

December 2019

Surface Water Quality Monitoring Report 2019 (Silver Springs Park)

CLIMATE CHANGE ADAPTATION

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EXECUTIVE SUMMARY

The purpose of East St. Paul's 2019 water quality monitoring program was to investigate areas of concern in the ponds of Silver Springs Park, related to water quality, water levels, and aquatic plant growth. The program occurred in order to identify and assess mitigation measures and create a baseline to monitor against future conditions.

The water sampling program occurred between June 13^{th} 2019 and September 19^{th} , 2019. Field measurements of pH, water temperature, dissolved oxygen (DO), and conductivity were collected using a SENSION+ M150 portable water quality meter. Further samples were sent to a Canadian Association for Laboratory Accreditation (CALA) accredited analytical laboratory (ALS Laboratories, Winnipeg, MB) to be analyzed for nitrate + nitrite (NO₃ + NO₂), ammonia (NH₃), chlorophyll *a*, total phosphorous (TP), total suspended solids (TSS), and turbidity, and in some cases, fecal matter, total chlorine (TCI) and algae identification. Results reflected seasonal changes, including temperature, moisture, and other weather conditions, as well as nutrient inputs.

Results were communicated to the public halfway through the sampling season during the Open House that occurred on August 20th, 2019, and then further summarized in the Open House report that was published in September 2019.

Data collected during the sampling program was analyzed and used to develop recommendations on opportunities to improve water quality conditions. Future sampling programs will reference the baseline data to verify findings and assess the impact of implemented mitigation measures.

Surface Water Quality Monitoring Report 2019 (Silver Springs Park)

1 INTRODUCTION

Purpose

The purpose of East St. Paul's 2019 water quality monitoring program was to investigate sources of water quality concerns in the ponds within the former quarry at Silver Springs Park, in order to identify and assess mitigation measures and create a baseline to monitor against future conditions.

Background

The ponds that currently exist in Silver Springs Park were originally formed during limestone quarrying activities, with groundwater and limited surface water runoff filling the low lying areas of the site. In the 1980s, the quarry began to decrease operation and restoration of the quarry side slopes was initiated to create a park overlooked by housing development. The east side of the site was reopened in the 1990s to remove residual granular materials. There are four separate waterbodies in the park. The separation of the ponds follows the high areas that were used as excavation platforms or access roads by excavating equipment during quarrying activities. These were later used as the base to create recreational pathways as part of the landscape master plan for the park.¹ Already in the 1990s varying surface water levels of up to 0.5 meters were measured between the ponds, indicating a certain degree of isolation between the systems. During a series of high water years, the pathways were further elevated to create permanent barriers between the ponds.²

The ponds are fed by groundwater, and to a lesser extent runoff.

Historic Water Quality Observations

Residents report that the ponds were a clear blue colour in the late 1990s and that locals frequently used the ponds for swimming. Feedback from residents indicates that water quality began making a visible shift within the last 10 years³, although air photos from 2000 suggest this change started several years prior.⁴ Residents raised concerns about changes in water quality and beginning in 2016, the RM began working with Clean Water Pro in order to look opportunities to improve water quality.

Historic Management Efforts

In August 2016, fine bubble aeration using six ProAir4 plates were installed in the NW corner of SS B. In September 2018, an assessment of all four ponds in Silver Springs was conducted by Clean Water Pro. The assessment concluded that all four ponds had adequate dissolved oxygen levels in the pond, which is the primary purpose of aeration.

¹ (McGowan Design Group, 1991)

² (Toews, 2019, pers comm.)

³ (RM ESP, 2019)

⁴ (Atlas Geomatics, 2000)

Description of Waterbodies

The four ponds vary in depth and water levels fluctuate, with low levels being observed in dry years.⁵ The ponds range in depth from approximately one to ten feet however fluctuate in response to changes to the water table. Residents have advised that in the dry years of the early 1990s, water levels in the park were very low. Groundwater infiltration has been observed in Ponds A and C in the winter from areas that do not freeze over.

The four ponds currently have distinct water quality from each other and the aquatic vegetative communities within the ponds vary substantially.

Silver Springs A (SS A)

SS A is a 15.4-acre pond. The pond is surrounded by steep gravel slopes on the south, trees and grassland to the west of the pond, as well as a few residential properties at the top of the hillside. There are hiking trails located on the east side of the pond. SS A has high levels of brown algae and some cyanobacteria species present. Initially, Pond A was the deepest; however, it is believed that erosion of the steep south banks contributed substantial sedimentation which resulted in decreased depth.

Silver Springs B (SS B)

SS B is a 26-acre pond. SS B is surrounded by residential properties on its north and east sides, as it lies at the base of properties on Silver Fox Place, Ridgeview Place, and Highfield Place. Aquatic vegetation is growing in the form of submerged aquatic plants.

Silver Springs C (SS C)

SS C is a 25.16-acre pond. The majority of SS C is bordered by grassland and deciduous trees; however, there are some residential properties on the hill on its west side. SS C has high levels of green algae and the presence of some cyanobacteria (blue green) algae species.

Silver Springs D (SS D)

SS D is the smallest pond at 6.81 acres in size and is also notably shallower than the other three ponds. The majority of the pond is bordered by grassland or forested areas; however, some residential properties are present on the north side, up the hill. SS D has a mixture of both algae and submerged aquatic plants.

⁵ (RM ESP, 2019)

Location	Algae	Aquatic Vegetation	Odour	Suspended Sediment	Wildlife	Other Notes
SS A	High levels of brown algae		1	High levels	Geese, Ducks, Turtles, Muskrat, Frogs, Minnows	Brown opaque water
SS B		High levels of submerged aquatic vegetation		Low levels	Geese, Ducks, Turtles, Frogs, Minnows	Blue clear water
SS C	High levels of green algae		1	Low levels	Geese, Ducks, Turtles, Muskrat, Frogs, Minnows	Blue-green opaque water
SS D		Moderate levels of submerged aquatic vegetation		Moderate levels	Geese, Ducks, Turtles, Frogs	Clear water

2 METHODOLOGY

Sample Locations

Silver Springs water quality sampling occurred at four locations; one for each of the four ponds designated as SS A, SS B, SS C, and SS D.



Figure 1. Sampling Locations in Silver Springs Park.

Sampling Protocol and Analysis

Ponds were accessed from the shoreline and water samples were collected using a sampling pole (i.e., a clean bucket attached to a long pole) in order to retrieve water from the water column. Sample water was composited in a larger (clean) bucket on the shore; the composite water was then used to collect readings with the portable water quality meter and to fill sample bottles for submission to the analytical laboratory. Sample dates and times were recorded at every site. Samples were sent to a Canadian Association for Laboratory Accreditation (CALA) accredited analytical laboratory (ALS Laboratories, Winnipeg, MB). Lab samples were kept cool and in the dark until submission to the laboratory. Laboratory samples were analyzed for nitrate + nitrite $(NO_3 + NO_2)$, ammonia (NH_3) , chlorophyll *a*, total phosphorous (TP), total suspended solids (TSS), and turbidity; in some cases, fecal matter, total chlorine (TCI) and algae identification were also assessed.

Field measurements of pH, water temperature, dissolved oxygen (DO), and conductivity were collected using a SENSION+ M150 portable water quality meter. The meter was calibrated in the office prior to each sampling event.

Prior to assessing the results, the field and laboratory data were reviewed for potential outliers and transcription or analytical errors. Any laboratory results that were reported below the analytical detection limit were included in the analyses at the value equal to the detection limit.

Full Parameter Sampling Lab Results Received June 19th June 27th June 26th July 19th July 11th July 24th July 24th August 7th August 7th August 21st August 29th September 9th October 19th September 19th Limited Parameter Sampling July 17th August 1st August 14th August 21st

Sampling Dates and Parameters

Limited parameters (pH, DO, temperature, and conductivity) with the portable meter were measured weekly at each pond in July and August. In addition, a full set of parameters were monitored in each pond approximately every two weeks. On these sampling dates, both meter readings (pH, DO, temperature, conductivity) and lab analysis samples (nitrates + nitrites, ammonia, chlorophyll *a*, total phosphorous, total suspended solids, and turbidity) were collected. DO was also measured at the laboratory six times through the summer to check the accuracy of readings from the water quality meter; all results indicated that the water quality meter was reading accurately. Based on information collected during the sampling process, additional samples (Fecals, algae, total chlorine) were occasionally collected from specific waterbodies.

Table 2. Sampling Dates

Water quality results were compared to the Manitoba Water Quality Standards, Objectives and Guidelines (2011)⁶ as well as the Canadian Council for Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (PAL)⁷ in cases where a provincial guideline needed further clarification. Objectives and guidelines for the Protection of Aquatic Life (PAL) are the primary focus, although drinking water and recreational use objectives/guidelines were also considered for perspective.

Table #3 summarizes the parameters measured during the monitoring program, including the rationale for its inclusion in the program, and lists the objective/guidelines, where applicable. Further description of select parameters follows.

⁶ (Manitoba Water Stewardship, 2011)

⁷ (CCME, 2011).

 Table 3.
 Summary of Parameters

Parameter Name	Analysis Method	Units	MB Objectives /Guidelines	Type of Objective or Guideline	Description
рН	Portable Meter	units	6.5-9	Guideline for PAL ⁸	Indicator of relative alkalinity or acidity of water
Water Temperature	Portable Meter	°C			Suitability for Aquatic Life
Dissolved Oxygen (DO)	Portable Meter/ Lab Analysis	mg/L	Minimum 6.5	Objective for PAL	Available oxygen in water
Conductivity	Portable Meter	μS/cm			Can indicate if a pollutant has entered the waterbody/presence or absence of groundwater
Nitrate + Nitrites (NO ₃ + NO ₂)	Lab Analysis	mg/L	10	Objective for Drinking Water ⁹	Nutrient
Nitrate (NO ₃)	Lab Analysis	mg/L	2.93 ¹⁰	Guideline for PAL	Nutrient
Nitrite (NO ₂)	Lab Analysis	mg/L	0.06	Guideline for PAL	Nutrient
Ammonia (NH3)	Lab Analysis	mg/L	Dependent on pH and water temperature	Objective for PAL	Nutrient, can be toxic at high levels
Total Phosphorous (TP)	Lab Analysis	mg/L	0.025	Narrative guideline to prevent the growth of nuisance algae	Nutrient
Total Chlorine (TCl)	Lab Analysis	mg/L	0.011		Can be discharged from swimming pools- toxic to aquatic life at small quantities
Chlorophyll A	Lab Analysis	mg/L			Indicator of plant growth
Total Suspended Solids (TSS)	Lab Analysis	mg/L			Particles in water column; high TSS impairs foraging and predator avoidance behaviours
Turbidity	Lab Analysis	NTU			Relative clarity of water, how much material suspended in water decreases light passage in water ¹¹
Fecal Bacteria	Lab Analysis	CFU/10 0 mL	200	Objective for Human Recreation	Indicator of fecal contamination
Cyanobacteria	Lab Analysis	cells/1 mL	100,000	Objective for Human Recreation	Indicator of eutrophication in waterbodies

⁸ PAL = Protection of Aquatic Life

⁹ Drinking water objectives are not directly applicable, however used for perspective

¹⁰ MB water quality states guideline as 13 mg/L as N; however, it was confirmed by Province to be "13 mg/L as NO₃", which is equivalent to 2.93 mg/L as N.

¹¹ (Ohrel, R. L., & Register, K. M, 2006).

рΗ

pH is used to specify the alkalinity or acidity of a solution by measuring the hydrogen ion concentration. pH directly affects aquatic life and organisms become stressed and when the pH of water is too low or high it can highly impair or have lethal consequences for individual species. pH also impacts toxicity and solubility of various chemicals or heavy metals in water, one example of this being ammonia. Excessively high or low pH levels can also cause skin and eye irritations for humans, which could be a concern for individuals using the ponds for recreation.¹⁴

Dissolved oxygen

Dissolved oxygen (DO) is an important water quality indicator of a waterbody's ability to support aquatic life, as DO levels below a certain threshold can cause lethal effects on aquatic organisms. DO enters the water from two main sources- the atmosphere and aquatic plants. DO enters the water by diffusion through the atmosphere. Algae and submerged plants produce oxygen through photosynthesis and release it into the pond water. DO is affected by temperature and fluctuates throughout the day. Higher temperatures usually result in higher plant decomposition which can contribute to elevated DO concentration. Aeration also increases DO levels as bubbles produced by the moving water supply oxygen. Fish and aquatic animals rely on dissolved oxygen to survive, and decreasing oxygen levels puts aquatic life under stress. The overabundance of algae and other aquatic plants can deplete DO to levels below the PAL threshold. When algae blooms die-off, they can cause rapid oxygen depletions since DO is consumed by bacteria and fungi as they decompose dead organic matter.¹⁵ Dissolved oxygen levels are also impacted by water flow, as higher flow rates increase turbulence and diffusion of atmospheric oxygen into the water, which will result in increased DO concentrations.

Nutrients

Nitrogen and Phosphorous are important naturally occurring and are the principle drivers for productivity in aquatic ecosystems. They can enter the aquatic environment through various human inputs, the most common being runoff from fertilized agricultural areas or lawns. They support the growth of aquatic vegetation including floating vegetation, submerged plants, macrophytes and emergent plants. However, excess nitrogen and phosphorus can result in nutrient pollution which may cause aquatic vegetation like algae to grow at rates higher than what can be supported naturally from the ecosystem. Eutrophication occurs when excessively high nutrient conditions result in excessive algal blooms and vegetation growth.¹⁶ Excessive algae or plant growth will eventually die off. Oxygenconsuming bacteria will decompose dead aquatic vegetation, depleting available oxygen which is needed by aquatic life to survive.¹⁷ There have also been studies that suggest that goose fecal matter can contribute to nutrient loading as it contains nitrogen and phosphorous.¹⁸ The presence of large amounts of geese may result in higher nutrient levels.

Although the Manitoba Water Quality Standards, Objectives and Guidelines (2011) provides guideline values for phosphorous, the CCME provides trigger ranges for phosphorous concentration in order to classify waterbodies by trophic status and the tendency towards eutrophication.

^{14 (}Health Canada, 2012)

¹⁵ (Ohrel, R. L., & Register, K. M, 2006).

¹⁶ Ibid

¹⁷ Ibid

¹⁸ (Dessborn, L., Hessel, R., & Elmberg, J., 2016)

1	· · · · · · · · · · · · · · · · · · ·
Trophic Status	Canadian Trigger Ranges Total Phosphorous (mg/L)
Ultra-oligotrophic	<0.004
Oligotrophic	0.004-0.01
Mesotrophic	0.01-0.02
Meso-eutrophic	0.02-0.035
Eutrophic	0.035-0.100
Hyper-Eutrophic	> 0.100

Table 4. Total Phosphorous Trigger ranges for Canadian lakes and Rivers. Adapted from Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems ¹⁹

The proposed provincial guideline value of 0.025 mg/L of phosphorous would indicate a water body is meso-eutrophic, meaning the waterbody's biological productivity is moderate to high. Exceeding this level would indicate high biological activity within a waterbody due to excessive nutrients, and eutrophic conditions which could be detrimental to ecosystem health.

Ammonia is highly dependent on a variety of factors, the main being temperature and pH of the particular waterbody, although it can also be impacted by other factors including dissolved oxygen concentration and salinity. It can enter the environment through either natural processes, such as the breakdown of organic or animal waste, forest fires, and gas exchange in the atmosphere, as well as point sources such as emissions and effluent material from industrial plants or agricultural facilities.²⁰ At high concentrations, ammonia can be toxic to aquatic organisms; however, there is no uniform guideline value for ammonia toxicity because of its variability depending on other factors such as pH, temperature and occurring biological activity. For the purpose of this study, the referenced guideline value for ammonia was determined using the most stringent conditions by using the highest pH and temperature measured in each pond during the summer (i.e., conditions when ammonia would be most toxic). If the reference guideline was exceeded, then analysis of the guideline for the specific sample was calculated relative to the relevant factors.

Aquatic vegetation

Ponds within the municipality have various types of aquatic vegetation, whether it be algae, duckweed, aquatic weeds, and/or emergent macrophytes, with often one or two types of aquatic vegetation dominating. Aquatic vegetation is highly receptive to the concentration of nutrients available in the water. If there are excess nutrients available in the pond ecosystem, the abundance of aquatic vegetation vegetation will increase.

Algae

Algae are a group of diverse aquatic organisms. Typically, algae are identified as green plants that clump together to cover the water surface in a mat-like manner; however, algae can be blue, green, brown or even red and take many different forms. Algae are sometimes stringy and can extend into the water column. Algae provides numerous benefits to aquatic ecosystems when present at healthy levels. It can serve as a food source for fish, waterfowl and other animals. It also produces oxygen in the water through photosynthesis and absorbs nutrients such as nitrogen and phosphorous from the water while

¹⁹ (CCME, 2004)

²⁰ (CCME, 2010)

it grows. However, excessive vegetation growth, such as algae blooms in the pond system is usually indicative of high nutrient levels. When large amounts of algae (or other vegetation) die off, oxygen levels typically decline. Some forms of algae, such as cyanobacteria, also known as blue-green oxygen algae can present a threat to human health. Certain species of cyanobacteria, the most common being *Anabaena, Aphanizomenon, Cylindrospermopsis, Microcystis, Nodularia* and *Planktothrix* are capable of releasing toxins during decomposition or during periods of limited nutrients.²¹ Even though certain species are capable of producing toxins, the formation of toxic cells is unpredictable and factors responsible are not completely understood.²² Lakes containing cyanobacteria may never form toxic blooms, or form toxic blooms once and never again. Contact with waters that may contain cyanobacterial blooms should be avoided. The most frequent reported symptoms are skin irritation and gastrointestinal symptoms.²³

Submerged Aquatic Vegetation

Submerged aquatic vegetation (SAV) or seagrasses refer to rooted aquatic plants that grow throughout the water column and blanket the SAV provide habitat and shelter for many aquatic organisms, as well as serve as a food source for some species. Their root systems can help stabilize the shoreline from erosion. SAV increases oxygen in the water through the process of photosynthesis and contributes to a healthy aquatic ecosystem. The root systems of SAV blanket the pond base, and therefore disruption or loss of the vegetation bed can result in detrimental effects in the pond ecosystem. ²⁴ Removal of SAV can result in overload of nutrients such as nitrogen and phosphorous, making the pond system susceptible to algal blooms.²⁵ Nutrients and suspended sediments that are tangled within the plant leaves and roots may be also released.²⁶ Dissolved oxygen levels may decrease due to loss of oxygen generated by photosynthesis.

Duckweed (Lemna)

Lemna, commonly known as Duckweed is a free floating aquatic plant that forms on the surface of still or slow moving waterbodies. Duckweed can be an important component of the pond ecosystem, serving as a food source for fish, waterfowl and other animals. It also helps to pull excess nutrients such as nitrogen and phosphorous from the water while it grows. Duckweed shades the water, which reduces water temperatures and makes the ponds more habitable for invertebrates and small fish; lower light levels also reduce the growth of nuisance algae and other plants. However, too much duckweed can also cause problems for the ponds. Duckweed multiplies very quickly and can overtake the pond surface in a short amount of time. In the fall, when duckweed dies, nutrients including phosphorous are released back into the water column at once, causing further nutrient loading. The microorganisms facilitating the decay process can also use up the available oxygen, creating anaerobic conditions that cause odours. There is very little duckweed growth within the ponds throughout Silver Springs.

Weather Conditions

Weather conditions impact water quality. Large precipitation events result in more water entering the retention ponds, and heavy rains will bring in increased pollutants and other substances into the system

²¹ (Health Canada, 2012)

²² Ibid

²³ Ibid

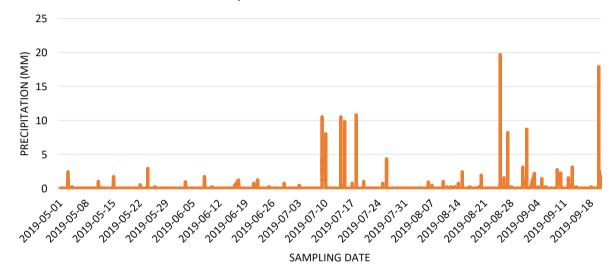
²⁴ (Ohrel, R. L., & Register, K. M, 2006).

²⁵ Ibid

²⁶ Ibid

through storm drain and lawn runoff. Higher water flows will push free-floating aquatic vegetation such as duckweed through the system faster, resulting in vegetation buildup at the downstream end of the ponds as it collects near the outfall drains.

The months of May, June and the first week of July were relatively dry, with very few precipitation events, visible in Figure #1. This was reflected by lower water levels throughout the pond systems and low flow rates. In July there were numerous rain events, including significant rain events on July 9th and July 10th (Figure #1), as well as another rain even that began on July 14th, 15th, and 18th. that resulted in higher water flow into the ponds system. There was another significant rain event on August 25th. September was generally wet with several smaller rain events.



Precipitation in East St.Paul

Figure 2. Precipitation in East St. Paul

3 RESULTS

The four ponds of Silver Springs currently have distinct water quality. While the ponds are groundwater fed, the ponds share high pH levels attributed to available lime from previous quarry activate. Groundwater from aquifer sources in the RM is consistently at a pH of approximately 7.5.²⁷ They also have elevated total phosphorous levels that indicate nutrient loading. Dissolved oxygen (DO) levels throughout the four waterbodies are sufficient to support a healthy aquatic ecosystem. The large surface area of all the Silver Springs ponds provides ample opportunity for aeration from wind and wave action.

²⁷ (Winsor, 2019, pers. Comm.)

Silver Springs Pond A (SS A)

The pH levels in SS A were higher than the upper limit for the protection of aquatic life (9.0 pH units) in July, August, and September, indicating aquatic organisms in the pond are frequently exposed to pH stress. pH was within the guideline range in June, then increased and remained elevated thereafter. High pH levels present in the Silver Springs ponds are attributed to their limestone quarry base which is a common condition in former limestone quarries. Groundwater from aquifer sources in the Rm is consistently at a pH of 7.5.

Dissolved oxygen (DO) concentrations in SS A were generally good and within PAL guideline values. Exceptions occurred three times through the summer; DO fell below the objective for protection of aquatic life (6.5 mg/L) on July 10th and August 1st and 29th (Appendix 1). Various aquatic wildlife was observed in SS A including minnows, frogs, turtles, and muskrat, indicating that DO levels within the pond were generally healthy and able to support a diverse ecosystem throughout the summer.

Nitrogen levels were below the PAL guideline values for Nitrate +Nitrites, as well as Nitrate and Nitrite. Ammonia guideline levels for ponds in Silver Springs are difficult to accurately determine as the ammonia objectives provided by the Manitoba Water Quality Standards, Objectives and Guidelines are appropriate across a pH range of 6.50-9.00 and, as discussed above, pH of SS A was frequently above that range. On all but one occasion, ammonia concentrations in SS A were lower than the guideline of 0.247 mg/L calculated using a pH value of 9.00 and the highest temperature measured during the summer; the exception occurred on July 10th. The site-specific guideline for that date was calculated to be 0.291 mg/L, which was exceeded. Ammonia in the pond was back to an acceptable concentration by July 24th.

Total phosphorous levels in SS A exceeded the provincial objective for control of nuisance algal growth (0.025 mg/L) during every sampling event in 2019. On average, TP concentrations were nearly eight times the provincial narrative guideline and Pond SS A would be classified as hyper-eutrophic using the CCME trigger ranges defined in Table #4. As such, the high TP concentrations could be contributing to the abundance of algae in the pond. Average TP levels are higher in SS A than the other three ponds in Silver Springs.

Residents have also expressed some concern about the brown color and foul odour of SS A.²⁸ The turbidity and TSS levels in SS A are generally higher than the other ponds within the park. Brown, foam-like algae was present along the pond banks and suspended sediment was visible in the water column from the shore.

Chlorophyll *a* levels in SS A were extremely high and concentrations increased through the summer, which indicates a high abundance of plant growth in the pond. There were no visible aquatic weeds or vegetation present in SS A; therefore, it is possible that particulates/suspended matter observed in the pond are actually algal material with possible suspended fine clay particles.

SS A has been observed to have usage by the resident geese population, consisting of around 40 geese. ²⁹ The effect of goose fecal matter was discussed as a possible source of increased nutrient levels, the

²⁸ (RM ESP, 2019)

²⁹ Ibid

brown color and odour; therefore, the fecal coliform count of SS A was analyzed five times during the sampling season. On average, the fecal coliform count was just over two times the guideline for recreational use of a waterbody (200 CFU/100 mL). The other three ponds showed no elevated levels. Since the elevated levels were not correlated to a high goose use period (fall migration), the source of the elevated fecals is unknown.

Samples for algae identification were collected on SS A on July 10th and August 7th, 2019 (Appendix 2).³⁰Analysis on July 10th indicated small amounts of Phacus, Aphanocapsa and Microcystic species; large amounts of Cryptomonas, Limnothrix, and an unidentified dispersed rod shaped single cell cyanobacteria; as well as massive amounts of Merismopedia, Planktothrix and Pseudanabaena species. Total blue green algae cells (cyanobacterial cell count) on July 10th was 2,230,000 cells/mL. The cyanobacteria species present were Aphanocapsa (300 cells/mL), Limnothrix (162,000 cells/mL), Merismopedia (611,000 cells/mL), Planktothrix (505,000 cells/mL), Pseudanabaena (715,000 cells/mL) as well as an unidentified dispersed rod shaped single celled cyanobacteria species (235,000 cells/mL).

Algal analysis from August 7th, 2019 indicated small amounts of Scenedesmus, Euglena, Phacus, Aphanizomenon and Rhopalodia species; moderate amounts of Cryptomonas, small Chrysophytes, Microcystis and Limnothrix species; large amounts of Merismopedia and Planktothrix species; as well as massive amounts of Pseudanabaena.

Parameter	Units	Guideline	Silver Springs	Silver Springs A (SS A)					
		Limit	Minimum	Maximum	Average				
Water Temperature	°C		16.7	25.6	21.7				
Conductivity	μS/cm		362	1921	717				
рН	units	6.5-9	8.81	9.77	9.35				
Dissolved Oxygen (field)	mg/L	Min. 6.5	2.86	12.76	8.78				
Nitrate + Nitrites	mg/L	10	<0.070	<0.070	<0.070				
Nitrate	mg/L	2.93	<0.020	<0.020	<0.020				
Nitrite	mg/L	0.06	<0.010	<0.010	<0.010				
Ammonia	mg/L	0.247	0.026	0.315	0.078				
Total Phosphorous	mg/L	0.025	0.142	0.275	0.210				
Total Suspended Solids	mg/L		26.0	44.8	34.1				
Turbidity	NTU		20.0	53.8	35.8				
Chlorophyll A	mg/L		35.9	187	96.7				
Fecal	CFU/100ml	200	45	1410	482				
Chlorine	mg/L	0.011	0.010	0.010	0.010				

Table 5. Summary of Water Quality Results in Silver Springs Pond A

Silver Springs Pond B (SS B)

Although pH increased between June and July in all four ponds in Silver Springs, SS B showed the most dramatic increase. At the beginning of the summer, pH levels were just above 8; however, they increased to more than 10 by July and remained high throughout the remainder of the summer, peaking

³⁰ ALS Global laboratory defined quantities under four qualitative categories- "small", "moderate", "large" and "massive".

on August 14th. As such, pH in SS B exceeded the provincial guideline for PAL in July, August, and September. It is possible that for Pond SS B, the substrate the submerged aquatic plants were growing in may be buffering the pond's exposure to lime and preventing the pH from further rising.

Dissolved oxygen levels in SS B were consistently above 7.7 and averaged 10.28 mg/L; thus, concentrations were above the guideline minimum value of 6.5 mg/L which indicates healthy oxygen levels in the pond. SS B was the pond that initially had aerators installed in 2018; these were removed in early 2019 due to operational issues with power supply. However, without the aerator the DO levels remained high.

Nitrogen levels within SS B are below the guideline values for all 4 parameters (Nitrate, Nitrite, Nitrate + Nitrite and Ammonia). Ammonia guideline levels for ponds in Silver Springs are difficult to accurately determine as the ammonia objectives provided by the Manitoba Water Quality Standards, Objectives and Guidelines only go up to a pH value of 9.00. However, using the pH value of 9.00 and the maximum temperature for the pond to determine the most stringent objective, ammonia levels did not exceed the guideline in summer 2019.

Total phosphorous levels in SS B were higher than the provincial narrative guideline to prevent the proliferation of nuisance algae and averaged almost three times the guideline of 0.025 mg/L; however, SS B has the lowest mean TP and chlorophyll *a* levels of all four ponds. Aquatic vegetation growth in SS B is in the form of submerged aquatic weeds. In some areas, the weeds have accumulated and are visible at the pond surface do, which may help to deter geese from landing in the pond. SS B would be classified as eutrophic to hyper-eutrophic using the trigger ranges defined in Table #4 indicating high levels of biological activity due to excessive nutrients in the system.

Turbidity and TSS in SS B was relatively low compared to the other ponds in Silver Springs and, in general, water clarity was clear throughout the sampling season. Although it was hypothesized that the presence of aquatic weeds in SS B was limiting the amount of geese landing in the ponds, residents indicated that SS B periodically has a large geese population. Fecal coliform analyses varied dramatically by sample, but the average fecal coliform count was slightly above the recreational objective of 200 CFU/100mL . SS B is the pond most frequently used for recreational water activities such as canoeing or kayaking.

Samples for algae identification were collected from SS B on August 7th, 2019 (Appendix 2). Analysis revealed small amounts of Nitzschia, Synedra, Chlamydomonas, Cosmarium, Dictyosphaerium, Monoraphidium, Oocystis, Scenedesmus, Stauruastrum, Tetraedron, Cryptomonas, Euglena, Anabaena, Planktolyngbya and Phopolodia species. Analysis also identified moderate amounts of Pseudanabaena, large amounts of Gomphosphaeria and Microcystis, and massive amounts of Merismopedia.

