ENVIRONMENTAL DIAGNOSTICS INC.

2018 SEWAGE TREATMENT PLANT ANNUAL REPORT

FERNIE ALPINE RESORT

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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 2018 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 was a slight decrease in ortho phosphorus and total phosphorus levels this year. 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.

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.

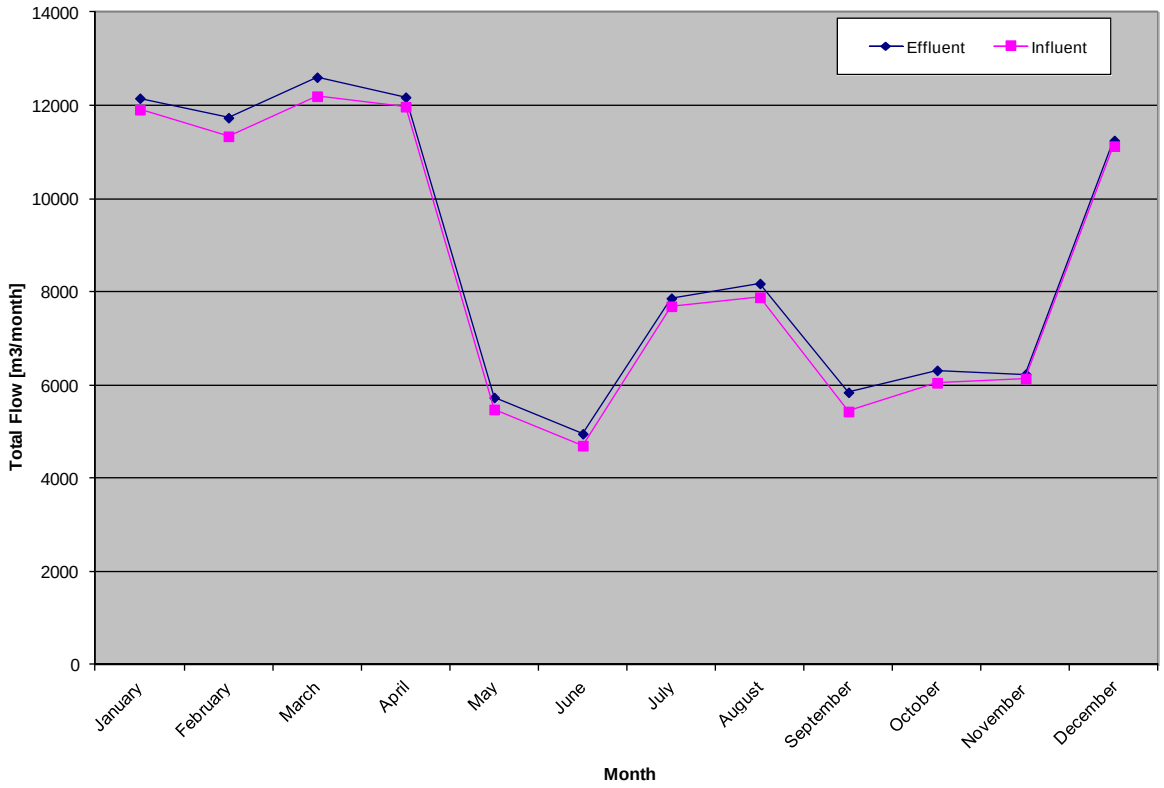
3.0 SEWAGE FLOW RECORDS

This section provides data and analysis regarding plant influent and effluent flows, and compares 2018 data to previous years.

Total effluent flow from the WWTP for all of 2018 was recorded from the effluent weir type flow meter as 105,073 m^3 and the average was 288 m^3 per day. This year, the graph below shows that total effluent is very similar to the total influent for the plant.

Available monthly total effluent flow meter records for 2018 are provided in Figure 1.

Figure 1
Effluent and Influent Flow Meter Monthly Flow Totals



The ski resort operates with higher winter and late spring sewage flows than during any other period. The average daily plant flow through January, February and March of 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.

Peak flow for the year reached 687 m^3/day on December 28th, 2018, which was 46% below the allowable daily limit of 1,280 m^3/day. The peak flow was lowest to date. Historical peak flows are as follows, 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). The peak flow day occurred during the heavy ski season, which is to be expected.

A summary of sewage flow for years 2003 through 2018 is provided in Table 3 and Figures 2 and 3:

Table 3

2003 – 2018 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

* 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 2018

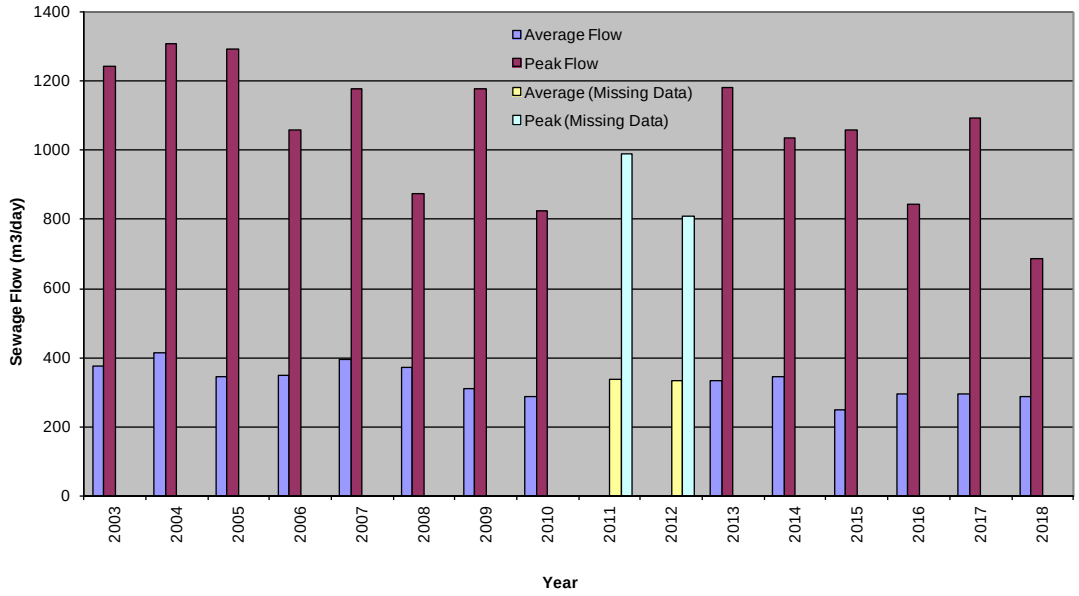
The average flow for 2018 was slightly lower than in 2017 at 288 m^3/day. There are no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m^3/day. The peak flow has decreased significantly compared to 2017 (687 m^3/day vs 1,095 m^3/day) however it was similar to that of 2016.

