IQWATER INC.
140, 5050 – 106th Avenue SE
Calgary, Alberta
T2C 5E9
Tel: 1-403-238-9510
E-mail: jana@iqwater.ca

April 27th, 2022
File No. W2020-019.2021

FERNIE ALPINE RESORT UTILITIES CORPORATION
1505 17th Avenue SW
Calgary, Alberta
T2T 0E2

Attention: Mr. Patrick Majer

Dear Mr. Majer:

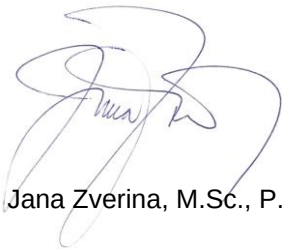
Re: FERNIE ALPINE RESORT
WASTEWATER TREATMENT PLANT
2021 ANNUAL REPORT

Forwarded is a pdf copy of the 2021 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.

Sincerely,

IQWATER INC.



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

2021 WASTEWATER TREATMENT PLANT ANNUAL REPORT

FERNIE ALPINE RESORT FERNIE, B.C.

Prepared for:

FERNIE ALPINE RESORT
UTILITIES CORPORATION
1505-17th Avenue SW
Calgary, Alberta
T2T 0E2

Prepared by:

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140, 5050 – 106th Avenue SE
Calgary, Alberta
T2C 5E9
Tel: 1-403-238-9510
E-mail: jana@iqwater.ca

April 27tht, 2022
Report # W2020-019.2021

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APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND

The following annual report for the Wastewater Treatment Plant at Fernie Alpine Resort (FAR) operated by Fernie Alpine Resort Utilities Corporation (FARUC) is compiled in accordance with the requirements of the Municipal Sewage Regulation (MSR). This report covers the 2021 calendar year.

Due to the nature of the resort the plant is subjected to a large seasonal swing in utilization with the winter ski period imposing the highest demands. The critical time for sewage flows at the resort is from mid-December to the end of March during the peak ski season. Summer utilization of the treatment work is generally low.

FARUC treats its wastewater at a tertiary treatment plant designed to remove BOD_5, suspended solids, ammonia, and phosphorous. Wastewater is disinfected with ultraviolet (UV) lamps prior to discharge into the Elk River.

Plant effluent quality has been high during the year. There is a clearly decreasing trend in ortho-phosphorus and total phosphorus levels during the last several years. All the results for ortho-phosphorus and total phosphorus were below the MSR discharge limits. FARUC began a monitoring and Clearpac dosing investigation in the winter of 2007 to reduce effluent phosphorous concentrations. The reduction program has shown significant improvement of phosphorus levels in plant effluent. This work will continue to maintain all the ortho and total phosphorus concentrations below the discharge limits.

2.0 REGISTRATION REQUIREMENTS

This section describes operating requirements as specified in the Resorts of the Canadian Rockies Inc.'s (RCRI) Registration Letter RE 17139 issued on September 30th, 2002. The registration describes parameters that must be tested for 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^3 /d
BOD_5	Five day biochemical oxygen demand, measured in mg/l
TSS	Total suspended solids or non-filterable residue, measured in mg/l
NH_3	Ammonia concentration, expressed as nitrogen in mg/l
NO_3	Nitrate concentration, expressed as nitrogen in mg/l
NO_2	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
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	1280	m^3/d
BOD_5	45	mg/l
TSS	45	mg/l
Total-P	1.0	mg/l
Ortho-P	0.5	mg/l
Coliforms*	200	CFU/100ml
Toxicity Bioassay	pass	n/a

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

Primary screenings and dewatered sludge are to be disposed of at the Crowsnest Pass/Pincher Creek Landfill. Disposal at other sites requires authorization under the Waste Management Act.

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. The report must include tabulated standards and results for all test samples, interpretation of the results, an indication of the state of compliance of the facility, and the total wastewater flow for the reported period.
In addition the report must also include the following:

- Notification of significant operating events including discharge variances outside given limits,
- Recommendations for operational or facility modifications,
- Notification of proposed or implemented plant modifications,
- Details of proposed or implemented water conservation measures,
- A plan indicating existing and proposed developments,
- A comparison of projected and actual wastewater flows,
- Projected wastewater flows resulting from proposed development compared to the remaining waste water treatment plant (WWTP) capacity, and
- A comparison of water supply and wastewater flows.

As with the previous Annual Reports, this report includes additional information on wasted sludge volumes.

2.4 SAMPLING FREQUENCY

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

Elk River testing requires that a minimum of 18 samples annually are taken from each of the upstream, initial dilution zone (IDZ) and downstream river locations, relative to the outfall diffuser. The sampling locations were identified in the April 2001 Environmental Impact Study.

A minimum of 12 influent samples are required for BOD_5 and TSS. Flow data is to be collected continuously.

The intent of the environmental testing procedure outlined in Table 2 is to collect influent and effluent samples during peak demand periods as indicated by resort bookings. To correspond with peak plant loading, river samples are to be collected on the same day as effluent samples.

In addition to the program and tests listed above, other in-plant testing is needed to permit operational control of the process as shown in Table 2 below.

Table 2
Sampling Location/Frequency/Type

Parameter	Location					
	Elk River	**QTY**	**Influent**	**QTY**	**Effluent**	**QTY**
pH	WS/G	18	/	/	M/G, WS/G	25
Temp	WS/G	18	/	/	/	/
Flow	/	/	D/C	n/a	D/C	n/a
BOD_5	/	/	M/G	12	M/G, WS/G	25
TSS	WS/G	18	M/G	12	M/G, WS/G, D/C	25
NH_3-N	WS/G	18	/	/	M/G, WS/G	25
NO_3-N	WS/G	18	/	/	M/G, WS/G	25
NO_2-N	WS/G	18	/	/	M/G, WS/G	25
Total-P	WS/G	18	/	/	M/G, WS/G	25
Ortho-P	WS/G	18	/	/	M/G, WS/G	25
Fecal Coliform	WS/G	18	/	/	M/G, WS/G	25
Toxicity Bioassay	/	/	/	/	3 Y/G	3

Where:

WS/G	Weekly seasonal grab sampling, required for three six-week periods during the winter peak, the spring after ice-out, and in the fall when river turbidity and flows are low.
D/C	Daily continuous sampling using an on-line instrument and data logger.
M/G	Monthly grab sample (not required when weekly seasonal testing is taking place).
3Y/G	Three samples per year to correspond with WS/G sampling periods.

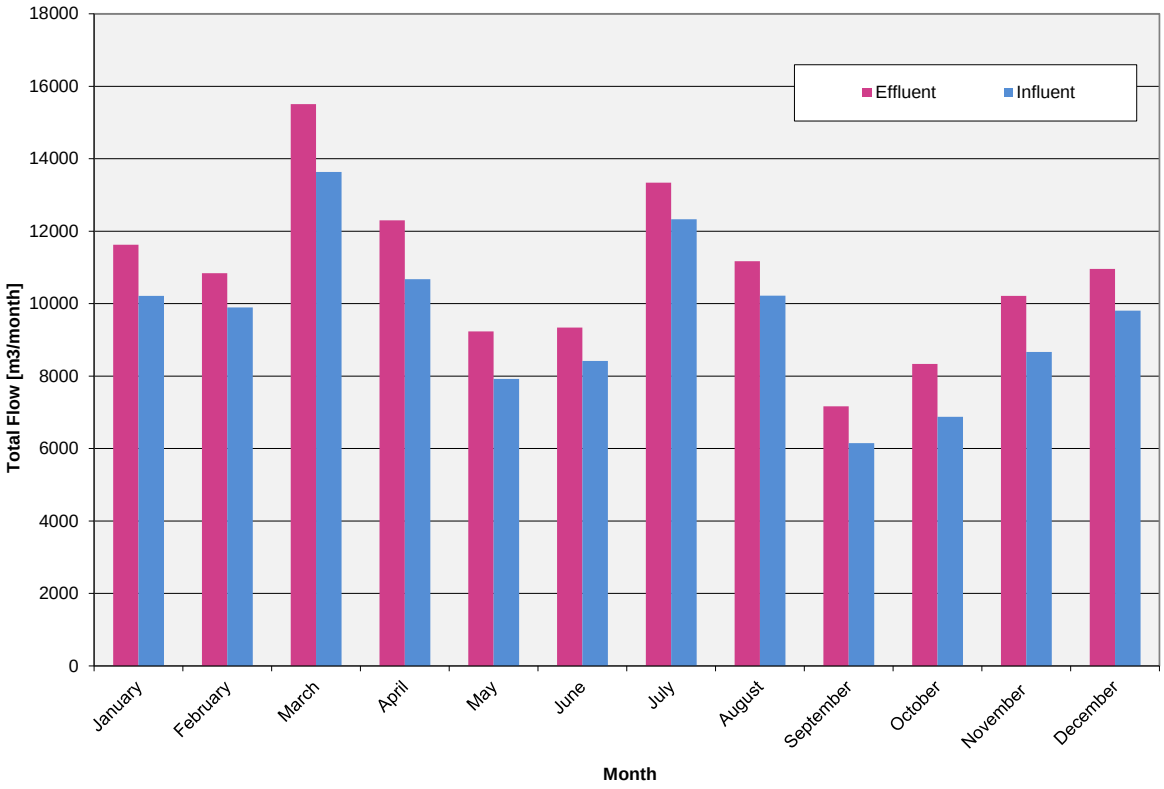
3.0 SEWAGE FLOW RECORDS

This section provides data and analysis regarding the plant influent and effluent flows, and compares 2021 data to previous years.

Total effluent flow from the WWTP for all of 2021 was recorded from the effluent weir type flow meter as 130,032 m^3 and the average was 351.7 m^3 per day. The graph below shows the 2021 total effluent flow per month vs total influent for the plant. The effluent flow follows very closely the influent.

Available monthly total effluent flow meter records for 2021 are provided in Figure 1a.

Figure 1a
Effluent and Influent Flow Meter Monthly Flow Totals

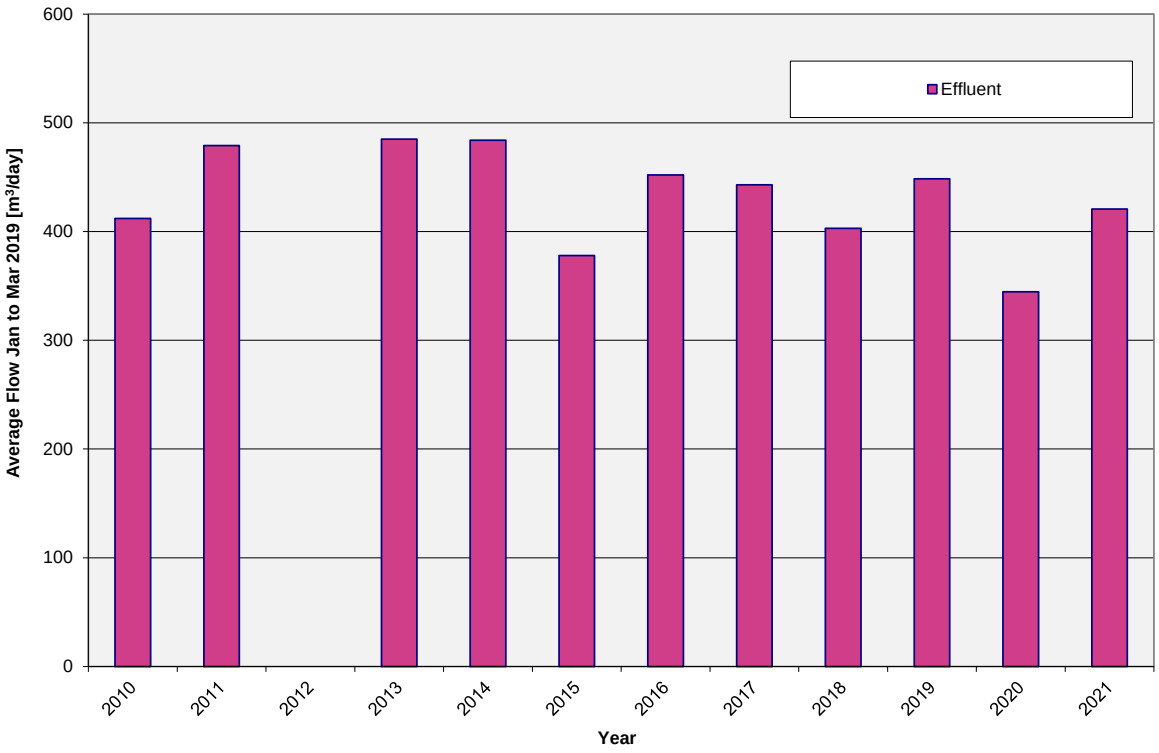


The ski resort operates with higher winter and late spring sewage flows (January to March) than during any other period. The average daily plant flow through January, February and March of 2021 was 420.8 m^3/day compared to the previous year's (2020) January to March average flow at 344.6 m^3/day. However, it should be noted that the January to March 2020 flow was the lowest when compared to the previous years, likely due to a significant decrease in March due to Covid-19 restrictions. The levels, which increased in 2021, were comparable to pre-Covid levels.

Also, as shown on the 2021 graph above, there is a noticeable increase in flow over the summer holiday months, July and August. This trend has been noticed over the last several years.

The average daily plant flow through January, February and March of 2019 was 449 m^3/day and 2018 was 403 m^3/day. The average daily flow was 443 m^3/day in 2017, 452 m^3/day in 2016, 378 m^3/day in 2015, 484 m^3/day in 2014, 485 m^3/day in 2013, the average daily flow could not be calculated in 2012 but it was 479 m^3/day for the same time period in 2011, compared to 412 m^3/day over the same period in 2010.

Figure 1b
Average Daily Flow during Jan – Mar Period



Peak flow for the year reached 810 m^3/day on November 16, 2021, which was 36 % below the allowable daily limit of 1,280 m^3/day.

Historical peak flows are as follows: 2020 (925 m^3/day), 2019 (1043 m^3/day), 2018 (687 m^3/day), 2017 (1,095 m^3/day), 2016 (844 m^3/day), 2015 (1,058 m^3/day), 2014 (1,036 m^3/day), 2013 (1,181 m^3/day), 2012 (811 m^3/day), 2011 (989 m^3/day) and 2010 (823 m^3/day) and 2009 (1,178 m^3/day). Usually, the peak flow day occurred during the heavy ski season, which was to be expected. In 2021, the peak flow day occurred in November which likely corresponds with the beginning of the season after the Covid-19 slow down.

A summary of sewage flow for years 2003 through 2021 is provided in Table 3 and Figures 2 and 3:

Table 3
2003 – 2021 Flow Comparisons

Year	Sewage Flow (m^3/day)			Days Over Limit
	Total	Average	Peak	
2003	137,035	375	1,244	0
2004	151,815	414	1,307	1
2005	125,699	344	1,293	1
2006	127,202	348	1,058	0
2007	144,480	396	1,177	0
2008	135,767	372	873	0
2009	113,336	311	1,178	0
2010	104,815	287	823	0
2011	90,213* (**122,275**)[1]	335	**989**[2]	0
2012	62,509** (**122,610**)[1]	335	**811**[2]	0
2013	121,982	335	1,181	0
2014	125,437	344	1,036	0
2015	90,931	250	1,058	0
2016	108,326	296	844	0
2017	108,695	296	1,095	0
2018	105,073	288	687	0
2019	105,748	290	1043	0
2020	101,640	274	925	0
2021	130,032	352	810	0

* not including part of Sept and all of Oct, Nov, and Dec 2011
** not including all of Jan, Feb, part of Aug, and all of Sept, Oct, and Nov 2012
[1] (data) in brackets – estimate based on daily average
[2] the number does not reflect a true peak as all the data was not available during high flow months

2004 to 2012

Higher flows in 2004 were caused by severe infiltration through the collection system.

Lower flows in 2005 and 2006 can also be attributed to the fact that a lot of sludge together with water was trucked away from the WWTP itself due to the volumes of sewage the existing plant would not handle without an equalization tank.

Through 2008 total and average flow decreased somewhat from 2007, there were no instances where flow exceeded the 1,280 m^3/day registration limit, compared to one day in each of 2004 and 2005. Peak flow dropped due to full operation of the equalizing tank and collection system improvements to eliminate storm water infiltration.

The average flow for 2009 further decreased from 2008 (372 m^3/day down to 311 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/day. The peak flow increased from 2008 but is comparable to the other years.

The average flow for 2010 further decreased from 2009 (311 m^3/day down to 287 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/day. The peak flow decreased from 2009 and is comparable to 2008.

The average flow for 2011 had increased slightly from 2010 (287 m^3/day) and 2009 (311 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/day limit. The peak flow had increased slightly from 2010; however it was still lower than 2008 and prior. Please note, the average flow was calculated for the data available and may not have been representative of the whole year as October, November and December were usually lower flow months.

Note that historically from 2004 to 2010 the peak flow occurred systematically in January, February, March and December, which was consistent with the facility operations. Although some data was missing, the values for 2011 were considered "as is". However, there was more data missing in 2012. In addition, the missing data was among others in January and February, which were historically two out of four highest flows in a year. January was on average the highest month.

The average flow for 2012 was the same as observed in 2011 (335 m^3/day) which had increased slightly from 2010 (287 m^3/day) and 2009 (311 m^3/day). There were no instances where the flow exceeded the registration limit of 1,280 m^3/day; however, there was no data for January and February (two out of four peak months in a year). The peak flow of 811 m^3/day was recorded in December, which was one of the four peak flow months, and therefore it was reasonable to assume that it would be close to or somewhat above the same number in January or February. Based on the remaining measurements it was unlikely that the peak in January or February would exceed the registration limit.

Please note, the average flow was calculated for the data available and may not have been representative of the whole year as January, February, part of August and all of September, October, and November information was not available. This average flow was used to estimate the total yearly effluent flow, which likely represented a reasonable estimate.

The records for 2011 and 2012 were incomplete due to the effluent flow meter failure from a lightning strike. The meter was repaired and fully functional for 2013.

2013 to 2021

In 2021 the average flow was 351.7 m^3/day, which is more than during previous several years and similar to 2013 and 2014. While the peak month is usually December, in 2021 the peak was in November followed by December and April. There are no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m^3/day.

The average flow for 2020 was low and well below previous several years, which can likely be attributed to the Covid-19 restrictions implemented in March 2020. There were no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m^3/day. The peak flow was higher than that of 2018 but very similar to 2013 to 2015 and 2017. Contrary to the previous years, when the highest peak was in December, in 2020 the highest peak was recorded in February.

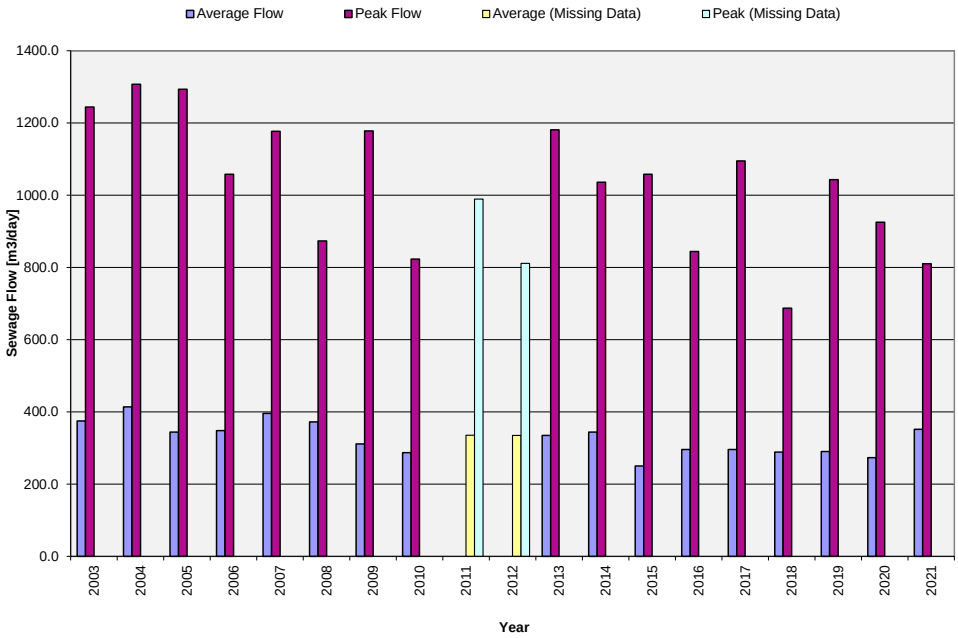
The highest month in 2019 for average flows was in February followed by January and December.

Between 2013 and 2021 the average sewage flow showed a decreasing trend with slightly higher value in 2021. There is a decreasing trend in peak values between 2013 and 2021 as shown on graphs below.

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 flow results from non-skiing related recreational activities, generally hiking or mountain biking events. The lowest plant flow is experienced in the shoulder season periods (April to June and September to November).

The approximately 85 permanent residents in addition to several year-round restaurants providing services to casual visitors ensure that the sewage flows never drop to zero. Figure 2 provides monthly average and peak day sewage flows since 2003.

Figure 2
Average and Peak Sewage Flow Comparison Graph



* Note that the values for 2011 and 2012 may not be representative as some of the effluent flow data for these years are missing

Figure 3
Total Sewage Flow Graph

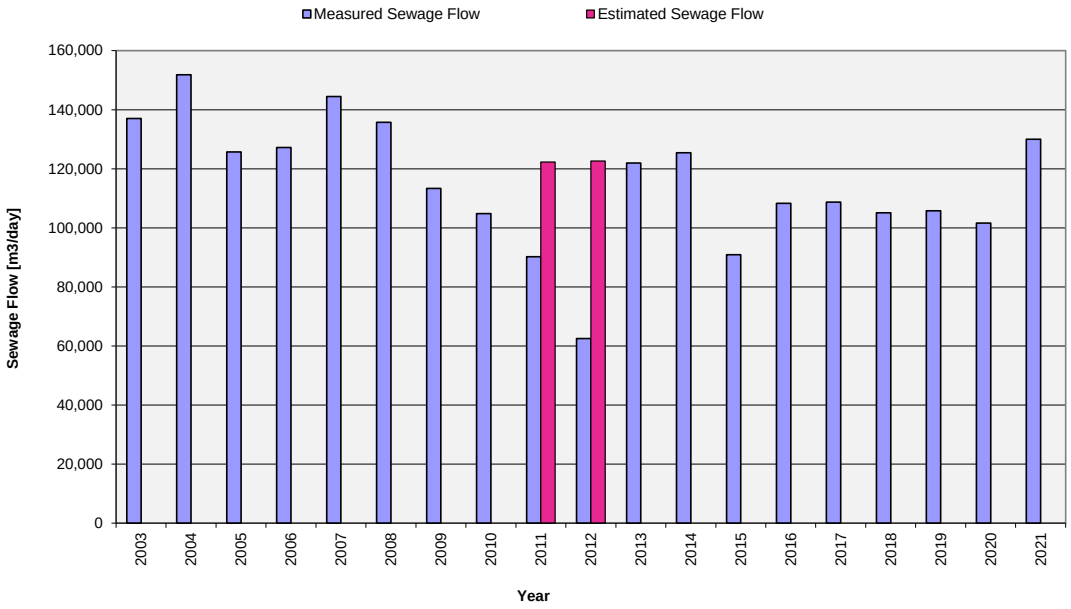
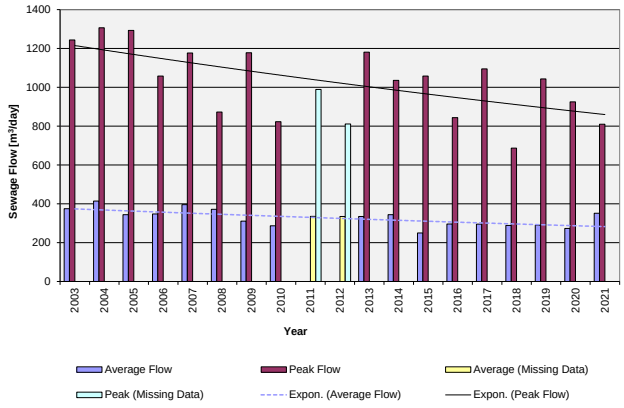
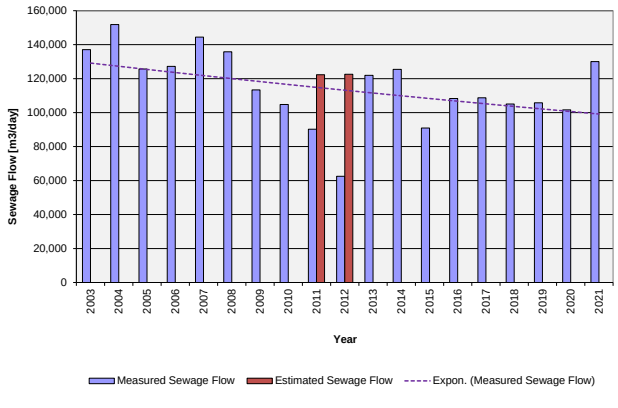


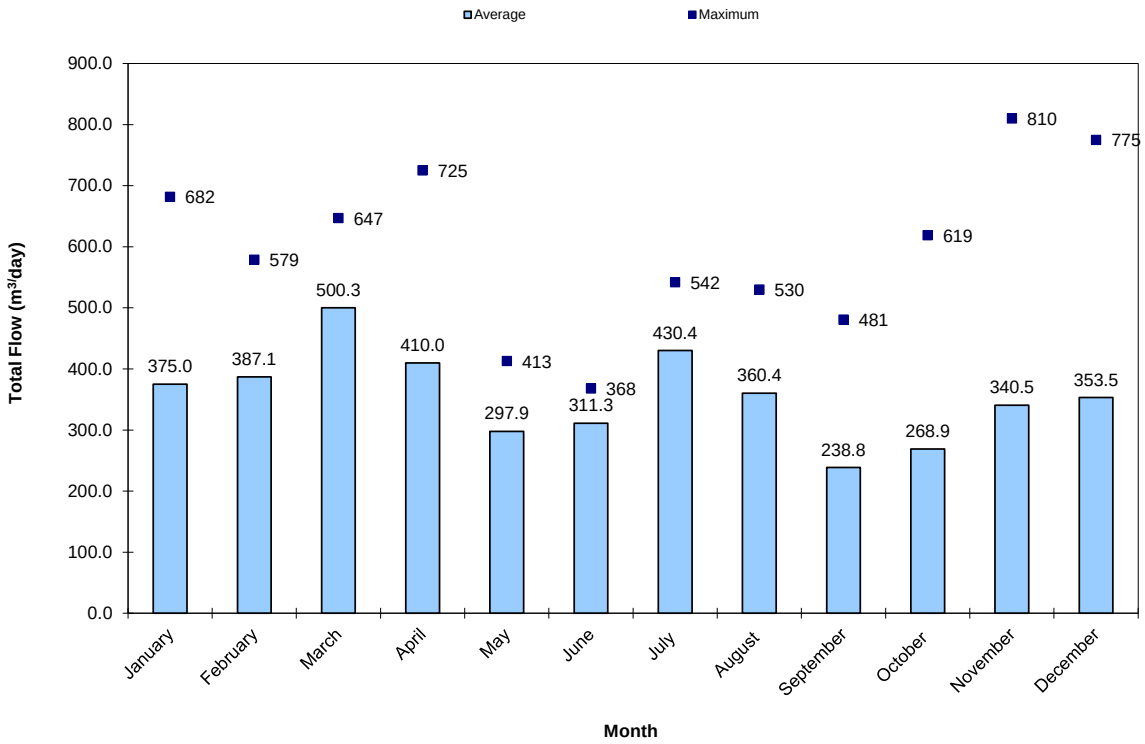
Figure 3a and Figure 3b
Trendlines for Average, Peak, and Total Sewage Flow Graphs





Sewage flow trend is shown on Fig 3a and 3b above, note that total sewage production has in general a declining trend with relatively stable flow numbers over the last five years.

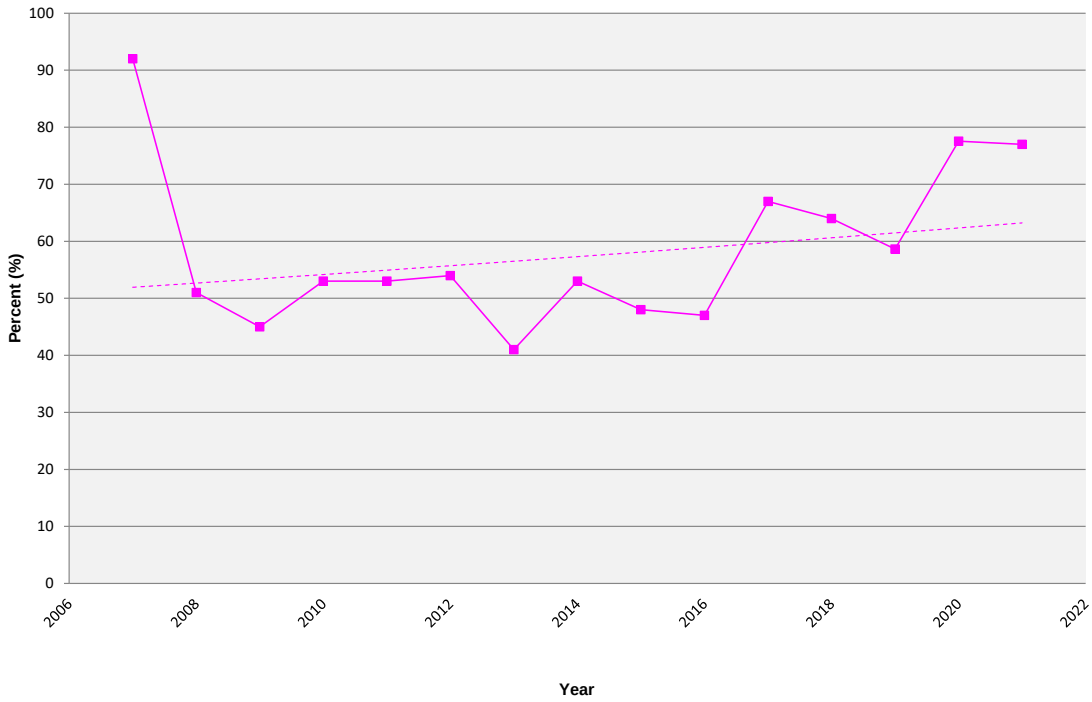
Figure 4
2021 Sewage Effluent Average and Peak Flows by Month



The Resort's ongoing program to reduce sewer infiltration is demonstrated by the reduction in return flow to the plant vs. total water usage. In 2007 the total sewage flow was equal to 92% of the total water production; however this number may not be representative as the total water production values were incomplete. In 2008 this figure decreased to 51%, which is considered to be a more representative. In 2009, this figure decreased even further to 45%. In 2012, the total sewage flow was equal to 54% of the total water production, and was consistent with 2010 and 2011. This again is slightly higher than in 2009 but similar to 2008. In 2013, the total sewage flow was 41% of the total water production, which was the lowest observed to date. In 2014, the total sewage flow was 53% of the total water production which was a slight increase from 2013 but comparable to that of 2008, 2010, 2011 and 2012. There was a slight decrease in 2015. The total sewage flow was 48% of the total water production which is comparable to 2013. The total sewage flow for 2016 was 47% which was very similar to that found in 2015. The total sewage flow for 2017, 2018, 2019, and 2020 was 67%, 64%, 59%, and 77%. The total sewage flow for 2021 was 77% which is the same as found in 2020.

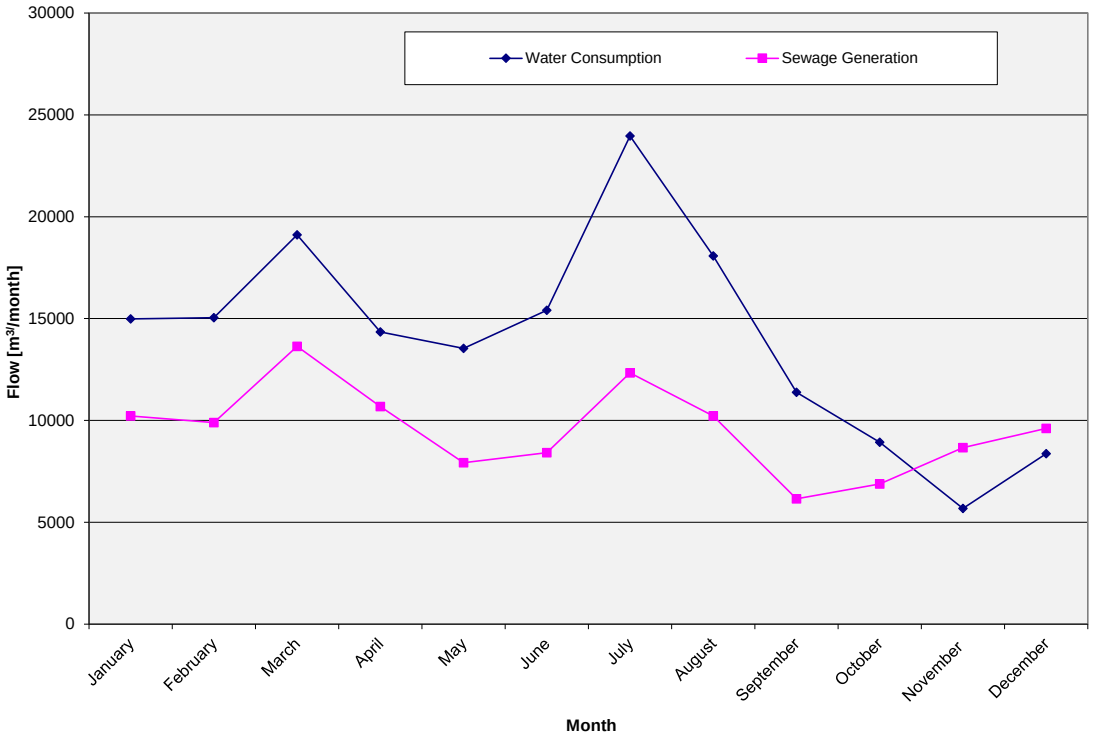
Note that in general, with the exception of 2007, there was relatively steady trend in % of return flow vs total water usage until 2017, there is an increasing trend recorded between 2017 and 2021. The percent sewage flow vs the water production for each year since 2007 has been plotted in Figure 5 below.

Figure 5
Percent Sewage Flow vs Water Production



Water use at the hill is compared to the amount of sewage received at the WWTP in Figure 6 for 2021.

Figure 6
2021 Water Consumption and Sewage Generation



The impact of rainfall and snowmelt on sewage flow has decreased each year since 2007 and 2017 as a result of system improvements, the use of water restrictive fixtures and the infiltration reduction program. There is slightly increasing trend shown between 2017 and 2021.

4.0 SEWAGE FLOW PROJECTION

This section shows projected wastewater flow for 2007 through 2021 based on 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, the estimated highest day wastewater generation for 2011 would have been 1302.3 m^3/day. Using the actual peak flow of 811 m^3/day, a correction factor of 0.62 was calculated. Averaged correction factor for 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014 was calculated and multiplied by the future estimated flows to more accurately reflect potential resort sewage generation rates.

In 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 respectively, the correction factors were 1.20, 0.89, 1.14, 0.65, 0.76, 0.62, 0.91, 080, 0.81, 0.65, 0.84, 0.51, 0.78, and 0.80, which showed that the resort had reduced the impact of both storm water infiltration and reduced peak flows.

Projected daily peak wastewater flows until 2010 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, 2021 was calculated based on the BC Health Act (refer to Table 11 enclosed at the end of this report). The future flows will be re-evaluated if further expansion occurs. The resort is committed to continuing the initiative on introducing a storm water 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. FARUC will monitor sewage flows to determine the efficacy of the program.

Based on a report prepared by Urban Systems, Wastewater Treatment Plant Assessment, prepared in October 2017, it was concluded that even with the additional expansion of the proposed Timberlanding, 27 residential lots (Phase 1) possibly in 2018 FARUC may not require an increase to permit discharge above the current limit of 1280 m^3/day if the flow restriction measures prove sustainable. Note that Phase 2 development may need a licence amendment to increase the maximum daily flow from 1280 m^3 to a maximum plant capacity of 1760 m^3. Sewage discharge rates will be monitored and an application will be submitted to increase the maximum daily discharge when warranted.

Phase 1 of the Timberlanding Development, all 27 lots have been sold. All but 3 of the lots have approval to begin constructed. 14 lots are connected to services. We anticipate all will be connected by next year. Phase 2 Timberlanding development, has not been included in the current calculations yet, after registration, a further 20 single family lots and 2 multi-family lots will be included.

Based on the 2021 flow data, the plant has an unused capacity of 470 m^3/day due to the flow saving measures. While the levels seem to have rebounded from the Covid-19 restrictions, this still needs to be closely monitored during 2022 and further considered when adding additional development.

Table 4
Projected Peak Flows: 2007-2021

	2007	**2008**	**2009**	**2010**	**2011**	**2012**
Estimated Wastewater Flow (m^3/day)	979.2	979.9	1032.4	1261.4	1302.3	1302.3
Actual and Corrected (m^3/day)	1177 (a)	873 (a)	1178(a)	823 (a)	989 (a)	811 (a)

	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Estimated Wastewater Flow (m^3/day)	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6
Actual and Corrected (m^3/day)	1181 (a)	1036 (a)	1058 (a)	844 (a)	1095 (a)	687 (a)

	2019	**2020**	**2021**	**2022**
Estimated Wastewater Flow (m^3/day)	1344.5*	1344.5*	1344.5*	1344.5*
Actual and Corrected (m^3/day)	1043 (a)	925 (a)	810 (a)	1062 (b)

**Note that all 27 lots for Timberlanding Phase 1 are included in the Estimated Flow (only 9 including 2 double lots or 11 single lots are either developed, under development or beginning construction)*

(a) actual peak flow

(b) corrected daily peak flows by the averaged correction faction for 2007 to 2021 and correction factor

2007	*correction factor of*	*1177/979.2*	*1.2*
2008		*873/979.9*	*0.89*
2009		*1178/1032.4*	*1.14*
2010		*823/1261.4*	*0.65*
2011		*989/1302.3*	*0.76*
2012		*811*/1302.3*	*0.62*
2013		*1181/1302.3*	*0.91*
2014		*1036/1302.3*	*0.8*
2015		*1058/1302.3*	*0.81*
2016		*844/1302.3*	*0.65*
2017		*1095/1302.3*	*0.84*
2018		*687/1337.6*	*0.51*
2019		*1043/1344.5*	*0.78*
2020		*925/1344.5*	*0.69*
2021		*810/1344.5*	*0.60*
AVERAGE			***0.79***

*Since only two out of the four months with the historically highest peaks were recorded, this number may be underestimated.

Note that based on the historical data and the above projections the actual flows based on Phase 1 Timberlanding expansion should not exceed the permitted discharge of 1280 m^3/d.

Graphs showing estimated vs actual historical peak flows and general trending of the correction factor are shown below.

Figure 7a
Estimated vs Actual Peak Flows (Historical)

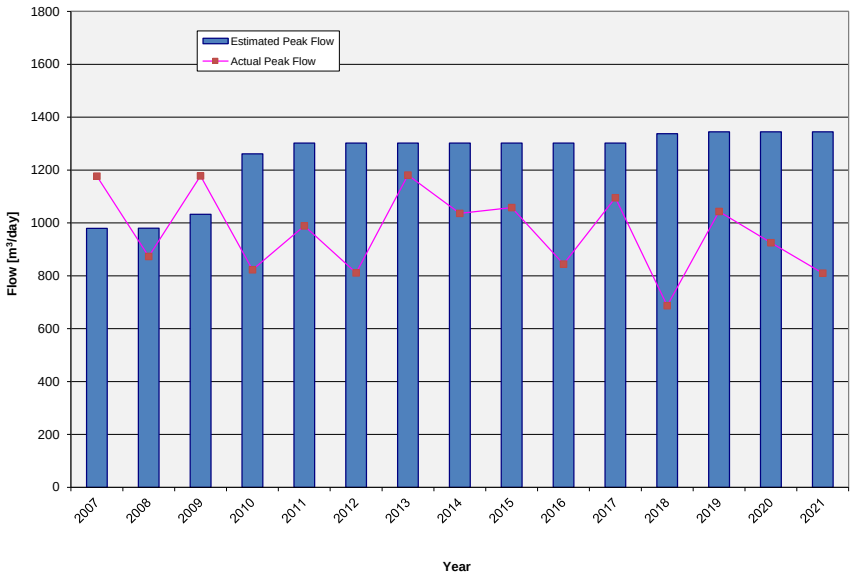
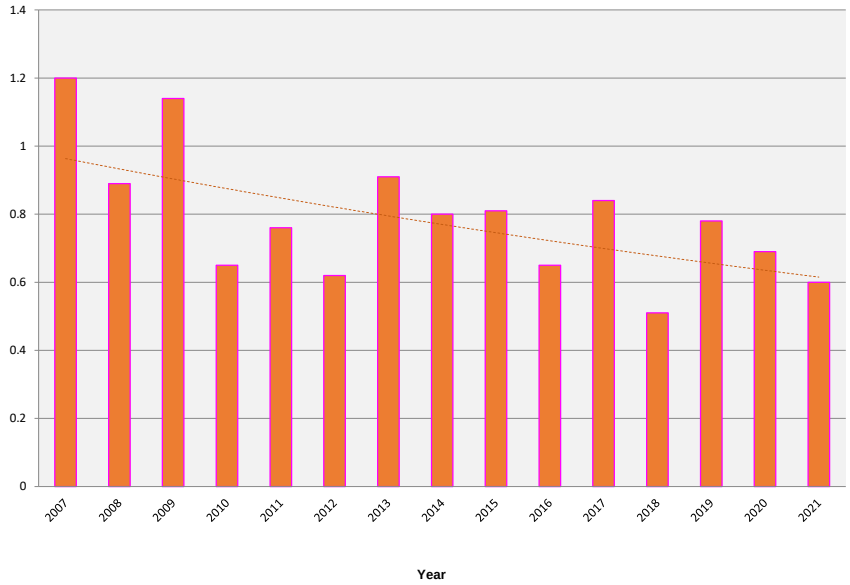


Figure 7b
Correction Factor and Trendline for Peak Flow (Historical)



5.0 OVERVIEW OF ELK RIVER SAMPLE RESULTS

This section provides data and analysis for the Elk River samples taken during 2021.

Table 5 provides a summary record of the Elk River test results for the time period from January 4, 2021 to December 29, 2021.

Table 5
2021 Elk River Sample Results

Sample Date	Ammonia-N			Ortho-P			Coliform - Fecal			Total P mg/L		
(yyyy-mm-dd)	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2021-01-04	0.05	0.05	0.05	0.005	0.009	0.005	1	4	1	0.005	0.018	0.005
2021-01-11	0.05	0.05	0.25	0.005	0.024	0.005	6	3	11	0.005	0.029	0.005
2021-01-18	0.05	0.05	0.05	0.005	0.041	0.005	11	2	9	0.006	0.044	0.005
2021-03-29	0.05	0.05	0.05	0.005	0.013	0.005	7	6	11	0.011	0.023	0.012
2021-04-05	0.05	0.05	0.05	0.005	0.012	0.005	2	1	4	0.013	0.021	0.011
2021-04-12	0.05	0.05	0.05	0.005	0.067	0.005	1	1	1	0.005	0.078	0.005
2021-04-19	0.05	0.05	0.05	0.005	0.011	0.005	3	1	6	0.005	0.010	0.009
2021-04-28	0.05	0.05	0.05	0.005	0.010	0.005	1	1	6	0.005	0.014	0.005
2021-05-05	0.05	0.05	0.05	0.005	0.005	0.005	2	1	1	0.013	0.008	0.011
2021-10-06	0.05	0.05	0.05	0.005	0.043	0.005	1	2	1	0.005	0.046	0.005
2021-10-13	0.05	0.05	0.05	0.005	0.057	0.005	1	18	1	0.005	0.049	0.005
2021-10-20	0.05	0.05	0.05	0.005	0.055	0.005	1	14	1	0.005	0.050	0.005
2021-10-27	0.05	0.10	0.05	0.007	0.015	0.005	12	92	18	0.016	0.043	0.008
2021-11-03	0.05	0.05	0.05	0.005	0.014	0.005	6	7	8	0.005	0.021	0.006
2021-11-12	0.05	0.05	0.05	0.005	0.030	0.005	3	3	3	0.005	0.026	0.005
2021-12-15	0.0052	<0.005	0.0086	0.0044	0.0219	0.0038	8	1	9	0.0059	0.0208	0.0054
2021-12-22	0.0052	0.0127	0.0050	0.0035	0.0690	0.0038	5	27	3	0.0048	0.0713	0.0049
2021-12-29	0.0216	0.0433	-	0.0022	0.0791	-	1	3	-	0.0060	0.0707	-
# Samples	18	18	17	18	18	17	18	18	17	18	18	17
Average	0.04	0.05	0.06	0.005	0.032	0.005	4	10	6	0.007	0.036	0.007
Maximum	0.05	0.10	0.25	0.007	0.079	0.005	12	92	18	0.016	0.078	0.012
Minimum	0.01	0.01	0.01	0.002	0.005	0.004	1	1	1	0.005	0.008	0.005

Light green 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
IDZ – Initial Dilution Zone
DN – Downstream

Table 5 cont.

Sample Date	TSS			pH			$N\text{-}NO_3$			$N\text{-}NO_2$		
(yyyy-mm-dd)	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2021-01-04	3.00	3.00	3.00	8.37	8.44	8.43	1.91	0.15	1.89	0.01	0.01	0.01
2021-01-11	3.00	3.00	3.00	8.33	8.25	8.33	2.08	3.73	2.08	0.01	0.01	0.01
2021-01-18	3.00	3.20	8.20	8.42	8.28	8.39	1.92	5.99	1.93	0.01	0.01	0.01
2021-03-29	8.90	9.50	6.50	8.19	8.04	8.19	1.91	0.08	1.92	0.01	0.01	0.01
2021-04-05	4.30	4.50	7.10	8.15	8.01	8.13	2.19	1.08	2.12	0.01	0.01	0.01
2021-04-12	3.00	3.60	3.00	8.25	8.00	8.26	2.34	9.98	2.28	0.01	0.01	0.01
2021-04-19	6.00	3.40	6.40	8.18	8.14	8.17	1.99	0.97	1.96	0.01	0.01	0.01
2021-04-28	4.70	3.00	3.00	8.25	8.09	8.29	2.22	1.21	2.19	0.01	0.01	0.01
2021-05-05	10.60	4.80	10.60	8.32	7.89	8.02	1.62	1.74	1.60	0.01	0.01	0.01
2021-10-06	3.00	3.00	3.00	8.28	8.10	8.24	2.03	3.31	2.02	0.01	0.01	0.01
2021-10-13	3.00	3.00	3.00	8.32	6.97	8.30	2.10	9.03	2.08	0.01	0.01	0.01
2021-10-20	3.00	3.50	3.00	8.40	8.32	8.41	2.09	7.79	2.09	0.01	0.01	0.01
2021-10-27	9.50	18.10	3.90	8.23	7.99	8.19	1.22	0.10	1.59	0.01	0.01	0.01
2021-11-03	3.00	3.00	3.00	8.27	8.11	8.26	1.50	0.91	1.45	0.01	0.01	0.01
2021-11-12	3.00	3.00	3.00	8.17	7.96	8.19	1.61	5.55	1.59	0.01	0.01	0.01
2021-12-15	3.00	3.00	3.00	8.31	8.18	8.34	1.67	1.59	1.66	0.0025	0.0027	0.0025
2021-12-22	3.00	3.00	3.00	8.23	7.91	8.20	1.50	13.40	1.50	0.0010	0.3910	0.0013
2021-12-29	3.00	3.00	-	8.40	8.23	-	1.69	15.50	-	0.0031	0.0685	-
# Samples	18	18	17	18	18	17	18	18	17	18	18	17
Average	4.44	4.48	4.45	8.28	8.05	8.26	1.87	4.56	1.88	0.01	0.03	0.01
Maximum	10.60	18.10	10.60	8.42	8.32	8.43	2.34	15.50	2.28	0.01	0.39	0.01
Minimum	3.00	3.00	3.00	8.15	6.97	8.02	1.22	0.08	1.45	0.00	0.00	0.00

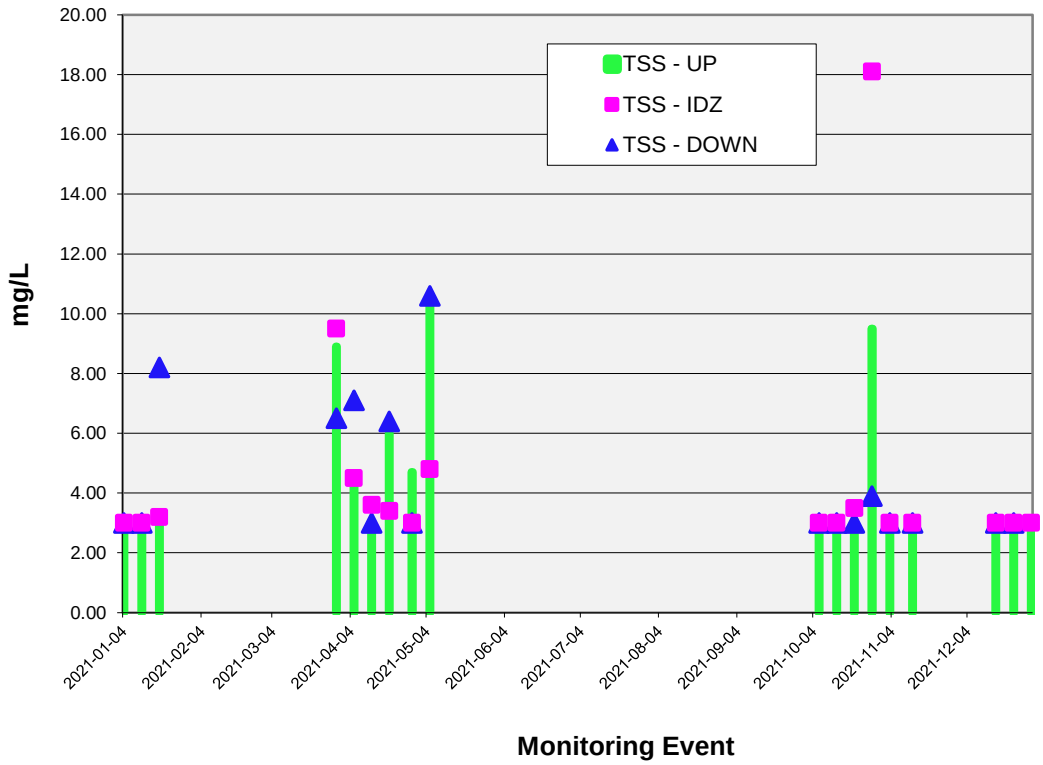
Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05
UP – Upstream
IDZ – Initial Dilution Zone
DN – Downstream

TSS

Outfall results slightly exceeded the upstream (background) results on January 18, March 29, April 5, April 12, October 20, and October 27 in 2021. Although below detection limit or low upstream and at the outfall, downstream TSS results were elevated above both on January 18, April 5, and April 19, 2021. High results were recorded at the outfall on October 27th, 2021 at 18.10 mg/L, however, the results downstream were lower than upstream.