Parameter	Units	Guideline	Silver Springs	B (SS B)	
		Limit	Minimum	Maximum	Average
Water Temperature	°C		16.2	24.7	21.5
Conductivity	μS/cm		329	1816	637
рН	units	6.5-9	8.26	10.80	9.94
Dissolved Oxygen (field)	mg/L	Min. 6.5	7.72	14.38	10.30
Nitrate + Nitrites	mg/L	10	<0.070	<0.070	<0.070
Nitrate	mg/L	2.93	<0.020	<0.020	<0.020
Nitrite	mg/L	0.06	<0.010	<0.010	<0.010
Ammonia	mg/L	0.247	0.019	0.194	0.069
Total Phosphorous	mg/L	0.025	0.049	0.131	0.085
Chlorophyll A	mg/L		4.1	86.3	28.7
Total Suspended Solids	mg/L		3.7	44.7	16.6
Turbidity	NTU		2.4	24.3	9.6
Fecal	CFU/100mL	200	1	1050	215
Chlorine	mg/L	0.011	0.010	0.010	0.010

Table 6. Summary of Water Quality Results in Silver Springs Pond B

Silver Springs Pond C (SS C)

The pH levels in SS C were higher than the guideline value of 6.5-9 in July, August, and September. pH in SS C increased in July (compared to June) then remained relatively stable.

Dissolved oxygen levels in SS C were high throughout the sampling period and well above the minimum guideline value of 6.5 mg/L for the protection of aquatic life.

All nitrogenous parameters (NH₃, NO₃, NO₂, and NO₃ + NO₂,) were all below the respective guidelines or objectives. In the case of Ammonia, using a pH of 9.00 and the highest temperature to calculate the most stringent objective, ammonia levels should not have exceeded 0.247 mg/L, however they reached 0.660 mg/L on June 19th. Using the temperature and pH level on that specific date (Appendix 1) to calculate the ammonia objective found that ammonia levels did not exceed the site-specific limit of 0.792 mg/L.

Total phosphorous levels were high and exceeded the provincial narrative guideline value of 0.025 mg/L to prevent formation of nuisance algae. On average, TP levels were seven times higher than the provincial guideline. SS C would be considered as eutrophic to hyper-eutrophic using the trigger ranges defined in Table #4 indicating high levels of biological activity due to excessive nutrients in the system.

In 2019, SS C had bright blue water with high levels of green algae growth. There were frequently geese present during sampling and an odour was also noted during sampling conducted later in the season, likely caused by the large algae blooms present along the shoreline, as well as accumulation of fecal matter. Chlorophyll-a levels fluctuated, but typically remained quite high as reflected by the high abundance of algae in the pond.

Samples for algae identification were collected from SS C on July 10th, 2019 and August 7th, 2019 (Appendix 2). Analysis on July 10th indicated small amounts of Fragilaria, Melosira, Naviula, Oedogonium, Pediastrum, Cryptomonas, Euglena, Phacus, Aphanocapsa, Gomphosphaeria, Microcystis,

Phormidium, Psuedanabaena, Planktolyngbya species. Analysis also revealed moderate amounts of Nitzschia, Monoraphidium, Scenedesmus, Schroederia and Cyanodictyon, as well as large amounts of Merismopedia and an unidentified dispersed coccoid shaped single celled cyanobacteria.

Total blue green algae cells (cyanobacterial cell count) was 358,000 cell/mL. The cyanobacteria species present were Aphanocapsa (2,000 cells/mL), Gomphosphaeria (100 cells/mL), Merismopedia (169,000 cells/mL), Microcystis (2,200 cells/mL), Phromidium (720 cells/mL), Planktolyngbya (990 cells/mL), Pseudanabaena (8,910 cells/mL), Unidentified dispersed coccoid shaped single celled blue green (129,000 cells/mL) and Cyanodictyon (44,600 cells/mL).

Analysis on August 7th, 2019 indicated small amounts of Chlamydomonas, Closterium, Cosmarium, Monoraphidium, Oocystis, Scenedesmus, Tetraedron, Cryptomonas, Euglena and Phormidium species. Also present were moderate amounts of Pseudanabaena, large amounts of Aphanizomenon and Planktolyngbya, as well as massive amounts of Merismopedia and Microcystis species.

Parameter	Units	Guideline	Silver Springs	C (SS C)	
		Limit	Minimum	Maximum	Average
Water Temperature	°C		17.1	25.7	22.0
Conductivity	μS/cm		391	1861	749
рН	units	6.5-9	8.36	9.95	9.35
Dissolved Oxygen (field)	mg/L	Min. 6.5	6.52	12.51	10.02
Nitrate + Nitrites	mg/L	10	<0.070	<0.070	<0.070
Nitrate	mg/L	2.93	<0.020	0.035	0.023
Nitrite	mg/L	0.06	<0.010	0.017	0.011
Ammonia	mg/L	0.247*	0.023	0.660	0.185
Total Phosphorous	mg/L	0.025	0.089	0.258	0.183
Chlorophyll A	mg/L		5.62	136	70.8
Total Suspended Solids	mg/L		2.3	47.5	27.8
Turbidity	NTU		3.99	36.5	21.6
Fecal	CFU/100ml	200	7	629	304
Chlorine	mg/L	0.011	0.010	0.010	0.010

Table 7. Summary of Water Quality Results in Silver Springs C

Silver Springs Pond D (SS D)

pH levels increased between June and July then remained high throughout the remainder of the sampling season. SS D generally had the highest pH levels of the four ponds (Appendix 3) and levels exceeded the provincial guideline for PAL on all but one occasion which occurred on June 26th (Appendix 1).

Dissolved oxygen levels in SS D were high and remained above the minimum guideline value of 6.5 mg/L for the protection of aquatic life.

Nitrogen levels for all four parameters (NH_3 , NO_3 , $NO_3 + NO_2$ and NO_2) were below the provincial objectives or guidelines even at maximum concentrations.

Total phosphorous concentrations exceeded the narrative guideline value of 0.025 mg/L by approximately 6 times on average. SS D would be considered as eutrophic to hyper-eutrophic using the trigger ranges defined in Table #4 again indicating high levels of biological activity due to excessive nutrients in the system.

SS D had relatively clear water and low amounts of aquatic vegetation in 2019. The water level in SS D was quite low at the beginning of the season and it continued to decline throughout the summer. Turbidity and TSS in SS D were low at the beginning of the sampling season, but increased throughout the season as water depth decreased. Chlorophyll-a levels fluctuated throughout the summer, but typically remained quite high and were comparable to levels measured in SS C.

Fecal coliform levels remained relatively in comparison to the other three ponds. Resident observations indicated that SS D was frequently used by migratory goose population, however geese were rarely observed using the pond during sampling.

Samples for algae identification were collected on August 7th, 2019. Analysis identified small amounts of Cosmarium, Monoraphidium, Oocystis, Pediastrum, Cryptomonas, Euglena, Phacus, Aphanizomenon, Microcystis, Pseudanabaena and Eucapsis species. Analysis also identified moderate amounts of Scenedesmus, Chroococcus, Merismopedia, Gymnodinium, and Planktolyngbya as well as large amounts of Gomphosphaeria species.

Parameter	Units	Guideline	Silver Springs	D (SS D)	
		Limit	Minimum	Maximum	Average
Water Temperature	°C		15.1	24.1	20.8
Conductivity	μS/cm		382	1913	721
рН	units	6.5-9	8.52	10.88	10.10
Dissolved Oxygen (field)	mg/L	Min. 6.5	7.22	14.40	10.81
Nitrate + Nitrites	mg/L	10	<0.070	<0.070	<0.070
Nitrate	mg/L	2.93	<0.020	<0.020	<0.020
Nitrite	mg/L	0.06	<0.010	<0.010	<0.010
Ammonia	mg/L	0.247	0.027	0.103	0.047
Total Phosphorous	mg/L	0.025	0.047	0.249	0.151
Chlorophyll A	mg/L		0.69	93.1	48.4
Total Suspended Solids	mg/L		2.9	134.0	66.4
Turbidity	NTU		1.54	59.9	24.8
Fecal	CFU/100ml	200	1	131	34
Chlorine	mg/L	0.011	0.020	0.020	0.020

Table 8. Summary of Water Quality Results in Silver Springs D

4 CONCLUSIONS & RECOMMENDATIONS

The Ponds within Silver Springs Park are unique; they operate as four distinct systems, rather than one cohesive watershed. However, they do share some similarities in regards to their water quality that is likely contributing to some of the visual issues that were observed.

All four ponds have issues with excess nutrients, specifically with total phosphorous concentrations resulting in them being considered as eutrophic or hyper-eutrophic by the Canadian Guidance

Framework. Phosphorous is likely entering the water from various sources, including fertilizer runoff from neighboring residential properties. Fecal matter from waterfowl is also a likely source of excess phosphorous in the system. This nutrient loading fuels to growth of aquatic vegetation.

Algal identification indicated that the ponds contain species with the potential to produce toxic bluegreen algae blooms, with Pond A and Pond C having the most dominant communities. However, not all blue green algae produce toxins and even the ones capable of producing toxins don't produce it all the time. Therefore, it is important to continue to educate residents on the potential concerns of blue-green algae and to closely monitor bloom presence within the ponds in the future.

pH levels throughout the four ponds are high, exceeding the guideline for protection of aquatic life. It is likely that the limestone quarry base of the ponds is contributing to the elevated pH levels within the four ponds. Limestone acts as a neutralizing agent and is often used in pond systems that have very low and thus acidic pH levels to raise them and make the water more neutral.

Residents have raised concerns about the presence of aquatic vegetation in the ponds, notably within SS B and questions were received about the possibility of removing the aquatic vegetation, particularly the submerged aquatic vegetation (SAV). Since there is no outflow from the ponds³¹, removing aquatic vegetation would help to remove nutrients from the current pond nutrient cycle. However, because the Silver Springs ponds are a relatively closed system, this removal would need to proceed cautiously to avoid exacerbating existing issues. The SAV bed at the bottom of the pond may be preventing further leaching of lime into the water column, and removing the aquatic vegetation using a mechanical method could disturb the substrate³², possible leading to further pH increases. Any removal should proceed cautiously with monitoring of surface water for nutrients and pH. It has been identified that removing the SAV root system destabilizes the sediment at the bottom of the pond, which would increase TSS and turbidity levels. ³³

Since DO concentrations in the ponds were consistently observed at levels above the guideline for protection of aquatic life, augmented aeration will not result in improved water quality in the Silver Springs Ponds and is not recommended.

Recommendations to reduce nutrient loading in the ponds consist of measures to promote uptake of nutrients by vegetation and dissuade increases in goose populations, particularly resident populations. Measures to support healthy macrophyte and upland hardy native vegetation such as grasses and shrubs should be considered.

To reduce the spread of purple loosestrife and avoid it outcompeting important macrophyte vegetation at the waters edge, manual removal of purple loosestrife in the Park occurred in the summer of 2019. The spread of purple loosestrife should be monitored with beetle introduction and manual controls considered on a seasonal basis.

Other measures to introduce beneficial vegetation such as manmade floating islands with wetland vegetation communities have been successfully implemented elsewhere.³⁴ These islands remove

³¹ Only outflow will be groundwater infiltration

³² (Ohrel, R. L., & Register, K. M, 2006)

³³ Ibid

³⁴ (Winston et al., 2013).

nutrients and can be harvested on periodic basis (8-10 years). A pilot would confirm if vegetation can be successfully grown on floating islands in the high pH waters of the ponds.

Implementing a naturalization plan to migrate existing grasses to native and other hardy species with deep root systems will not only capture nutrients from making their ways down the slopes to the ponds but also promote bank stability in dry years. These measures should be supplemented with a decrease in the mowing regime in the areas adjacent to the ponds.

Geese in particular favour loafing and feeding in short grasses, shying away from tall grass and other heavily vegetated environments because of the potential for these areas to harbour predators. Residents report that existing and transient predator populations appear to be helping to keep resident goose populations in check. Predators such as fox, coyote and raptors such as eagles provide important population controls and their presence should not be discouraged. More invasive measures for goose control such as noise cannons, fencing and are not consistent with park aesthetics and should only be considered if resident goose populations grow exponentially and then only in consultation with local residents and provincial wildlife officials.

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6 APPENDICES

- Appendix 1. Full Water Quality Data
- Appendix 2. Laboratory Reports

Appendix 3. Graphical Representation of Water Quality Data

Appendix 1. Full Water Quality Data

LOCATION	DATE	TIME	AIR	CONDUCTIVITY	pН	DO	Water	TSS	TURBIDITY	Nitrate in	Nitrate +	Nitrite	TOTAL	AMMONIA	TOTAL	DO	CHLORO-	FECAL
			TEMP			(field)	Temp			Water by IC	Nitrite as N	in Water by IC	PHOSPHOROUS	as N	CHLORINE	(lab)	PHYLL A	
			(°C)	(µS/cm)		(mg/L)	(°C)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(MPN/100ml)
Silver Spri	ings																	
SS A	6/19/2019	10:40	20	n.d.	8.89	11.90	20.2	44.8	53.8	0.020	0.070	0.010	0.200	0.026	0.010		51.6	
SS A	6/27/2019	10:15	19	362	8.81	12.76	22.6	37.9	47.4	0.020	0.070	0.010	0.217	0.041			35.9	
SS A	7/10/2019	12:20	21	381	9.58	2.86	22.5	35.8	36.4	0.020	0.070	0.010	0.275	0.315			50.3	1410
SS A	7/17/2019	9:50	21	405	9.70	10.30	25.6				N							
SS A	7/24/2019	9:30	21	395	9.77	11.52	25.0	26.0	20.0	0.020	0.070	0.010	0.211	0.028			78.8	45
SS A SS A	8/1/2019 8/7/2019	8:42 9:30	21 17	1575 1921	9.15 9.27	6.46 6.95	22.7 22.7	29.2	30.9	0.020	0.070	0.010	0.218	0.065			109.0	84
SS A	8/14/2019	10:10	1/	527	9.27	11.33	22.7	29.2	30.9	0.020	0.070	0.010	0.218	0.065			109.0	84
SS A	8/21/2019	9:44	14	435	9.48	8.16	20.0											
SS A	8/29/2019	9:05	14	455	9.59	6.31	16.7	37.9	31.1	0.020	0.070	0.010	0.207	0.037			187.0	411
SS A	9/19/2019	9:20	15		8.90	8.04	19.1	26.9	30.7	0.020	0.070	0.010	0.142	0.033			164.0	461
MINIMUM			14	362	8.81	2.86	16.7	26.0	20.0	0.020	0.070	0.010	0.142	0.026	0.010		35.9	45
MAXIMUM			21	1921	9.77	12.76	25.6	44.8	53.8	0.020	0.070	0.010	0.275	0.315	0.010		187.0	1410
AVERAGE			18	717	9.35	8.78	21.7	34.1	35.8	0.020	0.070	0.010	0.210	0.078	0.010		96.7	482
SS B	6/19/2019	10:00	20	329	8.26	8.60	20.5	7.7	4.0	0.020	0.070	0.010	0.0524	0.072	0.010		4.09	
SS B	6/27/2019	10:00	19	366	8.37	10.42	22.6	3.7	2.36	0.020	0.070	0.010	0.0488	0.102			4.67	1050
SS B SS B	7/10/2019 7/17/2019	12:10 9:33	21 21	343 401	10.27 10.25	9.33 9.38	24.0 24.7	10.1	7.8	0.020	0.070	0.010	0.066	0.020			15.6	1050
SS B	7/24/2019	9:33	21	373	n.d.	9.38	24.7	13.1	6.8	0.020	0.070	0.010	0.084	0.019			27.9	1
SS B	8/1/2019	8:33	21	1426	10.07	9.36	23.5	13.1	0.0	0.020	0.070	0.010	0.004	0.015			21.5	-
SS B	8/7/2019	9:20	17	1816	10.26	11.67	22.5	21.3	10.8	0.020	0.070	0.010	0.102	0.024			31.3	1
SS B	8/14/2019	9:57		504	10.80	11.70	21.5	-										
SS B	8/21/2019	9:37	14	421	10.49	14.38	19.6											
SS B	8/29/2019	9:00	14		10.57	8.06	16.2	44.7	24.3	0.020	0.070	0.010	0.131	0.194			86.3	4
SS B	9/19/2019	9:13	15	389	10.05	7.72	19.2	15.9	11.3	0.020	0.070	0.010	0.113	0.050			31.3	21
MINIMUM			14	329	8.26	7.72	16.2	3.7	2.4	0.020	0.070	0.010	0.049	0.019	0.010		4.1	1
MAXIMUM			21	1816	10.80	14.38	24.7	44.7	24.3	0.020	0.070	0.010	0.131	0.194	0.010		86.3	1050
AVERAGE			18	637	9.94	10.30	21.5	16.6	9.6	0.020	0.070	0.010	0.085	0.069	0.010		28.7	215
55.0	6/19/2019	11:15	21	1	8.46	10.90	20.5	7.5	7.01	0.035	0.070	0.013	0.109	0.660	0.010	1	19.2	
SS C SS C	6/26/2019	10:35	19	425	8.36	9.66	20.5	2.3	3.99	0.035	0.070	0.013	0.0894	0.660	0.010	9.40	5.62	
SS C	7/10/2019	12:40	21	391	9.70	10.67	24.7	20.7	15.9	0.020	0.070	0.010	0.168	0.046		5.40	88.4	548
SS C	7/17/2019	10:05	22	438	9.47	9.20	25.7	2017	1010	0.020	0.070	0.010	0.100	0.010			00.1	510
SS C	7/24/2019	9:45	21	414	9.57	11.46	24.7	28.4	25.4	0.020	0.070	0.010	0.220	0.023			66.7	7
SS C	8/1/2019	9:05	21	1536	9.23	8.72	23.3											
SS C	8/7/2019	9:52	18	1861	9.52	10.46	22.9	41.9	36.5	0.020	0.070	0.010	0.258	0.033			82.3	28
SS C	8/14/2019	10:23		513	9.85	12.51	21.6											
SS C	8/21/2019	9:57	14	418	9.59	10.62	20.6											
SS C	8/29/2019	9:37	14		9.95	9.54	17.1	46.1	32.8	0.020	0.070	0.010	0.198	0.037			97.6	308
SS C	9/19/2019	9:37	15 14	201	9.14	6.52	19.0 17.1	47.5	29.8	0.020	0.070	0.010	0.242	0.025	0.010	9.40	136.0	629 7
MINIMUM		-	14 22	391 1861	8.36 9.95	6.52 12.51	25.7	2.3 47.5	3.99 36.5	0.020	0.070	0.010 0.017	0.089	0.023	0.010	9.40	5.62 136.0	629
AVERAGE			19	749	9.35	10.02	22.0	27.8	21.6	0.033	0.070	0.011	0.183	0.185	0.010	9.40	70.8	304
				715	5.55	10:02	22.0	2710	2210	0.025	0.070	0.011	0.100	0.105	0.010	5.10	70.0	501
SS D	6/19/2019	11:31	21	441	9.13	10.80	19.6	2.9	1.54	0.020	0.070	0.010	0.0469	0.035	0.020		0.69	
SS D	6/27/2019	11:10	22	420	8.52	11.75	22.3	7.2	4.98	0.020	0.070	0.010	0.0967	0.041			7.59	
SS D	7/10/2019	12:55	21	382	n.d.	8.97	22.6	34.3	12.8	0.020	0.070	0.010	0.113	0.028			93.1	131
SS D	7/17/2019	10:15	22	421	10.29	10.54	24.0											
SS D	7/24/2019	10:00	21	399	10.53	11.92	24.1	54.4	15.4	0.020	0.070	0.010	0.133	0.029			36.8	3
SS D	8/1/2019	9:13	21	1540	10.24	8.30	22.9	420.0			0.070	0.010	0.000	0.027				
SS D	8/7/2019	10:05	18	1913	10.40	12.09	20.8	120.0	24.1	0.020	0.070	0.010	0.200	0.027			50.1	1
SS D SS D	8/14/2019 8/21/2019	10:31 10:06	14	543 429	10.88 10.47	14.40 12.95	21.2 17.7											
SS D SS D	8/21/2019 8/29/2019	9:50	14	429	10.47	12.95	17.7	134.0	59.9	0.020	0.070	0.010	0.249	0.103			74.3	25
SS D	9/19/2019	9:47	14		9.88	7.22	18.9	112.0	55.2	0.020	0.070	0.010	0.249	0.069			76.5	10
MINIMUM	5, 15, 2015	5.47	14	382	8.52	7.22	15.1	2.9	1.5	0.020	0.070	0.010	0.047	0.027	0.020		0.7	10
MAXIMUM			22	1913	10.88	14.40	24.1	134.0	59.9	0.020	0.070	0.010	0.249	0.103	0.020		93.1	131
AVERAGE			19	721	10.10	10.81	20.8	66.4	24.8	0.020	0.070	0.010	0.151	0.047	0.020		48.4	34
LEGEND												-						
		1																

cells = <indicated value

Appendix 2. Laboratory Reports



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received: 14-JUN-19 Report Date: 24-JUN-19 15:44 (MT) Version: FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2291959 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Hua Wo Chemistry Laboratory Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2291959-1 SS A							
Sampled By: TM on 13-JUN-19 @ 10:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC	<0.070		0.070	IIIg/L		19-3011-19	
Nitrite (as N)	<0.010		0.010	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	4.09		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters	0.070		0.040			47 1111 40	D (070000
Ammonia, Total (as N)	0.072	0.11	0.010	mg/L		17-JUN-19	R4672883
Chlorine, Total	0.010	CLH	0.010	mg/L		15-JUN-19	R4672207
Phosphorus (P)-Total	0.0524		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids Turbidity	7.7 4.00		2.0 0.10	mg/L NTU		20-JUN-19 14-JUN-19	R4681118 R4672328
	4.00		0.10	NIU		14-JUN-19	R40/2328
L2291959-2 SSB							
Sampled By: TM on 13-JUN-19 @ 10:40							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		14-JUN-19	R4673753
Chlorophyll a Chlorophyll a by fluorometry							
Chlorophyll a	51.6		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters				. 3			
Ammonia, Total (as N)	0.026		0.010	mg/L		21-JUN-19	R4682037
Chlorine, Total	<0.010	CLH	0.010	mg/L		15-JUN-19	R4672207
Phosphorus (P)-Total	0.200		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	44.8		2.0	mg/L		20-JUN-19	R4681118
Turbidity	53.8		0.10	NTU		14-JUN-19	R4672328
L2291959-3 SS C							
Sampled By: TM on 13-JUN-19 @ 11:15							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	0.000		0.000			44 11 11 1 10	D (070757
Nitrate (as N)	0.035		0.020	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC	\$0.070		0.070	g, L		10 0011-10	
Nitrite (as N)	0.013		0.010	mg/L		14-JUN-19	R4673753
Chlorophyll a				-			
Chlorophyll a by fluorometry							
Chlorophyll a	19.2		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters			0.10			04 11 11 40	D 4000007
Ammonia, Total (as N)	0.66		0.10	mg/L		21-JUN-19	R4682037
Chlorine, Total	0.010	CLH	0.010	mg/L		15-JUN-19	R4672207

L2291959 CONTD.... PAGE 3 of 7 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2291959-3 SS C							
Sampled By: TM on 13-JUN-19 @ 11:15							
Matrix: WATER							
Phosphorus (P)-Total	0.109		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	7.5		2.0	mg/L		20-JUN-19	R4681118
Turbidity	7.01		0.10	NTU		14-JUN-19	R4672328
L2291959-4 SS D							
Sampled By: TM on 13-JUN-19 @ 11:31							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite	0.070		0.075			40 1111 40	
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	0.69		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters							
Ammonia, Total (as N)	0.035		0.010	mg/L		17-JUN-19	R4672883
Chlorine, Total	0.020	CLH	0.010	mg/L		15-JUN-19	R4672207
Phosphorus (P)-Total	0.0469		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	2.9		2.0	mg/L		20-JUN-19	R4681118
Turbidity	1.54		0.10	NTU		14-JUN-19	R4672328
L2291959-5 CS U							
Sampled By: TM on 13-JUN-19 @ 14:12							
Matrix: WATER Nitrate + Nitrite							
Nitrate + Nitrite Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	108		0.20	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters							
Ammonia, Total (as N)	0.024		0.010	mg/L		21-JUN-19	R4682037
Chlorine, Total	0.020	CLH	0.010	mg/L		15-JUN-19	R4672207
Phosphorus (P)-Total	0.0813		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	17.3		2.0	mg/L		20-JUN-19	R4681118
Turbidity	26.4		0.10	NTU		14-JUN-19	R4672328
L2291959-6 CS L							
Sampled By: TM on 13-JUN-19 @ 14:45							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	-0.040	DLM	0.040	ma/l		14 11 10 40	DAGTOTEO
Nitrate (as N) Nitrate+Nitrite	<0.040		0.040	mg/L		14-JUN-19	R4673753
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		14-JUN-19	R4673753

L2291959 CONTD.... PAGE 4 of 7 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2291959-6 CS L							
Sampled By: TM on 13-JUN-19 @ 14:45							
Matrix: WATER							
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	6.06		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters	0.00		0.10	ug/L	14-5011-15	14-3011-13	R4075504
Ammonia, Total (as N)	0.017		0.010	mg/L		17-JUN-19	R4672883
Chlorine, Total	0.050	CLH	0.010	mg/L		15-JUN-19	R4672207
Oxygen, Dissolved	15.0	RWHS	0.10	mg/L		14-JUN-19	R4672730
Phosphorus (P)-Total	0.0456		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	4.9		2.0	mg/L		20-JUN-19	R4681118
Turbidity	1.59		0.10	NTU		14-JUN-19	R4672328
L2291959-7 S U	1.00		0.10				111012020
Sampled By: TM on 13-JUN-19 @ 13:30							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite				_			
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	13.6		0.10		14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters	13.0		0.10	ug/L	14-3010-19	14-3011-19	R4075504
Ammonia, Total (as N)	0.034		0.010	mg/L		17-JUN-19	R4672883
Chlorine, Total	0.060	CLH	0.010	mg/L		15-JUN-19	R46722003
Phosphorus (P)-Total	0.104		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	17.6		2.0	mg/L		20-JUN-19	R4681118
Turbidity	4.53		0.10	NTU		14-JUN-19	R4672328
L2291959-8 S L	4.00		0.10				1(4072020
Sampled By: TM on 13-JUN-19 @ 13:45							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite				-			
Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC			_				
Nitrite (as N)	<0.020	DLM	0.020	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	23.6		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters	20.0		0.10	uy/L		14 0011-13	11-01-0004
Ammonia, Total (as N)	0.016		0.010	mg/L		17-JUN-19	R4672883
Chlorine, Total	0.050	CLH	0.010	mg/L		15-JUN-19	R4672207
Phosphorus (P)-Total	0.0565		0.0030	mg/L		18-JUN-19	R4672439
Total Suspended Solids	14.1		2.0	mg/L		20-JUN-19	R4681118
Turbidity	3.28		0.10	NTU		14-JUN-19	R4672328

L2291959 CONTD.... PAGE 5 of 7 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2291959-9 BTP 1							
Sampled By: TM on 13-JUN-19 @ 15:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		14-JUN-19	R4673753
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		19-JUN-19	
Nitrite in Water by IC	<0.070		0.070	iiig/ L		13 3011 13	
Nitrite (as N)	<0.020	DLM	0.020	mg/L		14-JUN-19	R4673753
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	8.15		0.10	ug/L	14-JUN-19	14-JUN-19	R4675504
Miscellaneous Parameters Ammonia, Total (as N)	0.021		0.010	mg/L		21-JUN-19	R4682037
Chlorine, Total	0.021	CLH	0.010	mg/L mg/L		21-JUN-19 15-JUN-19	R4682037 R4672207
Phosphorus (P)-Total	0.020		0.0030	mg/L		18-JUN-19	R4672207 R4672439
Total Suspended Solids	13.3		2.0	mg/L		20-JUN-19	R4681118
Turbidity	10.8		0.10	NTU		14-JUN-19	R4672328

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description							
CLH	Free/Total Chlorine s dissipates rapidly int		lorine tests is 15 minutes; field testing is recommended. Chlorine					
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).							
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.							
RWHS	Samples Received V	Vith Headspace						
est Method Re	eferences:							
ALS Test Code	Matrix	Test Description	Method Reference**					
CHL/A-ACET-FLU WP	UORO- Water	Chlorophyll a by fluorometry	EPA 445.0 ACET					
			prophyll a is determined by a 90 % acetone extraction followed with ot subject to interferences from chlorophyll b.					
CL2-TOTAL-WP	Water	Chlorine, Total	APHA 4500-CI Chlorine(Residual) G (mod)					
			ethod. The recommended hold time for these tests is 15 minutes; field organic matter, if present, and dissipates rapidly into headspace.					
EC-SCREEN-WF	D Water	Conductivity Screen (Internal Use On	y) APHA 2510					
Qualitative analy	sis of conductivity wh	ere required during preparation of other t	est eg. IC, TDS, TSS, etc					
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F					
	er samples forms indo d measured colourme		nd phenol. The intensity is amplified by the addition of sodium					
NO2+NO3-CALC	C-WP Water	Nitrate+Nitrite	CALCULATION					
NO2-IC-N-WP Water Nitrite		Nitrite in Water by IC	EPA 300.1 (mod)					
Inorganic anions	are analyzed by Ion (Chromatography with conductivity and/or	UV detection.					
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)					
Inorganic anions	are analyzed by Ion (Chromatography with conductivity and/or	UV detection.					
O2-DIS-WP	Water	Dissolved Oxygen	APHA 4500-O-C					
manganic hydrox iodide in an amou	kide is formed. Additio	on of sulfuric acid dissolves the manganic original DO content. The iodide is then ti	e precipitate of manganous hydroxide. In the presence of oxygen, brown hydroxide, yielding manganic sulfate which reacts with iodide, releasing trated with a standard solution of thiosulphate. Results for					
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L					
This analysis is c		edures adapted from APHA METHOD 45	i00-P "Phosphorus". Total Phosphorus is determined colourmetrically					
SOLIDS-TOTSUS	S-WP Water	Total Suspended Solids	APHA 2540 D (modified)					
Total suspended	solids in aquesous m	natrices is determined gravimetrically afte	er drying the residue at 103 105°C.					
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)					
Turbidity in aque	ous matrices is deterr	mined by the nephelometric method.						
ALS test method	ds may incorporate m	odifications from specified reference me	thods to improve performance.					
The last two lette	ers of the above test c	ode(s) indicate the laboratory that perfor	med analytical analysis for that test. Refer to the list below:					
Laboratory Defir	nition Code Labo	oratory Location						
WP	ALS	ENVIRONMENTAL - WINNIPEG, MANI	TOBA, CANADA					

