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April 19<sup>th</sup>, 2023  
File No. W2020-20.2022

**KICKING HORSE MOUNTAIN UTILITIES CORP.**  
1505 17<sup>th</sup> Avenue SW  
Calgary, Alberta  
T2T 0E2

Attention: Mr. Patrick Majer  
  
Tel: 403.861.8730  
e-mail: [pmajer@skircr.com](mailto:pmajer@skircr.com)

Dear Mr. Majer:

**Re: KICKING HORSE MOUNTAIN RESORT  
WASTEWATER TREATMENT PLANT  
2022 ANNUAL REPORT**

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Forwarded is a pdf copy of the 2022 Annual Wastewater Report for the above property.

Should you have any questions, please call us at 403-238-9510 or email to [jana@iqwater.ca](mailto:jana@iqwater.ca).

Sincerely,

**IQWATER INC.**

A handwritten signature in black ink, appearing to read "Jana Zverina", is written over a light blue circular stamp. The signature is fluid and cursive.

Jana Zverina, M.Sc., P.Eng.

***IQWater Inc.***



**2022 WASTEWATER TREATMENT PLANT  
ANNUAL REPORT**

**KICKING HORSE MOUNTAIN RESORT  
1339 KICKING HORSE TRAIL  
GOLDEN, B.C.**

Prepared for:

**KICKING HORSE MOUNTAIN UTILITIES CORP.**  
1505-17<sup>th</sup> Avenue SW  
Calgary, Alberta  
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Prepared by:

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April 19<sup>th</sup>, 2023  
Report # W2020-020.2022

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## APPENDICES

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## **1.0 INTRODUCTION**

### **1.1 BACKGROUND**

The following annual report for the Wastewater Treatment Plant at Kicking Horse Mountain Resort (further KHMR) operated by Kicking Horse Mountain Utility Corporation (further KHMUC) is compiled in accordance with the requirements of the Municipal Sewage Regulation (further MSR). This report summarizes the calendar year 2022.

In January 2012 Resorts of the Canadian Rockies (RCR) took over the resort and the plant operations and formed KHMUC. KHMUC has made changes to the way the plant operates, mainly by using a spare tank as an equalization tank. There has been a noticeable difference in plant operations since RCR took over and KHMUC was formed.

The resort is an ongoing development currently consisting of a combination of a single family, multi-family, and rental pool/hotel style facilities. These contribute to the total loading of the site in addition to ski hill use and ancillary services.

### **1.2 RESORT CONSTRUCTION AND OCCUPANCY**

Kicking Horse Mountain Resort is located approximately 13 km from Golden, B.C. The sewage treatment plant, which was constructed in 2000, is located adjacent to the resort. The treatment USBF (Upflow Sludge Blanket Filtration) technology employed is a modified conventional activated sludge process applying an up-flow sludge blanket filtration clarifier. There are two independent treatment trains that are operated in parallel during the peak season (December to April) and as a single train during the rest of the calendar year.

The system incorporates two treatment zones and one clarification zone that are interconnected with the flow been driven by the hydraulic pressure from the influent storage tank pumps.

The two treatment zones consist of an Anoxic Zone and Aeration Zone discharging into an effluent clarifier.

Each zone is triangular in shape. Two 10" underflow pipes on either side of the clarification zone join in the anoxic and aeration zones together. The aeration zone is connected to the clarifier by a slotted flow through, approximately 18" above the clarifier bottom and the width of the clarifier wall. Each zone is approximately 15' deep. Effluent clarification is enhanced by an up-flow sludge blanket in the clarifier that serves to filter the solids.

Clarified effluent flows over the clarifier weir into a dual micro filtration well, equipped with dual drum screens. Leaving the drum screens, the final effluent enters an open channel Trojan U.V. disinfection system to be discharged through a 4 km long gravity main to the outfall in the Columbia River.

Waste activated sludge used to be stored in a thickener and removed by a vacuum tanker. In the fall of 2014, a 12 unit Teknofanghi (Model Number 12BCAVPK) supplied by Drycake was installed and was commissioned in mid-December. Historically, the sludge was bagged and disposed of at the CSRD Landfill located in Golden, BC; however, due to increased costs for disposal at this facility, the sludge is now disposed of at the Crowsnest/Pincher Creek Landfill site.



## 2.0 REGISTRATION REQUIREMENTS

This section describes operating requirements as specified in the Kicking Horse Mountain Resort (KHMR) Registration Letter RE 15474. The registration describes parameters that must be tested for as well as the operating conditions, sampling frequency and sampling locations.

### 2.1 PARAMETERS

The following parameters are to be monitored:

pH	Field Sample
Temperature	Field Sample, measured in Celsius
Flow	Field Samples, measured as m <sup>3</sup> /d
BOD <sub>5</sub>	Five day biochemical oxygen demand, measured in mg/l
TSS	Total suspended solids or non-filterable residue, measured in mg/l
NH <sub>3</sub>	Ammonia concentration, expressed as nitrogen in mg/l
NO <sub>3</sub>	Nitrate concentration, expressed as nitrogen in mg/l
NO <sub>2</sub>	Nitrite concentration, expressed as nitrogen in mg/l
Total-P	Total phosphorous concentration, measured in mg/l
Ortho-P	Orthophosphate concentration, measured in mg/l
Fecal coliform	Bacterial concentration, measured as colony forming units per 100ml
Enterococci	Bacterial concentration, measured as colony forming units per 100ml
E. Coli	Bacterial concentration, measured as colony forming units per 100ml
Toxicity Bioassay	96 hour toxicity test, recorded as pass or fail

### 2.2 REGISTRATION LETTER OPERATING CONDITIONS

The treatment plant is required to meet the effluent discharge conditions outlined in Table 1.

Table 1  
Effluent Limits

Parameter	Limit	Unit
Flow	300	m <sup>3</sup> /d
BOD <sub>5</sub>	45	mg/l
TSS	45	mg/l
Total-P	1.0	mg/l
Ortho-P	0.5	mg/l
Fecal Coliforms*	200	CFU/100ml
E. Coli*	77	CFU/100ml
Enterococci*	20	CFU/100ml
Toxicity Bioassay	pass	n/a

\*Limit for recreational waters only, not included in RCRI registration letter

Waste activated sludge used to be stored in a thickener and removed by a vacuum tanker. In the fall of 2014, a 12 unit Teknofanghi (Model Number 12BCAVPK) supplied by Drycake was installed and was commissioned in mid-December. The sludge is bagged and disposed of at the Crowsnest/Pincher Creek Landfill site.

Operators at the plant are required to be certified in Accordance with Section 22 of the MSR.

## **2.3 REPORTING REQUIREMENTS**

An annual report demonstrating the performance of the facility is to be publicly posted on the Internet within 120 days of the end of the calendar year.

In addition the report must also include the following:

- Tabulated results of the Effluent and Environmental Monitoring Data with standards and criteria
- Interpretation of the monitoring data
- The total volume discharged over the year
- Total sludge wasted over the year and its final destination
- The state of compliance of the treatment facility/process
- Indicated the percentage of residential development, as defined in the regulation, that contributes to the effluent discharge
- Any additional relevant information the discharger wishes to provide

## **2.4 SAMPLING FREQUENCY**

The MSR Registration requires KHMR and, as such, the contract operator KHMUC, to undertake the environmental testing program outlined in Table 2 below.

Columbia River testing requires that a minimum of 10 samples annually are taken from each of the upstream, the side channel (further also referred to as a side stream) and downstream river locations, relative to the outfall diffuser. The sampling locations were identified in Masse & Miller Consulting Ltd. letter dated February 17<sup>th</sup>, 2005. Flow data is to be collected continuously.

The intent of the environmental testing procedure outlined in Table 2 is to collect weekly samples of effluent during the summer and winter seasons. Commencement of the winter weekly seasonal sampling (weekly samples for a period of 5 weeks) is when the river sampling sites open up and the summer monitoring usually commences during low water flow in the river, usually in September or October.

In addition to the program and tests listed above, other in-plant testing is needed to permit operational control of the process.

Table 2  
Sampling Location/Frequency/Type

Parameter	Location				
	Columbia River Upstream at Bridge	Columbia River ~200 d/s of outfall from east shore	Columbia River d/s of island from west shore ~1km d/s of outfall	Columbia River side channel ~350m d/s of outfall	Effluent
EMS Number	E256694	E258898	E258899	E258897	E256696
	Winter/Summer	Winter/Summer	Winter	Summer	Winter/Summer
pH	WS/G	WS/G	WS/G	WS/G	W
Temp	WS/G	WS/G	WS/G	WS/G	W
Flow	/	/	/	/	W
BOD <sub>5</sub>	/	/	/	/	W
TSS	WS/G	WS/G	WS/G	WS/G	WS/G+Q/G
NH <sub>3</sub> -N	WS/G	WS/G	WS/G	WS/G	WS/G
NO <sub>3</sub> -N	WS/G	WS/G	WS/G	WS/G	WS/G
NO <sub>2</sub> -N	WS/G	WS/G	WS/G	WS/G	WS/G
Total-P	WS/G	WS/G	WS/G	WS/G	WS/G
Ortho-P	WS/G	WS/G	WS/G	WS/G	WS/G
Fecal Coliform	WS/G	WS/G	WS/G	WS/G	WS/G+Q/G
Enterococci	WS/G	WS/G	WS/G	WS/G	WS/G
E. Coli	WS/G	WS/G	WS/G	WS/G	WS/G
Toxicity Bioassay	/	/	/	/	1/3Y/G
Coordinates	11.500456 5684421	11.500288 5684880	N51 19.364 W 11700.218	11.500126 5684835	At sewage treatment plant

Where:

WS	Weekly seasonal (weekly samples for a period of 5 weeks)
Q	Quarterly
W	Weekly
G	Grab
1/3Y	Once every 3 years

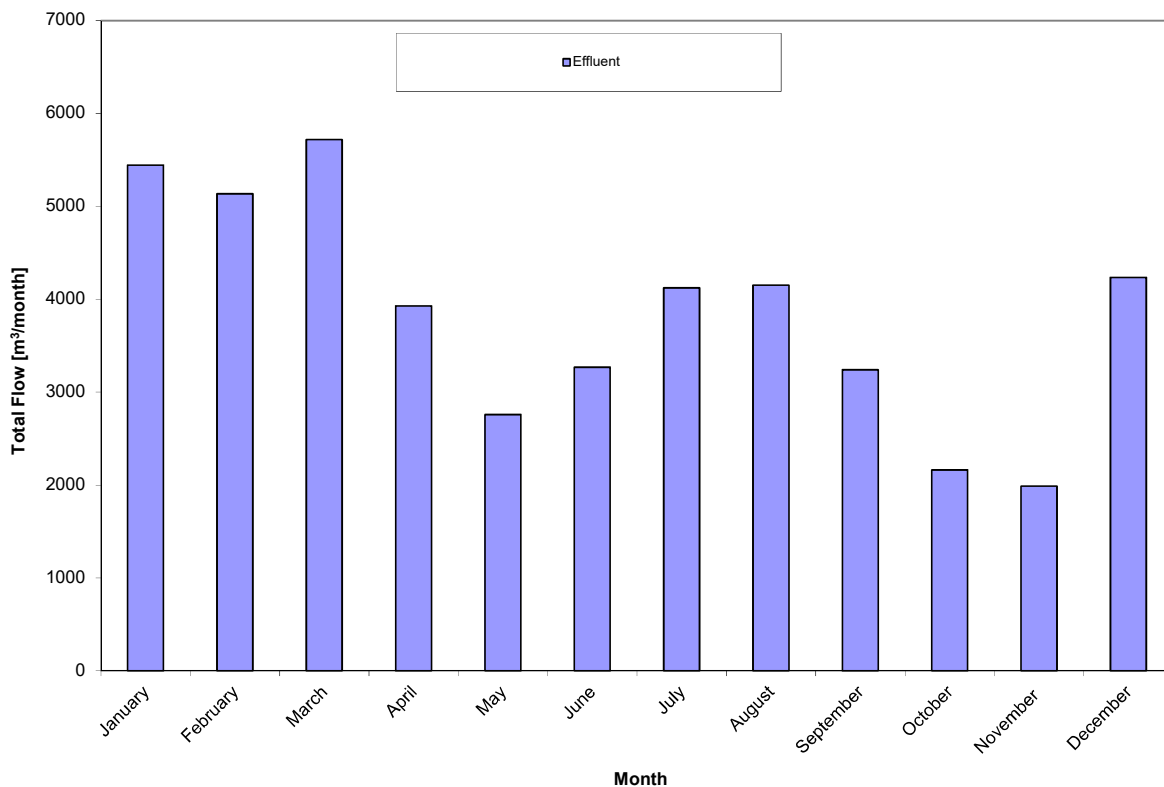
### 3.0 SEWAGE FLOW RECORDS

This section provides data and analysis regarding plant effluent flows, and compares 2022 data to the previous years.

Flow data is continuously monitored at the discharge to the outfall using a flow meter to be recorded in the SCADA system. Operators then transcribe the daily flows into a logbook.

The total effluent flow recorded for 2022 was 44,546 m<sup>3</sup> with an average of 122 m<sup>3</sup>/day. Available monthly total effluent flow meter records for 2022 are provided in Figure 1a.

**Figure 1a**  
2022 Effluent Flow Meter Monthly Flow Totals



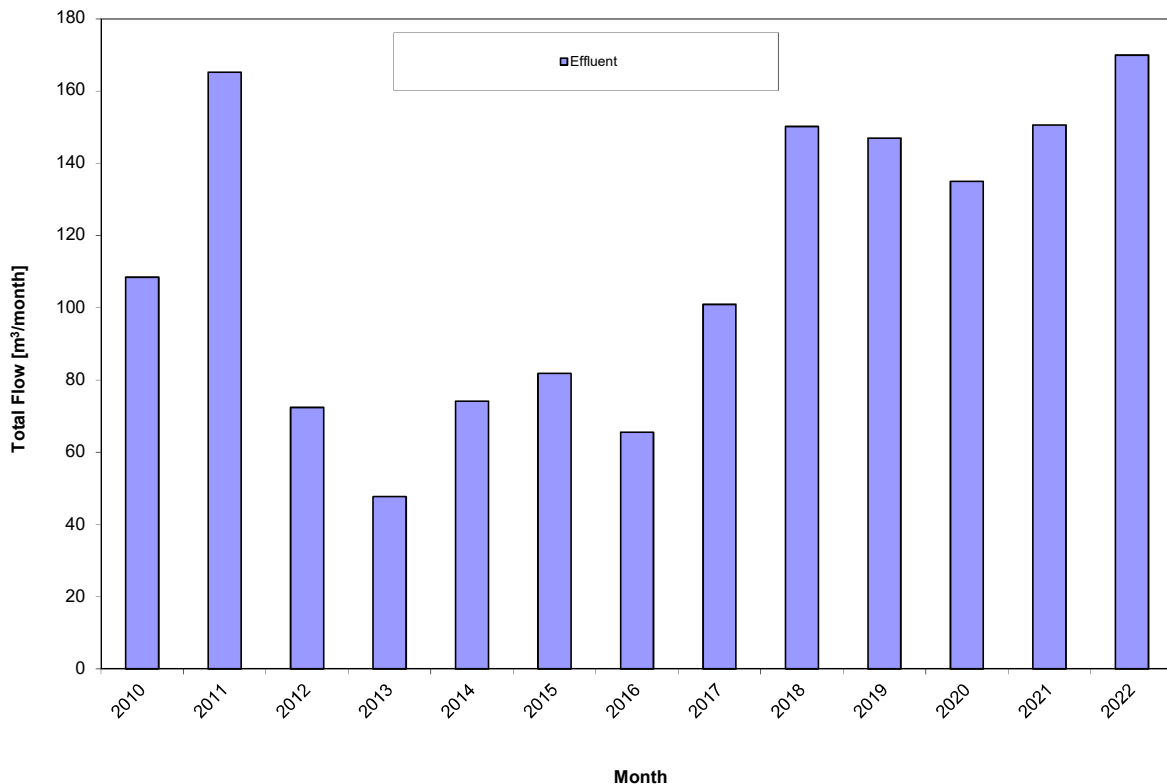
The ski resort operates with higher winter and early spring sewage flows than during any other period. Larger sewage flows were typically observed during January, February, March and December. The highest monthly flow was observed in March at 5,719 m<sup>3</sup>/month. However, summer month flows i.e. July and August are becoming similar to those in winter.

The average daily plant flow through January to March and December of 2022 was 170 m<sup>3</sup>/day compared to the last year average at 154 m<sup>3</sup>/day.

Please note that in the previous reports the highest plant flow was compared to five months i.e. January, February, March, April and December. In 2022 the flow for these five months was higher at 162 m<sup>3</sup>/day than that of 2021 at 151 m<sup>3</sup>/day, 2020 at 135 m<sup>3</sup>/day, 2019 at 147 m<sup>3</sup>/day and similar to 2018 at 150.2 m<sup>3</sup>/day.

These averages are higher compared to 100.96 m<sup>3</sup>/day over the same period in 2017, 65.52 m<sup>3</sup>/day in 2016, 81.79 m<sup>3</sup>/day in 2015, 74.10 m<sup>3</sup>/day in 2014, 47.73 m<sup>3</sup>/day in 2013, 72.41 m<sup>3</sup>/day in 2012 and 108.5 m<sup>3</sup>/day in 2010. The only exception was 2011 at 165.2 m<sup>3</sup>/day (note that data for Dec was missing).

**Figure 1b**  
Average Effluent Flow in Peak Period – Jan to April and Dec (Historical)



Peak flow for the year reached was 229 m<sup>3</sup>/day on December 31<sup>st</sup>, 2022, which is below the allowable limit of 300 m<sup>3</sup>/day.

The peak flow is lower than that at 263 m<sup>3</sup>/day in 2021, 247 m<sup>3</sup>/day in 2020 and also lower than the pre-Covid levels of the previous two years at 265 m<sup>3</sup>/day in 2019 and 262 m<sup>3</sup>/day in 2018.. The peak flow day occurred during the ski season.

Historical peak flows were 244 m<sup>3</sup>/day in 2017, 162.25 m<sup>3</sup>/day in 2016, 137.32 m<sup>3</sup>/day in 2015, 145.71 m<sup>3</sup>/day in 2014, 165.03 m<sup>3</sup>/day in 2013, 159.05 m<sup>3</sup>/day in 2012, 311.54 m<sup>3</sup>/day in 2011 (again note that the data for one of the historically highest months, December was missing), 317.6 m<sup>3</sup>/day in 2010 and 251.3 m<sup>3</sup>/day in 2009.

There is currently no method of measuring influent to the treatment plant.

A summary of sewage flow for years 2009 through 2022 is provided in Table 3 and Figures 2 and 3:

Table 3  
2009 – 2022 Flow Comparisons

Year	Sewage Flow (m <sup>3</sup> /day)			Days Over Limit
	Total	Average	Peak	
2009	25,093.9	69.4	251.3	0
2010	27,467.5	77.6	317.6	2
2011	27,771* (42,340) <sup>1</sup>	116	311.54**	2
2012	17,323.4	47.85	159.05	0
2013	16,089	44.73	165.03	0
2014	19,279 <sup>2</sup>	52.88	145.71	0
2015	20,594	56.4	167.32	0
2016	21,125	58.9	162.25	0
2017	31,431 <sup>3</sup>	85.9	240	0
2018	45,147	123.8	262	0
2019	41,785	114.0	265	0
2020	41,218	113.0	247	0
2021	44,546	122.0	263	0
2022	46,158	127	229	0

\*not including all of September, October, November or December

\*\*the number does not reflect a true peak as all the data was not available during the high flow months

<sup>1</sup> (data) in bracket – estimate based on daily average

<sup>2</sup> The SCADA failed to record flow for the entire day on several occasions; therefore flow was estimated on partial data

<sup>3</sup> The SCADA failed to record correct flow from July 24<sup>th</sup> until September 7<sup>th</sup>; therefore flow was based on partial estimates

### 2009 - 2020

Peak flows in **2009** coincided with the weekends, holidays, ski season and summer recreational activities. The highest daily flow was recorded on Feb 15<sup>th</sup> at 215.1 m<sup>3</sup>/day and on December 31<sup>st</sup> at 251.3 m<sup>3</sup>/day. At no time was the maximum allowed daily flow exceeded.

Peak flows in **2010** coincided with weekends, holidays, ski season and summer recreational activities. The highest daily flow was recorded on New Year's Day at 242.7 m<sup>3</sup>/day, February 14<sup>th</sup> at 206.4 m<sup>3</sup>/day, and on December 31<sup>st</sup> at 317.6 m<sup>3</sup>/day. During the third week of July 2010 a lightning strike damaged the level sensors in the wastewater treatment plant resulting in inaccurate measurement of flows. The Ministry of Environment was notified. The operators indicated that during daily monitoring of the system, there was no time when the flows came close to exceeding the permit based on visual observation and process control monitoring.

Peak flows in **2011** also coincided with weekends, holidays, ski season and summer recreational activities. The highest daily flow was recorded on a weekend (March 26<sup>th</sup>) at 311.54 m<sup>3</sup>/day and the second highest peak was observed on New Year's Day at 303.04 m<sup>3</sup>/day. The daily flow limit was exceeded on both occasions. Please note the data was incomplete for September, October, November and December 2011.

Peak flows in **2012** also coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2012. The reduction in daily flows and reduction in peak flow is due to flow equalization which has now been implemented in the facility using the vacant tank that will one day be used for additional process trains. Flow equalization began in January 2012.

Peak flows in **2013** also coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2013. The highest daily flow was recorded on December 29<sup>th</sup> at 165.03 m<sup>3</sup>/day.

Peak flows in **2014** coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2014. The highest daily flow was recorded on January 2<sup>nd</sup> at 145.71 m<sup>3</sup>/day. The SCADA failed to record flow for the entire day on several occasions and partial data was used to estimate total flow. The failure was due to computer issues.

On January 9, 24, 25; February 4; March 3, 28, 29; May 23 to June 2, June 9, 14, 15, 23, 27; July 4, 6-10, 12, 13, 28; August 12, 13, 16, 17; September 5, 6; October 1, 3; November 21, 22, 25, 26; and December 7, 8, and 9 the flow was estimated.

Peak flows in **2015** coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2015. The highest daily flow was recorded on January 2<sup>nd</sup> at 167.32 m<sup>3</sup>/day.

Peak flows in **2016** coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2016. The highest daily flow was recorded on December 29<sup>th</sup> at 162.25 m<sup>3</sup>/day.

Peak flows in **2017** coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2017. The highest daily flow was recorded on December 29<sup>th</sup> at 244 m<sup>3</sup>/day. Please note that the SCADA failed to record correct flow from July 24<sup>th</sup> until September 7<sup>th</sup>; therefore flow was based on partial estimates.

Peak flows in **2018** coincided with the peak season in January, February, March and December. There were no daily flow limit exceedances observed in 2018. The highest daily flow was recorded on December 31<sup>st</sup> at 262 m<sup>3</sup>/day.

Peak flows in **2019** generally coincided with the peak season in January, February, March and December. The highest daily flow, however, was recorded on November 3<sup>rd</sup> at 265 m<sup>3</sup>/day.

Peak flows in **2020** generally coincided with the peak season in January, February, March and December. The highest daily flow was recorded on December 31<sup>st</sup> at 247 m<sup>3</sup>/day.

## **2021**

Peak flows in 2021 generally coincided with the peak season in January, February, March and December. The peak flow was recorded at 263 m<sup>3</sup>/day on April 1<sup>st</sup>.

## **2022**

Peak flows in 2022 generally coincided with the peak season in January, February, March and December. April flow was similar to February. The peak flow was recorded at 229 m<sup>3</sup>/day on December 31<sup>st</sup>. There were no daily flow limit exceedances observed in 2022.

Daily wastewater flows are strongly correlated to weather and the number of day-users at the resort with the peak ski season having the highest flows. Summer flows result from non-skiing related recreational activities, generally hiking or mountain biking events. The lowest plant flow was experienced in the shoulder season periods (May to June and September to November).

- There are approximately 100 full-time year-round residents at the resort. In total, there are currently:
- ✓ 98 single family homes (Purcell Woods, Cache Estates, Cache Residences, Dogtooth and Cedar Creek Estates)
  - ✓ 116 multi-family units i.e. duplexes and triplexes (Whispering Pines, The Cedars<sup>1</sup> – 2 phases, Selkirk Resort Homes, Aspen – Phase 1 and 2)
  - ✓ 155 multi-storey condos (Mountaineer Lodge, Palliser Lodge, Glacier Lodge)
  - ✓ 3 commercial lodges (Cache Lodges)
  - ✓ Five seasonal restaurants
  - ✓ Administration office, day-care facilities, general store and rental shop

<sup>1</sup>The Cedars Phase 3 (10 units)

OCCUPANCY*	Family Residences	Hotel Units	Allocation	EQ Bed Units
<b>Seasonal</b>				
Multi-story condos (3 units)	-	155	2	310
Commercial Lodges (3)	-	-	As per tariff	122
Single Family Residences	98	-	varies	718
Multi-Family Units (Duplex & Triplex)	116	-	varies	448
<b>Non-residential</b>				
5 Restaurants	-	-	As per tariff	241
Office	-	-	As per tariff	4
Day lodge	-	-	As per tariff	144

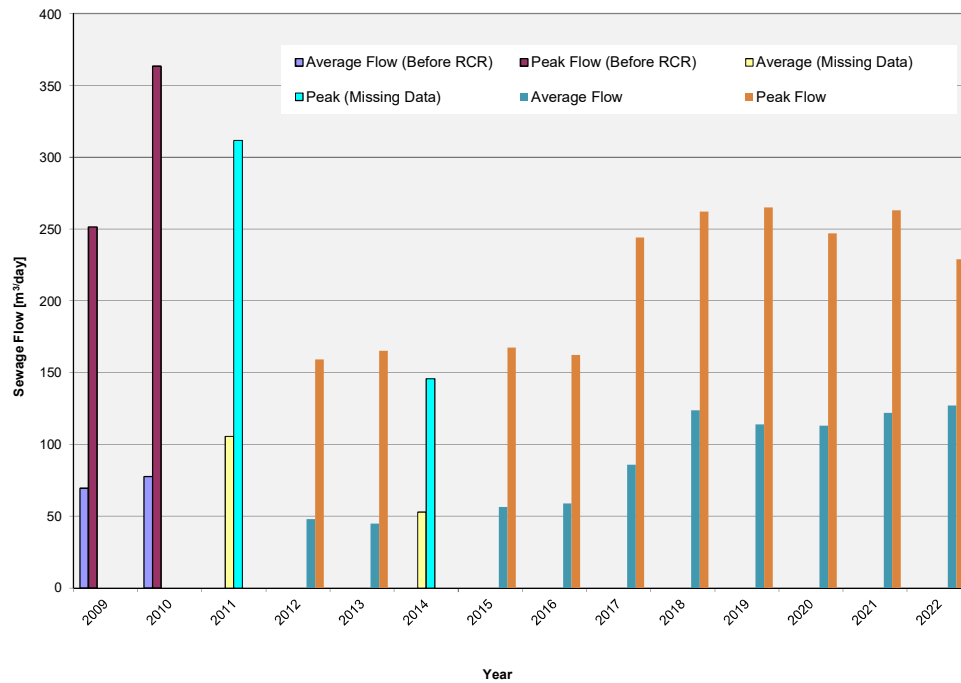
*\*Note that the occupancy significantly varies throughout the year with near full occupancy only during the ski season and during the long weekends.*

Current Total Bed Unit Count – Updated April 22, 2021 = 2448 BU



Figure 2 provides historical average and peak flow and Figure 3 shows historical total flows for 2009 to 2022 for comparison.

**Figure 2**  
Historical (2009 – 2022) Average and Peak Sewage Effluent Flow Comparison Graph



**Figure 3**  
Historical (2009 – 2022) Total Sewage Effluent Flow Graph

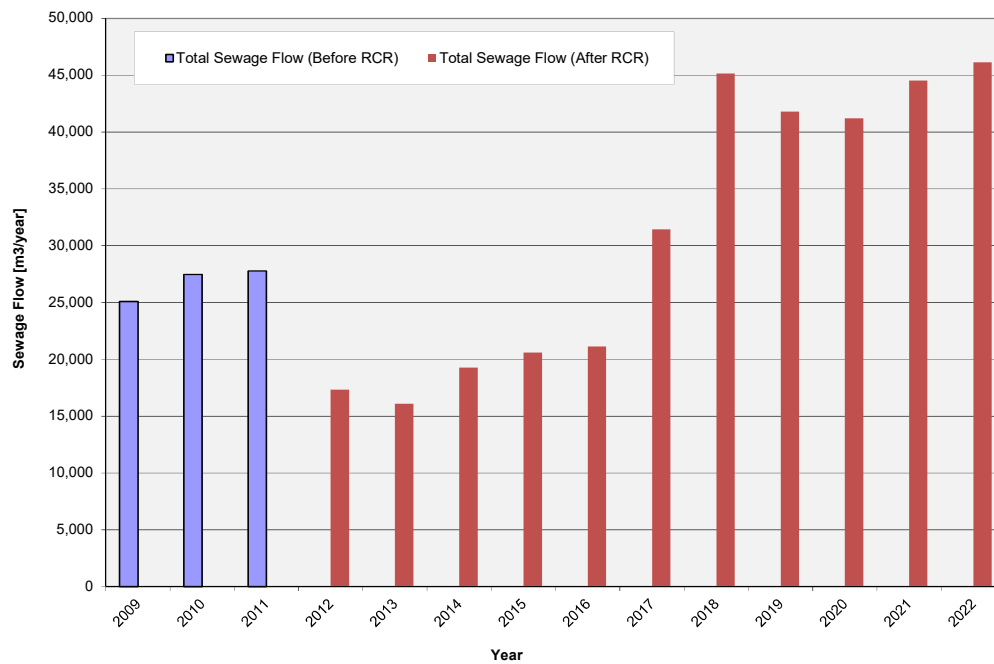
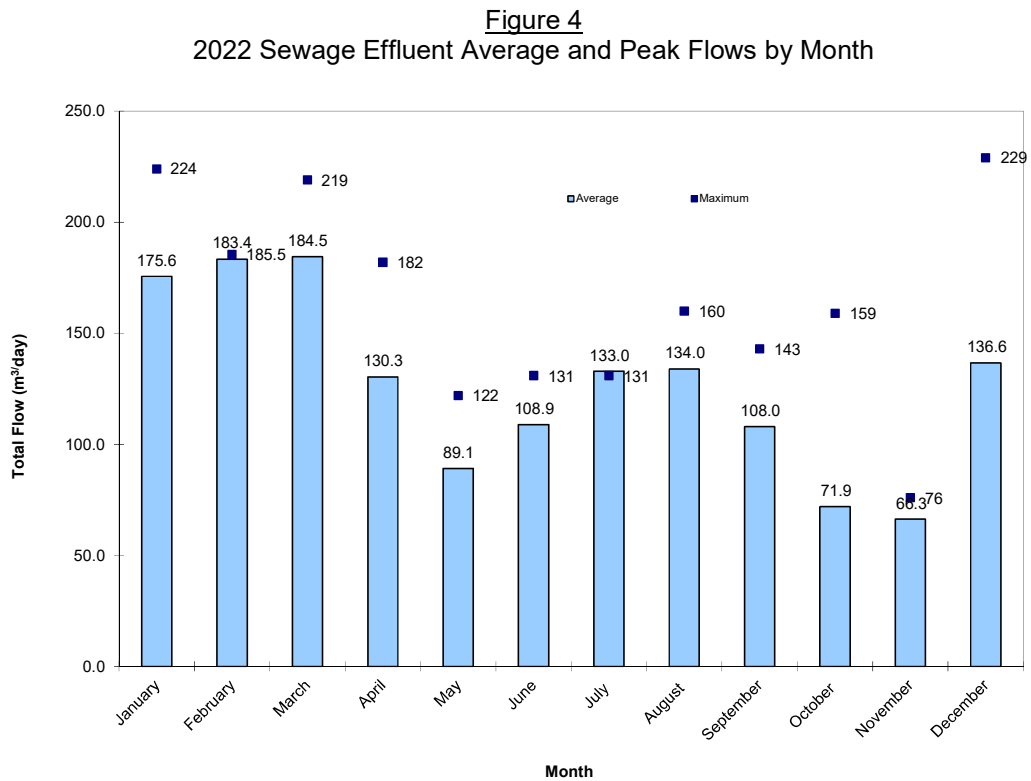
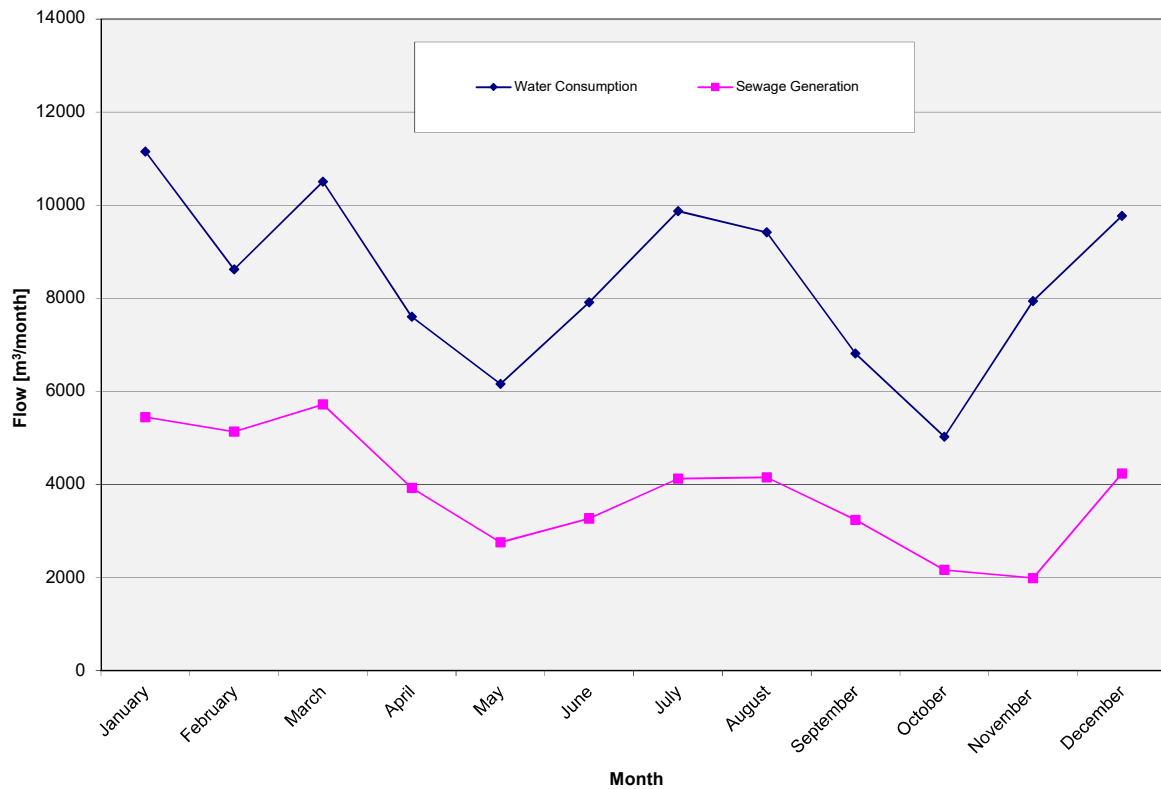


Figure 4 below shows average and peak flows for 2022.



This year, the total effluent discharged was equal to 46.0 % of the total water production, which is similar or lower than during the previous years. Monthly water usage at the hill is compared to the amount of effluent discharged at the WWTP in Figure 5.

**Figure 5**  
2022 Water Consumption and Sewage Effluent Generation



## 4.0 SEWAGE FLOW PROJECTION

This section shows projected wastewater flow for 2011 through 2022 based on the current development plans and provides an estimate of remaining plant capacity.

Based on unit generation rates provided in the BC Health Act for various lodging types as well as the assumption that wastewater generation would have been similar in 2011 to that calculated in 2015, the estimated highest day wastewater generation for 2011 would have been 705.5 m<sup>3</sup>/day. Using the actual peak flow of 312 m<sup>3</sup>/day, a correction factor of 0.44 was calculated for 2011. Averaged correction factor for the last eleven years (2011 to 2021) was also calculated and multiplied by the future estimated flows to more accurately reflect potential resort sewage generation rates. In 2019 the correction factor was 0.38, in 2020 it was calculated at 0.35 and in 2021 at 0.37. The correction factor for 2022 was calculated at 0.32.

