Environment | Water Resources Branch

Marsh Lake Wastewater Treatment Facility Water Resources Revised Audit Report

Date of site visit: July 13, 2020

Licensee: Yukon Government – Community Services

Licence number: MS97-076-2 (Expired); MN20-058 (effective June 25, 2021)

Distribution list: YG-ECI, YG-CS, KDFN, CTFN, ECCC

Report Issued: Originally released February 2021; revised September 2021

Field Team: Tyler Williams, Norbert Botca, Ralph Yuson, Brendan Mulligan

Lead Author: Tyler Williams

The Water Resource Branch (WRB) is responsible for monitoring surface and groundwater in Yukon and is committed to responsible management, protection and conservation of the territory's water resources. As technical experts in water resources, we provide advice for compliance and inspections purposes and conduct reviews of projects undergoing water licensing and environmental assessment processes.

One of WRB's responsibilities is to conduct site visits of various undertakings that use or deposit waste to water. Site visits are undertaken to improve understanding of a project's effects on the receiving water environment, with the intention of identifying emerging issues and enhancing understanding of existing water quality and quantity conditions to support technical advice and input into assessment, licensing, and post-licensing processes. The opinions and recommendations expressed in this report are based on relevant data, reports, interpretation/analyses of scientific information available to WRB, and what was observed in the field.

This report is a revised version of the preliminary report released in February 2021 Due to COVID-19, the analytical laboratory at Environment and Climate Change Canada had been closed for an extended period of time. As a result, artificial sweetener samples were frozen and analyzed almost exactly one year after they had been sampled. This version of the report was revised to include these results.

Contents

Key Findings

- Wastewater from the exfiltration lagoon is unlikely to emerge in the surface depression west of the facility under current operating conditions;
- Wastewater from the lagoon is unlikely to be detectable in Judas Creek;
- At the time of the field visit, there remained considerable uncertainty as to the exact direction of groundwater flow around the facility. Additional information has now been gathered (AE, 2021) and depicts complex groundwater behavior around the facility;

Audit objectives

1. Determine whether there is a detectable presence of wastewater in Judas Creek or nearby ponds to inform future monitoring needs
2. Evaluate the direction of groundwater flow from the facility at the time of visit
3. Collect further data to inform the impact of the facility on the d/g well

Background

History

The Marsh Lake Wastewater Treatment Facility (MLWTF) was constructed in 1997 to receive raw septage trucked from local communities. The facility consists of a lined anaerobic lagoon to receive raw influent and settle solids, which then spills into an exfiltration lagoon where water evaporates and infiltrates to ground (ELR, 2020a).

The facility has not operated since September 2018. The anaerobic lagoon currently requires desludging and samples of the sludge have indicated levels exceeding the relevant *Contaminated Sites Regulation* (CSR) standards for hydrocarbons and zinc (ELR, 2020a). The previous water licence (MS97-076-2) expired June 1, 2020. A new water licence (MN20-058) was issued in June 2021, including authorization of sludge drying beds to facilitate desludging.

The expired licence required water monitoring from two groundwater wells (ML-3 and ML-4), a kettle pond 750m down slope of the facility (ML-7), two sites upstream and downstream on Judas Creek (ML-5 and ML-6) (Figure 1a), and two potential seep locations, which have never had any observed flow (ML-1 and ML-2). The new licence

removed the requirements for ongoing surface water sampling, and added additional groundwater sampling stations.

Hydrogeology

Hydrogeological interpretations were made as part of the original water licence application in 1997, based primarily on surface topography and the stratigraphy in three wells that did not reach the water table (NovaTec, 1997; EBA, 1997). These wells were completed in overburden of mostly sand and gravel to depths close to 30m. It was hypothesized that groundwater from the facility discharged to surface in one of three ways: 1) via seeps in a depression west of the facility; 2) via the kettle lake ~750m to the southwest; or 3) via Judas Creek ~1km to the southwest. A conservatively fast estimate of travel time predicted a minimum of 10 years to emerge on slope of the depression west of the facility (EBA, 1997).

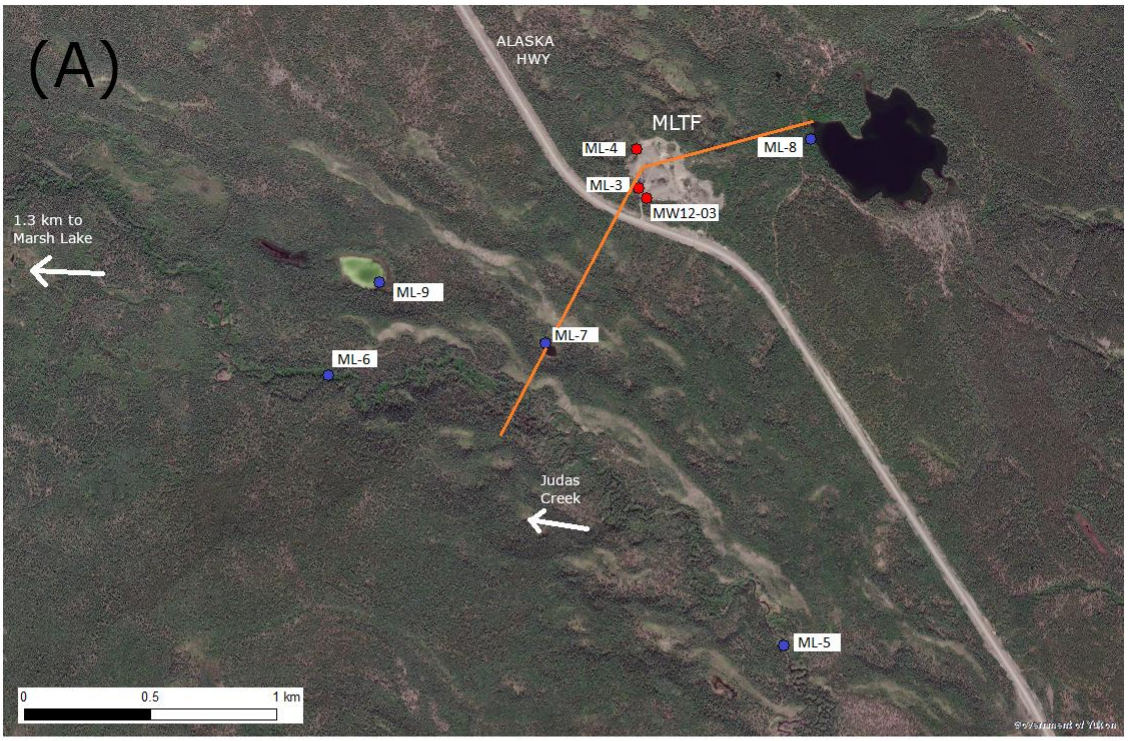
Additional hydrogeology interpretations were made in 2012 based on three new wells (Golder, 2013), and again in 2020 (AE, 2021) based on four new boreholes installed after the WRB field visit. Both of these documents (Golder, 2013; AE, 2021) only became available in the final editing stages of this report; therefore, information from these studies was largely not considered in the subsequent analysis sections of this report.

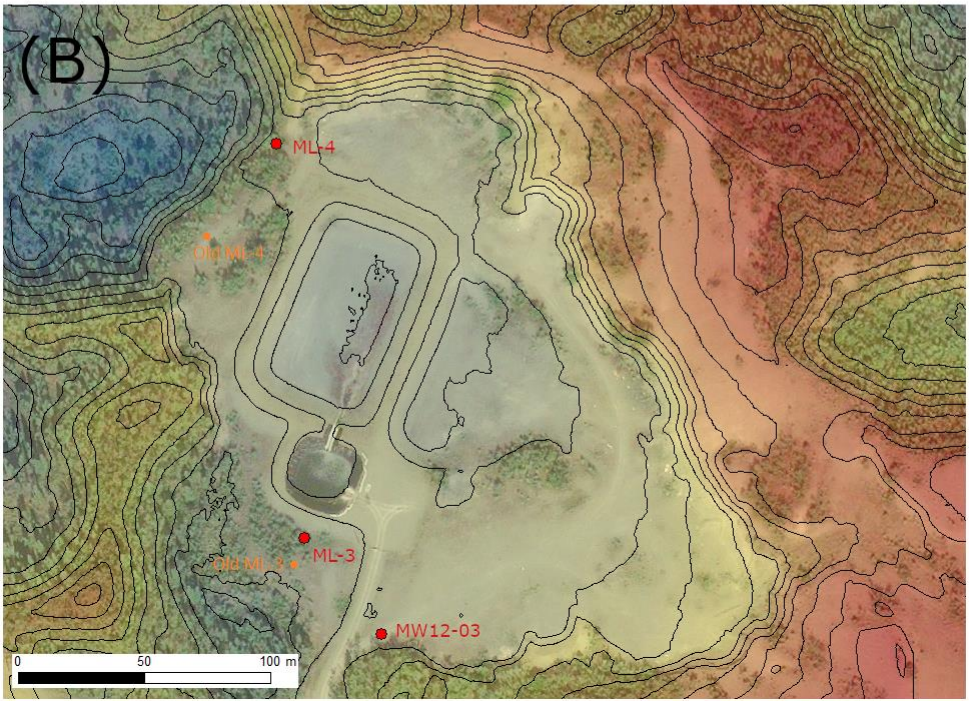
The interpretations based on the 2020 field work concluded that there is a confined aquifer along the east side of the facility with groundwater flows generally towards the southwest at 0.01 to 1.5 m/day, and an unconfined aquifer along the west side of the facility with flows generally towards the west estimated at 8 m/day. This suggests considerably faster travel times then predicted by the 1997 work.

The wells that are currently monitored as ML-3 and ML-4 are not the same wells as were originally referenced by these codes in the original licence MS97-076 (Figure 1b). In the case of ML-3, the new well is only a few meters from the original well; however, ML-4 has been relocated by about 50 m, with the older ML-4 (aka BH119192-02) well situated west of the exfiltration lagoon about half way up the long side of the lagoon (EBA, 1997). Based on the original hypotheses for potential flow directions, we expect that both ML-3 and ML-4 were originally intended to monitor potential downgradient flow paths. Recent reporting has referred to ML-3 as the downgradient well, and the relocated ML-4 as the upgradient well (ELR, 2020b).

Figure 1c shows the 2012 wells (with observed well depths of 37 and 43 m) in comparison to the local topography. The surficial geology between the facility and Judas Creek is identified as glaciofluvial sands and gravels (sgFGhtrM) (Yukon Geological Survey, 2014). Several elongated steeply sloping ridges run parallel to Judas Creek in-

between the creek and the MLWTF. The pond to the east of the MLWTF (ML-8) is upslope of the facility (Figure 1c).





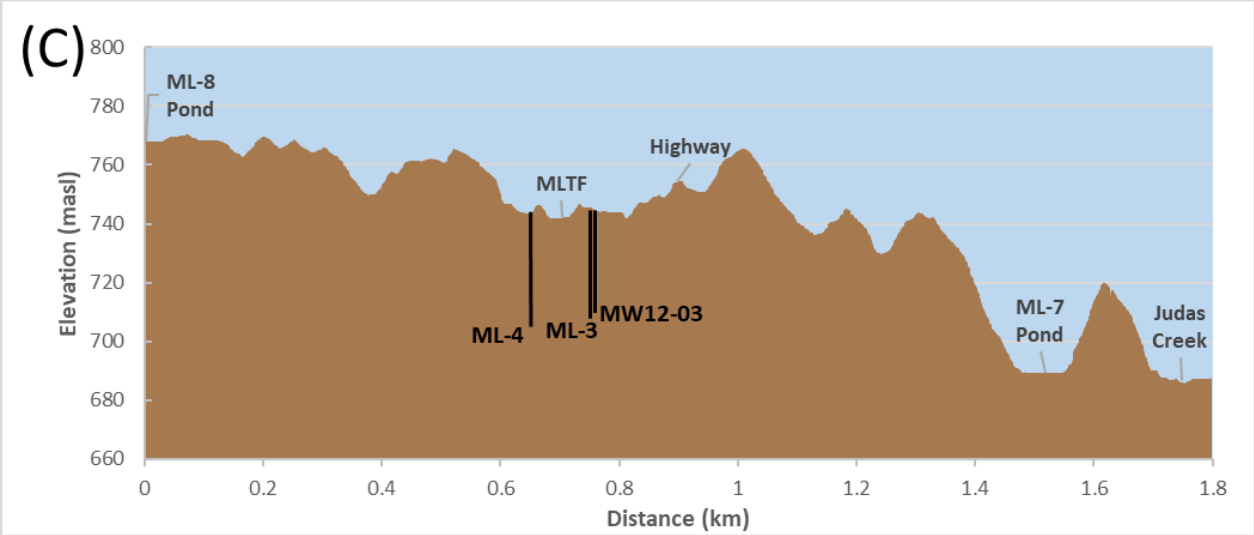


Figure 1: (A)Water monitoring locations sampled during audit around MLWTF with groundwater sampling locations in red, and surface water locations in blue; (B) surface elevation in the vicinity of the lagoons with 2m contours (red shading indicating higher ground); and (C) cross section of the profile identified by the orange line in figure 1A, elevation source: Yukon Government LiDAR.

Flow Volumes

The facility was designed for an influent of 35 m^3/day over a five month period (ELR, 2020a), which is about 5,250 m^3 total. Actual influent volumes have been well below that (see Figure 3) with the highest annual influent reported at 1,833 m^3 (source: annual reports since 2012). For comparison purposes, Judas Creek at the point where it passes the MLWTF has a drainage area of roughly 200 km^2; using a conservatively low end prediction for the mean annual runoff (73mm: Yukon Ecoregions, 2004), this equates to about 1.46 x 10^7 m^3 of annual flow.

Site Visit

Water Resources Branch (WRB) conducted the field audit on July 13, 2020. The team split into two groups: one sampling the groundwater wells and ML-8, the second group conducting surface water sampling south and west of the highway (Table 1). Access to Judas Creek was difficult with thick bush and undulating terrain. Each team collected field parameters using separate YSI ProDSS multiparameter sondes and sent samples for analysis to CARO labs. Additionally, artificial sweetener samples were collected, frozen, and sent to ECCC labs. The sweetener samples were analysed on July 27, 2021.

Weather during the site visit was mostly overcast with a few sunny breaks in the afternoon. Air temperatures were around 15°C. Rainfall had generally been above normal in the region in the weeks leading up to the site visit; however, conditions had been relatively dry for the past few days. Flow in Judas Creek appeared to be moderate based on the size of the channel.

Table 1. Water Quality Sampling Locations

Groundwater	Alias	Site Description
ML-3	MW12-02	2012 well south of anaerobic lagoon
ML-4	MW12-01	2012 well northwest of infiltration lagoon
MW12-03		2012 well southeast of anaerobic lagoon
Surface Water	**Site Description**	
ML-5	Judas Creek upstream	
ML-6	Judas Creek downstream	
ML-7	Pond apx. 750 m south-southwest of the facility	
ML-8 *	Pond apx. 700 m east of the facility	
ML-9	Pond apx. 800 m southwest of the facility	

*note: In the water licence issued in June 2021: ML-8 is identified as 'center of the anaerobic lagoon'. This has created a duplicate meaning for this code.

Results

Groundwater Chemistry

Past groundwater chemistry results from ML-3 and ML-4 have shown elevated concentrations of some parameters in the presumed downgradient well (ML-3) when compared with the presumed upgradient well (ML-4) (ELR, 2020b). This has occasionally included the presence of hydrocarbons (specifically EPH_{w10-19} and EPH_{w19-32}) in ML-3. However, further analysis of these EPH detections in May 2020 using silica-gel analysis found undetectable levels, and this was interpreted to mean the hydrocarbons were biogenic in origin (ELR, 2020b). Notably, silica-gel analysis is expected to reduce the concentration regardless of the origin compared to non-silica-gel analysis, and so a sufficiently high enough detectable result is needed to confirm a beiogenic origin. As the current interpretation, is based on a single sample with a fairly low EPH, it is difficult to make concrete conclusions at this time.

Samples from the July site visit were analyzed for aggregated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs), with no detections in any of the three groundwater wells (Table 2 and Appendix D).

Table 2 shows that concentrations of some metals and nutrients in the presumed downgradient wells (ML-3 and MW12-03) are elevated relative to the presumed upgradient well (ML-4). In particular, relatively-elevated nitrate, ammonia, and phosphorus concentrations in the presumed downgradient wells are all probable effects from wastewater influence. However, the concentrations observed in these wells are not elevated in an absolute sense. All metals and nutrients with CSR standards are well below these standards in these wells (Table 2). For example, ammonia in the downgradient wells is approximately two orders of magnitude below the calculated CSR standard for ammonia (3.7 mg/L, in this case).

A Piper plot (Figure 2) shows that all of the water samples collected during this audit are of the same water type. No clear impact to the downgradient wells is observed. Although no sewage effluent chemistry is available, we would expect relatively-elevated sodium and chloride in the source wastewater (plotting further to the right on both the ternary plots and the diamond-shaped part of the diagram); however, the presumed downgradient wells remain calcium/magnesium-bicarbonate type water. Chloride concentrations in the presumed downgradient wells are elevated relative to the presumed upgradient well; however, they are less than 1 mg/L (Table 2).

Overall, the chemical data indicate that the presumed downgradient wells are influenced by wastewater, but not significantly.

Table 2: Groundwater chemistry results compared between the presumed upgradient well (ML-4) and two presumed downgradient wells (ML-3 and MW12-03). Percent differences are expressed between the upgradient and downgradient wells, with red shading indicating increasing concentrations downgradient, and blue shading indicating decreasing concentrations downgradient. Where detections downgradient are compared with non-detects upgradient, these are identified as "increase". CSR standards are presented as in Schedule 3 of the *Contaminated Sites Regulations*; proposed WQO's were obtained from values presented in the ongoing water licence process for MN20-058.

