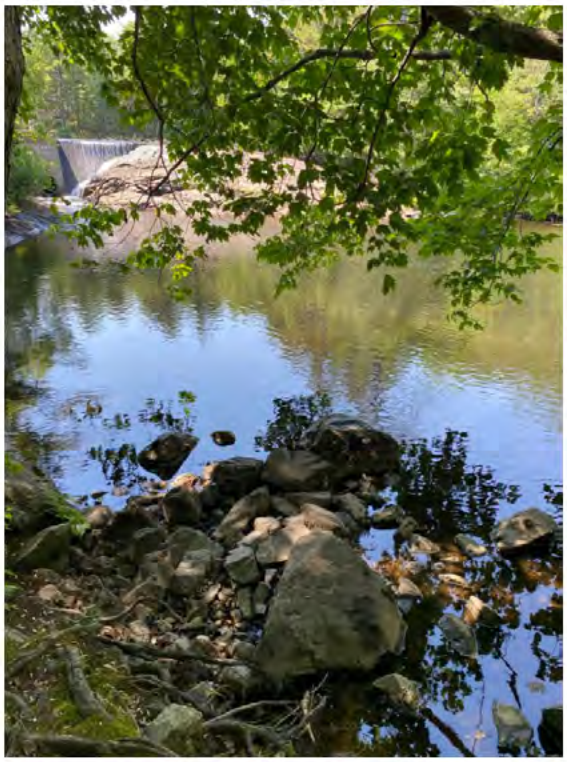
HWY-102-1 – View of sampling station HWY-102-1 during the spring re-sample event (photo taken on June 19th, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the spring re-sample event (photo taken June 19th, 2024).

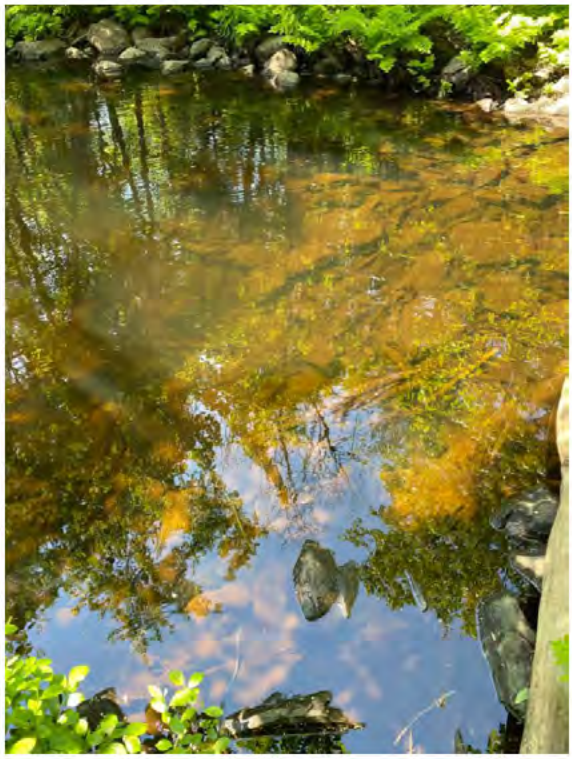
KL-1 – View of sampling station KL-1 during the spring re-sample event (photo taken June 19th, 2024).



KL-2 – View of KL-2 during the spring re-sample event (photo taken June 19th, 2024).



KL-3 – View of sampling station KL-3 during the spring re-sample event (photo taken June 19th, 2024).

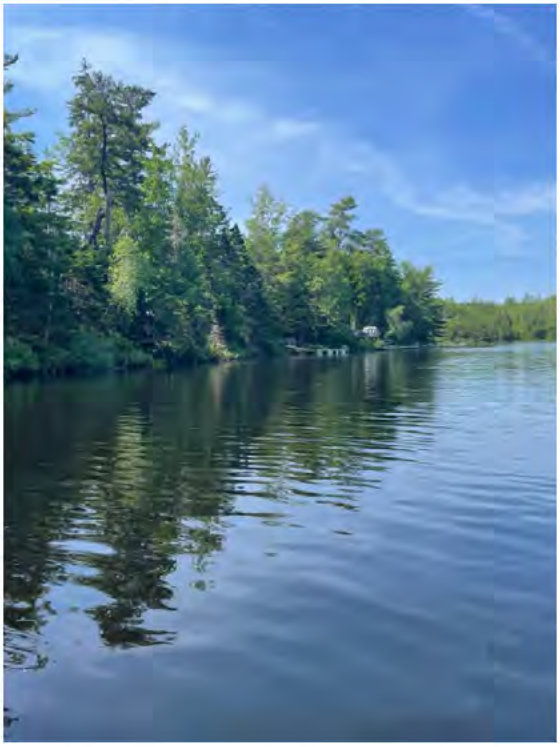


KL-4 – View of sampling station KL-4 during the spring re-sample event (photo taken June 19th, 2024).

KL-5 – View of sampling station KL-5 during the spring re-sample event (photo taken June 19th, 2024).

LSD – View of sampling station LSD during the spring re-sample event (photo taken June 20th, 2024).

LU – View of sampling station LU during the spring re-sample event (photo taken June 20th, 2024).



PML-1 – View of sampling station PML-1 during the spring re-sample event (photo taken June 19th, 2024).

PML-2 – View of sampling station PML-2 during the spring re-sample event (photo taken June 19th, 2024).

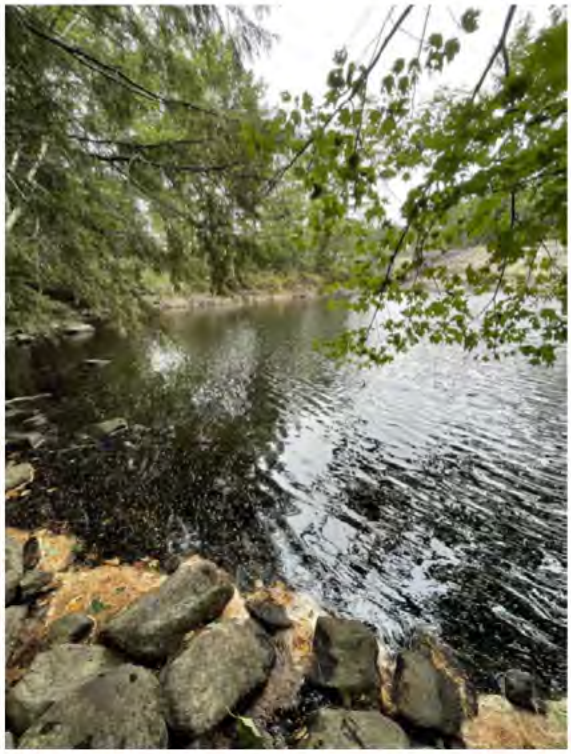
SUMMER SAMPLING EVENT

HWY-102-1 – View of sampling station HWY-102-1 during the summer event (photo taken on August 29th, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the summer event (photo taken August 29th, 2024).

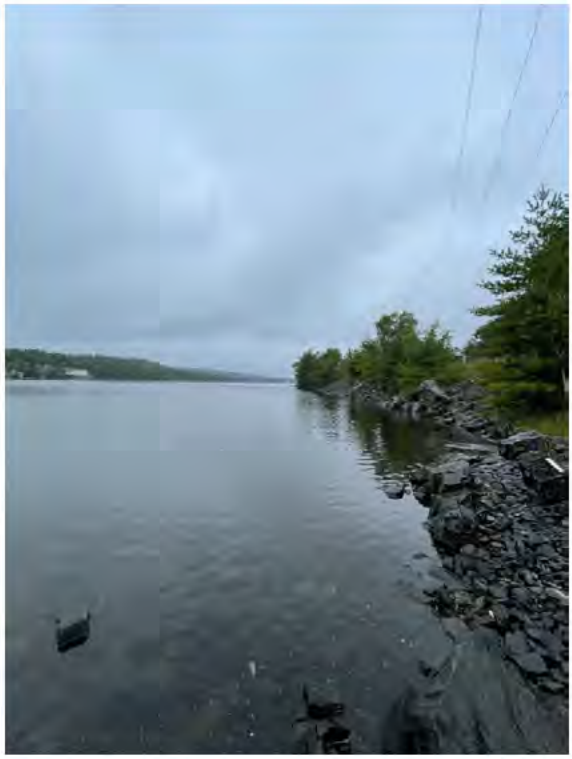
KL-1 – View of sampling station KL-1 during the summer event (photo taken August 29th, 2024).

KL-2 – View of KL-2 during the summer event (photo taken August 29th, 2024).



KL-3 – View of sampling station KL-3 during the summer event (photo taken August 29th, 2024).

KL-4 – View of sampling station KL-4 during the summer event (photo taken August 29th, 2024).



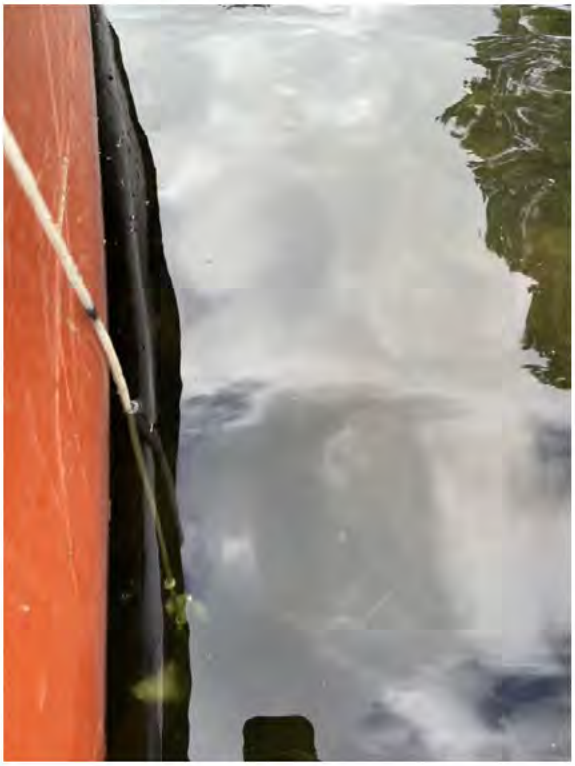
KL-5 – View of sampling station KL-5 during the summer event (photo taken August 29th, 2024).

LSD – View of sampling station LSD during the summer event (photo taken August 29th, 2024).

LU – View of sampling station LU during the summer event (photo taken August 29th, 2024).

PML-1 – View of sampling station PML-1 during the summer event (photo taken August 30th, 2024).

PML-2 – View of sampling station PML-2 during the summer event (photo taken August 30th, 2024).



PML-2 – View of Secchi disk reading attempt at PML-2 sampling location during the summer event (photo taken August 30th, 2024).

SUMMER RE-SAMPLING EVENT

HWY-102-1 – View of sampling station HWY-102-1 during the summer re-sampling event (photo taken on September 23rd, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the summer re-sampling event (photo taken on September 23rd, 2024).

KL-1 – View of sampling station KL-1 during the summer re-sampling event (photo taken on September 23rd, 2024).

KL-2 – View of KL-2 during the summer re-sampling event (photo taken on September 23rd, 2024).

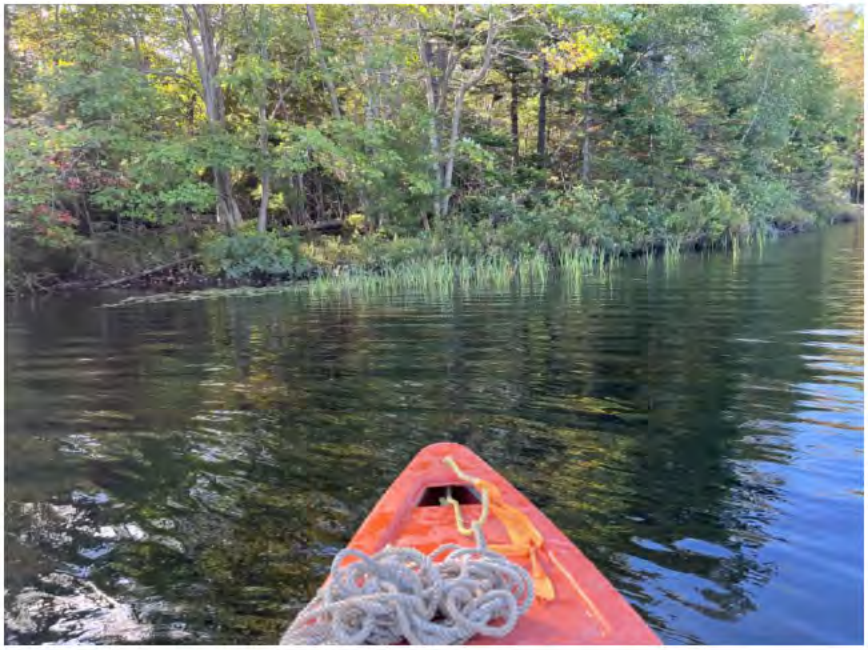
KL-3 – View of sampling station KL-3 during the summer re-sampling event (photo taken on September 23rd, 2024).

KL-4 – View of sampling station KL-4 during the summer re-sampling event (photo taken on September 23rd, 2024).

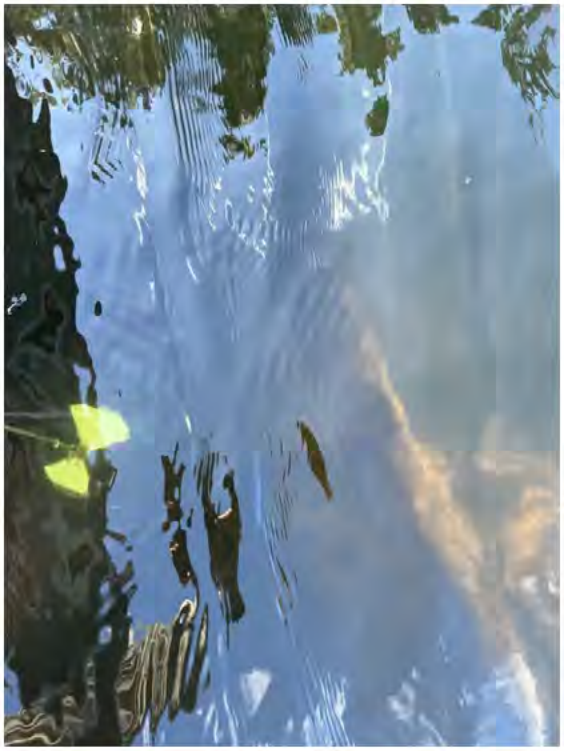
KL-5 – View of sampling station KL-5 during the summer re-sampling event (photo taken on September 23rd, 2024).

LSD – View of sampling station LSD during the summer re-sampling event (photo taken on September 23rd, 2024).

LU – View of sampling station LU during the summer re-sampling event (photo taken on September 23rd, 2024).



PML-1 – View of sampling station PML-1 during the summer re-sampling event (photo taken on September 23rd, 2024).



PML-1 – View of Secchi disk reading attempt at PML-2 sampling location during the summer re-sampling event (photo taken on September 23rd, 2024).

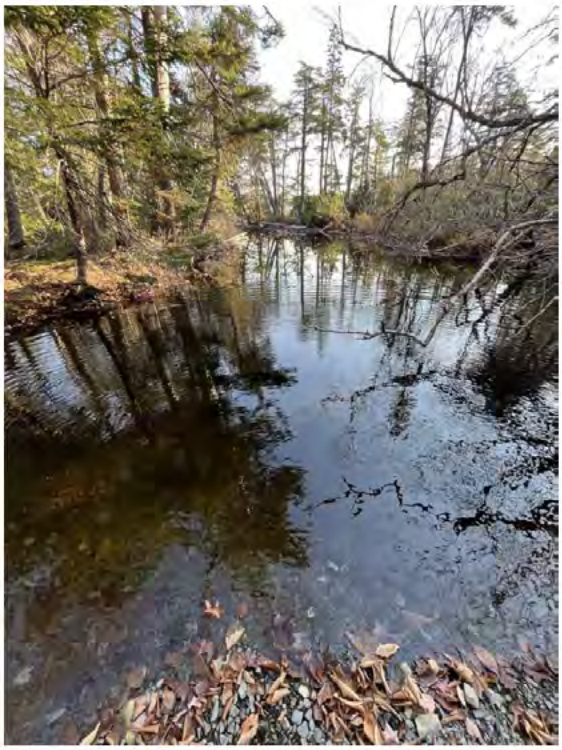
PML-2 – There was no photo of PML-2 available from the summer re-sampling event. Refer to Appendix C for field observations of sampling station conditions.

FALL SAMPLING EVENT

HWY-102-1 – View of sampling station HWY-102-1 during the fall event (photo taken on October 29th, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the fall event (photo taken on October 29th, 2024).

KL-1 – View of sampling station KL-1 during the fall event (photo taken on October 29th, 2024).



KL-2 – View of KL-2 during the fall event (photo taken on October 29th, 2024).

KL-2 – View of Secchi disk test at sampling station KL-2 during the fall event (photo taken on October 29th, 2024).

KL-3 – View of sampling station KL-3 during the fall event (photo taken on October 29th, 2024).

KL-4 – View of sampling station KL-4 during the fall event (photo taken on October 29th, 2024).

KL-5 – View of sampling station KL-5 during the fall event (photo taken on October 29th, 2024).

LSD – View of sampling station LSD during the fall event (photo taken on October 29th, 2024).

LU – View of sampling station LU during the fall event (photo taken on October 29th, 2024).

PML-1 – View of sampling station PML-1 during the fall event (photo taken on October 29th, 2024).

PML-2 – View of sampling station PML-2 during the fall event (photo taken on October 29th, 2024).

FALL RE-SAMPLING EVENT

HWY-102-1 – View of sampling station HWY-102-1 during the fall re-sampling event (photo taken on December 4th, 2024).

HWY-102-2 – View of sampling station HWY-102-2 during the fall re-sampling event (photo taken on December 4th, 2024).

KL-1 – View of sampling station KL-1 during the fall re-sampling event (photo taken on December 5th, 2024).

KL-2 – View of KL-2 during the fall re-sampling event (photo taken on December 4th, 2024).

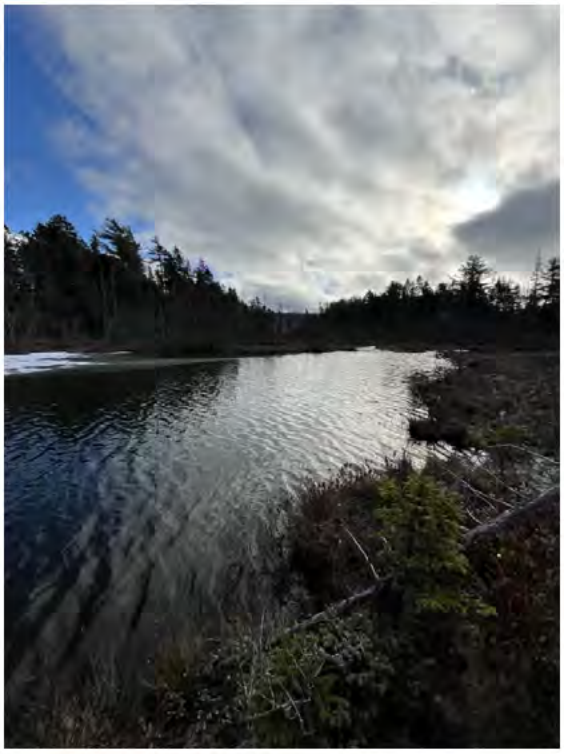
KL-3 – View of sampling station KL-3 during the fall re-sampling event (photo taken on December 5th, 2024).

KL-4 – View of sampling station KL-4 during the fall re-sampling event (photo taken on December 5th, 2024).

KL-5 – View of sampling station KL-5 during the fall re-sampling event (photo taken on December 4th, 2024).

LSD – View of sampling station LSD during the fall re-sampling event (photo taken on December 4th, 2024).

LSD – View of Secchi disk test, unsuccessful due to thick ice, at sampling station LSD during the fall re-sampling event (photo taken on December 4th, 2024).



LU – View of sampling station LU during the fall re-sampling event (photo taken on December 4th, 2024).

PML-1 – View of sampling station PML-1 during the fall re-sampling event (photo taken on December 4th, 2024).

PML-2 – View of sampling station PML-2 during the fall re-sampling event (photo taken on December 4th, 2024).

PML-2 – View of Secchi disk test at sampling station PML-2 during the fall re-sampling event (photo taken on December 4th, 2024).

APPENDIX E

Standard Operating Procedures

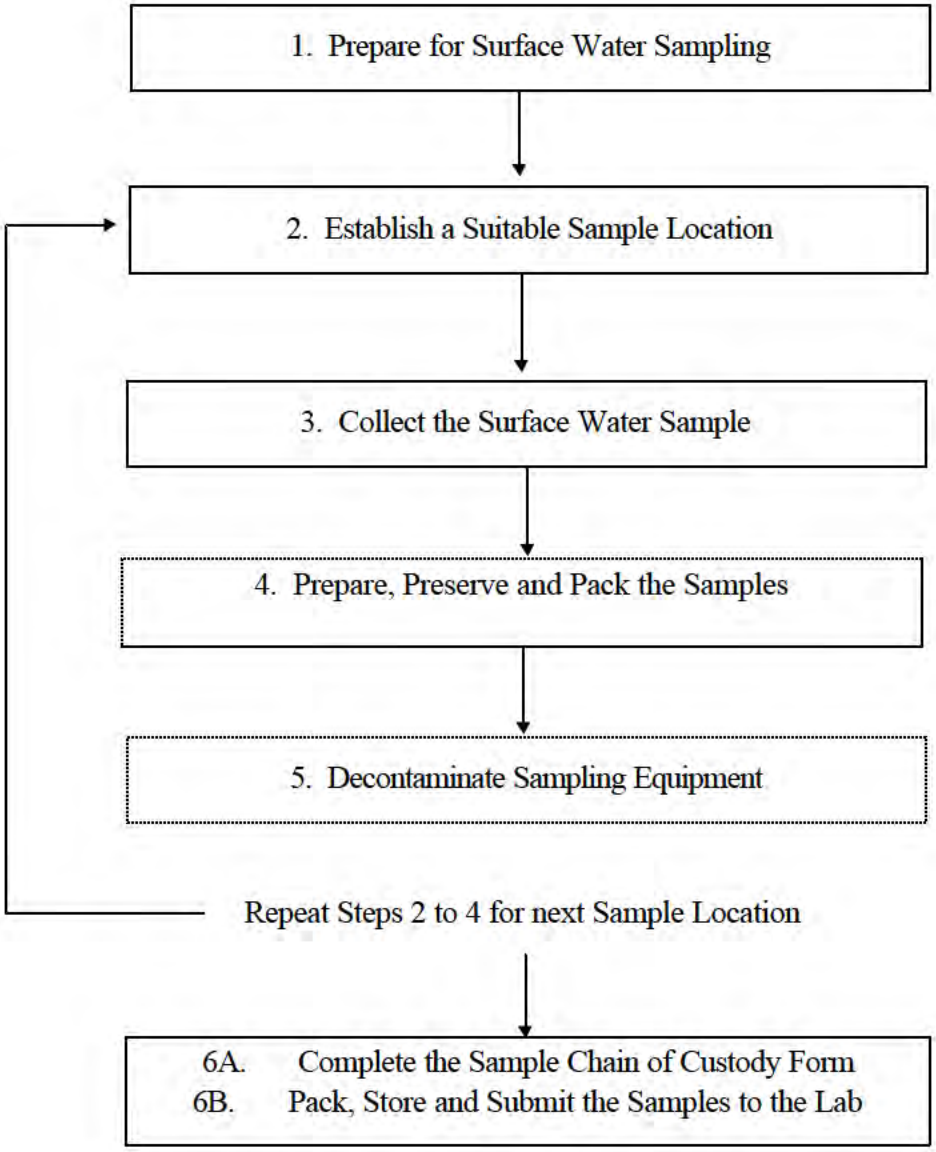
PROCEDURE NO. 31
SURFACE WATER SAMPLING

WHEN? Surface water samples may be collected from streams, lakes, reservoirs or ditches during site investigations or as part of an on-going monitoring program. In streams and ditches, sampling should generally be conducted during low or "normal" flow (as opposed to during or following a storm) to assess typical surface water quality.

WHY? Surface water is sampled and analyzed to assess general water quality, concentrations of potential contaminants, or nutrient or chemical loading. This information may be required to determine whether discharge from a site meets regulatory criteria or discharge permits, determine what type of treatment or action may be necessary, or assess potential off-site impacts.

Surface water sampling is commonly undertaken at or in the vicinity of woodpole storage yards, where PCP, CCA and mineral oil & grease are typical chemical parameters of concern.

HOW? The following diagram shows the main steps involved in the collection of surface water samples and described in this procedure. The elements having a dashed outline are described in further detail in other procedures contained in this manual.


1. Prepare for Surface Water Sampling
2. Establish a Suitable Sample Location
3. Collect the Surface Water Sample
4. Prepare, Preserve and Pack the Samples
5. Decontaminate Sampling Equipment
Repeat Steps 2 to 4 for next Sample Location
6A. Complete the Sample Chain of Custody Form
6B. Pack, Store and Submit the Samples to the Lab

Essential Site Information

- site plan showing sampling location
- information regarding chemical parameters of concern

Essential Equipment

The equipment needed to collect a representative surface water sample depends on the size of the surface water body and access to the planned sampling locations.

- appropriate health and safety equipment (See ***Health and Safety Plan,*** Procedure No. 2)
- field book, pens, pencils
- water level tape or depth-measuring device (e.g., yard stick)
- pre-cleaned sample bottles with labels and lids, provided by analytical lab. See Table No. 31-1 for type and size of bottles required.
- cooler with appropriate packing material
- ice packs (or heat packs to maintain samples at 4°C if ambient temperature is below 0° C)
- wooden stakes and magic markers for marking sample location
- camera and film

One or more of the following devices, to collect sample:

- sampling iron (a long pole with a metal bottle holder that can be used to reach the middle of streams)
- rope and clean bucket

Essential Forms

- Water Sampling Data Sheet

Other / Optional Equipment

- field meters (pH, conductivity, temperature, dissolved oxygen), 250 mL container and calibration solutions (See ***Measurement of Field Parameters in Water,*** Procedure No. 27)

- If sampling for dissolved metals, filtering apparatus (see ***Field Filtering and Acidification for Dissolved Metals Samples,*** Procedure No. 28)
  **Note, it may be acceptable for the analytical lab to filter the sample(s) if the analysis is commenced soon after the sample is collected. Discuss this option with the Site Investigation Coordinator (Project Manager).

- Decontamination equipment (See ***Decontamination of Equipment,*** Procedure No. 4):
  - biodegradable detergent, rinse water, deionized final rinse water, paper towels,
  - brush, washing container (bucket)

1. Preparing for Surface Water Sampling

OFFICE PREPARATION:

- ☐ Organize equipment and forms.
- ☐ Make sure sampling equipment is clean (see section..).

SAMPLING APPROACH (in consultation with Site Investigation Coordinator (Project Manager):

- ☐ Review available information to determine the size /flow of the surface water body and the accessibility to the sampling locations.
- ☐ Identify the objectives of the surface water sampling and the chemical parameters to be analyzed.
- ☐ Use this information to select a sampling approach based on the guidelines in Appendix 31-1.

2. Establishing a Suitable Sample Location

- ☐ Surface water at the sample location should be free of debris and should have a relatively uniform velocity (e.g., not directly downstream of a bend).
- ☐ Although bridges are often a convenient sampling location, contamination of surface water in these areas may result from eroding structures and traffic use.
- ☐ Investigate the area to ensure that there are no outfalls or merging creeks just upstream of the sample location, as inflow may not be thoroughly mixed before reaching the sample location.
- ☐ If the location may be sampled at a different times of the year, look for signs, determine whether the sample site would still be usable under high or low water conditions.

2. Establishing a Suitable Sample Location (continued)

- ☐ Record all details of the sample location, especially anything that might be influencing the chemistry of the water. Also note the water depth (using a measuring rod) and estimate (qualitatively) the flow velocity (e.g., .fast, slow, stagnant).
- ☐ Take photographs of the sample location and keep a record of photos taken in the field book.

3. Collecting the Surface Water Sample

Approaching or Accessing the Sampling Location

- ☐ If the water is shallow and slow enough, the sampler can wade into the surface water to obtain a sample. Collect the sample facing upstream to avoid contamination.
- ☐ Always ensure that the sample is collected from the upstream side of any object that is being used for sampling.

Collection Devices

- ☐ Refer to Table 31-1 at the end of this procedure for selection of appropriate sample bottles, preservatives, and sampling handling guidelines. Review Step 4.
- ☐ It is always preferable that a sterile laboratory bottle is used directly to collect the sample. If due to problems of accessibility, some other collection device such as a bucket has to be used, make sure that the bucket is cleaned properly (Procedure No. 4) and then rinse the bucket three times with the water to be sampled.
- ☐ If the sample is to be collected from the shore, bank, or overhead bridge, a sampling iron or a bottle attached to a rope may be used to obtain the sample. Always ensure that the free end of the rope is tied to something solid, to avoid loss of the bottle or iron.

Sampling Iron

3. Collecting the Surface Water Sample (continued)

Sample Collection

I) Collect a sufficient volume of water to be able to fill the bottles necessary to conduct the various required analyses.

- ☐ Do not include any large, non-homogeneous particles such as leaves or sticks.
- ☐ Avoid disturbing the bottom sediments while sampling as 1) this will increase the turbidity of the collected sample and 2) sediments may be contaminated.

II) If required, transfer sufficient water to a clean container (e.g., 250 mL beaker) and measure field parameters (pH, temperature, conductivity) as described in *Measurement of Field Parameters in Water* (Procedure No. 27). Record the readings on the Water Sampling Data Sheet.

III) Record field observations on the Water Sampling Data Sheet (colour, turbidity, odour (if present) and sheen (if present) of sample).

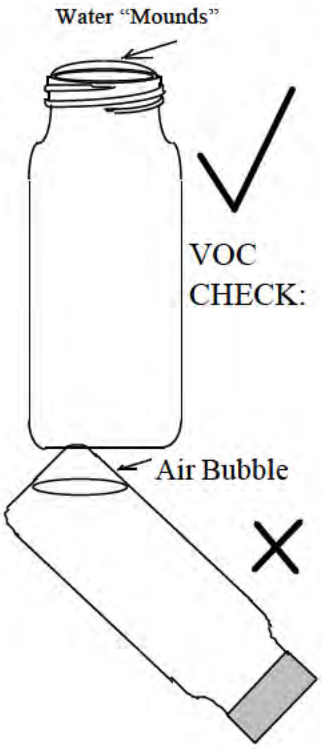
4. Preparing, Preserving and Packing the Samples

VOC
↓
TOC
↓
DISSOLVED METALS
↓
EXTRACTABLE ORGANICS
↓
TOTAL METALS
↓
ANIONS

IMPORTANT: The results of any laboratory analysis are dependent both on the ability to collect a representative sample and to maintain that sample until it can be analyzed. Sample preparation, preservation and storage procedures are designed to ensure that the sample is properly maintained. See Procedure No. 3.

- ☐ As a general guideline, fill the bottles for those samples that require special handling first (e.g., filtering, preservative) followed by those that do not.

4. Preparing, Preserving and Packing the Samples (continued)



- ☐ Sample for volatile organic compounds (VOC) first, followed by Total Organic Carbon (TOC) and those constituents that require field filtration (i.e., dissolved metals). Collect samples for analysis of extractable organic constituents, total metals and anions last.

- ☐ **Fill VOC sample bottles completely until water "mounds" on top of rim.** Place the cap on snugly and then ensure that no air bubbles are trapped in the bottle. Check this by tipping the bottle upside down and tapping the bottle to dislodge any bubbles. If bubbles are present, discard the sample and resample using a new bottle.

- ☐ **Samples to be analyzed for dissolved metals must be field-filtered and acidified.** See ***Field Filtering and Acidification of Dissolved Metals Samples*** (Procedure No. 28) for guidance.

- ☐ If samples <u>require</u> a preservative:

  - **If the preservative is already present** in the sample bottle provided by the analytical laboratory, <u>do not rinse</u> the bottle, but <u>fill</u> to the rim.

  - **If the preservative is not already present** in the sample bottle provided by the laboratory, <u>rinse</u> the bottle and cap with the sample water three times, then <u>fill</u> the sample bottle to the base of the neck, taking care to <u>leave sufficient room</u> for the preservative. Add preservative immediately.

- ☐ If samples <u>do not</u> require a preservative, <u>rinse</u> sample bottle and bottle cap three times, and then <u>fill</u> bottle to the rim.

- ☐ Seal all sample bottles tightly.

- ☐ Label all samples clearly with an indelible marker. Include sample number/ID, sample location, date and time collected, sampler, project descriptor, parameter to be analyzed and preservative (if added).

Site ID
Sample ID
Matrix Type _____
Date/Time Sampled
Parameters
Preservatives
Filtered Y/N
Sampler Initials

4. Preparing, Preserving and Packing the Samples (continued)

- ☐ Collect a sufficient number of duplicate samples to meet data quality objectives and QA/QC requirements. See ***Quality Control Sample Collection*** (Procedure No. 7). Consider collecting duplicate samples if access to the sampling location is difficult or if the sampling procedure is particularly time consuming. This will help ensure that a sample is available if breakage of some of the bottles occurs during transport or at the laboratory.

- ☐ Pack samples in a cooler and maintain at 4 degrees Celsius using ice packs. If the samples are collected and/or transported in very cold weather, use heat packs, if required, to prevent freezing. See Procedure No. 3 for discussion.

- ☐ Pack the samples in a transport container such that they will not break due to impact or vibration. Do not let sample bottles touch each other or they may break. Place generous amounts of packing material between all glass bottles.

5. Decontaminating the Equipment

- ☐ Thoroughly decontaminate the bucket or sampling iron, if used, prior to proceeding to the next sampling location.

- ☐ Repeat steps 2 to 5 for the next location.

6A. Completing the Sample Chain-of-Custody Form

- ☐ Complete the sample chain of custody form once all surface water locations have been sampled. See the example completed form at the end of Procedure No. 3 for further guidance.

6B. Storing and Submitting the Samples

- ☐ Ensure that the samples are delivered to the laboratory, and that the lab has enough time to start the analysis, within the recommended holding time (see Table 26-1). Sometimes delivery of samples at the end of the day or work week can result in delays in commencing the analysis, so keep this in mind when shipping or transporting samples. In addition, some parameters may only be analyzed by the laboratory on certain days of the week.

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Recommended Readings:

CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Volume I: Main Report, December 1993.

Environment Canada, Sampling for Water Quality, Water Quality Branch, Inland Waters Directorate, Ottawa, 1983.

See Also:

Groundwater Sampling
Field Filtering and Acidification of Metals Samples
Field Quality Control Sample Collection
Measurement of Field Parameters in Water

APPENDIX 31-1

DEVELOPING AN APPROACH TO SAMPLING SURFACE WATER

I. Consider Size and Flow of Surface Water Body

☐ Small streams or ditches: a grab sample should be taken at the centre at 60% of the depth where there is maximum turbulence.

Larger streams: sample the cross-section at a number of depths and points. Then the different samples can be analysed as discrete samples or composited into one sample representing the stream. The number of sample points depends on the width, depth, and discharge.

Lakes: larger lakes may be stratified both thermally and chemically if the lake is greater than 5 m deep. In general the mixing due to wind on a lake that is less than five metres deep is sufficient to maintain a chemically uniform water body. The chemical quality may vary near stream inlets where the water is not thoroughly mixed.

II. Consider Suspected Contaminant

☐ If it is critical to take the sample at a certain depth to reach a stratified zone or to avoid surface contaminants, a number of commercially available grab samplers can be used. All of these devices have some method of removing and replacing the bottle cap underwater.

Density	Example	Relevance to Sampling
less than water	oils, gasoline	As the product will float on water the sample should be taken by skimming the bottle along the surface or just below the water surface.
slightly greater than water	suspended solids, turbidity	The turbulence will keep these particles suspended throughout the water column. Take a depth integrated sample by moving the bottle up and down the length of the water column.
greater than water	halogenated organic compounds	Product will sink to the bottom. Lower the bottle to the bottom of the water body to collect the sample. Consider also collecting a bottom sediment sample by using a dredge or sediment core sampler.

III. Consider Timing for Sampling

- ☐ The chemical composition of surface water may vary with the season (and the tide, near the coast) and depend on the weather conditions when the sample is taken. Seasonal variations may be influenced by to seasonal land uses or changes in the overall weather pattern. Spring runoff from snow melt or increased precipitation will affect surface water flow rates (in streams, ditches and chemistry). Any change in the hydrological regime of a water body will also have an effect on the water chemistry. On a smaller time scale, the local weather conditions will effect fluctuations in the flow rates and may affect water chemistry.

- ☐ The influence of the weather and season on the chemical concentrations in the water depends on the source of the contamination. If the source is constant such as a pipe outlet or from the bottom sediments of a stream, then an increased flow may dilute the contaminant concentration. Under these circumstances the water quality will be the worst under low flow conditions. If the source of the contaminant is from surface runoff, then the chemical concentrations will depend on 1) the preceding rainfall and 2) the intensity and duration of the rainfall.

- ☐ In general, the longer the period between rainfalls, the more time there is for contaminants to build up on the ground surface. As a result, there are more contaminants available to be transported by the runoff into adjoining surface water bodies. This is true especially for contaminants that come from a constant source such as contaminants from automobiles in urban runoff. The intensity of a rainfall event will influence the amount and size of particles that are displaced and transported into surface water bodies. Since many contaminants are associated with particulates, more contaminants may reach water bodies during a high intensity storm.

- ☐ The timing of sampling during a rainfall event is also critical because many of the contaminants are removed during the first part of the storm. This is particularly important for soluble contaminants. For example the peak concentration of dissolved metals usually occurs before the peak concentration of total metals. First flush effect occurs when a greater percentage of the total contaminant load is transported during the first part of the storm.

IV. Consider Site Accessibility

- ☐ Limited accessibility may limit the ability to collect the sample by the most appropriate method.

FIELD STANDARD OPERATING PROCEDURE #12

SURFACE WATER SAMPLING PROCEDURE

Surface water sampling procedures outlined in this Standard Operating Procedure (SOP) are designed to ensure that surface water samples are representative of the water body from which they were collected and that they have not been altered or contaminated by the sampling and handling methods. Potential surface water sample locations include freshwater and marine environments such as streams, rivers, ponds, lakes, canals, ditches, wetlands, lagoons, and estuaries. Surface water samples are collected for onsite screening or for offsite laboratory analysis. The user is advised to read the entire SOP and review the site health and safety plan (HASP) and/or project safety plan (PSP) before beginning any onsite activities. In accordance with the HASP or PSP, proper personal protective equipment (PPE) must be selected and used appropriately.

12.1 ACRONYMS AND ABBREVIATIONS

HASP	health and safety plan
IDW	investigation derived waste
NAPL	non-aqueous phase liquid
PPE	personal protective equipment
PSP	project safety plan
QAPP	quality assurance project plan
SOP	standard operating procedure

12.2 MATERIALS

- Field book
- PPE
- Air quality monitoring equipment (e.g., photoionization detector [PID]) with calibration reagents and standards, as needed
- Electronic water level indicator or interface probe
- Water quality meter(s) with calibration reagents and standards, as needed
- Field test kits, as needed
- Power supply, as needed
- Sampling containers and labeling/shipping supplies
- Hip-waders or rubber boots, as needed
- Personal flotation device, as needed
- Expanding ruler or tape measure
- Surface sampler (e.g., dipper, pump, bailer, composite sampler)
- Tubing, as needed
- Lanyard materials (e.g., nylon rope, steel cable), as needed
- Filters, as needed
- Decontamination supplies

12.3 PRECONDITIONS AND BACKGROUND

This SOP has been prepared as part of the company's Environmental Quality Management Plan and is designed to provide detailed procedures for common field practices. Compliance with the methods presented in this document is mandatory for all field personnel

and will ensure that the tasks are performed in a safe and consistent manner, are in accordance with federal and state guidance, and are technically defensible.

This SOP is written for the sole use of company employees and will be revised periodically to reflect updates to company policies, work practices, and the applicable state and/or federal guidance. Employees must verify that this document is the most recent version of the company's SOPs. Employees are also strongly advised to review relevant state and/or federal guidance, which may stipulate program-specific procedures, in advance of task implementation.

WSP requires that all personnel performing specific project assignments be appropriately qualified, including having required certifications or licenses, and properly trained in accordance with the requirements of their assignment, the Environmental Service Line's field SOPs, and the Quality Management System.

This SOP is designed to provide the user with a general outline for conducting groundwater sampling and assumes the user is familiar with basic field procedures, such as recording field notes (SOP 1), sample shipment procedures (SOP 3), sample collection and quality assurance procedures (SOP 4), investigation derived waste (IDW) management procedures (SOP 5), equipment decontamination (SOP 6), and use and calibration of all sampling and monitoring equipment (SOPs 7 and 8). This SOP does not cover investigation planning, nor does it cover the analysis of the analytical results. These topics are more appropriately addressed in a project-specific work plan. Before sampling, be sure to review the project-specific work plan or Quality Assurance Project Plan (QAPP) and any applicable state and federal guidelines or sampling procedures.

All sampling and monitoring references must be available for consultation in the field, including:

- Company SOPs
- Applicable state and federal guidelines or sampling procedures
- Manufacturer's manuals
- Project-specific work plan, PSP and/or HASP, and QAPP

12.4 GENERAL PROCEDURES

Although the sampling equipment and techniques used to sample surface water are varied, most sampling can be broken down into a two-step sequence:

1. Gauging: provides an indication of the surface water elevation
2. Sample Collection: collection of aliquots in method-specific, preserved (as needed) containers that are representative of the conditions in the surface water body

Be aware that stagnant and moving water bodies may require varying the sampling order and could also require concurrent monitoring and recording of geochemical parameters to assist with identifying a sample interval. Follow your project-specific work plan to accommodate any variances in sampling order.

The procedures and equipment that are used to accomplish these steps are project-specific and should be discussed by the project team before arriving onsite. All types of surface water sampling, regardless of the equipment used, share common handling and management procedures that are designed to ensure the integrity of the samples collected. These procedures include:

- The use of new, disposable or decontaminated sampling equipment
- The use, changing, and disposal of the appropriate PPE
- Selection of a suitable sampling location and staging area

Wear a clean pair of new, disposable gloves each time a different sample is collected and don the gloves immediately prior to collection. This limits the possibility of cross-contamination from accidental contact with gloves soiled during collection of the previous sample. The gloves must not contact the medium being sampled and must be changed any time during sample collection when their cleanliness is compromised. ***Gloved hands should not be used as a sampling device; always use the appropriate equipment to move the sample from the sampling device to the laboratory-supplied containers.***

12.4.1 EQUIPMENT SELECTION

Collect all samples using either new, disposable equipment, or properly decontaminated sampling equipment. Surface water gauging and sampling equipment should be selected based on the analytical requirements of the project and the project-specific conditions (e.g., water body depth, sample volume, chemical constituents in sample water, etc.) likely to be encountered. The equipment should be constructed of non-reactive, non-leachable materials (e.g., stainless steel, Teflon®, Teflon®-coated steel, polyethylene, polypropylene, etc.). Extension rods or other appropriate devices can be used, as necessary, to allow the sample to be collected from a distance (or through deeper water) to minimize the safety risk to the sampler. Note that project or regulatory guidance may limit the type of equipment for sampling.

Consider the following when choosing sampling equipment:

- the type and location of the surface water
- the required depth of the sample
- the volume of sample required
- the analytes of interest

Select the decontamination procedures based on the types of sampling to be performed and decontamination may require multiple steps or differing cleaning methods, depending on the sampling goals (see SOP 6 for decontamination procedures). In no case should disposable, single use materials be used to collect more than one sample.

12.4.2 PRE-SAMPLING CONSIDERATIONS

You should perform the following activities in preparing for sampling with all observations and measurements noted in the field book and on the project-specific groundwater monitoring log, if appropriate:

- Perform a quick reconnaissance of the site to identify sampling locations. Note that project or regulatory guidance may limit the type of equipment for surface water sampling.
- Record the approximate ambient air temperature, precipitation, wind (direction and speed), tide, and other field conditions. In addition, any site-specific conditions or situations that could potentially affect the samples at the sample locations should be recorded.
- Describe the sampling location including the width of the surface water, depth of surface water, water color and clarity (transparency), and approximate surface flow (e.g., slow, fast moving, etc.).
- Record sampling locations with respect to approximate distance to and direction from at least one permanent feature.
- Survey the breathing zone around the sampling location with the appropriate air quality meter(s), as necessary (see HASP), to ensure that the level of PPE is appropriate.

When sampling surface water, it is important to find a suitable sampling location away from any sources of cross-contamination that could compromise the integrity of the samples. Consider the following:

- Position the sample collection area away from fuel-powered equipment, such as drill rigs or excavators, and upwind of other site activities (e.g., purging, sampling, decontamination) that could influence the sample. This is particularly important when screening samples in the field for volatile organic compounds, but should not be limited to the active sample collection.
- If sediment samples are being collected concurrently, collect the surface water samples first to avoid disturbing the bottom and suspending sediment in the water column.
- Avoid wading into surface water, if possible, to avoid sediment suspension and potential cross-contamination.
- If collecting several surface water samples from a stream or river, start sampling at the downstream location and progressively move upstream.
- If using watercraft, orient the watercraft so that the bow is positioned in the upstream direction; collect samples near the bow, away and upwind from any fuel-powered equipment.
- Establish a secure sample staging area in an uncontaminated area of the site.

12.4.3 SAFETY CONSIDERATIONS

Surface water sampling presents a number of unique safety challenges. All water bodies, particularly those with moving water, are inherently dangerous and must be approached with caution. Steep embankments, loose footing, and the potential presence of subsurface hazards (or dangerous plants or wildlife, for some parts of the country) can lead to serious injury or even death.

A minimum of two people must be present during collection and samplers must use appropriate safety equipment (as outlined in the project HASP), such as insulated waders, snake chaps, and flotation devices. If possible, avoid wading into surface water. Be aware of recent weather conditions, tidal changes, or other events (e.g., a dam release), which may result in unexpectedly higher water or flow conditions (or temperature changes) at different times of the year. Do not bodily enter pipes, such as storm sewers or other drainage conveyances during surface water collection as these may be considered confined spaces.

12.5 SURFACE WATER LEVEL MEASUREMENT PROCEDURES

Surface water level measurements are typically collected prior to surface water sampling and are used after the sampling event is completed to establish surface water elevation, discharge, and groundwater/surface water interaction (e.g., gaining or losing stream, flow direction).

Surface water level measurements **MUST** be collected within the shortest interval possible from **all selected existing stream gauges or established measuring points** during the event. If groundwater level measurements are to be collected, gauging should be performed concurrently in accordance with SOP 11. This will ensure a nearly instantaneous snapshot of the water levels before the water body is acted upon by other outside influences, such as tides, precipitation, barometric pressure, river stage, or intermittent pumping of nearby production, irrigation, or supply wells.

Measure the surface water level on the stream gauge or depth to water and total depth from an established measuring point (e.g., bridge) with an electronic water level tape or appropriate equipment and record observations and measurements in the field book. If non-aqueous phase liquids (NAPL) are present on the surface water body, measure the NAPL thickness using the stream gauge (or other appropriate equipment) and record observations and measurements in the field book.

12.6 SURFACE WATER SAMPLE COLLECTION PROCEDURES

Collect surface water samples using the appropriate sampling vessel in accordance with the project-specific work plan. Slowly lower the method-specific sampling vessel (e.g., dippers, sampling container, etc.) into the surface water to the desired sampling depth; Kemmerer, Niskin, Van Dorn, or similar samplers, pumps equipped with tubing, or double check valve bailers can be used to collect samples 12 inches or deeper below the water surface. Allow surface water to slowly enter the sampling vessel until the necessary sample volume has been collected. Once filled, slowly retrieve the sampling vessel and transfer the surface water directly to the sample containers. As applicable, retrieve the sampler at a slightly tilted angle in the upstream direction to minimize the disturbance. If necessary, collect additional surface water to provide sufficient sample volume. Field samples must be directly transferred from the sampling equipment to the container that has been specifically prepared for that given parameter; intermediate containers should be avoided.

Automatic composite samplers are frequently deployed at sites needing long-term surface water sampling. In some sampling situations, automatic composite samplers are permanently installed at surface water stations and remain in the field for months or even years.

Collect surface water samples in order of volatilization sensitivity with organic compounds sampled first followed by inorganic compounds:

- Volatile organic compounds
- Extractable organics, petroleum hydrocarbons, aggregate organics, and oil and grease
- Per- and Polyfluoroalkyl substances
- Total metals

- Dissolved metals (see filtering procedures below)
- Inorganic non-metallic and physical and aggregate properties
- Microbiological samples
- Radionuclides

Water quality parameters (e.g.,temperature, depth, dissolved oxygen, pH, total dissolved solids, specific conductance, turbidity, salinity, oxidation reduction potential, and others) are typically measured in the field as specified in the project planning documents. Collect quality assurance/quality control samples in accordance with SOP 4 and the project-specific work plan or QAPP.

As necessary, conduct field tests or screening in accordance with the project-specific work plan and manufacturer's specifications for field testing equipment. Field samples must be directly transferred from the sampling equipment to the container that has been specifically prepared for that given parameter; intermediate containers should be avoided. If field chemical preservation is required, check the pH preservation by pouring a small portion of sample onto a pH test strip. Adjust pH with additional preservative, if necessary.

Record the depth interval, if applicable, which the sample was collected in the field book. Note the volume, phases, and color of the surface water in the field book.

12.6.1 SURFACE WATER FILTRATION PROCEDURES

Filtered surface water samples are sometimes used for field kit analyses and should only be collected for laboratory analysis after approval from the appropriate regulatory agency and/or project manager. If surface water sample filtration is necessary, the following procedures should be followed:

Filtered samples using pumps should use the following procedures:

- Use a variable speed peristaltic pump with the in-line filter fitted on the outlet end; pressurized bailers or submersible pumps can also be used if sampling the surface water body directly.
- Insert the pump inlet tubing into the intermediate container holding the unpreserved surface water sample or surface water body.

Once the filter is connected:

- Turn on the pump and reduce the flow rate, but maintain a flow rate high enough to deliver a smooth stream of water without splashing or undue agitation, hold the filter upright with the inlet and outlet in the vertical position and pump surface water through the filter until the minimum volume of water has been flushed through the filter, in accordance with the manufacturer's specifications.
- Collect the filtered samples directly into the sample container from the pump-filter assembly.
- If sediment is visible in the sample container after filtration, filter break-through has occurred and the sampling and filtering process should be repeated; the sediment-containing sample should be discarded appropriately.
- Discard the tubing and filter appropriately.
- Record sample filtration in the field book.

12.6.2 NAPL SAMPLING PROCEDURES

NAPL samples are not typically collected from surface water. If samples are to be collected, sampling options and techniques should be discussed with the assigned project compliance professional and project manager; ensure that the NAPL is not considered to be a hazardous material for the purpose of shipping to the laboratory (SOP 3). Samples of NAPL should be placed in the appropriate laboratory-supplied containers, packed on ice, and shipped to the analytical laboratory using procedures outlined in SOP 3.

12.6.3 SAMPLE LABELING AND PREPARATION FOR SHIPMENT

Samples for offsite laboratory analysis should be prepared as follows:

1. Clean the outside of the sample container, if necessary

2. Affix a sample tag or label to each sample container and complete all required information (sample number, date, time, sampler's initials, analysis, preservatives, place of collection)
3. Place clear tape over the tag or label (if non-waterproof labels are used)
4. If needed, preserve samples immediately after collection by placing them into an insulated cooler filled with bagged wet ice to maintain a temperature of approximately 4°Celcius
5. Record the sample designation, date, time, and the sampler's initials in the field book and on a sample tracking form, if appropriate
6. Complete the chain-of-custody forms with appropriate sampling information, including:
   - location
   - sample name
   - sample collection date and time
   - number of sample containers
   - analytical method
   - field filtration status
7. Secure the sample packing and shipping in accordance with proper procedures

Do not ship hazardous waste samples without first consulting a WSP compliance professional.

12.7 CLOSING NOTES

Once sampling is completed, secure the locations in accordance with the project-specific project work plan. Mark all sample locations with stakes or other appropriate markers for future reference or survey, including collecting Global Positioning System coordinates and photographs, in accordance with the project-specific work plan. Decontaminate all equipment prior to departure and properly manage all PPE and IDW in conformance with SOP 6, the project-specific work plan, and applicable regulations.