Projected daily peak wastewater flows from 2011 by year were provided in Table 4 for the Resort's planned expansions. The highest water generation for 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, and 2021 was calculated based on the BC Health Act (refer to Table 10 enclosed at the end of this report). The future flows will be re-evaluated as further expansion occurs. The resort is committed to continuing the initiative on introducing a stormwater infiltration program, flow restrictive devices, and other water consumption measures.

Flow restrictive devices are intended to be utilized in all new construction and the infiltration/rehabilitation program is expected to be ongoing. The intent is to reduce the amount of per unit sewage generation and to reduce the amount of ground and surface water infiltration into the sewer system. KHMUC will monitor sewage flows to determine the efficiency of the program.

Even with additional expansion, KHMUC may not require an increase to permit discharge above the current limit of 300 m<sup>3</sup>/day if the flow restriction measures prove to be sustainable. Sewage discharge rates will be monitored and an application will be submitted to increase the maximum daily discharge when warranted.

Based on 2022 flow data, the plant has an unused capacity of 71 m<sup>3</sup>/day (based on an operating limit of 300 m<sup>3</sup>/day) due to the flow saving measures. This still needs to be closely monitored during 2023 and further considered when adding additional development.

**Table 4**  
Projected Peak Flows: 2011-2022

	2011	2012	2013	2014
<b>Estimated Wastewater Flow (m<sup>3</sup>/day)</b>	705.5*	705.5*	705.5*	705.5
<b>Actual and Corrected (m<sup>3</sup>/day)</b>	312** (a)	159 (a)	165 (a)	146 (a)

	2015	2016	2017	2018
<b>Estimated Wastewater Flow (m<sup>3</sup>/day)</b>	705.5	705.5	705.5	705.5
<b>Actual and Corrected (m<sup>3</sup>/day)</b>	167 (a)	162 (a)	244 (a)	262 (a)

\*the number was calculated based on 2014 occupancy, which is likely overestimated

\*\*the number does not reflect a true peak as all the data was not available during the high flow months

2022 WASTEWATER TREATMENT PLANT  
ANNUAL REPORT  
Kicking Horse Mountain Resort  
April 19<sup>th</sup>, 2023

	2019	2020	2021	2022	2023
<b>Estimated Wastewater Flow (m<sup>3</sup>/day)</b>	705.5	707.2	711.2*	711.2*	711.2*
<b>Actual and Corrected (m<sup>3</sup>/day)</b>	265 (a)	247 (a)	263 (a)	229 (a)	220 (b)

\*the number was calculated based on 2014 occupancy, which is likely overestimated

(a) actual peak flow

(b) corrected daily peak flows by the averaged correction factor for 2011 - 2022 correction factor:

2011	correction factor of	312*/705.5	0.44
2012	"	159/705.5	0.22
2013	"	165/705.5	0.23
2014	"	146/705.5	0.21
2015	"	167/705.5	0.24
2016	"	162/705.5	0.23
2017	"	244/705.5	0.34
2018	"	262/705.5	0.37
2019	"	265/705.5	0.38
2020	"	247/707.2	0.35
2021	"	263/711.2	0.37
2022	"	229/711.2	0.32
<b>AVERAGE</b>			<b>0.31</b>

A graph showing estimated vs actual historical peak flows is shown below.

Figure 6a  
Historical Correction Factors

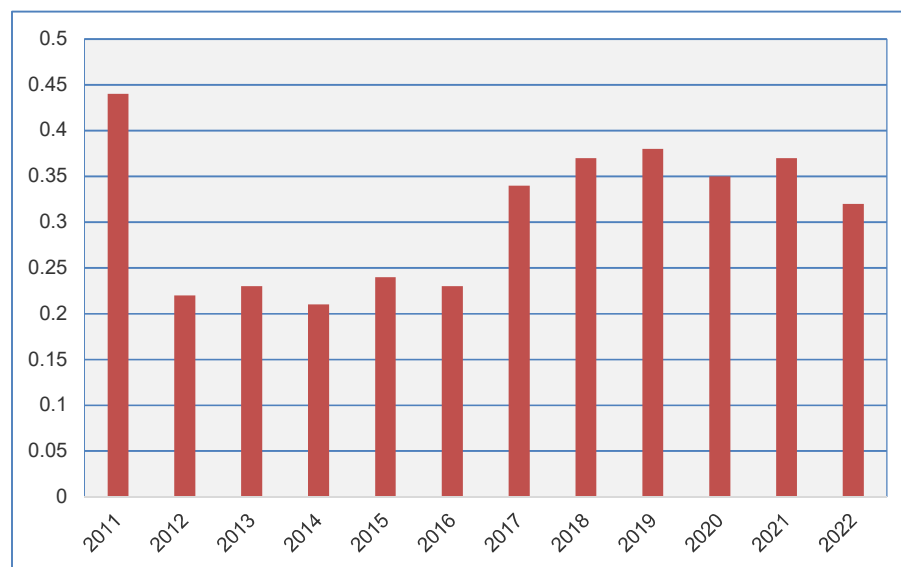
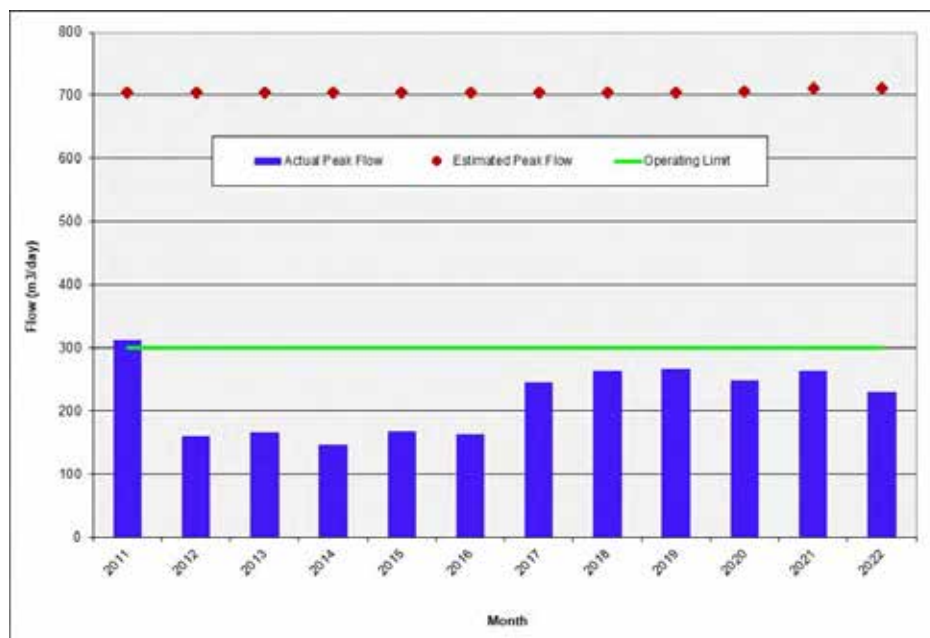


Figure 6b  
Estimated vs Actual Peak Flows (Historical)



## 5.0 OVERVIEW OF COLUMBIA RIVER SAMPLE RESULTS

This section provides data and analysis for the Columbia River samples taken during 2022.

Table 5 provides a summary record of the Columbia River test results for the period of April 12<sup>th</sup> to May 11<sup>th</sup>, 2022 and September 20<sup>th</sup> to October 19<sup>th</sup>, 2022.

Table 5  
2022 Columbia River Sample Results

Sample Date yyyy/mm/dd	NH <sub>4</sub> -N			Ortho-P			Fecal Coliform			E.Coli			Total P mg/L		
	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN
2022-04-12	0.024	0.016	0.012	0.003	0.011	0.001	8	4	4	1	3	1	0.014	0.021	0.006
2022-04-19	0.012	0.013	0.013	0.001	0.001	0.001	5	3	2	2	3	1	0.010	0.007	0.007
2022-04-26	0.005	0.006	0.005	0.001	0.001	0.001	5	6	1	5	1	1	0.010	0.010	0.012
2022-05-04	0.005	0.010	0.005	0.001	0.001	0.001	1	4	4	1	1	4	0.012	-	0.006
2022-05-11	0.005	0.027	0.020	0.001	0.001	0.001	2	1	1	1	1	3	0.009	0.015	0.012
2022-09-20	0.061	0.007	0.061	0.002	0.003	0.002	2	2	1	1	1	1	0.016	0.040	0.030
2022-09-28	0.005	0.005	0.005	0.001	0.001	0.001	18	6	16	16	1	4	0.014	0.014	0.015
2022-10-05	0.005	0.005	0.005	0.001	0.001	0.001	7	2	2	4	1	1	0.021	0.014	0.009
2022-10-12	0.005	0.005	0.005	0.001	0.003	0.001	2	6	2	2	5	1	0.012	0.012	0.006
2022-10-19	0.005	0.006	0.005	0.001	0.001	0.001	2	6	2	2	6	1	0.008	0.014	0.010
# Samples	10	5	10	10	5	10	10	5	10	8	5	8	10	5	10
Average	0.013	0.010	0.014	0.001	0.002	0.001	5	4	4	4	3	2	0.013	0.016	0.011
Maximum	0.061	0.027	0.061	0.003	0.011	0.002	18	6	16	16	6	4	0.021	0.040	0.030
Minimum	0.005	0.005	0.005	0.001	0.001	0.001	1	1	1	1	1	1	0.008	0.007	0.006

Sample Date yyyy/mm/dd	Field pH			TSS			NO <sub>3</sub> -N			NO <sub>2</sub> -N			Enterococcus		
	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN	UP	SIDE	DN
2022-04-12	6.8	6.6	6.8	5.4	4.0	5.6	0.124	0.116	0.132	0.002	0.002	0.002	1.0	1.0	1.0
2022-04-19	6.8	6.8	6.6	9.2	6.4	5.4	0.108	0.108	0.099	0.001	0.001	0.001	1.0	1.0	1.0
2022-04-26	8.2	7.8	7.8	20.5	24.9	22.1	0.098	0.108	0.130	0.002	0.001	0.002	1.0	1.0	1.0
2022-05-04	7.8	8.2	7.8	21.7	20.7	32.3	0.093	0.087	0.110	0.001	0.001	0.001	1.0	1.0	1.0
2022-05-11	7.8	7.8	7.8	18.5	20.7	23.7	0.213	0.202	0.214	0.001	0.001	0.001	1.0	1.0	2.0
2022-09-20	7.8	7.8	7.8	12.4	23.0	27.0	0.074	0.105	0.090	0.001	0.001	0.001	1.0	1.0	1.0
2022-09-28	7.8	7.8	7.6	18.2	7.0	19.4	0.081	0.114	0.095	0.001	0.001	0.001	1.0	1.0	1.0
2022-10-05	7.6	7.6	7.6	21.7	14.1	14.1	0.070	0.067	0.072	0.001	0.001	0.001	2.0	1.0	1.0
2022-10-12	7.8	7.8	7.6	15.5	16.6	11.0	0.079	0.100	0.076	0.001	0.001	0.001	1.0	1.0	1.0
2022-10-19	7.8	7.8	7.6	12.3	21.7	11.1	0.084	0.082	0.085	0.001	0.001	0.001	1.0	1.0	1.0
	10	5	10	10	5	10	10	5	10	10	5	10	10	5	10
Average	7.8	7.6	7.5	15.5	15.9	17.2	0.102	0.109	0.110	0.001	0.001	0.001	1.1	1.0	1.1
Maximum	8.2	8.2	7.8	21.7	24.9	32.3	0.213	0.202	0.214	0.002	0.002	0.002	2.0	1.0	2.0
Minimum	6.8	6.6	6.6	5.4	4.0	5.4	0.070	0.067	0.072	0.001	0.001	0.001	1.0	1.0	1.0

Green shaded squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie; <0.05 is assumed to be 0.05

UP – Upstream

SIDE – 1 km downstream of outfall from west shore (winter) and river side channel 350 m downstream of outfall (summer)

DN – Downstream

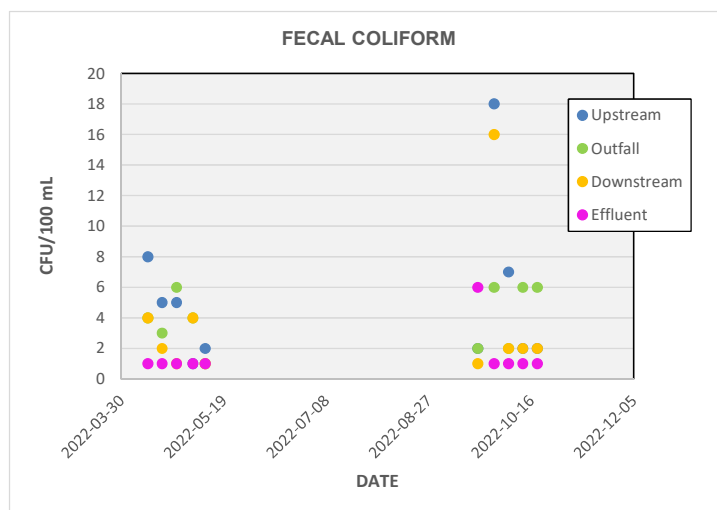
### Fecal coliforms, E-coli and Enterococci

Elevated Fecal coliforms and E-coli were recorded downstream on several days but with the exception of May 4<sup>th</sup>, 2022 and May 11<sup>th</sup> for E-coli they were higher in the upstream compared to downstream. All Enterococci results were at or below the detection limit value including April 12<sup>th</sup>, 2022 downstream when the results were high in the effluent.

The results for both Fecal coliforms and E-coli were below the detection limits tested in the effluent on May 4<sup>th</sup> and 11<sup>th</sup>, 2022.

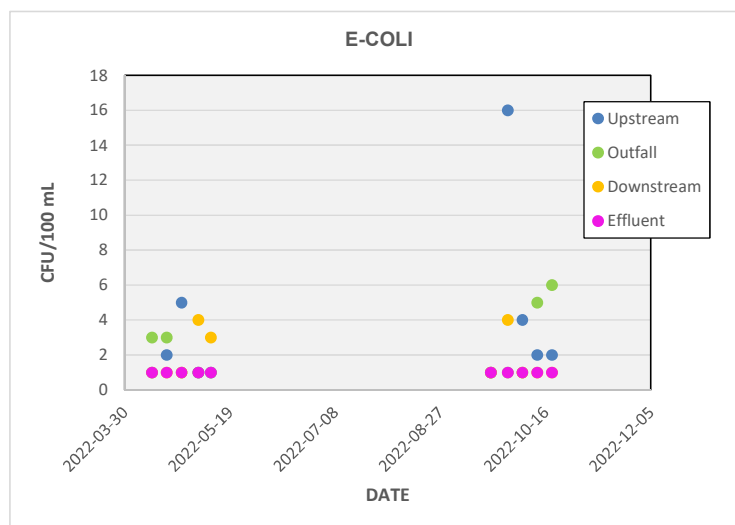
As shown on the graph below for Fecal coliforms the highest results at the outfall did not impact the results in the downstream, which are very close to the upstream.

**Figure 7a**  
Fecal Coliform Levels in the Columbia River and the Effluent



A graph below shows the highest E-coli results downstream likely due to the elevated results upstream.

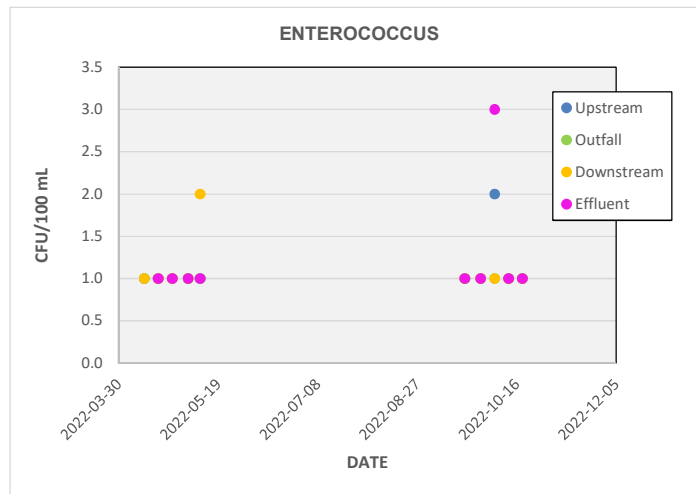
**Figure 7b**  
E.Coli Levels in the Columbia River and the Effluent





High Enterococci levels were recorded in the effluent on April 12, 2022 at 2420 CFU/100 mL, however, the results downstream were low at detection limit level. It should be noted that elevated Enterococci levels in the effluent impacted neither the outfall nor the river downstream as shown on the graph below.

**Figure 7c**  
Enterococci Levels in the Columbia River and the Effluent

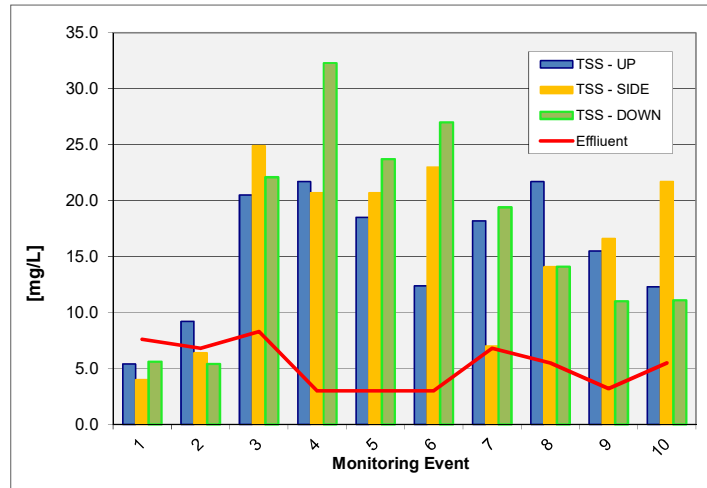


### **TSS**

The highest TSS levels were recorded on May 4<sup>th</sup> in the river downstream at 32.3 mg/L. TSS concentration at the side-stream was 20.7 mg/L, which was lower than the upstream value at 21.7 mg/L. It should be noted that effluent level on the same day was below the detection limit at 3.0 mg/L indicating that the effluent was not likely the source of elevated TSS results in the river.

There were three instances where the down-stream results were at or more than 5 mg/L (B.C. Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019; further BC AWQG) of the upstream, effluent levels on these days were either below the detection limits or very low.

**Figure 8**  
TSS Levels in the Columbia River and the Effluent



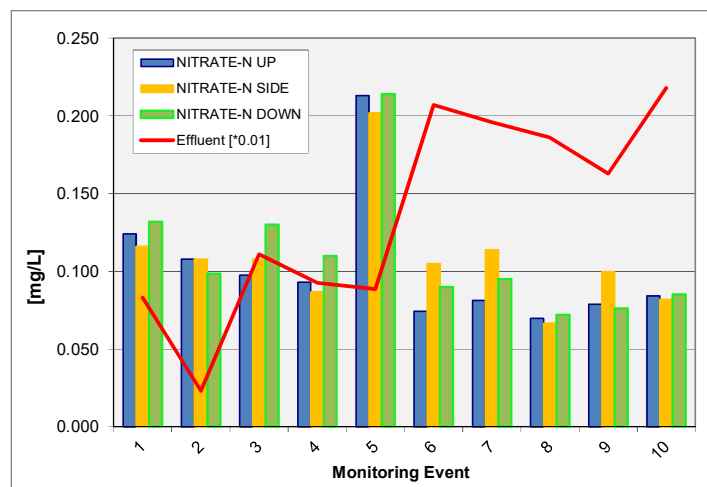
#### **Ammonia-N, Nitrate-N and Nitrite-N**

The ammonia-n levels were generally very low downstream and below 0.05 mg/L (BC AWQC guideline for pH>6.5) or the background (upstream) values, the levels downstream exceeded the upstream on April 19<sup>th</sup> and May 11<sup>th</sup>, 2022.

Majority of the nitrite-n levels downstream were below the detection limits and/or below or at the upstream values.

The nitrate-n outfall levels were low with a maximum of 0.202 mg/L on May 11<sup>th</sup>, 2022. The corresponding levels in the river upstream and downstream were similar at 0.213 and 0.214 mg/L. Note that all the downstream results were within the BC AWQG Long Term Chronic threshold at 3.0 mg/L.

**Figure 9**  
Nitrate-N Levels in the Columbia River



No significant changes were observed in **pH** values during any of the river sample periods between upstream and downstream samples. pH results in the downstream samples followed closely those in the upstream with no guideline (6.5 – 9.0) exceedance.

No significant changes were observed in **phosphorus** concentrations during any of the river sampling periods, several values were detected only slightly higher downstream compared to upstream; in general the results were very low and well below 0.05 mg/L. Total phosphorus was the highest downstream on September 20<sup>th</sup> at 0.030 mg/L with the upstream values at 0.016 and outfall value at 0.040 mg/L.

All the ortho-phosphorus values downstream were at or below the respective detection limits of 0.001 mg/L with one result at 0.002 mg/L similar to the upstream value on that day.

Overall, the analysed concentrations remained constant between the upstream (UP) sampling zone and the downstream (DN) sampling zone. The data indicates that the plant's effluent does not appear to have any adverse effect on background nutrient concentrations in the Columbia River.

## 6.0 OVERVIEW OF EFFLUENT RESULTS

This section provides data and analysis for the effluent (treated) samples and plant flows for 2022.

A total of 18 effluent samples were collected and analysed. Table 6 summarizes effluent test results for 2022.

Table 6  
Effluent Results

Date Sampled	2022 Effluent Results Summary												
	Flow	Temp	Field pH	NH <sub>4</sub> -N	BOD	P-OP04	Coliforms Fecal	E.Coli	Total P	TSS	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Enterococci
yyyy/mm/dd	m <sup>3</sup> /d	C		mg/L	mg/L	mg/L	cfu/100ml	cfu/100ml	mg/L	mg/L	mg/L	mg/L	cfu/100ml
2022-01-18	163	-2.0	-	0.264	3.0	0.420	1	1	0.659	5.5	-	-	-
2022-02-15	194	-3.0	-	0.274	2.9	0.542	1	1	0.793	4.6	-	-	-
2022-03-08	171	-10.0	-	0.232	5.6	0.475	2	2	0.861	5.8	-	-	-
2022-04-12	113	-6.0	6.8	0.056	2.4	0.126	1	1	0.442	7.6	8.33	0.031	2420
2022-04-19	99	-1.0	6.4	0.276	2.0	0.150	1	1	0.344	6.8	2.3	0.056	1
2022-04-26	122	5.0	6.8	0.057	2.3	0.135	1	1	0.374	8.3	11.1	0.028	1
2022-05-04	110	10.0	6.8	0.062	2.0	0.122	1	1	0.235	3.0	9.3	0.008	1
2022-05-10	81	3.0	6.6	0.022	2.0	0.086	1	1	0.167	3.0	8.9	0.009	1
2022-06-23	111	7.0	-	0.030	2.0	0.255	1	1	0.391	3.0	-	-	-
2022-07-28	126	21.0	-	0.093	2.8	0.154	1	1	0.249	3.0	-	-	-
2022-08-23	118	15.0	6.8	0.142	2.0	0.175	46	1	0.226	3.0	-	-	-
2022-09-20	118	2.0	6.8	0.060	2.0	0.200	6	1	0.344	3.0	20.7	0.026	1
2022-09-28	62	5.0	6.6	0.132	2.0	0.155	1	1	0.261	6.8	19.6	0.051	1
2022-10-05	64	4.0	6.6	0.122	2.4	0.058	1	1	0.227	5.5	18.6	0.105	3
2022-10-12	77	-2.0	6.6	0.116	2.0	0.040	1	1	0.158	3.2	16.3	0.059	1
2022-10-19	34	-3.0	-	0.096	2.0	0.020	1	1	0.151	5.5	21.8	0.028	1
2022-11-22	71	-3.0	-	0.091	2.4	0.139	1	1	0.353	6.7	-	-	-
2022-12-13	128	-6.0	-	0.381	2.0	0.066	5	3	0.325	6.8	-	-	-
# Samples	18	18	10	13	18	18	18	14	18	18	10	10	10
Average	109	2.0	6.7	0.126	2.4	0.183	4	1.2	0.366	5.1	13.5	0.040	243
High	194	21.0	6.8	0.381	5.6	0.542	46	3.0	0.861	8.3	21.8	0.105	2420
Low	34	-10.0	6.4	0.022	2.0	0.020	1	1.0	0.151	3.0	2.3	0.008	1
Limit	300	N/A	N/A	N/A	45	0.5	200	77	1	45	N/A	N/A	20
# Over Limit	0	N/A	N/A	N/A	0	1	0	0	0	0	N/A	N/A	1

1. Green shaded squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie; <0.05 is assumed to be 0.05

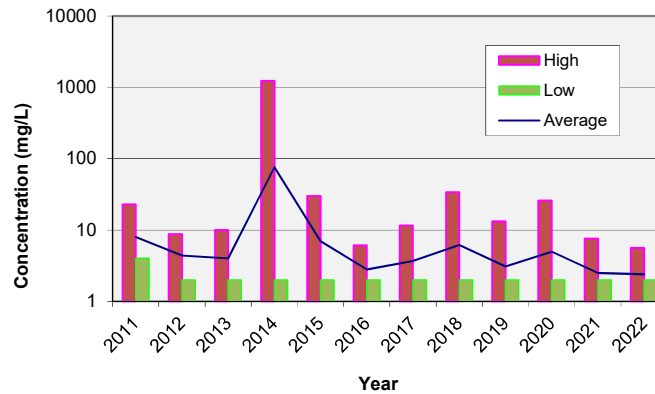
1. Geometric mean is used for coliform results

## 6.1 RESULTS ANALYSIS

Effluent **ammonia-n** concentrations were generally very low throughout the year with the highest level at 0.381 mg/L on December 13<sup>th</sup>, 2022. The results for ammonia-nitrogen were similar to or lower than to those in the previous years.

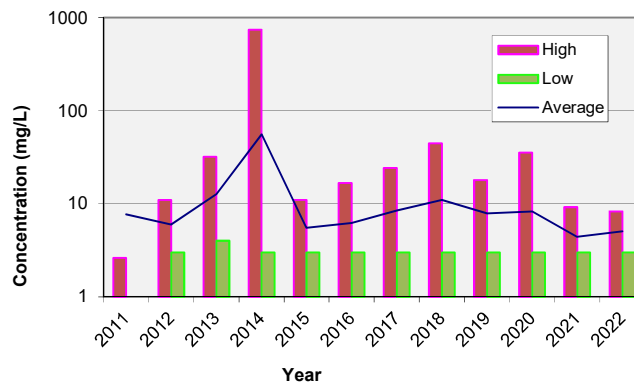
The average **BOD** in the effluent was low at 2.4 mg/L, which is similar to the previous years. The highest BOD results were recorded in the effluent on March 8<sup>th</sup>, 2022 at 5.6 mg/L, however, BOD was well below the MSR limits for all the samples.

**Figure 10**  
Historical BOD Results in Effluent



**TSS** results averaged at 5.1 mg/L with a maximum concentration of 8.3 mg/L, both of which were similar to the results during the previous years. TSS results were well below the MSR limits for all the samples.

**Figure 11**  
2022 TSS Results in Effluent



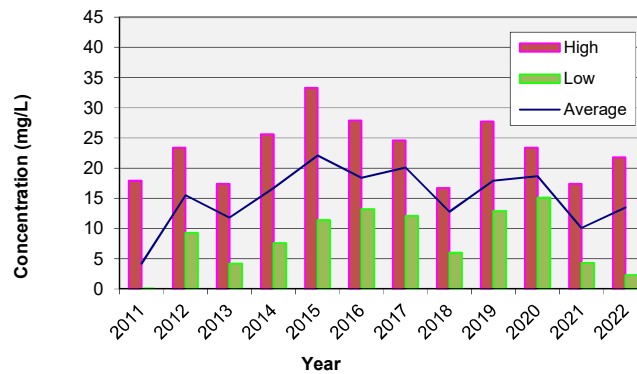
**Nitrate-N** averaged in the effluent at 13.1 mg/L with a maximum concentration at 21.8 mg/L on October 19<sup>th</sup>, 2022. As shown on the graph below the average and maximum values are very similar to the previous years.

The nitrate-n outfall levels were low with a maximum of 0.202 mg/L and the corresponding levels in the river upstream and downstream were similar at 0.213 and 0.214 mg/L. Note that all the downstream results were within the BC AWQG Long Term Chronic threshold at 3.0 mg/L.

**Nitrite-N** averaged in the effluent at 0.040 mg/L with a maximum concentration at 0.11 mg/L. The 2022 results were low and similar to the previous years.

**Figure 12**

### 2022 NO<sub>3</sub>-N Results in Effluent



#### **Fecal Coliforms and E-coli**

Majority of the results for fecal coliforms were below the detection limits with the exception of elevated results on four days for Fecal coliforms and two days for E-coli. None of the results exceeded the MSR limits.

#### **Enterococci**

All but two of the results were at or below their respective detection limits and, one of the results exceeded the MSR limit at 2420 CFU/100mL vs 20 CFU/100mL.

#### **Phosphorus and Ortho-phosphorus**

One out of 18 samples for ortho-phosphorus exceeded the MSR discharge limit, all total phosphorus samples conformed to the MSR limit.

The 2022 average for total phosphorus was 0.366 mg/L which was lower than previous years. The 2021 average for total phosphorus was 0.405 mg/L, 2020 average was 0.483 mg/L, 0.506 mg/L in 2019, 7.55 mg/L in 2018, 1.20 mg/L in 2017, 1.07 mg/L in 2016, 2.77 mg/L in 2015, 2.43 mg/L in 2014, 1.65 mg/L in 2013 and 0.97 mg/L in 2012. (However, note that 2018 average phosphorus value would be 0.61 mg/L if the December 27<sup>th</sup> result was not considered; this high results could have been due to a sampling error).

The 2022 average for ortho-phosphorus was 0.183 mg/L, which is lower than 2021 average at 0.263 mg/L and 2020 at 0.26 mg/L and 2019 at 0.277 mg/L and significantly lower than in 2018 at 0.485 mg/L or 0.91 mg/L in 2017, 0.88 mg/L in 2016, 2.37 mg/L in 2015, 2.18 mg/L in 2014, 1.26 mg/L in 2013 and 0.67 mg/L in 2012.

Phosphorus is further discussed in Section 11. Phosphorus levels are under review and KHMUC will continue to modify and adjust dosing of ClearPac until all the test results show levels within the allowable limits.

The **bioassay toxicity** testing was completed in 2020 as it is to be done every 3 years. The most recent testing showed that plant effluent was non-toxic. The results of the 2020 tests are shown below in Table 7.

Table 7

### Toxicity Test Results

Sample Date	Result
2020-10-15	Pass

## 6.2 COMPLIANCE SUMMARY

Table 8 summarizes the number of days that samples exceeded MSR effluent requirements.

Table 8

2022 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. Of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m <sup>3</sup> /day	300	365	127	229	0
BOD <sub>5</sub>	mg/l	45	18	2.4	5.6	0
TSS	mg/l	45	18	5.1	8.3	0
Total Phosphorus	mg/l	1	18	0.366	0.86	0
Ortho Phosphate	mg/l	0.5	18	0.183	0.542	1*
Fecal Coliforms	CFU/100ml	200	18	4	46	0
Enterococci	CFU/100ml	20	10	243.1**	>2420	1***
E.Coli	CFU/100ml	77	14	1.2	3.0	0
96 hr LC <sub>50</sub> Bioassay***	/	Non-toxic	1	Pass	Pass	0

\*This year the test results indicated that out of all the samples collected there were 2 exceedances, 1 for ortho-phosphorus and 1 for Enterococci

\*\*Due to the result with > value, the average is based at a maximum of 2420 CFU/100 mL

\*\*\*The most recent test was done in 2020.

## 7.0 SLUDGE PRODUCTION AND DISPOSAL

This section provides data regarding the disposal of bio-solids (sludge) from the treatment facility in 2022.

Waste activated sludge used to be stored in a thickener and removed by a vacuum tanker. In the fall of 2014, a 12 unit Teknofanghi (Model Number 12BCAVPK) supplied by Drycake was installed and was commissioned in mid-December. All solids were transported to the Crowsnest/Pincher Creek Landfill site.

Hauling data for pumped solids are in Table 9.

Table 9

2022 Pumped Solids Data

Month	Vol. Pumped (m <sup>3</sup> )
January	271
February	203
March	227
April	99
May	78
June	69
July	170
August	187
September	97
October	74
November	47
December	112
<b>Total</b>	<b>1634</b>

Volumes of sludge are currently being estimated by counting the quantity of bags produced. Long range plans call for the installation of a flow meter to better measure the quantity of sludge bagged.

Please note, the calculations for bagged solids are being reviewed to ensure consistency.



## **8.0 PLANT IMPROVEMENTS & BYPASS EVENTS**

The resort is committed to improvements to the phosphorus monitoring program and to implement further monitoring and increase dosage of clearpac. The resort will continue to address the phosphorus concern and bring phosphorus levels down.

KHMUC has engaged an engineer and is currently undertaking an assessment to determine the plant's capacity to accommodate additional growth and recommend plant improvements.

KHMUC will be looking into purchasing a new flow meter for the sludge and they will calibrate their flow meter for the effluent.

There were no bypass events for 2022.

## 9.0 PHOSPHORUS REMOVAL

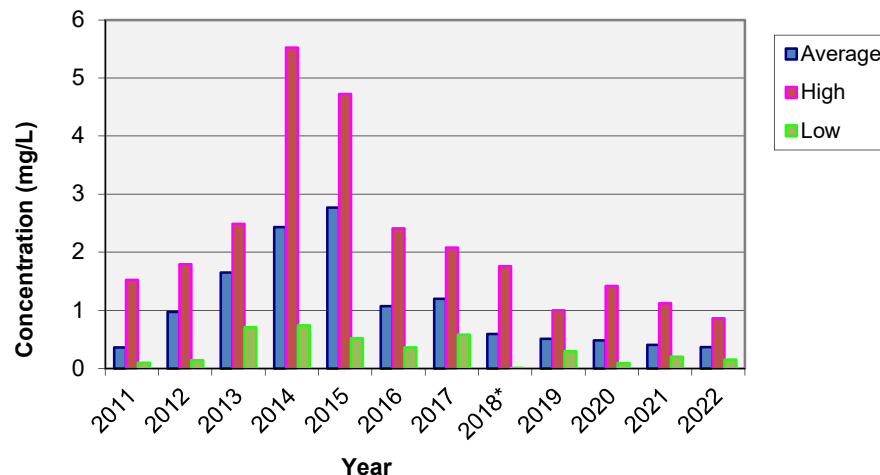
This section describes the phosphorus monitoring and removal strategy being implemented to bring the plant into compliance with effluent limits.

During 2022 **total phosphorus** varied between 0.15 and 0.86 mg/L with an average value at 0.37 mg/L.

As seen in the graphs below, the levels of phosphorus were increasing from 2011 until 2015 (average at 2.77 mg/L) but there has been a continuous decrease since 2015. The values in 2022 were low and similar to or lower than the previous year at an average value of 0.37 mg/L.

\*Note that on December 27<sup>th</sup>, 2018 high phosphorus value was tested resulting in very high yearly average at 7.55 mg/L. This value was likely a sampling error; without the high result being included the 2018 yearly average would be 0.61 mg/L, which is consistent with historical levels as shown on the following graph.