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Quality Control Report

			Workorder:	L229195	9	Report Date: 2	24-JUN-19	Pa	ige 1 of 4
Oliciti.	RM of Eas 3021 Birds East St. P		7						
Contact:	Leanne Sł	newchuk							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHL/A-ACET-FLU	IORO-WP	Water							
Batch R WG3082093-2 Chlorophyll a	4675504 LCS			101.2		%		80-120	19-JUN-19
WG3082093-1 Chlorophyll a	MB			<0.10		ug/L		0.1	14-JUN-19
CL2-TOTAL-WP		Water							
Batch R WG3080082-3 Chlorine, Total	4672207 DUP		L2291959-1 0.010	0.010		mg/L	0.0	15	15-JUN-19
WG3080082-2 Chlorine, Total	LCS			100.0		%		75-125	15-JUN-19
WG3080082-1 Chlorine, Total	MB			<0.010		mg/L		0.01	15-JUN-19
NH3-COL-WP		Water							
	4672883								
WG3080831-10 Ammonia, Tota				99.5		%		85-115	17-JUN-19
WG3080831-9 Ammonia, Tota	MB al (as N)			<0.010		mg/L		0.01	17-JUN-19
Batch R WG3085326-14 Ammonia, Tota				100.0		%		85-115	21-JUN-19
WG3085326-1 3 Ammonia, Tota				<0.010		mg/L		0.01	21-JUN-19
NO2-IC-N-WP		Water							
	4673753								
WG3077957-10 Nitrite (as N)) LCS			102.8		%		90-110	14-JUN-19
WG3077957-6 Nitrite (as N)	LCS			101.8		%		90-110	14-JUN-19
WG3077957-5 Nitrite (as N)	MB			<0.010		mg/L		0.01	14-JUN-19
WG3077957-9 Nitrite (as N)	MB			<0.010		mg/L		0.01	14-JUN-19
NO3-IC-N-WP		Water							



Quality Control Report

			•	-			
		Workorder: L22	91959	Report Date: 24	-JUN-19	Pa	ge 2 of 4
Test	Matrix	Reference Res	sult Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water						
Batch R4673753							
WG3077957-10 LCS							
Nitrate (as N)		100	0.8	%		90-110	14-JUN-19
WG3077957-6 LCS							
Nitrate (as N)		99.	2	%		90-110	14-JUN-19
WG3077957-5 MB							
Nitrate (as N)		<0.	.020	mg/L		0.02	14-JUN-19
WG3077957-9 MB							
Nitrate (as N)		<0.	.020	mg/L		0.02	14-JUN-19
O2-DIS-WP	Water						
Batch R4672730							
WG3080665-2 LCS							
Oxygen, Dissolved		104	4.6	%		85-115	14-JUN-19
WG3080665-1 MB							
Oxygen, Dissolved		<0.	.10	mg/L		0.1	14-JUN-19
P-T-COL-WP	Water						
Batch R4672439							
WG3079595-18 LCS							
Phosphorus (P)-Total		100	0.5	%		80-120	18-JUN-19
WG3079595-17 MB							
Phosphorus (P)-Total		<0.	.0030	mg/L		0.003	18-JUN-19
SOLIDS-TOTSUS-WP	Water						
Batch R4681118							
WG3081869-20 LCS							
Total Suspended Solids		102	2.7	%		85-115	20-JUN-19
WG3081869-19 MB							
Total Suspended Solids		<2.	.0	mg/L		2	20-JUN-19
TURBIDITY-WP	Water						
Batch R4672328							
WG3080125-5 LCS							
Turbidity		10	5.0	%		85-115	14-JUN-19
WG3080125-4 MB							
Turbidity		<0.	.10	NTU		0.1	14-JUN-19

Workorder: L2291959

Report Date: 24-JUN-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

CCV

Continuing Calibration Verification Calibration Verification Standard

CVS Calibration Verification Standard LCSD Laboratory Control Sample Duplicate

Workorder: L2291959

Report Date: 24-JUN-19

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests		5					
Dissolved Oxygen							
	6	13-JUN-19 14:45	14-JUN-19 14:36	8.0	24	hours	EHTR
Inorganic Parameters							
Chlorine, Total							
	1	13-JUN-19 10:00	15-JUN-19 14:00	0.25	52	hours	EHTR-FN
	2	13-JUN-19 10:40	15-JUN-19 14:00	0.25	51	hours	EHTR-FN
	3	13-JUN-19 11:15	15-JUN-19 14:00	0.25	51	hours	EHTR-FN
	4	13-JUN-19 11:31	15-JUN-19 14:00	0.25	50	hours	EHTR-FM
	5	13-JUN-19 14:12	15-JUN-19 14:00	0.25	48	hours	EHTR-FM
	6	13-JUN-19 14:45	15-JUN-19 14:00	0.25	47	hours	EHTR-FM
	7	13-JUN-19 13:30	15-JUN-19 14:00	0.25	48	hours	EHTR-FM
	8	13-JUN-19 13:45	15-JUN-19 14:00	0.25	48	hours	EHTR-FM
	9	13-JUN-19 15:20	15-JUN-19 14:00	0.25	47	hours	EHTR-FN

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2291959 were received on 14-JUN-19 13:40.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytica) **Request Form**

Canada Toll Free: 1 800 668 9878



COC Number: 17 -

Page of

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Report To	Contact and company name below will ap	pear on the final report		Report Form			1	rættit	t Serv	ice Le	vel Be	low - I	Conta	st you	AM to	o confi	rm all E	&P TA	l's (sur	charges	may apply	n l
Company:	RM of East St. Paul		Select Report F	format: 🔽 PDF		D (DIGITAL)		Re	gular	[R]	🗹 Sta	indard	TAT if r	eceived	by 3 p	m - busi	ness day	/s - no s	urcharge	is apply		
Contact:	Leanne Shewchuk		Quality Control	(QC) Report with R	eport 🔲 YES	NO .	∠ ar	4 da	y [P4·	20%]			ENCY	🖞 🛛 1 Business day (E - 100%) - 🛛 🗌 🗌								
Phone:	204-668-8112 x 4503		Compare Result	s to Criteria on Report -			RIOR	3 da	y (P3-	25%]	Ĺ		иеко	Same	Day,	Week	end of	r Statu	tory h	oliday (E2 -200%	
	Company address below will appear on the fi	inal report	Select Distributi	ion: 🗹 Email		FAX	[*] ∄ 2 day [P2-50%] □				13	(Laboratory opening fees may apply)										
Street:	3021 Birdshill Road	-	Email 1 or Fax	leanne.shewchuk(@eaststpaul.com	n		Date an	d Time	e Requ	red for	all E&	P TAT	8. I			(dd-mm	m-yy h	1h:mm		
City/Province:	East St. Paul, MB		Email 2	operations@easts	tpaul.com		For te	sts that :	can not	be perf	ormed a	ccordin	g to the	service	fevel se	lected, y	/ou will b	e contac	æd.			
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Drinking	Water (DW) Samples ¹ (client use)	Special Instructions / S			cking on the drop	o-down list below	.33		-		SAN	IPLE						lab us	e only		<u></u>	
			(elec	ctronic COC only)			Froz		Ц			- 			ations		Yes			No		
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REFER TO BAC	K PAGE FOR ALS LOCATIONS AND SAMPLI	NG INFORMATION		WH	TE - LABORATO	RY COPY YEL			IT CO	PY							and the first form	- <i>X</i>			NOV	2018 FRONT

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Feilure to complete all portions of this form may delay analysis. Please full in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the while - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received:19-JUN-19Report Date:27-JUN-19 07:02 (MT)Version:FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2295004 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Hua Wo Chemistry Laboratory Manager

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L2295004 CONTD.... PAGE 2 of 5 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
<0.10	DLM	0.10	mg/L		20-JUN-19	R4684255
0.44		0.44				
<0.11		0.11	mg/L		25-JUN-19	
<0.050	DLM	0.050	ma/l		20-JUN-19	R4684255
		0.000				
43.6		0.10	ug/L	19-JUN-19	19-JUN-19	R4688383
0.064		0.010	mg/L		24-JUN-19	R4685446
0.010	CLH	0.010	mg/L		20-JUN-19	R4680488
0.144		0.0030	mg/L		21-JUN-19	R4682341
13.9		2.0	mg/L		25-JUN-19	R4687654
3.70		0.10	NTU		20-JUN-19	R4681974
-0.10		0.40	ma/l		20-1111-10	R4684255
<0.10		0.10	ilig/L		20-3011-19	174004200
<0.11		0.11	ma/L		25-JUN-19	
		2	···			
<0.050	DLM	0.050	mg/L		20-JUN-19	R4684255
04.5		0.00			40 1111 40	D (0000000
61.6		0.20	ug/L	19-JUN-19	19-JUN-19	R4688383
0.065		0.050	ma/l		25- ILINI 10	R4688367
	СШ		-			R4680488
			-			R4682341
			-			R4682341 R4687654
			-			R4681974
۲. דו		0.10			20001110	1140101014
0.258		0.040	mg/L		20-JUN-19	R4684255
0.287		0.070	mg/L		25-JUN-19	
0.000		0.000			00 11 11 10	D 400 40
0.029		0.020	mg/L		20-JUN-19	R4684255
49.2		0.10	ua/L	19-JUN-19	19-JUN-19	R4688383
			- .			
					24 11 10 40	DACOFAAC
0.089		0.010	mg/L		24-JUN-19	R4685446
	<0.10 <0.11 <0.050 43.6 0.064 0.010 0.144 13.9 3.70 <0.10 <0.11 <0.050 61.6 0.065 0.020 0.480 24.3 2.47	<0.10	<0.10	<0.10	<0.10 DLM 0.10 mg/L $ < < <<<<<< <<<<<<<<< <<<<<<<<<<<<<<<<<<<<<<<< <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

L2295004 CONTD.... PAGE 3 of 5 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2295004-3 P3 L							
Sampled By: CLIENT on 19-JUN-19 @ 09:30							
Matrix:							
Phosphorus (P)-Total	0.193		0.0030	mg/L		21-JUN-19	R4682341
Total Suspended Solids	58.9		2.0	mg/L		25-JUN-19	R4687654
Turbidity	15.4		0.10	NTU		20-JUN-19	R4681974
L2295004-4 P4 L			0.1.0				
Sampled By: CLIENT on 19-JUN-19 @ 09:30							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		20-JUN-19	R4684255
Nitrate+Nitrite Nitrate and Nitrite as N	<0.11		0.11	mg/L		25-JUN-19	
Nitrite in Water by IC	<0.11		0.11	ing/L		23-3011-13	
Nitrite (as N)	<0.050	DLM	0.050	mg/L		20-JUN-19	R4684255
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	69.3		0.20	ug/L	19-JUN-19	19-JUN-19	R4688383
Miscellaneous Parameters							
Ammonia, Total (as N)	0.038		0.010	mg/L		24-JUN-19	R4685446
Chlorine, Total	0.010	CLH	0.010	mg/L		20-JUN-19	R4680488
Phosphorus (P)-Total	0.238		0.0030	mg/L		21-JUN-19	R4682341
Total Suspended Solids	19.1		2.0	mg/L		25-JUN-19	R4687654
Turbidity	7.77		0.10	NTU		20-JUN-19	R4681974
L2295004-5 P6 L							
Sampled By: CLIENT on 19-JUN-19 @ 09:30							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.10	DLM	0.10	mg/L		20-JUN-19	R4684255
Nitrate+Nitrite	<0.10	DEM	0.10	iiig/ L		20 3010 13	114004200
Nitrate and Nitrite as N	<0.11		0.11	mg/L		25-JUN-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLM	0.050	mg/L		20-JUN-19	R4684255
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	34.3		0.10	ug/L	19-JUN-19	19-JUN-19	R4688383
Miscellaneous Parameters	54.5		0.10	ug/L		10 0011-13	11-000303
Ammonia, Total (as N)	0.079		0.010	mg/L		25-JUN-19	R4685446
Chlorine, Total	0.020	CLH	0.010	mg/L		20-JUN-19	R4680488
Phosphorus (P)-Total	0.262		0.0030	mg/L		21-JUN-19	R4682341
Total Suspended Solids	32.1		2.0	mg/L		25-JUN-19	R4687654
Turbidity	24.4		0.10	NTU		20-JUN-19	R4681974

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description		
	Free/Total Chlorin dissipates rapidly		orine tests is 15 minutes; field testing is recommended. Chlorine
DLM	Detection Limit Ad	justed due to sample matrix effects (e.g. ch	emical interference, colour, turbidity).
DUP-H	Duplicate results o	utside ALS DQO, due to sample heterogen	eity.
est Method Ref	ferences:		
ALS Test Code	Matrix	Test Description	Method Reference**
CHL/A-ACET-FLU WP	ORO- Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
			rophyll a is determined by a 90 % acetone extraction followed with ot subject to interferences from chlorophyll b.
CL2-TOTAL-WP	Water	Chlorine, Total	APHA 4500-CI Chlorine(Residual) G (mod)
			thod. The recommended hold time for these tests is 15 minutes; field organic matter, if present, and dissipates rapidly into headspace.
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only	/) APHA 2510
Qualitative analys	is of conductivity v	here required during preparation of other te	est eg. IC, TDS, TSS, etc
NH3-COL-WP Water		Ammonia by colour	APHA 4500 NH3 F
Ammonia in water nitroprusside and			nd phenol. The intensity is amplified by the addition of sodium
NO2+NO3-CALC-	WP Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions a	are analyzed by lo	h Chromatography with conductivity and/or	UV detection.
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions a	are analyzed by lo	n Chromatography with conductivity and/or I	UV detection.
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis is ca after persulphate of			00-P "Phosphorus". Total Phosphorus is determined colourmetrically
SOLIDS-TOTSUS	-WP Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended s	solids in aquesous	matrices is determined gravimetrically after	r drying the residue at 103 105°C.
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
Turbidity in aqueo	us matrices is dete	ermined by the nephelometric method.	
* ALS test method	s may incorporate	modifications from specified reference met	hods to improve performance.
The last two letter	s of the above tes	code(s) indicate the laboratory that perform	ned analytical analysis for that test. Refer to the list below:
Laboratory Defini	ition Code La	boratory Location	

WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2295004	1 R	Report Date: 2	27-JUN-19	Pa	ge 1 of 4
Client:	3021 Bird East St. P	st St. Paul shill Road Paul MB R2E 1	A7						
Contact:	Leanne S				0				<u> </u>
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHL/A-ACET-FLU	JORO-WP	Water							
Batch R WG3089010-4 Chlorophyll a	4688383 DUP		L2295004-5 34.3	18.1	DUP-H	ug/L	62	35	19-JUN-19
WG3089010-3 Chlorophyll a	LCS			104.8		%		80-120	26-JUN-19
WG3089010-1 Chlorophyll a	MB			<0.10		ug/L		0.1	19-JUN-19
WG3089010-2 Chlorophyll a	MB			<0.10		ug/L		0.1	18-JUN-19
CL2-TOTAL-WP		Water							
Batch R WG3083963-3 Chlorine, Tota	4680488 DUP		L2295004-5 0.020	0.020		mg/L	0.0	15	20-JUN-19
WG3083963-2 Chlorine, Tota				95.0		%		75-125	20-JUN-19
WG3083963-1 Chlorine, Tota	MB			<0.010		mg/L		0.01	20-JUN-19
NH3-COL-WP		Water							
Batch R WG3087895-2 Ammonia, Tot				97.4		%		85-115	24-JUN-19
WG3087895-6 Ammonia, Tot				97.2		%		85-115	24-JUN-19
WG3087895-1 Ammonia, Tot	MB al (as N)			<0.010		mg/L		0.01	24-JUN-19
WG3087895-5 Ammonia, Tot				<0.010		mg/L		0.01	24-JUN-19
Batch R	4688367								
WG3089044-6 Ammonia, Tot				99.6		%		85-115	25-JUN-19
WG3089044-5 Ammonia, Tot				<0.010		mg/L		0.01	25-JUN-19
NO2-IC-N-WP		Water							
Batch R WG3083246-2 Nitrite (as N)	4684255 LCS			101.1		%		90-110	20-JUN-19
WG3083246-1 Nitrite (as N)	МВ			<0.010		mg/L		0.01	20-JUN-19
NO3-IC-N-WP		Water							



		Workorder:	L2295004	4	Report Date: 27	7-JUN-19	Pa	ge 2 of 4
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water							
Batch R4684255 WG3083246-2 LCS Nitrate (as N)			99.5		%		90-110	20-JUN-19
WG3083246-1 MB Nitrate (as N)			<0.020		mg/L		0.02	20-JUN-19
P-T-COL-WP	Water							
Batch R4682341 WG3083405-6 LCS Phosphorus (P)-Total			96.2		%		80-120	21-JUN-19
WG3083405-5 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	21-JUN-19
SOLIDS-TOTSUS-WP	Water							
Batch R4687654 WG3086688-22 LCS								
Total Suspended Solids			98.0		%		85-115	25-JUN-19
WG3086688-21 MB Total Suspended Solids			<2.0		mg/L		2	25-JUN-19
TURBIDITY-WP	Water							
Batch R4681974 WG3085302-8 LCS								
Turbidity			105.5		%		85-115	20-JUN-19
WG3085302-7 MB Turbidity			<0.10		NTU		0.1	20-JUN-19

Workorder: L2295004

Report Date: 27-JUN-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate
	····· , ··· , ··· · · · · · · · · · · ·

Sample Parameter Qualifier Definitions:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Workorder: L2295004

Report Date: 27-JUN-19

Hold Time Exceedances:

	Sample						
ALS Product Description	ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifie
Inorganic Parameters							
Chlorine, Total							
	1	19-JUN-19 09:30	20-JUN-19 10:00	0.25	24	hours	EHTR-FN
	2	19-JUN-19 09:30	20-JUN-19 10:00	0.25	24	hours	EHTR-FN
	3	19-JUN-19 09:30	20-JUN-19 10:00	0.25	24	hours	EHTR-FN
	4	19-JUN-19 09:30	20-JUN-19 10:00	0.25	24	hours	EHTR-FN
	5	19-JUN-19 09:30	20-JUN-19 10:00	0.25	24	hours	EHTR-FN

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2295004 were received on 19-JUN-19 16:25.

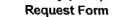
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Chain of Custody (COC) / Analytical



Canada Toll Free: 1 800 668 9878



COC Number: 17 -

Page of

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Report To	Contact and company name below will app	ear on the final report		Report Format	/ Distribution		Γ	Selec	t Serv	ice Le	vel Be	low -	Conta	ct you	ır AM t	o conf	irm all	E&P T	ATs (si	urcharge	s may apply	()
Company:	RM of East St. Paul		Select Report F	ormat: 🔄 PDF [J EXCER, 🗍 EC	DD (DIGITAL)		Re	gular	[R]	🗹 Sa	andard	TAT if i	re::eive	d by 3 p	m - bus	siness da	ays - no	surcharr	ges apply		
Contact:	Leanne Shewchuk		Quality Control	(QC) Report with R	eport 🔲 YES		, î	4 da	y [P4-	20%]			NCY	1 Bu	isines	is day	E - 1	00%]		h	_	
Phone:	204-668-8112 x 4503		Compare Result	s to Criteria on Report -	provide details belo	w if box checked	108r	3 day	y (P3-	25%]			ÊRGE	Sam	e Dav	. Wee	kend r	or Stat	utory	holidav	{E2 -200%	_
_	Company address below will appear on the fin	al report	Select Distributi	ion: 🗹 EMAIL	📋 MAIL 🛛	FAX	R PR	2 day	y (P2-	50%]			Ma						ay app		.	
Street:	3021 Birdshill Road		Email 1 or Fax	leanne.shewchuk@	@eaststpaul.con	n ·	1	Date an	d Time	e Réqui	red for	r all E&	P TAT	5:				dd-mr	nm-yy	hh:mm		
City/Province:	East St. Paul, MB		Email 2	operations@easts	tpaul.com		For tes	sts that c	an not	be perf	ormed a	ccordin	g to the	servic	e level s	elected.	you will	be contr	scted.			
Postal Code:	R2E 1A7		Email 3											An	alysis	Requ	est					
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ALS Lab Wor	k Order # (lab use only): L229	5004	ALS Contact:	Connor Cattani	Sampler:	тм	NUMBEF	TOTSU	FURBIDITY-WP	Ę	P-T-COL-WP	NH3-COL-WP	CL2-TOTAL-WP	ANIONS-NZN3-IC-N-WF	CHL-FLUORO-MP						AMP	SUSPECTED HAZARD (see Special Instructions)
ALS Sample #	Sample Identification	· · · · ·	1	Date	Time		13	SOLIDS-TO1	BID	02-DIS-WP	0 S	Ş	Б.	SNS	EL					·	Ā	E E
(lab use only)	{This description will a	appear on the report)		(dd-mmm-yy)	(hh:mm)	Sample Type	1ž	ទ្រ	12	5	ц ц	Ε	CL2	Ă	ਜੋ			-) .			S S	SUS
	P1U ·			19-06-2019	9:30	Water	4	R	R		R	R	R	R	R			-			1	1
	P2 L		•	19-06-2019	9:50	Water	4	R	R		R	R	R	R	R			+	+		 	
	P3 L			19-06-2019	10:20	Water	4	R	R		R	R	R	R	R		-		-	-	· ·	· ·
· · ·	P4 L			19-06-2019	10:50	Water	4	R	R		R	R	R	 R	R		-+	-+				
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	Water (DW) Samples ¹ (client use)		(elec	tronic COC only)			Froz	en					SIF C	bser	vation	s	Yes				-	
	e samples taken from a Regulated DW System?				,		Ice P	Packs		Ice C	ubes		Custo	ody se	eal inte	ict	Yes			No	1	
YES NO							Cooli	ing la							•							
Are samples for	samples for human consumption/ use?								IIÌIAL	COOLE	RTEN	IPERA	TURES	¢			F⊯	AL CO	OLER T	EMPERA	TURES C	
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	SHIPMENT RELEASE (client use		INITIAL SHIPMENT RECEPTION (lab use only)									F	INAL	SHIP			EPTIC	N (lat	use o	nly)		
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received:27-JUN-19Report Date:09-JUL-19 08:19 (MT)Version:FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2300108 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

David Inocando

Account Manager [This report shall not be reproduced except in full without the written authority of the Laboratory.]

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L2300108 CONTD.... PAGE 2 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2300108-1 P1 U							
Sampled By: TM on 26-JUN-19 @ 08:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	0.40		0.40				D 4000507
Nitrate (as N)	<0.10	DLM	0.10	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite Nitrate and Nitrite as N	<0.11		0.11	mg/L		03-JUL-19	
Nitrite in Water by IC			5.11				
Nitrite (as N)	<0.050	DLM	0.050	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry							D / 000000
Chlorophyll a	10.3		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters Ammonia, Total (as N)	0.049		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.049	CLH	0.010	mg/L		27-JUN-19	R4693823 R4689878
Phosphorus (P)-Total	0.050		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	15.7		2.0	mg/L		03-JUL-19 03-JUL-19	R4693447
Turbidity	6.06		2.0 0.10	NTU		27-JUN-19	R4689852
L2300108-2 P2 L	0.00		0.10			2. 0011-10	117000002
Sampled By: TM on 26-JUN-19 @ 09:10							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.11		0.11	mg/L		03-JUL-19	
Nitrite in Water by IC	-0.050	DLM	0.050	ma/l		27-JUN-19	D4600567
Nitrite (as N) Chlorophyll a	<0.050		0.050	mg/L		21-JUN-19	R4692567
Chlorophyll a by fluorometry							
Chlorophyll a	47.3		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters							
Ammonia, Total (as N)	0.171		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.010	CLH	0.010	mg/L		27-JUN-19	R4689878
Phosphorus (P)-Total	0.458		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	25.1		2.0	mg/L		03-JUL-19	R4693447
Turbidity	9.15		0.10	NTU		27-JUN-19	R4689852
L2300108-3 P3 L							
Sampled By: TM on 26-JUN-19 @ 09:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.040	DLM	0.040	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite	<0.040		0.040	iiig/L		21-0014-19	114032007
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC				Ű			
Nitrite (as N)	<0.020	DLM	0.020	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry	20.6		0.40	uc/l	27-JUN-19	27-JUN-19	P/606006
Chlorophyll a Miscellaneous Parameters	32.6		0.10	ug/L	21-3011-19	21-JUN-19	R4696236
Ammonia, Total (as N)	0.053		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.020	CLH	0.010	mg/L		27-JUN-19	R4689878
	0.020		0.010			27 001119	

L2300108 CONTD.... PAGE 3 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2300108-3 P3 L							
Sampled By: TM on 26-JUN-19 @ 09:40							
Matrix: WATER							
Oxygen, Dissolved	7.10		0.10	mg/L		27-JUN-19	R4690757
Phosphorus (P)-Total	0.113		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	5.9		2.0	mg/L		03-JUL-19	R4693447
Turbidity	1.97		0.10	NTU		27-JUN-19	R4689852
_2300108-4 P4 L							
Sampled By: TM on 26-JUN-19 @ 10:15							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC		DIM					D /000000
Nitrate (as N)	<0.040	DLM	0.040	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	20.5		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters Ammonia, Total (as N)	0.040		0.010			02 11 10	D 4000000
Chlorine, Total	0.042	CLH	0.010 0.010	mg/L		03-JUL-19 27-JUN-19	R4693823
Phosphorus (P)-Total	0.010	CLH	0.010	mg/L		05-JUL-19	R4689878 R4694643
Total Suspended Solids	20.9		2.0	mg/L mg/L		03-JUL-19	R4693447
Turbidity	5.85		0.10	NTU		27-JUN-19	R4689852
L2300108-5 P6 L	0.00		0.10			27 001110	114000002
Sampled By: TM on 26-JUN-19 @ 10:35							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.11		0.11	mg/L		03-JUL-19	
Nitrite in Water by IC	-0.050	DLM	0.050	mg/L		27-JUN-19	R4692567
Nitrite (as N) Chlorophyll a	<0.050	DLIVI	0.050	mg/L		27-3011-19	R4092007
Chlorophyll a by fluorometry							
Chlorophyll a	4.81		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters							
Ammonia, Total (as N)	0.072		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.010	CLH	0.010	mg/L		27-JUN-19	R4689878
Phosphorus (P)-Total	0.614		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	15.9		2.0	mg/L		03-JUL-19	R4693447
Turbidity	6.03		0.10	NTU		27-JUN-19	R4689852
_2300108-6 S U							
Sampled By: TM on 26-JUN-19 @ 10:55							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	<0.040	DLM	0.040	ma/l		27 11 10 40	DAGODEGT
Nitrate (as N) Nitrate+Nitrite	<0.040		0.040	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
	\$0.070		0.070				

L2300108 CONTD.... PAGE 4 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2300108-6 S U							
Sampled By: TM on 26-JUN-19 @ 10:55							
Matrix: WATER							
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	31.1		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters							
Ammonia, Total (as N)	0.021		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.150	CLH	0.010	mg/L		27-JUN-19	R4689878
Phosphorus (P)-Total	0.127		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	11.6		2.0	mg/L		03-JUL-19	R4693447
Turbidity	3.65		0.10	NTU		27-JUN-19	R4689852
L2300108-7 S L							
Sampled By: TM on 26-JUN-19 @ 11:15							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		03-JUL-19	
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	3.16		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters	3.10		0.10	ug/L	27 0011 10	27 0011 10	114030230
Ammonia, Total (as N)	0.041		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	0.030	CLH	0.010	mg/L		27-JUN-19	R4689878
Phosphorus (P)-Total	0.0495		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	4.4		2.0	mg/L		03-JUL-19	R4693447
Turbidity	1.76		0.10	NTU		27-JUN-19	R4689852
L2300108-8 CS U							
Sampled By: TM on 26-JUN-19 @ 11:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		27-JUN-19	R4692567
Chlorophyll a	~0.020		0.020			21 0011-13	11-032307
Chlorophyll a by fluorometry							
Chlorophyll a	7.48		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters							
Ammonia, Total (as N)	0.030		0.010	mg/L		03-JUL-19	R4693823
Chlorine, Total	<0.020	CLH	0.020	mg/L		27-JUN-19	R4689878
Phosphorus (P)-Total	0.0706		0.0030	mg/L		05-JUL-19	R4694643
Total Queneradad Calida	4.8		2.0	mg/L		03-JUL-19	R4693447
Total Suspended Solids							

L2300108 CONTD.... PAGE 5 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Extracted	Analyzed	Batch
	27-JUN-19	R4692567
	03-JUL-19	
	27-JUN-19	R4692567
27-JUN-19	27-JUN-19	R4696236
27-3011-19	27-3011-19	14090230
	03-JUL-19	R4693823
	27-JUN-19	R4689878
	05-JUL-19	R4694643
	03-JUL-19	R4693447
	27-JUN-19	R4689852
		111000002
	27-JUN-19	R4692567
	03-JUL-19	
	27-JUN-19	R4692567
27-JUN-19	27-JUN-19	R4696236
27 001110	27 001110	1030230
	03-JUL-19	R4693823
	27-JUN-19	R4689878
	05-JUL-19	R4694643
	03-JUL-19	R4693447
	27-JUN-19	R4689852
	27-JUN-19	R4692567
	03-JUL-19	
	27- II IN 40	D4602567
	21-JUN-19	R4692567
27-JUN-19	27-JUN-19	R4696236
	03-JUL-19	R4693823
	05-JUL-19	R4694643
27-JL	JN-19	03-JUL-19