As seen in previous years, the highest peak flow was in December; high peak flows also occurred systematically in January, February and March, which is consistent with the facility operations. The highest month in 2018 for average flows was in February, although the peak flow was observed in December.

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 70 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

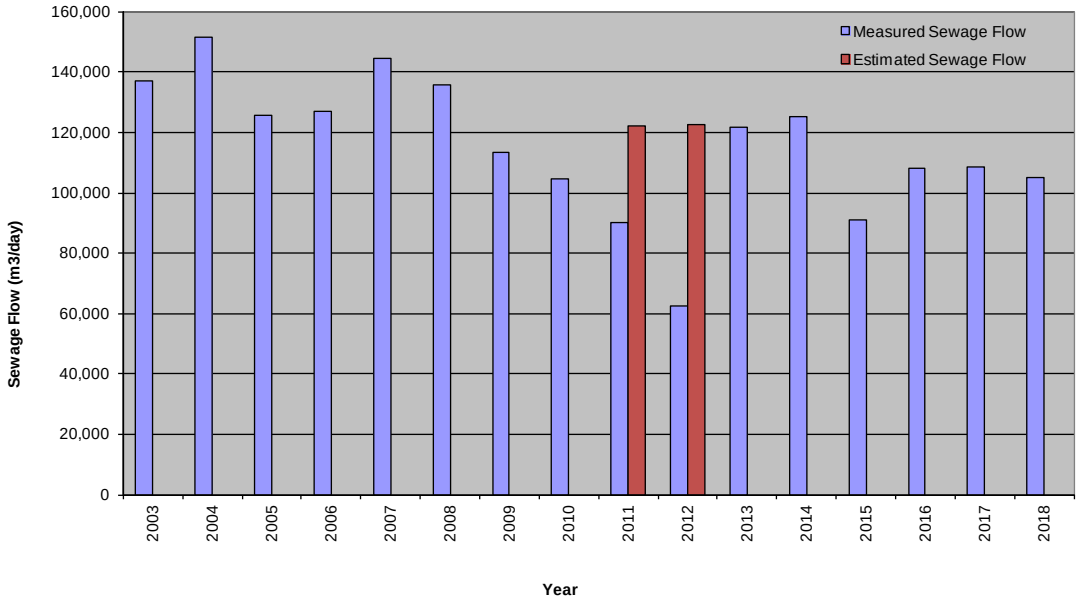
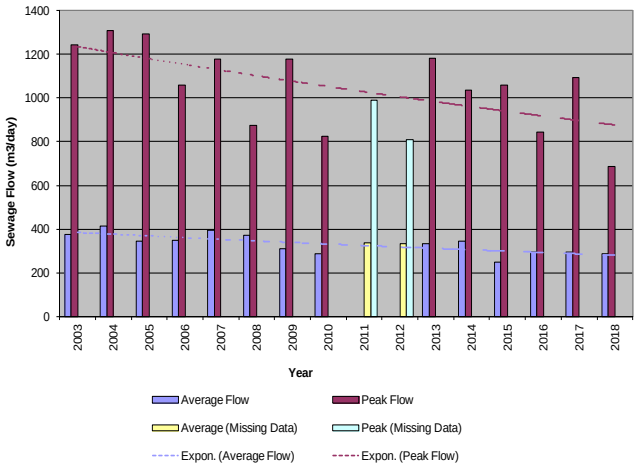


Figure 3a and Figure 3b
Trendlines for Average, Peak and Total Sewage Flow Graphs



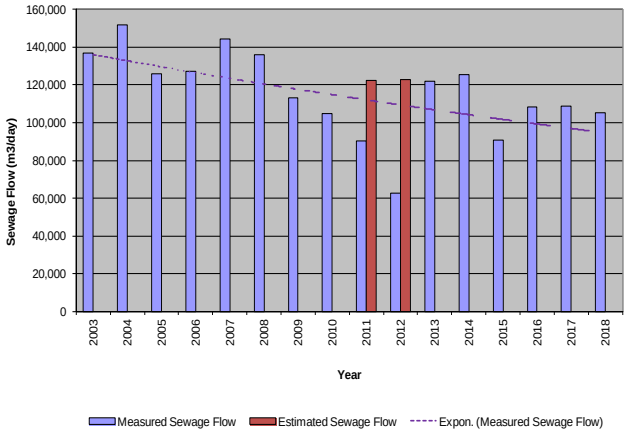
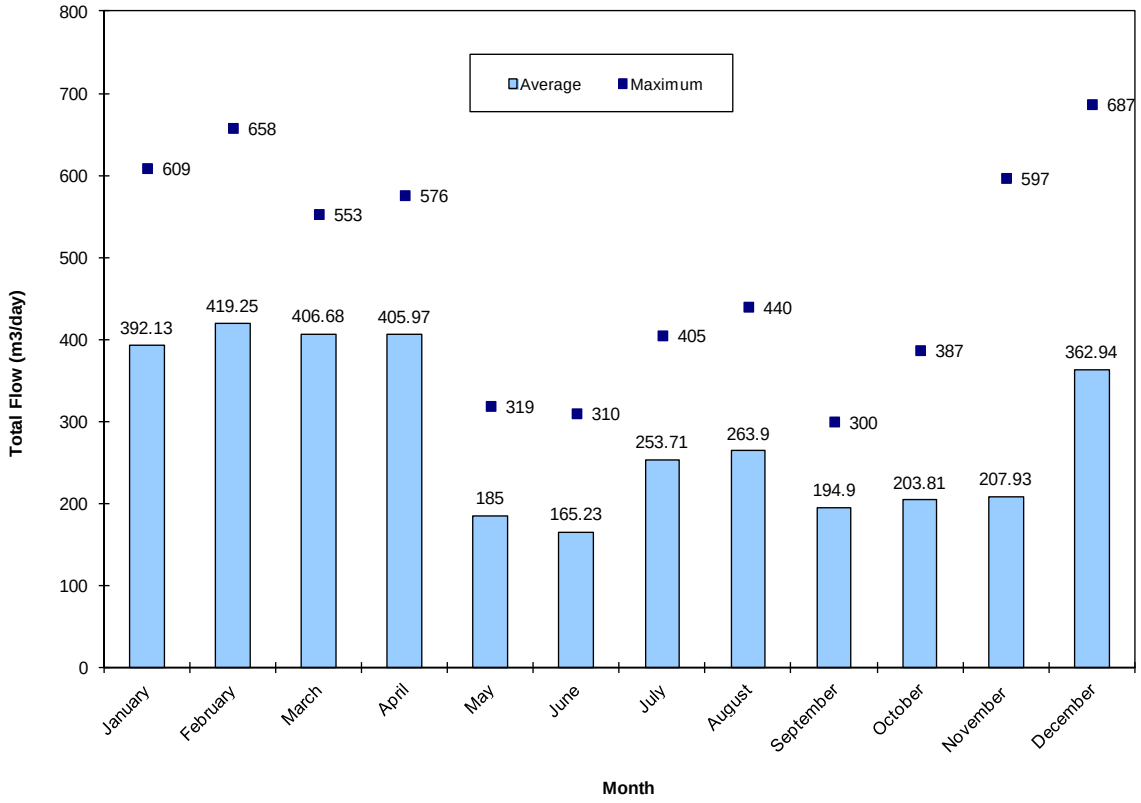