	Standards		Monitoring Data			Percent Difference *	
Dissolved Metals	**CSR**	**Proposed WQO**	**ML-4**	**ML-3**	**MW12-03**	**ML-4 & ML-3**	**ML-4 & MW12-03**
Aluminum (mg/L)			**	<0.005	<0.005	ND	ND
Antimony (mg/L)	0.2		<0.0002	0.00023	0.0002	Increase	Increase
Arsenic (mg/L)	0.05		<0.0005	0.00086	0.00071	Increase	Increase
Barium (mg/L)	10		0.0556	0.0175	0.0355	-104%	-44%
Beryllium (mg/L)	0.053		<0.0001	<0.0001	<0.0001	ND	ND
Bismuth (mg/L)			<0.0001	<0.0001	<0.0001	ND	ND
Boron (mg/L)			<0.05	0.159	0.126	Increase	Increase
Cadmium (mg/L)	calc.		<0.00001	0.000168	<0.00001	Increase	ND
Calcium (mg/L)			67.6	58.3	53.9	-15%	-23%
Chromium (mg/L)			0.00113	0.00682	0.00331	143%	98%
Cobalt (mg/L)	0.009		<0.0001	<0.0001	<0.0001	ND	ND
Copper (mg/L)	calc.		0.00117	0.00083	0.00071	-34%	-49%
Iron (mg/L)			<0.01	<0.01	<0.01	ND	ND
Lead (mg/L)	calc.		<0.0002	<0.0002	<0.0002	ND	ND
Lithium (mg/L)			0.00218	0.00363	0.00328	50%	40%
Magnesium (mg/L)			26.4	40.3	34.6	42%	27%
Manganese (mg/L)			0.00025	0.00101	0.00037	121%	39%
Molybdenum (mg/L)	10		0.00125	0.00816	0.00747	147%	143%
Nickel (mg/L)	calc.		0.00205	0.00303	0.00171	39%	-18%
Phosphorus (mg/L)			<0.05	<0.05	<0.05	ND	ND
Potassium (mg/L)			1.87	2.47	2.27	28%	19%
Selenium (mg/L)	0.01		<0.0005	0.0029	0.002	Increase	Increase
Silicon (mg/L)			5	6	5.6	18%	11%
Silver (mg/L)	calc.		<0.00005	<0.00005	<0.00005	ND	ND
Sodium (mg/L)			4.95	6.2	4.74	22%	-4%
Strontium (mg/L)			0.547	0.494	0.391	-10%	-33%
Sulphur (mg/L)			21.4	23	19.2	7%	-11%
Tellurium (mg/L)			<0.0005	<0.0005	<0.0005	ND	ND
Thallium (mg/L)	0.003		<0.00002	<0.00002	<0.00002	ND	ND
Thorium (mg/L)			<0.0001	<0.0001	<0.0001	ND	ND
Tin (mg/L)			<0.0002	0.00024	0.00033	Increase	Increase
Titanium (mg/L)	1		<0.005	<0.005	<0.005	ND	ND

Tungsten (mg/L)			<0.001	<0.001	<0.001	ND	ND
Uranium (mg/L)	3		0.000621	0.000384	0.00111	-47%	56%
Vanadium (mg/L)			<0.001	<0.001	<0.001	ND	ND
Zinc (mg/L)	calc.		<0.004	<0.004	<0.004	ND	ND
Zirconium (mg/L)			<0.0001	<0.0001	<0.0001	ND	ND
Nutrients, Physical, Routine							
Chloride (mg/L)			0.42	0.99	0.99	81%	81%
Sulphate (mg/L)	1000		65.5	65.6	61.1	0%	-7%
Bromide (mg/L)			<0.10	<0.10	<0.10	ND	ND
Ammonia (mg/L)	calc.	calc.	<0.050	0.092	0.055	Increase	Increase
Nitrate, as N (mg/L)	400		0.126	0.266	0.386	71%	102%
Nitrite, as N (mg/L)	calc.		<0.01	<0.01	<0.01	ND	ND
Phosphorus, Total Phosphate (mg/L)			0.0516	0.394	1.1	154%	182%
Dissolved Organic Carbon (mg/L)			4.34	6.57	4.53	41%	4%
Total Inorganic Carbon (mg/L)			62.1	74.9	82.5	19%	28%
Total Organic Carbon (mg/L)			4.49	7.01	5.43	44%	19%
Dissolved Inorganic Carbon (mg/L)			60.5	66.1	64.8	9%	7%
Alkalinity, Bicarbonate (mgCaCO3/L)			272	278	273	2%	0%
Alkalinity, Carbonate (mgCaCO3/L)			<1.0	<1.0	<1.0	ND	ND
Alkalinity, Hydroxide (mgCaCO3/L)			<1.0	<1.0	<1.0	ND	ND
Alkalinity, Phenolphthalein (mgCaCO3/L)			<1.0	<1.0	<1.0	ND	ND
Alkalinity, Total (mgCaCO3/L)			272	278	273	2%	0%
pH, Field		6 to 9	7.59	7.88	7.71	4%	2%
pH, Lab		6 to 9	8.05	8.14	8.13	1%	1%
Hardness (mgCaCO3/L)			278	312	277	12%	0%
Specif Cond. = Field (uS/cm)			574	551	547	4%	3%
Specific Cond. - Lab (uS/cm)			530	558	551	5%	4%
TSS (mg/L)			44	680	4730	176%	196%
Hydrocarbons ***							
EPH10-19 - silica gel analysis (ug/L)			<250	<250	<250	ND	ND
EPH19-32 - silica gel analysis (ug/L)			<250	<250	<250	ND	ND
EPH10-19 (ug/L)	5000	5000	<250	<250	<250	ND	ND
EPH19-32 (ug/L)			<250	<250	<250	ND	ND
HEPH (ug/L)			<250	<250	<250	ND	ND
LEPH (ug/L)	500		<250	<250	<250	ND	ND
VH (mg/L)	15	1.5	<0.1	<0.1	<0.1	ND	ND
VPH (mg/L)	1.5	0.5	<0.1	<0.1	<0.1	ND	ND

* Dark shading indicates percent differences >100%, light shading indicates differences of 30-100%.

** Result for dissolved aluminum removed as believed to be erroneous based on difference from replicate sample (see Appendix C, Table C2)

*** Full hydrocarbons results available in Appendix D; all results non-detect.

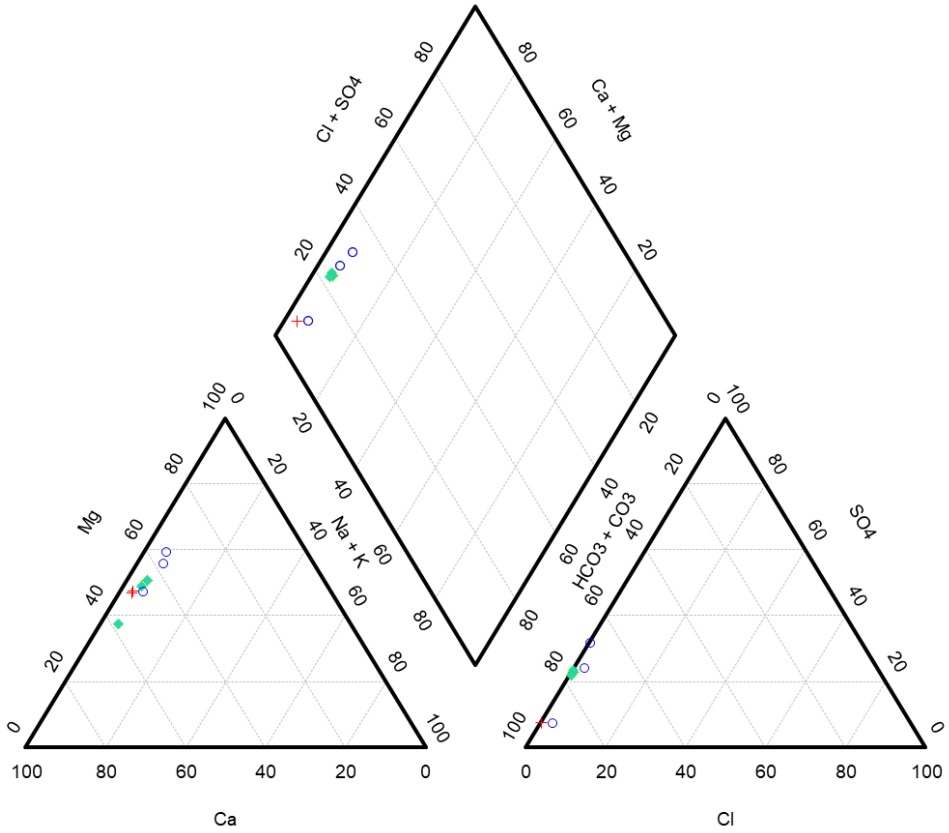


Figure 2: Piper Plot showing major ion chemistry for samples collected during the audit. Green diamonds represent groundwater samples (ML-3, ML-4, and MW12-03); blue circles represent ponds (ML-7, ML-8, ML-9), and red crosses represent Judas Creek (ML-5 and ML-6). The two Judas Creek sites have effectively identical major ion chemistry and so plot on top of each other in each part of the plot.

Artificial Sweeteners

Table 4: Artificial sweetener results as analyzed by Environment and Climate Change Canada (ECCC) laboratory. mdl: minimum detection limit; pql: practical quantitation limit. Asterixes denote results greater than the mdl, but less than the pql.

	Acesulfame (ng/L)	**Saccharin (ng/L)**	**Cyclamate (ng/L)**	**Sucralose (ng/L)**
mdl	2	2	3	20
pql	6	6	8	60
Groundwater				
ML-4	<2	2 *	<3	<20
ML-4 (duplicate)	<2	4 *	<3	<20

ML-3	7 *	10	<3	<20
MW12-03	4 *	10	<3	<20
Judas Creek				
ML-5	<2	3 *	<3	<20
ML-6	<2	3 *	<3	<20
Ponds				
ML-7	<2	4 *	<3	<20
ML-8	<2	3 *	<3	<20
ML-9	<2	2 *	<3	<20

Studies over the past 10 years have demonstrated artificial sweeteners are an effective tracer of domestic wastewater (Spoelstra et al., 2017). Artificial sweeteners are widespread in products consumed by humans such as beverages, pharmaceuticals, and toothpaste; they are not found naturally in the environment; and they are relatively slow to degrade.

Although all sites had saccharin results greater than the minimum detection limit (mdl), only two sites (ML-3 and MW12-03) had results above the practical quantitation limit (pql). Those same two sites also had detectable (although below pql) acesulfame, which is notable because acesulfame is considered to be the most stable of the four sweeteners (Spoelstra et al., 2013). Additionally, of the batch of 56 WRB sweetener samples analyzed by the ECCC lab in July 2021, only 1 returned a result less than the mdl for Saccharin, whereas 50 samples returned a result less than the mdl for acesulfame, suggesting that the Saccharin results may be representative.

The sweetener concentrations detected at ML-3 and MW12-03 are low relative to what would be expected in source wastewater. For reference, acesulfame concentrations in other Yukon wastewater lagoons (Whitehorse, Haines Junction, Carcross) have been measured by WRB in thousands to tens-of-thousands of ng/L.

Overall, the artificial sweetener results support the interpretations from the chemistry data; i.e. that ML-3 and MW12-03 are minimally influenced by wastewater, and ML-4 is not influenced by wastewater.

Groundwater Level

Groundwater level data from the three wells during the July 2020 visit (Table 3), and from the historical record (Figure 3), demonstrate some unexpected results with respect to the presumed upgradient and downgradient wells. Despite the fact that ML-4 has been presumed to be the upgradient well, it currently has the lowest hydraulic head of the three wells and had a lower hydraulic head than ML-3 in all but two monitoring events (in 2013 and 2014). While ML-3 has very consistant water levels observed since 2012, ML-4 has had water levels drop by about 2m since 2015 (Figure 3). Additionally, the two 2020 measurements show a significantly higher water level at MW12-03 then either of the other two wells, despite the fact that MW12-03 and ML-3 are within about 50m and have similar well depths.

Explaining why these results appear to contradict the story provided by looking at the well chemistry is not straight forward; however, additional information recently made available (AE, 2021) suggests a complex dynamic with heterogenous groundwater conditions and multiple flow directions. The artificial sweetener results support the chemistry data that suggests wells ML-3 and MW12-03 are influenced by wastewater. Although the AE report (2021) suggests MW12-03 is completed in a confined aquifer, the presence of detectable acesulfame in this well is evidence of a hydraulic connection to wastewater, suggesting that the supposed confining layer is leaky or perhaps that MW12-03 is completed in an unconfined aquifer.

The water levels in the wells are still 16-25m below the elevation of the surface depression located to the WNW of the lagoon, which was identified in original groundwater reports as a potential receptor of lagoon water, and is at about 732 masl. These observations are consistent with the ML-1 and ML-2 seepage monitoring which has never observed any flowing seepage. It does not appear likely that wastewater would emerge in this depression under current operations.

All of the above inferences are based on water level data that relied on surface elevations derived from LiDAR sources (Table 3). All wells (except WL-4) were surveyed in late 2020 (AE, 2021); however, this information was not available at the time of this analysis. LiDAR data produces highly accurate elevations; however, identifying the x,y location of each well is based on navigation gps data that carries greater uncertainty. There are elevation data (presumably surveyed) reported for the older (dry and inactive) wells previously referred to as ML-3 and ML-4 that are located at similar elevations. These collar elevations were reported as 744.3 masl and 745.3 masl (respectively). For ML-3,

which has the new and old wells located very close together, this is within 0.2m of the LiDAR derived elevations, providing some confidence in the accuracy of these elevations.

Table 3: Groundwater levels observed during the July 2020 audit. Ground surface elevations are LiDAR derived elevations (source: Yukon Government) based on the location of each well as determined by a navigational GPS. Well depths and stick-ups are listed as observed in July 2020.

	Well Depth (mbtoc)	Ground Surface Elevation (masl)	Stick-Up (m)	Water Level (mbtoc)	Water Level (masl)
ML-4	43.46	746.8	0.55	40.522	706.8
ML-3	37.225	744.5	0.55	35.558	709.5
MW12-03	36.715	746.3	0.65	31.077	715.9

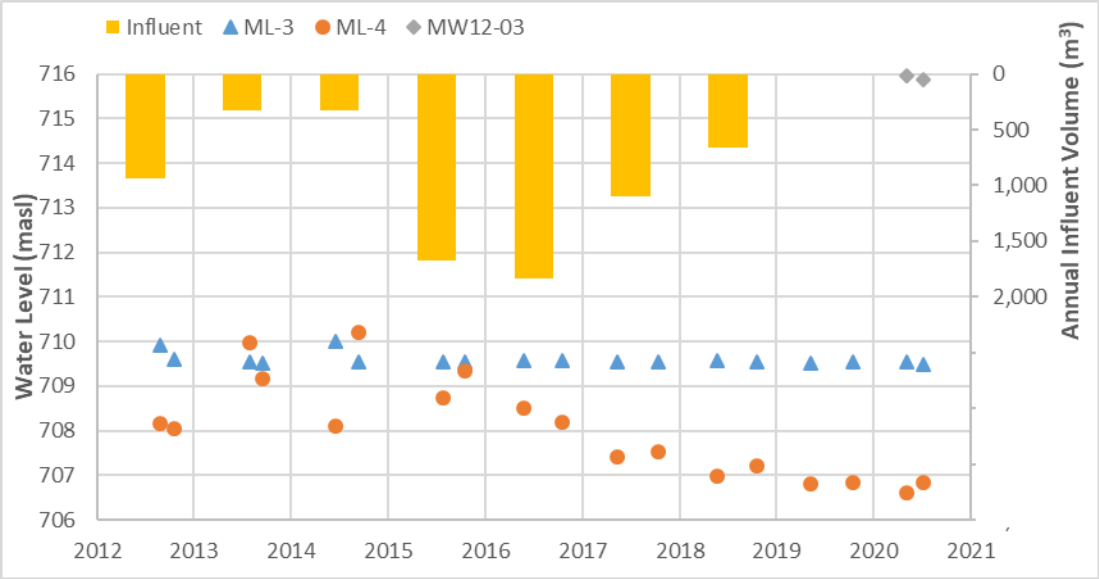


Figure 3: Water Level data expressed in meters above sea level (based on LiDAR derived surface elevations) using data obtained by WRB from water licence reporting, along with reported annual wastewater influent volumes (bar graph secondary axis).

Surface Water Quality

Nutrient sampling twice annually since 2012 in Judas Creek has shown no significant differences between upstream and downstream total nitrogen, total phosphorus,

ammonia, nitrite, or nitrate (Figure 4) (note: nitrite not displayed in figure as vast majority of samples are non-detect).

The audit sampling in Judas Creek occured for a wider range of paramaters than typically monitored, including total and dissolved metals and aggregate hydrocarbons. There were no substantial differences in chemistry between the upstream and downstream locations (Figure 5 and Figure 6) during this one sampling event. Additoinally, there were no exceedences of CCME or BCMoE protection of aquatic life guidelines. A detectable EPH_{w19-32} of 597 ug/L was observed in the upstream Judas Creek (ML-5) with undetectable EPH (<250 ug/L) at the downstream site (ML-6).

Similarily, the small ponds showed no significant differences in water chemistry attributable to the wastewater facility (Figure 2). Chloride was slightly elevated in the ponds (3.3 mg/L at ML-7 and 3/1 mg/L at ML-9); however, this is likely enhanced due to evaporation of ponds that have no surface water connections.

Artificial sweetener results likewise showed no evidence of detectable wastewater in either Judas Creek or the downgradient ponds.