APPENDIX F

Analytical Results

Table F1: Bedford West Water Quality Sampling Program - 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSECC ESQs for Surface Water [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Sampling Event						Spring Sampling Program										
Sampling Date						25-Apr-24	26-Apr-24	26-Apr-24	26-Apr-24	25-Apr-24	25-Apr-24	25-Apr-24	25-Apr-24	25-Apr-24	26-Apr-24	26-Apr-24
Sampling Time						10:07 AM	1:15 PM	12:15 PM	12:35 PM	11:15 AM	1:40 PM	12:40 PM	4:50 PM	3:40 PM	10:40 AM	11:!5 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	9.7	8.2	8.9	9.3	9.3	11.8	10.2	13.2	13.0	9.5	10.3
Dissolved Oxygen	mg/L	--	> 5.5	--	--	11.49	763	11.89	12.20	11.53	10.64	8.39	9.05	7.31	11.13	11
pH	pH	--	6.5 - 9.0	5.0-11.0	6.5 - 9.0	6.70	***5.93***	6.80	***6.42***	6.65	6.99	***6.39***	***6.48***	6.82	***6.38***	6.73
Specific Conductance	µS/cm	--	--	--	--	207.9	100.8	216.2	219.0	220.1	458.0	460.1	126.0	642.0	227.9	233.1
Total Dissolved Solids	mg/L	--	--	--	--	133.40	65.50	140.60	142.30	137.20	297.80	297.30	82.20	417.20	148.30	151.10
Inorganic Parameters																
Alkalinity	mg/L	5	--	--	--	*<5*	7	5	6	6	16	16	12	14	6	6
Chloride	mg/L	1	120	--	120	49	16	54	55	51	51	51	51	51	57	60
Fluoride	mg/L	0.12	0.12	--	0.12	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*	*<0.12*
True Color	TCU	5	--	--	--	38	36.3	30.5	30.5	33.4	14.1	13.50	16.10	5.52	26.90	24.40
Nitrate + Nitrite as N	mg/L	0.05	--	--	--	0.16	0.16	0.33	0.26	0.27	0.31	0.22	0.34	0.22	0.30	0.24
Nitrate as N	mg/L	0.05	13	--	13	0.16	0.16	0.27	0.26	0.27	0.24	0.22	0.25	0.22	0.30	0.24
Nitrite as N	mg/L	0.05	0.06	--	0.06	*<0.05*	*<0.05*	***0.06***	*<0.05*	*<0.05*	***0.07***	*<0.05*	***0.09***	*<0.05*	*<0.05*	*<0.05*
Ammonia as N	mg/L	0.03	5.7 [4]	--	5.7 [4]	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*	*<0.03*
Total Kjeldahl Nitrogen as N	mg/L	0.1	--	--	--	*<0.10*	0.24	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.15	0.13	*<0.10*	*<0.10*
Total Organic Carbon	mg/L	0.5	--	--	--	4.2	5.4	4.2	4.2	4.2	3.3	3.3	3.7	2.9	4.1	3.9
Ortho-Phosphate as P	mg/L	0.01	--	--	--	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Total Calcium	mg/L	0.1	--	--	--	6.3	4.3	6.3	6.7	6.1	16.8	17.7	5.3	19	7.5	8
Total Magnesium	mg/L	0.1	--	--	--	1	1.1	1.1	1.1	1	2.3	2.4	1.2	2.4	1.1	1.2
Total Phosphorus	mg/L	0.002 - 0.006	0.01 [5]	--	--	**0.027**	**0.021**	**0.019**	**0.028**	**0.027**	**0.026**	**0.016**	**0.015**	**0.026**	**0.024**	**0.015**
Total Potassium	mg/L	0.1	--	--	--	0.9	0.9	1	1	0.9	2.2	2.1	1	2.8	1	1.1
Total Sodium	mg/L	0.1	--	--	--	33.9	10.4	32.5	34	31.3	61.7	65.6	14.7	89.5	33.5	36.5
Reactive Silica as SiO2	mg/L	0.5	--	--	--	2.4	2.7	2.8	2.7	2.7	2.1	2.70	2.30	3.20	2.70	2.60
Total Suspended Solids	mg/L	5	25-250 [6]	--	--	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*
Sulphate	mg/L	2	--	--	128	7	5	8	8	7	7	7	7	7	8	9
Turbidity	NTU	0.5	--	50	--	1.3	11.7	1.3	1.1	0.9	0.9	1.7	3.0	2.2	0.8	0.9
Conductivity	umho/cm	1	--	--	--	203	87	216	219	211	457	462	124	621	227	237
Calculated Parameters																
Anion Sum	me/L	--	--	--	--	1.54	0.71	1.81	1.86	1.72	1.93	1.92	1.85	1.88	1.92	2.02
Bicarb. Alkalinity (as CaCO3)	mg/L	5	--	--	--	*<5*	7	5	6	6	16	16	12	14	6	6
Calculated TDS	mg/L	1	--	--	--	99	44	108	111	102	152	157	90	181	113	121
Carb. Alkalinity (as CaCO3)	mg/L	10	--	--	--	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*	*<10*
Cation sum	me/L	--	--	--	--	1.93	0.9	1.87	1.95	1.8	3.78	4.02	1.07	5.13	1.97	2.14
Hardness	mg/L	--	--	--	--	19.8	15.3	20.3	21.3	19.3	51.4	54.1	18.2	57.3	23.3	24.9
% Difference/ Ion Balance (NS)	%	--	--	--	--	11.1	11.8	1.5	2.6	2.1	32.5	35.4	26.5	46.4	1.4	2.9
Langelier Index (@20C)	NA	--	--	--	--	-4.04	-4.00	-4.00	-3.90	-3.90	-2.90	-2.89	-3.51	-2.94	-3.81	-3.77
Langelier Index (@ 4C)	NA	--	--	--	--	-4.36	-4.32	-4.32	-4.22	-4.22	-3.22	-3.21	-3.83	-3.26	-4.13	-4.09
Saturation pH (@ 20C)	NA	--	--	--	--	10.1	10.1	10.1	9.99	10	9.18	9.15	9.78	9.19	9.94	9.91
Saturation pH (@ 4C)	NA	--	--	--	--	10.4	10.4	10.4	10.3	10.3	9.5	9.47	10.10	9.51	10.30	10.20
Hydroxide	mg/L	5	--	--	--	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*

Table F1: Bedford West Water Quality Sampling Program - 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSECC ESQs for Surface Water [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Metals (ICP-MS)																
pH	pH	--	6.5 - 9.0	5.0-11.0	6.5 - 9.0	***6.05***	***6.07***	***6.09***	***6.09***	***6.12***	***6.28***	***6.26***	***6.27***	***6.25***	***6.13***	***6.14***
Total Aluminum	ug/L	5	pH < 6.5 = 5 pH > 6.5 = 100	--	pH < 6.5 = 5	***216***	***686***	***174***	***179***	***176***	***60***	***82***	***232***	***112***	***153***	***162***
Total Antimony	ug/L	2	--	--	9	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L	2	5	--	5.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L	5	--	--	1000	13	20	17	19	14	75	112	9	93	20	22
Total Beryllium	ug/L	2	--	--	0.15	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L	5	1500	--	1500	18	20	13	15	<5	<5	22	8	25	17	15
Total Cadmium	ug/L	0.09	0.04 [7]	--	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L	2	--	--	8.9	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Cobalt	ug/L	1	--	--	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L	2	2 [7]	--	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Iron	ug/L	50	300	--	300	163	***971***	120	117	128	104	***664***	***417***	148	120	143
Total Lead	ug/L	0.5	1 [7]	--	1	<0.5	***2.4***	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	***6.9***	<0.5	<0.5
Total Manganese	ug/L	2	--	--	430	29	121	17	20	14	13	66	102	27	27	29
Total Molybdenum	ug/L	2	73	--	73	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L	2	25 [7]	--	25	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Selenium	ug/L	1	1	--	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.1	0.25	--	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L	5	--	--	21000	29	19	30	31	27	76	83	21	78	31	33
Total Thallium	ug/L	0.1	0.8	--	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L	3	--	--	--	<3	15	<3	<3	<3	<3	<3	<3	<3	<3	<3
Total Uranium	ug/L	0.2	15	--	15	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L	2	--	--	120	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L	5	7	--	7	<5	<5	<5	<5	<5	<5	<5	<5	***8***	<5	<5
Microbiological Parameters																
Total Coliforms	CFU/100 mL	1	--	--	--	>235	>235	146	>235	165	>235	>235	>235	>235	>235	>235
E. Coli	CFU/100 mL	1	--	235/ 100 mL	--	1	1	3	5	<1	<1	1	<1	1	1	3
Chlorophyll A - Spectrophotometer	ug/L	0.3	--	33	--	1.1	0.7	0.7	0.3	0.5	1.8	2.3	0.3	1.7	<0.3	0.5

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[4] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[6] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[7] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

Bold and Grey Shaded	Concentration exceeds CCME FWAL applicable guideline.
Underlined and Grey Shaded	Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)
Italics and Grey Shaded	Concentration exceeds NSECC EQS Contaminated Sites Regulations

Date Entry	EB
QA/QC	NG
PM Review	NDL

Table F1: Bedford West Water Quality Sampling Program - Spring 2024 Phosphorus Resample Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Sampling Event						Spring Resampling Program										
Sampling Date						19-Jun-24	19-Jun-24	19-Jun-24	19-Jun-24	19-Jun-24	19-Jun-24	19-Jun-24	20-Jun-24	20-Jun-24	19-Jun-24	19-Jun-24
Sampling Time						1:45 PM	2:30 PM	3:00 PM	3:30 PM	2:00 PM	12:20 PM	11:58 AM	9:30 AM	9:00 AM	10:55 AM	11:10 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	21.5	17.9	24.1	21.9	24.4	23.1	17.2	21.5	23.1	20.3	22.6
Dissolved Oxygen	mg/L	--	> 5.5	--	--	7.80	**3.61**	7.98	5.53	6.61	5.57	**3.5**	**2.54**	7.31	7.80	8.25
pH	pH	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	7.02	***6.40***	7.02	6.75	7.04	6.88	6.59	6.72	7.35	6.97	7.07
Specific Conductance	µS/cm	--	--	--	--	208.3	103.8	218.8	221.5	221.7	461.3	455.2	127.2	638.0	212.6	235.6
Total Dissolved Solids	mg/L	--	--	--	--	132.50	83.40	142.90	161.00	139.50	274.60	293.70	103.00	398.60	156.70	160.50
Inorganic Parameters																
Total Phosphorus	mg/L	0.002	0.01 [4]	--	--	**0.013**	**0.013**	**0.011**	0.009	**0.011**	**0.072**	**0.017**	**0.014**	0.009	**0.012**	**0.012**

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[4] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

Date Entry	EB
QA/QC	NG
PM Review	NDL

Bold and Grey Shaded Concentration exceeds CCME FWAL applicable guideline.

Underlined and Grey Sh Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)

Italics and Grey Shaded Concentration exceeds NSECC EQS Contaminated Sites Regulations

Table F2: Bedford West Water Quality Sampling Program - Summer 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Sampling Event						Summer Sampling Program										
Sampling Date						28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	28-Aug-24	29-Aug-24	29-Aug-24
Sampling Time						3:15 PM	9:40 AM	10:05 AM	10:30 AM	3:00 PM	1:30 PM	1:50 PM	12:00 PM	2:20 PM	10:30 AM	11:10 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	22.6	19.6	21.8	20.5	22.8	21.4	17.3	19.2	21.5	20.9	22.2
Dissolved Oxygen	mg/L	--	> 5.5	--	--	5.93	**1.88**	**5.34**	**3.75**	5.88	**3.90**	5.52	**2.75**	5.55	7.12	6.96
pH	pH	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	7.36	8.61	7.79	7.41	7.41	7.07	6.62	7.20	6.99	7.61	7.31
Specific Conductance	µS/cm	--	--	--	--	210.4	1.92	218.5	289.6	205.5	415.0	419.3	165.5	518.0	259.2	266.0
Total Dissolved Solids	mg/L	--	--	--	--	136.8	109.0	141.8	188.1	133.6	269.7	272.6	107.6	336.9	168.5	172.7
Inorganic Parameters																
Alkalinity	mg/L	5	--	--	--	11	26	14	18	14	29	25	27	28	17	18
Chloride	mg/L	1	120	--	120	53	25	58	66	50	109	105	31	***139***	67	75
Fluoride	mg/L	0.12	0.12	--	0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
True Color	TCU	5	--	--	--	6	18	7	5	7	25	24	22	10	<5	<5
Nitrate + Nitrite as N	mg/L	0.05	--	--	--	0.85	0.19	0.08	0.28	0.07	<0.05	<0.05	<0.05	1.15	0.15	0.11
Nitrate as N	mg/L	0.05	13	--	13	0.85	0.19	0.08	0.28	0.07	<0.05	<0.05	<0.05	1.15	0.15	0.11
Nitrite as N	mg/L	0.05	0.06	--	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05
Ammonia as N	mg/L	0.03	5.7 [4]	--	5.7 [4]	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	<0.3	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.1	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.60	<0.10	<0.10	<0.10
Total Organic Carbon	mg/L	0.5	--	--	--	3.5	5.1	3.4	3	3.4	6.9	6.1	9.1	4.9	3.3	3.6
Ortho-Phosphate as P	mg/L	0.01	--	--	--	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Total Calcium	mg/L	0.1	--	--	--	7.3	10.6	8	12.9	6.9	20.8	21.2	9.7	22.8	9.8	9.6
Total Magnesium	mg/L	0.1	--	--	--	1.2	2.4	1.3	2.2	1.2	3	3.2	2.3	3.3	1.6	1.5
Total Phosphorus	mg/L	0.003 - 0.008	0.01 [5]	--	--	**0.041**	**0.015**	**0.012**	**0.014**	**0.058**	**0.016**	**0.030**	**0.054**	**0.026**	**0.015**	**0.011**
Total Potassium	mg/L	0.1	--	--	--	1.0	1.7	1.2	1.5	1.0	2.5	2.2	1.6	2.8	1.4	1.3
Total Sodium	mg/L	0.1	--	--	--	31.4	17.4	34.2	36.9	31.1	58.3	58.8	19.9	83.4	38.9	39.3
Reactive Silica as SiO2	mg/L	0.5	--	--	--	1.40	4.20	1.50	2.00	1.60	4.40	6.80	3.10	1.0	1.6	1.5
Total Suspended Solids[8]	mg/L	5	25-250 [6]	--	--	<5	<5	<5	<5	<5	<5	<5	25	<5	6	<5
Sulphate	mg/L	2	--	--	128	7	13	8	9	7	12	7	4	20	9	9
Turbidity	NTU	0.1	--	50	--	0.90	1.00	0.95	0.50	0.81	1.07	3.31	4.33	2.64	1.19	0.67
Conductivity	umho/cm	1	--	--	--	228	171	238	280	223	460	432	174	574	269	276
Calculated Parameters																
Anion Sum	me/L	--	--	--	--	1.92	1.51	2.09	2.43	1.84	3.9	3.61	1.50	4.98	2.43	2.67
Bicarb. Alkalinity (as CaCO3)	mg/L	5	--	--	--	11	26	14	18	14	29	25	27	28	17	18
Calculated TDS	mg/L	1	--	--	--	112	87	120	141	106	223	216	93	294	139	147
Carb. Alkalinity (as CaCO3)	mg/L	10	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation sum	me/L	--	--	--	--	1.88	1.55	2.03	2.49	1.83	3.9	4.06	2.06	5.14	2.36	2.35
Hardness	mg/L	--	--	--	--	23.2	36.4	25.3	41.3	22.2	64.3	66.1	33.7	70.5	31.1	30.1
% Difference/ Ion Balance (NS)	%	--	--	--	--	1.2	1.2	1.3	1.3	0.4	0	5.9	15.7	1.6	1.5	6.3
Langelier Index (@20C)	NA	--	--	--	--	-2.58	-2.17	-2.63	-2.35	-2.70	-1.76	-1.91	-2.12	-1.56	-2.04	-2.35
Langelier Index (@ 4C)	NA	--	--	--	--	-2.9	-2.49	-2.95	-2.67	-3.02	-2.08	-2.23	-2.44	-1.88	-2.36	-2.67
Saturation pH (@ 20C)	NA	--	--	--	--	9.69	9.14	9.55	9.24	9.6	8.84	8.90	9.10	8.83	9.38	9.37
Saturation pH (@ 4C)	NA	--	--	--	--	10.0	9.5	9.9	9.6	9.9	9.2	9.2	9.5	9.15	9.70	9.69
Hydroxide	mg/L	5	--	--	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Metals (ICP-MS)																
pH	pH	--	6.5 - 9.0	5.0-11.0	6.5 - 9.0	7.11	6.97	6.92	6.89	6.90	7.08	6.99	7.05	7.27	7.34	7.02
Total Aluminum	ug/L	5	pH < 6.5 = 5 pH > 6.5 = 100	--	pH < 6.5 = 5	***125***	53	39	33	36	48	***139***	***2240***	***146***	28	27
Total Antimony	ug/L	2	--	--	9	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L	2	5	--	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L	5	--	--	1000	17	26	22	51	16	99	183	46	125	23	20
Total Beryllium	ug/L	2	--	--	0.15	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L	5	1500	--	1500	7	25	<5	9	7	13	11	19	30	7	8
Total Cadmium	ug/L	0.09	0.04 [7]	--	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	**0.15**	<0.09	<0.09	<0.09
Total Chromium	ug/L	1	--	--	8.9	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1
Total Cobalt	ug/L	1	--	--	1	<1	<1	<1	<1	<1	<1	<1	***4***	<1	<1	<1

Table F2: Bedford West Water Quality Sampling Program - Summer 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Total Copper	ug/L	1	2 [7]	--	2	<1	***2***	<1	<1	<1	<1	<1	***5***	***2***	<1	<1
Total Iron	ug/L	50	300	--	300	192	271	98	89	<50	281	***2800***	***4740***	***397***	112	85
Total Lead	ug/L	0.5	1 [7]	--	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	***6.3***	<0.5	<0.5	<0.5
Total Manganese	ug/L	2	--	--	430	49	83	74	442	18	70	223	1600	54	82	47
Total Molybdenum	ug/L	2	73	--	73	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L	2	25 [7]	--	25	<2	<2	<2	<2	<2	<2	<2	3	<2	<2	<2
Total Selenium	ug/L	1	1	--	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.1	0.25	--	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L	5	--	--	21000	33	43	37	56	31	100	109	43	105	45	43
Total Thallium	ug/L	0.1	0.8	--	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	4	<2	<2	<2
Total Uranium	ug/L	0.2	15	--	15	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L	2	--	--	120	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L	5	7	--	7	<5	<5	<5	<5	***9***	<5	<5	***26***	***18***	<5	<5
Microbiological Parameters																
Total Coliforms	CFU/100 mL	1	--	--	--	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
E. Coli	CFU/100 mL	1	--	235/ 100 mL	--	27	7	58	8	7	>200	>200	>200	33	6	2
Chlorophyll A - Spectrophotometer	ug/L	0.30	--	33	--	1.5	0.3	1.4	1.5	1.3	1.8	13.8	2.4	9.2	1.0	0.9

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[4] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[6] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[7] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a result was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

8. Total Suspended Solids concentrations for the Summer 2024 sampling event were not reported by the analytical laboratory and are presented as estimates only. The rationales for these estimates are provided in Appendix G.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

Bold and Grey Shaded	Concentration exceeds CCME FWAL applicable guideline.
Underlined and Grey Shaded	Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)
Italics and Grey Shaded	Concentration exceeds NSECC EQS Contaminated Sites Regulations

Date Entry	NG
QA/QC	MO
PM Review	NDL

Table F2: Bedford West Water Quality Sampling Program - Summer 2024 Resample Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY102-1	HWY102-2	LSD	LU	PML-1	PML-2
Sampling Event						Summer Resampling Program										
Sampling Date						23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24	23-Sep-24
Sampling Time						8:45 AM	2:45 PM	2:11 PM	2:22 PM	9:00 AM	11:52 AM	11:30 AM	1:11 PM	12:24 PM	10:15 AM	10:36 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	17.0	15.1	18.5	18.2	18.5	14.3	12.5	16.8	17.1	17.1	17.7
Dissolved Oxygen	mg/L	--	> 5.5	--	--	7.13	**3.16**	7.02	6.77	7.01	**2.82**	**2.74**	**2.20**	8.24	8.28	8.02
pH	pH	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	7.14	***6.46***	6.78	6.88	7.08	***6.45***	6.85	6.76	7.03	6.87	6.88
Specific Conductance	µS/cm	--	--	--	--	214.6	141.1	229.5	236.1	219.0	422.4	456.2	153.4	658.0	245.4	251.8
Total Dissolved Solids	mg/L	--	--	--	--	140.40	9.17	149.20	153.40	141.90	276.60	296.50	99.60	427.80	159.50	162.90
Inorganic Parameters																
Total Phosphorus	mg/L	0.002	0.01 [4]	--	--	**0.018**	**0.023**	**0.028**	**0.028**	**0.021**	**0.013**	**0.022**	**0.020**	**0.022**	**0.023**	**0.014**
Microbiological Parameters																
Total Coliforms	CFU/100 mL	5	--	--	--	N/A	N/A	N/A	N/A	N/A	625	380	>1000	N/A	N/A	N/A
E. Coli	mg/L	5	--	235/ 100 mL	--	N/A	N/A	N/A	N/A	N/A	140	60	190	N/A	N/A	N/A

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[4]CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

N/A - Not Applicable as location was not resampled.

Bold and Grey Shaded	Concentration exceeds CCME FWAL applicable guideline.
Underlined and Grey Shaded	Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)
Italics and Grey Shaded	Concentration exceeds NSECC EQS Contaminated Sites Regulations

Date Entry	NG
QA/QC	MO
PM Review	NDL

Table F3: Bedford West Water Quality Sampling Program - 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Sampling Event						Fall Sampling Program										
Sampling Date						30-Oct-24	30-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24	29-Oct-24
Sampling Time						9:50 AM	10:15 AM	11:40 AM	11:50 AM	2:40 PM	1:30 PM	1:50 PM	12:50 PM	11:00 AM	9:15 AM	9:50 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	9.4	5.9	9.6	9.1	11.6	6.9	7.9	4.6	8.6	8.9	9.4
Dissolved Oxygen*	mg/L	--	> 5.5	--	--	8.02	5.93	9.81	9.11	8.79	**1.82**	5.64	8.19	8.56	10.05	9.53
pH	pH	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	***9.84***	***9.6***	7.05	7.09	7.20	6.63	6.92	***6.30***	6.91	6.93	6.96
Specific Conductance [8]	µS/cm	--	--	--	--	232.2	141.0	247.2	250.4	233.8	661.0	447.9	175.8	771.4	269.5	281.8
Total Dissolved Solids	mg/L	--	--	--	--	147.30	91.70	160.50	162.70	151.90	429.60	291.10	114.30	390.10	175.00	183.00
Inorganic Parameters																
Alkalinity	mg/L	5	--	--	--	8	12	11	9	7	17	17	17	21	10	12
Chloride	mg/L	2	120	--	120	44	15	70	52	46	***141***	98	28	***149***	50	60
Fluoride	mg/L	0.12	0.12	--	0.12	***0.17***	<0.12	<0.12	<0.12	***0.15***	<0.12	<0.12	<0.12	<0.12	***0.17***	***0.14***
True Color	TCU	5	--	--	--	12	38	12	11	12	24	23.00	18.00	7.00	10.00	9.00
Nitrate + Nitrite as N	mg/L	0.05	--	--	--	0.33	<0.05	0.28	0.14	0.12	0.18	0.14	<0.05	1.80	0.11	0.40
Nitrate as N	mg/L	0.05	13	--	13	0.15	<0.05	0.28	0.14	0.12	0.18	0.14	<0.05	1.80	<0.05	0.33
Nitrite as N	mg/L	0.05	0.06	--	0.06	***0.18***	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	***0.11***	***0.07***
Ammonia as N	mg/L	0.03	5.7 [4]	--	5.7 [4]	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.1	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Organic Carbon	mg/L	0.5	--	--	--	3.7	6.7	3.8	3.9	3.9	6.2	5.2	5.4	4.0	3.5	3.7
Ortho-Phosphate as P	mg/L	0.01	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Calcium	mg/L	0.1	--	--	--	6.2	6.7	7.3	8	6.9	20	18.2	6.9	18.8	8.6	8.8
Total Magnesium	mg/L	0.1	--	--	--	1.1	1.7	1.2	1.3	1.1	3	2.7	1.8	2.8	1.4	1.5
Total Phosphorus	mg/L	0.003	0.01 [5]	--	--	**0.071**	**0.020**	**0.062**	**0.064**	**0.062**	**0.088**	**0.054**	**0.078**	**0.035**	**0.035**	**0.045**
Total Potassium	mg/L	0.1	--	--	--	0.9	1.1	1.2	1.2	1.1	2.2	2.2	1.3	2.8	1.3	1.4
Total Sodium	mg/L	0.1	--	--	--	29.4	12.1	30.2	30.5	30.2	52.2	47.2	18.1	75.5	33.3	35.5
Reactive Silica as SiO2	mg/L	0.5	--	--	--	2.1	4.9	2	2.1	1.9	6.3	5.50	4.40	3.30	2.10	2.00
Total Suspended Solids	mg/L	5	25-250 [6]	--	--	<5	12	<5	<5	<5	<5	<5	<5	<5	<5	<5
Sulphate	mg/L	2	--	--	128	8	9	8	8	7	12	15	5	21	9	9
Turbidity	NTU	0.1	--	50	--	1.44	2.34	2.25	0.94	1.09	13.1	1.7	5.1	1.6	1.3	1.0
Conductivity	umho/cm	1	--	--	--	214	126	226	226	209	425	402	155	541	242	257
Calculated Parameters																
Anion Sum	me/L	--	--	--	--	1.59	0.85	2.38	1.82	1.59	4.58	3.43	1.23	5.19	1.81	2.15
Bicarb. Alkalinity (as CaCO3)	mg/L	5	--	--	--	8	12	11	9	7	17	17	17	21	10	12
Calculated TDS	mg/L	1	--	--	--	96	53	126	107	97	244	194	72	291	110	125
Carb. Alkalinity (as CaCO3)	mg/L	10	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation sum	me/L	--	--	--	--	1.71	1.05	1.82	1.87	1.79	3.67	3.25	1.35	4.53	2.04	2.15
Hardness	mg/L	--	--	--	--	20	23.7	23.2	25.3	21.8	62.3	56.6	24.6	58.5	27.2	28.2
% Difference/ Ion Balance (NS)	%	--	--	--	--	3.5	10.7	13.4	1.4	5.7	11	2.6	4.3	6.7	6.0	0.1
Langelier Index (@20C)	NA	--	--	--	--	-3.58	-3.23	-3.21	-3.55	-3.78	-2.78	-2.76	-3.14	-2.56	-3.40	-3.31
Langelier Index (@ 4C)	NA	--	--	--	--	-3.9	-3.55	-3.53	-3.87	-4.1	-3.1	-3.08	-3.46	-2.88	-3.72	-3.63
Saturation pH (@ 20C)	NA	--	--	--	--	9.89	9.65	9.69	9.73	9.9	9.09	9.13	9.50	9.04	9.66	9.57
Saturation pH (@ 4C)	NA	--	--	--	--	10.2	9.97	10	10.1	10.2	9.41	9.45	9.82	9.36	9.98	9.89
Hydroxide	mg/L	5	--	--	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Metals (ICP-MS)																
pH	pH	--	6.5 - 9.0	5.0-9.0	*6.5 - 9.0*	***6.31***	***6.42***	***6.48***	***6.18***	***6.12***	***6.31***	***6.37***	***6.36***	***6.48***	***6.26***	***6.26***
Total Aluminum	ug/L	5	pH < 6.5 = 5 pH > 6.5 = 100	--	pH < 6.5 = 5	***45***	***125***	***54***	***55***	***70***	***136***	***58***	***121***	***45***	***43***	***47***
Total Antimony	ug/L	2	--	--	9	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L	2	5	--	5.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L	5	--	--	1000	16	23	23	23	23	153	82	9	106	25	29
Total Beryllium	ug/L	2	--	--	0.15	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L	5	1500	--	1500	9	21	15	15	8	15	7	18	28	10	11
Total Cadmium	ug/L	0.09	0.04 [7]	--	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L	1	--	--	8.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Cobalt	ug/L	1	--	--	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L	2	2 [7]	--	2	<1	<1	<1	<1	<1	<1	***15***	<1	2	2	2
Total Iron	ug/L	50	300	--	300	<50	296	102	85	85	***2240***	148	***363***	61	107	120

Table F3: Bedford West Water Quality Sampling Program - 2024 Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Total Lead	ug/L	0.5	1 [7]	--	1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
Total Manganese	ug/L	2	--	--	430	13	37	46	29	29	143	13	158	17	43	43
Total Molybdenum	ug/L	2	73	--	73	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L	2	25 [7]	--	25	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Selenium	ug/L	1	1	--	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.1	0.25	--	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L	5	--	--	21000	31	30	35	35	35	97	82	28	90	40	42
Total Thallium	ug/L	0.1	0.8	--	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L	2	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Uranium	ug/L	0.2	15	--	15	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L	2	--	--	120	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L	5	7	--	7	<5	<5	<5	<5	<5	6	5	<5	***97***	<5	***7***
Microbiological Parameters																
Total Coliforms	CFU/100 mL	1--2	--	--	--	376	220	252	236	390	196	384	376	396	220	286
E. Coli	CFU/100 mL	1--2	--	235/ 100 mL	--	10	18	12	8	4	26	4	6	24	8	6
Chlorophyll A - Spectrophotometer	ug/L	0.30	--	33	--	1.3	0.3	0.9	0.6	1.3	2.8	1.3	1.6	1.1	0.7	1.9

Date Entry	NG
QA/QC	MO
PM Review	NDL

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[4] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[6] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[7] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a result was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

8. During the Fall 2024 sampling event, the water quality meter recorded conductivity instead of specific conductivity for locations KL-3, KL-4, LU, PML-1, and PML-2. Specific conductivity values for these locations were calculated using a compensation coefficient of 1.91% per degree Celsius and a reference temperature of 25 degrees Celsius, consistent with how the qater quality meter calculated specific conductivity at the other sampling locations.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

*'It should be noted that the water quality instrument was not calibrated for dissolved oxygen (DO) on October 29, 2024, affecting all stations except KL-1. However, DO measurements remained consistent with typical seasonal concentrations, and the lack of calibration for this parameter is not considered a quality concern.

Bold and Grey Shaded	Concentration exceeds CCME FWAL applicable guideline.
Underlined and Grey Shaded	Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)
Italics and Grey Shaded	Concentration exceeds NSECC EQS Contaminated Sites Regulations

Table F3: Bedford West Water Quality Sampling Program - Fall 2024 Phosphorus Resample Results

Tested Parameters	Units	RDL	CCME Guideline FWAL [1]	Health Canada Guideline for Recreational Water Quality [2]	NSE ESQs for Surface Water September 2021 [3]	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1	PML-2
Sampling Event						Fall Resampling Program										
Sampling Date						05-Dec-24	04-Dec-24	05-Dec-24	05-Dec-24	05-Dec-24	04-Dec-24	05-Dec-24	04-Dec-24	04-Dec-24	04-Dec-24	04-Dec-24
Sampling Time						10:00 AM	12:05 PM	9:05 AM	9:10 AM	9:40 AM	10:20 AM	12:20 PM	11:35 AM	10:55 AM	9:10 AM	9:30 AM
Field Data (in Situ)																
Secchi Depth	meters	--	--	> 1.2	--	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow	Not collected - Water too Shallow
Water Temp	celsius	--	--	--	--	3.8	3.1	5.2	5.1	6.0	2.2	3.50	2.9	4.2	5.0	3.8
Dissolved Oxygen	mg/L	--	> 5.5	--	--	12.72	10.23	13.30	11.95	11.49	8.45	7.9	5.91	10.33	12.81	12.51
pH	pH	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	7.24	7.05	7.74	7.36	6.91	7.87	6.57	7.52	8.84	8.13	8.16
Specific Conductance	µS/cm	--	--	--	--	204.1	104.5	244.7	245.6	214.6	388.5	439.40	157.6	523.0	251.3	260.7
Total Dissolved Solids	mg/L	--	--	--	--	132.60	67.90	159.00	159.70	139.50	257.30	285.30	102.50	340.00	163.20	169.40
Inorganic Parameters																
Total Phosphorus	mg/L	0.002	0.01 [4]	--	--	0.004	0.003	**0.013**	<0.002	<0.002	0.002	0.005	0.010	0.004	<0.002	<0.002

Notes:

[1] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[2] Health Canada Guidelines for Canadian Recreational Water Quality, Summary Document (February 2024).

[3.] NSECC Tier I EQS for Surface Water and Groundwater Discharging to Surface Water, Groundwater <10m from Surface Water Body (ug/L) for Fresh Water. (September 2021)

[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

Date Entry	NG
QA/QC	MO
PM Review	NDL

Bold and Grey Shaded	Concentration exceeds CCME FWAL applicable guideline.
Underlined and Grey Shad	Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines)
Italics and Grey Shaded	Concentration exceeds NSECC EQS Contaminated Sites Regulations

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake															
Sample Site (KL-1)								KL-1															
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-14	2012-10-10	2013-05-15	2013-08-16	2013-10-16	2014-05-14
Sampling Time	hh:mm							08:00	11:45	08:30	11:00	13:10	12:00	11:00	14:30	14:00	8:30	11:20	9:50	10:20	11:10	13:30	10:30
FIELD DATA																							
Secchi Depth	Meters	--	--	--	1.2	--	--	4.1	4.2	5.0	N/A	5.0	4.9	2.4	3.2	2.4	2.4	5.4	N/A	2.5	2.0	2.9	2.4
Water Temp	Celsius	--	--	--	--	--	--	14.0	22.2	16.7	12.9	23.3	8.8	11.5	25.6	15.9	8.9	23.3	15.4	13.2	22.2	14.1	12.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.77	8.20	7.00	9.13	7.86	10.48	10.69	8.22	9.22	8.98	7.93	8.72	9.76	8.57	8.30	15.29
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.20	6.76	6.67	7.23	7.32	6.61	6.60	6.16	6.04	8.67	6.91	6.32	6.32	8.24	6.35	6.74
Specific Conductance	uS/cm	--	--	--	--	--	--	263.0	299.0	261.0	248.0	242.0	218.7	288.0	178.6	146.3	277.0	279.0	198.1	243.0	216.5	217.9	547.0
INORGANICS																							
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	6	8	8	7	8	6	<5	9	7	24	7	<5	<5	<5	8	30
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	81	74	64	62	60	55	73	45	33	66	70	50	66	59	48	80
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	18	18	16	26	8	21	28	40	45	50	11	20	11	37	20	13
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.18	0.09	0.12	0.21	0.16	0.23	0.20	0.11	0.13	0.20	0.09	0.10	0.18	0.14	0.19	0.11
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.18	--	--	0.21	0.16	--	0.20	--	--	0.20	0.09	0.10	0.18	0.14	0.19	0.11
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	0.03	<0.03	0.03	0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.9	3.1	0.4	--	0.7	<0.4	1.1
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	2.4	2.9	4.7	3.3	3.2	3.1	3.4	5.9	5.5	5.4	2.9	5.2	4.4	4.1	4.3	4.6
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.94	6.65	6.68	6.91	7.00	6.79	6.52	6.51	6.52	6.70	7.20	6.90	6.78	6.93	6.85	6.72
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	9.2	8.5	7.2	7.7	8.7	8.3	7.7	4.8	5.3	6.8	8.4	6.3	7.5	6.6	6.5	8.1
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.5	1.4	1.2	1.4	1.4	1.3	1.3	0.9	1.1	1.1	1.5	1.5	1.1	1.2	1.2	1.6
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.020	<0.020	<0.002	0.009	0.007	0.005	0.008	0.012	0.009	0.037	0.043	0.007	0.007	0.011	0.008	0.011
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.1	0.9	1.3	0.9	0.9	0.9	0.8	0.8	0.9	0.7	0.9	0.9	0.8	0.7	1.1	0.9
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	51.0	46.0	37.0	31.8	35.2	33.8	43.7	22.8	19.8	40.1	42.0	29.8	35.8	26.2	31.6	50.2
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.6	2.2	2.3	2.9	2.7	2.9	2.8	1.9	2.3	2.4	1.3	2.2	2.5	1.8	2.2	2.0
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	1	1	<1	4	17	3	2	2	3	<5	<5	<5	<5	<5	5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	14	13	12	11	11	11	12	10	8	8	9	9	11	9	9	12
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	0.8	1.0	1.3	0.6	1.0	1.0	1.0	0.9	2.4	0.8	1.3	1.6	3.3	0.5	2.9
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	310	290	250	240	240	230	290	180	140	246	274	196	259	241	212	290
Calculated Parameters																							
Anion Sum	me/L	N/A	--	--	--	--	--	2.72	2.52	2.23	2.12	2.08	1.91	2.33	1.66	1.27	2.52	2.31	1.60	2.10	1.86	1.71	3.11
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	6	8	8	7	8	6	<1	9	7	24	7	<5	<5	<5	8	30
Calculated TDS	mg/L	1	--	--	--	--	--	166	151	131	123	125	118	143	92	77	139	137	98	124	104	103	172
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.85	2.57	2.12	1.92	2.10	2.02	2.42	1.33	1.25	2.24	2.41	1.79	2.08	1.61	1.84	2.77
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	29.00	27.00	23.00	25.00	27.00	26.00	24.00	16.00	18.00	21.50	27.20	21.90	23.30	21.40	21.20	26.80
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	2.33	0.98	2.53	4.95	0.48	2.80	1.89	11.00	0.79	5.90	2.10	5.30	0.70	7.30	3.40	5.80
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.68	-2.87	-2.94	-2.72	-2.51	-2.87	NC	-3.18	-3.21	-2.69	-2.63	-3.19	-3.24	-3.14	-3.02	-2.51
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.93	-3.12	-3.19	-2.97	-2.76	-3.12	NC	-3.43	-3.46	-3.01	-2.95	-3.51	-3.56	-3.46	-3.34	-2.83
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.62	9.52	9.62	9.63	9.51	9.66	NC	9.69	9.73	9.39	9.83	10.10	10.00	10.10	9.87	9.23
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.87	9.77	9.87	9.88	9.76	9.91	NC	9.94	9.98	9.71	10.20	10.40	10.30	10.40	10.20	9.55
Metals (ICP-MS)																							
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	230	--	--	289	48	--	338	--	--	321	43	168	191	120	56	229
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	16	--	--	19	16	--	13	--	--	12	15	9	12	7	16	14
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	8	--	--	11	9	--	<50	--	--	<5	11	33	6	10	9	7
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.3	--	--	0.053	<0.017	--	0.056	--	--	0.032	0.027	0.021	0.020	<0.017	0.017	0.037
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	6
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	1	--	--	1	<0.40	--	1	--	--	<1	<1	<1	<1	<1	<1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2	--	--	6	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2	<1	1	1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	130	--	--	313	62	125	177	162	384	229	137	195	207	132	92	147
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	10.3	<0.50	--	<0.50	--	--	<0.5	<0.5	1.9	<0.5	<0.5	<0.5	5.1
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	100	--	--	79	57	59	78	52	56	48	65	68	73	48	24	48
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	5	--	--	3	<2.0	--	3	--	--	<2	<2	2	2	<2	<2	3
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	46	--	--	39	38	--	36	--	--	32	41	32	37	33	30	40
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	11	--	--	6	<2.0	--	5	--	--	8	<2	3	4	2	<2	2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	0.1	--	--	0.1	<0.1	--	0.1	--	--	0.1	<0.1	0.1	0.1	0.1	<0.1	0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	27	--	--	14	8	11	12	13	10	5	<5	11	11	6	5	14
MICROBIOLOGICAL																							
Total Coliform	MPN/100m	1	--	--	--	--	--	200	65	--	>250	63	>250	91	>250	--	2,420	>2420	1,120	1,200	866	488	525
E. coli	MPN/100m	1	--	--	400	--	--	39	24	--	9	15	37	8	>250	<100	41	11	17	48	2	7	<1
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.53	0.79	1.11	1.73	1.47	0.99	0.76	1.44	1.36	0.62	2.30	1.54	1.22	1.40	1.19	0.40
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.48	0.69	1.17	1.61	1.42	0.81	0.69	1.15	1.14	0.63	2.30	2.16	1.40	1.40	1.19	1.32

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																	
Sample Site (KL-1)								KL-1																	
Sampling Date	yyyy-mm-dd							2014-08-14	2014-10-27	2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20
Sampling Time	hh:mm							14:15	14:55	08:30	14:54	12:30	9:30	7:50	13:20	8:30	9:30 AM	9:35 AM	9:15 AM	7:50 AM	9:00 AM	8:40 AM	9:15 AM	8:45 AM	3:05 PM
FIELD DATA																									
Secchi Depth	Meters	--	--	--	1.2	--	--	2.7	2.5	NCC	N/A	2.2	1.8	2.1	2.5	2.1	2.2	2.2	2.1	2.1	2.5	2.5	2.7	1.9	NA*
Water Temp	Celsius	--	--	--	--	--	--	23.2	12.2	14.1	26.1	9.4	12.8	22.2	11.9	16.6	23.2	14.1	12.2	24.2	12.8	12.2	23.6	10.4	25.4
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	7.22	8.12	9.55	8.13	7.38	14.02	10.33	12.06	8.27	7.91	8.22	11.13	6.72	8.61	**	7.10	8.90	6.55
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.46	6.44	8.33	6.95	7.02	8.29	4.60	6.23	7.47	7.00	7.84	7.85	7.51	6.84	9.70	7.41	6.77	6.43
Specific Conductance	uS/cm	--	--	--	--	--	--	341.0	223.0	0.2	298.3	238.5	239.0	298.0	212.4	240.0	292.0	312.0	203.1	288.2	253.7	205.0	160.0	194.0	245.0
INORGANICS																									
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	14	<5	5	6	7	5	8	6	<5	8	10	<5	9	7.0	<5	7.0	<5	<5
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	76	46	60	62	58	55	57	45	71	73	60	53	54	55	75	59	43	65
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	8	23	37	8	22	31	17	18	15	14	12	42	16	18	41	21	19	22
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.11	0.08	0.15	0.15	0.17	0.10	0.15	0.13	0.20	0.29	0.10	0.26	0.16	0.2	0.2	0.1	0.3	0.10
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.11	0.08	0.15	0.15	0.17	0.10	0.08	0.13	0.08	0.08	0.10	0.16	0.07	0.2	0.2	0.1	0.3	0.10
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	0.07	<0.05	0.12	0.21	<0.05	0.10	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	<0.050	<0.03	<0.03	0.05	0.09	<0.03	<0.03	<0.03	0.04	<0.03	0.08	0.1	<0.03	0.1	0.1	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	<0.4	0.4	0.2	4.5	0.4	0.7	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.6	3.0	<0.4
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	2.4	4.4	3.0	5.3	5.5	4.3	3.4	7.3	4.5	4.6	4.8	5.1	3.1	4.0	4.3	4.2	4.0	3.20
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.06	6.35	6.62	6.95	6.99	6.64	7.23	6.81	6.64	7.07	7.00	6.71	7.31	7.07	6.70	6.95	6.70	6.82
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	11.0	6.0	6,400.0	7.9	6.1	6.8	8.0	6.3	8.6	7.1	8.3	5.8	7.2	6.9	7.0	7.8	4.2	6.8
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.6	0.9	920.0	1.3	0.9	1.1	1.1	1.2	1.3	1.2	1.3	1.0	1.2	1.3	1.2	1.2	0.8	1.1
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.026	0.013	0.008	0.002	0.011	0.024	0.005	0.008	0.010	0.010	0.005	0.012	0.007	0.008	0.011	0.005	0.008	0.008
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.6	0.7	680.0	0.9	0.7	0.7	0.9	0.8	1.0	0.9	1.2	0.7	1.0	0.8	0.8	1.0	0.6	0.9
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	54.2	37.6	33.0	43.3	39.8	35.5	32.2	31.0	44.9	50.3	35.7	36.4	34.7	31.7	46.3	43.9	23.4	36.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	1.5	1.8	2.5	1.8	2.7	2.8	2.0	1.6	2.0	1.6	1.8	2.6	1.7	1.7	1.7	1.6	1.6	1.7
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<1.0	<5	<5	38	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	6.0
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	11	7	9	10	8	10	10	10	11	9	10	8	7.0	9.0	10.0	9.0	9.0	9.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	1.9	0.8	1.9	1.1	10.6	0.9	2.6	1.4	1.1	0.8	1.3	0.7	2.1	0.9	3.2	2.9	3.4
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	339	235	220	257	244	212	270	161	271	260	249	243	261	215	280	232	129	266
Calculated Parameters																									
Anion Sum	me/L	N/A	--	--	--	--	--	2.66	1.45	1.98	2.09	1.95	1.87	1.99	1.61	2.25	2.43	2.11	1.68	1.86	1.9	2.3	2.0	1.42	2.03
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	14	<5	5	6	7	5	8	6	<5	8	10	<5	9	7.0	<5	7.0	<5	<5
Calculated TDS	mg/L	1	--	--	--	--	--	165	99	120	130	119	113	115	99	139	148	123	106	112	110.0	141.0	127.0	83.0	120
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<1.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	3.09	2.05	1.84	2.43	2.14	2.03	1.93	1.82	2.54	2.67	2.12	2.00	2.01	1.9	2.5	2.4	1.34	2.05
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	34.10	18.70	20.00	25.10	18.90	21.50	24.50	20.70	26.80	22.70	26.10	18.6	22.9	22.6	22.4	24.4	13.8	21.5
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	7.50	17.20	3.66	7.50	4.50	4.10	1.50	6.20	6.10	4.80	0.20	8.6	3.8	0.4	3.5	9.9	3.1	0.5
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.36	-3.76	-3.21	-2.97	-2.97	-3.42	-2.56	-3.20	-3.33	-2.78	-2.68	-3.42	-2.47	-2.8	-3.4	-2.9	-3.6	-3.24
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.68	-4.08	-3.46	-3.29	-3.29	-3.74	-2.88	-3.52	-3.65	-3.10	-3.00	-3.74	-2.79	-3.2	-3.7	-3.2	-3.9	-3.56
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.42	10.10	9.83	9.92	9.96	10.10	9.79	10.00	9.97	9.85	9.68	10.1	9.78	9.9	10.1	9.9	10.3	10.10
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.74	10.40	10.10	10.20	10.30	10.40	10.10	10.30	10.30	10.20	10.00	10.4	10.1	10.2	10.4	10.2	10.6	10.4
Metals (ICP-MS)																									
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	42	155	100	--	88	206	--	--	158	41	46	169	29	--	145	49	160	136
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	20	9	16	--	17	14	--	--	16	--	17	12	16	--	14.0	15.0	8.0	18.0
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	<1.0	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	22	10	<50	--	<5	8	--	--	<5	--	26	5	10	--	5.0	11.0	5.0	9.0
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.017	0.025	--	--	0.187	0.029	--	--	0.058	--	<0.017	<0.09	<0.09	--	<0.09	<0.09	<0.09	0.024
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	<1	<1.0	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	<1	<0.40	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	1	<2.0	<1	2	<1	<1	1	<1	2	1	<1	<1	2.0	<1	1.0	1.0	2.0
Total Iron (Fe)	µg/L	50	300	300	--	300	--	124	168	110	157	81	149	62	269	78	70	116	96	142	142	155	105	145	264
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	<0.5	<0.50	--	<0.5	<0.5	--	--	1.3	--	<0.5	1.3	<0.5	--	<0.5	<0.5	<0.5	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	115	42	39	41	22	47	23	45	46	31	17	28	49	28.0	42.0	32.0	23.0	85
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	<2	3	<2.0	--	<2	3	--	--	15	--	<2	<2	<2	--	2.0	<2	6.0	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	<1	<1.0	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	45	26	29	--	19	30	--	--	38	--	40	26	38	--	36.0	33.0	27.0	45.0
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	5	2	--	<2	2	--	--	<2	--	<2	<2	<2	--	<2	<2	3.0	<2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	<0.1	<0.1	--	<0.1	0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	0.1	<0.1	0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	<2	<2	--	<2	<2	--	--	2	--	<2	<2	<2	--	2.0	<2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	9	13	8	<5	11	<5	19	58	<5	6	8	<5	19.0	8.0	<5	6.0	6.0
MICROBIOLOGICAL																									
Total Coliform	MPN/100m	1	--	--	--	--	--	1,550	>2420	---	980	122	866	548	>2420	299	488	154	14	611	157.0	256	NDOGT	1198	>2420
E. coli	MPN/100m	1	--	--	400	--	--	15	28	60	24	6	4	33	99	29	18	3	5	11	61.0	<1	6	26	59
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.26	4.42
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.41	0.84	0.64	1.14	1.79	2.76	0.90	2.08	1.45	1.75	1.10	1.91	1.26	1.63	1.50	2.18	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.36	0.80	0.62	1.11	0.95	3.48	1.15	2.19	2.55	1.87	1.18	3.09	--	*	1.46	1.89	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake										
Sample Site (KL-1)								KL-1										
Sampling Date	yyyy-mm-dd							17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	28-Aug-23	16-Oct-23
Sampling Time	hh:mm							11:40 AM	12:59 PM	12:15 PM	12:12 PM	11:20 AM	1:00 PM	11:22 AM	11:55 AM	10:57 AM	1:10 PM	2:25 PM
FIELD DATA																		
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*	1.00	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	22.6	11.6	15.6	22.6	15.2	18.9	22.64	14.6	19.6	22.3	15.2
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	8.04	9.69	17.24	7.72	11.34	7.75	5.77	9.12	9.13	6.66	8.54
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.67	6.54	6.76	**5.95**	6.72	7.14	7.27	***9.47***	***6.48***	***6.36***	6.88
Specific Conductance	uS/cm	--	--	--	--	--	--	219.0	219.6	176.0	202.0	189.0	299.4	70	270.6	230.8	140.9	--
INORGANICS																		
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	8.0	7.0	<5	9	10	6	9	7	6	8	10
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	59	60	49	48	53	84	73	67	60	30	31
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	11	16	20.7	14.7	10.9	16.1	9.5	11.0	10.5	67.1	45.8
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.06	0.17	0.14	0.11	0.23	0.16	0.17	0.10	0.12	0.17	0.52
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.06	0.17	0.14	0.11	0.23	0.16	0.17	0.10	0.12	0.17	0.21
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.31
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.60	1.70	0.19	0.22	<0.10	0.18	0.22	0.14	<0.10	--	0.25
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.90	12.10	5.2	3.1	5.2	3.8	4.2	3.8	6.3	8.7	6.4
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	0.01	0.01	<0.01	<0.01	<0.01	0.13	<0.01	0.02	0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.94	6.79	6.69	6.50	7.06	6.94	6.55	***6.23***	***6.48***	***6.36***	***6.88***
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	5.4	6.4	9.2	7.5	8.6	8.3	8.3	7.3	6.0	5.0	4.5
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	20.0	1.0	1.1	1.1	1.2	1.3	1.3	1.2	1.0	0.8	0.8
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.036	0.029	<0.006	**0.017**	**0.011**	0.015	0.298	0.030	0.008	<0.002	0.005
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.7	0.8	0.8	1.1	1.0	1.1	1.2	1.0	0.7	0.9	0.9
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	44.4	40.3	34.2	31.9	30.4	48.0	44.0	38.0	37.0	20.3	19.5
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	1.3	2.0	2.8	3.7	1.7	2.6	2.0	1.7	1.7	2.6	2.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	8.0	9.0	8	8	10	9	9	9	8	6	6
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.8	0.7	1.0	2.1	0.9	1.0	1.4	0.6	0.9	1.6	4.0
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	275	239	205	217	222	313	286	257	--	--	--
Calculated Parameters																		
Anion Sum	me/L	N/A	--	--	--	--	--	2.00	2.03	1.56	1.71	1.92	2.69	2.44	2.22	1.99	1.14	1.24
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	8	7	<5	9	10	6	9	7	6	8	10
Calculated TDS	mg/L	1	--	--	--	--	--	124	123	103	104	111	156	143	128	117	69	71
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.33	2.19	2.09	1.90	1.88	2.66	2.47	2.15	2.04	1.27	1.19
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	18.0	20.1	27.5	23.3	26.4	26.1	26.1	23.2	19.1	15.8	14.5
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	7.7	3.7	14.5	5.2	0.9	0.6	0.7	1.7	1.3	5.1	1.9
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.02	-3.15	-3.24	-3.26	-2.60	-2.97	-3.18	-3.66	-3.84	-3.58	-3.84
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.34	-3.47	-3.56	-3.58	-2.92	-3.29	-3.50	-3.98	-4.16	-3.90	-4.08
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.96	9.94	9.93	9.76	9.66	9.91	9.73	9.89	10.00	9.97	10.00
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.3	10.3	10.2	10.1	10.0	10.2	10.0	10.2	10.4	10.3	10.2
Metals (ICP-MS)																		
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	--	**145**	--	--	***123***	--	--	216	285	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	--	14	--	--	22	--	--	13	11	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	--	16	--	--	7	--	--	<5	7	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	--	--	<0.09	--	--	--	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	--	<1	--	--	<1	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	1.0	1	2	<1	<1	<1	<1	<2	<2	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	135	88	139	115	53	138	82	99	154	299	192
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	--	<0.5	--	--	<0.5	--	--	<0.5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	20	15	51	33	13	53	37	26	57	56	22
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	--	7	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	--	33	--	--	39	--	--	31	23	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	--	<2	--	--	<2	--	--	<3	4	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	--	<0.2	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	**189**	6	<5	<5	<5	<5	7	15	25
MICROBIOLOGICAL																		
Total Coliform	MPN/100m	1	--	--	--	--	--	345	158	>200	>200	>200	>200	8,600	4,800	>200	>200	>200
E. coli	MPN/100m	1	--	--	400	--	--	11	1	25	130	43	18	1500	86	17	>200	95
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	1.73	0.95	0.95	2.4	1.05	1.4	2.3	1.5	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																						
Sample Site - KL-2								KL-2																						
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-14	2012-10-10	2013-05-15	2013-08-15	2013-10-16	2014-05-14	2014-08-14	2014-10-27	2015-05-20	2015-08-25	2015-10-22
Sampling Time	hh:mm							11:00	10:30	10:45	10:15	12:25	10:50	09:30	14:00	13:15	9:50	10:30	10:20	09:10	16:10	14:30	10:45	9:20	14:04	09:15	13:29	13:05
FIELD DATA																														
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	1.3
Water Temp	Celsius	--	--	--	--	--	--	16.8	18.2	15.4	13.5	20.4	8.0	9.9	19.1	14.1	7.6	21.8	12.3	10.1	22.9	9.7	11.7	21.1	10.8	13.1	24.7	8.1
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.16	8.50	5.70	6.28	4.66	9.58	9.66	7.06	8.43	6.47	5.82	7.63	9.37	6.38	7.40	14.90	6.95	7.70	8.41	7.28	7.14
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.33	6.35	6.19	6.61	6.96	6.25	6.77	5.90	5.62	7.72	6.41	6.29	5.75	7.47	5.57	6.60	7.22	5.79	6.36	5.88	6.43
Specific Conductance	uS/cm	--	--	--	--	--	--	46.0	106.0	89.2	198.5	104.0	75.1	79.7	66.7	54.3	58.0	96.6	61.1	77.9	65.3	64.5	188.0	266.0	63.0	0.1	107.9	73.6
INORGANICS																														
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	8	8	8	8	7	<5	<5	7	<5	20	<5	8	<5	<5	<5	29	7	28	<5.0	7	<5
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	48	48	48	48	25	17	19	14	10	16	20	12	19	21	14	20	17	12	15	14	12
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	20	20	20	20	63	95	80	110	120	52	60	94	37	90	71	25	44	168	50	63	61
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.19	0.19	0.19	0.19	0.07	0.06	0.12	0.07	<0.05	0.11	0.08	<0.05	0.12	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.08	<0.05
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.19	0.19	0.19	0.19	0.07	--	0.12	--	--	0.11	0.08	<0.05	0.12	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.08	<0.05
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.04	<0.03	<0.050	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.4	2.2	0.7	--	1.1	<0.4	<0.4	0.4	<0.4	0.4	0.8	0.8
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	4.3	4.3	4.3	4.3	6.6	9.7	6.5	10.0	12.0	8.1	7.1	10.9	7.5	11.1	10.9	6.2	6.6	12.9	4.0	13.3	14.0
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.85	6.85	6.85	6.85	6.78	6.11	6.27	6.40	6.05	6.50	6.70	6.50	6.37	6.62	6.34	6.53	6.87	6.06	6.32	6.99	6.28
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.5	6.5	6.5	6.5	4.1	3.6	2.5	2.5	2.2	2.4	3.6	2.9	2.7	2.5	2.4	3.4	4.0	2.4	2,600.0	3.4	1.1
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	1.2	1.2	1.2	1.0	0.8	0.6	0.6	0.4	0.7	1.0	1.0	0.7	0.5	0.8	1.1	1.0	0.6	640.0	0.9	0.7
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.020	0.020	0.020	0.020	0.009	0.009	0.009	0.008	0.013	0.021	0.059	0.013	0.010	0.020	0.029	0.013	0.039	0.025	0.008	0.012	0.008
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.1	1.1	1.1	1.1	0.6	0.8	0.5	0.5	0.7	0.5	0.7	0.8	0.5	0.5	0.7	0.7	0.9	0.7	540.0	0.7	0.6
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	31.6	31.6	31.6	31.6	14.7	10.6	11.1	7.8	6.9	9.8	14.2	9.5	8.9	7.0	7.9	17.5	14.0	7.6	8.4	11.5	6.6
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.2	2.2	2.2	2.2	4.2	4.7	2.7	4.3	4.0	2.6	4.0	4.9	2.8	4.4	4.9	2.4	3.3	4.6	2.0	3.7	5.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	103	103	103	103	7	<1	<1	<2	<1	<5	<5	<5	<5	135	<5	<5	<5	<5	<1.0	<5	17
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	9	9	9	<2	<2	<2	<2	<2	3	3	2	4	5	4	4	2	3	3	<2	3
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.5	0.5	0.5	0.5	1.0	1.0	0.4	0.7	0.6	0.5	1.1	1.0	1.9	2.2	1.0	0.9	0.8	1.2	<1.0	1.6	6.2
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	212	212	212	212	100	97	79	66	54	71	91	61	83	69	62	87	94	66	64	81	73
Calculated Parameters																														
Anion Sum	me/L	N/A	--	--	--	--	--	0.49	0.82	0.45	0.77	0.85	0.49	0.53	0.53	0.28	0.92	0.63	0.54	0.63	0.70	0.48	1.23	0.66	0.96	0.48	0.54	0.40
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<1	8	<1	5	7	<1	<1	7	<1	20	<5	8	<5	<5	<5	29	7	28	<1.0	7	<5
Calculated TDS	mg/L	1	--	--	--	--	--	36	55	35	46	55	38	37	34	25	45	44	34	37	37	31	65	44	44	32	36	25
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1.0	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	0.71	0.99	0.67	0.74	0.95	0.74	0.68	0.55	0.49	0.65	0.94	0.73	0.63	0.54	0.60	1.07	0.97	0.57	0.57	0.82	0.47
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	10.00	15.00	10.00	12.00	14.00	12.00	9.00	9.00	8.00	8.90	13.10	11.40	9.60	8.30	9.30	13.00	14.10	8.50	9.10	12.20	5.60
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	18.30	9.39	19.60	1.99	5.56	20.30	12.40	1.85	27.30	17.60	19.70	15.10	0.30	12.90	11.00	7.10	19.10	25.70	8.57	20.50	7.50
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	NC	-3.20	NC	-3.44	-3.05	NC	NC	-3.66	NC	-3.37	-3.60	-3.68	-4.05	-3.83	-4.12	-3.04	-3.23	-3.66	NC	-3.18	-4.51
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	NC	-3.45	NC	-3.70	-3.30	NC	NC	-3.91	NC	-3.69	-3.92	-4.00	-4.37	-4.15	-4.44	-3.36	-3.55	-3.98	NC	-3.50	-4.83
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	NC	9.78	NC	10.00	9.83	NC	NC	10.10	NC	9.87	10.30	10.20	10.40	10.50	10.50	9.57	10.10	9.72	NC	10.20	10.80
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	NC	10.00	NC	10.30	10.10	NC	NC	10.30	NC	10.20	10.60	10.50	10.70	10.80	10.80	9.89	10.40	10.00	NC	10.50	11.10
Metals (ICP-MS)																														
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	290	--	--	175	151	--	271	--	--	209	205	338	256	270	259	205	236	340	180	--	284
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	9	--	--	12	14	--	10	--	--	9	11	10	8	<5	13	13	18	9	9	--	9
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	8	--	--	15	13	--	<50	--	--	6	14	22	6	11	9	11	12	12	<50	--	<5
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note	--	<0.3	--	--	0.018	<0.017	--	<0.017	--	--	<0.017	<0.017	<0.017	<0.017	<0.017	0.019	<0.017	<0.017	0.018	0.014	--	0.176
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	9	<1	<1	<1.0	--	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	<0.40	<0.40	--	<0.40	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.40	--	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2	--	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2	<1	2	<1	<1	4	<2.0	<1	<1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	250	--	--	227	403	238	202	418	358	154	541	813	269	528	523	174	723	305	250	641	478
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	1.0	<0.50	--	<0.50	--	--	<0.5	<0.5	1.1	<0.5	0.5	<0.5	5.8	<0.5	0.5	<0.5	--	0.6
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	26	--	--	43	83	35	12	68	23	17	90	114	24	67	53	33	146	25	47	120	57
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1	<1	--	<1	--	--	<1	<1	1	<1	<1	<1	<1	<1	<1	<1.0	--	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	0.420	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	--	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	14	--	--	18	20	--	12	--	--	10	18	15	12	9	12	16	17	12	12	--	8
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	3	<2	<2	<2	<2	<2	<2	<2.0	--	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	2	--	--	<2	<2	--	3	--	--	<2	2	3	4	<2	2	2	<2	3	3	--	<2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	8	--	--	5	5	7	<5.0	<5.0	<5.0	<5	<5	7	<5	<5	<5	<5	<5	<5	<5.0	<5	<5
MICROBIOLOGICAL																														
Total Coliform	MPN/100m	1	--	--	--	--	--	1,800	170	--	>250	11	>250	59	>250	--	>2420	1,986	>2420	>2420	>2420	>2420	525	>2420	>2420	---	>2420	>2420
E. coli	MPN/100m	1	--	--	400	--	--	1,500	100	--	>250	6	6	2	>250	<100	3	7	3	12	6	2	<1	18	11	30	11	5
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.82	6.05	1.97	0.73	0.55	0.22	0.44	0.89	0.97	0.53	2.20	0.07	0.62	1.00	0.73	0.13	0.83	0.41	0.34	0.96	0.46
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.87	5.97	1.95	0.66	0.54	0.21	0.42	0.73	0.82	0.56	2.20	0.12	0.72	1.00	0.74	0.14	0.86	0.41	---	1.26	0.26