L2300108 CONTD.... PAGE 6 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2300108-11 SS A							
Sampled By: TM on 26-JUN-19 @ 10:00							
Matrix: WATER							
Total Suspended Solids	3.7		2.0	mg/L		03-JUL-19	R4693447
Turbidity	2.36		0.10	NTU		27-JUN-19	R4689852
L2300108-12 SS B	2.50		0.10	NIO		27 3011 13	114009032
Sampled By: TM on 26-JUN-19 @ 10:15							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry	05.0		0.40				D 4000000
Chlorophyll a	35.9		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters	0.044		0.040	m~//		04 11 10	D4604040
Ammonia, Total (as N)	0.041		0.010	mg/L		04-JUL-19 05-JUL-19	R4694849
Phosphorus (P)-Total	0.217		0.0030	mg/L			R4694643
Total Suspended Solids	37.9		2.0	mg/L		03-JUL-19	R4693447
Turbidity	47.4		0.10	NTU		27-JUN-19	R4689852
L2300108-13 SS C							
Sampled By: TM on 26-JUN-19 @ 10:35							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.028		0.020	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	0.017		0.010	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	5.62		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters	5.02		0.10	uy/L	21 0011-19	21-0011-13	114030230
Ammonia, Total (as N)	0.474		0.010	mg/L		03-JUL-19	R4693823
Oxygen, Dissolved	9.40		0.010	mg/L		27-JUN-19	R4690757
Phosphorus (P)-Total	0.0894		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	2.3		2.0	mg/L		03-JUL-19	R4693447
Turbidity	3.99		0.10	NTU		27-JUN-19	R4689852
L2300108-14 SS D	0.00		0.10				11-000002
Sampled By: TM on 26-JUN-19 @ 11:10 Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		27-JUN-19	R4692567
Nitrate+Nitrite				5			
Nitrate and Nitrite as N	<0.070		0.070	mg/L		03-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUN-19	R4692567
Chlorophyll a							
Chlorophyll a by fluorometry							

L2300108 CONTD.... PAGE 7 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2300108-14 SS D							
Matrix: WATER							
Chlorophyll a by fluorometry Chlorophyll a	7.59		0.10	ug/L	27-JUN-19	27-JUN-19	R4696236
Miscellaneous Parameters	7.59		0.10	ug/L	27-3011-19	27-3011-19	R4090230
Ammonia, Total (as N)	0.041		0.010	mg/L		03-JUL-19	R4693823
Phosphorus (P)-Total	0.0967		0.0030	mg/L		05-JUL-19	R4694643
Total Suspended Solids	7.2		2.0	mg/L		03-JUL-19	R4693447
Turbidity			2.0 0.10	NTU		28-JUN-19	
lublaity	4.98		0.10	NIU		20-JUN-19	R4692344

Reference Information

Sample Parameter Qualifier Key:

CLH			tests is 15 minutes; field testing is recommended. Chlorine
DLM	dissipates rapidly Detection Limit A	into neadspace. Jjusted due to sample matrix effects (e.g. chemic	al interference, colour, turbidity).
ЛS-B		very could not be accurately calculated due to hig	
est Method F	References		
LS Test Code		Test Description	Method Reference**
CHL/A-ACET-F	LUORO- Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
		rres modified from EPA method 445.0. Chlorophy on-acidification procedure. This method is not sul	Il a is determined by a 90 % acetone extraction followed with oject to interferences from chlorophyll b.
CL2-TOTAL-W	P Water	Chlorine, Total	APHA 4500-Cl Chlorine(Residual) G (mod)
			The recommended hold time for these tests is 15 minutes; field nic matter, if present, and dissipates rapidly into headspace.
C-SCREEN-V	VP Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative ana	lysis of conductivity	where required during preparation of other test eq	. IC, TDS, TSS, etc
IH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
	ater samples forms ir nd measured colourr		enol. The intensity is amplified by the addition of sodium
IO2+NO3-CAL	-C-WP Water	Nitrate+Nitrite	CALCULATION
IO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
norganic anion	ns are analyzed by lo	n Chromatography with conductivity and/or UV d	etection.
IO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
norganic anion	ns are analyzed by lo	n Chromatography with conductivity and/or UV d	etection.
02-DIS-WP	Water	Dissolved Oxygen	APHA 4500-O-C
nanganic hydro odide in an am	oxide is formed. Add	ition of sulfuric acid dissolves the manganic hydr e original DO content. The iodide is then titrated	ipitate of manganous hydroxide. In the presence of oxygen, brown oxide, yielding manganic sulfate which reacts with iodide, releasing with a standard solution of thiosulphate. Results for
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
,	s carried out using pr te digestion of the sa	•	"Phosphorus". Total Phosphorus is determined colourmetrically
OLIDS-TOTS	US-WP Water	Total Suspended Solids	APHA 2540 D (modified)
otal suspende	ed solids in aquesous	matrices is determined gravimetrically after dryi	ng the residue at 103 105°C.
URBIDITY-WI	P Water	Turbidity	APHA 2130B (modified)
urbidity in aqu	leous matrices is def	ermined by the nephelometric method.	
ALS test meth	ods may incorporate	modifications from specified reference methods	to improve performance.
⁻he last two let	tters of the above tes	t code(s) indicate the laboratory that performed a	nalytical analysis for that test. Refer to the list below:
aboratory De	finition Code La	aboratory Location	
VP	A	_S ENVIRONMENTAL - WINNIPEG, MANITOBA	, CANADA
	ody Numbers:		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody (COC) / Analytical **Request Form**

L2300108-COFC

COC Number: 17 -

Page | of 2

Canada Toll Free: 1 800 668 9878 www.alsglobal.com

Report To	Contact and company name below will appe	ar on the final report Report Format / Distribution					Selec	t Serv	ice Le	Vel De	mativ ·	Conta	ct you	r AM t	o conf	irm all	E&P 1	TATs (surcharges may apply) no surcharges apply										
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Chain of Custody (COC) / Analytical **Request Form**



(COC Number: 17 -

Page 2 of 2

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Street:	3021 Birdshill Road		Email 1 or Fax	leanne.shewchuk(@eaststpaul.com	1		Date an	and Time Required for all E&P TATs: dd-mmm-yy hh:mm														
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RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received:10-JUL-19Report Date:24-JUL-19 15:51 (MT)Version:FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2307649 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Hua Wo Chemistry Laboratory Manager

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L2307649 CONTD.... PAGE 2 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-1 P1 U							
Sampled By: TM on 10-JUL-19 @ 09:15							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	1.11		0.10	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	1.40		0.44			13-JUL-19	
Nitrate and Nitrite as N Nitrite in Water by IC	1.18		0.11	mg/L		13-JUL-19	
Nitrite (as N)	0.073		0.050	mg/L		11-JUL-19	R4709040
Chlorophyll a				5			
Chlorophyll a by fluorometry Chlorophyll a	2.71		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters				Ū			
Ammonia, Total (as N)	0.063		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.292		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	25.6		2.0	mg/L		17-JUL-19	R4714220
Turbidity	18.9		0.10	NTU		11-JUL-19	R4708479
L2307649-2 P2 L							
Sampled By: TM on 10-JUL-19 @ 09:35							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	1.28		0.10	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	1.36		0.11	mg/L		13-JUL-19	
Nitrite in Water by IC	1.50		0.11	ing/∟		13-302-13	
Nitrite (as N)	0.079		0.050	mg/L		11-JUL-19	R4709040
Chlorophyll a				-			
Chlorophyll a by fluorometry							
Chlorophyll a	3.93		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters	0.400		0.040			15 11 10	D 4740700
Ammonia, Total (as N) Phosphorus (P)-Total	0.108 0.278		0.010 0.0030	mg/L mg/L		15-JUL-19 15-JUL-19	R4712722 R4711474
Total Suspended Solids	40.0		2.0	mg/L		17-JUL-19	R4711474 R4714220
Turbidity	31.2		0.10	NTU		11-JUL-19	R4708479
L2307649-3 P3 L	01.2		0.10			1100210	
Sampled By: TM on 10-JUL-19 @ 09:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	1.17		0.040	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite			0.070			40 11 11 40	
Nitrate and Nitrite as N	1.24		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC Nitrite (as N)	0.074		0.020	mg/L		11-JUL-19	R4709040
Chlorophyll a				5-			
Chlorophyll a by fluorometry Chlorophyll a	20.7		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters				-			
Ammonia, Total (as N)	0.144		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.328		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	48.7		2.0	mg/L		17-JUL-19	R4714220
Turbidity	37.5		0.10	NTU		11-JUL-19	R4708479

L2307649 CONTD.... PAGE 3 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-3 P3 L Sampled By: TM on 10, IIII, 10, @ 00:50							
Sampled By: TM on 10-JUL-19 @ 09:50							
Matrix: WATER L2307649-4 P4 L							
Sampled By: TM on 10-JUL-19 @ 10:00 Matrix: WATER							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.824		0.040	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.851		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC	0.007					44 11 40	D (7000 (0
Nitrite (as N) Chlorophyll a	0.027		0.020	mg/L		11-JUL-19	R4709040
Chlorophyll a by fluorometry							
Chlorophyll a	14.9		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters	_		-				
Ammonia, Total (as N)	0.091		0.010	mg/L		15-JUL-19	R4712722
Chlorine, Total	0.020	CLH	0.010	mg/L		11-JUL-19	R4708486
Oxygen, Dissolved	4.30		0.10	mg/L		11-JUL-19	R4714825
Phosphorus (P)-Total	0.273		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	17.9		2.0	mg/L		17-JUL-19	R4714220
Turbidity	13.6		0.10	NTU		11-JUL-19	R4708479
L2307649-5 P6 L							
Sampled By: TM on 10-JUL-19 @ 10:21							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.090		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	0.113		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC	0.110		0.070	iiig/L		10 002 10	
Nitrite (as N)	0.023		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a				-			
Chlorophyll a by fluorometry							
Chlorophyll a	15.0		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters			0.010				D 4740700
Ammonia, Total (as N)	0.141		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.294		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	37.1		2.0	mg/L		17-JUL-19	R4714220
Turbidity	14.0		0.10	NTU		11-JUL-19	R4708479
L2307649-6 SL U							
Sampled By: TM on 10-JUL-19 @ 10:35							
Matrix: WATER Nitrate + Nitrite							
Nitrate + Nitrite Nitrate in Water by IC							
Nitrate (as N)	0.043		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite						-	
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	20.8		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
	20.0		0.10	uy/L		11301-19	114720390

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-6 SL U							
Sampled By: TM on 10-JUL-19 @ 10:35							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.013		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.0589		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	5.6		2.0	mg/L		17-JUL-19	R4714220
Turbidity	4.41		0.10	NTU		11-JUL-19	R4708479
L2307649-7 SL L							
Sampled By: TM on 10-JUL-19 @ 10:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.600		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite	0.000		0.070			40 11 40	
Nitrate and Nitrite as N	0.626		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC Nitrite (as N)	0.026		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a	0.020		0.010			11001-19	117103040
Chlorophyll a by fluorometry							
Chlorophyll a	11.2		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							
Ammonia, Total (as N)	0.089		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.192		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	20.1		2.0	mg/L		17-JUL-19	R4714220
Turbidity	13.8		0.10	NTU		11-JUL-19	R4708479
L2307649-8 CS U							
Sampled By: TM on 10-JUL-19 @ 11:05							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.109		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	0.100		0.070	ma/l		13-JUL-19	
Nitrite in Water by IC	0.109		0.070	mg/L		13-301-19	
Nitrite (as N)	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	64.2		0.20	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							
Ammonia, Total (as N)	0.028		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.193		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	22.3		2.0	mg/L		17-JUL-19	R4714220
Turbidity	16.7		0.10	NTU		11-JUL-19	R4708479
L2307649-9 CS L							
Sampled By: TM on 10-JUL-19 @ 11:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	0.500		0.000	m ~/l		11 11 10	D 4700040
Nitrate (as N)	0.598		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	0.628		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC	0.020		0.070	g/ L		10000-19	
Nitrite (as N)	0.030		0.010	mg/L		11-JUL-19	R4709040

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-9 CS L							
Sampled By: TM on 10-JUL-19 @ 11:20							
Matrix: WATER							
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	74.7		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters				U U			
Ammonia, Total (as N)	0.362		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.0990		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	62.3		2.0	mg/L		17-JUL-19	R4714220
Turbidity	51.4		0.10	NTU		11-JUL-19	R4708479
L2307649-10 BTP 1							
Sampled By: TM on 10-JUL-19 @ 13:25							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.638		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite	0.004		0.070			12 11 10	
Nitrate and Nitrite as N Nitrite in Water by IC	0.684		0.070	mg/L		13-JUL-19	
Nitrite (as N)	0.046		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a				5			
Chlorophyll a by fluorometry							
Chlorophyll a	5.52		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							
Ammonia, Total (as N)	0.048		0.010	mg/L		15-JUL-19	R4712722
Phosphorus (P)-Total	0.152		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	12.9		2.0	mg/L		17-JUL-19	R4714220
Turbidity	8.07		0.10	NTU		11-JUL-19	R4708479
L2307649-11 SS A							
Sampled By: TM on 10-JUL-19 @ 12:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	.0.000		0.000	~~~/l		11 11 10	D 4700040
Nitrate (as N)	<0.020		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC	<0.070		0.070	iiig/E		10 002 10	
Nitrite (as N)	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	50.3		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							DITIOTO
Ammonia, Total (as N)	0.315		0.010	mg/L		15-JUL-19	R4712722
Biochemical Oxygen Demand	15.7		6.0	mg/L		11-JUL-19	R4714331
Fecal Coliforms	1410		1	MPN/100mL		10-JUL-19	R4707712
Phosphorus (P)-Total	0.275		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	35.8		2.7	mg/L		11-JUL-19	R4710308
Turbidity	36.4		0.10	NTU		11-JUL-19	R4708479
Algae Identification Gomphonema (Bacillariophyceae)	Small amount		1.0			24-JUL-19	R4724019
Scenedesmus (Chlorophyceae)	Small amount		1.0 1.0			24-JUL-19 24-JUL-19	R4724019 R4724019
Cryptomonas (Cryptophyceae)	Large amount		1.0			24-JUL-19 24-JUL-19	R4724019 R4724019
Euglena (Euglenophyceae)	Small amount		1.0			24-JUL-19	R4724019

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-11 SS A							
Sampled By: TM on 10-JUL-19 @ 12:20							
Matrix: WATER							
Algae Identification							
Phacus (Euglenophyceae)	Small amount		1.0			24-JUL-19	R4724019
Aphanocapsa (Cyanophyceae)	Small amount		1.0			24-JUL-19	R4724019
Merismopedia (Cyanophyceae)	Massive amount		1.0			24-JUL-19	R4724019
Microcystis (Cyanophyceae)	Small amount		1.0			24-JUL-19	R4724019
Pseudanabaena (Cyanophyceae)	Massive amount		1.0			24-JUL-19	R4724019
Limnothrix (Cyanophyceae)	Large amount		1.0			24-JUL-19	R4724019
Planktothrix (Cyanophyceae)	Massive amount		1.0			24-JUL-19	R4724019
Unidentified	Large amount		1.0			24-JUL-19	R4724019
Note: Unidentified: dispersed rod shaped single cells of an unidentified cyanobacteria							
Enumeration of blue green algae cells Total cyanobacterial cell count	2230000		1	cells/mL		24-JUL-19	R4724029
Aphanocapsa (Cyanophyceae)	300		1	cells/mL		24-JUL-19	R4724029
Limnothrix (Cyanophyceae)	162000		1	cells/mL		24-JUL-19	R4724029
Merismopedia (Cyanophyceae)	611000		1	cells/mL		24-JUL-19	R4724029
Planktothrix (Cyanophyceae)	505000		1	cells/mL		24-JUL-19	R4724029
Pseudanabaena (Cyanophyceae)	715000		1	cells/mL		24-JUL-19	R4724029
Unidentified blue-green	235000		1	cells/mL		24-JUL-19	R4724029
Note: Unidentified: dispersed rod shaped single cells of an unidentified cyanobacteria							
L2307649-12 SS B							
Sampled By: TM on 10-JUL-19 @ 12:10							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC	0.010		0.010			11 11 10	D 4700040
Nitrite (as N) Chlorophyll a	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a by fluorometry							
Chlorophyll a	15.6		0.10	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							
Ammonia, Total (as N)	0.020		0.010	mg/L		15-JUL-19	R4712722
Biochemical Oxygen Demand	4.3		2.0	mg/L		11-JUL-19	R4714331
Fecal Coliforms	1050		1	MPN/100mL		10-JUL-19	R4707712
Phosphorus (P)-Total	0.0658		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids	10.1		2.0	mg/L		17-JUL-19	R4714220
Turbidity	7.82		0.10	NTU		11-JUL-19	R4708479
L2307649-13 SS C				-			
Sampled By: TM on 10-JUL-19 @ 12:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite			0.020				
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a							

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Miscelaneous Parametes ng/L 15-UU-19 R47 Ammonia, Total (as N) 0.046 0.010 mg/L 15-UU-19 R47 Phosphons (P)-Total 0.168 0.0300 mg/L 11-UU-19 R47 Total Suspended Salids 20.7 2.0 mg/L 11-UU-19 R47 Turbidity 15.9 0.10 NTU 11-UU-19 R47 Melosira (Coscindiscophyceae) Small amount 1.0 24-UU-19 R47 Melosira (Coscindiscophyceae) Small amount 1.0 24-UU-18 R47 Navicula (Bacillariophyceae) Small amount 1.0 24-UU-18 R47 Navicula (Bacillariophyceae) Small amount 1.0 24-UU-18 R47 Condogonium (Chiorophyceae) Small amount 1.0 24-UU-19 R47 Cryptomonae (Cyptophyceae) Small amount 1.0 24-UU-19 R47 Condogonium (Chiorophyceae) Small amount 1.0 24-UU-19 R47 Condogonium (Chiorophyceae) Small amount 1.0 <th>Sample Details/Parameters</th> <th>Result</th> <th>Qualifier*</th> <th>D.L.</th> <th>Units</th> <th>Extracted</th> <th>Analyzed</th> <th>Batch</th>	Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
Sampide By: TM on 10-ULL-19 @ 12:40 Matric: WATER Chicorphylia by fluorometry B8.4 0.20 ugL 11-ULL-19 11-ULL-19 R47. Chicorphylia by fluorometry 0.045 0.010 mgL 15-ULL-19 R47. Amonia, Total (as N) 0.045 0.001 mgL 15-ULL-19 R47. Presoloci/forms 5.48 1 MPN100mL 10-ULL-19 R47. Total Supended Solids 20.7 2.0 mgL 11.JUL-19 R47. Alge Identification 15.9 0.10 NTU 11.JUL-19 R47. Maticia (Baccianchycose) Small amount 1.0 24-JUL-19 R47. Nackicia (Baccianchycose) Small amount 1.0 24-JUL-19 R47. Nackicia (Baccianchycose) Small amount 1.0 24-JUL-19 R47. Nackicia (Baccianchycose) Small amount 1.0 24-JUL-19 R47. Codoponium (Chicorphyceae) Small amount 1.0 24-JUL-19 R47. Condophyc	L2307649-13 SS C							
Matrix WATER Kall Choophylia Choophylia <thchoophylia< th=""> Choophylia</thchoophylia<>								
Chicrophyll a byfluorometry Chicrophyll a byfluorometry Miscellancous Parameters 88.4 0.20 ug/L 11-JUL-19 R47. Ammonia, Total (as N) 0.046 0.010 mg/L 15-JUL-19 R47. Posphorus (P)-Total 0.168 0.0030 mg/L 15-JUL-19 R47. Total Suspended Solids 20.7 2.0 mg/L 11-JUL-19 R47. Alge Identification 15.9 0.10 NTU 11-JUL-19 R47. Alge Identification 1.0 24-JUL-19 R47. R47. R40. R44. R47. Nativatius (Bacelinophyceae) Smail amount 1.0 24-JUL-19 R47. R47. R44.								
Chlorophylia 88.4 0.20 ug/L 11-JUL-19 11-JUL-19<								
Misselaneous Parameters number of the second s		88.4		0.20	ua/l	11-JUI -19	11-JUI -19	R4720596
Ammonia, Total (as N) 0.046 0.010 mg/L 15-JUL-19 R47 Fecal Coliforms 548 1 MPN100mL 10-JUL-18 R47 Total Suspended Solids 20.7 2.0 mg/L 11-JUL-19 R47 Turbidity 15.9 0.10 NTU 11-JUL-19 R47 Alge Identification 10 24-JUL-19 R47 R47 R4ge Identification 24-JUL-19 R47 Naticula (Baciliariophyceae) Small amount 1.0 24-JUL-19 R47 Naticula (Baciliariophyceae) Moderate amount 1.0 24-JUL-19 R47 Scandessmuc (Chirophyceae) Small amount 1.0 24-JUL-19 R47 Scandessmuc (Chirophyceae) Small amount 1.0 24-JUL-19 R47 Cytomoras (Chirophyceae) Small amount 1.0 24-JUL-19 R47 Cytomoras (Chirophyceae) Small amount 1.0 24-JUL-19 R47 Cytomoras (Chirophyceae) Small amount 1.0 24-JUL-19 R47		00.4		0.20	ag/ E	11 002 10	11 002 10	104720000
Facal Coliforms 548 1 MPN/100mL 10-JUL-19 R47 Phosphons (P)-Total 0.168 0.0330 mgL 11-JUL-19 R47 Turbidity 15.9 0.10 NTU 11-JUL-19 R47 Alga Identification 5 9 0.10 NTU 11-JUL-19 R47 Malosina (Coscindiscophyceae) Smail amount 1.0 24-JUL-19 R47 Natocuta (Baciliariophyceae) Smail amount 1.0 24-JUL-19 R47 Natocuta (Baciliariophyceae) Moderate amount 1.0 24-JUL-19 R47 Natocuta (Baciliariophyceae) Smail amount 1.0 24-JUL-19 R47 Pediastrum (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Cryptomonas (Cyptophyceae) Smail amount 1.0 24-JUL-19 R47 Theaus (Euglenophyceae) Smail amount 1.0 24-JUL-19 R47 Chorophyceae) Smail amount 1.0 24-JUL-19 R47 Phormidium (Chiorophyceae) Smai		0.046		0.010	ma/l		15-JUI -19	R4712722
Phosphorus (P)-Total 0.168 0.0030 mg/L 15-JUL-19 R47 Tatal Suspended Solids 20.7 2.0 mg/L 11-JUL-19 R47 Alga Identification 11-JUL-19 R47 R47 Refailand phyceae) Smail amount 1.0 24-JUL-19 R47 Netcolar (Reglariophyceae) Smail amount 1.0 24-JUL-19 R47 Netcolar (Scalinariophyceae) Moderate amount 1.0 24-JUL-19 R47 Codeogonium (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Scenedesmus (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Scenedesmus (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Scenedesmus (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Phacus (Euglenophyceae) Smail amount 1.0 24-JUL-19 R47 Chiorophyceae) Smail amount 1.0 24-JUL-19 R47 Metrocoptic (Chiorophyceae) Smail amount 1.0 24-JUL-19 R47<					-			R4707712
Total Suspended Solids 20.7 2.0 mg/L 11-JUL-19 R47. Turbidiy 15.9 0.10 NTU 11-JUL-19 R47. Agae Identification 5.9 0.10 NTU 11-JUL-19 R47. Melosia (Coscindotscorhyceae) Small amount 1.0 24-JUL-19 R47. Natzachia (Bacillariophyceae) Moderate amount 1.0 24-JUL-19 R47. Monoraphidum (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Monoraphidum (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Cryptomonas (Cryptophyceae) Small amount 1.0 24-JUL-19 R47. Scenedesmus (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Phacus (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Meriosopsis (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phacus (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Meriosopsid (Cyanophyceae) Sm				-				R4711474
Turbidity 15.9 0.10 NTU 11-JUL-19 R47 Alga Identification Fragilaria (Fragilariophyceae) Small amount 1.0 24-JUL-19 R47 Melosira (Coscindiscophyceae) Small amount 1.0 24-JUL-19 R47 Navicual Reclamisphyceae) Moderate amount 1.0 24-JUL-19 R47 Monoraphidium (Chlorophyceae) Small amount 1.0 24-JUL-19 R47 Oddgraium (Chlorophyceae) Small amount 1.0 24-JUL-19 R47 Scenedesmus (Chlorophyceae) Small amount 1.0 24-JUL-19 R47 Cryptomonas (Cryptophyceae) Small amount 1.0 24-JUL-19 R47 Aphanccapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47 Aphanccapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47 Aphanccapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47 Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47 Phormidium (Cyanophyceae) Small a	• • • • •				-			R4710308
Ages Identification Fragilaria (Fragilaria	·	-			-			R4708479
Fragilaria (Fragilaria (Fragilaria phyceae) Small amount 1.0 24-JUL-19 R47. Melosira (Coscinodiscophyceae) Small amount 1.0 24-JUL-19 R47. Naticula (Bacillariophyceae) Small amount 1.0 24-JUL-19 R47. Nitzschia (Bacillariophyceae) Moderate amount 1.0 24-JUL-19 R47. Natoraphilum (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Odogonium (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Scenedesmus (Chiorophyceae) Small amount 1.0 24-JUL-19 R47. Cryptomonas (Chyptophyceae) Small amount 1.0 24-JUL-19 R47. Pacuas (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Gomphosphaeria (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Merismopedia (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Mortorospitis (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phornidium (Cyanophyceae)	-	15.9		0.10	NIO		11-30E-13	14700479
Melosira (Coscindiscophyceae) Small amount 1.0 24-UU-19 R47. Navicula (Bacillariophyceae) Moderate amount 1.0 24-UU-19 R47. Monoraphidium (Chlorophyceae) Moderate amount 1.0 24-UU-19 R47. Oedogonium (Chlorophyceae) Small amount 1.0 24-UU-19 R47. Oedogonium (Chlorophyceae) Small amount 1.0 24-UU-19 R47. Scenedesmus (Chlorophyceae) Small amount 1.0 24-UU-19 R47. Cyptomonas (Cryptophyceae) Small amount 1.0 24-UU-19 R47. Phacus (Euglenophyceae) Small amount 1.0 24-UU-19 R47. Aphanocapsa (Cyanophyceae) Small amount 1.0 24-UU-19 R47. Meriomopedia (Cyanophyceae) Small amount 1.0 24-UU-19 R47. Meriomopedia (Cyanophyceae) Small amount 1.0 24-UU-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-UU-19 R47. Phormidium (Cyanophyceae) Small amount		Small amount		10			24-JUI -19	R4724019
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Cryptomonas (Cryptophyceae) Small amount 1.0 24-JUL-19 R47. Euglena (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Aphanocapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Aphanocapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Gomphosphaeria (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Merisopedia (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Planktolyngbya (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Vinidentified: Large amount 1.0 24-JUL-19 R47. Unidentified: dispersed coccoid shaped Small amount 1.0 24-JUL-19 R47. Vinidentified: dispersed coccoid shaped Small amount 1.0 24-JUL-19 R47. Note:	Pediastrum (Chlorophyceae)	Small amount		1.0			24-JUL-19	R4724019
Euglena (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Phacus (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Aphanocapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Gomphosphaeria (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Merismopedia (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Microcystis (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Pseudanabaena (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Chroedria (Chlorophyceae) Moderate amount 1.0 24-JUL-19 R47. Unidentified cyanobacteria Chroedria (Chanophyceae) Moderate amount 1.0 24-JUL-19 R47. Note: Unidentified cyanobacteria. Chroedria (Cyanophyceae) 2000 1 cells/mL 24-JUL-19 <	Scenedesmus (Chlorophyceae)	Moderate amount		1.0			24-JUL-19	R4724019
Phacus (Euglenophyceae) Small amount 1.0 24-JUL-19 R47. Aphanocapsa (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Gomphospharia (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Merismopedia (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Microcystis (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Phormidium (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Pseudanabaena (Cyanophyceae) Small amount 1.0 24-JUL-19 R47. Schroederia (Chirophyceae) Small amount 1.0 24-JUL-19 R47. Vinidentified Large amount 1.0 24-JUL-19 R47. Other Moderate amount 1.0 24-JUL-19 R47. Other Moderate amount 1.0 24-JUL-19 R47. Other Moderate amount of Cyanophyceae) 100 1 cells/mL 24-JUL-19 R47. Aphanocapsa (Cyanophyceae) 100 1	Cryptomonas (Cryptophyceae)	Small amount		1.0			24-JUL-19	R4724019
Aphanocapsa (Cyanophyceae)Small amount1.024-JUL-19R47.Gomphosphaeria (Cyanophyceae)Small amount1.024-JUL-19R47.Merismopedia (Cyanophyceae)Small amount1.024-JUL-19R47.Microcystis (Cyanophyceae)Small amount1.024-JUL-19R47.Phormidium (Cyanophyceae)Small amount1.024-JUL-19R47.Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R47.Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R47.Schroederia (Chlorophyceae)Small amount1.024-JUL-19R47.Unidentified :dispersed coccoid shapedSmall amount1.024-JUL-19R47.OtherModerate amount1.024-JUL-19R47.OtherModerate amount1.024-JUL-19R47.OtherModerate amount1.024-JUL-19R47.OtherGomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19Gomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19R47.Merismopedia (Cyanophyceae)1001cells/mL24-JUL-19R47.Merismopedia (Cyanophyceae)20001cells/mL24-JUL-19R47.Merismopedia (Cyanophyceae)1001cells/mL24-JUL-19R47.Merismopedia (Cyanophyceae)20001cells/mL24-JUL-19R47.Merismopedia (Cyanophyceae)22001ce				1.0			24-JUL-19	R4724019
Gomphosphaeria (Cyanophyceae)Small amount1.024-JUL-19R472Merismopedia (Cyanophyceae)Small amount1.024-JUL-19R472Microcystis (Cyanophyceae)Small amount1.024-JUL-19R472Phormidium (Cyanophyceae)Small amount1.024-JUL-19R472Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R472Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R472Schreederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedCyanophyceae)Moderate amount1.024-JUL-19R472Unidentified: dispersed coccoid shapedImoderate amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472Other: moderate amount of CyanodictyonImoderate amount1.024-JUL-19R472Cyanophyceae)amount of Athrospira20001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)1001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)10001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)22001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)22001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)2901cells/mL24-JUL-19R472 </td <td>Phacus (Euglenophyceae)</td> <td>Small amount</td> <td></td> <td>1.0</td> <td></td> <td></td> <td>24-JUL-19</td> <td>R4724019</td>	Phacus (Euglenophyceae)	Small amount		1.0			24-JUL-19	R4724019
Merismopedia (Cyanophyceae)Large amount1.024-JUL-19R472Microcystis (Cyanophyceae)Small amount1.024-JUL-19R472Phormidium (Cyanophyceae)Small amount1.024-JUL-19R472Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R472Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R472VindentifiedModerate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472Note: Unidentified cyanobacteria. OtherCyanophyceae)1.024-JUL-19R472Note: Unidentified cyanobacteriaOtherModerate amount1.024-JUL-19R472Note: Unidentified cyanobacteria. OtherCyanophyceae)20001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)29901cells/mL24-JUL-19R472 <td></td> <td>Small amount</td> <td></td> <td>1.0</td> <td></td> <td></td> <td></td> <td>R4724019</td>		Small amount		1.0				R4724019
Microcystis (Cyanophyceae)Small amount1.024-JUL-19R472Phormidium (Cyanophyceae)Small amount1.024-JUL-19R472Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R472Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R472Schroederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherNote: Unidentified cyanobacteria.Moderate amount1.024-JUL-19R472Othermoderate amount of CyanodictyonModerate amount1.024-JUL-19R472(Cyanophyceae).amount of ArthrospiraModerate amount1.024-JUL-19R472(Cyanophyceae).moderate amount of Cyanodictyon1cells/mL24-JUL-19R472(Cyanophyceae).Brown of blue green algae cells3580001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)1001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)20001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)29901cells/mL24-JUL-19R472Phormidium (Cyanophyceae)								R4724019
Phormidium (Cyanophyceae)Small amount1.024-JUL-19R472Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R472Planktolyngbya (Cyanophyceae)Moderate amount1.024-JUL-19R472Schroederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472Note: Unidentified dispersed coccoid shapedModerate amount1.024-JUL-19R472Othermoderate amount of CyanodictyonModerate amount1.024-JUL-19R472(Cyanophyceae), small amount of Arthrospira3580001cells/mL24-JUL-19R472(Cyanophyceae), small amount of Arthrospira3580001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)20001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)22001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Planktolyngbya (Cyanophyceae)9901cells/mL24-JUL-19R472Planktolyngbya (Cyanophyceae)89101cells/mL24-JUL-19R472Note: Unidentified blue-green1290001 <td< td=""><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td>R4724019</td></td<>		-						R4724019
Pseudanabaena (Cyanophyceae)Small amount1.024-JUL-19R472Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R472Schroederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472Note: Unidentified cyanobacteria.Moderate amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472Note: Unidentified cyanobacteria.Moderate amount1.024-JUL-19R472OtherModerate amount of Cyanophyceae), small amount of Arthrospira (Cyanophyceae).3580001cells/mL24-JUL-19R472Founderate amount of Cyanophyceae)20001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)1001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)1600001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)7201cells/mL24-JUL-19R472Phormidium (Cyanophyceae)89101cells/mL24-JUL-19R472Piseudanabaena (Cyanophyceae)89101cells/mL24-JUL-19R472Other Indentified cyanophyceae)1200001cells/mL24-JUL-19R472Didentified blue-green1200001cells/mL24-JUL-19R472Didentified blue-green446001cells/mL </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>R4724019</td>								R4724019
Planktolyngbya (Cyanophyceae)Small amount1.024-JUL-19R472Schroederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472OtherModerate amount1.024-JUL-19R472OtherModerate amount of Cyanodictyon (Cyanophyceae), small amount of Arthrospira (Cyanophyceae)3580001cells/mLTotal cyanobacterial count3580001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)1690001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)3901cells/mL24-JUL-19R472Phormidium (Cyanophyceae)88101cells/mL24-JUL-19R472Unidentified blue-green1290001cells/mL24-JUL-19R472Unidentified blue-green446001cells/mL24-JUL-19R472Unidentified cispersed coccoid shaped1290001cells/mL24-JUL-19R472Vindentified: dispersed coccoid shaped8101cells/mL24-JUL-19								R4724019
Schroederia (Chlorophyceae)Moderate amount1.024-JUL-19R472UnidentifiedLarge amount1.024-JUL-19R472OtherModerate amount1.01.024-JUL-19R472Note: Unidentified cispersed coccoid shapedModerate amount1.024-JUL-19R472SchroederiaGomphosphaeria1.01cells/mL24-JUL-19R472Other:moderate amount of Cyanophicyoan3580001cells/mL24-JUL-19R472Cyanophyceae), small amount of Arthrospira3580001cells/mL24-JUL-19R472Cyanophyceae)20001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)20001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)1001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)1690001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)7201cells/mL24-JUL-19R472Planktolyngbya (Cyanophyceae)3901cells/mL24-JUL-19R472Phormidium (Cyanophyceae)89101cells/mL24-JUL-19R472Unidentified blue-green1290001cells/mL24-JUL-19R472Other blue-green1290001cells/mL24-JUL-19R472Note: Unidentified cispersed coccid shaped89101cells/mL24-JUL-19R472Unidentified blue-green1290001 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R4724019</td></td<>								R4724019
Unidentified OtherLarge amount1.024-JUL-19R472Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: moderate amount of Cyanodictyon (Cyanophyceae), small amount of Arthrospira (Cyanophyceae), small amount of Arthrospira (Cyanophyceae)3580001cells/mL24-JUL-19R472Funderation of blue green algae cells Total cyanobacterial cell count3580001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)1690001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)22001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)7201cells/mL24-JUL-19R472Planktolyngbya (Cyanophyceae)9901cells/mL24-JUL-19R472Pseudanabaena (Cyanophyceae)89101cells/mL24-JUL-19R472Unidentified blue-green1290001cells/mL24-JUL-19R472Note: Unidentified cyanobacteria. Other Unidentified cyanobacteria. Other Cyanodicyon (Cyanophyceae).446001cells/mL24-JUL-19IL2307649-14SS DIIcells/mL24-JUL-19R472 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>R4724019</td>								R4724019
OtherModerate amount1.024-JUL-19R472Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: moderate amount of Cyanophyceae), Enumeration of blue green algae cells Total cyanobacterial cell count3580001cells/mL24-JUL-19R472Aphanocapsa (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)20001cells/mL24-JUL-19R472Gomphosphaeria (Cyanophyceae)1001cells/mL24-JUL-19R472Merismopedia (Cyanophyceae)1001cells/mL24-JUL-19R472Microcystis (Cyanophyceae)1001cells/mL24-JUL-19R472Phormidium (Cyanophyceae)7201cells/mL24-JUL-19R472Phormidium (Cyanophyceae)9901cells/mL24-JUL-19R472Phormidium (Cyanophyceae)89101cells/mL24-JUL-19R472Piseudanabaena (Cyanophyceae)89101cells/mL24-JUL-19R472Unidentified blue-green1290001cells/mL24-JUL-19R472Other blue-green446001cells/mL24-JUL-19R472Note: Unidentified cyanobacteria. Other Supersed coccoid shaped single cells of an unidentified cyanobacteria. Other: Cyanodictyon (Cyanophyceae).446001cells/mL24-JUL-19L2307649-14SS D </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>R4724019 R4724019</td>								R4724019 R4724019
Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: moderate amount of Cyanobacteria. Other: moderate amount of Arthrospira 		-						R4724019 R4724019
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Pseudanabaena (Cyanophyceae)89101cells/mL24-JUL-19R472Unidentified blue-green1290001cells/mL24-JUL-19R472Other blue-green446001cells/mL24-JUL-19R472Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: Cyanodictyon (Cyanophyceae).446001cells/mL24-JUL-19R472L2307649-14SS DIIIIIIIIIIImage: Colored				-				R4724029
Unidentified blue-green1290001cells/mL24-JUL-19R472Other blue-green446001cells/mL24-JUL-19R472Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: Cyanodictyon (Cyanophyceae).R472R472L2307649-14SS DImage: SDImage: SDImage: SDImage: SDImage: SD				-				R4724029
Other blue-green446001cells/mL24-JUL-19R472Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria. Other: Cyanodictyon (Cyanophyceae).1cells/mL24-JUL-19R472L2307649-14SS DIIIIIIIII				-				R4724029
Note: Unidentified: dispersed coccoid shaped Image: Constraint of the system Image: Constraint of the sys	-			-				R4724029
L2307649-14 SS D	Note: Unidentified: dispersed coccoid shaped single cells of an unidentified cyanobacteria.	44600		1	cells/mL		24-JUL-19	R4724029
	L2307649-14 SS D							
Sampled By: TM on 10-JUL-19 @ 12:55	Sampled By: TM on 10-JUL-19 @ 12:55							
Matrix: WATER Nitrate + Nitrite								