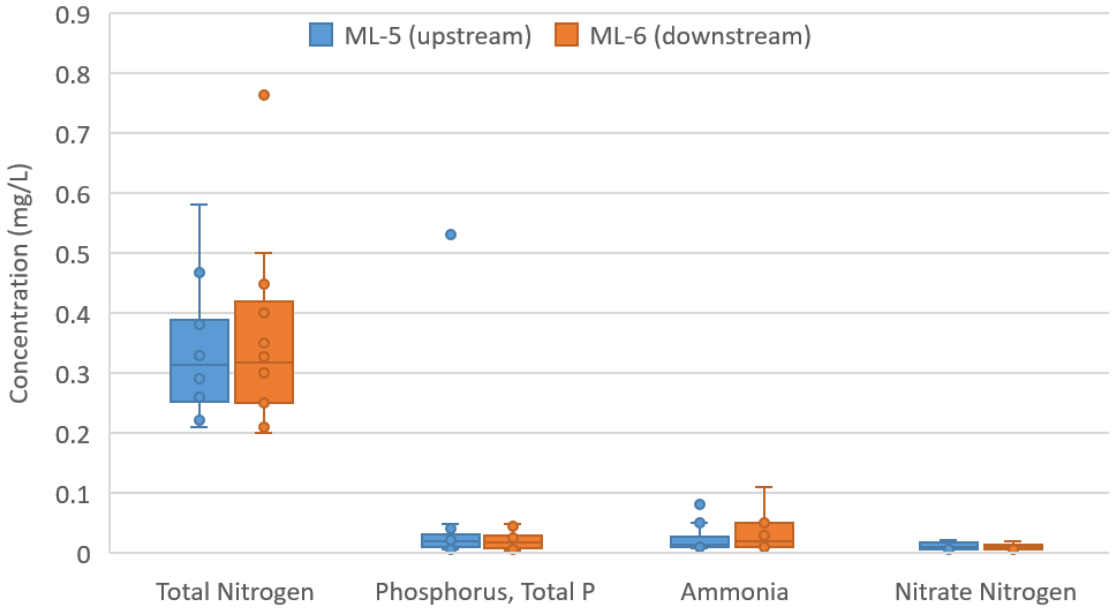


Figure 4: Box-Whisker plot of nutrient results in Judas Creek upstream (ML-5) and downstream (ML-6) of the MLWTF since 2012 (11-15 samples). Each box represents the inter-quartile range and whiskers represent the maximum and minimum samples excluding any outliers (depicted as solid circles) defined as being greater than 1.5*IQR ± (Q1 or Q3). There is a high occurrence of

non-detects in both ammonia and nitrate samples which have been presented in this plot at the detection level.

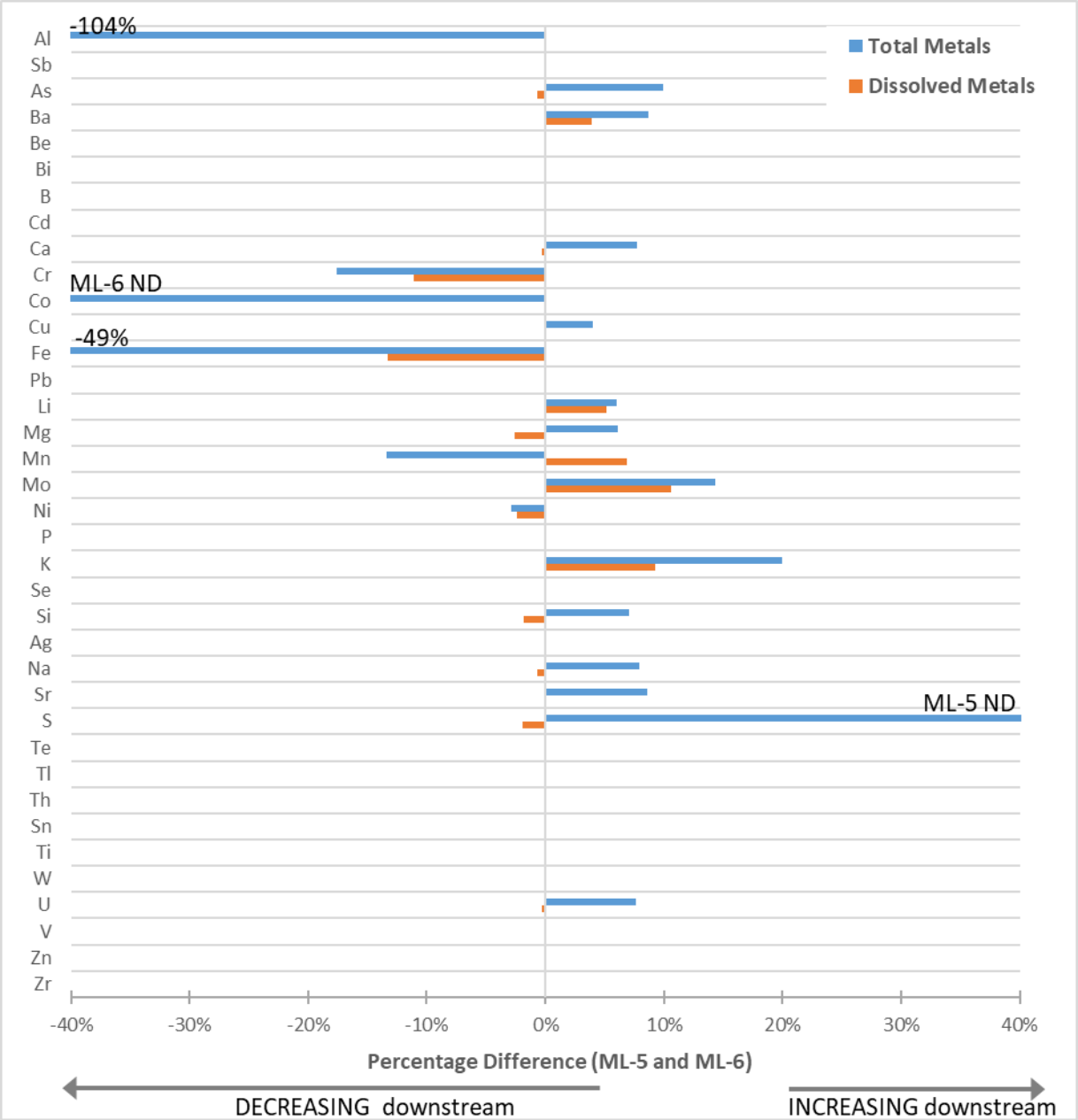


Figure 5: Total and Dissolved metals from one sample in Judas Creek in July 2020 expressed as a percentage difference between the upstream and downstream sites. Instances without results differences depicted are a result of non-detections from both sites.

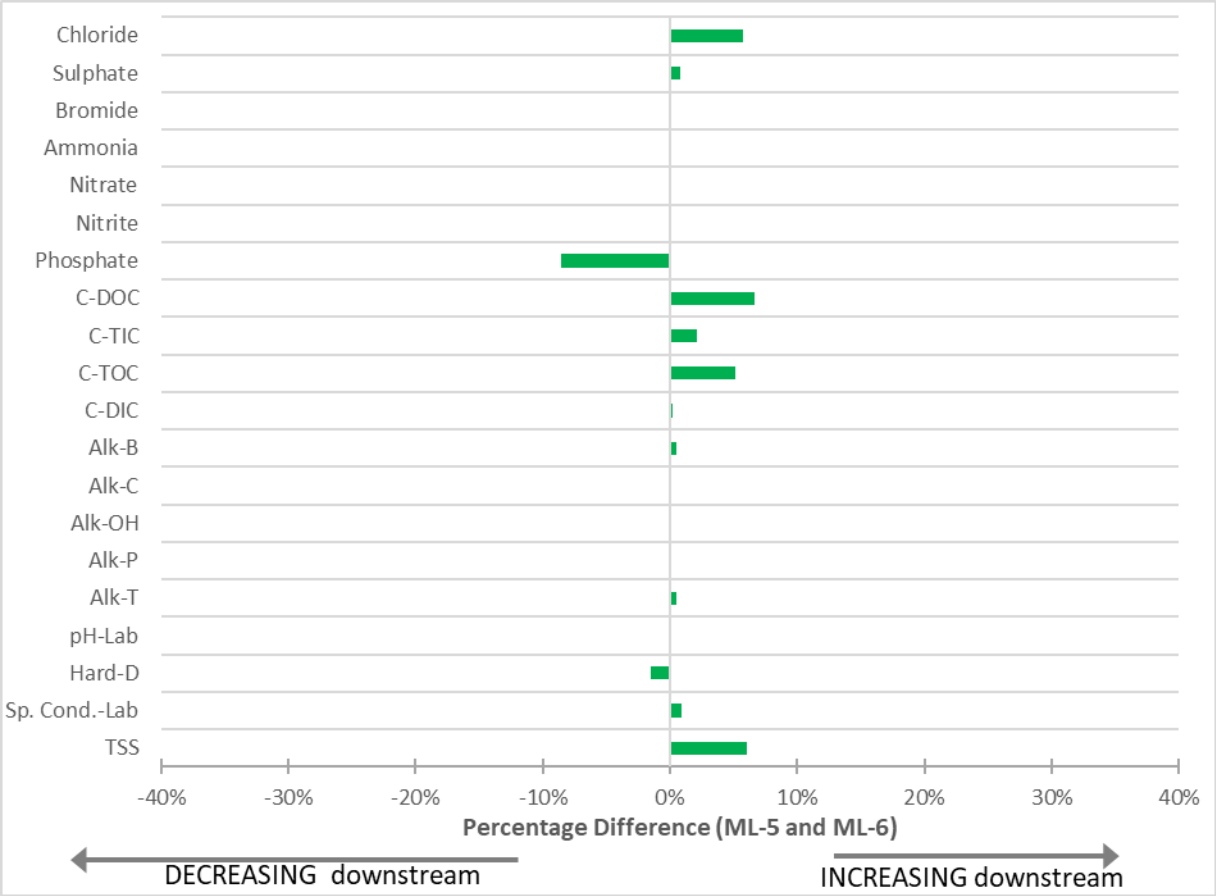


Figure 6: Nutrients, ions, and physical parameters from one sample in Judas Creek in July 2020 expressed as a percentage difference between the upstream and downstream sites. Instances without results differences depicted are a result of non-detections from both sites.

Conclusions

Objective 1: Determine whether there is a detectable presence of wastewater in Judas Creek or nearby ponds to inform future monitoring needs

- The water chemistry and artificial sweetener data collected in July 2020 show no indication of impacts to Judas Creek.
- Given current operations, it is unlikely that there would be any detectable impacts in the surface water receiving environment (Judas Creek and ponds) from the wastewater facility.

Objective 2: Evaluate the direction of groundwater flow from the facility at the time of visit

- At the time of this study there remained considerable uncertainty in the direction of groundwater flow. Additional information has now been gathered (AE, 2021) and depicts complex groundwater behavior around the facility.
- Although the AE 2021 report identified MW12-03 as a confined aquifer; the chemistry and artificial sweetener results suggest a connection to source wastewater. Either the supposed confining layer is leaky or perhaps MW12-03 screens an unconfined aquifer.

Objective 3: Collect further data to inform the impact of the facility on the downgradient wells

- Sampling of MW12-03, which has not been a part of regular licencee sampling, showed similar chemistry in MW12-03 to ML-3.
- Because neither well returned any detectable hydrocarbons, no further information on the nature of previously detected hydrocarbons was able to be inferred.

Recommendations

1. In the future, well logs produced during the drilling of monitoring wells should be submitted to the Yukon Water Well Registry.
2. Avoid using duplicate site sampling codes to have more than one meaning. Specifically, rename the sampling code for ‘center of the anerobic lagoon,’ which the water board has referred to as ‘ML-8’ in MN20-058 because this code has already been used and could lead to future database confusion and uncertainty.

References

AE, 2021. Marsh Lake Hydrogeological Study. Produced by Associated Engineering for Government of Yukon Community Services. February 2021.

EBA, 1997. Report on Permeability and Infiltration Rates. Submitted to the Yukon Water Board as part of application MS97-076.

ELR, 2020a. Marsh Lake WTF Upgrades – YESAA Project Proposal. July 2020. YESAA File #2020-0126-0002.

ELR, 2020b. Application for Type B Miscellaneous Water Licence – Marsh Lake Wastewater Treatment Facility. September 2020.

Golder, 2013. Marsh Lake Sewage Lagoon Hydrogeological Assessment. Produced by Golder for Government of Yukon Community Services. February 2013. Report Number 1114360073-517-R-Rev0-3100.

NovaTec Consultants Inc., 1997. Assessment of Potential Environmental Impacts of the Proposed Marsh Lake Wastewater Treatment and Disposal System. For Yukon Engineering Services Ltd. MS97-062 exhibit 1.6.2 available from www.yukonwaterboard.ca/waterline/

Spoelstra, J, S.L. Schiff, and S.J. Brown. 2013. Artificial Sweeteners in a Large Canadian River Reflect Human Consumption in the Watershed. PLoS ONE 9(8): e106394. https://doi.org/10.1371/journal.pone.0106394.

Spoelstra, J., N.D. Senger, and S.L. Schiff. 2017. Artificial Sweeteners Reveal Septic System Effluent in Rural Groundwater. Journal of Environmental Quality. 46:1434-1443.

USGS. Nevada Excel for Hydrology Piper Plot retrieved from: https://nevada.usgs.gov/tech/excelforhydrology/WaterQualityTools/PiperPlot-QW.XLS.

Yukon Ecoregions Working Group, 2004. Yukon Southern Lakes. In: Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes, C.A.S. Smith, J.C. Meikle and C.F. Roots (eds.), Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, p. 207-218.

Yukon Geological Survey, 2014. Surficial Geology Map Index. Yukon Geological Survey, http://data.geology.gov.yk.ca/Compilation/20; accessed September 23, 2020.

Appendix A: Field Notes

Yukon

Environment Yukon
Water Resources Branch

DUP ML-4D

Groundwater Well Purging and Sampling Record

Well ID: ML 4 **Date:** 20 07 13
Location: Marsh Lake Sewage lag. **Weather:** overcast
Project Name: Audit **Sampler:** NB ; RY

WELL INFORMATION

Well Cover Type Flush ☐ Lock ☒ Well Casing Diam.: 6-inch (15 cm) ☐
Stick-up ☒ 0.55 m above grade No-lock ☐ 2-inch (5 cm) ☒
Active Drinking Water Well ☐ Other: _____
Screened Interval (m bTOC): ? No info

PURGING INFORMATION AND OBSERVATIONS

DGW m bTOC (X) 40.522 m Time: 10:31
DTB m bTOC (Y) 43.460 m

Length of Water Column (X-Y) 5.9 m
Volume of Water in 2" Well = (X - Y) x 2 _____ L
Volume of Water in 6" Well = (17.7L/m) _____ L

LOGGER INFORMATION

LTC Serial #: _____
BL Serial #: _____
NEW LTC # TYPE
LTC downloaded at: _____
BL downloaded at: _____
Notes:

Purging Method

Grundfos Pump ☐
Hydralift Pump ☐
Peristaltic (Tubing set to: 0.5 m b~~TOC~~ BOW) ☒
Flow-through cell ☐
HydraSleeve 2.5 L (sampled at: _____ m bTOC) ☐
Other (specify) _____ ☐

UTM coordinates
Zone
E
N

Photos Taken (Y) / N

Volume Purged (L)	T°C	DO mg/L	SPC uS-mS/cm	pH	Turbidity FNU/NTU	ORP mV	Time	DTW m bTOC	Rate L/min
~10	6.0	11.27	578	7.82	11.52	—	10:40	40.522	
11	6.4	11.15	543	7.73	12.61	—	10:43	—"—	
20	6.4	11.10	540	7.61	24.03	—	10:48	—"—	
21	6.0	11.19	540	7.60	22.09	—	10:49	—"—	
22	6.0	11.24	541	7.59	23.41	—	10:50	—"—	
						11:00			

Odour Yes ☐ No ☒ Description: _____ Colour (initial) clear (stable) Brown (3)
Recovery* Slow ☐ Moderate ☐ Fast ☒

NOTES: Field Parameter and Stability Guidance: pH (±0.2 standard units); Temperature (±0.2 °C); Specific Conductance (±3%); Oxidation-Reduction Potential (±20mV); and if applicable: Dissolved Oxygen (±10% or ±0.2 mg/L – whichever is greater)
**Recovery Estimate - Slow: greater than 10 cm drawdown Moderate: slightly lower than 10 cm drawdown Fast: within 10 cm drawdown*

SAMPLING PARAMETER INFORMATION

Date and Time: _____

Sample ID: _____ Duplicate Sample ID: _____

Analytical Laboratory: _____

Analysis	Bottle	Preserved	Filtered
BOD	1L plastic	no	no
TIC/DIC	500 mL plastic	no	no
TOC	2x 40 mL vial	H_3PO_4-precharged	no
Nutrients	125 mL plastic	H2SO4-precharged	no
DOC	2x 40 mL vial	H_3PO_4-precharged	yes
Diss. Metals	125 mL plastic	HNO_3-precharged	yes
Diss. Mercury	40 mL vial	HCl-precharged	yes
Sweetener	plastic vial	no	yes
VOCs (within city limits)	40mL vial	precharged	no

Notes from previous site visit:

Current site visit notes:

Yukon

Environment Yukon
Water Resources Branch

Groundwater Well Purging and Sampling Record

Well ID: MW 12-03 ML
Location: Marsh Lake Sewage Lagoon
Project Name: Audit

Date: 20 07 13
Weather: Overcast
Sampler: NB; RY

WELL INFORMATION

Well Cover Type: Flush ☐ Lock ☐ Well Casing Diam.: 6-inch (15 cm) ☐
Stick-up ☒ 0.65 m above grade No-lock ☒ 2-inch (5 cm) ☒
Active Drinking Water Well ☐ Other: _____
Screened Interval (m bTOC): _____

PURGING INFORMATION AND OBSERVATIONS

DGW m bTOC (X) 31.077 m Time: 11:30
DTB m bTOC (Y) 36.715 m

Length of Water Column (X-Y) 5.638 m
Volume of Water in 2" Well = (X - Y) x 2 11.276 L
Volume of Water in 6" Well = (17.7L/m) _____ L

LOGGER INFORMATION

LTC Serial #: _____
BL Serial #: _____
NEW LTC # TYPE
LTC downloaded at: _____
BL downloaded at: _____
Notes:

Purging Method

Grundfos Pump ☐
Hydralift Pump ☐
Peristaltic (Tubing set to: _____ m bTOC) ☐
Flow-through cell ☐
HydraSleeve 2.5 L (sampled at: _____ m bTOC) ☐
Other (specify) BAILER ☒

UTM coordinates
Zone
E
N

Photos Taken Y / N

Volume *Purged (L)*	T°C	DO *mg/L*	SPC *uS-mS/cm*	pH	Turbidity *FNU/NTU*	ORP *mV*	Time	DTW *m bTOC*	Rate *L/min*
13	5.8	11.41	544	7.75	3482	—	12:20		
14	4.4	11.63	557	7.70	3133	-	12:22		
15	4.2	11.51	555	7.70	2981	—	12:24		
16	4.1	11.64	557	7.71	2842	—	12:26	37.412	
				12:30					