Figure 4
2018 Sewage Effluent Average and Peak Flows by Month

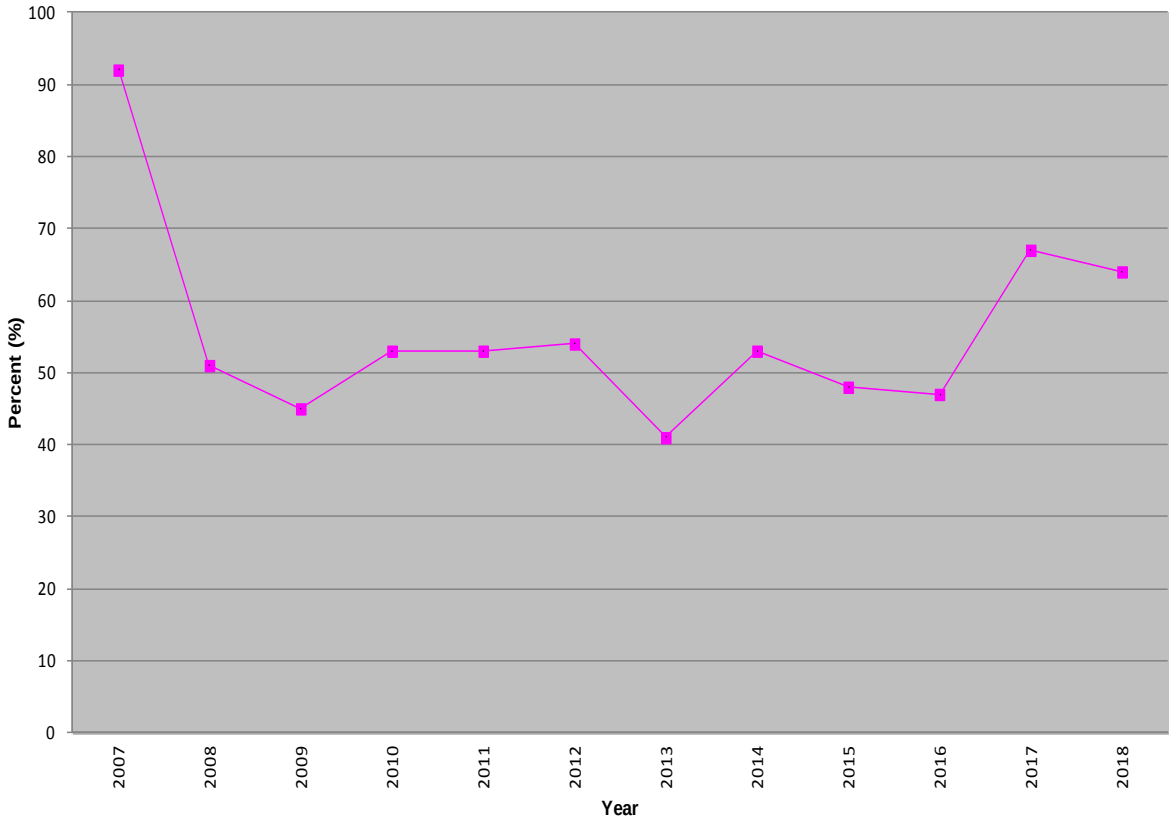


The Resort's ongoing program to reduce sewer infiltration is demonstrated by the reduction in return flow to the plant vs. total water usage. In 2007 the total sewage flow was equal to 92% of the total water production; however this number may not be representative as the total water production values 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 was 67% which was an increase from previous years. The total sewage flow for 2018 was 64% which is similar to 2017.

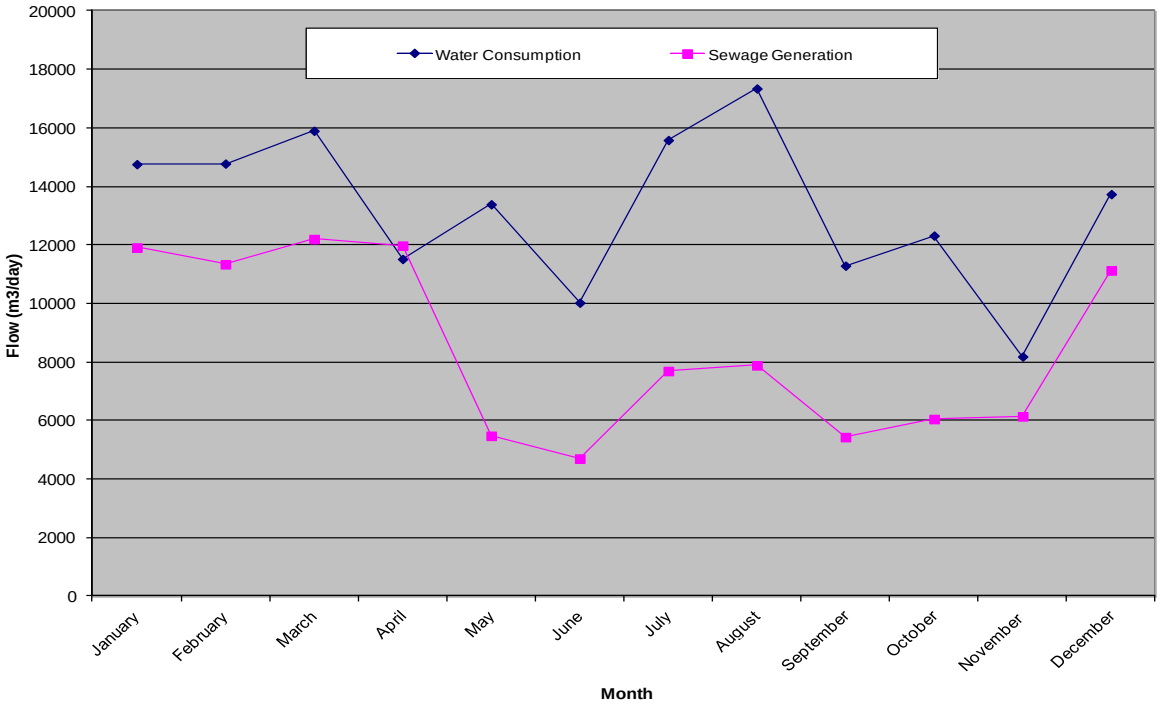
Note that in general, there is an overall decreasing trend in % of return flow vs total water usage since 2007. The percent sewage flow vs the water production for each year since 2007 has been plotted in Figure 5 below.