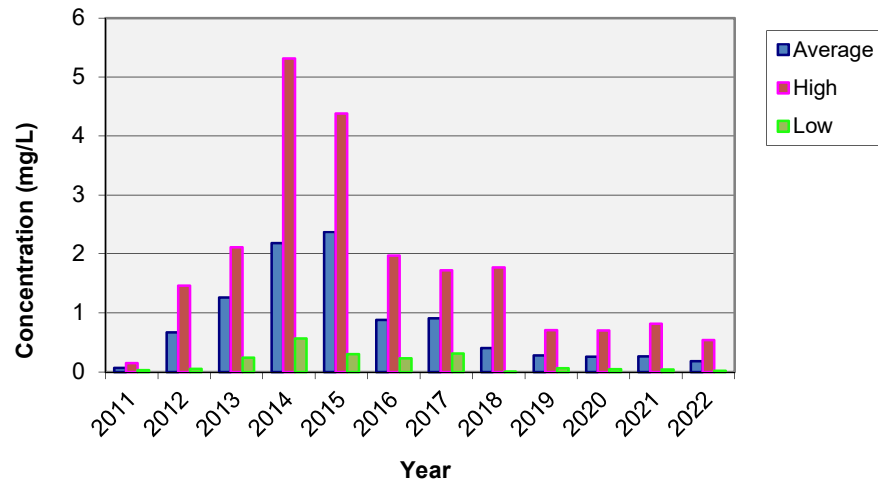
Figure 13  
Total Phosphorus Levels 2011-2021



During 2022 **ortho-phosphorus** varied between 0.02 and 0.81 mg/L with an average value at 0.18 mg/L, which was very lower than 2021 average value of 0.26 mg/L.

The historical levels of ortho-phosphorus were increasing until they peaked in 2014/2015 (average concentration at 2.18 and 2.37 mg/L), there has been a decreasing trend since.

Figure 14  
Ortho-Phosphorus Levels 2011-2022



The days over limit for both phosphorus and ortho-phosphorus were increasing from 2011 to 2017 were either increasing or steady up to 11 days for total phosphorus and 12 days for ortho-phosphorus.

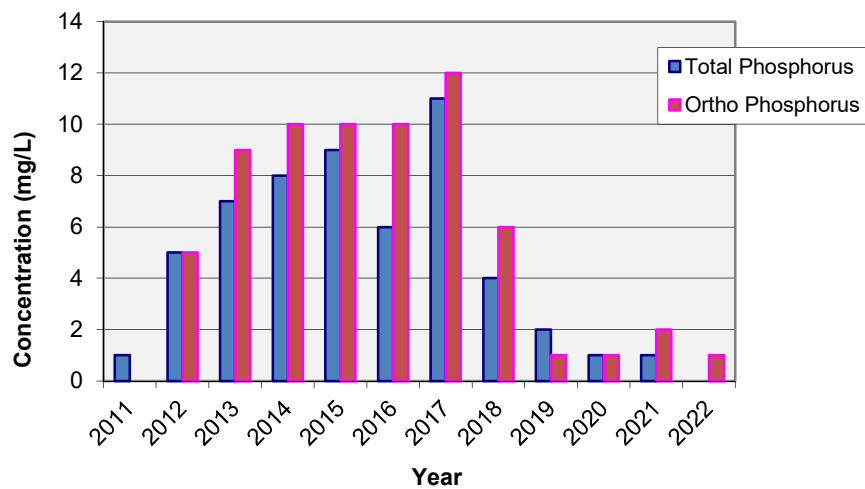
In the fall of 2015 KHMUC began injecting alum into the effluent to reduce the phosphorus levels in the plant effluent. There was a noticeable drop in the levels in the final EMS test run in 2015.

Beginning in December 2016, KHMUC switched to ClearPac addition in the winter months to control phosphorus. In 2020 ClearPac was used year round. Phosphorus levels were easier to control and with the lower summer flows, we found that ClearPac was a superior product and will likely continue with its year-round use. Note that the levels in 2019 to 2022 levels have been the lowest since 2011.

Additionally, KHMUC will continue to test total phosphorus and ortho phosphorus with the monthly effluent sampling. This will help to monitor the levels on an ongoing basis and help to determine dosage levels. KHMUC has also agreed to collect a laboratory sample in first week of January going forward in order to better characterize/monitor the effluent during the peak capacity. It is also recommended that as soon as very high results are found, samples be collected immediately and submitted for testing to ensure the levels drop below the allowable limits.

Historical limits exceedances are shown on the graph below, the 2022 exceedances for both total phosphorus and ortho-phosphorus are the lowest since 2011 indicating the current phosphorus reduction strategy has been successful.

**Figure 15**  
**Days over Limit 2011-2022**



## 10.0 ASSESSMENT SUMMARY

The total effluent flow recorded for 2022 was 46,158 m<sup>3</sup> with an average of 127 m<sup>3</sup>/day and a maximum peak flow at 229 m<sup>3</sup>/day. There were no days where the flow was over the allowable limit.

Effluent **ammonia-n** concentrations were generally very low throughout the year with the highest level at 0.381 mg/L on December 13<sup>th</sup>, 2022. The results for ammonia-nitrogen were similar to or lower than to those in the previous years.

The ammonia levels in the river downstream were either below 0.05 mg/L or below the background (upstream) levels.

The average **BOD** in the effluent was low at 2.4 mg/L, which was similar to the previous years. The highest BOD results were recorded in the effluent on March 8<sup>th</sup>, 2022 at 5.6 mg/L; BOD was well below the MSR limits for all the samples.

**TSS** results averaged at 5.1 mg/L with a maximum concentration of 8.3 mg/L, both of which were similar to the results during the previous years. TSS results were well below the MSR limits for all the samples.

The highest TSS levels in the river were recorded on May 4<sup>th</sup>, 2022 downstream at 32 mg/L. It should be noted that the effluent levels were below the detection limit (3 mg/L) on that day. There were three instances where the down-stream results were at or more than 5 mg/L (B.C. Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019; further BC AWQG) of the upstream, effluent levels on these days were either below the detection limits or very low. Based on the results, it does not appear the river was impacted by the effluent throughout the year.

**Nitrate-N** averaged in the effluent at 13.1 mg/L with a maximum concentration at 21.8 mg/L on October 19<sup>th</sup>, 2022. The average and maximum values are very similar to the previous years.

The nitrate-n outfall levels were low with a maximum of 0.202 mg/L and the corresponding levels in the river upstream and downstream were similar at 0.213 and 0.214 mg/L. Note that all the downstream results were within the BC AWQG Long Term Chronic threshold at 3.0 mg/L.

**Nitrite-N** averaged in the effluent at 0.040 mg/L with a maximum concentration at 0.11 mg/L. The 2022 results were low and similar to the previous years.

The results in the river downstream were very low and either very slightly above or below the detection limits.

### **Fecal Coliforms and E-coli**

Majority of the results for Fecal coliforms were below the detection limits with the exception of elevated results on four days for Fecal coliforms and two days for E-coli. None of the results exceeded the MSR limits.

The results in the river downstream for both coliforms were similar to the background (upstream). The slightly elevated levels downstream on two days occurred for either coliform on two days; the levels in effluent were below their respective detection limits on the same days.

### **Enterococci**

All but two of the results were at or below their respective detection limits and, one of the results exceeded the MSR limit at 2420 CFU/100mL vs 20 CFU/100mL.

It should be noted that the Enterococci values in the river downstream were at the detection limit on the same day.

**Phosphorus and Ortho-phosphorus**

One out of 18 samples for ortho-phosphorus exceeded the MSR discharge limit, all total phosphorus samples conformed to the MSR limit.

During 2022 **total phosphorus** varied between 0.15 and 0.86 mg/L with an average value at 0.37 mg/L. The levels of phosphorus were increasing from 2011 until 2015 (average at 2.77 mg/L), there had been a continuous decrease since 2015.

During 2022 **ortho-phosphorus** varied between 0.02 and 0.813 mg/L with an average value at 0.183 mg/L, which was lower than 2021 average value of 0.263 mg/L. The historical levels of ortho-phosphorus were increasing until 2014/2015 (average concentration at 2.18 and 2.37 mg/L), there has been a decreasing trend since.

The days over limit for total phosphorus increased from 2011 until 2015, decreased in 2016, increased to 11 days over the limit in 2017 and decreased again to four days over the limit in 2018. There was a significant decrease in exceedances in 2019, 2020, 2021, and 2022 with only one day over limit for ortho-phosphorus and no days over limit for total phosphorus in 2022.

In the fall of 2015 KHMUC began injecting alum into the effluent to reduce the phosphorus levels in the plant effluent. There was a noticeable drop in the levels in the final EMS test run in 2015. Beginning in December 2016, KHMUC switched to ClearPac addition in the winter months to control phosphorus. In 2020 ClearPac was used year round. Phosphorus levels are under review and KHMUC will continue to modify and adjust dosing of ClearPac until all the test results show levels within the allowable limits. Note that the levels in 2019 to 2022 have been the lowest since 2011.

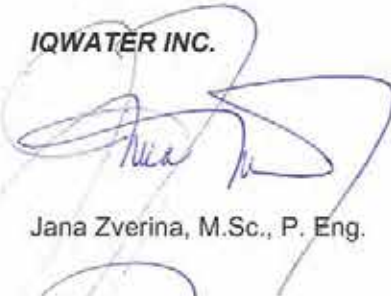
KHMUC will continue to test total phosphorus and ortho-phosphorus with the monthly effluent sampling. This will help to monitor the levels on an ongoing basis and help to determine dosage levels.

A small 26 unit subdivision was proposed and construction started in 2014. Out of the 26 units approved, Phase 1 (8 units) and Phase 2 (8 units) are now completed. Phase 3 (10 units) is currently constructed and waiting for subdivision approval. Flows will be monitored closely and additional improvements may be required as growth at the resort continues.

## 11.0 AUTHORIZATION AND CLOSING


This report, titled *2022 Sewage Treatment Plant Annual Report*, was prepared for KHMUC by IQWater Inc. The material in this report reflects the best judgement of IQWater Inc. based on the information available at the time of preparation. Any use that a third party makes of this report, or reliance on or decisions based on it, is the responsibility of the third party. IQWater Inc. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based on this report.

**IQWATER INC.**

  
Jana Zverina, M.Sc., P. Eng.



*20/04/2023*

  
IQWater Inc.  
Permit #1003055

*20/04/2023*

*iqw/jobs/W2020-020.2022*

## 12.0 REFERENCES

American Public Health Association, American Water Works Association and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 24<sup>th</sup> Edition

BC Environmental Management Act, Municipal Wastewater Regulation B.C. Reg. 87/2012, last Amended March 30<sup>th</sup>, 2022 by B.C. Reg. 76/2022

BC Ministry of Health, Health Protection Branch, Sewerage System Standard Practice Manual, Version 3, September 2014

British Columbia Ministry of Environment and Climate Change Strategy. 2021. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary. Water Quality Guideline Series, WQG-20 (the most recent update April 2023)

Canadian Council of Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Aquatic Life

Canadian Council of Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses

Canadian Council of Ministers of the Environment. Protocols Manual for Water Quality Sampling in Canada. 2011

Health Canada. Guidelines for Canadian Drinking Water Quality. September 2022



### 13. TERMS AND CONDITIONS

1. Our reports are prepared to specifically fulfil our Clients' requirements. The conclusions are based on the time limitations and scope of the services provided and information obtained from those services. The Inspector certifies that he/she has no present or contemplated future interest in the inspected property.
  2. IQWATER INC. will provide skill, care and diligence in accordance with generally accepted engineering practices and procedures at the time and location in which the services are performed. With time, conditions may change and the interpretation of the findings may be altered.
  3. IQWATER INC. cannot assume responsibility for any deficiency, misstatement or inaccuracy in the report resulting from the omissions or misrepresentations of persons providing information to use in the report. Any sketch appearing in or attached to the inspection report, or any statement of dimensions, capacities, quantities, or distances, are approximate and are included to assist the reader in visualizing the property.
  4. The contents of the report are for the sole use of the Client. The report is the property of the Client and copies shall only be made by the Client or with the approval of the Client. IQWATER INC. is not responsible for any use of information contained in the report, or any reliance or decisions made based on it by an unauthorized third party.
  5. This report represents the conditions investigated and sampled at the time of study. Some of the services performed were based on visual observations of the site and the areas surrounding the site, and our opinion cannot be extended to areas that were unavailable for direct observation.
  6. The Client is responsible for all permits, authorization, or consents and giving any required notices that enable EDI to perform the services required.
- IQWATER INC. may use any contractor with appropriate recognized professional status or with special skills or knowledge to assist in performing the services, at the expense of the client.
7. Any documents provided to IQWATER INC. from the Client will remain the property of the Client, and upon written request IQWATER INC. will return such documents as soon as possible. Any information or documents obtained by IQWATER INC. while performing the services requested will remain the property of IQWATER INC.
  8. IQWATER INC. and the client will take reasonable care to prevent any disclosure of the reports or documents, or any information obtained or contained in the reports prepared by IQWATER INC., unless it is to the persons who require such access to the information in order to discharge their responsibilities to IQWATER INC. or as required by law.
  9. This report is not intended to have any direct effect on the value of the property, but rather to provide information on apparent site conditions. The Client acknowledges that IQWATER INC. is not making any recommendations with respect to the purchase, sale, investment, or development of the property; and that all decisions associated therewith are the sole responsibility and liability of the Client. Further, IQWATER INC. assumes no responsibility for matters of legal nature affecting the property or title thereto.
  10. Limits of Liability – To the fullest extent permitted by law, and notwithstanding any other provision of the Service Agreement between the Client and IQWATER INC., total liability, in the aggregate, of IQWATER INC. and the IQWATER INC. officers, directors, partners, employees and sub-consultants, and any of them, to the Client and anyone claiming by or through the Client, for any and all claims, losses, costs or damages, including attorneys' fees and costs and expert-witness fees and costs of any nature whatsoever or claims expenses resulting from or in any way related to the Project shall not exceed the limit of IQWATER's insurance in effect at the time of this report.
  11. In accepting and using this report the Client agrees to indemnify and hold harmless IQWATER INC., its officers, partners, employees and consultant (collectively IQWATER INC.) from and against any and all claims, suits, demands, liabilities, losses, damages or costs, including reasonable attorney's fees and defence costs arising out of or in any way connected to the findings and results of the proposed work, whether liability arises under breach of contract or warranty, tort, including negligence, strict liability or statutory liability or any other cause of action.
  12. IQWATER INC. will exercise due diligence, however, IQWATER INC. will not assume any liability for any damage to any facilities, utilities, ground or above-ground surface infrastructure within or outside the subject property boundary since any sampling if needed is intrusive in nature and damage may have to be done to obtain samples.
  13. IQWATER INC. will not assume any responsibility for any actual or perceived loss of business to owner's operations as a result of the work proposed herein.
  14. The governing law for this contract will be the Alberta law.
  15. All claims of costs, losses, damages, etc. have to be immediately forward to IQWATER INC. insurance

# APPENDIX

Table 10 - Kicking Horse Mountain Resort Estimated Sewage Generation (m³/day)

Current Development	Flow* (l/unit/day)	Units	2011 Generation (m3/day)	2018 Generation (m3/day)	Flow* (l/unit/day)	Units	2019 Generation (m3/day)	2020 Generation (m3/day)	Units	2021 Generation (m3/day)	2022 Generation (m3/day)	2023 Generation (m3/day)
Single Family	318	972	309.1	309.1	1300	98	127.4	127.4	98	127.4	127.4	127.4
Duplexes & Triplexes	318	see single family	see single family	see single family	1000	112	112.0	112.0	116	116.0	116.0	116.0
Lodges (EBU)	318	296	94.1	94.1	700	296	207.2	207.2	296	207.2	207.2	207.2
Condominiums	318	952	302.7	302.7	1000	155	155.0	155.0	155	155.0	155.0	155.0
	Subtotal	2220	706.0	706.0	Subtotal	661	601.6	601.6	665	605.6	605.6	605.6

Commercial	Flow* (l/unit/day)	Unit	2011 Generation (m3/day)	2018 Generation (m3/day)	Flow* (l/unit/day)	Units	2019 Generation (m3/day)	2020 Generation (m3/day)	Units	2021 Generation (m3/day)	2022 Generation (m3/day)	2023 Generation (m3/day)
Administration	75	20	0	0.0	57	20	0.0	1.1	20	1.1	1.1	1.1
Other (day care, shops etc.)	20	5	0	0.0	20	5	0	0.1	5	0.1	0.1	0.1
	Subtotal	5	0	0.0	Subtotal	5	0.0	1.2	5	1.2	1.2	1.2

Dining Facilites/Bars	Flow* (l/m²/day)	Area (m2)	2011 Generation (m3/day)	2018 Generation (m3/day)	Flow* (l/m²/day)	Area (m2)	2019 Generation (m3/day)	2020 Generation (m3/day)	Area (m2)	2021 Generation (m3/day)	2022 Generation (m3/day)	2023 Generation (m3/day)
Peaks Grill	97	256	0.0	0.0	97	256	0.0	24.8	256	24.8	24.8	24.8
Double Black	97	190	0.0	0.0	97	190	0.0	18.4	190	18.4	18.4	18.4
Whitetooth Grill	97	300	0.0	0.0	97	300	0.0	29.1	300	29.1	29.1	29.1
Copperhorse Steak House	97	110	0.0	0.0	97	110	0.0	10.7	110	10.7	10.7	10.7
Winston	97	220	0.0	0.0	97	220	0.0	21.3	220	21.3	21.3	21.3
	Subtotal	1076	0.0	0.0	Subtotal	1076	0.0	104.4	1076	104.4	104.4	104.4

Daily Wastewater Flow (m3/day)*	705.5	705.5
Corrected Daily Peak Flow Projections**	167 (actual)	262 (actual)

705.5	707.2
265 (actual)	247 (actual)

711.2	711.2	711.2
263	229	213 (projected)

\*Estimated Wastewater Flows - Residential and Non-residential Daily Flows  
Note that the occupancy significantly varies throughout the year with near full occupancy only during the ski season and during the long weekends.



April 28, 2005

File: RE-15474

**REGISTERED MAIL**

Kicking Horse Mountain Sanitary Sewer Services Ltd.  
2100- 1075 W. Georgia Street  
Vancouver, BC V6E 3G2

Attn: Arijan van Vuure

Dear Mr. van Vuure:

**Re: Letter of Transmittal for Registration under the *Municipal Sewage Regulation* of the discharge to Columbia River from the Kicking Horse Mountain Resort located at Unsurveyed Crown land in the vicinity of Section 9, together with those parts of the Northwest  $\frac{1}{4}$  of Section 14 and 15, all of Township 27, R22 West of 5<sup>th</sup> Meridian, and Unsurveyed Crown Foreshore, being part of the Columbia River, Kootenay District**

Enclosed herewith is a copy of the registration letter RE-15474 in the name of the Kicking Horse Mountain Sanitary Sewer Services Ltd. Your attention is respectfully directed to the conditions outlined in the registration letter.

In addition to the registration letter and the terms and conditions of the Environmental Impact Study, dated November 20, 2000, you are directed to comply with the following requirements:

**A. Outfall**

The outfall shall consist of a permanent outfall with diffusers.

The permittee shall have the outfall inspected once each five years by independent qualified personnel to ensure it is in good working condition. An inspection report shall be submitted to the Regional Manager, Environmental Protection within 30 days after the inspection date. The first report shall be submitted by January 2006.

... 2

B. Environmental Monitoring

In accordance with Part 7, Section 26 and 27 and applicable conditions of Schedule 6 of the *Regulation*, the discharger shall undertake the discharge and receiving environment monitoring programs established by Masse & Miller Consulting Ltd., in their letter dated February 17, 2005.

The person collecting samples shall be properly trained in sample collection and handling.

C. Reporting non-compliances

The discharger is required to report instances of non-compliance within 15 days of the date of discovery. The discharger is required to provide a report of actions taken to remediate non-compliance within 30 days from the start of non-compliance.

D. Financial Security requirements

The discharger is required to notify the Ministry and to set up either a capital replacement fund or financial security or assurance plan when the residential development content, as defined by the *regulation*, exceeds 10%.

The administration of this registration, including periodic inspections and audits shall be carried out by staff from our sub-regional office located at 205 Industrial Road G, Cranbrook, BC, V1C 7G5. Any required information may be submitted to the Regional Manager, Environmental Protection at this address in lieu of the Director.

Yours truly,



Kathy Eichenberger, P.Eng.  
for Director, *Environmental Management Act*  
Kootenay and Okanagan Regions

AMT/KE:lkM

cc: Environment Canada  
Kicking Horse Mountain Sanitary Sewer Services Ltd., 1500 Kicking Horse Trail, PO  
Box 839, Golden, BC V0A 1H0, Attn: John Urie  
Ecofluid, #101-334 E. Kent Ave. South, Vancouver, BC V5X 4N5 Attn: Rolf Loker, VP  
& Manager of Operations  
Ana C. May Tsui, MWLAP-Environment Protection, Cranbrook



April 28, 2005

File: RE-15474

**REGISTERED MAIL**

Kicking Horse Mountain Sanitary Sewer Services Ltd.  
2100-1075 W. Georgia Street  
Vancouver, BC V6E 3G2

Attn: Arijan van Vuure

Dear Mr. van Vuure:

Re: Registration under the Municipal Sewage Regulation of the discharge to Columbia River from the Kicking Horse Mountain Resort located at Unsurveyed Crown land in the vicinity of Section 9, together with those parts of the Northwest  $\frac{1}{4}$  of Section 14 and 15, all of Township 27, R22 West of 5<sup>th</sup> Meridian, and Unsurveyed Crown Foreshore, being part of the Columbia River, Kootenay District

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Receipt of the completed Municipal Sewage Regulation registration form for the subject discharge is acknowledged. Pursuant to Part 2, section 3 of the Municipal Sewage Regulation, the effective date of registration of this discharge is November 24, 2000. The ministry file number for this discharge is RE-15474. Please indicate this number on all future correspondence regarding this discharge.

An annual registration fee will be determined according to the Waste Management Permit Fees Regulation and you will be receiving an annual invoice from the ministry for payment of this fee. Payment of all fees due is necessary to comply with the Municipal Sewage Regulation. Fees will be calculated using a maximum daily effluent discharge of 300 m<sup>3</sup>/day, a maximum BOD<sub>5</sub> of 45 mg/L and a maximum TSS of 45 mg/L.

Acceptance of this registration under the Regulation is based on the following documents:

1. Kicking Horse Mountain Resort Ltd. Partnership, Registration Form dated November 24, 2000 and submitted by McElhanney Consulting Services Ltd.
2. Environmental Impact Study entitled Kicking Horse Mountain Resort – Environmental Impact Study for Sewage Treatment and Disposal, dated November 20, 2000, prepared by Western BioResources Consulting Ltd. and signed by Christopher Bullock, P.Eng.

... 2



Pursuant to Part 2, Section 3 (2) (k) of the Municipal Sewage Regulation, more stringent standards or requirements may be specified by the Director. Accordingly, in addition to the terms and conditions of the regulation, for this discharge the following standards and requirements apply. The following information related to RE-15474 must be submitted within 30 days:

1. Tables that summarize the Discharge Monitoring Program and the Environment Monitoring Sampling Programs. Tables should indicate sampling sites/locations and short description of the locations, parameters, sampling frequency, reporting frequency and standards and criteria to be met.
2. GPS coordinates for all sampling sites. Specify in decimal degrees to 4 decimal places using NAD83 Datum.

The discharger shall **report monitoring data** in accordance with Part 7, Section 28 of the *Regulation* and in accordance with the following requirements. Monitoring data shall be submitted to the Ministry (EMS) database quarterly within 30 days of the end of each quarter. Instances of non-compliances are to be notified and reported to the Manager in writing, with an explanation and action taken to remediate non-compliance.

In accordance with Part 7, Section 28 (3) of the *Regulation*, the discharger shall submit an annual report and do so in accordance with the annual report requirements of Section 28 of the *Regulation*. The annual report shall be prepared by a suitably qualified professional and shall include the following:

- Tabulated results of the Effluent and Environmental Monitoring Data with standards and criteria
- Interpretation of the monitoring data
- The total volume discharged over the year
- Total sludge wasted over the year and its final destination
- The state of compliance of the treatment facility/process
- Indicate the percentage of residential development, as defined in the *Regulation*, that contributes to the effluent discharge
- Any additional relevant information the discharger wishes to provide

The annual report shall contain recommendations of a qualified professional regarding changes (additions, deletions, modifications) to the monitoring program. Electronic and hard copies of the annual report submission is due within 120 days of the end of each calendar year.

This decision to specify more stringent standards or requirements under the Municipal Sewage Regulation may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given, in accordance with the practices, procedures and forms prescribed by regulation under the *Environment Management Act*. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

The ministry uses a reference number to track monitoring data associated with discharges. The following are the EMS site numbers assigned to the monitoring sites listed above. These numbers are to be used when entering data directly into the Ministry EMS database in accordance with Part 7, Section 28 (2) of the *Regulation*.

SAMPLING SITE/LOCATION	EMS NUMBER	DESCRIPTION
Columbia River UP IDZ	E256694	Upstream at the bridge
Columbia River 100m DN, main stem	E256695	~ 100 m downstream of outfall, at main stem from island
Columbia River 100m DN, side channel	E258897	~ 100 m downstream of outfall, at side channel
Columbia River 200m DN, east shore	E258898	~ 200 m downstream of outfall, from east shore
Columbia River 1km DN, west shore	E258899	~ 1 km downstream of outfall, downstream of island from west shore
Plant Effluent	E256696	Sample prior to the discharge outfall

For information on the use of EMS and the electronic data transfer utility, please refer to the following website: [http://wlapwww.gov.bc.ca/epd/ems\\_edt.html](http://wlapwww.gov.bc.ca/epd/ems_edt.html)

Your attention is respectfully directed to the terms and conditions outlined in the Municipal Sewage Regulation. Compliance with all the terms and conditions of the regulation is required. Contravention of any of the conditions of the regulation is a violation of the *Environmental Management Act* and may result in prosecution.

Registration under the Municipal Sewage Regulation should not be construed as a representation that the works are adequately designed or will satisfy all the requirements of the regulation. It is the responsibility of the discharger to ensure that the works are adequately designed, constructed and operated and that the discharge quality complies with the regulation. Registration under the regulation is without prejudice to any additional works that may be required or any additional requirements that may be specified by the Director. The Director may also issue Orders under the *Environmental Management Act*.



Registration under the Municipal Sewage Regulation does not authorise entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the discharger. It is also the responsibility of the discharger to ensure that all activities conducted under this registration are carried out with regard to the rights of third parties and comply with other applicable legislation that may be in force. The discharger must also obtain any necessary approvals from other agencies.

Administration of the Municipal Sewage Regulation will be carried out by staff from our Sub-regional office located at 205 Industrial Road G, Cranbrook, British Columbia, V1C 7G5 (Telephone 250-489-8540). Plans, data and reports pertinent to the regulation are to be submitted to the Regional Manager, Environmental Protection, at this address. If you have any questions concerning this registration, please contact our Cranbrook Sub-Regional Office at 250-489-8540

Yours truly,



Kathy Eichenberger, P.Eng.  
for Director, *Environmental Management Act*  
Kootenay and Okanagan Regions

cc:	Environment Canada
	Kicking Horse Mountain Sanitary Sewer Services Ltd., 1500 Kicking Horse Trail, PO Box 839, Golden, BC V0A 1H0, Attn: John Urie
	Ecofluid, #101-334 E. Kent Ave. South, Vancouver, BC V5X 4N5 Attn: Rolf Loker, VP & Manager of Operations
	Ana C. May Tsui, MWLAP- Environmental Protection, Cranbrook

AMT/KE:lkM

# JANUARY

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (mg/l)	BR2 MLSS (mg/l)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4 (mg/l)	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Jan	snow	-22		182553	199		6000	6000	5.6	5.6	3.1			478293	644128
2-Jan	snow	-16		182752	207		5900	6000	5.6	5.6	2.8			478442	644352
3-Jan	snow	-7		182959	224		5900	5900	5.6	5.6	1.4			478592	
4-Jan	clear	-17		183183	195		5800	5600	5.6	5.6	1.7			478791	644877
5-Jan	clear	-19		183378	170		6000	5900	5.6	5.6	1.4			478868	644991
6-Jan	snow	-20		183548	179		6000	6000	5.6	5.6	1.3			478953	
7-Jan	snow	-15		183727	178		6000	6000	5.6	5.6	1.8			479127	645383
8-Jan	clear	-11		183905	171				5.6	5.6	2.7			479266	
9-Jan	clear	-12		184076	173		5800	5800	5.6	5.6	2.3			479402	645581
10-Jan	clear	-7		184249	136		5900	5900	5.6	5.6	2.7			479527	
11-Jan	snow	-3		184385	140		5800	5700	5.6	5.6	1			479649	646178
12-Jan	clear	0		184525	100		5300	5700	5.6	5.6				479788	646385
13-Jan	clear	1		184625	168		5800	5700	5.6	5.6	0.8			479800	646409
14-Jan	clear	1		184793	170				5.6	5.6	1.2			479962	
15-Jan	clear	-1		184963	202				5.6	5.6	1.2			480103	646865
16-Jan	clear	-2		185165	179		6000	5400	5.6	5.6	2.1			480248	647085
17-Jan	snow	-1		185344	161		6000	5400	5.6	5.6	1.6			480380	
18-Jan	clear	-2		185505	163		6000	5500	5.6	5.6	1.4			480501	647472
19-Jan	clear	-9		185668	149		5900	5400	5.6	5.6	1.3			480623	647654
20-Jan	snow	-9		185817	182		5900	5500	5.6	5.6	2.2			480725	647811
21-Jan	clear	-7		185999	153		5900	5500	5.6	5.6	2			480808	647936
22-Jan	clear	-7		186152	182		6000	5800	5.6	5.6	1.8			480964	648173
23-Jan	clear	-9		186334	205		6000	5800	5.6	5.6	2.8			481110	648394
24-Jan	snow	-6		186539	178		6100	5900	5.6	5.6	2.3			481248	
25-Jan	clear	-4		186717	165		6000	5800	5.6	5.6				481412	
26-Jan	clear	-6		186882	181		6000	5700	5.6	5.6	1.6			481583	648611
27-Jan	clear	-4		187063	169		6000	5700	5.6	5.6	1.5			481727	649082
28-Jan	clear	-5		187232	204		6300	5900	5.6	5.6	1.8			481871	649304
29-Jan	clear	-8		187436	205		6100	5600	5.6	5.6	2.7			482016	649525
30-Jan	clear	-8		187641	219		6000	5700	5.6	5.6	3.3			482160	649746
31-Jan	clear	-5		187860	138	271	6000	5700	5.6	5.6	2.3			482298	649958
Summary		-8		Average	176				6	6	2				
	Median	-7		Max	224				5.6	5.6	1.8				
				Total	5445	271			173.6	173.6	56.1			Monthly total	11156

# FEBRUARY

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (mg/l)	BR2 MLSS (mg/l)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4 (mg/l)	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Feb	clear	-10		187998	166		5900	5600	5.6	5.6	1.5			482427	651150
2-Feb	clear	-9		188164	149		5800	5600	5.6	5.6	1.3			482556	650354
3-Feb	snow	-14		188313	165				5.6	5.6	1.1			482671	650529
4-Feb	snow	-11		188478	185		5700	5700	5.6	5.6	1.2			482756	650662
5-Feb	clear	-9		188663	193				5.6	5.6	2.2			482889	650861
6-Feb	clear	-6		188856	192		5700	5700	5.6	5.6	3.2			483065	651129
7-Feb	clear	-3		189048	173		5600	5800	5.6	5.6	2.5			483211	651351
8-Feb	clear	-3		189221	169		5600	5800	5.6	5.6	3			483554	651570
9-Feb	clear	-2		189390	155		5500	5900	5.6	5.6	2.8			483599	651771
10-Feb	clear	-1		189545	177		5600	5900	5.6	5.6	0.6			483621	651978
11-Feb	clear	-5		189722	189		5700	5900	5.6	5.6	1.8			483740	652160
12-Feb	clear	-9		189911	199		5200	5600	5.6	5.6	2			483819	652284
13-Feb	clear	-9		190110	184		5300	6000	5.6	5.6	2.8			484002	652558
14-Feb	clear	-5		190294	186		5300	5900	5.6	5.6	2.1			484155	652791
15-Feb	clear	-3		190480	194		5400	6100	5.6	5.6	2			484282	652990
16-Feb	cloud	-3		190674	179		5400	6400	5.6	5.6	1.6			484417	653193
17-Feb	snow	-3		190853	173				5.6	5.6	1.7			484556	653404
18-Feb	cloud	-5		191026	176		5600	6400	5.6	5.6	2.4			484638	653537
19-Feb	cloud	-5		191202	194		5900	6700	5.6	5.6	2.4			484734	653677
20-Feb	clear	-5		191396	200		6000	6700	5.6	5.6	3.1			484934	653980
21-Feb	clear	-8		191596	191		5800	6200	5.6	5.6	3			485109	
22-Feb	sun	-21		191787	196		5800	6100	5.6	5.6	2.9			485247	654459
23-Feb	clear	-22		191983	179		5700	6000	5.6	5.6	2.4			485396	654687
24-Feb	clear	-18		192162	192		5800	6300	5.6	5.6	2.9			485553	654928
25-Feb	clear	-16		192354	189			6600	5.6	5.6	2.6			485686	
26-Feb	clear	-14		192543	211		5800	5900	5.6	5.6	2.7			485803	653311
27-Feb	cloud	-10		192754	182		5900	5900	5.6	5.6	3.1			485940	
28-Feb	snow	-1		192936	197		5900	6000	5.6	5.6	2.4			486085	655742
						203									
Summary	Average	-8		Average	183	203			6	6	2				
	Median	-7		Median	185.5	203			5.6	5.6	2.4				
				Total	5135	203			156.8	156.8	63.3			Monthly total	11156

## March

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (mg/l)	BR2 MLSS (mg/l)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4 (mg/l)	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Mar	fog	0		193133	202		5900	5700	5.6	5.6	2.3			486231	655966
2-Mar	fog	0		193335	199		5900	5800	5.6	5.6	2.3			486375	656188
3-Mar	snow	1		193534	181		6100	6000	5.6	5.6	2.4			486515	656413
4-Mar	clear	-2		193715	187				5.6	5.6	3.2			489616	656558
5-Mar	clear	-3		193902	211		5900	5900	5.6	5.6	3.2			486710	
6-Mar	clear	-10		194113	186		6000	6000	5.6	5.6	3.3			486908	657004
7-Mar	clear	-4		194299	164		6000	6100	5.6	5.6	2.3			487060	657236
8-Mar	clear	-10		194463	171		6000	6100	5.6	5.6	1.5			487194	
9-Mar	clear	-15		194634	179		6000	6100	5.6	5.6	1.5			487339	657664
10-Mar	clear	-14		194813	170		5700	5800	5.6	5.6	1.3			487456	657847
11-Mar	clear	-16		194983	180				5.6	5.6	1.6			487523	657949
12-Mar	snow	-6		195163	193		5600	5600	5.6	5.6	2			487692	658208
13-Mar	snow	-2		195356	195				5.6	5.6	3.3			487851	658451
14-Mar	snow	-1		195551	152		5700	5500	5.6	5.6	2.8			487991	658668
15-Mar	snow	1		195703	167		5500	5300	5.6	5.6	2.1			488139	658896
16-Mar	clear	-2		195870	170		5500	5400	5.6	5.6	1.7			488183	658966
17-Mar	clear	0		196040	182		5300	5200	5.6	5.6	1.7			488321	659129
18-Mar	clear	-2		196222	186				5.6	5.6	2.3			488475	659413
19-Mar	clear	-4		196408	219		5400	5400	5.6	5.6	2.6			488624	659643
20-Mar	clear	-2		196627	207		5500	5500	5.6	5.6	3.2			488775	659876
21-Mar	clear	-2		196834	178		5500	5500	5.6	5.6	2.4			488930	660116
22-Mar	clear	2		197012	187		5700	5700	5.6	5.6	2.4			489048	
23-Mar	clear	2		197199	190		5600	5600	5.6	5.6	2			489142	660444
24-Mar	clear	-2		197389	210				5.6	5.6	1.8			489278	660551
25-Mar	cloud	0		197599	157		5400	5700	5.6	5.6				489428	660882
26-Mar	clear	1		197756	203				5.6	5.6	2.2			489568	661099
27-Mar	clear	1		197959	197		5500	5900	5.6	5.6	3.3			489711	661321
28-Mar	cloud	0		198156	169		5500	6100	5.6	5.6	2.4			489864	661530
29-Mar	clear	-1		198325	192		5300	5800	5.6	5.6	2			489988	661750
30-Mar	clear	-1		198517	164		6400	5900	5.6	5.6	2			490029	661813
31-Mar	clear	0		198681	171	227	5400	5900	5.6	5.6	1.2			490161	662018
Summary	Average	-3		Average	184				6	6	2				
	Median	-2		Max	219				5.6	5.6	2.3				
				Total	5719	227			173.6	173.6	68.3			Monthly total	9982