Odour Yes ☐ No ☒ Description: _____ Colour (initial) 4 (Brown) (stable) 10 (brown)
Recovery* Slow ☐ Moderate ☐ Fast ☒

NOTES: Field Parameter and Stability Guidance: pH (±0.2 standard units); Temperature (±0.2 °C); Specific Conductance (±3%); Oxidation-Reduction Potential (±20mV); and if applicable: Dissolved Oxygen (±10% or ±0.2 mg/L – whichever is greater)
**Recovery Estimate - Slow: greater than 10 cm drawdown Moderate: slightly lower than 10 cm drawdown Fast: within 10 cm drawdown*

SAMPLING PARAMETER INFORMATION

Date and Time: _____

Sample ID: _____ Duplicate Sample ID: _____

Analytical Laboratory: _____

Analysis	Bottle	Preserved	Filtered
BOD	1L plastic	no	no
TIC/DIC	500 mL plastic	no	no
TOC	2x 40 mL vial	H_3PO_4-precharged	no
Nutrients	125 mL plastic	H2SO4-precharged	no
DOC	2x 40 mL vial	H_3PO_4-precharged	yes
Diss. Metals	125 mL plastic	HNO_3-precharged	yes
Diss. Mercury	40 mL vial	HCl-precharged	yes
Sweetener	plastic vial	no	yes
VOCs (within city limits)	40mL vial	precharged	no

Notes from previous site visit:

Current site visit notes:

Yukon

Environment Yukon
Water Resources Branch

Groundwater Well Purging and Sampling Record

Well ID: ML-3
Location: MARSH LAKE SEWAGE LAGOON
Project Name: AMDIP

Date: 20 07 13
Weather: OVERCAST
Sampler: NB, RY

WELL INFORMATION

Well Cover Type: Flush ☐ Stick-up ☒ 0.55 m above grade ☐ Active Drinking Water Well ☐
Lock ☒ No-lock ☐
Well Casing Diam.: 6-inch (15 cm) ☐ 2-inch (5 cm) ☒ Other: _____
Screened Interval (m bTOC): _____

PURGING INFORMATION AND OBSERVATIONS

DGW m bTOC (X) 35.558 m Time: 13:17
DTB m bTOC (Y) 37.225 m

Length of Water Column (X-Y) 1.667 m
Volume of Water in 2" Well = (X - Y) x 2 3.334 L
Volume of Water in 6" Well = (17.7L/m) _____ L

Purging Method

Grundfos Pump ☐
Hydralift Pump ☐
Peristaltic (Tubing set to: _____m bTOC) ☐
Flow-through cell ☐
HydraSleeve 2.5 L (sampled at: _____ m bTOC) ☐
Other (specify) BAILER ☒

LOGGER INFORMATION

LTC Serial #: _____
BL Serial #: _____
NEWLTC # TYPE
LTC downloaded at: _____
BL downloaded at: _____
Notes:

UTM coordinates

Zone
E
N

Photos Taken Y / N

Volume Purged (L)	T°C	DO mg/L	SPC uS-mS/cm	pH	Turbidity FNU/NTU	ORP mV	Time	DTW m bTOC	Rate L/min
5	5.9	9.77	576	7.97	143.45	–	13:35	--	
6	5.0	9.71	575	7.88	146.32	–	13:37		
7	4.7	9.82	571	7.84	207.03	–	13:39		
8	4.9	9.94	572	7.87	328.26	–	13:42		
9	4.7	9.80	574	7.88	347.20	–	13:44		
					14:10				

Odour Yes ☐ No ☐ Description: _____ Colour (initial) 2 (brown) (stable) 5 (brown)
Recovery* Slow ☐ Moderate ☐ Fast ☐

NOTES: Field Parameter and Stability Guidance: pH (±0.2 standard units); Temperature (±0.2 °C); Specific Conductance (±3%); Oxidation-Reduction Potential (±20mV); and if applicable: Dissolved Oxygen (±10% or ±0.2 mg/L – whichever is greater)
**Recovery Estimate - Slow: greater than 10 cm drawdown Moderate: slightly lower than 10 cm drawdown Fast: within 10 cm drawdown*

SAMPLING PARAMETER INFORMATION

Date and Time: _____

Sample ID: _____ Duplicate Sample ID: _____

Analytical Laboratory: _____

Analysis	Bottle	Preserved	Filtered
BOD	1L plastic	no	no
TIC/DIC	500 mL plastic	no	no
TOC	2x 40 mL vial	H_3PO_4-precharged	no
Nutrients	125 mL plastic	H2SO4-precharged	no
DOC	2x 40 mL vial	H_3PO_4-precharged	yes
Diss. Metals	125 mL plastic	HNO_3-precharged	yes
Diss. Mercury	40 mL vial	HCl-precharged	yes
Sweetener	plastic vial	no	yes
VOCs (within city limits)	40mL vial	precharged	no

Notes from previous site visit:

Current site visit notes:

Appendix B - Photo Log

Figure B1: Exfiltration Lagoon, looking north.

Figure B2: Primary Lagoon, looking southwest.

Figure B3: Monitoring well ML-4.

Figure B4: Monitoring well ML-3.

Figure B5: Monitoring well MW12-03.

Figure B6: Pond south-southwest of the MLWTF (ML-7).

Figure B7: Pond east of the MLWTF (ML-8).

Figure B8: Pond west of the MLWTF (ML-9).

Figure B9: Judas Creek upstream sampling location (ML-5).

Figure B10: Judas Creek downstream sampling location (ML-6).

Appendix C: Quality Assurance and Control

Hold Time Exceedances

Nitrate and Nitrite

Hold Time: 3 days
Sampled: July 13, 2020 (11:00-15:30)
Lab Received: July 16, 2020 (08:00)
Lab Analysed: July 17th

Lab pH

Hold Time: 15 minutes
Sampled: July 13, 2020 (11:00-15:30)
Lab Received: July 16, 2020 (08:00)
Lab Analysed: July 16th

Table C1. QAQC field and laboratory results

	pH			Specific Conductance (µS/cm)		
Station	**Field**	**Lab**	**RPD**	**Field**	**Lab**	**RPD**
ML-3	7.88	8.14	3%	574	558	3%
ML-4	7.59	8.05	6%	541	530	2%
ML-5	8.37	8.3	1%	-	318	
ML-6	7.98	8.29	4%	-	321	
MW12-03	7.71	8.13	5%	557	551	1%
ML-7	7.27	8.17	12%	-	287	
ML-8	8.63	8.44	2%	386	363	6%
ML-9	8.3	8.43	2%	-	271	

Note: Relative percent difference (RPD) calculated using the formula: Relative difference (x,y) = [|x - y| ÷ |(x + y)/2|] * 100

Table C2. QAQC results for replicate sample from groundwater well ML-4

Parameter	Units	ML-4	ML-4 Replicate	RPD
Dissolved Metals				
Aluminum	mg/L	0.107	<0.0050	ND
Antimony	mg/L	<0.0002	<0.0002	-
Arsenic	mg/L	<0.0005	0.00051	ND
Barium	mg/L	0.0556	0.0608	9%

Beryllium	mg/L	<0.0001	<0.0001	-
Bismuth	mg/L	<0.0001	<0.0001	-
Boron	mg/L	<0.0500	<0.0500	-
Cadmium	mg/L	<0.00001	<0.00001	-
Calcium	mg/L	67.6	72.3	7%
Chromium	mg/L	0.00113	0.0012	6%
Cobalt	mg/L	<0.0001	<0.0001	
Copper	mg/L	0.00117	0.00122	4%
Iron	mg/L	<0.010	<0.010	
Lead	mg/L	<0.0002	<0.0002	
Lithium	mg/L	0.00218	0.00229	5%
Magnesium	mg/L	26.4	27.6	4%
Manganese	mg/L	0.00025	<0.00020	ND
Molybdenum	mg/L	0.00125	0.00143	13%
Nickel	mg/L	0.00205	0.00206	0.5%
Phosphorus	mg/L	<0.05	<0.05	
Potassium	mg/L	1.87	1.99	6%
Selenium	mg/L	<0.0005	<0.0005	
Silicon	mg/L	5	5.3	6%
Silver	mg/L	<0.00005	<0.00005	
Sodium	mg/L	4.95	5.24	6%
Strontium	mg/L	0.547	0.594	8%
Sulphur	mg/L	21.4	21.9	2%
Tellurium	mg/L	<0.0005	<0.0005	
Thallium	mg/L	<0.00002	<0.00002	
Thorium	mg/L	<0.0001	<0.0001	
Tin	mg/L	<0.0002	<0.0002	
Titanium	mg/L	<0.005	<0.005	
Tungsten	mg/L	<0.001	<0.001	
Uranium	mg/L	0.000621	0.000633	2%
Vanadium	mg/L	<0.001	<0.001	
Zinc	mg/L	<0.004	<0.004	
Zirconium	mg/L	<0.0001	<0.0001	
Nutrients, Anions, Physical				
Chloride	mg/L	0.42	0.42	0%
Sulphate, Dissolved	mg/L	65.5	65.5	0%
Bromide	mg/L	<0.1	<0.1	
Ammonium Nitrogen, as N	mg/L	<0.05	<0.05	
Nitrate Nitrogen, as N	mg/L	0.126	0.152	19%
Nitrite Nitrogen, as N	mg/L	<0.01	<0.01	

Phosphorus, Total Phosphate as P	mg/L	0.0516	0.0491	5%
Carbon, Dissolved Organic	mg/L	4.34	4.63	6%
Carbon, Total Inorganic	mg/L	62.1	62.8	1%
Carbon, Total Organic	mg/L	4.49	4.63	3%
Carbon, Dissolved Inorganic	mg/L	60.5	61.7	2%
Alkalinity, Bicarbonate HCO3	mgCaCO3/L	272	252	8%
Alkalinity, Carbonate CO3	mgCaCO3/L	<1.0	<1.0	
Alkalinity, Hydroxide OH	mgCaCO3/L	<1.0	<1.0	
Alkalinity, Phenolphthalein	mgCaCO3/L	<1.0	<1.0	
Alkalinity, Total	mgCaCO3/L	272	252	8%
pH, Laboratory	-	8.05	8.05	0%
Specific Conductance - Lab	µS/cm	530	530	0%

Appendix D: Certificates of Analysis

CERTIFICATE OF ANALYSIS

REPORTED TO	Yukon Government - Water Resources Suite 210, 419 Range Road Whitehorse, YT Y1A 3V1		
ATTENTION	Norbert Botca	**WORK ORDER**	0071316
PO NUMBER	C00043458	**RECEIVED / TEMP**	2020-07-15 08:00 / 4°C
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22
PROJECT INFO		**COC NUMBER**	No #

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

This is a revised report; please refer to Appendix 3 for details.

If you have any questions or concerns, please contact me at tmaxwell@caro.ca

Authorized By:

Taylor Maxwell
Junior Account Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-01 (0071316-01) | Matrix: Water | Sampled: 2020-07-13 11:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	
Chloride	**0.42**	0.10	mg/L	2020-07-17	
Nitrate (as N)	**0.126**	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**65.5**	1.0	mg/L	2020-07-17	
BCMOE Aggregate Hydrocarbons					
VHw (6-10)	< 100	100	µg/L	2020-07-20	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2020-07-17	
EPHw19-32	< 250	250	µg/L	2020-07-17	
EPHw10-19(sg)	< 250	250	µg/L	2020-07-19	
EPHw19-32(sg)	< 250	250	µg/L	2020-07-19	
LEPHw	< 250	250	µg/L	N/A	
HEPHw	< 250	250	µg/L	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*89*	*60-126*	%	*2020-07-17*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**278**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00218**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	**0.107**	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0556**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	< 0.0500	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**67.6**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00113**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00117**	0.00040	mg/L	2020-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**26.4**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.00025**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00125**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00205**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**1.87**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**5.0**	1.0	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-01 (0071316-01) | Matrix: Water | Sampled: 2020-07-13 11:00, Continued					
Dissolved Metals, Continued					
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**4.95**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.547**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**21.4**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000621**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**272**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**272**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**62.1**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**4.49**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**60.5**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**4.34**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**530**	2.0	µS/cm	2020-07-16	
pH	**8.05**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0516**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**44.0**	2.0	mg/L	2020-07-20	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2020-07-17	
Acenaphthylene	< 0.200	0.200	µg/L	2020-07-17	
Acridine	< 0.050	0.050	µg/L	2020-07-17	
Anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benz(a)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Chrysene	< 0.050	0.050	µg/L	2020-07-17	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2020-07-17	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-01 (0071316-01) | Matrix: Water | Sampled: 2020-07-13 11:00, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Fluoranthene	< 0.030	0.030	µg/L	2020-07-17	
Fluorene	< 0.050	0.050	µg/L	2020-07-17	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2020-07-17	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Naphthalene	< 0.200	0.200	µg/L	2020-07-17	
Phenanthrene	< 0.100	0.100	µg/L	2020-07-17	
Pyrene	< 0.020	0.020	µg/L	2020-07-17	
Quinoline	< 0.050	0.050	µg/L	2020-07-17	
Surrogate: Acridine-d9	*84*	*50-140*	%	*2020-07-17*	
Surrogate: Naphthalene-d8	*85*	*50-140*	%	*2020-07-17*	
Surrogate: Perylene-d12	*60*	*50-140*	%	*2020-07-17*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2020-07-20	
Ethylbenzene	< 1.0	1.0	µg/L	2020-07-20	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2020-07-20	
Styrene	< 1.0	1.0	µg/L	2020-07-20	
Toluene	< 1.0	1.0	µg/L	2020-07-20	
Xylenes (total)	< 2.0	2.0	µg/L	2020-07-20	
Surrogate: Toluene-d8	*89*	*70-130*	%	*2020-07-20*	
Surrogate: 4-Bromofluorobenzene	*95*	*70-130*	%	*2020-07-20*	
2020T16-02 (0071316-02) | Matrix: Water | Sampled: 2020-07-13 11:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-16	
Chloride	**0.42**	0.10	mg/L	2020-07-16	
Nitrate (as N)	**0.152**	0.010	mg/L	2020-07-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-16	
Sulfate	**65.5**	1.0	mg/L	2020-07-16	
BCMOE Aggregate Hydrocarbons					
VHw (6-10)	< 100	100	µg/L	2020-07-20	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2020-07-17	
EPHw19-32	< 250	250	µg/L	2020-07-17	
LEPHw	< 250	250	µg/L	N/A	
HEPHw	< 250	250	µg/L	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*102*	*60-126*	%	*2020-07-17*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**294**	0.500	mg/L	N/A	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-02 (0071316-02) | Matrix: Water | Sampled: 2020-07-13 11:00, Continued					
Dissolved Metals					
Lithium, dissolved	**0.00229**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00051**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0608**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	< 0.0500	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**72.3**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00120**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00122**	0.00040	mg/L	2020-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**27.6**	0.010	mg/L	2020-07-22	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00143**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00206**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**1.99**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**5.3**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**5.24**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.594**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**21.9**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000633**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**252**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**252**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-02 (0071316-02) | Matrix: Water | Sampled: 2020-07-13 11:00, Continued					
General Parameters, Continued					
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**62.8**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**4.63**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**61.7**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**4.63**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**530**	2.0	µS/cm	2020-07-16	
pH	**8.05**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0491**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**69.6**	2.0	mg/L	2020-07-19	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2020-07-17	
Acenaphthylene	< 0.200	0.200	µg/L	2020-07-17	
Acridine	< 0.050	0.050	µg/L	2020-07-17	
Anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benz(a)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Chrysene	< 0.050	0.050	µg/L	2020-07-17	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Fluoranthene	< 0.030	0.030	µg/L	2020-07-17	
Fluorene	< 0.050	0.050	µg/L	2020-07-17	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2020-07-17	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Naphthalene	< 0.200	0.200	µg/L	2020-07-17	
Phenanthrene	< 0.100	0.100	µg/L	2020-07-17	
Pyrene	< 0.020	0.020	µg/L	2020-07-17	
Quinoline	< 0.050	0.050	µg/L	2020-07-17	
Surrogate: Acridine-d9	*92*	*50-140*	%	*2020-07-17*	
Surrogate: Naphthalene-d8	*92*	*50-140*	%	*2020-07-17*	
Surrogate: Perylene-d12	*74*	*50-140*	%	*2020-07-17*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2020-07-20	
Ethylbenzene	< 1.0	1.0	µg/L	2020-07-20	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2020-07-20	
Styrene	< 1.0	1.0	µg/L	2020-07-20	
Toluene	< 1.0	1.0	µg/L	2020-07-20	
Xylenes (total)	< 2.0	2.0	µg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-02 (0071316-02) | Matrix: Water | Sampled: 2020-07-13 11:00, Continued					
Volatile Organic Compounds (VOC), Continued					
Surrogate: Toluene-d8	*90*	*70-130*	%	*2020-07-20*	
Surrogate: 4-Bromofluorobenzene	*95*	*70-130*	%	*2020-07-20*	
2020T16-03 (0071316-03) | Matrix: Water | Sampled: 2020-07-13 12:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-16	
Chloride	**0.99**	0.10	mg/L	2020-07-16	
Nitrate (as N)	**0.386**	0.010	mg/L	2020-07-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-16	
Sulfate	**61.1**	1.0	mg/L	2020-07-16	
BCMOE Aggregate Hydrocarbons					
VHw (6-10)	< 100	100	µg/L	2020-07-20	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2020-07-17	
EPHw19-32	< 250	250	µg/L	2020-07-17	
EPHw10-19(sg)	< 250	250	µg/L	2020-07-19	
EPHw19-32(sg)	< 250	250	µg/L	2020-07-19	
LEPHw	< 250	250	µg/L	N/A	
HEPHw	< 250	250	µg/L	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*88*	*60-126*	%	*2020-07-17*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**277**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00328**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	**0.00020**	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00071**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0355**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	**0.126**	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**53.9**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00331**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00071**	0.00040	mg/L	2020-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**34.6**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.00037**	0.00020	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-03 (0071316-03) | Matrix: Water | Sampled: 2020-07-13 12:30, Continued					
Dissolved Metals, Continued					
Molybdenum, dissolved	**0.00747**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00171**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**2.27**	0.10	mg/L	2020-07-22	
Selenium, dissolved	**0.00200**	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**5.6**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**4.74**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.391**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**19.2**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	**0.00033**	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.00111**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**273**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**273**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	**0.055**	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**82.5**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**5.43**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**64.8**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**4.53**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**551**	2.0	µS/cm	2020-07-16	
pH	**8.13**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**1.10**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**4730**	2.0	mg/L	2020-07-19	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2020-07-17	
Acenaphthylene	< 0.200	0.200	µg/L	2020-07-17	
Acridine	< 0.050	0.050	µg/L	2020-07-17	
Anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benz(a)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2020-07-17	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-03 (0071316-03) | Matrix: Water | Sampled: 2020-07-13 12:30, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Chrysene	< 0.050	0.050	µg/L	2020-07-17	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Fluoranthene	< 0.030	0.030	µg/L	2020-07-17	
Fluorene	< 0.050	0.050	µg/L	2020-07-17	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2020-07-17	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Naphthalene	< 0.200	0.200	µg/L	2020-07-17	
Phenanthrene	< 0.100	0.100	µg/L	2020-07-17	
Pyrene	< 0.020	0.020	µg/L	2020-07-17	
Quinoline	< 0.050	0.050	µg/L	2020-07-17	
Surrogate: Acridine-d9	*84*	*50-140*	%	*2020-07-17*	
Surrogate: Naphthalene-d8	*93*	*50-140*	%	*2020-07-17*	
Surrogate: Perylene-d12	*63*	*50-140*	%	*2020-07-17*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2020-07-20	
Ethylbenzene	< 1.0	1.0	µg/L	2020-07-20	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2020-07-20	
Styrene	< 1.0	1.0	µg/L	2020-07-20	
Toluene	< 1.0	1.0	µg/L	2020-07-20	
Xylenes (total)	< 2.0	2.0	µg/L	2020-07-20	
Surrogate: Toluene-d8	*91*	*70-130*	%	*2020-07-20*	
Surrogate: 4-Bromofluorobenzene	*97*	*70-130*	%	*2020-07-20*	
2020T16-04 (0071316-04) | Matrix: Water | Sampled: 2020-07-13 12:30 To 2020-07-13 15:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-16	
Chloride	**0.46**	0.10	mg/L	2020-07-16	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-16	
Sulfate	**62.4**	1.0	mg/L	2020-07-16	
Calculated Parameters					
Hardness, Total (as CaCO3)	**203**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00220**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-04 (0071316-04) | Matrix: Water | Sampled: 2020-07-13 12:30 To 2020-07-13 15:00, Continued					
Dissolved Metals, Continued					
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00051**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0261**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	< 0.0500	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**32.7**	0.20	mg/L	2020-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2020-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**29.3**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.00173**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00083**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00055**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**2.11**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**4.8**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**5.58**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.403**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**22.8**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000313**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**160**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	**4.7**	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**151**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	**9.3**	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-04 (0071316-04) | Matrix: Water | Sampled: 2020-07-13 12:30 To 2020-07-13 15:00, Continued					
General Parameters, Continued					
Carbon, Total Inorganic	**37.9**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**9.71**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**37.2**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**9.16**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**363**	2.0	µS/cm	2020-07-16	
pH	**8.44**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0118**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**6.0**	2.0	mg/L	2020-07-19	
Total Metals					
Aluminum, total	< 0.0050	0.0050	mg/L	2020-07-20	
Antimony, total	< 0.00020	0.00020	mg/L	2020-07-20	
Arsenic, total	< 0.00050	0.00050	mg/L	2020-07-20	
Barium, total	**0.0270**	0.0050	mg/L	2020-07-20	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-07-20	
Boron, total	< 0.0500	0.0500	mg/L	2020-07-20	
Cadmium, total	< 0.000010	0.000010	mg/L	2020-07-20	
Calcium, total	**33.7**	0.20	mg/L	2020-07-20	
Chromium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Cobalt, total	< 0.00010	0.00010	mg/L	2020-07-20	
Copper, total	< 0.00040	0.00040	mg/L	2020-07-20	
Iron, total	< 0.010	0.010	mg/L	2020-07-20	
Lead, total	< 0.00020	0.00020	mg/L	2020-07-20	
Lithium, total	**0.00227**	0.00010	mg/L	2020-07-20	
Magnesium, total	**31.1**	0.010	mg/L	2020-07-20	
Manganese, total	**0.00977**	0.00020	mg/L	2020-07-20	
Molybdenum, total	**0.00085**	0.00010	mg/L	2020-07-20	
Nickel, total	**0.00057**	0.00040	mg/L	2020-07-20	
Phosphorus, total	< 0.050	0.050	mg/L	2020-07-20	
Potassium, total	**2.09**	0.10	mg/L	2020-07-20	
Selenium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Silicon, total	**5.0**	1.0	mg/L	2020-07-20	
Silver, total	< 0.000050	0.000050	mg/L	2020-07-20	
Sodium, total	**5.72**	0.10	mg/L	2020-07-20	
Strontium, total	**0.382**	0.0010	mg/L	2020-07-20	
Sulfur, total	**23.0**	3.0	mg/L	2020-07-20	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Thallium, total	< 0.000020	0.000020	mg/L	2020-07-20	
Thorium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Tin, total	< 0.00020	0.00020	mg/L	2020-07-20	
Titanium, total	< 0.0050	0.0050	mg/L	2020-07-20	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-04 (0071316-04) | Matrix: Water | Sampled: 2020-07-13 12:30 To 2020-07-13 15:00, Continued					
Total Metals, Continued					
Uranium, total	**0.000314**	0.000020	mg/L	2020-07-20	
Vanadium, total	< 0.0010	0.0010	mg/L	2020-07-20	
Zinc, total	< 0.0040	0.0040	mg/L	2020-07-20	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-07-20	
2020T16-05 (0071316-05) | Matrix: Water | Sampled: 2020-07-13 11:00 To 2020-07-13 14:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	
Chloride	**0.99**	0.10	mg/L	2020-07-17	
Nitrate (as N)	**0.266**	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**65.6**	1.0	mg/L	2020-07-17	
BCMOE Aggregate Hydrocarbons					
VHw (6-10)	< 100	100	µg/L	2020-07-20	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2020-07-17	
EPHw19-32	< 250	250	µg/L	2020-07-17	
EPHw10-19(sg)	< 250	250	µg/L	2020-07-19	
EPHw19-32(sg)	< 250	250	µg/L	2020-07-19	
LEPHw	< 250	250	µg/L	N/A	
HEPHw	< 250	250	µg/L	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*79*	*60-126*	%	*2020-07-17*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**312**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00363**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	**0.00023**	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00086**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0175**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	**0.159**	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	**0.000168**	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**58.3**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00682**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00083**	0.00040	mg/L	2020-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-05 (0071316-05) | Matrix: Water | Sampled: 2020-07-13 11:00 To 2020-07-13 14:30, Continued					
Dissolved Metals, Continued					
Magnesium, dissolved	**40.3**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.00101**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00816**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00303**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**2.47**	0.10	mg/L	2020-07-22	
Selenium, dissolved	**0.00290**	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**6.0**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**6.20**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.494**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**23.0**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	**0.00024**	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000384**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**278**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**278**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	**0.092**	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**74.9**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**7.01**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**66.1**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**6.57**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**558**	2.0	µS/cm	2020-07-16	
pH	**8.14**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.394**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**680**	2.0	mg/L	2020-07-19	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2020-07-17	
Acenaphthylene	< 0.200	0.200	µg/L	2020-07-17	
Acridine	< 0.050	0.050	µg/L	2020-07-17	
Anthracene	< 0.010	0.010	µg/L	2020-07-17	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-05 (0071316-05) | Matrix: Water | Sampled: 2020-07-13 11:00 To 2020-07-13 14:30, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Benz(a)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2020-07-17	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2020-07-17	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2020-07-17	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Chrysene	< 0.050	0.050	µg/L	2020-07-17	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2020-07-17	
Fluoranthene	< 0.030	0.030	µg/L	2020-07-17	
Fluorene	< 0.050	0.050	µg/L	2020-07-17	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2020-07-17	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2020-07-17	
Naphthalene	< 0.200	0.200	µg/L	2020-07-17	
Phenanthrene	< 0.100	0.100	µg/L	2020-07-17	
Pyrene	< 0.020	0.020	µg/L	2020-07-17	
Quinoline	< 0.050	0.050	µg/L	2020-07-17	
Surrogate: Acridine-d9	*74*	*50-140*	%	*2020-07-17*	
Surrogate: Naphthalene-d8	*80*	*50-140*	%	*2020-07-17*	
Surrogate: Perylene-d12	*69*	*50-140*	%	*2020-07-17*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2020-07-20	
Ethylbenzene	< 1.0	1.0	µg/L	2020-07-20	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2020-07-20	
Styrene	< 1.0	1.0	µg/L	2020-07-20	
Toluene	< 1.0	1.0	µg/L	2020-07-20	
Xylenes (total)	< 2.0	2.0	µg/L	2020-07-20	
Surrogate: Toluene-d8	*90*	*70-130*	%	*2020-07-20*	
Surrogate: 4-Bromofluorobenzene	*95*	*70-130*	%	*2020-07-20*	
2020T16-06 (0071316-06) | Matrix: Water | Sampled: 2020-07-13 13:10					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	
Chloride	**3.34**	0.10	mg/L	2020-07-17	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**10.0**	1.0	mg/L	2020-07-17	
Calculated Parameters					
Hardness, Total (as CaCO3)	**168**	0.500	mg/L	N/A	
Dissolved Metals					