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L)

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0 8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0 01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																			
Sample Site - KL-2								KL-2																			
Sampling Date	yyyy-mm-dd							2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22
Sampling Time	hh:mm							10:30	8:30	12:50	10:47	11:15 AM	10:30 AM	11:00 AM	10:10 AM	10:00 AM	10:44 AM	3:01 PM	10:45 AM	1:10 PM	4:05 PM	13.22 PM	11:33 AM	11:53 AM	11:46 AM	12:00 PM
FIELD DATA																											
Secchi Depth	Meters	--	--	--	1.2	--	--	2.1	1.8	1.9	2.0	1.5	1.2	2.1	1.4	1.4	2.2	1.80	1.20	1.35	1.60	NA*	0.2 m	NA*	1.65	NA*
Water Temp	Celsius	--	--	--	--	--	--	10.7	20.3	10.2	15.7	21.2	10.6	11.7	21.6	10.3	10.3	26.4	10.1	21.5	19.3	8.4	14.1	18.5	11.7	15.5
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	7.88	4.21	9.65	9.72	6.61	6.23	9.41	4.17	7.54	**	2.58	7.90	5.10	4.96	9.84	15.01	8.17	12.07	8.11
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.64	5.97	5.54	6.69	6.00	6.29	6.21	5.16	5.84	8.50	5.18	6.11	6.07	5.98	6.16	6.07	5.80	6.14	6.56
Specific Conductance	uS/cm	--	--	--	--	--	--	82.0	117.0	103.7	78.0	114.0	109.0	57.4	109.9	67.2	48.3	119.0	214.0	81.0	101.0	80.8	69.0	76.0	84.0	111.5
INORGANICS																											
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	<5	10	6	5	12	9	<5	11	<5	<5	9.0	<5	9.0	14.0	7.0	8	8	15	95.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	17	26	30	20	19	19	12	19	11	13	16	14	17	21	15	13	13	14	24
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.12	--
Colour	TCU	5	--	--	--	--	--	47	48	93	46	46	57	82	59	123	76	106	77	59	40	81	47.0	84.1	66.3	59
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.05	0.06	0.19	0.05	0.08	<0.05	0.07	0.05	<0.05	0.1	0.05	<0.05	0.12	0.10	0.08	0.05	0.41	0.10	0.29
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.05	<0.05	0.19	<0.05	0.08	<0.05	0.07	<0.05	<0.05	0.06	0.05	<0.05	0.12	0.10	0.08	0.05	0.41	0.10	0.29
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	0.06	<0.05	0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [7]	--	0.05	0.06	<0.03	<0.03	0.03	0.04	0.04	0.06	0.05	<0.03	0.12	0.07	0.07	0.09	<0.03	<0.03	<0.03	0.44	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.4	0.9	0.5	<0.4	0.5	<0.4	<0.4	<0.4	<0.4	0.5	0.80	2.70	<0.4	1.70	0.60	0.24	0.24	<0.10	0.23
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.2	7.0	13.2	8.5	8.2	8.5	9.0	6.6	14.0	6.9	12.10	9.40	5.80	2.50	4.20	8.5	9.9	3.0	6.70
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.13
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.35	6.87	6.19	6.57	6.87	6.66	6.46	7.04	6.27	6.44	6.70	5.89	6.60	7.01	6.49	6.69	6.42	7.04	7.70
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	2.9	4.5	5.6	3.6	4.3	3.9	2.3	4.2	2.9	2.3	4.3	2.0	3.8	5.7	3.0	3.8	5.9	7.6	6.4
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.7	1.1	1.5	1.0	1.2	0.9	0.7	1.1	0.8	0.7	1.1	0.6	1.0	1.4	0.8	0.8	1.3	1.5	1.4
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.009	0.016	0.013	0.012	0.028	0.010	0.014	0.015	0.004	0.009	0.019	0.031	0.014	0.027	0.016	0.01	0.03	0.02	**0.018**
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	0.8	1.1	0.8	0.8	0.7	0.5	0.8	0.6	0.6	0.8	0.6	0.6	0.9	0.7	0.7	1.1	1.0	1.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	11.5	16.1	17.7	13.8	15.4	13.0	9.2	13.9	11.8	11.9	10.0	7.5	10.1	14.8	7.8	10.1	10.9	10.0	17.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.0	2.3	4.5	1.3	2.2	4.6	2.3	2.8	3.6	1.7	3.7	3.5	2.6	3.4	4.7	2.3	5.4	3.9	4.2
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	12	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.0	<5	<5	6.0	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	4	3	7	3	2	3	3	<2	3.0	3.0	<2	4.0	3.0	4.0	5.0	4	6	7	6.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	2.0	1.9	0.8	4.4	1.6	0.9	1.2	1.1	0.6	3.5	1.3	1.3	1.8	2.9	3.0	5.6	1.3	1.2
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	79	135	125	93	110	97	68	115	70	72	88	45	95	128	88	79	94	106	350
Calculated Parameters																											
Anion Sum	me/L	N/A	--	--	--	--	--	0.56	1.00	1.13	0.73	0.82	0.78	0.41	0.76	0.4	0.4	0.6	0.5	0.73	0.96	0.67	0.61	0.68	0.85	2.72
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<5	10	6	5	12	9	<5	11	<5	<5	9.0	<5	9	14	7	8	8	15	95
Calculated TDS	mg/L	1	--	--	--	--	--	38	59	68	46	51	47	28	47	31.0	32.0	40.0	29.0	42	58	38	38	46	52	115
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	0.76	1.09	1.25	0.91	1.05	0.90	0.62	0.97	0.8	0.7	0.9	0.5	0.78	1.13	0.64	0.76	0.97	1.04	1.24
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	10.10	15.80	20.20	13.10	15.70	13.40	8.6	15	10.5	8.6	15.3	7.5	13.6	20.0	10.8	12.8	20.1	25.2	21.7
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	14.90	4.50	5.30	11.00	12.30	7.50	20.8	12.4	36.7	25.6	14.6	6.4	3.1	8.2	2.6	10.4	17.7	10.3	37.5
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-4.04	-3.04	-3.85	-3.73	-2.98	-3.35	-4.02	-2.85	-4.1	-4.0	-3.3	-4.7	-3.42	-2.65	-3.73	-3.37	-3.46	-2.46	-1.11
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-4.36	-3.36	-4.17	-4.05	-3.30	-3.67	-4.34	-3.17	-4.4	-4.4	-3.6	-5.0	-3.74	-2.97	-4.05	-3.69	-3.78	-2.78	-1.43
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	10.40	9.91	10.00	10.30	9.85	10.00	10.5	9.89	10.4	10.5	10.0	10.5	10.00	9.66	10.20	10.1	9.88	9.50	8.81
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.70	10.20	10.40	10.60	10.20	10.30	10.8	10.2	10.7	10.8	10.3	10.9	10.3	10.0	10.5	10.4	10.2	9.8	9.1
Metals (ICP-MS)																											
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	187	--	--	185	150	240	228	123	--	156	257	318	227	--	--	204	--	--	***231***
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	10	--	--	10	--	14	7	14	--	10	37	9	15.0	--	--	13	--	--	23.0
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	9	--	--	<5	--	17	7	13	--	7	11	7	14.0	--	--	11	--	--	16.0
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	<0.017	--	--	0.041	--	<0.017	<0.09	<0.09	--	<0.09	<0.09	<0.09	<0.017	--	--	<0.09	--	--	<0.09
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	1	--	--	<1	--	1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	<1	--	<1	<1	<1	--	<1	1	<1	<1	--	--	<1	--	--	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	<1	2	<1	1	1	<1	<1	1	<1	<1	1	<1	<1	1.0	1	2	<1	<1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	232	1,000	290	168	759	572	148	783	336	227	1,210	277	486	1,040	659	472	503	462	***338***
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	<0.5	--	<0.5	1.2	<0.5	--	<0.5	1.0	1.6	<0.5	--	--	0.7	--	--	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	21	109	39	39	96	64	17	78	29	28	295	23	98	260	168	77	36	44	46
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	3	--	--	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	12	--	--	15	--	20	10	24	--	13	24	13	17.0	--	--	17	--	--	22.0
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	--	<2	--	<2	<2	<2	--	<2	2	2	3.0	--	--	4	--	--	3.0
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.2	--	--	<0.2
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	8	<5	8	6	<5	<5	20	<5	9	6	<5	<5	<5	<5	<5	<5	<5
MICROBIOLOGICAL																											
Total Coliform	MPN/100m	1	--	--	--	--	--	>2420	>2420	>2420	>2420	>2420	659	10	2420	140.0	1960	630	1240	>2420	>2420	1730	>200	>200	>200	>200
E. coli	MPN/100m	1	--	--	400	--	--	4	15	25	31	16	3	4	20	50	<10	2	12	31	58	4	195	26	12	36
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	0.53	4.25	3.15	0.95	0.6	0.79	0.6
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.30	1.86	0.32	0.99	1.47	0.31	0.51	1.25	0.75	0.47	1.67	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.43	2.43	0.36	1.86	1.81	0.49	0.91	--	*	0.49	1.50	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L)

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0 8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0 01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake				
Sample Site - KL-2								KL-2				
Sampling Date	yyyy-mm-dd							18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							11:40 AM	12:10 PM	12:05 PM	12:00 PM	1:50 PM
FIELD DATA												
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	19.58	11.7	17.5	17.7	12.9
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	2.00	9.04	7.88	6.64	6.85
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.45	8.62	6.33	6.41	6.39
Specific Conductance	uS/cm	--	--	--	--	--	--	102	114.7	98.4	--	--
INORGANICS												
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	24.0	10.0	7.0	12.0	11.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	19	19	17	8	12
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	65	80	54	128	62
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.12	0.10	0.08	0.10	0.16
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.12	0.10	0.08	0.10	0.07
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	0.09
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	0.04	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.43	0.27	0.11	--	0.31
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	8.50	10.20	10.90	15.00	8.40
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.75	***6.29***	***6.33***	***6.41***	***6.39***
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	9.3	5.6	4.4	4.0	4.7
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2.0	1.4	1.0	0.9	1.2
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	**0.063**	**0.030**	**0.008**	**<0.002**	**0.007**
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.5	1.2	0.8	1.0	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	13.0	13.0	12.0	7.4	8.8
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	6.0	5.3	2.3	4.4	4.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	5.0	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	7.0	8.0	8.0	5.0	6.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	1.4	2.0	0.9	4.0	1.3
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	135	105	--	--	--
Calculated Parameters												
Anion Sum	me/L	N/A	--	--	--	--	--	1.17	0.91	0.75	0.58	0.69
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	24	10	7	12	11
Calculated TDS	mg/L	1	--	--	--	--	--	68	55	46	35	42
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.28	1.03	0.89	0.69	0.78
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	31.5	19.7	15.1	13.7	16.7
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	4.4	6.4	8.4	8.7	5.6
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.47	-3.52	-3.74	-3.26	-3.82
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.79	-3.84	-4.06	-3.58	-4.04
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.22	9.81	10.10	9.90	9.90
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.5	10.1	10.4	10.2	10.2
Metals (ICP-MS)												
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	--	--	295	412	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	--	17.0	15.0	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	--	8.0	11.0	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	1.0	<2	<2	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	***631***	***339***	***248***	***512***	***246***
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	--	<0.5	0.8	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	92	50	25	20	11
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	--	20.0	17.0	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	--	<3	7.0	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	<5	12.0	<5
MICROBIOLOGICAL												
Total Coliform	MPN/100m	1	--	--	--	--	--	21,600	8,600	>200	>200	>200
E. coli	MPN/100m	1	--	--	400	--	--	13	28	20	93	12
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	2.0	0.5	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L)

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0 8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0 01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-3

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Kearney Lake																			
Sample Site KL-3								KL-3																			
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-14	2012-10-10	2013-05-15	2013-08-16	2013-10-16	2014-05-14	2014-08-14	2014-10-27	2015-05-20
Sampling Time	hh:mm							09:00	11:00	09:30	11:30	14:12	11:40	10:30	12:20	12:00	10:26	12:20	11:20	9:50	10:00	14:00	11:00	11:50	14:25	10:35
FIELD DATA																											
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC
Water Temp	Celsius	--	--	--	--	--	--	14.0	21.6	17.3	14.7	23.1	9.9	10.3	21.1	15.5	9.0	24.5	15.6	11.7	21.5	13.6	11.0	22.7	12.8	14.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.79	8 00	8.00	9.26	7.83	10.35	11.06	8.42	9.60	8.89	8.17	7.72	10.20	9.20	8.90	5.90	7.87	8.12	8.02
pH (in Situ)	pH	--	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	7.27	6.74	6.97	7.27	7.33	6.76	6.83	6.96	6.30	7.68	6.85	6.51	5.86	7.25	6.49	6 55	7.37	6.67	6.84
Specific Conductance	uS/cm	--	--	--	--	--	--	95.0	282 0	246.0	220.0	228.0	199.4	220.0	175.0	161.3	204.0	225.0	177.2	207.3	194.4	210.6	405 0	252.0	208.0	0.2
INORGANICS																											
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	<5	7	7	6	7	7	6	7	7	23	6	5	<5	5	7	15	5	6	<5.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	66	63	60	55	55	53	56	43	37	50	57	46	54	40	46	58	46	45	60
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	22	20	20	28	12	20	31	38	40	57	15	31	19	23	20	16	13	20	34
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.14	0.12	0.14	0.24	0.15	0.22	0.24	0.15	0.16	0.19	0.09	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.14	--	--	0.24	0.15	--	0.24	--	--	0.19	0.09	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	0 06	<0.05	<0.05	<0.05	<0.05	<0 05	<0.05	<0.05	<0 03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.050
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.4	2.8	<0.4	--	1.3	<0.4	0.6	0.4	0.4	0 2
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	2.6	3.9	4.3	3.6	3.1	3.3	3.8	5.1	5.0	5.9	3.4	4.9	4.3	4.4	4.6	4.6	2.8	4.5	3.4
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.010
pH (Lab)	pH	N/A	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	6.38	6.67	6.82	6.82	6.99	6.87	6.52	6.50	6.38	6.70	7.10	6.90	6.68	6.96	6.86	6.68	6.87	6.59	6.54
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.7	7.1	6.8	6.8	8 0	8.3	7.1	4.7	5.6	5.7	6.9	6.0	7.0	5.3	6.8	6.4	7.9	6.8	6,600.0
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	1.2	1.1	1.2	1.3	1.3	1.2	0.8	1.0	1.0	1.2	1.3	1.0	0.9	1.3	1.4	1.2	1.0	940.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0 010	<0.02	<0.02	0.005	0.005	<0.002	0.003	0.008	0 003	0.012	0.019	0.045	0.007	0.006	0.006	0.012	0.009	0.023	0.148	0.004
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	1.1	0.9	0.8	0 8	1.0	0.9	0.7	0.9	0.7	0.9	0.9	0.8	0.6	1.2	0.8	1.1	0.9	770.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	38.0	38.0	35.0	28.3	33.1	33.0	33.0	20.8	21.3	31.2	34.5	26.4	35.1	20.1	32.1	36.4	39.0	35.3	34.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.7	2.6	2.6	3.2	2 9	3.2	2.9	2.5	2.6	2.7	2.0	2.6	2.9	2.6	2.7	2.6	1.9	2.4	2 5
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<1	1	1	2	<2	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	3
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	11	12	12	10	10	10	9	10	8	7	8	7	7	7	8	9	7	7	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	1.4	0.6	0.3	0.5	0.6	0.6	0.6	0.4	0.8	0.7	1.0	0.7	2.4	0.4	0.4	0.3	0.9	0.7
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	250	250	240	220	220	220	220	170	160	197	222	182	219	216	204	218	243	216	220
Calculated Parameters																											
Anion Sum	me/L	N/A	--	--	--	--	--	2.11	2.17	2.08	1.90	1.93	1.87	1.90	1.58	1.36	2.03	1.90	1.55	1.68	1.38	1.60	2.14	1.55	1.54	1.87
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<1	7	7	6	7	7	6	7	7	23	6	5	<5	5	7	15	5	6	<1.0
Calculated TDS	mg/L	1	--	--	--	--	--	128	130	123	110	117	116	115	88	82	111	113	91	106	78	100	122	106	100	110
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1.0
Cation Sum	me/L	N/A	--	--	--	--	--	2.12	2.16	1.99	1.69	1 97	1.98	1.92	1.23	1.32	1.77	1.98	1.60	2.00	1.24	1.89	2.07	2.23	2.00	1.89
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	22.00	23.00	22.00	22.00	25.00	26.00	23.00	15 00	18.00	18.40	22.20	20.30	21.60	16.90	22.30	21.70	24.70	21.10	20.00
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.24	0.23	2.21	5.85	1 03	2.86	0.52	12 50	1.49	6.80	2.10	1.60	8.60	5.50	8.30	1.50	17.90	12.80	0.53
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	NC	-3.00	-2.89	-2.92	-2.60	-2.73	-3.23	-3.33	-3.35	-2.77	-2.88	-3.21	-3 37	-3.19	-3.05	-2.93	-3.12	-3.39	NC
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	NC	-3.25	-3.14	-3.17	-2.85	-2.99	-3.49	-3.58	-3.60	-3 09	-3.20	-3.53	-3.69	-3.51	-3.37	-3.25	-3.44	-3.71	NC
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	NC	9.67	9.71	9.74	9 59	9.60	9.75	9.83	9.73	9.47	9.98	10.10	10.00	10.20	9.91	9.61	9.99	9.98	NC
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	NC	9.92	9.96	9.99	9 84	9.86	10.00	10.10	9.98	9.79	10.30	10.40	10.40	10.50	10.20	9 93	10.30	10.30	NC
Metals (ICP-MS)																											
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	259	259	--	124	54	--	266	--	--	199	54	153	140	65	100	260	52	105	180
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	13	13	--	16	13	--	19	--	--	18	17	15	19	9	18	17	17	16	19
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	--	<1.0	<1.0	--	<1 0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	9	9	--	8	9	--	<50	--	--	5	9	17	7	7	10	8	10	12	<50
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	0.019	0.019	--	0.030	<0.017	--	0.046	--	--	0.019	0.021	0.027	0.028	<0.017	<0.017	0.038	<0.017	0.017	0 033
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	7	<1	<1	<1.0
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	<1	--	<0.40	<0.40	--	<0.40	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.40
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2	<1	1	1	<1	2	<2.0
Total Iron (Fe)	µg/L	50	300	300	--	300	--	523	523	--	73	133	58	136	104	154	137	136	119	131	71	172	137	96	118	120
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	<0.5	--	0.6	<0.5	--	<0.5	--	--	<0.5	<0.5	0.7	<0.5	<0.5	0.9	3.6	<0.5	<0.5	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	53	53	--	37	67	32	42	33	33	25	47	46	37	20	92	41	45	27	36
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	<2	<2	--	2	<2.0	--	2	--	--	<2	<2	<2	<2	<2	<2	2	<2	<2	<2.0
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	--	<0.10	<0.10	--	<0.10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	12	12	--	34	36	--	33	--	--	25	33	29	33	18	32	31	32	29	29
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	2	2	--	<2.0	<2.0	--	5	--	--	<2	<2	<2	<2	<2	2	3	<2	2	3
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	<0.1	--	<0.1	<0.1	--	0.1	--	--	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	<2	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	--	10	7	6	9	7	9	<5	<5	8	10	5	7	10	<5	6	9
MICROBIOLOGICAL																											
Total Coliform	MPN/100mL	1	--	--	--	--	--	120	24	--	190	16	58	72	110	--	291	1,553	178	345	2,420	1,300	86	1,730	>2420	---
E. coli	MPN/100mL	1	--	--	400	--	--	1	17	--	2	<1	8	5	37	<100	2	<1	3	8	21	<1	<1	<1	13	<0.10
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.04	1.11	1.18	1.30	1.14	0.51	0.78	1.26	1.24	0.52	1.30	0.81	1.44	2.00	0.65	0.76	0.59	1.23	0.72
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.94	0 97	1.21	1.09	1.19	0.42	0.67	0.98	1.01	0.55	1.20	1.14	1.62	2.30	0.61	0.69	0.51	1.12	0.68

Notes:
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of he Environment Guidelines for he Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-3

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Kearney Lake																		
Sample Site KL-3								KL-3																		
Sampling Date	yyyy-mm-dd							2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21
Sampling Time	hh:mm							11:45	10:40	11 00	11:30	11:00	9:36	10:15	10:15	10:30	9:10	11:30 AM	10:00 AM	10:00 AM	11:45 AM	3:30 PM	3:30 PM	13:42 PM	1:20 PM	12:44 PM
FIELD DATA																										
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	25.0	8.4	12.1	21.7	12.5	16.1	22.5	13.8	12.1	23.8	12.4	9.6	23.3	11.3	25.2	21.8	11.5	16.4	21.9
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	9.91	8.65	9.34	7.72	11.41	9.00	7.40	8.17	7.33	6.90	8.64	**	7.28	9 30	5.09	6.94	8.84	17.84	8.36
pH (in Situ)	pH	--	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	6.87	7.17	7.40	6.82	5.58	7.02	7.04	6.97	6.66	6.94	6.64	8.25	7.05	6.61	6.61	6.21	6.51	6.87	6.34
Specific Conductance	uS/cm	--	--	--	--	--	--	245.1	236.6	213.0	264.0	227.8	204.0	248.0	248.0	190.3	242.7	209.8	158.6	319.0	183 0	253.0	217.0	219.9	182.0	211.0
INORGANICS																										
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	6	6	<5	9	8	<5	8	9	<5	8	7	<5	8	6	7.0	8.0	8.0	6	8
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	56	56	54	56	49	63	56	59	54	48	46	49	56	54	69	65	59	51	49
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	13	14	29	13	21	24	13	15	63	26	27	53	13	21	25	12	12	18.5	13.4
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.12	0.21	0.14	0.13	0.10	0.24	0.30	0.24	0.17	0.06	0.13	0.14	0.10	0.29	0.18	<0.05	0.18	<0.05	0.18
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.12	0.21	0.14	0.06	0.10	0.13	0.17	0.24	0.17	0.06	0.13	0.14	0.10	0.29	0.18	<0.05	0.18	<0.05	0.18
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	0.07	<0.05	0.11	0.13	<0 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0 05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	0 06	<0.03	<0.03	<0.03	0.03	0.03	<0.03	0.04	0.03	<0.03	0.08	0.07	<0.03	0.08	<0 03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	1.2	0.9	<0.4	<0.4	0.4	<0.4	0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2.0	0.40	0.70	0.80	0.14	0.1
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	5.7	5.8	4.3	2.7	8.0	5 3	4.9	4.1	5.1	3.2	4.0	4.4	4.1	4.0	3.30	<0.5	4.10	5.1	2.9
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.04	<0 01	0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	6.92	6.94	6.69	7.28	6.93	6.77	7.13	6.88	6.72	7.21	7.10	6.66	7.07	6.81	6.89	7.02	6.83	6.76	6.50
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	7.8	5.2	6.2	8.3	7.3	6 9	7.2	8.1	6.0	7.3	8.4	5.9	7.6	5.0	7.6	7.7	7.3	7.5	7.6
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	0.9	1.0	1.3	1.3	1.0	1.1	1.2	1.0	1.2	1.4	1.0	1.2	0.9	1.2	1.1	1.2	1.0	1.3
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0 010	0.004	0.002	0.108	0.005	0.004	0.006	0.009	0.007	0.010	0.010	0.006	0.011	0.007	0.007	0.010	0.014	0.023	<0.006	0.024
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	0.7	0.7	1.0	1.0	0.8	0.9	1.0	0.7	1.0	1.1	0.7	1.0	0.8	0.9	0.9	1.0	0.8	1.2
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	40.0	27.1	32.1	37.2	32.8	44.0	41.4	35.9	35.9	36.6	39.9	44.3	38.9	30.1	36.9	42.2	39.4	31.3	32.8
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.4	2.6	2.6	1.8	2.5	2 2	1.6	1.9	2.6	1.7	1.9	2.1	1.4	2.2	1.6	1.3	2.1	2.9	4.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	8	10	10	10	10	9	10	8	7	7	6	9	9	9.0	8.0	9.0	8	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.5	0.7	1.1	1.1	1.0	1.0	1.3	2.6	1.0	0.5	1.2	0.9	2.0	1.1	1.0	0.8	0.7	0.7	0.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	242	238	206	262	185	245	251	247	244	246	232	244	233	160	275	288	240	210	233
Calculated Parameters																										
Anion Sum	me/L	N/A	--	--	--	--	--	1.90	1.88	1.74	1.98	1.76	2.00	1.95	2.07	1.70	1.66	1.6	1.5	1.9	1.9	2.29	2.16	2.02	1.73	1.72
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	6	6	<5	9	8	<5	8	9	<5	8	<5	<5	8.0	6.0	7	8	8	6	8
Calculated TDS	mg/L	1	--	--	--	--	--	119	103	105	120	107	127	122	122	107	106	109.0	108.0	119.0	105.0	130	130	123	103	106
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.27	1.55	1.83	2.18	1.94	2.38	2.28	2.10	1.98	2.09	2.3	2.3	2.2	1.7	2.14	2.35	2.22	1.86	1.95
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	24.40	16.70	19.60	26.10	23.60	21.30	22.50	25.20	19.1	23.2	26.7	18.9	23.9	16.2	24.7	23.8	23.2	22.8	24.3
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	9.00	9.80	2.60	4.80	4.90	8.60	7.90	0.80	7.6	11.4	18.4	21.4	6.7	5.2	3.3	4.2	4.5	3.7	6.3
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.00	-3.15	-3.41	-2.44	-2 89	-3.29	-2.71	-2.85	-3.39	-2.61	-2.7	-3.5	-2.7	-3.3	-2.97	-2.79	-3.00	-3.18	-3 31
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.32	-3.47	-3.73	-2.76	-3 21	-3.61	-3.03	-3.17	-3.71	-2.93	-3 0	-3.8	-3.1	-3.6	-3.29	-3.11	-3.32	-3 50	-3.63
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.92	10.10	10.10	9.72	9.82	10.10	9.84	9.73	10.1	9.82	9.8	10.1	9.8	10.1	9.86	9.81	9.83	9.94	9.81
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10 20	10.40	10.40	10.00	10.10	10.40	10.20	10.10	10.4	10.1	10.1	10.4	10.1	10.4	10.2	10.1	10.1	10.3	10.1
Metals (ICP-MS)																										
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	90	163	--	--	128	36	43	164	26	--	139	39	80	60	--	--	116	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	19	15	--	--	17	--	20	14	15	--	17	16	15	21.0	--	--	16	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	<5	8	--	--	7	--	12	5	10	--	6	9	6	8.0	--	--	9	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	--	<0.017	0.021	--	--	0 020	--	<0.017	<0.09	<0.09	--	<0.09	<0.09	<0.09	<0.017	--	--	<0 09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	2.0	--	--	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	1	<1	2	<1	<1	<1	<1	1	<1	<1	1	<1	1	<1	1.0	<1	1.0	1	1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	165	115	112	117	99	125	83	130	81	148	<50	123	93	<50	274	180	105	114	68
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	<0.5	--	--	<0.5	--	<0 5	0.7	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	48	24	31	41	20	30	35	54	21	50	22	26	44	18	137	80	19	24	16
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	--	<2	2	--	--	<2	--	<2	<2	<2	--	3	<2	2	2.0	--	--	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	21	28	--	--	33	--	41	27	38	--	30	34	31	49.0	--	--	31	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0 2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	2	<2	<2	<2	--	--	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	7	8	8	<5	<5	6	6	6	6	<5	<5	16	<5	<5	<5	<5	<5	40	<5
MICROBIOLOGICAL																										
Total Coliform	MPN/100mL	1	--	--	--	--	--	2,420	285	548	1,990	2,420	687	2,420	411	<1	NDOGT	5,020.0	103.0	NDOGT	628.0	>2420	1990	130	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	7	6	2	38	30	7	13	46	<1	51	20	1	15	6	44	61	<1	12	18
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.47	0.47	1.41	0.64	1.1	1.6
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.27	1.34	1.63	0.81	2.29	1.96	1.24	1 34	1.16	1.14	1.28	0.74	1.94	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	1.34	0.69	2.00	0.99	2.37	2.46	1.32	1 87	1.80	--	*	0.74	1.73	--	--	--	--	--	--

Notes:
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* "--" = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of he Environment Guidelines for he Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-3

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Kearney Lake						
Sample Site KL-3								KL-3						
Sampling Date	yyyy-mm-dd							22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							12:02 PM	12:15 PM	11:58 AM	11:58 AM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA														
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	15.0	16 36	22.9	14.6	17.8	21.1	15.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	15.96	7.34	5.97	10.35	9.14	8.74	9
pH (in Situ)	pH	--	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	6.78	7.17	7.42	8.16	6.73	6.5	6.99
Specific Conductance	uS/cm	--	--	--	--	--	--	186.0	278.9	72	270 9	230 2	140	127.5
INORGANICS														
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	9	9	10	8	6	8	10
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	52	79	73	65	60	30	33
Fluoride	mg/L	0.12	--	--	--	0.12	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	13.6	27.8	11.5	20.8	10.4	58.5	48.5
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.19	0.20	0.09	0.19	0 21	0.21	0.54
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.19	0.20	0.09	0.19	0 21	0.21	0.23
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.31
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	0.67	<0.03	0.04	0 09	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	<0.10	0.18	0.32	0.14	<0.10	--	0.30
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	7.5	4.1	4 0	4.3	6.4	8.3	6.3
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	0.88	0.1	0 0	0.0	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5 0-9.0	6.5 - 9.0	--	7.10	6.97	6.61	***6.30***	***6.73***	***6.50***	***6.99***
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	8.6	8.30	9.40	8 30	6 90	5.30	4.90
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	1 3	1 5	1.3	1.1	0.8	0.9
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0 010	0 014	**0.016**	**0.021**	**0.030**	**0.008**	**<0.002**	**0.006**
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.0	1.1	1 3	1.3	0.9	1.0	1.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	28.6	44.0	45.0	39.0	34.3	19.4	20 5
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	0.7	3.1	2.1	2.3	2.0	2.7	2.9
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	10	9	9	9	8	7	7
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	1.4	0 5	<0.5	1.1	0.8	1.7
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	227	115	291	252	--	--	--
Calculated Parameters														
Anion Sum	me/L	N/A	--	--	--	--	--	1.87	1.73	1.72	1 87	1 99	1.17	1.32
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	9	6	8	9	6	8	10
Calculated TDS	mg/L	1	--	--	--	--	--	109	103	106	109	116	70	76
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.85	1.86	1.95	1 85	1 97	1.24	1.26
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	26.4	22 80	24 30	26.40	21.80	16.50	15.90
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.5	3.70	6.30	0 50	0.50	2.80	2.20
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.60	-3.18	-3.31	-2.60	-3.76	-3.61	-3.81
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.92	-3.50	-3.63	-2.92	-4.08	-3.93	-4.06
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.70	9.94	9.81	9.70	9 98	9.94	9.96
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.0	10 30	10.10	10.00	10.30	10.30	10.20
Metals (ICP-MS)														
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	***137***	--	--	167	197	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	29	--	--	18	13	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	7	--	--	6	8	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	--	<0.09	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	<1	<1	<1	<2	<2	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	<50	143	178	73	93	318	155
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	--	--	<0 5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	35	54	97	28	30	49	23
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<2	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	36	--	--	33	24	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<2	--	--	<3	<3	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	<5	<5	7	8	10
MICROBIOLOGICAL														
Total Coliform	MPN/100mL	1	--	--	--	--	--	>200	>200	2,700	3,900	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	29	41	173	62	11	24	12
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	13.1	1.6	1.4	0.7	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* "--" = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of he Environment Guidelines for he Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-4

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Kearney Lake															
Sample Site KL-4								KL-4															
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-14	2012-10-10	2013-05-15	2013-08-16	2013-10-16	2014-05-14
Sampling Time	hh:mm							10:00	11:30	10:00	11:20	13:50	11:15	10:10	11:40	11:40	10:16	12:00	11:40	9:41	10:30	14:20	11:15
FIELD DATA																							
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	13.4	21.9	17.3	14.5	21.9	9.8	10.1	21.2	15.3	9.0	24.4	15.7	11.7	20.4	13.5	11.0
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.87	8.10	8.30	9.01	6.27	10.89	10.99	8.55	9.65	8.70	7.32	8.87	10.09	8.89	9.60	14.50
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	8.00	6.71	6.94	7.19	6.98	6.07	6.49	6.43	6.02	9.00	6.71	6.77	5.72	7.08	6.41	6.30
Specific Conductance	uS/cm	--	--	--	--	--	--	771.0	262.0	247.0	224.0	226.0	214.8	218.0	171.9	126.2	206.0	225.0	185.9	207.1	196.2	209.0	273.0
INORGANICS																							
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	6	8	7	5	8	7	22	8	<5	<5	<5	<5	30
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	67	65	60	56	56	53	56	44	37	51	57	46	54	41	47	59
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	22	18	20	27	11	20	32	38	43	48	11	20	17	21	20	13
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.15	0.12	0.14	0.23	0.19	0.21	0.23	0.15	0.17	0.19	0.11	0.09	0.20	0.11	0.17	0.25
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.15	--	--	0.23	0.19	--	0.23	--	--	0.19	0.11	0.09	0.20	0.11	0.17	0.25
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	<0.4	0.7	--	1.8	1.1	<0.4
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	2.5	2.6	4.0	3.3	2.6	3.1	3.7	6.0	5.4	7.5	3.2	4.8	4.2	4.5	4.3	4.4
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.61	6.75	6.83	6.83	6.93	6.83	6.57	6.57	6.46	6.70	7.00	6.90	6.69	6.96	6.85	6.69
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.8	7.7	7.0	6.8	8.0	8.5	6.8	4.9	5.2	5.7	6.8	5.8	6.8	5.1	6.8	6.4
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	1.3	1.2	1.2	1.2	1.3	1.2	0.9	1.0	1.0	1.2	1.2	1.0	0.8	1.2	1.3
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02	<0.02	<0.002	0.004	<0.002	<0.002	0.007	0.003	0.026	0.022	0.043	0.007	0.006	2.390	0.016	0.022
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	1.0	1.0	0.8	0.9	1.0	0.8	0.7	1.1	0.7	1.0	0.9	0.8	0.8	1.2	0.8
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	39.0	41.0	37.0	28.5	34.3	33.9	32.1	21.5	21.1	31.5	34.5	25.2	31.6	20.1	30.7	35.9
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.7	2.6	2.6	3.1	2.9	3.1	2.9	2.5	2.7	2.7	2.2	2.6	3.0	2.6	2.5	2.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<1	1	<1	<2	<2	<1	2	<1	<2	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	11	12	11	10	10	10	9	10	8	7	8	7	7	7	9	9
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.5	1.0	0.3	0.3	0.2	0.8	0.7	0.7	0.4	0.7	0.4	0.8	0.7	2.6	2.1	1.1
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	260	250	230	220	230	250	210	170	160	200	224	183	218	218	204	219
Calculated Parameters																							
Anion Sum	me/L	N/A	--	--	--	--	--	2.23	2.22	2.09	1.91	1.94	1.85	1.88	1.62	1.36	2.04	1.94	1.45	1.68	1.31	1.53	2.47
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	6	8	7	5	8	7	22	8	<5	<5	<5	<5	30
Calculated TDS	mg/L	1	--	--	--	--	--	132	135	125	111	118	116	113	90	81	111	114	87	103	75	97	132
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.16	2.32	2.07	1.70	2.02	2.03	1.86	1.28	1.30	1.78	1.97	1.53	1.84	1.23	1.84	2.04
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	22.00	25.00	22.00	22.00	25.00	27.00	22.00	16.00	17.00	18.40	21.90	19.40	21.10	16.00	21.90	21.30
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	1.59	2.20	0.48	5.82	2.02	4.64	0.53	11.70	2.26	6.60	0.80	2.80	4.50	3.20	9.20	9.50
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.21	-2.89	-2.84	-2.92	-2.64	-2.75	-3.22	-3.18	-3.31	-2.79	-2.86	-3.22	-3.37	-3.21	-3.21	-2.63
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.46	-3.14	-3.09	-3.17	-2.89	-3.00	-3.47	-3.43	-3.56	-3.11	-3.18	-3.54	-3.69	-3.53	-3.53	-2.95
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.82	9.64	9.67	9.75	9.57	9.58	9.79	9.75	9.77	9.49	9.86	10.10	10.10	10.20	10.10	9.32
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.10	9.89	9.92	10.00	9.82	9.83	10.00	10.00	10.00	9.81	10.20	10.40	10.40	10.50	10.40	9.64
Metals (ICP-MS)																							
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	150	--	--	125	29	--	231	--	--	188	48	149	141	106	159	236
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	<1.0	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	16	--	--	17	18	--	18	--	--	18	17	16	18	10	19	17
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	6	--	--	9	9	--	<50	--	--	6	9	16	7	6	9	8
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.3	--	--	0.031	<0.017	--	0.035	--	--	0.021	<0.017	0.027	0.027	<0.017	0.050	0.027
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	6	<1	<1	<1	6
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	<0.40	<0.40	--	<0.40	--	--	<1	<1	<1	<1	<1	<1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2	--	--	<2.0	2	<2.0	2	<2.0	<2.0	<2	<2	4	9	<1	1	<1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	86	--	--	82	51	55	119	109	138	129	118	133	213	144	248	129
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	3.2	<0.5	--	<0.5	--	--	<0.5	<0.5	0.8	0.9	<0.5	<0.5	2.6
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	51	--	--	35	64	29	39	27	30	23	34	38	34	77	130	34
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	3	--	--	2	<2.0	--	<2.0	--	--	<2	<2	5	<2	<2	<2	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	34	--	--	33	37	--	33	--	--	25	32	28	32	17	31	31
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	5	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	4	--	--	<2	<2	<2	<2	<2	3	2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	0.1	--	--	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	14	--	--	10	7	7	11	7	7	<5	<5	68	21	<5	9	9
MICROBIOLOGICAL																							
Total Coliform	MPN/100mL	1	--	--	--	--	--	28	58	--	100	16	75	83	95	--	345	>2420	921	548	>2420	770	308
E. coli	MPN/100mL	1	--	--	400	--	--	4	33	--	1	<1	2	5	39	<100	4	<1	4	6	38	<1	<1
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.78	1.11	1.06	0.92	0.07	0.50	0.60	1.04	1.31	0.52	0.70	0.55	1.34	1.50	0.40	0.44
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.69	0.96	1.11	0.77	0.07	0.41	0.55	0.82	1.07	0.55	0.70	0.74	1.48	1.70	0.39	0.40

Notes:
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* -- " = no guideline available / Not Tested.
[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-4

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																
Sample Site KL-4								KL-4																
Sampling Date	yyyy-mm-dd							2014-08-14	2014-10-27	2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19
Sampling Time	hh:mm							11:35	14:35	10:25	11:02	11:15	11:30	12:00	11:11	9:25	10:45 AM	10:05 AM	10:45 AM	9:00 AM	11:45 AM	9:43 AM	9:43 AM
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	NCC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	21.8	12.5	14.8	24.7	9.5	12.2	20.6	12.3	16.5	22.4	13.8	12.7	23.1	12.7	9.9	23.4
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	5.92	7.52	9.81	9.09	8.80	8.27	5.50	10.11	8.33	6.41	7.32	11.01	4.70	8.46	**	2.98
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.25	6.55	6.64	6.81	7.09	7.32	6.72	6.14	6.90	6.88	6.84	7.01	6.67	6.91	8.68	6.97
Specific Conductance	uS/cm	--	--	--	--	--	--	251.0	208.0	0.2	243.5	232.4	215.0	260.0	228.0	213.0	262.0	252.0	202.9	251.0	210.6	161.1	540.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	5	29	<5.0	6	7	<5	9	8	<5	9	10	<5	9	8	<5	9
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	47	48	61	56	55	54	58	49	64	62	59	52	50	47	50	56
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	11	28	33	10	12	25	12	22	19	11	16	35	10	16	42	<5
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.17	0.16	0.16	0.14	0.21	0.15	0.21	0.10	0.27	0.12	0.15	0.27	0.25	0.13	0.15	0.18
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.17	0.16	0.16	0.14	0.21	0.15	0.14	0.10	0.15	0.12	0.15	0.17	0.13	0.13	0.15	0.18
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	0.07	<0.05	0.12	<0.05	<0.05	0.10	0.12	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	0.10	<0.03	0.04	0.06	<0.03	<0.03	<0.03	0.03	0.04	<0.03	0.04	0.03	<0.03	0.06
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	<0.4	<0.4	0.2	0.4	1.0	<0.4	<0.4	0.4	<0.4	0.5	<0.4	<0.4	<0.4	<0.4	<0.4	0.6
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	2.1	4.4	2.8	5.2	5.7	4.3	3.3	8.1	5.1	4.3	4.0	5.1	2.7	4.0	4.5	3.3
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.91	6.85	6.59	6.94	6.97	6.70	7.03	6.89	6.75	6.99	6.95	6.74	7.13	7.13	6.67	6.91
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	7.9	6.8	6,500.0	7.9	3.7	6.5	7.1	7.3	7.7	7.5	8.6	5.9	7.9	7.7	6.2	8.0
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.2	1.0	920.0	1.3	1.0	1.0	1.1	1.3	1.2	1.1	1.3	1.0	1.2	1.3	1.0	1.2
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.031	0.015	0.006	0.007	0.003	0.007	0.004	0.007	0.020	0.008	0.006	0.024	0.004	0.004	0.009	0.011
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.1	0.9	760.0	0.9	0.7	0.7	0.9	1.0	0.8	0.9	1.1	0.7	1.0	1.0	0.8	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	38.6	34.1	34.0	40.0	28.2	32.4	41.4	31.1	37.6	41.4	38.9	35.6	39.2	40.6	37.0	36.7
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.1	2.5	2.5	2.6	3.0	2.6	2.0	2.4	2.3	1.7	2.1	2.6	1.8	2.0	2.1	1.4
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<1.0	7	<5	7	<5	10	6	<5	<5	<5	<5	<5	<5	6
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	8	8	8	9	8	10	10	10	10	9	10	8	7	8	6	9
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.6	0.8	0.6	0.7	1.2	1.2	1.5	1.6	1.3	0.9	1.6	1.2	0.5	1.7	0.8	1.5
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	241	218	220	241	235	206	275	185	251	255	248	243	252	231	246	236
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	1.60	2.11	1.88	1.90	1.87	1.74	2.04	1.76	2.03	2.12	2.08	1.65	1.75	1.7	1.6	2.0
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	5	29	<1.0	6	7	<5	9	8	<5	9	10	<5	9	8.0	<5	9.0
Calculated TDS	mg/L	1	--	--	--	--	--	108	117	110	121	102	106	125	105	123	128	126	105	113	111.0	102.0	119.0
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<1.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.21	1.94	1.91	2.35	1.53	1.86	2.28	1.87	2.17	2.31	2.27	1.96	2.24	2.3	2.0	2.1
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	24.70	21.10	20.00	25.10	13.40	20.30	22.30	23.60	24.20	23.30	26.80	18.9	24.7	24.6	19.6	24.9
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	15.80	4.20	0.79	10.70	10.10	3.40	5.50	3.00	3.20	4.10	4.30	8.6	12.1	16.2	13.8	4.4
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.08	-2.45	NC	-2.98	-3.20	-3.38	-2.76	-2.93	-3.26	-2.78	-2.71	-3.38	-2.61	-2.7	-3.4	-2.8
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.40	-2.77	NC	-3.30	-3.52	-3.70	-3.08	-3.25	-3.58	-3.10	-3.03	-3.70	-2.93	-3.0	-3.8	-3.2
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.99	9.30	NC	9.92	10.20	10.10	9.79	9.82	10.00	9.77	9.66	10.1	9.74	9.8	10.1	9.7
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.30	9.62	NC	10.20	10.50	10.40	10.10	10.10	10.30	10.10	9.98	10.4	10.1	10.1	10.4	10.1
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	46	93	160	--	84	172	--	--	180	89	55	157	32	--	132	70
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	19	16	20	--	17	16	--	--	20	--	20	15	19	--	18	20
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	<1.0	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	11	11	<50	--	<5	7	--	--	<5	--	11	6	10	--	6	9
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.017	<0.017	0.033	--	<0.017	0.024	--	--	0.021	--	<0.017	<0.09	<0.09	--	<0.09	<0.09
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	<1	<1.0	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	<1	<0.4	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	2	7	1	1	1	<1	<1	<1	<1	<1	<1	<1	1	<1	1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	55	104	100	217	83	122	61	114	136	131	141	83	119	78	120	100
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	--	--	<0.5	--	<0.5	1.4	<0.5	--	<0.5	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	29	24	25	78	34	34	58	29	74	76	48	19	84	43	24	85
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	<2	<2	<2.0	--	<2	2	--	--	7	--	<2	<2	<2	--	<2	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	<1	<1.0	--	3	<1	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	31	29	30	--	20	28	--	--	33	--	40	27	39	--	33	35
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	<0.1	<0.1	--	<0.1	0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	<2	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	10	8	12	7	<5	<5	13	7	<5	7	<5	7	7	6
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	1,550	>2420	---	>2420	281	488	1,730	>2420	792	>2420	>2420	4	NDOGT	8,000.0	198.0	560.0
E. coli	MPN/100mL	1	--	--	400	--	--	1	8	<10	5	1	2	35	29	15	1	3	2	19	12	<1	1
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.50	1.03	0.55	0.26	1.09	1.62	0.16	2.18	2.40	0.33	0.35	1.06	0.24	1.12	0.78	0.47
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.57	0.95	0.51	0.31	0.55	2.09	0.21	2.15	3.04	0.39	0.43	1.71	--	*	0.82	0.42

Notes:

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-4

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake												
Sample Site KL-4								KL-4												
Sampling Date	yyyy-mm-dd							2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							12:15 PM	4:06 PM	3:09 PM	13:59 PM	12:40 PM	1:02 PM	12:16 PM	12:30 PM	12:46 PM	12:45PM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA																				
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	NA**	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	10.9	23.6	20.7	11.4	16.1	21.9	15.0	16.9	22.4	14.5	17.7	20.9	15.6
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.80	3.49	4.73	9.22	16.37	8.77	19.23	7.98	5.77	8.09	6.26	7.16	8.08
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.81	6.30	5.78	6.68	6.68	6.29	6.79	7.13	7.39	8.12	6.63	6.3	6.79
Specific Conductance	uS/cm	--	--	--	--	--	--	188.0	259.0	221.0	220.6	185.0	212.0	188.0	282.6	73.0	271.0	245.8	141.2	--
INORGANICS																				
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	6	7.0	12.0	5.0	<5	8	11	6	10	9	6	8	10
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	54	72	73	91	51	49	53	80	75	65	59	30	33
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	17	22	<5	16	21.7	10.5	13.3	23.6	11.4	16.4	18	56	43
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.29	0.24	0.19	0.17	0.18	0.16	0.21	0.18	0.13	0.19	0.23	0.23	0.51
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.29	0.24	0.19	0.17	0.18	0.16	0.21	0.18	0.13	0.19	0.23	0.23	0.21
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	0.07	<0.03	0.10	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.19	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.6	<0.4	0.40	0.80	0.22	0.1		0.16	0.27	0.13	<0.10	--	0.26
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	4.3	2.60	2.90	2.10	6.1	3.1	3.0	4.0	3.7	4.3	6.5	8.3	6.3
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.13	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.87	6.77	7.08	6.86	6.64	6.49	7.08	6.82	6.57	***6.30***	6.63	6.3	6.79
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	5.1	8.1	8.6	7.1	10.1	8.1	8.6	8.1	9.1	8.2	6.6	5.1	5.5
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.9	1.3	1.3	1.2	1.2	1.3	1.2	1.3	1.4	1.3	1.1	0.8	1
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.005	<0.006	0.014	0.003	0.038	0.031	0.008	**0.016**	**0.013**	**0.030**	0.008	0.004	0.006
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.8	1.0	1.1	1.0	1.0	1.1	1.0	1.1	1.3	1.2	0.9	1	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	23.4	37.4	39.4	39.6	34.8	34.0	29.0	42.0	44.0	38.0	34.6	19.7	22.4
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.2	1.8	1.7	2.1	3.1	3.9	1.9	3.2	2.1	2.4	2	2.6	2.8
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	12	<5	<5	12	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	9.0	9.0	13.0	8	8	10	9	9	10	8	7	7
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	1.1	1.0	0.8	1.1	22.6	0.6	0.7	0.6	<0.5	<0.5	1.3	0.5	1.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	158	288	297	240	213	234	228	289	300	254	--	--	--
Calculated Parameters																				
Anion Sum	me/L	N/A	--	--	--	--	--	1.9	2.38	2.50	2.95	1.62	1.72	1.94	2.58	2.51	2.24	1.97	1.17	1.31
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	6.0	7	12	5	<5	8	11	6	10	9	6	8	10
Calculated TDS	mg/L	1	--	--	--	--	--	98.0	135	141	157	111	107	110	146	147	130	115	70	79
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.4	2.18	2.31	2.21	2.40	2.03	1.82	2.380	2.520	2.220	1.97	1.23	1.39
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	16.4	25.6	26.8	22.7	30.2	25.6	26.4	25.6	28.5	25.8	21	16	17.9
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	14.5	4.2	4.1	14.3	19.5	8.2	3.1	3.9	0.2	0.3	0.1	2.7	2.8
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.2	-3.08	-2.51	-3.20	-3.25	-3.29	-2.54	-3.1	-3.1	-3.4	-3.78	-3.61	-3.76
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.6	-3.40	-2.83	-3.52	-3.57	-3.61	-2.86	-3	-3	-4	-4.1	-3.93	-4
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	10.1	9.85	9.59	10.10	9.89	9.78	9.62	9.92	9.64	9.73	10	9.96	9.92
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.4	10.2	9.9	10.4	10.2	10.1	9.9	10.2	10.0	10.1	10.3	10.4	10.2
Metals (ICP-MS)																				
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	92	52	--	--	1,510	--	--	***116***	--	--	165	186	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	17	21.0	--	--	30	--	--	30	--	--	19	14	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	6	7.0	--	--	18	--	--	7	--	--	<5	5	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.09	0.020	--	--	0.150	--	--	<0.09	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	<1	--	--	2	--	--	<1	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	<1	--	--	5	--	--	<1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	1	2.0	<1	1.0	4	1	<1	<1	<1	<1	<2	<2	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	<50	177	139	102	2,070	69	73	124	96	75	121	176	189
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	<0.5	--	--	5.1	--	--	<0.5	--	--	<0.5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	19	209	357	18	252	19	32	41	42	24	35	44	45
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	<2	<2	--	--	6	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	<1	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	31	45.0	--	--	37	--	--	37	--	--	32	24	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	<2	--	--	30	--	--	<2	--	--	<3	<3	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	<0.1	--	--	0.4	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	<2	--	--	5	--	--	<2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	6	<5	<5	<5	201	<5	<5	<5	<5	<5	5	26	17
MICROBIOLOGICAL																				
Total Coliform	MPN/100mL	1	--	--	--	--	--	604.0	2,420	>2420	172	>200	>200	>200	>200	4,600	3,000	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	<1	48	133	5	39	24	44	37	100	50	12	23	29
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	0.32	<0.25	0.60	0.63	8.31	1.8	5.26	2.0	0.6	0.4	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-5

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																	
Sample Sites								KL-5																	
Sampling Date	yyyy-mm-dd							2011/10/17	2012-05-01	2012-08-14	2012-10-10	2013-05-15	2013-08-16	2013-10-16	2014-05-14	2014-08-14	2014-10-27	2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15
Sampling Time	hh:mm							9:40	10:52	13:10	12:10	10 03	10:50	13:45	11:30	13:55	10:45	09:00	12:04	12:00	10:00	8:00	13:05	9:00	9:45
FIELD DATA																									
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	2.7	2.1	5.3	4.2	2.1	4.6
Water Temp	Celsius	--	--	--	--	--	--	14.7	10.5	26.1	16.6	13.3	22.7	14.7	13.7	22.9	12.8	14.1	25.4	9.4	12.2	22.2	12.7	16 8	21.0
Dissolved Oxygen	mg/L	--	--	--	--	5 5 - 9.5	--	9.38	7.88	7.90	8.16	9.67	8.89	8.60	15.83	7.64	7.91	8.32	8.75	7.63	10.47	8.39	9.92	8.70	7.07
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6.52	7.76	6.69	6.72	6.20	8.57	6.51	6.79	7 86	6.60	7.82	6.77	7 05	5.75	5.11	5.72	7.00	6.83
Specific Conductance	uS/cm	--	--	--	--	--	--	111.9	230.0	229.0	189.0	219.5	202.1	212.9	472.0	251 0	211.0	0.2	249.8	240 8	209.0	267.0	243.2	219.0	246.0
INORGANICS																									
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	9	21	8	<5	<5	6	5	32	<5	<5	5	6	7	<5	7	9	<5	7
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	37	55	57	48	58	44	46	61	47	47	59	58	58	54	56	53	65	58
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	35	43	10	27	10	22	18	14	11	22	35	8	19	27	13	17	18	14
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.17	0.19	0.15	0.83	0.21	0.21	0.25	0.16	0.10	0.16	0.16	0.12	0.19	0.14	0.19	0.15	0.25	0.21
Nitrate (N)	mg/L	0.05	--	13	--	13	--	--	0.19	0.15	0.83	0.21	0.21	0.20	0.16	0.10	0.16	0.16	0.12	0.19	0.14	0.09	0.15	0.13	0.07
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	--	<0.05	<0.05	<0 05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	0.10	<0.05	0.12	0.14
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	<0.03	0.03	<0 03	<0.03	<0.03	<0.03	<0 03	<0.03	0.06	<0.050	<0.03	0 04	0.06	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	<0.4	2.3	1.0	--	0.6	1.1	<0.4	0.5	1.1	0.3	<0.4	1.8	0.5	<0.4	0.7	0.4	<0.4
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	4 8	5.8	3.4	4.7	4.0	4.6	7.0	4.3	2.7	4.5	3.1	5.3	5.7	4.4	3.3	7.0	4.7	4 8
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6.57	6.70	7.10	6.50	6.71	6.93	6.89	6.64	6 84	6.63	6.56	6.90	6 94	6.66	7.16	7.03	6.74	7.09
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	5 8	6.1	6.6	5.9	7.1	5.7	6.4	6.5	7.6	7.0	6,500.0	8.0	4.7	6.3	7.3	8.2	7.4	7.0
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.1	1.0	1.1	1.2	1 0	1.0	1.1	1.4	1 2	1.0	930.0	1.3	0 9	1.0	1.1	1.3	1.2	1.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0 009	0.018	0.040	0.006	0.005	0.013	0.010	0.010	0.026	0.135	0.005	0.005	0.005	0.004	0.004	0.003	0.010	0 012
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0 9	0.7	0.9	0.8	0 8	0.7	1.1	0.8	1.1	0.9	720.0	0.1	0.7	0.7	0.9	1.0	0.9	0.8
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	22.0	34.6	32.0	27.7	33.6	19.2	31.3	37.5	40.3	38.3	33.0	42.6	28.3	32.5	33.1	33.5	38 9	42.4
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2 5	2.7	2.0	2.4	2.7	2.5	2.5	2.7	2.1	2.5	3.3	1.9	2.2	2.7	2.0	2.3	2.1	1.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1.0	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	7	8	8	8	7	8	9	8	8	8	9	8	10	10	10	10	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0 9	1.1	0.7	0.9	0.7	0.8	0.4	1.1	0.4	0.8	0.7	1.0	1.0	0.7	1.3	1.2	0.9	0 9
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	160	215	226	189	232	223	204	228	246	225	220	248	244	208	267	196	248	249
Calculated Parameters																									
Anion Sum	me/L	N/A	--	--	--	--	--	1.42	2.13	1.95	1.58	1 82	1.52	1.58	2.56	1 50	1.50	1.94	1.95	1.96	1.74	1.94	1.89	2.06	1.96
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	9	21	8	<5	<5	6	5	32	<5	<5	5	6	7	<5	7	9	<5	7
Calculated TDS	mg/L	1	--	--	--	--	--	84	118	111	96	110	82	98	136	106	103	120	124	106	105	114	113	125	122
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1.0	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1 36	1.94	1.85	1.64	1 94	1.23	1.81	2.12	2.27	2.14	1.87	2.40	1.58	1.86	1.93	2.01	2.20	2.30
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	19.00	19.30	21.00	19.70	21.80	18.40	20.50	22.00	23.90	21.60	20.00	25.30	15.40	19.80	22.80	25.80	23.40	21.60
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	2.16	4.70	2.60	2.00	3 20	10.60	6.70	9.40	20.30	17.50	1.84	10.20	10.80	3.20	0.40	3.00	3.40	8.10
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.06	-2.79	-2.77	-3.62	-3.33	-3.11	-3.19	-2.64	-3.17	-3.42	-3.24	-3.20	-3.13	-3.43	-2.72	-2.69	-3 29	-2.82
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.31	-3.11	-3.09	-3.94	-3.65	-3.43	-3.51	-2.96	-3.49	-3.74	-3.50	-3.34	-3.45	-3.75	-3.04	-3.01	-3.61	-3.14
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.63	9.49	9.87	10.10	10.00	10.00	10.10	9.28	10.00	10 00	9.81	9.92	10.10	10.10	9.88	9.72	10.00	9 91
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.88	9.81	10.20	10.40	10.40	10.40	10.40	9.60	10.30	10.40	10.10	10.20	10.40	10.40	10.20	10.00	10.30	10.20
Metals (ICP-MS)																									
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	--	222	52	154	136	58	61	224	53	108	180	---	79	163	--	--	156	45
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	---	<2	<2	--	--	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	---	<2	<2	--	--	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	18	16	15	19	9	16	16	17	17	17	---	19	14	--	--	17	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	---	<2	<2	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	---	<2	<2	--	--	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	6	9	15	7	7	9	7	6	10	<50	---	<5	7	--	--	<5	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	--	0.022	0.027	0.029	0.024	<0.017	0.034	0.036	<0 017	0.024	0.035	---	0.332	0.024	--	--	0.025	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	<1	5	<1	<1	<1	6	<1	<1	<1.0	---	7	<1	--	--	2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.40	---	<1	<1	--	--	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2.0	<2	<2	<2	<2	<1	1	<1	<1	5	<2.0	1	<1	<1	<1	<1	<1	<1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	175	160	78	120	111	70	79	111	<50	119	100	123	158	96	55	88	59	<50
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.9	<0.5	0.5	<0.5	---	<0.5	<0.5	--	--	<0 5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	36	30	14	37	35	13	12	40	18	25	34	24	35	23	15	17	24	11
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	---	<2	<2	--	--	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	--	<2	<2	5	<2	<2	<2	2	<2	<2	<2.0	---	3	3	--	--	14	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	---	<1	<1	--	--	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	---	<0.1	<0.1	--	--	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	27	31	29	31	18	31	31	30	30	29	---	23	28	--	--	32	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---	<0.1	<0.1	--	--	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	---	<2	<2	--	--	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	3	<2	<2	<2	<2	<2	<2	<2	2	2	---	<2	<2	--	--	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	---	0.1	0.1	--	--	<0.1	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	---	<2	<2	--	--	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	9	5	<5	64	11	7	5	10	<5	10	14	6	12	10	<5	<5	11	8
MICROBIOLOGICAL																									
Total Coliform	MPN/100mL	1	--	--	--	--	--	--	461	613	93	461	308	461	42	629	>2470	---	356	163	179	517	2,420	260	577
E. coli	MPN/100mL	1	--	--	400	--	--	100	14	2	6	6	6	4	<1	1	17	<10	1	2	<1	23	44	<1	5
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification me hod	µg/L	0.05	--	--	--	--	--	0.91	0.30	1.20	1.09	1.44	2.20	0.64	0.20	0.61	0 90	0.48	1.22	2.71	1 52	1.20	2.32	1.09	1.43
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.85	0.33	1.00	1.41	1.59	2.40	0.62	0.20	0.54	0 84	---	1.26	1.44	1 86	1.57	2.34	1.28	1.40

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - KL-5

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Kearney Lake																			
Sample Sites								KL-5																			
Sampling Date	yyyy-mm-dd							2017-10-18	2018-05-09	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							9:50	9:30	8:20	9:30 AM	9:10 AM	9:27 AM	10:00 AM	2:40 PM	11:27 AM	12:45 PM	11.:52 PM	12:24 PM	11:08 AM	12:50 PM	11:05 AM	11:43 AM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA																											
Secchi Depth	Meters	--	--	--	1.2	--	--	2.7	3.1	3.01	3.8	3.1	3.70	2.20	NA**	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	14.6	12.7	24.5	13.1	11.2	23 8	12.8	25.6	22.9	12.2	16.0	23.1	15.4	18.7	22.9	15.1	21	22.3	15.8
Dissolved Oxygen	mg/L	--	--	--	--	5 5 - 9.5	--	7.17	10.42	6.42	7.58	**	5.46	8.10	6.85	7.43	8.02	17.88	8.66	16.90	8.70	5.83	9.44	7.68	7.57	8.82
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	7.05	6.74	7.14	6.67	9.20	7.45	6.62	6.49	6.73	6.73	6.74	**6.24**	6.70	7.45	7.44	8.94	7.24	6.34	6.96
Specific Conductance	uS/cm	--	--	--	--	--	--	257.0	196.4	244 9	236.4	171.6	220.0	216.0	245.0	221.0	224 0	181.0	210.0	190.0	278.2	99.0	270.0	233.3	140.1	--
INORGANICS																											
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	9	<5	7	26	<5	7	6	6.0	7.0	8.0	<5	8.0	11 0	6.0	9.0	8.0	6	32	11
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	60	56	49	47	51	55	57	67	62	61	50	51	53	80	72	65	60	29	34
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	14	34	14	12	38	16	19	28	17	15	17	13	13	23	11	14	11	58	46
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.09	0.17	0.20	0.42	0.14	0.16	0.35	0.38	0 08	0.17	0.19	0.15	0.20	0.17	0.11	0.18	0.14	0.2	0.5
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.09	0.17	0.09	0.42	0.14	0.16	0.35	0.38	0 08	0.17	0.19	0.15	0.20	0.17	0.11	0.18	0.14	0.2	0.18
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0 05	<0.05	0.32
Nitrogen (Ammonia Nitrogen) *	mg/L	0.03	--	--	--	1.15 note [5]	--	0.04	<0.03	0.04	0.05	<0.03	0.06	0.06	<0.03	0 06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0 03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.6	1.50	0.80	8.10	0.16	<0.10		0.12	0.27	0.17	<0.10	--	0.29
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.9	4.9	2.9	3.0	4.5	4.5	4.2	3.20	3 80	4.00	5.10	2.90	2.90	3.90	3.90	4.10	6	9.4	6.3
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	0 01	0.01	<0.01	<0.01	<0.01	0.13	0.01	0.01	0.01	<0.01	<0.01
pH (Lab)	pH	N/A	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6.93	6.70	7.15	7.47	6.64	7.04	6.81	6.88	6 95	6.81	6.71	6.47	7.07	6.82	6.59	***6.30***	7.24	6.34	6.96
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	7.5	5.9	6.7	7.6	6.4	7.7	5.4	6.8	5.5	7.0	6.0	7.3	8.6	8.3	8.4	7.9	6	4.9	5.8
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.1	1.0	1.1	1.2	1.1	1 2	0.9	1.1	4.0	1.1	1.0	1.1	1.2	1.2	1.3	1.3	1	0.8	0.9
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.005	0.031	0.005	0.005	0.011	0.007	0.005	<0.006	0.028	0.004	0.007	0.019	0.009	0.015	0.023	0.020	0.008	0.008	0.006
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0 9	0.7	0.9	0.9	0.8	1 0	0.8	0.8	0.8	1.0	0.8	1.1	1.0	1.1	1.2	1.1	0.8	1	1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	37.2	37.2	38.5	41.7	43.8	37.7	30.6	35.4	39.7	38.0	34.7	31.4	30.7	47.0	43.0	39.0	35.5	20.1	22.9
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	1.7	2.4	1.7	3.4	2.1	1.4	2.0	1.8	1.5	1.9	3.0	4.2	1.6	3.0	2.1	2.2	2	2.4	2.8
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	10	8	7	11	6	8	9	9.0	8.0	9.0	8.0	8.0	10 0	9.0	9.0	9.0	8	6	7
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0 9	1.4	0.4	0.7	0.9	2 0	0.8	0.9	1.2	0.9	1.3	0.6	<0.5	0.7	<0.5	1.0	1.1	0.5	0.9
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	246	247	247	286	249	229	160	269	272	248	208	229	226	290	284	257	--	--	--
Calculated Parameters																											
Anion Sum	me/L	N/A	--	--	--	--	--	2.09	1.76	1.68	2.1	1.6	1 9	1.9	2.22	2 06	2.08	1.59	1.78	1.94	2.58	2.41	2.19	1.99	1.6	1.36
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	9	<5	7	26.0	<5	7 0	6.0	6	7	8	<5	8	11	6	9	8	6	8	11
Calculated TDS	mg/L	1	--	--	--	--	--	123	110	108	127.0	110.0	116.0	109.0	125	122	123	102	105	112	151	141	129	116	82	81
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.12	2.04	2.13	2.3	2.4	2.2	1.7	2.00	2.12	2.13	1.93	1.86	1.89	2.60	2.43	2.24	1.97	1.24	1.41
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	23.30	18.9	21.3	23.9	20.5	24.2	17.2	21.5	17.9	22.0	19.1	22.8	26.4	25.7	26.3	25.1	19.1	15.5	18.2
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.70	7.3	11.8	5.0	19.9	7.3	6.3	5.3	1.3	1.2	9.6	2.2	1.1	0.5	0.6	1.0	0 5	12.6	1.8
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.84	-3.42	-2.77	-1.8	-3.5	-2.8	-3 3	-3.11	-3.06	-3.04	-3.40	-3.35	-2.55	-3.09	-3.13	-3.50	-3.78	-3.04	-3.81
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.16	-3.74	-3.09	-2.2	-3.8	-3.1	-3.6	-3.43	-3.38	-3.36	-3.72	-3.67	-2.87	-3.41	-3.45	-3.82	-4.1	-3.36	-3.9
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.77	10.1	9.92	9.3	10.1	9 9	10.1	9.99	10.00	9.85	10.10	9.82	9.62	9.91	9.72	9.80	10	9.4	9.8
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.10	10.4	10.2	9.6	10.4	10.2	10.4	10.3	10.3	10.2	10.4	10.1	9.9	10.2	10.0	10.1	10.5	9.7	10.1
Metals (ICP-MS)																											
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	44	172	30	--	142	57	97	75	--	--	126	--	--	***115***	--	--	171	195	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	17	13	13	--	17	16	15	15.0	--	--	15.0	--	--	26.0	--	--	13	12	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	10	5	9	--	6	9	7	8.0	--	--	7.0	--	--	7.0	--	--	6	7	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.017	<0.09	<0.09	--	<0.09	<0 09	<0.09	0.026	--	--	<0.09	--	--	<0.09	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--	--	<2	5	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	1	<1	<1	1	<1	1	1	1.0	<1	<1	1.0	2.0	<1	<1	1.0	<1	<2	<2	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	106	80	81	<50	121	63	<50	<50	72	111	103	<50	<50	96	56	62	90	177	150
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	0.9	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--	<0 5	--	--	<0.5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	13	24	15	14	25	18	17	28	4	25	21	8	7	21	16	19	36	37	16
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	0.300	<0.1	--	--	<0.1	--	--	<2	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	38	28	35	--	31	33	33	28.0	--	--	30.0	--	--	36.0	--	--	30	23	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<3	<3	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.2	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	<2	<2	--	2	<2	<2	<2	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	8	<5	7	7	<5	5	5.0	<5	<5	6.0	<5	<5	<5	<5	<5	6	<5	8
MICROBIOLOGICAL																											
Total Coliform	MPN/100mL	1	--	--	--	--	--	>2420	58	601	6,000.0	55.0	770.0	560.0	>2420	291	159	196	>200	>200	>200	300	400	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	517	8	1	11	1	<1	8	6	122	<1	<1	9	1	4	13	12	2	4	11
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	0.32	0.47	0 95	0.83	0.79	1.9	63.1	1.1	2.3	0.7	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.22	6.25	1.28	1.68	1.24	3.70	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	1.33	3.35	--	*	1.19	3.00	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" * -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - HWY102-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Highway 102-1																		
Sample Sites								HWY102-1																		
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-15	2012-10-11	2013-05-15	2013/08/15	2013-10-16	2014-05-14	2014-08-14	2014-10-27	2015-05-20
Sampling Time	hh:mm							07:00	12:45	08:00	13:00	10:20	09:00	13:40	11:00	11:00	14:50	11:00	9:50	14:15	12:22	12:30	12:00	10:10	9:30	13:15
FIELD DATA																										
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	11.8	18.8	15.7	14.9	19.6	7.4	11.4	17 8	14.6	10.7	21.8	13.6	11.7	19.5	8.9	12.1	19.6	10 2	14.3
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	11.44	5.80	4.34	8.18	4.25	6.05	8.15	3.88	5.34	5.65	1.03	3.83	7.55	3.32	3.10	12.03	2.09	4.54	4.27
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.98	5.35	5.25	6.31	5.26	5.62	5.75	5.77	5.99	8.76	5.73	6.38	6.19	7.10	6.79	6.02	6.63	5.12	6.35
Specific Conductance	uS/cm	--	--	--	--	--	--	194.0	153.0	103.8	135.0	106.0	108.6	114.1	107.6	88.6	288.0	225.0	155.5	226.0	173.2	234.0	880.0	337.0	109.0	0.4
INORGANICS																										
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	<5	<5	<5	<5	<5	<5	5	11	8	22	25	15	9	23	20	31	28	30	16
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	24	38	24	32	25	22	24	19	12	58	48	28	53	31	40	65	57	19	130
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	67	68	57	37	89	53	39	65	79	24	65	40	9	65	25	11	31	93	22
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.05	<0.05	<0.05	0.69	<0.05	1.20	0.69	0.25	1.20	2.61	0.06	0.43	0.51	<0.05	<0.05	<0.05	<0.05	0.53	<0.050
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.05	--	--	0.69	<0.05	--	0.69	--	--	2.61	0.06	0.43	0.51	<0.05	<0.05	<0.05	<0.05	0.53	<0.050
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	0.29	<0.05	<0.05	<0.05	<0.05	0.05	0.10	0.07	0.31	0.19	0.04	<0.03	0.05	0.06	<0.03	0.04	0.03	<0.050
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1	1.3	0.6	--	0.8	0.6	0.7	0.6	<0.4	0.3
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.5	10.0	7.7	4.7	11.0	6.3	4 5	7.2	7.4	5.5	10.0	7 0	5.1	10.1	17.7	4.1	7.7	9.0	2.7
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	4.54	5.24	5.40	5.48	6.24	5.31	6.42	6.55	6.28	6.40	6.90	6.80	6.86	6.87	6.73	6.56	7.49	5.90	6.61
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	1.7	1 8	1.6	4.9	3.3	5.1	4 9	5.2	5.6	12.5	11.7	7 5	11.1	10.5	13.9	7.2	23.3	2.2	18,000.0
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.3	0 5	0.5	1.1	0.8	1.1	0.9	0.9	1.2	1.7	2.0	1.4	1.4	1.5	2.3	1.6	3.2	0.6	2,400.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.070	0.140	0.020	0.006	0.007	0.011	0.009	0.012	0.010	0.019	0.039	0.020	0.006	0.021	0.022	0.013	0.038	0.031	0.007
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.5	1 2	0.7	1.1	1.6	1.3	1.1	1.5	1.9	1.6	2.5	1 5	1.3	1.7	2.4	1.2	2 5	0.7	2,000.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	15.0	25.0	13 0	15.9	14.5	14.6	14.8	10 2	8.3	36.3	27.7	14.6	30 8	15.0	20.5	39.1	38.7	18.6	64.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.5	2 2	2.0	1.1	3.8	5.1	2 8	5.2	4.6	4.1	6.1	5.1	3.1	5.1	5.8	1.7	7.1	4.7	2.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	7	80	2	<2	11	<2	<1	1	<1	9	6	<5	<5	<5	<5	6	<5	<5	<1.0
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	5	3	3	8	<2	8	10	8	10	14	8	9	12	8	12	10	7	6	13
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	14.0	35.0	0.9	1.4	1.2	0.6	0.4	0.6	1.1	0.9	1.9	0.9	0.5	1.6	0.5	0.7	1.6	0.9	0.6
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	100	140	92	130	100	110	110	100	88	263	231	143	243	188	218	252	338	112	470
Calculated Parameters																										
Anion Sum	me/L	N/A	--	--	--	--	--	0.77	1.12	0.73	1.11	0.71	0.88	1.03	0.95	0.80	2.55	2.02	1.31	1.96	1.50	1.78	2.66	2.31	1.30	4.20
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<1	<1	<1	<1	<1	<1	5	11	8	22	25	15	9	23	20	31	28	30	16
Calculated TDS	mg/L	1	--	--	--	--	--	50	73	45	67	50	63	65	58	54	150	117	73	117	83	104	143	150	68	240
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1.0
Cation Sum	me/L	N/A	--	--	--	--	--	0.84	1.32	0.74	1.06	0.93	1.02	1.00	0.83	0.80	2.43	6.04	1.19	2.06	1.40	1.87	2.25	3.22	1.04	3.94
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	6.00	6.00	6.00	17.00	12.00	17.00	16 00	17.00	19.00	38.20	37.50	24 50	33.50	32.40	44.20	24.60	71.40	8.00	55.00
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	4.35	8.20	0.68	2.30	13.40	7.37	1.48	6.74	0.00	2.60	1.90	4.60	2.40	3.50	2.60	8.40	16.40	11.20	3.19
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	NC	NC	NC	NC	NC	NC	-3.50	-2 99	-3.36	-2.77	-2.23	-2.72	-2.73	-2.33	-2.41	-2.69	-1.30	-3 85	-2.32
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	NC	NC	NC	NC	NC	NC	-3.75	-3.25	-3.61	-3.09	-2.55	-3.04	-3 05	-2.65	-2.73	-3.01	-1.62	-4.17	-2.57
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	NC	NC	NC	NC	NC	NC	9.92	9.54	9.64	9.17	9.13	9.52	9.59	9.20	9.14	9.25	8.79	9.75	8.93
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	NC	NC	NC	NC	NC	NC	10 20	9.80	9.89	9.49	9.45	9 84	9.91	9.52	9.46	9.57	9.11	10.10	9.18
Metals (ICP-MS)																										
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	510	--	--	169	192	--	205	--	--	134	183	146	86	145	150	187	83	310	51
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	22	--	--	53	37	--	37	--	--	58	284	42	57	57	80	46	142	17	130
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<5	--	--	11	11	--	<50	--	--	12	18	13	10	10	11	9	14	11	<50
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	04 - 0.16 note	--	<0.300	--	--	0.043	<0.017	--	0 023	--	--	0.034	0.021	<0.017	<0.017	<0.017	0.040	0.022	<0.017	0.022	0.024
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	8	<1	<1	<1.0
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	1	0	--	<0.40	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.40
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2	--	--	3	<2.0	<2.0	<2.0	<2 0	<2.0	<2	<2	3	<2	<1	2	<1	<1	2	<2.0
Total Iron (Fe)	µg/L	50	300	300	--	300	--	720	--	--	146	637	150	107	209	219	102	1,380	255	111	938	446	147	820	290	140
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	1.6	--	--	2.4	0.6	--	<0.5	--	--	<0.5	0.7	<0.5	<0 5	<0.5	0.6	2.6	<0.5	0.6	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	40	--	--	55	39	67	28	21	31	34	79	28	23	45	31	56	122	61	28
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	11	--	--	29	20	--	24	--	--	48	58	36	52	47	62	38	103	13	85
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	6	--	--	<2	<2	--	4	--	--	<2	3	<2	<2	<2	4	2	<2	<2	<2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	21	--	--	16	7	7	<5.0	<5.0	7	<5	6	<5	<5	<5	10	10	<5	7	11
MICROBIOLOGICAL																										
Total Coliform	MPN/100mL	1	--	--	--	--	--	84	>250	--	>250	>250	180	120	180	--	687	>2420	>2420	1,550	>2420	1,553	120	>2420	>2420	---
E. coli	MPN/100mL	1	--	--	400	--	--	54	>250	--	12	17	5	1	78	<100	3	68	145	4	9	5	3	179	3	20
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	15.40	19.29	0.70	18.12	1.61	8.45	0.93	0.58	0.69	0.53	2.59	0.81	1.27	14.70	1.99	0.25	1.10	1.22	0.50
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	17.50	19.60	0.84	17.62	1.68	7.52	0.84	0.56	0.65	0.59	2.89	1.05	1.45	15.80	2.20	0.82	1.11	1.38	0.55

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - HWY102-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Highway 102-1																		
Sample Sites								HWY102-1																		
Sampling Date	yyyy-mm-dd							2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21
Sampling Time	hh:mm							09:20	9:40	14:30	11:00	10:20	12:00	15:00	11:40	12:40	11 00	15:40:00 PM	2:45 PM	12:40 PM	4:15 PM	10:22 AM	10:34 AM	8:40 AM	9:42 AM	9:53 AM
FIELD DATA																										
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA**	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	20.7	5.4	13.4	19.3	9 2	16.4	22.1	10.1	14.4	21.4	10.6	14.0	27.4	9.7	21.2	19.7	6.2	15.1	17.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	3.82	5.03	8.18	10.14	7.35	5.77	5.77	5.56	7.09	2.78	6.06	**	6.27	7.80	3.27	2.61	6.05	11.15	7.16
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.24	6.92	7.34	6.14	5.69	6.40	7.76	6.32	6.13	6.13	6.70	7.20	6.09	6.37	6.20	6.22	6.49	6.38	5.74
Specific Conductance	uS/cm	--	--	--	--	--	--	335.8	251.2	289.0	353.0	208.9	354.0	257.0	266.0	232.2	280.5	189.4	330.0	383.0	210.0	446 0	345.0	318.2	367.0	259.0
INORGANICS																										
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	21	12	14	27	10	17	21	16	13	26	12	12	23	<5	23.0	27.0	14.0	21.0	23.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	67	49	71	87	35	101	49	51	51	54	61	90	80	92	137	100	72	98	57
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	27	29	23	37	64	24	31	29	27	56	68	35	37	28	30	32	24	19	52
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.05	0.17	0.05	0.13	0.53	0.35	0.71	0.58	0.37	0.11	0.19	0.57	<0.05	0.12	0.05	<0 05	0.50	0.25	0.65
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.05	0.17	0.05	<0.05	0.53	0.18	0.50	0.58	0.37	<0.05	0.19	0.32	<0.05	0.12	0.05	<0 05	0.50	0.25	0.65
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	0.13	<0.05	0.17	0.21	<0.05	<0.05	0.11	<0 05	0.25	<0.05	<0.05	<0.05	<0 05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	0.04	0.06	0.06	<0.03	<0.03	0.10	0.07	<0.03	0.07	<0 03	<0.03	0.06	0.06	0.24	0.17	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.5	0.6	0.7	1.2	0.7	0.5	1.3	3.8	1.1	0.7	<0.4	<0.4	0.6	0.9	<0.4	0.90	3.80	0.24	0.30
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	14.6	8.4	4.5	8.0	11.5	7.4	8.6	6.9	5.0	7.7	7.0	4.4	9.5	4.1	6 00	9.00	6.20	6.70	5.20
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0 01	<0.01	<0.01	<0.01	<0.01	<0 01	0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.46	6.80	6.87	7.03	6.45	6.84	6.91	6.90	7.02	7.14	6.94	7.07	7.15	5.73	7.10	7.16	6.95	7.06	6.87
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	18.0	12.4	12.9	25.8	9.9	20.9	10.3	14.6	12.5	15.6	9.9	16.5	17.9	12.2	22.5	23.7	17.8	18.0	15.9
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2.7	2.3	1.7	2.7	1.7	3.0	1.7	2.2	1.8	2.2	1.8	2.5	2.6	1.8	3.0	41.0	2.4	2.7	2.2
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.020	0.002	0.005	0 038	0.009	0.017	0.052	0.008	0 022	0.014	0.010	0.011	0.023	0 026	0.012	0.016	0.007	0.007	0 034
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	2.1	1.5	1.4	1.9	1.7	2.0	2.1	2.0	1.6	2.0	1.4	2.3	2.3	0.9	2.4	2.9	2.3	2.0	2.3
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	37.7	28.8	45.4	43.8	24 8	64.1	29.7	29.6	41.2	35 5	47.9	69.1	54.3	38.3	68.7	60.3	41.7	60.4	39.6
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	4.9	4.8	1.4	6.3	4.6	1.8	3.8	5.6	2 5	5.3	4.6	2.2	4.7	4 8	4.3	5.9	6.2	2.8	7.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	10	<5	<5	11	<5	<5	<5	<5	<5	8	<5	<5	<5	<5	5.0	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	14	14	14	18	15	13	19	12	7	11	14	10	8	13.0	8.0	20.0	15.0	21.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.9	0.8	1.0	4.1	1.0	1.3	7.7	1.1	1.7	1.1	3.2	0.8	2.6	1.5	1.2	1.5	1.0	1.1	0.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	324	244	289	440	167	411	251	258	298	306	306	464	340	247	517	469	339	424	326
Calculated Parameters																										
Anion Sum	me/L	N/A	--	--	--	--	--	2.50	1.93	2.58	3 29	1.60	3.53	2.12	2.20	1 97	2.2	2.2	3.1	2.9	2.8	4.60	3.53	2.76	3.51	2.55
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	21	12	14	27	10	17	21	16	13	26	12.0	12.0	23.0	<5	23	27	14	21	23
Calculated TDS	mg/L	1	--	--	--	--	--	151	116	155	193	100	218	127	131	130	133	142.0	204.0	182.0	154.0	262	215	167	210	155
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.88	2.11	2.81	3.51	1.79	4.14	2.22	2.28	2.62	2.6	2.8	4.1	3.6	2.5	4.46	4.15	2.97	3.81	2.78
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	56.10	40.40	39.20	75.50	31.70	64.50	32.70	45.50	38.6	48	32.1	51.5	55.4	37 9	68.5	70.3	54.3	56.1	48 8
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	7.10	4.70	4.40	3.10	5.70	8.00	2.20	1.80	14 0	8.3	12.1	13.8	10.0	5.3	1.5	8.1	3.7	4.1	4.4
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-1.57	-2.62	-2.48	-1.74	-3.14	-2.23	-2.35	-2.33	-2.37	-1.85	-2.6	-2.3	-1.9	-4.1	-1.82	-1.65	-2.26	-1.98	-2.17
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-1.89	-2.94	-2.80	-2.06	-3.46	-2.55	-2.67	-2.65	-2.69	-2.17	-2.9	-2.6	-2.2	-4.4	-2.14	-1.97	-2.58	-2.30	-2.49
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.03	9.42	9.35	8.77	9.59	9.07	9.26	9.23	9.39	8.99	9.5	9.3	9 0	9.8	8.92	8.81	9.21	9.04	9.04
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.35	9.74	9.67	9.09	9.91	9.39	9.58	9.55	9.71	9.31	9.9	9.6	9 3	10.1	9.2	9.1	9.5	9.4	9.4
Metals (ICP-MS)																										
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	--	52	81	--	--	69	450	100	72	80	--	45	93	215	107	--	--	66	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	86	79	--	--	130	--	77	68	100	--	108	104	197	141	--	--	110	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	<5	10	--	--	<5	--	24	11	14	--	10	16	6	11	--	--	11	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	04 - 0.16 note	--	--	<0.017	<0 017	--	--	0.032	--	<0 017	<0 09	<0.09	--	<0.09	<0.09	<0.09	<0.017	--	--	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	<1	--	--	1	--	1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	2	<1	--	--	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [6]	--	<1	1	<1	<1	2	<1	4	1	1	<1	3	1	2	2	<1	<1	2	1	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	1,280	138	144	766	228	151	3,960	281	85	634	403	122	896	256	429	528	196	193	294
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [6]	--	--	<0.5	<0.5	--	--	<0.5	--	<0.5	0.8	<0.5	--	<0.5	0.7	0.9	<0.5	--	--	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	95	22	19	78	38	22	511	28	9	99	71	14	62	125	33	41	8	16	34
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	<2	<2	--	--	12	--	<2	6	<2	--	<2	<2	5	<2	--	--	12	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	39	58	--	--	92	--	76	54	88	--	93	88	67	102.0	--	--	89	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0 2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	2	2	<2	<2	--	--	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	<5	<5	6	9	37	8	6	<5	12	5	8	12	<5	<5	<5	6	8
MICROBIOLOGICAL																										
Total Coliform	MPN/100mL	1	--	--	--	--	--	>2420	659	>2420	>2420	--	914	>2420	>2420	105	9010	370.0	1,520.0	450.0	1,128.0	>2420	>2420	1,200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	25	2	<1	86	--	12	14	3	<1	10	2	1	3	2	70	33	3	27	34
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	4.93	1.57	0.63	0.95	1.2
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	7.27	0.36	0.94	51.51	0.33	1.56	5.32	0.62	1.57	0.86	1.11	1.88	5.55	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	6.79	0.23	1.30	60.68	0.43	2.04	5.48	0.99	2.62	--	*	1.90	5.09	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulati
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - HWY102-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Highway 102-1						
Sample Sites								HWY102-1						
Sampling Date	yyyy-mm-dd							22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							9:49 AM	10:20 AM	9:15 AM	9:55 AM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA														
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	12 3	15,7	18.9	10.6	15.9	16.1	12.4
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	20.74	5.45	2.80	4.79	5.88	43.1	5.48
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.31	7.48	7.45	8.88	6.84	7.75	6.67
Specific Conductance	uS/cm	--	--	--	--	--	--	316.0	544.0	99.0	306.0	423.3		
INORGANICS														
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	25 0	20	25	18	21	20	23
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	82	171	101	71	125	44	48
Fluoride	mg/L	0.12	--	--	--	0.12	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	28	34.4	23.9	46.0	9 2	55 8	39.6
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.17	0.16	0.06	0.30	0.36	0.29	0.68
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.17	0.16	0.06	0.30	0 3	0.29	0.33
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.35
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.15	0.29	0.44	0.29	0.16		0.35
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.00	6.0	6.9	7.9	10.6	9.9	6.9
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	0.13	<0.01	0.01	0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.20	7.34	6.70	***6.38***	6.84	7.75	6.67
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	19.6	21.5	18.4	13.7	18.7	10 5	11.3
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2.6	3.1	2.6	2.2	2.7	1.6	1.8
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	**0.012**	0.059	0.284	0.030	0.007	<0.002	0.004
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	2.1	2.6	2.4	2.4	2 2	2	2.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	41.1	80.0	55.0	36.0	68.3	28.9	29.2
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	3.8	3.8	4.6	3.2	1.7	4.1	4.5
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	17.0	14	10	12	17	11	14
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.8	1.1	1.9	1.0	0.8	1.3	1.4
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	365	573	418	303			
Calculated Parameters														
Anion Sum	me/L	N/A	--	--	--	--	--	3.18	5.53	3.56	2.63	4 33	1.89	2.15
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	25	20	25	18	21	20	23
Calculated TDS	mg/L	1	--	--	--	--	--	180	305	205	150	248	112	124
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	3.05	4.89	3.61	2.51	4.2	1.99	2.06
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	59.6	66.5	56.7	43.3	57.8	32.8	35.6
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	2.1	6.1	0.6	2.5	1.5	2.6	2.3
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-1.72	-1.66	-2.26	-2.83	-2.57	-2.77	-3.02
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2 04	-1.98	-2.58	-3.15	-2.89	-3 09	-3.28
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	8.92	9.00	8.96	9.21	9 03	9.27	9.24
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.2	9.32	9.28	9.53	9 35	9.59	9.5
Metals (ICP-MS)														
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	--	***54***	--	--	84	157	
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	--	--	<2	<2	
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	--	--	<2	<2	
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	155	--	--	112	54	
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	--	--	<2	<2	
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	<2	
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	14	--	--	14	11	
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	04 - 0.16 note	--	--	<0.09	--	--	<0.09	<0 09	
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	--	--	<2	<2	
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	--	--	<1	<1	
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	1	1	1	1	<2	<2	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	179	289	276	151	144	260	180
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	--	--	<0.5	<0 5	
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	21	25	44	11	14	20	9
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	--	--	<2	<2	
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	<2	--	--	<2	<2	
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	--	--	<1	<1	
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<2	--	--	<0.1	<0.1	
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	109	--	--	95	50	
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	--	--	<0.1	<0.1	
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	<2	
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<2	--	--	<3	<3	
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.2	--	--	<0.2	<0 2	
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	--	--	<2	<2	
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	6	<5	<5	8	5	20
MICROBIOLOGICAL														
Total Coliform	MPN/100mL	1	--	--	--	--	--	>200	>200	20,400	8,900	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	1	46	400	68	24	195	13
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	1.05	0.7	13.4	0.4			
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--			
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--			

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulati
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - HWY102-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Highway 102-2																
Sample Site HWY102-2								HWY102-2																
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-08-15	2012-10-11	2013-05-15	2013-08-15	2013-10-16	2014-05-14	2014-10-27
Sampling Time	hh:mm							12:30	12:15	12:30	12:40	09:30	12:30	11:20	15:00	15:30	11:20	12:20	10:35	10:40	10:00	10:22	12:15	10:07
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	16.7	19.2	16.4	17.2	17.0	8.7	10.8	24.2	15.1	7.8	23.7	14.3	11.5	22.0	10.7	11.4	10.4
Dissolved Oxygen	mg/L	--	--	--	--	5 5 - 9.5	--	10.01	5.90	4.80	4.91	2.45	2.99	6.92	7.03	5.09	3.73	13.10	3.28	6.30	1.57	4.20	10.50	9.25
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6 57	5.71	5.40	6.33	5.86	5.64	6.22	5.89	5 29	7.30	6.37	6.72	6.01	6.92	5.40	5.40	5.85
Specific Conductance	uS/cm	--	--	--	--	--	--	37.0	457.0	162.1	415.0	167.0	101.2	92.2	123.1	96.0	225.0	226 0	159.1	288.0	188.5	204.4	204.4	174.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	<5	<5	7	6	5	<5	<5	5	<5	17	7	<5	6	14	7	30	8
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	21	82	83	170	41	18	21	21	17	63	109	45	71	50	52	113	34
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	120	190	91	96	160	68	65	98	77	32	100	70	11	61	36	13	85
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.05	<0 05	<0.05	0.10	<0.05	0.62	0.26	1.80	3 20	1.54	<0.05	0.14	0.17	<0.05	<0.05	<0.05	0.12
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.05	--	--	0.10	<0.05	--	0.26	--	--	1.54	<0.05	0.14	0.17	<0.05	<0.05	<0.05	0.12
Nitrite (N)	mg/L	0.05	--	0.06	--	0 06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	0.06	<0.05	<0.05	0.20	<0.05	<0.05	0.30	0.08	0.09	<0 03	<0.03	<0.03	0.17	0.09	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.6	1.1	0.5	--	0.7	2.0	15.3	<0.4
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	8.5	13 0	13.0	7.2	14.0	7.4	5.7	9.2	8.4	7.0	15.8	11.2	6.1	10.6	5.1	17.4	8.0
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	5.43	5.96	6.30	6.05	6.32	5.47	5.93	6.18	5.92	5.90	6.70	6.80	6.61	6.59	6.34	7.20	6.40
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	1.6	4.0	4 8	7.4	3.8	4.0	3.1	2.2	3.8	7.0	8.4	5.6	7.6	8.5	8.2	14.1	9.5
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.4	0.7	0 9	1.0	0.6	1.0	0.7	0.7	1.4	1.2	1.4	1.2	1.2	1.3	2.2	3.1	1.8
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02	0 040	0.034	0.010	0.028	0.003	0.009	0.019	0.041	0 021	0.054	0.030	0.014	0.028	0.199	0.028	0.201
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.5	0.8	1.1	1.0	1.0	1.4	0.8	1.3	1.9	1.2	1.7	1.6	1.3	1.5	2.5	2.9	1.7
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	15.0	51 0	55.0	83.7	32.0	12.1	13.3	13.1	13.3	41 5	63.6	20.4	39.0	19.1	34.5	69.6	24.0
Reac ive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.2	4.4	4 0	3.0	6.4	5.4	2.5	6.5	6.7	4.1	6 9	5.8	1.6	6.2	6.6	1.6	5.9
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<2	58	62	34	27	3	<1	10	14	<5	39	<5	<5	<5	194	34	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	<2	3	8	11	<2	7	5	5	8	12	6	10	10	9	10	12	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	3.8	4.2	2.6	3.1	0.5	0.4	1.2 (1)	3.9	0.6	10.8	2.0	1.5	3.3	144.0	1.1	1.1
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	85	290	310	590	160	94	91	100	110	263	403	179	295	203	223	433	194
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	0.60	2.37	2.62	5.13	1.27	0.70	0.73	0.91	0 86	2.48	3.34	1.49	2.34	1.88	1.81	4.04	1.29
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<1	<1	7	6	5	<1	<1	5	<1	17	7	<5	6	14	7	30	8
Calculated TDS	mg/L	1	--	--	--	--	--	42	150	165	282	93	52	48	62	67	143	200	86	135	100	145	235	85
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	0.81	2.65	2.89	4.17	1.81	0.86	0.82	0.83	0 97	2.32	2.10	1.40	2.24	1.50	3.50	4.17	1.76
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	6 00	13.00	16.00	23.00	12.00	14.00	11.00	8.00	15.00	22.40	26.70	18.90	23.90	26.60	29.50	48.00	31.10
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	14.90	5.58	4.90	10.30	17.50	10.30	5.81	4.60	6.01	3.30	3.60	3.10	2.30	11.30	31.70	1.60	15.10
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	NC	NC	-3.57	-3.72	-3.70	NC	NC	-4.07	NC	-3.63	-3.15	-3.34	-3.33	-2.92	-3.50	-1.80	-3.30
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	NC	NC	-3 82	-3.97	-3.95	NC	NC	-4.32	NC	-3.95	-3.47	-3.66	-3.65	-3.24	-3.82	-2.12	-3.62
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	NC	NC	9.87	9.77	10.00	NC	NC	10.30	NC	9 53	9.85	10.10	9.94	9.51	9.84	9.00	9.70
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	NC	NC	10.10	10.00	10.30	NC	NC	10.50	NC	9 85	10 20	10.50	10.30	9.83	10.20	9.32	10.00
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	270	--	--	189	368	--	260	--	--	145	466	259	130	138	2,760	400	216
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1 0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	2	--	<1.0	--	--	<2	<2	<2	<2	<2	6	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	20	--	--	53	28	--	27	--	--	49	74	33	44	43	213	381	63
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1 0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2 0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<5	--	--	8	8	--	<50	--	--	10	17	15	9	10	13	11	12
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.300	--	--	0.051	<0.017	--	<0.017	--	--	0 037	0.031	0.032	0.019	<0.017	0.096	0.051	0.019
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1 0	1	--	<1.0	--	--	<1	<1	<1	<1	1	9	2	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	1	1	--	<0.40	--	--	<1	1	1	<1	1	3	1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2	--	--	2	<2.0	<2.0	<2.0	3	3	<2	3	3	<2	1	12	4	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	880	--	--	1,380	3,850	303	229	897	1,110	214	5,210	1,550	383	1,720	28,400	1,660	485
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	1.9	--	--	1.6	2.7	--	0.6	--	--	<0.5	5 2	2.1	0.6	0.7	19.4	3.5	1.0
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	110	--	--	387	135	53	41	106	176	78	219	207	83	173	327	212	93
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	<2	--	--	<2 0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	4	2	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1 0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0 25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	11	--	--	37	21	--	17	--	--	33	45	31	39	40	45	75	43
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	4	--	--	<2	6	--	5	--	--	<2	10	4	4	<2	60	9	6
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	2	<2	<2	<2	11	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	12	--	--	14	12	9	6	9	13	<5	7	12	12	<5	46	36	17
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	28	>250	--	>250	75	41	110	>250	--	1,553	>2420	>2420	2,420	1,990	>2420	687	>2420
E. coli	MPN/100mL	1	--	--	400	--	--	4	230	--	9	5	<1	7	>250	<100	<1	16	50	111	9	4	<1	<1
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--						--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidifica ion method	µg/L	0.05	--	--	--	--	--	0 90	82.63	48.17	0.85	16.36	0.25	0.97	4.91	1.90	2.07	21 03	0.33	2.41	1.10	21.62	10.34	0.46
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0 91	81.20	52.50	0.85	17.35	0.23	0.87	4.49	2.15	2.27	17 26	0.50	3.02	1.30	27.02	11.09	0.55

Notes

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RDL = Reported Detection Limit (represents most recent sampling event)

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[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L..