Note that there were no changes higher than 5 mg/L (B.C. Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019; further BC AWQG) between the upstream and downstream values due to the effluent discharge with the exception of January 18th, 2021 with a very minimal change of 5.2 mg/L. The effluent results throughout the season were below their respective detection limits including January 18th, 2021.

Figure 8a
2021 TSS Results in the River Upstream, at the Outfall and Downstream

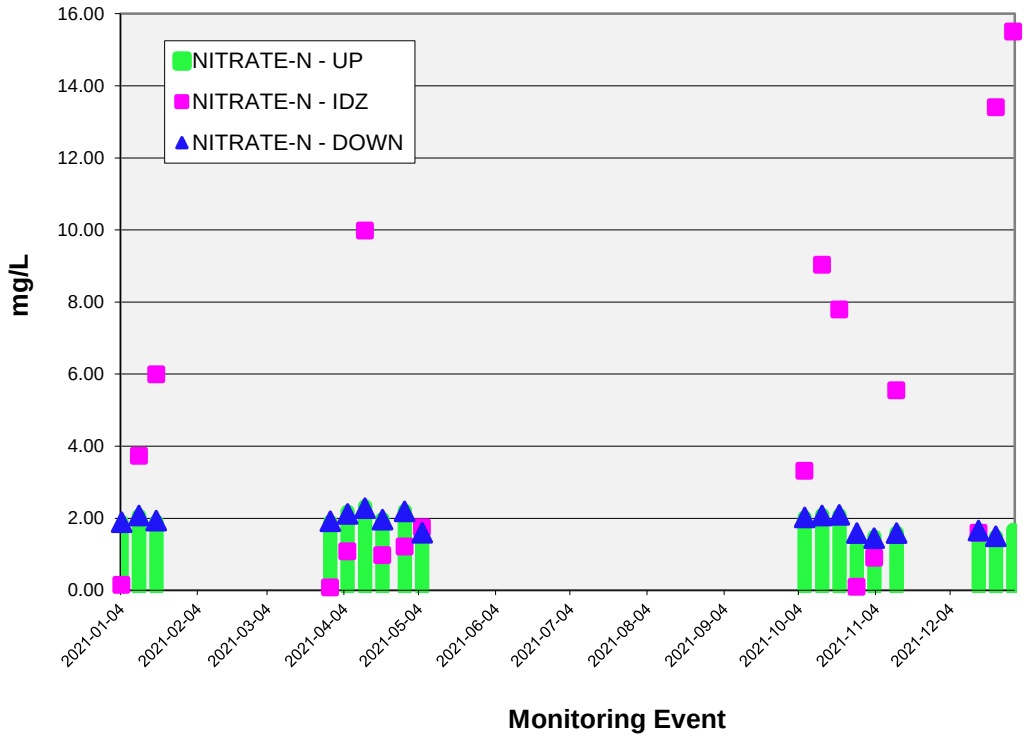


Nitrate-N & Nitrite-N

The highest levels of nitrate-n (15.5 mg/L) were observed at the outfall on December 29th, 2021. The levels of nitrate-n up-stream on the same day were significantly lower (1.69 mg/L) and the down-stream was not tested due to unsafe access. The level of nitrate-n in the effluent on the same day was 34.2 mg/L, which is consistent with other weekly samples from the plant effluent and suggests the effluent was not the cause of the elevate nitrate levels at the outfall. Note that all the downstream results were very similar to the background levels and within the BC AWQG Long Term Chronic threshold at 3.0 mg/L.

The majority of the downstream nitrite-n results were below the detection limits and, all the down-stream results were below the BC AWQG Long Term Chronic threshold at 0.02 mg/L (the most stringent guideline for chloride < 2 mg/L).

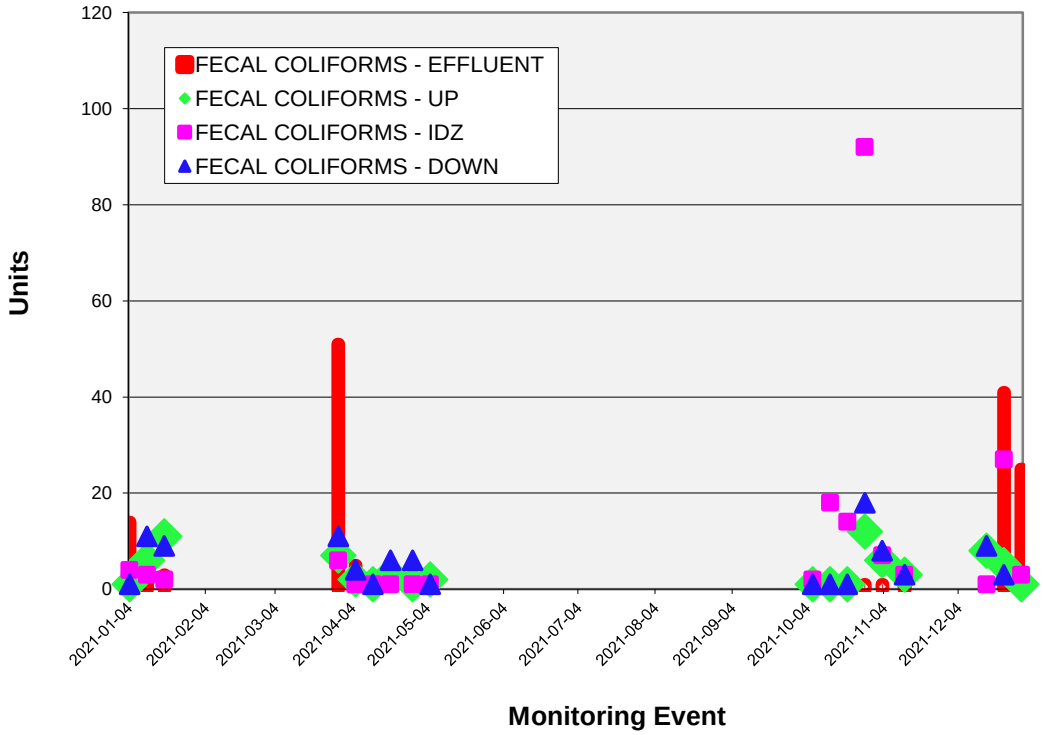
Figure 8b
2021 Nitrate-N Results in the River Upstream, at the Outfall and Downstream



Fecal Coliform

Elevated levels of coliforms were tested at the outfall on October 13, October 20, October 27, and December 22, 2021 when compared to the background location (upstream). The highest levels measured at the outfall were on October 27th. The levels were also slightly elevated upstream and down-stream. The coliform levels in the effluent on the same day were <1 CFU/100mL

Figure 8c
2021 Fecal Coliform Results in the River Upstream, at the Outfall, Downstream and Effluent



No significant changes were observed in **ammonia-n**, ***pH*** or ***phosphorus*** concentrations during any of the river sample periods. Majority of ammonia-n samples downstream were below their detection limits and/or well below the BC AWQG guideline). In general, ortho and total phosphorus was highest in the outfall but the majority of the results from down-stream were below laboratory detection limits and/or within the background (upstream) values.

Overall, the analyzed concentrations remain constant between the upstream (US) sampling zone and the downstream (DS) sampling zone. The data indicates that the plant's effluent appears not to have any adverse effect on background nutrient concentrations in the Elk River.

pH results in the downstream samples followed closely those in the upstream with no guideline (6.5 – 9.0) exceedance.

6.0 OVERVIEW OF INFLUENT TEST RESULTS

This section provides data and analysis for the plant influent (raw sewage) samples taken during 2021.

Table 6 provides a summary record of the influent test results for the period of January 4, 2021 to December 29, 2021.

Table 6
2021 Influent Results

Date	2021 Influent Results Summary					
	Flow	Temp	pH	TSS	BOD	COD
(yyyy/mm/dd)	m^3/d	C		mg/L	mg/L	mg/L
2021-01-04	458	-2.0	7.86	292.0	166.0	-
2021-01-11	391	0.0	7.96	145.0	128.0	-
2021-01-18	363	-7.0	8.05	217.0	108.0	-
2021-02-22	460	2.0	7.86	159.0	106.0	-
2021-03-29	544	-5.0	7.35	140.0	93.0	-
2021-04-05	634	0.0	7.20	126.0	90.0	-
2021-04-12	317	0.0	7.17	270.0	57.0	-
2021-04-19	293	0.0	7.42	56.8	43.0	-
2021-04-28	321	8.0	7.55	150.0	62.0	-
2021-05-05	257	6.0	8.18	43.8	37.0	-
2021-06-23	256	15.0	7.56	42.6	36.0	-
2021-07-14	481	14.0	7.62	97.1	56.0	-
2021-08-31	239	12.0	7.70	672	179.0	-
2021-09-15	174	13.0	7.20	211.0	179.0	-
2021-10-06	137	9.0	7.58	262.0	263.0	-
2021-10-13	156	0.0	7.83	68.7	58.0	-
2021-10-20	156	-1.0	8.02	130.0	54.0	-
2021-10-27	266	3.0	7.95	51.7	20.8	-
2021-11-03	171	2.0	8.13	35.6	54.0	-
2021-11-12	216	0.0	8.03	127	95.0	-
2021-12-15	240	-9.0	7.77	78.5	81.6	-
2021-12-22	482	-3.0	8.27	218.0	266.0	-
2021-12-29	421	-29.0	8.28	259.0	219.0	-
# Samples	23	23	23	23	23	0
Average	323	1.2	7.76	167.5	106.6	-
High	634	15	8.28	672.0	266.0	-
Low	137	-29	7.17	35.6	20.8	-

BOD
Inlet BOD ranged from 20.8 mg/L to 266.0 mg/L with an average of 106.6 mg/L. The average influent sewage strength was measured at 109.6 mg/L in 2020, 90.0 mg/L in 2019, 102 mg/L in 2018, 114.5 mg/L in 2017, 95.8 mg/L in 2016, 190.1 mg/L in 2015, 92.3 mg/L in 2014, 106 mg/L in 2013, 220 mg/L in 2012, 108 mg/L in 2011, 142 mg/L in 2010, 143 mg/L in 2009, 99 mg/L in 2008 and 488 mg/L in 2007. Since a typical municipal waste water BOD is in the range of 100 to 300 mg/L, it is assumed that the average BOD is well within the expected level.

TSS

TSS values ranged in the influent from 35.6 to 672.0 mg/L with an average of 167.5 compared to 2020 average at 162.7 mg/L. High value was recorded on August 31, 2021. The remaining values fall well within the expected municipal wastewater values between 100 and 350 mg/L.

7.0 OVERVIEW OF EFFLUENT RESULTS

This section provides data and analysis for the effluent (treated) samples and plant flows for 2021.

A total of 388 effluent samples were collected and analyzed for TSS; 23 of them were samples that were laboratory tested for TSS in 2021. 23 samples were laboratory tested for BOD_5, ortho-phosphate, total phosphate, fecal coliforms in 2021. 3 samples were laboratory tested for 96-hr LC50 Bioassay.

Effluent samples were collected on the same dates as influent samples to permit an evaluation of plant performance. Table 7 summarizes the laboratory effluent test results for 2021.

Table 7
2021 Effluent Results

Date	2021 Effluent Results Summary											
	Flow	Temp	NH_3-N	BOD	COD	P-OP04	Coliforms Fecal	Total P	TSS	pH	NO_3-N	NO_2-N
(yyyy/mm/dd)	m^3/d	C	mg/L	mg/L	mg/L	mg/L	cfu/100ml	mg/L	mg/L		mg/L	mg/L
2021-01-04	535	-2.0	0.050	3.4	21	0.118	14	0.301	3.0	8.16	28.6	0.050
2021-01-11	416	0.0	0.050	2.0	11	0.235	3	0.275	3.0	7.74	43.5	0.050
2021-01-18	418	-7.0	0.050	2.0	15	0.183	3	0.257	3.0	8.09	39.9	0.050
2021-02-22	502	2.0	0.050	2.0	10	0.161	2	0.203	3.0	7.95	39.2	0.050
2021-03-29	644	-5.0	0.050	2.0	10	0.403	51	0.413	3.0	7.83	17.5	0.010
2021-04-05	725	0.0	0.050	2.0	12	0.135	5	0.140	3.0	7.70	21.5	0.050
2021-04-12	409	0.0	0.050	2.0	10	0.131	1	0.169	3.0	7.78	20.9	0.010
2021-04-19	340	0.0	0.050	2.0	10	0.057	1	0.064	3.0	7.69	17.4	0.010
2021-04-28	358	8.0	0.050	2.0	10	0.080	1	0.099	3.0	7.89	16.0	0.010
2021-05-05	286	6.0	0.050	2.0	13	0.064	1	0.069	4.2	8.16	14.8	0.010
2021-06-23	272	15.0	0.050	2.3	-	0.163	1	0.209	3.0	8.06	15.5	0.010
2021-07-14	467	14.0	0.050	2.0	-	0.091	3	0.087	3.0	7.69	19.3	0.010
2021-08-31	334	12.0	0.050	2.0	-	0.239	1	0.254	3.0	7.73	41.3	0.017
2021-09-15	202	13.0	0.050	2.0	-	0.076	1	0.070	3.0	7.76	30.4	0.101
2021-10-06	165	9.0	0.050	2.0	10	0.068	1	0.210	3.1	7.94	22.2	0.079
2021-10-13	233	0.0	0.050	2.0	10	0.088	1	0.095	3.0	7.95	23.4	0.019
2021-10-20	216	-1.0	0.050	2.0	10	0.223	1	0.267	3.0	8.09	24.2	0.017
2021-10-27	338	3.0	0.050	2.0	10	0.163	1	0.181	3.0	7.93	14.5	0.010
2021-11-03	283	2.0	0.050	2.0	10	0.013	1	0.032	3.0	7.88	11.2	0.010
2021-11-12	238	0.0	0.050	2.0	10	0.085	1	0.072	3.0	7.98	15.7	0.011
2021-12-15	332	-9.0	0.020	2.0	10	0.370	1	0.415	3.0	8.08	26.3	0.012
2021-12-22	521	-3.0	0.047	2.0	16	0.369	41	0.440	3.0	7.52	40.9	2.100
2021-12-29	435	-29.0	0.913	2.0	26	0.305	25	0.310	3.1	8.05	34.2	0.419
# Samples	23	23	23	23	23	23	23	23	23	23	23	23
Average	377	1.2	0.09	2.1	12	0.166	7	0.2	3	7.90	25.6	0.14
High	725	15.0	0.91	3.4	26	0.403	51	0.4	4	8.16	43.5	2.10
Low	165	-29.0	0.02	2.0	10	0.013	1	0.0	3	7.52	11.2	0.01
Limit	1280	N/A	N/A	45	N/A	0.5	200	1	45	N/A	N/A	N/A
# Over Limit	0	N/A	N/A	0	N/A	0	0	0	0	N/A	N/A	N/A

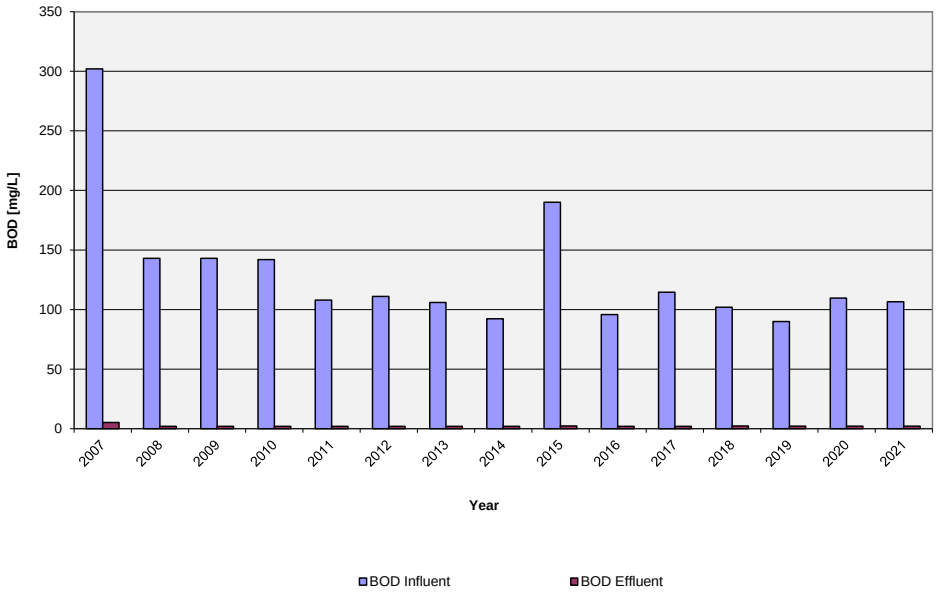
Notes: 1. Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05
2. Geometric mean is used for coliform results

7.1 RESULTS ANALYSIS

BOD

The average BOD in the effluent was 2.1 mg/L in 2021, which was low and similar to the previous years (all but one sample were below the detection limit). Historically, the average BOD was 2.1 in 2020, 2.1 in 2019, 2.3 mg/L in 2018, 2.2 mg/L in 2015, 5.0 mg/L in 2007 and <2.0 mg/L in 2017, 2016 and between 2008 and 2014. None of the samples were over the limit.

Figure 9
Historical BOD Test Results for Influent vs Effluent

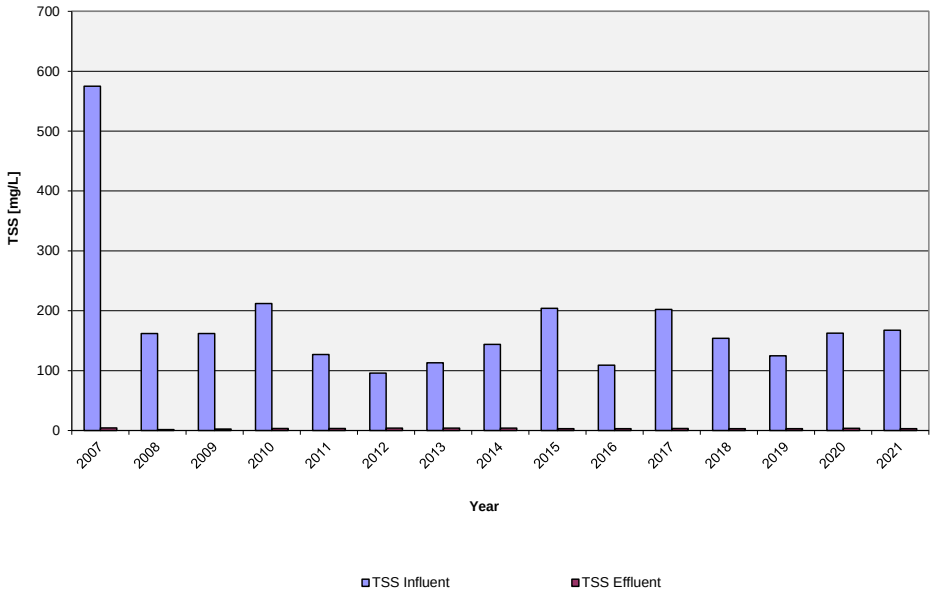


TSS

Laboratory tests indicated that majority of TSS samples were below the laboratory detection at <3.0 mg/L, the average below 3 mg/L and the highest result was at 4.2 mg/L.

The plant measured TSS on a daily basis. The highest result measured at the plant was recorded on October 29, 2021 at 12.6 mg/L. Average TSS measured at the plant was at 0.67 mg/L (January 1 to December 31, 2021). All the results measured at the plant were well below the discharge limit.

Figure 10
Historical TSS Test Results for Influent vs Effluent



Based on the above results the plant provides excellent BOD_5 and TSS treatment with average removals of almost 00%.

Fecal Coliforms

Due to the relatively low levels of TSS, UV disinfection was able to effectively control the amount of coliform concentration found in the effluent. The UV disinfection was able to keep the coliform levels well below the acceptable limits for recreational waters (200 CFU/100 mL) throughout the year as the maximum levels in the effluent were at 51 CFU/100 mL.

The levels of coliforms tested in the Elk River outfall and downstream were all low or below the acceptable limits throughout the season.

Ammonia-n

The majority of the effluent ammonia-n concentrations were below the detection limit of 0.05 mg/L with the highest results recorded on December 29th, 2021 at 0.093 mg/L. It should be noted that the results at the discharge on the same date were below the 0.05 mg/L limit.

Effluent data shows the plant is effectively oxidizing ammonia nitrogen and that there is no evidence of elevated ammonia levels in the Elk River as a result of discharge from the treatment plant.

As was the case in previous years, the bioassay toxicity tests in 2021 shows that plant effluent is non-toxic. The results of these tests are shown below in Table 8.

Table 8
Toxicity Test Results

Sample Date	Result
2021/01/11	Pass
2021/04/28	Pass
2021/10/20	Pass
2022/01/12*	Pass

Test undertaken in January 2022 is included for reference purposes only.

The levels of ortho-phosphorus and total phosphorus were below the discharge limits for 2021.

A phosphorus reduction strategy, as outlined in Section 11, was started in the winter of 2007 to address the removal of soluble phosphorus from the effluent stream. The plant has sufficient infrastructure to remove precipitated nutrients and no additional treatment processes are required.

Phosphorus in the plant effluent has no discernable impact on background nutrient levels in the Elk River, with upstream and downstream concentrations being virtually identical. A 2001 report by Highwood Environmental indicated that phosphorus releases would have a negligible impact on aquatic life in the Elk River.

FARUC completed plant modifications for phosphorous removal.

7.2 COMPLIANCE SUMMARY

Table 9 summarizes the number of days that samples exceeded MSR effluent requirements.

Table 9
2021 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m^3/day	1280	365	351.7	810	0
BOD_5	mg/L	45	23[1]	2.1	0.91	0
TSS	mg/L	45	388	3** (0.67)***	4**	0
Total Phosphorous	mg/L	1	23[1]	0.2	0.4	0
Ortho Phosphate	mg/L	0.5	23[1]	0.166	0.403	0
Fecal Coliforms*	CFU/100mL	200	23[1]	7	51	0
96 hr LC_{50} Bioassay	/	Non-toxic	3.0	/	/	0

* *Limit for recreational waters only, not included in FAR registration letter*
** *Laboratory tests only* (<3 considered at 3 mg/L)
*** *Average of daily measurements*
[1] *Only 23 laboratory tests done in 2021 instead of 25*

In 2021, all the samples for BOD, TSS, total phosphorus, ortho phosphorus, and fecal coliforms were below the MSR limits.

8.0 SLUDGE PRODUCTION AND DISPOSAL

This section provides data regarding the disposal of bio-solids (sludge) from the treatment facility in 2021.

Operation of the 200 m^3 aerated sludge digester allowed the plant to bag and landfill all of its bio-solids without resorting to vacuum truck services. All solids were transported to the Crowsnest/Pincher Creek Landfill site.

Hauling data for bagged solids are in Table 10.

Table 10
2021 Bagged Solids Data

Month	***Vol. Bagged (m^3)***
January	*271*
February	*215*
March	*311*
April	*311*
May	*280*
June	*204*
July	*232*
August	*281*
September	*154*
October	*71*
November	*118*
December	*132*
Total	***2571***

The aerated sludge digester has allowed the operators to store liquid sludge during peak winter weekend periods and bag at the less active midweek times, avoiding the need for emergency vacuum truck services. Sludge bag data indicates the winter season is most active for the plant.

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

9.0 BYPASS EVENTS

This section provides information about bypass events in 2021.

Bypass events result in elevated effluent suspended solids concentrations, which decrease the effectiveness of the UV disinfection system; an increase in TSS results in a simultaneous increase in coliform counts. While soluble BOD is removed though the aeration basins, the overflow of TSS also results in an increase in BOD readings due to the presence of biological floc.

There were no bypass events in 2021.

10.0 PLANT IMPROVEMENTS

In January of 2015 the plant was retrofitted with a submersible pump in the Clearwell in order to utilize Clearwell effluent to spray down clarifiers. This was done to rectify the discrepancy between influent and effluent flows and to hopefully reduce the effluent flows. As seen in Figure 1 and Table 3, the influent and effluent flows were very similar and the total effluent and average effluent decreased from 2014.

The continuous strive for the improvements of the Waste Water Treatment System by FARUC will continue along with minimization of the potable water use i.e. clear well water will be used to spray down the clarifiers instead of potable water.

There were no major plant improvements in 2021, however FARUC has recognized that the current bagger disposal method is near capacity and will need upgrading in the near future.

11.0 PHOSPHORUS REMOVAL

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

In the winter of 2007, the plant increased chemical dosing with Clearpac to reduce effluent phosphorus concentrations. By late January 2008 sample results showed marked improvement with both ortho and total phosphorus concentrations falling below discharge requirements.

The increased application of Clearpac in 2008, while effective, has been operationally costly; the relationship between chemical dose and nutrient removal will be adjusted for best efficiency.

The monitoring and removal program continued in the summer of 2008 with the plant evaluating additional removal strategies, including:

- Implementation of sampling procedures to measure total phosphorus concentrations at the following locations; auger monster (raw sewage), clarifier supernatant, RBC overflow, mix tank liquor, sand filter filtrate, filter backwash, sludge digester supernatant, and effluent,
- Evaluation of precipitant dose on effluent phosphorous levels at the current chemical addition point (clarifier overflow),
- Evaluation of changing the precipitant dose location, and
- Evaluation of alternative chemicals.

The plant planned to continually monitor and optimize coagulant dosages for improved phosphorus removal.

In 2009 upgrades to the phosphorus injections points and mixing tanks began. In the spring of 2011 the final stage of this improvement was completed with the installation of a rapid mixer and flocculation system and the relocation of the UV system. This resulted in the better usage of tertiary filtration. Longer runs, less backwash water, better phosphorus removal and better effluent quality were to be the result.

2010 data shows further improvement in phosphorus concentrations with only three exceedances for ortho phosphorus (all results for total phosphorus were below the limits) with only a 15% exceedance compared to 2008 results with 50% exceedance and to 2009 with only a 18% exceedance.

2011 data showed further improvement in phosphorus concentrations with only one exceedances for each total phosphorus and ortho-phosphorus, both on July 14th, 2011. The exceedances for ortho phosphorus was only 4% and for total phosphorus was only 13% above the limit with is less than those of previous years.

The 2012 data showed similar results to that of 2011. Two samples exceeded the limit both for ortho phosphorus. The exceedance was 14% on January 5th and 16% on December 27th. It was anticipated that the program will continue to show improvement to plan effluent quality in 2013.

The 2013 data showed slightly elevated results to that of 2012. Six samples exceeded the limit for ortho phosphorus and one for total phosphorus. The exceedance ranged from 4% to 54% for ortho phosphorus and 9% for total phosphorus. The exceedances for ortho phosphorus were observed on January 3rd, January 17th, January 23rd, February 26th, July 30th and December 26th. The exceedance for total phosphorus was observed on January 3rd.

The 2014 data showed slightly lower results than those in 2013. Only one sample for each total and ortho phosphorus were above the limits. The exceedance was 9% for ortho-phosphorus and 40% for total phosphorus. The exceedance for ortho phosphorus was observed on December 21st. The exceedance for total phosphorus was observed on January 16th.

The average total phosphorus and ortho phosphorus for 2015 were slightly lower than in 2014. Three samples exceeded the limit for ortho phosphorus and none for total phosphorus. The exceedances for ortho phosphorus were 22% on January 1st, 3% on January 7th and 19% on December 22nd.

The average total phosphorus and ortho phosphorus for 2016 were similar to previous years. One sample exceeded the limit for ortho phosphorus and one for total phosphorus. The exceedance for ortho phosphorus was 18% December 28th and for total phosphorus was it 23% on December 28th.

The results for total and ortho phosphorus have decreased and during the 2017 season, all the ortho and total phosphorus results were below the discharge limits.

The results for total phosphorus remained low (no days above the discharge limit) for 2018. There was one ortho phosphorus result from March 21st that slightly exceeded the discharge limit (0.703 mg/L vs 0.5 mg/L); however all the remaining results were below the discharge limit for the year.

In 2019 and 2020 the results for total phosphorus remained low and mostly below the discharge limit of 1 mg/L with one ortho-phosphorus exceedance in 2019 and two exceedances in 2020.

In 2021, all the results ortho- and total phosphorus were below the discharge limits.

Figure 11
Total Phosphorus Levels 2007-2021

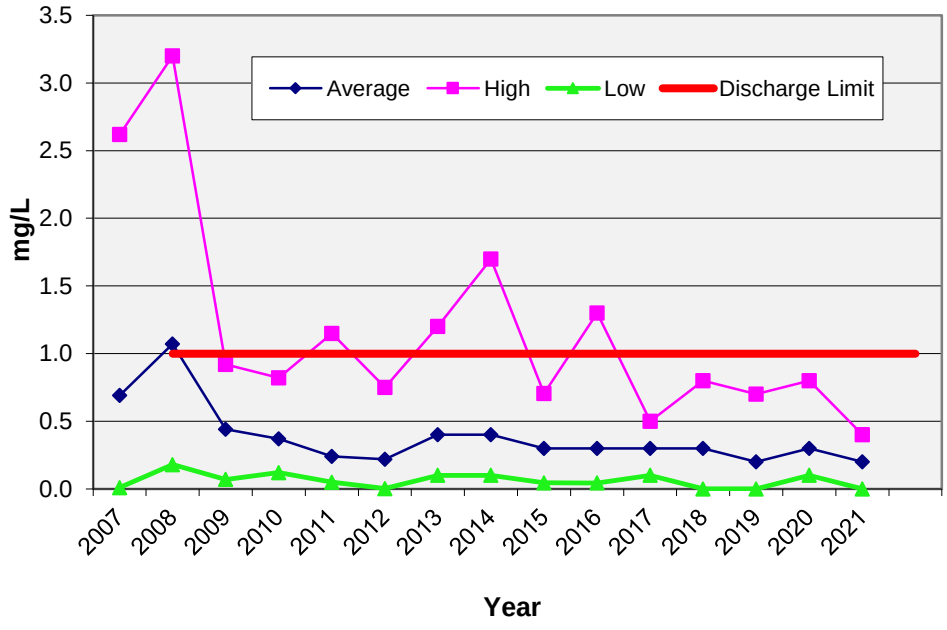
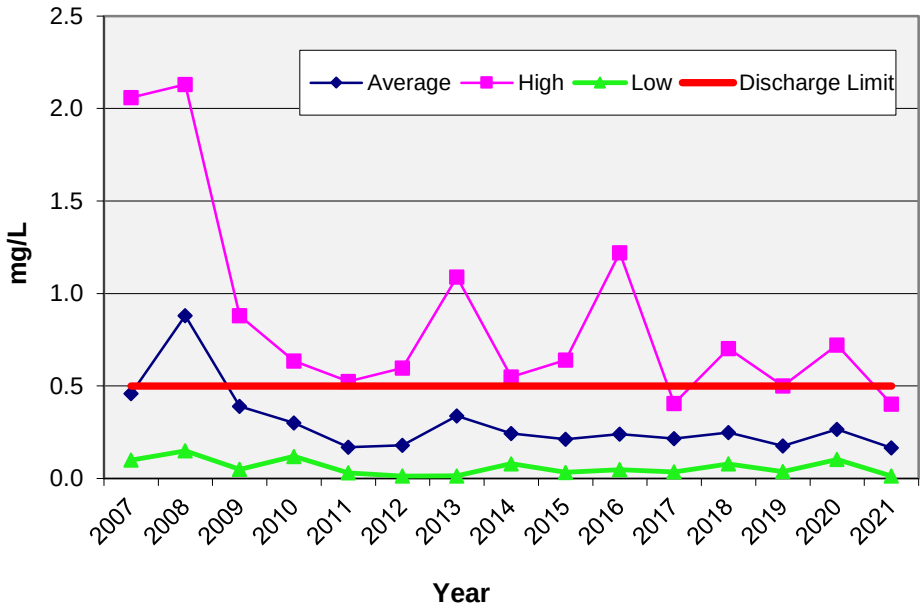
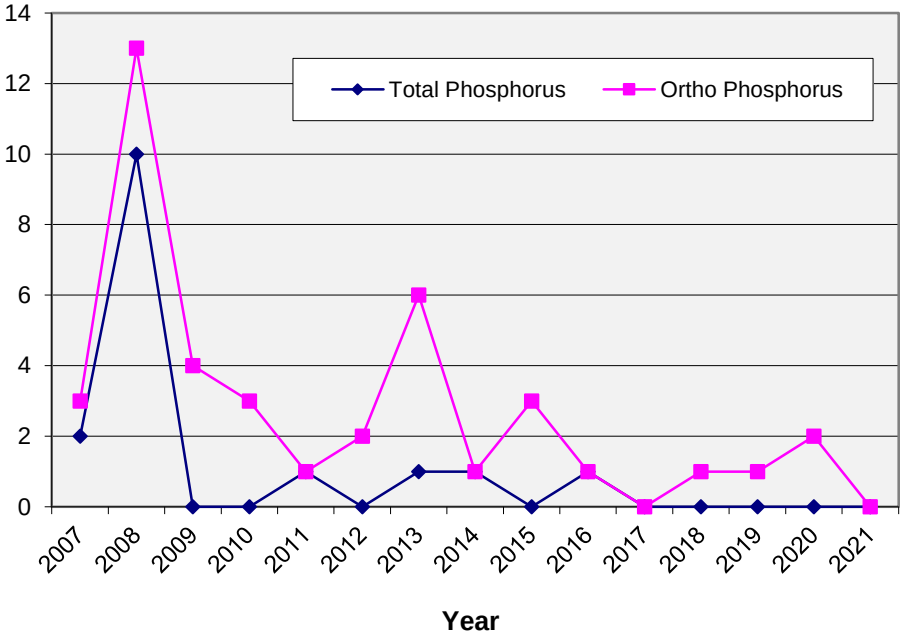


Figure 12
Ortho Phosphorus Levels 2007-2021

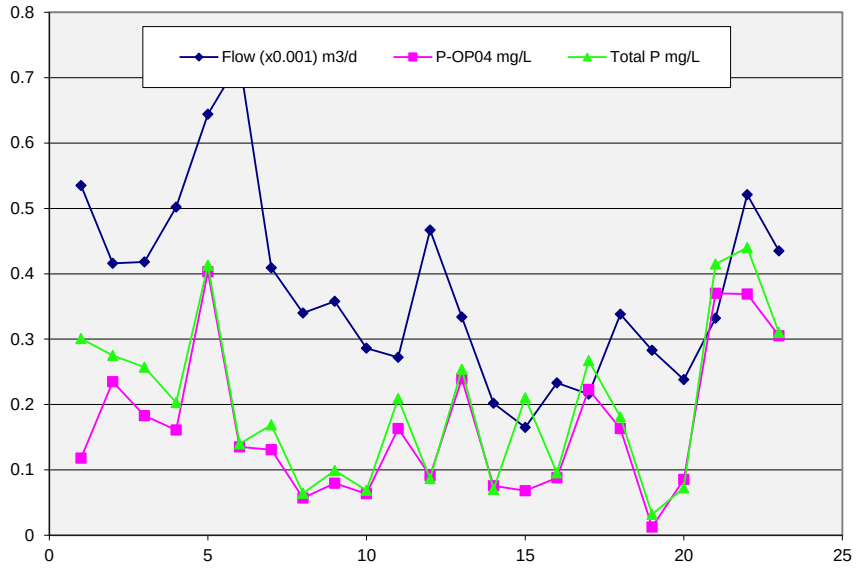


.Figure 13
Days over Limit 2007-2021



Phosphorus and ortho-phosphorus follow relatively closely the effluent flows in the plant as shown below.

Figure 14
Total Flow and Phosphorus Levels



12.0 ASSESSMENT SUMMARY

In 2021 the number of samples for BOD, total phosphorus, ortho-phosphorus and fecal coliform did not comply with the MSR requirements; however all the results were below the discharge limits.

There does not appear to be any significant adverse impacts to the Elk River from the effluent discharged.

The plant has produced high quality effluent with ***BOD_5*** normally below the regulated limit of 45 mg/l and the majority of the results at less than 2 mg/L.

TSS results were less than laboratory detection limit for the majority samples tested and, therefore, below the MSR allowable limits. All daily samples from the plant were also low and below the limits.

Nitrogen
Ammonia-n results in the effluent were low with majority below the laboratory detection limits. Elevated result was detected in December 2021 with the results at the discharge below the applicable guideline.

Nitrate-n values vary between 11.2 and 43.5 mg/L, these values are fairly typical for a municipal wastewater effluent and fairly consistent throughout the years. Nitrite-n values are also very low with majority of the results below the detection limits; elevated nitrite-n results were detected in December with very low to no impact to the river downstream.

Nitrogen results indicate that the plant functioned well again in 2021.

Phosphorus and Ortho-phosphorus
There has been a significant decrease in both total phosphorus and ortho-phosphorus concentrations as well as non-compliance events during the last several years. In 2021 all the ortho- and total phosphorus concentrations were below the discharge limits.

Fecal Coliforms
Generally, fecal coliforms in the effluent conformed to the applicable discharge levels throughout the year. Elevated coliform levels in the effluent did not coincide very well with elevated levels found in Elk River at the outfall and downstream.

Operation of the sludge digester has eliminated the need for emergency liquid sludge hauling. All sludge was bagged and disposed of at the approved landfill site.

FARUC recognizes the requirement to inspect the diffuser (outfall) every five years, an inspection was completed in the summer of 2021 by Urban Systems. FARUC is currently reviewing the draft report with US.

A new subdivision has been approved and is currently under construction (Timberlanding). A capacity report from Urban Systems has been submitted and approved by the RDEK for the tying in of the subdivision into the WWTP. Details of the subdivision at build-out include 48 single family lots (27 in the first phase). The second phase includes the remaining 21 single family lots and 2 multifamily lots, each with a maximum density of approximately 56 units. Please note the first phase also includes 4 infill lots on Lower Timberline Crescent.

Analysis shows sufficient capacity in the WWTP for the development but may require an increase to the maximum allowable daily discharge at build out of Phase 2. Please note that when the WWTP was upgraded in 2005, additional capacity was built into the plant which would allow it to operate to a

maximum flow of 1760 m^3. In order to utilize this capacity, a license amendment to increase the maximum daily flow from 1280 m^3 to 1760 m^3 will be required. The facility operators will have to monitor flows closely and ensure this application happens in a timely fashion. Other upgrades may be required to achieve this capacity.

13.0 AUTHORIZATION AND CLOSING

This report, titled *2021 Sewage Treatment Plant Annual Report,* was prepared for FARUC 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.

27/04/2022

Jana Zverina, M.Sc., P. Eng.
Manager, Water & Wastewater

IQWater Inc.
Permit #1003055

27/04/2022

iqw/jobs/W2020-019.2021

14.0 REFERENCES

American Public Health Association, American Water Works Association and the Water Environment Federation: Standard Methods for Examination of Water and Wastewater

American Public Health Association, American Water Works Association and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 23rd Edition

BC Environmental Management Act, Municipal Wastewater Regulation B.C. Reg. 87/2012, lasts Amended April 1st, 2018 by B.C. Reg. 46/2018

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

BC Ministry of Environment & Climate Change Strategy, British Columbia Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019

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 2020

15.0 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 affection 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 nay 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 11 - Fernie Alpine Resort Estimated Sewage Generation (m3/day)

Existing Development	Flow* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 Generation (m3/day)	2022 Generation (m3/day)
Griz Inn	1136	45	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Wolf's Den	318	42	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Cornerstone	1136	26	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Timberline Condos	1022	58	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3
Polar Peaks (4-Plex Units)	1136	24	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3
Timberline Single Family & B&B	1363	51	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5
	Subtotal	**246**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**	**250.1**

Infill Units	Flow* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 Generation (m3/day)	2022 Generation (m3/day)
Timberline Infills	1022	141	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1
Timberline Single Family	1363	2	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Timberline Infills	1022	106	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3
Timberlanding Multifamily	1022	45	60.0	60.0	60.0	60.0	60.0	60.0	60.0	46.0	46.0	46.0	46.0	46.0
Timberlanding Single Family[1)]	1363	59.5	44.3	44.3	44.3	44.3	44.3	44.3	44.3	81.1	81.1	81.1	81.1	81.1
Highline Infill	1022	26	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6
	Subtotal	**379.5**	**386.0**	**386.0**	**386.0**	**386.0**	**386.0**	**386.0**	**386.0**	**408.8**	**408.8**	**408.8**	**408.8**	**408.8**

Highline Subdivision	Flow* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 Generation (m3/day)	2022 Generation (m3/day)
Single Family	1363	54	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	73.6	73.6	73.6	73.6
Duplexes	1363	10	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Parcel 31-Condotel	318	61	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Parcel 32-Duplex	1363	16	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Parcel 36-Hotel	318	101	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Parcel 37-Townhouses	1363	8	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Parcel 38-Townhouses	1363	23	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Parcel 3-Condominium	1363	12	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Parcel 8-Condominium	1363	42	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2
	Subtotal	**327**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**276.4**	**276.4**	**276.4**	**276.4**

Day Users	Flow* (l/unit/day)	Population (each)	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 Generation (m3/day)	2022 Generation (m3/day)
Skiers	36	700	252	252	252	252	252	252	252	252	252	252	252	252
	Subtotal	**700**	**252**	**252**	**252**	**252**	**252**	**252**	**252**	**252**	**252**	**252**	**252**	**252**

Dining Facilites/Bars	Flow* (l/m^2/day)	Area (m2)	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 Generation (m3/day)	2023 Generation (m3/day)
Lizard Creek - Dining	97	54.7	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Lizard Creek - Bar	145	40.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Kelseys - Dining	97	204.4	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Kelseys - Bar	145	65	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Daylodge - Dining	97	358.6	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8
Daylodge - Bar	145	260.7	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8
Mean Bean	97	26.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Gabrielles	97	133.8	13	13	13	13	13	13	13	13.0	13.0	13.0	13.0	13.0
Powder House Inn	97	232.2	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Bears Den	97	62.4	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
	Subtotal	**1439**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**	**157.2**

Daily Wastewater Flow (m3/day)*	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6	1344.5	1344.5	1344.5	1344.5
Corrected Daily Peak Flow Projections**	989 (actual)	811***(actual)	1181 (actual)	1036 (actual)	1058 (actual)	844 (actual)	1095 (actual)	687 (actual)	1043 (actual)	925 (actual)	810 (actual)	1062 (projected)

*Estimated Wastewater flows from BC Health Act, Sewage Disposal Regulation

**Based on 2005 flow for peak day flows

*** Note that the number does not reflect a true peak as all the data were not available during high flow months

1) 27 units added for Phase 1 Timberlanding in 2018


Highline Estates
Highline Drive
Ref. NEP60893
Snow Pines
Boomerang
HWY. NO. 3
Ref. NEP60893
R/W NEP60897
Thunder Ridge
Lizard Creek Lodge
Tamarack
Stone Creek
Bears Paw
Cedar Ridge
NEG2194
WELL # 2
WELL # 1
ELK QUAD
NEG2213
Snow Creek Lodge
Ref. NEP60893
Highline Drive
R/W NEP20793
Lower Timberline
Griz Inn
NEP21811
KN08092
Ref. NEP60893
Timberline Infill
MIGHTY MOOSE
R/W NEP13748
Cornerstone
Ref. 18850
Exp. 15606
Lower Timberline
TREATMENT BLDG
Wolfs Den
NEP59141
Timberline Lodges
Phase 1
Upper Timberline
NEP59794
NEG2139
Polar Peak
Upper Timberline
Exp. 15606
Rem. Blk. A
P. 1687
Timberline Infill
DEER CHAR
TIMBER FOX EXPRESS QUAD
Ref. 10144
D.L. 6901
Blk. B
Timberlanding Phase 1
NEP19500
Timberlanding Phase 1

January 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.28	16:30	0.65	16:30			0.59	6:45	0.23	10:45	0.27	11:00			0.35	14:15					0.49	13:45	83	534	617	0.149	0.192			
2	1.08	14:30	0.51	14:30			0.34	9:00	0.21	11:15			0.29	11:45	0.45	11:30							72	517	589	0.146	0.231			
3	1.16	14:30	0.63	14:30			0.28	9:00	0.38	11:45					0.49	12:45	0.7	12:30					76	513	589	0.196	0.242			
4	1.13	13:00	0.63	13:00			0.70	6:30	0.44	7:15	0.29	11:30			0.43	14:30			0.33	14:45			77	514	591	0.151	0.268			
5	1.31	12:30	0.89	12:30			0.26	6:30	0.43	14:30			0.42	13:15	0.47	9:15					0.52	13:45	74	623	697	0.103	0.274	< 1 / < 1	< 1 / < 1	WWTP, Maintenance
6	1.16	13:00	0.97	13:00			0.44	7:15	0.17	15:45					0.52	12:45	0.68	12:30					74	449	523	0.087	0.147			
7	1.12	14:30	0.81	14:30			0.30	9:30	0.37	10:45					0.71	11:00			0.62	11:15			75	348	423	0.082	0.149			
8	1.16	15:45	0.69	15:45			0.40	8:45	0.15	17:00	0.09	11:00			0.19	16:30					0.58	16:15	71	478	549	0.059	0.134			
9	0.98	13:00	0.77	13:00			0.61	8:45	1.17	8:30			0.47	11:00	0.64	10:30							68	453	521	0.066	0.139			
10	1.45	12:15	0.59	12:15			0.21	10:00	0.31	13:45					0.71	13:30	0.49	14:00					64	364	428	0.083	0.146			
11	0.85	13:00	0.94	13:00			0.31	8:45	0.71	15:00	0.31	11:30			0.22	14:30			0.62	12:00			72	338	410	0.084	0.147	< 1 / < 1	< 1 / < 1	Pantry, Lizard
12	1.4	16:00	0.91	16:00			0.66	6:30	0.76	8:30			0.81	9:15	0.83	9:00							68	521	589	0.084	0.141			
13	1.06	13:00	1.15	13:00			0.41	13:30	0.85	10:00					0.97	8:30	1.44	10:15					116	408	524	4.83	0.323			
14	0.72	13:30	0.74	13:30			0.30	6:00	0.76	10:00					0.90	15:30			0.92	15:15			13	191	204	0.91	0.426			
15	0.45	14:30	0.75	14:30			0.41	9:00	0.80	14:00	0.48	11:00			0.91	17:45					0.82	11:30	205	354	559	0.361	0.211			
16	0.66	13:15	0.87	13:15			0.27	9:00	1.09	10:45			0.71	9:00	1.14	9:30							147	365	512	0.233	0.213			
17	1.12	13:30	0.76	13:30			0.26	10:00	0.86	10:15					1.21	9:30							136	243	379	0.187	0.201			
18	0.95	13:30	0.62	13:30			0.20	7:00	1.05	16:45	0.65	15:00			1.15	8:30			0.71	13:00			120	350	470	0.161	0.145			
19	0.91	13:15	0.77	13:15			0.04	7:00	0.38	16:30			0.95	9:15	1.08	9:45					1.39	9:45	108	621	729	0.135	0.3	< 1 / < 1	< 1 / < 1	Tamarak, Snow Creek
20	1.38	13:45	0.98	13:45			0.26	7:00	0.60	9:00					0.78	8:30	0.64	8:30					104	32	136	0.12	0.348			
21	1.51	14:30	0.91	14:30			0.11	9:00	1.02	10:45					1.52	11:00			0.82	11:15			97	434	531	0.117	0.171			
22	1.28	16:30	1.08	16:30			0.20	9:00	0.94	9:15	0.48	13:00			0.99	16:15					0.62	13:15	98	352	450	0.113	0.197			
23	1.18	13:45	0.93	13:45			0.23	9:00	0.62	10:00			1.06	10:30	1.63	10:00							84	416	500	0.1	0.206			
24	1.1	14:00	1.14	14:00			0.10	9:00	0.85	11:00					1.55	10:45	0.89	11:00					103	131	234	0.102	0.151			
25	1.12	13:45	1.14	13:45			0.09	7:30	0.16	10:45	0.65	10:30			0.20	8:45			0.01	14:30			100	344	444	0.1	0.073			
26	1.06	13:45	1.19	13:45			0.44	7:30	0.45	10:30			1.03	8:45	1.60	8:30					1.51	8:45	90	512	602	0.098	0.205	< 1 / < 1	< 1 / < 1	WWTP, Maintenance
27	0.66	13:45	1.06	13:45			0.47	9:00	1.55	10:30					1.59	9:30	0.9	9:30					80	345	425	0.098	0.203			
28		14:00	1.08	14:00			0.47	11:00	1.51	10:45					1.70	11:45			1.01	14:00			79	381	460	0.1	0.23			
29	1.29	16:00	0.91	16:00			0.04	5:15	1.23	6:45	0.67	12:15			1.13	12:30					0.75	12:30	82	228	310	0.097	0.077			
30	0.9	14:00	1.59	14:00			0.21	8:30	0.70	15:30			0.12	10:00	0.07	10:15							66	368	434	0.095	0.777			
31	0.11	14:00	0.89	14:00			0.35	9:00	0.80	10:00					1.41	9:15	1.26	9:30					70	485	555	0.098	0.186			
Average	1.05		0.89		#DIV/0!		0.32		0.70		0.43		0.65		0.89		0.88		0.63		0.84		89.42	393.94	483.35	0.30	111.00			
Median	1.12		0.89		#NUM!		0.3		0.71		0.48		0.71		0.9		0.795		0.665		0.685		80	381	512	0.102	0.201			
Total	31.54		27.55		0		9.96		21.55		3.89		5.86		27.54		7		5.04		6.68		2772	12212	14984	9.345	6.853	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 and New reservoir continue to act as the end point in the system so residuals may be lower than 0.5mg/L.