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-06 (0071316-06) | Matrix: Water | Sampled: 2020-07-13 13:10, Continued					
Dissolved Metals, Continued					
Lithium, dissolved	**0.00230**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00055**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0260**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	**0.0958**	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**33.5**	0.20	mg/L	2020-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2020-07-22	
Iron, dissolved	**0.019**	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**20.4**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.0367**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00390**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00049**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**4.12**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**1.4**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**2.53**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.354**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**5.6**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000528**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**158**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**158**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-06 (0071316-06) | Matrix: Water | Sampled: 2020-07-13 13:10, Continued					
General Parameters, Continued					
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	**0.060**	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**38.8**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**17.1**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**37.3**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**16.5**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**287**	2.0	µS/cm	2020-07-16	
pH	**8.17**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0224**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**5.4**	2.0	mg/L	2020-07-19	
Total Metals					
Aluminum, total	< 0.0050	0.0050	mg/L	2020-07-20	
Antimony, total	< 0.00020	0.00020	mg/L	2020-07-20	
Arsenic, total	< 0.00050	0.00050	mg/L	2020-07-20	
Barium, total	**0.0274**	0.0050	mg/L	2020-07-20	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-07-20	
Boron, total	**0.0950**	0.0500	mg/L	2020-07-20	
Cadmium, total	< 0.000010	0.000010	mg/L	2020-07-20	
Calcium, total	**34.9**	0.20	mg/L	2020-07-20	
Chromium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Cobalt, total	< 0.00010	0.00010	mg/L	2020-07-20	
Copper, total	< 0.00040	0.00040	mg/L	2020-07-20	
Iron, total	**0.030**	0.010	mg/L	2020-07-20	
Lead, total	< 0.00020	0.00020	mg/L	2020-07-20	
Lithium, total	**0.00237**	0.00010	mg/L	2020-07-20	
Magnesium, total	**22.1**	0.010	mg/L	2020-07-20	
Manganese, total	**0.0560**	0.00020	mg/L	2020-07-20	
Molybdenum, total	**0.00425**	0.00010	mg/L	2020-07-20	
Nickel, total	**0.00053**	0.00040	mg/L	2020-07-20	
Phosphorus, total	< 0.050	0.050	mg/L	2020-07-20	
Potassium, total	**4.15**	0.10	mg/L	2020-07-20	
Selenium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Silicon, total	**1.3**	1.0	mg/L	2020-07-20	
Silver, total	< 0.000050	0.000050	mg/L	2020-07-20	
Sodium, total	**2.53**	0.10	mg/L	2020-07-20	
Strontium, total	**0.341**	0.0010	mg/L	2020-07-20	
Sulfur, total	**3.8**	3.0	mg/L	2020-07-20	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Thallium, total	< 0.000020	0.000020	mg/L	2020-07-20	
Thorium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Tin, total	< 0.00020	0.00020	mg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-06 (0071316-06) | Matrix: Water | Sampled: 2020-07-13 13:10, Continued					
Total Metals, Continued					
Titanium, total	< 0.0050	0.0050	mg/L	2020-07-20	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-07-20	
Uranium, total	**0.000534**	0.000020	mg/L	2020-07-20	
Vanadium, total	< 0.0010	0.0010	mg/L	2020-07-20	
Zinc, total	< 0.0040	0.0040	mg/L	2020-07-20	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-07-20	
2020T16-06 (0071316-06RE1) | Matrix: Water | Sampled: 2020-07-13 13:10					
Anions					
Chloride	**3.34**	0.10	mg/L	2020-07-21	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Sulfate	**10.0**	1.0	mg/L	2020-07-21	
General Parameters					
Conductivity (EC)	**301**	2.0	µS/cm	2020-07-20	
pH	**8.04**	0.10	pH units	2020-07-20	HT2
2020T16-07 (0071316-07) | Matrix: Water | Sampled: 2020-07-13 12:15					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	
Chloride	**0.36**	0.10	mg/L	2020-07-17	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**12.2**	1.0	mg/L	2020-07-17	
BCMOE Aggregate Hydrocarbons					
EPHw10-19	< 250	250	µg/L	2020-07-17	
EPHw19-32	< 250	250	µg/L	2020-07-17	
Surrogate: 2-Methylnonane (EPH/F2-4)	*91*	*60-126*	%	*2020-07-17*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**194**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00099**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00146**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0545**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-07 (0071316-07) | Matrix: Water | Sampled: 2020-07-13 12:15, Continued					
Dissolved Metals, Continued					
Boron, dissolved	< 0.0500	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**40.2**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00085**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00085**	0.00040	mg/L	2020-07-22	
Iron, dissolved	**0.077**	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**22.8**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.0211**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00149**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00623**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**0.45**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**5.4**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**2.76**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.179**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**5.1**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000344**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**192**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**192**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**46.7**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**9.15**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**45.6**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**8.87**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**321**	2.0	µS/cm	2020-07-16	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-07 (0071316-07) | Matrix: Water | Sampled: 2020-07-13 12:15, Continued					
General Parameters, Continued					
pH	**8.29**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0179**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**6.8**	2.0	mg/L	2020-07-19	
Total Metals					
Aluminum, total	**0.0203**	0.0050	mg/L	2020-07-20	
Antimony, total	< 0.00020	0.00020	mg/L	2020-07-20	
Arsenic, total	**0.00138**	0.00050	mg/L	2020-07-20	
Barium, total	**0.0600**	0.0050	mg/L	2020-07-20	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-07-20	
Boron, total	< 0.0500	0.0500	mg/L	2020-07-20	
Cadmium, total	< 0.000010	0.000010	mg/L	2020-07-20	
Calcium, total	**44.2**	0.20	mg/L	2020-07-20	
Chromium, total	**0.00109**	0.00050	mg/L	2020-07-20	
Cobalt, total	< 0.00010	0.00010	mg/L	2020-07-20	
Copper, total	**0.00101**	0.00040	mg/L	2020-07-20	
Iron, total	**0.132**	0.010	mg/L	2020-07-20	
Lead, total	< 0.00020	0.00020	mg/L	2020-07-20	
Lithium, total	**0.00102**	0.00010	mg/L	2020-07-20	
Magnesium, total	**25.4**	0.010	mg/L	2020-07-20	
Manganese, total	**0.0285**	0.00020	mg/L	2020-07-20	
Molybdenum, total	**0.00157**	0.00010	mg/L	2020-07-20	
Nickel, total	**0.00711**	0.00040	mg/L	2020-07-20	
Phosphorus, total	< 0.050	0.050	mg/L	2020-07-20	
Potassium, total	**0.44**	0.10	mg/L	2020-07-20	
Selenium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Silicon, total	**5.9**	1.0	mg/L	2020-07-20	
Silver, total	< 0.000050	0.000050	mg/L	2020-07-20	
Sodium, total	**2.89**	0.10	mg/L	2020-07-20	
Strontium, total	**0.182**	0.0010	mg/L	2020-07-20	
Sulfur, total	**4.4**	3.0	mg/L	2020-07-20	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Thallium, total	< 0.000020	0.000020	mg/L	2020-07-20	
Thorium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Tin, total	< 0.00020	0.00020	mg/L	2020-07-20	
Titanium, total	< 0.0050	0.0050	mg/L	2020-07-20	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-07-20	
Uranium, total	**0.000369**	0.000020	mg/L	2020-07-20	
Vanadium, total	**0.0017**	0.0010	mg/L	2020-07-20	
Zinc, total	< 0.0040	0.0040	mg/L	2020-07-20	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-07 (0071316-07RE1) | Matrix: Water | Sampled: 2020-07-13 12:15					
Anions					
Chloride	**0.36**	0.10	mg/L	2020-07-21	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Sulfate	**12.2**	1.0	mg/L	2020-07-21	
General Parameters					
Conductivity (EC)	**344**	2.0	µS/cm	2020-07-20	
pH	**8.30**	0.10	pH units	2020-07-20	HT2
2020T16-08 (0071316-08) | Matrix: Water | Sampled: 2020-07-13 11:11					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	
Chloride	**3.10**	0.10	mg/L	2020-07-17	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**34.0**	1.0	mg/L	2020-07-17	
Calculated Parameters					
Hardness, Total (as CaCO3)	**147**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00240**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	**0.0075**	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00063**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0212**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	**0.0674**	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**21.9**	0.20	mg/L	2020-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2020-07-22	
Iron, dissolved	**0.012**	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**22.5**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.00198**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00384**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**2.28**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-08 (0071316-08) | Matrix: Water | Sampled: 2020-07-13 11:11, Continued					
Dissolved Metals, Continued					
Silicon, dissolved	< 1.0	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**2.81**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.199**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**14.2**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000704**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**126**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	**3.1**	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**120**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	**6.2**	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**30.8**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**11.8**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**30.6**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**11.2**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**271**	2.0	µS/cm	2020-07-16	
pH	**8.43**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0131**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	< 2.0	2.0	mg/L	2020-07-19	
Total Metals					
Aluminum, total	**0.0084**	0.0050	mg/L	2020-07-20	
Antimony, total	< 0.00020	0.00020	mg/L	2020-07-20	
Arsenic, total	< 0.00050	0.00050	mg/L	2020-07-20	
Barium, total	**0.0228**	0.0050	mg/L	2020-07-20	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-07-20	
Boron, total	**0.0697**	0.0500	mg/L	2020-07-20	
Cadmium, total	< 0.000010	0.000010	mg/L	2020-07-20	
Calcium, total	**23.5**	0.20	mg/L	2020-07-20	
Chromium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Cobalt, total	< 0.00010	0.00010	mg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-08 (0071316-08) | Matrix: Water | Sampled: 2020-07-13 11:11, Continued					
Total Metals, Continued					
Copper, total	< 0.00040	0.00040	mg/L	2020-07-20	
Iron, total	**0.017**	0.010	mg/L	2020-07-20	
Lead, total	< 0.00020	0.00020	mg/L	2020-07-20	
Lithium, total	**0.00250**	0.00010	mg/L	2020-07-20	
Magnesium, total	**24.8**	0.010	mg/L	2020-07-20	
Manganese, total	**0.00389**	0.00020	mg/L	2020-07-20	
Molybdenum, total	**0.00406**	0.00010	mg/L	2020-07-20	
Nickel, total	< 0.00040	0.00040	mg/L	2020-07-20	
Phosphorus, total	< 0.050	0.050	mg/L	2020-07-20	
Potassium, total	**2.29**	0.10	mg/L	2020-07-20	
Selenium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Silicon, total	< 1.0	1.0	mg/L	2020-07-20	
Silver, total	< 0.000050	0.000050	mg/L	2020-07-20	
Sodium, total	**2.88**	0.10	mg/L	2020-07-20	
Strontium, total	**0.200**	0.0010	mg/L	2020-07-20	
Sulfur, total	**11.4**	3.0	mg/L	2020-07-20	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Thallium, total	< 0.000020	0.000020	mg/L	2020-07-20	
Thorium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Tin, total	< 0.00020	0.00020	mg/L	2020-07-20	
Titanium, total	< 0.0050	0.0050	mg/L	2020-07-20	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-07-20	
Uranium, total	**0.000723**	0.000020	mg/L	2020-07-20	
Vanadium, total	< 0.0010	0.0010	mg/L	2020-07-20	
Zinc, total	< 0.0040	0.0040	mg/L	2020-07-20	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-07-20	
2020T16-08 (0071316-08RE1) | Matrix: Water | Sampled: 2020-07-13 11:11					
Anions					
Chloride	**3.10**	0.10	mg/L	2020-07-21	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-21	HT1
Sulfate	**34.0**	1.0	mg/L	2020-07-21	
General Parameters					
Conductivity (EC)	**285**	2.0	µS/cm	2020-07-20	
pH	**8.39**	0.10	pH units	2020-07-20	HT2
2020T16-09 (0071316-09) | Matrix: Water | Sampled: 2020-07-13 15:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2020-07-17	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-09 (0071316-09) | Matrix: Water | Sampled: 2020-07-13 15:30, Continued					
Anions, Continued					
Chloride	**0.34**	0.10	mg/L	2020-07-17	
Nitrate (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2020-07-17	HT1
Sulfate	**12.1**	1.0	mg/L	2020-07-17	
BCMOE Aggregate Hydrocarbons					
EPHw10-19	< 250	250	µg/L	2020-07-18	
EPHw19-32	**597**	250	µg/L	2020-07-18	
Surrogate: 2-Methylnonane (EPH/F2-4)	*77*	*60-126*	%	*2020-07-18*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**197**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00094**	0.00010	mg/L	2020-07-22	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Arsenic, dissolved	**0.00147**	0.00050	mg/L	2020-07-22	
Barium, dissolved	**0.0524**	0.0050	mg/L	2020-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Boron, dissolved	< 0.0500	0.0500	mg/L	2020-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-07-22	
Calcium, dissolved	**40.3**	0.20	mg/L	2020-07-22	
Chromium, dissolved	**0.00095**	0.00050	mg/L	2020-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
Copper, dissolved	**0.00085**	0.00040	mg/L	2020-07-22	
Iron, dissolved	**0.088**	0.010	mg/L	2020-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Magnesium, dissolved	**23.4**	0.010	mg/L	2020-07-22	
Manganese, dissolved	**0.0197**	0.00020	mg/L	2020-07-22	
Molybdenum, dissolved	**0.00134**	0.00010	mg/L	2020-07-22	
Nickel, dissolved	**0.00638**	0.00040	mg/L	2020-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-07-22	
Potassium, dissolved	**0.41**	0.10	mg/L	2020-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Silicon, dissolved	**5.5**	1.0	mg/L	2020-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-07-22	
Sodium, dissolved	**2.78**	0.10	mg/L	2020-07-22	
Strontium, dissolved	**0.179**	0.0010	mg/L	2020-07-22	
Sulfur, dissolved	**5.2**	3.0	mg/L	2020-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-09 (0071316-09) | Matrix: Water | Sampled: 2020-07-13 15:30, Continued					
Dissolved Metals, Continued					
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Uranium, dissolved	**0.000345**	0.000020	mg/L	2020-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**191**	1.0	mg/L	2020-07-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Bicarbonate (as CaCO3)	**191**	1.0	mg/L	2020-07-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-07-16	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2020-07-16	
Carbon, Total Inorganic	**45.7**	0.50	mg/L	2020-07-20	
Carbon, Total Organic	**8.69**	0.50	mg/L	2020-07-17	
Carbon, Dissolved Inorganic	**45.5**	0.5	mg/L	2020-07-20	
Carbon, Dissolved Organic	**8.30**	0.50	mg/L	2020-07-17	
Conductivity (EC)	**318**	2.0	µS/cm	2020-07-16	
pH	**8.30**	0.10	pH units	2020-07-16	HT2
Phosphorus, Total (as P)	**0.0195**	0.0050	mg/L	2020-07-16	
Solids, Total Suspended	**6.4**	2.0	mg/L	2020-07-19	
Total Metals					
Aluminum, total	**0.0650**	0.0050	mg/L	2020-07-20	
Antimony, total	< 0.00020	0.00020	mg/L	2020-07-20	
Arsenic, total	**0.00125**	0.00050	mg/L	2020-07-20	
Barium, total	**0.0550**	0.0050	mg/L	2020-07-20	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-07-20	
Boron, total	< 0.0500	0.0500	mg/L	2020-07-20	
Cadmium, total	< 0.000010	0.000010	mg/L	2020-07-20	
Calcium, total	**40.9**	0.20	mg/L	2020-07-20	
Chromium, total	**0.00130**	0.00050	mg/L	2020-07-20	
Cobalt, total	**0.00015**	0.00010	mg/L	2020-07-20	
Copper, total	**0.00097**	0.00040	mg/L	2020-07-20	
Iron, total	**0.218**	0.010	mg/L	2020-07-20	
Lead, total	< 0.00020	0.00020	mg/L	2020-07-20	
Lithium, total	**0.00096**	0.00010	mg/L	2020-07-20	
Magnesium, total	**23.9**	0.010	mg/L	2020-07-20	
Manganese, total	**0.0326**	0.00020	mg/L	2020-07-20	
Molybdenum, total	**0.00136**	0.00010	mg/L	2020-07-20	
Nickel, total	**0.00732**	0.00040	mg/L	2020-07-20	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Analyzed	Qualifier
2020T16-09 (0071316-09) | Matrix: Water | Sampled: 2020-07-13 15:30, Continued					
Total Metals, Continued					
Phosphorus, total	< 0.050	0.050	mg/L	2020-07-20	
Potassium, total	**0.36**	0.10	mg/L	2020-07-20	
Selenium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Silicon, total	**5.5**	1.0	mg/L	2020-07-20	
Silver, total	< 0.000050	0.000050	mg/L	2020-07-20	
Sodium, total	**2.67**	0.10	mg/L	2020-07-20	
Strontium, total	**0.167**	0.0010	mg/L	2020-07-20	
Sulfur, total	< 3.0	3.0	mg/L	2020-07-20	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-07-20	
Thallium, total	< 0.000020	0.000020	mg/L	2020-07-20	
Thorium, total	< 0.00010	0.00010	mg/L	2020-07-20	
Tin, total	< 0.00020	0.00020	mg/L	2020-07-20	
Titanium, total	< 0.0050	0.0050	mg/L	2020-07-20	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-07-20	
Uranium, total	**0.000342**	0.000020	mg/L	2020-07-20	
Vanadium, total	**0.0017**	0.0010	mg/L	2020-07-20	
Zinc, total	< 0.0040	0.0040	mg/L	2020-07-20	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-07-20	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2017)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	Kelowna
BTEX in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Carbon, Dissolved Inorganic in Water	SM 5310 B (2017)	Combustion, Infrared CO2 Detection		Kelowna
Carbon, Dissolved Organic in Water	SM 5310 B (2017)	Combustion, Infrared CO2 Detection	✓	Kelowna
Carbon, Total Inorganic in Water	SM 5310 B (2017)	Combustion, Infrared CO2 Detection		Kelowna
Carbon, Total Organic in Water	SM 5310 B (2017)	Combustion, Infrared CO2 Detection	✓	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
EPH in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	✓	Richmond
EPH, SG in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	✓	Richmond
Hardness in Water	SM 2340 B (2017)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
HEPHw in Water	BCMOE LEPH/HEPH	Calculation		N/A
LEPHw in Water	BCMOE LEPH/HEPH	Calculation		N/A
pH in Water	SM 4500-H+ B (2017)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Polycyclic Aromatic Hydrocarbons in Water	EPA 3511* / EPA 8270D	Hexane MicroExtraction (Base/Neutral) / GC-MSD (SIM)	✓	Richmond
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
VH in Water	EPA 5030B / BCMOE VHw	Purge&Trap / Gas Chromatography (GC-FID)	✓	Richmond
VPHw in Water	BCMOE VPH	Calculation: VH - (Benzene + Toluene + Ethylbenzene + Xylenes + Styrene)		N/A

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, ph > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

BCMOE	British Columbia Environmental Laboratory Manual, British Columbia Ministry of Environment
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:tmaxwell@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B0G1299										
Blank (B0G1299-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B0G1299-BLK2)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B0G1299-BLK3)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B0G1299-BS1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Bromide	4.06	0.10	mg/L	4.00		101	85-115			
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Nitrate (as N)	4.06	0.010	mg/L	4.00		101	90-110			
Nitrite (as N)	1.98	0.010	mg/L	2.00		99	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
LCS (B0G1299-BS2)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	4.20	0.10	mg/L	4.00		105	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Nitrate (as N)	4.07	0.010	mg/L	4.00		102	90-110			
Nitrite (as N)	1.99	0.010	mg/L	2.00		100	85-115			
Sulfate	16.1	1.0	mg/L	16.0		100	90-110			
LCS (B0G1299-BS3)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	4.02	0.10	mg/L	4.00		101	85-115			
Chloride	16.2	0.10	mg/L	16.0		101	90-110			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B0G1299, Continued										
LCS (B0G1299-BS3), Continued				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Nitrate (as N)	4.26	0.010	mg/L	4.00		107	90-110			
Nitrite (as N)	1.99	0.010	mg/L	2.00		99	85-115			
Sulfate	16.1	1.0	mg/L	16.0		101	90-110			
Anions, Batch B0G1413										
Blank (B0G1413-BLK1)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B0G1413-BLK2)				Prepared: 2020-07-18, Analyzed: 2020-07-18						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B0G1413-BS1)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Bromide	4.06	0.10	mg/L	4.00		101	85-115			
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Nitrate (as N)	4.12	0.010	mg/L	4.00		103	90-110			
Nitrite (as N)	1.99	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
LCS (B0G1413-BS2)				Prepared: 2020-07-18, Analyzed: 2020-07-18						
Bromide	4.13	0.10	mg/L	4.00		103	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Nitrate (as N)	4.12	0.010	mg/L	4.00		103	90-110			
Nitrite (as N)	2.00	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
BCMOE Aggregate Hydrocarbons, Batch B0G1402										
Blank (B0G1402-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-17						
EPHw10-19	< 250	250	µg/L							
EPHw19-32	< 250	250	µg/L							
EPHw10-19(sg)	< 250	250	µg/L							
EPHw19-32(sg)	< 250	250	µg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	*320*		*µg/L*	444		*72*	*60-126*			
LCS (B0G1402-BS2)				Prepared: 2020-07-16, Analyzed: 2020-07-17						
EPHw10-19	14100	250	µg/L	15500		91	70-117			
EPHw19-32	20100	250	µg/L	22200		90	70-113			
EPHw10-19(sg)	13900	250	µg/L	15500		90	60-130			
EPHw19-32(sg)	19500	250	µg/L	22200		88	60-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	*424*		*µg/L*	444		*95*	*60-126*			
BCMOE Aggregate Hydrocarbons, Batch B0G1552										
Blank (B0G1552-BLK1)				Prepared: 2020-07-18, Analyzed: 2020-07-18						
EPHw10-19	< 250	250	µg/L							
EPHw19-32	< 250	250	µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
BCMOE Aggregate Hydrocarbons, Batch B0G1552, Continued										
Blank (B0G1552-BLK1), Continued				Prepared: 2020-07-18, Analyzed: 2020-07-18						
Surrogate: 2-Methylnonane (EPH/F2-4)	*342*		*µg/L*	444		*77*	*60-126*			
LCS (B0G1552-BS2)				Prepared: 2020-07-18, Analyzed: 2020-07-18						
EPHw10-19	11100	250	µg/L	15500		72	70-117			
EPHw19-32	17600	250	µg/L	22200		79	70-113			
Surrogate: 2-Methylnonane (EPH/F2-4)	*406*		*µg/L*	444		*91*	*60-126*			
LCS Dup (B0G1552-BSD2)				Prepared: 2020-07-18, Analyzed: 2020-07-18						
EPHw10-19	13300	250	µg/L	15500		86	70-117	18	20	
EPHw19-32	18400	250	µg/L	22200		83	70-113	5	20	
Surrogate: 2-Methylnonane (EPH/F2-4)	*518*		*µg/L*	444		*117*	*60-126*			
BCMOE Aggregate Hydrocarbons, Batch B0G1616										
Blank (B0G1616-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
VHw (6-10)	< 100	100	µg/L							
LCS (B0G1616-BS2)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
VHw (6-10)	2440	100	µg/L	2690		91	70-130			
Dissolved Metals, Batch B0G1879										
Blank (B0G1879-BLK1)				Prepared: 2020-07-22, Analyzed: 2020-07-22						
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0500	0.0500	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0G1879, Continued										
Blank (B0G1879-BLK1), Continued				Prepared: 2020-07-22, Analyzed: 2020-07-22						
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B0G1879-BS1)				Prepared: 2020-07-22, Analyzed: 2020-07-22						
Lithium, dissolved	0.0201	0.00010	mg/L	0.0200		101	80-120			
Aluminum, dissolved	0.0234	0.0050	mg/L	0.0199		117	80-120			
Antimony, dissolved	0.0193	0.00020	mg/L	0.0200		97	80-120			
Arsenic, dissolved	0.0202	0.00050	mg/L	0.0200		101	80-120			
Barium, dissolved	0.0191	0.0050	mg/L	0.0198		97	80-120			
Beryllium, dissolved	0.0209	0.00010	mg/L	0.0198		105	80-120			
Bismuth, dissolved	0.0206	0.00010	mg/L	0.0200		103	80-120			
Boron, dissolved	< 0.0500	0.0500	mg/L	0.0200		101	80-120			
Cadmium, dissolved	0.0195	0.000010	mg/L	0.0199		98	80-120			
Calcium, dissolved	2.25	0.20	mg/L	2.02		111	80-120			
Chromium, dissolved	0.0201	0.00050	mg/L	0.0198		102	80-120			
Cobalt, dissolved	0.0201	0.00010	mg/L	0.0199		101	80-120			
Copper, dissolved	0.0219	0.00040	mg/L	0.0200		110	80-120			
Iron, dissolved	1.99	0.010	mg/L	2.02		99	80-120			
Lead, dissolved	0.0206	0.00020	mg/L	0.0199		103	80-120			
Magnesium, dissolved	2.34	0.010	mg/L	2.02		116	80-120			
Manganese, dissolved	0.0201	0.00020	mg/L	0.0199		101	80-120			
Molybdenum, dissolved	0.0197	0.00010	mg/L	0.0200		99	80-120			
Nickel, dissolved	0.0203	0.00040	mg/L	0.0200		102	80-120			
Phosphorus, dissolved	2.02	0.050	mg/L	2.00		101	80-120			
Potassium, dissolved	2.13	0.10	mg/L	2.02		105	80-120			
Selenium, dissolved	0.0199	0.00050	mg/L	0.0200		100	80-120			
Silicon, dissolved	2.3	1.0	mg/L	2.00		113	80-120			
Silver, dissolved	0.0186	0.000050	mg/L	0.0200		93	80-120			
Sodium, dissolved	2.21	0.10	mg/L	2.02		110	80-120			
Strontium, dissolved	0.0202	0.0010	mg/L	0.0200		101	80-120			
Sulfur, dissolved	4.6	3.0	mg/L	5.00		91	80-120			
Tellurium, dissolved	0.0208	0.00050	mg/L	0.0200		104	80-120			
Thallium, dissolved	0.0201	0.000020	mg/L	0.0199		101	80-120			
Thorium, dissolved	0.0195	0.00010	mg/L	0.0200		98	80-120			
Tin, dissolved	0.0207	0.00020	mg/L	0.0200		103	80-120			
Titanium, dissolved	0.0194	0.0050	mg/L	0.0200		97	80-120			
Tungsten, dissolved	0.0193	0.0010	mg/L	0.0200		96	80-120			
Uranium, dissolved	0.0208	0.000020	mg/L	0.0200		104	80-120			
Vanadium, dissolved	0.0221	0.0010	mg/L	0.0200		110	80-120			
Zinc, dissolved	0.0223	0.0040	mg/L	0.0200		112	80-120			
Zirconium, dissolved	0.0201	0.00010	mg/L	0.0200		100	80-120			
Duplicate (B0G1879-DUP1)		**Source: 0071316-05**		Prepared: 2020-07-22, Analyzed: 2020-07-22						
Lithium, dissolved	0.00347	0.00010	mg/L		0.00363			5	20	
Aluminum, dissolved	< 0.0050	0.0050	mg/L		< 0.0050				20	
Antimony, dissolved	0.00021	0.00020	mg/L		0.00023				20	
Arsenic, dissolved	0.00087	0.00050	mg/L		0.00086				20	
Barium, dissolved	0.0172	0.0050	mg/L		0.0175				20	
Beryllium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Bismuth, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Boron, dissolved	0.151	0.0500	mg/L		0.159				20	
Cadmium, dissolved	0.000172	0.000010	mg/L		0.000168			2	20	
Calcium, dissolved	55.5	0.20	mg/L		58.3			5	20	
Chromium, dissolved	0.00651	0.00050	mg/L		0.00682			5	20	
Cobalt, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0G1879, Continued										
Duplicate (B0G1879-DUP1), Continued		**Source: 0071316-05**		Prepared: 2020-07-22, Analyzed: 2020-07-22						
Copper, dissolved	0.00079	0.00040	mg/L		0.00083				20	
Iron, dissolved	< 0.010	0.010	mg/L		< 0.010				20	
Lead, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Magnesium, dissolved	38.9	0.010	mg/L		40.3			4	20	
Manganese, dissolved	0.00098	0.00020	mg/L		0.00101			2	20	
Molybdenum, dissolved	0.00776	0.00010	mg/L		0.00816			5	20	
Nickel, dissolved	0.00295	0.00040	mg/L		0.00303			3	20	
Phosphorus, dissolved	< 0.050	0.050	mg/L		< 0.050				20	
Potassium, dissolved	2.37	0.10	mg/L		2.47			4	20	
Selenium, dissolved	0.00283	0.00050	mg/L		0.00290			2	20	
Silicon, dissolved	5.8	1.0	mg/L		6.0			4	20	
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050				20	
Sodium, dissolved	6.45	0.10	mg/L		6.20			4	20	
Strontium, dissolved	0.478	0.0010	mg/L		0.494			3	20	
Sulfur, dissolved	22.7	3.0	mg/L		23.0			1	20	
Tellurium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Thallium, dissolved	< 0.000020	0.000020	mg/L		< 0.000020				20	
Thorium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Tin, dissolved	0.00024	0.00020	mg/L		0.00024				20	
Titanium, dissolved	< 0.0050	0.0050	mg/L		< 0.0050				20	
Tungsten, dissolved	< 0.0010	0.0010	mg/L		< 0.0010				20	
Uranium, dissolved	0.000374	0.000020	mg/L		0.000384			3	20	
Vanadium, dissolved	< 0.0010	0.0010	mg/L		< 0.0010				20	
Zinc, dissolved	< 0.0040	0.0040	mg/L		< 0.0040				20	
Zirconium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Reference (B0G1879-SRM1)				Prepared: 2020-07-22, Analyzed: 2020-07-22						
Lithium, dissolved	0.0977	0.00010	mg/L	0.100		98	77-127			
Aluminum, dissolved	0.236	0.0050	mg/L	0.235		100	79-114			
Antimony, dissolved	0.0433	0.00020	mg/L	0.0431		101	89-123			
Arsenic, dissolved	0.421	0.00050	mg/L	0.423		100	87-113			
Barium, dissolved	2.82	0.0050	mg/L	3.30		85	85-114			
Beryllium, dissolved	0.214	0.00010	mg/L	0.209		102	79-122			
Boron, dissolved	1.67	0.0500	mg/L	1.65		101	79-117			
Cadmium, dissolved	0.205	0.000010	mg/L	0.221		93	89-112			
Calcium, dissolved	8.27	0.20	mg/L	7.72		107	85-120			
Chromium, dissolved	0.420	0.00050	mg/L	0.434		97	87-113			
Cobalt, dissolved	0.120	0.00010	mg/L	0.124		97	90-117			
Copper, dissolved	0.791	0.00040	mg/L	0.815		97	90-115			
Iron, dissolved	1.22	0.010	mg/L	1.27		96	86-112			
Lead, dissolved	0.104	0.00020	mg/L	0.110		95	90-113			
Magnesium, dissolved	7.36	0.010	mg/L	6.59		112	84-116			
Manganese, dissolved	0.326	0.00020	mg/L	0.342		95	85-113			
Molybdenum, dissolved	0.394	0.00010	mg/L	0.404		97	87-112			
Nickel, dissolved	0.812	0.00040	mg/L	0.835		97	90-114			
Phosphorus, dissolved	0.474	0.050	mg/L	0.499		95	74-119			
Potassium, dissolved	3.08	0.10	mg/L	2.88		107	78-119			
Selenium, dissolved	0.0335	0.00050	mg/L	0.0324		103	89-123			
Sodium, dissolved	16.8	0.10	mg/L	18.0		93	81-117			
Strontium, dissolved	0.889	0.0010	mg/L	0.935		95	82-111			
Thallium, dissolved	0.0363	0.000020	mg/L	0.0385		94	90-113			
Uranium, dissolved	0.231	0.000020	mg/L	0.258		90	87-113			
Vanadium, dissolved	0.850	0.0010	mg/L	0.873		97	85-110			
Zinc, dissolved	0.839	0.0040	mg/L	0.848		99	88-114			
General Parameters, Batch B0G1339										