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

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(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
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Sample Site HWY102-2								HWY102-2																
Sampling Date	yyyy-mm-dd							2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2107-06-08	2017-08-15	2017-10-18	2018-05-09	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20
Sampling Time	hh:mm							11:00	12:58	14:30	12:50	12:45	10:40	11:45	15:25	12:25	12:30	11:30	14:15 PM	3 55PM	12:20PM	16:30	10:00 AM	1:54 PM
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	NCC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA**	NA*
Water Temp	Celsius	--	--	--	--	--	--	12.7	23.7	9.3	13.4	20.4	10.2	13.0	22.4	15.2	14 9	18.3	10.6	11.4	23.1	9.7	18.8	17.7
Dissolved Oxygen	mg/L	--	--	--	--	5 5 - 9.5	--	4.24	6.11	5.28	6.77	7.06	6.80	5.68	1.81	11.32	8.75	2.29	5.62	**	3.81	12.70	4.92	7.96
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6.45	6 04	5.96	5.86	6.19	5.36	6.04	7.56	8.32	6.13	5.88	7.24	6.83	6.19	6.98	5.99	5.56
Specific Conductance	uS/cm	--	--	--	--	--	--	0.4	699.0	197.6	968 0	838.0	219.2	400.0	414.0	338.0	355.6	394.7	246.4	501.0	720.0	202.0	461.0	472.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	8	5	<5	13	21	6	<5	22	11	9	21	13	<5	17	<5	18.0	11.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	260	178	78	236	226	48	136	107	92	79	90	30	161	223	74	172	200
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	17	9	8	14	39	86	20	41	22	25	85	85	22	42	45	27	56
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.050	<0.05	0.15	0.21	0.23	0.11	0.20	0.09	0.07	0.33	0 21	0.76	0.60	0.14	0.58	0.08	<0.05
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.050	<0.05	0.15	<0 05	<0.05	0.11	<0.05	0.09	0.07	0.16	<0.05	0.76	0.17	0.07	0.58	0.08	<0.05
Nitrite (N)	mg/L	0.05	--	0.06	--	0 06	--	<0.010	<0.05	<0.05	0.21	0.23	<0.05	0.20	<0.05	<0.05	0.17	0 21	<0.05	0.43	0.07	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	0.06	0.19	0 05	0.14	0.37	<0.03	<0.03	0.09	0.14	<0.03	0 24	0.06	0.04	0.29	0.05	0.25	0.31
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.3	62.6	2.0	24 3	2.1	0.6	<0.4	0.7	0.6	1.4	0.9	<0.4	<0.4	0.7	1.2	<0.4	4.10
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.0	29.0	9.9	79 3	11.1	13.4	5.4	9.2	5.9	5.6	7.5	8.0	3 2	8.2	6.8	4.90	21.20
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.010	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6 5 - 9.0	--	6.12	6.64	6.18	6.46	6.80	6.15	6.22	6.73	6.51	6.79	6.79	7 07	6.36	6.67	6.37	6.86	6.86
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	20,000.0	33.3	9.8	23.9	23.8	8.6	13.3	14.7	14.7	11.5	12.5	16.5	22 8	17.2	7.9	23.2	9.8
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2,500.0	32.7	2.2	3.2	2.5	1.7	2.5	1.9	2.1	1.4	1.7	1.9	3.6	2 2	1.4	3.1	340.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.010	1.560	0.012	0.222	0 034	0.012	0.013	0.042	0.011	0.034	0.025	0.014	0 006	0.037	0.022	0.018	0.008
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1,900.0	12.5	1.1	4.0	2.1	1.4	1.1	1.6	1.6	1.3	1.6	1.7	2.2	2.1	1.1	2.1	3.7
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	150.0	124.0	36.8	149.0	124.0	26.4	68.8	66.0	55.2	59.4	81.6	29.4	148.0	139.0	31.7	96.7	118.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.3	7.2	5.6	2.8	9.0	4 5	3.1	5.7	6.4	1.6	8.8	4.6	3.1	7 2	4.4	5.7	7.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	2	3,000	15	342	69	<5	6	7	8	12	<5	<5	<5	16	<5	<5	57.0
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	15	7	8	22	21	8	10	7	9	9	4	16	13	11	9	12.0	10.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	1.2	1,490.0	9.9	131.0	54.2	1.1	2.4	9.9	12.5	7.0	13.8	1.1	1.2	26.8	4.4	9.7	32.9
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	920	662	315	817	952	177	451	413	366	422	444	208	737	782	204	629	742
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	7.88	5.27	2.38	7.39	7.25	1.65	4.06	3.61	3.01	2.62	3.06	1.5	4.9	6 9	2.3	5.47	6.07
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	8	5	<5	13	21	6	<5	22	11	9	21	13.0	<5	17.0	<5	18	11
Calculated TDS	mg/L	1	--	--	--	--	--	460	712	138	473	422	99	233	215	187	170	209	107.0	354.0	415.0	129.0	324	359
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	7.87	29.10	2.35	9.27	7 23	1.80	3.92	3.93	3.60	3.36	4.53	2.3	8.0	7.5	2.0	5.83	6.25
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	59.00	218.00	33.50	72.90	69.70	28.50	43.50	44.50	45.40	34.5	38.2	49.0	71.8	52 0	25.5	70.7	33.1
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.06	69.40	0.50	11.30	0.10	4.30	1.80	4.20	8.90	12.4	19.4	21.8	24.3	4.4	8 0	3.2	1.5
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.18	-2.81	-3.73	-2.70	-2.15	-3.72	-3 58	-2.38	-2.90	-2.81	-2.41	-2.2	-3.2	-2.5	-3.6	-2.16	-2.75
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.42	-3.13	-4.05	-3.02	-2.47	-4.04	-3 90	-2.70	-3.22	-3.13	-2.73	-2.5	-3.6	-2.8	-4.0	-2.48	-3.07
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.29	9.45	9.91	9.16	8.95	9 87	9.80	9.11	9.41	9.60	9.2	9.3	9.6	9.2	10 0	9.02	9.61
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.54	9.77	10.20	9.48	9.27	10.20	10.10	9.43	9.73	9.92	9.52	9.6	9.9	9.5	10 3	9.3	9.9
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	100	--	129	3,880	--	--	99	149	542	167	152	--	126	194	306	99	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<1.0	--	<2	3	--	--	<2	--	<2	<2	<2	--	<2	4	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	140	--	147	762	--	--	151	--	122	96	146	--	272	138	100	266 0	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<1.0	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<50	--	<5	9	--	--	<5	--	12	7	11	--	7	9	6	11.0	--
Total Cadmium (Cd)	µg/L	0.017	0 01	0.09	--	.04 - 0.16 note	--	0.100	--	<0.017	0.778	--	--	0.019	--	0.048	<0.09	<0.09	--	<0.09	<0.09	<0 09	<0 017	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1.0	--	<1	8	--	--	<1	--	2	<1	2	--	<1	1	<1	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	2	--	3	4	--	--	<1	--	2	<1	2	--	<1	3	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2.0	404	2	13	<1	2	<1	1	3	2	1	2	2	1	3	3	4
Total Iron (Fe)	µg/L	50	300	300	--	300	--	960	217,000	714	21,300	7,380	375	369	2,650	4,760	870	3,600	93	728	8,440	506	3,260	7,640
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.50	--	0.6	39.7	--	--	<0.5	--	3.3	2.3	1.0	--	1.4	1.4	1.9	0.7	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	470	2,800	303	586	359	71	125	160	215	55	262	10	137	625	50	341	340
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	<2.0	--	<2	8	--	--	6	--	3	<2	<2	--	3	<2	2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1.0	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0 25	--	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	96	--	38	96	--	--	72	--	80	53	81	--	129	95	49	112 0	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	<2	41	--	--	<2	--	15	4	3	--	<2	3	7	2.0	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	<0.1	0.2	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2.0	--	<2	18	--	--	2	--	3	<2	2	--	4	5	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	27	1,210	10	170	22	11	14	9	19	12	6	69	16	15	13	<5	24.0
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	---	>2420	328	>2420	>2420	>2420	>2420	>2420	>2420	6	410	81.0	930.0	NDOGT	1,152 0	>2420	>2420
E. coli	MPN/100mL	1	--	--	400	--	--	<10	201	2	1	20	11	<1	8	41	1	26	3	<10	30	18	365	172
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32	2.89	206
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.53	119.14	6.24	539.78	54.98	0.43	1.40	2.11	28.94	2.56	2.58	0.53	3.06	23.70	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.58	129.77	2.23	793.90	73.67	0 56	1.74	3.20	37.67	4.28	--	*	3.04	20.50	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" * -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - HWY102-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [6]	Highway 102									
Sample Site HWY102-2								HWY102-2									
Sampling Date	yyyy-mm-dd							29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							9:01 AM	1:38 PM	1:22 PM	12:34 PM	1:15 PM	12:10 PM	1:15 PM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA																	
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	7.5	14 9	18.5	13.7	14.9	18.4	12.8	16.6	17.1	13.1
Dissolved Oxygen	mg/L	--	--	--	--	5 5 - 9.5	--	5.45	17.91	4.27	15.05	3.92	2.27	5.05	6.66	3.21	4.43
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6 5 - 9.0	--	6.18	6.52	5.99	6.07	6.71	7.29	7.86	6.41	6.03	6.48
Specific Conductance	uS/cm	--	--	--	--	--	--	399.0	424.0	729 0	728.0	693.0	689.0	450.2	--	294.2	--
INORGANICS																	
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	11.0	16	11	8	8	13	9	6	18	9
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	99	103	94	199	251	186	108	87	91	64
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	26	22 9	86.6	24.8	33	45.8	42.6	14.7	107	44 8
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0 30	0.11	<0.05	0.06	0.06	0.09	0.08	0.05	0.08	0.54
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0 30	0.11	<0.05	0.06	0.06	0.09	0.08	0.05	0.08	0.07
Nitrite (N)	mg/L	0.05	--	0.06	--	0 06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.47
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	<0.03	<0.03	<0.03	0.09	0.22	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	9 80	0.35	0.4	0.1	0.23	0.64	0.25	0.1	--	0.32
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6 30	9.0	10.4	4.7	5.7	9.4	7.8	7.6	13	7
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	0.13	0.01	0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6 5 - 9.0	--	6.77	7.05	6.40	6.66	6.99	6.44	6.15	6.41	6.03	6.48
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	19.2	19 3	11.9	17.1	16.6	16	11.1	11.7	7.4	7.1
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2.8	2.8	1.8	2.1	2.4	2.4	2.1	1.8	1.1	1.2
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.013	0.018	0.036	0.018	0.020	0.033	0.030	0.007	0.002	0 004
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	2.1	1.9	1.2	2.0	2	2.1	1.9	1.3	1.4	1.3
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	57.8	64.7	61.9	98.1	123	107	63	71.3	59.6	42 5
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	6.7	3 3	6.6	4.5	4.8	9.4	5.3	2.4	5.3	5.5
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	9	14	<5	13	<5	<5	<5	6	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	16.0	13	6	8	13	16	10	11	10	7
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	3.0	2.6	1.7	6.8	1.1	5.4	2.0	0.7	3.8	1.6
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	412	436	430	546	746	647	413	--	--	--
Calculated Parameters																	
Anion Sum	me/L	N/A	--	--	--	--	--	3 37	3.50	3.00	5.94	7.52	5.85	3.44	2.81	3.14	2.57
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	11	16	11	8	8	13	9	6	18	9
Calculated TDS	mg/L	1	--	--	--	--	--	206	217	185	335	414	339	203	188	184	132
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	3 81	4.13	3.54	5.49	6.46	5.78	3.56	3.89	3.19	2.4
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	59.5	59.7	37.1	51.3	51.3	49.8	36.4	36.6	23	22.7
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	6.2	8 2	8.4	4.0	7.6	0.6	1.7	16.2	0.8	5
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.52	-2.08	-3.10	-2.84	-2.54	-2.88	-3.47	-3.52	-3.02	-3.9
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.84	-2.40	-3.42	-3.16	-2.86	-3.20	-3.79	-3.84	-3.34	-4.11
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9 29	9.13	9.50	9.50	9.53	9.32	9.62	9.77	9.49	9 9
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.6	9.45	9.82	9.82	9.85	9.64	9.94	10.1	9 91	10.1
Metals (ICP-MS)																	
Total Aluminum (Al)	µg/L	5	5	5	--	00 (pH based	--	--	112	--	--	*98*	--	--	117	258	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	174	--	--	180	--	--	115	61	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	10	--	--	9	--	--	6	7	--
Total Cadmium (Cd)	µg/L	0.017	0 01	0.09	--	.04 - 0.16 note	--	--	<0 09	--	--	<0.09	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	--	--	<1	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	--	--	1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2.0	2	2	5	2	2	2	<2	4	<2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	1,030	1,600	1,080	2,400	***367***	***1250***	***309***	348	1950	1040
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	0.6	--	--	<0.5	--	--	<0.5	0.8	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	99	100	328	562	134	148	40	65	106	118
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0 25	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	97	--	--	82	--	--	59	36	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	3	--	--	<2	--	--	<3	4	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.2	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	--	--	2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	7.0	6	6	16	*11*	7	7	9	5	14
MICROBIOLOGICAL																	
Total Coliform	MPN/100mL	1	--	--	--	--	--	816	>200	>200	>200	>200	10,500	4,700	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	<1	14	31	<1	33	49	22	3	20	4
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	0 81	1.1	0.77	4.99	8.2	1.2	<0.3	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" * -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - LSD

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Lake Shore Drive																
Sample Site - LSD								LSD																
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-17	2012-05-01	2012-08-15	2012-10-11	2013-05-15	2013-08-15	2013-10-16	2014-05-15	2014-10-27
Sampling Time	hh:mm							12:00	09:30	11:45	09:00	11:28	10 00	08:45	13:20	9:00	9:15	13:00	9:10	08:40	15:30	11:55	9:30	13:30
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	13.1	16.7	15 3	13.4	21.3	7 3	10.2	21.0	12.0	5.7	25.7	13.4	7.7	20.2	8.8	8.9	10.5
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9 5	--	10.84	5.70	5.50	8.60	5.41	8.47	9.44	7.87	8.16	4.06	2.69	7.58	8.77	7.26	7.60	14.78	7.22
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	7.88	6.74	6.34	6.42	6.64	6.17	7.09	6.88	6.63	8.22	7.16	6.92	5.19	7.28	6.23	7.02	6.31
Specific Conductance	uS/cm	--	--	--	--	--	--	723.0	210.0	167.7	217.8	203.2	110.3	145.9	126.4	111.9	62.0	177.5	116.7	123.6	132.5	147 8	180.0	111.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	13	16	12	13	21	9	9	15	12	21	14	11	8	20	11	35	10
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	41	34	31	49	45	25	38	27	22	22	33	23	39	32	23	29	23
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	32	27	37	20	26	33	32	41	49	13	20	40	10	21	25	9	31
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.14	0.14	0.06	0.23	0.10	0.12	0.25	0.17	0.09	0.13	0.80	<0.05	0.18	0.20	<0.05	0.09	0.11
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.14	--	--	0.23	0.10	--	0.25	--	--	0.13	0.80	<0.05	0.18	0.20	<0.05	0.09	0.11
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.06	0.03	<0.03	<0.03	<0.03	0.03	0.03	0.04	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	3.5	0 5	--	0.7	3 0	1.0	<0.4
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	5.0	3.8	6.8	3.7	6.0	5 3	4.7	7.1	7 5	3.1	8.0	7.7	4.7	6.3	6 9	5.2	8.1
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0 01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	6.69	6.69	6.93	7.10	7.30	6.67	6.72	6.79	6.49	6.20	6.90	6.90	6.94	6.95	6.49	6.47	6.72
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.5	6.9	5.4	8.0	10.5	5 3	5.9	5.1	5 0	2.6	18.1	5.1	6.4	6.0	5.6	5.4	5.1
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.4	1.6	1.3	2.0	2.1	1.2	1.3	1.2	1 2	0.7	3.3	1.4	1.2	1.4	1.6	1.5	1.1
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02	0.030	0 009	0.018	0.100	0.009	0.018	0.028	0.014	0.022	0.063	0.003	0.007	0.015	0.078	0.100	0.031
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.2	1.1	1.3	1.2	1.2	1.0	1.1	1.0	1 2	0.6	1.9	1.3	1.2	1.1	1.4	1.1	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	24.0	21.0	18.0	24.8	26.9	15.2	23.2	14.3	13.8	11.3	18.6	15.2	21.9	26.6	14.6	23.4	18.1
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	3.1	4.2	4.0	3.2	3.4	4 3	2.6	3.9	3 8	3.1	2.9	4.9	2.6	3.9	5.0	2.9	4.2
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	16	98	5	6	110	7	4	77	5	<5	16	19	<5	17	9	51	8
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	6	4	5	7	3	4	6	4	4	5	5	5	6	7	5	5	4
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.6	12.0	2.5	12.0	6.2	1 0	0.6	2.5	1.7	6.7	283.0	2.1	1.1	31.6	82.6	6.6	1.4
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	170	150	140	200	200	110	150	130	110	96	161	110	168	136	105	122	125
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	1.56	0.82	1 22	1.80	1.77	0.97	1.39	1.14	0.96	1.15	1.37	0.97	1.40	1.46	0.97	1.63	0.94
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	13	8	12	13	21	9	9	15	12	21	14	11	8	20	11	35	10
Calculated TDS	mg/L	1	--	--	--	--	--	92	55	74	104	107	62	84	66	60	56	163	58	82	87	66	88	59
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.53	0.99	1.20	1.69	1.94	1.05	1.44	1.02	1.00	0.76	3.59	1.10	1.43	1.62	1.62	1.52	1.19
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	22.00	15.00	19.00	28.00	35.00	18 00	20.00	18.00	18.00	9.40	58.80	18.50	20.90	20.70	20.60	19.70	17.30
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0 97	9.39	0.83	3.15	4.58	3.96	1.77	5.56	2.04	20.70	63.00	6.10	1.00	5.20	25.00	3.40	11.80
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.74	-3.20	-2.60	-2.22	-1.71	-2 99	-2.88	-2.64	-3.05	-3.62	-2.30	-2.91	-2.93	-2.55	-3.29	-2.84	-3.14
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.99	-3.45	-2.85	-2.47	-1.96	-3 24	-3.13	-2.89	-3.31	-3.94	-2.62	-3.23	-3.25	-2.87	-3.61	-3.16	-3.46
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.43	9.78	9.53	9.32	9.01	9.66	9.60	9.43	9.54	9.82	9.20	9.81	9 87	9 50	9.78	9.31	9.86
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.68	10.00	9.78	9.57	9.26	9.91	9.85	9.68	9.80	10.10	9.52	10.10	10.20	9 82	10.10	9.63	10.20
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	259	--	--	349	189	--	217	--	--	490	19,200	186	131	93	3,420	487	141
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	8	<2	<2	<2	<2	<2	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	13	--	--	15	19	--	14	--	--	11	86	12	12	7	24	15	11
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	2	<2	<2	<2	<2	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	9	--	--	41	22	--	<50	--	--	6	24	16	10	15	15	14	16
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	0.019	--	--	0.018	<0.017	--	<0.017	--	--	0.029	1.050	0.023	<0.017	<0.017	0.073	0.032	<0.017
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	--	--	<1.0	<1.0	--	<1.0	--	--	<1	11	<1	<1	<1	2	<1	<1
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	<0.40	1	--	<0.40	--	--	<1	34	<1	<1	<1	1	<1	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2	--	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	22	2	<2	1	12	2	3
Total Iron (Fe)	µg/L	50	300	300	--	300	--	523	--	--	554	965	120	211	388	384	161	38,900	312	236	254	4,200	593	363
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	3.0	0.5	--	<0.5	--	--	0.6	82.4	<0.5	<0.5	<0.5	5 2	0.5	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	53	--	--	113	632	23	30	53	39	26	13,200	67	71	81	124	140	60
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97 03 note	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	13	<2	<2	<2	2	<2	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	--	--	<1.0	<1.0	--	<1.0	--	--	<1	2	<1	<1	<1	<1	<1	<1
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	0.100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	12	--	--	36	42	--	24	--	--	12	82	22	24	24	25	26	19
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	2	--	--	7	4	--	5	--	--	3	405	4	<2	2	36	6	3
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	1.6	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	30	<2	<2	<2	2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	--	--	7	7	<5.0	<5.0	<5.0	5	<5	110	7	6	<5	15	<5	<5
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	53	>250	--	>250	>250	280	85	>250	--	1,414	>2420	>2420	1,990	>2420	>2420	1,203	8
E. coli	MPN/100mL	1	--	--	400	--	--	22	24	--	4	45	6	10	>250	<100	2	26	10	10	20	2	<1	>2420
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.46	10.70	4.68	1.21	6.64	0.21	1.19	1.93	1.41	1.88	6.62	0.13	<0.50	1.60	2.02	1.91	0.32
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	1.85	11.10	5.62	1.32	7.71	0.19	1.07	1.73	1.18	2.28	7.58	0.22	<0.50	2.00	2.98	1.91	0.33

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

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[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded) = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

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Italics (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - LSD

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Lake Shore Drive																
Sample Site - LSD								LSD																
Sampling Date	yyyy-mm-dd							2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-09	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20
Sampling Time	hh:mm							09:50	16:02	13:40	15:00	12:10	12:25	10:20	11:55	11:05	11:30	10:30	10:50 AM	11:26 AM	10:44 AM	1:45 PM	12:15 PM	1:08 PM
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	NCC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA**	NA*
Water Temp	Celsius	--	--	--	--	--	--	12.5	24.3	5.8	13.2	24.0	9.4	15.6	23.0	9.7	14.4	22.4	9.3	10.2	25.0	8.3	26.5	18.3
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9 5	--	6 26	7.25	7.21	8 22	1.86	8.67	11.35	6.95	5 34	9.08	6.85	7.24	**	4.93	7.90	2.66	3.24
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	6.88	6.34	6.48	6.63	6.16	6.25	6.78	6.57	5 91	5.82	6.41	5.90	7.01	6.51	6.40	6.31	6.05
Specific Conductance	uS/cm	--	--	--	--	--	--	0.1	155.3	132.3	162.0	254.0	162.2	150.0	188.0	92 0	75.0	182.9	108.1	99.7	368.0	171.0	195.0	158.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	11	7	9	11	22	8	12	26	20	9	27	9	12	33	<5	30.0	21.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	32	27	26	39	45	31	43	38	36	23	32	20	30	29	20	35	35
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	20	11	26	25	26	24	25	31	21	36	40	65	39	86	38	56	60
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.15	0.25	0.30	0.08	0.08	<0.05	0.19	0.48	0.22	0.32	<0.05	0.10	0.08	0.07	0.07	<0.05	<0.05
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.15	0.16	0.30	0.08	0.08	<0.05	0.10	0.39	0.22	0.32	<0.05	0.10	0.08	0.07	0.07	<0.05	<0.05
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.010	0.09	<0.05	<0 05	<0.05	<0.05	0.09	0.09	<0 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.050	0.11	<0.03	0.06	0.10	<0.03	<0.03	0.08	0.04	<0.03	0.06	<0.03	<0.03	0.53	0.06	0.60	0.68
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0 3	77.4	2.8	2 2	11.8	0.5	1.0	34.5	10.0	<0.4	1.7	<0.4	<0.4	1.6	1.6	0.70	4.10
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.2	14.1	9.9	5 5	14.0	8.9	7.7	8.1	6 9	5.8	5.8	8.0	5.9	12.1	6.2	7.50	8.70
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.010	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	7.02	6.59	6.68	6.65	7.01	6.38	6.92	7.08	7.01	6.91	7.20	6.99	6.93	7.11	6.55	7.19	7.04
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6,100.0	52.2	5.4	6.6	9.9	4.8	7.1	8.0	6.7	4.4	10.2	3.5	6.0	9.6	2.7	8.4	4.5
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1,300.0	23.0	1.5	1.4	1.8	1.3	1.6	1.7	1.6	1.1	2.3	0.9	1.5	2.6	0.7	1.8	1,190.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.011	0.501	0.095	1.250	0.023	0.012	0.102	0.059	0.015	0.052	0.305	0.018	0.008	0.031	0.008	0.028	0.084
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1,100.0	9.7	1.0	1 2	1.3	1.1	1.3	1.4	1 2	0.9	1.6	0 8	1.3	1.7	0.6	1.2	0.9
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	19.0	24.4	13.4	25.1	23.4	19.7	25.2	26.0	23.0	16.5	21.7	15.4	24.4	20.7	9.8	21.4	25.1
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.4	4.2	4.4	1.6	3.3	3.5	1.1	2.7	4 0	2.4	2.4	3 3	1.7	4.2	3.5	3.9	2.0
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	5	719	69	93	9,020	15	138	41	<5	<5	444	6	8	150	<5	56.0	132.0
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	5	<2	3	5	6	7	4	3	4	5	<2	5	4	<2	5	3.0	3.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	1 2	4,430.0	5.4	65 3	206.0	7.9	53.8	21.3	15.1	2.0	72.2	2 5	5.0	44.4	1.2	6.4	18.2
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	140	129	136	160	236	133	178	192	171	122	192	123	151	170	63	197	193
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	1.22	0.92	1.00	1.43	1.84	1.18	1.55	1.69	1.51	0.96	1.44	0 9	1.2	1.5	0.7	1.65	1.47
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	11	7	9	11	22	8	12	26	20	9	27	9 0	12.0	33.0	<5	30	21
Calculated TDS	mg/L	1	--	--	--	--	--	74	498	65	91	107	70	92	97	87	58	95	52.0	76.0	96.0	39.0	96	90
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.28	31.00	1.42	1.94	2.04	1.27	1.75	1.74	1.59	1.08	2.27	1.0	1.6	2.1	0.7	1.83	1.76
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	21 00	225.00	19.70	22 20	32.10	17.30	24.30	27.00	23 30	15.5	34.9	12.4	21.2	34.7	9.6	28.4	17.0
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	2.40	94.20	17.50	15 20	5.30	3.80	6.10	1.40	2.30	6.0	22.2	6.6	14.2	17.9	1.0	5.1	9.0
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2 50	-2.50	-3.20	-2 97	-2.24	-3.61	-2.73	-2.19	-2.44	-3.06	-1.94	-3.1	-2.8	-2.0	-3.9	-1.99	-2.57
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.75	-2.82	-3.52	-3 29	-2.56	-3.93	-3.05	-2.51	-2.76	-3.38	-2.26	-3.4	-3.1	-2.3	-4.2	-2.31	-2.89
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.51	9.09	9.88	9.72	9.25	9.99	9.65	9.27	9.45	9.97	9.14	10.1	9.7	9.1	10.4	9.18	9.61
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.77	9.41	10.20	10 00	9.57	10.30	9.97	9.59	9.77	10.3	9.46	10.4	10.0	9.4	10.7	9.5	9.9
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	120	--	1,960	2,150	--	--	731	48	401	142	2,590	--	124	665	154	248	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	3	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	12	--	27	34	--	--	32	--	11	8	53	--	13	53	7	42.0	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<1.0	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<50	--	<5	12	--	--	<5	--	20	10	20	--	9	21	9	18.0	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	0.011	--	<0.017	0.120	--	--	0.031	--	<0 017	<0.09	0.130	--	<0.09	<0.09	<0.09	<0.017	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1.0	--	3	2	--	--	<1	--	1	<1	2	--	<1	<1	<1	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<0.40	--	4	4	--	--	1	--	<1	<1	6	--	<1	6	<1	2.0	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2.0	183	6	3	<1	<1	<1	<1	1	<1	4	1	<1	2	1	<1	1.0
Total Iron (Fe)	µg/L	50	300	300	--	300	--	230	176,000	4,570	2,790	2,190	303	1,080	375	874	239	5,460	164	560	5,530	118	3,510	4,550
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0 5	--	5.9	4.3	--	--	0.6	--	0.7	0.7	4.3	--	<0.5	3.2	<0 5	0.8	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	130	13,800	985	921	2,420	75	436	212	250	55	2,630	58	368	5,050	8	2,840	1,190
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2 0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97 03 note	--	<2 0	--	5	2	--	--	<2	--	<2	<2	4	--	<2	<2	9	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1 0	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	0.200	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	25	--	16	29	--	--	28	--	31	17	54	--	27	56	15	32 0	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	3	--	41	30	--	--	14	--	7	3	36	--	<2	6	<2	5.0	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	0.2	0.2	--	--	<0.1	--	<0.1	<0.1	0.2	--	<0.1	<0.1	<0.1	<0.1	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	6	4	--	--	<2	--	<2	<2	4	--	<2	2	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5 0	799	11	17	14	<5	8	<5	7	<5	23	<5	<5	10	<5	<5	<5
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	---	>2420	>2420	>2420	>2420	>2420	534	>2420	641	46	3020	2,380.0	1120	NDOGT	932	>2420	>2420
E. coli	MPN/100mL	1	--	--	400	--	--	<10	16	17	9	30	16	1	479	1	23	20	20	7	50	12	12	172
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	4.42	12.5
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.02	90.33	5.12	8.22	127.14	0.38	18.67	20.15	1.85	0 93	141.49	0.60	2.47	14.60	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	1.07	121.83	4.62	13.77	185.98	0.48	25.84	24.37	2.89	1.60	--	*	2 51	15.40	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -

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[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded) = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Q

Italics (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - LSD

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Lake Shore Drive										
Sample Site - LSD								LSD										
Sampling Date	yyyy-mm-dd							29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23	20-Nov-23
Sampling Time	hh:mm							11:22 AM	10:52 PM	11:07 AM	10:38 AM	11:20 AM	1:00 PM	11:07 AM	11:20 AM	12:25 PM	1:40 PM	12:30 PM
FIELD DATA																		
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	6.8	13.9	18.6	10.5	15.7	19 2	11.7	18.2	17.6	13	--
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9 5	--	11.40	12.45	6.46	12.45	8.69	4.09	9.27	6.58	9.14	7.47	--
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	6.41	6.75	6.55	5.95	7.58	7.52	8.94	6.39	6.87	6.82	--
Specific Conductance	uS/cm	--	--	--	--	--	--	145.8	120.0	137.0	129.0	246.9	141.0	171.4	147.0	--	--	--
INORGANICS																		
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	13.0	15	13	17	16	14	10	13	12	17	--
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	32	27	26	33	60	42	37	41	14	20	--
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12	--
Colour	TCU	5	--	--	--	--	--	30	17.0	50 8	31.1	25.1	16.7	31.5	13.5	52.6	30	--
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.05	0.10	<0.05	<0.05	0.08	0.31	<0.05	0.11	0.06	0.29	--
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.05	0.10	<0.05	<0.05	0.08	0.31	<0.05	0.11	0.06	0.09	--
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0 05	0 2	--
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [9]	--	<0.03	<0.03	<0.03	<0.03	<0.03	0.13	0.14	<0.03	<0 03	<0.03	--
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.60	0.64	0.3	<0.10	0.23	0.61	0.3	0.29	--	0.31	--
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.90	7.3	6.4	3.7	5.4	6.1	7.3	8.8	11	6.4	--
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	0.01	<0.01	<0.01	0.13	<0.01	0.01	<0.01	<0 01	<0.01	--
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9 0	--	6.75	6.88	6.54	7.15	7.35	6.7	***6.34***	6.39	6.87	6.82	--
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.3	7.5	6.3	8.4	8.9	8.1	6.4	6.4	4 2	4.8	--
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.5	1.6	1.4	1.7	2	1.9	1.6	1.4	1	1.2	--
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.010	0.044	0 043	0.034	0.020	0 064	0.030	0.008	<0.002	0.146	0.042
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.2	1.1	1.0	1.4	1.6	1.4	1.5	1.1	1.1	1.3	--
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	21.9	17.9	19 9	20.2	34	24	22	24.3	11.9	13.1	--
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	3.9	3.0	4.9	3.4	3.9	4.3	3.9	1.6	3.1	3.7	--
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	19	32	<5	<5	6	<5	<5	<5	<5	--
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	5.0	4	4	4	7	5	7	5	4	4	--
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	8.2	0.9	1.2	1.4	4.6	2.9	2.9	1 5	6	--
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	150	139	146	163	243	197	170	--	--	--	--
Calculated Parameters																		
Anion Sum	me/L	N/A	--	--	--	--	--	1.27	1.15	1.08	1.35	2.16	1.59	1.39	1.53	0.72	1.01	--
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	13	15	13	17	16	14	10	13	12	17	--
Calculated TDS	mg/L	1	--	--	--	--	--	77	70	67	80	124	94	82	88	44	57	--
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--
Cation Sum	me/L	N/A	--	--	--	--	--	1.45	1.40	1 35	1.51	2.15	1.71	1.49	1.57	0.88	0.99	--
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	21.9	25.3	21.5	28.0	30.5	28 0	22.6	21.7	14.6	16.9	--
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	6.6	9.6	11.3	5.4	0.3	3.6	3.5	1.5	9.6	0.7	--
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.91	-2.64	-3.12	-2.27	-2.09	-2.83	-3.43	-3.26	-3.38	-3.49	--
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.23	-2.96	-3.44	-2.59	-2.41	-3.15	-3.75	-3.58	-3.7	-3.69	--
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.66	9.52	9.66	9.42	9.44	9.53	9.77	9.66	9.85	9.77	--
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.0	9.84	9 98	9.74	9.76	9.85	10.10	9.98	10 2	9.97	--
Metals (ICP-MS)																		
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	199	--	--	92	--	--	335	199	--	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	18	--	--	17	--	--	12	9	--	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	14	--	--	20	--	--	14	15	--	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	--	<0.09	--	--	<0.09	--	--	<0.09	<0.09	--	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	--	--	<1	--	--	<2	<2	--	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	1	--	--	<1	--	--	<1	<1	--	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	1.0	1	2	<1	1	<1	1	<2	<2	<2	--
Total Iron (Fe)	µg/L	50	300	300	--	300	--	378	1,020	356	440	239	***761***	245	410	387	369	--
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0 5	--	--	<0.5	--	--	<0.5	<0.5	--	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	102	678	74	308	112	529	27	82	51	37	--
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97 03 note	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	--	--	<1	--	--	<1	<1	--	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	--	--	<2	--	--	<0.1	<0.1	--	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	30	--	--	36	--	--	28	19	--	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	4	--	--	<2	--	--	6	4	--	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0 2	--	--	<0.2	--	--	<0.2	<0.2	--	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	8	8	<5	<5	<5	<5	5	<5	10	--
MICROBIOLOGICAL																		
Total Coliform	MPN/100mL	1	--	--	--	--	--	1,200	>200	>200	>200	>200	23,000	7,900	>200	>200	>200	--
E. coli	MPN/100mL	1	--	--	400	--	--	2	>200	27	18	109	>200	53	4	73	30	--
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	0.32	5.06	2.3	0.79	4.2	3	0.5	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded) = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Q

Italics (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS

Table F4: Statistical Presentation of Key Water Quality Parameters - LU

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Larry Uteck Blvd															
Sample Site - LU								LU															
Sampling Date	yyyy-mm-dd							2011-10-17	2012-05-01	2012-08-15	2012-10-11	2013-05-15	2013-08-15	2013-10-16	2014-05-15	2014-08-14	2014-10-27	2015-05-20	2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25
Sampling Time	hh:mm							10:30	15:20	11:30	10:10	14:30	14:30	13:00	11:45	10:45	9:54	13:45	10:23	10:05	12:20	11:20	11:45
FIELD DATA																							
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	N/A	N/A	N/A	N/A
Water Temp	Celsius	--	--	--	--	--	--	11.3	12.8	27 3	14.6	13.9	18.3	10.9	15 0	22.8	10.2	16.1	23.4	8.2	13.3	21.9	11.6
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	4.24	6.17	8.20	9.04	10.15	8.29	4.50	11.96	8.08	7.55	7.28	9.49	8.50	8.75	16.62	9.68
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.07	7.82	6.65	6.78	6.39	7.49	5.45	6.50	7.23	6.17	6.57	6.80	6.99	7.17	6.24	6.23
Specific Conductance	uS/cm	--	--	--	--	--	--	203.0	955.0	480.0	262.0	670.0	320.0	845.0	999.0	611.0	371.0	0.6	569.0	436.2	588.0	574.0	483.4
INORGANICS																							
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	12	14	14	14	6	22	7	30	21	<5	13	16	13	13	27	14
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	34	224	116	52	190	99	258	243	104	70	210	132	93	154	164	92
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	94	18	14	18	7	7	19	6	8	18	8	8	6	17	13	26
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	0.61	1.00	0.64	1.89	1.11	2.57	0.34	1.22	0.47	1.97	0.53	0.59	1.63	1.01	0.47	2.61
Nitrate (N)	mg/L	0 05	--	13	--	13	--	--	1.00	0.64	1.89	1.11	2.57	0.34	1.22	0.47	1.97	0.53	0.59	1.63	1.01	0.41	2.61
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	0.06	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	0.06	0.04	0.16	<0.03	<0.03	0.04	0.04	0.05	<0.03	<0.03	<0.050	0.05	<0.03	0.05	0.05	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	0.4	4.2	0.7	--	0.5	<0.4	1.2	1.7	<0.4	0.3	8.0	0.7	1.2	1.1	0.6
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	11.0	3.7	22 8	4.8	3.1	4.5	2.9	6.9	4.7	4.7	2.2	7.6	6.5	3.9	5 3	7.6
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.43	6.70	7.20	7.20	6.92	7.11	6.49	6.42	7.42	6.41	6.95	7.30	7.15	6.94	7.42	6.96
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	7.6	30.7	22.1	14.5	22.0	17.6	21.8	23.9	27.6	12.6	27,000.0	20.3	15.9	20.6	17.2	17.9
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	2.3	4.2	3.6	2.2	2 8	2.7	4.0	4.2	3.8	2 2	3,800.0	3.4	1.9	2.9	3.4	2.6
Total Phosphorus	mg/L	0 002	--	--	--	0.01 note [6]	0.010	0.034	0.043	0.036	0.030	0 006	0.027	0.046	0.260	0.028	0.039	0.007	0.009	0.011	0.029	0.011	0.012
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	2.1	3.2	3.6	2.5	2.6	2.8	2.9	3.1	3.7	3 0	3,300.0	2.8	1.6	2.8	2.6	2.7
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	22.7	124.0	62 2	32.3	95.1	51.7	170.0	147.0	88.1	62.7	110.0	102.0	57.8	96.4	81.1	65.6
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	6.9	4.9	0.7	6.3	5.1	8.6	7.0	2.1	2.5	6 9	3.6	4.9	6.9	4.2	1 3	6.7
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	13	5	165	<5	<5	<5	<5	626	<5	<5	<1.0	<5	6	29	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	21	26	25	23	26	29	33	29	20	27	27	31	30	28	23	41
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	3.3	4.1	23.0	2.3	1.8	1.6	0.7	42.7	10.1	1.6	0.3	2.8	2.4	15.8	3.0	3.3
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	190	813	482	255	732	433	840	819	605	394	790	575	462	582	739	371
Calculated Parameters																							
Anion Sum	me/L	N/A	--	--	--	--	--	1.69	7.21	4.12	2.36	6.10	4.02	8.13	8.15	3.80	2.68	6.77	4.73	3.62	5.26	5.68	3.91
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	12	14	14	14	6	22	7	30	21	<5	13	16	13	13	27	14
Calculated TDS	mg/L	1	--	--	--	--	--	109	426	246	144	347	229	496	477	262	187	400	305	216	321	310	242
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1.0	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.70	7.40	4 30	2.43	5.55	3.51	8.90	8.24	5.64	3.64	6.69	5.86	3.52	5.78	4.76	4.06
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	29.00	94.00	70.00	45.30	66 50	55.10	70.90	77.00	84.60	40.50	84.00	64.70	47.50	63.40	56.90	55.40
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.29	1.30	2.20	1.40	4.70	6.80	4.50	0.60	19.40	15.20	0.59	10.60	1.40	4.70	8.80	1.80
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.95	-2.32	-1 94	-2.10	-2.60	-1.93	-2.98	-2.38	-1.45	-3.41	-1.95	-1.82	-2.16	-2.27	-1.55	-2.27
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.20	-2.64	-2 26	-2.42	-2.92	-2.25	-3.30	-2.70	-1.77	-3.73	-2.20	-2.14	-2.48	-2.59	-1.87	-2.59
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.38	9.02	9.14	9.30	9.52	9.04	9.47	8.80	8.87	9 82	8.90	9.12	9.31	9.21	8 97	9.23
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.63	9.34	9.46	9.62	9 84	9.36	9.79	9.12	9.19	10.10	9.15	9.44	9.63	9.53	9 29	9.55
Metals (ICP-MS)																							
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	218	227	252	107	447	31	1,400	46	109	59	--	66	1,420	--	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	225	201	116	133	134	119	185	157	80	150	--	111	127	--	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	11	17	22	10	22	18	22	20	21	<50	--	9	14	--	--
Total Cadmium (Cd)	µg/L	0 017	0.01	0.09	--	.04 - 0.16 note	--	--	0.538	0.171	0.168	0 300	0.236	0.148	0.171	0.031	0.079	0.150	--	0.176	0.426	--	--
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	--	<1	<1	<1	<1	1	<1	<1	<1	<1	<1.0	--	<1	3	--	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	1	<1	<1	<1	<1	<1	<1	<1	<0.40	--	<1	2	--	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [9]	--	3	<2	3	16	2	6	2	2	<1	4	2	3	3	10	<1	3
Total Iron (Fe)	µg/L	50	300	300	--	300	--	2,150	347	1,320	500	194	890	157	2,000	207	229	170	671	171	1,940	374	223
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [9]	--	--	0.8	0.7	1.0	<0.5	1.4	<0.5	1.8	<0.5	<0.5	<0.5	--	<0 5	3.4	--	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	129	182	485	120	87	89	26	71	182	36	110	371	61	444	148	35
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	<2	<2	<2	<2	<2	<2	3	<2	<2	<2.0	--	<2	3	--	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	--	<1	<1	--	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	112	94	60	93	90	96	116	111	54	120	--	43	89	--	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2	--	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	4	3	7	3	11	2	22	<2	3	<2	--	<2	31	--	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1	0.2	--	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	4	--	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	9	79	92	39	57	49	26	17	8	23	27	17	16	64	7	52
MICROBIOLOGICAL																							
Total Coliform	MPN/100mL	1	--	--	--	--	--	--	>2420	>2420	2,420	866	>2420	866	>2420	961	>2420	---	>2420	>2420	>2420	>2420	>2420
E. coli	MPN/100mL	1	--	--	400	--	--	<100	<1	2	19	3	86	<1	<1	7	1,730	<10	19	6	<1	40	50
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.99	2.44	32.52	1.80	1.54	2.30	0.12	99.13	2.54	0.96	0.69	3.14	4.94	5.43	4.57	1.55
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	2.08	2.71	31.31	2.15	1.77	2.50	0.11	98.00	2.51	0.96	0.68	3.10	2.71	6.73	5.23	1.61

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[9] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Table F4: Statistical Presentation of Key Water Quality Parameters - LU

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Larry Uteck Blvd																
Sample Site - LU											LU													
Sampling Date	yyyy-mm-dd							2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22
Sampling Time	hh:mm							11:25	10:15 AM	12:00	10:00	8:40	12:25 PM	3:20PM	11:45 AM	12:15 PM	11:00 AM	11:00 AM	12:22 PM	10:05 AM	10:18 AM	10:08 AM	10:45 AM	9:35 AM
FIELD DATA																								
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	18.2	22.4	13 3	14.3	23.1	12.4	13.8	25 8	10.8	24.5	21.6	10 2	16.4	18.8	14.0	18.3	21.0
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	9.56	8.34	7.43	11.34	6.76	9.79	**	5.54	10.30	3.53	6.44	8.12	18.71	10.02	12.39	7.40	3.55
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.80	7.11	6.90	6.73	6.85	7.09	7.22	6.92	6.62	6.36	6.24	6.27	6.89	6.03	6.33	7.51	7.60
Specific Conductance	uS/cm	--	--	--	--	--	--	755.0	660.0	590.0	434.6	588.0	384.4	621.0	710.0	196.0	945 0	710.0	511.8	618.0	507.0	503.0	770.0	190.0
INORGANICS																								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	13	27	20	11	23	13	10	23	10	26.0	21.0	17 0	15	17	24	12	24
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	247	154	143	96	124	74	174	202	75	297	221	147	189	132	153	243	167
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.12	--	<0.12
Colour	TCU	5	--	--	--	--	--	12	12	8	28	21	24	18	14	16	17	16	11	6.12	26.2	12.2	14.7	24.6
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	1.35	0.87	1.72	1.01	0.41	1.26	1.27	0.37	1.77	0.20	0.24	1.23	0.69	1.09	0.71	0.41	0.24
Nitrate (N)	mg/L	0 05	--	13	--	13	--	1.01	0.51	1.72	0.87	0.16	1.26	0.80	0.30	1.24	0.20	0.24	1.23	0.60	1.09	0.71	0.41	0.24
Nitrite (N)	mg/L	0 05	--	0.06	--	0.06	--	0.34	0.36	<0.05	0.14	0.25	<0.05	0.47	0.07	0.53	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	<0.03	0.09	0.04	<0.03	0.17	<0.03	<0.03	0.09	0.15	0.24	0.11	<0.03	<0.03	<0.03	<0.03	<0.03	0.14
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.7	3.8	0.6	1.1	0.6	<0.4	0.6	<0.4	0.7	<0.4	1.60	6.40	0.27	<0.10	<0.10	0.34	0.77
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.1	6.8	5.4	9.3	5.5	5.0	4.3	5.7	3.9	4.80	6.60	3.90	5.7	3.5	4.4	4.8	6.3
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.13	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.26	7.40	7.13	7.01	7.46	7.29	7.17	7.45	7.01	7.37	7.28	7.19	7.36	6.75	7.38	7.13	6.73
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	25.7	23.8	22.8	12.7	20 8	14.9	25.2	30.2	9.6	33.4	33.7	16.7	20.2	19.8	18.0	20.1	18.7
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	3.8	3 0	2.5	1.6	2.7	2.1	3 5	4.2	1.5	4.6	18.0	2.3	2.7	2.8	2.4	2.9	2.8
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.024	0.027	0.008	0.078	0.019	0.021	0.010	0.014	0.013	0.011	0.013	0.160	0.007	0.018	0.011	0.019	0.062
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	3.2	3 0	2.6	2.2	2.9	2.3	3 2	3.4	1.7	3.4	3.2	2.5	2.3	2.7	2.2	2.8	2.7
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	137.0	113.0	86.9	73.0	94.7	69.9	159.0	129.0	44.0	183.0	150.0	86.1	120	102	81.2	119	91
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	4.6	3.6	5.9	3.5	5.4	4.7	3.7	3.0	4.4	3.8	1.8	5.2	4.0	6.8	3.2	3.5	3.4
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	22	16	<5	52	11	<5	7	6	<5	<5	<5	<5	<5	8	<5	<5	6
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	32	18	33	19	15	24	22	23	23	21 0	23.0	30.0	25	27	29	22	17
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	7.3	6.6	3.0	21.4	2.4	4.5	3.6	3.7	3.8	3.6	2.4	1.7	1.6	2.9	1.4	2.2	2.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	849	673	610	518	620	422	871	765	256	1,030	928	558	717	620	568	758	605
Calculated Parameters																								
Anion Sum	me/L	N/A	--	--	--	--	--	7.99	5.32	5.24	3.40	4.3	2.9	5.7	6.7	2.9	9.35	7.15	5.20	6.20	4.70	5.45	7.58	5.56
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	13	27	20	11	23	13.0	10.0	23.0	10.0	26	21	17	15	17	24	12	24
Calculated TDS	mg/L	1	--	--	--	--	--	463	341	311	216	277	201.0	399.0	408.0	169.0	561	449	301	372	302	304	419	316
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	7.65	6.74	5.21	4.04	5.52	4.1	8.6	7.6	2.6	10.20	8.61	4.86	6.53	5.77	4.70	6.51	5.23
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	79.80	71 80	67.20	38.3	63.1	45.9	77.3	92.7	30.1	102.0	99.0	51.2	61.6	61.0	54.8	62.1	58.2
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	2.20	11 80	0.30	8.7	12 5	15.9	20.4	6.5	5.8	4.2	9.3	3.4	2.6	10.2	7.4	7.6	3.0
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-1.87	-1.43	-1.85	-2.47	-1.49	-2.0	-2.1	-1.4	-2.6	-1.35	-1.52	-1 99	-1.80	-2.36	-1.62	-2.14	-2.26
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-2.19	-1.75	-2.17	-2.79	-1.81	-2.4	-2.4	-1.7	-2.9	-1.67	-1.84	-2 31	-2.12	-2.68	-1.94	-2.46	-2.58
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.13	8.83	8.98	9.48	8.95	9.3	9 3	8.8	9.6	8.72	8.80	9.18	9.16	9.11	9.00	9.27	8.99
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.45	9.15	9.30	9.80	9.27	9.7	9.6	9.1	10.0	9.0	9.1	9.5	9.48	9.43	9.32	9.59	9.31
Metals (ICP-MS)																								
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	61	978	29	231	94	--	84	31	169	32	--	--	52	--	--	*56*	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	132	--	111	110	143	--	135	184	63	350.0	--	--	116	--	--	118	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<5	--	19	9	16	--	11	16	10	13 0	--	--	11	--	--	9	--
Total Cadmium (Cd)	µg/L	0 017	0.01	0.09	--	.04 - 0.16 note	--	0.069	--	0.052	0.140	<0.09	--	0.120	<0.09	<0.09	0.025	--	--	<0.09	--	--	<0.09	--
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	<1	--	1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [9]	--	<1	14	3	4	2	5	3	2	4	<1	1	3	2	3	2	2	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	<50	3,540	289	494	1,090	206	290	556	313	1,210	429	432	289	650	231	235	*633*
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [9]	--	<0.5	--	<0.5	1.3	<0.5	--	<0.5	<0.5	0.8	<0.5	--	--	<0.5	--	--	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	77	1,870	91	91	240	40	51	66	33	291	18	63	77	103	59	58	147
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	<2	--	<2	<2	2	--	10	<2	3	3.0	--	--	3	--	--	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	104	--	111	56	115	--	107	134	58	146 0	--	--	96	--	--	95	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	<2	6	2	--	<2	<2	4	2 0	--	--	<2	--	--	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.2	--	--	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	3	--	<2	2	<2	--	5	<2	2	2 0	--	--	<2	--	--	2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	21	120	22	41	13	38	27	8	23	6 0	5	22 0	31	26	13	*13*	*10*
MICROBIOLOGICAL																								
Total Coliform	MPN/100mL	1	--	--	--	--	--	488	>2420	1,990	210	5020	330.0	540.0	NDOGT	984.0	>2420	>2420	921	<1	>200	>200	>200	18,700
E. coli	MPN/100mL	1	--	--	400	--	--	6	51	4	<1	20	30	<10	26	8	11	2	<1	<1	60	70	32	500
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	2.41	4.41	3.78	10 9	3.4	2.37	7.5	5.3
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	25.83	21.03	2.47	78.76	5.50	2.39	4.19	6.38	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0 05	--	--	--	--	--	31.14	24.37	2.85	131.56	--	*	4.24	6.19	--	--	--	--	--	--	--	--	--

Notes

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RDL = Reported Detection Limit (represents most recent sampling event)

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[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Table F4: Statistical Presentation of Key Water Quality Parameters - LU

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Larry Uteck Blvd			
Sample Site - LU								LU			
Sampling Date	yyyy-mm-dd							21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							10:25 AM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA											
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	13.8	18.3	17.7	14
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	7.47	9.02	4.91	7.65
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	8.80	6.79	6.35	6.98
Specific Conductance	uS/cm	--	--	--	--	--	--	419.6	661	--	--
INORGANICS											
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	16	13	17	24
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	97	164	52	52
Fluoride	mg/L	0.12	--	--	--	0.12	--	<0.12	<0.60	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	26.4	10	47.9	19.8
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	0.75	2.81	1.48	3.44
Nitrate (N)	mg/L	0 05	--	13	--	13	--	0.75	2.81	1.48	3.01
Nitrite (N)	mg/L	0 05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	0.43
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	0.06	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.33	0.28	--	0.65
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	5.9	8.1	9.5	5.5
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	***6.42***	6.79	6.35	6.98
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	11.8	18.3	9.1	12.1
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.9	2.6	1.4	1.8
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.030	0.008	<0.002	--
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	2.2	2.8	2	2.5
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	60	105	36.7	39.5
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.8	3.2	3.9	5.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	7	<5	10	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	21	26	14	18
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	3.8	1.3	6.6	12.1
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	420	--	--	--
Calculated Parameters											
Anion Sum	me/L	N/A	--	--	--	--	--	3.55	5.63	2.2	2.57
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	16	13	17	24
Calculated TDS	mg/L	1	--	--	--	--	--	207	339	133	157
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	3.45	5.78	2.31	2.61
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	37.3	56.4	28.5	37.6
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	1.5	1.4	2.3	0.7
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.92	-2.81	-2.94	-2.96
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.24	-3.13	-3.26	-3.19
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.34	9.26	9.41	9.23
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	9.66	9.58	9.73	9.46
Metals (ICP-MS)											
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	--	111	600	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	99	69	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	16	11	--
Total Cadmium (Cd)	µg/L	0 017	0.01	0.09	--	.04 - 0.16 note	--	--	0.1	<0.09	--
Total Chromium (Cr)	µg/L	1	--	8.9	--	--	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	3	<2	9	4
Total Iron (Fe)	µg/L	50	300	300	--	300	--	***360***	124	621	456
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	1.3	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	56	27	60	36
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	5 - 97.03 note	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	83	40	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<3	12	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	***18***	30	36	29
MICROBIOLOGICAL											
Total Coliform	MPN/100mL	1	--	--	--	--	--	12,300	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	500	9	148	38
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	6.1	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0 05	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake																		
Sample Site - PML-1								PML-1																		
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2012-10-11	2013-05-15	2013-08-15	2013-10-16	2014-05-15	2014-08-14	2014-10-27	2015-05-20	2015-08-25
Sampling Time	hh mm							13:45	13:00	13 00	13:35	15:15	13:00	13:00	16:50	17:00	12:50	10:55	10:51	11:35	10:45	10:30	14:45	12:35	12:45	08:45
FIELD DATA																										
Secchi Depth	Meters	--	--	--	1 2	--	--	3.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A
Water Temp	Celsius	--	--	--	--	--	--	15.7	17.1	16.2	13.2	22.7	9.1	10.3	22.1	13.6	8.3	14.9	11.6	22.5	12.3	12.1	23.6	12.4	15.1	24.0
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.56	8.10	6.90	8.76	7.83	10.43	10.39	8.17	9.54	8.41	8.60	9.98	7.65	9.90	12.08	7.49	8.06	7.16	8.04
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.39	6.57	6.64	7.06	7.35	5.89	6.28	6.20	6.11	7.58	6.63	6.39	7.20	6.32	6.60	7.42	6.60	6.90	6.34
Specific Conductance	uS/cm	--	--	--	--	--	--	561.0	279.0	223.0	265.0	234.0	124.5	176.6	173.6	105 5	366.0	186.4	215.1	199.0	250.5	431 0	263.0	210.0	0.2	432.1
INORGANICS																										
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	6	7	7	7	9	5	6	7	7	20	<5	<5	6	7	31	7	7	5	6
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	39	64	58	67	61	24	44	43	18	55	45	57	57	48	63	50	46	65	57
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	54	15	21	19	12	57	32	38	65	38	29	8	15	11	17	10	30	31	7
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	0.49	0.10	0.17	0.42	0.27	0.66	0.55	0.15	0.62	0.22	0.14	0.21	0.18	0.18	0.22	0.24	0.18	0.18	0.14
Nitrate (N)	mg/L	0 05	--	13	--	13	--	0.49	--	--	0.42	0.27	--	0.55	--	--	0.22	0.14	0.21	0.18	0.18	0.22	0.24	0.18	0.18	0.14
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	<0.05	<0.05	<0 05	<0.05	<0.05	<0.05	<0.05	0.06	<0 05	0.06	<0.03	<0.03	0.04	<0.03	0.04	<0.03	<0.03	<0.050	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.4	0.4	--	0.4	0.8	0.4	0.4	<5	0.5	1.2
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.5	3.6	4.7	0.7	3.3	6.7	4.6	5.0	8.3	5.7	5.3	4.2	4.1	5.1	4.0	2.0	4.4	2.7	5.4
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.010	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.36	6.75	6.79	6.63	7.04	6.58	6.54	6.83	6.67	6.60	6.80	6.71	6.92	6.88	6.66	7.00	6.64	6.67	6.95
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	4.5	6.9	6.4	8.4	9.0	5.9	6.0	5.0	4.6	6.0	6.0	6.8	6.6	6.9	6.9	9.1	7.0	6,900.0	7.8
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.6	1.1	1 0	1.3	1.2	0.8	1.0	0.9	0 8	1.0	1.1	1.0	0.9	1.5	1 3	1.4	1.0	970.0	1.4
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02	<0.02	0.002	0.018	0.002	<0.002	0.014	0.011	0.030	0 019	0.030	0.006	0.007	0.047	0.012	0 030	0.021	0.005	0.060
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	0.9	0 9	1.2	1.1	1.3	1.2	0.8	1.4	0.8	1.0	0.8	1.0	1.5	0.9	1 3	0.9	800.0	1.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	25.0	38.0	34.0	35.2	40.2	18.4	26.8	22.8	13.7	33.6	29.8	35.3	28.5	32.2	38.1	41.6	33.7	35.0	38.6
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	4.5	2.6	2 8	3.8	3.4	5.9	3.7	2.6	5.4	2.9	3.2	2.8	2.6	2.6	2.5	2.3	2.7	2.4	2.4
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<2	3	9	7	<2	<1	1	<2	5	9	6	<5	<5	23	6	<5	<5	1	149
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	13	11	11	13	12	12	12	10	12	7	10	8	10	10	10	8	8	8	9
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.4	0.5	0.6	8.2	0.9	0.5	0.6	1.0	1 2	0.7	1.0	0.7	1.1	19.2	1.4	0.9	1.5	0.5	3.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	170	250	230	260	250	130	180	170	100	214	179	227	218	209	230	261	224	240	246
Calculated Parameters																										
Anion Sum	me/L	N/A	--	--	--	--	--	1.51	2.18	1.99	2.34	2.15	1.09	1.62	1.56	0.92	2.11	1.49	1.79	1.95	1.71	2.62	1.73	1.62	2.11	1.93
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	6	7	7	7	9	5	6	7	7	20	<5	<5	6	7	31	7	7	5	6
Calculated TDS	mg/L	1	--	--	--	--	--	93	129	118	137	134	75	100	90	63	117	95	110	109	115	140	117	102	120	126
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<1.0	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.40	2.11	1.89	2.11	2.33	1.20	1.58	1.35	0.95	1 89	1.78	2.00	1.69	2.56	2.18	2.45	1.94	1.98	2.61
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	14.00	22.00	20.00	26.00	28.00	18.00	19.00	16.00	15 00	19.10	19.50	21.10	20.20	23.40	22.60	28.50	21.60	21.00	25.20
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	3.78	1.63	2.58	5.17	4.02	4.80	1.25	7.22	1.60	5 50	9.00	5.50	7.00	19.80	9.20	17.00	9.20	3.18	15.20
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.57	-2.90	-2.94	-2 96	-2.43	-3.25	-3.27	-2.94	-3.13	-2.91	-3.31	-3.35	-3.07	-3.03	-2.61	-2.79	-3.26	-3.13	-2.98
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.82	-3.15	-3.19	-3 21	-2.68	-3.50	-3.53	-3.19	-3 38	-3.23	-3.63	-3.67	-3.39	-3.35	-2.93	-3.11	-3.58	-3.38	-3.30
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.93	9.65	9.73	9.59	9.47	9.83	9.81	9.77	9.80	9 51	10.10	10.10	9.99	9.91	9.27	9.79	9.90	9.80	9.93
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.20	9.90	9.98	9.84	9.72	10.10	10.10	10.00	10.10	9 83	10.40	10.40	10.30	10.20	9.59	10.10	10.20	10.10	10.20
Metals (ICP-MS)																										
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	260	--	--	665	46	--	233	--	--	177	306	141	103	3,920	305	129	142	140	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	2	<2	<2	<2	<1.0	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	23	--	--	35	24	--	27	--	--	22	19	20	12	40	23	23	18	21	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1 0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	8	--	--	11	9	--	<50	--	--	6	9	6	8	9	8	13	11	<50	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	.04 - 0.16 note	--	<0.300	--	--	0.032	<0.017	--	<0.017	--	--	<0.017	0.066	0.021	0.018	0.430	<0 017	0 020	<0.017	0.025	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	3	<1	<1	<1	<1.0	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	1	<0.4	--	<0.4	--	--	<1	2	<1	<1	9	<1	<1	<1	<0.40	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2	--	--	2	<2.0	<2.0	4	<2 0	2	<2	<2	<2	1	6	1	<1	2	<2.0	3
Total Iron (Fe)	µg/L	50	300	300	--	300	--	140	--	--	837	89	161	141	315	528	137	742	130	205	5,300	239	296	182	93	4,460
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	1.7	<0.5	--	<0.5	--	--	<0.5	0.9	<0.5	<0.5	13.5	0.9	<0.5	<0.5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	17	--	--	142	69	41	14	128	62	48	214	33	58	693	54	260	49	34	296
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	2	<2	<2	9	<2	<2	<2	<2.0	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	18	--	--	36	37	--	25	--	--	26	30	31	25	34	35	37	30	32	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	--	8	<2.0	--	4	--	--	<2	4	<2	<2	65	4	<2	3	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	10	<2	<2	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	8	--	--	10	5	6	6	6	5	<5	13	8	<5	62	<5	<5	6	11	13
MICROBIOLOGICAL																										
Total Coliform	MPN/100mL	1	--	--	--	--	--	200	73	--	>250	>250	>250	85	>250	--	411	2,420	866	1,730	1,011	613	2,420	>2420	---	>2420
E. coli	MPN/100mL	1	--	--	400	--	--	33	45	--	19	>250	2	2	34	<100	2	20	12	4	6	6	10	10	<10	3
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.62	2.31	0.57	0 82	1.12	0.07	2.85	0.86	0.15	1.03	0.69	1.17	1.10	5.07	0.67	0.64	0 91	0.57	8.84
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.64	2.21	0.64	0.74	1.04	0.06	2.75	0.76	0.15	1.10	0.91	1.37	1.10	6.39	0.65	0.65	0.87	0.54	9.54