During the reporting period the water system was in compliance with permit requirements.

All items within the reporting period met interior healths current requirements for our water system.

February 2021 Water Report for Fernie Alpine Resor Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	0.36	15:30	0.92	15:30	0.53	15:30	0.31	8:30	0.57	9:45	15:21	10:15			0.00	9:00	0.82	11:00	1.05	10:30	0.14	10:45	72	457	529	0.108	0.078	<1 / < 1	< 1 / < 1	Lizard Creek, Pantry & raw river well#1
2	0.73	12:00	1.42	12:00	0.71	12:15	0.3	7:00	0.12	9:15			0.22	9:30	0.00	9:00					0.81	14:45	54	529	583	0.105	0.16			
3	1	14:00	0.89	14:00	0.46	14:00	0.2	8:00	0.09	9:15					1.41	8:15	0.66	8:30					82	390	472	0.108	0.23			
4	1.4	15:30	0.79	15:30	0.46	11:45	0.31	9:00	0.84	11:30					0.90	14:00			0.82	11:15			76	268	344	0.1	0.203			
5	1.04	15:00	0.89	15:00	0.62	12:00	0.25	9:00	0.68	11:00	0.67	12:15			1.61	11:30					1.2	11:45	65	276	341	0.099	0.196			
6	0.74	13:45	0.72	13:45	0.59	13:00	0.25	9:00	0.82	12:00			0.98	9:15	1.64	9:00							60	522	582	0.099	0.193			
7	0.5	12:15	1.08	12:15	0.73	16:00	0.28	8:15	0.82	15:00					1.50	10:00	0.8	10:15					58	369	427	0.087	0.176			
8	0.28	10:30	0.98	10:30	0.69	12:00	0.27	11:00	0.76	10:00			1.13	10:15	1.59	10:30			1.03	10:30			57	539	596	0.088	0.18	<1 / < 1	< 1 / < 1	Tamarak, Snowcreek & raw river well#1
9	0.37	13:45	0.99	13:45	0.58	14:30	0.55	9:00	0.21	12:30			0.02	9:30	0.63	9:00					0.59	9:45	68	316	384	0.086	0.126			
10	1.7	13:30	0.94	13:30	0.48	13:30	0.63	9:00	1.27	15:30	1.48	11:15			0.29	9:15	0.96	9:30					58	431	489	0.086	0.092			
11	1.12	14:45	0.78	14:45	0.54	14:00	0.3	12:30	0.95	10:30					0.30	11:30			0.63	11:15			60	390	450	0.087	0.147			
12	1.06	12:30	0.67	12:30	0.45	12:00	0.27	11:00	0.72	14:00	0.42	12:45			0.39	12:30					0.08	13:00	51	244	295	0.086	0.081			
13	1.34	15:00	0.57	15:00	0.37	11:00	0.44	10:00	0.60	12:00			0.59	9:00	0.37	9:15							63	407	470	0.089	0.086			
14	1.67	12:45	0.58	12:45	0.33	13:00	0.36	8:00	0.72	15:45					0.52	10:30	0.44	10:15					49	477	526	0.093	0.178			
15	1.12	11:30	0.64	11:30	0.62	12:00	1.01	6:00	0.72	7:00			0.52	11:45	0.51	10:45							40	1245	1285	0.088	0.063			
16	1.06	9:45	0.62	9:45	0.59	11:15	0.13	8:00	0.81	11:15	0.19	11:30			0.57	9:00					0.7	15:00	49	585	634	0.087	0.129	<1 / < 1	< 1 / < 1	WWTP, Maintenance & raw river well#1
17	1.34	9:30	1.32	9:30	0.1	10:30	0.13	10:45	0.32	11:00					0.50	8:45	0.5	9:00					51	732	783	0.088	0.294			
18	1.67	14:15	0.65	14:15	0.38	11:00	0.25	11:30	0.45	11:00					0.00	11:45			0.35	12:00			59	620	679	0.088	0.061			
19	0.97	13:00	0.43	13:00	0.35	12:15	0.11	12:00	0.45	10:30	0.15	12:30			0.44	13:30					0.31	13:45	46	439	485	0.087	0.431			
20	1.08	12:15	0.62	12:15	0.49	12:00	0.26	11:30	0.46	15:00			0.6	8:30	0.56	9:00							46	571	617	0.087	0.002			
21	1.02	10:00	0.73	10:00	0.46	16:45	0.34	11:30	0.37	15:00					0.01	11:00	0.41	12:00	0.52	12:15			44	456	500	0.087	2.381			
22	0.75	12:00	0.57	12:00	0.52	11:45	0.11	10:00	0.22	11:30					0.00	18:00	0.12	14:00			0.08	14:15	49	601	650	0.096	0.164	<1 / < 1	< 1 / < 1	Lizard Creek, Pantry & raw river well#1
23	0.37	9:45	0.71	9:45	0.47	13:45	0.13	9:00	0.49	14:00			0.57	13:15	0.49	13:00					0.1	13:15	44	493	537	0.096	0.076			
24	0.45	15:00	0.38	15:00	0.32	9:30	0.14	10:15	0.56	8:15	0.32	9:15			0.50	9:45	0.9	10:00					57	523	580	0.089	0.065			
25	0.76	11:00	0.91	11:00	0.3	15:00	0.33	9:00	0.24	14:00					0.45	9:00							38	459	497	0.088	0.112			
26	0.99	13:45	0.54	13:45	0.5	13:30	0.62	12:50	0.35	9:30	0.43	13:15			0.50	14:45					0.42	13:30	48	615	663	0.088	0.07			
27	1.51	12:25	0.53	12:25	0.27	14:30	0.11	8:30	0.12	14:45			0.1	9:00	0.50	8:45							40	528	568	0.09	0.525			
28	1.58	13:30	0.54	13:30	too low		0.35	7:15	0.18	15:45					0.44	10:30	0.15	11:00	0.38	11:30			44	37	81	0.089	0.078			
29																									0					
30																									0					
31																									0					
Average	1.00		0.76		0.48		0.31		0.53		0.54		0.53		0.59		0.58		0.68		0.44		54.57	482.82	485.39	0.09	0.23			
Median	1.03		0.715		0.48		0.275		0.525		0.425		0.57		0.5		0.58		0.63		0.365		52.5	468	500	0.088	0.138			
Total	27.98		21.41		12.91		8.74		14.91		4.3		4.73		16.62		5.76		4.78		4.43		1528	13519	15047	2.569	6.577	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 and New Reservoir continue to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

March 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.75	12:45	0.59	12:45	0.32	13:00			0.18	10:30			0.15	11:15	0.33	10:00			0.21	11:00			41		41	0.089	0.11	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
2	1.5	15:00	0.61	15:00	0.27	10:15	0.43	8:00	0.34	14:15					0.38	8:15					0.57	10:00	44	1303	1347	0.087	0.112			
3	1.24	12:50	0.66	12:50	0.35	8:30	0.31	8:00	0.30	9:30	0.37	8:30			0.36	8:00	0.61	8:15					37	518	555	0.087	0.189			
4	0.52	15:45	0.52	15:45	0.32	15:30	0.42	8:00	0.09	10:00					0.10	10:00			0.3	10:15			45	449	494	0.087	0.377			
5	0.71	12:15	0.48	12:15	0.4	12:00	0.28	8:45	0.12	10:40	0.14	11:45			0.35	11:15					0.2	11:30	37	613	650	0.088	0.292			
6	1.06	13:45	0.51	13:45	0.41	13:30	0.39	9:15	0.30	13:00			0.34	12:45	0.42	10:45							51	682	733	0.118	0.116			
7	1.22	13:00	0.51	13:00	0.43	12:45	0.19	8:00	0.36	10:00					0.36	11:00	0.42	10:45	0.38	10:30			53	738	791	0.120	0.084			
8	1	13:00	lo water	13:00	0.31	7:30	0.19	7:00	0.34	10:30	0.32	10:45			0.39	10:00							59	195	254	0.109	0.132	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
9	1.08	13:00	0.57	13:00	0.12	13:30	0.20	6:30	0.56	8:30			0.55	8:45	0.48	8:30					0.43	9:00	68	810	878	0.100	0.117			
10	1.16	11:30	0.6	11:30	0.38	11:45	0.47	8:45	0.50	15:30	0.49	10:15			0.31	10:00	0.49	10:15					50	580	630	0.095	1.909			
11	1.2	10:15	lo water	10:15	0.44	10:00	0.23	9:00	0.32	16:15					0.42	16:00			0.35	15:45			43		43	0.091	1.047			
12	1.62	13:15	0.62	13:15	0.14	13:15	0.27	7:00	0.30	12:00	0.33	9:45			0.38	10:00					0.4	10:15	53	548	601	0.088	0.081			
13	1.6	12:40	0.74	12:40	0.15	13:00	0.31	9:00	0.22	15:15			0.48	8:30	0.38	8:45							46	1027	1073	0.087	0.075			
14	1.06	14:00	0.77	14:00	0.14	13:00	0.33	9:00	0.22	15:00					0.45	10:30	0.11	10:15	0.26	9:30			50	634	684	0.087	0.083			
15	1.37	14:30	0.68	14:30	0.15	15:30	0.16	8:00	0.13	8:45					0.39	9:30	0.22	11:15			0.12	11:30	60	551	611	0.099	0.084	< 1 / < 1	< 1 / < 1	Pantry, Lizard Creek Lodge
16	0.46	15:30	0.68	15:30	0.36	10:00	0.26	9:00	0.79	12:00			0.94	11:15	0.71	11:15					1.14	9:15	83	475	558	0.171	0.09			
17	0.27	15:00	0.21	15:00	0.28	14:45	0.31	9:00	0.19	16:30	0.29	14:30			0.64	12:30	0.24	12:45					99	629	728	0.144	0.079			
18	0.5	16:30	0.52	16:30	0.3	13:30	0.28	9:00	0.29	16:00					0.33	13:00			0.4	13:15			120	411	531	0.130	0.07			
19	0.63	13:00	0.37	13:00	0.28	12:45	0.34	14:30	0.32	11:00	0.21	12:30			0.32	12:30					0.22	12:15	106	418	524	0.344	0.03			
20	0.72	13:45	0.66	13:45	0.19	16:00	0.33	9:00	0.32	16:15			0.39	11:00	0.41	10:45							192		192	0.440	0.089			
21	0.64	11:00	0.71	11:00	0.27	15:15	0.35	8:00	0.37	8:30					0.41	14:00	0.48	14:45	0.73	15:00			172	451	623	0.275	0.1			
22	0.61	9:45	0.31	9:45	0.19	16:00	0.37	7:00	0.32	12:00					0.47	8:45	0.32	10:30			0.51	10:45	160	477	637	0.194	0.099	< 1 / < 1	< 1 / < 1	Pantry, Lizard Creek Lodge
23	0.88	9:30	0.71	9:30	0.31	16:00	0.33	8:00	0.54	14:15			0.31	8:30	0.51	8:30							132	539	671	0.137	0.095			
24	0.94	15:30	0.62	15:30	0.2	16:30	0.43	8:00	0.42	13:00	0.23	13:00			0.50	14:00	1.13	14:45					149	331	480	0.137	0.044			
25	0.97	14:30	0.61	14:30	0.98	15:00	0.35	8:00	0.30	11:00					0.54	17:30			0.72	14:00			106	750	856	0.112	0.063			
26	1.07	13:15	0.91	13:15	0.9	13:00	0.70	9:30	0.34	11:30	0.32	12:45			0.54	12:45					0.42	13:45	96	539	635	0.102	0.067			
27	1.29	14:30	0.93	14:30	0.43	15:00	0.50	8:00	0.37	13:00			0.74	10:15	0.61	10:00							101	462	563	0.111	0.063			
28	1.13	14:30	0.71	14:30	0.25	13:00	0.55	9:00	0.49	15:30					0.46	11:00	0.42	11:15	0.42	11:30			104	632	736	0.196	0.078			
29	0.7	12:30	0.8	12:30	0.09	16:30	0.29	9:00	0.42	12:00			0.72	11:15	0.47	16:30			0.8	11:00			164	540	704	1.166	0.069	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
30	0.33	10:00	0.51	10:00	0.18	16:15	0.28	8:15	0.38	17:00					0.59	11:30					0.15	11:45	178	401	579	0.436	0.067			
31	0.89	13:15	0.78	13:15	0.22	14:30	0.28	10:00	0.51	10:00	0.6	10:30			0.42	10:15	0.58	10:30					181	531	712	0.215	0.059			
Average	0.97		0.62		0.31		0.34		0.34		0.33		0.51		0.43		0.46		0.46		0.42		92.90	579.79	616.58	0.19	0.19			
Median	1		0.62		0.28		0.32		0.32		0.32		0.48		0.42		0.42		0.39		0.41		83	539.5	630	0.112	0.084			
Total	30.12		17.9		9.76		10.13		10.65		3.3		4.62		13.43		5.02		4.57		4.16		2880	16234	19114	5.742	5.97	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 and new reservoir continue to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

April 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																						Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry									
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	0.55	13:45	0.55	13:45	0.21	14:00	0.19	9:00	0.48	10:30					0.43	13:15			0.62	13:00			142	473	615	0.160	0.061			
2	0.73	13:45	0.69	13:45	0.28	14:00	0.45	9:00	0.32	11:00	0.58	13:45			0.44	13:30					0.22	14:15	133	548	681	0.223	0.059			
3	0.28	13:45	0.49	13:45	0.13	14:45	0.28	7:00	0.41	15:00			0.81	8:30	0.58	8:30							206	145	351	0.641	0.067			
4	0	11:00	0.22	11:00	0.18	14:00	0.35	7:00	0.39	8:15					0.16	8:15	0.41	8:30	0.26	16:30			314	550	864	0.913	0.740			
5	0.21	15:00	0.32	15:00	0.2	14:00	0.27	7:00	0.45	10:00	0.41	10:30			0.44	8:45							0	449	449	0.393	0.073	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
6	0.18	14:00	0.28	14:00	0.2	15:45	0.21	10:15	0.34	16:15			0.22	9:15	0.41	11:45					0.14	10:30	230	595	825	0.407	0.096			
7	0.06	12:00	0.19	12:00	0.32	8:30	0.31	7:00	0.25	12:00	0.35	8:30			0.20	8:45	0.3	8:45					315	303	618	0.400	0.189			
8	0.1	10:30	0.22	10:30	0.29	11:00	0.16	9:00	0.10	15:00					0.15	11:15			0.24	12:00			324	0	324	0.604	0.256			
9	0.06	16:00	0.33	16:00	0.42	16:30	0.5	12:00	0.26	16:45	0.44	16:00			0.20	17:15					0.42	17:30	412	0	412	0.339	0.746			
10	0.03	12:00	1.04	12:00	0.41	14:00	0.52	9:00	0.33	16:00			0.65	8:30	0.39	8:45							230	245	475	0.271	0.509			
11	0.06	14:45	1	14:45	0.39	13:00	0.45	13:00	0.37	16:30					0.69	11:15	0.97	12:00	0.95	11:45			278	225	503	0.187	0.159			
12	0	13:00	0.64	13:00	0.45	14:00	0.48	10:45	0.54	10:00					0.54	11:00			0.86	11:15			210	352	562	0.160	0.157	< 1 / < 1	< 1 / < 1	Pantry, Lizard Creek Lodge
13	1.08	11:30	0.8	11:30	0.31	10:00	0.31	10:15	0.69	9:15			0.62	9:30	0.42	9:30					0.75	9:45	180	188	368	0.150	0.163			
14	0.67	13:00	0.81	13:00	0.27	12:30	0.28	10:30	0.52	12:00	0.42	12:30			0.62	8:45	0.71	9:00					202	143	345	0.147	0.132			
15	0.15	16:30	0.49	16:30	0.25	16:45	0.34	11:45	0.51	11:30					0.62	12:00			0.7	12:15			245	249	494	0.406	0.135			
16	0.04	14:30	0.2	14:30	0.3	15:15	0.28	9:15	0.38	16:00	0.42	13:30			0.57	15:30					0.45	15:00	257	153	410	0.288	0.140			
17	1.91	10:45	0.82	10:45	0.27	14:00	0.46	11:15	0.34	14:30			0.5	9:30	0.44	9:30							280	412	692	0.381	0.145			
18	0.85	9:30	0.98	9:30	0.24	13:15	0.31	13:00	0.42	9:00					0.54	10:15	0.94	10:15					363	0	363	0.833	0.140			
19	0.67	11:00	0.84	11:00	0.26	16:30	0.31	8:30	0.46	11:30			0.45	11:00	0.96	16:15			0.53	11:15			0	0	0	0.368	0.150	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
20	0.9	10:15	1.01	10:15	0.23	9:00	0.48	10:30	0.50	15:00					0.62	9:45					0.42	10:30	336	506	842	0.277	0.153			
21	1.03	11:15	0.9	11:15	0.3	11:30	0.34	17:00	0.60	16:00	0.46	12:00			0.75	11:00	0.55	11:45					350	0	350	0.253	0.143			
22	0.9	10:45	0.93	10:45	0.41	10:45	0.35	10:15	0.43	15:00					0.76	10:30			0.43	11:00			364	0	364	0.308	0.149			
23	0.72	10:15	0.64	10:15	0.26	8:15	0.29	9:30	0.51	11:00	0.5	8:30			0.56	9:45					0.66	9:15	347	323	670	0.230	0.141			
24	0.99	14:00	0.64	14:00	0.19	10:00	0.34	11:00	0.62	9:30			0.66	10:15	0.71	10:15							374	0	374	0.201	0.142			
25	0.82	13:00	0.68	13:00	0.27	11:30	0.35	12:00	0.54	11:00					0.70	11:30	0.41	11:45					280	0	280	0.164	0.147			
26	0.48	12:30	0.7	12:30	0.19	9:30	0.28	9:45	0.54	8:30	0.34	9:30			0.69	9:15			0.59	11:00			270	0	270	0.198	0.141			
27	1.12	11:30	0.78	11:30	0.27	10:00	0.4	12:15	0.39	15:00			0.59	11:15	0.55	12:00					0.72	9:45	285	269	554	0.267	0.146			
28	1.15	14:00	1	14:00	0.55	15:00	0.43	10:30	0.49	10:30	0.52	10:45			0.60	11:00	0.7	11:15					352	207	559	0.336	0.140	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
29	0.84	14:00	0.96	14:00	0.41	13:00	0.36	16:00	0.48	11:30					0.92	13:30			0.54	12:00			375	0	375	0.435	0.144			
30	0.66	11:45	0.78	11:45	0.38	13:00	0.28	18:00	0.47	15:00	0.7	12:30			0.95	11:30					0.52	12:15	356	0	356	0.408	0.135			
31																														
Average	0.57		0.66				0.35		0.44		0.47		0.56		0.55		0.62		0.57		0.48		267.00	211.17	478.17	0.34	0.19			
Median	0.665		0.695				0.34		0.455		0.44		0.605		0.565		0.625		0.565		0.45		280	197.5	430.5	0.298	0.1435			
Total	17.24		19.93				10.36		13.13		5.14		4.5		16.61		4.99		5.72		4.3		8010	6335	14345	10.348	5.698	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

May 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry									
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	0.65	10:15	0.64	10:15	0.3	13:00	0.28	12:00	0.37	13:30			0.4	9:30	0.82	9:30							365		365	0.541	0.14			
2	0.64	9:15	0.64	9:15	0.29	13:30	0.28	10:15	0.58	14:45	0.7	12:30			0.67	9:30	0.58	9:15	0.45	9:45			74		74	0.33	0.144			
3	0.7	10:00	0.62	10:00	0.28	8:30	0.5	9:15	0.35	8:15	0.38	8:45			0.59	9:00							475	295	770	0.245	0.094			
4	0.62	9:45	0.59	9:45	0.28	15:15	0.15	10:30	0.41	11:00			0.57	10:00	0.56	10:30					0.56	9:30	390		390	0.222	0.146			
5	0.57	12:30	0.56	12:30	0.29	11:15	0.09	10:30	0.48	13:45	0.44	11:15			0.56	11:00	0.59	11:00			0.29	11:15	480		480	0.228	0.141	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
6	0.8	11:15	0.67	11:15	0.33	8:30	0.1	8:45	0.53	8:30					0.59	9:30			0.42	11:00			410	10	420	0.196	0.125			
7	0.82	10:30	0.65	10:30	0.31	13:30	0.09	14:00	0.48	13:15	0.52	11:45			0.61	11:30					0.37	13:00	420		420	0.212	0.124			
8	0.6	12:00	0.68	12:00	0.32	12:15	0.3	16:00	0.64	17:00			0.7	12:30	0.43	13:00							455	263	718	0.189	0.129			
9	0.68	9:00	0.74	9:00	0.23	9:30	0.26	13:00	0.49	8:45					0.61	10:00	0.62	9:45	0.57	9:45			0		0	0.174	0.137			
10	0.66	12:00	0.58	12:00	0.25	10:00	0.35	11:30	0.44	14:00	0.31	9:45			0.59	10:00							503	65	568	0.158	0.068			
11	0.78	10:15	0.61	10:15	0.29	15:45	0.31	16:00	0.54	9:30			0.62	10:00	0.40	10:00					0.58	10:00	425		425	0.148	0.142			
12	0.83	13:30	0.67	13:30	0.22	11:00	0.29	14:45	0.51	17:30			0.71	11:30	0.54	11:30			0.63	11:00			534		534	0.145	0.147	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
13	0.75	9:45	0.67	9:45	0.15	10:15	0.28	9:15	0.37	15:00					0.58	10:30	0.65	10:30	0.24	10:30			387		387	0.141	0.152			
14	0.68	14:15	0.66	14:15	0.22	12:00	0.28	18:00	0.26	11:15	0.6	11:30			0.60	14:00					0.58	12:15	546		546	0.144	0.145			
15	0.69	11:15	0.71	11:15	0.32	11:00	0.27	12:30	0.30	13:00			0.62	10:45	0.61	10:30							401		401	0.145	0.146			
16	0.69	10:15	0.65	10:15	0.37	10:00	0.27	13:00	0.63	14:45					0.59	9:15	0.54	9:45	0.44	9:45			432	35	467	0.149	0.132			
17	0.48	12:00	0.61	12:00	0.24	12:15	0.31	12:00	0.44	9:45	0.57	10:15			0.58	10:00							485		485	0.149	0.171			
18	0.72	13:00	0.62	13:00	0.22	10:15	0.1	18:00	0.52	10:00			0.6	13:15	0.57	10:30					0.48	13:30	503		503	0.151	0.168			
19	0.59	10:00	0.63	10:00	0.24	10:30	0.08	10:45	0.53	8:30	0.59	10:30			0.53	10:15							441		441	0.141	0.156			
20	0.76	15:30	0.58	15:30	0.22	15:45	0.11	11:00	0.46	16:00					0.58	14:00	0.32	14:30	0.24	14:45			610		610	0.133	0.172			
21	0.74	10:00	0.71	10:00	0.25	10:30	0.14	11:00	0.42	16:00	0.5	15:45			0.59	10:00					0.42	10:15	374		374	0.13	0.167			
22	0.71	14:30	0.67	14:30	0.22	14:15	0.1	15:00	0.32	16:00			0.48	14:30	0.62	14:00							526		526	0.129	0.167			
23	0.9	15:00	0.8	15:00	0.26	10:30	0.08	11:45	0.56	10:15					0.65	11:00	0.68	11:00	0.62	10:45			418		418	0.124	0.173			
24	0.78	10:30	0.8	10:30	0.27	13:00	0.08	11:00	0.28	9:45	0.54	13:00			0.69	10:00							0	76	76	0.249	0.169			
25	0.87	7:45	1.05	7:45	0.25	14:15	0.31	15:30	0.35	9:30			0.58	11:00	0.48	10:45					0.49	10:00	350	282	632	0.14	0.248			
26	0.97	12:45	1.02	12:45	0.21	13:30	0.28	14:00	0.38	10:00					0.70	10:30	0.38	10:30					350		350	0.135	0.251	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
27	0.52	14:00	0.75	14:00	0.24	14:15	0.24	14:30	0.42	14:45					0.55	13:30	0.42	14:00	0.53	13:45			357		357	0.131	0.162			
28	0.56	7:30	0.73	7:30	0.22	7:45	0.2	10:45	0.50	14:00	0.38	8:00			0.67	14:30					0.42	13:00	247		247	0.314	0.174			
29	0.47	11:30	0.57	11:30	0.3	12:00	0.26	11:00	0.40	13:00			0.42	11:45	0.54	12:15							100	298	398	0.161	0.171			
30	0.53	11:30	0.57	11:30	0.23	10:15	0.4	10:30	0.36	12:00					0.51	10:00	0.49	9:30	0.52	9:45			364	280	644	0.136	0.219			
31	0.61	12:30	0.62	12:30	0.18	11:15	0.33	11:30	0.29	10:30	0.31	11:10			0.50	11:00							350	164	514	0.13	0.219			
Average	0.69		0.68		0.26		0.23		0.44		0.49		0.57		0.58		0.53		0.47		0.47		379.74	176.80	436.77	0.18	0.16			
Median	0.69		0.65		0.25		0.27		0.44		0.51		0.59		0.59		0.56		0.485		0.48		410	213.5	425	0.149	0.152			
Total	21.37		21.07		8		7.12		13.61		5.84		5.7		18.11		5.27		4.66		4.19		11772	1768	13540	5.72	4.899	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

flow meter plugged - estimate of flow

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

June 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	0.58	9:45	0.57	9:45	0.22	10:00	0.33	15:15	0.46	15:30			0.35	10:45	0.56	10:15					0.39	10:30	277	286	563	0.126	0.219			
2	0.62	13:30	0.61	13:30	0.13	10:45	0.43	11:00	0.46	14:00			0.69	10:30	0.51	10:15			0.49	10:00			341	62	403	0.123	0.166	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
3	0.78	10:45	0.66	10:45	0.2	11:00	0.31	12:00	0.59	10:15					0.55	11:15	0.45	11:45	0.43	11:30			254	352	606	0.12	0.175			
4	0.76	10:15	0.72	10:15	0.13	10:30	0.32	11:45	0.48	9:15	0.72	10:45			0.57	10:00					0.6	9:45	268	230	498	0.121	0.179			
5	0.77	11:00	0.77	11:00	0.17	11:15	0.33	14:00	0.61	10:00			0.7	11:30	0.57	12:15							268	344	612	0.119	0.216			
6	0.79	14:00	0.76	14:00	0.24	10:30	0.31	10:15	0.55	10:00					0.57	11:15	0.56	11:00	0.6	10:45			290	224	514	0.137	0.184			
7	0.67	12:40	0.77	12:40	0.25	9:50	0.31	13:00	0.44	12:10	0.29	9:45			0.63	10:10							233	232	465	0.16	0.324			
8	0.83	13:30	0.81	13:30	0.17	9:40	0.33	10:00	0.62	14:40			0.66	9:30	0.72	9:50					0.7	9:20	250	128	378	0.127	0.387			
9	0.78	12:50	0.9	12:50	0.22	9:50	0.34	10:10	0.72	9:20	0.54	9:40			0.67	10:00							211	313	524	0.122	0.201	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
10	1.01	13:20	0.75	13:20	0.12	13:30	0.32	14:45	0.42	11:45					0.65	13:50	0.52	14:00	0.45	13:45			207	281	488	0.123	0.16			
11	0.97	13:15	0.79	13:15	0.24	13:30	0.33	16:00	0.50	17:00	0.58	13:45			0.64	15:45					0.7	14:00	190	332	522	0.127	0.162			
12	0.95	14:00	0.95	14:00	0.16	14:15	0.31	15:00	0.49	10:00			0.52	14:30	0.69	15:30							189	200	389	0.446	0.151			
13	1.05	14:30	0.94	14:30	0.08	10:00	0.04	10:30	0.51	14:50					0.66	12:20	0.81	12:40	0.84	12:30			180	190	370	0.122	0.1224			
14	0.82	14:00	0.9	14:00	0.15	10:30	0.19	10:50	0.07	10:00	0.4	10:20			0.45	10:45							163	257	420	0.12	0.136			
15	1.12	12:30	1.03	12:30	0.08	15:30	0.28	11:15	0.51	11:45			0.47	12:40	0.50	12:50					0.58	13:00	144	321	465	0.166	0.129			
16	0.86	14:20	0.49	14:20	0.19	14:10	0.28	13:00	0.53	16:45					0.87	14:00	0.92	11:15			0.43	11:30	152	373	525	0.117	0.137			
17	1.05	14:30	0.95	14:30	0.22	15:00	0.28	10:00	0.48	14:00					0.51	14:00	0.63	13:00	0.46	13:15			136	254	390	0.123	0.15			
18	1.1	14:30	0.97	14:30	0.19	15:00	0.35	12:45	0.61	16:00	0.52	14:45			0.92	13:15					0.42	13:45	129	431	560	0.118	0.153			
19	0.85	14:00	0.89	14:00	0.35	14:00	0.26	9:15	0.26	15:30			0.15	14:15	0.00	13:15							122	384	506	0.115	0.139			
20	1.01	13:40	0.77	13:40	0	10:20	0.26	10:40	0.31	15:00					0.02	10:30	0.53	14:10	0.73	14:00			120	485	605	0.117	0.197			
21	0.9	8:30	0.75	8:30	0.09	8:15	0.35	8:00	0.42	10:00	0.41	9:15			0.56	9:00							90	243	333	0.117	0.277			
22	0.98	15:30	0.79	15:30	0.07	15:45	0.35	13:00	0.48	16:15			0.57	16:00	0.66	16:15					0.47	16:15	146	387	533	0.116	0.161			
23	0.71	13:30	0.77	13:30	0.02	14:00	0.32	11:30	0.35	13:00					0.67	14:15							100	340	440	0.116	0.145	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
24	0.8	11:30	0.85	11:30	0.1	14:00	0.35	8:45	0.32	12:30					0.65	14:30	0.26	14:45	0.37	15:00			96	407	503	0.114	0.141			
25	0.93	8:30	0.91	8:30	0.05	12:30	0.33	12:30	0.45	12:30	0.39	14:00			0.63	14:30					0.42	14:15	90	284	374	0.115	0.147			
26	1.06	13:15	0.81	13:15	0.06	12:30	0.35	9:00	0.53	9:00			0.63	12:45	0.72	14:00							120	369	489	0.115	0.148			
27	1.04	13:30	0.85	13:30	0.08	14:15	0.34	12:30	0.48	15:00					0.74	12:45	0.63	13:15	0.74	13:00			96	566	662	0.114	0.14			
28	1.21	10:00	0.82	10:00	0.05	13:45	0.35	8:00	0.40	13:00					0.71	11:30							80	503	583	0.11	0.142			
29	1.02	7:30	0.78	7:30	0	12:30	0.08	5:00	0.37	15:00			0.66	12:45	0.77	12:50					0.4	12:15	67	500	567	0.113	0.093			
30	1.23	15:30	0.82	15:30	0	11:00	0.08	6:00	0.40	16:50			0.61	11:30	0.77	10:30			0.24	10:15			112	1012	1124	0.114	0.099	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
31																														
Average	0.91		0.81		0.13		0.29		0.46		0.48		0.55		0.60		0.59		0.54		0.51		170.70	343.00	513.70	0.13	0.17			
Median	0.915		0.8		0.13		0.32		0.48		0.465		0.61		0.645		0.56		0.475		0.45		149	326.5	504.5	0.1195	0.152			
Total	27.25		24.15		4.03		8.81		13.82		3.85		6.01		18.14		5.31		5.35		5.11		5121	10290	15411	3.993	5.1804	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

July 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																						Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry									
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.35	10:00	0.67	10:00	0.08	8:15	0.08	10:45	0.24	11:15					0.57	9:15	0.38	10:35	0.1	10:30			60	760	820	0.113	0.212			
2	1.69	13:00	0.72	13:00	0.15	11:15	0.33	11:20	0.50	14:20	0.1	11:00			0.70	13:15					0.46	10:50	90	647	737	0.116	0.127			
3	0.99	10:00	0.87	10:00	0.07	14:00	0.57	13:00	0.57	13:00			0.65	10:15	0.69	10:30							60	808	868	0.117	0.152			
4	0.87	13:00	0.77	13:00	0.1	12:45	0.08	12:00	0.14	15:00					0.29	12:00	0.22	12:30	0.06	13:20			85	700	785	0.111	0.107			
5	0.72	8:45	0.79	8:45	0.05	13:00	0.42	7:30	0.35	8:00	0.29	12:45			0.74	12:30							69	486	555	0.113	0.552			
6	1.15	13:00	0.78	13:00	0	12:45	0.33	10:40	0.44	14:20			0.76	14:15	0.69	10:30					1.05	10:30	80	307	387	0.104	0.108			
7	1.31	10:15	0.69	10:15	0.04	10:20	0.34	9:30	0.50	9:45	0.57	10:30			0.60	10:00							60	831	891	0.111	0.12	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
8	1.3	9:45	0.72	9:45	0.03	10:00	0.07	10:45	0.53	11:00					0.68	10:15	0.64	10:20	0.72	10:30			67	546	613	0.107	0.148			
9	1.46	10:30	0.73	10:30	0.22	10:45	0.07	8:15	0.16	14:00	0.38	11:00			0.74	10:00					0.48	10:15	67	681	748	0.107	0.093			
10	1.11	11:00	0.49	11:00	0.07	8:30	0.06	10:30	0.12	18:00			0.01	12:00	0.01	14:30							64	619	683	0.11	0.093			
11	1.39	11:30	0.52	11:30	0.27	9:30	0.37	10:30	0.53	10:00					0.62	13:15	0.44	13:00	0.53	12:45			61	671	732	0.113	0.154			
12	1.79	10:10	0.71	10:10	0.54	13:30	0.31	11:20	0.42	15:50	0.54	13:40			0.67	10:30							55	724	779	0.108	0.15			
13	1.14	10:45	0.63	10:45	0.2	11:00	0.06	12:45	0.57	13:30			0.45	11:15	0.31	12:30							55	695	750	0.108	0.098			
14	0.64	10:00	0.67	10:00	0.2	9:20	0.08	11:30	0.67	15:00					0.48	10:30	0.09	10:20			0.16	10:15	50	794	844	0.104	0.118	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
15	0.98	9:00	0.44	9:00	0.22	12:00	0.06	8:30	0.42	15:00					0.45	10:00	0.12	9:50	0.26	9:40			50	737	787	0.1	0.102			
16	0.88	10:30	0.44	10:30	0.2	14:45	0.06	7:00	0.05	9:00	0.02	15:00			0.01	10:30					0.13	10:45	52	799	851	0.109	0.102			
17	0.55	10:30	0.43	10:30	0.2	14:45	0.49	9:00	0.24	16:00			0.61	10:00	0.42	11:30							50	473	523	0.11	0.155			
18	0.34	8:30	0.59	8:30	0.21	15:15	0.31	8:00	0.56	8:15					0.40	11:40	0.46	11:30	0.49	11:20			40	1462	1502	0.106	0.121			
19	0.86	10:00	0.25	10:00	0.27	16:00	0.38	8:00	0.39	16:15	0.31	12:45			0.31	12:30							50	503	553	0.109	0.256			
20	0.92	10:30	0.48	10:30	0	14:45	0.21	7:00	0.12	15:30			0.26	10:45	0.07	11:10					0.47	11:00	45	547	592	0.107	0.137			
21	0.62	9:50	0.34	9:50	0.14	15:15	0.33	7:30	0.01	15:45			0.79	10:45	0.01	10:15			0.36	10:30			40	721	761	0.109	0.099	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
22	0.39	9:30	0.28	9:30	0.23	13:45	0.28	7:45	0.24	15:00					0.53	10:50	0.42	10:30	0.43	10:40			42	524	566	0.108	0.162			
23	0.89	10:30	0.48	10:30	0.19	11:00	0.36	6:30	0.28	13:00	0.37	14:15			0.56	11:15					0.11	14:00	43	788	831	0.109	0.147			
24	1.45	10:00	0.73	10:00	0.1	10:30	0.02	8:00	1.04	14:00			0.09	12:00	1.20	10:45							39	1074	1113	0.109	0.107			
25	1.52	9:15	0.72	9:15	0.12	13:00	0.11	7:45	0.58	11:15					0.68	11:50	0.6	11:45	0.64	11:30			36	370	406	0.107	0.199			
26	1.95	13:00	0.78	13:00	0.2	16:10	0.26	7:50	0.33	14:30	0.38	16:00			0.31	10:20							45	717	762	0.108	0.144			
27	1.85	10:00	0.56	10:00	0.15	13:45	0.25	6:45	0.29	15:00			0.6	10:15	0.30	10:40					0.89	10:30	30	1041	1071	0.107	0.1			
28	1.52	10:40	0.52	10:40	0.07	15:00	0.41	6:45	0.51	11:30	0.42	11:45			0.75	11:00							36	564	600	0.109	0.116	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
29	1.67	10:10	0.93	10:10	0.07	13:00	0.7	6:45	0.62	14:00					0.95	9:20	0.09	9:40	0.75	9:30			33	1072	1105	0.106	0.112			
30	1.57	12:00	0.94	12:00	0.14	11:00	0.33	6:30	0.50	14:00	0.45	12:30			0.89	11:30					0.25	14:00	34	905	939	0.104	0.105			
31	1.69	10:30	1.01	10:30	0.09	10:45	0.41	7:00	0.35	7:30			0.44	11:15	0.64	11:00							28	780	808	0.109	0.09			
Average	1.18		0.63		0.15		0.26		0.40		0.35		0.47		0.52		0.35		0.43		0.44		52.13	720.84	772.97	0.11	0.14			
Median	1.15		0.67		0.14		0.31		0.42		0.38		0.525		0.57		0.4		0.46		0.46		50	717	762	0.109	0.12			
Total	36.56		19.68		4.62		8.14		12.27		3.83		4.66		16.27		3.46		4.34		4		1616	22346	23962	3.368	4.486	ok	ok	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

August 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	10:30	1.6	10:30	0.51	0.13	14:50	0.87	12:30	0.03	12:00					0.01	9:20	0.39	12:25	0.06	12:15			30	1434	1464	0.104	0.322			
2	11:15	1.76	11:15	0.81	0.16	15:15	0.21	7:00	0.41	10:00	0.2	15:30			0.19	11:00							29	560	589	0.104	0.102			
3	9:45	1.66	9:45	0.8	0.17	15:15	0.02	8:00	0.22	13:00					0.03	10:00	0.5	10:00			0.39	10:20	28	758	786	0.108	0.091			
4	10:45	1.37	10:45	0.61	0.19	15:20	0.23	8:30	0.38	15:45					0.47	12:30	0.56	12:20	0.62	10:45			32	431	463	0.104	0.161	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
5	13:15	1.39	13:15	0.77	0.17	11:30	0.25	9:20	0.36	15:15	0.25	11:20			0.54	10:50					0.05	11:15	34	675	709	0.104	0.198			
6	12:15	1.44	12:15	0.67	0.25	13:15	0.02	8:00	0.31	14:30			0.26	9:15	0.13	10:45							28	930	958	0.107	0.089			
7	10:20	1.51	10:20	0.56	0.09	14:00	0.86	9:00	0.11	9:00					0.01	12:30	0.26	13:00	0.09	12:45			25	379	404	0.105	0.292			
8	13:45	1.58	13:45	0.38	0.13	14:50	0.01	8:00	0.03	12:00					0.01	9:20	0.39	12:25	0.06	12:15			34	626	660	0.298	0.255			
9	16:00	0.87	16:00	0.52	0.12	11:40	0.33	8:30	0.44	12:00	0.21	0.47917			0.01	11:20							45	558	603	0.173	0.137			
10	12:45	1.53	12:45	0.32	0.12	10:30	0.35	6:45	0.23	10:00			0.19	10:15	0.39	10:45					0.12	0.44444	33	236	269	0.122	0.160			
11	11:50	1.5	11:50	0.46	0.18	11:10	0.05	8:00	0.15	12:15			0.49	0.45139	0.04	10:30			0.05	10:40			31	467	498	0.121	0.109	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
12	10:50	1.75	10:50	0.65	0.11	14:00	0.23	7:00	0.66	13:00					0.66	9:30	0.8	0.41667	0.58	0.40625			25	521	546	0.117	0.116			
13	9:30	1.66	9:30	0.76	0.19	13:30	0.2	7:30	0.42	15:00	0.25	0.57292			0.68	10:00					0.63	0.40625	25	777	802	0.121	0.113			
14	14:00	1.3	14:00	0.62	0.01	17:00	0.21	8:00	0.30	9:00			0.48	0.71875	0.48	14:30							30	414	444	0.120	0.108			
15	14:00	1.07	14:00	0.71	0.04	0.66667	0.22	9:00	0.28	0.38542					0.39	0.60417	0.37	0.625	0.48	0.61458			23	806	829	0.132	0.108			
16	8:30	0.79	8:30	0.63	0.23	14:15	0.3	7:30	0.33	15:00	0.33	14:00			0.49	13:45							17	662	679	0.119	0.264			
17	11:30	0.6	11:30	0.58	0.16	16:00	0.25	8:15	0.42	15:00			0.51	13:30	0.47	9:15					0.43	13:15	27	460	487	7.659	0.105			
18	11:15	0.71	11:15	0.59	0.14	16:00	0.22	8:00	0.22	10:00	0.4	10:15			0.45	12:30							0	634	634	0.803	0.218	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
19	12:15	0.64	12:15	0.53	0.12	16:00	0.22	8:30	0.30	16:50					0.34	12:45	0.39	11:30	0.42	11:45			0	600	600	0.203	0.133			
20	10:30	0.55	10:30	0.55	0.14	16:15	0.23	7:45	0.27	13:00	0.29	16:00			0.48	10:45					0.31	10:45	32	481	513	0.156	0.119			
21	13:30	0.6	13:30	0.58	0.1	16:00	0.27	11:00	0.30	11:30			0.42	13:15	0.61	14:00							34	626	660	0.151	0.093			
22	11:30	0.66	11:30	0.6	0.17	16:00	0.04	8:00	0.56	16:30					0.63	13:20	0.66	13:40	0.31	13:30			27	469	496	0.210	0.173			
23	11:15	0.52	11:15	0.5	0.07	14:45	0.28	9:30	0.45	15:30	0.28	11:00			0.59	15:00							3	355	358	0.400	0.222			
24	10:45	0.78	10:45	0.52	0.25	11:10	0.2	7:15	0.59	9:40			0.96	10:30	0.54	11:30					0.85	10:20	0	364	364	0.186	0.167			
25	10:15	0.97	10:15	0.67	0.21	13:30	0.22	7:30	0.40	13:00					0.77	10:30							37	429	466	0.168	0.038			
26	11:30	1.24	11:30	0.76	0.13	13:00	0.2	7:30	0.47	10:00					0.77	12:00	0.31	10:00			0.42	10:15	34	486	520	0.161	0.113			
27	10:15	1.89	10:15	0.72	0.2	10:30	0.22	8:00	0.56	14:00	0.39	10:45			0.86	10:30					0.48	10:45	27	528	555	0.157	0.012			
28	12:45	1.6	12:45	0.75	0.22	13:15	0.2	10:00	0.60	12:00			0.48	13:00	0.92	13:30							30	395	425	0.154	0.114			
29	15:45	1.2	15:45	0.85	0.17	10:45	0.23	9:15	0.58	13:20					0.90	10:00	0.82	10:30	0.33	10:15			29	531	560	0.150	0.119			
30	9:30	0.95	9:30	0.88	0.13	13:15	0.21	9:00	1.06	10:10	0.64	9:50			1.03	9:10							19	321	340	0.148	0.113			
31	10:30	0.8	10:30	0.8	0.14	16:00	0.2	9:30	0.40	15:00			0.56	10:30	0.97	9:45	0.46	14:00			0.06	10:00	24	374	398	0.146	0.158	< 1 / < 1	< 1 / < 1	Lizard Creek, Pantry
Average	0.49		0.49		0.15		0.24		0.38		0.32		0.48		0.48		0.49		0.30		0.37		25.55	557.65	583.19	0.42	0.15			
Median	0.46875		0.46875		0.14		0.22		0.38		0.285		0.48		0.48		0.425		0.32		0.405		28	521	546	0.148	0.119			
Total	15.0938		15.0938		4.64		7.55		11.84		3.24		4.35		14.86		5.91		3		3.74		792	17287	18079	12.911	4.522	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