L2307649 CONTD.... PAGE 8 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307649-14 SS D							
Sampled By: TM on 10-JUL-19 @ 12:55							
Matrix: WATER							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		11-JUL-19	R4709040
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-JUL-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		11-JUL-19	R4709040
Chlorophyll a	0.010		0.010				
Chlorophyll a by fluorometry							
Chlorophyll a	93.1		1.5	ug/L	11-JUL-19	11-JUL-19	R4720596
Miscellaneous Parameters							
Ammonia, Total (as N)	0.028		0.010	mg/L		15-JUL-19	R4712722
Fecal Coliforms	131			MPN/100mL		10-JUL-19	R4707712
Phosphorus (P)-Total	0.113		0.0030	mg/L		15-JUL-19	R4711474
Total Suspended Solids Turbidity	34.3 12.8		2.0 0.10	mg/L NTU		17-JUL-19 11-JUL-19	R4714220 R4708479

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Descrip	tion		
CLH	dissipat	es rapidly int	o headspace.	e tests is 15 minutes; field testing is recommended. Chlorine
MS-B	Matrix S	pike recover	ry could not be accurately calculated due to his	gh analyte background in sample.
est Method I	Reference	es:		
ALS Test Code	•	Matrix	Test Description	Method Reference**
ALGAE-CYANG WP	D-BACT-	Water	Enumeration of blue green algae cells	APHA 10200 C & F
			on/settling and examined using a compound p us and the cells are enumerated. The total cy	hase contrast inverted microscope. Cyanobacteria (also known as anobacteria count is also reported.
ALGAE-ID-WP		Water	Algae Identification	Microscopic Examination
Standard Meth	ods 10200,	, 2005		
	are then e	xamined usi	ng a compound phase contrast inverted micro	es of fresh water. Samples are prepared using a sedimentation oscope. This test is a general screen of dominant types of algae.
BOD-WP		Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B
				days. Dissolved oxygen is measured initially and after incubation,
CHL/A-ACET-F		Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
This analysis is			s modified from EPA method 445.0. Chloroph acidification procedure. This method is not su	yll a is determined by a 90 % acetone extraction followed with bject to interferences from chlorophyll b.
CL2-TOTAL-W	Р	Water	Chlorine, Total	APHA 4500-CI Chlorine(Residual) G (mod)
				. The recommended hold time for these tests is 15 minutes; field unic matter, if present, and dissipates rapidly into headspace.
EC-SCREEN-V	VP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative ana	lysis of cor	nductivity wh	ere required during preparation of other test e	g. IC, TDS, TSS, etc
-C-QT97-WP		Water	Fecal Coliform by MPN QT97	APHA 9223B QT97
mixture of hydr	olyzable su	ubstrates and	d then sealed in a 97-well packet. The packet	nzyme Substrate Coliform Test". The sample is mixed with a is incubated at $44.5 - 0.2^{\circ}$ C for 18 hours and then the number of paring the number of positive responses to a probability table.
NH3-COL-WP		Water	Ammonia by colour	APHA 4500 NH3 F
Ammonia in wa hitroprusside a				nenol. The intensity is amplified by the addition of sodium
NO2+NO3-CAL	-C-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP		Water	Nitrite in Water by IC	EPA 300.1 (mod)
norganic anior	ns are analy	yzed by Ion (Chromatography with conductivity and/or UV c	detection.
103-IC-N-WP		Water	Nitrate in Water by IC	EPA 300.1 (mod)
norganic anior	ns are analy	yzed by Ion (Chromatography with conductivity and/or UV c	detection.
D2-DIS-WP		Water	Dissolved Oxygen	APHA 4500-O-C
Manganous su manganic hydr	oxide is for ount equiv	ets with potas med. Additic ralent to the	ssium or sodium hydroxide to give a white prea on of sulfuric acid dissolves the manganic hydr original DO content. The iodide is then titrated	cipitate of manganous hydroxide. In the presence of oxygen, brown roxide, yielding manganic sulfate which reacts with iodide, releasing d with a standard solution of thiosulphate. Results for
P-T-COL-WP		Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L

This analysis is carried out using procedures adapted from APHA METHOD 4500-P "Phosphorus". Total Phosphorus is determined colourmetrically after persulphate digestion of the sample.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**	
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)	
Total suspended solids in	aquesous n	natrices is determined gravimetrically a	ter drying the residue at 103 105°C.	
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)	
Turbidity in aqueous mate	rices is deter	mined by the nephelometric method.		

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



		Workorder:	L230764	9	Report Date: 24-	JUL-19	Pa	ge 1 of 5
Client:	RM of East St. Paul 3021 Birdshill Road East St. Paul MB R2E	1A7						
Contact:	Leanne Shewchuk							
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-WP	Water							
WG3101856-1	R4714331 2 LCS Dxygen Demand		102.2		%		85-115	11-JUL-19
WG3101856-1 Biochemical (1 MB Dxygen Demand		<2.0		mg/L		2	11-JUL-19
CHL/A-ACET-FL	UORO-WP Water							
Batch F	R4720596							
WG3111940-3 Chlorophyll a		L2307649-1 2.71	3.67		ug/L	30	35	11-JUL-19
WG3111940-2 Chlorophyll a			106.4		%		80-120	22-JUL-19
WG3111940-1 Chlorophyll a			<0.10		ug/L		0.1	11-JUL-19
CL2-TOTAL-WP	Water							
Batch F WG3103154-3 Chlorine, Tota		L2307649-4 0.020	0.020		mg/L	0.0	15	11-JUL-19
WG3103154-2 Chlorine, Tota			105.0		%		75-125	11-JUL-19
WG3103154-1 Chlorine, Tota			<0.010		mg/L		0.01	11-JUL-19
FC-QT97-WP	Water							
Batch F	R4707712							
WG3101488-2 Fecal Coliforn	ns	L2307649-12 1050	866		MPN/100mL	19	65	10-JUL-19
WG3101488-1 Fecal Coliforn			<1		MPN/100mL		1	10-JUL-19
NH3-COL-WP	Water							
	R4712722							
WG3106545-2 Ammonia, To	tal (as N)		100.2		%		85-115	15-JUL-19
WG3106545-1 Ammonia, To			<0.010		mg/L		0.01	15-JUL-19
NO2-IC-N-WP	Water							
Batch F WG3102280-2 Nitrite (as N)	R4709040 2 LCS		100.8		%		90-110	11-JUL-19
WG3102280-6	LCS							



	Matrix	Workorder: L2307649			Report Date: 24-JUL-19		Page 2 of 5	
Test								
		Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-N-WP	Water							
Batch R4709040								
WG3102280-6 LCS Nitrite (as N)			99.8		%		90-110	11-JUL-19
WG3102280-1 MB Nitrite (as N)			<0.010		mg/L		0.01	11-JUL-19
WG3102280-5 MB Nitrite (as N)			<0.010		mg/L		0.01	11-JUL-19
NO3-IC-N-WP	Water							
Batch R4709040								
WG3102280-2 LCS Nitrate (as N)			99.8		%		90-110	11-JUL-19
WG3102280-6 LCS Nitrate (as N)			99.5		%		90-110	11-JUL-19
WG3102280-1 MB Nitrate (as N)			<0.020		mg/L		0.02	11-JUL-19
WG3102280-5 MB Nitrate (as N)			<0.020		mg/L		0.02	11-JUL-19
D2-DIS-WP	Water							
Batch R4714825								
WG3107252-2 LCS Oxygen, Dissolved			98.9		%		85-115	11-JUL-19
WG3107252-1 MB Oxygen, Dissolved			<0.10		mg/L		0.1	11-JUL-19
P-T-COL-WP	Water							
Batch R4711474								
WG3103799-10 LCS Phosphorus (P)-Total			96.6		%		80-120	15-JUL-19
WG3103799-14 LCS							00 120	
Phosphorus (P)-Total			97.6		%		80-120	15-JUL-19
WG3103799-13 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	15-JUL-19
WG3103799-9 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	15-JUL-19
SOLIDS-TOTSUS-WP	Water							
Batch R4710308								
WG3101355-6 LCS								
Total Suspended Solids			95.8		%		85-115	11-JUL-19
WG3101355-5 MB								



		Workorder:	L230764	9	Report Date: 2	4-JUL-19	Pa	ige 3 of 5
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TOTSUS-WP	Water							
Batch R4710308 WG3101355-5 MB Total Suspended Solids			<2.0		mg/L		2	11-JUL-19
Batch R4714220 WG3106450-2 LCS Total Suspended Solids			86.4		%		85-115	17-JUL-19
WG3106450-1 MB Total Suspended Solids			<2.0		mg/L		2	17-JUL-19
TURBIDITY-WP	Water							
Batch R4708479 WG3103133-2 LCS Turbidity			103.0		%		85-115	11-JUL-19
WG3103133-1 MB Turbidity			<0.10		NTU		0.1	11-JUL-19

Workorder: L2307649

Report Date: 24-JUL-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

Certified Reference Material Continuing Calibration Verification CRM CCV

CVS Calibration Verification Standard LCSD Laboratory Control Sample Duplicate

Workorder: L2307649

Report Date: 24-JUL-19

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Dissolved Oxygen							
	4	10-JUL-19 10:00	11-JUL-19 15:24	8.0	30	hours	EHTL
Inorganic Parameters							
Chlorine, Total							
	4	10-JUL-19 10:00	11-JUL-19 10:00	0.25	24	hours	EHTR-FM
Taxonomy							
Algae Identification							
-	11	10-JUL-19 12:20	24-JUL-19 12:00	7	14	days	EHT
	13	10-JUL-19 12:40	24-JUL-19 12:00	7	14	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2307649 were received on 10-JUL-19 15:55.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical



Canada Toll Free: 1 800 668 9878



COC	Number:	17
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Page of Z

Report To	Contact and company name	e below will app	ear on the final report			Report Form			- -					ów - (Contac	ct you	r AM t	o con	firm all	E&P 1	TATs (s	surcha	arges	may app	ly)
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	P2 L				· · · · · · · · · · · · · · · · · · ·	10-Jul-19	9 :35	Water	3	R	R		R	R		R	R								
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	P4 L					10-Jui-19	10:00	Water	5	R	R	R	R	R	R	R	R								Ī
	P6 L					· 10-Jul-19	10:21	Water	3	R	R		R	R		R	R]		
	SLU					10-Jul-19	10:35	Water	3	R	R		R	R		R	R								Τ
	SL L		·			10-Jul-19	. 10:50	Water	3	R	R		R	R		R	R								Τ
	CS U					10-Jul-19	11:05	Water	3	R	R		R	R		R	R								Т
	CSL				· ., · .	10-Jul-19	11:20	Water	3	R	R		R	R		R	R						T		+-
	BTP 1					10-Ju⊢19	1:25	Water	3	R	R		R	R		Ŕ	R								
	SS A		•••••••		- /····	10-Jul-19	12:20	Water	5	R	R		R	R		R	R	R	R						+
	SS B					10-Jul-19	12:10	Water	5	R	R		R	R	_	R	R	R	R			-			1-
Drinking	Water (DW) Samples ¹ (clien	t uso)	Special Instruction	s / Spe		add on report by clic	cking on the drop	-down list below			_		SAN	IPLE	CON	DITIO	NAS	REC	EiVED	(lab i	ise on	ily)			
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	human consumption/ use?								1			COOLE	R TEM	PERAT	URES	°C		Į	FI	NAL CO	DOLER	TEMPI	ERATU	RES C	
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COC Number: 17 -

Page	2	of	2
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Chain of Custody (COC) / Analytical____

Canada Toll Free: 1 800 668 9878

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Request Form



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Report To	Contact and company name below will appe	ar on the final report		Report F							- <u>4</u>			•							-	nay apply	<u>}</u>
Company:	RM of East St. Paul		Select Report F			· • · · · · · · · · · · · · · · · · · ·			guiar	[K]]	න් Sta	ndard	TAT if r	eceive	by 3 p	m - bu	isiness d	lays - n	o surcha	irges ap	ply		
Contact:	Leanne Shewchuk		Quality Control	(QC) Report with R	teport 🗋 YES		2	4 dag	/ [P4-	20%]			ENCY	1 Βι	sines	is day	/ [E - 1	100%]					
Phone:	204-668-8112 × 4503		Compare Result	s to Criteria on Report -	provide details belo	w if box checked	RIOR			25%]			VIERO	Sam	e Day	, Wee	kend	or Sta	tutory	/ holid	lay [E	2 -200%	
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Street: -	3021 Birdshill Road		Email 1 or Fax	leanne.shewchuk(@eaststpaul.com	1		Date an	d Time	Requir	ed for	all E&	PTAT	5:				dd-n	nmm-y	y hh:n	៣		
City/Province:	East St. Paul, MB		Email 2	operations@easts	stpaul.com		For tes	sts that o	tan not i	be perto	rmed a	coordin	ig to the				, you wil	lì be cor	tacted.				
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ALS Lab Wor	k Order # (lab use only):		ALS Contact:	Connor Cattani	Sampler:	тм	NUMBEI	SOLIDS-TOTSUS	TURBIDITY-WP	ЧЪ	-WP	NH3-COL-WP	CL2-TOTAL-WP (Monochloramine)	ANIONS-N2N3-(C-N-WF	CHL-FLUORO-WP		•					AMPI	SUSPECTED HAZARD (see Special Instructions)
ALS Sample #	Sample Identification	and/or Coordinates		Date	Time	1	Įξ	DS:	DI B	02-DIS-WP	P-T-COL-WP	_Q	101	SNS.	늰		FECALS					A	E E
(lab use only)	(This description will a			(dd-mmm-yy)	(bb:mm)	Sample Type	Ĩź	õ	۳Ľ	8	-1-0	ET 2	312	Ň	물	800	臣					Ś	SUS
	SS C			10-Jul-19	12:40	Water	4	R	R	-	R	R	<u> </u>	R	R		R		- 1				<u>†</u>
	SS D			10-Jul-19	12:55	Water	.4	R	R		R	R	 	R	R		R						
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Drinking	Water (DW) Samples ¹ (client use)	Special Instructions / Sp		add on report by cis stronic COC only)	uking on the drop	-down ast below	Froz	en			orun				vation		Yes	<u> </u>			No	 	
Are samples tak	en from a Regulated DW System?									Ice C	ubes	П					Yes	Ē			No		
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Are samples for	human consumption/ use?						—	4	a selfer reasons	COOLE	R TEM	IPERA	TURES	°C			F	INAL C	OOLER	ТЕМРЕ	RATU	RES °C	
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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received: 24-JUL-19 Report Date: 07-AUG-19 15:24 (MT) Version: FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2316302 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Hua Wo Chemistry Laboratory Manager

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L2316302 CONTD.... PAGE 2 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-1 SS A							
Sampled By: TM on 24-JUL-19 @ 09:30							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a			0.010			10 001 10	
Chlorophyll a by fluorometry							
Chlorophyll a	78.8		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.028		0.010	mg/L		25-JUL-19	R4727748
Biochemical Oxygen Demand	11.1		2.0	mg/L		25-JUL-19	R4731628
Fecal Coliforms	45		1	MPN/100mL		24-JUL-19	R4724888
Phosphorus (P)-Total	0.211		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	26.0		2.0	mg/L		31-JUL-19	R4734288
Turbidity	20.0		0.10	NTU		25-JUL-19	R4727347
L2316302-2 SS B							
Sampled By: TM on 24-JUL-19 @ 09:17							
Matrix: WATER Nitrate + Nitrite							
Nitrate + Nitrite Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC			0.010				D 4700550
Nitrite (as N) Chlorophyll a	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a by fluorometry							
Chlorophyll a	27.9		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.019		0.010	mg/L		25-JUL-19	R4727748
Fecal Coliforms	<1		1	MPN/100mL		24-JUL-19	R4724888
Phosphorus (P)-Total	0.0839		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	13.1		2.0	mg/L		31-JUL-19	R4734288
Turbidity	6.76		0.10	NTU		25-JUL-19	R4727347
L2316302-3 SS C							
Sampled By: TM on 24-JUL-19 @ 09:45							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite	-0.020		0.020				
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	66.7		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters	00.7		0.10	ug/L	20-001-13	20-001-13	117172123
Ammonia, Total (as N)	0.023		0.010	mg/L		25-JUL-19	R4727748

L2316302 CONTD.... PAGE 3 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-3 SS C							
Sampled By: TM on 24-JUL-19 @ 09:45							
Matrix: WATER							
Biochemical Oxygen Demand	6.0		2.0	mg/L		25-JUL-19	R4731628
Fecal Coliforms	7		2.0	MPN/100mL		23-JUL-19	R4724888
Phosphorus (P)-Total	0.220		0.0030	mg/L		31-JUL-19	R4724000 R4731768
Total Suspended Solids	28.4		2.0	mg/L		31-JUL-19	R4734288
Turbidity	25.4		2.0 0.10	NTU		25-JUL-19	R4734200 R4727347
	25.4		0.10	NIO		23-301-19	R4727347
L2316302-4 SS D							
Sampled By: TM on 24-JUL-19 @ 10:00							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite	\$0.020		0.020				117100000
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	36.8		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.029		0.010	mg/L		25-JUL-19	R4727748
Fecal Coliforms	3		1	MPN/100mL		24-JUL-19	R4724888
Phosphorus (P)-Total	0.133		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	54.4		2.0	mg/L		31-JUL-19	R4734288
Turbidity	15.4		0.10	NTU		25-JUL-19	R4727347
L2316302-5 CS U							
Sampled By: TM on 24-JUL-19 @ 10:57							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	<0.020		0.020	ma/l		25-JUL-19	D 4720559
Nitrate (as N) Nitrate+Nitrite	<0.020		0.020	mg/L		20-JUL-19	R4730558
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC			5.070				
Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a				-			
Chlorophyll a by fluorometry							
Chlorophyll a	5.99		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters			_	<i></i>			
Ammonia, Total (as N)	0.026		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.151		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	5.3		2.0	mg/L		31-JUL-19	R4734288
Turbidity	2.21		0.10	NTU		25-JUL-19	R4727347
L2316302-6 CS L							
Sampled By: TM on 24-JUL-19 @ 11:10							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC				i.			
Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite	-0.070		0.070	ma/l		20 11 1 10	
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	

L2316302 CONTD.... PAGE 4 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-6 CS L							
Sampled By: TM on 24-JUL-19 @ 11:10							
Matrix: WATER							
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	46.6		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters	10.0		0.10	~g/ =			
Ammonia, Total (as N)	0.037		0.010	mg/L		25-JUL-19	R4727748
Oxygen, Dissolved	10.2		0.10	mg/L		24-JUL-19	R4728608
Phosphorus (P)-Total	0.166		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	49.3		3.3	mg/L		31-JUL-19	R4734288
Turbidity	28.9		0.10	NTU		25-JUL-19	R4727347
L2316302-7 BTP 1							
Sampled By: TM on 24-JUL-19 @ 10:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite	0.070		0.070			20 11 10	
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		30-JUL-19	
Nitrite (as N)	<0.020	DLM	0.020	mg/L		25-JUL-19	R4730558
Chlorophyll a	101020		0.020				
Chlorophyll a by fluorometry							
Chlorophyll a	3.17		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.027		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.0293		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	<2.0		2.0	mg/L		31-JUL-19	R4734288
Turbidity	1.13		0.10	NTU		25-JUL-19	R4727347
L2316302-8 S U							
Sampled By: TM on 24-JUL-19 @ 11:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite	<u>\0.020</u>		0.020	ing/L		20 000-19	117130330
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC				-			
Nitrite (as N)	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	02.0		0.00	u~/!	25-JUL-19	25 11 40	D 47 40700
Miscellaneous Parameters	93.0		0.20	ug/L	20-JUL-19	25-JUL-19	R4742723
Ammonia, Total (as N)	0.072		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.554		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	42.7		2.0	mg/L		31-JUL-19	R4734288
Turbidity	5.24		0.10	NTU		25-JUL-19	R4727347
L2316302-9 S L			5.10				
Sampled By: TM on 24-JUL-19 @ 11:40							
Matrix: WATER							
Nitrate + Nitrite							

L2316302 CONTD.... PAGE 5 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-9 S L							
Sampled By: TM on 24-JUL-19 @ 11:40							
Matrix: WATER							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		30-JUL-19	
Nitrite in Water by IC	0.040		0.040			05 11 10	D (700550
Nitrite (as N) Chlorophyll a	<0.010		0.010	mg/L		25-JUL-19	R4730558
Chlorophyll a by fluorometry							
Chlorophyll a	17.2		0.10	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.020		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.0577		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	21.7		2.0	mg/L		31-JUL-19	R4734288
Turbidity	7.49		0.10	NTU		25-JUL-19	R4727347
L2316302-10 P1 U							
Sampled By: TM on 24-JUL-19 @ 12:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite Nitrate and Nitrite as N	<0.11		0.11	mg/L		30-JUL-19	
Nitrite in Water by IC	<0.11		0.11	ing/L		30-301-13	
Nitrite (as N)	<0.050	DLM	0.050	mg/L		25-JUL-19	R4730558
Chlorophyll a				-			
Chlorophyll a by fluorometry							
Chlorophyll a	62.4		0.20	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.071		0.010	mg/L		25-JUL-19	R4727748
Oxygen, Dissolved	3.30		0.10	mg/L		24-JUL-19	R4728608
Phosphorus (P)-Total	0.189		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	82.7		2.0	mg/L		31-JUL-19	R4734288
Turbidity	22.4		0.10	NTU		25-JUL-19	R4727347
L2316302-11 P2 L							
Sampled By: TM on 24-JUL-19 @ 12:50							
Matrix: WATER Nitrate + Nitrite							
Nitrate + Nitrite Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite				5-			
Nitrate and Nitrite as N	<0.11		0.11	mg/L		30-JUL-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLM	0.050	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	55.9		0.20	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters	50.3		0.20	ug/L	20000-13	20 000-13	117172123
Ammonia, Total (as N)	0.126		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.197		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	11.9		2.0	mg/L		31-JUL-19	R4734288
Turbidity	4.31		0.10	NTU		25-JUL-19	R4727347
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L2316302 CONTD.... PAGE 6 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-11 P2 L							
Sampled By: TM on 24-JUL-19 @ 12:50							
Matrix: WATER							
L2316302-12 P3 L							
Sampled By: TM on 24-JUL-19 @ 12:25							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite Nitrate and Nitrite as N	.0.44		0.44			20 11 10	
Nitrite in Water by IC	<0.11		0.11	mg/L		30-JUL-19	
Nitrite (as N)	<0.050	DLM	0.050	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	69.1		0.20	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters							
Ammonia, Total (as N)	0.112		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.807		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	55.7		2.0	mg/L		31-JUL-19	R4734288
Turbidity	19.6		0.10	NTU		25-JUL-19	R4727347
L2316302-13 P4 L							
Sampled By: TM on 24-JUL-19 @ 12:15							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		25-JUL-19	R4730558
Nitrate+Nitrite Nitrate and Nitrite as N	<0.11		0.11	mg/L		30-JUL-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		25-JUL-19	R4730558
Chlorophyll a				5			
Chlorophyll a by fluorometry Chlorophyll a	30.9		0.20	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters					_	-	
Ammonia, Total (as N)	0.089		0.010	mg/L		25-JUL-19	R4727748
Phosphorus (P)-Total	0.190		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	8.3		2.0	mg/L		31-JUL-19	R4734288
Turbidity	2.50		0.10	NTU		25-JUL-19	R4727347
L2316302-14 P6 L							
Sampled By: TM on 24-JUL-19 @ 12:05							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC	<0.10	DLM	0.10	ma/l		25-JUL-19	D4720559
Nitrate (as N)	<0.10		0.10	mg/L		20-JUL-19	R4730558
Nitrate+Nitrite Nitrate and Nitrite as N	<0.11		0.11	mg/L		30-JUL-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		25-JUL-19	R4730558
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	24.2		0.20	ug/L	25-JUL-19	25-JUL-19	R4742723
Miscellaneous Parameters				Ŭ			
				mg/L	1	26-JUL-19	1

L2316302 CONTD.... PAGE 7 of 9 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2316302-14 P6 L							
Sampled By: TM on 24-JUL-19 @ 12:05							
Matrix: WATER							
Phosphorus (P)-Total	0.000		0.0000			21 11 10	D4704700
	0.208		0.0030	mg/L		31-JUL-19	R4731768
Total Suspended Solids	43.2		2.0	mg/L		31-JUL-19	R4734288
Turbidity	19.4		0.10	NTU		25-JUL-19	R4727347

Reference Information

Sample Parameter Qualifier Key:

	Description		
		sted due to sample matrix effects (e.g. chemi	
DUP-H	Duplicate results out	side ALS DQO, due to sample heterogeneity	
est Method Re	ferences:		
ALS Test Code	Matrix	Test Description	Method Reference**
BOD-WP	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B
		hen incubated in airtight bottles at 20°C for 5 erence between initial and final DO.	days. Dissolved oxygen is measured initially and after incubation,
CHL/A-ACET-FLL WP	JORO- Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
		s modified from EPA method 445.0. Chloroph acidification procedure. This method is not su	nyll a is determined by a 90 % acetone extraction followed with ubject to interferences from chlorophyll b.
EC-SCREEN-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analys	sis of conductivity who	ere required during preparation of other test e	eg. IC, TDS, TSS, etc
FC-QT97-WP	Water	Fecal Coliform by MPN QT97	APHA 9223B QT97
mixture of hydroly	zable substrates and	then sealed in a 97-well packet. The packet	Enzyme Substrate Coliform Test". The sample is mixed with a is incubated at 44.5 – 0.2°C for 18 hours and then the number of paring the number of positive responses to a probability table.
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
	r samples forms indo measured colourme	1 21 1	henol. The intensity is amplified by the addition of sodium
NO2+NO3-CALC-	-WP Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions a	are analyzed by Ion (Chromatography with conductivity and/or UV	detection.
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions a	are analyzed by Ion (Chromatography with conductivity and/or UV	detection.
02-DIS-WP	Water	Dissolved Oxygen	APHA 4500-O-C
manganic hydroxi iodide in an amou	ide is formed. Additio	n of sulfuric acid dissolves the manganic hyc original DO content. The iodide is then titrate	ecipitate of manganous hydroxide. In the presence of oxygen, brown Iroxide, yielding manganic sulfate which reacts with iodide, releasing d with a standard solution of thiosulphate. Results for
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
	arried out using proce digestion of the sam		P "Phosphorus". Total Phosphorus is determined colourmetrically
SOLIDS-TOTSUS	S-WP Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended	solids in aquesous m	atrices is determined gravimetrically after dry	ving the residue at 103 105°C.
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
Turbidity in aqueo	ous matrices is deterr	nined by the nephelometric method.	
ALS test method	ls may incorporate m	odifications from specified reference method	s to improve performance.