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake																		
Sample Site - PML-1								PML-1																		
Sampling Date	yyyy-mm-dd							2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-08	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20	29-Oct-20	27-May-21	09-Aug-21	22-Oct-21
Sampling Time	hh mm							8:20	13:15	9:30	9:15	13:40	13:45	13:25	13:00	11:40	14:45 PM	1:10PM	4:20 PM	2:45 PM	8:20 AM	9:07 AM	10:02 AM	8:13 AM	8:39 AM	8:44 AM
FIELD DATA																										
Secchi Depth	Meters	--	--	--	1 2	--	--	2.9	2.7	4 2	3.8	4.1	4.7	3.9	4.1	2.4	2.9	1.9	4.30	N/A	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	9.3	12.8	21.6	12.1	17.2	23.0	14.4	14.4	24.7	12.3	12.0	28.1	11.1	23.1	23.5	10 5	15.8	21.9	13.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	8.63	8.84	6.53	12.96	6.97	7.76	8.19	9.44	5.57	8.36	**	6.07	9.20	8.35	6.72	10.80	16.27	9.16	20.65
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.98	7.57	5.94	4.63	6.91	6.74	7.31	6.29	6.75	7.19	7.38	6.53	7.05	5.77	5.62	6.56	**6.10**	5.35	**5.60**
Specific Conductance	uS/cm	--	--	--	--	--	--	289.1	231.0	289.0	234.3	234.0	273.0	255.0	203.7	203 8	208.1	177.9	257.0	201.0	267.0	271 0	224.5	199.0	219.0	266.0
INORGANICS																										
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	6	<5	8	7	<5	13	9	<5	10	8	<5	11	6	8.0	9.0	5.0	6	9	13
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	56	59	67	50	66	63	59	57	54	47	55	64	53	74	72	60	55	50	55
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.12
Colour	TCU	5	--	--	--	--	--	15	18	16	20	20	18	24	28	7	31	46	16	21	14	15	14	15.0	8.19	7.50
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	0.24	0.19	0.09	0.16	0.28	0.28	0.20	0.51	0.15	0.24	0.18	0.05	0.49	0.13	<0.05	0.19	0.20	0.21	0.25
Nitrate (N)	mg/L	0 05	--	13	--	13	--	0.24	0.19	<0 05	0.16	0.17	0.13	0.20	0.40	0.05	0.24	0.18	0.05	0.49	0.13	<0.05	0.19	0.20	0.21	0.25
Nitrite (N)	mg/L	0 05	--	0.06	--	0.06	--	<0.05	<0.05	0.09	<0.05	0.11	0.15	<0.05	0.11	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	0.03	0.06	<0 03	<0.03	<0.03	<0.03	0.05	<0.03	0.04	<0.03	<0.03	0.10	0.08	0.07	0.10	<0.03	0.04	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	6.0	2.6	3.4	0.4	0.5	0.8	1.1	<0.4	<0.4	<0.4	0.6	<0.4	0.7	<0.4	1.00	0.60	0.11	<0.10	<0.10
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	5.8	7.1	6.1	8.7	5.7	4.7	6.3	4.9	3.2	4.0	4.2	4.2	4.4	3.10	4.10	4.30	4.6	2.9	14.8
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.84	6.36	6.86	6 87	6.80	7.15	6.75	6.84	7.28	7.16	6.78	7.22	6.85	7.01	7.11	6.85	6.80	6.50	7.15
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	4.8	7.9	10.5	7.6	8.0	8.2	9.5	6.3	8.7	8.4	7.0	8.3	5.3	8.8	8.2	7.4	8.9	7.8	9.9
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.9	1.5	1.8	1.3	1.3	1.2	1.5	1.1	1.4	1.4	1.2	1.3	0.9	1.3	61.0	1.1	1.2	1.3	1.3
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.018	0.173	0.104	0.013	0.041	0.036	0.099	0.032	0.011	0 012	0.007	0.008	0.012	<0.006	0.011	0.020	0.017	0.01	0.010
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.6	1.0	1 3	1.1	1.0	1.1	1.3	0.9	1.2	1.1	0.9	1.2	0.8	0.9	1.1	1.0	1.0	0.9	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	25.6	37.6	35.1	32.1	40.9	45.3	36.0	35.5	37.5	39 2	42.6	45.4	27.8	41.6	8.2	36 3	35.4	32.8	31.6
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.5	2.5	0 8	2.7	1.9	1.3	1.8	2.7	1.2	2.3	2.3	0.9	2.5	0.9	0.7	2.3	2.7	4.3	2.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	6	531	10	18	20	5	104	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	8	11	11	11	10	9	11	9	7	9	7	9	10	9.0	19.0	10 0	8	9	11
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	24.2	199.0	112.0	2.6	3.3	3.2	31.3	0.7	0 5	2.1	1.2	1.2	1.7	1.1	1.0	0.6	0.6	0.7	<0.5
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	241	224	310	189	256	277	248	242	274	232	256	264	156	298	334	243	227	238	238
Calculated Parameters																										
Anion Sum	me/L	N/A	--	--	--	--	--	1.88	1.91	2.29	1.79	2.09	2.24	2.09	1.83	1.88	1.7	1.7	2.2	1.9	2.44	2.61	2.01	1.85	1.79	2.06
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	6	<5	8	7	<5	13	9	<5	10	8.0	<5	11.0	6.0	8	9	5	6	9	13
Calculated TDS	mg/L	1	--	--	--	--	--	109	141	148	108	129	137	142	112	117	112.0	115.0	136.0	104.0	141	156	120	114	108	119
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	1.93	3.54	3.33	1.93	2.35	2.53	3.15	1.99	2.23	2.3	2.4	2.6	1.6	2.40	2.68	2.08	2.14	1.96	2.01
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	15.70	25.90	33.60	24.30	25.30	25.40	29.90	20.3	27.5	26.7	22.4	26.1	16.9	27.3	26.7	23 0	27.2	24.8	30.1
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	1.20	30.00	18.60	3.80	5.80	6.10	20.30	4.2	8.4	14.9	15.7	6.9	7.7	0.9	1.4	1.5	7.1	4.3	1.2
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.29	-3.65	-2.82	-2.99	-3.20	-2.42	-2.92	-3.26	-2 37	-2.6	-3.3	-2.4	-3.2	-2.74	-2.63	-3.18	-3.07	-3.24	-2.34
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.61	-3.97	-3.14	-3.31	-3.52	-2.74	-3.24	-3.58	-2.69	-2.9	-3.6	-2.7	-3.6	-3.06	-2.95	-3.50	-3.39	-3.56	-2.66
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	10.10	10.00	9.88	9 86	10.00	9.57	9.67	10.1	9.65	9.8	10.1	9.6	10.1	9.75	9.74	10.00	9.87	9.74	9.49
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.50	10.30	10 00	10.20	10.30	9.89	9.99	10.4	9.97	10.1	10.4	10.0	10.4	10.1	10.1	10 3	10.2	10.1	9.81
Metals (ICP-MS)																										
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	2,320	7,690	--	--	250	94	4,190	151	26	--	139	25	133	35	--	--	114	--	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	4	--	--	<2	--	3	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	34	60	--	--	22	--	58	19	12	--	21	16	17	25.0	--	--	22	--	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<5	10	--	--	<5	--	12	6	11	--	7	10	7	8.0	--	--	14	--	--
Total Cadmium (Cd)	µg/L	0 017	0.01	0.09	--	.04 - 0.16 note	--	0.146	0.227	--	--	0.041	--	0.179	<0.09	<0 09	--	<0.09	<0.09	<0.09	<0.017	--	--	<0.09	--	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	2	6	--	--	<1	--	5	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	3	6	--	--	<1	--	6	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	4	10	<1	<1	<1	<1	8	<1	<1	1	1	<1	1	<1	<1	<1	1	1	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	6,020	13,600	8,250	171	206	359	12,600	93	184	82	136	187	108	164	224	108	169	74	65
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	6.3	13.9	--	--	<0.5	--	9.1	1.2	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	278	424	281	53	64	125	894	21	64	22	26	115	28	220	61	21	52	25	19
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	5	7	--	--	22	--	6	2	<2	--	5	2	<2	<2	--	--	60	--	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	1	1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	--	<1	--	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	22	40	--	--	34	--	47	27	42	--	35	37	30	38.0	--	--	37	--	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--	--	<2	--	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	25	106	--	--	2	--	75	<2	<2	--	<2	<2	2	<2	--	--	<2	--	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	0.6	0.9	--	--	<0.1	--	0.6	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.2	--	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	7	16	--	--	<2	--	12	<2	<2	--	2	<2	<2	<2	--	--	<2	--	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	12	34	20	<5	11	<5	29	6	6	<5	7	<5	<5	<5	<5	<5	120	<5	<5
MICROBIOLOGICAL																										
Total Coliform	MPN/100mL	1	--	--	--	--	--	>2420	>2420	1,410	>2420	665	>2420	166	9	400	4,000.0	128	500	864	166	548	250	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	6	>2420	34	10	6	2	<1	1	10	13	<1	4	14	3	10	2	2	23	2
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32	1.89	1.1	0.63	0.47	1.1	<0.25
Chlorophyll A - Acidifica ion method	µg/L	0 05	--	--	--	--	--	4.67	8.00	4.71	1.70	4.97	4.40	4.86	1.93	1.14	1.12	1.53	1.84	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0 05	--	--	--	--	--	3.69	12.31	10.82	1.76	6.45	4.96	6.58	0.98	--	*	1.44	1.56	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-1

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake						
Sample Site - PML-1								PML-1						
Sampling Date	yyyy-mm-dd							31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23	20-Nov-23
Sampling Time	hh mm							9:04 AM	8:35 AM	9:15 AM	11:20 AM	12:25 PM	1:40 PM	11:30 AM
FIELD DATA														
Secchi Depth	Meters	--	--	--	1 2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	17.0	22.5	14.3	17.7	19.7	15.2	--
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	8.67	6.70	9.57	9.16	8.19	9.37	--
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	7.61	7.53	***9.61***	***6.80***	***6.66***	***6.95***	--
Specific Conductance	uS/cm	--	--	--	--	--	--	308.0	75.0	275.3	240.5	144.9	--	--
INORGANICS														
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	7	14	11	6	9	13	--
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	86	78	62	59	30	33	--
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	<0.12	<0.12	<0.12	<0.12	<0.12	--
Colour	TCU	5	--	--	--	--	--	19	7.76	13.5	17.4	56.4	40.3	--
Nitrite + Nitrate	mg/L	0 05	--	--	--	--	--	0.23	0.11	0.21	0 26	0.39	0.59	--
Nitrate (N)	mg/L	0 05	--	13	--	13	--	0.23	0.11	0.21	0 26	0.39	0.27	--
Nitrite (N)	mg/L	0 05	--	0.06	--	0.06	--	<0.05	<0.05	<0 05	<0.05	<0.05	0.32	--
Nitrogen (Ammonia Nitrogen)	mg/L	0 03	--	--	--	1.15 note [5]	--	<0.03	0.2	0.04	<0.03	<0.03	<0.03	--
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	0.18	0.29	0.16	<0.10	--	0.27	--
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.8	3.5	4.1	6.2	8.8	6.2	--
Orthophosphate (as P)	mg/L	0 01	--	--	--	--	--	0.13	<0.01	<0 01	0 01	<0.01	<0.01	--
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.98	7.12	7.18	6 80	6.66	6.95	--
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	9.2	9.8	8 5	6.8	5.1	5.7	--
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.4	1.6	1.4	1.2	0.9	0.9	--
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.015	0.070	0.030	0.007	0.005	--	0.021
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.3	1.4	1 3	1	1	1.1	--
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	49	49	38	37.5	21	21.9	--
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	3.2	2.2	1 8	1.9	2.9	3.4	--
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	--
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	10	9	10	8	7	7	--
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	0.5	0.7	0.9	0.8	0.8	--
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	320	323	256	--	--	--	--
Calculated Parameters														
Anion Sum	me/L	N/A	--	--	--	--	--	2.79	2.68	2.19	1 97	1.20	1.38	--
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	7	14	11	6	9	13	--
Calculated TDS	mg/L	1	--	--	--	--	--	162	158	129	119	73	80	--
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	--
Cation Sum	me/L	N/A	--	--	--	--	--	2.76	2.81	2.24	2.12	1.30	1.37	--
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	28.7	31.1	27.0	21.9	16.4	17.9	--
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	0.6	2.5	1 0	3.6	4.0	0.5	--
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.82	-2.35	-2.45	-3.74	-3.50	-2.37	--
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.14	-2.67	-2.77	-4.06	-3.82	-2.61	--
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.80	9.47	9.63	9.98	9.91	9.79	--
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.1	9.8	10.0	10.3	10.2	10.0	--
Metals (ICP-MS)														
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based	--	***91***	--	--	154	189	--	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<2	<2	--	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2	--	--	<2	<2	--	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	34	--	--	21	16	--	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<2	<2	--	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	8	--	--	7	7	--	--
Total Cadmium (Cd)	µg/L	0 017	0.01	0.09	--	.04 - 0.16 note	--	<0.09	--	--	<0.09	<0.09	--	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<1	--	--	<2	<2	--	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	<1	<1	--	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	<1	<1	<2	<2	<2	--
Total Iron (Fe)	µg/L	50	300	300	--	300	--	121	139	86	87	256	182	--
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	<0.5	<0.5	--	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	64	126	21	27	65	33	--
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2	<2	--	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note	--	<2	--	--	<2	<2	--	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<1	--	--	<1	<1	--	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<2	--	--	<0.1	<0.1	--	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	41	--	--	34	26	--	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	--	<3	<3	--	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.2	--	--	<0.2	<0.2	--	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	<5	<5	5	<5	22	--
MICROBIOLOGICAL														
Total Coliform	MPN/100mL	1	--	--	--	--	--	>200	2,500	5,500	>200	>200	>200	--
E. coli	MPN/100mL	1	--	--	400	--	--	29	48	44	3	27	12	--
Chlorophyll A - Spectrophotometer	µg/L	0 25	--	--	--	--	--	0.9	2.9	<0.3	--	--	--	--
Chlorophyll A - Acidifica ion method	µg/L	0 05	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0 05	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake															
Sample Site PML-2								PML-2															
Sampling Date	yyyy-mm-dd							2009-06-29	2009-08-13	2009-10-01	2010-05-31	2010-08-24	2010-11-01	2011-05-13	2011-08-14	2011-10-16	2012-05-01	2013-05-15	2013-10-16	2014-05-15	2014-08-14	2014-10-27	2015-05-20
Sampling Time	hh:mm							13:15	13:40	13:45	14:30	16:20	13 00	12:40	16:20	16:15	13:16	13:40	11:20	11:00	9:20	8:30	11:30
FIELD DATA																							
Secchi Depth	Meters	--	--	--	1.2	--	--	2.8	2 2	2.3	N/A	3.0	2 0	2.2	2.3	2.2	2.4	3.2	N/A	N/A	N/A	3.1	NCC
Water Temp	Celsius	--	--	--	--	--	--	14.8	24.2	19.7	17 8	25.3	10.1	10.9	23.1	15.2	11.6	14.8	12.6	14.4	21.1	12.1	15.1
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.20	8.30	8.40	8.78	8.09	10 58	9.88	8.70	8.94	7.75	9.26	8.90	12.44	6.95	7.92	8.06
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6.5 - 9.0	--	6.36	6.82	6.84	7.09	7.39	6.53	6.31	6.67	6.13	8.61	6.49	6.13	6 50	7.22	5.92	6.56
Specific Conductance	uS/cm	--	--	--	--	--	--	267.0	264.0	241.0	237.0	234.0	200.5	158.7	173.2	155.9	231.0	234.0	250.5	966 0	266.0	215.0	0.2
INORGANICS																							
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	6	8	7	<5	8	7	21	<5	8	32	10	26	<5.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	63	63	58	62	58	50	44	43	34	55	63	64	245	50	42	69
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	22	17	19	20	13	23	35	38	48	39	18	8	6	7	31	26
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.14	0.07	0.09	0.19	0.11	0.23	0.33	0.14	0.22	0.24	0.22	<0.05	0.13	0.18	0.18	0.11
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.14	--	--	0.19	0.11	--	0.33	--	--	0.24	0.22	<0.05	0.13	0.18	0.18	0.11
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05	<0 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.03	0.03	0.23	0 05	0.03	<0.03	<0.050
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.4	--	1.7	<0.4	0.4	<5	0.2
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	3.6	2.6	4.5	3.2	3.4	3.6	4.0	6.0	5.6	5.9	4.4	4.0	2.7	2.4	5.8	2.8
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.50	6.81	6.82	6.66	7.02	6.83	6.37	6.60	6.60	6.60	6.68	6.73	7.13	7.04	6.77	6.64
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	6.1	7.1	6.1	7.2	7.7	8.0	5.3	4.8	5.0	6.1	6.7	7.7	19.2	8.8	6.9	7,300.0
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.1	1.1	1.1	1 3	1.2	1.2	0.9	0.9	0.9	1.0	1.0	1.4	1.7	1.4	1.0	1,000.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02	<0 02	0.002	0.010	0.002	<0.002	0.009	0 009	0.007	0.025	0.006	0.026	0.011	0.026	0.018	0.008
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.9	1.0	0.9	1.0	0.9	1 0	0.9	0.8	1.0	0.8	0.8	1.3	1.4	1.2	1.1	830.0
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	35.0	40.0	34.0	31.1	35.1	30.8	25.7	21.3	20.9	34.6	37.5	42.0	133.0	42.6	33.9	38.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.6	2.5	2.3	2.6	2.3	3 3	2.9	2.5	3.0	2.8	2.7	4.2	2.4	2.3	2 9	1.9
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	2	3	<1	15	<2	11	<1	8	<1	<5	<5	<5	16	<5	<5	1
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	11	11	11	10	10	10	9	10	9	7	9	11	27	7	7	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.8	0.7	0.6	1.0	0.8	0.4	0.4	3.4	0.5	0.7	1.0	3.3	2.6	0.7	1 0	0.9
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	240	250	230	230	230	210	170	170	150	213	254	277	777	273	212	260
Calculated Parameters																							
Anion Sum	me/L	N/A	--	--	--	--	--	2.11	2.17	1.99	2 07	2.01	1.77	1.46	1.58	1.30	2.13	1.98	2.19	8.12	1.77	1.86	2.13
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	6	8	7	<1	8	7	21	<5	8	32	10	26	<1.0
Calculated TDS	mg/L	1	--	--	--	--	--	123	131	117	120	120	110	91	89	79	119	119	137	448	118	109	130
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10	<10	<1.0
Cation Sum	me/L	N/A	--	--	--	--	--	1.94	2.23	1.88	1 88	2.03	1.86	1.48	1.28	1.27	1.94	2.09	2.55	6 96	2.47	1.95	2.14
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	20.00	22.00	20.00	23.00	24.00	25 00	17.00	15.00	16.00	19.30	20.80	25.00	54.90	27.70	21 30	23.00
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	4.20	1.36	2.84	4 81	0.50	2.48	0.68	10.50	1.17	4.80	2.80	7.50	7.70	16.50	2.20	0.23
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.33	-2.83	-2.93	-3.06	-2.55	-2.80	NC	-3.18	-3.17	-2.89	-3 39	-3.08	-1.73	-2.61	-2.57	NC
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.59	-3 08	-3.18	-3.31	-2.80	-3.05	NC	-3.43	-3.42	-3.21	-3.71	-3.40	-2.05	-2.93	-2.89	NC
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.83	9.64	9.75	9.72	9.57	9.63	NC	9.78	9.77	9.49	10.10	9.81	8 86	9.65	9.34	NC
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.10	9.89	10.00	9 97	9.82	9.88	NC	10.00	10.00	9.81	10.40	10.10	9.18	9.97	9.66	NC
Metals (ICP-MS)																							
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	130	--	--	1,030	56	--	202	--	--	189	131	107	181	52	122	130
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<1.0
Total Arsenic (As)	µg/L	2	5.0	5 0	--	5	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<1.0
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	16	--	--	23	12	--	23	--	--	22	22	37	50	27	19	25
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2	--	--	<1.0	<1.0	--	<1 0	--	--	<2	<2	<2	<2	<2	<2	<1.0
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2.0
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	5	--	--	8	9	--	<50	--	--	6	6	9	7	13	11	<50
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	<0.300	--	--	0.037	<0.017	--	0.028	--	--	0.023	0.039	0.060	0.062	0.019	0.018	0.023
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2	--	--	<1 0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1.0
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1	--	--	1	<0.4	--	<0.4	--	--	<1	<1	2	<1	<1	<1	<0.40
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<2	--	--	3	<2	<2	<2	<2	<2	<2	<2	1,380	1	<1	2	<2.0
Total Iron (Fe)	µg/L	50	300	300	--	300	--	100	--	--	1,090	151	76	143	699	181	178	181	1,760	264	316	134	170
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	<0.5	--	--	2.4	<0.5	--	<0.5	--	--	<0.5	<0 5	49.7	0.7	<0.5	<0.5	<0.5
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	58	--	--	159	81	28	34	89	31	22	87	866	206	278	24	43
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2.0
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	2	--	--	2	<2.0	--	<2.0	--	--	<2	<2	3	<2	<2	<2	<2.0
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1.0
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	0.100	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	30	--	--	35	33	--	26	--	--	27	31	35	68	37	29	34
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1	--	--	<0.1	<0.1	--	<0.1	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	3	<2	<2	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	<2	--	--	21	<2	--	4	--	--	<2	<2	2	3	<2	<2	2
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1	--	--	0.1	<0.1	--	<0.1	--	--	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2	--	--	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	12	--	--	18	<5.0	6	7	8	10	8	11	762	<5	<5	5	14
MICROBIOLOGICAL																							
Total Coliform	MPN/100mL	1	--	--	--	--	--	49	40	--	>250	46	97	64	>250	--	261	1,410	411	291	517	>2420	---
E. coli	MPN/100mL	1	--	--	400	--	--	10	31	--	69	<1	6	17	>250	<100	1	12	2	<1	3	16	<0.10
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	1.15	1.36	0.59	3.50	1.54	0 53	0.55	2.48	1.33	0.76	1.18	0.25	0.99	0.48	0.72	1.67
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	1.22	1.33	0.66	3.39	1.51	0.42	0.51	2.26	1.13	0.76	1.34	0.27	1.13	0.44	0.70	1.56

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake															
Sample Site PML-2								PML-2															
Sampling Date	yyyy-mm-dd							2015-08-25	2015-10-22	2016-05-16	2016-08-16	2016-10-25	2017-06-08	2017-08-15	2017-10-18	2018-05-09	2018-08-17	2018-10-17	05/09/2019	08-20-19	2019-11-08	02-Jul-20	17-Aug-20
Sampling Time	hh:mm							13:45	9:08	13:45	10:00	9:50	14:30	14:30	14:00	13:30	12:10	14:15 PM	12:50PM	3:40 PM	3:15 PM	8:50 AM	9:27 AM
FIELD DATA																							
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A	2.4	2.7	2.3	2.6	2 5	2.5	2.9	2.9	3.0	2.2	2.4	2 20	N/A	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	27.0	9.0	13.8	22.1	11.8	17.1	24.0	14.0	15.3	5.4	12.2	12.7	27.4	11.3	23.9	23.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	9.76	8.28	8.55	7.69	10.31	10.44	8.89	6.56	9.91	6.97	8.70	**	6 06	9.80	7.79	7.58
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6.5 - 9.0	--	6.76	7.25	7.57	5 93	5.37	6.73	7.01	6.87	6.33	24.70	7.00	6.76	6 39	7.40	6.07	6.08
Specific Conductance	uS/cm	--	--	--	--	--	--	255.6	454.9	264.0	298 0	230.3	242.0	285.0	252.0	214.4	293.8	297.3	6.1	239 0	193.0	275.0	270.0
INORGANICS																							
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	10	8	5	12	11	5	11	8	<5	11	8	9.0	10.0
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	59	57	67	67	50	67	72	60	46	55	43	50	64	64	76	72
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	TCU	5	--	--	--	--	--	10	9	22	13	22	18	7	19	31	21	21	43	14	19	<5	12
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.32	0.23	0.10	0.11	0.18	0.27	0.07	0.16	0.17	0.13	0.20	0.14	0.07	0.38	<0.05	<0.05
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.17	0.23	0.10	<0.05	0.18	0.16	0.07	0.16	0.17	<0.05	0 20	0.14	0.07	0.38	<0.05	<0.05
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	0.15	<0.05	<0.05	0.11	<0.05	0.11	<0.05	<0.05	<0 05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0 03	0.04	0 05	0.06	0.08	0.06	0.06	0.08
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	1.2	3.0	0.6	<0.4	0.5	0.6	0.6	<0.4	<0.4	<0.4	<0.4	1.3	<0.4	1.9	<0.4	1.40
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	6.0	6.1	4.0	3.6	8.3	5.5	5.4	4.1	4.9	3.5	4.0	4.3	4.4	4.5	3.00	4.10
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0 01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9 0	5.0-9.0	6.5 - 9.0	--	6.98	6 98	6.83	7.23	6.93	6.86	7.23	6.99	6.81	7.29	7 05	6.78	7.20	6.89	7.00	7.11
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	8.2	6.2	8.9	8.1	7.4	8.1	8.5	8.1	6.7	8.1	7.7	7.1	9.1	5.6	8.6	7.2
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.3	1.2	1.2	1.2	1.3	1.3	1.1	1.2	1.1	1.2	1.3	1.2	1.4	0.9	1.3	40.0
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.012	0.008	0.012	0.003	0.005	0.018	0.013	0.006	0.047	0.005	0.012	0.008	0 005	0.008	<0.006	0.017
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.0	0.9	1.0	1.0	1.1	0.9	1.4	1.1	0.9	1.1	1.1	0.9	1.2	0.8	0.9	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	43.3	31.3	42.9	37.5	32.1	41.5	47.2	35.5	37 5	37.7	39.6	42.9	46.7	29.9	40.7	50.2
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	1.8	2.8	2.3	0.6	2.6	1.7	0.8	2.0	2.5	1.0	2 3	2.0	0.9	2.4	0.9	0.6
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	45	<5	<5	<5	14	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	9	9	12	7	10	10	8	11	7	7	8	7	9	11	9.0	8.0
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	1.9	1 3	9.4	1.1	1.4	1.9	1.9	1.8	1.4	0.7	1 2	1.0	1.2	2.2	1.1	0.8
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	251	246	263	319	190	259	286	255	249	289	227	261	268	189	302	335
Calculated Parameters																							
Anion Sum	me/L	N/A	--	--	--	--	--	1.97	1.95	2.29	2.24	1.79	2.22	2.44	2.15	1 56	1.93	1.6	1.57	2.2	2.2	2.51	2.40
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	5	7	7	10	8	5	12	11	5	11	8.0	<5	11.0	8.0	9	10
Calculated TDS	mg/L	1	--	--	--	--	--	127	112	139	129	108	133	146	124	103	118	107.0	110	139.0	119.0	142	146
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.44	1.84	2.53	2.17	1.92	2.37	2.62	2.09	2.10	2.19	2.3	2.37	2.7	1.7	2.35	2.69
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	25.80	20.40	27.20	25.20	23.80	25.60	25.80	25.20	21.3	25.2	24.6	22.70	28.5	17.7	26.8	22 9
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	10.60	3.00	5.10	1.70	3.40	3.20	3.50	1.60	14.9	6.4	18.7	20.40	9.0	13.6	3.3	5.7
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-3.00	-2.97	-2.98	-2.46	-2 89	-3.13	-2.37	-2.66	-3.25	-2.35	-2.8	-3.26	-2.4	-3.1	-2.71	-2.64
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.32	-3.29	-3.30	-2.78	-3 21	-3.45	-2.69	-2.98	-3.57	-2.67	-3.1	-3.58	-2.7	-3.4	-3.03	-2.96
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.98	9.95	9.81	9.69	9.82	9.99	9.60	9.65	10.1	9.64	9.8	10.00	9.6	9.9	9.71	9.75
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.30	10.30	10.10	10.00	10.10	10.30	9.92	9.97	10.4	9.96	10.1	10.40	9.9	10.3	10.0	10.1
Metals (ICP-MS)																							
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	--	278	610	--	--	215	40	34	141	75	--	134	27	79	36	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	24	35	--	--	27	--	23	21	8	--	25	19	17	28.0	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	<5	8	--	--	<5	--	11	6	10	--	6	11	6	8.0	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	--	0.145	0.042	--	--	<0.017	--	<0.017	<0.09	<0.09	--	<0.09	<0.09	<0 09	<0.017	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2	2	<1	<1	1	<1	<1	1	<1	<1	2	<1	1	1	<1	<1
Total Iron (Fe)	µg/L	50	300	300	--	300	--	334	368	647	174	123	<50	203	145	104	163	165	128	258	<50	172	224
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	0.5	1.1	--	--	<0.5	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0 5	<0.5	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	67	61	109	36	23	85	68	26	20	42	74	28	139	30	192	40
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	--	2	<2	--	--	4	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	21	38	--	--	35	--	39	29	38	--	35	42	27	40.0	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	4	7	--	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	<2	--	--	<2	--	<2	<2	<2	--	2	<2	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	8	7	<5	<5	8	9	5	5	<5	6	7	<5	<5	<5	<5
MICROBIOLOGICAL																							
Total Coliform	MPN/100mL	1	--	--	--	--	--	>2420	1,120	687	>2420	>2420	1,990	>2420	1,730	1	4000	3,030.0	106.0	NDOGT	1134	249	192
E. coli	MPN/100mL	1	--	--	400	--	--	5	2	4	47	30	1	11	5	<1	1	30	<1	3	20	2	7
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.47	1.89	1.1
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	4.79	1.50	3.82	1.09	2.02	5.31	4 30	1.27	1.37	1.28	1.78	1.58	1.62	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	4.59	0.74	5.04	1.42	2.12	6.60	4 23	1.47	2.22	--	*	1.50	1.44	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded)	= Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
Italics (black shaded)	= Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations
Blue shaded	= Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Table F4: Statistical Presentation of Key Water Quality Parameters - PML-2

Tested Parameters	Units	RDL (2021)	NSE ESQs for Surface Water 2016 [1]	NSE ESQs for Surface Water September 2021 [2]	Health Canada Guideline for Recreational Water Quality [3]	CCME Guideline FWAL [4]	HRM Phosphorus Trigger Range [5]	Paper Mill Lake									
Sample Site PML-2								PML-2									
Sampling Date	yyyy-mm-dd							29-Oct-20	27-May-21	09-Aug-21	22-Oct-21	31-May-22	18-Aug-22	21-Oct-22	13-Jun-23	23-Aug-23	23-Oct-23
Sampling Time	hh:mm							10:25 AM	8:25 AM	8:56 AM	8:59 AM	9:25 AM	8:10 AM	9:00 AM	11:20 AM	12:25 PM	1:40 PM
FIELD DATA																	
Secchi Depth	Meters	--	--	--	1.2	--	--	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Water Temp	Celsius	--	--	--	--	--	--	10.4	17.0	21.9	14.1	18.5	22.6	15.2	18.2	18.5	14.6
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	10.16	16.06	9.01	11.88	8.36	7.53	9.04	9.19	7.14	8.79
pH (in Situ)	pH	--	--	6.5 - 9 0	5.0-9.0	6.5 - 9.0	--	6.64	6.41	5.53	6 22	6.95	7.54	***10.44***	***7.00***	***6.58***	***6.94***
Specific Conductance	uS/cm	--	--	--	--	--	--	228.7	209.0	219.0	207 0	333.4	76.0	287.7	256.7	181.0	--
INORGANICS																	
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	7.0	6	10	13	8	11	10	7	9	13
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	61	58	47	59	94	82	69	61	31	36
Fluoride	mg/L	0.12	--	--	--	0.12	--	--	--	--	<0.12	--	<0.12	<0.12	<0.12	<0.12	<0.12
Colour	TCU	5	--	--	--	--	--	15	12.4	5.50	12.00	15.5	6.1	15.9	11.5	45.9	40.1
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	0.18	0.17	0.25	0 22	0.20	0.07	0.18	0.26	0.24	0.57
Nitrate (N)	mg/L	0.05	--	13	--	13	--	0.18	0.17	0.25	0 22	0.20	0.07	0.18	0.26	0.24	0.27
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.03	<0.03	<0.03	<0.03	0.07	0.05	<0.03	<0.03	<0.03	<0.03
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	<0.4	0.12	<0.10	<0.10	0.16	0.33	0.18	<0.10	--	0.26
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	4.20	4.7	3.0	2.8	3.6	3.7	4.2	6.5	8.6	6.2
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	0.13	<0.01	0.01	0.01	<0.01	<0.01
pH (units)	pH	N/A	--	6.5 - 9 0	5.0-9.0	6.5 - 9.0	--	6.85	6.84	6.54	7.17	6.98	6.64	***6.29***	***7.00***	***6.58***	***6.94***
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	8.3	8.5	8.2	8.8	9.0	10.2	9.4	7.2	5.7	5.6
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	1.3	1.2	1.3	1.3	1.4	1.6	1.4	1.1	0.8	0.9
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	0.004	0.006	0.022	0.009	0.027	0 010	0.030	0.008	0.002	
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	1.2	1.0	1.5	1.2	1.4	1.5	1.4	1.1	1.0	1.1
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	39.6	38.6	34.8	34.2	52.0	49.0	41.0	36.5	19.9	21.4
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.4	2.6	4.2	1 8	2.1	1.6	2.7	2.2	2.6	3.1
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	10.0	9	9	11	10	9	10	8	7	8
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7	1.0	0.6	0.6	0.7	0.8	0.6	0.8	0.6	1.1
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	249	241	238	252	349	328	271	--	--	--
Calculated Parameters																	
Anion Sum	me/L	N/A	--	--	--	--	--	2.08	1.96	1.73	2.17	3.03	2.73	2.37	2.05	1.22	1.48
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	7	6	10	13	8	11	10	7	9	13
Calculated TDS	mg/L	1	--	--	--	--	--	127	121	109	125	174	160	139	121	72	84
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	me/L	N/A	--	--	--	--	--	2.29	2 24	2.08	2.08	2.88	2.82	2.41	2.09	1.27	1.34
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	26.1	26.2	25.8	27.3	28.2	32.1	29.2	22.5	17.5	17.7
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	4.7	6.9	9.1	2.2	2.6	1.7	0.9	1.0	2.1	5.1
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	-2.98	-3.05	-3.14	-2.37	-2.77	-2.92	-3 34	-3.56	-3.40	-3.46
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	-3.30	-3.37	-3.46	-2.69	-3.09	-3.24	-3.66	-3.88	-3.72	-3.71
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	9.83	9 89	9.68	9.54	9.75	9.56	9.63	9.89	9.86	9.79
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	10.2	10.2	10.0	9.86	10.1	9.9	10.0	10.2	10.2	10.0
Metals (ICP-MS)																	
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	--	93	--	--	*63*	--	--	154	167	--
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	--	25	--	--	42	--	--	23	16	--
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	--	8	--	--	8	--	--	9	12	--
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	--	<0.09	--	--	<0.09	--	--	<0.09	<0.09	--
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	--	<1	--	--	<1	--	--	<2	<2	--
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	<1	2	2	2	<1	<1	<1	<2	<2	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	124	142	74	213	134	93	76	93	192	181
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	--	<0.5	--	--	<0.5	--	--	<0.5	0.9	--
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	32	48	20	33	78	58	28	31	53	36
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Selenium (Se)	µg/L	1	1.0	1.0	--	--	--	--	<1	--	--	<1	--	--	<1	<1	--
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	--	36	--	--	45	--	--	33	24	--
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--
Total Tin (Sn)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	--	<2	--	--	<2	--	--	9	<3	--
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	--	<0.2	--	--	<0.2	--	--	<0.2	<0.2	--
Total Vanadium (V)	µg/L	2	6	120	--	--	--	--	<2	--	--	<2	--	--	<2	<2	--
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	<5	5	<5	7	<5	6	<5	<5	15	18
MICROBIOLOGICAL																	
Total Coliform	MPN/100mL	1	--	--	--	--	--	285	>200	>200	>200	>200	2,600	1,700	>200	>200	>200
E. coli	MPN/100mL	1	--	--	400	--	--	2	2	19	9	6	10	50	3	16	15
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	0.95	2 84	0.64	1.05	1.3	1.3	0.6	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

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[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shaded)	= Present Result - Parameter concentration exceeds CCME FWAL Guideline.
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APPENDIX G

Estimation of Total Suspended Solids Concentrations for SUMMER 2024

Bedford West Water Quality Monitoring Program
Summer 2024

INTRODUCTION

During the Summer 2024 surface water sampling event, laboratory analysis of total suspended solids (TSS) was not conducted. The analytical laboratory subcontracted by WSP Canada Inc. (WSP) failed to provide the necessary sampling containers for this analysis, and the omission was not identified by WSP during the sampling event.

To address this data gap, WSP used the historical relationships between reported TSS concentrations and other water quality parameters to estimate TSS concentrations at each sampling location for the Summer 2024 sampling event. The estimated TSS concentrations are provided in Appendix F, with a footnote indicating that they are estimated values.

This appendix details the assessment and the basis of our estimated TSS concentrations. It is intended to be read in conjunction with the full report.

METHODOLOGY

The measurement of TSS identifies the mass concentration of suspended particles in a volume of water sample and is typically reported in milligrams per litre (mg/L). Suspended particles may be inorganic or organic, with typical materials including soils, sediment, organic debris, and bacteria. Suspended particles may be indefinitely suspended or have the potential to settle out of the water, depending on the characteristics of the materials and the water.

The laboratory analysis of TSS (conducted in this program by AGAT Laboratories) is based on a quantitative gravimetric analysis, which measures particles in a water sample that can be retained on a glass fiber filter with standardized pore sizes. The filter pore sizes are nominally 1.5 microns. This differentiates TSS from total dissolved solids, which are not retained on a filter.

Information about the concentration of TSS may be discerned through other water quality parameters. Most notably, turbidity measures the ability of light to pass through water, which is affected by the presence of suspended particles. While turbidity and TSS are distinct metrics, they may correlate strongly when suspended particles are the primary variable affecting the light-scattering properties of water. An additional water quality parameter which may affect the relationship between TSS and turbidity is true colour, which measures the ability of light to pass through water once particulate matter has been removed from a sample.

The correlation between TSS and turbidity measurements may be sensitive to solids that settle over time (captured by TSS) and opaque aqueous constituents such as dyes, humic acids, or other dissolved organic matter (captured by turbidity). The addition of true colour to correlation models can provide insight into some discrepancies. Furthermore, the correlation between these two parameters may be limited where one or both are near laboratory detection limits, as this prevents an understanding of their relationship across a range of concentrations.

Nevertheless, the availability of historical seasonal data for TSS, turbidity, and true colour data at each sampling location provides an opportunity to review these relationships. Where a strong relationship can be established between water quality parameters, a defensible estimate of TSS for the Summer 2024 sampling event can be derived.

ANALYSIS

This section describes the relationships between TSS and turbidity in the historical dataset, incorporating true colour when necessary.

Appendix G
Estimation of Total Suspended Solids Concentrations

In the initial stage of this assessment, simple linear regression modelling was applied to the historical data sets for each sampling location. Simple linear regression is a statistical method which assumes a linear relationship between two variables; it is relatively resistant to minor variances in data and departures from normal distributions. The independent variable in these models is turbidity and the dependent variable is TSS. Prior to determining the linear correlation coefficient, the randomness of residuals and the linear behaviour for each model were reviewed to confirm the validity of the methodology; however, these data are not included in this report. The linear correlation coefficients between TSS and turbidity measurements from 2009 to 2023, including all seasons (where available), are presented in Table F-1.

Simple linear regression provided defensible estimation models for most sampling stations. Large effect sizes were found for these locations, measured using the Pearson correlation coefficient (*r*), where an effect size greater than 0.5 was considered a strong correlation. Furthermore, these locations typically exhibited statistically significant correlations, measured using the *p*-value compared to a 0.05 level of significance. However, as discussed above, it is interpreted that water colour may be a relevant variable in the relationship between TSS and turbidity; therefore, multiple linear regression models were also created for each sampling station to model the effects of true colour.

Incorporating true colour into the multiple regression models significantly improved the effect size for locations KL-2 and KL-5, suggesting that these locations may include dissolved constituents contributing to turbidity but not TSS. For most sampling stations, the effect size of the multiple linear regression was very similar to the simple linear regression, and often the correlation between TSS and true colour was not statistically significant. The correlation coefficients for the multiple linear regression models are presented alongside those from simple linear regression in Table F-1.

The median historical TSS concentration was not detectable (at the typical reportable detection limit of 5 mg/L) in any sampling stations except for HWY-102-2 and LSD. The frequency of non-detectable TSS concentrations in the data set limits the ability to model circumstances where TSS concentrations are elevated; however, it also provides evidence that elevated TSS concentrations are uncommon at most sampling stations. Furthermore, when TSS concentrations are elevated in the historical data, turbidity also tends to be elevated above baseline levels. Therefore, a qualitative interpretation is possible in the absence of a statistically significant model: where insufficient data exist to derive a reliable estimate of TSS, turbidity can still provide evidence when TSS concentrations are likely anomalously elevated.

Table F-1: Statistical Results of Linear Regression Modelling between TSS, Turbidity, and True Colour

Station	*n*, Sample Size 1. Simple 2. Multiple	*r*, Correlation Coefficient 1. Simple 2. Multiple	*P*-value 1. Simple 2. Multiple	Observations 1. Simple 2. Multiple
KL-1	1. 45 2. 45	1. 0.76 2. 0.77	1. <.001 2. <.001	Valid for Turbidity ≤11 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**
KL-2	1. 45 2. 8	1. -0.14 2. 0.62	1. .168 2. .302	Valid for Turbidity ≤6 NTU. 1. Weak, not statistically significant, negative correlation. 2. Removed TSS ≤5 mg/L. Strong, not statistically significant, positive correlation. Potentially inaccurate for low TSS concentrations. **Interpret qualitatively.**

Station	*n*, Sample Size 1. Simple 2. Multiple	*r*, Correlation Coefficient 1. Simple 2. Multiple	*P*-value 1. Simple 2. Multiple	Observations 1. Simple 2. Multiple
KL-3	1. 45 2. 45	1. 0.26 2. 0.25	1. .090 2. .250	Valid for Turbidity ≤3 NTU. 1. Weak, not statistically significant, positive correlation. 2. Weak, not statistically significant, positive correlation. **Interpret qualitatively.**
KL-4	1. 45 2. 45	1. 0.53 2. 0.54	1. <.001 2. <.001	Valid for Turbidity ≤23 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**
KL-5	1. 37 2. 37	1. 0.09 2. 0.20	1. .598 2. .496	Valid for Turbidity ≤5 NTU. 1. Trivial, not statistically significant, positive correlation. 2. Weak, not statistically significant, positive correlation. Colour is a stronger predictor of TSS than turbidity. **Interpret qualitatively.**
HWY-102-1	1. 45 2. 45	1. 0.93 2. 0.94	1. <.001 2. <.001	Valid for Turbidity ≤35 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**
HWY-102-2	1. 44 2. 44	1. 1.0 2. 1.0	1. <.001 2. <.001	Valid for Turbidity ≤1,490 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour near statistical significance (p = 0.065). **Preferred model, with colour included as an independent variable.**
LSD	1. 44 2. 43	1. 0.09 2. 0.83	1. .540 2. <.001	Valid for Turbidity ≤4,430 NTU. 1. Trivial, not statistically significant, positive correlation. 2. Outlier from Summer 2016 removed. Strong, statistically significant, positive correlation. Colour near statistical significance (p = 0.085). **Preferred model, with colour included as an independent variable.**
LU	1. 37 2. 37	1. 0.87 2. 0.87	1. <.001 2. <.001	Valid for Turbidity ≤43 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**
PML-1	1. 44 2. 44	1. 0.84 2. 0.84	1. <.001 2. <.001	Valid for Turbidity ≤199 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**

Station	*n*, Sample Size 1. Simple 2. Multiple	*r*, Correlation Coefficient 1. Simple 2. Multiple	*P*-value 1. Simple 2. Multiple	Observations 1. Simple 2. Multiple
PML-2	1. 42 2. 42	1. 0.85 2. 0.85	1. <.001 2. <.001	Valid for Turbidity ≤9 NTU. 1. Strong, statistically significant, positive correlation. 2. Strong, statistically significant, positive correlation. Colour not a statistically significant variable. **Preferred model, with colour negligible.**

As shown by Table F-1, multiple linear regression produced satisfactory prediction models for TSS at sampling locations KL-1, KL-4, HWY-102-1, HWY-102-2, LSD, LU, PML-1, and PML-2. At HWY-102-2 and LSD, true colour was sufficiently statistically significant that it should be used as a predictor variable, while it was negligible at the other locations with successful regression models.

Linear regression models for locations KL-2, KL-3, and KL-5 did not have adequate effect sizes or statistical significance to reliably predict TSS concentrations. However, the following observations provide guidance for a qualitative approach to estimation.

- At KL-2, TSS concentrations have been consistently low or not detectable since 2013, but were markedly elevated (on the order of 100 mg/L) between 2009 and 2013 without correspondingly elevated turbidity concentrations. It is possible that settleable solids were historically present at this location, creating this discrepancy. For the purpose of estimating Summer 2024 TSS concentrations, it is assumed that the presence of detectable TSS would be accompanied by an anomalous increase in turbidity relative to recent years. Therefore, for turbidity below 5 NTU, it is considered unlikely that TSS would be above 5 mg/L.
- At KL3, historical TSS concentrations have not been detectable since 2010 (2 mg/L) and have typically been reported as
  <5 mg/L. The lack of variability in TSS prevented the creation of an accurate regression model. However, turbidity has never exceeded 3 NTU, and it is assumed that provided turbidity remains below 3 NTU, TSS is likely to be below 5 mg/L.
- At KL-5, historical TSS concentrations have not been detectable since 2011 (1 mg/L) and have typically been reported as
  <5 mg/L. The lack of variability in TSS prevented the creation of an accurate regression model. However, turbidity has never exceeded 2 NTU, and it is assumed that provided turbidity remains below 2 NTU, TSS is likely to be below 5 mg/L.

RESULTS

The estimated TSS concentrations for the Summer 2024 sampling event are presented in Table F-2. Estimated concentrations have been rounded to the nearest integer. Where estimated concentrations are less than 5 mg/L, the typical laboratory reportable detection limit, they have been presented as <5 mg/L. This accounts for estimation uncertainty at very low concentrations, as many of the TSS concentrations used for regression modelling were reported as <5 mg/L but treated as 2.5 mg/L during regression. All turbidity results were within the applicable validity ranges of the models (shown in Table F-1).

Table F-2: Estimated TSS Concentrations for Summer 2024 Sampling Event

Sampling Station	Turbidity (NTU)	True Colour (TCU)	Estimation Method	Estimated TSS (mg/L)
KL-1	0.90	6	TSS = 2.8*(NTU) + 0.4	<5
KL-2	1.00	18	Qualitative – assumes low turbidity indicates TSS consistent with historicl data.	<5
KL-3	0.95	7	Qualitative – assumes low turbidity indicates TSS consistent with historicl data.	<5
KL-4	0.50	5	TSS = 0.4*(NTU) + 3	<5
KL-5	0.81	7	Qualitative – assumes low turbidity indicates TSS consistent with historicl data.	<5
HWY-102-1	1.07	25	TSS = 2*(NTU) + 1	<5
HWY-102-2	3.31	24	TSS = 2*(NTU) + 0.2*(TCU) - 9.8	<5
LSD	4.33	22	TSS = 0.2*(NTU) + 1.3*(TCU) - 4.8	25
LU	2.64	10	TSS = 11.1*(NTU) - 28.5	<5
PML-1	1.19	<5	TSS = 2*(NTU) + 3.8	6
PML-2	0.67	<5	TSS = 4.3*(NTU) - 0.9	<5

CLOSURE

We trust that the methodology and results described herein address the needs of Halifax Regional Municipality and support the overall delivery of the Bedford West water quality monitoring program. The TSS estimates provided herein have been prepared for the Summer 2024 monitoring event at the specified locations, and the estimation methods presented in this appendix are valid for this event only.