September 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	0.6	11:00	0.85	11:00	0.16	10:30	8:30	0.31	0.58	7:25					0.96	10:45							21	508	529	0.143	0.263			
2	0.34	11:00	0.84	11:00	0.15	13:30	9:45	0.25	0.95	10:00					1.01	10:40	0.64	10:30	0.84	10:15			31	366	397	0.142	0.165			
3	0.62	12:45	1	12:45	0.12	12:00	9:30	0.19	0.90	13:00	0.58	12:45			0.96	16:00					0.72	13:15	21	248	269	0.139	0.115			
4	1.14	12:30	0.98	12:30	0.14	15:30	11:15	0.18	0.77	16:00			1.10	12:45	1.06	16:00							18	402	420	0.138	0.114			
5	1.2	10:00	0.71	10:00	0.21	15:30	9:15	0.3	0.82	9:00					0.38	12:00	0.87	11:50	0.81	11:40			15	491	506	0.135	0.16			
6	1.03	10:15	0.64	10:15	0.19	14:45	6:30	0.32	0.56	10:00	0.37	11:00			0.64	11:15							16	411	427	0.134	0.118			
7	0.74	10:45	0.56	10:45	0.21	15:30	9:30	0.47	0.33	10:30			0.41	12:40	0.43	11:00					0.49	13:00	16	847	863	0.133	0.108			
8	0.82	9:30	0.55	9:30	0.17	12:20	7:00	0.07	0.06	9:00			0.55	10:00	0.51	10:20			0.54	10:10			15	410	425	0.135	0.082	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
9	0.89	11:30	0.51	11:30	0.15	17:00	9:00	0.49	0.32	10:00					0.40	11:45	0.31	11:30	0.42	11:45			16	297	313	0.133	0.111			
10	1.14	15:30	0.53	15:30	0.14	13:00	10:30	0.67	0.43	15:00	0.32	15:30			0.42	16:00					0.16	15:15	16	611	627	0.131	0.114			
11	1.57	13:15	0.58	13:15	0.12	13:30	9:00	0.69	0.40	10:00			0.56	13:45	0.47	14:00							13	354	367	0.173	0.117			
12	1.87	12:15	0.55	12:15	0.13	12:45	10:00	0.54	0.41	11:00					0.43	9:45	0.46	14:00	0.14	13:50			15	331	346	0.176	0.122			
13	1.8	11:00	0.57	11:00	0.14	10:50	8:30	0.57	0.48	8:40	0.36	10:40			0.49	11:15							17	268	285	0.133	0.117			
14	1.49	10:30	0.55	10:30	0.29	14:00	9:45	0.52	0.46	9:30			0.27	13:45	0.50	10:15					0.53	10:00	17	279	296	0.130	0.119			
15	1.05	13:30	0.7	13:30	0.14	10:30	8:45	0.2	0.25	10:00	0.32	10:20			0.52	10:05							14	348	362	0.130	0.212	< 1 / < 1	< 1 / < 1	WWTP, Maintenace Shop
16	0.85	14:30	0.37	14:30	0.1	10:45	8:30	0.11	0.13	8:45					0.43	9:30	0.37	10:15	0.44	10:00			15	308	323	0.133	0.2			
17	1	11:00	0.53	11:00	0.35	15:00	9:30	0.17	0.23	9:15	0.24	14:15			0.39	10:30					0.35	14:00	12	306	318	0.133	0.198			
18	1.13	11:00	0.52	11:00	0.22	11:15	8:30	0.6	0.56	10:30			0.52	11:30	0.37	12:00							17	333	350	0.248	0.126			
19	0.96	11:45	0.31	11:45	0.19	14:30	9:15	0.56	0.58	9:00					0.48	11:15	0.42	10:30	0.48	10:45			33	286	319	1.200	0.003			
20	1.03	10:00	0.45	10:00	0.22	10:30	8:15	0.2	0.25	11:00	0.33	10:40			0.53	10:50							0	355	355	0.550	0.267			
21	1.47	13:30	0.54	13:30	0.25	8:45	8:15	0.51	0.34	7:15			0.21	9:30	0.38	8:30					0.21	9:00	50	283	333	0.181	0.247			
22	1.85	10:45	0.54	10:45	0.27	10:30	9:45	0.64	0.32	12:00					0.39	15:30	0.23	10:00			0.34	10:15	28	257	285	0.166	0.25	< 1 / < 1	< 1 / < 1	Pantry, Lizard Creek Lodge
23	1.81	10:30	0.49	10:30	0.22	13:00	9:45	0.2	0.40	14:00					0.47	11:00	0.28	11:00	0.24	11:15			26	286	312	0.165	0			
24	1.85	11:15	0.77	11:15	0.36	11:00	10:45	0.08	0.52	10:00	0.34	11:15			0.58	12:00					0.44	11:30	24	429	453	0.152	0.072			
25	1.48	11:30	0.6	11:30	0.3	11:45	11:00	0.38	0.50	12:00			0.7	11:15	0.68	11:45							25	180	205	0.153	0.085			
26	0.72	10:45	0.62	10:45	0.23	13:30	9:45	0.44	0.58	15:30					0.72	11:15	0.57	11:30	0.73	11:45			21	302	323	0.148	0.115			
27	0.76	13:30	0.59	13:30	0.26	9:50	8:30	0.19	0.28	15:30	0.37	9:15			0.74	9:30							22	326	348	0.144	0.075			
28	1.21	13:00	0.59	13:00	0.21	13:30	8:30	0.12	0.60	8:45			0.69	9:50	0.47	9:30					0.73	9:40	20	293	313	1.125	0.068			
29	1.16	10:15	0.55	10:15	0.26	11:00	9:45	0.22	0.40	8:30			0.35	10:00	0.60	9:40			0.3	9:45			0	368	368	0.454	0.132	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
30	1.52	8:50	0.56	8:50	0.33	9:00	15:30	0.27	0.38	8:00					0.46	10:10	0.48	10:00	0.54	9:45			54	291	345	0.226	0.13			
31																														
Average	1.17		0.61		0.21		0.39		0.46		0.36		0.54		0.56		0.46		0.50		0.44		20.27	359.13	379.40	0.24	0.13			
Median	1.135		0.56		0.21		0.39063		0.42		0.34		0.535		0.485		0.44		0.48		0.44		17	328.5	347	0.1435	0.1175			
Total	35.1		18.15		6.23		11.7604		13.79		3.23		5.36		16.87		4.63		5.48		3.97		608	10774	11382	7.283	4.005	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 continues to act as the end point in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

October 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																						Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry									
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.19	8:30	0.72	8:30	0.22	8:50	0.14	7:15	0.48	10:00	8:38	9:00			0.51	9:20					0.4	9:15	51	0	51	0.164	0			
2	0.54	10:00	0.78	10:00	0.24	12:00	0.08	8:15	0.50	10:00			0.42	10:30	0.64	11:00							46	0	46	0.148	0.075			
3	0.51	11:00	0.71	11:00	0.21	14:45	0.06	9:15	0.71	15:00					0.64	11:40	0.54	11:30	0.51	11:15			41	831	872	0.146	0.152			
4	0.6	13:45	0.59	13:45	0.24	14:00	0.18	8:00	0.34	15:00	0.34	14:10			0.66	14:15							39	246	285	0.141	0.075			
5	0.77	14:00	0.61	14:00	0.26	14:30	0.20	11:00	0.35	13:00			0.93	13:50	0.52	14:45					0.19	13:40	34	192	226	0.138	0.08			
6	0.92	11:30	0.57	11:30	0.29	13:00	0.75	10:15	0.65	9:20	0.34	10:40			0.50	15:30							37	136	173	0.135	0.092	< 1 / < 1	< 1 / < 1	WWTP, Maintenace Shop
7	1.18	11:30	0.5	11:30	0.32	11:30	0.05	10:15	0.65	9:15					0.51	11:00	0.29	11:20	0.71	11:15			28	344	372	0.134	0.059			
8	0.99	11:45	0.6	11:45	0.28	11:30	0.06	10:30	0.33	10:15	0.24	11:15			0.59	11:00					0.41	10:00	28	289	317	0.133	0			
9	1.07	15:00	0.66	15:00	0.22	15:15	0.17	13:15	0.48	16:00			0.61	14:45	0.64	13:00							31	147	178	0.133	0.088			
10	1.46	9:05	0.63	9:05	0.18	9:20	0.06	8:15	0.64	7:30					0.64	8:30	0.62	9:00	0.59	8:45			20	351	371	0.133	0.081			
11	1.21	14:00	0.46	14:00	0.29	10:50	0.49	9:45	0.40	10:15	0.43	10:40			0.51	14:15							37	295	332	0.174	0.088			
12	1.33	13:10	0.51	13:10	0.31	10:30	0.23	8:00	0.30	14:00			0.32	10:45	0.66	15:10					0.28	11:00	33	395	428	0.135	0.1			
13	1.38	13:10	0.38	13:10	0.25	11:00	0.96	10:15	0.61	9:00			0.82	10:45	0.44	12:45			0.53	10:30			32	471	503	0.133	0.4	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek Lodge
14	1.35	13:00	0.68	13:00	0.25	11:00	0.20	8:00	0.50	9:00					0.32	13:00	0.41	15:30	0.32	15:15			32	293	325	0.127	0.113			
15	1.09	10:00	0.78	10:00	0.35	13:30	0.06	8:30	0.17	9:30	0.33	13:15			0.60	10:30					0.4	13:00	23	247	270	0.127	0.055			
16	0.83	14:00	0.68	14:00	0.32	13:45	0.06	11:00	0.24	9:45			0.33	14:15	0.67	13:00							33	279	312	0.143	0.18			
17	0.63	11:00	0.84	11:00	0.26	13:30	0.05	9:45	0.58	9:30					0.70	12:45	0.54	11:30	0.68	11:15			25	344	369	0.132	0.091			
18	0.57	14:00	0.44	14:00	0.38	11:15	0.06	11:30	0.43	14:15	0.37	11:00			0.69	14:30							31	147	178	0.127	0.068			
19	1.37	13:45	0.7	13:45	0.38	10:10	0.29	9:40	0.39	14:00			0.61	10:20	0.66	14:10					0.48	10:00	27	214	241	0.123	0.099			
20	1.56	11:15	0.57	11:15	0.27	11:00	0.26	10:00	0.44	10:30	0.37	10:45			0.66	13:10							24	304	328	0.123	0.079	< 1 / < 1	< 1 / < 1	WWTP, Maintenace Shop
21	1.32	10:30	0.64	10:30	0.3	10:45	0.28	9:45	0.36	9:30					0.55	10:15	0.5	9:45	0.44	10:00			30	195	225	0.708	0.08			
22	1.1	11:15	0.83	11:15	0.27	11:30	0.27	10:45	0.40	10:00	0.42	11:45			0.54	11:00					0.64	10:30	38	169	207	0.141	0.086			
23	1.02	14:30	0.68	14:30	0.3	14:45	0.27	11:00	0.50	10:00			0.61	14:15	0.65	15:30							78	165	243	4.75	0.084			
24	0.9	11:45	0.71	11:45	0.38	9:10	0.13	9:00	0.50	8:50					0.65	12:30	0.58	12:20	0.58	12:00			0	255	255	0.303	0			
25	0.58	9:30	0.68	9:30	0.3	13:00	0.27	9:00	0.51	8:15	0.44	9:45			0.60	9:15							9	223	232	2.98	0.135			
26	0.59	10:30	0.53	10:30	0.19	14:00	0.25	11:30	0.46	10:00			0.4	12:00	0.57	11:00					0.32	12:15	0	66	66	0.3	0.127			
27	0.52	9:00	0.61	9:00	0.45	13:15	0.24	10:30	0.44	9:45					0.59	9:15	0.22	10:45			0.3	10:30	0	286	286	2.808	0.184	< 1 / < 1	< 1 / < 1	Pantry, Lizard Creek Lodge
28	0.52	10:30	0.62	10:30	0.42	10:45	0.24	12:30	0.47	9:45					0.57	11:00	0.26	10:00	0.61	10:15			0	265	265	0.308	0.178			
29	0.21	9:00	0.51	9:00	0.39	11:45	0.26	12:00	0.42	12:15	0.28	12:00			0.54	11:15					0.41	12:30	224	281	505	1.223	0.179			
30	0.17	7:00	0.43	7:00	0.37	8:00	0.21	7:45	0.53	6:30			0.51	7:15	0.55	7:30							0	0	0	0.339	0.181			
31	0.8	10:45	0.4	10:45	0.35	10:30	0.15	10:00	0.61	13:30					0.42	13:20	0.39	13:10	0.74	13:00			230	239	469	0.217	0.178			
Average	0.91		0.61		0.30		0.23		0.46		0.36		0.56		0.58		0.44		0.57		0.38		40.68	247.39	288.06	0.54	0.11			
Median	0.92		0.62		0.29		0.2		0.47		0.36		0.56		0.59		0.455		0.585		0.4		31	247	270	0.141	0.088			
Total	28.28		19.05		9.24		6.98		14.39		3.92		5.56		17.99		4.35		5.71		3.83		1261	7669	8930	16.826	3.387	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 and new reservoir act as the end points in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

November 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																						Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry									
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.40	10:45	0.72	10:45	0.38	14:30	0.23	11:15	0.51	14:45	0.40	10:30			0.41	11:00							200	118	318	0.208	0.127			
2	1.09	12:45	0.68	12:45	0.30	13:00	0.20	12:00	0.53	14:30			0.66	11:00	0.39	12:30					0.71	10:45	214	0	214	0.192	0.117			
3	0.71	11:20	0.77	11:20	0.14	11:15	0.21	8:15	0.69	9:30			0.52	11:00	0.57	10:45			0.66	10:40			180	183	363	0.178	0.36	< 1 / < 1	< 1 / < 1	Tamarak & Snowcreek
4	0.77	11:00	0.81	11:00	0.20	11:00	0.20	13:30	0.62	14:00					0.67	11:15	0.33	10:30	0.62	10:45			180	0	180	no power	0.124			
5	0.58	9:00	0.71	9:00	0.14	14:00	0.22	14:00	0.60	14:00	0.19	14:30			0.75	14:00					0.59	14:15	18	172	190	1.485	0.124			
6	0.57	11:45	0.70	11:45	0.22	11:30	0.24	12:00	0.51	14:00			0.41	12:00	0.69	7:30							0	239	239	0.473	0.241			
7	0.30	12:30	0.55	12:30	0.34	16:00	0.22	13:00	0.64	15:45					0.66	16:30	0.55	11:20	0.59	16:10			357	346	703	0.299	0.199			
8	0.32	8:40	0.39	8:40	0.50	8:30	0.20	15:00	0.45	16:00	0.43	8:45			0.68	8:30							3		3	0.221	0.209			
9	1.03	12:45	0.48	12:45	0.34	12:20	0.18	15:30	0.48	14:00			0.61	12:30	0.44	13:45					0.58	13:30	347		347	0.181	0.199			
10	0.99	14:20	0.70	14:20	0.30	14:40	0.17	10:30	0.52	7:00	0.50	11:00			0.42	7:30							300		300	0.169	0.201			
11	1.06	11:40	0.83	11:40	0.31	12:30	0.17	16:00	0.66	11:20					0.51	14:00	0.71	13:50	0.72	13:40			220		220	0.159	0.2			
12	1.38	12:00	1.00	12:00	0.32	11:00	0.16	14:00	0.62	8:20	0.48	7:00			0.73	12:30					0.73	10:45	245		245	0.153	0.195	< 1 / < 1	< 1 / < 1	WWTP & Maintenance
13	1.26	8:40	1.00	8:40	0.27	14:00	0.15	14:20	0.39	13:30					0.93	8:30							0		0	0.714	0.191			
14	0.73	11:30	0.91	11:30	0.57	15:00	0.16	11:00	1.08	16:45			0.72	12:00	1.02	10:45	0.87	11:15	0.86	11:00			372	98	470	0.356	0.21			
15	0.54	8:30	0.80	8:30	0.27	10:50	0.16	7:30	0.55	12:00	0.55	12:00			1.03	11:00							8		8	0.88	5			
16	1.61	11:00	0.68	11:00	0.32	14:15	0.15	11:20	0.65	16:00			0.69	14:00	0.89	14:30					0.94	14:45	260	6	266	0.25	0.66			
17	1.44	8:45	1.07	8:45	0.55	13:00	0.20	8:15	0.82	8:30					0.85	9:30	0.79	10:45			0.96	10:55	214	329	543	0.399	0.326	< 1 / < 1	< 1 / < 1	Lizard & Pantry
18	0.57	15:00	0.78	15:00	0.50	14:30	0.20	13:00	0.80	16:00					0.73	15:45	0.82	16:00	0.40	16:15			190	101	291	0.176	0.205			
19	0.70	11:30	0.67	11:30	0.38	14:15	0.20	11:00	0.40	14:00	0.58	13:45			0.95	12:30					0.48	13:30	196	5	201	0.202	0.263			
20	0.64	12:30	0.47	12:30	0.49	12:30	0.19	14:00	0.39	13:00			0.70	12:00	0.83	12:45							241		241	0.173	0.194			
21	0.65	10:15	0.67	10:15	0.31	10:30	0.10	11:10	0.88	14:00					0.61	11:00	0.79	10:50	1.01	10:10			223	104	327	0.169	0.033			
22	0.52	14:30	0.41	14:30	0.33	11:10	0.08	16:00	0.53	15:45	0.36	11:00			0.57	11:20							broken		0	0.163	2.075			
23	0.60	10:00	0.58	10:00	0.29	10:50	0.08	15:45	0.58	15:00			0.46	10:30	0.56	9:30					0.40	9:40	broken		0	0.155	0.074			
24	0.73	15:15	0.66	15:15	0.23	10:45	0.06	13:00	0.63	16:00			0.51	10:30	0.57	16:30			0.32	10:15			broken		0	0.15	0.086	< 1 / < 1	< 1 / < 1	Tamarak & Snowcreek
25	0.57	10:15	0.62	10:15	0.34	15:00	0.09	11:00	0.53	16:00					0.57	9:00	0.62	8:50	0.57	8:40			broken	3	3	0.165	0.112			
26	0.55	13:30	0.50	13:30	0.30	14:00	0.08	12:30	0.60	10:00	0.40	10:30			0.56	13:00					0.62	13:15	broken		0	0.196	0.073			
27	0.21	13:30	0.33	13:30	0.27	14:00	0.08	12:30	0.57	11:00			0.49	13:45	0.55	13:00							broken		0	0.184	0.074			
28	0.63	13:00	0.41	13:00	0.21	12:00	0.34	13:15	0.40	9:00					0.49	11:00	0.41	11:15	0.41	10:45			broken	8	8	0.777	0.329			
29	0.71	9:15	0.44	9:15	0.32	9:45	0.08	10:15	0.16	8:45	0.36	10:00			0.36	9:00							broken		0	0.42	0.122			
30	0.69	7:30	0.57	7:30	0.36	10:45	0.10	8:30	0.41	9:45			0.39	10:30	0.33	11:00					0.39	10:15	broken		0	0.292	0.116			
31																														
Average	0.79		0.66		0.33		0.16		0.57		0.43		0.56		0.64		0.65		0.62		0.64		188.95	114.13	189.33	0.33	0.41			
Median	0.695		0.675		0.315		0.17		0.56		0.415		0.52		0.59		0.71		0.605		0.605		214	101	207.5	0.196	0.197			
Total	23.55		19.91		########		4.9		17.2		4.25		6.16		19.32		5.89		6.16		6.4		3968	1712	5680	9.539	12.439	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

Comments:

The reservoir #2 and new reservoir act as the end points in the system so residuals may be lower than 0.5mg/L.

All items within the reporting period met interior healths current requirements for our water system.

December 2021 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)																				Water Usage (m^3)			Turbidity (NTU)		Independent Testing		
	Reservoir 1		Reservoir 2		New Reservoir		River Pump		WWTP		Shop		Tamarack		Lift Station		Lizard Creek		Snow Creek		Pantry								
	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	CL_2	Time	Springs	River Pp	Total	Spring	River	T. Coliform	E. Coli	
1	1.06	10:00	0.60	10:00	0.32	10:30	0.10	12:00	0.37	10:00	0.23	10:15			0.41	17:00								181	181	0.740	0.723	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
2	1.14	11:00	0.74	11:00	0.30	10:30	0.28	13:00	0.32	10:00					0.47	10:45	0.48	10:00	0.29	10:15					0	0.266	0.733			
3	1.06	10:30	0.60	10:30	0.42	10:45	0.10	9:45	0.40	9:00	0.32	11:15			0.55	11:00					0.42	12:00		216	216	0.248	0.206			
4	1.00	12:15	0.83	12:15	0.30	12:45	0.44	12:45	0.38	9:00			0.62	12:30	0.49	16:00								9	9	0.188	0.217			
5	1.12	12:30	0.72	12:30	0.29	14:45	0.10	12:00	0.42	9:00					0.71	14:15	0.12	14:30	0.32	13:00				375	375	0.178	0.224			
6	1.18	13:15	0.67	13:15	0.26	9:10	0.11	8:30	0.02	9:00	0.13	9:20			0.79	9:30								176	176	0.158	0.161			
7	0.97	13:30	0.91	13:30	0.13	9:00	0.26	9:30	0.43	8:15			0.56	8:40	0.96	8:30								110	110	0.154	0.183			:
8	0.91	13:30	0.89	13:30	0.20	11:20	0.29	14:30	0.47	16:00					0.76	14:00	0.59	11:00			0.59	10:45		77	77	0.142	0.106	< 1 / < 1	< 1 / < 1	Pantry, Lizard
9	0.67	13:00	0.66	13:00	0.21	14:00	0.23	9:00	0.35	9:15					0.78	8:45	0.43	8:30	0.39	8:15				212	212	0.150	0.131			
10	0.71	13:00	0.67	13:00	0.32	13:30	0.21	9:15	0.41	8:30	0.32	9:30			0.65	10:00					0.71	9:45		0	0	0.150	0.128			
11	0.76	14:00	0.55	14:00	0.15	9:00	0.10	10:00	0.42	11:30			0.29	8:30	0.73	9:45								331	331	0.147	0.122			
12	0.75	14:00	0.55	14:00	0.15	13:00	0.39	10:45	0.00	17:00					0.59	9:30	0.42	10:20	0.36	10:00				288	288	0.147	0.136			
13	0.68	11:20	0.48	11:20	0.26	9:30	0.29	10:00	0.40	18:00	0.62	16:00			0.49	17:00								36	36	0.143	0.086			
14	1.07	10:30	0.66	10:30	0.18	13:00	0.21	8:00	0.19	8:10			0.32	12:30	0.51	9:00					0.38	9:10		280	280	0.141	0.122			
15	1.03	17:00	0.70	17:00	0.21	14:00	0.22	12:30	0.26	16:00			0.40	10:30	0.46	17:00			0.32	10:15				288	288	0.102	0.126	< 1 / < 1	< 1 / < 1	Tamarak, Snowcreek
16	1.12	17:00	0.63	17:00	0.24	15:15	0.39	12:45	0.52	9:00					0.53	11:30	0.53	10:00	0.71	10:15				62	62	0.146	0.1			
17	1.06	13:30	0.73	13:30	0.28	13:15	0.34	9:15	0.63	14:00	0.37	13:00			0.64	11:30					0.50	13:45		271	271	0.150	0.113			
18	1.14	14:30	0.84	14:30	0.30	14:45	0.19	12:30	0.52	9:00			0.55	14:45	0.82	11:30								276	276	0.147	0.124			
19	1.00	14:00	0.90	14:00	0.32	14:30	0.20	10:45	0.33	10:15					0.81	11:20	0.37	11:45	0.66	11:30				283	283	0.145	0.101			
20	0.96	11:00	0.71	11:00	0.35	9:45	0.23	15:00	0.15	16:00	0.12	14:45			0.73	13:30								354	354	0.146	0.117			
21	0.85	13:30	0.68	13:30	0.27	12:00	0.22	9:30	0.20	8:30			0.72	9:00	0.76	9:15					0.65	9:15		327	327	0.148	0.109			
22	0.77	15:00	0.69	15:00	0.32	15:15	0.11	11:30	0.72	11:00	0.35	12:00			2.36	11:00								391	391	0.144	0.092	< 1 / < 1	< 1 / < 1	Wastewater, Maintenance
23	0.90	13:30	0.84	13:30	0.24	13:00	0.20	13:15	0.33	11:30					0.83	12:15	0.31	12:00	0.72	11:45				353	353	0.147	0.114			
24	0.99	16:45	0.59	16:45	0.22	16:30	0.33	16:45	0.50	9:00	0.42	16:15			0.71	16:00					0.62	15:45		347	347	0.146	0.111			
25	0.93	14:15	0.70	14:15	0.29	14:00	0.10	15:00	0.42	12:00			0.31	13:00	0.80	12:45								332	332	0.146	0.081			
26	1.03	15:30	0.68	15:30	0.30	15:00	0.29	16:15	0.41	9:00					0.37	14:00	0.62	14:15	0.32	14:30				381	381	0.148	0.12			
27	0.80	14:00	0.75	14:00	0.25	14:30	0.29	12:00	0.52	16:30	0.36	11:00			0.34	15:30								372	372		0.111			
28							0.21	11:30	0.42	12:15					0.38	11:15								541	541		0.109			
29							0.19	11:15	0.45	15:00					0.30	14:15	0.33	10:39			0.36	10:19		363	363		0.095			
30							0.20	14:00	0.35	13:00					0.36	14:30								460	460		0.13	< 1 / < 1	< 1 / < 1	Pantry, Lizard
31	1.16	13:30	0.87	13:30	0.22	13:00	0.33	15:15	0.29	16:00					0.34	11:00								670	670		0.078			
Average	0.96		0.71		0.26		0.23		0.37		0.32		0.47		0.66		0.42		0.45		0.53		#DIV/0!	278.73	269.74	0.18	0.16			
Median	0.995		0.695		0.265		0.22		0.4		0.335		0.475		0.64		0.425		0.36		0.545		#DIV/0!	288	288	0.147	0.12			
Total	26.82		19.84		#######		7.15		11.6		3.24		3.77		20.43		4.2		4.09		4.23		#DIV/0!	8362	8362	4.667	5.109	>1	>1	

NOTE: For Independent Testing Column, if 'normal' must input < 1 / < 1 exactly in order for formula to work (spaces between everything)

All items within the reporting period met interior health's current requirements for our water system.

Comments:

The reservoir #2 and our new rerservoir continue to act as the end points in the system so residuals may be lower than 0.5mg/L.

2020 Summary

Month	Chlorine Residual (mg/L)																												Water Usage (m^3)									Turbidity (NTU)						dependent Testi	
	Reservoir 1 CL_2			Reservoir 2 CL_2			River Pump CL_2			WWTP CL_2			Shop CL_2			Tamarack CL_2			Lift Station CL_2			Lizard Creek CL_2			Snow Creek CL_2			Pantry CL_2			Springs			River Pp			Total			Spring			River				
	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Averag	Mediar	Total	Colifor	E. Coli
Jan	1.05	1.12	31.54	0.89	0.89	27.55	0.32	0.3	9.96	0.70	0.71	21.55	0.43	0.48	3.89	0.65	0.71	5.86	0.89	0.90	27.54	0.88	0.795	7	0.63	0.665	5.04	0.84	0.69	6.68	89.42	80	2772	#####	381	12212	#####	512	14984	0.30	0.102	9.345	#####	0.201	6.853	>1	>1
Feb	1.00	1.03	27.98	0.76	0.715	21.41	0.31	0.28	8.74	0.53	0.525	14.91	0.54	0.425	4.30	0.53	0.57	4.73	0.59	0.50	16.62	0.58	0.58	5.76	0.68	0.63	4.78	0.44	0.37	4.43	54.57	52.50	#####	#####	#####	#####	#####	#####	#####	0.09	0.088	2.569	0.23	0.138	6.577	>1	>1
Mar	0.97	1	30.12	0.62	0.62	17.9	0.34	0.32	10.13	0.34	0.32	10.65	0.33	0.32	3.3	0.51	0.48	4.62	0.43	0.42	13.43	0.46	0.42	5.02	0.46	0.39	4.57	0.42	0.41	4.16	92.90	83	2880	#####	539.5	16234	#####	630	19114	0.19	0.112	5.742	0.19	0.084	5.97	>1	>1
Apr	0.57	0.665	17.24	0.66	0.695	19.93	0.35	0.34	10.36	0.44	0.455	13.13	0.47	0.44	5.14	0.56	0.605	4.5	0.55	0.565	16.61	0.62	0.625	4.99	0.57	0.565	5.72	0.48	0.45	4.3	#####	280	8010	#####	197.5	6335	#####	430.5	14345	0.34	0.298	10.35	0.19	0.144	5.698	>1	>1
May	0.69	0.69	21.37	0.68	0.65	21.07	0.23	0.27	7.12	0.44	0.44	13.61	0.49	0.51	5.84	0.57	0.59	5.7	0.58	0.59	18.11	0.53	0.56	5.27	0.47	0.485	4.66	0.47	0.48	4.19	#####	410	11772	#####	213.5	1768	#####	425	13540	0.18	0.149	5.72	0.16	0.152	4.899	>1	>1
June	0.91	0.915	27.25	0.81	0.8	24.15	0.29	0.32	8.81	0.46	0.48	13.82	0.48	0.465	3.85	0.55	0.61	6.01	0.60	0.645	18.14	0.59	0.56	5.31	0.54	0.475	5.35	0.51	0.45	5.11	#####	149	5121	#####	326.5	10290	#####	504.5	15411	0.13	0.12	3.993	0.17	0.152	5.18	>1	>1
July	1.18	1.15	36.56	0.63	0.67	19.68	0.26	0.31	8.14	0.40	0.42	12.27	0.35	0.38	3.83	0.47	0.525	4.66	0.52	0.57	16.27	0.35	0.4	3.46	0.43	0.46	4.34	0.44	0.46	4	52.13	50	1616	#####	717	22346	#####	762	23962	0.11	0.109	3.368	0.14	0.12	4.486	ok	ok
Aug	0.49	0.469	15.09	0.49	0.469	15.09	0.24	0.22	7.55	0.38	0.38	11.84	0.32	0.285	3.24	0.48	0.48	4.35	0.48	0.48	14.86	0.49	0.425	5.91	0.30	0.32	3	0.37	0.405	3.74	25.55	28	792	#####	521	17287	#####	546	18079	0.42	0.148	12.91	0.15	0.119	4.522	>1	>1
Sept	1.17	1.135	35.1	0.61	0.56	18.15	0.39	0.39	11.76	0.46	0.42	13.79	0.36	0.34	3.23	0.54	0.535	5.36	0.56	0.485	16.87	0.46	0.44	4.63	0.50	0.48	5.48	0.44	0.44	3.97	20.27	17	608	#####	328.5	10774	#####	347	11382	0.24	0.144	7.283	0.13	0.118	4.005	>1	>1
Oct	0.91	0.92	28.28	0.61	0.62	19.05	0.30	0.29	9.24	0.46	0.47	14.39	0.36	0.36	3.92	0.56	0.56	5.56	0.58	0.59	17.99	0.44	0.455	4.35	0.57	0.585	5.71	0.38	0.4	3.83	40.68	31	1261	#####	247	7669	#####	270	8930	0.54	0.141	16.83	0.11	0.088	3.387	>1	>1
Nov	0.79	0.695	23.55	0.66	0.675	19.91	0.16	0.17	4.90	0.57	0.56	17.2	0.43	0.415	4.25	0.56	0.52	6.16	0.64	0.59	19.32	0.65	0.71	5.89	0.62	0.605	6.16	0.64	0.605	6.4	#####	214	3968	#####	101	1712	#####	207.5	5680	0.33	0.196	9.539	0.41	0.197	12.44	>1	>1
Dec	0.96	0.995	26.82	0.71	0.695	19.84	0.23	0.22	7.15	0.37	0.4	11.6	0.32	0.335	3.24	0.47	0.475	3.77	0.66	0.64	20.43	0.42	0.425	4.2	0.45	0.36	4.09	0.53	0.545	4.23	#####	#####	#####	#####	288	8362	#####	288	8362	0.18	0.147	4.667	0.16	0.12	5.109	>1	>1
Annual	0.89	0.958	320.9	0.68	0.673	243.7	0.29	0.295	103.9	0.46	0.448	168.8	0.41	0.398	48.03	0.54	0.548	61.28	0.59	0.58	216.2	0.54	0.508	61.79	0.52	0.483	58.9	0.50	0.45	55.04	#####	#####	#####	#####	327.5	1E+05	#####	465.3	2E+05	0.26	0.142	92.31	9.42	0.129	69.13	no	no

January 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1571931		881000												
1-Jan	snow	-1		1572470	**539**	881593	**593**	1.20	5.6	4.5	11	23	51	1.09	70.135	59.76	129.90	
2-Jan	rain	3		1572891	**421**	882085	**492**	1.80	4.5	6.6	8	31	52	1.09	50.215	26.56	76.78	
3-Jan	cloud	1		1573391	**500**	882656	**571**	2.90	4.5	5.4	10	34	54	1.36	64.74	33.62	98.36	
4-Jan	cloud	-2		1573849	**458**	883191	**535**	4.10	4.3	5.9	12	26	50	0.50	64.74	29.88	94.62	3.4
5-Jan	cloud	0		1574167	**318**	883512	**321**	3.20	3.3	3.8	6	34	51	0.18	64.74	29.88	94.62	
6-Jan	snow	-1		1574553	**386**	883889	**377**	4.40	3.9	5.4	6	29	51	0.91	45.65	26.56	72.21	
7-Jan	sun	-3		1574943	**390**	884312	**423**	0.30	4	6.9	10	25	48	0.80	45.65	26.56	72.21	
8-Jan	cloud	-4		1575278	**335**	884669	**357**	5.10	6.4	9.2	13	26	52	0.37	45.65	26.56	72.21	
9-Jan	cloud	-4		1575559	**281**	885005	**336**	1.50	3.3	3.9	4	32	60	0.39	41.5	23.24	64.74	
10-Jan	cloud	-3		1575887	**328**	885382	**377**	1.40	4.7	5	7	39	62	1.94	45.65	19.92	65.57	
11-Jan	cloud	0		1576278	**391**	885798	**416**	3.00	5.7	5	10	24	67	0.88	49.8	29.88	79.68	<2.0
12-Jan	snow	0		1576554	**276**	886083	**285**	2.00	5.2		12	22	70	0.65	49.8	29.88	79.68	
13-Jan	rain	3		1576859	**305**	886463	**380**	0.70	3.4		9	56	57	0.61	49.8	29.88	79.68	
14-Jan	sun	-4		1577465	**606**	887145	**682**	3.40	6.1	3.8	13	45	52	0.25	49.8	29.88	79.68	
15-Jan	sun	-2		1577964	**499**	887680	**535**	2.10	5.1	7.9	12	22	55	0.48	41.085	23.24	64.33	
16-Jan	sun	-8		1578229	**265**	888009	**329**	0.70	3	3.4	6	23	56	0.36	41.085	23.24	64.33	
17-Jan	cloud	-6		1578606	**377**	888449	**440**	0.60	4	2.2	9	23	58	0.49	41.085	23.24	64.33	
18-Jan	sun	-7		1578969	**363**	888867	**418**	1.00	3.3	7.8	7	11	57	0.68	41.085	23.24	64.33	<2.0
19-Jan	cloud	-6		1579225	**256**	889136	**269**	1.90	5.2		13	8	56	0.65	41.085	23.24	64.33	
20-Jan	sun	-3		1579447	**222**	889432	**296**	3.00	6	6.1	11	6	55	0.40	41.085	23.24	64.33	
21-Jan	sun	-12		1579671	**224**	889706	**274**	0.90	3.7	4.7	5	11	56	0.08	41.085	23.24	64.33	
22-Jan	sun	-16		1579873	**202**	889953	**247**	1.30				16	57	0.69	23.24	14.94	38.18	
23-Jan	cloud	-14		1580103	**230**	890202	**249**	0.20	4.1		8	18	59	1.31	23.24	14.94	38.18	
24-Jan	cloud	-10		1580460	**357**	890592	**390**	0.10	3.4	5.3	8	17	57	2.63	23.24	14.94	38.18	
25-Jan	cloud	-10		1580729	**269**	890933	**341**	4.20	5	5.4	9	10	57	1.62	29.88	20.34	50.22	
26-Jan	cloud	-10		1580892	**163**	891144	**211**	3.20	5.2	6	10	11	59	1.22	29.88	20.34	50.22	
27-Jan	cloud	-9		1581084	**192**	891374	**230**	0.50	5.7	4.4	10	14	60	0.66	49.8	23.24	73.04	
28-Jan	snow	-4		1581299	**215**	891630	**256**	2.80	3.5	5.5	8	20	60	0.26	49.8	23.24	73.04	
29-Jan	snow	-4		1581476	**177**	891844	**214**	1.20	3		3	25	61	0.21	49.8	23.24	73.04	
30-Jan	snow	-1		1581784	**308**	892215	**371**	0.10	4.5	2.6	10	34	61	0.54	49.8	23.24	73.04	
31-Jan	cloud	0		1582146	**362**	892624	**409**	0	4.3	6.6	11	29	61	1.33	49.8	23.24	73.04	
Average	**N/A**	**-4.42**			**329.52**		**374.97**	**1.90**	**4.46**	**5.33**	**9.03**	**24.00**	**56.84**	**0.79**	**45.29**	**25.37**	**70.66**	
Median	**N/A**	**-4.00**			**318.00**		**371.00**	**1.50**	**4.40**	**5.40**	**9.50**	**23.00**	**57.00**	**0.65**	**45.65**	**23.24**	**72.21**	
Total	**N/A**	**N/A**	**0**		**10215**		**11624**	**N/A**	**133.90**	**133.30**	**271**	**N/A**	**N/A**	**N/A**	**1403.95**	**786.43**	**2190.37**	

February 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1582146		**892624**												
1-Feb	sun	1		1582524	**378**	893048	**424**	0.296	5.4		16	23	64	1.07	49.8	33.20	83.00	
2-Feb	cloud	3		1582794	**270**	893335	**287**	0.234	3.2	5	9	18	54	0.86	49.8	33.20	83.00	
3-Feb	snow	-1		1583052	**258**	893508	**173**	0.193	3.4	9.7	8	20	41	0.38	59.345	23.24	82.59	
4-Feb	sun	-3		1583330	**278**	893801	**293**	0.184	3.1	4.1	9	18	44	0.34	59.345	20.34	79.68	
5-Feb	sun	-3		1583579	**249**	894088	**287**	0.203	4.1	6.3	9	18	46	0.36	59.345	20.34	79.68	
6-Feb	snow	-13		1583844	**265**	894395	**307**	0.235	4.2	4.6	15	19	47	0.35	59.345	20.34	79.68	
7-Feb	cloud	-17		1584236	**392**	894830	**435**	0.389	3.8	7.8	9	19	70	0.95	59.345	20.34	79.68	
8-Feb	cloud	-15		1584577	**341**	895217	**387**	0.445	4.4	10.6	11	4	51	0.94	59.345	20.34	79.68	
9-Feb	sun	-25		1584775	**198**	895475	**258**	0.300	4.4		12	0	53	0.62	59.345	20.34	79.68	
10-Feb	sun	-28		1584806	**31**	895542	**67**	0.270	3	9.5	5	40	52	0.34	26.56	10.38	36.94	
11-Feb	sun	-25		1584995	**189**	895752	**210**	0.271	3.2		3	54	42	0.87	26.56	10.38	36.94	
12-Feb	sun	-27		1585288	**293**	896061	**309**	0.239	4.1	6.8	9	48	62	0.77	41.5	19.92	61.42	
13-Feb	sun	-20		1585615	**327**	896433	**372**	0.256	3		6	53	79	1.36	41.5	19.92	61.42	
14-Feb	sun	-18		1586100	**485**	896978	**545**	1.150	2	11.8		51	77	1.86	59.76	33.20	92.96	
15-Feb	cloud	-16		1586644	**544**	897557	**579**	0.389	3.2		5	45	70	0.78	59.76	33.20	92.96	
16-Feb	cloud	-10		1587174	**530**	898136	**579**	0.438	2.7		5	32	74	0.85	59.76	26.56	86.32	
17-Feb	cloud	-8		1587532	**358**	898541	**405**	0.212	3.1	3.2	8	42	63	0.56	59.76	26.56	86.32	
18-Feb	cloud	-9		1587947	**415**	898992	**451**	0.245	4.5	2.4	9	51	72	0.86	59.76	26.56	86.32	
19-Feb	cloud	-4		1588394	**447**	899488	**496**	0.250	3.5		6	46	65	0.89	59.76	26.56	86.32	
20-Feb	cloud	-2		1588824	**430**	899982	**494**	0.195	3.1		5	36	81	1.11	59.76	26.56	86.32	
21-Feb	snow	0		1589259	**435**	900447	**465**	0.220	3.3		4	33	71	0.83	69.72	33.20	102.92	
22-Feb	cloud	2		1589719	**460**	900949	**502**	0.281	1	6.6		30	66	0.61	39.84	33.20	73.04	<2.0
23-Feb	cloud	-2		1590087	**368**	901350	**401**	0.705	3.4	6.6	12	28	70	0.31	70.135	33.20	103.34	
24-Feb	sun	-7		1590477	**390**	901763	**413**	0.935	5.2	7.1	12	25	62	0.61	49.8	19.92	69.72	
25-Feb	snow	-3		1590852	**375**	902193	**430**	0.555	4.4	12.6	9	21	62	0.47	49.8	33.20	83.00	
26-Feb	cloud	-2		1591211	**359**	902568	**375**	0.449	3.8	9.5	10	34	67	0.42	49.8	26.56	76.36	
27-Feb	cloud	-3		1591558	**347**	902951	**383**	0.541	2.7	0.2	1	43	72	0.61	49.8	26.56	76.36	
28-Feb	cloud	2		1592040	**482**	903464	**513**	0.950	5.2	10.9	8	47	76	1.22	49.8	26.56	76.36	
																	0.00	
Average	**N/A**	**-9.04**			**353.36**		**387.14**	**0.394**	**3.59**	**7.12**	**8.27**	**32.07**	**62.61**	**0.76**	**53.51**	**25.14**	**75.93**	
Median	**N/A**	**-5.50**			**363.50**		**403.00**	**0.276**	**3.40**	**6.80**	**9.00**	**32.50**	**64.50**	**0.78**	**59.35**	**26.56**	**79.68**	
Total	**N/A**	**N/A**	**0**		**9894**		**10840**	**N/A**	**100.40**	**135.30**	**215**	**N/A**	**N/A**	**N/A**	**1498.15**	**703.84**	**2201.99**	

March 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1592040		**903464**												
1-Mar	cloud	2		1592568	**528**	904019	**555**	1.45	4.3	13.5	11	25	79	1.31	49.80	26.56	76.36	
2-Mar	cloud	2		1592901	**333**	904392	**373**	0.92	4.2	0.1	12	30	81	0.48	49.80	26.56	76.36	
3-Mar	sun	6		1593230	**329**	904753	**361**	0.375	4.7		11	38	79	1.31	49.80	26.56	76.36	
4-Mar	sun	-2		1593652	**422**	905236	**483**	0.318	5.3	3.9	10	39	72	0.46	49.80	26.56	76.36	
5-Mar	sun	2		1594113	**461**	905740	**504**	0.36	5	10.2	12	31	74	0.73	49.80	26.56	76.36	
6-Mar	rain	3		1594562	**449**	906244	**504**	0.344	3.8		11	38	75	0.66	49.80	26.56	76.36	
7-Mar	cloud	0		1595005	**443**	906742	**498**	0.49	4.6		12	41	70	0.91	49.80	26.56	76.36	
8-Mar	sun	-2		1595503	**498**	907287	**545**	0.81	4.3		10	34	70	1.03	49.80	26.56	76.36	
9-Mar	sun	-4		1595873	**370**	907715	**428**	0.403	3.7		2	33	74	0.27	59.76	37.35	97.11	
10-Mar	sun	0		1596275	**402**	908180	**465**	0.321	5.7		10	26	74	0.15	59.76	37.35	97.11	
11-Mar	sun	-3		1596641	**366**	908603	**423**	0.315	2.3			29	73	0.62	41.50	26.56	68.06	
12-Mar	sun	-5		1596946	**305**	908942	**339**	0.307	3.6		12	38	81	0.7	41.50	26.56	68.06	
13-Mar	sun	-2		1597402	**456**	909471	**529**	0.698	4.2		12	48	78	0.92	41.50	26.56	68.06	
14-Mar	sun	0		1597895	**493**	910025	**554**	0.986	5.9		12	43	67	0.95	50.22	33.62	83.83	
15-Mar	cloud	2		1598443	**548**	910632	**607**	1.54	5.9		12	29	68	0.95	50.22	33.62	83.83	
16-Mar	sun	-8		1598865	**422**	911129	**497**	0.501	6		12	22	68	0.72	50.22	33.62	83.83	
17-Mar	sun	-2		1599221	**356**	911543	**414**	0.322	4.8		12	36	68	0.31	59.76	26.56	86.32	
18-Mar	cloud	-2		1599623	**402**	911998	**455**	0.322	3.8		10	37	69	0.26	59.76	26.56	86.32	
19-Mar	cloud	2		1600124	**501**	912565	**567**	0.339	2.8		17	24	69	0.48	59.76	26.56	86.32	
20-Mar	snow	0		1600637	**513**	913149	**584**	0.312	5.1			19	70	0.36	59.76	26.56	86.32	
21-Mar	cloud	0		1601192	**555**	913792	**643**	0.29	5		12	13	65	0.35	64.74	37.35	102.09	
22-Mar	snow	0		1601638	**446**	914297	**505**	0.297	5.7			12	65	0.01	64.74	37.35	102.09	
23-Mar	sun	0		1601986	**348**	914707	**410**	0.297	5.1		12	17	64	0.28	59.76	23.24	83.00	
24-Mar	cloud	0		1602342	**356**	915141	**434**	0.33	4		12	19	63	0.47	41.50	23.24	64.74	
25-Mar	cloud	0		1602721	**379**	915577	**436**	0.308	5.6	8.8	12	21	60	0.74	41.50	23.24	64.74	
26-Mar	sun	-4		1603134	**413**	916048	**471**	0.294	2.9	5.9	6	24	65	0.57	41.50	23.24	64.74	
27-Mar	sun	3		1603506	**372**	916474	**426**	0.25	5.5	7.2	12	21	68	0.76	41.50	23.24	64.74	
28-Mar	sun	4		1604042	**536**	917095	**621**	0.357	5.6	6.4	12	15	70	1.25	50.22	29.88	80.10	
29-Mar	snow	-5		1604586	**544**	917739	**644**	0.39	3.8		12	29	72	1.23	50.22	29.88	80.10	<2.0
30-Mar	sun	-5		1605166	**580**	918386	**647**	0.254	5.8	10.6	9	18	73	0.49	59.76	33.62	93.38	
31-Mar	sun	2		1605676	**510**	918974	**588**	0.272	4.4		12	23	76	0.78	41.50	26.56	68.06	
Average	**N/A**	**-0.52**			**439.87**		**500.32**	**0.48**	**4.63**	**7.40**	**11.11**	**28.13**	**70.97**	**0.66**	**51.26**	**28.54**	**79.80**	
Median	**N/A**	**0.00**			**443.00**		**498.00**	**0.33**	**4.70**	**7.20**	**12.00**	**29.00**	**70.00**	**0.66**	**49.80**	**26.56**	**76.36**	
Total	**N/A**	**N/A**	**0**		**13636**		**15510**	**N/A**	**143.40**	**66.60**	**311**	**N/A**	**N/A**	**N/A**	**1589.04**	**884.78**	**2473.82**	