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 2018.

Figure 6
2018 Water Consumption and Sewage Generation



The impact of rainfall and snowmelt on sewage flow has decreased each year since 2007 as a result of system improvements, the use of water restrictive fixtures and the infiltration reduction program.

4.0 SEWAGE FLOW PROJECTION

This section shows projected wastewater flow for 2007 through 2018 based on current development plans and provides an estimate of remaining plant capacity as calculated and tabulated in the 2006 yearly report.

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 the last five years (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 and 2017 respectively, the correction factors were 1.20, 0.89, 1.14, 0.65, 0.76, 0.62, 0.91, 0.80, 0.81, 0.65 and 0.84 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 and 2019 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 license 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.

The 27 lots from Phase 1 were registered and eleven of the lots have been sold. None of the lots have been tied in to the sewer system yet; however, two of the lots are under construction and it is anticipated they will be tied in later this year. There are two newly built single family homes, two homes under construction and a final lot to be ready later this year located in the Snow Pines development.

Based on the 2018 flow data, the plant has an unused capacity of 593 m^3/day due to the flow saving measures. This still needs to be closely monitored during 2019 and further considered when adding additional development.

Table 4
Projected Peak Flows: 2007-2019

	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
Estimated Wastewater Flow (m^3/day)	1344.5
Actual and Corrected (m^3/day)	1102.6 (b)

(a) actual peak flow

(b) corrected daily peak flows by the averaged correction faction for 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 and correction factor

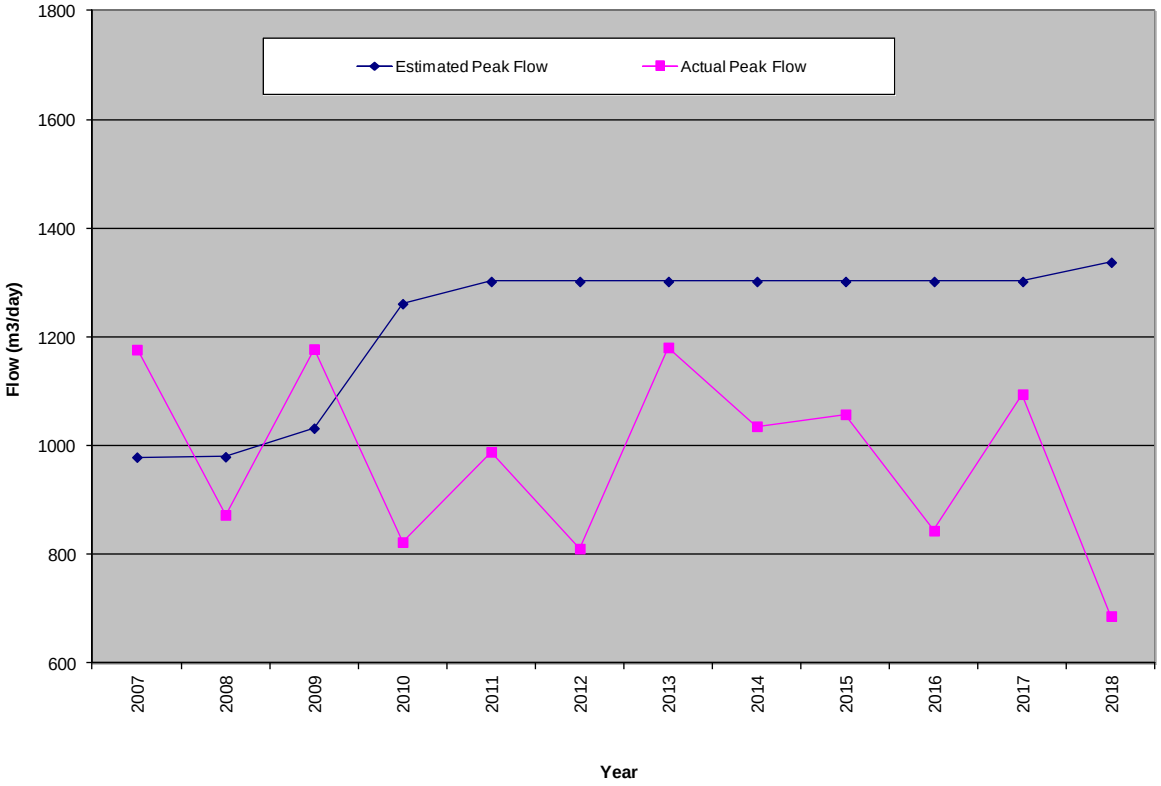
2007	correction factor of	1177/979.2 = 1.20
2008	"	873/979.9 = 0.89
2009		1178/1032.4 = 1.14
2010		823/1261.4 = 0.65
2011		989/1302.3 = 0.76
2012		811*/1302.3 = 0.62
2013		1181/1302.3 = 0.91
2014		1036/1302.3 = 0.80
2015		1058/1302.3 = 0.81
2016		844/1302.3 = 0.65
2017		1095/1302.3 = 0.84
2018		687/1337.6 = 0.51
	AVERAGE	**= 0.82**

*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.

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

Figure 7
Estimated vs Actual Peak Flows (Historical)



5.0 OVERVIEW OF ELK RIVER SAMPLE RESULTS

This section provides data and analysis for the Elk River samples taken during 2018.

Table 5 provides a summary record of the Elk River test results for the time period from January 4th, 2018 to December 27th, 2018.

No significant changes were observed in ammonia, pH, phosphorous or nitrogen concentrations during any of the river sample periods. 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.