APPENDIX H

Laboratory Certificates Of Analysis

Spring and Resample Event

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
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FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Jihan Selim-Omar
PROJECT: Bedford West WQM
AGAT WORK ORDER: 24X143364
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Ashleigh Dussault, Inorganics Laboratory Supervisor
DATE REPORTED: May 07, 2024
PAGES (INCLUDING COVER): 14
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-04-27

		SAMPLE DESCRIPTION:		KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
Total Coliforms (MF)	CFU/100 mL		1	>235	165	>235	>235	>235	>235
E. Coli (MF)	CFU/100 mL		1	1	<1	<1	1	<1	1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Subcontracted Data Received - Chlorophyll A

DATE RECEIVED: 2024-04-26

DATE REPORTED:

			SAMPLE DESCRIPTION:	KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
Subcontracted Data									

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Low Level Total Phosphorous, TKN

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

		SAMPLE DESCRIPTION:		KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
Total Phosphorus	mg/L		0.002	0.027	0.027	0.026	0.016	0.015	0.026
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	0.15	0.13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5820499-5820505 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

		SAMPLE DESCRIPTION:		KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
pH				6.05	6.12	6.28	6.26	6.27	6.25
Reactive Silica as SiO2	mg/L		0.5	2.4	2.7	2.1	2.7	2.3	3.2
Chloride	mg/L		1	49	51	51	51	51	51
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	7	7	7	7	7	7
Alkalinity	mg/L		5	<5	6	16	16	12	14
True Color	TCU		5.00	38.0	33.4	14.1	13.5	16.1	5.52
Turbidity	NTU		0.5	1.3	0.9	0.9	1.7	3.0	2.2
Electrical Conductivity	umho/cm		1	203	211	457	462	124	621
Nitrate + Nitrite as N	mg/L		0.05	0.16	0.27	0.31	0.22	0.34	0.22
Nitrate as N	mg/L		0.05	0.16	0.27	0.24	0.22	0.25	0.22
Nitrite as N	mg/L		0.05	<0.05	<0.05	0.07	<0.05	0.09	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	4.2	4.2	3.3	3.3	3.7	2.9
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	33.9	31.3	61.7	65.6	14.7	89.5
Total Potassium	mg/L		0.1	0.9	0.9	2.2	2.1	1.0	2.8
Total Calcium	mg/L		0.1	6.3	6.1	16.8	17.7	5.3	19.0
Total Magnesium	mg/L		0.1	1.0	1.0	2.3	2.4	1.2	2.4
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5	6	16	16	12	14
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	99	102	152	157	90	181
Hardness	mg/L			19.8	19.3	51.4	54.1	18.2	57.3
Langelier Index (@20C)	NA			-4.04	-3.90	-2.90	-2.89	-3.51	-2.94
Langelier Index (@ 4C)	NA			-4.36	-4.22	-3.22	-3.21	-3.83	-3.26
Saturation pH (@ 20C)	NA			10.1	10.0	9.18	9.15	9.78	9.19
Saturation pH (@ 4C)	NA			10.4	10.3	9.50	9.47	10.1	9.51
Anion Sum	me/L			1.54	1.72	1.93	1.92	1.85	1.88
Cation sum	me/L			1.93	1.80	3.78	4.02	1.07	5.13

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

		SAMPLE DESCRIPTION:		KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
% Difference/ Ion Balance	%			11.1	2.1	32.5	35.4	26.5	46.4
Total Aluminum	ug/L		5	216	176	60	82	232	112
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	13	14	75	112	9	93
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	18	<5	<5	22	8	25
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L		2	<2	<2	<2	<2	<2	<2
Total Iron	ug/L		50	163	128	104	664	417	148
Total Lead	ug/L		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.9
Total Manganese	ug/L		2	29	14	13	66	102	27
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L		0.07	0.80	0.73	0.58	0.81	0.72	0.97
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	29	27	76	83	21	78
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		3	<3	<3	<3	<3	<3	<3
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	8

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5820499-5820501 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

5820502-5820505 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
Ion Balance is biased high, contributing parameters have been confirmed.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

TSS

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-02

		SAMPLE DESCRIPTION:		KL-1	KL-5	HWY-102-1	HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25	2024-04-25
Parameter	Unit	G / S	RDL	5820499	5820501	5820502	5820503	5820504	5820505
Total Suspended Solids	mg/L		5	<5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5820499-5820505 pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: Bedford West WQM
SAMPLING SITE:

AGAT WORK ORDER: 24X143364
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	5818534		6.54	6.56	0.3%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	5820505	5820505	3.2	3.6	10.1%	< 0.5	97%	80%	120%	107%	80%	120%	113%	80%	120%
Chloride	5819052		135	143	5.8%	< 1	92%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	5819052		<0.12	<0.12	NA	< 0.12	108%	80%	120%	NA	80%	120%	110%	70%	130%
Sulphate	5819052		15	16	8.1%	< 2	106%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	5818534		71	71	0.0%	< 5	94%	80%	120%	NA			NA		
True Color	5820505	5820505	5.52	6.49	NA	< 5	97%	80%	120%	103%	80%	120%	NA		
Turbidity	5818548	5818548	<0.5	<0.5	NA	< 0.5	101%	80%	120%						
Electrical Conductivity	5818534		483	481	0.4%	< 1	99%	90%	110%	NA			NA		
Nitrate as N	5819052		1.54	1.64	5.9%	< 0.05	102%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	5819052		<0.05	<0.05	NA	< 0.05	98%	80%	120%	NA	80%	120%	114%	70%	130%
Ammonia as N	5821917		0.12	0.13	NA	< 0.03	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Organic Carbon	5819172		2.0	2.0	NA	< 0.5	87%	80%	120%	NA	80%	120%	89%	80%	120%
Ortho-Phosphate as P	5820505	5820505	<0.01	<0.01	NA	< 0.01	82%	80%	120%	102%	80%	120%	97%	80%	120%
Total Sodium	5820571		18.1	18.6	2.8%	< 0.1	95%	80%	120%	101%	80%	120%	101%	70%	130%
Total Potassium	5820571		0.1	0.1	NA	< 0.1	96%	80%	120%	107%	80%	120%	92%	70%	130%
Total Calcium	5820571		0.2	0.2	NA	< 0.1	94%	80%	120%	105%	80%	120%	92%	70%	130%
Total Magnesium	5820571		< 0.1	< 0.1	0.0%	< 0.1	97%	80%	120%	105%	80%	120%	94%	70%	130%
Bicarb. Alkalinity (as CaCO3)	5818534		71	71	0.0%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	5818534		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	5818534		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	5820571		39	32	19.0%	< 5	95%	80%	120%	103%	80%	120%	95%	70%	130%
Total Antimony	5820571		< 2	< 2	0.0%	< 2	86%	80%	120%	96%	80%	120%	84%	70%	130%
Total Arsenic	5820571		< 2	< 2	0.0%	< 2	92%	80%	120%	99%	80%	120%	87%	70%	130%
Total Barium	5820571		< 5	< 5	0.0%	< 5	86%	80%	120%	91%	80%	120%	80%	70%	130%
Total Beryllium	5820571		< 2	< 2	0.0%	< 2	93%	80%	120%	107%	80%	120%	96%	70%	130%
Total Bismuth	5820571		< 2	< 2	0.0%	< 2	92%	80%	120%	105%	80%	120%	91%	70%	130%
Total Boron	5820571		< 5	< 5	0.0%	< 5	88%	80%	120%	114%	80%	120%	92%	70%	130%
Total Cadmium	5820571		< 0.09	< 0.09	0.0%	< 0.09	86%	80%	120%	92%	80%	120%	81%	70%	130%
Total Chromium	5820571		< 1	< 1	0.0%	< 1	94%	80%	120%	101%	80%	120%	89%	70%	130%
Total Cobalt	5820571		< 1	< 1	0.0%	< 1	95%	80%	120%	101%	80%	120%	88%	70%	130%
Total Copper	5820571		50	52	3.4%	< 1	94%	80%	120%	100%	80%	120%	88%	70%	130%
Total Iron	5820571		207	267	NA	< 50	95%	80%	120%	102%	80%	120%	90%	70%	130%
Total Lead	5820571		2.0	2.1	NA	< 0.5	98%	80%	120%	103%	80%	120%	90%	70%	130%
Total Manganese	5820571		31	32	1.7%	< 2	94%	80%	120%	102%	80%	120%	91%	70%	130%
Total Molybdenum	5820571		< 2	< 2	0.0%	< 2	86%	80%	120%	93%	80%	120%	83%	70%	130%
Total Nickel	5820571		< 2	< 2	0.0%	< 2	93%	80%	120%	102%	80%	120%	88%	70%	130%
Total Phosphorous	5820571		1.12	1.14	2.1%	< 0.02	92%	80%	120%	101%	80%	120%	95%	70%	130%
Total Selenium	5820571		< 1	< 1	0.0%	< 1	91%	80%	120%	99%	80%	120%	85%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: Bedford West WQM
SAMPLING SITE:

AGAT WORK ORDER: 24X143364
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date:			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	5820571		< 0.1	< 0.1	0.0%	< 0.1	87%	80%	120%	91%	80%	120%	80%	70%	130%
Total Strontium	5820571		< 5	< 5	0.0%	< 5	94%	80%	120%	102%	80%	120%	89%	70%	130%
Total Thallium	5820571		< 0.1	< 0.1	0.0%	< 0.1	93%	80%	120%	102%	80%	120%	90%	70%	130%
Total Tin	5820571		< 2	< 2	0.0%	< 2	87%	80%	120%	95%	80%	120%	85%	70%	130%
Total Titanium	5820571		< 2	< 2	0.0%	< 2	94%	80%	120%	98%	80%	120%	93%	70%	130%
Total Uranium	5820571		< 0.2	< 0.2	0.0%	< 0.2	90%	80%	120%	97%	80%	120%	86%	70%	130%
Total Vanadium	5820571		< 2	< 2	0.0%	< 2	93%	80%	120%	97%	80%	120%	88%	70%	130%
Total Zinc	5820571		< 5	< 5	0.0%	< 5	94%	80%	120%	NA	80%	120%	86%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TSS

Total Suspended Solids	5820499		NA	NA	NA	< 5	98%	80%	120%	NA			NA	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Low Level Total Phosphorous, TKN

Total Phosphorus	5820508		1.66	1.68	1.2%	< 0.002	100%	70%	130%	113%	80%	120%	NA	70%	130%
Total Kjeldahl Nitrogen	5820774		0.22	0.20	NA	< 0.10	100%	70%	130%	98%	80%	120%	98%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Low Level Total Phosphorous, TKN

Total Phosphorus	5820504	5820504	0.015	0.016	3.9%	< 0.002	100%	70%	130%	113%	80%	120%	102%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 24X143364

PROJECT: Bedford West WQM

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Have feedback? Scan here for a quick survey!

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 1.1, 1.3, 2.7
Hold Time:
AGAT Job Number: 24X143364
Notes:

Report Information
Company: WSP
Contact: Jihan Selim
Address: 1 Spectacle Lake Dr.
Dartmouth NS, B3B 1X7
Phone: Fax:
Client Project #: Bedford West WQM
AGAT Quotation: 16714976880
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Jihan Selim - Omar
Email: Jihan.Selim-omar@wsp.com
2. Name: Nick LeBlanc
Email: nicholas.leblanc2@wsp.com

Report Format
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☑ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☑ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other: Chlorophyll A - Innotech	Hazardous (Y/N)
KL-1		SW	8			☑	☑				☑	☑	☑										☑				☑	
~~KL-2~~		~~SW~~	~~8~~			☑	☑				☑	☑	☑										☑				☑	
~~KL-3~~		~~SW~~	~~8~~			☑	☑				☑	☑	☑										☑				☑	
~~KL-4~~		~~SW~~	~~8~~			☑	☑				☑	☑	☑										☑				☑	
KL-5		SW	8			☑	☑				☑	☑	☑										☑				☑	
HWY-102-1		SW	8			☑	☑				☑	☑	☑										☑				☑	
HWY-102-2		SW	8			☑	☑				☑	☑	☑										☑				☑	
LSD		SW	8			☑	☑				☑	☑	☑										☑				☑	
LU		SW	8			☑	☑				☑	☑	☑										☑				☑	
~~PMH-1~~		~~SW~~	~~8~~			☑	☑				☑	☑	☑										☑				☑	
~~PMH-2~~		~~SW~~	~~8~~			☑	☑				☑	☑	☑										☑				☑	

Samples Relinquished By (Print Name)	Date/Time	Samples Rece[redacted]	Date/Time
N. Giles	26/04		
Samples Relinquished By (Sign):	Date/Time	Samples Rece[redacted]	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page ____ of ____
Nº:

PO Bag 4000
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Canada T9C 1T4
(780) 632-8211

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Brianna Sandau 902-468-2430
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID	Matrix
24X143364-499-KL-1	Water

CANISTER ID:

PRIORITY: Normal

DESCRIPTION:

DATE SAMPLED: 25-Apr-24 **DATE RECEIVED:** 30-Apr-24

REPORT CREATED: 09-May-24 **REPORT NUMBER:** 24040312

VERSION: **Version 01**

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-001	Chlorophylla (Phytoplankton)		1.1	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing
Date: May 9, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143364-501-KL-5		Water	25-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040312 **REPORT CREATED:** 09-May-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-002	Chlorophylla (Phytoplankton)		0.5	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: May 9, 2024

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143364-502-HWY-102-1		Water	25-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040312 **REPORT CREATED:** 09-May-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-003	Chlorophylla (Phytoplankton)		1.8	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: May 9, 2024

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143364-503-HWY-102-2		Water	25-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040312 **REPORT CREATED:** 09-May-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-004	Chlorophylla (Phytoplankton)		2.3	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: May 9, 2024

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143364-504-LSD		Water	25-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040312 **REPORT CREATED:** 09-May-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-005	Chlorophylla (Phytoplankton)		0.3	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: May 9, 2024

Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143364-505-LU		Water	25-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040312 **REPORT CREATED:** 09-May-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040312-006	Chlorophylla (Phytoplankton)		1.7	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: May 9, 2024

Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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Revision History

Order ID	Ver	Date	Reason
24040312	01	09-May-24	Report created

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24040312

Send results also to AGATDartmouthCPM@agatlabs.com. Project #: 24X143364

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Sample Comments

PO Bag 4000
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Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.

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FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Jihan Selim-Omar
PROJECT: Bedford West WQM
AGAT WORK ORDER: 24X143583
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Ashleigh Dussault, Inorganics Laboratory Supervisor
DATE REPORTED: May 07, 2024
PAGES (INCLUDING COVER): 14
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-04-27

			SAMPLE DESCRIPTION:	KL-2	KL-3	KL-4	PML-1	PML-2
			SAMPLE TYPE:	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
Total Coliforms (MF)	CFU/100 mL		1	>235	146	>235	>235	>235
E. Coli (MF)	CFU/100 mL		1	1	3	5	1	3

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Subcontracted Data Received - Chlorophyll A

DATE RECEIVED: 2024-04-26

DATE REPORTED:

		SAMPLE DESCRIPTION:		KL-2	KL-3	KL-4	PML-1	PML-2
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
Subcontracted Data								

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

		SAMPLE DESCRIPTION:		KL-2	KL-3	KL-4	PML-1	PML-2
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
pH				6.07	6.09	6.09	6.13	6.14
Reactive Silica as SiO2	mg/L		0.5	2.7	2.8	2.7	2.7	2.6
Chloride	mg/L		1	16	54	55	57	60
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	5	8	8	8	9
Alkalinity	mg/L		5	7	5	6	6	6
True Color	TCU		5.00	36.3	30.5	30.5	26.9	24.4
Turbidity	NTU		0.5	11.7	1.3	1.1	0.8	0.9
Electrical Conductivity	umho/cm		1	87	216	219	227	237
Nitrate + Nitrite as N	mg/L		0.05	0.16	0.33	0.26	0.30	0.24
Nitrate as N	mg/L		0.05	0.16	0.27	0.26	0.30	0.24
Nitrite as N	mg/L		0.05	<0.05	0.06	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	5.4	4.2	4.2	4.1	3.9
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	10.4	32.5	34.0	33.5	36.5
Total Potassium	mg/L		0.1	0.9	1.0	1.0	1.0	1.1
Total Calcium	mg/L		0.1	4.3	6.3	6.7	7.5	8.0
Total Magnesium	mg/L		0.1	1.1	1.1	1.1	1.1	1.2
Bicarb. Alkalinity (as CaCO3)	mg/L		5	7	5	6	6	6
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	44	108	111	113	121
Hardness	mg/L			15.3	20.3	21.3	23.3	24.9
Langelier Index (@20C)	NA			-4.00	-4.00	-3.90	-3.81	-3.77
Langelier Index (@ 4C)	NA			-4.32	-4.32	-4.22	-4.13	-4.09
Saturation pH (@ 20C)	NA			10.1	10.1	9.99	9.94	9.91
Saturation pH (@ 4C)	NA			10.4	10.4	10.3	10.3	10.2
Anion Sum	me/L			0.71	1.81	1.86	1.92	2.02

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

		SAMPLE DESCRIPTION:		KL-2	KL-3	KL-4	PML-1	PML-2
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
Cation sum	me/L			0.90	1.87	1.95	1.97	2.14
% Difference/ Ion Balance	%			11.8	1.5	2.6	1.4	2.9
Total Aluminum	ug/L		5	686	174	179	153	162
Total Antimony	ug/L		2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	20	17	19	20	22
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	20	13	15	17	15
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1
Total Copper	ug/L		2	<2	<2	<2	<2	<2
Total Iron	ug/L		50	971	120	117	120	143
Total Lead	ug/L		0.5	2.4	<0.5	<0.5	<0.5	<0.5
Total Manganese	ug/L		2	121	17	20	27	29
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L		0.07	1.03	0.86	0.82	0.80	0.76
Total Selenium	ug/L		1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	19	30	31	31	33
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2
Total Titanium	ug/L		3	15	<3	<3	<3	<3
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5822493 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
The cation and anion sums are at, or below, 1 me/L, therefore the acceptable criteria is a difference of less than 0.3me/L.

5822504-5822508 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

TSS

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-02

			SAMPLE DESCRIPTION:	KL-2	KL-3	KL-4	PML-1	PML-2
			SAMPLE TYPE:	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
Total Suspended Solids	mg/L		5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5822493-5822508 pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Phosphorous, TKN

DATE RECEIVED: 2024-04-26

DATE REPORTED: 2024-05-03

SAMPLE DESCRIPTION:				KL-2	KL-3	KL-4	PML-1	PML-2
SAMPLE TYPE:				Water	Water	Water	Water	Water
DATE SAMPLED:				2024-04-26 13:15	2024-04-26 12:15	2024-04-26 12:35	2024-04-26 10:40	2024-04-26 11:15
Parameter	Unit	G / S	RDL	5822493	5822504	5822506	5822507	5822508
Total Phosphorus	mg/L		0.006	0.021	0.019	0.028	0.024	0.015
Total Kjeldahl Nitrogen	mg/L		0.10	0.24	<0.10	<0.10	<0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: Bedford West WQM
SAMPLING SITE:

AGAT WORK ORDER: 24X143583
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	5822493	5822493	6.07	6.11	0.6%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	5821917		9.5	10.5	9.7%	< 0.5	100%	80%	120%	110%	80%	120%	115%	80%	120%
Chloride	5821917		9	9	0.4%	< 1	90%	80%	120%	NA	80%	120%	91%	70%	130%
Fluoride	5821917		<0.12	<0.12	NA	< 0.12	93%	80%	120%	NA	80%	120%	82%	70%	130%
Sulphate	5821917		62	62	0.6%	< 2	101%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	5822493	5822493	7	7	NA	< 5	94%	80%	120%	NA			NA		
True Color	5821917		<5.00	<5.00	NA	< 5	93%	80%	120%	103%	80%	120%	NA		
Turbidity	5822257	5822257	<0.5	<0.5	NA	< 0.5	101%	80%	120%						
Electrical Conductivity	5822493	5822493	87	87	0.3%	< 1	99%	90%	110%	NA			NA		
Nitrate as N	5821917		<0.05	<0.05	NA	< 0.05	97%	80%	120%	NA	80%	120%	104%	70%	130%
Nitrite as N	5821917		<0.05	<0.05	NA	< 0.05	94%	80%	120%	NA	80%	120%	91%	70%	130%
Ammonia as N	5821917		0.12	0.13	NA	< 0.03	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Organic Carbon	5820503		3.3	3.2	1.5%	< 0.5	88%	80%	120%	NA	80%	120%	86%	80%	120%
Ortho-Phosphate as P	5821917		0.02	<0.01	NA	< 0.01	91%	80%	120%	105%	80%	120%	102%	80%	120%
Total Sodium	5821917		8.9	8.7	1.5%	< 0.1	104%	80%	120%	96%	80%	120%	106%	70%	130%
Total Potassium	5821917		7.0	6.9	0.7%	< 0.1	106%	80%	120%	102%	80%	120%	107%	70%	130%
Total Calcium	5821917		116	116	0.0%	< 0.1	103%	80%	120%	103%	80%	120%	NA	70%	130%
Total Magnesium	5821917		21.0	20.8	0.7%	< 0.1	105%	80%	120%	100%	80%	120%	111%	70%	130%
Bicarb. Alkalinity (as CaCO3)	5822493	5822493	7	7	NA	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	5822493	5822493	<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	5822493	5822493	<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	5821917		24	34	NA	< 5	101%	80%	120%	102%	80%	120%	104%	70%	130%
Total Antimony	5821917		<2	<2	NA	< 2	95%	80%	120%	90%	80%	120%	94%	70%	130%
Total Arsenic	5821917		9	9	NA	< 2	100%	80%	120%	93%	80%	120%	99%	70%	130%
Total Barium	5821917		46	45	0.6%	< 5	95%	80%	120%	86%	80%	120%	92%	70%	130%
Total Beryllium	5821917		<2	<2	NA	< 2	107%	80%	120%	105%	80%	120%	107%	70%	130%
Total Bismuth	5821917		<2	<2	NA	< 2	100%	80%	120%	98%	80%	120%	98%	70%	130%
Total Boron	5821917		33	35	6.4%	< 5	111%	80%	120%	NA	80%	120%	112%	70%	130%
Total Cadmium	5821917		<0.09	<0.09	NA	< 0.09	96%	80%	120%	88%	80%	120%	91%	70%	130%
Total Chromium	5821917		<2	<2	NA	< 1	102%	80%	120%	96%	80%	120%	100%	70%	130%
Total Cobalt	5821917		<1	<1	NA	< 1	103%	80%	120%	97%	80%	120%	98%	70%	130%
Total Copper	5821917		41	39	5.4%	< 1	104%	80%	120%	94%	80%	120%	99%	70%	130%
Total Iron	5821917		89	93	NA	< 50	104%	80%	120%	98%	80%	120%	101%	70%	130%
Total Lead	5821917		5.9	5.3	10.4%	< 0.5	100%	80%	120%	95%	80%	120%	98%	70%	130%
Total Manganese	5821917		175	173	1.0%	< 2	103%	80%	120%	98%	80%	120%	110%	70%	130%
Total Molybdenum	5821917		<2	<2	NA	< 2	97%	80%	120%	89%	80%	120%	95%	70%	130%
Total Nickel	5821917		<2	<2	NA	< 2	102%	80%	120%	96%	80%	120%	99%	70%	130%
Total Phosphorous	5821917		2.96	2.79	5.9%	< 0.1	104%	80%	120%	103%	80%	120%	NA	70%	130%
Total Selenium	5821917		<1	<1	NA	< 1	102%	80%	120%	89%	80%	120%	97%	70%	130%

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AGAT Laboratories

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: Bedford West WQM
SAMPLING SITE:

AGAT WORK ORDER: 24X143583
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date:			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	5821917		<0.1	<0.1	NA	< 0.1	97%	80%	120%	87%	80%	120%	90%	70%	130%
Total Strontium	5821917		447	445	0.6%	< 5	102%	80%	120%	98%	80%	120%	NA	70%	130%
Total Thallium	5821917		<0.1	<0.1	NA	< 0.1	100%	80%	120%	98%	80%	120%	99%	70%	130%
Total Tin	5821917		<2	<2	NA	< 2	96%	80%	120%	91%	80%	120%	95%	70%	130%
Total Titanium	5821917		<3	<3	NA	< 2	103%	80%	120%	97%	80%	120%	103%	70%	130%
Total Uranium	5821917		4.5	4.2	6.2%	< 0.2	99%	80%	120%	94%	80%	120%	96%	70%	130%
Total Vanadium	5821917		<2	<2	NA	< 2	101%	80%	120%	92%	80%	120%	99%	70%	130%
Total Zinc	5821917		53	53	0.2%	< 5	103%	80%	120%	80%	80%	120%	102%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TSS															
Total Suspended Solids	5822493		NA	NA	NA	< 5	98%	80%	120%	NA			NA	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Total Phosphorous, TKN															
Total Phosphorus	5820504		0.015	0.016	NA	< 0.006	100%	70%	130%	113%	80%	120%	102%	70%	130%
Total Kjeldahl Nitrogen	5814965		<0.10	<0.10	NA	< 0.10	101%	70%	130%	99%	80%	120%	97%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

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Method Summary

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 24X143583
PROJECT: Bedford West WQM
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 24X143583

PROJECT: Bedford West WQM

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA

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AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 10.3, 10.8, 11.2
Hold Time:
AGAT Job Number: 24X143583
Notes:

Report Information

Company: WSP Canada
Contact: Jihan Selim-omar
Address: 1 Spectacle Lake Drive
Dartmouth, NS, B3B 1X7
Phone: 782-640-1923 Fax:
Client Project #: Bedford West WQM
AGAT Quotation: 16714976880
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Jihan Selim-omar
   Email: Jihan.Selim-omar@wsp.com
2. Name: Nich Leblanc
   Email: nicholas.leblanc2@wsp.com

Report Format

☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ No ☐

Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled (pm)	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☑ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☒ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other: chlorophyll A - inmuth	Hazardous (Y/N)
KL-2	26/04 - 1:15	SW	8	CFU to 235/100		X	X				X	X	X										X				X	
KL-3	26/04 - 12:15	SW	↓	↓		X	X				X	X	X										X				X	
KL-4	26/04 - 12:35	SW	↓	↓		X	X				X	X	X										X				X	
PMC-1	26/04 - 10:40	SW	↓	↓		X	X				X	X	X										X				X	
PMC-2	26/04 - 11:15	SW	↓	↓		X	X				X	X	X										X				X	

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print N[redacted]	Date/Time
N. Giles	26/04 2:17		
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

Nº: 77092

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(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

RESULTS: Brianna Sandau 902-468-2430
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID	Matrix
24X143583-5822493 KL-2	Water

CANISTER ID:
PRIORITY: Normal
DESCRIPTION:

DATE SAMPLED: 26-Apr-24 **DATE RECEIVED:** 30-Apr-24
REPORT CREATED: 09-May-24 **REPORT NUMBER:** 24040311
REPORT REVISED: 26-Nov-24 **VERSION:** **Version 02**

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040311-001	Chlorophylla (Phytoplankton)		0.7	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing
Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

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Canada T9C 1T4
(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143583-5822504 KL-3		Water	26-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040311 **REPORT CREATED:** 09-May-24 **REPORT REVISED:** 26-Nov-24 **VERSION:** Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040311-002	Chlorophylla (Phytoplankton)		0.7	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143583-5822506 KL-4		Water	26-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040311 **REPORT CREATED:** 09-May-24 **REPORT REVISED:** 26-Nov-24 **VERSION:** Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040311-003	Chlorophylla (Phytoplankton)		0.3	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143583-5822507 PML-1		Water	26-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040311 **REPORT CREATED:** 09-May-24 **REPORT REVISED:** 26-Nov-24 **VERSION:** Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040311-004	Chlorophylla (Phytoplankton)	K, T, U	< 0.3	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 26, 2024

Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
24X143583-5822508 PML-2		Water	26-Apr-24

DESCRIPTION:

REPORT NUMBER: 24040311 **REPORT CREATED:** 09-May-24 **REPORT REVISED:** 26-Nov-24 **VERSION:** Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24040311-005	Chlorophylla (Phytoplankton)		0.5	ug/L	0.3	AC-020	07-May-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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Revision History

Order ID	Ver	Date	Reason
24040311	01	09-May-24	Report created
24040311	02	26-Nov-24	Client requested changes to sample IDs as follows: Sample ID 24X143583 – 5822507 PMC-1 update to 24X143583 – 5822507 PML-1 & Sample ID 24X143583 – 5822508 PMC-2 update to 24X143583 – 5822508 PML-2.

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24040311

Send results also to AGATDartmouthCPM@agatlabs.com. Project #: 24X143583

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(780) 632-8211

Sample Comments

24040311-001

1L

24040311-002

0.685L

24040311-003

0.985L

24040311-004

1L

24040311-005

0.988L

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Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

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http://www.agatlabs.com

CLIENT NAME: WSP E&I CANADA LIMITED
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X164607
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Jun 28, 2024
PAGES (INCLUDING COVER): 5
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
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- *All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.*
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Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X164607

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

TP in Water

DATE RECEIVED: 2024-06-20

DATE REPORTED: 2024-06-28

			SAMPLE DESCRIPTION:	LSD	LU	KL1	KL2	KL3	KL4	KL5	PML-1
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-06-20	2024-06-20	2024-06-19	2024-06-19 12:00	2024-06-19 12:00	2024-06-19 12:00	2024-06-19 12:00	2024-06-19 12:00
Parameter	Unit	G / S	RDL	5948931	5948932	5948933	5948934	5948935	5948936	5948937	5948938
Total Phosphorus	mg/L		0.002	0.014	0.009	0.013	0.013	0.011	0.009	0.011	0.012

			SAMPLE DESCRIPTION:	PML-2	Hwy 102-1	Hwy 102-2
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2024-06-19 12:00	2024-06-19 12:00	2024-06-19 12:00
Parameter	Unit	G / S	RDL	5948939	5948940	5948941
Total Phosphorus	mg/L		0.002	0.012	0.072	0.017

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: CA0033982.0870
SAMPLING SITE:

AGAT WORK ORDER: 24X164607
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis

RPT Date: Jun 28, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
TP in Water															
Total Phosphorus	5946492		0.174	0.174	0.0%	< 0.006	95%	70%	130%	102%	80%	120%	NA	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By: [redacted]

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Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X164607

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 3.6, 3.4, 3.7
Hold Time:
AGAT Job Number: 24X164607
Notes:

Report Information

Company: WSP ~~Canada Inc.~~ E&I
Contact: Jihan Selim-Omar.
Address: 1 Spectacle Lake.
Phone: 782 409 6803 Fax:
Client Project #: CA0033982.0870
AGAT Quotation: —
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Jihan Selim-Omar.
   Email: Jihan.Selim-Omar@wsp.com
2. Name: Naomi Giles
   Email: naomi.giles@wsp.com

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):

☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☑ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☑ / No ☐

Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
LSD	24/06/20	SW	1										X															
LU	24/06/20	↓	↓										X															
KL1	24/06/19	↓	↓										X															
KL2	↓	↓	↓										X															
KL3	↓	↓	↓										X															
KL4	↓	↓	↓										X															
KL5	↓	↓	↓										X															
PML-1	↓	↓	↓										X															
PML-2	↓	↓	↓										X															
HWY102-1	↓	↓	↓										X															
HWY-102-2	↓	↓	↓										X															

Samples Relinquished By (Print Name): Naomi Giles
Date/Time: 24/06/20
Samples Received: [redacted]
Date/Time:
Samples Relinquished By (Print Name): [redacted]
Date/Time:
Samples Received: [redacted]
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page ___ of ___
N°: 79251

Document [redacted] Any and all products and/or services provided by AGAT Labs are pursuant to the terms [redacted] nditions unless otherwise agreed in a current written contractual document.

Date revised: June 15, 2023

Summer and Resample Event

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CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X190536
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
MISCELLANEOUS ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Sep 11, 2024
PAGES (INCLUDING COVER): 15
VERSION*: 1

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*Notes

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- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

			SAMPLE DESCRIPTION:	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-08-28 15:15	2024-08-28 09:40	2024-08-28 10:05	2024-08-28 10:30	2024-08-28 15:00	2024-08-28 13:30	2024-08-28 13:50	2024-08-28 12:00
Parameter	Unit	G / S	RDL	6105192	6105197	6105198	6105199	6105200	6105201	6105202	6105203
Total Coliforms (MF)	CFU/100 mL		1	>200	>200	>200	>200	>200	>200	>200	>200
E. Coli (MF)	CFU/100 mL		1	27	7	58	8	7	>200	>200	>200

			SAMPLE DESCRIPTION:	LU
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2024-08-28 14:20
Parameter	Unit	G / S	RDL	6105204
Total Coliforms (MF)	CFU/100 mL		1	>200
E. Coli (MF)	CFU/100 mL		1	33

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Subcontracted Data Received

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

			SAMPLE DESCRIPTION:	KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-08-28 15:15	2024-08-28 09:40	2024-08-28 10:05	2024-08-28 10:30	2024-08-28 15:00	2024-08-28 13:30	2024-08-28 13:50	2024-08-28 12:00
Parameter	Unit	G / S	RDL	6105192	6105197	6105198	6105199	6105200	6105201	6105202	6105203
Subcontracted Data				Y	Y	Y	Y	Y	Y	Y	Y

			SAMPLE DESCRIPTION:	LU
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2024-08-28 14:20
Parameter	Unit	G / S	RDL	6105204
Subcontracted Data				Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Low Level Total Phosphorous - 0.002 mg/L, TKN

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		KL-1	KL-2	KL-3	KL-4		KL-5		HWY-102-1
		SAMPLE TYPE:		Water	Water	Water	Water		Water		Water
		DATE SAMPLED:		2024-08-28 15:15	2024-08-28 09:40	2024-08-28 10:05	2024-08-28 10:30		2024-08-28 15:00		2024-08-28 13:30
Parameter	Unit	G / S	RDL	6105192	6105197	6105198	6105199	RDL	6105200	RDL	6105201
Total Phosphorus	mg/L		0.003	0.041	0.015	0.012	0.014	0.008	0.058	0.003	0.016
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	<0.10

		SAMPLE DESCRIPTION:		HWY-102-2	LSD	LU
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2024-08-28 13:50	2024-08-28 12:00	2024-08-28 14:20
Parameter	Unit	G / S	RDL	6105202	6105203	6105204
Total Phosphorus	mg/L		0.003	0.030	0.054	0.026
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.60	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6105192-6105204 Total Phosphorous RDL is the calculated MDL.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-08-28 15:15	2024-08-28 09:40	2024-08-28 10:05	2024-08-28 10:30	2024-08-28 15:00	2024-08-28 13:30	2024-08-28 13:50	2024-08-28 12:00
Parameter	Unit	G / S	RDL	6105192	6105197	6105198	6105199	6105200	6105201	6105202	6105203
pH				7.11	6.97	6.92	6.89	6.90	7.08	6.99	7.05
Reactive Silica as SiO2	mg/L		0.5	1.4	4.2	1.5	2.0	1.6	4.4	6.8	3.1
Chloride	mg/L		1	53	25	58	66	50	109	105	31
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	7	13	8	9	7	12	7	4
Alkalinity	mg/L		5	11	26	14	18	14	29	25	27
True Color	TCU		5	6	18	7	5	7	25	24	22
Turbidity	NTU		0.50	0.90	1.0	0.95	0.5	0.81	1.07	3.31	4.33
Electrical Conductivity	umho/cm		1	228	171	238	280	223	460	432	174
Nitrate + Nitrite as N	mg/L		0.05	0.85	0.19	0.08	0.28	0.07	<0.05	<0.05	<0.05
Nitrate as N	mg/L		0.05	0.85	0.19	0.08	0.28	0.07	<0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	<0.03
Total Organic Carbon	mg/L		0.50	3.5	5.1	3.4	3.0	3.4	6.9	6.1	9.1
Ortho-Phosphate as P	mg/L		0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	31.4	17.4	34.2	36.9	31.1	58.3	58.8	19.9
Total Potassium	mg/L		0.1	1.0	1.7	1.2	1.5	1.0	2.5	2.2	1.6
Total Calcium	mg/L		0.1	7.3	10.6	8.0	12.9	6.9	20.8	21.2	9.7
Total Magnesium	mg/L		0.1	1.2	2.4	1.3	2.2	1.2	3.0	3.2	2.3
Bicarb. Alkalinity (as CaCO3)	mg/L		5	11	26	14	18	14	29	25	27
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	112	87	120	141	106	223	216	93
Hardness	mg/L			23.2	36.4	25.3	41.3	22.2	64.3	66.1	33.7
Langelier Index (@20C)	NA			-2.58	-2.17	-2.63	-2.35	-2.70	-1.76	-1.91	-2.12
Langelier Index (@ 4C)	NA			-2.90	-2.49	-2.95	-2.67	-3.02	-2.08	-2.23	-2.44
Saturation pH (@ 20C)	NA			9.69	9.14	9.55	9.24	9.60	8.84	8.90	9.17
Saturation pH (@ 4C)	NA			10.0	9.46	9.87	9.56	9.92	9.16	9.22	9.49
Anion Sum	me/L			1.92	1.51	2.09	2.43	1.84	3.90	3.61	1.50

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190536
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		KL-1	KL-2	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-08-28 15:15	2024-08-28 09:40	2024-08-28 10:05	2024-08-28 10:30	2024-08-28 15:00	2024-08-28 13:30	2024-08-28 13:50	2024-08-28 12:00
Parameter	Unit	G / S	RDL	6105192	6105197	6105198	6105199	6105200	6105201	6105202	6105203
Cation sum	me/L			1.88	1.55	2.03	2.49	1.83	3.90	4.06	2.06
% Difference/ Ion Balance	%			1.2	1.2	1.3	1.3	0.4	0	5.9	15.7
Total Aluminum	ug/L		5	125	53	39	33	36	48	139	2240
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	17	26	22	51	16	99	183	46
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	7	25	<5	9	7	13	11	19
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	0.15
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1	<1	2
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	4
Total Copper	ug/L		1	<1	2	<1	<1	<1	<1	<1	5
Total Iron	ug/L		50	192	271	98	89	<50	281	2800	4740
Total Lead	ug/L		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	6.3
Total Manganese	ug/L		2	49	83	74	442	18	70	223	1600
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	3
Total Phosphorous	mg/L		0.02	0.49	1.28	0.41	0.63	0.46	1.12	1.86	1.66
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	33	43	37	56	31	100	109	43
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	46
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	9	<5	<5	26

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190536
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		LU
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-08-28 14:20
Parameter	Unit	G / S	RDL	6105204
pH				7.27
Reactive Silica as SiO2	mg/L		0.5	1.0
Chloride	mg/L		2	139
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	20
Alkalinity	mg/L		5	28
True Color	TCU		5	10
Turbidity	NTU		0.50	2.64
Electrical Conductivity	umho/cm		1	574
Nitrate + Nitrite as N	mg/L		0.05	1.15
Nitrate as N	mg/L		0.05	1.15
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.50	4.9
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	83.4
Total Potassium	mg/L		0.1	2.8
Total Calcium	mg/L		0.1	22.8
Total Magnesium	mg/L		0.1	3.3
Bicarb. Alkalinity (as CaCO3)	mg/L		5	28
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	294
Hardness	mg/L			70.5
Langelier Index (@20C)	NA			-1.56
Langelier Index (@ 4C)	NA			-1.88
Saturation pH (@ 20C)	NA			8.83
Saturation pH (@ 4C)	NA			9.15
Anion Sum	me/L			4.98

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		LU
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-08-28 14:20
Parameter	Unit	G / S	RDL	6105204
Cation sum	me/L			5.14
% Difference/ Ion Balance	%			1.6
Total Aluminum	ug/L		5	146
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	125
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	30
Total Cadmium	ug/L		0.09	<0.09
Total Chromium	ug/L		1	<1
Total Cobalt	ug/L		1	<1
Total Copper	ug/L		1	2
Total Iron	ug/L		50	397
Total Lead	ug/L		0.5	<0.5
Total Manganese	ug/L		2	54
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	<2
Total Phosphorous	mg/L		0.02	0.34
Total Selenium	ug/L		1	<1
Total Silver	ug/L		0.1	<0.1
Total Strontium	ug/L		5	105
Total Thallium	ug/L		0.1	<0.1
Total Tin	ug/L		2	<2
Total Titanium	ug/L		2	<2
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	18

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-28

DATE REPORTED: 2024-09-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6105192-6105202 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

6105203 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
Ion Balance is biased high, contributing parameters have been confirmed.

6105204 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
AGAT WORK ORDER: 24X190536
PROJECT: CA0033982.0870
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Sep 11, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	6100563		7.30	7.33	0.5%	<	100%	80%	120%	NA			NA		
Reactive Silica as SiO2	6100563		4.1	4.1	0.6%	< 0.5	99%	80%	120%	102%	80%	120%	106%	80%	120%
Chloride	6105145		22	22	0.2%	< 1	106%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	6105145		<0.12	<0.12	NA	< 0.12	117%	80%	120%	NA	80%	120%	117%	70%	130%
Sulphate	6105145		27	29	4.8%	< 2	109%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	6104121		16	8	NA	< 5	92%	80%	120%	NA			NA		
True Color	6100563		<5	<5	NA	< 5	88%	80%	120%	101%	80%	120%	NA		
Turbidity	6105083		0.66	0.63	NA	< 0.5	92%	80%	120%	NA			NA		
Electrical Conductivity	6100563		2160	2090	3.3%	< 1	98%	90%	110%	NA			NA		
Nitrate as N	6105145		<0.05	<0.05	NA	< 0.05	111%	80%	120%	NA	80%	120%	114%	70%	130%
Nitrite as N	6105145		<0.05	<0.05	NA	< 0.05	102%	80%	120%	NA	80%	120%	102%	70%	130%
Ammonia as N	6105144		<0.03	<0.03	NA	< 0.03	99%	80%	120%	101%	80%	120%	99%	70%	130%
Total Organic Carbon	6104631		21	21	1.5%	< 0.5	98%	80%	120%	NA	80%	120%	91%	80%	120%
Ortho-Phosphate as P	6100563		<0.01	<0.01	NA	< 0.01	96%	80%	120%	101%	80%	120%	91%	80%	120%
Total Sodium	6106546		11.9	11.9	0.1%	< 0.1	104%	80%	120%	101%	80%	120%	101%	70%	130%
Total Potassium	6106546		0.4	0.4	NA	< 0.1	103%	80%	120%	103%	80%	120%	100%	70%	130%
Total Calcium	6106546		7.2	7.0	1.8%	< 0.1	100%	80%	120%	101%	80%	120%	101%	70%	130%
Total Magnesium	6106546		0.4	0.4	NA	< 0.1	105%	80%	120%	104%	80%	120%	101%	70%	130%
Bicarb. Alkalinity (as CaCO3)	6104121		16	8	NA	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	6100563		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	6100563		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	6106546		71	63	12.7%	< 5	97%	80%	120%	99%	80%	120%	101%	70%	130%
Total Antimony	6106546		<2	<2	NA	< 2	93%	80%	120%	91%	80%	120%	91%	70%	130%
Total Arsenic	6106546		<2	<2	NA	< 2	98%	80%	120%	97%	80%	120%	94%	70%	130%
Total Barium	6106546		<5	5	NA	< 5	93%	80%	120%	90%	80%	120%	90%	70%	130%
Total Beryllium	6106546		<2	<2	NA	< 2	107%	80%	120%	103%	80%	120%	111%	70%	130%
Total Bismuth	6106546		<2	<2	NA	< 2	96%	80%	120%	95%	80%	120%	95%	70%	130%
Total Boron	6106546		18	11	NA	< 5	102%	80%	120%	95%	80%	120%	102%	70%	130%
Total Cadmium	6106546		<0.09	<0.09	NA	< 0.09	93%	80%	120%	92%	80%	120%	88%	70%	130%
Total Chromium	6106546		<1	<1	NA	< 1	100%	80%	120%	98%	80%	120%	94%	70%	130%
Total Cobalt	6106546		<1	<1	NA	< 1	99%	80%	120%	98%	80%	120%	93%	70%	130%
Total Copper	6106546		30	30	0.8%	< 1	100%	80%	120%	100%	80%	120%	93%	70%	130%
Total Iron	6106546		64	64	NA	< 50	101%	80%	120%	101%	80%	120%	97%	70%	130%
Total Lead	6106546		<0.5	<0.5	NA	< 0.5	97%	80%	120%	97%	80%	120%	95%	70%	130%
Total Manganese	6106546		93	94	0.3%	< 2	100%	80%	120%	99%	80%	120%	98%	70%	130%
Total Molybdenum	6106546		<2	<2	NA	< 2	90%	80%	120%	90%	80%	120%	86%	70%	130%
Total Nickel	6106546		<2	<2	NA	< 2	100%	80%	120%	99%	80%	120%	94%	70%	130%
Total Phosphorous	6106546		0.21	0.24	11.4%	< 0.02	89%	80%	120%	91%	80%	120%	98%	70%	130%
Total Selenium	6106546		<1	<1	NA	< 1	95%	80%	120%	103%	80%	120%	93%	70%	130%

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: CA0033982.0870
SAMPLING SITE:

AGAT WORK ORDER: 24X190536
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Sep 11, 2024

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Total Silver	6106546		<0.1	<0.1	NA	< 0.1	94%	80%	120%	93%	80%	120%	88%	70%	130%
Total Strontium	6106546		11	11	NA	< 5	98%	80%	120%	98%	80%	120%	96%	70%	130%
Total Thallium	6106546		<0.1	<0.1	NA	< 0.1	97%	80%	120%	96%	80%	120%	96%	70%	130%
Total Tin	6106546		<2	<2	NA	< 2	92%	80%	120%	92%	80%	120%	89%	70%	130%
Total Titanium	6106546		<2	<2	NA	< 2	100%	80%	120%	98%	80%	120%	95%	70%	130%
Total Uranium	6106546		<0.2	<0.2	NA	< 0.2	94%	80%	120%	93%	80%	120%	92%	70%	130%
Total Vanadium	6106546		<2	<2	NA	< 2	97%	80%	120%	93%	80%	120%	93%	70%	130%
Total Zinc	6106546		117	117	0.0%	< 5	104%	80%	120%	107%	80%	120%	98%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Chloride	6106546		7	8	4.2%	< 1	102%	80%	120%	NA	80%	120%	98%	70%	130%
Fluoride	6106546		<0.12	<0.12	NA	< 0.12	113%	80%	120%	NA	80%	120%	116%	70%	130%
Sulphate	6106546		13	13	2.7%	< 2	107%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrate as N	6106546		<0.05	<0.05	NA	< 0.05	110%	80%	120%	NA	80%	120%	115%	70%	130%
Nitrite as N	6106546		<0.05	<0.05	NA	< 0.05	98%	80%	120%	NA	80%	120%	96%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Reactive Silica as SiO2	6105312		13.3	13.7	2.4%	< 0.5	NA	80%	120%	NA	80%	120%	105%	80%	120%
True Color	6105312		<5	<5	NA	< 5	86%	80%	120%	100%	80%	120%	NA		
Ortho-Phosphate as P	6105312		<0.01	<0.01	NA	< 0.01	NA	80%	120%	NA	80%	120%	87%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Low Level Total Phosphorous - 0.002 mg/L, TKN

Total Phosphorus	6106177		1.61	1.60	0.6%	< 0.002	106%	70%	130%	105%	80%	120%	NA	70%	130%
Total Kjeldahl Nitrogen	6106177		29.4	29.2	0.7%	< 0.10	99%	70%	130%	104%	80%	120%	105%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Low Level Total Phosphorous - 0.002 mg/L, TKN

Total Phosphorus	6105199	6105199	0.014	0.013	NA	< 0.002	106%	70%	130%	105%	80%	120%	109%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	COLORIMETER
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INOR-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6052	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INOR-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190536

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 17.1, 17.5, 16.3
Hold Time:
AGAT Job Number: 24x190536
Notes:

Report Information

Company: WSP E&I
Contact: Jihan Selim-Omar
Address: 1 Spectacle Lake Drive
Dartmouth, NS B3B 1X7
Phone: Fax:
Client Project #: CA0033982.0870
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Jihan Selim-Omar
   Email: jihan.selim-omar@wsp.com
2. Name: Nick Leblanc
   Email: nicholas.leblanc2@wsp.com

Report Format

☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☐ / No ☐

Company: Same
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

'24 AUG 28 3:59pm

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments - Site/Sample Info. Sample Containment	SWA + TMS	TKN	Low Level TP (0.002 mg/L)	Total Coliforms + E.Coli (CFU)	Chlorophyll A
KL-1	24/08/28 3:15pm	Water	6		☑	☑	☑	☑	☑
KL-2	24/08/28 9:40Am	Water	6		☑	☑	☑	☑	☑
KL-3	24/08/28 10:05	Water	6		☑	☑	☑	☑	☑
KL-4	24/08/28 10:30	Water	6		☑	☑	☑	☑	☑
KL-5	24/08/28 3:00pm	Water	6		☑	☑	☑	☑	☑
HWY-102-1	24/08/28 1:30pm	Water	6		☑	☑	☑	☑	☑
HWY-102-2	24/08/28 1:50pm	Water	6		☑	☑	☑	☑	☑
LSD	24/08/28 12:00pm	Water	6		☑	☑	☑	☑	☑
LU	24/08/28 2:20pm	Water	6		~~☑~~	~~☑~~	~~☑~~	~~☑~~	~~☑~~
~~FLM-1~~		~~Water~~	~~6~~		~~☑~~	~~☑~~	~~☑~~	~~☑~~	~~☑~~
~~FLM-2~~		~~Water~~	~~6~~						

Samples Relinquished By (Print Name)	Date/Time	Samples Received By (Print N[redacted]	Date/Time	Pink Copy - Client	Page 1 of 1
Naomi Giles	24/08/28			Yellow Copy - AGAT	
[redacted]	Date/Time 4:00pm	Samples Received By (Sign) [redacted]	Date/Time	White Copy- AGAT	Nº:

Document ID: DIV-133-1502.002

Date revised: May 19, 2016

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

RESULTS: DartmouthCPM
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID	Matrix
6105192 - KL-1	Water

CANISTER ID:

PRIORITY: Normal

DESCRIPTION: AGAT Project 24X190536

DATE SAMPLED: 28-Aug-24 **DATE RECEIVED:** 05-Sep-24

REPORT CREATED: 10-Sep-24 **REPORT NUMBER:** 24090020

VERSION: **Version 01**

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-001	Chlorophylla (Phytoplankton)		1.5	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105197 - KL-2		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-002	Chlorophylla (Phytoplankton)		0.3	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105198 - KL-3		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-003	Chlorophylla (Phytoplankton)		1.4	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105199 - KL-4		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-004	Chlorophylla (Phytoplankton)		1.5	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105200 - KL-5		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-005	Chlorophylla (Phytoplankton)		1.3	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105201 - HWY-102-1		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-006	Chlorophylla (Phytoplankton)		1.8	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105202 - HWY-102-2		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-007	Chlorophylla (Phytoplankton)		13.8	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105203 - LSD		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-008	Chlorophylla (Phytoplankton)		2.4	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6105204 - LU		Water	28-Aug-24

DESCRIPTION: AGAT Project 24X190536

REPORT NUMBER: 24090020 **REPORT CREATED:** 10-Sep-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090020-009	Chlorophylla (Phytoplankton)		9.2	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: September 10, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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Revision History

Order ID	Ver	Date	Reason
24090020	01	10-Sep-24	Report created

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24090020

AGAT Project 24X190536

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

Sample Comments

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

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11 Morris Drive, Unit 122
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CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X190875
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
MISCELLANEOUS ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Sep 11, 2024
PAGES (INCLUDING COVER): 13
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X190875

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-08-29

DATE REPORTED: 2024-09-11

			SAMPLE DESCRIPTION:	PLM-1	PLM-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-08-29 10:30	2024-08-29 11:10
Parameter	Unit	G / S	RDL	6107115	6107119
Total Coliforms (MF)	CFU/100 mL		1	>200	>200
E. Coli (MF)	CFU/100 mL		1	6	2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190875
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Subcontracted Data Received

DATE RECEIVED: 2024-08-29

DATE REPORTED: 2024-09-11

			SAMPLE DESCRIPTION:	PLM-1	PLM-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-08-29 10:30	2024-08-29 11:10
Parameter	Unit	G / S	RDL	6107115	6107119
Subcontracted Data				Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190875
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Low Level Total Phosphorous - 0.002 mg/L, TKN

DATE RECEIVED: 2024-08-29
DATE REPORTED: 2024-09-11

			SAMPLE DESCRIPTION:	PLM-1	PLM-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-08-29 10:30	2024-08-29 11:10
Parameter	Unit	G / S	RDL	6107115	6107119
Total Phosphorus	mg/L		0.003	0.015	0.011
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6107115-6107119 Total Phosphorous RDL is the calculated MDL.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190875
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-29

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		PLM-1	PLM-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-08-29 10:30	2024-08-29 11:10
Parameter	Unit	G / S	RDL	6107115	6107119
pH				7.34	7.02
Reactive Silica as SiO2	mg/L		0.5	1.6	1.5
Chloride	mg/L		1	67	75
Fluoride	mg/L		0.12	<0.12	<0.12
Sulphate	mg/L		2	9	9
Alkalinity	mg/L		5	17	18
True Color	TCU		5	<5	<5
Turbidity	NTU		0.50	1.19	0.67
Electrical Conductivity	umho/cm		1	269	276
Nitrate + Nitrite as N	mg/L		0.05	0.15	0.11
Nitrate as N	mg/L		0.05	0.15	0.11
Nitrite as N	mg/L		0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	3.3	3.6
Ortho-Phosphate as P	mg/L		0.01	0.01	<0.01
Total Sodium	mg/L		0.1	38.9	39.3
Total Potassium	mg/L		0.1	1.4	1.3
Total Calcium	mg/L		0.1	9.8	9.6
Total Magnesium	mg/L		0.1	1.6	1.5
Bicarb. Alkalinity (as CaCO3)	mg/L		5	17	18
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10
Hydroxide	mg/L		5	<5	<5
Calculated TDS	mg/L		1	139	147
Hardness	mg/L			31.1	30.1
Langelier Index (@20C)	NA			-2.04	-2.35
Langelier Index (@ 4C)	NA			-2.36	-2.67
Saturation pH (@ 20C)	NA			9.38	9.37
Saturation pH (@ 4C)	NA			9.70	9.69
Anion Sum	me/L			2.43	2.67

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190875
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-29