April 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1605676		**918974**												
1-Apr	sun	4		1606187	**511**	919572	**598**	0.275	3.4		9	26	71	0.76	54.78	26.56	81.34	
2-Apr	sun	3		1606685	**498**	920147	**575**	0.262	4.2	8.9	11	28	74	0.82	54.78	26.56	81.34	
3-Apr	sun	5		1607144	**459**	920670	**523**	0.294	4.9		12	31	79	1.1	54.78	26.56	81.34	
4-Apr	rain	5		1607707	**563**	921320	**650**	0.394	5.5		12	31	74	1.5	54.78	26.56	117.03	
5-Apr	cloud	0		1608341	**634**	922045	**725**	0.262	5.6	9.2	12	29	75	0.42	75.53	41.5	81.34	<2.0
6-Apr	sun	6		1608786	**445**	922551	**506**	0.271	4.2		12	18	76	0.63	54.78	26.56	61.84	
7-Apr	sun	6		1609137	**351**	922958	**407**	0.404	5.8		12	22	75	0.75	41.5	20.335	68.89	
8-Apr	snow	-2		1609542	**405**	923431	**473**	0.427	5		12	27	75	0.53	45.65	23.24	68.89	
9-Apr	sun	3		1609965	**423**	923923	**492**	0.387				27	75	0.4	45.65	23.24	68.89	
10-Apr	snow	2		1610320	**355**	924325	**402**	0.275	6.8	9.8	12	20	77	0.51	45.65	23.24	68.89	
11-Apr	cloud	0		1610758	**438**	924785	**460**	0.27	5	9.5	12	21	75	0.64	45.65	23.24	68.89	
12-Apr	cloud	0		1611075	**317**	925194	**409**	0.238	4.9		12	20	82	0.59	45.65	23.24	68.89	<2.0
13-Apr	sun	5		1611409	**334**	925575	**381**	0.275	4	0.3	12	15	73	0.35	45.65	23.24	42.33	
14-Apr	sun	6		1611677	**268**	925887	**312**	0.309	4.6	0.2	12	18	70	0.44	29.88	12.45	44.41	
15-Apr	sun	3		1611948	**271**	926214	**327**	0.353	4.5		10	24	69	0.58	29.88	14.525	44.41	
16-Apr	sun	9		1612250	**302**	926567	**353**	0.34	3		9	29	68	0.54	29.88	14.525	44.41	
17-Apr	sun	18		1612507	**257**	926873	**306**	0.287	5.2	0.6	11	27	69	0.35	29.88	14.525	44.41	
18-Apr	sun	5		1612814	**307**	927230	**357**	0.289	5		10	25	69	0.22	29.88	14.525	44.41	
19-Apr	sun	0		1613107	**293**	927570	**340**	0.243	4.3		12	24	68	0.12	29.88	14.525	25.73	<2.0
20-Apr	sun	0		1613408	**301**	927903	**333**	0.263	5.1		12	42	68	0.48	17.43	8.3	25.73	
21-Apr	sun	3		1613725	**317**	928276	**373**	0.258	4.5		12	24	67	0.59	17.43	8.3	25.73	
22-Apr	rain	4		1613998	**273**	928589	**313**	0.257	4.4		12	22	67	0.48	17.43	8.3	25.73	
23-Apr	cloud	0		1614266	**268**	928898	**309**	0.266	4.9		12	23	66	0.3	17.43	8.3	25.73	
24-Apr	rain	0		1614555	**289**	929235	**337**	0.25	4.5		11	21	66	0.57	17.43	8.3	25.73	
25-Apr	snow	0		1614844	**289**	929560	**325**	0.38	2.3			25	70	0.06	17.43	8.3	25.73	
26-Apr	cloud	4		1615126	**282**	929895	**335**	0.406	3.9		10	27	70	1.12	17.43	8.3	47.31	
27-Apr	sun	0		1615430	**304**	930250	**355**	0.29	3.5		10	36	62	0.31	29.88	17.43	47.31	
28-Apr	sun	8		1615751	**321**	930608	**358**	0.29	4	9.5	12	30	52	0.33	29.88	17.43	47.31	<2.0
29-Apr	cloud	7		1616075	**324**	930964	**356**	0.265	3.5	3	6	23	55	0.31	29.88	17.43	47.31	
30-Apr	cloud	8		1616353	**278**	931274	**310**	0.265	3.7	4.4	10	20	61	0.57	29.88	17.43	0.00	
																	0.00	
Average	**N/A**	**3.73**			**355.90**		**410.00**	**0.20**	**4.49**	**5.54**	**11.11**	**25.17**	**69.93**	**0.55**	**36.19**	**18.23**	**50.04**	
Median	**N/A**	**3.50**			**317.00**		**357.50**	**0.28**	**4.50**	**6.65**	**12.00**	**24.50**	**70.00**	**0.52**	**29.88**	**17.43**	**47.31**	
Total	**N/A**	**N/A**	**0**		**10677**		**12300**	**N/A**	**130.20**	**55.40**	**311**	**N/A**	**N/A**	**N/A**	**1085.64**	**546.97**	**1551.27**	

May 2021 WWTP Monthly Report

Date	Weather	Temp. (^{o}c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)
				1616353		**931274**											
1-May	cloud	6		1616593	**240**	931541	**267**	0.315	4.3	3.8	12	29	58	0.31	26.56	14.94	41.50
2-May	sun	5		1616931	**338**	931919	**378**	0.409	3.4	5.6	4	20	59	0.57	26.56	14.94	41.50
3-May	sun	6		1617205	**274**	932229	**310**	0.296	4.7	2.7	12	18	61	0.08	33.20	19.92	53.12
4-May	cloud	4		1617485	**280**	932542	**313**	0.25	4.9		12	17	62	0.29	33.20	19.92	53.12
5-May	sun	6		1617742	**257**	932828	**286**	0.275	3.6	2.8	12	21	61	0.24	33.20	19.92	53.12
6-May	sun	6		1618010	**268**	933134	**306**	0.25	4.6	3.9	12	24	52	0.17	33.20	19.92	53.12
7-May	cloud	9		1618311	**301**	933474	**340**	0.243	0.8			22	61	0.23	26.56	14.94	41.50
8-May	cloud	4		1618593	**282**	933788	**314**	0.282	3.5		12	15	54	0.33	26.56	10.38	36.94
9-May	rain	5		1618880	**287**	934063	**275**	0.365	4.5		12	4	62	0.63	20.34	6.64	26.98
10-May	sun	6		1619050	**170**	934299	**236**	0.3	4.7	2.1	12	13	49	0.44	19.92	12.45	32.37
11-May	rain	4		1619205	**155**	934502	**203**	0.575	0.8			26	48	1.39	19.92	17.43	37.35
12-May	cloud	3		1619435	**230**	934834	**332**	0.405	3.7		12	33	45	0.9	49.80		49.80
13-May	sun	6		1619729	**294**	935160	**326**	0.662	4.3	0.2	12	23	46	0.6	49.80		49.80
14-May	sun	14		1620044	**315**	935512	**352**	0.697	4.7	8	12	13	41	0.59	49.80		49.80
15-May	sun	8		1620306	**262**	935788	**276**	0.807	3.5		12	9	59	0.58	49.80		49.80
16-May	sun	20		1620582	**276**	936095	**307**	0.524	0.8	7.2		10	44	0.45	49.80		49.80
17-May	sun	10		1620748	**166**	936291	**196**	0.37	4.5	3	12	19	47	0.36	49.80		49.80
18-May	cloud	10		1620945	**197**	936531	**240**	0.4	4.9	2	12	28	46	0.32	49.80		49.80
19-May	sun	0		1621205	**260**	936827	**296**	0.875	4.8		12	24	45	0.62	41.50		41.50
20-May	cloud	6		1621481	**276**	937134	**307**	0.929	2.5	4.3	12	17	43	0.65	41.50		41.50
21-May	cloud	4		1621711	**230**	937316	**182**	0.396	2.2			9	42	1.36	41.50		41.50
22-May	cloud	5		1621904	**193**	937616	**300**	0.308	3.7		12	15	41	0.88	59.76		59.76
23-May	cloud	10		1622111	**207**	937858	**242**	0.375	5.3	1.2	12	20	53	0.37	50.22		50.22
24-May	rain	5		1622409	**298**	938165	**307**	0.315	3.8	3.5	12	19	51	0.32	50.22		50.22
25-May	rain	6		1622696	**287**	938454	**289**	0.254	2.1	5.8		13	51	0.26	50.22		50.22
26-May	cloud	6		1622940	**244**	938795	**341**	0.275	4.8	9.4	12	33	48	0.22	50.22		50.22
27-May	sun	7		1623035	**95**	939128	**333**	0.28	3.8	6.5	12	31	53	0.22	41.50		41.50
28-May	rain	3		1623402	**367**	939541	**413**	0.326	1	2.6		24	59	0.31	41.50		41.50
29-May	sun	7		1623711	**309**	939892	**351**	0.283	3.3	5.8	12	24	61	0.11	41.50		41.50
30-May	sun	10		1623992	**281**	940216	**324**	0.298	2.7	4.9		24	65	0.23	26.56		26.56
31-May	sun	10		1624272	**280**	940509	**293**	0.279	4	4.5	12			0.31	26.56		26.56
Average	**N/A**	**6.81**			**255.45**		**297.90**	**0.41**	**3.55**	**4.28**	**11.67**	**19.90**	**52.23**	**0.46**	**39.05**	**15.58**	**44.58**
Median	**N/A**	**6.00**			**274.00**		**307.00**	**0.32**	**3.80**	**3.90**	**12.00**	**20.00**	**51.50**	**0.33**	**41.50**	**14.94**	**49.80**
Total	**N/A**	**N/A**	**0**		**7919**		**9235**	**N/A**	**110.20**	**89.80**	**280**	**N/A**	**N/A**	**N/A**	**1210.56**	**171.40**	**1381.95**

June 2021 WWTP Monthly Report

Date	Weather	Temp. (^{o}c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)
				1624272		**940509**											
1-Jun	sun	10		1624521	**249**	940809	**300**	0.4	0.6	8.4		26	75	0.25	26.56		26.56
2-Jun	sun	20		1624763	**242**	941119	**310**	0.3	3.4		12	24	70	0.17	24.90		24.90
3-Jun	sun	21		1625087	**324**	941454	**335**	0.241	0.9			22	66	0.04	24.90		24.90
4-Jun	sun	12		1625371	**284**	941802	**348**	0.284	3.3	4.2	12	18	53	0.24	23.24		23.24
5-Jun	cloud	17		1625670	**299**	942100	**298**	0.265	3.2	6.4	12	16	54	0.25	23.24		23.24
6-Jun	cloud	10		1625951	**281**	942458	**358**	0.323	4.6		12	24	65	0.49	23.24		23.24
7-Jun	cloud	6		1626234	**283**	942786	**328**	0.286	2.7		12	23	54	0.43	26.56		26.56
8-Jun	cloud	6		1626533	**299**	943079	**293**	0.269	3.1		12	27	43	0.38	26.56		26.56
9-Jun	rain	10		1626847	**314**	943358	**279**	0.307	3.9		12	23	42	0.40	26.56		26.56
10-Jun	cloud	11		1627156	**309**	943709	**351**	0.471	0.9			22	69	0.79	26.56		26.56
11-Jun	sun	12		1627419	**263**	944024	**315**	0.274	3.2		12	20	40	0.36	26.56		26.56
12-Jun	rain	11		1627689	**270**	944329	**305**	0.261	2.9		12	19	40	0.43	26.56		26.56
13-Jun	sun	15		1627953	**264**	944639	**310**	0.275	0.9	8.1		21	37	0.47	26.56		26.56
14-Jun	sun	20		1628227	**274**	944922	**283**	0.25	3.5	5.9	12	20	68	0.38	26.56		26.56
15-Jun	cloud	13		1628495	**268**	945239	**317**	0.45	4.5	6.9	12	14	55	0.59	26.56		26.56
16-Jun	sun	15		1628762	**267**	945539	**300**	0.375	0.8	11.1		16	42	0.76	26.56		26.56
17-Jun	sun	16		1628974	**212**	945783	**244**	0.35	2.8		12	22	52	0.46	26.56		26.56
18-Jun	sun	13		1629215	**241**	946048	**265**	0.388	3.1	12.2	12	25	74	1.24	26.56		26.56
19-Jun	cloud	16		1629537	**322**	946402	**354**	0.402	2.7	6	12	13	49	0.49	26.56		26.56
20-Jun	sun	15		1629774	**237**	946669	**267**	0.372	3.7	2.7	12	21	50	0.57	26.56		26.56
21-Jun	sun	8		1630037	**263**	946965	**296**	0.36				24	39	0.63	26.56		26.56
22-Jun	sun	10		1630318	**281**	947253	**288**	0.268				20	39	0.79	26.56		26.56
23-Jun	sun	15		1630574	**256**	947525	**272**	0.288	1			23	39	1.48	26.56		26.56
24-Jun	sun	10		1630821	**247**	947853	**328**	0.281				24	39	1.01	33.20		33.20
25-Jun	sun	19		1631117	**296**	948140	**287**	0.25				24	39	1.05	33.20		33.20
26-Jun	sun	20		1631409	**292**	948497	**357**	0.284				26	39	0.92	33.20		33.20
27-Jun	sun	22		1631728	**319**	948825	**328**	0.374				28	39	1.66	33.20		33.20
28-Jun	sun	25		1632029	**301**	949182	**357**	0.395	3.6	2.3	12	23	38	0.60	49.80		49.80
29-Jun	sun	20		1632335	**306**	949479	**297**	0.35	0.4	9.3		20	40	0.66	49.80		49.80
30-Jun	sun	30		1632691	**356**	949847	**368**	0.275	3.8		12	15	43	1.06	49.80		49.80
																	0.00
Average	**N/A**	**14.93**			**280.63**		**311.27**	**0.32**	**2.65**	**6.96**	**12.00**	**21.43**	**49.73**	**0.64**	**29.33**	**#DIV/0!**	**28.38**
Median	**N/A**	**15.00**			**281.00**		**307.50**	**0.29**	**3.10**	**6.65**	**12.00**	**22.00**	**43.00**	**0.53**	**26.56**	**#NUM!**	**26.56**
Total	**N/A**	**N/A**	**0**		**8419**		**9338**	**N/A**	**63.50**	**83.50**	**204**	**N/A**	**N/A**	**N/A**	**879.80**	**0.00**	**879.80**

July 2021 WWTP Monthly Report

	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1632691		**949847**												
1-Jul	sun	30		1632977	**286**	950223	**376**	0.25	0.9	9.7		12	43	0.9	49.80		49.80	
2-Jul	sun	30		1633307	**330**	950544	**321**	0.215	3.4	1.3	12	24	47	0.48	59.76		59.76	
3-Jul	sun	30		1633656	**349**	950896	**352**	0.27	4.5	2.1	12	36	52	1.02	59.76		59.76	
4-Jul	sun	25		1634040	**384**	951366	**470**	0.28	5.3	3.9	12	45	55	0.95	64.74		64.74	
5-Jul	sun	17		1634377	**337**	951704	**338**	0.257	1.9			46	55	0.75	75.53		75.53	
6-Jul	sun	20		1634733	**356**	952075	**371**	0.315	4.5	7.9	12	44	59	0.42	75.53		75.53	
7-Jul	sun	16		1635062	**329**	952387	**312**	0.346	6.1	0.8	12	54	64	0.49	75.53		75.53	
8-Jul	cloud	14		1635438	**376**	952788	**401**	0.382	5.4	3.7	11	55	63	0.48	75.53		75.53	
9-Jul	sun	13		1635905	**467**	953240	**452**	0.367	5	6.7	6	42	63	0.73	75.53		75.53	
10-Jul	sun	16		1636330	**425**	953754	**514**	0.282	1.6	13.1	11	40	63	0.66	75.53		75.53	
11-Jul	sun	20		1636736	**406**	954175	**421**	0.315				47	69	0.69	75.53		75.53	
12-Jul	sun	20		1637100	**364**	954608	**433**	0.361	2.3			51	70	0.86	75.53		75.53	
13-Jul	sun	22		1637579	**479**	955078	**470**	0.501	1.5	8.1		44	49	0.63	93.38		93.38	
14-Jul	sun	14		1638060	**481**	955545	**467**	0.574	0.9	0.6		28	54	0.34	93.38		93.38	<2.0mg/L
15-Jul	sun	15		1638419	**359**	955965	**420**	0.305		1.5		37	55	0.39	81.34		81.34	
16-Jul	sun	18		1638894	**475**	956448	**483**	0.376				33	59	1.12	81.34		81.34	
17-Jul	sun	25		1639331	**437**	956990	**542**	0.336		2.8	12	34	62	0.41	93.38		93.38	
18-Jul	sun	30		1639837	**506**	957519	**529**	0.373		7.5		19	65	0.4	93.38		93.38	
19-Jul	sun	15		1640289	**452**	957955	**436**	0.33	2.7	0.8		22	70	0.45	93.38		93.38	
20-Jul	sun	20		1640665	**376**	958321	**366**	0.3	4	3	12	23	70	0.41	93.38		93.38	
21-Jul	cloud	18		1641041	**376**	958812	**491**	0.302			12	27	48	0.47	93.38		93.38	
22-Jul	sun	20		1641417	**376**	959172	**360**	0.24			12	22	53	0.34	93.38		93.38	
23-Jul	sun	9		1641796	**379**	959548	**376**	0.238			12	23	53	0.34	93.38		93.38	
24-Jul	sun	13		1642173	**377**	960054	**506**	0.31			12	23	51	0.53	93.38		93.38	
25-Jul	sun	18		1642549	**376**	960420	**366**	0.24			12	26	49	0.36	93.38		93.38	
26-Jul	sun	20		1642934	**385**	960884	**464**	0.242			12	31	49	0.49	93.38		93.38	
27-Jul	sun	16		1643308	**374**	961247	**363**	0.3			12	34	50	0.37	93.38		93.38	
28-Jul	sun	20		1643777	**469**	961692	**445**	0.6			12	33	56	0.47	93.38		93.38	
29-Jul	sun	14		1644175	**398**	962168	**476**	0.699				33	43	0.41	93.38		93.38	
30-Jul	sun	18		1644628	**453**	962660	**492**	0.569			12	30	45	0.46	93.38		93.38	
31-Jul	sun	16		1645023	**395**	963188	**528**	0.439			12	28	43	0.44	93.38		93.38	
Average	**N/A**	**19.10**			**397.81**		**430.35**	**0.35**	**3.33**	**4.59**	**11.60**	**33.74**	**55.71**	**0.56**	**83.50**	**#DIV/0!**	**83.50**	
Median	**N/A**	**18.00**			**379.00**		**436.00**	**0.32**	**3.40**	**3.35**	**12.00**	**33.00**	**55.00**	**0.47**	**93.38**	**#NUM!**	**93.38**	
Total	**N/A**	**N/A**	**0**		**12332**		**13341**	**N/A**	**50.00**	**73.50**	**232**	**N/A**	**N/A**	**N/A**	**2588.36**	**0.00**	**2588.36**	

August 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1645023		**963188**												
1-Aug	smoke	17		1645538	**515**	963678	**490**	0.384	4.4	6.5	12	30	44	0.54	93.38		93.38	
2-Aug	rain	18		1646065	**527**	964197	**519**	0.27	5.1		12	31	50	0.66	93.38		93.38	
3-Aug	cloud	19		1646525	**460**	964681	**484**	0.281	4.6	7.6	12	29	48	0.55	106.24		106.24	
4-Aug	smoke	17		1646952	**427**	965211	**530**	0.223	1.5	7.2		33	54	0.75	106.24		106.24	
5-Aug	sun	10		1647388	**436**	965638	**427**	0.245	4.9	3	12	33	56	0.22	106.24		106.24	
6-Aug	smoke	16		1647859	**471**	966104	**466**	0.235	4.1		12	14	44	0.34	106.24		106.24	
7-Aug	cloud	18		1648162	**303**	966505	**401**	0.235	4.9	5.6	12	13	43	0.59	106.24		106.24	
8-Aug	cloud	12		1648548	**386**	966870	**365**	0.27	5.2	2.9	12	11	48	0.49	106.24		106.24	
9-Aug	cloud	11		1648829	**281**	967190	**320**	0.39	6.4	2.8	12	7	51	0.38	81.34		81.34	
10-Aug	cloud	17		1649040	**211**	967501	**311**	0.342	4.3	2.2	12	13	49	0.83	81.34		81.34	
11-Aug	sun	20		1649325	**285**	967769	**268**	0.305	4		12	21	37	0.65	81.34		81.34	
12-Aug	sun	12		1649620	**295**	968074	**305**	0.334	1			22	49	0.85	81.34		81.34	
13-Aug	sun	10		1649899	**279**	968408	**334**	0.412				21	53	0.79	81.34		81.34	
14-Aug	sun	13		1650240	**341**	968747	**339**	0.625	5.7		12	25	49	1.27	81.34		81.34	
15-Aug	cloud	17		1650540	**300**	969145	**398**	0.937	5.2		12	26	43	2.05	81.34		81.34	
16-Aug	cloud	21		1650896	**356**	969508	**363**	0.824				23	44	1.87	92.96		92.96	
17-Aug	rain	10		1651225	**329**	969866	**358**	0.586	4.8		12	37	49	2.54	92.96		92.96	
18-Aug	cloud	11		1651649	**424**	970340	**474**	0.693	2.2			21	48	2.4	106.24		106.24	
19-Aug	sun	9		1652029	**380**	970753	**413**	0.645	5.8		12	12	54	1.22	106.24		106.24	
20-Aug	cloud	9		1652300	**271**	971052	**299**	0.707	1.8			7	52	1.24	106.24		106.24	
21-Aug	rain	12		1652577	**277**	971335	**283**	0.759	4.2	4.2	12	14	55	2.45	81.34		81.34	
22-Aug	cloud	15		1652837	**260**	971646	**311**	0.8	4.2	5.5	12	16	41	0.98	105.83		105.83	
23-Aug	cloud	12		1653129	**292**	972034	**388**	1.84	6		12	26	46	1.32	105.83		105.83	
24-Aug	fog	9		1653409	**280**	972298	**264**	1.18	2.4			22	44	0.58	105.83		105.83	
25-Aug	sun	2		1653727	**318**	972613	**315**	1.35	3.8		9	10	45	0.6	105.83		105.83	
26-Aug	sun	11		1653928	**201**	972873	**260**	0.647	6.3		12	23	45	0.46	105.83		105.83	
27-Aug	cloud	11		1654179	**251**	973143	**270**	0.622	5.6		10	20	46	0.59	105.83		105.83	
28-Aug	cloud	11		1654490	**311**	973494	**351**	0.557	3.8		10	19	48	0.98	86.32		86.32	
29-Aug	fog	10		1654745	**255**	973772	**278**	0.498	5.3		12	16	50	1.12	86.32		86.32	
30-Aug	sun	10		1655002	**257**	974026	**254**	0.36	5.4		12	19	35	0.76	86.32		86.32	
31-Aug	sun	12		1655241	**239**	974360	**334**	0.4	6.1	3.1	12			1.05	86.32		86.32	<2.0mg/L
Average	**N/A**	**12.97**			**329.61**		**360.39**	**0.58**	**4.45**	**4.60**	**11.71**	**20.47**	**47.33**	**1.00**	**95.48**	**#DIV/0!**	**95.48**	
Median	**N/A**	**12.00**			**300.00**		**339.00**	**0.50**	**4.80**	**4.20**	**12.00**	**21.00**	**48.00**	**0.79**	**93.38**	**#NUM!**	**93.38**	
Total	**N/A**	**N/A**	**0**		**10218**		**11172**	**N/A**	**129.00**	**50.60**	**281**	**N/A**	**N/A**	**N/A**	**2959.78**	**0.00**	**2959.78**	

September 2021 WWTP Monthly Report

Date	Weather	Temp. (^{o}c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1655241		**974360**												
1-Sep	sun	9		1655445	**204**	974566	**206**	0.3	4.9		12	10	34	0.46	86.32		86.32	
2-Sep	sun	6		1655582	**137**	974697	**131**	0.265	5.9		12	8	33	0.45	86.32		86.32	
3-Sep	sun	11		1655734	**152**	974917	**220**	0.311	4.6		10	23	31	0.74	75.53		75.53	
4-Sep	sun	9		1655948	**214**	975153	**236**	0.327	5.3		12	24	30	0.67	75.53		75.53	
5-Sep	sun	13		1656214	**266**	975460	**307**	0.515	5.5	3.8	12	34	29	1.29	75.53		75.53	
6-Sep	sun	15		1656594	**380**	975836	**376**	0.57	4.6	3.8	12	22	29	0.87	92.96		92.96	
7-Sep	sun	9		1656935	**341**	976317	**481**	0.54	5.8	5.8	12	15	25	0.45	106.24		106.24	
8-Sep	sun	6		1657146	**211**	976534	**217**	0.5	5.7		12	10	27	0.28	81.34		81.34	
9-Sep	sun	13		1657320	**174**	976801	**267**	0.329	1.3			1	26	0.61	81.34		81.34	
10-Sep	cloud	17		1657484	**164**	976984	**183**	0.278	3.9		12	10	26	0.43	81.34		81.34	
11-Sep	rain	12		1657666	**182**	977182	**198**	0.269	5.1		12	5	26	0.34	81.34		81.34	
12-Sep	cloud	12		1657799	**133**	977347	**165**	0.315		9.8		15	24	0.72	64.74		64.74	
13-Sep	cloud	10		1657980	**181**	977587	**240**	0.311		4.5		8	30	0.61	81.34		81.34	
14-Sep	cloud	5		1658104	**124**	977701	**114**	0.26				16	32	0.52	81.34		81.34	
15-Sep	cloud	13		1658278	**174**	977903	**202**	0.44				17	33	0.36	81.34		81.34	<2.0
16-Sep	sun	3		1658423	**145**	978043	**140**	0.4		6.1		25	34	0.21	59.76		59.76	
17-Sep	cloud	2		1658610	**187**	978266	**223**	0.601	1.3			26	37	1.22	59.76		59.76	
18-Sep	cloud	13		1658861	**251**	978596	**330**	0.475		0.7		26	38	1.01	59.76		59.76	
19-Sep	cloud	10		1659199	**338**	978981	**385**	0.7				32	32	0.91	81.34		81.34	
20-Sep	cloud	4		1659456	**257**	979269	**288**	0.825				30	32	0.49	81.34		81.34	
21-Sep	sun	5		1659702	**246**	979621	**352**	0.5	1.2			17	34	0.36	59.76		59.76	
22-Sep	sun	6		1659888	**186**	979802	**181**	0.54	0.9	2.3		14	34	0.29	59.76		59.76	
23-Sep	sun	8		1660093	**205**	979978	**176**	0.43	3.2	0.3		1	37	0.25	59.76		59.76	
24-Sep	sun	8		1660283	**190**	980223	**245**	0.608			12	2	24	0.41	50.22		50.22	
25-Sep	sun	11		1660429	**146**	980380	**157**	0.526	1.2	1.2		16	23	0.81	50.22		50.22	
26-Sep	sun	10		1660645	**216**	980620	**240**	0.933	0.9			8	24	0.5	50.22		50.22	
27-Sep	cloud	16		1660787	**142**	980829	**209**	0.868	2.7	3.9	12	12	24	0.48	70.14		70.14	
28-Sep	rain	7		1660934	**147**	980984	**155**	0.923	1.4	3		26	26	1.08	50.22		50.22	
29-Sep	cloud	8		1661186	**252**	981282	**298**	1.07	0.9	3		25	27	0.31	59.76		59.76	
30-Sep	sun	10		1661388	**202**	981523	**241**	0.88			12	29	39	0.79	59.76		59.76	
																	0.00	
Average	**N/A**	**9.37**			**204.90**		**238.77**	**0.53**	**3.32**	**3.71**	**11.85**	**16.90**	**30.00**	**0.60**	**71.48**	**#DIV/0!**	**69.17**	
Median	**N/A**	**9.50**			**188.50**		**221.50**	**0.50**	**3.55**	**3.80**	**12.00**	**16.00**	**30.00**	**0.50**	**75.53**	**#NUM!**	**75.53**	
Total	**N/A**	**N/A**	**0**		**6147**		**7163**	**N/A**	**66.30**	**48.20**	**154**	**N/A**	**N/A**	**N/A**	**2144.31**	**0.00**	**2144.31**	

October 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1661388		**981523**												
1-Oct	Sun	6		1661610	**222**	981753	**230**	1.35	2.2			22	36	0.79	59.76		59.76	
2-Oct	cloud	4		1661879	**269**	982075	**322**	1.29				11	26	0.48	59.76		59.76	
3-Oct	cloud	12		1662072	**193**	982296	**221**	1.16	1.4	0.7		13	27	0.59	59.76		59.76	
4-Oct	Sun	6		1662262	**190**	982510	**214**	1.13		0.4		6	27	0.75	59.76		59.76	
5-Oct	Sun	8		1662406	**144**	982703	**193**	1	1.4	0.3		10	28	0.85	59.76		59.76	
6-Oct	rain	9		1662543	**137**	982868	**165**	1.15	3		12	14	21	0.61	59.76		59.76	<2.0
7-Oct	Sun	1		1662736	**193**	983077	**209**	1.11	1.3			10	20	0.54	59.76		59.76	
8-Oct	Sun	-2		1662769	**33**	983214	**137**	1.11	0.9			26	20	0.15	59.76		59.76	
9-Oct	Sun	-2		1663001	**232**	983497	**283**	1.57		0.7		9	20	0.22	59.76		59.76	
10-Oct	rain	4		1663148	**147**	983706	**209**	1.57	0.9			21	21	0.15	59.76		59.76	
11-Oct	Sun	-5		1663474	**326**	984092	**386**	2.5	0.4	0.2		21	23	1.30	59.76		59.76	
12-Oct	Sun	-7		1663713	**239**	984422	**330**	1.9	1.5	0.5	12	11	24	0.45	93.38		93.38	
13-Oct	cloud	0		1663869	**156**	984655	**233**	0.245		0.8		15	24	0.30	59.76		59.76	<2.0
14-Oct	cloud	2		1664035	**166**	984873	**218**	2.9				12	25	0.40	59.76		59.76	
15-Oct	rain	6		1664204	**169**	985038	**165**	1.23	1.7			16	26	0.20	59.76		59.76	
16-Oct	cloud	5		1664393	**189**	985243	**205**	0.235		2.7		13	26	0.74	50.22		50.22	
17-Oct	Sun	3		1664555	**162**	985456	**213**	0.41		0.5		10	27	0.62	50.22		50.22	
18-Oct	Sun	1		1664728	**173**	985674	**218**	0.239	1.2	1		3	28	0.62	59.76		59.76	
19-Oct	Sun	5		1664837	**109**	985676	**2**	0.282	3.1	4.1	7	13	29	0.63	59.76		59.76	
20-Oct	cloud	-1		1664993	**156**	985892	**216**	0.521	1.4	6.4	4	14	22	0.82	59.76		59.76	<2.0
21-Oct	cloud	3		1665172	**179**	986139	**247**	0.283	1.2	6.2		14	25	0.51	59.76		59.76	
22-Oct	cloud	4		1665338	**166**	986318	**179**	0.398	0.4			14	27	0.38	59.76		59.76	
23-Oct	rain	6		1665515	**177**	986548	**230**	0.351	2		10	26	26	0.48	59.76		59.76	
24-Oct	cloud	6		1665779	**264**	986889	**341**	0.73	1.6	0.8	2	23	26	0.77	59.76		59.76	
25-Oct	rain	6		1665991	**212**	987139	**250**	0.32	1			30	26	0.82	59.76		59.76	
26-Oct	cloud	6		1666322	**331**	987540	**401**	0.703	1.8		12	22	27	0.48	59.76		59.76	
27-Oct	cloud	3		1666588	**266**	987878	**338**	0.418	1.1	0.2		25	27	0.59	59.76		59.76	<2.0
28-Oct	rain	4		1666847	**259**	988231	**353**	0.764	0.9			18	26	0.53	59.76		59.76	
29-Oct	rain	5		1667362	**515**	988850	**619**	12.6				92	40	1.35	59.76	14.94	74.70	
30-Oct	snow	0		1667814	**452**	989369	**519**	1.56				71	55	0.95	59.76	14.94	74.70	
31-Oct	Sun	-5		1668264	**450**	989859	**490**	0.624	3.3		12	41	41	0.26	59.76	14.94	74.70	
Average	**N/A**	**3.00**			**221.81**		**268.90**	**1.34**	**1.53**	**1.70**	**8.88**	**20.84**	**27.29**	**0.15**	**60.23**	**14.94**	**61.67**	
Median	**N/A**	**4.00**			**190.00**		**230.00**	**1.00**	**1.40**	**0.70**	**11.00**	**14.00**	**26.00**	**0.50**	**59.76**	**14.94**	**59.76**	
Total	**N/A**	**N/A**	**0**		**6876**		**8336**	**N/A**	**33.70**	**25.50**	**71**	**N/A**	**N/A**	**0.33**	**1867.09**	**44.82**	**1911.91**	

November 2021 WWTP Monthly Report

Date	Weather	Temp. (^{o}c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1668264		**989859**												
1-Nov	sun	-8		1668583	**319**	990118	**259**	0.517	2.6	0.8		14	40	0.15	59.76	14.94	74.70	
2-Nov	sun	-4		1668834	**251**	990392	**274**	0.407	2.1		12	10	40	0.5	59.76	14.94	74.70	
3-Nov	cloud	2		1669005	**171**	990675	**283**	0.563	1.3	0.2		4	40	0.33	59.76	14.94	74.70	<2.0
4-Nov	cloud	4		1669200	**195**	990891	**216**	0.209	1.1	6.2		4	36	0.25	59.76	14.94	74.70	
5-Nov	rain	6		1669405	**205**	991164	**273**	0.786	0.9			24	38	0.42	59.76	14.94	74.70	
6-Nov	cloud	1		1669729	**324**	991536	**372**	0.494	3.5		12	31	24	0.28	45.65	10.38	56.03	
7-Nov	snow	2		1670099	**370**	991962	**426**	9	1.3			19	18	0.16	45.65	10.38	56.03	
8-Nov	snow	1		1670344	**245**	992235	**273**	0.41	3.7	0.7	12	10	18	0.09	45.65	10.38	56.03	
9-Nov	cloud	-4		1670549	**205**	992521	**286**	1.5	2.4	0.4	11	0	18	0.24	41.50	10.38	51.88	
10-Nov	snow	0		1670690	**141**	992694	**173**	0.3		0.3		22	19	0.24	41.50	10.38	32.00	
11-Nov	cloud	-4		1670906	**216**	992937	**243**	0.5		0.3		23	20	0.19	26.56	6.64	33.20	
12-Nov	snow	0		1671122	**216**	993175	**238**	0.333	1.5		1	15	21	0.32	14.94	6.64	21.58	<2.0
13-Nov	cloud	0		1671544	**422**	993685	**510**	1.43	0.9	4.3		53	22	0.54	26.56	14.94	41.50	
14-Nov	rain	0		1672091	**547**	994377	**692**	0.9	2.9		11	20	25	0.36	26.56	14.94	41.50	
15-Nov	rain	9		1672783	**692**	995158	**781**	2.3		1		75	56	0.41	26.56	14.94	41.50	
16-Nov	sun	-1		1673475	**692**	995968	**810**	0.625	2.4	0.6	1	28	57	0.58	26.56	14.94	41.50	
17-Nov	sun	-8		1673859	**384**	996407	**439**	0.545	2.6	3.7	12	10	38	0.31	26.56	14.94	41.50	
18-Nov	sun	-4		1674070	**211**	996666	**259**	0.569	1.6			21	27	0.71	6.64	6.64	13.28	
19-Nov	snow	-1		1674252	**182**	996888	**222**	0.384	1	1		19	27	0.98	12.45	12.45	24.90	
20-Nov	cloud	-2		1674435	**183**	997083	**195**	0.422	1.6	1	10	19	27	0.88	12.45	12.45	24.90	
21-Nov	cloud	0		1674597	**162**	997300	**217**	0.489	2.6	0.9	12	16	28	1.11	12.45	12.45	24.90	
22-Nov	cloud	-3		1674771	**174**	997498	**198**	0.565	1	0.2		10	28	1.23	14.94	14.94	29.88	
23-Nov	snow	-2		1674944	**173**	997691	**193**	0.84		2.4		10	52	1.02	29.88	14.94	44.82	
24-Nov	cloud	-6		1675081	**137**	997851	**160**	0.79		0.8		10	30	0.98	19.92	14.94	34.86	
25-Nov	snow	1		1675195	**114**	998037	**186**	0.452		10		14	33	0.4	14.94	14.94	29.88	
26-Nov	rain	2		1675406	**211**	998282	**245**	0.305	1.1	1.6		23	35	0.5	14.94	14.94	29.88	
27-Nov	cloud	0		1675709	**303**	998632	**350**	0.582	3.7		12	20	38	0.64	14.94	14.94	29.88	
28-Nov	rain	10		1676007	**298**	999007	**375**	0.413	2.1	1.4		52	38	1.03	14.94	14.94	29.88	
29-Nov	cloud	7		1676493	**486**	999607	**600**	0.6	1	2.3	12	38	37	1.05	14.94	14.94	29.88	
30-Nov	rain	4		1676929	**436**	1000075	**468**	0.488		4		21	40	0.58	14.94	14.94	29.88	
																	0.00	
Average	**N/A**	**0.07**			**288.83**		**340.53**	**0.92**	**1.95**	**2.00**	**9.83**	**21.17**	**32.33**	**0.55**	**29.71**	**13.10**	**40.79**	
Median	**N/A**	**0.00**			**216.00**		**273.00**	**0.53**	**1.60**	**1.00**	**12.00**	**19.00**	**31.50**	**0.46**	**26.56**	**14.94**	**34.86**	
Total	**N/A**	**N/A**	**0**		**8665**		**10216**	**N/A**	**44.90**	**44.10**	**118**	**N/A**	**N/A**	**N/A**	**891.42**	**393.01**	**1264.55**	

December 2021 WWTP Monthly Report

Date	Weather	Temp. (°c)	Skier Visits	Total Influent Flow (m^3)	Daily Influent flow (m^3)	Total Effluent Flow	Effluent Flow (m^3)	TSS (mg/L)	Solids Bagged (m^3)	Wasting (m^3)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO_4 (mg/L)	East RBC (l/d)	West RBC (l/d)	Alum/PAC (l/d)	BOD (mg/L)
				1676929		**1000075**												
1-Dec	rain	6		1677536	**607**	1000810	**735**	0.465				52	44	0.82	14.94	14.94	29.88	
2-Dec	cloud	6		1678256	**720**	1001585	**775**	0.379	2.9			15	27	0.31	14.94	14.94	29.88	
3-Dec	sun	-4		1678528	**272**	1001893	**308**	0.524	1.5	4.2	12	14	28	0.25	14.94	14.94	29.88	
4-Dec	snow	-4		1678754	**226**	1002166	**273**	0.315	0.8			14	28	0.37	14.94	14.94	29.88	
5-Dec	sun	-6		1678955	**201**	1002440	**274**	0.381	1.9	5.3		15	29	0.85	14.94	14.94	29.88	
6-Dec	snow	-7		1679128	**173**	1002629	**189**	0.630				14	31	0.92	14.94	14.94	29.88	
7-Dec	sun	-8		1679291	**163**	1002808	**179**	0.730				17	33	1.15	14.94	14.94	29.88	
8-Dec	snow	0		1679447	**156**	1002973	**165**	0.681			12	19	33	1.10	14.94	14.94	29.88	
9-Dec	cloud	-4		1679696	**249**	1003183	**210**	0.668				13	34	1.55	41.50	14.94	56.44	
10-Dec	cloud	-10		1679843	**147**	1003432	**249**	0.586	2.1			7	34	0.76	41.50	14.94	56.44	
11-Dec	snow	-1		1679987	**144**	1003666	**234**	0.420	2.7	1		21	34	0.87	41.50	14.94	56.44	
12-Dec	cloud	0		1680330	**343**	1004021	**355**	0.500	0.9			9	34	1.26	41.50	14.94	56.44	
13-Dec	cloud	-4		1680528	**198**	1004261	**240**	0.580	0.8	0.6		19	34	0.95	59.76	14.94	74.70	
14-Dec	snow	-2		1680737	**209**	1004480	**219**	0.525		8.5		20	36	0.79	41.50	14.94	56.44	
15-Dec	sun	-9		1680977	**240**	1004812	**332**	0.479	2.2		7	19	37	1.10	41.50	14.94	56.44	<2.0
16-Dec	cloud	-9		1681200	**223**	1005041	**229**	0.469	2.5	1.4		18	38	0.78	50.22	14.94	65.16	
17-Dec	sun	-18		1681421	**221**	1005298	**257**	0.585	2.7	0.7		17	38	0.93	50.22	14.94	65.16	
18-Dec	snow	-10		1681664	**243**	1005585	**287**	0.517	3.6	15.4	13	23	38	1.25	50.22	14.94	65.16	
19-Dec	sun	-6		1681915	**251**	1005865	**280**	0.475	3	3.9	3	31	43	1.87	50.22	14.94	65.16	
20-Dec	sun	-11		1682181	**266**	1006159	**294**	0.540	3.8	1	9	43	46	1.36	70.14	14.94	85.08	
21-Dec	sun	-10		1682552	**371**	1006548	**389**	0.420	2.8	0.8		38	48	0.92	93.38	14.94	108.32	
22-Dec	snow	-3		1683034	**482**	1007069	**521**	0.713	2.1			22	50	1.22	93.38	14.94	108.32	<2.0
23-Dec	snow	1		1683425	**391**	1007566	**497**	0.490	3.7			13	52	0.47	93.38	14.94	108.32	
24-Dec	snow	-6		1683935	**510**	1008087	**521**	0.362	2.2	18.1		20	53	1.86	33.62	33.62	67.23	
25-Dec	snow	-6		1684165	**230**	1008347	**260**	0.188	4.6	9.1	12	20	50	0.23	50.22	50.22	100.43	
26-Dec	snow	-26		1684535	**370**	1008761	**414**	0.367	1.9	16.2		18	54	0.66	26.56	33.62	60.18	
27-Dec	sun	-23		1684911	**376**	1009176	**415**	0.400	4.8	4.3	26	6	64	0.53	26.56	33.62	60.18	
28-Dec	snow	-22		1685266	**355**	1009592	**416**	0.400	5.3	5.3	8	16	65	0.59	26.56	33.62	60.18	
29-Dec	sun	-27		1685687	**421**	1010027	**435**	0.500	5.5	3.9	12	18	68	1.03	26.56	14.94	41.50	<2.0
30-Dec	sun	-16		1686110	**423**	1010546	**519**	0.600	4.7	7.6	8	26	71	1.66	26.56	14.94	41.50	
31-Dec	sun	-16		1686535	**425**	1011032	**486**	0.923	3	1.8	1	22	76	1.53	33.62	20.34	53.95	
Average	**N/A**	**-8.23**			**309.87**		**353.45**	**0.51**	**2.88**	**5.74**	**10.25**	**19.97**	**43.55**	**0.97**	**39.67**	**18.66**	**58.33**	
Median	**N/A**	**-6.00**			**251.00**		**294.00**	**0.50**	**2.70**	**4.20**	**10.50**	**18.00**	**38.00**	**0.92**	**41.50**	**14.94**	**56.44**	
Total	**N/A**	**N/A**	**0**		**9606**		**10957**	**N/A**	**72.00**	**109.10**	**123**	**N/A**	**N/A**	**N/A**	**1229.65**	**578.51**	**1808.16**	

2021 Summary

	Temperature		Total	Influent flow			Effluent Flow			TSS		Volume Bagged			Volume Wasted			Amount of Bags Removed			EQ Tank % Full		SD Tank % Full		Total PO4 (mg/L)		Alum/ PAC usage (L)		
	Average	Median	Skiers	Average	Median	total	Average	Median	total	Average	Median	Average	Median	total	Average	Median	total	Average	Median	total	Average	Median	Average	Median	Average	Median	Average	Median	total
January	-4.4	-4.0		329.5	329.5	10215	375.0	371.0	11624	1.9	1.5	4.5	4.4	133.9	5.3	5.4	133.3	9.0	9.5	271	24.00	31.00	56.84	57.00	0.79	0.65	70.66	72.21	1516.00
February	-9.0	-5.5		353.4	363.5	9894	387.1	403.0	10840	0.4	0.3	3.6	3.4	100.4	7.1	6.8	135.3	8.3	9.0	215	32.07	36.50	62.61	64.50	0.76	0.78	75.93	79.68	1656.00
March	-0.5	0.0		439.9	443.0	13636	500.3	498.0	15510	0.5	0.3	4.6	4.7	143.4	7.4	7.2	66.6	11.1	12.0	311	28.13	38.00	70.97	70.00	0.66	0.66	79.80	76.36	1248.00
Q1	**-4.7**	**-4.0**	**0**	**374.2**	**363.5**	**33745**	**420.8**	**403.0**	**37974**	**0.9**	**0.3**	**4.2**	**4.4**	**377.7**	**6.6**	**6.8**	**335.2**	**9.5**	**9.5**	**797**	**28.07**	**36.50**	**63.47**	**64.50**	**0.74**	**0.66**	**75.46**	**76.36**	**4420.00**
April	3.7	3.5		355.9	317.0	10677	355.9	357.5	12300	0.2	0.8	4.5	4.5	130.2	5.5	6.7	55.4	11.1	12.0	311	30.70	29.00	69.93	70.00	0.55	0.52	50.04	26.56	656.50
May	6.8	6.0		255.5	274.0	7919	297.9	307.0	9235	0.4	1.4	3.6	3.8	110.2	4.3	3.9	89.8	11.7	12.0	280	21.20	21.00	52.23	51.50	0.46	0.33	44.58	47.31	478.10
June	14.9	15.0		280.6	281.0	8419	311.3	307.5	9338	0.3	0.9	2.6	3.1	63.5	7.0	6.7	83.5	12.0	12.0	204	21.70	21.00	49.73	22.00	0.64	0.53	28.38	49.80	455.70
Q2	**8.5**	**6.0**	**0**	**297.3**	**281.0**	**27015**	**321.7**	**307.5**	**30873**	**0.3**	**0.9**	**3.6**	**3.8**	**303.9**	**5.6**	**6.7**	**228.7**	**11.6**	**12.0**	**795**	**24.53**	**21.00**	**57.30**	**51.50**	**0.55**	**0.52**	**41.00**	**47.31**	**1590.30**
July	19.1	18.0		397.8	379.0	12332	430.4	379.0	13341	0.4	0.3	3.3	3.4	50.0	4.6	3.4	73.5	11.6	12.0	232	33.74	33.00	55.71	55.00	0.56	0.47	83.50	93.38	2588.36
August	13.0	12.0		329.6	300.0	10218	360.4	339.0	11172	0.6	0.5	4.4	4.8	129.0	4.6	4.2	50.6	11.7	12.0	281	20.47	21.00	47.33	48.00	1.00	0.79	95.48	93.38	2959.78
September	9.4	9.5		204.9	188.5	6147	238.8	221.5	7163	0.5	0.5	3.3	3.6	66.3	3.7	3.8	48.2	11.8	12.0	154	16.90	16.00	30.00	30.00	0.60	0.50	69.17	75.53	2144.31
Q3	**13.8**	**12.0**	**0**	**310.8**	**300.0**	**28697**	**343.2**	**339**	**31676**	**0.5**	**0.5**	**3.7**	**3.6**	**245.3**	**4.3**	**3.8**	**172.3**	**11.7**	**12.0**	**667**	**23.70**	**21.00**	**44.35**	**48.00**	**0.72**	**0.50**	**82.71**	**93.38**	**7692.44**
October	3.0	4.0		221.8	190.0	6876	268.9	230.0	8336	1.3	1.0	1.5	1.4	33.7	1.7	0.7	25.5	8.9	11.0	71	20.84	14.00	27.29	26.00	0.15	0.50	61.67	59.76	1911.91
November	0.1	0.0		288.8	216.0	10216	340.5	273.0	10216	0.9	0.5	2.0	1.6	44.9	2.0	1.0	44.1	9.8	12.0	118	21.17	19.00	32.33	31.50	0.55	0.46	40.79	34.86	1264.55
December	-8.2	-6.0		309.9	251.0	9606	353.5	294.0	10957	0.5	0.5	2.9	2.7	72.0	5.7	4.2	109.1	10.3	10.5	123	19.97	18.00	43.55	38.00	0.97	0.92	58.33	56.44	1808.16
Q4	**-1.7**	**0.0**	**0**	**273.5**	**216.0**	**26698**	**321.0**	**273**	**29509**	**0.9**	**0.5**	**2.1**	**1.6**	**150.6**	**3.1**	**1.0**	**178.7**	**9.7**	**11.0**	**312**	**20.66**	**18.00**	**34.39**	**31.50**	**0.56**	**0.50**	**53.60**	**56.44**	**4984.61**
Annual	**4.0**	**3.8**	**0**	**314.0**	**290.5**	**116155**	**351.7**	**323.3**	**130032**	**0.7**	**0.5**	**3.4**	**3.5**	**1077.5**	**4.9**	**4.2**	**914.9**	**10.6**	**12.0**	**2571**	**24.2**	**21.0**	**49.9**	**49.8**	**0.6**	**0.5**	**63.2**	**66.0**	**18687.35**

BRITISH COLUMBIA

Date: September 30, 2002 Our File: RB 17139

REGISTERED MAIL

Resorts of the Canadian Rockies Inc.
PO Box 997
Victoria, BC V8W 2S8

Resorts of the Canadian Rockies Inc.
1507 – 17th Avenue, SW
Calgary Alberta T2T 0E2

Dear Sir:

Re: Registration under the *Municipal Sewage Regulation* of the discharge to the Elk River from the Fernie Alpine Resort sewage treatment plant located at District Lot 8900, Kootenay District (Plan 1687) near Fernie British Columbia

This is to acknowledge your registration form under the *Municipal Sewage Regulation* (the *Regulation*) dated August 30, 2001, and received at this office on October 31, 2001, for the registration of the wastewater treatment plant owned and operated by Resorts of the Canadian Rockies Inc. at the Fernie Alpine Resort ski hill located near Fernie, British Columbia. Pursuant to Part 2, section 3 of the *Regulation*, the effective date of registration of this discharge is the date of this letter. The ministry file number for this discharge is RB 17139. Please indicate this number on all future correspondence regarding this discharge.