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0G1339, Continued										
Blank (B0G1339-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Ammonia, Total (as N)	< 0.050	0.050	mg/L							
Blank (B0G1339-BLK2)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Ammonia, Total (as N)	< 0.050	0.050	mg/L							
Blank (B0G1339-BLK3)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Ammonia, Total (as N)	< 0.050	0.050	mg/L							
LCS (B0G1339-BS1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Ammonia, Total (as N)	1.06	0.050	mg/L	1.00		106	90-115			
LCS (B0G1339-BS2)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Ammonia, Total (as N)	1.06	0.050	mg/L	1.00		106	90-115			
LCS (B0G1339-BS3)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Ammonia, Total (as N)	1.04	0.050	mg/L	1.00		104	90-115			
Duplicate (B0G1339-DUP1)		**Source: 0071316-01**		Prepared: 2020-07-17, Analyzed: 2020-07-17						
Ammonia, Total (as N)	< 0.050	0.050	mg/L		< 0.050				15	
Matrix Spike (B0G1339-MS1)		**Source: 0071316-01**		Prepared: 2020-07-17, Analyzed: 2020-07-17						
Ammonia, Total (as N)	0.298	0.050	mg/L	0.250	< 0.050	113	75-125			
General Parameters, Batch B0G1370										
Blank (B0G1370-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Phosphorus, Total (as P)	< 0.0020	0.0020	mg/L							
LCS (B0G1370-BS1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Phosphorus, Total (as P)	0.102	0.0020	mg/L	0.100		102	85-115			
General Parameters, Batch B0G1381										
Blank (B0G1381-BLK1)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Carbon, Dissolved Organic	< 0.50	0.50	mg/L							
Blank (B0G1381-BLK2)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Carbon, Dissolved Organic	< 0.50	0.50	mg/L							
Blank (B0G1381-BLK3)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Carbon, Dissolved Organic	< 0.50	0.50	mg/L							
LCS (B0G1381-BS1)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	9.66	0.50	mg/L	10.0		97	78-116			
Carbon, Dissolved Organic	9.66	0.50	mg/L	10.0		97	78-116			
LCS (B0G1381-BS2)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	9.44	0.50	mg/L	10.0		94	78-116			
Carbon, Dissolved Organic	9.44	0.50	mg/L	10.0		94	78-116			
LCS (B0G1381-BS3)				Prepared: 2020-07-17, Analyzed: 2020-07-17						
Carbon, Total Organic	9.44	0.50	mg/L	10.0		94	78-116			
Carbon, Dissolved Organic	9.44	0.50	mg/L	10.0		94	78-116			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0G1421										
Blank (B0G1421-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B0G1421-BLK2)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B0G1421-BLK3)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B0G1421-BS1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	104	1.0	mg/L	100		104	80-120			
LCS (B0G1421-BS2)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	100		103	80-120			
LCS (B0G1421-BS3)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	105	1.0	mg/L	100		105	80-120			
LCS (B0G1421-BS4)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Conductivity (EC)	1370	2.0	µS/cm	1410		97	95-104			
LCS (B0G1421-BS5)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Conductivity (EC)	1360	2.0	µS/cm	1410		96	95-104			
LCS (B0G1421-BS6)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Conductivity (EC)	1360	2.0	µS/cm	1410		97	95-104			
Duplicate (B0G1421-DUP2)		**Source: 0071316-01**		Prepared: 2020-07-16, Analyzed: 2020-07-16						
Alkalinity, Total (as CaCO3)	251	1.0	mg/L		272			8	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	251	1.0	mg/L		272			8	10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Conductivity (EC)	529	2.0	µS/cm		530			< 1	5	
pH	8.08	0.10	pH units		8.05			< 1	4	
Reference (B0G1421-SRM1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
pH	6.98	0.10	pH units	7.01		100	98-102			
Reference (B0G1421-SRM2)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
pH	6.98	0.10	pH units	7.01		100	98-102			
Reference (B0G1421-SRM3)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
pH	6.99	0.10	pH units	7.01		100	98-102			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0G1467										
Blank (B0G1467-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Carbon, Total Inorganic	< 0.50	0.50	mg/L							
Carbon, Dissolved Inorganic	< 0.5	0.5	mg/L							
LCS (B0G1467-BS1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Carbon, Total Inorganic	97.5	5.00	mg/L	100		98	80-120			
Carbon, Dissolved Inorganic	98.8	5.0	mg/L	100		99	80-120			
Duplicate (B0G1467-DUP1)		**Source: 0071316-01**		Prepared: 2020-07-20, Analyzed: 2020-07-20						
Carbon, Total Inorganic	61.9	0.50	mg/L		62.1			< 1	15	
Carbon, Dissolved Inorganic	60.5	0.5	mg/L		60.5			< 1	20	
Matrix Spike (B0G1467-MS1)		**Source: 0071316-01**		Prepared: 2020-07-20, Analyzed: 2020-07-20						
Carbon, Total Inorganic	69.9	5.00	mg/L	10.0	62.1	78	70-130			
Carbon, Dissolved Inorganic	68.2	5.0	mg/L	10.0	60.5	77	30-130			
General Parameters, Batch B0G1593										
Blank (B0G1593-BLK1)				Prepared: 2020-07-19, Analyzed: 2020-07-19						
Solids, Total Suspended	< 1.0	1.0	mg/L							
LCS (B0G1593-BS1)				Prepared: 2020-07-19, Analyzed: 2020-07-19						
Solids, Total Suspended	99.0	10.0	mg/L	100		99	85-115			
Duplicate (B0G1593-DUP1)		**Source: 0071316-03**		Prepared: 2020-07-19, Analyzed: 2020-07-19						
Solids, Total Suspended	5510	2.0	mg/L		4730			15	20	
General Parameters, Batch B0G1636										
Blank (B0G1636-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B0G1636-BLK2)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B0G1636-BS1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Solids, Total Suspended	110	10.0	mg/L	100		110	85-115			
LCS (B0G1636-BS2)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Solids, Total Suspended	100	10.0	mg/L	100		100	85-115			
General Parameters, Batch B0G1682										
Blank (B0G1682-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B0G1682-BLK2)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B0G1682-BLK3)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B0G1682-BS4)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	1440	2.0	µS/cm	1410		102	95-104			
LCS (B0G1682-BS5)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0G1682, Continued										
LCS (B0G1682-BS6)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Conductivity (EC)	1440	2.0	µS/cm	1410		102	95-104			
Reference (B0G1682-SRM1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
pH	6.99	0.10	pH units	7.01		100	98-102			
Reference (B0G1682-SRM2)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
pH	6.99	0.10	pH units	7.01		100	98-102			
Reference (B0G1682-SRM3)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
pH	6.99	0.10	pH units	7.01		100	98-102			
Polycyclic Aromatic Hydrocarbons (PAH), Batch B0G1402										
Blank (B0G1402-BLK1)				Prepared: 2020-07-16, Analyzed: 2020-07-17						
Acenaphthene	< 0.050	0.050	µg/L							
Acenaphthylene	< 0.200	0.200	µg/L							
Acridine	< 0.050	0.050	µg/L							
Anthracene	< 0.010	0.010	µg/L							
Benz(a)anthracene	< 0.010	0.010	µg/L							
Benzo(a)pyrene	< 0.010	0.010	µg/L							
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L							
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L							
Benzo(k)fluoranthene	< 0.050	0.050	µg/L							
2-Chloronaphthalene	< 0.100	0.100	µg/L							
Chrysene	< 0.050	0.050	µg/L							
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L							
Fluoranthene	< 0.030	0.030	µg/L							
Fluorene	< 0.050	0.050	µg/L							
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L							
1-Methylnaphthalene	< 0.100	0.100	µg/L							
2-Methylnaphthalene	< 0.100	0.100	µg/L							
Naphthalene	< 0.200	0.200	µg/L							
Phenanthrene	< 0.100	0.100	µg/L							
Pyrene	< 0.020	0.020	µg/L							
Quinoline	< 0.050	0.050	µg/L							
Surrogate: Acridine-d9	*<*		*µg/L*	4.47		*2*	*50-140*			*S02*
Surrogate: Naphthalene-d8	*3.48*		*µg/L*	4.47		*78*	*50-140*			
Surrogate: Perylene-d12	*3.26*		*µg/L*	4.47		*73*	*50-140*			
LCS (B0G1402-BS1)				Prepared: 2020-07-16, Analyzed: 2020-07-16						
Acenaphthene	7.72	0.050	µg/L	8.89		87	55-137			
Acenaphthylene	7.95	0.200	µg/L	8.89		89	53-140			
Acridine	0.432	0.050	µg/L	8.89		5	50-120			SPK1
Anthracene	7.46	0.010	µg/L	8.89		84	64-130			
Benz(a)anthracene	7.84	0.010	µg/L	8.89		88	57-140			
Benzo(a)pyrene	7.71	0.010	µg/L	8.89		87	63-133			
Benzo(b+j)fluoranthene	15.7	0.050	µg/L	17.8		88	60-129			
Benzo(g,h,i)perylene	8.35	0.050	µg/L	8.89		94	52-139			
Benzo(k)fluoranthene	6.57	0.050	µg/L	8.89		74	50-138			
2-Chloronaphthalene	7.01	0.100	µg/L	8.76		80	50-139			
Chrysene	7.72	0.050	µg/L	8.89		87	59-140			
Dibenz(a,h)anthracene	7.70	0.010	µg/L	8.89		87	53-136			
Fluoranthene	7.53	0.030	µg/L	8.89		85	67-135			
Fluorene	6.94	0.050	µg/L	8.89		78	57-134			
Indeno(1,2,3-cd)pyrene	7.70	0.050	µg/L	8.89		87	52-129			
1-Methylnaphthalene	7.58	0.100	µg/L	8.89		85	50-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Polycyclic Aromatic Hydrocarbons (PAH), Batch B0G1402, Continued										
LCS (B0G1402-BS1), Continued				Prepared: 2020-07-16, Analyzed: 2020-07-16						
2-Methylnaphthalene	7.66	0.100	µg/L	8.89		86	50-140			
Naphthalene	7.50	0.200	µg/L	8.89		84	50-140			
Phenanthrene	7.34	0.100	µg/L	8.89		83	61-134			
Pyrene	7.89	0.020	µg/L	8.89		89	66-131			
Quinoline	9.05	0.050	µg/L	8.89		102	50-140			
Surrogate: Acridine-d9	*0.708*		*µg/L*	8.93		*8*	*50-140*			*SPK1*
Surrogate: Naphthalene-d8	*7.77*		*µg/L*	8.93		*87*	*50-140*			
Surrogate: Perylene-d12	*7.43*		*µg/L*	8.93		*83*	*50-140*			
LCS Dup (B0G1402-BSD1)				Prepared: 2020-07-16, Analyzed: 2020-07-17						
Acenaphthene	7.35	0.050	µg/L	8.89		83	55-137	5	18	
Acenaphthylene	7.53	0.200	µg/L	8.89		85	53-140	5	20	
Acridine	0.140	0.050	µg/L	8.89		2	50-120	102	30	SPK1
Anthracene	7.11	0.010	µg/L	8.89		80	64-130	5	15	
Benz(a)anthracene	7.36	0.010	µg/L	8.89		83	57-140	6	25	
Benzo(a)pyrene	7.28	0.010	µg/L	8.89		82	63-133	6	18	
Benzo(b+j)fluoranthene	14.8	0.050	µg/L	17.8		83	60-129	6	17	
Benzo(g,h,i)perylene	7.66	0.050	µg/L	8.89		86	52-139	9	22	
Benzo(k)fluoranthene	5.61	0.050	µg/L	8.89		63	50-138	16	26	
2-Chloronaphthalene	6.56	0.100	µg/L	8.76		75	50-139	7	23	
Chrysene	7.37	0.050	µg/L	8.89		83	59-140	5	23	
Dibenz(a,h)anthracene	6.99	0.010	µg/L	8.89		79	53-136	10	21	
Fluoranthene	6.96	0.030	µg/L	8.89		78	67-135	8	18	
Fluorene	6.64	0.050	µg/L	8.89		75	57-134	4	18	
Indeno(1,2,3-cd)pyrene	7.05	0.050	µg/L	8.89		79	52-129	9	21	
1-Methylnaphthalene	7.20	0.100	µg/L	8.89		81	50-140	5	20	
2-Methylnaphthalene	6.96	0.100	µg/L	8.89		78	50-140	10	21	
Naphthalene	7.05	0.200	µg/L	8.89		79	50-140	6	22	
Phenanthrene	7.04	0.100	µg/L	8.89		79	61-134	4	17	
Pyrene	7.32	0.020	µg/L	8.89		82	66-131	7	19	
Quinoline	5.04	0.050	µg/L	8.89		57	50-140	57	14	RPD
Surrogate: Acridine-d9	*0.193*		*µg/L*	8.93		*2*	*50-140*			*SPK1*
Surrogate: Naphthalene-d8	*7.26*		*µg/L*	8.93		*81*	*50-140*			
Surrogate: Perylene-d12	*6.89*		*µg/L*	8.93		*77*	*50-140*			
Total Metals, Batch B0G1649										
Blank (B0G1649-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0G1649, Continued										
Blank (B0G1649-BLK1), Continued				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B0G1649-BS1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Aluminum, total	0.0191	0.0050	mg/L	0.0199		96	80-120			
Antimony, total	0.0216	0.00020	mg/L	0.0200		108	80-120			
Arsenic, total	0.0208	0.00050	mg/L	0.0200		104	80-120			
Barium, total	0.0195	0.0050	mg/L	0.0198		98	80-120			
Beryllium, total	0.0214	0.00010	mg/L	0.0198		108	80-120			
Bismuth, total	0.0203	0.00010	mg/L	0.0200		101	80-120			
Boron, total	< 0.0500	0.0500	mg/L	0.0200		97	80-120			
Cadmium, total	0.0198	0.000010	mg/L	0.0199		100	80-120			
Calcium, total	2.31	0.20	mg/L	2.02		114	80-120			
Chromium, total	0.0196	0.00050	mg/L	0.0198		99	80-120			
Cobalt, total	0.0199	0.00010	mg/L	0.0199		100	80-120			
Copper, total	0.0207	0.00040	mg/L	0.0200		104	80-120			
Iron, total	1.96	0.010	mg/L	2.02		97	80-120			
Lead, total	0.0204	0.00020	mg/L	0.0199		102	80-120			
Lithium, total	0.0176	0.00010	mg/L	0.0200		88	80-120			
Magnesium, total	1.99	0.010	mg/L	2.02		99	80-120			
Manganese, total	0.0189	0.00020	mg/L	0.0199		95	80-120			
Molybdenum, total	0.0196	0.00010	mg/L	0.0200		98	80-120			
Nickel, total	0.0205	0.00040	mg/L	0.0200		102	80-120			
Phosphorus, total	2.13	0.050	mg/L	2.00		106	80-120			
Potassium, total	2.07	0.10	mg/L	2.02		103	80-120			
Selenium, total	0.0197	0.00050	mg/L	0.0200		99	80-120			
Silicon, total	2.2	1.0	mg/L	2.00		109	80-120			
Silver, total	0.0195	0.000050	mg/L	0.0200		97	80-120			
Sodium, total	2.07	0.10	mg/L	2.02		102	80-120			
Strontium, total	0.0186	0.0010	mg/L	0.0200		93	80-120			
Sulfur, total	4.3	3.0	mg/L	5.00		86	80-120			
Tellurium, total	0.0229	0.00050	mg/L	0.0200		114	80-120			
Thallium, total	0.0201	0.000020	mg/L	0.0199		101	80-120			
Thorium, total	0.0189	0.00010	mg/L	0.0200		95	80-120			
Tin, total	0.0197	0.00020	mg/L	0.0200		99	80-120			
Titanium, total	0.0185	0.0050	mg/L	0.0200		93	80-120			
Tungsten, total	0.0203	0.0010	mg/L	0.0200		102	80-120			
Uranium, total	0.0193	0.000020	mg/L	0.0200		97	80-120			
Vanadium, total	0.0209	0.0010	mg/L	0.0200		105	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0G1649, Continued										
LCS (B0G1649-BS1), Continued				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Zinc, total	0.0212	0.0040	mg/L	0.0200		106	80-120			
Zirconium, total	0.0197	0.00010	mg/L	0.0200		98	80-120			
Reference (B0G1649-SRM1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Aluminum, total	0.287	0.0050	mg/L	0.303		95	82-114			
Antimony, total	0.0541	0.00020	mg/L	0.0511		106	88-115			
Arsenic, total	0.126	0.00050	mg/L	0.118		107	88-111			
Barium, total	0.787	0.0050	mg/L	0.823		96	83-110			
Beryllium, total	0.0525	0.00010	mg/L	0.0496		106	80-119			
Boron, total	4.08	0.0500	mg/L	3.45		118	80-118			
Cadmium, total	0.0496	0.000010	mg/L	0.0495		100	90-110			
Calcium, total	10.4	0.20	mg/L	11.6		90	85-113			
Chromium, total	0.249	0.00050	mg/L	0.250		100	88-111			
Cobalt, total	0.0390	0.00010	mg/L	0.0377		103	90-114			
Copper, total	0.520	0.00040	mg/L	0.486		107	90-117			
Iron, total	0.492	0.010	mg/L	0.488		101	90-116			
Lead, total	0.225	0.00020	mg/L	0.204		110	90-110			
Lithium, total	0.356	0.00010	mg/L	0.403		88	79-118			
Magnesium, total	3.68	0.010	mg/L	3.79		97	88-116			
Manganese, total	0.104	0.00020	mg/L	0.109		96	88-108			
Molybdenum, total	0.199	0.00010	mg/L	0.198		100	88-110			
Nickel, total	0.255	0.00040	mg/L	0.249		102	90-112			
Phosphorus, total	0.246	0.050	mg/L	0.227		109	72-118			
Potassium, total	6.27	0.10	mg/L	7.21		87	87-116			
Selenium, total	0.125	0.00050	mg/L	0.121		103	90-122			
Sodium, total	7.82	0.10	mg/L	7.54		104	86-118			
Strontium, total	0.372	0.0010	mg/L	0.375		99	86-110			
Thallium, total	0.0820	0.000020	mg/L	0.0805		102	90-113			
Uranium, total	0.0294	0.000020	mg/L	0.0306		96	88-112			
Vanadium, total	0.382	0.0010	mg/L	0.386		99	87-110			
Zinc, total	2.66	0.0040	mg/L	2.49		107	90-113			
Volatile Organic Compounds (VOC), Batch B0G1616										
Blank (B0G1616-BLK1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Benzene	< 0.5	0.5	µg/L							
Ethylbenzene	< 1.0	1.0	µg/L							
Methyl tert-butyl ether	< 1.0	1.0	µg/L							
Styrene	< 1.0	1.0	µg/L							
Toluene	< 1.0	1.0	µg/L							
Xylenes (total)	< 2.0	2.0	µg/L							
Surrogate: Toluene-d8	*25.5*		*µg/L*	26.5		*96*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*26.6*		*µg/L*	24.9		*107*	*70-130*			
LCS (B0G1616-BS1)				Prepared: 2020-07-20, Analyzed: 2020-07-20						
Benzene	19.7	0.5	µg/L	20.0		98	70-130			
Ethylbenzene	20.3	1.0	µg/L	20.0		102	70-130			
Methyl tert-butyl ether	19.2	1.0	µg/L	20.0		96	70-130			
Styrene	19.0	1.0	µg/L	20.1		95	70-130			
Toluene	20.5	1.0	µg/L	20.0		103	70-130			
Xylenes (total)	58.0	2.0	µg/L	60.3		96	70-130			
Surrogate: Toluene-d8	*24.5*		*µg/L*	26.5		*92*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.1*		*µg/L*	24.9		*97*	*70-130*			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