# APRIL

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Apr	clear	1		198852	168				5.6	5.6	1.8			490369	662338
2-Apr	snow	-2		199020	182		5600	5700	5.6	5.6	2.2			490436	
3-Apr	cloud	0		199202	162				5.6	5.6	2.9			490551	662618
4-Apr	snow	2		199364	152		5500	5700	5.6	5.6	1.5			490696	662844
5-Apr	clear	-2		199516	158		5600	5600	5.6	5.6	0.6			490817	
6-Apr	clear	-3		199674	155		5700	5600	5.6	5.6	0.4			490917	663187
7-Apr	clear	-1		199829	159				5.6	5.6	0.4			490955	663248
8-Apr	clear	-1		199988	152				5.6	5.6	0.4			491103	663477
9-Apr	cloud	-2		200140	154		5700	5500	5.6	5.6	0.3			491235	663682
10-Apr	clear	-4		200294	141				5.6	5.6	0.5			491370	663892
11-Apr	clear	-6		200435	114		5600	5500	5.6	5.6	0.8			491458	664027
12-Apr	clear	-6		200549	113		5600	5500	5.6	5.6	0.4			491512	664114
13-Apr	clear	-10		200662	111		5500	5400	5.6	5.6	0.3			491640	664310
14-Apr	clear	-7		200773	115		5400	5300	5.6	5.6	0.4			491768	664509
15-Apr	cloud	-3		200888	144				5.6	5.6	0.3			491772	664522
16-Apr	sun	-6		201032	163				5.6	5.6	0.8			491938	664771
17-Apr	sun	-5		201195	161		5900	6000	5.6	5.6	1.8			492126	665054
18-Apr	clear	-1		201356	131		5700	6000	5.6	5.6	1.9			492246	665236
19-Apr	snow	-1		201487	99		5800	6000	5.6	5.6	0.5				
20-Apr	snow	-2		201586	113		5600	6000	5.6	5.6	0.1			492496	665625
21-Apr	cloud	1		201699	108				5.6	5.6	0.2				
22-Apr	rain	1		201807	114				5.6	5.6	0.4			492623	
23-Apr	sun	-1		201921	113		5300	6000	5.6	5.6	0.4			492720	665977
24-Apr	sun	-1		202034	115				5.6	5.6	0.4			492742	666006
25-Apr	clear	3		202149	103		5400	6000	5.6	5.6	0.6				
26-Apr	rain	5		202252	122		5300	5800	5.6	5.6	3.3			492980	666372
27-Apr	cloud	3		202374	94				5.6	5.6	0.5			493000	
28-Apr	cloud	4		202468	101				5.6	5.6	0.4			493110	666571
29-Apr	sun	4		202569	101		5000	5800	5.6	5.6	0.2			493226	
30-Apr	clear	-1		202670	91				5.6	5.6	0.3			493256	666750
						99									
Summary	Average	-1			130				6	6	1				
	Median	-1		Max	182				5.6	5.6	0.4				
				Total	3909	99			168	168	25			Monthly tota	7299

# MAY

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-May	cloud	5		202781	122		5000	5700	2.4	2.4	2			493359	666949
2-May	cloud	5		202903	104				2.4	2.4	2			493479	
3-May	sun	14		203007	119		5000	5600	2.4	2.4	0.9				
4-May	cloud	10		203126	110		5000	5600	2.4	2.4				493605	
5-May	cloud	6		203236	99		offline		0	2.4	0.6			493725	
6-May	cloud	8		203335	98			5700		5.6	0.6			493794	667589
7-May	cloud	7		203433	89					5.6	0.6			493842	667659
8-May	cloud	7		203522	71			5900		5.6	0.3			493953	667815
9-May	clear	0		203593	82			5900		5.6	0.4			493953	667815
10-May	cloud	3		203675	81			5900		5.6	0.5				
11-May	cloud	4		203756	77			6000		5.6	3			494187	668149
12-May	sun	1		203833	71			6000		5.6	0.3			494187	
13-May	cloud	5		203904	76					5.6	0.2			494301	668313
14-May	sun	4		203980	89					5.6	0.2			494325	668356
15-May	cloud	4		204069	87			6000		5.6	0.2			494425	668490
16-May	fog	6		204156	86			6100		5.6	0.5			494537	668651
17-May	sun	5		204242	81			6100		5.6	0.5			494565	668697
18-May	cloud	4		204323	86			6100		5.6	0.4			494655	668822
19-May	cloud	2		204409	79			6200		5.6	0.7			494763	668979
20-May	cloud	5		204488	88			6300		5.6	0.7			494763	
21-May	sun	5		204576	106			6000	2.4	5.6	0.8			494884	669156
22-May	sun	4		204682	98			5900	2.4	5.6	3			495013	669343
23-May	cloud	5		204780	97			6000	2.4	5.6	3.3			495127	669510
24-May	cloud	6		204877	80			6000	2.4	5.6	0.9			495246	669683
25-May	cloud	7		204957	85			6000	2.4	5.6	0.3			495246	669684
26-May	sun	5		205042	80				2.4	5.6	0.1			495364	669857
27-May	rain	7		205122	74			5700	2.4	2.4	0.1			495447	669983
28-May	sun	7		205196	80				2.4	2.4	0.1			495490	670042
29-May	cloud	6		205276	92		4700	5900	2.4	2.4	0.1			495613	670223
30-May	sun	8		205368	88		4700	5900	2.4	2.4	0.3			495733	670398
31-May	sun	10		205456	88	78	4800	5700	2.4	2.4	0.4			495859	670584
Summary	Average			Average	89				2						
	Median	5		max	122				2.4		0.5				
				Total	2763				36		24			Monthly tota	6135

# JUNE

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Jun	cloud	7		205540	90		4800	5800	2.8	2.8	0.3			495867	670602
2-Jun	cloud	8		205630	87		4800	5800	2.8	2.8				495982	670765
3-Jun	clear	8		205717	100				2.8	2.8	0.6			496106	670948
4-Jun	cloud	6		205817	110		4900	5800	2.8	2.8	0.6			496226	671127
5-Jun	rain	10		205927	106				2.8	2.8	0.6			496299	671238
6-Jun	cloud	9		206033	93		5100	6000	2.8	2.8	0.8			496374	671348
7-Jun	sun	10		206126	100		5100	6000	2.8	2.8	0.6			496496	671522
8-Jun	rain	11		206226	98		5100	6000	2.8	2.8	0.8			496621	671706
9-Jun	sun	8		206324	112		5100	6100	2.8	2.8	1.1			496738	671881
10-Jun	cloud	7		206436	107				2.8	2.8	1.3			496790	671964
11-Jun	cloud	6		206543	118				2.8	2.8	1.3			496869	672073
12-Jun	clear	9		206661	102		5100	6300	2.8	2.8	1.9			497002	672269
13-Jun	cloud	9		206763	103		5200	6500	2.8	3.6	1.7			497135	672465
14-Jun	cloud	7		206866	105		5100	6500	2.8	3.6	1.3			497255	672643
15-Jun	sun	10		206971	97		5000	6100	2.8	3.6	1.5			497359	672797
16-Jun	cloud	10		207068	115				2.8	3.6				497439	672921
17-Jun	cloud	10		207183	104				2.8	3.6				497527	673044
18-Jun	cloud	8		207287	126		5100	5900	2.8	3.6	1.6			497679	673250
19-Jun	cloud	9		207413	125		5100	5900	2.8	3.6	1.8			497805	673438
20-Jun	sun	11		207538	105		5100	5800	2.8	3.6	1.6			497940	673636
21-Jun	cloud	10		207643	105		5100	5800	2.8	3.6	1.8			498049	673799
22-Jun	rain	8		207748	96				2.8	3.6	1.5			498102	673877
23-Jun	rain	7		207844	111				2.8	7	1.4			498237	674076
24-Jun	cloud	7		207955	122		5200	5800	2.8	5.6	1.2			498358	674255
25-Jun	clear	9		208077	127				2.8	5.6	1.6			498477	674435
26-Jun	sun	10		208204	128		5400	5800	2.8	7	1.3			498572	67456
27-Jun	sun	13		208332	104		5400	5800	2.8	7	1.5			498646	674691
28-Jun	sun	15		208436	121		5500	5800	2.8	7	1.1			498767	674864
29-Jun	rain	9		208557	131		5700	5600	2.8	7	0.9			498849	675054
30-Jun	sun	10		208688	120									499011	675228
						69									
Summary	Average	9		Average	109	69			3	4	1				
	Median	9		Max	131	69			2.8	3.6	1.3				
				Total	3268	69			81.2	115.8	31.7			Monthly total	7770

# JULY

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Jul	sun	13		208808	156				2.8	7				499151	675228
2-Jul	sun	14		208964	123		6000	5700	2.8	7	2			499481	off
3-Jul	sun	14		209087	145		5900	5800	2.8	7	1.9			499788	
4-Jul	rain	13		209232	145		5900	5800	2.8	7	1.5			500098	
5-Jul	cloud	11		209377	141		6100	5800	2.8	7	1.1			500390	
6-Jul	sun	12		209518	134				2.8	7	1.1			500727	
7-Jul	cloud	10		209652	129		6100	5700	2.8	7	1.4			500973	
8-Jul	rain	6		209781	128				2.8	7	1.3			501264	
9-Jul	clear	10		209909	143		6200	5800	2.8	7	1.6			501568	
10-Jul	cloud	11		210052	119		6100	6000	2.8	7	1.9			501862	
11-Jul	cloud	12		210171	111		5800	5900	2.8	7	1.6			502149	
12-Jul	clear	14		210282	118		5700	5800	2.8	7	1.4			502435	
13-Jul	sun	16		210400	123				2.8	7	1.5			502710	
14-Jul	sun	13		210523	138				2.8	7	1.9			503012	
15-Jul	sun	15		210661	104		5800	6200	5.6	8.4	2.3			503300	
16-Jul	sun	15		210765	129		5600	6100	5.6	8.4	2.2			503564	
17-Jul	rain	15		210894	131		5600	6000	5.6	8.4	1.8			503847	
18-Jul	sun	13		211025	120		5500	5900	5.6	8.4	1.2			504119	
19-Jul	cloud	14		211145	124		5400	5800	5.6	8.4	0.7			504478	
20-Jul	sun	17		211269	103				5.6	8.4	1.1			504679	
21-Jul	sun	17		211372	128		5300	5500	5.6	8.4				504928	675284
22-Jul	sun	18		211500	144				5.6	8.4	0.8			505201	675444
23-Jul	sun	13		211644	158		5100	5700	5.6	8.4	0.7			505491	
24-Jul	sun	15		211802	103		5100	5800	5.6	8.4	1.1			505748	675672
25-Jul	sun	15		211905	186		5200	5900	5.6	8.4	0.6			506036	675797
26-Jul	sun	16		212091	135		5200	5900	5.6	8.4	2.8			506282	676135
27-Jul	sun	18		212226	142				5.6	8.4	0.6			506381	676310
28-Jul	sun	21		212368	126				5.6	8.4	0.5			506519	676543
29-Jul	sun	19		212494	143		5300	6000	5.6	8.4	0.7			506618	676710
30-Jul	sun	13		212637	153		5400	5900	5.6	8.4	0.8			506748	676921
31-Jul	sun	16		212790	141	170	5600	6000	5.6	8.4	0.6			506748	677089
Summary	Average	14		Average	133	170			4	8	1				
	Median	14		Max	186	170			5.6	8.4	1.3				
				Total	4123	170			134.4	240.8	38.7			Monthly total	9458



# AUGUST

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Aug	cloud	16		212931	153		56000	5900	5.6	8.4	0.8			506966	677285
2-Aug	sun	12		213084	126		5600	5900	5.6	8.4	0.6			507122	677531
3-Aug	sun	15		213210	131				5.6	8.4	0.6			507256	
4-Aug	cloud	11		213341	150		5700	5700	5.6	8.4	0.5			507363	
5-Aug	cloud	8		213491	135				5.6	8.4	0.3			507482	678118
6-Aug	sun	10		213626	144		5900	5600	5.6	7	0.5			507591	678297
7-Aug	sun	12		213770	140		5300	5200	5.6	7	0.6			507717	678501
8-Aug	sun	15		213910	118		6100	5600	5.6	7	0.5			507839	678716
9-Aug	sun	14		214028	136		6100	5600	5.6	7	0.6			507973	678912
10-Aug	cloud	15		214164	146				5.6	7	0.7			508071	
11-Aug	sun	17		214310	150		6100	5600	5.6	7	0.8			508186	679254
12-Aug	sun	15		214460	130		6300	5600	5.6	7	1.9			508284	679407
13-Aug	sun	13		214590	151		6400	5600	5.6	7	3.3			508418	679621
14-Aug	sun	11		214741	160		6200	5700	5.6	8.4	2.7			508547	679826
15-Aug	sun	13		214901	144		6200	5800	5.6	8.4	0.8			508681	680040
16-Aug	sun	13		215045	158		6100	6000	5.6	8.4	0.3			508814	680252
17-Aug	sun	12		215203	125		6100	6200	5.6	8.4	0.9			508934	680480
18-Aug	sun	12		215328	135		6100	6200	5.6	8.4	0.9			509074	680480
19-Aug	sun	13		215463	129		6200	7800	5.6	8.4				509250	680729
20-Aug	cloud	14		215592	142		6000	6300	5.6	8.4	0.4			509402	680961
21-Aug	rain	20		215734	140		5800	3000	5.6	5.6	0.8			509534	681181
22-Aug	sun	16		215874	116		5900	3000	5.6	5.6	1			509580	681257
23-Aug	cloud	15		215990	118		5900	5900	5.6	5.6	0.7			509693	681439
24-Aug	sun	13		216108	123		5600	5300	5.6	5.6	0.9			509809	681616
25-Aug	sun	19		216231	114		5500	5100	5.6	5.6	0.9			509929	681806
26-Aug	sun	14		216345	127		5400	5100	5.6	5.6	1.1			510041	681985
27-Aug	rain	12		216472	145		5500	4800	5.6	5.6	1.1			510145	682150
28-Aug	sun	8		216617	136		5200	4800	5.6	5.6	1			510253	682321
29-Aug	cloud	10		216753	128		5100	4900	5.6	5.6	1			510301	682402
30-Aug	sun	13		216881	113		4900	4800	5.6	5.6	1			510452	682631
31-Aug	sun	12		216994	90	187	4700	4700	5.6	5.6	1.1			510569	682818
Summary	Average	13		Average	134				6	7	1				
	Median	13		Max	160				5.6	7	0.8				
				Total	4153	187			173.6	218.4	28.3			Monthly tota	9136

# SEPTEMBER

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Sep	sun	12		217084	95		4500	4600	5.6	5.6	1.3			510678	682990
2-Sep	sun	18		217179	107		4400	4500	5.6	5.6	1			510728	683072
3-Sep	sun	9		217286	135		4300	4600	5.6	5.6	1.3			510787	683176
4-Sep	cloud	13		217421	143		4400	4600	5.6	5.6	1.3			510949	683414
5-Sep	sun	14		217564	112		4400	4900	5.6	5.6	1.3			510082	683622
6-Sep	sun	5		217676	108		5300	4800	5.6	5.6	1.2			511174	683769
7-Sep	cloud	5		217784	104		4200	4800	5.6	5.6	1.2			511289	683950
8-Sep	sun	3		217888	117		4300	4700	5.6	5.6	1.8			511289	683950
9-Sep	sun	3		218005	109		4000	4600	5.6	5.6	2.7			511415	684147
10-Sep	sun	7		218114	137		4100	4500	5.6	5.6	2.8			511530	684327
11-Sep	sun	8		218251	123		4300	4800	5.6	5.6	2.9			5113.8	384497
12-Sep	smoke	7		218374	120		4300	4700	5.6	5.6	2.9			511701	684598
13-Sep	smoke	11		218494	115		4100	4700	5.6	5.6	3			511772	684705
14-Sep	sun	10		218609	116		4000	4700	5.6	5.6	3.3			511893	684895
15-Sep	rain	10		218725	122		4200	4700	8.4	8.4	3			511991	684047
16-Sep	cloud	9		218847	124		4300	4700	8.4	8.4	2.5			512013	685081
17-Sep	sun	5		218971	126		4400	4700	8.4	8.4	1.9			512150	685294
18-Sep	sun	5		219097	124		4400	4700	8.4	8.4	1.1			512272	685483
19-Sep	sun	4		219221	100		4200	4700	8.4	8.4	1			512364	685626
20-Sep	sun	2		219321	118		4200	4600	8.4	8.4	0.9			512418	685717
21-Sep	sun	2		219439	107		4100	4600	8.4	8.4	0.8			512517	685858
22-Sep	sun	1		219546	86		4200	4600	8.4	8.4				512606	685005
23-Sep	cloud	8		219632	94		4200	4500	8.4	8.4	0.5			512633	686046
24-Sep	sun	6		219726	121		4200	4600	8.4	8.4	0.9			512763	686248
25-Sep	sun	5		219847	99		4100	4600	8.4	8.4	0.9			512878	686426
26-Sep	sun	6		219946	90		4200	4700	8.4	8.4	0.9			512920	686495
27-Sep	sun	5		220036	69		4200	4700	8.4	8.4	1			513000	686616
28-Sep	sun	5		220105	62		4200	4500	8.4	8.4	1.1			513109	686787
29-Sep	sun	8		220167	73		4300	4400	8.4	8.4	1.3			513723	686816
30-Sep	clear	4		220240	85		4100	4400	8.4	8.4	1.3			513231	686976
						97									
Summary	Average	7		Average	108				7	7	2				
	Median	6		Max	143				8.4	8.4	1.3				
				Total	3241	97			212.8	212.8	47.1			Monthly tota	6539

# OCTOBER

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Oct	sun	8		220325	85		4100	4500	8.4	8.4	0.3			513339	687144
2-Oct	fog	7		220410	84		4200	4600	8.4	8.4	0.4			513339	687147
3-Oct	sun	6		220494	87		1200	4600	8.4	8.4	0.3			513459	687329
4-Oct	sun	14		220581	57		4200	4700	5.6	56	0.3			513568	687498
5-Oct	clear	4		220638	64				5.6	5.6	0.3			513568	687498
6-Oct	sun	4		220702	75		3900	4600	5.6	5.6	0.7			513681	687674
7-Oct	cloud	4		220777	78		3700	4500	5.6	5.6	0.3			513715	687733
8-Oct	cloud	5		220855	112				5.6	5.6				513799	687855
9-Oct	clear	6		220967	159				5.6	5.6				513924	688048
10-Oct	cloud	12		221126	60				5.6	5.6					
11-Oct	clear	1		221186	83		3900	4600	5.6	5.6				514044	688233
12-Oct	sun	-2		221269	77				5.6	5.6				514156	688406
13-Oct	sun	-1		221346	73		3800	420	5.6	5.6				514243	688593
14-Oct	sun	3		221419	76		3700	4100	5.6	5.6	0.7			514267	688616
15-Oct	sun	2		221495	69				5.6	5.6	0.4			514377	688754
16-Oct	clear	2		221564	52				5.6	5.6				514377	688751
17-Oct	clear	-1		221616	50				5.6	5.6				514488	688919
18-Oct	clear	-2		221666	41		3800	4000	5.6	5.6	0.3			514509	688948
19-Oct	clear	-3		221707	34		3500	3700	5.6	5.6	0.2			514509	688948
20-Oct	rain	1		221741	42		3400	3800	1.4	1.4	0.7			514509	688948
21-Oct	clear	2		221783	52		3400	3700	1.4	1.4	0.4			514509	688948
22-Oct	clear	0		221835	54				1.4	1.4	0.2			514768	689328
23-Oct	clear	-3		221889	64				1.4	1.4	0.3			514775	689334
24-Oct	snow	-1		221953	57		3000	3700	1.4	1.4	0.5			514881	387497
25-Oct	clear	-2		222010	61		3000	3600	1.4	1.4	0.4			514881	689497
26-Oct	clear	-2		222071	67				1.4	1.4	0.4			514991	689665
27-Oct	snow	1		222138	71		2900	3600	1.4	1.4	0.9			515048	689754
28-Oct	rain	2		222209	70		2700	3600	1.4	1.4	1			515107	689842
29-Oct	clear	3		222279	76				1.4	1.4	0.5			515203	689992
30-Oct	clear	3		222355	133				1.4	1.4	0.5			515220	690014
31-Oct	rain	2		222422	66	74								515327	690177
Summary	Average	2			72	74			4	6	0				
	Median	2		Median	69	74			5.6	5.6	0.4				
				Total	2229	74			130.2	180.6	10			Monthly tota	5021

# NOVEMBER

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Nov	cloud	0		222488	55		2800	3600	1.4	1.4	1			515327	690177
2-Nov	snow	-2		222543	59		2700	3700	1.4	1.4	0.9			515438	690034
3-Nov	clear	-8		222602	60				1.4	1.4	0.8			515438	690342
4-Nov	snow	-2		222662	64				1.4	1.4	0.8				
5-Nov	snow	-4		222726	69				1.4	1.4	0.6			515569	
6-Nov	clear	-8		222795	74				1.4	1.4	0.6			515677	690712
7-Nov	snow	-11		222869	56		2800		1.4	1.4	0.7			515904	
8-Nov	clear	-17		222925	65		2700		1.4	1.4	0.9			515914	
9-Nov	clear	-13		222990	63		2800		1.4	1.4	0.8			515025	
10-Nov	cloud	-12		223053	71		2800		1.4	1.4	0.8			516025	691233
11-Nov	snow	-10		223124	71		2800	3800	1.4	1.4	0.9			516254	691571
12-Nov	clear	-9		223195	74				1.4	1.4	0.8			516438	591843
13-Nov	clear	-9		223269	76		2700	4000	1.4	1.4	0.8			516713	
14-Nov	clear	-6		223345	68		2800	4000	1.4	1.4	0.8			514766	
15-Nov	snow	-3		223413	64		2800	4000	1.4	1.4	0.6			516876	
16-Nov	clear	-3		223477	76		3000	3900	1.4	1.4	0.6			516876	
17-Nov	sun	-17		223553	73		3500	3900	1.4	1.4	0.9			516986	592666
18-Nov	cloud	-13		223626	57		3500	3900	1.4	1.4	0.7			517158	592921
19-Nov	clear	-15		223683	63		3400	3900	1.4	1.4	0.4			517289	
20-Nov	clear	-13		223746	67		3400	3800	1.4	1.4	0.8			517465	293378
21-Nov	clear	-12		223813	64		3400	3500	1.4	1.4	1			517626	693635
22-Nov	snow	-3		223877	71		3500	3400	1.4	1.4	0.7			517804	693903
23-Nov	clear	-3		223948	72		3500	3300	1.4	1.4	0.8			517908	694066
24-Nov	cloud	-4		224020	66				1.4	1.4				518001	694205
25-Nov	cloud	0		224086	57		3400	3700	1.4	1.4	0.8			518143	694424
26-Nov	cloud	-5		224143	66				1.4	1.4	0.4			518143	
27-Nov	snow	-2		224209	60		3800	3200	1.4	1.4	0.6			518259	294602
28-Nov	clear	-11		224269	62		3900	3100	1.4	1.4	0.9			518367	694767
29-Nov	clear	-21		224331	70		4000	3100	1.4	1.4	1			518378	694785
30-Nov	snow	-12		224401	75		3800	3200	1.4	1.4	0.6			518489	694956
						47									
Summary	Average	-8			66	47			1	1	1				
	Median	-8.5		Median	66	47			1.4	1.4	0.8				
				Total	1988	47			42	42	22			Monthly total	7941

## December

DATE	WEATHER	TEMP	Skier Visits	Cumulative Flow (m3/dy)	Total Flow (m3/dy)	Bags Rem'd	BR1 MLSS (m3/dy)	BR2 MLSS (m3/dy)	BR1 ClearPAC (l/d)	BR2 ClearPAC (l/d)	PO4	TSS	BOD	Well 3 Cum. Flow (m3)	Well 4 Cum. Flow (m3)
1-Dec	cloud	-15		224476	76		3800	3200	1.4	1.4	0.7			518489	694956
2-Dec	cloud	-15		224552	90		3700	3300	1.4	1.4	3.3			518601	695129
3-Dec	cloud	-15		224642	68		3600	3400	1.4	1.4	0.8			518669	
4-Dec	cloud	-15		224710	91		3600	3400	1.4	1.4	1.4			518722	695315
5-Dec	cloud	-16		224801	107				1.4	1.4	1.2			218847	695505
6-Dec	snow	-12		224908	84		3300	3100	1.4	1.4	1			518924	
7-Dec	snow	-10		224992	77		3200	3000	1.4	1.4	0.7			519109	595907
8-Dec	clear	-12		225069	105				1.4	1.4				519323	695268
9-Dec	clear	-8		225174	121				1.4	1.4				519429	69535
10-Dec	snow	-8		225295	145				1.4	1.4	1.6			519613	696653
11-Dec	clear	-5		225440	131		3400	3600	5.6	5.6	2.1			519815	696965
12-Dec	clear	-3		225571	122		3400	3500	5.6	5.6	1.1			520002	697252
13-Dec	clear	-6		225693	128		3400	3600	5.6	5.6	0.6			520108	
14-Dec	clear	-6		225821	121		3500	3400	5.6	5.6	0.1			520223	697594
15-Dec	clear	-8		225942	109				5.6	5.6	0.4			520344	597784
16-Dec	snow	-8		226051	130		3400	3300	5.6	5.6	0.2			520424	697909
17-Dec	snow	-8		226181	151				5.6	5.6	0.2			520477	697992
18-Dec	clear	-19		226332	139		3600	3600	5.6	5.6	0.8			520636	698238
19-Dec	clear	-26		226471	135		3600	3500	5.6	5.6	0.7			520757	698427
20-Dec	cloud	-28		226606	131		3600	3500	5.6	5.6	0.6			520887	
21-Dec	clear	-28		226737	130		3700	3600	5.6	5.6	0.7			520947	698724
22-Dec	clear	-28		226867	132				5.6	5.6	0.3				
23-Dec	snow	-25		226999	158				5.6	5.6	0.4			521166	
24-Dec	snow	-19		227157	149		4200	4000	5.6	5.6	0.9			521293	
25-Dec	cloud	-15		227306	166		4400	4000	5.6	5.6	1.5			521383	699401
26-Dec	snow	-10		227472	172		4400	4200	5.6	5.6	1.7			521450	699508
27-Dec	snow	-1		227644	227		4500	4500	5.6	5.6	1.3			521614	599758
28-Dec	cloud	0		227871	187		4400	4600	5.6	5.6	1.6			521757	599982
29-Dec	clear	-3		228058	223		4000	4500	5.6	5.6	1.2			521899	
30-Dec	snow	-5		228281	201				5.6	5.6	1.8			522045	700435
31-Dec	cloud	-5		228482	229	112			5.6	5.6	2.3			522199	700674
Summary	Average	-12		46851	137				4	4	3				
	Median	-10		97074	131				5.6	5.6	2.8				
			Total		4235	112			131.6	131.6	31.2			Monthly total	9428

Date	Effluent Flow (m3/dy)
1-Jul	
2-Jul	
3-Jul	
4-Jul	
5-Jul	
6-Jul	
7-Jul	
8-Jul	
9-Jul	
10-Jul	
11-Jul	
12-Jul	
13-Jul	
14-Jul	
15-Jul	
16-Jul	
17-Jul	
18-Jul	
19-Jul	
20-Jul	
21-Jul	
22-Jul	
23-Jul	
24-Jul	
25-Jul	
26-Jul	
27-Jul	
28-Jul	
29-Jul	
30-Jul	
31-Jul	
Avg	
Max	
Total	

Date	Effluent Flow (m3/dy)
1-Aug	
2-Aug	
3-Aug	
4-Aug	
5-Aug	
6-Aug	
7-Aug	
8-Aug	
9-Aug	
10-Aug	
11-Aug	
12-Aug	
13-Aug	
14-Aug	
15-Aug	
16-Aug	
17-Aug	
18-Aug	
19-Aug	
20-Aug	
21-Aug	
22-Aug	
23-Aug	
24-Aug	
25-Aug	
26-Aug	
27-Aug	
28-Aug	
29-Aug	
30-Aug	
31-Aug	
Avg	
Max	
Total	

Date	Effluent Flow (m3/dy)
1-Sep	
2-Sep	
3-Sep	
4-Sep	
5-Sep	
6-Sep	
7-Sep	
8-Sep	
9-Sep	
10-Sep	
11-Sep	
12-Sep	
13-Sep	
14-Sep	
15-Sep	
16-Sep	
17-Sep	
18-Sep	
19-Sep	
20-Sep	
21-Sep	
22-Sep	
23-Sep	
24-Sep	
25-Sep	
26-Sep	
27-Sep	
28-Sep	
29-Sep	
30-Sep	
Avg	
Max	
Total	

		Well 3 (Cum M3)	Monthly Total	Well 4 (Cum m3)	Monthly Total	Totals	
2022	Jan	478293	4134	644128	7022	11156	
	Feb	482427	3804	651150	4816	8620	
	Mar	486231	4138	655966	6372	10510	
	Apr	490369	2990	662338	4611	7601	
	May	493359	2508	666949	3653	6161	
	Jun	495867	3284	670602	4626	7910	
	Jul	499151	7815	675228	2057	9872	
	Aug	506966	3712	677285	5705	9417	
	Sep	510678	2661	682990	4154	6815	
	Oct	513339	1988	687144	3033	5021	
	Nov	515327	3162	690177	4779	7941	
	Dec	518489	3866	694956	5904	9770	
2023	Jan	522355		700860			
		Well 3 Total	44062	Well 4 Total	56732	100794	Yearly Total (m3)

		Cum. Effluent on the 1st of the month	Monthly Total
<b>2022</b>	Jan	182553	5445
	Feb	187998	5135
	Mar	193133	5719
	Apr	198852	3929
	May	202781	2759
	Jun	205540	3268
	Jul	208808	4123
	Aug	212931	4153
	Sep	217084	3241
	Oct	220325	2163
	Nov	222488	1988
	Dec	224476	4235
<b>2023</b>	Jan	228711	

		<b>Plant effluent</b>	<b>46158</b>	<b>Yearly Total (m3)</b>
--	--	-----------------------	--------------	--------------------------





## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2200602**  
**Client** : **Kicking Horse Mountain Resort LP**  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 2  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 19-Jan-2022 11:44  
**Date Analysis** : 19-Jan-2022  
**Commenced** :  
**Issue Date** : 26-Jan-2022 15:06

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

## Analytical Results

CG2200602-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: UV trough

Client sampling date / time: 18-Jan-2022 10:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
<b>solids, total suspended [TSS]</b>	----	5.5	3.0	mg/L	E160	-	25-Jan-2022	393512
<b>Anions and Nutrients</b>								
<b>ammonia, total (as N)</b>	7664-41-7	0.264	0.0050	mg/L	E298	20-Jan-2022	20-Jan-2022	391112
<b>phosphate, ortho-, dissolved (as P)</b>	14265-44-2	0.420 <sup>DLHC</sup>	0.0050	mg/L	E378-U	19-Jan-2022	19-Jan-2022	390453
<b>phosphorus, total</b>	7723-14-0	0.659 <sup>DLHC</sup>	0.0200	mg/L	E372-U	20-Jan-2022	20-Jan-2022	390305
<b>Bacteriological Tests</b>								
<b>coliforms, thermotolerant [fecal]</b>	----	<1	1	CFU/100mL	E012.FC	-	19-Jan-2022	391351
<b>coliforms, Escherichia coli [E. coli]</b>	----	<1	1	MPN/100mL	E010	-	19-Jan-2022	391300
<b>Aggregate Organics</b>								
<b>biochemical oxygen demand [BOD]</b>	----	3.0	2.0	mg/L	E550	-	20-Jan-2022	391177

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2200602</b>	Page	: 1 of 5
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: RCR - Kicking Horse Mountain Resort	Date Samples Received	: 19-Jan-2022 11:44
PO	: ----	Issue Date	: 26-Jan-2022 15:06
C-O-C number	: ----		
Sampler	: TJ		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

### Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] UV trough	E550	18-Jan-2022	----	----	----		20-Jan-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) UV trough	E298	18-Jan-2022	20-Jan-2022	----	----		20-Jan-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE UV trough	E378-U	18-Jan-2022	----	----	----		19-Jan-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) UV trough	E372-U	18-Jan-2022	20-Jan-2022	----	----		20-Jan-2022	28 days	2 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) UV trough	E012.FC	18-Jan-2022	----	----	----		19-Jan-2022	30 hrs	27 hrs	✓
Bacteriological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) UV trough	E010	18-Jan-2022	----	----	----		19-Jan-2022	30 hrs	27 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE UV trough	E160	18-Jan-2022	----	----	----		25-Jan-2022	7 days	7 days	✓

[Legend & Qualifier Definitions](#)



Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	391112	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	391177	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	390453	1	8	12.5	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	391351	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	391300	0	17	0.0	10.0	✖
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	390305	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	393512	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	391112	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	391177	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	390453	1	8	12.5	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	390305	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	393512	1	20	5.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	391112	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	391177	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	390453	1	8	12.5	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	391351	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	391300	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	390305	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	393512	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	391112	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	390453	1	8	12.5	5.0	✔
Gravimetry (Ultra Trace)	E372-U	390305	1	20	5.0	5.0	✔



## CERTIFICATE OF ANALYSIS

Work Order : **CG2202618**  
 Client : **Kicking Horse Mountain Resort LP**  
 Contact : Travis Jobin  
 Address : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
 Telephone : 250 344 6003

Page : 1 of 2  
 Laboratory : Calgary - Environmental  
 Account Manager : Patryk Wojciak  
 Address : 2559 29th Street NE  
 Calgary AB Canada T1Y 7B5  
 Telephone : +1 403 407 1800



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a flow analyzer on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2200602**

**Page** : 1 of 4

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 19-Jan-2022 11:44  
**Date Analysis Commenced** : 19-Jan-2022  
**Issue Date** : 26-Jan-2022 15:06

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



Page : 2 of 4  
 Work Order : CG2200602  
 Client : Kicking Horse Mountain Resort LP  
 Project : RCR - Kicking Horse Mountain Resort



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 393512)</b>											
FC2200109-003	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	51.9	51.7	0.386%	20%	----
<b>Anions and Nutrients (QC Lot: 390305)</b>											
CG2200588-004	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0027	0.0023	0.0004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 390453)</b>											
CG2200593-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0029	0.0026	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 391112)</b>											
CG2200602-001	UV trough	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.264	0.262	0.721%	20%	----
<b>Bacteriological Tests (QC Lot: 391351)</b>											
CG2200569-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 391177)</b>											
CG2200587-005	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 393512)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 390305)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 390453)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 391112)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Bacteriological Tests (QCLot: 391300)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Bacteriological Tests (QCLot: 391351)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 391177)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 393512)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.7	85.0	115	----
Anions and Nutrients (QCLot: 390305)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 390453)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	98.2	80.0	120	----
Anions and Nutrients (QCLot: 391112)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.7	85.0	115	----
Aggregate Organics (QCLot: 391177)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.2	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Laboratory sample ID					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
					Concentration	Target	MS	Low	High
Anions and Nutrients (QCLot: 390305)									
CG2200588-005	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0511 mg/L	0.0676 mg/L	75.6	70.0	130
Anions and Nutrients (QCLot: 390453)									
CG2200593-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0477 mg/L	0.05 mg/L	95.4	70.0	130
Anions and Nutrients (QCLot: 391112)									
CG2200627-006	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125





## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2201769**  
**Client** : **Kicking Horse Mountain Resort LP**  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 2  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 16-Feb-2022 11:45  
**Date Analysis** : 16-Feb-2022  
**Commenced** :  
**Issue Date** : 23-Feb-2022 16:52

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

## Analytical Results

CG2201769-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: UV TROUGH

Client sampling date / time: 15-Feb-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
<b>solids, total suspended [TSS]</b>	----	4.6	3.0	mg/L	E160	-	22-Feb-2022	413831
<b>Anions and Nutrients</b>								
<b>ammonia, total (as N)</b>	7664-41-7	0.274	0.0050	mg/L	E298	16-Feb-2022	16-Feb-2022	411794
<b>phosphate, ortho-, dissolved (as P)</b>	14265-44-2	0.542	0.0100	mg/L	E378-U	16-Feb-2022	16-Feb-2022	411750
<b>phosphorus, total</b>	7723-14-0	0.793 <sup>DLHC</sup>	0.0200	mg/L	E372-U	20-Feb-2022	20-Feb-2022	411627
<b>Bacteriological Tests</b>								
<b>coliforms, thermotolerant [fecal]</b>	----	<1	1	CFU/100mL	E012.FC	-	16-Feb-2022	411908
<b>coliforms, Escherichia coli [E. coli]</b>	----	<1	1	MPN/100mL	E010	-	16-Feb-2022	411980
<b>Aggregate Organics</b>								
<b>biochemical oxygen demand [BOD]</b>	----	2.9	2.0	mg/L	E550	-	17-Feb-2022	413053