The initial registration fee is $148.55. Please submit to the Regional Manager (the *Manager*) a cheque payable to the Minister of Finance and Corporate Relations, for this amount by September 25, 2002. 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 *Regulation*. Fees will be calculated using a maximum effluent flow of 1280 m^3/day, a maximum BOD_5 of 45 mg/L and a maximum TSS of 45 mg/L.

We wish to remind you that the discharger is responsible for compliance with the requirements of the *Regulation*, the registration, the *Waste Management Act* (the *Act*) and this registration letter. Your attention is respectfully directed to the terms and conditions outlined in the *Regulation*, the registration, this registration letter and the *Act*. Compliance with all the terms and conditions of the *Regulation*, the registration and this registration letter is required. Contravention of any of the conditions of the *Regulation*, the registration and this letter is a violation of the *Act* and may result in prosecution.

Ministry of Water, Land and Air Protection
Kootenay Region
Mailing/Location Address: 401 - 333 Victoria Street Nelson BC V1L 4K3
Telephone: 250 354-6333
Facsimile: 250 354-6332
PP Facsimile: 250 354-6367

We also wish to draw your attention to the Environmental Impact Study Guideline dated December 2000 or the latest version and the *Regulation* Compliance Guideline dated January 2001 or the latest version, these policy documents are used in conjunction with the *Regulation*, the registration and the *Act*.

The *Regulation* and policy documents are available at :

http://wlapwww.gov.bc.ca/epd/epdpa/mpp/msrhome.html

This letter does not replace the *Act*, regulations issued under the *Act* or the *Regulation*. It does not list all provisions relating to municipal sewage discharges. If there are differences or omissions in this document then the *Act*, the regulations issued under the *Act* and the *Regulation* apply except where expressly noted in this letter.

Registration under the *Regulation* should not be construed as a representation that the authorized works are adequately designed or will satisfy 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* and this letter. Registration under the *Regulation* and this letter are without prejudice to any additional works that may be required or any additional requirements that may be specified by the *Manager*. The *Manager* may also issue Orders under the *Act*.

Registration under the *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 *Act*, the *Regulation*, the registration and this registration letter will be carried out by staff from our Sub-Regional Office located at #205 Industrial Road G, Cranbrook, British Columbia, V1C 7G5, (telephone: (250) 489-8570) or from our Regional Office located at #401 - 333 Victoria Street, Nelson, British Columbia, V1L 4K3. Plans, data and reports pertinent to the *Regulation*, registration and this letter are to be submitted to the *Manager* at the Sub-Regional office address at Cranbrook, British Columbia in the form required by the *Regulation* or in the form required by the *Manager*. The ministry uses a reference number to track monitoring data associated with discharges. The site reference number for this discharge is E102571.

Registration Reference Documents

This registration under the *Regulation* is based on the following documents:

1. The Fernie Alpine Resort Limited, Registration Form dated August 30, 2001 and received October 31, 2001.
2. Environmental Impact Study, Sewage Treatment Plant at Fernie Alpine Resort, prepared for Fernie Alpine Resort Ltd. by Highwood Environmental Management Limited dated April 2001.
3. Environmental Impact Study for Fernie Alpine Resort's Wastewater Discharge into the Elk River, Interim Report prepared by Conor Pacific Environmental Technologies Incorporated dated May 1, 2001.
4. Fernie Alpine Resort, Wastewater Treatment Plant, Guiding Document for Proposed Improvements 2001 prepared by Urban Systems dated May 2001.
5. Urban Systems drawings titled Fernie Alpine Resort Wastewater Treatment Plant Expansion dated August, 2001.

Treatment Plant Works

The treatment plant works are one influent macerator and screen, two aeration flow equalization tanks, a separate equalization tank, two clarifiers, two three stage rotating biological contactors, two flocculation tanks with mixers and coagulant feed, two sand filters, a backwash water settling tank, UV disinfection units, one aerated biosolids (sludge) digestion tank, biosolids (sludge) dewatering equipment and a pipeline and outfall to the Elk River and related appurtenances approximately as shown on Urban Systems drawings titled Fernie Alpine Resort Wastewater Treatment Plant Expansion dated August, 2001 or on the attached Site Plan. The plant maximum daily flow and discharge to the environment is 1280 m^3/day. The effluent quality shall be BOD_5 of 45 mg/L, TSS of 45 mg/L, total phosphorus of 1.0 mg/L, ortho phosphate 0.5 mg/L and the effluent shall also pass a 96 hour LC50 bioassay test.

Primary Screenings and Dewatered Biosolids (Sludge) Disposal

Primary screenings and dewatered biosolids (sludge) from the treatment plant shall be disposed at the Crowsnest/Pincher Creek Landfill. The discharger shall submit confirmation of acceptance of the screenings and biosolids by the Crowsnest/Pincher Creek Landfill Authority on or before October 25, 2002. If primary screenings and dewatered biosolids (sludge) from the treatment plant are not disposed at the Crowsnest/Pincher Creek Landfill they must be disposed in accordance with an authorization issued under the *Act*, the Organic Matter Recycling Regulation or in a manner approved by the *Manager*.

Semi-solid Waste

The discharger shall not accept semi-solid wastes at the treatment plant. Semi-solid wastes means septic tank pumpage, holding tank solids or sludge from sewage facilities.

Plant Design

The treatment plant design must be in accordance with Schedule 7 of the *Regulation* and meet reliability Category I. The discharger shall provide written confirmation that the treatment plant works meet reliability Category I and confirm that multiple disinfection units have been installed. The confirmation shall be submitted on or before October 25, 2002.

Outfall Diffuser

The discharger shall install an outfall diffuser in accordance with Part 4, Section 5 and Schedule 7, Condition 4 of the *Regulation*. The diffuser shall be installed on or before August 31, 2003. The discharger must obtain all necessary approvals from other agencies prior to installing the diffuser.

Additional Works

The works are to be designed to allow for additional facilities in future to reduce effluent ammonia levels if ammonia levels in the Elk River exceed the current British Columbia Approved Water Quality Guidelines (Criteria) or if monitoring results indicate exceedance of the current Criteria for ammonia is imminent. Water quality Criteria apply at the edge of the initial dilution zone.

The works are also to be designed to allow for increased phosphorus removal if algae problems develop in the Elk River.

Operator Qualifications and Certification

The discharger shall ensure that the treatment plant is classified and the treatment plant operators certified in accordance with Part 6, Section 22 of the *Regulation*. Proof of treatment plant classification (copy of classification) and operator certification (copy of certification) shall be submitted to the *Manager* on or before October 25, 2002.

Monitoring

The discharger shall undertake monitoring in accordance with Part 7 and applicable conditions of Schedule 6 of the *Regulation* subject to the requirements as follows:

Sampling and Analysis

Sampling and analysis shall be in accordance with Part 7, Section 25 of the *Regulation*. Minimum detection limits for nutrients shall be:

Ammonia	5µg/L (5ppm)
Nitrate	5 µg/L
Nitrite	2 µg/L
Total Phosphorus	3 µg/L
Orthophosphate	3 µg/L

These detection limits shall only apply to the analysis of samples obtained from the Elk River. These detection limits will not apply to the analysis of samples obtained from the plant influent and effluent.

Please note the requirement to submit data in accordance with the *Environmental Data Quality Assurance Regulation* as per Section 25 (3) of the *Regulation*.

Discharge Monitoring and Receiving Environment Monitoring

In accordance with Part 7, Section 26 and 27 of the *Regulation* the discharger shall undertake the following monitoring program:

Sampling Location Frequency/Type

	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD_5 [1]		M/G	M/G and WS/G
TSS[2]	WS/G	M/G	M/G and WS/G and D/CON.
ammonia (as nitrogen)	WS/G		M/G and WS/G
nitrate (as nitrogen)	WS/G		M/G and WS/G
nitrite (as nitrogen)	WS/G		M/G and WS/G
total phosphorus	WS/G		M/G and WS/G
	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD_5 - means the total 5-day biochemical oxygen demand.
2. TSS - means total suspended solids or non-filterable residue.
3. Plant influent and effluent samples must be obtained at peak times on peak flow days. The peak flow days shall be based on bookings at the resort. An influent flow meter shall be installed on or before December 31, 2003.
4. Sampling of the Elk River shall be done on the same day as plant influent and effluent sampling and also correspond with peak flow days at the resort in a manner similar to plant influent/effluent sampling.

Sampling Location Frequency/Type

	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD_5[1]		M/G	M/G and WS/G
TSS[2]	WS/G	M/G	M/G and WS/G and D/CON.
ammonia (as nitrogen)	WS/G		M/G and WS/G
nitrate (as nitrogen)	WS/G		M/G and WS/G
nitrite (as nitrogen)	WS/G		M/G and WS/G
total phosphorus	WS/G		M/G and WS/G
	Elk River[4] (At Sites UP, IDZ and DN)	**Plant Influent[3]**	**Plant Effluent[3]**
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD_5 - means the total 5-day biochemical oxygen demand.
2. TSS - means total suspended solids or non-filterable residue.
3. Plant influent and effluent samples must be obtained at peak times on peak flow days. The peak flow days shall be based on bookings at the resort. An influent flow meter shall be installed on or before December 31, 2003.
4. Sampling of the Elk River shall be done on the same day as plant influent and effluent sampling and also correspond with peak flow days at the resort in a manner similar to plant influent/effluent sampling.

Sampling Frequency:

D - means daily.

M - means monthly.

WS – weekly seasonal (This means obtaining samples weekly for a six week period in the spring, in the fall and during the Christmas season at peak flow times and days. Peak flow days will be predicted on the basis of resort bookings. The commencement of the spring and fall sampling sessions depends on weather and hydrologic conditions. The spring sampling should begin early in the spring after ice-out when river flows are low and the fall sampling should begin when river flows are low and turbidity is low. Professional judgment should be used regarding the start times of the weekly sampling programs in the spring and fall. The Christmas sampling should begin in mid December and extend into January. During the six week sampling period the monthly sampling is not necessary.)

3Y – means three times per year to correspond with the WS sampling.

Sample Type:

G - means grab sample (Note: when obtaining samples of the influent and effluent the grab samples will be taken on peak flow days at peak flow times during the day. Peak days shall be predicted on the basis of bookings at the resort.)

CON. - means continuous using a data logger. (Note: Flow meters and TSS monitors shall be calibrated. The flow meter and TSS meter calibration frequency and procedures shall be contained in the operating plan.)

Monitoring for Plant Operation Purposes

The discharger is expected to undertake additional monitoring for plant operation purposes. The monitoring program outlined in this letter is not considered adequate for plant operation purposes.

Environmental Monitoring System (EMS) Numbers

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*. Monitoring data shall be submitted to the Ministry data base quarterly within 30 days of the end of each quarter.

Monitoring Program Changes

The *Manager* may modify the monitoring program from time to time. The annual report shall contain recommendations regarding changes (additions/deletions/modifications) to the monitoring program.

Supervisory Control and Data Acquisition (SCADA)

The discharger is encouraged to install a SCADA system. SCADA systems may be a requirement in the future.

If you have any questions concerning this registration, please contact our Cranbrook Sub-Regional Office at (250) 489-8540.

Yours truly,

Carl Johnson, P.Eng.
Assistant Regional Waste Manager

/lp

cc: Paul Bates, Resorts of the Canadian Rockies, Calgary
Toby Todaro, Resorts of the Canadian Rockies, Calgary
Peter Gigliotti, P.Eng. Urban Systems, Kelowna
Andrew Walls, Fernie Alpine Resort, Fernie
Andrew Brown, Fernie Alpine Resort, Fernie
Ken van Heyningen, Fernie Alpine Resort, Fernie
Gary Lawrence, MWLAP, Cranbrook

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 05-JAN-21
Report Date: 11-JAN-21 15:23 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2545155

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - EMS WEEK 4
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2545155-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:10							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	166	DLHC	75	mg/L		06-JAN-21	R5341658
Total Suspended Solids	292		3.0	mg/L		07-JAN-21	R5339339
pH	7.86		0.10	pH		06-JAN-21	R5336839
L2545155-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Biochemical Oxygen Demand	3.4		2.0	mg/L		06-JAN-21	R5341658
Chemical Oxygen Demand	21		10	mg/L		05-JAN-21	R5334536
Orthophosphate-Dissolved (as P)	0.118	DLHC	0.010	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	14		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	0.301	DLHC	0.020	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
pH	8.16		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	28.6	DLHC	0.10	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	28.6		0.11	mg/L		06-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		05-JAN-21	R5335120
L2545155-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	1		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
pH	8.37		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.91		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.91		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120
L2545155-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	0.0093		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	4		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	0.0182		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2545155-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:45							
Matrix: Water							
pH	8.44		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.150		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.150		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120
L2545155-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	1		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
pH	8.43		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.89		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.89		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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ae: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC – Winter EMS week 4		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Woyciak			
REPORT FORMAT:	☒ HARD ☒ EMAIL ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	1	WWTP Influent Routine 1	2021-01-04	10:10	Water		X	X								
		WWTP Influent BOD 2	2021-01-04	10:10	Water									X		
	2	WWTP Effluent Routine 3	2021-01-04	10:15	Water		X	X							X	
		WWTP Effluent BOD 4	2021-01-04	10:15	Water									X		
		WWTP Effluent Nutrients 5	2021-01-04	10:15	Water				X	X	X	X	X			
		WWTP Effluent Bacteriological 6	2021-01-04	10:15	Water	X										
	3	Elk River Upstream Routine 7	2021-01-04	10:~~30~~50	Water		X	X								
		Elk River Upstream Nutrients 8	2021-01-04	10:~~30~~50	Water				X	X	X	X	X			
		Elk River Upstream Bacteriological 9	2021-01-04	10:~~30~~50	Water	X										
	4	Elk River @ Outfall Routine 10	2021-01-04	10:45	Water		X	X								
		Elk River @ Outfall Nutrients 11	2021-01-04	10:45	Water				X	X	X	X	X			
		Elk River @ Outfall Bacteriological 12	2021-01-04	10:45	Water	X										
	5	Elk River Downstream Routine 13	2021-01-04	10:30	Water		X	X								
		Elk River Downstream Nutrients 14	2021-01-04	10:30	Water				X	X	X	X	X			
		Elk River Downstream Bacteriological 15	2021-01-04	10:30	Water	X										

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS ABOVE

INVOICE FORMAT: ☐ HARD ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	2021-01-04		
	TIME: 12:00		TIME: 1:25
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 6 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 12-JAN-21
Report Date: 19-JAN-21 08:07 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2547302

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER EMS WEEK 5
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2547302-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	128	DLHC	75	mg/L		12-JAN-21	R5352198
Total Suspended Solids	145		3.0	mg/L		17-JAN-21	R5350981
pH	7.96		0.10	pH		12-JAN-21	R5345177
L2547302-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
Biochemical Oxygen Demand	<2.0		2.0	mg/L		12-JAN-21	R5352198
Chemical Oxygen Demand	11		10	mg/L		13-JAN-21	R5345179
Orthophosphate-Dissolved (as P)	0.235	DLHC	0.025	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	0.275		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
pH	7.74		0.10	pH		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	43.5	DLHC	0.10	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	43.5		0.11	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		12-JAN-21	R5344822
L2547302-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	6		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
pH	8.33		0.10	pH		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.08		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.08		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822
L2547302-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:35							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
Orthophosphate-Dissolved (as P)	0.0242		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	0.0294		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2547302-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:35							
Matrix: Water							
pH	8.25		0.10	pH		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	3.73		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	3.73		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822
L2547302-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:40							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.248		0.050	mg/L		16-JAN-21	R5350127
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	11		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
pH	8.33		0.10	pH		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.08		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.08		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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: 780-513-2191
780-437-2311
3 Fax: 403-291-0298
x: 306-668-8383

L2547302-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC – Winter EMS week 5		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Woyciak			
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☒ PDF ☐ EXCEL		pmajer@skircr.com		

ANALYSIS REQUESTED:

	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	1	WWTP Influent Routine 1	2021-01-11	10:50	Water		X	X												9.2°C
		WWTP Influent BOD 2	2021-01-11	10:50	Water									X						9.2°C
	2	WWTP Effluent Routine 3	2021-01-11	10:50	Water		X	X							X					12.8°C
		WWTP Effluent BOD 4	2021-01-11	10:50	Water									X						12.8°C
		WWTP Effluent Nutrients 5	2021-01-11	10:50	Water				X	X	X	X	X							12.8°C
		WWTP Effluent Bacteriological 6	2021-01-11	10:50	Water	X														12.8°C
	3	Elk River Upstream Routine 7	2021-01-11	10:30	Water		X	X												1.0 °C
		Elk River Upstream Nutrients 8	2021-01-11	10:30	Water				X	X	X	X	X							1.0°C
		Elk River Upstream Bacteriological 9	2021-01-11	10:30	Water	X														1.0°C
	4	Elk River @ Outfall Routine 10	2021-01-11	10:55	Water		X	X												1.4°C
		Elk River @ Outfall Nutrients 11	2021-01-11	10:35	Water				X	X	X	X	X							1.4°C
		Elk River @ Outfall Bacteriological 12	2021-01-11	10:35	Water	X														1.4°C
	5	Elk River Downstream Routine 13	2021-01-11	10:40	Water		X	X												0.9°C
		Elk River Downstream Nutrients 14	2021-01-11	10:40	Water				X	X	X	X	X							0.9°C
		Elk River Downstream Bacteriological 15	2021-01-11	10:40	Water	X														0.9°C

TURN AROUND REQUIRED:	◉ REGULAR	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2021-01-11	RECEIVED BY:	DATE:	
SEND INVOICE TO:	☐ SAME AS REPORT ☐ DIFFERENT		Carter Barrett	TIME: 11:30		TIME:	
INVOICE FORMAT:	☐ HARDMAIL ☐ EMAIL ☐ FAX ☐ PDF ☐ EXCEL		RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com			TIME:		TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ___°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 19-JAN-21
Report Date: 25-JAN-21 15:00 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2549356

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER EMS WEEK 6
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2549356-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	108	DLHC	75	mg/L		19-JAN-21	R5357178
Total Suspended Solids	217	DLHC	5.0	mg/L		24-JAN-21	R5357259
pH	8.05		0.10	pH		19-JAN-21	R5355666
L2549356-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Biochemical Oxygen Demand	<2.0		2.0	mg/L		19-JAN-21	R5357178
Chemical Oxygen Demand	15		10	mg/L		20-JAN-21	R5355831
Orthophosphate-Dissolved (as P)	0.183	DLHC	0.010	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	3		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.257	DLHC	0.025	mg/L		20-JAN-21	R5355117
Total Suspended Solids	<3.0		3.0	mg/L		24-JAN-21	R5357259
pH	8.09		0.10	pH		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	39.9	DLHC	0.10	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	39.9		0.11	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		19-JAN-21	R5356914
L2549356-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	11		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.0057		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	<3.0		3.0	mg/L		24-JAN-21	R5357259
pH	8.42		0.10	pH		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.92		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.92		0.022	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914
L2549356-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	0.0414		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	2		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.0443		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	3.2		3.0	mg/L		24-JAN-21	R5357259

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2549356-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:45							
Matrix: Water							
pH	8.28		0.10	pH		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	5.99		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	5.99		0.022	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914
L2549356-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	9		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	8.2		3.0	mg/L		24-JAN-21	R5357259
pH	8.39		0.10	pH		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.93		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.93		0.022	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1,
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Te
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E
Saskatoon SK, 819 - 58th Street East, S7K 6X5,

L2549356-COFC

SEND REPORT TO:

CHAIN OF CU

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Winter EMS week 6			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 1	2021-01-18	10:30	Water		X	X								10.7 °C
	WWTP Influent BOD 2	2021-01-18	10:30	Water									X		10.7
2	WWTP Effluent Routine 3	2021-01-18	10:30	Water		X	X							X	12.2 °C
	WWTP Effluent BOD 4	2021-01-18	10:30	Water									X		"
	WWTP Effluent Nutrients 5	2021-01-18	10:30	Water				X	X	X	X	X			"
	WWTP Effluent Bacteriological 6	2021-01-18	10:30	Water	X										"
3	Elk River Upstream Routine 7	2021-01-18	10:00	Water		X	X								0.5 °C
	Elk River Upstream Nutrients 8	2021-01-18	10:00	Water				X	X	X	X	X			"
	Elk River Upstream Bacteriological 9	2021-01-18	10:00	Water	X										"
4	Elk River @ Outfall Routine 10	2021-01-18	9:45	Water		X	X								1.5 °C
	Elk River @ Outfall Nutrients 11	2021-01-18	9:45	Water				X	X	X	X	X			"
	Elk River @ Outfall Bacteriological 12	2021-01-18	9:45	Water	X										"
5	Elk River Downstream Routine 13	2021-01-18	9:30	Water		X	X								0.5 °C
	Elk River Downstream Nutrients 14	2021-01-18	9:30	Water				X	X	X	X	X			"
	Elk River Downstream Bacteriological 15	2021-01-18	9:30	Water	X										"

FOR LAB USE ONLY

- water temp. (°C)

TURN AROUND REQUIRED: ◉ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT

INVOICE FORMAT: ☐ HARDMAIL ☐ FAX ☐ PDF ☐

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-01-18	RECEIVED BY:	DATE:	
Carter Barrett	TIME:	11:45		TIME:	
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: ___°C

Frozen? ___Yes ___No

Cooling Method? ___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 23-FEB-21
Report Date: 01-MAR-21 14:49 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2560009

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER - FEBRUARY 2021 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2560009-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 22-FEB-21 @ 13:45							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	106	DLHC	20	mg/L		23-FEB-21	R5394883
Total Suspended Solids	159		3.0	mg/L		24-FEB-21	R5390556
pH	7.86		0.10	pH		23-FEB-21	R5388383
L2560009-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 22-FEB-21 @ 13:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-FEB-21	R5391017
Biochemical Oxygen Demand	<2.0		2.0	mg/L		23-FEB-21	R5394883
Chemical Oxygen Demand	<10		10	mg/L		24-FEB-21	R5388823
Orthophosphate-Dissolved (as P)	0.161	DLHC	0.010	mg/L		23-FEB-21	R5387316
Coliform Bacteria - Fecal	2		1	CFU/100mL		23-FEB-21	R5388937
Phosphorus (P)-Total	0.203	DLHC	0.010	mg/L		24-FEB-21	R5387956
Total Suspended Solids	<3.0		3.0	mg/L		24-FEB-21	R5390556
pH	7.95		0.10	pH		23-FEB-21	R5388383
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	39.2	DLHC	0.10	mg/L		23-FEB-21	R5388217
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	39.2		0.11	mg/L		24-FEB-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		23-FEB-21	R5388217

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
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Fort McMurray AB, Bay 1,
Edmonton AB, 9936 - 67tl
Calgary AB, Bay 7, 1313 -
Saskatoon SK, 819 - 58th
Tel: 250-261-5517 Fax: 250-261-5587
x: 780-513-2191
: 780-437-2311
78 Fax: 403-291-0298
ax: 306-668-8383

L2560009-COFC

C

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	Wastewater -February 2021 Monthly EMS		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Wojciak			

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2021-02-22	13:45	Water		X	X								9.9°C
1	WWTP Influent BOD	2021-02-22	13:45	Water									X		
2	WWTP Effluent Routine	2021-02-22	13:45	Water		X	X								11.8°C
2	WWTP Effluent BOD	2021-02-22	13:45	Water									X		
2	WWTP Effluent Nutrients	2021-02-22	13:45	Water				X	X	X	X	X			
2	WWTP Effluent Bacteriological	2021-02-22	13:45	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-02-22	RECEIVED BY:	DATE:	2-22
Carter Barrett	TIME:	14:45		TIME:	850
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A
Sample Temperature: ___°C Frozen? ___Yes ___No
Cooling Method? ___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 30-MAR-21
Report Date: 08-APR-21 11:10 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2571523

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING EMS WEEK 1
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2571523-1 WWTP INFLUENT							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 10:15							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	93	DLHC	20	mg/L		30-MAR-21	R5418978
Total Suspended Solids	140		3.0	mg/L		31-MAR-21	R5417604
pH	7.35		0.10	pH		06-APR-21	R5420823
L2571523-2 WWTP EFFLUENT							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-APR-21	R5420384
Biochemical Oxygen Demand	<2.0		2.0	mg/L		30-MAR-21	R5418978
Chemical Oxygen Demand	<10		10	mg/L		30-MAR-21	R5417551
Orthophosphate-Dissolved (as P)	0.403	DLHC	0.025	mg/L		31-MAR-21	R5417681
Coliform Bacteria - Fecal	51		1	CFU/100mL		30-MAR-21	R5418176
Phosphorus (P)-Total	0.413	DLHC	0.050	mg/L		06-APR-21	R5419791
Total Suspended Solids	<3.0		3.0	mg/L		05-APR-21	R5419565
pH	7.83		0.10	pH		06-APR-21	R5420823
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	17.5		0.020	mg/L		31-MAR-21	R5418891
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	17.5		0.022	mg/L		03-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-21	R5418891
L2571523-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 09:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-APR-21	R5420384
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		31-MAR-21	R5417681
Coliform Bacteria - Fecal	7		1	CFU/100mL		30-MAR-21	R5418176
Phosphorus (P)-Total	0.0109		0.0050	mg/L		06-APR-21	R5419791
Total Suspended Solids	8.9		3.0	mg/L		31-MAR-21	R5417604
pH	8.19		0.10	pH		06-APR-21	R5420823
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.91		0.020	mg/L		31-MAR-21	R5418891
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.91		0.022	mg/L		03-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-21	R5418891
L2571523-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 09:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-APR-21	R5420384
Orthophosphate-Dissolved (as P)	0.0130		0.0050	mg/L		31-MAR-21	R5417681
Coliform Bacteria - Fecal	6		1	CFU/100mL		30-MAR-21	R5418176
Phosphorus (P)-Total	0.0229		0.0050	mg/L		06-APR-21	R5419791
Total Suspended Solids	9.5		3.0	mg/L		31-MAR-21	R5417604

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2571523-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 09:30							
Matrix: WATER							
pH	8.04		0.10	pH		06-APR-21	R5420823
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.078		0.020	mg/L		31-MAR-21	R5418891
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.078		0.022	mg/L		03-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-21	R5418891
L2571523-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BARRETT on 29-MAR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-APR-21	R5420384
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		31-MAR-21	R5417681
Coliform Bacteria - Fecal	11		1	CFU/100mL		30-MAR-21	R5418176
Phosphorus (P)-Total	0.0119		0.0050	mg/L		06-APR-21	R5419791
Total Suspended Solids	6.5		3.0	mg/L		31-MAR-21	R5417604
pH	8.19		0.10	pH		06-APR-21	R5420823
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.92		0.020	mg/L		31-MAR-21	R5418891
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.92		0.022	mg/L		03-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		31-MAR-21	R5418891

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 T
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-79
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 T
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370

L2571523-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Spring EMS week 1			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

FOR LAB USE ONLY

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine 1	2021-03-29	10:15	Water		X	X								7.4°C
	WWTP Influent BOD 2	2021-03-29	10:15	Water									X		
	WWTP Effluent Routine 3	2021-03-29	10:30	Water		X	X							X	10.5°C
	WWTP Effluent BOD 4	2021-03-29	10:30	Water									X		
	WWTP Effluent Nutrients 5	2021-03-29	10:30	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2021-03-29	10:30	Water	X										
	Elk River Upstream Routine 7	2021-03-29	9:45	Water		X	X								0.5°C
	Elk River Upstream Nutrients 8	2021-03-29	9:45	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2021-03-29	9:45	Water	X										
	Elk River @ Outfall Routine 10	2021-03-29	9:30	Water		X	X								0.5°C
	Elk River @ Outfall Nutrients 11	2021-03-29	9:30	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2021-03-29	9:30	Water	X										
	Elk River Downstream Routine 13	2021-03-29	10:00	Water		X	X								0.5°C
	Elk River Downstream Nutrients 14	2021-03-29	10:00	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2021-03-29	10:00	Water	X										

ANALYSIS REQUESTED:

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: 2021-03-29 TIME: 11:60	RECEIVED BY:	DATE: 3/30 TIME: 0940
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME: 4°C
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX				
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com				

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 06-APR-21
Report Date: 13-APR-21 16:41 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2573310

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING EMS WEEK 2
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2573310-1 WWTP INFLUENT							
Sampled By: CARTER BARRETT on 05-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	90	DLHC	20	mg/L		06-APR-21	R5422598
Total Suspended Solids	126		3.0	mg/L		07-APR-21	R5420948
pH	7.20		0.10	pH		13-APR-21	R5423109
L2573310-2 WWTP EFFLUENT							
Sampled By: CARTER BARRETT on 05-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		10-APR-21	R5422051
Biochemical Oxygen Demand	<2.0		2.0	mg/L		06-APR-21	R5422598
Chemical Oxygen Demand	12		10	mg/L		06-APR-21	R5420201
Orthophosphate-Dissolved (as P)	0.135	DLHC	0.010	mg/L		06-APR-21	R5420009
Coliform Bacteria - Fecal	5		1	CFU/100mL		06-APR-21	R5420486
Phosphorus (P)-Total	0.140	DLHC	0.010	mg/L		09-APR-21	R5421519
Total Suspended Solids	<3.0		3.0	mg/L		07-APR-21	R5420948
pH	7.70		0.10	pH		13-APR-21	R5423109
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	21.5	DLHC	0.10	mg/L		07-APR-21	R5421758
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	21.5		0.11	mg/L		09-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		07-APR-21	R5421758
L2573310-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BARRETT on 05-APR-21 @ 09:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		10-APR-21	R5422051
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		06-APR-21	R5420009
Coliform Bacteria - Fecal	2		1	CFU/100mL		06-APR-21	R5420486
Phosphorus (P)-Total	0.0132		0.0050	mg/L		09-APR-21	R5421519
Total Suspended Solids	4.3		3.0	mg/L		07-APR-21	R5420948
pH	8.15		0.10	pH		13-APR-21	R5423109
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.19		0.020	mg/L		07-APR-21	R5421758
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.19		0.022	mg/L		09-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		07-APR-21	R5421758
L2573310-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 05-APR-21 @ 09:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		10-APR-21	R5422051
Orthophosphate-Dissolved (as P)	0.0123		0.0050	mg/L		06-APR-21	R5420009
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-APR-21	R5420486
Phosphorus (P)-Total	0.0207		0.0050	mg/L		09-APR-21	R5421519
Total Suspended Solids	4.5		3.0	mg/L		07-APR-21	R5420948

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2573310-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 05-APR-21 @ 09:45							
Matrix: WATER							
pH	8.01		0.10	pH		13-APR-21	R5423109
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.08		0.020	mg/L		07-APR-21	R5421758
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.08		0.022	mg/L		09-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		07-APR-21	R5421758
L2573310-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BARRETT on 05-APR-21 @ 09:50							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		10-APR-21	R5422051
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		06-APR-21	R5420009
Coliform Bacteria - Fecal	4		1	CFU/100mL		06-APR-21	R5420486
Phosphorus (P)-Total	0.0112		0.0050	mg/L		09-APR-21	R5421519
Total Suspended Solids	7.1		3.0	mg/L		07-APR-21	R5420948
pH	8.13		0.10	pH		13-APR-21	R5423109
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.12		0.020	mg/L		07-APR-21	R5421758
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.12		0.022	mg/L		09-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		07-APR-21	R5421758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Spring EMS week 2			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

L2573310-COFC

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD			NOTES (sample specific comments, due dates, etc.)
		WWTP Influent Routine 1	2021-04-05	10:00	Water		X	X										8.3°C
		WWTP Influent BOD 2	2021-04-05	10:00	Water									X				
		WWTP Effluent Routine 3	2021-04-05	10:60	Water		X	X							X			11.4°C
		WWTP Effluent BOD 4	2021-04-05	10:00	Water									X				
		WWTP Effluent Nutrients 5	2021-04-05	10:00	Water				X	X	X	X	X					
		WWTP Effluent Bacteriological 6	2021-04-05	10:00	Water	X												
		Elk River Upstream Routine 7	2021-04-05	9:30	Water		X	X										3.6°C
		Elk River Upstream Nutrients 8	2021-04-05	9:30	Water				X	X	X	X	X					
		Elk River Upstream Bacteriological 9	2021-04-05	9:30	Water	X												
		Elk River @ Outfall Routine 10	2021-04-05	9:45	Water		X	X										3.7°C
		Elk River @ Outfall Nutrients 11	2021-04-05	9:45	Water				X	X	X	X	X					
		Elk River @ Outfall Bacteriological 12	2021-04-05	9:45	Water	X												
		Elk River Downstream Routine 13	2021-04-05	9:50	Water		X	X										3.5°C
		Elk River Downstream Nutrients 14	2021-04-05	9:50	Water				X	X	X	X	X					
		Elk River Downstream Bacteriological 15	2021-04-05	9:50	Water	X												

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-04-05	RECEIVED BY:	DATE:	4/6
Carter Barrett	TIME:	11:30		TIME:	830
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ___°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 13-APR-21
Report Date: 27-APR-21 15:03 (MT)
Version: FINAL REV. 2

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2575769

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING EMS WEEK 3
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2575769-1 WWTP INFLUENT							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	57		20	mg/L		13-APR-21	R5430517
Total Suspended Solids	270		3.0	mg/L		17-APR-21	R5430264
pH	7.17		0.10	pH		20-APR-21	R5434279
L2575769-2 WWTP EFFLUENT							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-APR-21	R5429198
Biochemical Oxygen Demand	<2.0		2.0	mg/L		13-APR-21	R5430517
Chemical Oxygen Demand	<10		10	mg/L		13-APR-21	R5424396
Orthophosphate-Dissolved (as P)	0.131	DLHC	0.010	mg/L		13-APR-21	R5423146
Coliform Bacteria - Fecal	<1		1	CFU/100mL		13-APR-21	R5424696
Phosphorus (P)-Total	0.169	DLHC	0.010	mg/L		19-APR-21	R5431839
Total Suspended Solids	<3.0		3.0	mg/L		17-APR-21	R5430264
pH	7.78		0.10	pH		20-APR-21	R5434279
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	20.9	HTD	0.020	mg/L		17-APR-21	R5432564
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	20.9		0.022	mg/L		20-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010	HTD	0.010	mg/L		17-APR-21	R5432564
L2575769-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-APR-21	R5429198
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		13-APR-21	R5423146
Coliform Bacteria - Fecal	<1		1	CFU/100mL		13-APR-21	R5424696
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		19-APR-21	R5431839
Total Suspended Solids	<3.0		3.0	mg/L		17-APR-21	R5430264
pH	8.25		0.10	pH		20-APR-21	R5434279
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.34	HTD	0.020	mg/L		17-APR-21	R5432564
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.34		0.022	mg/L		20-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010	HTD	0.010	mg/L		17-APR-21	R5432564
L2575769-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-APR-21	R5429198
Orthophosphate-Dissolved (as P)	0.0666		0.0050	mg/L		13-APR-21	R5423146
Coliform Bacteria - Fecal	<1		1	CFU/100mL		13-APR-21	R5424696
Phosphorus (P)-Total	0.078	DLHC	0.010	mg/L		19-APR-21	R5431839
Total Suspended Solids	3.6		3.0	mg/L		17-APR-21	R5430264

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2575769-4 ELK RIVER OUTFALL							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
pH	8.00		0.10	pH		20-APR-21	R5434279
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	9.98	HTD	0.020	mg/L		17-APR-21	R5432564
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	9.98		0.022	mg/L		20-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010	HTD	0.010	mg/L		17-APR-21	R5432564
L2575769-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BARRETT on 12-APR-21 @ 08:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-APR-21	R5429198
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		13-APR-21	R5423146
Coliform Bacteria - Fecal	1		1	CFU/100mL		13-APR-21	R5424696
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		19-APR-21	R5431839
Total Suspended Solids	<3.0		3.0	mg/L		17-APR-21	R5430264
pH	8.26		0.10	pH		20-APR-21	R5434279
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.28	HTD	0.020	mg/L		17-APR-21	R5432564
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.28		0.022	mg/L		20-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010	HTD	0.010	mg/L		17-APR-21	R5432564

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Spring EMS week 3			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

L2575769-COFC

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD				NOTES (sample specific comments, due dates, etc.)
		WWTP Influent Routine 1	2021-04-12		Water		X	X											7.8°C
		WWTP Influent BOD 2	2021-04-12		Water									X					
		WWTP Effluent Routine 3	2021-04-12		Water		X	X							X				0.3°C
		WWTP Effluent BOD 4	2021-04-12		Water									X					
		WWTP Effluent Nutrients 5	2021-04-12		Water				X	X	X	X	X						
		WWTP Effluent Bacteriological 6	2021-04-12		Water	X													
		Elk River Upstream Routine 7	2021-04-12		Water		X	X											3.2°C
		Elk River Upstream Nutrients 8	2021-04-12		Water				X	X	X	X	X						
		Elk River Upstream Bacteriological 9	2021-04-12		Water	X													
		Elk River @ Outfall Routine 10	2021-04-12		Water		X	X											5.0°C
		Elk River @ Outfall Nutrients 11	2021-04-12		Water				X	X	X	X	X						
		Elk River @ Outfall Bacteriological 12	2021-04-12		Water	X													
		Elk River Downstream Routine 13	2021-04-12		Water		X	X											4.2°C
		Elk River Downstream Nutrients 14	2021-04-12		Water				X	X	X	X	X						
		Elk River Downstream Bacteriological 15	2021-04-12		Water	X													

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	2021-04-12 TIME: 11:45	MP	4/13 0840 TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A | Sample Temperature: ____°C Frozen? ___Yes ___No | Cooling Method? ✓Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS EMS.xls

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 20-APR-21
Report Date: 27-APR-21 14:31 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2578287

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING EMS WEEK 4
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2578287-1 WWTP INFLUENT							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	43		20	mg/L		20-APR-21	R5441332
Total Suspended Solids	56.8		3.0	mg/L		22-APR-21	R5438243
pH	7.42		0.10	pH		27-APR-21	R5441915
L2578287-2 WWTP EFFLUENT							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-APR-21	R5438156
Biochemical Oxygen Demand	<2.0		2.0	mg/L		20-APR-21	R5441332
Chemical Oxygen Demand	<10		10	mg/L		20-APR-21	R5434379
Orthophosphate-Dissolved (as P)	0.0570		0.0050	mg/L		20-APR-21	R5434597
Coliform Bacteria - Fecal	<1		1	CFU/100mL		20-APR-21	R5436596
Phosphorus (P)-Total	0.064	DLM	0.020	mg/L		26-APR-21	R5441212
Total Suspended Solids	<3.0		3.0	mg/L		22-APR-21	R5438243
pH	7.69		0.10	pH		27-APR-21	R5441915
Total Coliforms and E. Coli by MPN							
MPN - E. Coli	<1		1	MPN/100mL		20-APR-21	R5436531
MPN - Total Coliforms	<1		1	MPN/100mL		20-APR-21	R5436531
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	17.4		0.020	mg/L		20-APR-21	R5437936
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	17.4		0.022	mg/L		22-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		20-APR-21	R5437936
L2578287-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-APR-21	R5438156
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		20-APR-21	R5434597
Coliform Bacteria - Fecal	3		1	CFU/100mL		20-APR-21	R5436596
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		23-APR-21	R5440552
Total Suspended Solids	6.0		3.0	mg/L		22-APR-21	R5438243
pH	8.18		0.10	pH		27-APR-21	R5441915
Total Coliforms and E. Coli by MPN							
MPN - E. Coli	2	OCR	1	MPN/100mL		20-APR-21	R5436531
MPN - Total Coliforms	38	OCR	1	MPN/100mL		20-APR-21	R5436531
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.99		0.020	mg/L		20-APR-21	R5437936
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.99		0.022	mg/L		22-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		20-APR-21	R5437936
L2578287-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2578287-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:30							
Matrix: WATER							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-APR-21	R5438156
Orthophosphate-Dissolved (as P)	0.0112		0.0050	mg/L		20-APR-21	R5434597
Coliform Bacteria - Fecal	1		1	CFU/100mL		20-APR-21	R5436596
Phosphorus (P)-Total	0.0096		0.0050	mg/L		23-APR-21	R5440552
Total Suspended Solids	3.4		3.0	mg/L		22-APR-21	R5438243
pH	8.14		0.10	pH		27-APR-21	R5441915
Total Coliforms and E. Coli by MPN							
MPN - E. Coli	1	OCR	1	MPN/100mL		20-APR-21	R5436531
MPN - Total Coliforms	170	OCR	1	MPN/100mL		20-APR-21	R5436531
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.969		0.020	mg/L		20-APR-21	R5437936
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.969		0.022	mg/L		22-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		20-APR-21	R5437936
L2578287-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BENNETT on 19-APR-21 @ 10:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-APR-21	R5438156
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		20-APR-21	R5434597
Coliform Bacteria - Fecal	6		1	CFU/100mL		20-APR-21	R5436596
Phosphorus (P)-Total	0.0094		0.0050	mg/L		23-APR-21	R5440552
Total Suspended Solids	6.4		3.0	mg/L		22-APR-21	R5438243
pH	8.17		0.10	pH		27-APR-21	R5441915
Total Coliforms and E. Coli by MPN							
MPN - E. Coli	5	OCR	1	MPN/100mL		20-APR-21	R5436531
MPN - Total Coliforms	55	OCR	1	MPN/100mL		20-APR-21	R5436531
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.96		0.020	mg/L		20-APR-21	R5437936
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.96		0.022	mg/L		22-APR-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		20-APR-21	R5437936

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
OCR	Parameter is out of client specific range.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TC-EC-MPN-CL	Water	Total Coliforms and E. Coli by MPN	APHA METHOD 9223

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The
sample is mixed with a mixture hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL		ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA	

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

2021-04-19
20 cycles

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Spring EMS week 4			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com ☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQU

L2578287-COFC

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	~~2024-05-19~~	10:00	Water		X	X								~~8.5~~ 6.8°C
	WWTP Influent BOD	2021-04-19	10:00	Water									X		
	WWTP Effluent Routine		10:00	Water		X	X							X	9.6°C
	WWTP Effluent BOD		10:00	Water									X		
	WWTP Effluent Nutrients		10:00	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological		10:00	Water	X										
	Elk River Upstream Routine		10:15	Water		X	X								3.8°C
	Elk River Upstream Nutrients		10:15	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological		10:15	Water	X										
	Elk River @ Outfall Routine		10:30	Water		X	X								3.5°C
	Elk River @ Outfall Nutrients		10:30	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological		10:30	Water	X										
	Elk River Downstream Routine		10:45	Water		X	X								3.3°C
	Elk River Downstream Nutrients		10:45	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological		10:45	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE:	2021-~~05~~-19	RECEIVED BY: DATE: 4/20
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	Carter Barrett	TIME:	11:30	TIME: 625
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX	RELINQUISHED BY:	DATE:		RECEIVED BY: DATE:
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com		TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 3 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 29-APR-21
Report Date: 07-MAY-21 09:19 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2581748

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING EMS WEEK 5
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2581748-1 WWTP INFLUENT							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	62		20	mg/L		29-APR-21	R5448677
Total Suspended Solids	150		3.0	mg/L		04-MAY-21	R5450538
pH	7.55		0.10	pH		06-MAY-21	R5453975
L2581748-2 WWTP EFFLUENT							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAY-21	R5450818
Biochemical Oxygen Demand	<2.0		2.0	mg/L		29-APR-21	R5448677
Chemical Oxygen Demand	<10		10	mg/L		30-APR-21	R5443995
Orthophosphate-Dissolved (as P)	0.0797		0.0050	mg/L		29-APR-21	R5445956
Coliform Bacteria - Fecal	<1		1	CFU/100mL		29-APR-21	R5443972
Phosphorus (P)-Total	0.099		0.010	mg/L		05-MAY-21	R5450245
Total Suspended Solids	<3.0		3.0	mg/L		04-MAY-21	R5450538
pH	7.89		0.10	pH		06-MAY-21	R5453975
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	16.0		0.020	mg/L		29-APR-21	R5448439
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	16.0		0.022	mg/L		04-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-APR-21	R5448439
L2581748-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:10							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAY-21	R5450818
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		29-APR-21	R5445956
Coliform Bacteria - Fecal	<1		1	CFU/100mL		29-APR-21	R5443972
Phosphorus (P)-Total	0.0051		0.0050	mg/L		05-MAY-21	R5450245
Total Suspended Solids	4.7		3.0	mg/L		04-MAY-21	R5450538
pH	8.25		0.10	pH		06-MAY-21	R5453975
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.22		0.020	mg/L		29-APR-21	R5448439
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.22		0.022	mg/L		04-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-APR-21	R5448439
L2581748-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:20							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAY-21	R5450818
Orthophosphate-Dissolved (as P)	0.0104		0.0050	mg/L		29-APR-21	R5445956
Coliform Bacteria - Fecal	<1		1	CFU/100mL		29-APR-21	R5443972
Phosphorus (P)-Total	0.0139		0.0050	mg/L		05-MAY-21	R5450245
Total Suspended Solids	<3.0		3.0	mg/L		04-MAY-21	R5450538

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2581748-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:20							
Matrix: WATER							
pH	8.09		0.10	pH		06-MAY-21	R5453975
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.21		0.020	mg/L		29-APR-21	R5448439
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.21		0.022	mg/L		04-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-APR-21	R5448439
L2581748-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BARRETT on 28-APR-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAY-21	R5450818
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		29-APR-21	R5445956
Coliform Bacteria - Fecal	6		1	CFU/100mL		29-APR-21	R5443972
Phosphorus (P)-Total	0.0050		0.0050	mg/L		05-MAY-21	R5450245
Total Suspended Solids	<3.0		3.0	mg/L		05-MAY-21	R5450120
pH	8.29		0.10	pH		06-MAY-21	R5453975
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.19		0.020	mg/L		29-APR-21	R5448439
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.19		0.022	mg/L		04-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-APR-21	R5448439

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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L2581748-COFC

748

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Spring EMS week 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2021-04-28	10:00	Water		X	X								4.9°C
	WWTP Influent BOD 2	2021-04-28	10:00	Water									X		
	WWTP Effluent Routine 3	2021-04-28	10:00	Water		X	X							X	10.2°C
	WWTP Effluent BOD 4	2021-04-28	10:00	Water									X		
	WWTP Effluent Nutrients 5	2021-04-28	10:00	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2021-04-28	10:00	Water	X										
	Elk River Upstream Routine 7	2021-04-28	10:10	Water		X	X								4.9°C 5
	Elk River Upstream Nutrients 8	2021-04-28	10:10	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2021-04-28	10:10	Water	X										
	Elk River @ Outfall Routine 10	2021-04-28	10:20	Water		X	X								5.0°C
	Elk River @ Outfall Nutrients 11	2021-04-28	10:20	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2021-04-28	10:20	Water	X										
	Elk River Downstream Routine 13	2021-04-28	10:30	Water		X	X								5.0°C
	Elk River Downstream Nutrients 14	2021-04-28	10:30	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2021-04-28	10:30	Water	X										

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	2021-04-28 TIME: 11:45	DK	4/29 TIME: 0900
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY
Cooler Seal Intact? ✓ Yes ___No ___N/A
Sample Temperature: ____°C Frozen? ___Yes ___No
Cooling Method? 6 ___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 06-MAY-21
Report Date: 18-MAY-21 16:05 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2584458