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
Chain of Custody Numbers:	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



		Workorder:	L231630	2	Report Date: 07-	-AUG-19	Pa	ige 1 of 3
30	M of East St. Paul 021 Birdshill Road ast St. Paul MB R2E 1	1A7						
Contact: Le	eanne Shewchuk							
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-WP	Water							
Batch R47	31628							
WG3114845-12 Biochemical Oxy			103.0		%		85-115	25-JUL-19
WG3114845-11 Biochemical Oxy			<2.0		mg/L		2	25-JUL-19
CHL/A-ACET-FLUO	RO-WP Water							
Batch R47	42723							
WG3124934-2 Chlorophyll a	LCS		107.5		%		80-120	06-AUG-19
	МВ							
Chlorophyll a			<0.10		ug/L		0.1	25-JUL-19
FC-QT97-WP	Water							
Batch R47	24888							
WG3114541-2 Fecal Coliforms	DUP	L2316302-1 45	30		MPN/100mL	41	65	24-JUL-19
WG3114541-1 Fecal Coliforms	MB		<1		MPN/100mL		1	24-JUL-19
NH3-COL-WP	Water							
Batch R47	27748							
WG3116506-10 Ammonia, Total (101.4		%		85-115	25-JUL-19
WG3116506-9 Ammonia, Total (MB (as N)		<0.010		mg/L		0.01	25-JUL-19
	29344				C C			
WG3118122-2								
Ammonia, Total			104.0		%		85-115	26-JUL-19
WG3118122-1 Ammonia, Total (MB (as N)		<0.010		mg/L		0.01	26-JUL-19
NO2-IC-N-WP	Water				-			
Batch R47	30558							
WG3115270-10 Nitrite (as N)	103		98.3		%		90-110	25-JUL-19
WG3115270-9 Nitrite (as N)	MB		<0.010		mg/L		0.01	25-JUL-19
NO3-IC-N-WP	Water							



		Workorder:	L2316302	2	Report Date: 07-	AUG-19	Pa	ge 2 of 3
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water							
Batch R4730558 WG3115270-10 LCS Nitrate (as N) Nitrate			96.7		%		90-110	25-JUL-19
WG3115270-9 MB Nitrate (as N)			<0.020		mg/L		0.02	25-JUL-19
O2-DIS-WP	Water							
Batch R4728608 WG3117330-2 LCS Oxygen, Dissolved			94.7		%		85-115	24-JUL-19
WG3117330-1 MB Oxygen, Dissolved			<0.10		mg/L		0.1	24-JUL-19
P-T-COL-WP	Water							
Batch R4731768 WG3119582-2 LCS Phosphorus (P)-Total			102.5		%		80-120	31-JUL-19
WG3119582-1 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	31-JUL-19
SOLIDS-TOTSUS-WP	Water							
Batch R4734288 WG3119451-2 LCS Total Suspended Solids			94.4		%		85-115	31-JUL-19
WG3119451-1 MB Total Suspended Solids			<2.0		mg/L		2	31-JUL-19
TURBIDITY-WP	Water							
Batch R4727347 WG3116063-5 LCS Turbidity			99.98		%		85-115	25-JUL-19
WG3116063-4 MB Turbidity			<0.10		NTU		0.1	25-JUL-19

Workorder: L2316302

Report Date: 07-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

(ALS)	www.alsglobat.com



COC	Number:	1	7
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Page of 2

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City/Province:	R2E 1A7	·····	Email 2 Email 3	operations@easts	wau.com		For this	icii thirt	can not	be part	ormed a	econd(h	d to the			Reat	you wit	150 501	Asched.				
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY DOPY VEI.LOW - CLIENT COPY Feiture to complete ell portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1, If any water samples are taken from a Regulated Drinking Water (DW). System, please submit using an Authorized DW COC form.



Chain of Custody (COC) / Analytical **Request Form**

Canada Toll Free: 1 800 668 9878



COC Number: 17 -

Page 2 of 2

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ALS Lab Wor	k Order # (lab use only):				ALS Contact:	Connor Cattani	Sampler:	тм	Ĭ	0TSI	۲-WF	۰ ۵	٩٨	d M	CL2-TOTAL-WP	ANIONS-N2N3-IC-N-WF	CHL-FLUORO-WP							Ę	SUSPECTED HAZARD (see Special Instructions)
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ALS Sample # (lab use only)			and/or Coore			Date	Time	Sample Type	NUMB	SOLIDS	TURBIDITY	O2-DIS-WP	P-T-COL-WP	NH3-COL-WF	7	ĝ	Ļ.	BOD	FECALS		.			รั	IdS
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	P4 L					24-Jul-19	12:15	Water	3	R	R		R	R		R	R								·
	P6 L				<u>.</u>	24-Jul-19	12:05	Water	3	R	R		R	R		R	R								
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B.4.11			Special Instru	ictions / S	Specify Criteria to	add on report by clic	king on the drop	-down list below					SAN	IPLE	CON	оптю	N AS	RECE	IVED	(lab u	se on	iy)			-
_	Water (DW) Samples ¹ (client					ctronic COC only)			Froz	en					SIF C	bserv	ations	5	Yes			ł	٩o		
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Are samples for	human consumption/ use?								F		IITIAL	COOLE	RTEM	PERAT	URES	<u>°C</u>			Fil		OLER	TEMPE	RATURI	ES ℃	
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	SHIPMENT RELEASE	(client use)		and the second se	INITIAL SHIPMEN	7- 1	(lab use only)	· .					F	INAL	SHIP			EPTIC	DN (la	b use	only)			
Released by:	Date:			Time:	Received by:		Date:	ydu	Time	07	Rec	eived	^{by:} (ΈL			Date						Ti	^{ne:} 42	06
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received: 07-AUG-19 Report Date: 21-AUG-19 13:14 (MT) Version: FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2324295 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Hua Wo Chemistry Laboratory Manager

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L2324295 CONTD.... PAGE 2 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-1 SS A							
Sampled By: TM on 07-AUG-19 @ 09:30							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		09-AUG-19	R4750115
Nitrate+Nitrite				5			
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		09-AUG-19	R4750115
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	109		0.20	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.065		0.010	mg/L		12-AUG-19	R4751433
Fecal Coliforms	84		1	MPN/100mL		07-AUG-19	R4744466
Phosphorus (P)-Total	0.218		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	29.2		2.0	mg/L		14-AUG-19	R4754769
Turbidity	30.9		0.10	NTU		08-AUG-19	R4744903
Algae Identification	00.0		0.10				
Scenedesmus (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Cryptomonas (Cryptophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Small Chrysophytes (Chrysophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Euglena (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Phacus (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Aphanizomenon (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Merismopedia (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Microcystis (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Pseudanabaena (Cyanophyceae)	Massive amount		1.0			09-AUG-19	R4746767
Limnothrix (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Planktothrix (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Other	Small amount		1.0			09-AUG-19	R4746767
Note: Other: Rhopalodia (Bacillariophyceae)							
_2324295-2 SS B							
Sampled By: TM on 07-AUG-19 @ 09:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		09-AUG-19	R4750115
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-AUG-19	
Nitrite in Water by IC				-			
Nitrite (as N)	<0.010		0.010	mg/L		09-AUG-19	R4750115
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	31.3		0.50	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.024		0.010	mg/L		12-AUG-19	R4751433
Fecal Coliforms	<1		1	MPN/100mL		07-AUG-19	R4744466
Phosphorus (P)-Total	0.102		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	21.3		2.0	mg/L		14-AUG-19	R4754769
Turbidity	10.8		0.10	NTU		08-AUG-19	R4744903
Algae Identification			50				
Nitzschia (Bacillariophyceae)	Small amount		1.0			09-AUG-19	R4746767
	Small amount		1.0	1		09-AUG-19	R4746767

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-2 SS B							
Sampled By: TM on 07-AUG-19 @ 09:20							
Matrix: WATER							
Algae Identification							
Chlamydomonas (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Cosmarium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Dictyosphaerium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Monoraphidium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Oocystis (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Scenedesmus (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Staurastrum (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Tetraedron (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Cryptomonas (Cryptophyceae)	Small amount		1.0			09-AUG-19	R4746767
Euglena (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Anabaena (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Gomphosphaeria (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Merismopedia (Cyanophyceae)	Massive amount		1.0			09-AUG-19	R4746767
Microcystis (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Pseudanabaena (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Planktolyngbya (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Other	Small amount		1.0			09-AUG-19	R4746767
Note: Other: Rhopalodia (Bacillariophyceae)							
L2324295-3 SS C							
Sampled By: TM on 07-AUG-19 @ 09:52							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		09-AUG-19	R4750115
Nitrate+Nitrite	0.070		0.070			40 4110 40	
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-AUG-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		09-AUG-19	R4750115
Chlorophyll a	<0.010		0.010	mg/∟		09-AUG-19	R4750115
Chlorophyll a by fluorometry							
Chlorophyll a	82.3		0.50	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters	02.0		0.00				
Ammonia, Total (as N)	0.033		0.010	mg/L		12-AUG-19	R4751433
Fecal Coliforms	28		1	MPN/100mL		07-AUG-19	R4744466
Phosphorus (P)-Total	0.258		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	41.9		2.0	mg/L		14-AUG-19	R4754769
Turbidity	36.5		2.0 0.10	NTU		08-AUG-19	R4744903
Algae Identification	00.0		0.10			007.00-19	000
Chlamydomonas (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Closterium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Cosmarium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Monoraphidium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Oocystis (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Scenedesmus (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Tetraedron (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Cryptomonas (Cryptophyceae)	Small amount		1.0			09-AUG-19	R4746767
Euglena (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Aphanizomenon (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Merismopedia (Cyanophyceae)	Massive amount		1.0			09-AUG-19	R4746767
Microcystis (Cyanophyceae)	Massive amount		1.0			09-AUG-19	R4746767
Phormidium (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767

L2324295 CONTD.... PAGE 4 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-3 SS C							
Sampled By: TM on 07-AUG-19 @ 09:52							
Matrix: WATER							
Algae Identification							
Pseudanabaena (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Planktolyngbya (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
L2324295-4 SS D							
Sampled By: TM on 07-AUG-19 @ 10:05							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		09-AUG-19	R4750115
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		13-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		09-AUG-19	R4750115
Chlorophyll a							
Chlorophyll a by fluorometry	F0.4		0.50	//	00 4110 40	00 4110 40	D 4700005
Chlorophyll a Miscellaneous Parameters	50.1		0.50	ug/L	08-AUG-19	08-AUG-19	R4762235
	0.007		0.010			12-AUG-19	R4751433
Ammonia, Total (as N)	0.027		0.010	mg/L			
Oxygen, Dissolved	11.5		0.10	mg/L		08-AUG-19	R4744914
Fecal Coliforms	<1		1	MPN/100mL		07-AUG-19	R4744466
Phosphorus (P)-Total	0.200		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	120		6.0	mg/L		14-AUG-19	R4754769
Turbidity	24.1		0.10	NTU		08-AUG-19	R4744903
Algae Identification						00 4110 40	D /7 /0707
Cosmarium (Chlorophyceae)	Small amount		1.0			09-AUG-19	R4746767
Monoraphidium (Chlorophyceae)	Small amount		1.0			09-AUG-19 09-AUG-19	R4746767
Oocystis (Chlorophyceae) Pediastrum (Chlorophyceae)	Small amount Small amount		1.0 1.0			09-AUG-19 09-AUG-19	R4746767 R4746767
Scenedesmus (Chlorophyceae)	Moderate amount		1.0			09-AUG-19 09-AUG-19	R4746767
Cryptomonas (Cryptophyceae)	Small amount		1.0			09-AUG-19	R4746767
Euglena (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Phacus (Euglenophyceae)	Small amount		1.0			09-AUG-19	R4746767
Aphanizomenon (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Chroococcus (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Gomphosphaeria (Cyanophyceae)	Large amount		1.0			09-AUG-19	R4746767
Merismopedia (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Microcystis (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Pseudanabaena (Cyanophyceae)	Small amount		1.0			09-AUG-19	R4746767
Gymnodinium (Dinophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Planktolyngbya (Cyanophyceae)	Moderate amount		1.0			09-AUG-19	R4746767
Other	Small amount		1.0			09-AUG-19	R4746767
Note: Other: Eucapsis (Cyanophyceae)							
L2324295-5 CS U							
Sampled By: TM on 07-AUG-19 @ 12:37							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.040	DLM	0.040	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		14-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		09-AUG-19	R4752545

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-5 CS U							
Sampled By: TM on 07-AUG-19 @ 12:37							
Matrix: WATER							
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	5.60		0.10	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.028		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.191		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	3.7		2.0	mg/L		14-AUG-19	R4754769
Turbidity	2.37		0.10	NTU		08-AUG-19	R4744903
L2324295-6 CS L							
Sampled By: TM on 07-AUG-19 @ 12:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.040	DLM	0.040	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite	<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	2	0.040			30 / 00-19	1171 02040
Nitrate and Nitrite as N	<0.070		0.070	mg/L		14-AUG-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		09-AUG-19	R4752545
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	24.8		0.10	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters	24.0		0.10	ug/L	00-A0G-19	08-AUG-19	R4702235
Ammonia, Total (as N)	0.081		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.148		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	19.9		2.0	mg/L		14-AUG-19	R4754769
Turbidity	26.4		0.10	NTU		08-AUG-19	R4744903
L2324295-7 BTP 1							
Sampled By: TM on 07-AUG-19 @ 11:45							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite	0.070		0.070	~~/!			
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		14-AUG-19	
Nitrite in water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		09-AUG-19	R4752545
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	18.9		0.10	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.050		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.0710		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	8.8		2.0	mg/L		14-AUG-19	R4754769
Turbidity	6.11		0.10	NTU		08-AUG-19	R4744903
L2324295-8 S U							
Sampled By: TM on 07-AUG-19 @ 12:05							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	<0.040	DLM	0.040	mg/L		09-AUG-19	R4752545
Nitrate (as N)							

L2324295 CONTD.... PAGE 6 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-8 S U							
Sampled By: TM on 07-AUG-19 @ 12:05							
Matrix: WATER							
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		14-AUG-19	
Nitrite in Water by IC				-			
Nitrite (as N)	<0.020	DLM	0.020	mg/L		09-AUG-19	R4752545
Chlorophyll a							
Chlorophyll a by fluorometry							D /
Chlorophyll a	72.4		0.20	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters	0.004		0.040				D 4754 400
Ammonia, Total (as N)	0.021		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.119		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	20.9		2.0	mg/L		14-AUG-19	R4754769
Turbidity	11.6		0.10	NTU		08-AUG-19	R4744903
L2324295-9 S L							
Sampled By: TM on 07-AUG-19 @ 12:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	<0.020		0.020	ma/l		09-AUG-19	D 4750545
Nitrate (as N) Nitrate+Nitrite	<0.020		0.020	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		14-AUG-19	
Nitrite in Water by IC	\$0.070		0.070				
Nitrite (as N)	<0.010		0.010	mg/L		09-AUG-19	R4752545
Chlorophyll a				0			
Chlorophyll a by fluorometry							
Chlorophyll a	12.1		0.10	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.026		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.0595		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	35.3		2.0	mg/L		14-AUG-19	R4754769
Turbidity	15.4		0.10	NTU		08-AUG-19	R4744903
L2324295-10 P1 U							
Sampled By: TM on 07-AUG-19 @ 10:40							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite	0.44		0.44			14 410 40	
Nitrate and Nitrite as N	<0.11		0.11	mg/L		14-AUG-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		09-AUG-19	R4752545
Chlorophyll a	<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>		0.000	mg/∟		00 400-19	1171 02040
Chlorophyll a by fluorometry							
Chlorophyll a	27.1		0.10	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.068		0.010	mg/L		12-AUG-19	R4751433
Fecal Coliforms	687		1	MPN/100mL		07-AUG-19	R4744466
Phosphorus (P)-Total	0.217		0.0030	mg/L		09-AUG-19	R4745230
Total Supported Calida	17.7		2.0	mg/L		14-AUG-19	R4754769
Total Suspended Solids							

L2324295 CONTD.... PAGE 7 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2324295-11 P2 L							
Sampled By: TM on 07-AUG-19 @ 10:50							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite Nitrate and Nitrite as N	0.44		0.44			44 4110 40	
	<0.11		0.11	mg/L		14-AUG-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		09-AUG-19	R4752545
Chlorophyll a	0.000		0.000	iiig/L		00710010	114102040
Chlorophyll a by fluorometry							
Chlorophyll a	57.2		0.20	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.073		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.581		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	23.2		2.0	mg/L		14-AUG-19	R4754769
Turbidity	4.43		0.10	NTU		08-AUG-19	R4744903
L2324295-12 P3 L							
Sampled By: TM on 07-AUG-19 @ 11:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.11		0.11	mg/L		14-AUG-19	
Nitrite in Water by IC Nitrite (as N)	0.050	DLM	0.050			09-AUG-19	D 4750545
Chlorophyll a	<0.050	DLIVI	0.050	mg/L		09-AUG-19	R4752545
Chlorophyll a by fluorometry							
Chlorophyll a	477		1.0	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters				Ŭ			
Ammonia, Total (as N)	0.060		0.020	mg/L		13-AUG-19	R4753069
Phosphorus (P)-Total	0.635		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	56.0		2.0	mg/L		14-AUG-19	R4754769
Turbidity	15.9		0.10	NTU		08-AUG-19	R4744903
L2324295-13 P4 L							
Sampled By: TM on 07-AUG-19 @ 11:06							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		09-AUG-19	R4752545
Nitrate+Nitrite			<u> </u>				
Nitrate and Nitrite as N	<0.11		0.11	mg/L		14-AUG-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		09-AUG-19	R4752545
Chlorophyll a	<u> </u>		0.000	ing/L		00 700-19	1171 02040
Chlorophyll a by fluorometry							
Chlorophyll a	138		0.20	ug/L	08-AUG-19	08-AUG-19	R4762235
Miscellaneous Parameters							
Ammonia, Total (as N)	0.042		0.010	mg/L		12-AUG-19	R4751433
Phosphorus (P)-Total	0.535		0.0030	mg/L		09-AUG-19	R4745230
Total Suspended Solids	60.0		2.0	mg/L		14-AUG-19	R4754769
Turbidity	25.5		0.10	NTU		08-AUG-19	R4744903

L2324295 CONTD.... PAGE 8 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

L2324295-13 P4 L Sampled By: TM on 07-AUG-19 @ 11:06 Matrix: WATER L2324295-14 P6 L Sampled By: TM on 07-AUG-19 @ 11:35 Matrix: WATER Nitrate + Nitrite Nitrate in Water by IC Nitrate in Water by IC Nitrate and Nitrite as N <0.11 Nitrate in Water by IC 0.11 Nitrate in Water by IC Nitrate and Nitrite as N <0.11 Nitrate and Nitrite as N <0.11 Nitrate in Water by IC Nitrate and Nitrite as N <0.11 Nitrate and Nitrite as N <0.050 DLM 0.050 Miscellaneous Parameters Ammonia, Total (as N) 0.107 Phosphorus (P)-Total 0.312 Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R47527	Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
Sampled By:TM on 07-AUG-19 @ 11:06Image: Constraint of the second								
Matrix:WATERImage: Chlorophyll aWATERImage: Chlorophyll aImage: Chlorophyll aImage: Chlorophyll aP6 LImage: Chlorophyll aImage: Chlorophyll aI								
L2324295-14 P6 L Sampled By: TM on 07-AUG-19 @ 11:35 Matrix: WATER Nitrate + Nitrite Nitrate in Water by IC Nitrate and Nitrite as N Nitrate and Nitrite as N Vitrate in Water by IC Nitrate and Nitrite as N Vitrate and Nitrite as N Vitrate (as N) Nitrate and Nitrite as N Vitrate (as N) Vitrate (as N) Nitrate and Nitrite as N Vitrate (as N) Chlorophyll a Chlorophyll a Miscellaneous Parameters Ammonia, Total (as N) Phosphorus (P)-Total Dispended Solids 210 3.3 mg/L U U U U Nitrite U U U U U U U U U Nitrite (as N) U U U <								
Sampled By: Matrix: WATER Nitrate + Nitrite Nitrate in Water by IC Nitrate and Nitrite as N <0.10 DLM0.10mg/L09-AUG-19R47525Nitrate ANitrite Nitrate (as N)<0.10								
Matrix:WATER Nitrate + NitriteWATERImage: Sector Sect								
Nitrate + NitriteNitrate in Water by ICOP-AUG-19R47525Nitrate + Nitrite<0.10								
Nitrate (as N)<0.10DLM0.10mg/L09-AUG-19R475254Nitrate+Nitrite Nitrate and Nitrite as N<0.11								
Nitrate+Nitrite Nitrate and Nitrite as N<0.11o.11mg/L14-AUG-19Nitrite in Water by IC Nitrite (as N)<0.050		0.40	DIM	0.40			00 0110 40	D 1750515
Nitrate and Nitrite as N<0.11mg/L14-AUG-19Nitrite in Water by IC Nitrite (as N)<0.050		<0.10	DLIM	0.10	mg/∟		09-AUG-19	R4752545
Nitrite in Water by IC Nitrite (as N)<0.050DLM0.050mg/L09-AUG-19R47525-Chlorophyll a Chlorophyll a Chlorophyll a Miscellaneous Parameters51.30.50ug/L08-AUG-19R47622-Miscellaneous Parameters0.1070.010mg/L0.010mg/L12-AUG-19R47614-Phosphorus (P)-Total0.3120.0030mg/L0.0030mg/L14-AUG-19R476474-		<0.11		0.11	ma/L		14-AUG-19	
Chlorophyll a Chlorophyll a by fluorometry Chlorophyll a51.30.50ug/L08-AUG-19R476223Miscellaneous Parameters0.1070.010mg/L12-AUG-19R475143Phosphorus (P)-Total0.3120.0030mg/L09-AUG-19R474523Total Suspended Solids2103.3mg/L14-AUG-19R475474					5			
Chlorophyll a by fluorometry Chlorophyll a51.30.50ug/L08-AUG-1908-AUG-19R47622Miscellaneous Parameters0.1070.010mg/L12-AUG-19R475142Ammonia, Total (as N)0.1070.0030mg/L09-AUG-19R475142Phosphorus (P)-Total0.3120.0030mg/L09-AUG-19R475472Total Suspended Solids2103.3mg/L14-AUG-19R475474		<0.050	DLM	0.050	mg/L		09-AUG-19	R4752545
Chlorophyll a 51.3 0.50 ug/L 08-AUG-19 R476223 Miscellaneous Parameters 0.107 0.010 mg/L 12-AUG-19 R476143 Ammonia, Total (as N) 0.107 0.0030 mg/L 09-AUG-19 R476523 Phosphorus (P)-Total 0.312 0.0030 mg/L 09-AUG-19 R476523 Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R476547								
Miscellaneous Parameters 0.107 0.010 mg/L 12-AUG-19 R475143 Ammonia, Total (as N) 0.312 0.0030 mg/L 09-AUG-19 R475143 Phosphorus (P)-Total 0.312 0.0030 mg/L 09-AUG-19 R475474 Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R475474	Chlorophyll a by fluorometry Chlorophyll a	51 3		0.50	μα/l	08-AUG-19	08-AUG-19	R4762235
Ammonia, Total (as N) 0.107 0.010 mg/L 12-AUG-19 R47514 Phosphorus (P)-Total 0.312 0.0030 mg/L 09-AUG-19 R47652 Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R47547		01.0		0.00	~~g/ L		30,00,10	117102200
Phosphorus (P)-Total 0.312 0.0030 mg/L 09-AUG-19 R47452 Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R47547		0.107		0.010	mg/L		12-AUG-19	R4751433
Total Suspended Solids 210 3.3 mg/L 14-AUG-19 R475470	Phosphorus (P)-Total							R4745230
Turbidity 107 0.10 NTU 08-AUG-19 R47449		210		3.3				R4754769
	Turbidity	107		0.10	NTU		08-AUG-19	R4744903

Reference Information

Qualifier	Descrip			
DLM	Detectio	n Limit Adju	sted due to sample matrix effects (e.g. chen	nical interference, colour, turbidity).
MS-B	Matrix S	pike recover	y could not be accurately calculated due to	high analyte background in sample.
est Method	Reference	s:		
ALS Test Cod	e	Matrix	Test Description	Method Reference**
ALGAE-ID-WF	0	Water	Algae Identification	Microscopic Examination
Standard Meth	nods 10200,	2005		
	d are then ex	amined usi	ng a compound phase contrast inverted mic	ples of fresh water. Samples are prepared using a sedimentation croscope. This test is a general screen of dominant types of algae.
CHL/A-ACET-I WP	FLUORO-	Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
			s modified from EPA method 445.0. Chlorop acidification procedure. This method is not s	ohyll a is determined by a 90 % acetone extraction followed with subject to interferences from chlorophyll b.
EC-SCREEN-	WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative and	alysis of con	ductivity wh	ere required during preparation of other test	eg. IC, TDS, TSS, etc
C-QT97-WP		Water	Fecal Coliform by MPN QT97	APHA 9223B QT97
mixture of hyd	rolyzable su	bstrates and	then sealed in a 97-well packet. The packe	Enzyme Substrate Coliform Test". The sample is mixed with a et is incubated at 44.5 – 0.2°C for 18 hours and then the number of mparing the number of positive responses to a probability table.
NH3-COL-WP		Water	Ammonia by colour	APHA 4500 NH3 F
Ammonia in w nitroprusside a	ater sample and measure	s forms indo ed colourme	phenol when reacted with hypochlorite and trically.	phenol. The intensity is amplified by the addition of sodium
NO2+NO3-CA	LC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP		Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anio	ns are analy	zed by lon (Chromatography with conductivity and/or UV	/ detection.
NO3-IC-N-WP		Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anio	ns are analy	zed by lon (Chromatography with conductivity and/or UV	/ detection.
02-DIS-WP		Water	Dissolved Oxygen	APHA 4500-O-C
manganic hyd	roxide is form	ned. Additic	n of sulfuric acid dissolves the manganic hy priginal DO content. The iodide is then titrat	recipitate of manganous hydroxide. In the presence of oxygen, brown droxide, yielding manganic sulfate which reacts with iodide, releasing ed with a standard solution of thiosulphate. Results for
P-T-COL-WP		Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis i after persulpha				-P "Phosphorus". Total Phosphorus is determined colourmetrically
SOLIDS-TOTS	SUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspend	ed solids in	aquesous m	natrices is determined gravimetrically after d	rying the residue at 103 105°C.
URBIDITY-W	/P	Water	Turbidity	APHA 2130B (modified)
		ces is deter	nined by the nephelometric method.	· ·
	hode may in	corporate	odifications from specified reference metho	de to improvo porformance