Slightly elevated TSS was observed at the outfall on March 28th and April 11th. The levels in the corresponding up-stream and down-stream samples as well as the effluent samples were very low on the corresponding days.

High levels of nitrate-n (34.6 mg/L) were observed at the outfall on April 4th. The levels of nitrate-n up-stream and down-stream were significantly lower (2.20 mg/L and 2.27 mg/L) on the same day. The level of nitrate-n in the effluent on April 4th was 34.4 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.

Elevated levels of coliforms were observed on March 21st and December 27th. Elevated coliforms were also found in the plant effluent on March 21st. While the coliform levels at the outfall were elevated on March 21st, however, the results of the down-steam sample were lower than the levels in the up-stream sample on the same day. The results of coliforms in the plant effluent on December 27th were less than the levels found at the outfall of the Elk River. The results from the up-stream and down-stream samples were below laboratory detection limits on the same day.

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.

Table 5
2018 Elk River Sample Results

Sample Date	NH_3			Ortho-P			Coliform			Total P mg/L		
(yyyy-mm-dd)	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2018-01-17	0.05	0.05	0.05	0.010	0.012	0.010	1	2	1	0.020	0.020	0.020
2018-01-25	0.05	0.05	0.05	0.010	0.010	0.010	1	1	4	0.020	0.020	0.020
2018-02-01	0.05	0.05	0.05	0.010	0.073	0.010	1	1	5	0.020	0.088	0.020
2018-03-14	0.05	0.05	0.05	0.010	0.172	0.010	3	1	1	0.175	0.020	0.020
2018-03-21	0.05	0.05	0.05	0.010	0.111	0.010	18	91	9	0.020	0.116	0.020
2018-03-28	0.05	0.05	0.05	0.010	0.071	0.010	5	21	4	0.020	0.086	0.020
2018-04-04	0.05	0.05	0.05	0.010	0.182	0.010	1	5	1	0.020	0.220	0.020
2018-04-11	0.05	0.05	0.05	0.010	0.010	0.010	11	3	22	0.020	0.023	0.020
2018-04-18	0.05	0.05	0.05	0.010	0.013	0.010	1	30	2	0.020	0.022	0.020
2018-12-05	0.05	0.05	0.05	0.011	0.037	0.010	1	5	1	0.005	0.005	0.005
2018-12-12	0.06	0.05	0.05	0.010	0.020	0.020	1	11	1	0.005	0.011	0.005
2018-12-19	0.05	0.05	0.05	0.005	0.022	0.005	3	21	6	0.020	0.028	0.020
2018-12-27	0.05	0.05	0.05	0.009	0.023	0.011	1	59	1	0.005	0.018	0.005
# Samples	13	13	13	13	13	13	13	13	13	13	13	13
Average	0.05	0.05	0.05	0.010	0.058	0.010	4	19	4	0.028	0.052	0.017
Maximum	0.06	0.05	0.05	0.011	0.182	0.020	18	91	22	0.175	0.220	0.020
Minimum	0.05	0.05	0.05	0.005	0.010	0.005	1	1	1	0.005	0.005	0.005

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
2018-01-17	3.3	3.3	4.0	8.32	8.25	8.20	2.01	0.32	10.10	0.01	0.01	0.05
2018-01-25	4.7	3.0	4.7	8.35	8.25	8.36	1.95	1.66	1.97	0.01	0.01	0.01
2018-02-01	4.0	3.0	4.7	8.46	8.28	8.45	1.79	9.09	1.83	0.01	0.01	0.01
2018-03-14	5.7	3.0	5.0	8.40	8.27	8.42	1.89	14.80	1.91	0.01	0.01	0.01
2018-03-21	3.0	6.0	3.3	8.31	8.18	8.32	2.01	2.80	2.03	0.01	0.01	0.01
2018-03-28	4.7	13.3	3.3	8.25	8.05	8.25	2.09	5.95	2.16	0.01	0.01	0.01
2018-04-04	3.0	3.0	3.0	8.38	8.04	8.40	2.20	34.60	2.27	0.01	0.01	0.01
2018-04-11	7.7	11.0	9.0	8.37	8.22	8.34	1.73	0.23	1.87	0.01	0.01	0.01
2018-04-18	5.3	6.7	7.3	8.38	8.28	8.38	1.57	0.20	1.73	0.01	0.01	0.01
2018-12-05	3.0	3.0	4.0	8.44	8.34	8.43	1.68	2.52	1.66	0.01	0.01	0.01
2018-12-12	4.7	3.0	3.0	5.56	4.88	8.32	2.10	0.12	2.08	0.01	0.01	0.01
2018-12-19	3.0	6.0	3.0	8.41	8.25	8.39	1.88	0.17	1.73	0.01	0.01	0.01
2018-12-27	3.0	3.0	3.0	8.35	8.20	8.33	1.91	0.28	1.86	0.01	0.01	0.01
# Samples	13	13	13	13	13	13	13	13	13	13	13	13
Average	4.2	5.2	4.4	8.15	7.96	8.35	1.91	5.60	2.55	0.01	0.01	0.01
Maximum	7.7	13.3	9.0	8.46	8.34	8.45	2.20	34.60	10.10	0.01	0.01	0.05
Minimum	3.0	3.0	3.0	5.56	4.88	8.20	1.57	0.12	1.66	0.01	0.01	0.01

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

6.0 OVERVIEW OF INFLUENT TEST RESULTS

This section provides data and analysis for the plant influent (raw sewage) samples taken during 2018.

Table 6 provides a summary record of the influent test results for the period January 4th, 2018 to December 27th, 2018.

Table 6
2018 Influent Results

Date	2018 Influent Results Summary					
	Flow	Temp	pH	TSS	BOD	COD
(yyyy/mm/dd)	m^3/d	C		mg/L	mg/L	mg/L
2018-01-04	482	-8.0	7.53	306.0	237.0	-
2018-01-10	343	-12.0	7.69	136.0	114.0	-
2018-01-17	226	-3.0	7.88	254.0	234.0	-
2018-01-25	288	0.0	8.11	176.0	117.0	-
2018-02-01	485	-7.0	8.03	148.0	103.0	-
2018-03-14	360	-5.0	8.00	238.0	99.0	-
2018-03-21	325	0.0	7.87	196.0	83.0	-
2018-03-28	492	2.0	7.51	113.0	97.0	-
2018-04-04	261	-6.0	8.16	194.0	143.0	-
2018-04-11	344	3.0	7.97	66.3	37.0	-
2018-04-18	486	2.0	8.17	45.3	28.9	-
2018-05-23	131	11.0	8.20	75.2	65.0	-
2018-07-26	312	18.0	7.77	238.0	149.0	-
2018-08-16	234	11.0	7.86	167.0	86.0	-
2018-10-25	154	11.0	8.06	61.0	39.0	-
2018-12-05	152	-8.0	7.89	66.7	42.0	-
2018-12-12	220	0.0	9.79	48.0	42.0	-
2018-12-19	519	0.0	7.72	98.8	65.0	-
2018-12-27	517	-9.0	7.34	298.0	157.0	-
# Samples	19	19	19	19	19	0
Average	333	0.0	8.0	154.0	102.0	-
High	519	18	10	306	237	0
Low	131	-12	7	45	29	0