QC Qualifiers:

RPD	Relative percent difference (RPD) of duplicate analysis are outside of control limits for unknown reason(s).
S02	Surrogate recovery outside of control limits. Data accepted based on acceptable recovery of other surrogates.
SPK1	The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.

APPENDIX 3: REVISION HISTORY

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	0071316
PROJECT	Marsh Lake Sewage Lagoon Audit	**REPORTED**	2020-08-05 13:22

Sample ID	Changed	Change	Analysis	Analyte(s)
0071316-06RE1	2020-07-20	Added	Conductivity	Conductivity (EC)
0071316-06RE1	2020-07-20	Added	pH	pH
0071316-07RE1	2020-07-20	Added	Conductivity	Conductivity (EC)
0071316-07RE1	2020-07-20	Added	pH	pH
0071316-08RE1	2020-07-20	Added	Conductivity	Conductivity (EC)
0071316-08RE1	2020-07-20	Added	pH	pH
0071316-06RE1	2020-07-21	Added	Chloride by IC	Chloride
0071316-06RE1	2020-07-21	Added	Nitrate by IC	Nitrate (as N)
0071316-06RE1	2020-07-21	Added	Nitrite by IC	Nitrite (as N)
0071316-06RE1	2020-07-21	Added	Sulfate by IC	Sulfate
0071316-07RE1	2020-07-21	Added	Chloride by IC	Chloride
0071316-07RE1	2020-07-21	Added	Nitrate by IC	Nitrate (as N)
0071316-07RE1	2020-07-21	Added	Nitrite by IC	Nitrite (as N)
0071316-07RE1	2020-07-21	Added	Sulfate by IC	Sulfate
0071316-08RE1	2020-07-21	Added	Chloride by IC	Chloride
0071316-08RE1	2020-07-21	Added	Nitrate by IC	Nitrate (as N)
0071316-08RE1	2020-07-21	Added	Nitrite by IC	Nitrite (as N)
0071316-08RE1	2020-07-21	Added	Sulfate by IC	Sulfate

CARO ANALYTICAL SERVICES
Caring About Results, Obviously.

CA *0071316* 46

#110 K9
#102- C3
17225 , Edmonton, AB T5S 1H7

CARO BC COC, Rev 2017-05

CHAIN OF CUSTODY RECORD

COC# _____ PAGE 1 OF 1

RELINQUISHED BY:	DATE: 2020-07-14	RECEIVED BY:	DATE: 7/15
Norbert Botca Digitally signed by Norbert Botca Date: 2018.10.19 11:00:43 -07'00'	TIME: 12:30	AFA AIR North	TIME: 8:00

TURNAROUND TIME REQUESTED:
Routine: (5-7 Days) ☒
Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
Other* _____
*Contact Lab To Confirm. Surcharge May Apply

REGULATORY APPLICATION: Show on Report ☐
Canadian Drinking Water Quality ☒ BC WQG ☐ BC HWR ☐
BC CSR Soil: WL ☐ AL ☐ PL ☐ RL-LD ☐ RL-HD ☐ CL ☐ IL ☐
BC CSR Water: AW ☐ IW ☐ LW ☐ DW ☐
CCME: DW Other: YT CSR DW

REPORT TO:
COMPANY: Yukon Government, Dept of ENV
ADDRESS: Water Resources Branch (V-310)
Box 2703, Whitehorse, YT Y1A 2C6
CONTACT: Tyler Williams; Norbert Botca
TEL/FAX: 867-667-3512
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
DATA FORMAT: EXCEL ☒ WATERTRAX ☐ ESdat ☐ EQuIS ☐ BC EMS ☐ OTHER* ☒
EMAIL 1: norbert.botca@gov.yk.ca
EMAIL 2: tyler.williams@gov.yk.ca
EMAIL 3:

INVOICE TO: SAME AS REPORT TO ☐
COMPANY: Yukon Government, Dept of ENV
ADDRESS: Water Resources Branch (V-310_
Box 2703, Whitehorse, YT Y1A0K5
CONTACT: Holly Goulding
TEL/FAX: 867-456-6538
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
EMAIL 1: tyler.williams@gov.yk.ca
EMAIL 2: norbert.botca@gov.yk.ca
EMAIL 3:
PO #:

** If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, please check here: ☐

PROJECT NUMBER / INFO:
Marsh Lake Sewage Lagoon Audit

A: Biohazard B: Cyanide C: PCBs D: Asbestos E: Heavy Metals F: Flammable G: Strong Odour H: High Contamination I: Other (please specify*)

COMMENTS:
ML-8 and ML-3 samples had high turbidity
Please use silica gel extraction method

SAMPLED BY: NB

ANALYSES REQUESTED:

	SAMPLE ID - SAMPLE CLASS - STATION CODE	MATRIX: DRINKING WATER	OTHER WATER	SOIL	OTHER	CONTAINER QTY	SAMPLING: DATE YYYY-MM-DD	TIME HH:MM	CHLORINATED	FILTERED	PRESERVED	(e.g. flow/volume media ID/notes)	METALS - WATER TOTAL Hg ☐	METALS - WATER DISSOLVED Hg ☐	pH, EC	TSS	TIC, TOC, DIC, DOC	Chloride, Sulphate, Nitrite, Nitrate	Total Phosphorus, Total Ammonia - N	Bromide	Alkalinity	Fecal Coliforms	Total Oil & Grease	BTEX/VPH	LEPH/HEPH/PAH	EPH			HOLD	POSSIBLE SAMPLE HAZARD CODE(S)
1	2020T16-01-M-ML- 4		✓			9	2020-07-13	11:00		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
2	2020T16-02-M-ML-4D		✓			9	2020-07-13	11:00		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
3	2020T16-03-M-MW12-03ML		✓			9	2020-07-13	12:30		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
4	2020T16-04-M-ML-8		✓			6	2020-07-13	15:00		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
5	2020T16-05-M-ML-3		✓			9	2020-07-13	14:30		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
6	2020T16-06-M-ML-7		✓			6	2020-07-13	13:10		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
7	2020T16-07-M-ML-6		✓			7	2020-07-13	12:15		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓					✓				
8	2020T16-08-M-ML-9		✓			6	2020-07-13	11:11		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
9	2020T16-09-M-ML-5		✓			7	2020-07-13	15:30		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓					✓				

SHIPPING INSTRUCTIONS: Return Cooler(s) ☒
Supplies Needed:
Please return coolers. Thank you!

SAMPLE RETENTION:
30 Days (default) ☐
60 Days ☐ 90 Days ☐
Other (surcharges will apply): _____

*** OTHER INSTRUCTIONS:**

If you would like to talk to a real live Scientist about your project requirements, please check here: ☐

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): 8.4 ICE: Y ☒ N ☐
COOLER 2 (°C): 4.2 ICE: Y ☒ N ☐
COOLER 3 (°C): _____ ICE: Y ☐ N ☐
CUSTODY SEALS INTACT: NA ☐ Y ☐ N ☐

CARO ANALYTICAL SERVICES
Caring About Results, Obviously.

CA #110 #102- 17225 ... Edmonton, AB T5S 1H7 — 46 K9 C3

CARO BC COC, Rev 2017-05

CHAIN OF CUSTODY RECORD

COC# _____ PAGE 1 OF 1

RELINQUISHED BY:	DATE: 2020-07-14	RECEIVED BY:	DATE: 7/15
Norbert Botca Digitally signed by Norbert Botca Date: 2018.10.19 11:00:43 -07'00'	TIME: 12:30	ATA AIR North	TIME: 8:00

REPORT TO:
COMPANY: Yukon Government, Dept of ENV
ADDRESS: Water Resources Branch (V-310)
Box 2703, Whitehorse, YT Y1A 2C6
CONTACT: Tyler Williams; Norbert Botca
TEL/FAX: 867-667-3512
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
DATA FORMAT: EXCEL ☒ WATERTRAX ☐ ESdat ☐ EQuIS ☐ BC EMS ☐ OTHER* ☒
EMAIL 1: norbert.botca@gov.yk.ca
EMAIL 2: tyler.williams@gov.yk.ca
EMAIL 3:

INVOICE TO: SAME AS REPORT TO ☐
COMPANY: Yukon Government, Dept of ENV
ADDRESS: Water Resources Branch (V-310_
Box 2703, Whitehorse, YT Y1A0K5
CONTACT: Holly Goulding
TEL/FAX: 867-456-6538
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
EMAIL 1: tyler.williams@gov.yk.ca
EMAIL 2: norbert.botca@gov.yk.ca
EMAIL 3:
PO #:

** If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, please check here: ☐

TURNAROUND TIME REQUESTED:
Routine: (5-7 Days) ☒
Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
Other* _____
*Contact Lab To Confirm. Surcharge May Apply

REGULATORY APPLICATION: Show on Report ☐
Canadian Drinking Water Quality ☒ BC WQG ☐ BC HWR ☐
BC CSR Soil: WL ☐ AL ☐ PL ☐ RL-LD ☐ RL-HD ☐ CL ☐ IL ☐
BC CSR Water: AW ☐ IW ☐ LW ☐ DW ☐
CCME: DW Other: YT CSR DW

PROJECT NUMBER / INFO:
Marsh Lake Sewage Lagoon Audit

A: Biohazard B: Cyanide C: PCBs D: Asbestos E: Heavy Metals F: Flammable G: Strong Odour H: High Contamination I: Other (please specify*)

COMMENTS:
ML-8 and ML-3 samples had high turbidity
Please use silica gel extraction method

SAMPLED BY: NB

ANALYSES REQUESTED:

	SAMPLE ID - SAMPLE CLASS - STATION CODE	MATRIX: DRINKING WATER	OTHER WATER	SOIL	OTHER	CONTAINER QTY	SAMPLING: DATE YYYY-MM-DD	TIME HH:MM	CHLORINATED	FILTERED	PRESERVED	(e.g. flow/volume media ID/notes)	METALS - WATER TOTAL Hg	METALS - WATER DISSOLVED Hg	pH, EC	TSS	TIC, TOC, DIC, DOC	Chloride, Sulphate, Nitrite, Nitrate	Total Phosphorus, Total Ammonia - N	Bromide	Alkalinity	Fecal Coliforms	Total Oil & Grease	BTEX/VPH	LEPH/HEPH/PAH	EPH			HOLD	POSSIBLE SAMPLE HAZARD CODE(S)
1	2020T16-01-M-ML- 4		✓			9	2020-07-13	11:00		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
2	2020T16-02-M-ML-4D		✓			9	2020-07-13	11:00		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
3	2020T16-03-M-MW12-03ML		✓			9	2020-07-13	12:30		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
4	2020T16-04-M-ML-8		✓			6	2020-07-13	15:00		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
5	2020T16-05-M-ML-3		✓			9	2020-07-13	14:30		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				
6	2020T16-06-M-ML-7		✓			6	2020-07-13	13:10		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
7	2020T16-07-M-ML-6		✓			7	2020-07-13	12:15		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓					✓				
8	2020T16-08-M-ML-9		✓			6	2020-07-13	11:11		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓									
9	2020T16-09-M-ML-5		✓			7	2020-07-13	15:30		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓					✓				

SHIPPING INSTRUCTIONS: Return Cooler(s) ☒
Supplies Needed:
Please return coolers. Thank you!

SAMPLE RETENTION:
30 Days (default) ☐
60 Days ☐ 90 Days ☐
Other (surcharges will apply): _____

*** OTHER INSTRUCTIONS:**

If you would like to talk to a real live Scientist about your project requirements, please check here: ☐

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): 8.4 ICE: Y ☒ N ☐
COOLER 2 (°C): 4.2 ICE: Y ☒ N ☐
COOLER 3 (°C): _____ ICE: Y ☐ N ☐
CUSTODY SEALS INTACT: NA ☐ Y ☐ N ☐