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2201769</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: RCR - Kicking Horse Mountain Resort</b>	<b>Date Samples Received</b>	<b>: 16-Feb-2022 11:45</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 23-Feb-2022 16:52</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: TJ</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 1</b>		
<b>No. of samples analysed</b>	<b>: 1</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] UV TROUGH	E550	15-Feb-2022	----	----	----		17-Feb-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) UV TROUGH	E298	15-Feb-2022	16-Feb-2022	----	----		16-Feb-2022	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE UV TROUGH	E378-U	15-Feb-2022	----	----	----		16-Feb-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) UV TROUGH	E372-U	15-Feb-2022	20-Feb-2022	----	----		20-Feb-2022	28 days	5 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E012.FC	15-Feb-2022	----	----	----		16-Feb-2022	30 hrs	27 hrs	✓
Bacteriological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E010	15-Feb-2022	----	----	----		16-Feb-2022	30 hrs	27 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE UV TROUGH	E160	15-Feb-2022	----	----	----		22-Feb-2022	7 days	7 days	✓

[Legend & Qualifier Definitions](#)



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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	411794	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	413053	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	411750	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	411908	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	411980	1	15	6.6	10.0	✗
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	411627	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	413831	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	411794	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	413053	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	411750	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	411627	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	413831	1	16	6.2	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	411794	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	413053	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	411750	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	411908	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	411980	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	411627	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	413831	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	411794	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	411750	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	411627	1	19	5.2	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a flow analyzer on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2201769**

**Page** : 1 of 5

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 16-Feb-2022 11:45  
**Date Analysis Commenced** : 16-Feb-2022  
**Issue Date** : 23-Feb-2022 16:52

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Microbiology, Calgary, Alberta

Page : 2 of 5  
Work Order : CG2201769  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 413831)</b>											
CG2201742-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 411627)</b>											
CG2201754-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0038	0.0033	0.0006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 411750)</b>											
CG2201768-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0030	0.0029	0.00005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 411794)</b>											
CG2201742-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.353	0.340	3.78%	20%	----
<b>Bacteriological Tests (QC Lot: 411908)</b>											
FJ2200423-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
<b>Bacteriological Tests (QC Lot: 411980)</b>											
CG2201765-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 413053)</b>											
CG2201744-004	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 413831)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 411627)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 411750)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 411794)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Bacteriological Tests (QCLot: 411908)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Bacteriological Tests (QCLot: 411980)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Aggregate Organics (QCLot: 413053)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 413831)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 411627)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	97.6	80.0	120	----
<b>Anions and Nutrients (QCLot: 411750)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 411794)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
<b>Aggregate Organics (QCLot: 413053)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	96.5	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 411627)										
CG2201754-003	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0513 mg/L	0.0676 mg/L	75.9	70.0	130	----
Anions and Nutrients (QCLot: 411750)										
CG2201769-001	UV TROUGH	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 411794)										
CG2201742-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0935 mg/L	0.1 mg/L	93.5	75.0	125	----



Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)

metry (Ultra Trace)

E200

E378-U

E372-U

390453

390305

1

1

8

20



## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2202618</b>	Page	: 1 of 2
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330	Address	: 2559 29th Street NE
	: Golden BC Canada V0A 1H0		: Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: RCR - Kicking Horse Mountain Resort	Date Samples Received	: 09-Mar-2022 10:30
PO	: ----	Date Analysis	: 09-Mar-2022
		Commenced	
C-O-C number	: ----	Issue Date	: 15-Mar-2022 12:27
Sampler	: TJ		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 1		
No. of samples analysed	: 1		

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This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Erin Sanchez		Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

## Analytical Results

CG2202618-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: UV TROUGH

Client sampling date / time: 08-Mar-2022 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	5.8	3.0	mg/L	E160	-	14-Mar-2022	429142
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.232	0.0050	mg/L	E298	09-Mar-2022	09-Mar-2022	428104
phosphate, ortho-, dissolved (as P)	14265-44-2	0.475	0.0100	mg/L	E378-U	09-Mar-2022	09-Mar-2022	427923
phosphorus, total	7723-14-0	0.861 <sup>DLHC</sup>	0.0200	mg/L	E372-U	10-Mar-2022	10-Mar-2022	427989
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	2	1	CFU/100mL	E012.FC	-	09-Mar-2022	429122
coliforms, Escherichia coli [E. coli]	----	2	1	MPN/100mL	E010	-	09-Mar-2022	429065
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	5.6	2.0	mg/L	E550	-	09-Mar-2022	428222

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2202618</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: RCR - Kicking Horse Mountain Resort</b>	<b>Date Samples Received</b>	<b>: 09-Mar-2022 10:30</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 15-Mar-2022 12:27</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: TJ</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 1</b>		
<b>No. of samples analysed</b>	<b>: 1</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] UV TROUGH	E550	08-Mar-2022	----	----	----		09-Mar-2022	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) UV TROUGH	E298	08-Mar-2022	09-Mar-2022	28 days	1 days	✓	09-Mar-2022	27 days	0 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE UV TROUGH	E378-U	08-Mar-2022	----	----	----		09-Mar-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) UV TROUGH	E372-U	08-Mar-2022	10-Mar-2022	28 days	2 days	✓	10-Mar-2022	26 days	0 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E012.FC	08-Mar-2022	----	----	----		09-Mar-2022	0 hrs	25 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E010	08-Mar-2022	----	----	----		09-Mar-2022	0 hrs	25 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE UV TROUGH	E160	08-Mar-2022	----	----	----		14-Mar-2022	7 days	6 days	✓

[Legend & Qualifier Definitions](#)



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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	428104	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	428222	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	427923	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	429122	0	8	0.0	5.0	✗
Total Coliforms and E. coli (Enzyme Substrate)	E010	429065	2	20	10.0	10.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	427989	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	429142	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	428104	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	428222	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	427923	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	427989	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	429142	1	19	5.2	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	428104	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	428222	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	427923	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	429122	1	8	12.5	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	429065	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	427989	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	429142	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	428104	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	427923	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	427989	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2202618**

**Page** : 1 of 5

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 09-Mar-2022 10:30  
**Date Analysis Commenced** : 09-Mar-2022  
**Issue Date** : 15-Mar-2022 12:27

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta

Page : 2 of 5  
Work Order : CG2202618  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---

Page : 3 of 5  
 Work Order : CG2202618  
 Client : Kicking Horse Mountain Resort LP  
 Project : RCR - Kicking Horse Mountain Resort



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 429142)</b>											
FC2200387-003	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	84.6	81.0	4.35%	20%	----
<b>Anions and Nutrients (QC Lot: 427923)</b>											
CG2202612-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 427989)</b>											
CG2202600-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 428104)</b>											
CG2202618-001	UV TROUGH	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.232	0.231	0.173%	20%	----
<b>Microbiological Tests (QC Lot: 429065)</b>											
CG2202608-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2202616-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 428222)</b>											
CG2202552-009	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 429142)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 427923)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 427989)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 428104)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 429065)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Microbiological Tests (QCLot: 429122)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 428222)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 429142)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 427923)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	89.0	80.0	120	----
Anions and Nutrients (QCLot: 427989)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	99.8	80.0	120	----
Anions and Nutrients (QCLot: 428104)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Aggregate Organics (QCLot: 428222)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	95.6	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 427923)										
CG2202612-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0503 mg/L	0.05 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 427989)										
CG2202600-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0587 mg/L	0.0676 mg/L	86.8	70.0	130	----
Anions and Nutrients (QCLot: 428104)										
CG2202628-004	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.107 mg/L	0.1 mg/L	107	75.0	125	----



<b>Report To</b>		<b>Report Format / Distribution</b>		<b>Service Requested</b> (Rush for routine analysis subject to availability)												
Company: Kicking Horse Mountain Water Utility Co. Ltd.		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)												
Contact: Travis Jobin		<input type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Fax		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT												
Address: 1500 Kicking Horse Trail		Email 1: tjobin@kickinghorseresort.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT												
		Email 2: pmajer@skircr.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT												
Phone: 250-344-6003 Fax:		Email 3: mskyring@kickinghorseresort.com														
<b>Invoice To</b> Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>Client / Project Information</b>		<b>Analysis Request</b>												
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Job #: RCR - Kicking Horse Mountain Resort		Please indicate below Filtered, Preserved or both (F, P, F/P)												
Company: Resorts of the Canadian Rockies		PO / AFE:														
Contact: Patrick Majer		LSD:														
Address: 1505 - 17th Ave SW Calgary AB																
Phone: Fax:		Quote #: Q33059														
Lab Work Order # (lab use only)		ALS Contact: LS		Sampler: TJ												Number of Containers
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	BOD	TSS	Fecal Coliform	Ortho Phosphate	Total P	N-NH4	E. Coli					
	UV trough	08-Mar-22	10:00	Water	X	X	X	X	X	X	X					

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2202618**



Telephone: +1 403 407 1800

**Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details**

**Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.**

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another

SHIPMENT RELEASE (lab use only)

Released by: Travis Jobin  
 Date (dd-mm-yy): 8-M

**NAUTILUS ENVIRONMENTAL**

Signature: \_\_\_\_\_ Verified by: \_\_\_\_\_ Date: \_\_\_\_\_

SHIPMENT VERIFICATION (lab use only)

Time: \_\_\_\_\_ Observations: Yes / No ?  
 If Yes add SIF





## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2204185</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 1-2022 SPRING EMS PROGRAM	Date Samples Received	: 13-Apr-2022 10:40
PO	: ----	Date Analysis	: 13-Apr-2022
C-O-C number	: ----	Commenced	
Sampler	: TJ/JD	Issue Date	: 25-Apr-2022 15:24
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Erin Sanchez		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



## Analytical Results

CG2204185-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: WWTP EFFLUENT-UV TROUGH

Client sampling date / time: 12-Apr-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	7.6	3.0	mg/L	E160	-	16-Apr-2022	458051
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0563	0.0050	mg/L	E298	14-Apr-2022	14-Apr-2022	458847
nitrate (as N)	14797-55-8	8.33	0.0050	mg/L	E235.NO3-L	13-Apr-2022	13-Apr-2022	458069
nitrite (as N)	14797-65-0	0.0312	0.0010	mg/L	E235.NO2-L	13-Apr-2022	13-Apr-2022	458073
phosphate, ortho-, dissolved (as P)	14265-44-2	0.126 <sup>DLHC</sup>	0.0020	mg/L	E378-U	13-Apr-2022	13-Apr-2022	457727
phosphorus, total	7723-14-0	0.442 <sup>DLHC</sup>	0.0100	mg/L	E372-U	23-Apr-2022	23-Apr-2022	463068
nitrate + nitrite (as N)	----	8.36	0.0051	mg/L	EC235.N+N	-	18-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1	1	CFU/100mL	E012.FC	-	13-Apr-2022	460080
Enterococcus	----	>2419.6	1	MPN/100mL	ENTERO.MF	-	25-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	13-Apr-2022	460118
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	2.4	2.0	mg/L	E550	-	14-Apr-2022	459055

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204185-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UPSTREAM -

Client sampling date / time: 12-Apr-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	5.4	3.0	mg/L	E160	-	16-Apr-2022	458051
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0238	0.0050	mg/L	E298	14-Apr-2022	14-Apr-2022	458847
nitrate (as N)	14797-55-8	0.124	0.0050	mg/L	E235.NO3-L	13-Apr-2022	13-Apr-2022	458069
nitrite (as N)	14797-65-0	0.0015	0.0010	mg/L	E235.NO2-L	13-Apr-2022	13-Apr-2022	458073
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0034	0.0010	mg/L	E378-U	13-Apr-2022	13-Apr-2022	457727
phosphorus, total	7723-14-0	0.0135 <sup>DLM</sup>	0.0040	mg/L	E372-U	23-Apr-2022	23-Apr-2022	463068
nitrate + nitrite (as N)	----	0.126	0.0051	mg/L	EC235.N+N	-	18-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	8	1	CFU/100mL	E012.FC	-	13-Apr-2022	460080
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	25-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	13-Apr-2022	460118

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

CG2204185-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER DOWNSTREAM -

Client sampling date / time: 12-Apr-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	5.6	3.0	mg/L	E160	-	16-Apr-2022	458051
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0120	0.0050	mg/L	E298	14-Apr-2022	14-Apr-2022	458847
nitrate (as N)	14797-55-8	0.132	0.0050	mg/L	E235.NO3-L	13-Apr-2022	13-Apr-2022	458069
nitrite (as N)	14797-65-0	0.0018	0.0010	mg/L	E235.NO2-L	13-Apr-2022	13-Apr-2022	458073
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	13-Apr-2022	13-Apr-2022	457727
phosphorus, total	7723-14-0	0.0063	0.0020	mg/L	E372-U	23-Apr-2022	23-Apr-2022	463068
nitrate + nitrite (as N)	----	0.134	0.0051	mg/L	EC235.N+N	-	18-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	4	1	CFU/100mL	E012.FC	-	13-Apr-2022	460080
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	25-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	13-Apr-2022	460118

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204185-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER SIDE CHANNEL -

Client sampling date / time: 12-Apr-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	4.0	3.0	mg/L	E160	-	16-Apr-2022	458051
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0160	0.0050	mg/L	E298	14-Apr-2022	14-Apr-2022	458847
nitrate (as N)	14797-55-8	0.116	0.0050	mg/L	E235.NO3-L	13-Apr-2022	13-Apr-2022	458069
nitrite (as N)	14797-65-0	0.0024	0.0010	mg/L	E235.NO2-L	13-Apr-2022	13-Apr-2022	458073
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0107	0.0010	mg/L	E378-U	13-Apr-2022	13-Apr-2022	457727
phosphorus, total	7723-14-0	0.0213	0.0020	mg/L	E372-U	23-Apr-2022	23-Apr-2022	463068
nitrate + nitrite (as N)	----	0.118	0.0051	mg/L	EC235.N+N	-	18-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	4	1	CFU/100mL	E012.FC	-	13-Apr-2022	460080
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	25-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	3	1	MPN/100mL	E010	-	13-Apr-2022	460118

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2204185</b>	<b>Page</b>	<b>: 1 of 10</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: WEEK 1-2022 SPRING EMS PROGRAM</b>	<b>Date Samples Received</b>	<b>: 13-Apr-2022 10:40</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 25-Apr-2022 15:24</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: TJ/JD</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 4</b>		
<b>No. of samples analysed</b>	<b>: 4</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT-UV TROUGH	E550	12-Apr-2022	----	----	----		14-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWNSTREAM	E298	12-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E298	12-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E298	12-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E298	12-Apr-2022	14-Apr-2022	----	----		14-Apr-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E378-U	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E378-U	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER UPSTREAM	E378-U	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E378-U	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO3-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO3-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO3-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO3-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO2-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO2-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO2-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓





Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO2-L	12-Apr-2022	----	----	----		13-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWNSTREAM	E372-U	12-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E372-U	12-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E372-U	12-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E372-U	12-Apr-2022	23-Apr-2022	----	----		23-Apr-2022	28 days	11 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	ENTERO.MF	12-Apr-2022	----	----	----		25-Apr-2022	48 hrs	317 hrs	✖ EHT
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	ENTERO.MF	12-Apr-2022	----	----	----		25-Apr-2022	48 hrs	317 hrs	✖ EHT
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	ENTERO.MF	12-Apr-2022	----	----	----		25-Apr-2022	48 hrs	317 hrs	✖ EHT
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	ENTERO.MF	12-Apr-2022	----	----	----		25-Apr-2022	48 hrs	318 hrs	✖ EHT



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E012.FC	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E012.FC	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E012.FC	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E012.FC	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E010	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	26 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E010	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	26 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E010	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E010	12-Apr-2022	----	----	----		13-Apr-2022	30 hrs	27 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER DOWNSTREAM	E160	12-Apr-2022	----	----	----		16-Apr-2022	7 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER SIDE CHANNEL	E160	12-Apr-2022	----	----	----		16-Apr-2022	7 days	4 days	✔
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UPSTREAM	E160	12-Apr-2022	----	----	----		16-Apr-2022	7 days	4 days	✔
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT-UV TROUGH	E160	12-Apr-2022	----	----	----		16-Apr-2022	7 days	4 days	✔

**Legend & Qualifier Definitions**

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	458847	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459055	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	457727	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	458069	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	458073	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	460080	1	17	5.8	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	460118	2	18	11.1	10.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	463068	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	458051	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	458847	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459055	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	457727	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	458069	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	458073	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	463068	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	458051	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	458847	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	459055	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	457727	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	458069	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	458073	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	460080	1	17	5.8	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	460118	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	463068	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	458051	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	458847	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	457727	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	458069	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	458073	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	463068	1	4	25.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^{\circ}\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^{\circ}\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^{\circ}\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

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 Work Order : CG2204185  
 Client : Kicking Horse Mountain Resort LP  
 Project : WEEK 1-2022 SPRING EMS PROGRAM



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2204185**

**Page** : 1 of 6

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 1-2022 SPRING EMS PROGRAM  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ/JD  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 13-Apr-2022 10:40  
**Date Analysis Commenced** : 13-Apr-2022  
**Issue Date** : 25-Apr-2022 15:24

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Erin Sanchez		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta

Page : 2 of 6  
Work Order : CG2204185  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 1-2022 SPRING EMS PROGRAM



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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 Work Order : CG2204185  
 Client : Kicking Horse Mountain Resort LP  
 Project : WEEK 1-2022 SPRING EMS PROGRAM



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 458051)</b>											
CG2204071-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	4.4	4.8	0.4	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 457727)</b>											
CG2204164-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 458069)</b>											
CG2204183-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.626	0.620	1.08%	20%	----
<b>Anions and Nutrients (QC Lot: 458073)</b>											
CG2204183-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0025	0.0020	0.0005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 458847)</b>											
CG2204185-001	WWTP EFFLUENT-UV TROUGH	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0563	0.0568	0.884%	20%	----
<b>Anions and Nutrients (QC Lot: 463068)</b>											
CG2204185-001	WWTP EFFLUENT-UV TROUGH	phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	0.442	0.443	0.202%	20%	----
<b>Microbiological Tests (QC Lot: 460080)</b>											
FJ2200891-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	100	CFU/100mL	100	200	100	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 460118)</b>											
CG2204187-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2204195-002	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 459055)</b>											
CG2204174-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 458051)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 457727)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 458069)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 458073)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 458847)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 463068)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Microbiological Tests (QCLot: 460080)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Microbiological Tests (QCLot: 460118)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Aggregate Organics (QCLot: 459055)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 458051)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.2	85.0	115	----
<b>Anions and Nutrients (QCLot: 457727)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	104	80.0	120	----
<b>Anions and Nutrients (QCLot: 458069)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 458073)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 458847)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.7	85.0	115	----
<b>Anions and Nutrients (QCLot: 463068)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	103	80.0	120	----
<b>Aggregate Organics (QCLot: 459055)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	95.9	85.0	115	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 457727)</b>										
CG2204164-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0524 mg/L	0.05 mg/L	105	70.0	130	----
<b>Anions and Nutrients (QCLot: 458069)</b>										
CG2204198-005	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.48 mg/L	2.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 458073)</b>										
CG2204198-005	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.506 mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 458847)</b>										
CG2204185-002	COLUMBIA RIVER UPSTREAM	ammonia, total (as N)	7664-41-7	E298	0.0968 mg/L	0.1 mg/L	96.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 463068)</b>										
CG2204185-002	COLUMBIA RIVER UPSTREAM	phosphorus, total	7723-14-0	E372-U	0.0569 mg/L	0.0676 mg/L	84.2	70.0	130	----

one 1 403 407 1800

Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details									
--	--	--	--	--	--	--	--	--	--

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

Use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Failure to use the NAUTILUS address at the bottom of the form will result in the sample being rejected for common analyses.

**NAUTILUS ENVIRONMENTAL**

Temperature: 50°C	Verified By:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
-------------------	--------------	-------	-------	--

GENF 20.00 Front

# Enterococcus Test Results

Sample collected April 12, 2022

Final Report

April 25, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2204185-001 / 2122-1899-01	12-Apr-22 at 0900h	13-Apr-22 at 1500h	14-Apr-22 at 0900h	9.4°C
CG2204185-002 / 2122-1899-02	12-Apr-22 at 0945h	13-Apr-22 at 1500h	14-Apr-22 at 0900h	12.3°C
CG2204185-003 / 2122-1899-03	12-Apr-22 at 1000h	13-Apr-22 at 1500h	14-Apr-22 at 0900h	10.4°C
CG2204185-004 / 2122-1899-04	12-Apr-22 at 0930h	13-Apr-22 at 1500h	14-Apr-22 at 0900h	9.9°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL <i>Enterococcus</i>
CG2204185-001	>2419.6
CG2204185-002	1.0
CG2204185-003	1.0
CG2204185-004	<1

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

The samples were received and testing initiated outside of the 24-hour hold time at the client's request.



---

Report By:  
Mia Fearey, BIT  
Biologist



---

Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

---



## Quanti-Tray Bench Sheet - *Enterococcus*

 Client AUS 106 Reference 2022-1099
**Test Initiation**

 Date: 2022/04/14  
 Time: 0900  
 Technician: SC
**Sample Information**

 Reagent used: Enterolert™  
 Reagent Lot#/Expiry: JT936 03/10/2022  
 Dilution Factor: —  
 Comments:

 Thermometer Serial #: 20000919  
 Incubator #: 7  
 Incubator Temperature: 41 (must be 41 ± 0.5°C)

 Quanti Tray 2000 Lot#/Expiry: CT028  
03/10/2024
**Results - 24 Hour Incubation**

 Date: 2022/04/15 Time: 0900 Technician: SC

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL	-01	-02	-03	-04					
# Positive Large Wells:	0	49	1	1	0					
# Ambiguous Large Wells:	1	0	0	0						
# Positive Small Wells (Tray 2000 only):	1	48	0	0	1					
# Ambiguous Small Wells (Tray 2000 only):	0	0	0	0						
Most Probable Number at 24 hours:	21	72419.6	1.0	1.0	21					

**Results - 28 Hour Incubation**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
 At 28 hours only score marked ambiguous from 24 hours

 Reviewed By: LO Date Reviewed: 2022/04/18

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

49604



Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2204185</b>
Original Receipt Date/Time	Instructions Received
13/04/2022 10:40	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: ALSCGClientServices@alsglobal.com Invoice: ALSCGClientServices@alsglobal.com Electronic Data: ALSCGClientServices@alsglobal.com  
Attention: Patryk Wojciak

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2204185-001 -01	WWTP EFFLUENT-UV TROUGH	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	21-04-2022	12/04/2022 09:00	9.4°C
CG2204185-002 -02	COLUMBIA RIVER UPSTREAM	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	21-04-2022	12/04/2022 09:45	12.3°C
CG2204185-003 -03	COLUMBIA RIVER DOWNSTREA M	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	21-04-2022	12/04/2022 10:00	10.4°C
CG2204185-004 -04	COLUMBIA RIVER SIDE CHANNEL	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	21-04-2022	12/04/2022 09:30	9.9°C

2122-1899  
2022/04/13  
15:00  
Drop off  
JC  
4x400mL bottles  
NoS/NoB  
Good Condition

**END OF REPORT**

---

GENF 20.00 Front



## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2204485</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 2-2022 SPRING EMS PROGRAM	Date Samples Received	: 20-Apr-2022 13:45
PO	: ----	Date Analysis	: 20-Apr-2022
C-O-C number	: ----	Commenced	
Sampler	: ----	Issue Date	: 28-Apr-2022 17:37
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Erin Sanchez		Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Enterococcus went past hold time prior to receipt at ALS (24 hrs) - Deviation noted in attached Nautilus Report



## Analytical Results

CG2204485-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: WWTP EFFLUENT-UV TROUGH

Client sampling date / time: 19-Apr-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	6.8	3.0	mg/L	E160	-	21-Apr-2022	463870
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.276	0.0050	mg/L	E298	20-Apr-2022	20-Apr-2022	463335
nitrate (as N)	14797-55-8	2.32	0.0050	mg/L	E235.NO3-L	20-Apr-2022	20-Apr-2022	463280
nitrite (as N)	14797-65-0	0.0558	0.0010	mg/L	E235.NO2-L	20-Apr-2022	20-Apr-2022	463281
phosphate, ortho-, dissolved (as P)	14265-44-2	0.150	0.0100	mg/L	E378-U	20-Apr-2022	20-Apr-2022	463340
phosphorus, total	7723-14-0	0.344	0.0200	mg/L	E372-U	25-Apr-2022	25-Apr-2022	464613
nitrate + nitrite (as N)	----	2.38	0.0051	mg/L	EC235.N+N	-	21-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1	1	CFU/100mL	E012.FC	-	20-Apr-2022	464680
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	20-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	20-Apr-2022	464674
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	21-Apr-2022	464804

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204485-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UPSTREAM -

Client sampling date / time: 19-Apr-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	9.2	3.0	mg/L	E160	-	21-Apr-2022	463870
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0121	0.0050	mg/L	E298	20-Apr-2022	20-Apr-2022	463335
nitrate (as N)	14797-55-8	0.108	0.0050	mg/L	E235.NO3-L	20-Apr-2022	20-Apr-2022	463280
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	20-Apr-2022	20-Apr-2022	463281
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	20-Apr-2022	20-Apr-2022	463340
phosphorus, total	7723-14-0	0.0098	0.0020	mg/L	E372-U	25-Apr-2022	25-Apr-2022	464613
nitrate + nitrite (as N)	----	0.108	0.0051	mg/L	EC235.N+N	-	21-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	5	1	CFU/100mL	E012.FC	-	20-Apr-2022	464680
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	20-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	2	1	MPN/100mL	E010	-	20-Apr-2022	464674

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

CG2204485-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER DOWNSTREAM -

Client sampling date / time: 19-Apr-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
<b>solids, total suspended [TSS]</b>	----	5.4	3.0	mg/L	E160	-	21-Apr-2022	463870
<b>Anions and Nutrients</b>								
<b>ammonia, total (as N)</b>	7664-41-7	0.0127	0.0050	mg/L	E298	20-Apr-2022	20-Apr-2022	463335
<b>nitrate (as N)</b>	14797-55-8	0.0985	0.0050	mg/L	E235.NO3-L	20-Apr-2022	20-Apr-2022	463280
<b>nitrite (as N)</b>	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	20-Apr-2022	20-Apr-2022	463281
<b>phosphate, ortho-, dissolved (as P)</b>	14265-44-2	<0.0010	0.0010	mg/L	E378-U	20-Apr-2022	20-Apr-2022	463340
<b>phosphorus, total</b>	7723-14-0	0.0066	0.0020	mg/L	E372-U	25-Apr-2022	25-Apr-2022	464613
<b>nitrate + nitrite (as N)</b>	----	0.0985	0.0051	mg/L	EC235.N+N	-	21-Apr-2022	-
<b>Microbiological Tests</b>								
<b>coliforms, thermotolerant [fecal]</b>	----	2	1	CFU/100mL	E012.FC	-	20-Apr-2022	464680
<b>Enterococcus</b>	----	<1	1	MPN/100mL	ENTERO.MF	-	20-Apr-2022	-
<b>coliforms, Escherichia coli [E. coli]</b>	----	1	1	MPN/100mL	E010	-	20-Apr-2022	464674

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204485-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER SIDE CHANNEL -

Client sampling date / time: 19-Apr-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
<b>solids, total suspended [TSS]</b>	----	6.4	3.0	mg/L	E160	-	21-Apr-2022	463870
<b>Anions and Nutrients</b>								
<b>ammonia, total (as N)</b>	7664-41-7	0.0126	0.0050	mg/L	E298	20-Apr-2022	20-Apr-2022	463335
<b>nitrate (as N)</b>	14797-55-8	0.108	0.0050	mg/L	E235.NO3-L	20-Apr-2022	20-Apr-2022	463280
<b>nitrite (as N)</b>	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	20-Apr-2022	20-Apr-2022	463281
<b>phosphate, ortho-, dissolved (as P)</b>	14265-44-2	<0.0010	0.0010	mg/L	E378-U	20-Apr-2022	20-Apr-2022	463340
<b>phosphorus, total</b>	7723-14-0	0.0066	0.0020	mg/L	E372-U	25-Apr-2022	25-Apr-2022	464613
<b>nitrate + nitrite (as N)</b>	----	0.108	0.0051	mg/L	EC235.N+N	-	21-Apr-2022	-
<b>Microbiological Tests</b>								
<b>coliforms, thermotolerant [fecal]</b>	----	3	1	CFU/100mL	E012.FC	-	20-Apr-2022	464680
<b>Enterococcus</b>	----	<1	1	MPN/100mL	ENTERO.MF	-	20-Apr-2022	-
<b>coliforms, Escherichia coli [E. coli]</b>	----	3	1	MPN/100mL	E010	-	20-Apr-2022	464674

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2204485</b>	Page	: 1 of 10
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 2-2022 SPRING EMS PROGRAM	Date Samples Received	: 20-Apr-2022 13:45
PO	: ----	Issue Date	: 28-Apr-2022 17:37
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT-UV TROUGH	E550	19-Apr-2022	----	----	----		21-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWNSTREAM	E298	19-Apr-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E298	19-Apr-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E298	19-Apr-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E298	19-Apr-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E378-U	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E378-U	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE COLUMBIA RIVER UPSTREAM	E378-U	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E378-U	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO3-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO3-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO3-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO3-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO2-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO2-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO2-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO2-L	19-Apr-2022	----	----	----		20-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWNSTREAM	E372-U	19-Apr-2022	25-Apr-2022	----	----		25-Apr-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E372-U	19-Apr-2022	25-Apr-2022	----	----		25-Apr-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E372-U	19-Apr-2022	25-Apr-2022	----	----		25-Apr-2022	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E372-U	19-Apr-2022	25-Apr-2022	----	----		25-Apr-2022	28 days	6 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	ENTERO.MF	19-Apr-2022	----	----	----		20-Apr-2022	48 hrs	30 hrs	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	ENTERO.MF	19-Apr-2022	----	----	----		20-Apr-2022	48 hrs	30 hrs	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	ENTERO.MF	19-Apr-2022	----	----	----		20-Apr-2022	48 hrs	30 hrs	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	ENTERO.MF	19-Apr-2022	----	----	----		20-Apr-2022	48 hrs	31 hrs	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E012.FC	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	28 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E012.FC	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E012.FC	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E012.FC	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E010	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E010	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E010	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E010	19-Apr-2022	----	----	----		20-Apr-2022	30 hrs	29 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER DOWNSTREAM	E160	19-Apr-2022	----	----	----		21-Apr-2022	7 days	2 days	✓

Page : 7 of 10  
 Work Order : CG2204485  
 Client : Kicking Horse Mountain Resort LP  
 Project : WEEK 2-2022 SPRING EMS PROGRAM



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER SIDE CHANNEL	E160	19-Apr-2022	----	----	----		21-Apr-2022	7 days	2 days	✔
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UPSTREAM	E160	19-Apr-2022	----	----	----		21-Apr-2022	7 days	2 days	✔
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT-UV TROUGH	E160	19-Apr-2022	----	----	----		21-Apr-2022	7 days	2 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	463335	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	464804	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	463340	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	463280	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	463281	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	464680	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	464674	1	19	5.2	10.0	✗
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	464613	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	463870	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	463335	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	464804	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	463340	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	463280	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	463281	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	464613	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	463870	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	463335	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	464804	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	463340	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	463280	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	463281	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	464680	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	464674	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	464613	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	463870	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	463335	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	463340	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	463280	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	463281	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	464613	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2204485**

**Page** : 1 of 6

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 2-2022 SPRING EMS PROGRAM  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 20-Apr-2022 13:45  
**Date Analysis Commenced** : 20-Apr-2022  
**Issue Date** : 28-Apr-2022 17:37

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Erin Sanchez		Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta

Page : 2 of 6  
Work Order : CG2204485  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 2-2022 SPRING EMS PROGRAM

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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 463870)</b>											
CG2204398-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 463280)</b>											
CG2204475-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	16.7	16.7	0.126%	20%	----
<b>Anions and Nutrients (QC Lot: 463281)</b>											
CG2204475-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 463335)</b>											
CG2204476-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0147	0.0149	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 463340)</b>											
CG2204481-003	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 464613)</b>											
CG2204476-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0072	0.0072	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 464674)</b>											
CG2204489-004	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 464680)</b>											
CG2204453-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 464804)</b>											
CG2204473-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 463870)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 463280)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 463281)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 463335)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 463340)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 464613)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Microbiological Tests (QCLot: 464674)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 464680)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 464804)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 463870)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 463280)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 463281)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.3	90.0	110	----
<b>Anions and Nutrients (QCLot: 463335)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
<b>Anions and Nutrients (QCLot: 463340)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	99.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 464613)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	98.9	80.0	120	----
<b>Aggregate Organics (QCLot: 464804)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	97.2	85.0	115	----





## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 463280)</b>										
CG2204475-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.33 mg/L	2.5 mg/L	93.3	75.0	125	----
<b>Anions and Nutrients (QCLot: 463281)</b>										
CG2204475-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.472 mg/L	0.5 mg/L	94.4	75.0	125	----
<b>Anions and Nutrients (QCLot: 463335)</b>										
CG2204476-003	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 463340)</b>										
CG2204485-001	WWTP EFFLUENT-UV TROUGH	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 464613)</b>										
CG2204476-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0544 mg/L	0.0676 mg/L	80.5	70.0	130	----

and Conditions as provided on a separate Excel tab.

NAUTHUS

ENVIRONMENTAL VERIFICATION

Date: 12/01/2010 Time: 10:00 Observations: Yes/No? If Yes add SIF

GENF 20.00 Front

Sample collected April 19, 2022

April 28, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2204485-001 / 2122-1959-01	19-Apr-22 at 0900h	20-Apr-22 at 1500h	20-Apr-22 at 1600h	3.6°C
CG2204485-002 / 2122-1959-02	19-Apr-22 at 0930h	20-Apr-22 at 1500h	20-Apr-22 at 1600h	3.8°C
CG2204485-003 / 2122-1959-03	19-Apr-22 at 0945h	20-Apr-22 at 1500h	20-Apr-22 at 1600h	2.1°C
CG2204485-004 / 2122-1959-04	19-Apr-22 at 1000h	20-Apr-22 at 1500h	20-Apr-22 at 1600h	2.7°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL
	<i>Enterococcus</i>
CG2204485-001	1.0
CG2204485-002	1.0
CG2204485-003	<1
CG2204485-004	<1

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

Samples were received and testing initiated outside of the required hold time.



---

Report By:  
Mia Fearey, BIT  
Biologist



---

Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

---

## Quanti-Tray Bench Sheet - *Enterococcus*

 Client AUS106 Reference 2022-1959
**Test Initiation**

 Date: 2022/04/20  
 Time: 1600  
 Technician: S
**Sample Information**

 Reagent used: Enterolert™  
 Reagent Lot#/Expiry: JT936 03 MAR 2022  
 Dilution Factor: —  
 Comments:

 Thermometer Serial #: 700626099  
 Incubator #: 5  
 Incubator Temperature: 41 (must be  $41 \pm 0.5^\circ\text{C}$ )

 Quanti Tray 2000 Lot#/Expiry: CT028 03/10/2024
**Results - 24 Hour Incubation**

 Date: 2022/04/21 Time: 1555 Technician: EP/AE

Incubator Temp: <u>41</u> (must be $41 \pm 0.5^\circ\text{C}$ )	Enterococci (Fluorescent)									
	CTL	1959	1959	1959	1959	1959	1959	1959	1959	1959
# Positive Large Wells:	0	1	1	0	0	0	0	0	0	0
# Ambiguous Large Wells:	0	0	0	0	0	0	0	0	0	0
# Positive Small Wells (Tray 2000 only):	0	0	0	0	0	0	0	0	0	0
# Ambiguous Small Wells (Tray 2000 only):	0	0	0	0	0	0	0	0	0	0
Most Probable Number at 24 hours:	<1	1.0	1.0	<1	<1					

**Results - 28 Hour Incubation**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be $41 \pm 0.5^\circ\text{C}$ )	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours.