A total of 19 BOD and TSS samples were analyzed. Inlet BOD ranged from 28.9 mg/l to 237.0 mg/L with an average of 102.0 mg/L. The average influent sewage strength was measured at 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 waste water BOD is in the range of 250 mg/L, it is assumed that the average BOD is still below the expected level.

7.0 OVERVIEW OF EFFLUENT RESULTS

This section provides data and analysis for the effluent (treated) samples and plant flows for 2018.

A total of 384 effluent samples were collected and analyzed for TSS, 19 out of 384 samples were laboratory tested for BOD5, ortho phosphate, total phosphate, fecal coliforms and 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 2018.

Table 7
2018 Effluent Results

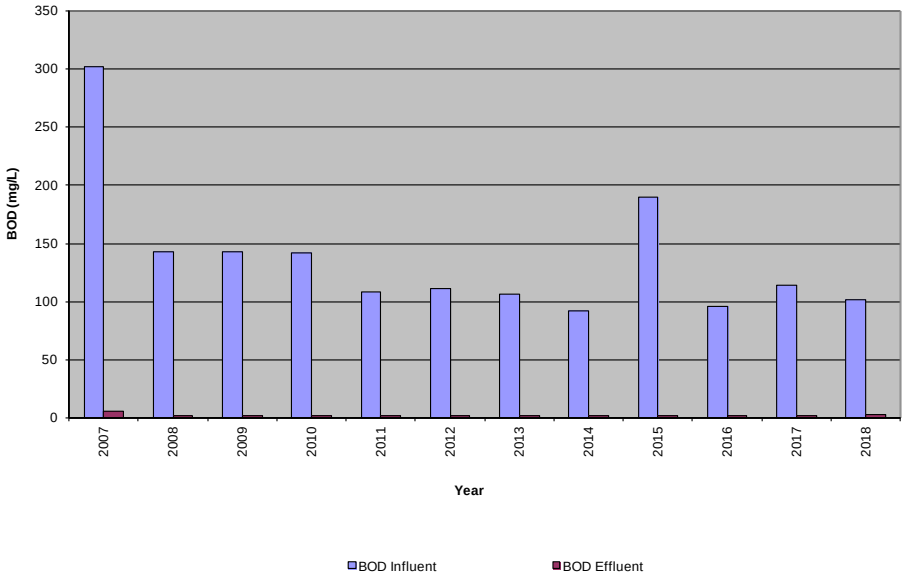
Date	2018 Effluent Results Summary											
	Flow	Temp	NH_3-N	BOD	COD	P-OP04	Coliforms	Total P	TSS	pH	NO_3-N	NO_2-N
(yyyy/mm/dd)	m^3/d	C	mg/L	mg/L	mg/L	mg/L	cfu/100ml	mg/L	mg/L		mg/L	mg/L
2018-01-04	460	-8.0	0.052	4.7	35	0.362	800	0.626	4.0	7.52	40.6	0.034
2018-01-10	355	-12.0	0.050	2.0	16	0.220	11	0.279	3.0	7.97	36.6	0.050
2018-01-17	244	-3.0	0.050	2.0	10	0.079	2	0.099	3.0	7.97	35.1	0.050
2018-01-25	300	0.0	0.050	2.0	12	0.090	7	0.097	3.0	7.98	36.2	0.050
2018-02-01	494	-7.0	0.050	2.0	12	0.196	1	0.225	4.0	8.06	29.2	0.050
2018-03-14	380	-5.0	0.050	2.0	10	0.270	2	0.282	3.0	8.04	35.0	0.050
2018-03-21	350	0.0	0.050	2.0	17	0.703	800	0.751	3.0	7.97	14.3	0.050
2018-03-28	513	2.0	0.050	2.0	13	0.485	48	0.537	3.0	7.64	34.2	0.050
2018-04-04	280	-6.0	0.050	2.0	16	0.184	1	0.207	3.0	8.06	34.4	0.075
2018-04-11	364	3.0	0.050	2.0	10	0.205	1	0.223	3.0	8.08	25.3	0.050
2018-04-18	503	2.0	0.050	2.0		0.220	17	0.248	3.0	8.27	11.4	0.050
2018-05-23	132	11.0	0.050	2.0	-	0.166	1	0.382	3.0	8.08	35.7	0.050
2018-07-26	341	18.0	0.050	2.0	-	0.225	9	0.305	3.0	7.90	18.1	0.050
2018-08-16	250	11.0	0.050	4.1	-	0.184	6	0.295	3.0	8.33	17.9	0.015
2018-10-25	143	11.0	0.050	2.0	-	0.269	1	0.380	3.0	8.32	2.0	1
2018-12-05	187	-8.0	0.050	2.0	10	0.132	1	0.005	3.0	8.22	21.4	0.021
2018-12-12	193	0.0	0.050	2.0	10	0.152		0.219	3.0	8.00	27.9	0.050
2018-12-19	534	0.0	0.050	2.0	10	0.335	6	0.445	3.0	8.09	21.2	0.010
2018-12-27	517	-9.0	0.050	2.0	18	0.262	48	0.335	3.0	7.83	31.3	0.010
# Samples	19	19	19	19	15	19	19	19	19	19	19	19
Average	344	0	0.05	2.3	14	0.249	98	0.3	3	8.02	26.7	0.09
High	534	18	0.05	4.7	35	0.703	800	0.8	4	8.33	40.6	1.00
Low	132	-12	0.05	2.0	10	0.079	1	0.0	3	7.52	2.0	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	1	2	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