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC- SPRING EMS WEEK 6
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2584458-1 WWTP INFLUENT							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	37	BODP	20	mg/L		07-MAY-21	R5457277
Total Suspended Solids	43.8		3.0	mg/L		12-MAY-21	R5456918
pH	8.18		0.10	pH		15-MAY-21	R5458355
L2584458-2 WWTP EFFLUENT							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-MAY-21	R5457872
Biochemical Oxygen Demand	<2.0		2.0	mg/L		07-MAY-21	R5457277
Chemical Oxygen Demand	13		10	mg/L		11-MAY-21	R5456248
Orthophosphate-Dissolved (as P)	0.0635		0.0050	mg/L		07-MAY-21	R5454600
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-MAY-21	R5454524
Phosphorus (P)-Total	0.0688		0.0050	mg/L		12-MAY-21	R5456372
Total Suspended Solids	4.2		3.0	mg/L		12-MAY-21	R5456918
pH	8.16		0.10	pH		15-MAY-21	R5458355
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	14.8		0.020	mg/L		06-MAY-21	R5455600
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	14.8		0.022	mg/L		11-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-MAY-21	R5455600
L2584458-3 ELK RIVER UPSTREAM							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-MAY-21	R5457872
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		07-MAY-21	R5454600
Coliform Bacteria - Fecal	2	HTD	1	CFU/100mL		07-MAY-21	R5454524
Phosphorus (P)-Total	0.0126		0.0050	mg/L		12-MAY-21	R5456372
Total Suspended Solids	10.6		3.0	mg/L		12-MAY-21	R5456918
pH	8.32		0.10	pH		15-MAY-21	R5458355
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.62		0.020	mg/L		06-MAY-21	R5455600
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.62		0.022	mg/L		11-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-MAY-21	R5455600
L2584458-4 ELK RIVER @ OUTFALL							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-MAY-21	R5457872
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		07-MAY-21	R5454600
Coliform Bacteria - Fecal	1		1	CFU/100mL		06-MAY-21	R5454524
Phosphorus (P)-Total	0.0076		0.0050	mg/L		12-MAY-21	R5456372
Total Suspended Solids	4.8		3.0	mg/L		12-MAY-21	R5456918

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2584458-4 ELK RIVER @ OUTFALL							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
pH	7.89		0.10	pH		17-MAY-21	R5458829
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.74		0.020	mg/L		06-MAY-21	R5455600
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.74		0.022	mg/L		11-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-MAY-21	R5455600
L2584458-5 ELK RIVER DOWNSTREAM							
Sampled By: CB on 05-MAY-21 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-MAY-21	R5457872
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		07-MAY-21	R5454600
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-MAY-21	R5454524
Phosphorus (P)-Total	0.0111		0.0050	mg/L		12-MAY-21	R5456372
Total Suspended Solids	10.6		3.0	mg/L		12-MAY-21	R5456918
pH	8.02		0.10	pH		17-MAY-21	R5458829
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.60		0.020	mg/L		06-MAY-21	R5455600
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.60		0.022	mg/L		11-MAY-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-MAY-21	R5455600

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD result may be less than usual.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
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Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
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CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC – Spring EMS week 6		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Woyciak			
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

L2584458-COFC

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 1	2021-05-05		Water		X	X								8.2°C
1	WWTP Influent BOD 2	2021-05-05		Water									X		
2	WWTP Effluent Routine 3	2021-05-05		Water		X	X							X	10.1°C
2	WWTP Effluent BOD 4	2021-05-05		Water									X		
2	WWTP Effluent Nutrients 5	2021-05-05		Water				X	X	X	X	X			
2	WWTP Effluent Bacteriological 6	2021-05-05		Water	X										
3	Elk River Upstream Routine 7	2021-05-05		Water		X	X								5.1°C
3	Elk River Upstream Nutrients 8	2021-05-05		Water				X	X	X	X	X			
3	Elk River Upstream Bacteriological 9	2021-05-05		Water	X										
4	Elk River @ Outfall Routine 10	2021-05-05		Water		X	X								7.0°C
4	Elk River @ Outfall Nutrients 11	2021-05-05		Water				X	X	X	X	X			
4	Elk River @ Outfall Bacteriological 12	2021-05-05		Water	X										
5	Elk River Downstream Routine 13	2021-05-05		Water		X	X								5.5°C
5	Elk River Downstream Nutrients 14	2021-05-05		Water				X	X	X	X	X			
5	Elk River Downstream Bacteriological 15	2021-05-05		Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	2021-05-05 TIME: 11:45		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 1 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 24-JUN-21
Report Date: 09-JUL-21 14:39 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2605863

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER- JUNE 2021 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2605863-1 WWTP INFLUENT							
Sampled By: CB on 23-JUN-21 @ 11:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	36		20	mg/L		25-JUN-21	R5506802
Total Suspended Solids	42.6		3.0	mg/L		29-JUN-21	R5506840
pH	7.56		0.10	pH		06-JUL-21	R5513195
L2605863-2 WWTP EFFLUENT							
Sampled By: CB on 23-JUN-21 @ 11:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JUL-21	R5513087
Biochemical Oxygen Demand	2.3		2.0	mg/L		25-JUN-21	R5506802
Orthophosphate-Dissolved (as P)	0.163	DLHC	0.010	mg/L		24-JUN-21	R5501396
Coliform Bacteria - Fecal	<1		1	CFU/100mL		24-JUN-21	R5503977
Phosphorus (P)-Total	0.209		0.050	mg/L		09-JUL-21	R5516508
Total Suspended Solids	<3.0		3.0	mg/L		29-JUN-21	R5506840
pH	8.06		0.10	pH		06-JUL-21	R5513195
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	15.5		0.020	mg/L		24-JUN-21	R5505819
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	15.5		0.022	mg/L		29-JUN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		24-JUN-21	R5505819

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

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Fort McMurray A[illegible] [illegible]91-1586
Edmonton AB, [illegible] [illegible]9878 Fax: 780-437-2311
Calgary AB, Ba[illegible] [illegible]00-668-9878 Fax: 403-291-0298
Saskatoon SK, [illegible]57-7645 Fax: 306-668-8383

L2605863-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -June 2021 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	2021-06-23	11:00	Water		X	X								
	WWTP Influent BOD	2021-06-23	11:00	Water									X		
	WWTP Effluent Routine	2021-06-23	11:00	Water		X	X								
	WWTP Effluent BOD	2021-06-23	11:00	Water									X		
	WWTP Effluent Nutrients	2021-06-23	11:00	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological	2021-06-23	11:00	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
Carter Barrett	June 23, 2021	11:45	[signature]	24/06	8:35
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A | Sample Temperature: 8 °C | Frozen? ___Yes ___No | Cooling Method? ___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 15-JUL-21
Report Date: 22-JUL-21 11:12 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2614406

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER- JULY 2021 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2614406-1 WWTP INFLUENT							
Sampled By: CARTGER BARRETT on 14-JUL-21 @ 11:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	56		20	mg/L		16-JUL-21	R5526304
Total Suspended Solids	97.1		3.0	mg/L		20-JUL-21	R5526611
pH	7.62		0.10	pH		18-JUL-21	R5524948
L2614406-2 WWTP EFFLUENT							
Sampled By: CARTGER BARRETT on 14-JUL-21 @ 11:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JUL-21	R5525642
Biochemical Oxygen Demand	<2.0		2.0	mg/L		16-JUL-21	R5526304
Orthophosphate-Dissolved (as P)	0.0910		0.0050	mg/L		17-JUL-21	R5524648
Coliform Bacteria - Fecal	3		1	CFU/100mL		15-JUL-21	R5524256
Phosphorus (P)-Total	0.0866		0.0050	mg/L		21-JUL-21	R5526837
Total Suspended Solids	<3.0		3.0	mg/L		20-JUL-21	R5526611
pH	7.69		0.10	pH		18-JUL-21	R5524948
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	19.3		0.020	mg/L		15-JUL-21	R5524506
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	19.3		0.022	mg/L		17-JUL-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-JUL-21	R5524506

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

PAGE OF

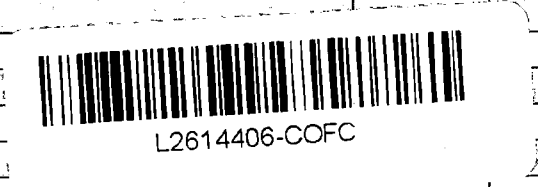
SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -July 2021 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL ADDRESS: pmajer@skircr.com ☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	2021-07-14	11:00	Water		X	X								16.3°C
	WWTP Influent BOD	2021-07-14	11:00	Water									X		
	WWTP Effluent Routine	2021-07-14	11:00	Water		X	X								17.2°C
	WWTP Effluent BOD	2021-07-14	11:00	Water									X		
	WWTP Effluent Nutrients	2021-07-14	11:00	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological	2021-07-14	11:00	Water	X										

FOR LAB USE ONLY



TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: July 14, 2021 TIME: 11:45	RECEIVED BY:	DATE: 21/15 TIME: 1240
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX				
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com	FOR LAB USE ONLY			
		Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 16 °C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ___Ice ___None	

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 01-SEP-21
Report Date: 13-SEP-21 14:02 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2634193

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER- AUGUST 2021 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2634193-1 WWTP INFLUENT							
Sampled By: CB on 31-AUG-21 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	179	BODP	75	mg/L		03-SEP-21	R5580967
Total Suspended Solids	672		8.0	mg/L		02-SEP-21	R5578664
pH	7.70		0.10	pH		08-SEP-21	R5581442
L2634193-2 WWTP EFFLUENT							
Sampled By: CB on 31-AUG-21 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-SEP-21	R5583322
Biochemical Oxygen Demand	<2.0		2.0	mg/L		03-SEP-21	R5580967
Orthophosphate-Dissolved (as P)	0.239	DLHC	0.025	mg/L		01-SEP-21	R5576176
Coliform Bacteria - Fecal	<1		1	CFU/100mL		01-SEP-21	R5576397
Nitrate (as N)	41.3	HTD	0.020	mg/L		01-SEP-21	R5583116
Nitrate and Nitrite (as N)	41.3		0.022	mg/L		13-SEP-21	
Nitrite (as N)	0.017		0.010	mg/L		01-SEP-21	R5583116
Phosphorus (P)-Total	0.254	DLHC	0.050	mg/L		07-SEP-21	R5578238
Total Suspended Solids	<3.0		3.0	mg/L		02-SEP-21	R5578664
pH	7.73		0.10	pH		08-SEP-21	R5581442

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD result may be less than usual.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

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

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

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mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -August 2021 Monthly EMS			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com ☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

L2634193-COFC

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
		WWTP Influent Routine	2021-08-31	14:30	Water		X	X								16.8°C
		WWTP Influent BOD	2021-08-31	14:30	Water									X		
		WWTP Effluent Routine	2021-08-31	14:30	Water		X	X								17.9°C
		WWTP Effluent BOD	2021-08-31	14:30	Water									X		
		WWTP Effluent Nutrients	2021-08-31	14:30	Water				X	X	X	X	X			
		WWTP Effluent Bacteriological	2021-08-31	14:30	Water	X										

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	August 31/21	RECEIVED BY:	DATE:
Carter Barrett	TIME:	15:00		TIME:
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:
	TIME:			TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 16-SEP-21
Report Date: 04-OCT-21 09:46 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2640200

Project P.O. #: NOT SUBMITTED
Job Reference: SEPTEMBER 2021 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640200-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 15-SEP-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	179		75	mg/L		17-SEP-21	R5592656
Total Suspended Solids	211		3.0	mg/L		20-SEP-21	R5590125
pH	7.20		0.10	pH		27-SEP-21	R5603999
L2640200-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 15-SEP-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-OCT-21	R5606938
Biochemical Oxygen Demand	<2.0		2.0	mg/L		17-SEP-21	R5592656
Orthophosphate-Dissolved (as P)	0.0755		0.0050	mg/L		16-SEP-21	R5585755
Coliform Bacteria - Fecal	<1		1	CFU/100mL		16-SEP-21	R5586405
Phosphorus (P)-Total	0.0702		0.0050	mg/L		21-SEP-21	R5591117
Total Suspended Solids	<3.0		3.0	mg/L		20-SEP-21	R5590125
pH	7.76		0.10	pH		27-SEP-21	R5603999
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	30.4	HTD	0.10	mg/L		21-SEP-21	R5591459
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	30.5		0.11	mg/L		21-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	0.101	HTD	0.050	mg/L		21-SEP-21	R5591459

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street V5L 1K5 Tel: 604-253-4188
Fort St. John BC
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Fort McMurray AB
Edmonton AB, 9
Calgary AB, Bay
Saskatoon SK, 8

-0243 Fax: 604-253-6700
261-5587
9878 Fax: 780-513-2191
1-1586
878 Fax: 780-437-2311
)-668-9878 Fax: 403-291-0298
-7645 Fax: 306-668-8383

L2640200-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	Wastewater ~~August~~ Sept 2021 Monthly EMS		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Wojciak			
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	2021-09-15	10:00	Water		X	X								
	WWTP Influent BOD	2021-09-15	10:00	Water									X		
	WWTP Effluent Routine	2021-09-15	10:00	Water		X	X								
	WWTP Effluent BOD	2021-09-15	10:00	Water									X		
	WWTP Effluent Nutrients	2021-09-15	10:00	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological	2021-09-15	10:00	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: 2021-09-15 TIME: 10:00	RECEIVED BY:	DATE: 9/14 TIME: 10:00		
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:		
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX						
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com	FOR LAB USE ONLY					
		Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 6 °C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ___Ice ___None			

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 07-OCT-21
Report Date: 01-NOV-21 09:55 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2648585

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL EMS WEEK 1
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2648585-1 WWTP INFLUENT							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	263	BODP	75	mg/L		08-OCT-21	R5616467
Total Suspended Solids	262		3.0	mg/L		12-OCT-21	R5616602
pH	7.58		0.10	pH		13-OCT-21	R5617668
L2648585-2 WWTP EFFLUENT							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-21	R5633107
Biochemical Oxygen Demand	<2.0		2.0	mg/L		08-OCT-21	R5616467
Chemical Oxygen Demand	<10		10	mg/L		08-OCT-21	R5614846
Orthophosphate-Dissolved (as P)	0.0681		0.0050	mg/L		07-OCT-21	R5614412
Coliform Bacteria - Fecal	<1		1	CFU/100mL		07-OCT-21	R5614689
Phosphorus (P)-Total	0.210	DLHC	0.0050	mg/L		15-OCT-21	R5620762
Total Suspended Solids	3.1		3.0	mg/L		12-OCT-21	R5616602
pH	7.94		0.10	pH		13-OCT-21	R5617668
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	22.2		0.020	mg/L		08-OCT-21	R5619616
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	22.3		0.022	mg/L		15-OCT-21	
Nitrite in Water by IC							
Nitrite (as N)	0.079		0.010	mg/L		08-OCT-21	R5619616
L2648585-3 ELK RIVER UPSTREAM							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 10:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-21	R5633107
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		07-OCT-21	R5614412
Coliform Bacteria - Fecal	<1		1	CFU/100mL		07-OCT-21	R5614689
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		15-OCT-21	R5620762
Total Suspended Solids	<3.0		3.0	mg/L		12-OCT-21	R5616602
pH	8.28		0.10	pH		13-OCT-21	R5617668
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.03		0.020	mg/L		08-OCT-21	R5619616
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.03		0.022	mg/L		15-OCT-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-21	R5619616
L2648585-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-21	R5633107
Orthophosphate-Dissolved (as P)	0.0429		0.0050	mg/L		07-OCT-21	R5614412
Coliform Bacteria - Fecal	2		1	CFU/100mL		07-OCT-21	R5614689
Phosphorus (P)-Total	0.046	DLM	0.020	mg/L		15-OCT-21	R5620762
Total Suspended Solids	<3.0		3.0	mg/L		12-OCT-21	R5616602

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2648585-4 ELK RIVER @ OUTFALL							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 10:00							
Matrix: WATER							
pH	8.10		0.10	pH		13-OCT-21	R5617668
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	3.31		0.020	mg/L		08-OCT-21	R5619616
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	3.31		0.022	mg/L		15-OCT-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-21	R5619616
L2648585-5 ELK RIVER DOWNSTREAM							
Sampled By: CARTER BARRETT on 06-OCT-21 @ 09:50							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-21	R5633107
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		07-OCT-21	R5614412
Coliform Bacteria - Fecal	<1		1	CFU/100mL		07-OCT-21	R5614689
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		15-OCT-21	R5620762
Total Suspended Solids	<3.0		3.0	mg/L		12-OCT-21	R5616602
pH	8.24		0.10	pH		13-OCT-21	R5617668
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.02		0.020	mg/L		08-OCT-21	R5619616
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.02		0.022	mg/L		15-OCT-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-21	R5619616

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD result may be less than usual.
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).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-8
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-80
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Fr
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-

L2648585-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC - Fall EMS week 1			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

FOR LAB USE ONLY WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine 1	2021-10-6	10:30	Water		X	X								13.2°C
	WWTP Influent BOD 2	2021-10-6	10:30	Water									X		
	WWTP Effluent Routine 3	2021-10-6	10:30	Water		X	X							X	13.3°C
	WWTP Effluent BOD 4	2021-10-6	10:30	Water									X		
	WWTP Effluent Nutrients 5	2021-10-6	10:30	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2021-10-6	10:30	Water	X										
	Elk River Upstream Routine 7	2021-10-6	10:15	Water		X	X								8.7°C
	Elk River Upstream Nutrients 8	2021-10-6	10:15	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2021-10-6	10:~~00~~15	Water	X										
	Elk River @ Outfall Routine 10	2021-10-6	10:00	Water		X	X								11.3°C
	Elk River @ Outfall Nutrients 11	2021-10-6	10:00	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2021-10-6	10:00	Water	X										
	Elk River Downstream Routine 13	2021-10-6	9:50	Water		X	X								8.7°C
	Elk River Downstream Nutrients 14	2021-10-6	9:50	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2021-10-6	9:50	Water	X										

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	2021-10-6		10/6
	TIME: 11:00 ~~9:45~~		TIME: 8:30
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ___°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 14-OCT-21
Report Date: 01-NOV-21 13:15 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2650961

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL EMS WEEK 2
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2650961-1 WWTP INFLUENT							
Sampled By: CB on 13-OCT-21 @ 09:30							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	58		20	mg/L		15-OCT-21	R5625007
Total Suspended Solids	68.7		3.0	mg/L		19-OCT-21	R5625419
pH	7.83		0.10	pH		19-OCT-21	R5626939
L2650961-2 WWTP EFFLUENT							
Sampled By: CB on 13-OCT-21 @ 09:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-OCT-21	R5633394
Biochemical Oxygen Demand	<2.0		2.0	mg/L		15-OCT-21	R5625007
Chemical Oxygen Demand	<10		10	mg/L		15-OCT-21	R5620298
Orthophosphate-Dissolved (as P)	0.0878		0.0050	mg/L		14-OCT-21	R5619157
Coliform Bacteria - Fecal	<1		1	CFU/100mL		14-OCT-21	R5619919
Nitrate (as N)	23.4		0.020	mg/L		15-OCT-21	R5625315
Nitrate and Nitrite (as N)	23.4		0.022	mg/L		20-OCT-21	
Nitrite (as N)	0.019		0.010	mg/L		15-OCT-21	R5625315
Phosphorus (P)-Total	0.0952		0.0050	mg/L		21-OCT-21	R5625375
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-21	R5625419
pH	7.95		0.10	pH		19-OCT-21	R5626939
L2650961-3 ELK RIVER UPSTREAM							
Sampled By: CB on 13-OCT-21 @ 09:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-OCT-21	R5633394
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		14-OCT-21	R5619157
Coliform Bacteria - Fecal	<1		1	CFU/100mL		14-OCT-21	R5619919
Nitrate (as N)	2.10		0.020	mg/L		15-OCT-21	R5625315
Nitrate and Nitrite (as N)	2.10		0.022	mg/L		20-OCT-21	
Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-21	R5625315
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		21-OCT-21	R5625375
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-21	R5625419
pH	8.32		0.10	pH		19-OCT-21	R5626939
L2650961-4 ELK RIVER @ OUTFALL							
Sampled By: CB on 13-OCT-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-OCT-21	R5633394
Orthophosphate-Dissolved (as P)	0.0571		0.0050	mg/L		14-OCT-21	R5619157
Coliform Bacteria - Fecal	18		1	CFU/100mL		14-OCT-21	R5619919
Nitrate (as N)	9.03		0.020	mg/L		15-OCT-21	R5625315
Nitrate and Nitrite (as N)	9.03		0.022	mg/L		20-OCT-21	
Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-21	R5625315
Phosphorus (P)-Total	0.0486		0.0050	mg/L		21-OCT-21	R5625375
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-21	R5625419
pH	6.97		0.10	pH		19-OCT-21	R5626939
L2650961-5 ELK RIVER DOWNSTREAM							
Sampled By: CB on 13-OCT-21 @ 10:15							
Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2650961-5 ELK RIVER DOWNSTREAM							
Sampled By: CB on 13-OCT-21 @ 10:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-OCT-21	R5633394
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		14-OCT-21	R5619157
Coliform Bacteria - Fecal	<1		1	CFU/100mL		14-OCT-21	R5619919
Nitrate (as N)	2.08		0.020	mg/L		15-OCT-21	R5625315
Nitrate and Nitrite (as N)	2.08		0.022	mg/L		20-OCT-21	
Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-21	R5625315
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		21-OCT-21	R5625375
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-21	R5625419
pH	8.30		0.10	pH		19-OCT-21	R5626939

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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ree: 1-800-668-9878 Fax: 403-291-0298
1-800-667-7645 Fax: 306-668-8383

961

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC - Fall EMS week 2			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
	1	WWTP Influent Routine 1	2021-10-13	9:30	Water		X	X												12°C
		WWTP Influent BOD 2	2021-10-13	9:30	Water									X						1
	2	WWTP Effluent Routine 3	2021-10-13	9:30	Water		X	X							X					14°C
		WWTP Effluent BOD 4	2021-10-13	9:30	Water									X						1
		WWTP Effluent Nutrients 5	2021-10-13	9:30	Water				X	X	X	X	X							1
		WWTP Effluent Bacteriological 6	2021-10-13	9:30	Water	X														1
	3	Elk River Upstream Routine 7	2021-10-13	9:45	Water		X	X												3.7°C
		Elk River Upstream Nutrients 8	2021-10-13	9:45	Water				X	X	X	X	X							1
		Elk River Upstream Bacteriological 9	2021-10-13	9:45	Water	X														
	4	Elk River @ Outfall Routine 10	2021-10-13	10:00	Water		X	X												8.6°C
		Elk River @ Outfall Nutrients 11	2021-10-13	10:00	Water				X	X	X	X	X							1
		Elk River @ Outfall Bacteriological 12	2021-10-13	10:00	Water	X														
	5	Elk River Downstream Routine 13	2021-10-13	10:15	Water		X	X												3.6°C
		Elk River Downstream Nutrients 14	2021-10-13	10:15	Water				X	X	X	X	X							1
		Elk River Downstream Bacteriological 15	2021-10-13	10:15	Water	X														

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2021-10-13	RECEIVED BY:	DATE: 10/14	0840
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	Carter Barrett	TIME: 10:30	DK	TIME:	
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX	RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com		TIME:		TIME:	

FOR LAB USE ONLY
Cooler Seal Intact? X Yes ___ No ___ N/A
Sample Temperature: 6 °C
Frozen? ___ Yes X No
Cooling Method? ___ Icepacks ___ Ice ___ None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 21-OCT-21
Report Date: 15-NOV-21 11:12 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2653987

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL EMS WEEK 3
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2653987-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 20-OCT-21 @ 09:45							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	54		20	mg/L		22-OCT-21	R5629318
Total Suspended Solids	130		3.0	mg/L		24-OCT-21	R5627906
pH	8.02		0.10	pH		26-OCT-21	R5629798
L2653987-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 20-OCT-21 @ 09:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-NOV-21	R5640223
Biochemical Oxygen Demand	<2.0		2.0	mg/L		22-OCT-21	R5629318
Chemical Oxygen Demand	<10		10	mg/L		22-OCT-21	R5627110
Orthophosphate-Dissolved (as P)	0.223	DLHC	0.050	mg/L		21-OCT-21	R5626445
Coliform Bacteria - Fecal	<1		1	CFU/100mL		21-OCT-21	R5626886
Phosphorus (P)-Total	0.267	DLHC	0.025	mg/L		29-OCT-21	R5632826
Total Suspended Solids	<3.0		3.0	mg/L		24-OCT-21	R5627906
pH	8.09		0.10	pH		26-OCT-21	R5629798
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	24.2		0.020	mg/L		22-OCT-21	R5633792
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	24.2		0.022	mg/L		01-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	0.017		0.010	mg/L		22-OCT-21	R5633792
L2653987-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 20-OCT-21 @ 10:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-NOV-21	R5640223
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		21-OCT-21	R5626445
Coliform Bacteria - Fecal	1		1	CFU/100mL		21-OCT-21	R5626886
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		29-OCT-21	R5632826
Total Suspended Solids	<3.0		3.0	mg/L		24-OCT-21	R5627906
pH	8.40		0.10	pH		26-OCT-21	R5629798
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.09		0.020	mg/L		22-OCT-21	R5633792
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.09		0.022	mg/L		01-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-OCT-21	R5633792
L2653987-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 20-OCT-21 @ 10:20							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-NOV-21	R5640223
Orthophosphate-Dissolved (as P)	0.0550	RRV	0.0050	mg/L		21-OCT-21	R5626445
Coliform Bacteria - Fecal	14		1	CFU/100mL		21-OCT-21	R5626886
Phosphorus (P)-Total	0.0500	RRV	0.0050	mg/L		29-OCT-21	R5632826
Total Suspended Solids	3.5		3.0	mg/L		24-OCT-21	R5627906

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2653987-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 20-OCT-21 @ 10:20							
Matrix: Water							
pH	8.32		0.10	pH		26-OCT-21	R5629798
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	7.79		0.020	mg/L		22-OCT-21	R5633792
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	7.79		0.022	mg/L		01-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-OCT-21	R5633792
L2653987-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 20-OCT-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-NOV-21	R5640223
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		21-OCT-21	R5626445
Coliform Bacteria - Fecal	<1		1	CFU/100mL		21-OCT-21	R5626886
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		29-OCT-21	R5632826
Total Suspended Solids	<3.0		3.0	mg/L		24-OCT-21	R5627906
pH	8.41		0.10	pH		26-OCT-21	R5629798
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.09		0.020	mg/L		22-OCT-21	R5633792
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.09		0.022	mg/L		01-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-OCT-21	R5633792

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

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Saskatoon SK, 819 - 58th Stre

253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
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L2653987-COFC

CHAIN OF CUSTODY

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC - Fall EMS ~~week 2~~ week 3			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com ☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 1	2021-10-20	9:45	Water		X	X								8.4°C
1	WWTP Influent BOD 2	2021-10-20	9:45	Water									X		
2	WWTP Effluent Routine 3	2021-10-20	9:45	Water		X	X							X	14.°C
2	WWTP Effluent BOD 4	2021-10-20	9:45	Water									X		
2	WWTP Effluent Nutrients 5	2021-10-20	9:45	Water				X	X	X	X	X			
2	WWTP Effluent Bacteriological 6	2021-10-20	9:45	Water	X										
3	Elk River Upstream Routine 7	2021-10-20	10:15	Water		X	X								5.1°C
3	Elk River Upstream Nutrients 8	2021-10-20	10:15	Water				X	X	X	X	X			
3	Elk River Upstream Bacteriological 9	2021-10-20	10:15	Water	X										
4	Elk River @ Outfall Routine 10	2021-10-20	10:20	Water		X	X								5.4°C
4	Elk River @ Outfall Nutrients 11	2021-10-20	10:20	Water				X	X	X	X	X			
4	Elk River @ Outfall Bacteriological 12	2021-10-20	10:20	Water	X										
5	Elk River Downstream Routine 13	2021-10-20	10:30	Water		X	X								5.1°C
5	Elk River Downstream Nutrients 14	2021-10-20	10:30	Water				X	X	X	X	X			
5	Elk River Downstream Bacteriological 15	2021-10-20	10:30	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: 2021-10-20 TIME: 10:45 ~~10:30~~
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	RELINQUISHED BY:	DATE: TIME:
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX		
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com	RECEIVED BY:	DATE: 10/21 TIME: 8:42
		RECEIVED BY:	DATE: TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: ___°C	Cooling Method? ___Icepacks ___Ice ___None
	Frozen? ___Yes ___No	

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS EMS.xls

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 28-OCT-21
Report Date: 17-NOV-21 14:07 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2656500

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL EMS WEEK 4
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2656500-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	20.8		6.0	mg/L		28-OCT-21	R5634437
Total Suspended Solids	51.7		3.0	mg/L		02-NOV-21	R5634652
pH	7.95		0.10	pH		31-OCT-21	R5634423
L2656500-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-NOV-21	R5652224
Biochemical Oxygen Demand	<2.0		2.0	mg/L		28-OCT-21	R5634437
Chemical Oxygen Demand	<10		10	mg/L		28-OCT-21	R5632168
Orthophosphate-Dissolved (as P)	0.163	DLHC	0.010	mg/L		28-OCT-21	R5632613
Coliform Bacteria - Fecal	<1		1	CFU/100mL		28-OCT-21	R5633576
Phosphorus (P)-Total	0.181	DLHC	0.010	mg/L		04-NOV-21	R5636152
Total Suspended Solids	<3.0		3.0	mg/L		02-NOV-21	R5634652
pH	7.93		0.10	pH		31-OCT-21	R5634423
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	14.5		0.020	mg/L		28-OCT-21	R5636409
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	14.5		0.022	mg/L		05-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-OCT-21	R5636409
L2656500-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:05							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-NOV-21	R5652224
Orthophosphate-Dissolved (as P)	0.0070		0.0050	mg/L		28-OCT-21	R5632613
Coliform Bacteria - Fecal	12		1	CFU/100mL		28-OCT-21	R5633576
Phosphorus (P)-Total	0.0162		0.0050	mg/L		04-NOV-21	R5636152
Total Suspended Solids	9.5		3.0	mg/L		02-NOV-21	R5634652
pH	8.23		0.10	pH		31-OCT-21	R5634423
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.22		0.020	mg/L		28-OCT-21	R5636409
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.22		0.022	mg/L		05-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-OCT-21	R5636409
L2656500-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:10							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.101		0.050	mg/L		16-NOV-21	R5652224
Orthophosphate-Dissolved (as P)	0.0150		0.0050	mg/L		28-OCT-21	R5632613
Coliform Bacteria - Fecal	92		1	CFU/100mL		28-OCT-21	R5633576
Phosphorus (P)-Total	0.0430		0.0050	mg/L		04-NOV-21	R5636152
Total Suspended Solids	18.1		3.0	mg/L		02-NOV-21	R5634652

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2656500-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:10							
Matrix: Water							
pH	7.99		0.10	pH		31-OCT-21	R5634423
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.099		0.020	mg/L		28-OCT-21	R5636409
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.099		0.022	mg/L		05-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-OCT-21	R5636409
L2656500-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 27-OCT-21 @ 10:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-NOV-21	R5652224
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		28-OCT-21	R5632613
Coliform Bacteria - Fecal	18		1	CFU/100mL		28-OCT-21	R5633576
Phosphorus (P)-Total	0.0080		0.0050	mg/L		04-NOV-21	R5636152
Total Suspended Solids	3.9		3.0	mg/L		02-NOV-21	R5634652
pH	8.19		0.10	pH		31-OCT-21	R5634423
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.59		0.020	mg/L		28-OCT-21	R5636409
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.59		0.022	mg/L		05-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-OCT-21	R5636409

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouv... 1-800-665-0243 Fax: 604-253-6700
Fort St... Fax: 250-261-5587
Grand ... 1-800-668-9878 Fax: 780-513-2191
Fort Mc... ax: 780-791-1586
Edmont... 800-668-9878 Fax: 780-437-2311
Calgary ... Free: 1-800-668-9878 Fax: 403-291-0298
Saskat... 1-800-667-7645 Fax: 306-668-8383

L2656500-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC - Fall EMS week 4			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	1	WWTP Influent Routine 1	2021-10-27	10:00	Water		X	X								11.4°C
		WWTP Influent BOD 2	2021-10-27	10:00	Water									X		
	2	WWTP Effluent Routine 3	2021-10-27	10:00	Water		X	X							X	13.4
		WWTP Effluent BOD 4	2021-10-27	10:00	Water									X		
		WWTP Effluent Nutrients 5	2021-10-27	10:00	Water				X	X	X	X	X			
		WWTP Effluent Bacteriological 6	2021-10-27	10:00	Water	X										
	3	Elk River Upstream Routine 7	2021-10-27	10:05	Water		X	X								5.4°C
		Elk River Upstream Nutrients 8	2021-10-27	10:05	Water				X	X	X	X	X			
		Elk River Upstream Bacteriological 9	2021-10-27	10:05	Water	X										
	4	Elk River @ Outfall Routine 10	2021-10-27	10:10	Water		X	X								5.7°C
		Elk River @ Outfall Nutrients 11	2021-10-27	10:10	Water				X	X	X	X	X			
		Elk River @ Outfall Bacteriological 12	2021-10-27	10:10	Water	X										
	5	Elk River Downstream Routine 13	2021-10-27	10:15	Water		X	X								5.4°C
		Elk River Downstream Nutrients 14	2021-10-27	10:15	Water				X	X	X	X	X			
		Elk River Downstream Bacteriological 15	2021-10-27	10:15	Water	X										

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-10-27	RECEIVED BY:	DATE:	10/28
Carter Barrett	TIME:	11:15		TIME:	9:00
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 04-NOV-21
Report Date: 18-NOV-21 18:17 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2659158

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC-FALL EMS WEEK 5
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2659158-1 WWTP INFLUENT							
Sampled By: CB on 03-NOV-21 @ 09:45							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	54		20	mg/L		04-NOV-21	R5638431
Total Suspended Solids	35.6		3.0	mg/L		09-NOV-21	R5640170
pH	8.13		0.10	pH		07-NOV-21	R5637880
L2659158-2 WWTP EFFLUENT							
Sampled By: CB on 03-NOV-21 @ 09:50							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		17-NOV-21	R5653860
Biochemical Oxygen Demand	<2.0		2.0	mg/L		04-NOV-21	R5638431
Chemical Oxygen Demand	<10		10	mg/L		09-NOV-21	R5638563
Orthophosphate-Dissolved (as P)	0.0125		0.0050	mg/L		04-NOV-21	R5636945
Coliform Bacteria - Fecal	<1		1	CFU/100mL		04-NOV-21	R5636818
Phosphorus (P)-Total	0.0320		0.0050	mg/L		10-NOV-21	R5640576
Total Suspended Solids	<3.0		3.0	mg/L		09-NOV-21	R5640170
pH	7.88		0.10	pH		07-NOV-21	R5637880
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	11.2		0.020	mg/L		05-NOV-21	R5644541
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	11.2		0.022	mg/L		12-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-NOV-21	R5644541
L2659158-3 ELK RIVER UPSTREAM							
Sampled By: CB on 03-NOV-21 @ 10:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		17-NOV-21	R5653860
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		04-NOV-21	R5636945
Coliform Bacteria - Fecal	6		1	CFU/100mL		04-NOV-21	R5636818
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		10-NOV-21	R5640576
Total Suspended Solids	<3.0		3.0	mg/L		09-NOV-21	R5640170
pH	8.27		0.10	pH		07-NOV-21	R5637880
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.50		0.020	mg/L		05-NOV-21	R5644541
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.50		0.022	mg/L		12-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-NOV-21	R5644541
L2659158-4 ELK RIVER OUTFALL							
Sampled By: CB on 03-NOV-21 @ 10:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		17-NOV-21	R5653860
Orthophosphate-Dissolved (as P)	0.0142		0.0050	mg/L		04-NOV-21	R5636945
Coliform Bacteria - Fecal	7		1	CFU/100mL		04-NOV-21	R5636818
Phosphorus (P)-Total	0.0210		0.0050	mg/L		10-NOV-21	R5640576
Total Suspended Solids	<3.0		3.0	mg/L		09-NOV-21	R5640170

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2659158-4 ELK RIVER OUTFALL							
Sampled By: CB on 03-NOV-21 @ 10:15							
Matrix: WATER							
pH	8.11		0.10	pH		07-NOV-21	R5637880
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.905		0.020	mg/L		05-NOV-21	R5644541
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.905		0.022	mg/L		12-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-NOV-21	R5644541
L2659158-5 ELKRIVER DOWNSTREAM							
Sampled By: CB on 03-NOV-21 @ 10:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		17-NOV-21	R5653860
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		04-NOV-21	R5636945
Coliform Bacteria - Fecal	8		1	CFU/100mL		04-NOV-21	R5636818
Phosphorus (P)-Total	0.0056		0.0050	mg/L		10-NOV-21	R5640576
Total Suspended Solids	<3.0		3.0	mg/L		09-NOV-21	R5640170
pH	8.26		0.10	pH		07-NOV-21	R5637880
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.45		0.020	mg/L		05-NOV-21	R5644541
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.45		0.022	mg/L		12-NOV-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-NOV-21	R5644541

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

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Grand
Fort
Edmo
Calga
Saski

e: 1-800-668-9878 Fax: 780-513-2191
Fax: 780-791-1586
1-800-668-9878 Fax: 780-437-2311
oll Free: 1-800-668-9878 Fax: 403-291-0298
ge: 1-800-667-7645 Fax: 306-668-8383

L2659158-COFC

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC - Fall EMS week 5		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

FOR LAB USE ONLY: WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED: YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine 1	2021-11-03	9:45	Water		X	X								11.7°C
	WWTP Influent BOD 2	2021-11-03	9:45	Water									X		
	WWTP Effluent Routine 3	2021-11-03	9:50	Water		X	X							X	11.4°C
	WWTP Effluent BOD 4	2021-11-03	9:50	Water									X		
	WWTP Effluent Nutrients 5	2021-11-03	9:50	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2021-11-03	9:50	Water	X										
	Elk River Upstream Routine 7	2021-11-03	10:00	Water		X	X								3.2°C
	Elk River Upstream Nutrients 8	2021-11-03	10:00	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2021-11-03	10:00	Water	X										
	Elk River @ Outfall Routine 10	2021-11-03	10:15	Water		X	X								5.5°C
	Elk River @ Outfall Nutrients 11	2021-11-03	10:15	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2021-11-03	10:15	Water	X										
	Elk River Downstream Routine 13	2021-11-03	10:30	Water		X	X								3.9°C
	Elk River Downstream Nutrients 14	2021-11-03	10:30	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2021-11-03	10:30	Water	X										

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE:	2021-11-03	RECEIVED BY:	DATE:	
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	Carter Barrett	TIME:	11:15		TIME:	
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX	RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	11/4
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com		TIME:			TIME:	8:50

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
✓ Yes ___ No ___ N/A	Frozen? ___ Yes ___ No	✓ Icepacks ___ Ice ___ None

FERNIE ALPINE RESORT UTILITIES CORPORATION
ATTN: Patrick Majer
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2

Date Received: 12-NOV-21
Report Date: 23-NOV-21 13:36 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2662053

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC-FALL EMS WEEK 6
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2662053-1 WWTP INFLUENT							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	95		20	mg/L		13-NOV-21	R5653487
Total Suspended Solids	127		3.0	mg/L		16-NOV-21	R5652511
pH	8.03		0.10	pH		12-NOV-21	R5648817
L2662053-2 WWTP EFFLUENT							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-NOV-21	R5655439
Biochemical Oxygen Demand	<2.0		2.0	mg/L		13-NOV-21	R5653487
Chemical Oxygen Demand	<10		10	mg/L		15-NOV-21	R5648818
Orthophosphate-Dissolved (as P)	0.0852		0.0050	mg/L		12-NOV-21	R5645479
Coliform Bacteria - Fecal	<1		1	CFU/100mL		12-NOV-21	R5647299
Nitrate (as N)	15.7		0.020	mg/L		12-NOV-21	R5649257
Nitrite (as N)	0.011		0.010	mg/L		12-NOV-21	R5649257
Phosphorus (P)-Total	0.0723		0.0050	mg/L		17-NOV-21	R5651766
Total Suspended Solids	<3.0		3.0	mg/L		16-NOV-21	R5652511
pH	7.98		0.10	pH		12-NOV-21	R5648817
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	15.7		0.022	mg/L		16-NOV-21	
L2662053-3 ELK RIVER UPSTREAM							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-NOV-21	R5655439
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-NOV-21	R5645479
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-NOV-21	R5647299
Nitrate (as N)	1.61		0.020	mg/L		12-NOV-21	R5649257
Nitrite (as N)	<0.010		0.010	mg/L		12-NOV-21	R5649257
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		17-NOV-21	R5651766
Total Suspended Solids	<3.0		3.0	mg/L		16-NOV-21	R5652511
pH	8.17		0.10	pH		12-NOV-21	R5648817
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.61		0.022	mg/L		16-NOV-21	
L2662053-4 ELK RIVER @ OUTFALL							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-NOV-21	R5655439
Orthophosphate-Dissolved (as P)	0.0302		0.0050	mg/L		12-NOV-21	R5645479
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-NOV-21	R5647299
Nitrate (as N)	5.55		0.020	mg/L		12-NOV-21	R5649257
Nitrite (as N)	<0.010		0.010	mg/L		12-NOV-21	R5649257
Phosphorus (P)-Total	0.0258		0.0050	mg/L		17-NOV-21	R5651766
Total Suspended Solids	<3.0		3.0	mg/L		16-NOV-21	R5652511
pH	7.96		0.10	pH		12-NOV-21	R5648817
NO2, NO3 and Sum of NO2/NO3							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2662053-4 ELK RIVER @ OUTFALL							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	5.55		0.022	mg/L		16-NOV-21	
L2662053-5 ELK RIVER DOWNSTREAM							
Sampled By: KM on 12-NOV-21 @ 07:20							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		22-NOV-21	R5655439
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-NOV-21	R5645479
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-NOV-21	R5647299
Nitrate (as N)	1.59		0.020	mg/L		12-NOV-21	R5649257
Nitrite (as N)	<0.010		0.010	mg/L		12-NOV-21	R5649257
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		17-NOV-21	R5651766
Total Suspended Solids	<3.0		3.0	mg/L		16-NOV-21	R5652511
pH	8.18		0.10	pH		12-NOV-21	R5648817
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.59		0.022	mg/L		16-NOV-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D
This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.			
N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-COL-CL	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-COL-CL	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
TSS-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			

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

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

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

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...ll Free: 1-800-668-9878 Fax: 780-513-2191
...1524 Fax: 780-791-1586
...Free: 1-800-668-9878 Fax: 780-437-2311
...97 Toll Free: 1-800-668-9878 Fax: 403-291-0298
...oll Free: 1-800-667-7645 Fax: 306-668-8383

L2662053-COFC

CHAIN OF CUSTODY FORM

PAGE ___ OF ___

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Kevin Mackey
PROJECT NAME AND NO.:	FARUC - Fall EMS week 6			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		

REPORT FORMAT: ☑ HARDCOPY ☑ EMAIL - ADDRESS pmajer@skircr.com
☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	2021-11-12	7:20	Water		X	X								9.8 °C
	WWTP Influent BOD	2021-11-12	"	Water									X		
	WWTP Effluent Routine	2021-11-12	"	Water		X	X							X	11-8 °C
	WWTP Effluent BOD	2021-11-12	"	Water									X		"
	WWTP Effluent Nutrients	2021-11-12	"	Water				X	X	X	X	X			"
	WWTP Effluent Bacteriological	2021-11-12	"	Water	X										"
	Elk River Upstream Routine	2021-11-12	7:30	Water		X	X								2.7 °C
	Elk River Upstream Nutrients	2021-11-12	"	Water				X	X	X	X	X			"
	Elk River Upstream Bacteriological	2021-11-12	"	Water	X										"
	Elk River @ Outfall Routine	2021-11-12	7:40	Water		X	X								5.1 °C
	Elk River @ Outfall Nutrients	2021-11-12	"	Water				X	X	X	X	X			"
	Elk River @ Outfall Bacteriological	2021-11-12	"	Water	X										"
	Elk River Downstream Routine	2021-11-12	7:50	Water		X	X								2.8 °C
	Elk River Downstream Nutrients	2021-11-12	"	Water				X	X	X	X	X			"
	Elk River Downstream Bacteriological	2021-11-12	"	Water	X										"
	L2662053														

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-11-12	RECEIVED BY:	DATE:	12/11
Kevin Mackey	TIME:	11:15		TIME:	11:30
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ___°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

CERTIFICATE OF ANALYSIS

Work Order	: **CG2106829**	Page	: 1 of 5
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 1	Date Samples Received	: 16-Dec-2021 09:00
PO	: ----	Date Analysis Commenced	: 16-Dec-2021
C-O-C number	: ----	Issue Date	: 23-Dec-2021 17:29
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Maria Tuguinay	Lab Assistant	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
pH units	pH units

>: 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

CG2106829-001

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: WWTP INFLUENT
Client sampling date / time: 15-Dec-2021 10:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	7.77	0.10	pH units	E108	20-Dec-2021	20-Dec-2021	372513
solids, total suspended [TSS]	----	78.5	3.0	mg/L	E160-H	-	21-Dec-2021	372491
Aggregate Organics								
biochemical oxygen demand [BOD]	----	81.6	20.0	mg/L	E550	-	16-Dec-2021	370488

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

Analytical Results

CG2106829-002

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: WWTP EFFLUENT
Client sampling date / time: 15-Dec-2021 10:40

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.08	0.10	pH units	E108	20-Dec-2021	20-Dec-2021	372513
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	21-Dec-2021	372491
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0202	0.0050	mg/L	E298	16-Dec-2021	16-Dec-2021	370124
nitrate (as N)	14797-55-8	26.3	0.0250	mg/L	E235.NO3-L	18-Dec-2021	18-Dec-2021	371379
nitrite (as N)	14797-65-0	0.0120	0.0010	mg/L	E235.NO2-L	18-Dec-2021	18-Dec-2021	371380
phosphate, ortho-, dissolved (as P)	14265-44-2	0.370 DLHC,	0.0050	mg/L	E378-U	16-Dec-2021	16-Dec-2021	369928
phosphorus, total	7723-14-0	0.415	0.0200	mg/L	E372-U	21-Dec-2021	21-Dec-2021	369764
nitrate + nitrite (as N)	----	26.3	0.0250	mg/L	EC235.N+N	-	20-Dec-2021	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	16-Dec-2021	372373
Aggregate Organics								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	16-Dec-2021	370488
chemical oxygen demand [COD]	----	<10	10	mg/L	E559-L	-	17-Dec-2021	370570

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

Analytical Results

CG2106829-003

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: ELK RIVER UPSTREAM
Client sampling date / time: 15-Dec-2021 10:50

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.31	0.10	pH units	E108	20-Dec-2021	20-Dec-2021	372513
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	21-Dec-2021	372491
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0052	0.0050	mg/L	E298	16-Dec-2021	16-Dec-2021	370124
nitrate (as N)	14797-55-8	1.67	0.0050	mg/L	E235.NO3-L	18-Dec-2021	18-Dec-2021	371379
nitrite (as N)	14797-65-0	0.0025	0.0010	mg/L	E235.NO2-L	18-Dec-2021	18-Dec-2021	371380
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0044	0.0010	mg/L	E378-U	16-Dec-2021	16-Dec-2021	369928
phosphorus, total	7723-14-0	0.0059	0.0020	mg/L	E372-U	21-Dec-2021	21-Dec-2021	369764

Analytical Results

CG2106829-003

Sub-Matrix:**Water** *Client sample ID:* ELK RIVER UPSTREAM
(Matrix: **Water**) *Client sampling date / time:* 15-Dec-2021 10:50

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
nitrate + nitrite (as N)	----	1.67	0.0051	mg/L	EC235.N+N	-	20-Dec-2021	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	8	1	CFU/100mL	E012.FC	-	16-Dec-2021	372373

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

Analytical Results

CG2106829-004

Sub-Matrix:**Water** *Client sample ID:* ELK RIVER @ OUTFALL
(Matrix: **Water**) *Client sampling date / time:* 15-Dec-2021 11:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.18	0.10	pH units	E108	20-Dec-2021	20-Dec-2021	372513
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	21-Dec-2021	372491
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	<0.0050	0.0050	mg/L	E298	16-Dec-2021	16-Dec-2021	370124
nitrate (as N)	14797-55-8	1.59	0.0050	mg/L	E235.NO3-L	18-Dec-2021	18-Dec-2021	371379
nitrite (as N)	14797-65-0	0.0027	0.0010	mg/L	E235.NO2-L	18-Dec-2021	18-Dec-2021	371380
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0219	0.0010	mg/L	E378-U	16-Dec-2021	16-Dec-2021	369928
phosphorus, total	7723-14-0	0.0208	0.0020	mg/L	E372-U	21-Dec-2021	21-Dec-2021	369764
nitrate + nitrite (as N)	----	1.59	0.0051	mg/L	EC235.N+N	-	20-Dec-2021	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	16-Dec-2021	372373