DATE REPORTED: 2024-09-11

		SAMPLE DESCRIPTION:		PLM-1	PLM-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-08-29 10:30	2024-08-29 11:10
Parameter	Unit	G / S	RDL	6107115	6107119
Cation sum	me/L			2.36	2.35
% Difference/ Ion Balance	%			1.5	6.3
Total Aluminum	ug/L		5	28	27
Total Antimony	ug/L		2	<2	<2
Total Arsenic	ug/L		2	<2	<2
Total Barium	ug/L		5	23	20
Total Beryllium	ug/L		2	<2	<2
Total Bismuth	ug/L		2	<2	<2
Total Boron	ug/L		5	7	8
Total Cadmium	ug/L		0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1
Total Cobalt	ug/L		1	<1	<1
Total Copper	ug/L		1	<1	<1
Total Iron	ug/L		50	112	85
Total Lead	ug/L		0.5	<0.5	<0.5
Total Manganese	ug/L		2	82	47
Total Molybdenum	ug/L		2	<2	<2
Total Nickel	ug/L		2	<2	<2
Total Phosphorous	mg/L		0.02	0.43	0.42
Total Selenium	ug/L		1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1
Total Strontium	ug/L		5	45	43
Total Thallium	ug/L		0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2
Total Titanium	ug/L		2	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2
Total Zinc	ug/L		5	<5	<5

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X190875

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-08-29

DATE REPORTED: 2024-09-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6107115-6107119 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Quality Assurance

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AGAT WORK ORDER: 24X190875
PROJECT: CA0033982.0870
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Sep 11, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	6106546		7.35	7.38	0.4%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	6107255		<0.5	<0.5	NA	< 0.5	97%	80%	120%	103%	80%	120%	105%	80%	120%
Chloride	6113873		4	4	NA	< 1	109%	80%	120%	NA	80%	120%	94%	70%	130%
Fluoride	6113873		0.13	0.14	NA	< 0.12	102%	80%	120%	NA	80%	120%	101%	70%	130%
Sulphate	6113873		2	2	NA	< 2	114%	80%	120%	NA	80%	120%	101%	70%	130%
Alkalinity	6106546		25	23	NA	< 5	86%	80%	120%	NA			NA		
True Color	6107255		<5	<5	NA	< 5	85%	80%	120%	102%	80%	120%	NA		
Turbidity	6105312	6105312	<0.5	<0.5	NA	< 0.5	87%	80%	120%	NA			NA		
Electrical Conductivity	6106546		106	104	2.8%	< 1	97%	90%	110%	NA			NA		
Nitrate as N	6113873		0.15	0.14	NA	< 0.05	116%	80%	120%	NA	80%	120%	96%	70%	130%
Nitrite as N	6113873		<0.05	<0.05	NA	< 0.05	104%	80%	120%	NA	80%	120%	96%	70%	130%
Ammonia as N	6107261		<0.03	<0.03	NA	< 0.03	98%	80%	120%	99%	80%	120%	99%	70%	130%
Total Organic Carbon	6107255		<0.50	<0.50	NA	< 0.5	102%	80%	120%	NA	80%	120%	103%	80%	120%
Ortho-Phosphate as P	6107255		<0.01	<0.01	NA	< 0.01	96%	80%	120%	95%	80%	120%	94%	80%	120%
Total Sodium	6107232		9.0	9.5	5.6%	< 0.1	101%	80%	120%	102%	80%	120%	100%	70%	130%
Total Potassium	6107232		4.0	4.2	5.6%	< 0.1	99%	80%	120%	102%	80%	120%	100%	70%	130%
Total Calcium	6107232		12.5	12.5	0.2%	< 0.1	96%	80%	120%	101%	80%	120%	98%	70%	130%
Total Magnesium	6107232		2.0	2.2	6.0%	< 0.1	102%	80%	120%	103%	80%	120%	101%	70%	130%
Bicarb. Alkalinity (as CaCO3)	6106546		25	23	NA	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	6106546		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	6106546		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	6107232		707	740	4.5%	< 5	95%	80%	120%	97%	80%	120%	NA	70%	130%
Total Antimony	6107232		<2	<2	NA	< 2	93%	80%	120%	93%	80%	120%	90%	70%	130%
Total Arsenic	6107232		<2	<2	NA	< 2	95%	80%	120%	96%	80%	120%	93%	70%	130%
Total Barium	6107232		32	32	0.5%	< 5	91%	80%	120%	91%	80%	120%	90%	70%	130%
Total Beryllium	6107232		<2	<2	NA	< 2	108%	80%	120%	102%	80%	120%	113%	70%	130%
Total Bismuth	6107232		<2	<2	NA	< 2	96%	80%	120%	97%	80%	120%	94%	70%	130%
Total Boron	6107232		20	23	NA	< 5	101%	80%	120%	104%	80%	120%	113%	70%	130%
Total Cadmium	6107232		0.12	0.11	NA	< 0.09	92%	80%	120%	92%	80%	120%	88%	70%	130%
Total Chromium	6107232		<1	<1	NA	< 1	96%	80%	120%	97%	80%	120%	93%	70%	130%
Total Cobalt	6107232		3	3	NA	< 1	96%	80%	120%	97%	80%	120%	93%	70%	130%
Total Copper	6107232		2	2	NA	< 1	96%	80%	120%	98%	80%	120%	89%	70%	130%
Total Iron	6107232		55	57	NA	< 50	98%	80%	120%	99%	80%	120%	96%	70%	130%
Total Lead	6107232		<0.5	<0.5	NA	< 0.5	96%	80%	120%	97%	80%	120%	93%	70%	130%
Total Manganese	6107232		53	56	5.7%	< 2	97%	80%	120%	98%	80%	120%	97%	70%	130%
Total Molybdenum	6107232		3	3	NA	< 2	90%	80%	120%	90%	80%	120%	85%	70%	130%
Total Nickel	6107232		5	5	NA	< 2	97%	80%	120%	96%	80%	120%	93%	70%	130%
Total Phosphorous	6107232		2.11	2.07	1.6%	< 0.02	92%	80%	120%	85%	80%	120%	NA	70%	130%
Total Selenium	6107232		<1	<1	NA	< 1	96%	80%	120%	97%	80%	120%	93%	70%	130%

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: CA0033982.0870
SAMPLING SITE:

AGAT WORK ORDER: 24X190875
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Sep 11, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	6107232		<0.1	<0.1	NA	< 0.1	92%	80%	120%	93%	80%	120%	87%	70%	130%
Total Strontium	6107232		73	77	4.8%	< 5	97%	80%	120%	98%	80%	120%	98%	70%	130%
Total Thallium	6107232		<0.1	<0.1	NA	< 0.1	97%	80%	120%	96%	80%	120%	93%	70%	130%
Total Tin	6107232		<2	<2	NA	< 2	93%	80%	120%	92%	80%	120%	90%	70%	130%
Total Titanium	6107232		<2	<2	NA	< 2	97%	80%	120%	98%	80%	120%	94%	70%	130%
Total Uranium	6107232		<0.2	<0.2	NA	< 0.2	95%	80%	120%	94%	80%	120%	92%	70%	130%
Total Vanadium	6107232		<2	<2	NA	< 2	95%	80%	120%	92%	80%	120%	92%	70%	130%
Total Zinc	6107232		11	13	NA	< 5	96%	80%	120%	101%	80%	120%	95%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Chloride	6110051		1	1	NA	< 1	107%	80%	120%	NA	80%	120%	97%	70%	130%
Fluoride	6110051		0.14	0.14	NA	< 0.12	113%	80%	120%	NA	80%	120%	120%	70%	130%
Sulphate	6110051		22	25	10%	< 2	114%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrate as N	6110051		<0.05	<0.05	NA	< 0.05	113%	80%	120%	NA	80%	120%	104%	70%	130%
Nitrite as N	6110051		<0.05	<0.05	NA	< 0.05	102%	80%	120%	NA	80%	120%	96%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Low Level Total Phosphorous - 0.002 mg/L, TKN

Total Phosphorus	6105199		0.014	0.013	7.4%	< 0.002	106%	70%	130%	105%	80%	120%	109%	70%	130%
Total Kjeldahl Nitrogen	6109176		<0.10	<0.10	NA	< 0.10	98%	70%	130%	102%	80%	120%	103%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190875

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190875

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	COLORIMETER
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INOR-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6052	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INOR-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X190875

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 6.5, 6.4, 6.9
Hold Time:
AGAT Job Number:
Notes: 24X190875

Report Information

Company: WSP E+I
Contact: Jihan Selim-Omar
Address: 1 Spectacle Lake Dartmouth, NS
Phone: Fax:
Client Project #: CA0033982-0876
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Jihan Selim-Omar
   Email: Jihan.selim-omar@wsp.com
2. Name: Nick Leblanc
   Email: nicholas-leblanc2@wsp.com

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No
Reg. No.:
Salt Water Sample ☐ Yes ☐ No

24 AUG 29 12:40PM

Invoice To Same Yes ☐ / No ☐

Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	Total Coliforms + E.coli (CFU)	Chlorophyll A	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: Low level TP (0.002 mg/L)	Other: SUVA + TMS	Hazardous (Y/N)
PLM-1	24/08/29 10:30	SW	6									X						X	X							X	X	
PLM-2	24/08/29 11:10	SW	6									X						X	X							X	X	

Samples Relinquished By (Print Name): Naomi Giles
Date/Time: 24/08/29
Samples Received By (Print Name): [redacted]
Date/Time:
Samples Relinquished By (Sig[redacted]
Date/Time: 24/08/29
Samples Received By (Sig[redacted]
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page ___ of ___
N°: 78693

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(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

RESULTS: DartmouthCPM
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID	Matrix
6107115 PML-1	Water

CANISTER ID:

PRIORITY: Normal

DESCRIPTION: AGAT Project 24X190875

DATE SAMPLED: 29-Aug-24 10:30 **DATE RECEIVED:** 05-Sep-24

REPORT CREATED: 10-Sep-24 **REPORT NUMBER:** 24090019

REPORT REVISED: 26-Nov-24 **VERSION:** **Version 02**

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090019-001	Chlorophylla (Phytoplankton)		1.0	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing
Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

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Canada T9C 1T4
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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6107119 PML-2		Water	29-Aug-24 11:10

DESCRIPTION: AGAT Project 24X190875

REPORT NUMBER: 24090019 **REPORT CREATED:** 10-Sep-24 **REPORT REVISED:** 26-Nov-24 **VERSION:** Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24090019-002	Chlorophylla (Phytoplankton)		0.9	ug/L	0.3	AC-020	09-Sep-24

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 26, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

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Revision History

Order ID	Ver	Date	Reason
24090019	01	10-Sep-24	Report created
24090019	02	26-Nov-24	Client requested changes to Sample IDs as follows: Sample ID 6107115 PLM-1 update to 6107115 PML-1 & Sample ID 6107119 PLM-2 update to 6107119 PML-2

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24090019

AGAT Project 24X190875

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Sample Comments

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Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.

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http://www.agatlabs.com

CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: HRM Bedford West
AGAT WORK ORDER: 24X200188
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Oct 03, 2024
PAGES (INCLUDING COVER): 6
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X200188

PROJECT: HRM Bedford West

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration *DILUTION REQ

DATE RECEIVED: 2024-09-23

DATE REPORTED: 2024-10-03

			SAMPLE DESCRIPTION:	HWY-102-1	HWY-102-2	LSD
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2024-09-23 11:52	2024-09-23 11:30	2024-09-23 13:11
Parameter	Unit	G / S	RDL	6165649	6165650	6165652
Total Coliforms (MF)	CFU/100 mL		5	625	380	>1000
E. Coli (MF)	CFU/100 mL		5	140	60	190

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6165649-6165652 Dilution required, RDL raised accordingly.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X200188

PROJECT: HRM Bedford West

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Low Level Total Phosphorous - 0.002 mg/L

DATE RECEIVED: 2024-09-23

DATE REPORTED: 2024-10-03

			SAMPLE DESCRIPTION:	KL-1	KL-2	KL-3	KL-4	KL-5	PML-1	PML-2	HWY-102-1
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-09-23	2024-09-23	2024-09-23	2024-09-23	2024-09-23	2024-09-23	2024-09-23	2024-09-23 11:52
Parameter	Unit	G / S	RDL	6165641	6165643	6165644	6165645	6165646	6165647	6165648	6165649
Total Phosphorus	mg/L		0.002	0.018	0.023	0.028	0.028	0.021	0.023	0.014	0.013

			SAMPLE DESCRIPTION:	HWY-102-2	LU	LSD
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2024-09-23 11:30	2024-09-23	2024-09-23 13:11
Parameter	Unit	G / S	RDL	6165650	6165651	6165652
Total Phosphorus	mg/L		0.002	0.022	0.022	0.020

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6165641-6165652 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: HRM Bedford West
SAMPLING SITE:

AGAT WORK ORDER: 24X200188
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis

RPT Date: Oct 03, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Low Level Total Phosphorous - 0.002 mg/L															
Total Phosphorus	6165641	6165641	0.018	0.018	0.0%	< 0.002	95%	70%	130%	105%	80%	120%	97%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Results relate only to the items tested. Results apply to samples as received.

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X200188

PROJECT: HRM Bedford West

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 7.9, 1.6, 5.3
Hold Time:
AGAT Job Number: 24X200188
Notes:
'24 SEP 23 3:36 PM

Report Information

Company: WSP E&I CANADA
Contact: JIHAN SELIM-OMAR
Address: 1 SPECTACLE LAKE DARTMOUTH, NS
Phone: 902-466-4448 Fax:
Client Project #: HRM BEDFORD WEST
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: JIHAN SELIM-OMAR
   Email: JIHAN.SELIM-OMAR@WSP.COM
2. Name: NAOMI.GILES@WSP.COM
   Email: NAOMI GILES

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☒ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☐ / No ☐

Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: low level Phosphorus	Other:	Hazardous (Y/N)
KL-1	2024/09/23	SW	1																							X		
KL-2			1																									
KL-3			1																									
KL-4			1																									
KL-5			1																									
PML-1			1																									
PML-2			1																									
HWY-102-1	11:52		2	dilution required																			X					
HWY-102-2	11:30		2	for micro /																			X					
LU			1																									
LSD	1:11		2	Count E.coli/TC 235 CFU/100ml																			X					

Samples Relinquished By (Print Name): Jihan Omar
Date/Time: 2024/09/23 3:30
Samples Received By (Print Name): [redacted]
Date/Time:
Samples Received By (Print Name):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
N°: 78765

[redacted] rovided by AGAT Labs are pursuant to the terms and conditions as set forth at www.agatlabs.com/termsandconditions unless otherwise agreed in a current written contractual document.

Date revised: June 15, 2023

Fall and Resample Event

11 Morris Drive, Unit 122
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CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X214568
MICROBIOLOGY ANALYSIS REVIEWED BY: Ashleigh Dussault, Inorganics Laboratory Supervisor
MISCELLANEOUS ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Nov 27, 2024
PAGES (INCLUDING COVER): 16
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 1:Please note, partial results. Chlorophyll A results to follow. November 20, 2024. MG

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-10-29 DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40	2024-10-29 13:30	2024-10-29 13:50	2024-10-29 12:50	2024-10-29 11:00	2024-10-29 09:15
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	6271499	6271500	6271501	6271502	6271503
Total Coliforms (MF)	CFU/100 mL		1	252	236	390	196	384	376	396	220
E. Coli (MF)	CFU/100 mL		1	12	8	4	26	4	6	24	8

			SAMPLE DESCRIPTION:	PML-2
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271504
Total Coliforms (MF)	CFU/100 mL		1	286
E. Coli (MF)	CFU/100 mL		1	6

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Subcontracted Data Received

DATE RECEIVED: 2024-10-29
DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40	2024-10-29 13:30	2024-10-29 13:50	2024-10-29 12:50	2024-10-29 11:00	2024-10-29 09:15
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	6271499	6271500	6271501	6271502	6271503
Subcontracted Data				Y	Y	Y	Y	Y	Y	Y	Y

			SAMPLE DESCRIPTION:	PML-2
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271504
Subcontracted Data				Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-29 DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-3	KL-4	KL-5		HWY-102-1		HWY-102-2	LSD
		SAMPLE TYPE:		Water	Water	Water		Water		Water	Water
		DATE SAMPLED:		2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40		2024-10-29 13:30		2024-10-29 13:50	2024-10-29 12:50
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	RDL	6271499	RDL	6271500	6271501
pH				6.48	6.18	6.12		6.31		6.37	6.36
Reactive Silica as SiO2	mg/L		0.5	2.0	2.1	1.9	0.5	6.3	0.5	5.5	4.4
Chloride	mg/L		1	70	52	46	2	141	1	98	28
Fluoride	mg/L		0.12	<0.12	<0.12	0.15	0.12	<0.12	0.12	<0.12	<0.12
Sulphate	mg/L		2	8	8	7	2	12	2	15	5
Alkalinity	mg/L		5	11	9	7	5	17	5	17	17
True Color	TCU		5	12	11	12	5	24	5	23	18
Turbidity	NTU		0.50	2.25	0.94	1.09	0.50	13.1	0.50	1.67	5.07
Electrical Conductivity	umho/cm		1	226	226	209	1	425	1	402	155
Nitrate + Nitrite as N	mg/L		0.05	0.28	0.14	0.12	0.05	0.18	0.05	0.14	<0.05
Nitrate as N	mg/L		0.05	0.28	0.14	0.12	0.05	0.18	0.05	0.14	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	3.8	3.9	3.9	0.50	6.2	0.50	5.2	5.4
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	30.2	30.5	30.2	0.1	52.2	0.1	47.2	18.1
Total Potassium	mg/L		0.1	1.2	1.2	1.1	0.1	2.2	0.1	2.2	1.3
Total Calcium	mg/L		0.1	7.3	8.0	6.9	0.1	20.0	0.1	18.2	6.9
Total Magnesium	mg/L		0.1	1.2	1.3	1.1	0.1	3.0	0.1	2.7	1.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	11	9	7	5	17	5	17	17
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	10	<10	10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	5	<5	5	<5	<5
Calculated TDS	mg/L		1	126	107	97	1	244	1	194	72
Hardness	mg/L			23.2	25.3	21.8		62.3		56.6	24.6
Langelier Index (@20C)	NA			-3.21	-3.55	-3.78		-2.78		-2.76	-3.14
Langelier Index (@ 4C)	NA			-3.53	-3.87	-4.10		-3.10		-3.08	-3.46
Saturation pH (@ 20C)	NA			9.69	9.73	9.90		9.09		9.13	9.50
Saturation pH (@ 4C)	NA			10.0	10.1	10.2		9.41		9.45	9.82
Anion Sum	me/L			2.38	1.82	1.59		4.58		3.43	1.23

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-29

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-3	KL-4	KL-5		HWY-102-1		HWY-102-2	LSD
		SAMPLE TYPE:		Water	Water	Water		Water		Water	Water
		DATE SAMPLED:		2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40		2024-10-29 13:30		2024-10-29 13:50	2024-10-29 12:50
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	RDL	6271499	RDL	6271500	6271501
Cation sum	me/L			1.82	1.87	1.79		3.67		3.25	1.35
% Difference/ Ion Balance	%			13.4	1.4	5.7		11.0		2.6	4.3
Total Aluminum	ug/L		5	54	55	70	5	136	5	58	121
Total Antimony	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Barium	ug/L		5	22	22	17	5	153	5	82	9
Total Beryllium	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Boron	ug/L		5	15	15	8	5	15	5	7	18
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	0.09	<0.09	0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	1	<1	1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	1	<1	1	<1	<1
Total Copper	ug/L		1	<1	<1	9	1	<1	1	15	<1
Total Iron	ug/L		50	102	85	<50	50	2240	50	148	363
Total Lead	ug/L		0.5	<0.5	<0.5	<0.5	0.5	0.6	0.5	<0.5	<0.5
Total Manganese	ug/L		2	46	29	11	2	143	2	13	158
Total Molybdenum	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Phosphorous	mg/L		0.02	0.62	0.65	0.59	0.02	1.98	0.02	1.48	1.28
Total Selenium	ug/L		1	<1	<1	<1	1	<1	1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1
Total Strontium	ug/L		5	35	35	32	5	97	5	82	28
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Titanium	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	2	<2	2	<2	<2
Total Zinc	ug/L		5	<5	<5	7	5	6	5	5	<5

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-29

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		LU		PML-1	PML-2
		SAMPLE TYPE:		Water		Water	Water
		DATE SAMPLED:		2024-10-29 11:00		2024-10-29 09:15	2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271502	RDL	6271503	6271504
pH				6.48		6.26	6.26
Reactive Silica as SiO2	mg/L		0.5	3.3	0.5	2.1	2.0
Chloride	mg/L		2	149	1	50	60
Fluoride	mg/L		0.12	<0.12	0.12	0.17	0.14
Sulphate	mg/L		2	21	2	9	9
Alkalinity	mg/L		5	21	5	10	12
True Color	TCU		5	7	5	10	9
Turbidity	NTU		0.50	1.56	0.50	1.30	0.95
Electrical Conductivity	umho/cm		1	541	1	242	257
Nitrate + Nitrite as N	mg/L		0.05	1.80	0.05	0.11	0.40
Nitrate as N	mg/L		0.05	1.80	0.05	<0.05	0.33
Nitrite as N	mg/L		0.05	<0.05	0.05	0.11	0.07
Ammonia as N	mg/L		0.03	<0.03	0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	4.0	0.50	3.5	3.7
Ortho-Phosphate as P	mg/L		0.01	<0.01	0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	75.5	0.1	33.3	35.5
Total Potassium	mg/L		0.1	2.8	0.1	1.3	1.4
Total Calcium	mg/L		0.1	18.8	0.1	8.6	8.8
Total Magnesium	mg/L		0.1	2.8	0.1	1.4	1.5
Bicarb. Alkalinity (as CaCO3)	mg/L		5	21	5	10	12
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	10	<10	<10
Hydroxide	mg/L		5	<5	5	<5	<5
Calculated TDS	mg/L		1	291	1	110	125
Hardness	mg/L			58.5		27.2	28.2
Langelier Index (@20C)	NA			-2.56		-3.40	-3.31
Langelier Index (@ 4C)	NA			-2.88		-3.72	-3.63
Saturation pH (@ 20C)	NA			9.04		9.66	9.57
Saturation pH (@ 4C)	NA			9.36		9.98	9.89
Anion Sum	me/L			5.19		1.81	2.15

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-29

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		LU		PML-1	PML-2
		SAMPLE TYPE:		Water		Water	Water
		DATE SAMPLED:		2024-10-29 11:00		2024-10-29 09:15	2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271502	RDL	6271503	6271504
Cation sum	me/L			4.53		2.04	2.15
% Difference/ Ion Balance	%			6.7		6.0	0.1
Total Aluminum	ug/L		5	45	5	43	47
Total Antimony	ug/L		2	<2	2	<2	<2
Total Arsenic	ug/L		2	<2	2	<2	<2
Total Barium	ug/L		5	106	5	25	29
Total Beryllium	ug/L		2	<2	2	<2	<2
Total Bismuth	ug/L		2	<2	2	<2	<2
Total Boron	ug/L		5	28	5	10	11
Total Cadmium	ug/L		0.09	<0.09	0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	1	<1	<1
Total Cobalt	ug/L		1	<1	1	<1	<1
Total Copper	ug/L		1	2	1	2	2
Total Iron	ug/L		50	61	50	107	120
Total Lead	ug/L		0.5	<0.5	0.5	<0.5	<0.5
Total Manganese	ug/L		2	17	2	43	43
Total Molybdenum	ug/L		2	<2	2	<2	<2
Total Nickel	ug/L		2	<2	2	<2	<2
Total Phosphorous	mg/L		0.02	1.01	0.02	0.70	0.75
Total Selenium	ug/L		1	<1	1	<1	<1
Total Silver	ug/L		0.1	<0.1	0.1	<0.1	<0.1
Total Strontium	ug/L		5	90	5	40	42
Total Thallium	ug/L		0.1	<0.1	0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	2	<2	<2
Total Titanium	ug/L		2	<2	2	<2	<2
Total Uranium	ug/L		0.2	<0.2	0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	2	<2	<2
Total Zinc	ug/L		5	97	5	<5	7

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-29

DATE REPORTED: 2024-11-27

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6271467	% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result Ion Balance is biased high, contributing parameters have been confirmed.
6271497-6271498	% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
6271499	% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result Ion Balance is biased high, contributing parameters have been confirmed.
6271500-6271504	% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
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Certificate of Analysis

AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

TKN & Low Level Total Phosphorous - 0.002 mg/L (Water)

DATE RECEIVED: 2024-10-29
DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40	2024-10-29 13:30	2024-10-29 13:50	2024-10-29 12:50	2024-10-29 11:00	2024-10-29 09:15
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	6271499	6271500	6271501	6271502	6271503
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Phosphorus	mg/L		0.003	0.062	0.064	0.062	0.088	0.054	0.078	0.035	0.035

		SAMPLE DESCRIPTION:		PML-2
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271504
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10
Total Phosphorus	mg/L		0.003	0.045

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6271467-6271504 Total Phosphorous RDL is the calculated MDL.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

TSS

DATE RECEIVED: 2024-10-29

DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-3	KL-4	KL-5	HWY-102-1	HWY-102-2	LSD	LU	PML-1
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-10-29 11:40	2024-10-29 11:50	2024-10-29 14:40	2024-10-29 13:30	2024-10-29 13:50	2024-10-29 12:50	2024-10-29 11:00	2024-10-29 09:15
Parameter	Unit	G / S	RDL	6271467	6271497	6271498	6271499	6271500	6271501	6271502	6271503
Total Suspended Solids	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5

			SAMPLE DESCRIPTION:	PML-2
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2024-10-29 09:50
Parameter	Unit	G / S	RDL	6271504
Total Suspended Solids	mg/L		5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
AGAT WORK ORDER: 24X214568
PROJECT: CA0033982.0870
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Nov 27, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	6269885		6.32	6.30	0.3%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	6270675		<0.5	<0.5	NA	< 0.5	96%	80%	120%	104%	80%	120%	103%	80%	120%
Chloride	6273150		5	6	18.2%	< 1	114%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	6273150		<0.12	<0.12	NA	< 0.12	118%	80%	120%	NA	80%	120%	106%	70%	130%
Sulphate	6273150		58	61	5.2%	< 2	102%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	6269885		26	25	1.5%	< 5	94%	80%	120%	NA			NA		
True Color	6270675		<5	<5	NA	< 5	91%	80%	120%	103%	80%	120%	NA		
Turbidity	6269939	6269939	0.98	0.92	6.0%	< 0.5	100%	80%	120%						
Electrical Conductivity	6269885		88	87	1.1%	< 1	98%	90%	110%	NA			NA		
Nitrate as N	6273150		3.09	2.72	12.7%	< 0.05	108%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	6273150		<0.05	<0.05	NA	< 0.05	87%	80%	120%	NA	80%	120%	90%	70%	130%
Ammonia as N	6273150		<0.03	<0.03	NA	< 0.03	98%	80%	120%	99%	80%	120%	90%	70%	130%
Total Organic Carbon	6274048		4.8	4.6	3.5%	< 0.5	99%	80%	120%	NA	80%	120%	95%	80%	120%
Ortho-Phosphate as P	6270675		<0.01	<0.01	NA	< 0.01	97%	80%	120%	100%	80%	120%	100%	80%	120%
Total Sodium	6271781		2.9	2.9	0.3%	< 0.1	106%	80%	120%	97%	80%	120%	96%	70%	130%
Total Potassium	6271781		1.3	1.3	1.8%	< 0.1	105%	80%	120%	99%	80%	120%	96%	70%	130%
Total Calcium	6271781		31.0	31.8	2.4%	< 0.1	101%	80%	120%	97%	80%	120%	NA	70%	130%
Total Magnesium	6271781		3.5	3.4	0.4%	< 0.1	106%	80%	120%	98%	80%	120%	97%	70%	130%
Bicarb. Alkalinity (as CaCO3)	6269885		26	25	1.5%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	6269885		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	6269885		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	6271781		121	110	9.4%	< 5	101%	80%	120%	98%	80%	120%	82%	70%	130%
Total Antimony	6271781		<2	<2	NA	< 2	98%	80%	120%	93%	80%	120%	92%	70%	130%
Total Arsenic	6271781		<2	<2	NA	< 2	103%	80%	120%	94%	80%	120%	94%	70%	130%
Total Barium	6271781		35	34	1.0%	< 5	101%	80%	120%	90%	80%	120%	91%	70%	130%
Total Beryllium	6271781		<2	<2	NA	< 2	99%	80%	120%	94%	80%	120%	94%	70%	130%
Total Bismuth	6271781		<2	<2	NA	< 2	105%	80%	120%	98%	80%	120%	89%	70%	130%
Total Boron	6271781		9	8	NA	< 5	85%	80%	120%	83%	80%	120%	98%	70%	130%
Total Cadmium	6271781		0.16	0.11	NA	< 0.09	104%	80%	120%	94%	80%	120%	92%	70%	130%
Total Chromium	6271781		<1	<1	NA	< 1	106%	80%	120%	97%	80%	120%	95%	70%	130%
Total Cobalt	6271781		<1	<1	NA	< 1	106%	80%	120%	97%	80%	120%	95%	70%	130%
Total Copper	6271781		8	7	3.4%	< 1	109%	80%	120%	99%	80%	120%	97%	70%	130%
Total Iron	6271781		149	149	NA	< 50	106%	80%	120%	97%	80%	120%	95%	70%	130%
Total Lead	6271781		11.3	11.1	1.6%	< 0.5	104%	80%	120%	95%	80%	120%	96%	70%	130%
Total Manganese	6271781		36	36	0.2%	< 2	105%	80%	120%	95%	80%	120%	96%	70%	130%
Total Molybdenum	6271781		<2	<2	NA	< 2	100%	80%	120%	95%	80%	120%	91%	70%	130%
Total Nickel	6271781		<2	2	NA	< 2	107%	80%	120%	97%	80%	120%	95%	70%	130%
Total Phosphorous	6271781		0.18	0.19	6.0%	< 0.02	95%	80%	120%	104%	80%	120%	84%	70%	130%
Total Selenium	6271781		<1	<1	NA	< 1	98%	80%	120%	97%	80%	120%	88%	70%	130%

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: CA0033982.0870
SAMPLING SITE:

AGAT WORK ORDER: 24X214568
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Nov 27, 2024

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Total Silver	6271781		<0.1	<0.1	NA	< 0.1	109%	80%	120%	96%	80%	120%	94%	70%	130%
Total Strontium	6271781		167	168	0.7%	< 5	105%	80%	120%	95%	80%	120%	101%	70%	130%
Total Thallium	6271781		<0.1	<0.1	NA	< 0.1	108%	80%	120%	99%	80%	120%	97%	70%	130%
Total Tin	6271781		<2	<2	NA	< 2	98%	80%	120%	94%	80%	120%	92%	70%	130%
Total Titanium	6271781		<2	<2	NA	< 2	100%	80%	120%	93%	80%	120%	92%	70%	130%
Total Uranium	6271781		<0.2	<0.2	NA	< 0.2	104%	80%	120%	96%	80%	120%	95%	70%	130%
Total Vanadium	6271781		<2	<2	NA	< 2	104%	80%	120%	89%	80%	120%	93%	70%	130%
Total Zinc	6271781		102	99	2.9%	< 5	109%	80%	120%	97%	80%	120%	98%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Total Organic Carbon	6271501	6271501	5.4	5.1	4%	< 0.5	95%	80%	120%	NA	80%	120%	102%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TSS

Total Suspended Solids	6271467	6271467	<5	<5	NA	< 5	99%	80%	120%	NA			81%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TKN & Low Level Total Phosphorous - 0.002 mg/L (Water)

Total Kjeldahl Nitrogen	6275074		<0.10	<0.10	NA	< 0.10	102%	70%	130%	102%	80%	120%	110%	70%	130%
Total Phosphorus	6270015		0.134	0.136	1.3%	< 0.002	98%	70%	130%	106%	80%	120%	NA	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

TKN & Low Level Total Phosphorous - 0.002 mg/L (Water)

Total Kjeldahl Nitrogen	6271504	6271504	<0.10	<0.10	NA	< 0.10	102%	70%	130%	102%	80%	120%	102%	70%	130%
Total Phosphorus	6271498	6271498	0.062	0.060	2.1%	< 0.002	98%	70%	130%	106%	80%	120%	106%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

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AGAT WORK ORDER: 24X214568

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ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	COLORIMETER
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INOR-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6052	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INOR-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X214568

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

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AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 12.1, 11.4, 11.5
Hold Time:
AGAT Job Number: 24X214568
Notes: 8 Bottles per ID. TSS not on COC, extra Chlorophyll bottle

Report Information
Company: WSP E&I
Contact: Jihan Selim-Omar
Address: 1 Spectacle Lake Drive
Dartmouth, NS B3B 1X7
Phone: Fax:
Client Project #: CA0033982.0870
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Jihan Selim-Omar
Email: jihan.selim-omar@wsp.com
2. Name: Nick Leblanc
Email: nicholas.leblanc2@wsp.com

Report Format
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample: ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☐ / No ☐
Company: Same
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

24OCT29 3:43PM

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	SWA + TMS	TKN	Low Level TP (0.002 mg/L)	Total Coliforms + E.Coli (CFU)	Chlorophyll A
~~KL-1~~		~~Water~~	~~6~~	~~TC+EC requires dilution~~	☑	☑	☑	☑	☑
~~KL-2~~		~~Water~~	~~6~~	~~TC+EC requires dilution~~	☑	☑	☑	☑	☑
KL-3	2024-10-29 / 1140	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
KL-4	/ 1150	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
KL-5	/ 1440	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
HWY-102-1	/ 1330	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
HWY-102-2	/ 1350	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
LSD	/ 1250	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
LU	/ 1100	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
PLM-1	/ 0915	Water	6	TC+EC requires dilution	☑	☑	☑	☑	☑
PLM-2	/ 0950	Water	6	TC+EC requires dilution					
	/								

Samples Relinquished By (Print Name)	Date/Time	Samples Received By	Date/Time
Jordan Henry	2024-10-29/ 15:40	[redacted]	
Samples Relinquished By (Sign): Emily Batt	Date/Time "	Samples Received By [redacted]	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
N°:

Document ID: DW-453-1502.002

Date revised: May 19, 2015

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

RESULTS: DartmouthCPM
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID: 6271467 - KL-3
Matrix: Water

CANISTER ID:
PRIORITY: Normal
DESCRIPTION: Project 24X214568

DATE SAMPLED: 29-Oct-24 11:40
DATE RECEIVED: 08-Nov-24
REPORT CREATED: 27-Nov-24
REPORT NUMBER: 24110074
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-001	Chlorophylla (Phytoplankton)		0.9	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant
On behalf of: Adam Malcolm, Manager, Chemical Testing
Date: November 27, 2024
Inquiries: (780) 632 8403
E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271497 - KL-4		Water	29-Oct-24 11:50

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-002	Chlorophylla (Phytoplankton)		0.6	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271498 - KL-5		Water	29-Oct-24 14:40

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-003	Chlorophylla (Phytoplankton)		1.3	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271499 - HWY-102-1		Water	29-Oct-24 13:30

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-004	Chlorophylla (Phytoplankton)		2.8	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271500 - HWY-102-2		Water	29-Oct-24 13:50

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-005	Chlorophylla (Phytoplankton)		1.3	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271501 - LSD		Water	29-Oct-24 12:50

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-006	Chlorophylla (Phytoplankton)		1.6	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271502 - LU		Water	29-Oct-24 11:00

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-007	Chlorophylla (Phytoplankton)		1.1	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271503 - PLM-1		Water	29-Oct-24 9:15

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-008	Chlorophylla (Phytoplankton)		0.7	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6271504 - PLM-2		Water	29-Oct-24 9:50

DESCRIPTION: Project 24X214568

REPORT NUMBER: 24110074 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110074-009	Chlorophylla (Phytoplankton)		1.9	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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Revision History

Order ID	Ver	Date	Reason
24110074	01	27-Nov-24	Report created

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24110074

Project 24X214568

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Sample Comments

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Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.

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Dartmouth, Nova Scotia
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TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Jihan Selim-Omar
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X214828
MICROBIOLOGY ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
MISCELLANEOUS ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Nov 27, 2024
PAGES (INCLUDING COVER): 14
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-1	KL-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
Total Coliforms (MF)	CFU/100 mL		2	376	220
E. Coli (MF)	CFU/100 mL		2	10	18

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Subcontracted Data Received

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-1	KL-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
Subcontracted Data				Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X214828
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-1	KL-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
pH				6.31	6.42
Reactive Silica as SiO2	mg/L		0.5	2.1	4.9
Chloride	mg/L		1	44	15
Fluoride	mg/L		0.12	0.17	<0.12
Sulphate	mg/L		2	8	9
Alkalinity	mg/L		5	8	12
True Color	TCU		5	12	38
Turbidity	NTU		0.5	1.44	2.34
Electrical Conductivity	umho/cm		1	214	126
Nitrate + Nitrite as N	mg/L		0.05	0.33	<0.05
Nitrate as N	mg/L		0.05	0.15	<0.05
Nitrite as N	mg/L		0.05	0.18	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.50	3.7	6.7
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	29.4	12.1
Total Potassium	mg/L		0.1	0.9	1.1
Total Calcium	mg/L		0.1	6.2	6.7
Total Magnesium	mg/L		0.1	1.1	1.7
Bicarb. Alkalinity (as CaCO3)	mg/L		5	8	12
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10
Hydroxide	mg/L		5	<5	<5
Calculated TDS	mg/L		1	96	53
Hardness	mg/L			20.0	23.7
Langelier Index (@20C)	NA			-3.58	-3.23
Langelier Index (@ 4C)	NA			-3.90	-3.55
Saturation pH (@ 20C)	NA			9.89	9.65
Saturation pH (@ 4C)	NA			10.2	9.97
Anion Sum	me/L			1.59	0.85

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X214828
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
SAMPLING SITE:

ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-1	KL-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
Cation sum	me/L			1.71	1.05
% Difference/ Ion Balance	%			3.5	10.7
Total Aluminum	ug/L		5	45	125
Total Antimony	ug/L		2	<2	<2
Total Arsenic	ug/L		2	<2	<2
Total Barium	ug/L		5	16	23
Total Beryllium	ug/L		2	<2	<2
Total Bismuth	ug/L		2	<2	<2
Total Boron	ug/L		5	9	21
Total Cadmium	ug/L		0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1
Total Cobalt	ug/L		1	<1	<1
Total Copper	ug/L		1	<1	<1
Total Iron	ug/L		50	<50	296
Total Lead	ug/L		0.5	<0.5	<0.5
Total Manganese	ug/L		2	13	37
Total Molybdenum	ug/L		2	<2	<2
Total Nickel	ug/L		2	<2	<2
Total Phosphorous	mg/L		0.02	0.59	1.48
Total Selenium	ug/L		1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1
Total Strontium	ug/L		5	31	30
Total Thallium	ug/L		0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2
Total Titanium	ug/L		2	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2
Total Zinc	ug/L		5	<5	<5

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6273774-6273777 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X214828
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

TKN & Low Level Total Phosphorous - 0.002 mg/L (Water)

DATE RECEIVED: 2024-10-30
DATE REPORTED: 2024-11-27

			SAMPLE DESCRIPTION:	KL-1	KL-2
			SAMPLE TYPE:	Water	Water
			DATE SAMPLED:	2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10
Total Phosphorus	mg/L		0.003	0.071	0.020

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6273774-6273777 Total Phosphorous RDL is the calculated MDL.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

TSS

DATE RECEIVED: 2024-10-30

DATE REPORTED: 2024-11-27

		SAMPLE DESCRIPTION:		KL-1	KL-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-10-30 09:50	2024-10-30 10:15
Parameter	Unit	G / S	RDL	6273774	6273777
Total Suspended Solids	mg/L		5	<5	12

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6273774-6273777 pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
AGAT WORK ORDER: 24X214828
PROJECT: CA0033982.0870
ATTENTION TO: Jihan Selim-Omar
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Nov 27, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
TSS															
Total Suspended Solids	6271467		<5	<5	NA	< 5	99%	80%	120%	NA			81%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals															
pH	6273774	6273774	6.31	6.27	0.6%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	6273150		7.6	7.7	1.8%	< 0.5	96%	80%	120%	102%	80%	120%	99%	80%	120%
Chloride	6278073		29	29	0.1%	< 1	91%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	6278073		<0.12	<0.12	NA	< 0.12	113%	80%	120%	NA	80%	120%	119%	70%	130%
Sulphate	6278073		3	3	NA	< 2	109%	80%	120%	NA	80%	120%	90%	70%	130%
Alkalinity	6273774	6273774	8	8	NA	< 5	95%	80%	120%	NA			NA		
True Color	6273150		6	5	NA	< 5	90%	80%	120%	103%	80%	120%	NA		
Turbidity	6273774	6273774	0.98	0.92	NA	< 0.5	93%	80%	120%	NA			NA		
Electrical Conductivity	6273774	6273774	214	212	0.9%	< 1	98%	90%	110%	NA			NA		
Nitrate as N	6278073		<0.05	<0.05	NA	< 0.05	94%	80%	120%	NA	80%	120%	107%	70%	130%
Nitrite as N	6278073		<0.05	<0.05	NA	< 0.05	91%	80%	120%	NA	80%	120%	110%	70%	130%
Ammonia as N	6273507		<0.03	<0.03	NA	< 0.03	100%	80%	120%	101%	80%	120%	99%	70%	130%
Total Organic Carbon	6271501		5.4	5.1	4.0%	< 0.5	95%	80%	120%	NA	80%	120%	102%	80%	120%
Ortho-Phosphate as P	6273150		<0.01	<0.01	NA	< 0.01	97%	80%	120%	99%	80%	120%	95%	80%	120%
Total Sodium	6274986		11.1	11.4	2.4%	< 0.1	109%	80%	120%	100%	80%	120%	104%	70%	130%
Total Potassium	6274986		0.3	0.3	NA	< 0.1	105%	80%	120%	96%	80%	120%	97%	70%	130%
Total Calcium	6274986		6.1	6.9	12.0%	< 0.1	103%	80%	120%	89%	80%	120%	98%	70%	130%
Total Magnesium	6274986		0.4	0.4	NA	< 0.1	109%	80%	120%	98%	80%	120%	98%	70%	130%
Bicarb. Alkalinity (as CaCO3)	6273774	6273774	8	8	NA	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	6273774	6273774	<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	6273774	6273774	<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	6274986		14	12	NA	< 5	105%	80%	120%	97%	80%	120%	100%	70%	130%
Total Antimony	6274986		<2	<2	NA	< 2	101%	80%	120%	94%	80%	120%	93%	70%	130%
Total Arsenic	6274986		<2	<2	NA	< 2	102%	80%	120%	94%	80%	120%	93%	70%	130%
Total Barium	6274986		<5	<5	NA	< 5	103%	80%	120%	94%	80%	120%	91%	70%	130%
Total Beryllium	6274986		<2	<2	NA	< 2	111%	80%	120%	92%	80%	120%	107%	70%	130%
Total Bismuth	6274986		<2	<2	NA	< 2	104%	80%	120%	94%	80%	120%	90%	70%	130%
Total Boron	6274986		8	6	NA	< 5	107%	80%	120%	118%	80%	120%	110%	70%	130%
Total Cadmium	6274986		<0.09	<0.09	NA	< 0.09	105%	80%	120%	94%	80%	120%	93%	70%	130%
Total Chromium	6274986		<1	<1	NA	< 1	106%	80%	120%	95%	80%	120%	97%	70%	130%
Total Cobalt	6274986		<1	<1	NA	< 1	106%	80%	120%	95%	80%	120%	98%	70%	130%
Total Copper	6274986		363	370	1.8%	< 1	110%	80%	120%	99%	80%	120%	NA	70%	130%
Total Iron	6274986		<50	<50	NA	< 50	108%	80%	120%	97%	80%	120%	98%	70%	130%
Total Lead	6274986		0.6	0.6	NA	< 0.5	102%	80%	120%	93%	80%	120%	95%	70%	130%
Total Manganese	6274986		5	5	NA	< 2	106%	80%	120%	93%	80%	120%	97%	70%	130%

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
PROJECT: CA0033982.0870
SAMPLING SITE:

AGAT WORK ORDER: 24X214828
ATTENTION TO: Jihan Selim-Omar
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Nov 27, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Molybdenum	6274986		<2	<2	NA	< 2	99%	80%	120%	93%	80%	120%	91%	70%	130%
Total Nickel	6274986		39	39	0.5%	< 2	106%	80%	120%	96%	80%	120%	100%	70%	130%
Total Phosphorous	6274986		0.18	0.15	18.2%	< 0.02	91%	80%	120%	100%	80%	120%	98%	70%	130%
Total Selenium	6274986		<1	<1	NA	< 1	102%	80%	120%	89%	80%	120%	96%	70%	130%
Total Silver	6274986		<0.1	<0.1	NA	< 0.1	109%	80%	120%	97%	80%	120%	93%	70%	130%
Total Strontium	6274986		10	10	NA	< 5	104%	80%	120%	93%	80%	120%	98%	70%	130%
Total Thallium	6274986		<0.1	<0.1	NA	< 0.1	106%	80%	120%	95%	80%	120%	98%	70%	130%
Total Tin	6274986		<2	<2	NA	< 2	100%	80%	120%	94%	80%	120%	94%	70%	130%
Total Titanium	6274986		<2	<2	NA	< 2	98%	80%	120%	93%	80%	120%	96%	70%	130%
Total Uranium	6274986		<0.2	<0.2	NA	< 0.2	106%	80%	120%	93%	80%	120%	96%	70%	130%
Total Vanadium	6274986		<2	<2	NA	< 2	103%	80%	120%	88%	80%	120%	95%	70%	130%
Total Zinc	6274986		128	133	3.3%	< 5	110%	80%	120%	97%	80%	120%	105%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TKN & Low Level Total Phosphorous - 0.002 mg/L (Water)

Total Kjeldahl Nitrogen	6271504	<0.10	<0.10	NA	< 0.10	102%	70%	130%	102%	80%	120%	102%	70%	130%
Total Phosphorus	6271498	0.062	0.060	2.1%	< 0.002	98%	70%	130%	106%	80%	120%	106%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR
Miscellaneous Analysis			
Subcontracted Data			

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	COLORIMETER
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INOR-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6052	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INOR-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INOR-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X214828

PROJECT: CA0033982.0870

ATTENTION TO: Jihan Selim-Omar

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

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AGAT Laboratories

Have feedback? Scan here for a quick survey!

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 7.7, 7.4, 8.2
Hold Time:
AGAT Job Number:
Notes: 24X214828

Report Information

Company: WSP E&I
Contact: Jihan Selim-Omar
Address: 1 Spectacle Lake Dr. Dartmouth, NS B3B 1X7
Phone: Fax:
Client Project #: CA0033982.0870
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Jihan Selim-Omar
   Email: jihan.selim-omar@wsp.com
2. Name: Nick LeBlanc
   Email: nicholas.leblanc2@wsp.com

Report Format

☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☐ / No ☐

Company: Same
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

24 OCT 30 11:49 AM

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☑ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus (low level)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☑ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: Chlorophyll A	Other:	Hazardous (Y/N)
KL-1	2024-10-30 / 9:50	water	8	TC+EC requires dilution		✓	✓				✓	✓	✓										✓			✓		
KL-2	↓ / 10:15	water	↓	↓		✓	✓				✓	✓	✓										✓			✓		

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Jordan Henry	2024-10-30 / 11:50	[redacted]	
Samples Relinquished By (Sign):	**Date/Time**	**Samples Received By (Sign):**	**Date/Time**
Emily Baff	"	[redacted]	

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1

N°: 78766

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(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

RESULTS: DartmouthCPM
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

INVOICE: Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

CLIENT SAMPLE ID: 6273774 KL-1
Matrix: Water
CANISTER ID:
PRIORITY: Normal
DESCRIPTION: Project 24X214828
DATE SAMPLED: 30-Oct-24 9:50
DATE RECEIVED: 08-Nov-24
REPORT CREATED: 27-Nov-24
REPORT NUMBER: 24110076
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110076-001	Chlorophylla (Phytoplankton)		1.3	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant
On behalf of: Adam Malcolm, Manager, Chemical Testing
Date: November 27, 2024
Inquiries: (780) 632 8403
E-mail: EAS.Results@innotechalberta.ca

InnoTech's ISO/IEC 17025:2017 scope of accreditation can be located at https://directory.cala.ca//

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

APPLIED CHEMISTRY SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
6273777 KL-2		Water	30-Oct-24 10:15

DESCRIPTION: Project 24X214828

REPORT NUMBER: 24110076 **REPORT CREATED:** 27-Nov-24 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
24110076-002	Chlorophylla (Phytoplankton)		0.3	ug/L	0.3	AC-020	12-Nov-24

Report certified by: Andrea Conner, Admin Assistant On behalf of: Adam Malcolm, Manager, Chemical Testing

Date: November 27, 2024 Inquiries: (780) 632 8403 E-mail: EAS.Results@innotechalberta.ca

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Revision History

Order ID	Ver	Date	Reason
24110076	01	27-Nov-24	Report created

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Methods

Method	Description
AC-020	Chlorophyll-a Phytoplankton (Fluorometric Analysis)

List of Analytical Method IDs within InnoTech's ISO/IEC 17025:2017 CALA Scope of Accreditation

Method ID	Description
AC-013	Mercury in Waters by Cold Vapor Atomic Fluorescence Detection (CVAFS)
AC-020	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-021	Elemental Analysis Methodology of Filter-collected Airborne Particulate Matter (PM) by ICP-MS
AC-026	Ion Chromatographic Procedures using the Dionex ICS 3000 and 5000 Systems
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-035	Analysis of Glyphosate, Aminomethylphosphonic Acid and Glufosinate in Water
AC-038	Trace Metal Analysis of Water Samples by ICP-MS
AC-048	Specific Conductance (Conductivity Meter Method)
AC-049	pH (Meter Method)
AC-054	Alkalinity Total and Phenolphthalein
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
AC-060	Trace Metal Analysis of Soil Sediment and Industrial Waste Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-061	Trace Metal Analysis for Biological Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
AC-065	Analysis of Naphthenic Acids in Water by HPLC-Orbitrap-MS analysis
AC-074	Pesticides in Water
AC-079	Alkylated PAH in Soil and Sediment
AC-080	Alkylated PAH in Water (SPE Extraction)
NA-006	Determination of BTEX, F1 Hydrocarbons and F2, F3 and F4 Hydrocarbons in Water
NA-024	Analysis of Reduced Sulfur Compounds in Air

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Qualifiers

Data Qualifier	Translation
B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank

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Order Comments

24110076

Project 24X214828

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Sample Comments

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Result Comments

Note:

1. Results relate only to items tested and apply to the sample as received.

2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.

11 Morris Drive, Unit 122
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TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WSP E&I CANADA LIMITED
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS B3B 1X7
(902) 468-2848
ATTENTION TO: Naomi Giles
PROJECT: CA0033982.0870
AGAT WORK ORDER: 24X228659
WATER ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead
DATE REPORTED: Dec 13, 2024
PAGES (INCLUDING COVER): 5
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24X228659
PROJECT: CA0033982.0870

CLIENT NAME: WSP E&I CANADA LIMITED
ATTENTION TO: Naomi Giles
SAMPLING SITE:
SAMPLED BY:

Low Level Total Phosphorous - 0.002 mg/L

DATE RECEIVED: 2024-12-05
DATE REPORTED: 2024-12-13

			SAMPLE DESCRIPTION:	KL-1	KL-2	KL-3	KL-4	KL-5	Hwy-102-1	Hwy-102-2	LSD
			SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
			DATE SAMPLED:	2024-12-05 10:00	2024-12-04 12:05	2024-12-05 09:05	2024-12-05 09:10	2024-12-05 09:40	2024-12-04 10:20	2024-12-04 12:20	2024-12-04 11:35
Parameter	Unit	G / S	RDL	6381272	6381278	6381279	6381280	6381281	6381282	6381283	6381284
Total Phosphorus	mg/L		0.002	0.004	0.003	0.013	<0.002	<0.002	0.002	0.005	0.010

			SAMPLE DESCRIPTION:	LU	PLM-1	PLM-2
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2024-12-04 10:55	2024-12-04 09:10	2024-12-04 09:30
Parameter	Unit	G / S	RDL	6381285	6381286	6381287
Total Phosphorus	mg/L		0.002	0.004	<0.002	<0.002

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6381272-6381287 Total Phosphorous RDL is the calculated MDL.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X228659

PROJECT: CA0033982.0870

ATTENTION TO: Naomi Giles

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Dec 13, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Low Level Total Phosphorous - 0.002 mg/L															
Total Phosphorus	6401152		0.019	0.022	14.6%	< 0.002	101%	70%	130%	100%	80%	120%	108%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Low Level Total Phosphorous - 0.002 mg/L															
Total Phosphorus	6381284	6381284	0.010	0.010	7%	< 0.002	108%	70%	130%	101%	80%	120%	105%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 24X228659

PROJECT: CA0033982.0870

ATTENTION TO: Naomi Giles

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 3.6, -0.1, -0.2
Hold Time:
AGAT Job Number: 24X228659
Notes: Undertime?

Report Information
Company: WSP E&I
Contact: Naomi Giles
Address: 1 Spectacle Lake Drive
Dartmouth, NS B3B 1X7
Phone: Fax:
Client Project #: CA0033982.0870
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Naomi Giles
Email: naomi.giles@wsp.com
2. Name: Nick Leblanc
Email: nicholas.leblanc2@wsp.com

Report Format
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
'24 DEC 5 10:33AM
Date Required:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☒ / No ☐
Company: Same
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Low Level T Posphorus (0.002 mg/L)
KL-1	2024-12-05/1000	Water	1		☑
KL-2	2024-12-04/1205	Water	1		☑
KL-3	2024-12-05/0905	Water	1		☑
KL-4	2024-120-05/0910	Water	1		☑
KL-5	2024-12-05/0940	Water	1		☑
HWY-102-1	2024-12-04/1020	Water	1		☑
HWY-102-2	2024-12-04/1220	Water	1		☑
LSD	2024-12-04/1135	Water	1		☑
LU	2024-12-04/1055	Water	1		☑
PLM-1	2024-12-04/0910	Water	1		☑
PLM-2	2024-12-04/0930	Water	1		☑

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Jordan Henry	2024-12-05/1032	[redacted]	
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
Matt Oelschlägel	"		

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
N°:

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