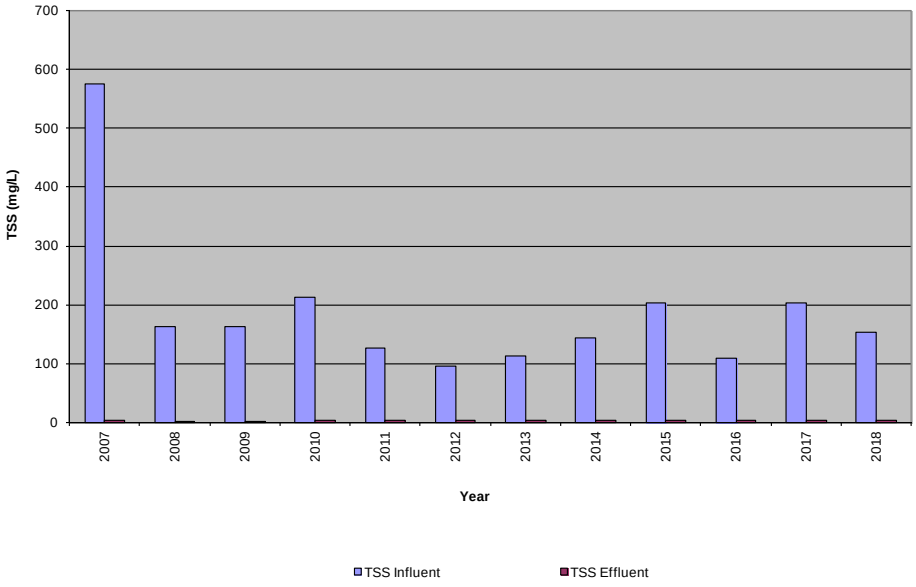
The average BOD in the effluent was 2.3 mg/L, which was similar to the previous years. Historically, the average BOD was <2.0 mg/L in 2016, 2014, 2013, 2012, 2011, 2010, 2009 and it was 2.2 mg/L in 2015.

Figure 8
Historical BOD Test Results for Influent vs Effluent



Laboratory tests indicated TSS samples averaged <3.0 mg/L with all but two of the results being below laboratory detection limits. The plant measured TSS on a daily basis. All the results measured at the plant were below the discharge limit. The highest result measured at the plant was recorded on February 20th at 2.8 mg/L with an average throughout the year of 0.2 mg/L. The plant provides excellent BOD_5 and TSS treatment with average removals of 100%.

Figure 9
Historical TSS Test Results for Influent vs Effluent



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 for the year for all but two days. The levels of coliforms were 800 cfu/100 mL on January 4th and March 21st and the levels exceeded the acceptable limit. The results for the weeks following the elevated results were low (11 cfu/100 mL and 48 cfu/100 mL respectively) and well below the acceptable limit of 200 cfu/100 mL for recreational water. The levels of coliforms were not tested in the Elk River on January 4th; however, they were tested in the Elk River on March 21st. The results on March 21st were slightly elevated (18 cfu/100 mL upstream, 91 cfu/100 mL at the outfall and 9 cfu/100 mL at the down-stream) with respect to the other weeks; however the results were well below the acceptable limit for recreational water indicating there were no measurable impact of the effluent discharge on the river.

Effluent ammonia concentrations are consistently low. 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 2018 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
2017/12/27*	Pass
2018/04/25	Pass
2018/12/27	Pass

*Please note two trout tests were completed in the calendar year for 2018; however, one test was completed at the very end of December 2017. As the test was close to the 2018 year, it was included in both the 2017 report and this report.

The level of ortho phosphorus exceeded the allowable limit on March 21st at 0.703 mg/L vs the allowable limit of 0.5 mg/L. All the other ortho phosphorus results were below the allowable limit. All the total phosphorus levels were below the discharge limits for 2018.

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
2018 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m^3/day	1280	365	288	687	0
BOD_5	mg/l	45	19	2.3	4.7	0
TSS	mg/l	45	384	1.6	4.0	0
Total Phosphorous	mg/l	1	19	0.3	0.8	0
Ortho Phosphate	mg/l	0.5	19	0.249	0.703	1
Fecal Coliforms*	cfu/100ml	200	19	98	800	2
96 hr LC_{50} Bioassay	/	Non-toxic	3.0	/	/	0

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

Coliforms exceeded the allowable limit on two days and ortho phosphorus exceeded the allowable limit on one day for 2018. All the remaining parameters were below the discharge limits for 2018.

8.0 SLUDGE PRODUCTION AND DISPOSAL

This section provides data regarding the disposal of bio-solids (sludge) from the treatment facility in 2018.

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
2018 Bagged Solids Data

Month	Vol. Bagged (m^3)
January	112.9
February	166.2
March	185.3
April	151.5
May	103.1
June	85.0
July	95.9
August	108.3
September	174.2
October	101.3
November	43.7
December	116.6
Total	**1,444.0**

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 2018.

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 2018.

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 RCR will continue along with minimization of the potable water use ie clear well water will be used to spray down the clarifiers instead of potable water.

There were no major plant improvements in 2018.

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 phosphours 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 phosphours 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.