At 28 hours only score marked ambiguous from 24 hours

 Reviewed By: W Date Reviewed: 2022/04/25

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

50388



Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2204485</b>
Original Receipt Date/Time	Instructions Received
20/04/2022 13:45	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: ALSCGClientServices@alsglobal.com	Invoice: ALSCGClientServices@alsglobal.com	Electronic Data: ALSCGClientServices@alsglobal.com
Attention: Patryk Wojciak		

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2204485-001 <i>2022-1969-01</i>	WWTP EFFLUENT-UV TROUGH	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	27-04-2022	19/04/2022 09:00	<i>3.2°C</i>
CG2204485-002 <i>-01-02</i>	COLUMBIA RIVER UPSTREAM	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	27-04-2022	19/04/2022 09:30	<i>3.8°C</i>
CG2204485-003 <i>-02-03</i>	COLUMBIA RIVER DOWNSTREA M	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	27-04-2022	19/04/2022 09:45	<i>2.1°C</i>
CG2204485-004 <i>-04</i>	COLUMBIA RIVER SIDE CHANNEL	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	27-04-2022	19/04/2022 10:00	<i>2.7°C</i>

*2022/04/20  
15:00  
Lab  
SC  
4x400mL bottles  
NoS/NOT  
Good Condition*



**END OF REPORT**

---



<b>Report To</b>		<b>Report Format / Distribution</b>		<b>Service Requested</b> (Rush for routine analysis subject to availability)													
Company: Kicking Horse Mountain Resort Utility Corporation		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)													
Contact: Mark Skyring		<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT													
Address: 1500 Kicking Horse Trail		Email 1: tjobin@kickinghorseresort.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT													
Phone: 250-344-1145 Fax:		Email 2: pmaier@skircr.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT													
Invoice To: Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Email 3: mskyring@kickinghorseresort.com		<b>Analysis Request</b>													
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)													
Company: Resorts of the Canadian Rockies		Job #: DW - RCR/KHMR															
Contact: Patrick Majer		PO / AFE:															
Address: 1505 - 17th Ave SW Calgary AB		LSD:															
Phone: 403-861-8730 Fax:		Quote #: DW 032044 WASTEWATER															
Lab Work Order # (lab use only)		ALS Contact: PW		Sampler:													
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (h:mm)	Sample Type	BOD5	TSS	N-NH4	N-NO3	N-NO2	TOTAL P	ORTHO P	FECA COLIFORM	ENTEROCOCCI	E. COLI	Number of Containers		
Admin	UV TROUGH PH: 6.4 TEMP: 11	APR 19	9:00AM	Water	X	X	X	X	X	X	X	X	X	X	1		
Day Lodge	RIVER SIDE CHANNEL PH. 6.6 TEMP: 6.8	APR 19	9:30 AM	Water	X	X	X	X	X	X	X	X	X	X	1		
	RIVER UPSTREAM PH 6.8 TEMP: 7	APR 19	9:45 AM	WATER		X	X	X	X	X	X	X	X	X	1		
	RIVER DOWNSTREAM PH 6.8 TEMP: 7	APR 19	10:00 AM	WATER		X	X	X	X	X	X	X	X	X			

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, e

Environmental Division  
Calgary

Work Order Reference

CG2204485



Telephone : +1 403 407 1800

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and service / holding time table for common analyses.

Released by: SHIPME



SHIPMENT VERIFICATION (lab use only)

Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
--------------	-------	-------	---



## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2204836</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 3-2022 SPRING EMS PROGRAM	Date Samples Received	: 27-Apr-2022 12:50
PO	: ----	Date Analysis	: 27-Apr-2022
C-O-C number	: ----	Commenced	
Sampler	: TJ	Issue Date	: 10-May-2022 17:08
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Enterococcus went past hold time prior to receipt at ALS (24 Hour Hold Time)

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).



## Analytical Results

CG2204836-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: WWTP EFFLUENT-UV TROUGH

Client sampling date / time: 26-Apr-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	8.3	3.0	mg/L	E160	-	02-May-2022	472743
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0569	0.0050	mg/L	E298	28-Apr-2022	28-Apr-2022	470867
nitrate (as N)	14797-55-8	11.1	0.0050	mg/L	E235.NO3-L	28-Apr-2022	28-Apr-2022	470556
nitrite (as N)	14797-65-0	0.0279	0.0010	mg/L	E235.NO2-L	28-Apr-2022	28-Apr-2022	470555
phosphate, ortho-, dissolved (as P)	14265-44-2	0.135	0.0100	mg/L	E378-U	27-Apr-2022	27-Apr-2022	470038
phosphorus, total	7723-14-0	0.374 <sup>DLHC</sup>	0.0100	mg/L	E372-U	30-Apr-2022	30-Apr-2022	470864
nitrate + nitrite (as N)	----	11.1	0.0051	mg/L	EC235.N+N	-	29-Apr-2022	-
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	<1	1	CFU/100mL	E012.FC	-	27-Apr-2022	471531
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	27-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	27-Apr-2022	471474
Aggregate Organics								
biochemical oxygen demand [BOD]	----	2.3	2.0	mg/L	E550	-	28-Apr-2022	471622

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204836-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UPSTREAM -

Client sampling date / time: 26-Apr-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	20.5	3.0	mg/L	E160	-	28-Apr-2022	470057
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0053	0.0050	mg/L	E298	28-Apr-2022	28-Apr-2022	470867
nitrate (as N)	14797-55-8	0.0976	0.0050	mg/L	E235.NO3-L	28-Apr-2022	28-Apr-2022	470556
nitrite (as N)	14797-65-0	0.0023	0.0010	mg/L	E235.NO2-L	28-Apr-2022	28-Apr-2022	470555
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	27-Apr-2022	27-Apr-2022	470038
phosphorus, total	7723-14-0	0.0104	0.0020	mg/L	E372-U	30-Apr-2022	30-Apr-2022	470864
nitrate + nitrite (as N)	----	0.0999	0.0051	mg/L	EC235.N+N	-	29-Apr-2022	-
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	5	1	CFU/100mL	E012.FC	-	27-Apr-2022	471531
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	27-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	5	1	MPN/100mL	E010	-	27-Apr-2022	471474

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

CG2204836-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER DOWNSTREAM -

Client sampling date / time: 26-Apr-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	22.1	3.0	mg/L	E160	-	28-Apr-2022	470057
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	28-Apr-2022	28-Apr-2022	470867
nitrate (as N)	14797-55-8	0.103	0.0050	mg/L	E235.NO3-L	28-Apr-2022	28-Apr-2022	470556
nitrite (as N)	14797-65-0	0.0019	0.0010	mg/L	E235.NO2-L	28-Apr-2022	28-Apr-2022	470555
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	27-Apr-2022	27-Apr-2022	470038
phosphorus, total	7723-14-0	0.0117	0.0020	mg/L	E372-U	30-Apr-2022	30-Apr-2022	470864
nitrate + nitrite (as N)	----	0.105	0.0051	mg/L	EC235.N+N	-	29-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	27-Apr-2022	471531
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	27-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	27-Apr-2022	471474

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2204836-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER SIDE CHANNEL -

Client sampling date / time: 26-Apr-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	24.9	3.0	mg/L	E160	-	28-Apr-2022	470058
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0060	0.0050	mg/L	E298	28-Apr-2022	28-Apr-2022	470867
nitrate (as N)	14797-55-8	0.108	0.0050	mg/L	E235.NO3-L	28-Apr-2022	28-Apr-2022	470556
nitrite (as N)	14797-65-0	0.0011	0.0010	mg/L	E235.NO2-L	28-Apr-2022	28-Apr-2022	470555
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	27-Apr-2022	27-Apr-2022	470038
phosphorus, total	7723-14-0	0.0100	0.0020	mg/L	E372-U	30-Apr-2022	30-Apr-2022	470864
nitrate + nitrite (as N)	----	0.109	0.0051	mg/L	EC235.N+N	-	29-Apr-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	6	1	CFU/100mL	E012.FC	-	27-Apr-2022	471531
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	27-Apr-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	27-Apr-2022	471474

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2204836</b>	<b>Page</b>	<b>: 1 of 10</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: WEEK 3-2022 SPRING EMS PROGRAM</b>	<b>Date Samples Received</b>	<b>: 27-Apr-2022 12:50</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 10-May-2022 17:09</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: TJ</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 4</b>		
<b>No. of samples analysed</b>	<b>: 4</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
<b>HDPE [BOD HT 3d]</b> WWTP EFFLUENT-UV TROUGH	E550	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER DOWNSTREAM	E298	26-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	28 days	2 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER SIDE CHANNEL	E298	26-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	28 days	2 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER UPSTREAM	E298	26-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	28 days	2 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WWTP EFFLUENT-UV TROUGH	E298	26-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	28 days	2 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
<b>HDPE</b> COLUMBIA RIVER DOWNSTREAM	E378-U	26-Apr-2022	----	----	----		27-Apr-2022	3 days	1 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
<b>HDPE</b> COLUMBIA RIVER SIDE CHANNEL	E378-U	26-Apr-2022	----	----	----		27-Apr-2022	3 days	1 days	✔



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER UPSTREAM	E378-U	26-Apr-2022	----	----	----		27-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE WWTP EFFLUENT-UV TROUGH	E378-U	26-Apr-2022	----	----	----		27-Apr-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO3-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO3-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO3-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO3-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWNSTREAM	E235.NO2-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO2-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO2-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓



Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO2-L	26-Apr-2022	----	----	----		28-Apr-2022	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWNSTREAM	E372-U	26-Apr-2022	30-Apr-2022	----	----		30-Apr-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E372-U	26-Apr-2022	30-Apr-2022	----	----		30-Apr-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E372-U	26-Apr-2022	30-Apr-2022	----	----		30-Apr-2022	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E372-U	26-Apr-2022	30-Apr-2022	----	----		30-Apr-2022	28 days	4 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	ENTERO.MF	26-Apr-2022	----	----	----		27-Apr-2022	24 hrs	29 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	ENTERO.MF	26-Apr-2022	----	----	----		27-Apr-2022	24 hrs	29 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	ENTERO.MF	26-Apr-2022	----	----	----		27-Apr-2022	24 hrs	29 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	ENTERO.MF	26-Apr-2022	----	----	----		27-Apr-2022	24 hrs	30 hrs	✖ EHTR



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E012.FC	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E012.FC	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E012.FC	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	28 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E012.FC	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWNSTREAM	E010	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E010	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	27 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E010	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E010	26-Apr-2022	----	----	----		27-Apr-2022	30 hrs	28 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER DOWNSTREAM	E160	26-Apr-2022	----	----	----		28-Apr-2022	7 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER SIDE CHANNEL	E160	26-Apr-2022	----	----	----		28-Apr-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UPSTREAM	E160	26-Apr-2022	----	----	----		28-Apr-2022	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT-UV TROUGH	E160	26-Apr-2022	----	----	----		02-May-2022	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	470867	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	471622	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	470038	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	470556	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	470555	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	471531	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	471474	2	16	12.5	10.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	470864	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	472743	3	60	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	470867	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	471622	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	470038	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	470556	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	470555	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	470864	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	472743	3	60	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	470867	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	471622	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	470038	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	470556	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	470555	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	471531	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	471474	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	470864	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	472743	3	60	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	470867	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	470038	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	470556	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	470555	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	470864	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Page : 10 of 10  
Work Order : CG2204836  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 3-2022 SPRING EMS PROGRAM



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



## QUALITY CONTROL REPORT

**Work Order** : **CG2204836**

**Page** : 1 of 6

**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 3-2022 SPRING EMS PROGRAM  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 27-Apr-2022 12:50  
**Date Analysis Commenced** : 27-Apr-2022  
**Issue Date** : 10-May-2022 17:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta

Page : 2 of 6  
Work Order : CG2204836  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 3-2022 SPRING EMS PROGRAM

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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 470057)</b>											
CG2204726-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	152	152	0.527%	20%	----
<b>Physical Tests (QC Lot: 470058)</b>											
CG2204836-004	COLUMBIA RIVER SIDE CHANNEL	solids, total suspended [TSS]	----	E160	3.0	mg/L	24.9	25.7	0.8	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 472743)</b>											
CG2204813-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	18.3	17.3	1.0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 470038)</b>											
CG2204835-005	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 470555)</b>											
CG2204847-013	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 470556)</b>											
CG2204847-013	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.329	0.300	9.28%	20%	----
<b>Anions and Nutrients (QC Lot: 470864)</b>											
CG2204829-008	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 470867)</b>											
CG2204829-008	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	1.72	1.72	0.180%	20%	----
<b>Microbiological Tests (QC Lot: 471474)</b>											
CG2204820-002	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2204837-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 471531)</b>											
CG2204838-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 471622)</b>											
CG2204852-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 470057)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 470058)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 472743)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 470038)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 470555)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 470556)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 470864)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 470867)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Microbiological Tests (QCLot: 471474)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 471531)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 471622)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 470057)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	102	85.0	115	----
<b>Physical Tests (QCLot: 470058)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	105	85.0	115	----
<b>Physical Tests (QCLot: 472743)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.1	85.0	115	----
<b>Anions and Nutrients (QCLot: 470038)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	98.0	80.0	120	----
<b>Anions and Nutrients (QCLot: 470555)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 470556)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 470864)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	100	80.0	120	----
<b>Anions and Nutrients (QCLot: 470867)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	87.6	85.0	115	----
<b>Aggregate Organics (QCLot: 471622)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.6	85.0	115	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 470038)</b>										
CG2204835-006	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0488 mg/L	0.05 mg/L	97.6	70.0	130	----
<b>Anions and Nutrients (QCLot: 470555)</b>										
CG2204847-014	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 470556)</b>										
CG2204847-014	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.70 mg/L	2.5 mg/L	108	75.0	125	----
<b>Anions and Nutrients (QCLot: 470864)</b>										
CG2204832-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0682 mg/L	0.0676 mg/L	101	70.0	130	----
<b>Anions and Nutrients (QCLot: 470867)</b>										
CG2204832-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.106 mg/L	0.1 mg/L	106	75.0	125	----

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

provided on another Excel tab are the ALS location addresses, phone numbers and sample containers / preservation / holding time table for common analyses



SHIPMENT VERIFICATION (lab use only)

Verified by:	Date:	Time:

## Enterococcus Test Results

Sample collected April 26, 2022

Final Report

May 10, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2204836-001 / 2122-2022-01	26-Apr-22 at 0900h	27-Apr-22 at 1430h	27-Apr-22 at 1500h	11.4°C
CG2204836-002 / 2122-2022-02	26-Apr-22 at 0930h	27-Apr-22 at 1430h	27-Apr-22 at 1500h	10.8°C
CG2204836-003 / 2122-2022-03	26-Apr-22 at 0945h	27-Apr-22 at 1430h	27-Apr-22 at 1500h	10.2°C
CG2204836-004 / 2122-2022-04	26-Apr-22 at 1000h	27-Apr-22 at 1430h	27-Apr-22 at 1500h	12.3°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL
	<i>Enterococcus</i>
CG2204836-001	<1
CG2204836-002	1.0
CG2204836-003	<1
CG2204836-004	<1

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

Sample were received and testing initiated outside of the required 24 hour hold time.





---

Report By:  
Mia Fearey, BIT  
Biologist



---

Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

---



# Quanti-Tray Bench Sheet - *Enterococcus*

Client AW106 Reference 2122-2022

## Test Initiation

Date: 2022/04/27  
Time: 1500  
Technician: JL

## Sample Information

Dilution Factor: —

Reagent used: Enterolert™  
Reagent Lot#/Expiry: JT 939 03 NOV 2022

Comments:

Thermometer Serial #: 200626099  
Incubator #: 7  
Incubator Temperature: 41 (must be  $41 \pm 0.5^{\circ}\text{C}$ )

Quanti Tray 2000 Lot#/Expiry: CT028  
03/19/2024

## Results - 24 Hour Incubation

Date: 2022/04/28

Time: 1445

Technician: EP / KTM

Incubator Temp: <u>41</u> (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)								
	CTL	2022-01	2022-02	2022-03	2022-04				
# Positive Large Wells:	0	0	0	0	0				
# Ambiguous Large Wells:	0	0	0	0	0				
# Positive Small Wells (Tray 2000 only):	0	0	1	0	0				
# Ambiguous Small Wells (Tray 2000 only):	0	0	0	0	0				
Most Probable Number at 24 hours:	0.0	0.0	1.0	0.0	0.0				

## Results - 28 Hour Incubation

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Technician: \_\_\_\_\_

Incubator Temp: _____ (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)								
	CTL								
# Confirmed Positive Large Wells:									
# Confirmed Positive Small Wells (Tray 2000 only):									
Most Probable Number at 28 hours:									

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguous from 24 hours

Reviewed By: LD

Date Reviewed: 2022/05/02

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

51614



Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2204836</b>
Original Receipt Date/Time	Instructions Received
27/04/2022 12:50	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: ALSCGClientServices@alsglobal.com

Invoice: ALSCGClientServices@alsglobal.com

Electronic Data: ALSCGClientServices@alsglobal.com

2122-2022


Attention: Patryk Wojciak

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2204836-001 -01	WWTP EFFLUENT-UV TROUGH	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF 11.4°C	Enterococcus by (MF - mE)	04-05-2022	26/04/2022 09:00	
CG2204836-002 -02	COLUMBIA RIVER UPSTREAM	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF 10.8°C	Enterococcus by (MF - mE)	04-05-2022	26/04/2022 09:30	
CG2204836-003 -03	COLUMBIA RIVER DOWNSTREA M	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF 10.2°C	Enterococcus by (MF - mE)	04-05-2022	26/04/2022 09:45	
CG2204836-004 -04	COLUMBIA RIVER SIDE CHANNEL	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF 12.3°C	Enterococcus by (MF - mE)	04-05-2022	26/04/2022 10:00	

2022/04/27  
14:30  
Lab  
SC  
4x20L - 4x400 mL  
bottles  
Nob/Nob  
Good Cond.

**END OF REPORT**

---

<b>Report To</b>		<b>Report Format / Distribution</b>		<b>Service Requested</b> (Rush for routine analysis subject to availability)																																																														
Company: Kicking Horse Mountain Resort Utility Corporation		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other <input type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Fax		<input checked="" type="radio"/> Regular (Standard) <input type="radio"/> Priority (2-4 Busi) <input type="radio"/> Emergency (1-2) <input type="radio"/> Same Day or We																																																														
Contact: Travis Jobin		Email 1: <a href="mailto:tjobin@kickinghorseresort.com">tjobin@kickinghorseresort.com</a>		<div style="float: right; text-align: right;"> <b>Environmental Division</b>  <b>Calgary</b>          Work Order Reference  <b>CG2204836</b>            Telephone: +1 403 407 1800       </div>																																																														
Address: 1500 Kicking Horse Trail		Email 2: <a href="mailto:pmajer@skircr.com">pmajer@skircr.com</a>																																																																
Phone: 250-344-8442    Fax: _____		Email 3: <a href="mailto:mskyring@kickinghorseresort.com">mskyring@kickinghorseresort.com</a>																																																																
<b>Invoice To</b> Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>Client / Project Information</b>		<b>Please indicate</b>																																																														
Company: Resorts of the Canadian Rockies		Job #: Week 3 - 2022 Spring EMS program - VVV		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>BOD5</td><td>TSS</td><td>N-NH4</td><td>N-NO3</td><td>N-NO2</td><td>Total P</td><td>Ortho P</td><td>Fecal Coliform</td><td>Enterococci</td><td>E. Coli</td><td rowspan="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">Number of Containers</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>												BOD5	TSS	N-NH4	N-NO3	N-NO2	Total P	Ortho P	Fecal Coliform	Enterococci	E. Coli	Number of Containers																																								
BOD5	TSS	N-NH4	N-NO3													N-NO2	Total P	Ortho P	Fecal Coliform	Enterococci	E. Coli	Number of Containers																																												
Contact: Patrick Majer		PO / AFE:																																																																
Address: 1505 - 17th Ave SW Calgary AB		LSD:																																																																
Phone: _____    Fax: _____		Quote #:																																																																
<b>Lab Work Order #</b> (lab use only)		ALS Contact: PW		Sampler: TJ																																																														


Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	BOD5	TSS	N-NH4	N-NO3	N-NO2	Total P	Ortho P	Fecal Coliform	Enterococci	E. Coli		
	WWTP Effluent - UV trough    Temp: 7    pH: 6.8	26-Apr-22	9:00	Water	X	X	X	X	X	X	X	X	X	X		5
	Columbia River Side Channel    Temp: 9    pH: 7.8	26-Apr-22	9:30	Water		X	X	X	X	X	X	X	X	X		4
	Columbia River Upstream    Temp: 9    pH: 8.2	26-Apr-22	9:45	Water		X	X	X	X	X	X	X	X	X		4
	Columbia River Down Stream    Temp: 8    pH: 7.8	26-Apr-22	10:00	Water		X	X	X	X	X	X	X	X	X		4


**Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details**

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS local

<b>SHIPMENT RELEASE (Client use)</b>			
Released by: Travis Jobin	Date (dd-mm-yy): 26-Oct-21	Time (hh:mm):	Received by: 



**NAUTILUS**  
ENVIRONMENTAL

Time tab for common analysis  
 VERIFICATION (base on)  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Observations: Yes/No?  
 If Yes add SIF



## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2205286</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 4-2022 SPRING EMS PROGRAM WWTP	Date Samples Received	: 05-May-2022 14:40
PO	: ----	Date Analysis	: 05-May-2022
C-O-C number	: ----	Commenced	
Sampler	: TJ	Issue Date	: 20-May-2022 15:43
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).



## Analytical Results

CG2205286-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: WWTP EFFLUENT-UV TROUGH

Client sampling date / time: 04-May-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160	-	10-May-2022	482148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0624	0.0050	mg/L	E298	05-May-2022	05-May-2022	478749
nitrate (as N)	14797-55-8	9.27	0.0050	mg/L	E235.NO3-L	06-May-2022	06-May-2022	479027
nitrite (as N)	14797-65-0	0.0079	0.0010	mg/L	E235.NO2-L	06-May-2022	06-May-2022	479028
phosphate, ortho-, dissolved (as P)	14265-44-2	0.122	0.0020	mg/L	E378-U	05-May-2022	05-May-2022	478550
phosphorus, total	7723-14-0	0.235 <sup>DLHC</sup>	0.0200	mg/L	E372-U	11-May-2022	11-May-2022	480188
nitrate + nitrite (as N)	----	9.28	0.0051	mg/L	EC235.N+N	-	10-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1	1	CFU/100mL	E012.FC	-	05-May-2022	479691
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	05-May-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	05-May-2022	479654
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	06-May-2022	479809

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2205286-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER SIDE CHANNEL -

Client sampling date / time: 04-May-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	20.7	3.0	mg/L	E160	-	10-May-2022	482148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0096	0.0050	mg/L	E298	05-May-2022	10-May-2022	478749
nitrate (as N)	14797-55-8	0.0867	0.0050	mg/L	E235.NO3-L	06-May-2022	06-May-2022	479144
nitrite (as N)	14797-65-0	0.0013	0.0010	mg/L	E235.NO2-L	06-May-2022	06-May-2022	479145
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0013	0.0010	mg/L	E378-U	05-May-2022	05-May-2022	478550
phosphorus, total	7723-14-0	0.0175	0.0020	mg/L	E372-U	11-May-2022	11-May-2022	480188
nitrate + nitrite (as N)	----	0.0880	0.0051	mg/L	EC235.N+N	-	10-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	4	1	CFU/100mL	E012.FC	-	05-May-2022	479691
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	05-May-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	05-May-2022	479654

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

CG2205286-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UPSTREAM -

Client sampling date / time: 04-May-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	21.7	3.0	mg/L	E160	-	10-May-2022	482148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	05-May-2022	10-May-2022	478749
nitrate (as N)	14797-55-8	0.0931	0.0050	mg/L	E235.NO3-L	06-May-2022	06-May-2022	479144
nitrite (as N)	14797-65-0	0.0014	0.0010	mg/L	E235.NO2-L	06-May-2022	06-May-2022	479145
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	05-May-2022	05-May-2022	478550
phosphorus, total	7723-14-0	0.0170	0.0020	mg/L	E372-U	11-May-2022	11-May-2022	480188
nitrate + nitrite (as N)	----	0.0945	0.0051	mg/L	EC235.N+N	-	10-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	05-May-2022	479691
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	05-May-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	05-May-2022	479654

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2205286-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER DOWN STREAM -

Client sampling date / time: 04-May-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	32.3	3.0	mg/L	E160	-	10-May-2022	482148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	05-May-2022	10-May-2022	478749
nitrate (as N)	14797-55-8	0.110	0.0050	mg/L	E235.NO3-L	06-May-2022	06-May-2022	479144
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	06-May-2022	06-May-2022	479145
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0014	0.0010	mg/L	E378-U	05-May-2022	05-May-2022	478550
phosphorus, total	7723-14-0	0.0247	0.0020	mg/L	E372-U	11-May-2022	11-May-2022	480188
nitrate + nitrite (as N)	----	0.110	0.0051	mg/L	EC235.N+N	-	10-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	4	1	CFU/100mL	E012.FC	-	05-May-2022	479691
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	05-May-2022	-
coliforms, Escherichia coli [E. coli]	----	4	1	MPN/100mL	E010	-	05-May-2022	479654

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2205286</b>	Page	: 1 of 10
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 4-2022 SPRING EMS PROGRAM WWTP	Date Samples Received	: 05-May-2022 14:40
PO	: ----	Issue Date	: 20-May-2022 15:44
C-O-C number	: ----		
Sampler	: TJ		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

#### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Biochemical Oxygen Demand - 5 day</b>										
<b>HDPE [BOD HT 3d]</b> WWTP EFFLUENT-UV TROUGH	E550	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER DOWN STREAM	E298	04-May-2022	05-May-2022	----	----		05-May-2022	28 days	1 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER SIDE CHANNEL	E298	04-May-2022	05-May-2022	----	----		05-May-2022	28 days	1 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> COLUMBIA RIVER UPSTREAM	E298	04-May-2022	05-May-2022	----	----		05-May-2022	28 days	1 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WWTP EFFLUENT-UV TROUGH	E298	04-May-2022	05-May-2022	----	----		05-May-2022	28 days	1 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
<b>HDPE</b> COLUMBIA RIVER DOWN STREAM	E378-U	04-May-2022	----	----	----		05-May-2022	3 days	1 days	✔
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)</b>										
<b>HDPE</b> COLUMBIA RIVER SIDE CHANNEL	E378-U	04-May-2022	----	----	----		05-May-2022	3 days	1 days	✔



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER UPSTREAM	E378-U	04-May-2022	----	----	----		05-May-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE WWTP EFFLUENT-UV TROUGH	E378-U	04-May-2022	----	----	----		05-May-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWN STREAM	E235.NO3-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO3-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO3-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO3-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER DOWN STREAM	E235.NO2-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER SIDE CHANNEL	E235.NO2-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UPSTREAM	E235.NO2-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓



Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT-UV TROUGH	E235.NO2-L	04-May-2022	----	----	----		06-May-2022	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER DOWN STREAM	E372-U	04-May-2022	11-May-2022	----	----		11-May-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER SIDE CHANNEL	E372-U	04-May-2022	11-May-2022	----	----		11-May-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UPSTREAM	E372-U	04-May-2022	11-May-2022	----	----		11-May-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT-UV TROUGH	E372-U	04-May-2022	11-May-2022	----	----		11-May-2022	28 days	7 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWN STREAM	ENTERO.MF	04-May-2022	----	----	----		05-May-2022	24 hrs	30 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	ENTERO.MF	04-May-2022	----	----	----		05-May-2022	24 hrs	30 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	ENTERO.MF	04-May-2022	----	----	----		05-May-2022	24 hrs	30 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	ENTERO.MF	04-May-2022	----	----	----		05-May-2022	24 hrs	31 hrs	✖ EHTR





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWN STREAM	E012.FC	04-May-2022	----	----	----		05-May-2022	30 hrs	22 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E012.FC	04-May-2022	----	----	----		05-May-2022	30 hrs	22 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E012.FC	04-May-2022	----	----	----		05-May-2022	30 hrs	23 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E012.FC	04-May-2022	----	----	----		05-May-2022	30 hrs	23 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER DOWN STREAM	E010	04-May-2022	----	----	----		05-May-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER SIDE CHANNEL	E010	04-May-2022	----	----	----		05-May-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UPSTREAM	E010	04-May-2022	----	----	----		05-May-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT-UV TROUGH	E010	04-May-2022	----	----	----		05-May-2022	30 hrs	30 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER DOWN STREAM	E160	04-May-2022	----	----	----		10-May-2022	7 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER SIDE CHANNEL	E160	04-May-2022	----	----	----		10-May-2022	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UPSTREAM	E160	04-May-2022	----	----	----		10-May-2022	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT-UV TROUGH	E160	04-May-2022	----	----	----		10-May-2022	7 days	6 days	✔

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	478749	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	479809	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	478550	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	479144	2	40	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	479145	2	39	5.1	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	479691	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	479654	2	19	10.5	10.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	480188	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	482148	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	478749	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	479809	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	478550	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	479144	2	40	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	479145	2	39	5.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	480188	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	482148	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	478749	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	479809	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	478550	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	479144	2	40	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	479145	2	39	5.1	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	479691	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	479654	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	480188	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	482148	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	478749	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	478550	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	479144	2	40	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	479145	2	39	5.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	480188	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

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<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2205286**  
**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 4-2022 SPRING EMS PROGRAM WWTP  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Page** : 1 of 6  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 05-May-2022 14:40  
**Date Analysis Commenced** : 05-May-2022  
**Issue Date** : 20-May-2022 15:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	Nautilus Environmental (Calgary) External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta

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Work Order : CG2205286  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 4-2022 SPRING EMS PROGRAM WWTP

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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 482148)</b>											
CG2205249-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	21.5	24.1	2.6	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 478550)</b>											
CG2205283-005	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0024	0.0022	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 478749)</b>											
CG2205275-009	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 479027)</b>											
CG2205197-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	2.32	2.30	1.01%	20%	----
<b>Anions and Nutrients (QC Lot: 479028)</b>											
CG2205197-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0497	0.0514	3.36%	20%	----
<b>Anions and Nutrients (QC Lot: 479144)</b>											
CG2205275-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.09	1.09	0.0731%	20%	----
<b>Anions and Nutrients (QC Lot: 479145)</b>											
CG2205275-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 480188)</b>											
CG2205271-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 479654)</b>											
CG2205262-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2205279-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 479691)</b>											
CG2205283-002	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 479809)</b>											
CG2205278-003	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 482148)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 478550)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 478749)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	MBRR
<b>Anions and Nutrients (QCLot: 479027)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 479028)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 479144)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 479145)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 480188)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Microbiological Tests (QCLot: 479654)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 479691)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 479809)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

## Qualifiers

Qualifier Description

MBRR Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown).  
 High level results (>5x initial MB level) and non-detect results were reported and are defensible



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 482148)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	95.7	85.0	115	----
<b>Anions and Nutrients (QCLot: 478550)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	114	80.0	120	----
<b>Anions and Nutrients (QCLot: 478749)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
<b>Anions and Nutrients (QCLot: 479027)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 479028)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 479144)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 479145)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 480188)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	106	80.0	120	----
<b>Aggregate Organics (QCLot: 479809)</b>									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	92.6	85.0	115	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
<b>Anions and Nutrients (QCLot: 478550)</b>									
CG2205286-001	WWTP EFFLUENT-UV TROUGH	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.05 mg/L	ND	70.0	130
<b>Anions and Nutrients (QCLot: 478749)</b>									
CG2205282-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.109 mg/L	0.1 mg/L	109	75.0	125
<b>Anions and Nutrients (QCLot: 479027)</b>									
CG2205207-005	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125
<b>Anions and Nutrients (QCLot: 479028)</b>									
CG2205207-005	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.527 mg/L	0.5 mg/L	105	75.0	125
<b>Anions and Nutrients (QCLot: 479144)</b>									
CG2205275-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	2.5 mg/L	ND	75.0	125
<b>Anions and Nutrients (QCLot: 479145)</b>									
CG2205275-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.493 mg/L	0.5 mg/L	98.7	75.0	125
<b>Anions and Nutrients (QCLot: 480188)</b>									
CG2205271-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0513 mg/L	0.0676 mg/L	75.9	70.0	130

knowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.



provided on a separate Excel tab.

# NAUTILUS

time tab for common names

DATE VERIFICATION by, epon

Date: \_\_\_\_\_ Time: \_\_\_\_\_

# ENVIRONMENTAL

## timetab for common analysis

THE VERIFICATION ON

Date: \_\_\_\_\_

time:

Observations:

Yes/No?

**It Yes add SIF**

GENE 20.00 Front

## Enterococcus Test Results

Sample collected May 4, 2022

# Final Report

May 19, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2205286-001 / 2122-2113-01	4-May-22 at 0900h	5-May-22 at 1605h	5-May-22 at 1625h	8.1°C
CG2205286-002 / 2122-2113-02	4-May-22 at 0930h	5-May-22 at 1605h	5-May-22 at 1625h	9.9°C
CG2205286-003 / 2122-2113-03	4-May-22 at 0945h	5-May-22 at 1605h	5-May-22 at 1625h	11.3°C
CG2205286-004 / 2122-2113-04	4-May-22 at 1000h	5-May-22 at 1605h	5-May-22 at 1625h	13.2°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL
	<i>Enterococcus</i>
CG2205286-001	<1
CG2205286-002	1.0
CG2205286-003	<1
CG2205286-004	<1

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

Samples were received and testing initiated outside of the required 24 hour hold time.