 Laboratory Definition Code
 Laboratory Location

 WP
 ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**
--

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2324295	5	Report D	ate: 21-A	UG-19	Pa	ge 1 of 5
		shill Road aul MB R2E 1A	7							
Contact: I	Leanne Sh	newchuk								
Test		Matrix	Reference	Result	Qualifier	Units	6	RPD	Limit	Analyzed
CHL/A-ACET-FLU	ORO-WP	Water								
Batch R4 WG3138205-3 Chlorophyll a	4762235 DUP		L2324295-5 5.60	6.16		ug/L		9.5	35	08-AUG-19
WG3138205-2 Chlorophyll a	LCS			105.9		%			80-120	20-AUG-19
WG3138205-1 Chlorophyll a	MB			<0.10		ug/L			0.1	08-AUG-19
FC-QT97-WP		Water								
Batch R4	4744466									
WG3126316-2 Fecal Coliforms	DUP S		L2324295-1 84	54		MPN	/100mL	43	65	07-AUG-19
WG3126316-1 Fecal Coliforms	MB			<1		MPN	/100mL		1	07-AUG-19
NH3-COL-WP		Water								
	4751433									
WG3131497-2 Ammonia, Tota	al (as N)			100.0		%			85-115	12-AUG-19
WG3131497-22 Ammonia, Tota	al (as N)			100.6		%			85-115	12-AUG-19
WG3131497-1 Ammonia, Tota	MB al (as N)			<0.010		mg/L			0.01	12-AUG-19
WG3131497-21 Ammonia, Tota				<0.010		mg/L			0.01	12-AUG-19
	4753069									
WG3132727-2 Ammonia, Tota				95.6		%			85-115	13-AUG-19
WG3132727-1 Ammonia, Tota	MB al (as N)			<0.010		mg/L			0.01	13-AUG-19
NO2-IC-N-WP		Water								
Batch R4 WG3128328-2 Nitrite (as N)	4750115 LCS			99.4		%			90-110	09-AUG-19
WG3128328-1 Nitrite (as N)	МВ			<0.010		mg/L			0.01	09-AUG-19
	4752545								-	
WG3128319-2 Nitrite (as N)	LCS			102.2		%			90-110	09-AUG-19
WG3128319-1 Nitrite (as N)	МВ			<0.010		mg/L			0.01	09-AUG-19



			•	•	•			
	V	Workorder:	L2324295	5	Report Date: 21	-AUG-19	Pa	ge 2 of 🗄
est	Matrix F	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water							
Batch R4750115								
WG3128328-2 LCS								
Nitrate (as N)			98.2		%		90-110	09-AUG-19
WG3128328-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	09-AUG-19
Batch R4752545								
WG3128319-2 LCS								
Nitrate (as N)			98.6		%		90-110	09-AUG-19
WG3128319-1 MB							00 110	
Nitrate (as N)			<0.020		mg/L		0.02	09-AUG-19
							0.02	
D2-DIS-WP	Water							
Batch R4744914								
WG3127931-2 LCS								
Oxygen, Dissolved			101.3		%		85-115	08-AUG-19
WG3127931-1 MB								
Oxygen, Dissolved			<0.10		mg/L		0.1	08-AUG-19
P-T-COL-WP	Water							
Batch R4745230								
WG3127329-27 DUP		L2324295-14						
Phosphorus (P)-Total		0.312	0.326		mg/L	4.3	20	09-AUG-19
WG3127329-22 LCS								
Phosphorus (P)-Total			103.7		%		80-120	09-AUG-19
WG3127329-26 LCS								
Phosphorus (P)-Total			98.2		%		80-120	09-AUG-19
WG3127329-21 MB								
Phosphorus (P)-Total			<0.0030		mg/L		0.003	09-AUG-19
WG3127329-25 MB					-			
Phosphorus (P)-Total			<0.0030		mg/L		0.003	09-AUG-19
					0			
OLIDS-TOTSUS-WP	Water							
Batch R4754769								
W00404440 0 100								
WG3131146-2 LCS			104.9		%		85-115	14-AUG-19
Total Suspended Solids			104.0					
Total Suspended Solids WG3131146-1 MB								
Total Suspended Solids			<2.0		mg/L		2	14-AUG-19



			Workorder:	L232429	5	Report Date: 2	I-AUG-19	Pa	ge 3 of 5
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WP		Water							
Batch F	R4744903								
WG3127403-2 Turbidity	2 LCS			104.5		%		85-115	08-AUG-19
WG3127403-1 Turbidity	MB			<0.10		NTU		0.1	08-AUG-19

Workorder: L2324295

Report Date: 21-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

CVV Continuing Calibration Verification CVS Calibration Verification Standard LCSD Laboratory Control Sample Duplicate

Workorder: L2324295

Report Date: 21-AUG-19

Hold Time Exceedances:

	Sample						
ALS Product Description	ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Dissolved Oxygen							
	4	07-AUG-19 10:05	08-AUG-19 08:45	8.0	23	hours	EHTL
Legend & Qualifier Definitio	ns:						

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2324295 were received on 07-AUG-19 16:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Chain of Custody (COC) / Analytical

Request Form



OC Number: 17 -

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will ap	Report Format / Di.																				
Company:	RM of East St. Paul	Select Report F	•Ormat: 🔽 PDF	🖸 EXCEL 🔲 ED	D (DIGITAL)	Regular [R] I Standard TAT if received by 3 pm - business days - no surcharge								arges apply								
Contact:	Leanne Shewchuk		Quality Control (QC) Report with Report 📋 YES 🔲 NO					4 da	iy [P4	-20%			ACK	1 B	usine	ss da	y (E -	100%]	i T			
Phone:	204-668-8112 x 4503		Compare Result	ts to Criteria on Report -	-		1 4 day [P4-20%] 1									~ п						
	Company address below will appear on the fi	nal report		Select Distribution: 🗹 EMAIL 🔲 MAIL 🔲 FAX					iy [P2	-50%]			ı o							pply)]		L
				leanne.shewchuk(@eaststpaul.com	n		Date a	nd Tim	ie Requ	ired fo	r all Eð	IP TAT	s:		-		dd-rr	יmm-y	y hh:mn	1	
City/Province:	East St. Paul, MB	Email 2 operations@eaststpaul.com F						çan no	t be per	formed a	iccordi	ng to th	a servic	e level i	selected	l, you wi	ll be con	tacted.	-			
Postal Code:	R2E 1A7		Email 3											An	alysi	s Req	uest			_		
Invoice To	Same as Report To IVES		Invoice Distribution					Indicate Filtered (F). Preserved (P) or Filtered and Preserved (F/P) below												-		
	Copy of Invoice with Report I YES		Select Invoice [lect Invoice Distribution: 🗹 EMAIL 🔲 MAIL 🔽 FAX															·		HOLD HOLD	tion Line
Company:			Email 1 or Fax	nail 1 or Fax operations@eaststpaul.com																	12	ŝ
Contact:			Email 2				.₹												1	1.		ŧ
	Project Information			and Gas Require	· · · · · · · · · · · · · · · · · · ·	use)	CONTAIN	1			ł		e l								NO	ecia
ALS Account #	# / Quote #: Q74289	· · · · · · · · · · · · · · · · · · ·	AFE/Cost Center:		PO#		<u>I</u> <u></u>						ami						. ·	: [:		Š
Job #:			- 3	Major/Minor Code: Routing Code:									Chio	a	1		z				S	(se
PO / AFE:	<u> </u>	· · · · · · · · · · · · · · · · · · ·	Requisitioner:			<u>-</u>	16	Ř					P C C	N -			ATIC		:		Ш	B
LSD:			Location:		.		1 02	rsn					P (V	- Ş	L 4		EIC.					R
ALS Lab Work Order # (lab use only):			ALS Contact:	Connor Cattani	Sampler:	тм		SOLIDS-TOTS	TURBIDITY-WP		₽	₹	CL2-TOTAL-WP (Monochioramine)	ANIONS-N2N3-IC-N-WP	CHL-FLUORO-WP	1	IDENTIFICATION				SAMPI	SUSPECTED HAZARD (see Special Instructions)
			1			T	Ξ	S-1	Ē	S-W	6 I	ġ.	OTA	2-2	١ <u>٢</u>	S						E.
ALS Sample # (lab use only)	-	n and/or Coordinates		Date	Time (hh:mm)	Sample Type	MUN	L L	E	02-DIS-WP	P-T-COL-WP	NH3-COL-WP	51	ļ ĝ.	17	FECALS	ALGAE					I I I
(ab use only)	SS A	appear on the report)		(dd-mmm-yy)	(00:00)				<u> </u>	0	· · · ·	÷	Ū	<u> </u>					\rightarrow		<u> </u>	<u></u>
	·			7-Aug-19		Water	4	R	R		R	R	 	R	R	R	R		\rightarrow		_	_ _
	SS B			7-Aug-19	9:20	Water	4	R	<u> </u>		R	R	ļ	R	R	R	R		\rightarrow		-	
	SS C		0.00	7-Aug-19	9:52	Water	4	R	R		R	R		R	R	R	R					
	SS D			7-Aug-19	10:05	Water	5	R	R	R	R	R		R	R	R	R					
	CSU			7-Aug-19	12:37	Water	[·] 3	R	R		R	R		R	R							. [
	CSL			7-Aug-19	12:50	Water	3	R	Ŕ		R	R		R	R							
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	SL			7-Aug-19	12:20	Water	3	R	R	1	R	R		R	R	<u> </u>					1	+
	P1 U			7-Aug-19	10:40	Water	4	R	R		R	R		R	R	R					1	\top
	P2 L			7-Aug-19	10:50	Water	3	R	R		R	R		R	R				\rightarrow		1	1
	P3 L			7-Aug-19	11:20	Water	3	R	R		R	R		R	R							—
Drinking	Water (DW) Samples ¹ (client use)	Special Instructions /			king on the drop	-down list below		SAMPLE CONDITION AS RECEIVED (lab use only								nly)						
			(elec	ctronic COC only)			Froz					_	-		vation		Yes]	No		
Are samples taken from a Regulated DW System?							ice Packs 🔲 ice Cubes 🛄 Cust						ustody seal intact Yes 🔲						No			
							Cooling Initiated INITIAL COOLER TEMPERATURES °C															
Are samples for human consumption/ use?						\vdash	I	T	COOL			IURES	ч <u>с</u>				INAL CL	OLER	TEMPERA	TURES °C		
				INITIAL SHIPMEN		(leb use h-)					[](<u>}.</u> ,		CLUP			-					
Released by:	SHIPMENT RELEASE (client use Date:	z) Time			ID-4-1		Time: Received by: Date:							only)	Time:							
				CM	7-6	1-19	4:	00	1		~y.										I nne.	
REFER TO BACK	K PAGE FOR ALS LOCATIONS AND SAMPLIN		14/14	ITE - LABORATOR		inw.		1 00	nv.					1			_			مصحب والمحاد		

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

								COC Number: 17 -																		
(ALS)	www.alsglobal.com	Canada Toll Free: 1 800 668 9878											Page Q of Q													
Report To	Contact and company name below will app	ear on the final report		Report Format	17	L232429	26 C						onta	ict you	ur AM 1	to con	firm al	II E&P	TATs	(surch:	arges	may apply	()			
Company:	RM of East St. Paul		Select Report Format: V PDF V						`				AT if	receive	d by 3 j	pm - bu	isiness (days - r	to surch	harges ap	pply					
Contact:	Leanne Shewchuk		Quality Control (QC) Report with Rep.						1 Business day [E - 100%]												%]					
Phone:	204-668-8112 x 4503		Compare Results to Criteria on Report - provide details below if box checked					3 da	ī у [Р3	-25%]	 		18	Sam	e Day	. Wee	kend	or St	atutor	ry holi	day [F	E2 -200%				
	Company address below will appear on the fin	nal report	Select Distribution: 🗹 EMAIL 🗌 MAIL 🔲 FAX					2 da	ı y (P2	-50%]										ipply)]						
Street:	3021 Birdshill Road Email 1 or Fax leanne.shewchuk@eaststpaul.com							Date ar	n d Tim	e Requ	ired fo	r all E8	P TAT	S:				dd-r	nmm-y	yy hh:	mm					
City/Province:	East St. Paul, MB		Email 2	operations@easts	stpaul.com		For tests that can not be performed according to the service level selected, you will be contacted.														·					
Postal Code:	R2E 1A7		Email 3				Analysis Request																			
Invoice To	Same as Report To		1	Invoice Di	stribution		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																			
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Contact:		······································	Email 2	-			15															Ť	lst-			
	Project Information	· · · · · ·		and Gas Require	d Fields (client	use)	님은						nine)										al I			
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LSD:		Location:]				Non	Ż			III					щ	ARI				
ALS Lab Work Order # (lab use only):			ALS Contact:	Connor Cattani	Sampler:	ТМ	NUMBER	SOLIDS-TOTSUS-WP	TURBIDITY-WP	WP	P-T-COL-WP	NH3-COL-WP	CL2-TOTAL-WP (Monochloramine)	ANIONS-N2N3-IC-N-WP	CHL-FLUORO-WP		ALGAE IDENTIFICATION					AMPI	SUSPECTED HAZARD (see Special Instructions)			
ALS Sample #	Sample Identification	and/or Coordinates	•	Date	Time		1₹	S		02-DIS-WP	1 Ş	8	Ι ̈́Ρ	S S	Ē	FECALS	AEI					A	E E			
(lab use only)	(This description will a	appear on the report)		(dd-mmm-yy)	(ħh:mm)	Sample Type	Ĩ	ฐ	١Ę.	8-1	ι.	E	3	Ă	통	E E E	ALG					Ś	SS			
	P4 L			7-Aug-19	11:06	Water	3	R	R		R	R	1	R	R								1			
}	P6 L	<u></u>		7-Aug-19	11:35	Water	3	R	R	 	R	R	<u>† </u>	R	R					·		<u>.</u>	+			
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Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below						1-			4	SAI	MPLE	CON	DITIC	N AS	RECI	EIVED) (lab	USE O	nly)			4				
Drinking Water (DW) Samples ¹ (client use) (electronic COC only)						Froz	Frozen SIF Observations Yes							No												
Are samples taken from a Regulated DW System?									Ice Packs 🔲 Ice Cubes 🔲					ody se	eal inta	act	Yes	E	Ĵ		No					
TYES INO							Cool	Cooling Initiated								_										
Are samples for human consumption/ use?								INITIAL COOLER TEMPERATURI						URES °C FINAL COOLER						R TEMPERATURES °C						
	is 🗍 NO										IB	.5														
	SHIPMENT RELEASE (client use)		INITIAL SHIPMEN	T RECEPTION ((iab use only)	-	FINAL SHIPMENT RECEPTION (lab use only								a onivi	,									
Released by:	Date:	Time:	Received by:	Cn	Date: 7-6	-19	Time	: :00	Rec	eived	by:				Date		-					Time:				
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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul **ATTN: Leanne Shewchuk** 3021 Birdshill Road East St. Paul MB R2E 1A7

Date Received: 29-AUG-19 Report Date: 10-SEP-19 12:09 (MT) Version: FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2338601 Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc:

NOT SUBMITTED WATER

Hua Wo Chemistry Laboratory Manager

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-1 S U							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.145		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite	0.445		0.070				
Nitrate and Nitrite as N	0.145		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a	10.010		0.010	ing/L			11102100
Chlorophyll a by fluorometry							
Chlorophyll a	32.2		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.063		0.010	mg/L		06-SEP-19	R4786151
Conductivity	651		1.0	umhos/cm		30-AUG-19	R4780896
Phosphorus (P)-Total	0.0786		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	11.9		2.0	mg/L		05-SEP-19	R4784577
Turbidity	7.35		0.10	NTU		30-AUG-19	R4778918
L2338601-2 S L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a	<0.010		0.010	IIIg/L		30-AUG-19	R4102400
Chlorophyll a by fluorometry							
Chlorophyll a	32.6		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.019		0.010	mg/L		06-SEP-19	R4786151
Fecal Coliforms	37		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.0494		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	8.0		2.0	mg/L		05-SEP-19	R4784577
Turbidity	6.50		0.10	NTU		30-AUG-19	R4778918
L2338601-3 P1 U							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLM	0.10	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite			<u> </u>			04.055.10	
Nitrate and Nitrite as N	<0.11		0.11	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		30-AUG-19	R4782488
Chlorophyll a	<0.000		0.030	ing/L		30 700-19	114102400
Chlorophyll a by fluorometry							
Chlorophyll a	29.7		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.141		0.010	mg/L		06-SEP-19	R4786151

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-3 P1 U							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Fecal Coliforms	548		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.110		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	10.1		2.0	mg/L		05-SEP-19	R4784577
Turbidity	4.90		0.10	NTU		30-AUG-19	R4778918
L2338601-4 P2 L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix: Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.33		0.10	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite							
Nitrate and Nitrite as N	0.33		0.11	mg/L		04-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLM	0.050	mg/L		30-AUG-19	R4782488
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	39.0		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters	00.0		0.10	ug/L	20710010	20 / 100 10	1(4/025/5
Ammonia, Total (as N)	0.126		0.010	mg/L		06-SEP-19	R4786151
Phosphorus (P)-Total	0.217		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	36.1		2.0	mg/L		05-SEP-19	R4784577
Turbidity	11.1		0.10	NTU		30-AUG-19	R4778918
L2338601-5 P3 L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite	0.070		0.070				
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		30-AUG-19	R4782488
Chlorophyll a			0.020				
Chlorophyll a by fluorometry							
Chlorophyll a	33.2		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.140		0.010	mg/L		06-SEP-19	R4786151
Phosphorus (P)-Total	0.120		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	4.7		2.0	mg/L		05-SEP-19	R4784577
Turbidity	2.80		0.10	NTU		30-AUG-19	R4778918
L2338601-6 P4 L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC	-0.040	DLM	0.040	ma/l		20 4110 40	D4700400
Nitrate (as N) Nitrate+Nitrite	<0.040		0.040	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC	\$0.070		0.070				
Nitrite (as N)	<0.020	DLM	0.020	mg/L		30-AUG-19	R4782488
Chlorophyll a							

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-6 P4 L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Chlorophyll a by fluorometry							
Chlorophyll a	23.0		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.201		0.010	mg/L		06-SEP-19	R4786151
Conductivity	1220		1.0	umhos/cm		30-AUG-19	R4780896
Phosphorus (P)-Total	0.122		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	6.1		2.0	mg/L		05-SEP-19	R4784577
Turbidity	3.60		0.10	NTU		30-AUG-19	R4778918
_2338601-7 P6 L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite	0.070		0.070				
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		30-AUG-19	R4782488
Chlorophyll a	<0.020	DEM	0.020	ing/E		30 400 13	114702400
Chlorophyll a by fluorometry							
Chlorophyll a	21.4		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters				_			
Ammonia, Total (as N)	0.063		0.010	mg/L		06-SEP-19	R4786151
Fecal Coliforms	114		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.0810		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	6.0		2.0	mg/L		05-SEP-19	R4784577
Turbidity	2.02		0.10	NTU		30-AUG-19	R4778918
_2338601-8 SS A							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite	0.070		0.070				
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in water by iC Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a	<0.010		0.010	ing/ E		0070010	114702400
Chlorophyll a by fluorometry							
Chlorophyll a	187		0.40	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.037		0.010	mg/L		06-SEP-19	R4786151
Conductivity	455		1.0	umhos/cm		30-AUG-19	R4780896
Fecal Coliforms	411		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.207		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	37.9		2.0	mg/L		05-SEP-19	R4784577
Turbidity	31.1		0.10	NTU		30-AUG-19	R4778918
_2338601-9 SS B							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-9 SS B							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a	<0.010		0.010	ing/E		30 400 13	114702400
Chlorophyll a by fluorometry							
Chlorophyll a	86.3		0.70	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.194		0.010	mg/L		06-SEP-19	R4786151
Fecal Coliforms	4		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.131		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	44.7		2.0	mg/L		05-SEP-19	R4784577
Turbidity	24.3		0.10	NTU		30-AUG-19	R4778918
L2338601-10 SS C							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC	<0.070		0.070	ing/L		04-021-19	
Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	97.6		0.70	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							
Ammonia, Total (as N)	0.037		0.010	mg/L		06-SEP-19	R4786151
Fecal Coliforms	308		1	MPN/100mL		29-AUG-19	R4778222
Phosphorus (P)-Total	0.198		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	46.1		2.0	mg/L		05-SEP-19	R4784577
Turbidity	32.8		0.10	NTU		30-AUG-19	R4778918
L2338601-11 SS D							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite	<0.020		0.020	iiig/L		00700-19	114/02400
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC				Ŭ			
Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a							
Chlorophyll a by fluorometry							DITECT
Chlorophyll a	74.3		1.0	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters	0.400		0.040				DATOCALL
Ammonia, Total (as N)	0.103		0.010	mg/L		06-SEP-19	R4786151
Fecal Coliforms	25		1	MPN/100mL		29-AUG-19	R4778222

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-11 SS D							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Phosphorus (P)-Total	0.249		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	134		7.5	mg/L		05-SEP-19	R4784577
Turbidity	59.9		0.10	NTU		30-AUG-19	R4778918
L2338601-12 CS U							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	ma/l		04-SEP-19	
Nitrite in Water by IC	<0.070		0.070	mg/L		04-367-19	
Nitrite (as N)	<0.010		0.010	mg/L		30-AUG-19	R4782488
Chlorophyll a							
Chlorophyll a by fluorometry							
Chlorophyll a	43.2		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters							B (==== (= (
Ammonia, Total (as N)	0.105		0.010	mg/L		06-SEP-19	R4786151
Conductivity	907		1.0	umhos/cm		30-AUG-19	R4780896
Phosphorus (P)-Total	0.198		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	44.3		2.0	mg/L		05-SEP-19	R4784577
Turbidity	18.1		0.10	NTU		30-AUG-19	R4778918
L2338601-13 CS L							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix: Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.051		0.040	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		04-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		30-AUG-19	R4782488
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	39.6		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters			5.10				
Ammonia, Total (as N)	0.120		0.010	mg/L		06-SEP-19	R4786151
Phosphorus (P)-Total	0.140		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	12.5		2.0	mg/L		05-SEP-19	R4784577
Turbidity	14.8		0.10	NTU		30-AUG-19	R4778918
L2338601-14 BTP 1							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	0.048		0.040	mg/L		30-AUG-19	R4782488
Nitrate+Nitrite Nitrate and Nitrite as N	-0.070		0.070	ma/l		05-SEP-19	
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		00-067-19	
Nitrite (as N)	<0.020	DLM	0.020	mg/L		30-AUG-19	R4782488
Chlorophyll a				5-			

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338601-14 BTP 1							
Sampled By: TM on 29-AUG-19 @ 11:10							
Matrix:							
Chlorophyll a by fluorometry							
Chlorophyll a	30.1		0.10	ug/L	29-AUG-19	29-AUG-19	R4782973
Miscellaneous Parameters	0011		0.10	~g/ _	207.0010		
Ammonia, Total (as N)	0.521		0.020	mg/L		06-SEP-19	R4790690
Phosphorus (P)-Total	0.136		0.0030	mg/L		03-SEP-19	R4781470
Total Suspended Solids	12.5		2.0	mg/L		05-SEP-19	R4784577
Turbidity	11.3		0.10	NTU		30-AUG-19	R4778918
			0.10				

Reference Information

Sample Parameter Qualifier Key:

	Descrip	tion		
DLM	Detectio	on Limit Adju	sted due to sample matrix effects (e.g. chemica	al interference, colour, turbidity).
MS-B	Matrix S	pike recover	ry could not be accurately calculated due to hig	h analyte background in sample.
est Method	d Reference	es:		
ALS Test Co	de	Matrix	Test Description	Method Reference**
CHL/A-ACET WP			Chlorophyll a by fluorometry	EPA 445.0 ACET
			s modified from EPA method 445.0. Chlorophy acidification procedure. This method is not sub	II a is determined by a 90 % acetone extraction followed with ject to interferences from chlorophyll b.
EC-SCREEN	-WP	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative ar	nalysis of con	nductivity wh	ere required during preparation of other test eg	. IC, TDS, TSS, etc
EC-WP		Water	Conductivity	APHA 2510B
Conductivity and chemical			efers to its ability to carry an electric current. Co	onductance of a solution is measured between two spatially fixed
FC-QT97-WF	FC-QT97-WP Water		Fecal Coliform by MPN QT97	APHA 9223B QT97
mixture of hy	drolyzable su	ubstrates and	d then sealed in a 97-well packet. The packet is	zyme Substrate Coliform Test". The sample is mixed with a sincubated at $44.5 - 0.2^{\circ}$ C for 18 hours and then the number of aring the number of positive responses to a probability table.
NH3-COL-WF	3-COL-WP Water A		Ammonia by colour	APHA 4500 NH3 F
Ammonia in v nitroprusside				enol. The intensity is amplified by the addition of sodium
	and measure			enol. The intensity is amplified by the addition of sodium CALCULATION
nitroprusside NO2+NO3-C/	and measure	ed colourme	trically.	
nitroprusside NO2+NO3-C/ NO2-IC-N-WI	and measure ALC-WP P	ed colourme Water Water	virically. Nitrate+Nitrite	CALCULATION EPA 300.1 (mod)
nitroprusside NO2+NO3-C/ NO2-IC-N-WI	and measure ALC-WP P ons are analy	ed colourme Water Water	Nitrate+Nitrite Nitrite in Water by IC	CALCULATION EPA 300.1 (mod)
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic ani NO3-IC-N-WI	and measure ALC-WP P ons are analy P	ed colourme Water Water yzed by Ion (Water	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod)
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic anio NO3-IC-N-WI Inorganic anio	and measure ALC-WP P ons are analy P ons are analy	ed colourme Water Water yzed by Ion (Water	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de Nitrate in Water by IC	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod)
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic anio NO3-IC-N-WI Inorganic anio P-T-COL-WP This analysis	and measure ALC-WP P ons are analy ons are analy s is carried ou	ed colourme Water Water yzed by Ion (Water yzed by Ion (Water it using proc	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de Nitrate in Water by IC Chromatography with conductivity and/or UV de Phosphorus, Total edures adapted from APHA METHOD 4500-P	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod) etection.
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic ani NO3-IC-N-WI Inorganic ani P-T-COL-WP This analysis after persulph	and measure ALC-WP P ons are analy ons are analy is carried ou hate digestion	ed colourme Water Water yzed by Ion (Water yzed by Ion (Water it using proc	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de Nitrate in Water by IC Chromatography with conductivity and/or UV de Phosphorus, Total edures adapted from APHA METHOD 4500-P	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod) etection. APHA 4500 P PHOSPHORUS-L
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic anio NO3-IC-N-WI Inorganic anio P-T-COL-WP This analysis after persulph SOLIDS-TOT	and measure ALC-WP P ons are analy ons are analy a is carried ou hate digestion	ed colourme Water Water yzed by lon (Water yzed by lon (Water tu using proc n of the sam Water	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de Nitrate in Water by IC Chromatography with conductivity and/or UV de Phosphorus, Total edures adapted from APHA METHOD 4500-P	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod) etection. APHA 4500 P PHOSPHORUS-L "Phosphorus". Total Phosphorus is determined colourmetrically APHA 2540 D (modified)
nitroprusside NO2+NO3-C/ NO2-IC-N-WI Inorganic anio NO3-IC-N-WI Inorganic anio P-T-COL-WP This analysis after persulph SOLIDS-TOT	and measure ALC-WP P ons are analy ons are analy is carried ou hate digestion SUS-WP ded solids in	ed colourme Water Water yzed by lon (Water yzed by lon (Water tu using proc n of the sam Water	trically. Nitrate+Nitrite Nitrite in Water by IC Chromatography with conductivity and/or UV de Nitrate in Water by IC Chromatography with conductivity and/or UV de Phosphorus, Total edures adapted from APHA METHOD 4500-P ple. Total Suspended Solids	CALCULATION EPA 300.1 (mod) etection. EPA 300.1 (mod) etection. APHA 4500 P PHOSPHORUS-L "Phosphorus". Total Phosphorus is determined colourmetrically APHA 2540 D (modified)

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
Chain of Custody Numbers:	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Quality Control Report

			Workorder:	L233860 ⁻	1	Report Dat	e: 10-SEP-19	Pa	age 1 of 3
Client:	RM of Eas 3021 Bird East St. P Leanne Sl	shill Road Paul MB R2E 1 <i>A</i>	۸7						
Contact:	Leanne Si		Defenses	Dessil	0	1114		1 1 14	A
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHL/A-ACET-FL	UORO-WP	Water							
	R4782973								
WG3151694- Chlorophyll a				109.7		%		80-120	04-SEP-19
WG3151694- Chlorophyll a				<0.10		ug/L		0.1	29-AUG-19
EC-WP		Water							
Batch	R4780896								
WG3150168- Conductivity				98.9		%		90-110	30-AUG-19
WG3150168- Conductivity				99.1		%		90-110	30-AUG-19
WG3150168- Conductivity				<1.0		umhos/	cm	1	30-AUG-19
WG3150168- Conductivity				<1.0		umhos/	cm	1	30-AUG-19
FC-QT97-WP		Water							
Batch	R4778222								
WG3147776- Fecal Colifor			L2338601-2 37	37		MPN/10	00mL 1.1	65	29-AUG-19
WG3147776- Fecal Colifor				<1		MPN/10	00mL	1	29-AUG-19
NH3-COL-WP		Water							
Batch	R4786151								
WG3154633- Ammonia, T				100.4		%		85-115	05-SEP-19
WG3154633- Ammonia, T				<0.010		mg/L		0.01	05-SEP-19
	R4790690								
WG3156239- Ammonia, T				100.2		%		85-115	06-SEP-19
WG3156239- Ammonia, T				<0.010		mg/L		0.01	06-SEP-19
NO2-IC-N-WP		Water							
Batch	R4782488								
WG3148511- Nitrite (as N)				99.99		%		90-110	30-AUG-19
WG3148511- Nitrite (as N)				<0.010		mg/L		0.01	30-AUG-19