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

Analytical Results

CG2106829-005

Sub-Matrix:**Water** *Client sample ID:* ELK RIVER DOWNSTREAM
(Matrix: **Water**) *Client sampling date / time:* 15-Dec-2021 11:10

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.34	0.10	pH units	E108	20-Dec-2021	20-Dec-2021	372513
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	21-Dec-2021	372491
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0086	0.0050	mg/L	E298	16-Dec-2021	16-Dec-2021	370124
nitrate (as N)	14797-55-8	1.66	0.0050	mg/L	E235.NO3-L	18-Dec-2021	18-Dec-2021	371379
nitrite (as N)	14797-65-0	0.0025	0.0010	mg/L	E235.NO2-L	18-Dec-2021	18-Dec-2021	371380
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0038	0.0010	mg/L	E378-U	16-Dec-2021	16-Dec-2021	369928
phosphorus, total	7723-14-0	0.0054	0.0020	mg/L	E372-U	21-Dec-2021	21-Dec-2021	369764
nitrate + nitrite (as N)	----	1.66	0.0051	mg/L	EC235.N+N	-	20-Dec-2021	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	9	1	CFU/100mL	E012.FC	-	16-Dec-2021	372373

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2106829**	Page	: 1 of 9
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 1	Date Samples Received	: 16-Dec-2021 09:00
PO	: ----	Issue Date	: 23-Dec-2021 17:29
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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)

- 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E559-L	15-Dec-2021	----	----	----		17-Dec-2021	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ OUTFALL	E298	15-Dec-2021	16-Dec-2021	----	----		16-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	15-Dec-2021	16-Dec-2021	----	----		16-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	15-Dec-2021	16-Dec-2021	----	----		16-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	15-Dec-2021	16-Dec-2021	----	----		16-Dec-2021	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER @ OUTFALL	E378-U	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER DOWNSTREAM	E378-U	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER UPSTREAM	E378-U	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WWTP EFFLUENT	E378-U	15-Dec-2021	----	----	----		16-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ OUTFALL	E235.NO3-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ OUTFALL	E235.NO2-L	15-Dec-2021	----	----	----		18-Dec-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER DOWNSTREAM	E235.NO2-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER UPSTREAM	E235.NO2-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
WWTP EFFLUENT	E235.NO2-L	15-Dec-2021	----	----	----		18-Dec-2021	3 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER @ OUTFALL	E372-U	15-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER DOWNSTREAM	E372-U	15-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER UPSTREAM	E372-U	15-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
WWTP EFFLUENT	E372-U	15-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	28 days	6 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER @ OUTFALL	E012.FC	15-Dec-2021	----	----	----		16-Dec-2021	30 hrs	24 hrs	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER DOWNSTREAM	E012.FC	15-Dec-2021	----	----	----		16-Dec-2021	30 hrs	24 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	15-Dec-2021	----	----	----		16-Dec-2021	30 hrs	24 hrs	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	15-Dec-2021	----	----	----		16-Dec-2021	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ OUTFALL	E108	15-Dec-2021	----	----	----		20-Dec-2021	0.25 hrs	119 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	15-Dec-2021	----	----	----		20-Dec-2021	0.25 hrs	119 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	15-Dec-2021	----	----	----		20-Dec-2021	0.25 hrs	119 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	15-Dec-2021	----	----	----		20-Dec-2021	0.25 hrs	119 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	15-Dec-2021	----	----	----		20-Dec-2021	0.25 hrs	119 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ OUTFALL	E160-H	15-Dec-2021	----	----	----		21-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160-H	15-Dec-2021	----	----	----		21-Dec-2021	7 days	6 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160-H	15-Dec-2021	----	----	----		21-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160-H	15-Dec-2021	----	----	----		21-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT	E160-H	15-Dec-2021	----	----	----		21-Dec-2021	7 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

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	370124	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	370488	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	370570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	369928	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	371379	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	371380	1	20	5.0	5.0	✓
pH by Meter	E108	372513	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	372373	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	369764	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	372491	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	370124	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	370488	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	370570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	369928	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	371379	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	371380	1	20	5.0	5.0	✓
pH by Meter	E108	372513	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	369764	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	372491	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	370124	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	370488	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	370570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	369928	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	371379	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	371380	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	372373	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	369764	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	372491	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	370124	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	370570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	369928	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	371379	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	371380	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	369764	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
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ±0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H 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 ± 1°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 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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Calgary - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

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.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **CG2106829**	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 1	Date Samples Received	: 16-Dec-2021 09:00
PO	: ----	Date Analysis Commenced	: 16-Dec-2021
C-O-C number	: ----	Issue Date	: 23-Dec-2021 17:29
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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*
Anthony Calero	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Maria Tuguinay	Lab Assistant	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 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: **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: 372491)											
CG2106829-001	WWTP INFLUENT	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	78.5	87.9	11.3%	20%	----
Physical Tests (QC Lot: 372513)											
CG2106826-001	Anonymous	pH	----	E108	0.10	pH units	7.79	7.81	0.256%	4%	----
Anions and Nutrients (QC Lot: 369764)											
CG2106773-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.300	0.291	3.24%	20%	----
Anions and Nutrients (QC Lot: 369928)											
CG2106829-002	WWTP EFFLUENT	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0050	mg/L	0.370	0.372	0.607%	20%	----
Anions and Nutrients (QC Lot: 370124)											
CG2106826-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	9.33	9.43	1.07%	20%	----
Anions and Nutrients (QC Lot: 371379)											
CG2106832-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	5.50	5.31	3.54%	20%	----
Anions and Nutrients (QC Lot: 371380)											
CG2106832-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0124	0.0075	0.0049	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 372373)											
CG2106829-002	WWTP EFFLUENT	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 370488)											
CG2106824-004	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 370570)											
CG2106829-002	WWTP EFFLUENT	chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	0	Diff <2x LOR	----

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: 372491)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 369764)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 369928)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 370124)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 371379)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 371380)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Bacteriological Tests (QCLot: 372373)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 370488)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 370570)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----

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: 372491)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	100	85.0	115	----
Physical Tests (QCLot: 372513)									
pH	----	E108	----	pH units	7 pH units	100	98.6	101	----
Anions and Nutrients (QCLot: 369764)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	96.1	80.0	120	----
Anions and Nutrients (QCLot: 369928)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	99.3	80.0	120	----
Anions and Nutrients (QCLot: 370124)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 371379)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 371380)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
Aggregate Organics (QCLot: 370488)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	91.3	85.0	115	----
Aggregate Organics (QCLot: 370570)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 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: 369764)										
CG2106829-002	WWTP EFFLUENT	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.0676 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 369928)										
CG2106829-003	ELK RIVER UPSTREAM	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0522 mg/L	0.05 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 370124)										
CG2106850-012	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 371379)										
CG2106832-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	2.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 371380)										
CG2106832-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.5	75.0	125	----
Aggregate Organics (QCLot: 370570)										
CG2106834-008	Anonymous	chemical oxygen demand [COD]	----	E559-L	110 mg/L	100 mg/L	110	75.0	125	----

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
Fort St. John BC, Box 258, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

Environmental Division
Calgary
Work Order Reference
CG2106829

Telephone : +1 403 407 1800

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Kevin Mackey	
PROJECT NAME AND NO.:	FARUC - Winter EMS week 1		QUOTE NO:		
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2021-12-15	10:30	Water		X	X								9.3°C
	WWTP Influent BOD	2021-12-15	10:30	Water									X		
	WWTP Effluent Routine	2021-12-15	10:40	Water		X	X							X	10.2°C
	WWTP Effluent BOD	2021-12-15	10:46	Water									X		
2	WWTP Effluent Nutrients	2021-12-15	10:40	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological	2021-12-15	10:40	Water	X										
	Elk River Upstream Routine	2021-12-15	10:50	Water		X	X								0.4°C
3	Elk River Upstream Nutrients	2021-12-15	10:50	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological	2021-12-15	10:50	Water	X										
	Elk River @ Outfall Routine	2021-12-15	11:00	Water		X	X								0.5°C
4	Elk River @ Outfall Nutrients	2021-12-15	11:00	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological	2021-12-15	11:00	Water	X										
	Elk River Downstream Routine	2021-12-15	11:10	Water		X	X								0.5°C
5	Elk River Downstream Nutrients	2021-12-15	11:10	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological	2021-12-15	11:30	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 11:15	Raghu	TIME: 9:00
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: ____°C Frozen? ___Yes ___No

Cooling Method? ___Icepacks ___Ice ___None

5°C

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\CoC for ALS EMS.xls

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **CG2107100**	Page	: 1 of 3
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 2	Date Samples Received	: 23-Dec-2021 10:00
PO	: ----	Date Analysis Commenced	: 23-Dec-2021
C-O-C number	: ----	Issue Date	: 31-Dec-2021 10:33
Sampler	: KM		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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*
Erin Sanchez		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		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).

Unit	*Description*
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater 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).*
HTD	*Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	WWTP INFLUENT	WWTP EFFLUENT	ELK RIVER UPSTREAM	ELK RIVER @ OUTFALL	ELK RIVER DOWNSTREAM
					Client sampling date / time	22-Dec-2021 10:00	22-Dec-2021 10:05	22-Dec-2021 10:50	22-Dec-2021 11:00	22-Dec-2021 11:10
						CG2107100-001	CG2107100-002	CG2107100-003	CG2107100-004	CG2107100-005
						Result	Result	Result	Result	Result
Physical Tests										
pH	----	E108	0.10	pH units		8.27	7.52	8.23	7.91	8.20
solids, total suspended [TSS]	----	E160-H	3.0	mg/L		218	<3.0	<3.0	<3.0	<3.0
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		----	0.0469	0.0052	0.0127	<0.0050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	40.9 HTD	1.50	13.4	1.50
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	2.10	0.0010	0.391	0.0013
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		----	0.369	0.0035	0.0690	0.0038
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		----	0.440 DLHC	0.0048	0.0713	0.0049
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L		----	43.0	1.50	13.8	1.50
Bacteriological Tests										
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL		----	41	5	27	3
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		266	<2.0	----	----	----
chemical oxygen demand [COD]	----	E559-L	10	mg/L		----	16	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2107100**	Page	: 1 of 9
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 2	Date Samples Received	: 23-Dec-2021 10:00
PO	: ----	Issue Date	: 31-Dec-2021 10:33
C-O-C number	: ----		
Sampler	: KM		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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)

- 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 / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E559-L	22-Dec-2021	----	----	----		29-Dec-2021	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ OUTFALL	E298	22-Dec-2021	23-Dec-2021	----	----		23-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	22-Dec-2021	23-Dec-2021	----	----		23-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	22-Dec-2021	23-Dec-2021	----	----		23-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	22-Dec-2021	23-Dec-2021	----	----		23-Dec-2021	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER @ OUTFALL	E378-U	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER DOWNSTREAM	E378-U	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ELK RIVER UPSTREAM	E378-U	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WWTP EFFLUENT	E378-U	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ OUTFALL	E235.NO3-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	22-Dec-2021	----	----	----		27-Dec-2021	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ OUTFALL	E235.NO2-L	22-Dec-2021	----	----	----		23-Dec-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER DOWNSTREAM	E235.NO2-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER UPSTREAM	E235.NO2-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
WWTP EFFLUENT	E235.NO2-L	22-Dec-2021	----	----	----		23-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER @ OUTFALL	E372-U	22-Dec-2021	28-Dec-2021	----	----		28-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER DOWNSTREAM	E372-U	22-Dec-2021	28-Dec-2021	----	----		28-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER UPSTREAM	E372-U	22-Dec-2021	28-Dec-2021	----	----		28-Dec-2021	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
WWTP EFFLUENT	E372-U	22-Dec-2021	28-Dec-2021	----	----		28-Dec-2021	28 days	6 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER DOWNSTREAM	E012.FC	22-Dec-2021	----	----	----		23-Dec-2021	30 hrs	24 hrs	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER @ OUTFALL	E012.FC	22-Dec-2021	----	----	----		23-Dec-2021	30 hrs	25 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	22-Dec-2021	----	----	----		23-Dec-2021	30 hrs	25 hrs	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	22-Dec-2021	----	----	----		23-Dec-2021	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ OUTFALL	E108	22-Dec-2021	----	----	----		23-Dec-2021	0.25 hrs	25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	22-Dec-2021	----	----	----		23-Dec-2021	0.25 hrs	25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	22-Dec-2021	----	----	----		23-Dec-2021	0.25 hrs	25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	22-Dec-2021	----	----	----		23-Dec-2021	0.25 hrs	26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	22-Dec-2021	----	----	----		23-Dec-2021	0.25 hrs	26 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ OUTFALL	E160-H	22-Dec-2021	----	----	----		28-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160-H	22-Dec-2021	----	----	----		28-Dec-2021	7 days	6 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE										
ELK RIVER UPSTREAM	E160-H	22-Dec-2021	----	----	----		28-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE										
WWTP EFFLUENT	E160-H	22-Dec-2021	----	----	----		28-Dec-2021	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE										
WWTP INFLUENT	E160-H	22-Dec-2021	----	----	----		28-Dec-2021	7 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

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	375858	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	375846	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	377588	0	18	0.0	5.0	✗
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	375727	0	11	0.0	5.0	✗
Nitrate in Water by IC (Low Level)	E235.NO3-L	376158	0	11	0.0	5.0	✗
Nitrite in Water by IC (Low Level)	E235.NO2-L	376159	0	10	0.0	5.0	✗
pH by Meter	E108	375670	0	8	0.0	5.0	✗
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	377800	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	376766	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	376809	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	375858	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	375846	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	377588	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	375727	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	376158	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	376159	1	10	10.0	5.0	✓
pH by Meter	E108	375670	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	376766	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	376809	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	375858	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	375846	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	377588	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	375727	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	376158	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	376159	1	10	10.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	377800	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	376766	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	376809	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	375858	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	377588	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	375727	0	11	0.0	5.0	✗
Nitrate in Water by IC (Low Level)	E235.NO3-L	376158	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	376159	1	10	10.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	376766	1	18	5.5	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
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ±0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H 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 ± 1°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 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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Calgary - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

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	: **CG2107100**	Page	: 1 of 5
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS WEEK 2	Date Samples Received	: 23-Dec-2021 10:00
PO	: ----	Date Analysis Commenced	: 23-Dec-2021
C-O-C number	: ----	Issue Date	: 31-Dec-2021 10:33
Sampler	: KM		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		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 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: **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: 376809)											
FC2101477-003	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	64.7	59.1	9.05%	20%	----
Anions and Nutrients (QC Lot: 375858)											
CG2107100-002	WWTP EFFLUENT	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0469	0.0461	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 376766)											
CG2107087-003	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0205	0.0180	0.0025	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 377800)											
CG2107100-003	ELK RIVER UPSTREAM	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	5	3	50.0%	65%	----
Aggregate Organics (QC Lot: 375846)											
CG2107074-002	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
Physical Tests (QCLot: 376809)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 375727)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 375858)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 376158)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 376159)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 376766)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Bacteriological Tests (QCLot: 377800)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 375846)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 377588)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----

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: 375670)									
pH	----	E108	----	pH units	7 pH units	99.7	98.6	101	----
Physical Tests (QCLot: 376809)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	96.7	85.0	115	----
Anions and Nutrients (QCLot: 375727)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	97.0	80.0	120	----
Anions and Nutrients (QCLot: 375858)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 376158)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.4	90.0	110	----
Anions and Nutrients (QCLot: 376159)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.5	90.0	110	----
Anions and Nutrients (QCLot: 376766)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	97.6	80.0	120	----
Aggregate Organics (QCLot: 375846)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	89.7	85.0	115	----
Aggregate Organics (QCLot: 377588)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	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: 375858)										
CG2107100-003	ELK RIVER UPSTREAM	ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 376158)										
CG2107087-005	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.32 mg/L	2.5 mg/L	92.6	75.0	125	----
Anions and Nutrients (QCLot: 376159)										
CG2107087-005	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.469 mg/L	0.5 mg/L	93.8	75.0	125	----
Anions and Nutrients (QCLot: 376766)										
CG2107087-004	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0581 mg/L	0.0676 mg/L	85.9	70.0	130	----
Aggregate Organics (QCLot: 377588)										
CG2107087-004	Anonymous	chemical oxygen demand [COD]	----	E559-L	104 mg/L	100 mg/L	104	75.0	125	----

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE ___ OF ___

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Kevin Mackey
PROJECT NAME AND NO.:	FARUC - Winter EMS week 2			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

FOR LAB USE ONLY WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2021-12-22	10:00	Water		x	x								9.5°C
	WWTP Influent BOD	2021-12-22	10:00	Water									x		
2	WWTP Effluent Routine	2021-12-22	10:05	Water		x	x							x	10.4°C
	WWTP Effluent BOD	2021-12-22	10:05	Water									x		
	WWTP Effluent Nutrients	2021-12-22	10:05	Water				x	x	x	x	x			
	WWTP Effluent Bacteriological	2021-12-22	10:05	Water	x										
3	Elk River Upstream Routine	2021-12-22	10:50	Water		x	x								
	Elk River Upstream Nutrients	2021-12-22	10:50	Water				x	x	x	x	x			0.4°C
	Elk River Upstream Bacteriological	2021-12-22	10:50	Water	x										
4	Elk River @ Outfall Routine	2021-12-22	11:00	Water		x	x								0.5°C
	Elk River @ Outfall Nutrients	2021-12-22	11:00	Water											
	Elk River @ Outfall Bacteriological	2021-12-22	11:00	Water	x										
5	Elk River Downstream Routine	2021-12-22	11:10	Water		x	x								0.5°C
	Elk River Downstream Nutrients	2021-12-22	11:10	Water											
	Elk River Downstream Bacteriological	2021-12-22	11:10	Water	x										

Environmental Division
Calgary
Work Order Reference
CG2107100

Telephone : +1 403 407 1800

TURN AROUND REQUIRED:	◉ ROUTINE ○ RUSH SPECIFY DATE: ___ (surcharge may apply)	RELINQUISHED BY:	DATE:	2021-12-22	RECEIVED BY:	DATE:	25/12
SEND INVOICE TO:	☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details	Carter Barrett	TIME:	11:15		TIME:	0:00
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐ FAX	RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com		TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

CERTIFICATE OF ANALYSIS

Work Order	: **CG2107254**	Page	: 1 of 4
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WEEK 3	Date Samples Received	: 30-Dec-2021 08:50
PO	: ----	Date Analysis Commenced	: 30-Dec-2021
C-O-C number	: ----	Issue Date	: 07-Jan-2022 13:28
Sampler	: Kevin Mackey		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
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
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, 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).

Unit	*Description*
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
pH units	pH units

>: 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

We did not received sample (fraction5) as client didn't send, unsafety reason

Qualifiers

Qualifier	*Description*
BODP	*BOD dilution results differed by more than 30% RPD. Precision of reported BOD result may be less than usual.*
BODQ	*BOD Qualification: Lab Control Sample outside standard 85-115% objective (see QC report). Sample(s) cannot be rerun due to hold time expiry.*
DLHC	*Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*

Analytical Results

CG2107254-001

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: WWTP INFLUENT\
Client sampling date / time: 29-Dec-2021 09:45

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.28	0.10	pH units	E108	30-Dec-2021	30-Dec-2021	378696
solids, total suspended [TSS]	----	259	3.0	mg/L	E160-H	-	02-Jan-2022	378397
Aggregate Organics								
biochemical oxygen demand [BOD]	----	219 BODP, BODQ,	75.0	mg/L	E550	-	30-Dec-2021	378779

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

Analytical Results

CG2107254-002

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: WWTP EFFLUENT
Client sampling date / time: 29-Dec-2021 10:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.05	0.10	pH units	E108	30-Dec-2021	30-Dec-2021	378696
solids, total suspended [TSS]	----	3.1	3.0	mg/L	E160-H	-	02-Jan-2022	378397
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.913	0.0250	mg/L	E298	30-Dec-2021	30-Dec-2021	378433
nitrate (as N)	14797-55-8	34.2	0.0250	mg/L	E235.NO3-L	30-Dec-2021	30-Dec-2021	378574
nitrite (as N)	14797-65-0	0.419	0.0050	mg/L	E235.NO2-L	30-Dec-2021	30-Dec-2021	378573
phosphate, ortho-, dissolved (as P)	14265-44-2	0.305	0.0100	mg/L	E378-U	30-Dec-2021	30-Dec-2021	378454
phosphorus, total	7723-14-0	0.310 DLHC,	0.0100	mg/L	E372-U	31-Dec-2021	31-Dec-2021	378657
nitrate + nitrite (as N)	----	34.6	0.0255	mg/L	EC235.N+N	-	03-Jan-2022	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	25	1	CFU/100mL	E012.FC	-	31-Dec-2021	379452
Aggregate Organics								
biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550	-	30-Dec-2021	378779
chemical oxygen demand [COD]	----	26	10	mg/L	E559-L	-	04-Jan-2022	380352

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

Analytical Results

CG2107254-003

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: ELK RIVER UPSTREAM
Client sampling date / time: 29-Dec-2021 10:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.40	0.10	pH units	E108	30-Dec-2021	30-Dec-2021	378696
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	02-Jan-2022	378397
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0216	0.0050	mg/L	E298	30-Dec-2021	30-Dec-2021	378433
nitrate (as N)	14797-55-8	1.69	0.0050	mg/L	E235.NO3-L	30-Dec-2021	30-Dec-2021	378574
nitrite (as N)	14797-65-0	0.0031	0.0010	mg/L	E235.NO2-L	30-Dec-2021	30-Dec-2021	378573
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0022	0.0010	mg/L	E378-U	30-Dec-2021	30-Dec-2021	378454
phosphorus, total	7723-14-0	0.0060	0.0020	mg/L	E372-U	31-Dec-2021	31-Dec-2021	378657

Analytical Results

CG2107254-003

Sub-Matrix:**Water** *Client sample ID:* ELK RIVER UPSTREAM

(Matrix: **Water**) *Client sampling date / time:* 29-Dec-2021 10:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
nitrate + nitrite (as N)	----	1.69	0.0051	mg/L	EC235.N+N	-	03-Jan-2022	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	1	1	CFU/100mL	E012.FC	-	31-Dec-2021	379452

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

Analytical Results

CG2107254-004

Sub-Matrix:**Water** *Client sample ID:* ELK RIVER OUTFALL

(Matrix: **Water**) *Client sampling date / time:* 29-Dec-2021 10:15

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.23	0.10	pH units	E108	30-Dec-2021	30-Dec-2021	378696
solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160-H	-	02-Jan-2022	378397
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0433	0.0050	mg/L	E298	30-Dec-2021	30-Dec-2021	378433
nitrate (as N)	14797-55-8	15.5	0.0050	mg/L	E235.NO3-L	30-Dec-2021	30-Dec-2021	378574
nitrite (as N)	14797-65-0	0.0685	0.0010	mg/L	E235.NO2-L	30-Dec-2021	30-Dec-2021	378573
phosphate, ortho-, dissolved (as P)	14265-44-2	0.0791	0.0010	mg/L	E378-U	30-Dec-2021	30-Dec-2021	378454
phosphorus, total	7723-14-0	0.0707	0.0020	mg/L	E372-U	31-Dec-2021	31-Dec-2021	378657
nitrate + nitrite (as N)	----	15.6	0.0051	mg/L	EC235.N+N	-	03-Jan-2022	-
Bacteriological Tests								
coliforms, thermotolerant [fecal]	----	3	1	CFU/100mL	E012.FC	-	31-Dec-2021	379452

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2107254**	Page	: 1 of 9
Client	: **Fernie Alpine Resort Utilities Corporation**	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WEEK 3	Date Samples Received	: 30-Dec-2021 08:50
PO	: ----	Issue Date	: 07-Jan-2022 13:28
C-O-C number	: ----		
Sampler	: Kevin Mackey		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
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.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- 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.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Aggregate Organics	QC-378779-002	----	biochemical oxygen demand [BOD]	----	E550	73.3 % LCS-ND	85.0-115%	Recovery less than lower control limit

Result Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
WWTP EFFLUENT	E550	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
WWTP INFLUENT\	E550	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid)										
WWTP EFFLUENT	E559-L	29-Dec-2021	----	----	----		04-Jan-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
ELK RIVER OUTFALL	E298	29-Dec-2021	30-Dec-2021	----	----		30-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
ELK RIVER UPSTREAM	E298	29-Dec-2021	30-Dec-2021	----	----		30-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
WWTP EFFLUENT	E298	29-Dec-2021	30-Dec-2021	----	----		30-Dec-2021	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
ELK RIVER OUTFALL	E378-U	29-Dec-2021	----	----	----		30-Dec-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
ELK RIVER UPSTREAM	E378-U	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
WWTP EFFLUENT	E378-U	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
ELK RIVER OUTFALL	E235.NO3-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
ELK RIVER UPSTREAM	E235.NO3-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
WWTP EFFLUENT	E235.NO3-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER OUTFALL	E235.NO2-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
ELK RIVER UPSTREAM	E235.NO2-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
WWTP EFFLUENT	E235.NO2-L	29-Dec-2021	----	----	----		30-Dec-2021	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER OUTFALL	E372-U	29-Dec-2021	31-Dec-2021	----	----		31-Dec-2021	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
ELK RIVER UPSTREAM	E372-U	29-Dec-2021	31-Dec-2021	----	----		31-Dec-2021	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid)										
WWTP EFFLUENT	E372-U	29-Dec-2021	31-Dec-2021	----	----		31-Dec-2021	28 days	2 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER OUTFALL	E012.FC	29-Dec-2021	----	----	----		31-Dec-2021	30 hrs	49 hrs	× EHTL
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
ELK RIVER UPSTREAM	E012.FC	29-Dec-2021	----	----	----		31-Dec-2021	30 hrs	49 hrs	× EHTL
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate)										
WWTP EFFLUENT	E012.FC	29-Dec-2021	----	----	----		31-Dec-2021	30 hrs	49 hrs	× EHTL
Physical Tests : pH by Meter										
HDPE										
ELK RIVER OUTFALL	E108	29-Dec-2021	----	----	----		30-Dec-2021	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
ELK RIVER UPSTREAM	E108	29-Dec-2021	----	----	----		30-Dec-2021	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
WWTP EFFLUENT	E108	29-Dec-2021	----	----	----		30-Dec-2021	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
WWTP INFLUENT\	E108	29-Dec-2021	----	----	----		30-Dec-2021	0.25 hrs	27 hrs	× EHTR-FM

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER OUTFALL	E160-H	29-Dec-2021	----	----	----		02-Jan-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160-H	29-Dec-2021	----	----	----		02-Jan-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160-H	29-Dec-2021	----	----	----		02-Jan-2022	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT\	E160-H	29-Dec-2021	----	----	----		02-Jan-2022	7 days	4 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

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	378433	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	378779	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	380352	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	378454	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	378574	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	378573	1	20	5.0	5.0	✓
pH by Meter	E108	378696	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	379452	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	378657	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	378397	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	378433	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	378779	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	380352	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	378454	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	378574	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	378573	1	20	5.0	5.0	✓
pH by Meter	E108	378696	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	378657	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	378397	1	12	8.3	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	378433	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	378779	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	380352	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	378454	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	378574	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	378573	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	379452	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	378657	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	378397	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	378433	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	380352	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	378454	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	378574	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	378573	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	378657	1	12	8.3	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
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Calgary - Environmental	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ±0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 Calgary - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H 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 ± 1°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 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.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Calgary - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
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).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

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.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **CG2107254**	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: Calgary - Environmental
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WEEK 3	Date Samples Received	: 30-Dec-2021 08:50
PO	: ----	Date Analysis Commenced	: 30-Dec-2021
C-O-C number	: ----	Issue Date	: 07-Jan-2022 13:28
Sampler	: Kevin Mackey		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 5		
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 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
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta
Sunil Palak		Inorganics, Calgary, Alberta
Vladka Stamenova	Analyst	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 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: **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: 378397)											
CG2107231-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	20.3	21.5	1.2	Diff <2x LOR	----
Physical Tests (QC Lot: 378696)											
CG2107244-001	Anonymous	pH	----	E108	0.10	pH units	7.75	7.76	0.129%	4%	----
Anions and Nutrients (QC Lot: 378433)											
CG2107244-007	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	5.01	5.06	1.07%	20%	----
Anions and Nutrients (QC Lot: 378454)											
CG2107244-007	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: 378573)											
CG2107256-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	0.0942	0.0960	0.0018	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 378574)											
CG2107256-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	272	277	1.85%	20%	----
Anions and Nutrients (QC Lot: 378657)											
CG2107254-002	WWTP EFFLUENT	phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	0.310	0.321	3.64%	20%	----
Bacteriological Tests (QC Lot: 379452)											
CG2107254-004	ELK RIVER OUTFALL	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	3	2	1	Diff <2x LOR	----
Aggregate Organics (QC Lot: 378779)											
CG2107235-010	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 380352)											
CG2107244-003	Anonymous	chemical oxygen demand [COD]	----	E559-L	10	mg/L	14	15	0.8	Diff <2x LOR	----

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: 378397)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 378433)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 378454)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 378573)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 378574)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 378657)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Bacteriological Tests (QCLot: 379452)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 378779)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 380352)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----

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: 378397)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	95.5	85.0	115	----
Physical Tests (QCLot: 378696)									
pH	----	E108	----	pH units	7 pH units	99.4	98.6	101	----
Anions and Nutrients (QCLot: 378433)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 378454)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.02 mg/L	97.8	80.0	120	----
Anions and Nutrients (QCLot: 378573)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 378574)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 378657)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	8.02 mg/L	87.8	80.0	120	----
Aggregate Organics (QCLot: 378779)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	# 73.3	85.0	115	LCS-ND
Aggregate Organics (QCLot: 380352)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	108	85.0	115	----

Qualifiers

Qualifier	Description
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

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: 378433)										
CG2107244-011	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.113 mg/L	0.1 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 378454)										
CG2107244-008	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0502 mg/L	0.05 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 378573)										
CG2107256-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.452 mg/L	0.5 mg/L	90.5	75.0	125	----
Anions and Nutrients (QCLot: 378574)										
CG2107256-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	2.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 378657)										
CG2107254-003	ELK RIVER UPSTREAM	phosphorus, total	7723-14-0	E372-U	0.0681 mg/L	0.0676 mg/L	101	70.0	130	----
Aggregate Organics (QCLot: 380352)										
CG2107244-004	Anonymous	chemical oxygen demand [COD]	----	E559-L	103 mg/L	100 mg/L	103	75.0	125	----

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

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Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: [illegible]
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306

Environmental Division
Calgary
Work Order Reference
CG2107254

Telephone : +1 403 407 1800

SEND REPORT TO:

CHAIN OF CUSTODY FORM

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Kevin Mackey	
PROJECT NAME AND NO.:	FARUC - Winter EMS week 3		QUOTE NO:		
PO NO.:		ALS CONTACT: Patryk Woyciak			
REPORT FORMAT:	☑ HARDCOPY ☑ EMAIL - ADDRESS: pmajer@skircr.com				
	☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	2021-12-29	9:45	Water		X	X								9.8 C
	WWTP Influent BOD	2021-12-29	/	Water									X		
	WWTP Effluent Routine	2021-12-29	10:00	Water		X	X							X	10-3 C
	WWTP Effluent BOD	2021-12-29	/	Water									X		/
	WWTP Effluent Nutrients	2021-12-29	/	Water				X	X	X	X	X			/
	WWTP Effluent Bacteriological	2021-12-29	/	Water	X										
	Elk River Upstream Routine	2021-12-29	10:30	Water		X	X								6.4 C
	Elk River Upstream Nutrients	2021-12-29	/	Water				X	X	X	X	X			/
	Elk River Upstream Bacteriological	2021-12-29	/	Water	X										/
	Elk River @ Outfall Routine	2021-12-29	10:15	Water		X	X								5.9 C
	Elk River @ Outfall Nutrients	2021-12-29	/	Water				X	X	X	X	X			/
	Elk River @ Outfall Bacteriological	2021-12-29	/	Water	X										
	Elk River Downstream Routine	2021-12-29	10:45	Water		X	X								do not sample unsafe due access
	Elk River Downstream Nutrients	2021-12-29	/	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological	2021-12-29	/	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPOR ☐ DIFFERENT FROM REPORT (provide details

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-12-29	RECEIVED BY:	DATE:	12/30
Kevin Mackey	TIME:	11:15	Raquel	TIME:	8:50
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

2°C

Acute Toxicity Test Results

Sample collected January 11, 2021

Final Report

January 25, 2021

Submitted to: **Fernie Alpine Resort**
Fernie, BC

#4, 6125 12 Street SE, Calgary, AB T2H 2K1

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER / 2021-0859	11-Jan-21 at 1130h	12-Jan-21 at 0950h	13-Jan-21 at 1420h	7.3°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.9 (3.6-4.3) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.6 (2.8-4.6) g/L KCl
Reference toxicant CV	8.2%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, December 21, 2020
LC = Lethal Concentration; CL = Confidence Limit

Report By:
Shae Cole, BSc
Biologist

Reviewed By:
Kayla Knol, BSc
Senior Biologist

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APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	*Oncorhynchus mykiss*
Organism source	Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	5 gallon glass aquariums
Test volume	10 - 20 L, depending on size of fish
Test solution depth	Minimum 15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	None
Test endpoints	96-hour LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS ENVIRONMENTAL

Trout Bench Sheet

Method TRD Client FER 116 Reference 2021-0859 Chamber 9

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	1/13/2021	1420 *	MW / MF	1	
1	1/14/2021	0800	MW	-	MF
2	1/15/2021	1010 0945	AW	-	MF
3	1/16/2021	0945	SC	-	MF
4	1/17/2021	0850	SH LC	1	MW

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.6
Initial EC (µS/cm): 1079
Initial DO (mg/L): 8.6
Initial Temp (°C): 17
Salinity (ppt): 0

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L: **yes/no**

	0.5 hours	1 hour	1.5 hours	2 hours
Preaeration time				
DO(mg/L) of 100%	8.9			

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.25	12.5	25	50	100		
pH (units) (range: 5.5-8.5)								
Day 0	7.5	7.6	7.6	7.5	7.5	7.4		
Day 4	7.8	7.8	7.8	7.8	7.7	7.5		
EC (uS/cm)								
Day 0	496	535	574	641	803	1100		
Day 4	491	583	576	644	810	1101		
DO (mg/L) (70-100% saturation at test temp.)								
Day 0	8.9	8.9	8.9	8.9	8.9	8.9		
Day 4	8.5	8.5	8.5	8.5	8.4	8.3		
Temperature (°C) (range: 14-16°C)								
Day 0	14	14	14	14	14	14		
Day 4	15	15	15	15	15	15		
Number Alive (In brackets number stressed)								
Day 0	10	10	10	10	10	10		
Day 1	10	10	10	10	10	10		
Day 2	10	10	10	10	10	10		
Day 3	10	10	10	10	10	10		
Day 4	10	10	10	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.0	0.3
2	3.0	0.3
3	3.2	0.4
4	3.0	0.3
5	3.3	0.4
6	3.2	0.3
7	3.2	0.3
8	3.0	0.3
9	3.0	0.3
10	3.0	0.3

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.1
Length Range (cm): 3.0-3.3
Mean Weight (g): 0.3 (Must be ≥0.3g)
Weight Range: (g): 0.3-0.4

Test Organism Information

Batch 20201114TR
Source Troutlodge
Tank # 2
Days Held at 15± 2°C 37 (must be ≥14 days)
Percent stock mortality 0 (7 days prior to test, must be ≤2%)
Test Volume (L) 18

Comments :

Reviewed By: LO Date Reviewed: 2021/01/18

APPENDIX C – Chain-of-custody form

HydroQual
Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information Client: FARUC Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Carter/ Jan 11, 2021 / 11:30	Fernie Alpine Resort	Grab	Effluent	X
7.3°C					
2021/01/12 0950					
AWJC good condition					
MS/MSD 2x 20L pail					
2021-0859					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	Jan 11/21 @ 11:30		

END OF REPORT

Acute Toxicity Test Results

Sample collected April 28, 2021

Final Report

May 13, 2021

Submitted to: **Fernie Alpine Resort**
Calgary, AB

#4, 6125 12 Street SE, Calgary, AB T2H 2K1

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER / 2021-1330	28-Apr-21 at 1130h	29-Apr-21 at 1100h	30-Apr-21 at 1345h	12.5°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.6 (3.4 - 3.9) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.6 (2.9 - 4.4) g/L KCl
Reference toxicant CV	6.6%
Organism health history	Acceptable
Protocol deviations	See below
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, April 15, 2021

LC = Lethal Concentration; CL = Confidence Limit, SD = Standard Deviation; CV = Coefficient of Variation

The rainbow trout test 100% concentration was supersaturated with dissolved oxygen at test setting and not aerated further to a maximum of 2 hours, resulting in a protocol deviation.

Report By:
Dana Wong, BSc
Biologist

Reviewed By:
Sara Thiessen, BSc
Senior Biologist

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APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	*Oncorhynchus mykiss*
Organism source	Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	5 gallon glass aquariums
Test volume	10 - 20 L, depending on size of fish
Test solution depth	Minimum 15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ±1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	None
Test endpoints	96-hour LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS

Trout Bench Sheet

Method TRD Client FER116 Reference 2021-1330 Chamber 5

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2021-04-30	1340*	DW/ ST	1	SC
1	2021-05-01	0830	ST	-	SC
2	2021-05-02	1400	KL	-	KL
3	2021-05-03	0910	AE/ MAE	-	CAE
4	2021-05-04	1015	AW/ MAE	1	AW

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.5
Initial EC (µS/cm): 806
Initial DO (mg/L): 9.8
Initial Temp (°C): 15
Salinity (ppt): 1

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L ; yes/no

Preaeration time	0.5 hours	1 hour	1.5 hours	2 hours
DO(mg/L) of 100%	9.5			

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.3	12.5	25	50	100		
pH (units) (range: **5.5-8.5**)								
Day 0	7.3	7.5	7.6	7.6	7.6	7.4		
Day 4	8.0	8.0	8.0	7.9	7.9	7.9		
EC (uS/cm)								
Day 0	466	502	509	566	634	812		
Day 4	409	511	526	599	645	829		
DO (mg/L) (**70-100% saturation at test temp.**)								
Day 0	8.9	8.9	8.9	9.0	9.4	9.5		
Day 4	8.0	8.0	8.0	8.0	8.0	8.0		
Temperature (°C) (range: **14-16°C**)								
Day 0	14	14	14	14	14	14		
Day 4	15	15	15	15	15	15		
Number Alive (In brackets number stressed)								
Day 0	10	10	10	10	10	10		
Day 1	10	10	10	10	10	10		
Day 2	10	10	10	10	10	10		
Day 3	10	10	10	10	10	10		
Day 4	10	10	10	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.1	0.3
2	3.0	0.3
3	3.4	0.5
4	2.9	0.3
5	3.1	0.3
6	3.1	0.4
7	3.3	0.4
8	3.6	0.6
9	3.2	0.4
10	3.2	0.4

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.2
Length Range (cm): 2.9-3.6
Mean Weight (g): 0.4 (Must be ≥0.3g)
Weight Range: (g): 0.3-0.6

Test Organism Information

Batch 20210306TR
Source Troutlodge
Tank # 1
Days Held at 15± 2°C 33 (must be ≥14 days)
Percent stock mortality 0 (7 days prior to test, must be ≤2%)
Test Volume (L) 18

Comments :

Reviewed By: LO Date Reviewed: 2021/05/06

APPENDIX C – Chain-of-custody form

HydroQual

Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information Client: FARUC Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Check appropriate box below

Sample ID	Sampled By / Date / Time	Location	Method	Type	x						
WASTEWATER	Carter/ April 28, 2021 / 11:30	Fernie Alpine Resort	Grab	Effluent							
Manfoulin	2021/04/29 11:00										
2 x 20L Pails	JCC/JC										
12.5°C	2021-1330										
NS/NI											
Good Condition											

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	April 28/ 21 @ 11:30		

END OF REPORT

Acute Toxicity Test Results

Sample collected October 20, 2021

Final Report

November 29, 2021

Submitted to: **Fernie Alpine Resort**
Calgary, AB

10823 27 Street SE, Calgary, AB T2Z 3V9

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER/ 2122-0396	20-Oct-21 at 0945h	21-Oct-21 at 0930h	24-Oct-21 at 1350h	12.5°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

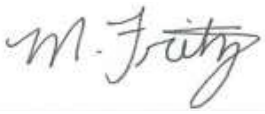
LC = Lethal Concentration

QA/QC

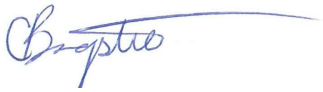
QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.3 (2.9-3.8) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.5 (2.7-4.5) g/L KCl
Reference toxicant CV	8.3%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, October 27, 2021

LC = Lethal Concentration; CL = Confidence Limit, SD = Standard Deviation; CV = Coefficient of Variation



Report By:
Michelle Fritz, BSc
Biologist



Reviewed By:
Courtney Bogstie, BSc
Senior Biologist

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APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	*Oncorhynchus mykiss*
Organism source	Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	5 gallon glass aquariums
Test volume	10 - 20 L, depending on size of fish
Test solution depth	Minimum 15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ±1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	None
Test endpoints	96-hour LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS

Trout Bench Sheet

Method TRD Client FER116 Reference 2122-0396 Chamber 3

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	10/24/2021	1350 *	JCC/DW	1	EV
1	10/25/2021	DEW	AW	-	AW
2	10/26/2021	0950	CC	-	EV
3	10/27/2021	1020	CC	-	EV
4	10/28/2021	1050	CC	1	AW

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.8
Initial EC (µS/cm): 866
Salinity (ppt): 0

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L : (yes)/no

Preaeration time	0 hours	0.5 hours	1 hour	1.5 hours	2 hours
DO(mg/L) of 100%	9.3	8.8			
Temp (°C) of 100%	15				

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.2	12.5	25	50	100		
pH (units) (range: **5.5-8.5**)								
Day 0	7.5	7.5	7.5	7.6	7.6	7.6 JCC		
Day 4	8.2	8.2	8.2	8.2	8.1	8.0		
EC (uS/cm)								
Day 0	433	462	485	555	622	813		
Day 4	438	463	489	557	627	820		
DO (mg/L) (**70-100% saturation at test temp.**)								
Day 0	8.2	7.9	7.9	8.0	8.2	8.8		
Day 4	8.8	8.8	8.8	8.6	8.6	8.6		
Temperature (°C) (range: **14-16°C**)								
Day 0	15	15	15	15	15	15		
Day 4	15	15	15	15 16	16	16		
Number Alive (In brackets number stressed)								
Day 0	10	10	10	10	10	10		
Day 1	10	10	10	10	10	10		
Day 2	10	10	10	10	10	10		
Day 3	10	9(1)	10	10	10	10		
Day 4	10	8	9	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	2.4	0.2
2	3.7	0.5
3	2.7	0.2
4	3.0	0.4
5	3.0	0.3
6	3.4	0.5
7	3.0	0.3
8	3.0	0.3
9	3.2	0.4
10	3.0	0.3

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.0
Length Range (cm): 2.4-3.7
Mean Weight (g): 0.3 (Must be ≥0.3g)
Weight Range: (g): 0.2-0.5

Test Organism Information

Batch 20211007TR
Source Lyndon
Tank # 3
Days Held at 15± 2°C 18 (must be ≥14 days)
Percent stock mortality 0.3 (7 days prior to test, must be ≤2%)
Test Volume (L) 18

Comments :

Reviewed By: TP Date Reviewed: NOV 0 2 2021

APPENDIX C – Chain-of-custody form

HydroQual

Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information Client: FARUC Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Carter/ Oct 20, 2021 / 9:45	Fernie Alpine Resort	Grab	Effluent	x
2122-0396 2021/10/21					
09:30 Manitou/in					
SC 2x20L pails					
NoS/NoI Good Condition					
12.5°C					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	Oct 20 @ 10:00		

END OF REPORT

Acute Toxicity Test Results

Sample collected January 12, 2022

Final Report

February 1, 2022

Submitted to: **Fernie Alpine Resort**
Fernie, BC

10823 27 Street SE, Calgary, AB T2Z 3V9

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER / 2122-1096	12-Jan-22 at 1000h	13-Jan-22 at 0930h	14-Jan-22 at 1415h	11.7°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.3 (2.8-3.9) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.4 (2.6-4.5) g/L KCl
Reference toxicant CV	9.1%
Organism health history	Acceptable
Protocol deviations	See Below
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, December 30, 2021

LC = Lethal Concentration; CL = Confidence Limit, SD = Standard Deviation; CV = Coefficient of Variation

The 100% test vessel leaked between day 1 and day 2 of testing and the volume in the test vessel was reduced to 13L, consequently the control test vessel and 100% test sample volumes were not consistent on day 2 resulting in a protocol deviation. The control volume was subsequently adjusted to match the test volume.

Report By:
Shae Cole, BSc
Biologist

Reviewed By:
Kayla Knol, P. Biol.
Senior Biologist

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APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	*Oncorhynchus mykiss*
Organism source	Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	5 gallon glass aquariums
Test volume	10 - 20 L, depending on size of fish
Test solution depth	Minimum 15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	None
Test endpoints	96-hour LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS ENVIRONMENTAL

Trout Bench Sheet

Method TRD Client FER116 Reference 2122-1096 Chamber 3

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2022/01/14	1415 *	CC/EP	1	
1	2022/01/15	0855	CC	-	
2	2022/01/16	0920	TCC	-	
3	2022/01/17	1110	KTM/JCC	-	
4	2022/01/18	1120	AW/CH/DM	1	

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.1
Initial EC (µS/cm): 970
Salinity (ppt): 1

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L : yes/no

Preaeration time	0 hours	0.5 hours	1 hour	1.5 hours	2 hours
DO(mg/L) of 100%	8.8	8.8			
Temp (°C) of 100%	15				

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.25	12.5	25	50	100		
pH (units) (range: **5.5-8.5**)								
Day 0	8.0	8.1	8.1	8.0	7.9	7.6		
Day 4	8.2	8.2	8.2	8.2	8.1	8.0		
EC (uS/cm)								
Day 0	479	505	541	606	736	986		
Day 4	477	501	538	601	727	964		
DO (mg/L) (**70-100% saturation at test temp.**)								
Day 0	8.8	8.8	8.8	8.8	8.8	8.8		
Day 4	8.6	8.6	8.6	8.6	8.6	8.6		
Temperature (°C) (range: **14-16°C**)								
Day 0	15	15	15	15	15	15		
Day 4	16	15	15	15	15	15		
Number Alive (In brackets number stressed)								
Day 0	10	10	10	10	10	10		
Day 1	10	10	10	10	10	10		
Day 2	10	10	10	10	10	10		
Day 3	10	10	10(1)	10	10(1)	10(1)		
Day 4	10	10	9	9(1)	8	10(1)		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.1	0.3
2	3.1	0.5
3	3.2	0.3
4	3.0	0.2
5	3.2	0.3
6	3.4	0.4
7	3.4	0.4
8	3.0	0.2
9	3.0	0.2
10	3.3	0.3

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.2
Length Range (cm): 3.0-3.4
Mean Weight (g): 0.3 (Must be ≥0.3g)
Weight Range: (g): 0.2-0.5

Test Organism Information

Batch 20211214TR
Source Smoky Trout Farm
Tank # 4
Days Held at 15± 2°C 32 (must be ≥14 days)
Percent stock mortality 0.1 (7 days prior to test, must be <2%)
Test Volume (L) 18

Comments :

Reviewed By: EV Date Reviewed: 2022/01/26

APPENDIX C – Chain-of-custody form

HydroQual

Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information Client: FARUC Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Carter/ Jan 12, 2022 / 10:00	Fernie Alpine Resort	Grab	Effluent	x
2122-1045 2022/01/13 09:30 Monitonlin OC 2x20L posits NoS/NpI Good Condition 11.7°C					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	Jan 12, 2022 / 10:00		

END OF REPORT