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Report By:  
Mia Fearey, BIT  
Biologist



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Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

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## Quanti-Tray Bench Sheet - *Enterococcus*

Client ALS 106 Reference 2122-2113

### Test Initiation

Date: 20221010  
Time: 1025  
Technician: AMINA

### Sample Information

Dilution Factor:       

Reagent used: Enterolert™  
Reagent Lot#/Expiry: 5T9360/03/11/2022

Comments:       

Thermometer Serial #: 200026000  
Incubator #: 7  
Incubator Temperature: 41 (must be  $41 \pm 0.5^{\circ}\text{C}$ )

Quanti Tray 2000 Lot#/Expiry: 5HT0105/08/17/2024  
45m

### Results - 24 Hour Incubation

Date: 2022105106 Time: 1025 Technician: AMINA

Incubator Temp: <u>41</u> (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)									
	CTL	2113-01	2113-02	2113-03	2113-04					
# Positive Large Wells:	0	0	1	0	0					
# Ambiguous Large Wells:	0	0	0	0	0					
# Positive Small Wells (Tray 2000 only):	0	0	0	0	0					
# Ambiguous Small Wells (Tray 2000 only):	0	0	0	0	0					
Most Probable Number at 24 hours:	1	1	1.0	1	1					

### Results - 28 Hour Incubation

Date:        Time:        Technician:       

Incubator Temp: <u>      </u> (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours

At 28 hours only score marked ambiguous from 24 hours

Reviewed By: LO Date Reviewed: 2022105109



## **APPENDIX B – Chain-of-custody form**

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Chain of Custody  
Calgary - Environmental  
2558 29th Street NE Calgary AB  
Canada T1Y 7B5

53061



Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2205286</b>
Original Receipt Date/Time:	Instructions Received 05/05/2022 14:40

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com) Invoice: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com) Electronic Data: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com)  
Attention: Patryk Wojciak

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2205286-001 -01	WWTP EFFLUENT-UV TROUGH	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	12-05-2022	04/05/2022 09:00	8.1°C
CG2205286-002 -02	COLUMBIA RIVER SIDE CHANNEL	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	12-05-2022	04/05/2022 09:30	9.9°C
CG2205286-003 -03	COLUMBIA RIVER UPSTREAM	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	12-05-2022	04/05/2022 09:45	11.3°C
CG2205286-004 -04	COLUMBIA RIVER DOWN STREAM	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	12-05-2022	04/05/2022 10:00	13.2°C

2122-2113  
2022/05/05  
405 1605  
Drop off  
AE  
4x 400 mL  
good cond  
no S/no 1

**END OF REPORT**

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## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2205624</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 5 - 2022 SPRING EMS PROGRAM - WW	Date Samples Received	: 11-May-2022 15:30
PO	: ----	Date Analysis	: 11-May-2022
C-O-C number	: ----	Commenced	
Sampler	: ----	Issue Date	: 01-Jun-2022 12:39
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Microbiology, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Shirley Li		Inorganics, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Bacteria went past hold time prior to receipt at ALS

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



## Analytical Results

CG2205624-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: WWTP Effluent - UV trough

Client sampling date / time: 10-May-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160	-	16-May-2022	488148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0222	0.0050	mg/L	E298	19-May-2022	19-May-2022	494005
nitrate (as N)	14797-55-8	8.87	0.0050	mg/L	E235.NO3-L	12-May-2022	12-May-2022	484993
nitrite (as N)	14797-65-0	0.0093	0.0010	mg/L	E235.NO2-L	12-May-2022	12-May-2022	484998
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0856	0.0010	mg/L	E378-U	11-May-2022	11-May-2022	484786
phosphorus, total	7723-14-0	0.167 <sup>DLHC</sup>	0.0040	mg/L	E372-U	21-May-2022	21-May-2022	488672
nitrate + nitrite (as N)	----	8.88	0.0051	mg/L	EC235.N+N	-	13-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1 <sup>DLM</sup>	2	CFU/100mL	E012.FC	-	11-May-2022	486802
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	12-May-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	11-May-2022	486641
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	12-May-2022	486120

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2205624-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Columbia River Side Channel

Client sampling date / time: 10-May-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	20.7	3.0	mg/L	E160	-	16-May-2022	488148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0266	0.0050	mg/L	E298	19-May-2022	19-May-2022	494005
nitrate (as N)	14797-55-8	0.202	0.0050	mg/L	E235.NO3-L	12-May-2022	12-May-2022	484993
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	12-May-2022	12-May-2022	484998
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	11-May-2022	11-May-2022	484786
phosphorus, total	7723-14-0	0.0148	0.0020	mg/L	E372-U	21-May-2022	21-May-2022	488672
nitrate + nitrite (as N)	----	0.202	0.0051	mg/L	EC235.N+N	-	13-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1 <sup>DLM</sup>	2	CFU/100mL	E012.FC	-	11-May-2022	486802
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	12-May-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	11-May-2022	486641

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

CG2205624-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Columbia River Upstream

Client sampling date / time: 10-May-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC/Lot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	18.5	3.0	mg/L	E160	-	16-May-2022	488148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	19-May-2022	19-May-2022	494005
nitrate (as N)	14797-55-8	0.213	0.0050	mg/L	E235.NO3-L	12-May-2022	12-May-2022	484993
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	12-May-2022	12-May-2022	484998
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	11-May-2022	11-May-2022	484786
phosphorus, total	7723-14-0	0.0092	0.0020	mg/L	E372-U	21-May-2022	21-May-2022	488672
nitrate + nitrite (as N)	----	0.213	0.0051	mg/L	EC235.N+N	-	13-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	2 <sup>DLM</sup>	2	CFU/100mL	E012.FC	-	11-May-2022	486802
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	12-May-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	11-May-2022	486642

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2205624-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Columbia River Downstream

Client sampling date / time: 10-May-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC/Lot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	23.7	3.0	mg/L	E160	-	16-May-2022	488148
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0202	0.0050	mg/L	E298	19-May-2022	19-May-2022	494005
nitrate (as N)	14797-55-8	0.214	0.0050	mg/L	E235.NO3-L	12-May-2022	12-May-2022	484993
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	12-May-2022	12-May-2022	484998
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	11-May-2022	11-May-2022	484786
phosphorus, total	7723-14-0	0.0118	0.0020	mg/L	E372-U	21-May-2022	21-May-2022	488672
nitrate + nitrite (as N)	----	0.214	0.0051	mg/L	EC235.N+N	-	13-May-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	<1 <sup>DLM</sup>	2	CFU/100mL	E012.FC	-	11-May-2022	486802
Enterococcus	----	2.0	1	MPN/100mL	ENTERO.MF	-	12-May-2022	-
coliforms, Escherichia coli [E. coli]	----	3	1	MPN/100mL	E010	-	11-May-2022	486642

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2205624</b>	Page	: 1 of 10
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 5 - 2022 SPRING EMS PROGRAM - WW	Date Samples Received	: 11-May-2022 15:30
PO	: ----	Issue Date	: 01-Jun-2022 12:39
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

#### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent - UV trough	E550	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Columbia River Downstream	E298	10-May-2022	19-May-2022	----	----		19-May-2022	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Columbia River Side Channel	E298	10-May-2022	19-May-2022	----	----		19-May-2022	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Columbia River Upstream	E298	10-May-2022	19-May-2022	----	----		19-May-2022	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent - UV trough	E298	10-May-2022	19-May-2022	----	----		19-May-2022	28 days	9 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE Columbia River Downstream	E378-U	10-May-2022	----	----	----		11-May-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE Columbia River Side Channel	E378-U	10-May-2022	----	----	----		11-May-2022	3 days	1 days	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE Columbia River Upstream	E378-U	10-May-2022	----	----	----		11-May-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE WWTP Effluent - UV trough	E378-U	10-May-2022	----	----	----		11-May-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Columbia River Downstream	E235.NO3-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Columbia River Side Channel	E235.NO3-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Columbia River Upstream	E235.NO3-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent - UV trough	E235.NO3-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Columbia River Downstream	E235.NO2-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Columbia River Side Channel	E235.NO2-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Columbia River Upstream	E235.NO2-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓



Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent - UV trough	E235.NO2-L	10-May-2022	----	----	----		12-May-2022	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Columbia River Downstream	E372-U	10-May-2022	21-May-2022	----	----		21-May-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Columbia River Side Channel	E372-U	10-May-2022	21-May-2022	----	----		21-May-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Columbia River Upstream	E372-U	10-May-2022	21-May-2022	----	----		21-May-2022	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent - UV trough	E372-U	10-May-2022	21-May-2022	----	----		21-May-2022	28 days	11 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) Columbia River Downstream	ENTERO.MF	10-May-2022	----	----	----		12-May-2022	24 hrs	53 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) Columbia River Side Channel	ENTERO.MF	10-May-2022	----	----	----		12-May-2022	24 hrs	53 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) Columbia River Upstream	ENTERO.MF	10-May-2022	----	----	----		12-May-2022	24 hrs	53 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent - UV trough	ENTERO.MF	10-May-2022	----	----	----		12-May-2022	24 hrs	54 hrs	✖ EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Columbia River Downstream	E012.FC	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Columbia River Side Channel	E012.FC	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Columbia River Upstream	E012.FC	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent - UV trough	E012.FC	10-May-2022	----	----	----		11-May-2022	30 hrs	32 hrs	* EHTL
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Columbia River Downstream	E010	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Columbia River Side Channel	E010	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Columbia River Upstream	E010	10-May-2022	----	----	----		11-May-2022	30 hrs	31 hrs	* EHTL
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent - UV trough	E010	10-May-2022	----	----	----		11-May-2022	30 hrs	32 hrs	* EHTL
Physical Tests : TSS by Gravimetry										
HDPE Columbia River Downstream	E160	10-May-2022	----	----	----		16-May-2022	7 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Columbia River Side Channel	E160	10-May-2022	----	----	----		16-May-2022	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE Columbia River Upstream	E160	10-May-2022	----	----	----		16-May-2022	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent - UV trough	E160	10-May-2022	----	----	----		16-May-2022	7 days	6 days	✔

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	494005	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	486120	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	484786	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	484993	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	484998	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	486802	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	486642	4	34	11.7	10.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	488672	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	488148	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	494005	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	486120	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	484786	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	484993	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	484998	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	488672	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	488148	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	494005	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	486120	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	484786	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	484993	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	484998	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	486802	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	486642	2	34	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	488672	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	488148	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	494005	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	484786	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	484993	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	484998	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	488672	1	4	25.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Page : 10 of 10  
 Work Order : CG2205624  
 Client : Kicking Horse Mountain Resort LP  
 Project : WEEK 5 - 2022 SPRING EMS PROGRAM - WW



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2205624**  
**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 5 - 2022 SPRING EMS PROGRAM - WW  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Page** : 1 of 6  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 11-May-2022 15:30  
**Date Analysis Commenced** : 11-May-2022  
**Issue Date** : 01-Jun-2022 12:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Microbiology, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	Nautilus Environmental (Calgary) External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Shirley Li		Calgary Inorganics, Calgary, Alberta



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 488148)</b>											
CG2205555-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 484786)</b>											
CG2205624-001	WWTP Effluent - UV trough	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0856	0.0867	1.30%	20%	----
<b>Anions and Nutrients (QC Lot: 484993)</b>											
CG2205608-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.198	0.198	0.0504%	20%	----
<b>Anions and Nutrients (QC Lot: 484998)</b>											
CG2205608-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 488672)</b>											
CG2205624-001	WWTP Effluent - UV trough	phosphorus, total	7723-14-0	E372-U	0.0040	mg/L	0.167	0.168	0.382%	20%	----
<b>Anions and Nutrients (QC Lot: 494005)</b>											
CG2205624-001	WWTP Effluent - UV trough	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0222	0.0209	0.0013	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 486641)</b>											
CG2205617-003	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2205620-007	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 486642)</b>											
EO2203210-005	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
FJ2201131-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 486802)</b>											
FJ2201126-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1000	CFU/100mL	70000	71000	1.42%	65%	----
<b>Aggregate Organics (QC Lot: 486120)</b>											
CG2205608-002	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 488148)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 484786)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 484993)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 484998)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 488672)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 494005)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Microbiological Tests (QCLot: 486641)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 486642)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 486802)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 486120)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 488148)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.8	85.0	115	----
Anions and Nutrients (QCLot: 484786)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	96.6	80.0	120	----
Anions and Nutrients (QCLot: 484993)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 484998)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 488672)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 494005)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	106	85.0	115	----
Aggregate Organics (QCLot: 486120)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.2	85.0	115	----



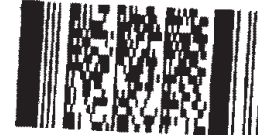
## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
<b>Anions and Nutrients (QCLot: 484786)</b>									
CG2205624-002	Columbia River Side Channel	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0462 mg/L	0.05 mg/L	92.3	70.0	130
<b>Anions and Nutrients (QCLot: 484993)</b>									
CG2205608-005	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.72 mg/L	2.5 mg/L	109	75.0	125
<b>Anions and Nutrients (QCLot: 484998)</b>									
CG2205608-005	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.544 mg/L	0.5 mg/L	109	75.0	125
<b>Anions and Nutrients (QCLot: 488672)</b>									
CG2205624-002	Columbia River Side Channel	phosphorus, total	7723-14-0	E372-U	0.0535 mg/L	0.0676 mg/L	79.2	70.0	130
<b>Anions and Nutrients (QCLot: 494005)</b>									
CG2205624-002	Columbia River Side Channel	ammonia, total (as N)	7664-41-7	E298	0.109 mg/L	0.1 mg/L	109	75.0	125





Telephone : +1 403 407 1800

Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.



**NAUTILUS**  
ENVIRONMENTAL

and sample container preservation / holding time table for common analyses.

(lab use only) SHIPMENT VERIFICATION (lab use only)

Time:	Temperature:	Verified by:	Date:	Time:
4:10	12 °C			

GENE

## Enterococcus Test Results

Sample collected May 10, 2022

Final Report

June 1, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2205624-001 / 2122-2197-01	10-May-22 at 0900h	12-May-22 at 1400h	12-May-22 at 1500h	7.4°C
CG2205624-002 / 2122-2197-02	10-May-22 at 0900h	12-May-22 at 1400h	12-May-22 at 1500h	6.3°C
CG2205624-003 / 2122-2197-03	10-May-22 at 0900h	12-May-22 at 1400h	12-May-22 at 1500h	7.8°C
CG2205624-004 / 2122-2197-04	10-May-22 at 0900h	12-May-22 at 1400h	12-May-22 at 1500h	8.1°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL <i>Enterococcus</i>
CG2205624-001	<1
CG2205624-002	1.0
CG2205624-003	<1
CG2205624-003	2.0

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
nance	Valid

re received and testing initiated outside of the required 24-hour hold time.



## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2209950</b>	Page	: 1 of 2
Client	Reference: 2122-2197-01 Kicking Horse Mountain Resort Ltd.	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800



---

Report By:  
Mia Fearey, BIT  
Biologist



---

Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

---

## Quanti-Tray Bench Sheet - *Enterococcus*

### Test Initiation

Date: 2022/05/12  
Time: 1500  
Technician: JCC

Thermometer Serial #: 200626099  
Incubator #: 7  
Incubator Temperature: 41 (must be  $41 \pm 0.5^{\circ}\text{C}$ )

Client ALS106

Reference 2122-2177-01

Reagent used: Enterolert™  
Reagent Lot#/Expiry: HT0143 / 09/12/2024

### Sample Information

Dilution Factor: —

### Comments:

Quanti Tray 2000 Lot#/Expiry: CT0281 / 03/10/2024

### Results - 24 Hour Incubation

Date: 2022/05/13 Time: 1500 Technician: maf

Incubator Temp: <u>41</u> (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)									
	CTL	<u>2122-01</u>	<u>2122-02</u>	<u>2122-03</u>	<u>2122-04</u>					
# Positive Large Wells:	0	0	1	0	2					
# Ambiguous Large Wells:	↓	↓	↓	↓	↓					
# Positive Small Wells (Tray 2000 only):	↓	↓	↓	↓	↓					
# Ambiguous Small Wells (Tray 2000 only):	↓	↓	↓	↓	↓					
Most Probable Number at 24 hours:	<1	<1	1.0	<1	2.0					

### Results - 28 Hour Incubation

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be $41 \pm 0.5^{\circ}\text{C}$ )	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguos from 24 hours

Reviewed By: KIM

Date Reviewed: 2022/05/13

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

53944



Destination Lab: **Nautilus Environmental (Calgary)**

Address: 10828 27 Street SE Calgary AB Canada  
T2Z 3V9

Work Order Number: **CG2205624**

Original Receipt Date/Time: 11/05/2022 15:30  
Instructions Received

Post Hold time  
Please proceed

Relinquished By

Date/Time

Received By

Date/Time

Receipt Temp

Return as Indicated: Results: ALSCGClientServices@alsglobal.com Invoice: ALSCGClientServices@alsglobal.com Electronic Data: ALSCGClientServices@alsglobal.com  
Attention: Patryk Wojciak

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2205624-001 -01	WWTP Effluent - UV trough	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	18-05-2022	10/05/2022 09:00	7.4°C
CG2205624-002 -02	Columbia River Side Channel	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	18-05-2022	10/05/2022 09:00	6.3°C
CG2205624-003 -03	Columbia River Upstream	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	18-05-2022	10/05/2022 09:00	7.8°C
CG2205624-004 -04	Columbia River Downstream	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF	Enterococcus by (MF - mE)	18-05-2022	10/05/2022 09:00	9.1°C

2122-2197  
2022/05/12  
14:00  
Jazoo Cab  
JC  
4x 400mL bottles  
NaS/NaT  
Good Cond.

**END OF REPORT**

---







## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2208099**  
**Client** : **Kicking Horse Mountain Resort LP**  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 2  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 24-Jun-2022 12:45  
**Date Analysis** : 24-Jun-2022  
**Commenced** :  
**Issue Date** : 02-Jul-2022 12:26

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

## Analytical Results

CG2208099-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: UV TROUGH

Client sampling date / time: 23-Jun-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
<b>solids, total suspended [TSS]</b>	----	<3.0	3.0	mg/L	E160	-	30-Jun-2022	543414
<b>Anions and Nutrients</b>								
<b>ammonia, total (as N)</b>	7664-41-7	0.0630	0.0050	mg/L	E298	27-Jun-2022	27-Jun-2022	540215
<b>phosphate, ortho-, dissolved (as P)</b>	14265-44-2	0.255 <sup>DLHC</sup>	0.0050	mg/L	E378-U	25-Jun-2022	25-Jun-2022	538551
<b>phosphorus, total</b>	7723-14-0	0.391 <sup>DLHC</sup>	0.0100	mg/L	E372-U	29-Jun-2022	29-Jun-2022	540591
<b>Microbiological Tests</b>								
<b>coliforms, thermotolerant [fecal]</b>	----	<1	1	CFU/100mL	E012.FC	-	24-Jun-2022	539799
<b>coliforms, Escherichia coli [E. coli]</b>	----	<1	1	MPN/100mL	E010	-	24-Jun-2022	539784
<b>Aggregate Organics</b>								
<b>biochemical oxygen demand [BOD]</b>	----	<2.0	2.0	mg/L	E550	-	25-Jun-2022	538779

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2208099</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: RCR - Kicking Horse Mountain Resort</b>	<b>Date Samples Received</b>	<b>: 24-Jun-2022 12:45</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 02-Jul-2022 12:26</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: TJ</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 1</b>		
<b>No. of samples analysed</b>	<b>: 1</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] UV TROUGH	E550	23-Jun-2022	----	----	----		25-Jun-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) UV TROUGH	E298	23-Jun-2022	27-Jun-2022	----	----		27-Jun-2022	28 days	4 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE UV TROUGH	E378-U	23-Jun-2022	----	----	----		25-Jun-2022	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) UV TROUGH	E372-U	23-Jun-2022	29-Jun-2022	----	----		29-Jun-2022	28 days	6 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E012.FC	23-Jun-2022	----	----	----		24-Jun-2022	30 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) UV TROUGH	E010	23-Jun-2022	----	----	----		24-Jun-2022	30 hrs	28 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE UV TROUGH	E160	23-Jun-2022	----	----	----		30-Jun-2022	7 days	7 days	✓



Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	540215	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	538779	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	538551	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	539799	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	539784	1	14	7.1	10.0	✗
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	540591	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	543414	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	540215	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	538779	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	538551	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	540591	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	543414	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	540215	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	538779	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	538551	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	539799	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	539784	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	540591	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	543414	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	540215	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	538551	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	540591	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2208099**  
**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 5  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 24-Jun-2022 12:45  
**Date Analysis Commenced** : 24-Jun-2022  
**Issue Date** : 02-Jul-2022 12:26

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta

Page : 2 of 5  
Work Order : CG2208099  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort



---

## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 543414)											
CG2208059-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	17.0	15.8	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 538551)											
CG2208091-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 540215)											
CG2208099-001	UV TROUGH	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0630	0.0623	1.12%	20%	----
Anions and Nutrients (QC Lot: 540591)											
CG2208091-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0360	0.0360	0.123%	20%	----
Microbiological Tests (QC Lot: 539784)											
CG2208058-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 539799)											
CG2208058-002	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 538779)											
CG2208022-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 543414)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 538551)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 540215)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 540591)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 539784)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Microbiological Tests (QCLot: 539799)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 538779)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 543414)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	92.0	85.0	115	----
Anions and Nutrients (QCLot: 538551)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	98.0	80.0	120	----
Anions and Nutrients (QCLot: 540215)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 540591)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	97.1	80.0	120	----
Aggregate Organics (QCLot: 538779)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	91.6	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 538551)										
CG2208098-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 540215)										
CG2208118-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 540591)										
CG2208098-001	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.0676 mg/L	ND	70.0	130	----

[illegible]

Environmental Division  
Calgary  
Work Order Reference  
**CG2208099**




Telephone : +1 403 407 1800

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
Travis Jobin	23-Jun-22	1030 a.m.				14 °C		24-Jun-22	12:45	Yes / No ? If Yes add SIF

GENF 20.00 Front





are received and testing initiated outside of the required 24-hour hold time.

## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2209950</b>	Page	: 1 of 2
Client	Reference: 2122-Kicking Horse Mountain Resort LP	Laboratory	: Calgary - Environmental 1
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: RCR - Kicking Horse Mountain Resort	Date Samples Received	: 28-Jul-2022 12:20
PO	: ----	Date Analysis	: 28-Jul-2022
		Commenced	
C-O-C number	: ----	Issue Date	: 04-Aug-2022 08:48
Sampler	: ----		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Analytical Results

CG2209950-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PLANT EFFLUENT

Client sampling date / time: 28-Jul-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160	-	29-Jul-2022	581060
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0933	0.0050	mg/L	E298	29-Jul-2022	29-Jul-2022	583013
phosphate, ortho-, dissolved (as P)	14265-44-2	0.154	0.0100	mg/L	E378-U	28-Jul-2022	28-Jul-2022	580992
phosphorus, total	7723-14-0	0.249	0.0200	mg/L	E372-U	29-Jul-2022	02-Aug-2022	582287
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	<1	1	CFU/100mL	E012.FC	-	28-Jul-2022	582886
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	28-Jul-2022	582857
Aggregate Organics								
biochemical oxygen demand [BOD]	----	2.8	2.0	mg/L	E550	-	29-Jul-2022	583023

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2209950</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: RCR - Kicking Horse Mountain Resort</b>	<b>Date Samples Received</b>	<b>: 28-Jul-2022 12:20</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 04-Aug-2022 08:48</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: ----</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 1</b>		
<b>No. of samples analysed</b>	<b>: 1</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] PLANT EFFLUENT	E550	28-Jul-2022	----	----	----		29-Jul-2022	48 hrs	32 hrs	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PLANT EFFLUENT	E298	28-Jul-2022	29-Jul-2022	----	----		29-Jul-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PLANT EFFLUENT	E378-U	28-Jul-2022	28-Jul-2022	----	----		28-Jul-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PLANT EFFLUENT	E372-U	28-Jul-2022	29-Jul-2022	----	----		02-Aug-2022	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT	E012.FC	28-Jul-2022	----	----	----		28-Jul-2022	30 hrs	13 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT	E010	28-Jul-2022	----	----	----		28-Jul-2022	30 hrs	13 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE PLANT EFFLUENT	E160	28-Jul-2022	----	----	----		29-Jul-2022	7 days	1 days	✓

Page : 4 of 6  
Work Order : CG2209950  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort

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#### Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
<b>Laboratory Duplicates (DUP)</b>							
Ammonia by Fluorescence	E298	583013	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	583023	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	580992	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	582886	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	582857	1	6	16.6	10.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	582287	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	581060	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Ammonia by Fluorescence	E298	583013	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	583023	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	580992	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	582287	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	581060	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Ammonia by Fluorescence	E298	583013	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	583023	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	580992	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	582886	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	582857	1	6	16.6	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	582287	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	581060	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	583013	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	580992	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	582287	1	20	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: CG2209950</b>	<b>Page</b>	<b>: 1 of 5</b>
<b>Client</b>	: Kicking Horse Mountain Resort LP	<b>Laboratory</b>	: Calgary - Environmental
<b>Contact</b>	: Travis Jobin	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	<b>Address</b>	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
<b>Telephone</b>	: 250 344 6003	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: RCR - Kicking Horse Mountain Resort	<b>Date Samples Received</b>	: 28-Jul-2022 12:20
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 28-Jul-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 04-Aug-2022 08:48
<b>Sampler</b>	: ----		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-RESC100-0001		
<b>No. of samples received</b>	: 1		
<b>No. of samples analysed</b>	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: CG2212891</b>	<b>Page</b>	<b>: 1 of 4</b>
<b>Client</b>	: Kicking Horse Mountain Resort LP	<b>Laboratory</b>	: Calgary - Environmental
<b>Contact</b>	: Travis Jobin	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 250 344 6003	<b>Telephone</b>	: +1 403 407 1800

RIGHT SOLUTIONS RIGHT PARTNER



Page : 2 of 5  
Work Order : CG2209950  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort

---



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---

Page : 3 of 5  
 Work Order : CG2209950  
 Client : Kicking Horse Mountain Resort LP  
 Project : RCR - Kicking Horse Mountain Resort



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 581060)</b>											
CG2209916-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	13.7	16.3	2.6	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 580992)</b>											
CG2209942-018	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 582287)</b>											
CG2209942-030	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0135	0.0124	0.0010	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 583013)</b>											
CG2209947-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 582857)</b>											
EO2205903-002	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 582886)</b>											
CG2209903-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	7	7	0.00%	65%	----
<b>Aggregate Organics (QC Lot: 583023)</b>											
CG2209942-008	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 581060)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 580992)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 582287)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 583013)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 582857)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Microbiological Tests (QCLot: 582886)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 583023)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 581060)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.4	85.0	115	----
Anions and Nutrients (QCLot: 580992)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 582287)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	91.3	80.0	120	----
Anions and Nutrients (QCLot: 583013)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.4	85.0	115	----
Aggregate Organics (QCLot: 583023)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	101	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 580992)										
CG2209942-019	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0486 mg/L	0.05 mg/L	97.2	70.0	130	----
Anions and Nutrients (QCLot: 582287)										
CG2209942-031	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0690 mg/L	0.0676 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 583013)										
CG2209950-001	PLANT EFFLUENT	ammonia, total (as N)	7664-41-7	E298	0.0970 mg/L	0.1 mg/L	97.0	75.0	125	----

<b>Report To</b>			<b>Report Format / Distribution</b>			<b>Service Requested</b> (Rush for routine analysis subject to availability)												
Company: Kicking Horse Mountain Water Utility Co. Ltd.			<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)												
Contact: Travis Jobin			<input type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Fax			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT												
Address: 1500 Kicking Horse Trail			Email 1: <a href="mailto:tjobin@kickinghorseresort.com">tjobin@kickinghorseresort.com</a>			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT												
Phone: 250-344-6003 Fax: _____			Email 2: <a href="mailto:pmaier@skircr.com">pmaier@skircr.com</a>			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT												
Invoice To Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Email 3: <a href="mailto:mskyring@kickinghorseresort.com">mskyring@kickinghorseresort.com</a>			<b>Analysis Request</b>												
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<b>Client / Project Information</b>			Please indicate below Filtered, Preserved or both (F, P, F/P)												
Company: Resorts of the Canadian Rockies			Job #: RCR - Kicking Horse Mountain Resort															
Contact: Patrick Majer			PO / AFE:															
Address: 1505 - 17th Ave SW Calgary AB			LSD:															
Phone: _____ Fax: _____			Quote #: Q33059															
Lab Work Order # (lab use only)			ALS Contact: PW		Sampler:													
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD	TSS	Fecal Coliform	Ortho Phosphate	Total P	N-NH4	E.Coli					Number of Containers		
	Plant Effluent - E256696	28 Jul-22		Water	X	X	X	X	X	X	X				4			
	Sample State: WW																	
	Sample Descriptor: MU																	
	Sample Class: REG																	
	Collection Mode: GRB																	
	Permit#: E256696																	

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2209950**



Telephone : +1 403 407 1800

**Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details**

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

<b>SHIPMENT RELEASE (client use)</b>			<b>SHIPMENT RECEPTION (lab use only)</b>			<b>SHIPMENT VERIFICATION (lab use only)</b>				
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date	Time	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Mark Skyring	28 Jul-22	0830am	<i>[Signature]</i>	28 Jul-22	1220	15 °C				



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2211314**  
**Client** : **Kicking Horse Mountain Resort LP**  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 24-Aug-2022 11:15  
**Date Analysis** : 24-Aug-2022  
**Commenced** :  
**Issue Date** : 29-Aug-2022 15:23

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Microbiology, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



## Analytical Results

CG2211314-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PLANT EFFLUENT - E256696

Client sampling date / time: 23-Aug-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160	-	24-Aug-2022	616727
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.142	0.0050	mg/L	E298	25-Aug-2022	25-Aug-2022	618602
phosphate, ortho-, dissolved (as P)	14265-44-2	0.175 <sup>DLHC</sup>	0.0020	mg/L	E378-U	24-Aug-2022	24-Aug-2022	616936
phosphorus, total	7723-14-0	0.226 <sup>DLHC</sup>	0.0100	mg/L	E372-U	28-Aug-2022	29-Aug-2022	622394
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	46 <sup>DLM</sup>	2	CFU/100mL	E012.FC	-	24-Aug-2022	620395
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	24-Aug-2022	620285
Aggregate Organics								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	24-Aug-2022	617439

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2211314-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PLANT INFLUENT

Client sampling date / time: 23-Aug-2022 10:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	230	3.0	mg/L	E160	-	24-Aug-2022	616727
Aggregate Organics								
biochemical oxygen demand [BOD]	----	353	75.0	mg/L	E550	-	24-Aug-2022	617439

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

<b>Work Order</b>	<b>: CG2211314</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Kicking Horse Mountain Resort LP</b>	<b>Laboratory</b>	<b>: Calgary - Environmental</b>
<b>Contact</b>	<b>: Travis Jobin</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0</b>	<b>Address</b>	<b>: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 250 344 6003</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: RCR - Kicking Horse Mountain Resort</b>	<b>Date Samples Received</b>	<b>: 24-Aug-2022 11:15</b>
<b>PO</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 29-Aug-2022 15:24</b>
<b>C-O-C number</b>	<b>: ----</b>		
<b>Sampler</b>	<b>: ----</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-RESC100-0001</b>		
<b>No. of samples received</b>	<b>: 2</b>		
<b>No. of samples analysed</b>	<b>: 2</b>		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] PLANT EFFLUENT - E256696	E550	23-Aug-2022	----	----	----		24-Aug-2022	48 hrs	24 hrs	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] PLANT INFLUENT	E550	23-Aug-2022	----	----	----		24-Aug-2022	48 hrs	24 hrs	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PLANT EFFLUENT - E256696	E298	23-Aug-2022	25-Aug-2022	----	----		25-Aug-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE PLANT EFFLUENT - E256696	E378-U	23-Aug-2022	24-Aug-2022	----	----		24-Aug-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PLANT EFFLUENT - E256696	E372-U	23-Aug-2022	28-Aug-2022	----	----		29-Aug-2022	28 days	6 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT - E256696	E012.FC	23-Aug-2022	----	----	----		24-Aug-2022	30 hrs	27 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT - E256696	E010	23-Aug-2022	----	----	----		24-Aug-2022	30 hrs	27 hrs	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE PLANT EFFLUENT - E256696	E160	23-Aug-2022	----	----	----		24-Aug-2022	7 days	1 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PLANT INFLUENT	E160	23-Aug-2022	----	----	----		24-Aug-2022	7 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	618602	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	617439	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	616936	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	620395	0	20	0.0	5.0	✗
Total Coliforms and E. coli (Enzyme Substrate)	E010	620285	2	20	10.0	10.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	622394	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	616727	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	618602	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	617439	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	616936	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	622394	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	616727	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	618602	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	617439	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	616936	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	620395	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	620285	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	622394	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	616727	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	618602	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	616936	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	622394	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^\circ\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^\circ\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2211314**  
**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
 Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : RCR - Kicking Horse Mountain Resort  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 5  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 24-Aug-2022 11:15  
**Date Analysis Commenced** : 24-Aug-2022  
**Issue Date** : 29-Aug-2022 15:26

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Microbiology, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta

Page : 2 of 5  
Work Order : CG2211314  
Client : Kicking Horse Mountain Resort LP  
Project : RCR - Kicking Horse Mountain Resort



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Page : 3 of 5  
 Work Order : CG2211314  
 Client : Kicking Horse Mountain Resort LP  
 Project : RCR - Kicking Horse Mountain Resort



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 616727)</b>											
FJ2202247-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	100	101	0.199%	20%	----
<b>Anions and Nutrients (QC Lot: 616936)</b>											
CG2211307-013	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0010	0.00002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 618602)</b>											
CG2211312-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	6.83	6.83	0.102%	20%	----
<b>Anions and Nutrients (QC Lot: 622394)</b>											
CG2211312-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.100	mg/L	2.99	2.96	1.01%	20%	----
<b>Microbiological Tests (QC Lot: 620285)</b>											
CG2211289-004	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2211313-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 617439)</b>											
CG2211258-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 616727)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 616936)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 618602)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 622394)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 620285)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Microbiological Tests (QCLot: 620395)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 617439)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 616727)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.3	85.0	115	----
Anions and Nutrients (QCLot: 616936)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	109	80.0	120	----
Anions and Nutrients (QCLot: 618602)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 622394)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.4	80.0	120	----
Aggregate Organics (QCLot: 617439)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	102	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 616936)										
CG2211307-014	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0480 mg/L	0.05 mg/L	96.1	70.0	130	----
Anions and Nutrients (QCLot: 618602)										
CG2211312-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 622394)										
CG2211312-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0423 mg/L	0.05 mg/L	84.5	70.0	130	----





## CERTIFICATE OF ANALYSIS

<b>Work Order</b> : <b>CG2212891</b> <b>Client</b> : <b>Kicking Horse Mountain Resort LP</b> <b>Contact</b> : <b>Travis Jobin</b> <b>Address</b> : <b>1500 Kicking Horse Trail PO BOX 330</b> <b>Golden BC Canada V0A 1H0</b> <b>Telephone</b> : <b>250 344 6003</b> <b>Project</b> : <b>WEEK 1-2022 SPRING EMS</b> <b>PROGRAM</b> <b>PO</b> : <b>----</b> <b>C-O-C number</b> : <b>----</b> <b>Sampler</b> : <b>TJ/JD</b> <b>Site</b> : <b>----</b> <b>Quote number</b> : <b>CG21-RESC100-0001</b> <b>No. of samples received</b> : <b>4</b> <b>No. of samples analysed</b> : <b>4</b>	<b>Page</b> : <b>1 of 4</b> <b>Laboratory</b> : <b>Calgary - Environmental</b> <b>Account Manager</b> : <b>Patryk Wojciak</b> <b>Address</b> : <b>2559 29th Street NE</b> <b>Calgary AB Canada T1Y 7B5</b> <b>Telephone</b> : <b>+1 403 407 1800</b> <b>Date Samples Received</b> : <b>21-Sep-2022 14:19</b> <b>Date Analysis</b> : <b>21-Sep-2022</b> <b>Commenced</b> <b>Issue Date</b> : <b>05-Oct-2022 10:45</b>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta
Tolulope Ogundipe	Analyst	External Subcontracting, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Enterococci Exceeded Recommended Holding Time prior to receipt at the lab.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).



## Analytical Results

CG2212891-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PLANT EFFLUENT-E256696

Client sampling date / time: 20-Sep-2022 09:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160	-	25-Sep-2022	663877
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0600	0.0050	mg/L	E298	22-Sep-2022	22-Sep-2022	660420
nitrate (as N)	14797-55-8	20.7	0.0050	mg/L	E235.NO3-L	21-Sep-2022	21-Sep-2022	658458
nitrite (as N)	14797-65-0	0.0264	0.0010	mg/L	E235.NO2-L	21-Sep-2022	21-Sep-2022	658459
phosphate, ortho-, dissolved (as P)	14265-44-2	0.200	0.0100	mg/L	E378-U	23-Sep-2022	23-Sep-2022	661538
phosphorus, total	7723-14-0	0.344 <sup>DLHC</sup>	0.0200	mg/L	E372-U	27-Sep-2022	27-Sep-2022	665678
nitrate + nitrite (as N)	----	20.7	0.0051	mg/L	EC235.N+N	-	22-Sep-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	6	1	CFU/100mL	E012.FC	-	21-Sep-2022	661922
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	22-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	21-Sep-2022	661823
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	22-Sep-2022	662054

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2212891-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899 -

Client sampling date / time: 20-Sep-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	23.0	3.0	mg/L	E160	-	25-Sep-2022	663877
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0072	0.0050	mg/L	E298	22-Sep-2022	22-Sep-2022	660420
nitrate (as N)	14797-55-8	0.105	0.0050	mg/L	E235.NO3-L	21-Sep-2022	21-Sep-2022	658458
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	21-Sep-2022	21-Sep-2022	658459
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0025	0.0010	mg/L	E378-U	23-Sep-2022	23-Sep-2022	661538
phosphorus, total	7723-14-0	0.0402	0.0020	mg/L	E372-U	27-Sep-2022	27-Sep-2022	665678
nitrate + nitrite (as N)	----	0.105	0.0051	mg/L	EC235.N+N	-	22-Sep-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	2	1	CFU/100mL	E012.FC	-	21-Sep-2022	661922
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	22-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	21-Sep-2022	661823

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

CG2212891-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UP IDZ - UPSTREAM E256694 -

Client sampling date / time: 20-Sep-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	12.4	3.0	mg/L	E160	-	25-Sep-2022	663877
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0061	0.0050	mg/L	E298	22-Sep-2022	22-Sep-2022	660420
nitrate (as N)	14797-55-8	0.0744	0.0050	mg/L	E235.NO3-L	21-Sep-2022	21-Sep-2022	658458
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	21-Sep-2022	21-Sep-2022	658459
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0024	0.0010	mg/L	E378-U	23-Sep-2022	23-Sep-2022	661538
phosphorus, total	7723-14-0	0.0164	0.0020	mg/L	E372-U	27-Sep-2022	27-Sep-2022	665678
nitrate + nitrite (as N)	----	0.0744	0.0051	mg/L	EC235.N+N	-	22-Sep-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	2	1	CFU/100mL	E012.FC	-	21-Sep-2022	661922
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	22-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	21-Sep-2022	661823

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2212891-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER 200M DN - EAST SHORE E258898 -

Client sampling date / time: 20-Sep-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	27.0	3.0	mg/L	E160	-	25-Sep-2022	663877
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.0061	0.0050	mg/L	E298	22-Sep-2022	22-Sep-2022	660420
nitrate (as N)	14797-55-8	0.0900	0.0050	mg/L	E235.NO3-L	21-Sep-2022	21-Sep-2022	658458
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	21-Sep-2022	21-Sep-2022	658459
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0020	0.0010	mg/L	E378-U	23-Sep-2022	23-Sep-2022	661538
phosphorus, total	7723-14-0	0.0297	0.0020	mg/L	E372-U	27-Sep-2022	27-Sep-2022	665678
nitrate + nitrite (as N)	----	0.0900	0.0051	mg/L	EC235.N+N	-	22-Sep-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	21-Sep-2022	661922
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	22-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	21-Sep-2022	661823

Please refer to the General Comments section for an explanation of any qualifiers detected.





## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2212891</b>	Page	: 1 of 10
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: WEEK 1-2022 SPRING EMS PROGRAM	Date Samples Received	: 21-Sep-2022 14:19
PO	: ----	Issue Date	: 05-Oct-2022 10:45
C-O-C number	: ----		
Sampler	: TJ/JD		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

#### **Outliers : Frequency of Quality Control Samples**

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] PLANT EFFLUENT-E256696	E550	20-Sep-2022	----	----	----		22-Sep-2022	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PLANT EFFLUENT-E256696	E298	20-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓



Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE PLANT EFFLUENT-E256696	E378-U	20-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E235.NO3-L	20-Sep-2022	21-Sep-2022	3 days	1 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E235.NO3-L	20-Sep-2022	21-Sep-2022	3 days	1 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E235.NO3-L	20-Sep-2022	21-Sep-2022	3 days	1 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PLANT EFFLUENT-E256696	E235.NO3-L	20-Sep-2022	21-Sep-2022	3 days	1 days	✓	21-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓



Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PLANT EFFLUENT-E256696	E235.NO2-L	20-Sep-2022	21-Sep-2022	----	----		21-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PLANT EFFLUENT-E256696	E372-U	20-Sep-2022	27-Sep-2022	----	----		27-Sep-2022	28 days	7 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	ENTERO.MF	20-Sep-2022	----	----	----		22-Sep-2022	24 hrs	47 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	ENTERO.MF	20-Sep-2022	----	----	----		22-Sep-2022	24 hrs	47 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	ENTERO.MF	20-Sep-2022	----	----	----		22-Sep-2022	24 hrs	48 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	ENTERO.MF	20-Sep-2022	----	----	----		22-Sep-2022	24 hrs	48 hrs	✖ EHTR



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E012.FC	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E012.FC	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E012.FC	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	E012.FC	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	30 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E010	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E010	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E010	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	29 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	E010	20-Sep-2022	----	----	----		21-Sep-2022	30 hrs	30 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PLANT EFFLUENT-E256696	E160	20-Sep-2022	----	----	----		25-Sep-2022	7 days	5 days	✓

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	660420	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	662054	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661538	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	658458	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	658459	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	661922	0	20	0.0	5.0	✗
Total Coliforms and E. coli (Enzyme Substrate)	E010	661823	2	19	10.5	10.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665678	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663877	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	660420	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	662054	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661538	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	658458	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	658459	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665678	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663877	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	660420	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	662054	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661538	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	658458	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	658459	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	661922	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	661823	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665678	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	663877	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	660420	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	661538	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	658458	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	658459	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	665678	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^{\circ}\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^{\circ}\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^{\circ}\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

**Work Order** : **CG2212891**  
**Client** : Kicking Horse Mountain Resort LP  
**Contact** : Travis Jobin  
**Address** : 1500 Kicking Horse Trail PO BOX 330  
Golden BC Canada V0A 1H0  
**Telephone** : 250 344 6003  
**Project** : WEEK 1-2022 SPRING EMS PROGRAM  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : TJ/JD  
**Site** : ----  
**Quote number** : CG21-RESC100-0001  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Page** : 1 of 6  
**Laboratory** : Calgary - Environmental  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary, Alberta Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 21-Sep-2022 14:19  
**Date Analysis Commenced** : 21-Sep-2022  
**Issue Date** : 05-Oct-2022 10:45

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta
Tolulope Ogundipe	Analyst	Nautilus Environmental (Calgary) External Subcontracting, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta

Page : 2 of 6  
Work Order : CG2212891  
Client : Kicking Horse Mountain Resort LP  
Project : WEEK 1-2022 SPRING EMS PROGRAM



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 663877)</b>											
CG2212863-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	15.0	12.6	2.4	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 658458)</b>											
CG2212867-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	2.27	2.24	1.48%	20%	----
<b>Anions and Nutrients (QC Lot: 658459)</b>											
CG2212867-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0207	0.0207	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 660420)</b>											
CG2212581-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 661538)</b>											
CG2212891-001	PLANT EFFLUENT-E256696	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.200	0.200	0.170%	20%	----
<b>Anions and Nutrients (QC Lot: 665678)</b>											
CG2212863-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0457	0.0467	2.14%	20%	----
<b>Microbiological Tests (QC Lot: 661823)</b>											
CG2212866-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2212893-003	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 662054)</b>											
CG2212862-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 663877)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 658458)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 658459)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 660420)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 661538)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 665678)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Microbiological Tests (QCLot: 661823)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 661922)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 662054)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 663877)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.3	85.0	115	----
Anions and Nutrients (QCLot: 658458)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 658459)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 660420)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 661538)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	87.3	80.0	120	----
Anions and Nutrients (QCLot: 665678)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	93.6	80.0	120	----
Aggregate Organics (QCLot: 662054)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	93.8	85.0	115	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 658458)</b>										
CG2212867-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.42 mg/L	2.5 mg/L	97.0	75.0	125	----
<b>Anions and Nutrients (QCLot: 658459)</b>										
CG2212867-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.504 mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 660420)</b>										
CG2212863-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.108 mg/L	0.1 mg/L	108	75.0	125	----
<b>Anions and Nutrients (QCLot: 661538)</b>										
CG2212891-002	COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0455 mg/L	0.05 mg/L	91.0	70.0	130	----
<b>Anions and Nutrients (QCLot: 665678)</b>										
CG2212863-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0482 mg/L	0.05 mg/L	96.3	70.0	130	----





# Enterococcus Test Results

Samples collected September 20, 2022

Final Report

October 4, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2212891-001 2223-0229-01	20-Sep-22 at 0900h	22-Sep-22 at 0840h	22-Sep-22 at 0930h	8.9°C
CG2212891-002 2223-0229-02	20-Sep-22 at 0930h	22-Sep-22 at 0840h	22-Sep-22 at 0930h	8.4°C
CG2212891-003 2223-0229-03	20-Sep-22 at 0945h	22-Sep-22 at 0840h	22-Sep-22 at 0930h	8.9°C
CG2212891-004 2223-0229-04	20-Sep-22 at 1000h	22-Sep-22 at 0840h	22-Sep-22 at 0930h	9.4°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

Sample ID	MPN/100 mL
	<i>Enterococcus</i>
CG2212891-001	1.0
CG2212891-002	<1
CG2212891-003	<1
CG2212891-004	<1

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

The samples were received and testing initiated outside of the required 24-hour hold time.



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Report By:  
Daisy Meyer, BSc  
Laboratory Biologist



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Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA

## **APPENDIX A – Test data**

---

# Quanti-Tray Bench Sheet - *Enterococcus*

Client ALS 106 Reference 2023-0228-44  
10

## Test Initiation

Date: 2022/09/22  
Time: 0930  
Technician: KO

## Sample Information

Reagent used: Enterolert™ Dilution Factor: —  
Reagent Lot#/Expiry: DUIG2/10 MAY 2023

## Comments:

Quanti Tray 2000 Lot#/Expiry: CL0223/03/04/2025

Thermometer Serial #: 211007752  
Incubator #: 7  
Incubator Temperature: 41 (must be 41 ± 0.5°C)

## Results - 24 Hour Incubation

Date: 22/09/23 Time: 0930 Technician: mf

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL <u>0224-01 0224-02 0224-03 0224-04</u> <del>0224-01 0224-02 0224-03 0224-04</del>									
# Positive Large Wells:	0	0	0	0	0					
# Ambiguous Large Wells:	↓	↓	↓	↓	↓					
# Positive Small Wells (Tray 2000 only):	↓	↓	↓	↓	↓					
# Ambiguous Small Wells (Tray 2000 only):	↓	↓	↓	↓	↓					
Most Probable Number at 24 hours:	<1	10	<1	<1	<1					

## Results - 28 Hour Incubation

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguos from 24 hours

Reviewed By: KTM Date Reviewed: 2022/09/28

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

77931



Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2212891</b>
Original Receipt Date/Time	Instructions Received
21/09/2022 14:19	

Past Hold Time  
Please Proceed

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: ALSCGClientServices@alsglobal.com Invoice: ALSCGClientServices@alsglobal.com Electronic Data: ALSCGClientServices@alsglobal.com  
Attention: Patryk Wojciak

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2212891-001	PLANT EFFLUENT-E25 6696	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF -01	Enterococcus by (MF - mE)	28-09-2022	20/09/2022 09:00	8.7°C
CG2212891-002	COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF -02	Enterococcus by (MF - mE)	28-09-2022	20/09/2022 09:30	8.4°C
CG2212891-003	COLUMBIA RIVER UP IDZ - UPSTREAM E256694	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF -03	Enterococcus by (MF - mE)	28-09-2022	20/09/2022 09:45	8.9°C
CG2212891-004	COLUMBIA RIVER 200M DN - EAST SHORE E258898	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO.MF -04	Enterococcus by (MF - mE)	28-09-2022	20/09/2022 10:00	9.4°C

2223-0229  
2022/09/22  
08:40  
Drop off  
JC/SRS  
4x 400mL bottles  
NoS/NoI  
Good Condition

**END OF REPORT**

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## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2213387</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: Week 2 -2022 Fall EMS program - WW	Date Samples Received	: 29-Sep-2022 12:20
PO	: ----	Date Analysis	: 29-Sep-2022
		Commenced	
C-O-C number	: ----	Issue Date	: 18-Oct-2022 15:37
Sampler	: TJ		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta
Vladka Stamenova	Analyst	Inorganics, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Enterococci Exceeded Recommended Holding Time prior to receipt at the lab.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).



## Analytical Results

CG2213387-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: PLANT EFFLUENT-E256696

Client sampling date / time: 28-Sep-2022 09:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	6.8	3.0	mg/L	E160	-	02-Oct-2022	674476
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	0.132	0.0050	mg/L	E298	29-Sep-2022	29-Sep-2022	672806
nitrate (as N)	14797-55-8	19.6	0.0050	mg/L	E235.NO3-L	29-Sep-2022	29-Sep-2022	673110
nitrite (as N)	14797-65-0	0.0507	0.0010	mg/L	E235.NO2-L	29-Sep-2022	29-Sep-2022	673109
phosphate, ortho-, dissolved (as P)	14265-44-2	0.155 <sup>DLHC</sup>	0.0020	mg/L	E378-U	29-Sep-2022	29-Sep-2022	673180
phosphorus, total	7723-14-0	0.261	0.0200	mg/L	E372-U	30-Sep-2022	03-Oct-2022	673972
nitrate + nitrite (as N)	----	19.6	0.0051	mg/L	EC235.N+N	-	04-Oct-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	29-Sep-2022	674816
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	29-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	<1	1	MPN/100mL	E010	-	29-Sep-2022	674784
<b>Aggregate Organics</b>								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	29-Sep-2022	674045

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2213387-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899 -

Client sampling date / time: 28-Sep-2022 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
solids, total suspended [TSS]	----	7.0	3.0	mg/L	E160	-	02-Oct-2022	674476
<b>Anions and Nutrients</b>								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	29-Sep-2022	29-Sep-2022	672806
nitrate (as N)	14797-55-8	0.114	0.0050	mg/L	E235.NO3-L	29-Sep-2022	29-Sep-2022	673110
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	29-Sep-2022	29-Sep-2022	673109
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	29-Sep-2022	29-Sep-2022	673180
phosphorus, total	7723-14-0	0.0135	0.0020	mg/L	E372-U	30-Sep-2022	03-Oct-2022	673972
nitrate + nitrite (as N)	----	0.114	0.0051	mg/L	EC235.N+N	-	04-Oct-2022	-
<b>Microbiological Tests</b>								
coliforms, thermotolerant [fecal]	----	6	1	CFU/100mL	E012.FC	-	29-Sep-2022	674816
Enterococcus	----	<1	1	MPN/100mL	ENTERO.MF	-	29-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	1	1	MPN/100mL	E010	-	29-Sep-2022	674784

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

CG2213387-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER UP IDZ - UPSTREAM E256694 -

Client sampling date / time: 28-Sep-2022 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	18.2	3.0	mg/L	E160	-	02-Oct-2022	674476
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	29-Sep-2022	29-Sep-2022	672806
nitrate (as N)	14797-55-8	0.0813	0.0050	mg/L	E235.NO3-L	29-Sep-2022	29-Sep-2022	673110
nitrite (as N)	14797-65-0	0.0010	0.0010	mg/L	E235.NO2-L	29-Sep-2022	29-Sep-2022	673109
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	29-Sep-2022	29-Sep-2022	673180
phosphorus, total	7723-14-0	0.0139	0.0020	mg/L	E372-U	30-Sep-2022	03-Oct-2022	673973
nitrate + nitrite (as N)	----	0.0823	0.0051	mg/L	EC235.N+N	-	04-Oct-2022	-
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	18	1	CFU/100mL	E012.FC	-	29-Sep-2022	674816
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	29-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	16	1	MPN/100mL	E010	-	29-Sep-2022	674784

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

CG2213387-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: COLUMBIA RIVER 200M DN - EAST SHORE E258898 -

Client sampling date / time: 28-Sep-2022 10:15

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
solids, total suspended [TSS]	----	19.4	3.0	mg/L	E160	-	02-Oct-2022	674476
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	29-Sep-2022	29-Sep-2022	672806
nitrate (as N)	14797-55-8	0.0951	0.0050	mg/L	E235.NO3-L	29-Sep-2022	29-Sep-2022	673110
nitrite (as N)	14797-65-0	<0.0010	0.0010	mg/L	E235.NO2-L	29-Sep-2022	29-Sep-2022	673109
phosphate, ortho-, dissolved (as P)	14265-44-2	<0.0010	0.0010	mg/L	E378-U	29-Sep-2022	29-Sep-2022	673180
phosphorus, total	7723-14-0	0.0152	0.0020	mg/L	E372-U	30-Sep-2022	03-Oct-2022	673973
nitrate + nitrite (as N)	----	0.0951	0.0051	mg/L	EC235.N+N	-	04-Oct-2022	-
Microbiological Tests								
coliforms, thermotolerant [fecal]	----	16	1	CFU/100mL	E012.FC	-	29-Sep-2022	674816
Enterococcus	----	1.0	1	MPN/100mL	ENTERO.MF	-	29-Sep-2022	-
coliforms, Escherichia coli [E. coli]	----	4	1	MPN/100mL	E010	-	29-Sep-2022	674784

Please refer to the General Comments section for an explanation of any qualifiers detected.

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## QUALITY CONTROL INTERPRETIVE REPORT

---

Work Order	: <b>CG2213387</b>	Page	: 1 of 10
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: Week 2 -2022 Fall EMS program - WW	Date Samples Received	: 29-Sep-2022 12:20
PO	: ----	Issue Date	: 18-Oct-2022 15:39
C-O-C number	: ----		
Sampler	: TJ		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

---

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] PLANT EFFLUENT-E256696	E550	28-Sep-2022	----	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E298	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E298	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E298	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) PLANT EFFLUENT-E256696	E298	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E378-U	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓





Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E378-U	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E378-U	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE PLANT EFFLUENT-E256696	E378-U	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E235.NO3-L	28-Sep-2022	29-Sep-2022	3 days	1 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E235.NO3-L	28-Sep-2022	29-Sep-2022	3 days	1 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E235.NO3-L	28-Sep-2022	29-Sep-2022	3 days	1 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE PLANT EFFLUENT-E256696	E235.NO3-L	28-Sep-2022	29-Sep-2022	3 days	1 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E235.NO2-L	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E235.NO2-L	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E235.NO2-L	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE PLANT EFFLUENT-E256696	E235.NO2-L	28-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E372-U	28-Sep-2022	30-Sep-2022	----	----		03-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E372-U	28-Sep-2022	30-Sep-2022	----	----		03-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E372-U	28-Sep-2022	30-Sep-2022	----	----		03-Oct-2022	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) PLANT EFFLUENT-E256696	E372-U	28-Sep-2022	30-Sep-2022	----	----		03-Oct-2022	28 days	5 days	✓
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	ENTERO.MF	28-Sep-2022	----	----	----		29-Sep-2022	24 hrs	28 hrs	✖ EHTR
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	ENTERO.MF	28-Sep-2022	----	----	----		29-Sep-2022	24 hrs	28 hrs	✖ EHTR



Matrix: **Water**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	ENTERO.MF	28-Sep-2022	----	----	----		29-Sep-2022	24 hrs	29 hrs	<div>✖ EHTR</div>
Microbiological Tests : Enterococcus by (MF - mE)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	ENTERO.MF	28-Sep-2022	----	----	----		29-Sep-2022	24 hrs	29 hrs	<div>✖ EHTR</div>
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E012.FC	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	27 hrs	<div>✔</div>
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E012.FC	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	27 hrs	<div>✔</div>
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E012.FC	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	28 hrs	<div>✔</div>
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	E012.FC	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	28 hrs	<div>✔</div>
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 200M DN - EAST SHORE E258898	E010	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	27 hrs	<div>✔</div>
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E010	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	27 hrs	<div>✔</div>
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E010	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	28 hrs	<div>✔</div>



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) PLANT EFFLUENT-E256696	E010	28-Sep-2022	----	----	----		29-Sep-2022	30 hrs	28 hrs	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	E160	28-Sep-2022	----	----	----		02-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER 200M DN - EAST SHORE E258898	E160	28-Sep-2022	----	----	----		02-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE COLUMBIA RIVER UP IDZ - UPSTREAM E256694	E160	28-Sep-2022	----	----	----		02-Oct-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE PLANT EFFLUENT-E256696	E160	28-Sep-2022	----	----	----		02-Oct-2022	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
<b>Laboratory Duplicates (DUP)</b>							
Ammonia by Fluorescence	E298	672806	1	16	6.2	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	674045	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	673180	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	673110	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	673109	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	674816	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	674784	2	17	11.7	10.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	673973	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	674476	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Ammonia by Fluorescence	E298	672806	1	16	6.2	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	674045	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	673180	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	673110	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	673109	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	673973	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	674476	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Ammonia by Fluorescence	E298	672806	1	16	6.2	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	674045	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	673180	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	673110	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	673109	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	674816	1	20	5.0	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	674784	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	673973	2	40	5.0	5.0	✔
TSS by Gravimetry	E160	674476	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	672806	1	16	6.2	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	673180	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	673110	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	673109	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	673973	2	40	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Calgary - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at $35.0 \pm 0.5^{\circ}\text{C}$ for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration ( $0.45 \mu\text{m}$ ), and incubation at $44.5 \pm 0.2^{\circ}\text{C}$ for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
TSS by Gravimetry	E160 Calgary - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^{\circ}\text{C}$ , with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Calgary - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Calgary - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Calgary - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 Calgary - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Calgary - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

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<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Enterococcus by (MF - mE)	ENTERO.MF  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	APHA 9230C (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 48 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  Calgary - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: CG2213387</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	: Kicking Horse Mountain Resort LP	<b>Laboratory</b>	: Calgary - Environmental
<b>Contact</b>	: Travis Jobin	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	<b>Address</b>	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
<b>Telephone</b>	:	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: Week 2 -2022 Fall EMS program - WW	<b>Date Samples Received</b>	: 29-Sep-2022 12:20
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 29-Sep-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 18-Oct-2022 15:38
<b>Sampler</b>	: TJ 250 344 6003		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-RESC100-0001		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Calgary Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	Nautilus Environmental (Calgary) External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sara Niroomand		Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta
Vladka Stamenova	Analyst	Calgary Inorganics, Calgary, Alberta



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Client : Kicking Horse Mountain Resort LP  
Project : Week 2 -2022 Fall EMS program - WW



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 674476)</b>											
CG2213310-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	372	354	4.96%	20%	----
<b>Anions and Nutrients (QC Lot: 672806)</b>											
CG2213335-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 673109)</b>											
CG2213402-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	0.756	0.769	1.72%	20%	----
<b>Anions and Nutrients (QC Lot: 673110)</b>											
CG2213402-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	220	223	1.24%	20%	----
<b>Anions and Nutrients (QC Lot: 673180)</b>											
CG2213385-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 673972)</b>											
CG2213318-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.476	0.477	0.257%	20%	----
<b>Anions and Nutrients (QC Lot: 673973)</b>											
CG2213387-003	COLUMBIA RIVER UP IDZ - UPSTREAM E256694	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0139	0.0126	0.0013	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 674784)</b>											
CG2213342-004	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
CG2213388-001	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
<b>Microbiological Tests (QC Lot: 674816)</b>											
CG2213304-001	Anonymous	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 674045)</b>											
CG2213328-004	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 674476)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 672806)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 673109)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 673110)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 673180)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 673972)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 673973)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Microbiological Tests (QCLot: 674784)</b>						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
<b>Microbiological Tests (QCLot: 674816)</b>						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
<b>Aggregate Organics (QCLot: 674045)</b>						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 674476)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.3	85.0	115	----
Anions and Nutrients (QCLot: 672806)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 673109)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 673110)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 673180)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	107	80.0	120	----
Anions and Nutrients (QCLot: 673972)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.6	80.0	120	----
Anions and Nutrients (QCLot: 673973)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 674045)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	105	85.0	115	----

Page : 6 of 6  
 Work Order : CG2213387  
 Client : Kicking Horse Mountain Resort LP  
 Project : Week 2 -2022 Fall EMS program - WW



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
<b>Anions and Nutrients (QCLot: 672806)</b>									
CG2213335-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125
<b>Anions and Nutrients (QCLot: 673109)</b>									
CG2213402-004	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.532 mg/L	0.5 mg/L	106	75.0	125
<b>Anions and Nutrients (QCLot: 673110)</b>									
CG2213402-004	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.68 mg/L	2.5 mg/L	107	75.0	125
<b>Anions and Nutrients (QCLot: 673180)</b>									
CG2213385-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.05 mg/L	ND	70.0	130
<b>Anions and Nutrients (QCLot: 673972)</b>									
CG2213336-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0494 mg/L	0.05 mg/L	98.9	70.0	130
<b>Anions and Nutrients (QCLot: 673973)</b>									
CG2213387-004	COLUMBIA RIVER 200M DN - EAST SHORE E258898	phosphorus, total	7723-14-0	E372-U	0.0497 mg/L	0.05 mg/L	99.3	70.0	130

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

and sample container preservation / holding time table for common analyses.

(lab use only) SHIPMENT VERIFICATION (lab use only)

Time: 1330 Temperature: 9 °C Verified by: Date: Time:

GENF

# Enterococcus Test Results

Samples collected September 28, 2022

Final Report

October 18, 2022

Submitted to: **ALS Environmental**  
Calgary, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		<i>Enterococcus</i> test initiation	Receipt temperature
	Collected	Received		
CG2213387-001/ 2223-0334-01	28-Sep-22 at 0930h	29-Sep-22 at 1415h	29-Sep-22 at 1455h	10.6°C
CG2213387-002/ 2223-0334-02	28-Sep-22 at 0945h	29-Sep-22 at 1415h	29-Sep-22 at 1455h	11.1°C
CG2213387-003/ 2223-0334-03	28-Sep-22 at 1000h	29-Sep-22 at 1415h	29-Sep-22 at 1455h	10.4°C
CG2213387-004/ 2223-0334-04	28-Sep-22 at 1015h	29-Sep-22 at 1415h	29-Sep-22 at 1455h	11.1°C

## TEST TYPES

- *Enterococcus* enumeration test

## RESULTS

### Microbial test results

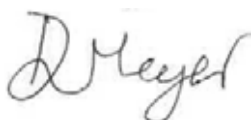
Sample ID	MPN/100 mL
	<i>Enterococcus</i>
CG2213387-001	<1
CG2213387-002	<1
CG2213387-003	1.0
CG2213387-004	1.0

MPN = Most Probable Number

## QA/QC

QA/QC summary	<i>Enterococcus</i>
Protocol deviations	See Below
Control performance	Acceptable
Test performance	Valid

The samples were received, and testing was initiated outside the required hold time.



---

Report By:  
Daisy Meyer, BSc  
Laboratory Biologist



Reviewed By:  
Leila Oosterbroek, P Biol  
Environmental Scientist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

## REFERENCES

Enterolert Test Kit Literature, IDEXX Laboratories Ltd., One IDEXX Drive, Westbrook, ME, 04092 USA



## **APPENDIX A – Test data**

---

## Quanti-Tray Bench Sheet - *Enterococcus*

Client ALS 106 Reference 2223-0334-01

### Test Initiation

Date: 2022/09/29  
Time: 1455  
Technician: XC

Reagent used: Enterolert™  
Reagent Lot#/Expiry: DUI62/10 MAY 2023

### Sample Information

Dilution Factor: —

Comments: set outside of hold

Quanti Tray 2000 Lot#/Expiry: CU0227/03/04/2025

Thermometer Serial #: 211007752  
Incubator #: 7  
Incubator Temperature: 41 (must be 41 ± 0.5°C)

### Results - 24 Hour Incubation

Date: 2022/09/30 Time: 1450 Technician: XC

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL	<u>0334-01</u>								
# Positive Large Wells:	<u>0</u>	<u>0</u>								
# Ambiguous Large Wells:	<u>0</u>	<u>0</u>								
# Positive Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
# Ambiguous Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
Most Probable Number at 24 hours:	<u>&lt;1</u>	<u>&lt;1</u>								

### Results - 28 Hour Incubation

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguos from 24 hours

Reviewed By: EP Date Reviewed: 2022/10/01

## Quanti-Tray Bench Sheet - *Enterococcus*

Client ALS106 Reference 2223-0334-02

### Test Initiation

Date: 2022/09/29  
Time: 1455  
Technician: XC

Reagent used: Enterolert™  
Reagent Lot#/Expiry: DUI62 / 10 MAY 2023

### Sample Information

Dilution Factor: —

Comments: set outside of hold

Thermometer Serial #: 21107752  
Incubator #: 3  
Incubator Temperature: 41 (must be 41 ± 0.5°C)

Quanti Tray 2000 Lot#/Expiry: CU0223 / 03/04/2025

### Results - 24 Hour Incubation

Date: 2022/09/30 Time: 1450 Technician: XC

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL	<u>0334-02</u>								
# Positive Large Wells:	<u>0</u>	<u>0</u>								
# Ambiguous Large Wells:	<u>0</u>	<u>0</u>								
# Positive Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
# Ambiguous Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
Most Probable Number at 24 hours:	<u>&lt;1</u>	<u>&lt;1</u>								

### Results - 28 Hour Incubation

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguous from 24 hours

Reviewed By: EP Date Reviewed: 2022/10/01



# Quanti-Tray Bench Sheet - *Enterococcus*

Client ALS106 Reference 2223-0334-03

## Test Initiation

Date: 2022/09/29  
Time: 1455  
Technician: XC

Reagent used: Enterolert™  
Reagent Lot#/Expiry: DU162/10 MAY 2023

## Sample Information

Dilution Factor: —

Comments: set outside of hold

Thermometer Serial #: 211007752  
Incubator #: 7  
Incubator Temperature: 41 (must be 41 ± 0.5°C)

Quanti Tray 2000 Lot#/Expiry: 100227/03/04/2025

## Results - 24 Hour Incubation

Date: 2022/09/30 Time: 1450 Technician: XC

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL	<u>0334-03</u>								
# Positive Large Wells:	<u>0</u>	<u>1</u>								
# Ambiguous Large Wells:	<u>0</u>	<u>0</u>								
# Positive Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
# Ambiguous Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
Most Probable Number at 24 hours:	<u>&lt;1</u>	<u>1.0</u>								

## Results - 28 Hour Incubation

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguous from 24 hours

Reviewed By: EP Date Reviewed: 2022/10/01

# Quanti-Tray Bench Sheet - *Enterococcus*

Client AIS 106 Reference 2223-0334-04

**Test Initiation**

Date: 2022/09/29  
Time: 1455  
Technician: XC

Reagent used: Enterolert™  
Reagent Lot#/Expiry: DUI62/10 MAY 2023

**Sample Information**

Dilution Factor: —

Comments: set outside of hold

Thermometer Serial #: 211007752  
Incubator #: 7  
Incubator Temperature: 41 (must be 41 ± 0.5°C)

Quanti Tray 2000 Lot#/Expiry: CU0227/03/04/2025

**Results - 24 Hour Incubation**

Date: 2022/09/30 Time: 1450 Technician: XC

Incubator Temp: <u>41</u> (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL	<u>0334-04</u>								
# Positive Large Wells:	<u>0</u>	<u>0</u>								
# Ambiguous Large Wells:	<u>0</u>	<u>0</u>								
# Positive Small Wells (Tray 2000 only):	<u>0</u>	<u>1</u>								
# Ambiguous Small Wells (Tray 2000 only):	<u>0</u>	<u>0</u>								
Most Probable Number at 24 hours:	<u>&lt;1</u>	<u>1.0</u>								

**Results - 28 Hour Incubation**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Technician: \_\_\_\_\_

Incubator Temp: _____ (must be 41 ± 0.5°C)	Enterococci (Fluorescent)									
	CTL									
# Confirmed Positive Large Wells:										
# Confirmed Positive Small Wells (Tray 2000 only):										
Most Probable Number at 28 hours:										

Confirmed positive wells includes the positive wells from 24 hours plus the ambiguous wells that became positive at 28 hours  
At 28 hours only score marked ambiguous from 24 hours

Reviewed By: EP 2022/10 EP Date Reviewed: 2022/10/01

## **APPENDIX B – Chain-of-custody form**

---



Chain of Custody  
Calgary - Environmental  
2559 29th Street NE Calgary AB  
Canada T1Y 7B5

79733



Hold time Passed-  
Please Proceed

Destination Lab:	<b>Nautilus Environmental (Calgary)</b>
Address:	10828 27 Street SE Calgary AB Canada T2Z 3V9
Work Order Number:	<b>CG2213387</b>
Original Receipt Date/Time	Instructions Received
29/09/2022 12:20	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as indicated: Results: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com) Invoice: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com) Electronic Data: [ALSCGClientServices@alsglobal.com](mailto:ALSCGClientServices@alsglobal.com)  
Attention: Patryk Wojcik

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
CG2213387-001	PLANT EFFLUENT-E25 6696	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO,MF	Enterococcus by (MF + mE)	06-10-2022	28/09/2022 09:30	10.6°C
CG2213387-002	COLUMBIA RIVER 1KM DN - SIDE CHANNEL E258899	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO,MF	Enterococcus by (MF + mE)	06-10-2022	28/09/2022 09:45	11.1°C
CG2213387-003	COLUMBIA RIVER UP IDZ - UPSTREAM E256694	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO,MF	Enterococcus by (MF + mE)	06-10-2022	28/09/2022 10:00	10.4°C
CG2213387-004	COLUMBIA RIVER 200M DN - EAST SHORE E258898	Water	Sterile HDPE (Sodium thiosulphate)	ENTERO,MF	Enterococcus by (MF + mE)	06-10-2022	28/09/2022 10:15	11.1°C

2223-0334

2022/09/29

14:15

cab

5R9

4 x 400 ml bottles

No 5 No I Good

Good Condition

**END OF REPORT**

---



<b>Report To</b>			<b>Report Format / Distribution</b>			<b>Service Requested</b> (Rush for routine analysis subject to availability)																																																				
Company: Kicking Horse Mountain Resort Utility Corporation			<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)																																																				
Contact: Travis Jobin			<input type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Fax			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																																																				
Address: 1500 Kicking Horse Trail			Email 1: <a href="mailto:tjobin@kickinghorseresort.com">tjobin@kickinghorseresort.com</a>			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																																																				
Phone: 250-344-8442 Fax: _____			Email 2: <a href="mailto:pmaier@skircr.com">pmaier@skircr.com</a>			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT																																																				
Invoice To Same as Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<b>Client / Project Information</b>			<b>Analysis Request</b>																																																				
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Job #: Week 2 - 2022 Fall EMS program - WW			Please indicate below Filtered, Preserved or both (F, P, F/P)																																																				
Company: Resorts of the Canadian Rockies			PO / AFE:			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>BOD5</td><td>TSS</td><td>N-NH4</td><td>N-NO3</td><td>N-NO2</td><td>Total P</td><td>Ortho P</td><td>Fecal Coliform</td><td>Enterococci</td><td>E. Coli</td><td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Number of Containers</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>												BOD5	TSS	N-NH4	N-NO3	N-NO2	Total P	Ortho P	Fecal Coliform	Enterococci	E. Coli	Number of Containers																														
BOD5	TSS	N-NH4	N-NO3	N-NO2	Total P													Ortho P	Fecal Coliform	Enterococci	E. Coli	Number of Containers																																				
Contact: Patrick Majer			LSD:																																																							
Address: 1505 - 17th Ave SW Calgary AB			Quote #:																																																							
Phone: _____ Fax: _____			ALS Contact: PW			Sampler: TJ																																																				
Lab Work Order # _____ (lab use only)																																																										
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	BOD5	TSS	N-NH4	N-NO3	N-NO2	Total P	Ortho P	Fecal Coliform	Enterococci	E. Coli	Number of Containers																																											
	Plant Effluent - E256696 Temp: 15 pH: 6.8	28-Sep-22	9:30	Water	X	X	X	X	X	X	X	X	X	X	5																																											
	Side Channel - Columbia River 1KM DN-E258899 Temp: 11 pH: 7.6	28-Sep-22	9:45	Water		X	X	X	X	X	X	X	X	X	4																																											
	Upstream - Columbia River UP IDZ-E256694 Temp: 10 pH: 1.9	28-Sep-22	10:00	Water		X	X	X	X	X	X	X	X	X	4																																											
	East Shore - Columbia River 200m DN-E258898 Temp: 10 pH: 7.8	28-Sep-22	10:15	Water		X	X	X	X	X	X	X	X	X	4																																											
	Sample State: WW																																																									
	Sample Descriptor: MU																																																									
	Sample Class: REG																																																									
	Collection Mode: GRB																																																									
	Permit: 15474																																																									
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc)																																																										
<p align="center">Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.</p> <p align="center">By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.</p> <p align="center">Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.</p>																																																										
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)																																																				
Released by:	Date (dd-mm-yy)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:																																																
Travis Jobin	28-Sep-22	1100	<i>[Signature]</i>	9/29	1220	5 °C					Yes / No ?																																															
											If Yes add SIF																																															

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2213387**



Telephone : + 1 403 407 1800

## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2213858</b>	Page	: 1 of 4
Client	: <b>Kicking Horse Mountain Resort LP</b>	Laboratory	: Calgary - Environmental
Contact	: Travis Jobin	Account Manager	: Patryk Wojciak
Address	: 1500 Kicking Horse Trail PO BOX 330 Golden BC Canada V0A 1H0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 344 6003	Telephone	: +1 403 407 1800
Project	: Week 3 - 2022 Fall EMS Program - WW	Date Samples Received	: 06-Oct-2022 13:35
PO	: ----	Date Analysis	: 06-Oct-2022
		Commenced	
C-O-C number	: ----	Issue Date	: 20-Oct-2022 15:51
Sampler	: ----		
Site	: ----		
Quote number	: CG21-RESC100-0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta
Patryk Wojciak	Account Manager	External Subcontracting, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).