Quality Control Report

		Workorder:	L233860	1	Report Date: 10	-SEP-19	Pa	ge 2 of 3
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-WP	Water							
Batch R4782488 WG3148511-2 LCS								
Nitrate (as N) WG3148511-1 MB Nitrate (as N)			99.6 <0.020		% mg/L		90-110 0.02	30-AUG-19 30-AUG-19
P-T-COL-WP	Water				0			
Batch R4781470 WG3148886-10 LCS			04.0		27			
Phosphorus (P)-Total WG3148886-6 LCS Phosphorus (P)-Total			94.9 94.3		%		80-120 80-120	03-SEP-19 03-SEP-19
WG3148886-5 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	03-SEP-19
WG3148886-9 MB Phosphorus (P)-Total			<0.0030		mg/L		0.003	03-SEP-19
SOLIDS-TOTSUS-WP	Water							
Batch R4784577 WG3151613-18 LCS Total Suspended Solids			106.2		%		85-115	05-SEP-19
WG3151613-17 MB Total Suspended Solids			<2.0		mg/L		2	05-SEP-19
TURBIDITY-WP	Water							
Batch R4778918 WG3148398-3 DUP Turbidity		L2338601-1 7.35	7.54		NTU	2.0	45	00 4110 40
WG3148398-2 LCS Turbidity		1.30	103.5		%	2.6	15 85-115	30-AUG-19 30-AUG-19
WG3148398-1 MB Turbidity			<0.10		NTU		0.1	30-AUG-19

Quality Control Report

Workorder: L2338601

Report Date: 10-SEP-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Chain of Custody (COC) / Analytical **Request Form**

Canada Toli Free: 1 800 668 9878

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Company:	RM of East St, Paul		Select Report F	Format: 🔽 PDF		DD (DIGITAL)	Regular [R] [] Standard TAT if received by 3 pm - business days - no surcharges apply									-						
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	Company address below will appear on the	final report	Select Distribut	tion: 🗹 EMAIL	🗌 MAIL 🗌	FAX	P R						EM						ay app			E
Street:	3021 Birdshill Road		Email 1 or Fax	leanne.shewchuk	@eaststpaul.co	m		Date a	nd Tim	e Requ	lired:fo	r alt Ęł	P TAT	s:				dd-mr	nm-yy	hh:mm		
City/Province:	East St. Paul, MB		Email 2	operations@easts	stpaul.com		For te	For tests that can not be performed according to the service level selected, you will be contacted.														
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I. If any water samp	ples are taken from a Regulated Drinking Water (I	DW) System, please submit us	ing an Authorized D	W COC form,		stilla and contailonatio				en haði	o or ane	witte -	report	~~~			(/				

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



COC Number: 17 -

Page 1 of 2

1

Report To	Contact and company n	ame below will a	ppear on the final re	eport		Report Format	/ Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)															
Company:	RM of East St. Paul				Select Report F	ormat: 🔽 PDF	🖸 EXCEL 🗌 E	DD (DIGITAL)	1		egular										surcharg			<u> </u>
Contact:	Leanne Shewchuk				Quality Control	(QC) Report with R	eport 🗌 YES		Ĩ	4 da	ay (P4				ζ					100%]				
Phone:	204-668-8112 x 4503	· · ·			Compare Result	s to Criteria on Report -	provide details belo	ow if box checked	ESS D	3 da	iy (P3	-25%]	П		RGE			-		-		haliday	152 -2001	<u>،</u>
	Company address below will	appear on the	final report		Select Distribut	ion: 🗹 Email		FAX	P 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					me Day, Weekend or Statutory holiday [E2 -200% aboratory opening fees may apply)]				″ Γ						
Street:	3021 Birdshill Road				Email 1 or Fax	leanne.shewchuk(@eaststpaul.com	Tİ		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm														
City/Province:	East St. Paul, MB				Email 2	Email 2 operations@eaststpaul.com			For te	or tests that can not be performed according to the service level selected, you will be contacted.														
Postal Code:	R2E 1A7				Email 3			-								Ana	lysis	Requ	Jest					
Invoice To	Same as Report To	✓ YES				Invoice Di			S		. 1	ndicate	Filtere	d (F), F	reserve	d (P) o	r Fäter	red and	Presen	red (F/P)) below			_
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6	P4 L					29-Aug-19	10:45	Water	3	R	R		R	R		R	R		R			1		-
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Are samples take	n from a Regulated DW Syst	em?	1						lce Pi		_	Ico C	whee		Custo				Yes			No		Ы
📋 Yes	S 🗋 NO		1								يت itiated		vuça	H	Cusio	ay sea	a inta	ict.	res			No		
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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY, By the use of this form like user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



RM of East St. Paul ATTN: Leanne Shewchuk 3021 Birdshill Road East St. Paul MB R2E 1A7 Date Received:19-SEP-19Report Date:08-OCT-19 08:46 (MT)Version:FINAL

Client Phone: 204-668-8112

Certificate of Analysis

Lab Work Order #: L2351375 Project P.O. #: NOT SUBMITTED Job Reference: C of C Numbers: Legal Site Desc:

Connor Cattani Account Manager

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L2351375 CONTD.... PAGE 2 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-1 S U							
Sampled By: TM on 19-SEP-19 @ 11:15							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	0.007		0.000			24 850 40	D4044040
Nitrate (as N) Nitrate+Nitrite	0.097		0.020	mg/L		21-SEP-19	R4841049
Nitrate and Nitrite as N	0.097		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	122		0.50	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters	122		0.50	ug/L	21-011-19	21-021-19	114039709
Ammonia, Total (as N)	0.156		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.100	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper						-	
sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Conductivity	824		1.0	umhos/cm		22-SEP-19	R4835269
Phosphorus (P)-Total	0.175		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	55.6		2.0	mg/L		26-SEP-19	R4848528
Turbidity	33.1		0.10	NTU		20-SEP-19	R4838752
L2351375-2 S L							
Sampled By: TM on 19-SEP-19 @ 11:05							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite	<0.020		0.020	iiig/L		21-021-13	114041043
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	70.8		0.20	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters				J.			
Ammonia, Total (as N)	0.042		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.080	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Phosphorus (P)-Total	0.139		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	89.3		2.0	mg/L		26-SEP-19	R4848528
Turbidity	54.9		0.10	NTU		20-SEP-19	R4838752
L2351375-3 P1 U							
Sampled By: TM on 19-SEP-19 @ 10:19							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.10	DLM	0.10	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.11		0.11	mg/L		26-SEP-19	
Nitrite in Water by IC				I			

L2351375 CONTD.... PAGE 3 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-3 P1 U							
Sampled By: TM on 19-SEP-19 @ 10:19							
Matrix: WATER							
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLM	0.050	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	15.2		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters			-				
Ammonia, Total (as N)	0.262		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.070	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Conductivity	1640		1.0	umhos/cm		22-SEP-19	R4835269
Fecal Coliforms	172	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.127		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	11.1		2.0	mg/L		26-SEP-19	R4848528
Turbidity	7.69		0.10	NTU		20-SEP-19	R4838752
L2351375-4 P2 L							
Sampled By: TM on 19-SEP-19 @ 10:25							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.10	DLM	0.10	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite	NO.10		0.10			21 021 -13	11-0-10-0-0
Nitrate and Nitrite as N	<0.11		0.11	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		21-SEP-19	R4841049
Chlorophyll a			0.000				
Chlorophyll a by fluorometry Chlorophyll a	70.6		0.20	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters	/ 0.0		0.20	~g/ _			
Ammonia, Total (as N)	0.105		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.020	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace. Phosphorus (P)-Total						25-SEP-19	
	0.227		0.0030	mg/L			R4839654
Total Suspended Solids Turbidity	34.9		2.0	mg/L NTU		26-SEP-19 20-SEP-19	R4848528
·	4.49		0.10	NIU		20-327-19	R4838752
L2351375-5 P3 L Sampled By: TM on 10 SEP 10 @ 10:27							
Sampled By: TM on 19-SEP-19 @ 10:37							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.10	DLM	0.10	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite				-			
Nitrate and Nitrite as N	<0.11		0.11	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLM	0.050	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry							

L2351375 CONTD.... PAGE 4 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-5 P3 L							
Sampled By: TM on 19-SEP-19 @ 10:37							
Matrix: WATER							
Chlorophyll a by fluorometry Chlorophyll a	4.68		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters							
Ammonia, Total (as N)	0.100		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.050	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Phosphorus (P)-Total	0.0689		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	3.6		2.0	mg/L		26-SEP-19	R4848528
Turbidity	2.48		0.10	NTU		20-SEP-19	R4838752
L2351375-6 P4 L							
Sampled By: TM on 19-SEP-19 @ 10:42							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	0.183		0.040	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite	01100		01010				
Nitrate and Nitrite as N Nitrite in Water by IC	0.183		0.070	mg/L		26-SEP-19	
Nitrite (as N) Chlorophyll a	<0.020	DLM	0.020	mg/L		21-SEP-19	R4841049
Chlorophyll a by fluorometry Chlorophyll a	11.2		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters				_			
Ammonia, Total (as N)	0.251		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.030	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Phosphorus (P)-Total	0.105		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	2.3		2.0	mg/L		26-SEP-19	R4848528
Turbidity	2.34		0.10	NTU		20-SEP-19	R4838752
L2351375-7 P6 L							
Sampled By: TM on 19-SEP-19 @ 10:55							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC Nitrate (as N)	<0.040	DLM	0.040	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	8.48		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters							
Ammonia, Total (as N)	0.039		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.060	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass							

L2351375 CONTD.... PAGE 5 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-7 P6 L							
Sampled By: TM on 19-SEP-19 @ 10:55							
Matrix: WATER							
bottle with no headspace. Also, Total Chlorine							
sample had headspace.							
Conductivity	1220		1.0	umhos/cm		22-SEP-19	R4835269
Fecal Coliforms	152	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.0630		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	29.6		2.0	mg/L		26-SEP-19	R4848528
Turbidity	5.35		0.10	NTU		20-SEP-19	R4838752
L2351375-8 SS A							
Sampled By: TM on 19-SEP-19 @ 09:20							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC						a. ar-	
Nitrate (as N)	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite Nitrate and Nitrite as N	-0.070		0.070	ma/l		26-SEP-19	
Nitrate and Nitrite as N Nitrite in Water by IC	<0.070		0.070	mg/L		20-367-19	
Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a			0.010				
Chlorophyll a by fluorometry							
Chlorophyll a	164		0.50	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters							
Ammonia, Total (as N)	0.033		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.020	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Fecal Coliforms	461	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.142		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	26.9		2.0	mg/L		26-SEP-19	R4848528
Turbidity	30.7		0.10	NTU		20-SEP-19	R4838752
L2351375-9 SS B							
Sampled By: TM on 19-SEP-19 @ 09:13							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D / D /
Nitrate (as N)	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC			0.070	iiig/L		20-061-19	
Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a				Ŭ			
Chlorophyll a by fluorometry							
Chlorophyll a	31.3		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters							
Ammonia, Total (as N)	0.050		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.050	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Conductivity	389		1.0	umhos/cm		22-SEP-19	R4835269

L2351375 CONTD.... PAGE 6 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-9 SS B							
Sampled By: TM on 19-SEP-19 @ 09:13							
Matrix: WATER							
Fecal Coliforms	21	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.113		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	15.9		2.0	mg/L		26-SEP-19	R4848528
Turbidity	11.3		0.10	NTU		20-SEP-19	R4838752
L2351375-10 SS C							
Sampled By: TM on 19-SEP-19 @ 09:37							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC	0.000		0.000			24 SED 40	D 40 44 0 40
Nitrate (as N) Nitrate+Nitrite	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a							
Chlorophyll a by fluorometry Chlorophyll a	136		0.20	uc/I	21-SEP-19	21-SEP-19	D 4050700
Miscellaneous Parameters	136		0.20	ug/L	21-3EP-19	21-3EP-19	R4859789
Ammonia, Total (as N)	0.025		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.010	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass							
bottle with no headspace. Also, Total Chlorine sample had headspace.							
Fecal Coliforms	629	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.242		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids Turbidity	47.5 29.8		2.0 0.10	mg/L NTU		26-SEP-19 20-SEP-19	R4848528 R4838752
	29.0		0.10	NIU		20-3LF-19	R4030732
Sampled By: TM on 19-SEP-19 @ 09:47							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		21-SEP-19	R4841049
Chlorophyll a			0.010				
Chlorophyll a by fluorometry Chlorophyll a	76.5		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters				-			
Ammonia, Total (as N)	0.069		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.020	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.							
Fecal Coliforms	10	МВНТ	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.215		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	112		6.0	mg/L		26-SEP-19	R4848528
Turbidity	55.2		0.10	NTU		20-SEP-19	R4838752

L2351375 CONTD.... PAGE 7 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-11 SS D							
Sampled By: TM on 19-SEP-19 @ 09:47							
Matrix: WATER							
L2351375-12 CS U							
1 ,							
Matrix: WATER Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC	-0.010		0.010			21-SEP-19	D4941040
Nitrite (as N) Chlorophyll a	<0.010		0.010	mg/L		21-569-19	R4841049
Chlorophyll a by fluorometry							
Chlorophyll a	7.71		0.10	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters			0.10	~g/=			111000100
Ammonia, Total (as N)	0.038		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.050	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper	0.000		0.010				
sampling bottle. Method requires amber glass							
bottle with no headspace. Also, Total Chlorine							
sample had headspace.		MOUT					D (000000
Fecal Coliforms	1	MBHT	1	MPN/100mL		20-SEP-19	R4832299
Phosphorus (P)-Total	0.156		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	5.3		2.0	mg/L		26-SEP-19	R4848528
Turbidity	4.11		0.10	NTU		20-SEP-19	R4838752
L2351375-13 CS L							
Sampled By: TM on 19-SEP-19 @ 11:38							
Matrix: WATER							
Nitrate + Nitrite							
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite	0.070		0.070	~~~~/l			
Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		21-SEP-19	R4841049
Chlorophyll a	<0.020	DEIVI	0.020	ing/L		21-021-19	R4041049
Chlorophyll a by fluorometry							
Chlorophyll a	39.1		0.20	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters				- 3 . –			
Ammonia, Total (as N)	0.027		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.050	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper							
sampling bottle. Method requires amber glass							
bottle with no headspace. Also, Total Chlorine							
sample had headspace.	060		4.0	umhos/cm		22 CED 40	D4005000
Conductivity	960		1.0			22-SEP-19	R4835269
Phosphorus (P)-Total	0.116		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	9.7		2.0	mg/L		26-SEP-19	R4848528
Turbidity	9.63		0.10	NTU		20-SEP-19	R4838752
L2351375-14 BTP 1							
Sampled By: TM on 19-SEP-19 @ 11:53							
Matrix: WATER							
Nitrate + Nitrite							

L2351375 CONTD.... PAGE 8 of 10 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2351375-14 BTP 1							
Sampled By: TM on 19-SEP-19 @ 11:53							
Matrix: WATER							
Nitrate in Water by IC Nitrate (as N)	<0.040	DLM	0.040	mg/L		21-SEP-19	R4841049
Nitrate+Nitrite Nitrate and Nitrite as N	<0.070		0.070	mg/L		26-SEP-19	
Nitrite in Water by IC Nitrite (as N)	<0.020	DLM	0.020	mg/L		21-SEP-19	R4841049
Chlorophyll a	<0.020	DEW	0.020	ing/∟		21-021-19	114041049
Chlorophyll a by fluorometry Chlorophyll a	88.2		0.20	ug/L	21-SEP-19	21-SEP-19	R4859789
Miscellaneous Parameters	00.2		0.20	ug/L	21-021-19	21-021-19	14039709
Ammonia, Total (as N)	0.018		0.010	mg/L		27-SEP-19	R4850813
Chlorine, Total	0.030	RRR	0.010	mg/L		21-SEP-19	R4838770
Note: RRR: Sample received in improper sampling bottle. Method requires amber glass bottle with no headspace. Also, Total Chlorine sample had headspace.	0.000		0.010	ing/ E			114030770
Phosphorus (P)-Total	0.267		0.0030	mg/L		25-SEP-19	R4839654
Total Suspended Solids	25.9		2.0	mg/L		26-SEP-19	R4848528
Turbidity	28.6		0.10	NTU		20-SEP-19	R4838752

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description		
DLM	Detection Limit Adj	usted due to sample matrix effects (e.g. chemica	al interference, colour, turbidity).
MBHT		hold time was exceeded for microbiological test uses (refer to Health Canada guidance).	ng. Samples processed within 48 hours from time of sampling ma
RRR		marks for issues regarding this analysis	
est Method R	eferences:		
ALS Test Code	Matrix	Test Description	Method Reference**
CHL/A-ACET-FL WP	UORO- Water	Chlorophyll a by fluorometry	EPA 445.0 ACET
		es modified from EPA method 445.0. Chlorophy n-acidification procedure. This method is not sub	I a is determined by a 90 % acetone extraction followed with ject to interferences from chlorophyll b.
CL2-TOTAL-WP	Water	Chlorine, Total	APHA 4500-CI Chlorine(Residual) G (mod)
			The recommended hold time for these tests is 15 minutes; field ic matter, if present, and dissipates rapidly into headspace.
EC-SCREEN-WI	P Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analy	sis of conductivity w	here required during preparation of other test eg	IC, TDS, TSS, etc
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of a and chemically in		refers to its ability to carry an electric current. Co	onductance of a solution is measured between two spatially fixed
FC-QT97-WP	Water	Fecal Coliform by MPN QT97	APHA 9223B QT97
mixture of hydrol	lyzable substrates ar	nd then sealed in a 97-well packet. The packet is	zyme Substrate Coliform Test". The sample is mixed with a incubated at $44.5 - 0.2^{\circ}$ C for 18 hours and then the number of aring the number of positive responses to a probability table.
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
	er samples forms inc d measured colourm		enol. The intensity is amplified by the addition of sodium
NO2+NO3-CALC	C-WP Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions	are analyzed by lon	Chromatography with conductivity and/or UV de	tection.
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions	are analyzed by lon	Chromatography with conductivity and/or UV de	tection.
P-T-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
	carried out using pro e digestion of the sar		Phosphorus". Total Phosphorus is determined colourmetrically
SOLIDS-TOTSU	S-WP Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended	l solids in aquesous	matrices is determined gravimetrically after dryir	g the residue at 103 105°C.
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
Turbidity in aque	ous matrices is dete	rmined by the nephelometric method.	

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location			
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA			
Chain of Custody Numbers:				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Chain of Custody (COC) / Analytic Request Form		İUH	
Request Form		MI	



COC Number: 17 -

Page of

SUSPECTED HAZARD (see Special Instructions)

Canada Toll Free: 1 800 668 9878 www.alsglobal.com Report To Contact and company name below will appear on the final report Report Format/ Distribution-____ RM of East SL Paul Select Report Format: 🕢 PDF 🕢 EXCEL 🗌 EDD (DIGITAL) Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply Company Contact: Leanne Shewchuk Quality Control (QC) Report with Report I YES INO 4 day [P4-20%] 1 Business day [E - 100%] 204-668-8112 x 4503 Compare Results to Criteria on Report - provide details below if box checked 3 day [P3-25%] Phone: Same Day, Weekend or Statutory holiday [E2 -200% Select Distribution: 📿 EMAIL 🗌 MAIL 🔄 FAX 2 day (P2-50%) (Laboratory opening fees may apply)] Company address below will appear on the final report 3021 Birdshill Road Email 1 or Fax leanne.shewchuk@eaststpaul.com Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm Street: East St. Paul, MB operations@eaststpaul.com Email 2 For tests that can not be performed according to the service level selected, you will be contacted. City/Province: **R2E 1A7** Analysis Request Email 3 Postal Code: Same as Report To YES 🗌 NO Invoice Distribution Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below Invoice To ON HOLD ONTAINERS Select Invoice Distribution: 🖓 EMAIL 🗌 MAIL Copy of Invoice with Report YES NO FAX Email 1 or Fax operations@eaststpaul.com Company: Email 2 Contact: Oil and Gas Required Fields (client use) Project Information line) ALS Account # / Quote #: Q74289 AFE/Cost Center: PO# Mator/Minor Code: Routing Code: õ Job #: AMPLES NIONS-N2N3-IC-N-WP PO/AFE: Ь Requisitioner: OLIDS-TOTSUS-WP LSD: Location: CHL-FLUORO-WP NUMBER CONDUCTIVITY URBIDITY-WP CL2-TOTAL-WP ALS Lab Work Order # (lab use only): L235(375 IH3-COL-WP ALS Contact: Sampler: тм Connor Cattani -T-COL-WP 12-DIS-WP ECALS Sample Identification and/or Coordinates Date Time ALS Sample # Sample Type ഗ് (lab use only) (This description will appear on the report) (dd-mmm-yy) (bb:mm) sυ 19-Sep-19 11:15 Water 3 R R R R R R R R SL 19-Sep-19 11:05 3 R R R R R R R Water R R R R P1 U 10:19 4 R R R R R Ъ 19-Sep-19 Water u P2 L 10:25 3 R R R 19-Sep-19 Water R R R R ¢ 3 R R P3 L 19-Sep-19 10:37 Water R R R R R ₽4 L 19-Sep-19 10:42 Water 3 R R R R R R R 6 P6 L R ٦. 19-Sep-19 10:55 Water 4 R R R R R R R R ß SS A 19-Sep-19 9:20 Water 4 R R R R R R R R 4 SS B 19-Sep-19 9:13 Water 4 R R Ŕ R R R R R R SS C 19-Sep-19 9:37 R R R R R R R lo Water 4 R 1 SS D 19-Sep-19 9:47 Water 4 R R R R R R R R CS U 19-Sep-19 11:30 4 R R R R R 1 Water R R R SAMPLE CONDITION AS RECEIVED (lab use only) Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below Drinking Water (DW) Samples¹ (client use) (electronic COC only) SIF Observations Frozen П Yes 10 No Are samples taken from a Regulated DW System? Ice Packs 🔲 Ice Cubes 🔲 Custody seal infact Yes Mo TYES NO. Cooling Initiated Are samples for human consumption/ use? NIITIAL COOLER TEMPERATURES *C FINAL COOLER TEMPERATURES *C TIYES INO 14) INITIAL SHIPMENT RECEPTION (lab use only) FINAL SHIPMENT RECEPTION (lab use only) SHIPMENT RELEASE (client use) Time: 21 Time: Released by: Date: Received by: 440 Received by: Date

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

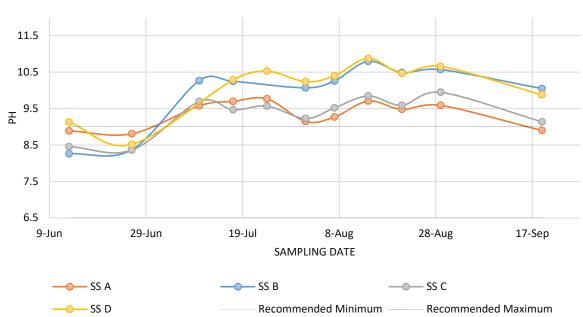
WHITE - LABORATORY COPY YELLOW - CLIENT COP

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical OC Number: 17 -**Request Form** 351375-COFC of Canada Toll Free: 1 800 668 9878 www.alsglobal.com Select Service Lever Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Report Format / Distribution Contact and company name below will appear on the final report Report To RM of East St. Paul Select Report Format: 🔽 PDF [EXCEL 🔲 EDD (DIGITAL) Regular [R] [7] Standard TAT if received by 3 pm - business days - no surcharges apply Company: Quality Control (QC) Report with Report I YES INO 4 day [P4-20%] Business day [E - 100%] Leanne Shewchuk Contact Compare Results to Criteria on Report - provide details below if box checked 3 day (P3-25%) 204-668-8112 x 4503 Same Day, Weekend or Statutory holiday [E2 -200% Phone: П Select Distribution: 🔽 EMAIL 🔲 MAIL 🛄 FAX (Laboratory opening fees may apply)] 2 day [P2-50%] Company address below will appear on the final report Email 1 or Fax leanne.shewchuk@eaststpaul.com Date and Time Required for all E&P TATs: 3021 Birdshill Road dd-mmm-yy hh:mm Street: operations@eaststpaul.com For tests that can not be performed according to the service level selected, you will be contacted. East St. Paul, MB Email 2 City/Province: Analysis Request R2E 1A7 Email 3 Postal Code: Invoice Distribution Indicate Filtered (F), Preserved (P) or Fittered and Preserved (F/P) below ON HOLD Same as Report To TYES 🗌 NO Invoice To ŝ Special Instructions) Select Invoice Distribution: 🖓 EMAIL 🗂 MAIL FAX Ë YES NO Copy of Invoice with Report Email 1 or Fax operations@eaststpaul.com AIN Company: mail 2 Contact: **NU** Oil and Gas Required Fields (client use) Project Information ê PO# ALS Account # / Quote #: Q74289 AFE/Cost Center: SUSPECTED HAZARD (see Routing Code: Maior/Minor Code: C Job #: SAMPLES (Monochla Р NIONS-NZN3-IC-N-WP PO / AFE: Requisitioner: OLIDS-TOTSUS-WP SD: Location: CHL-FLUORO-WP Ľ CL2-TOTAL-WP CONDUCTIVITY "URBIDITY-WP NUMBE 4H3-COL-WP ALS Lab Work Order # (lab use only): 12351275 ALS Contact: TM P-T-COL-WP Connor Cattani Sampler: D2-DIS-WP FCALS Sample Identification and/or Coordinates Date Time ALS Sample # Sample Type (lab use only) (This description will appear on the report) (dd-mmm-vv) (hb:mm) 11:38 R R R R 19-Sep-19 3 R R R 13 CS L Water R R R R BTP 1 19-Sep-19 11:53 Water 3 Ř R 14 6 jang jang ka 1400 ÷. <u>r</u> 16 1 4 11er - 497 SAMPLE CONDITION AS RECEIVED (lab use only) Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below Drinking Water (DW) Samples¹ (client use) (electronic COC only) SIF Observations П Yes 1 ·] No Frozen ice Packs 🔲 ice Cubes 🔲 Custody seal intact . •• Are samples taken from a Regulated DW System? Yes No YES NO 1211 Cooling Initiated FINAL COOLER TEMPERATURES *C INITIAL COOLER TEMPERATURES *C Are samples for human consumption/ use? 11.5 TYES TNO FINAL SHIPMENT RECEPTION (lab use only) INITIAL SHIRMENT RECEPTION (lab use only) SHIPMENT RELEASE (client use) Time: 22 Released by: Time: Received by: Received by: Date Date:

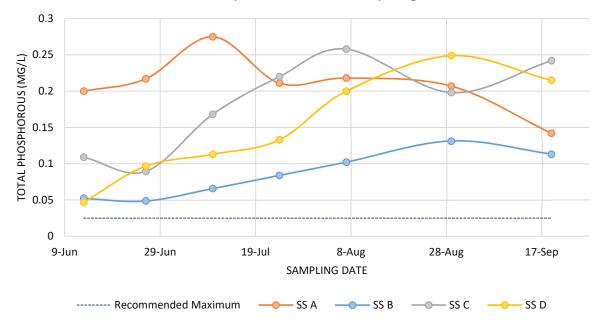
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY / J Failure to complete all partions of this form may delay analysis. Please fill in this form LEGIBLY, By the use of this form the user acknowledges and agrees with the forms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated brinking Water (DW) System, please submit using an Authorized DW COC form.

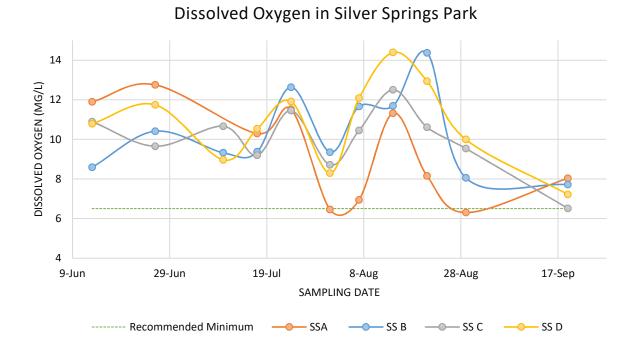
Appendix 3- Graphs of Water Quality Data



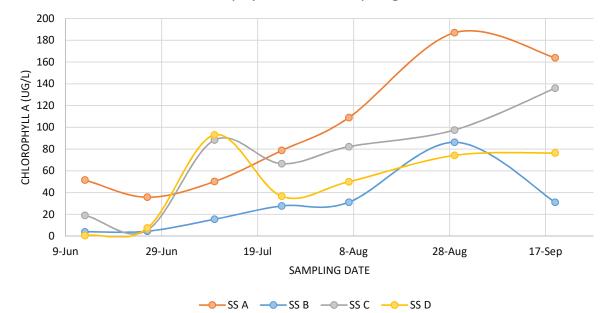
pH Levels in Silver Springs Park

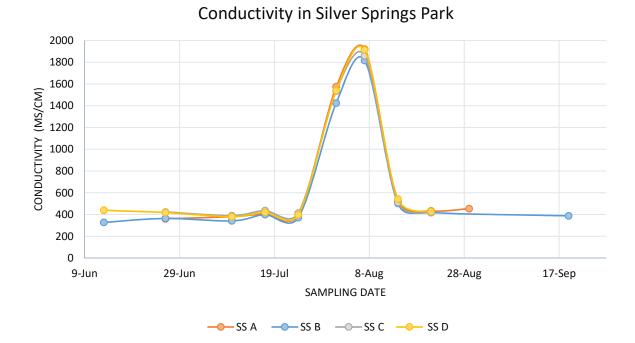
Total Phosphorous in Silver Springs Park





Chlorophyll-A in Silver Springs Park





Water Temperature in Silver Springs Park 26 24 TEMPERATURE (°C) 18 18 16 14 9-Jun 29-Jun 19-Jul 8-Aug 28-Aug 17-Sep SAMPLING DATE SSA SS B ------------------------------SS C 🗕 SS D