Figure 10
Total Phosphorus Levels 2007-2018

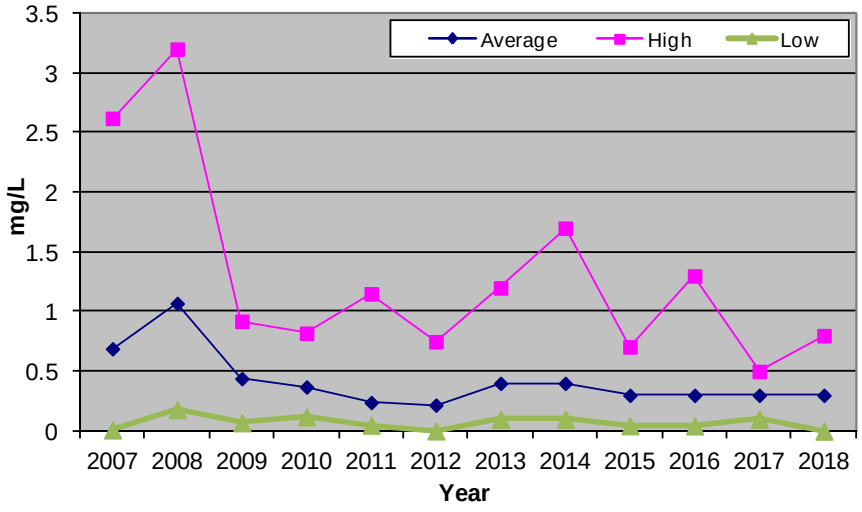


Figure 11
Ortho Phosphorus Levels 2007-2018

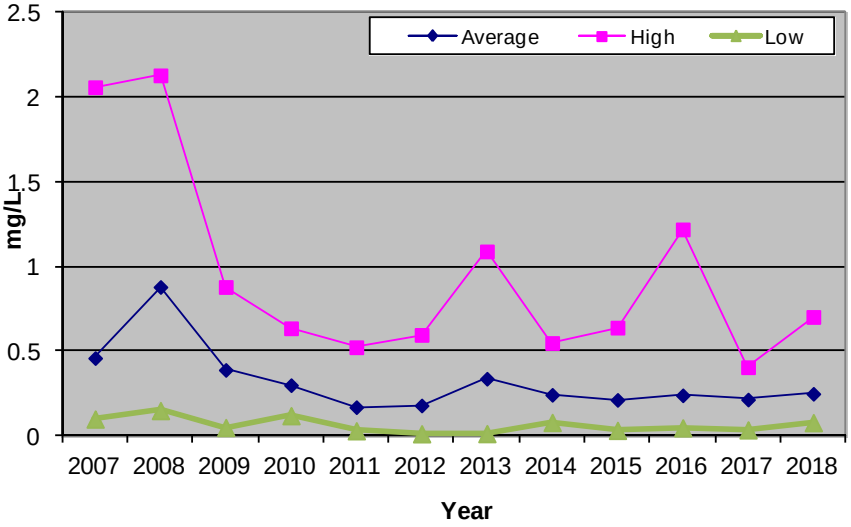
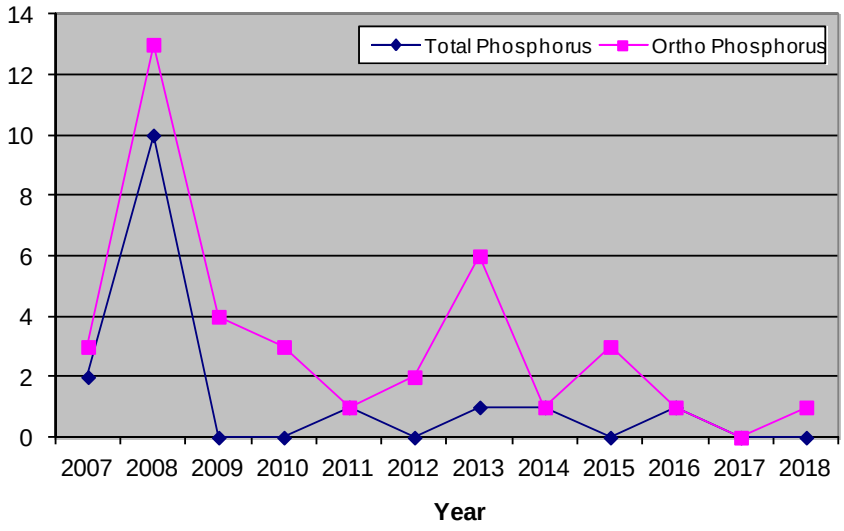


Figure 12
Days over Limit 2007-2018



12.0 ASSESSMENT SUMMARY

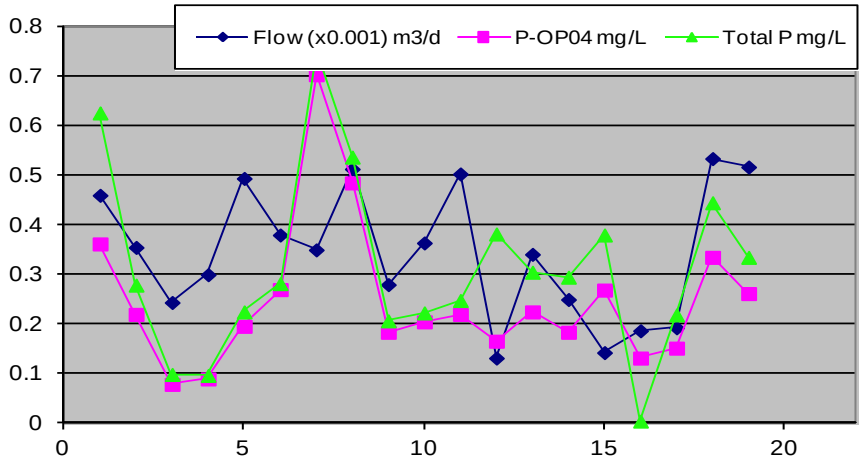
The plant has produced high quality effluent with BOD_5 normally below the regulated limit of 45 mg/l and for all but two instances, the results were less than 2 mg/L (on January 4th, BOD was measured at 4.7 mg/L and on August 16th, BOD was measured at 4.1 mg/L). TSS was less than laboratory detection limit for all but two samples (on January 4th and February 2nd, TSS was measured at 4.0 and mg/L). Both TSS and BOD were below the MSR limits.

Nitrogen (ammonia-n, nitrate-n and nitrite-n) results indicate that the plant functioned well again in 2018.

Generally, elevated coliform levels in the effluent did coincide with elevated levels found in Elk River at the outfall; however the levels in the down-stream sample was less than the up-stream sample on the same day. High levels of TSS were found in Elk River on March 28th and April 11th. The levels in the effluent were below laboratory detection limits on same days. Elevated levels of nitrate were also found in the Elk River on two occasions and low levels were found in the effluent on the same days. There does not appear to be any adverse impacts to the Elk River from the effluent discharged.

The results for coliforms exceeded the discharge limits on January 4th and March 21st and the result for ortho phosphorus exceeded the discharge limits on March 21st. All the remaining parameters were below the discharge limits for 2018.

Figure 13
Total Flow and Phosphorus Levels



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.

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 capacity in the WWTP for the first phase of development but likely an increase to the maximum allowable daily discharge will be required for 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 1760m³. In order to utilize this capacity, a license amendment to increase the maximum daily flow from 1280 m³ to 1760 m³ will be required. The facility operators will have to monitor flows closely and ensure this application happens in a timely fashion.

13.0 AUTHORITIZATION AND CLOSING

This report, titled *2018 Sewage Treatment Plant Annual Report,* was prepared for FARUC by Environmental Diagnostics Inc. The material in this report reflects the best judgement of Environmental Diagnostics 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. Environmental Diagnostics 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.

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J:jobs/water/2019/W28001/Fernie/Wastewater/2018Annual Report

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)
Griz Inn	1136	45	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
Cornerstone	1136	26	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
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
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
	Subtotal	**246**	**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)
Timberline Infills	1022	141	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
Timberline Infills	1022	106	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
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
Highline Infill	1022	26	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**

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)
Single Family	1363	54	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	73.6
Duplexes	1363	10	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
Parcel 32-Duplex	1363	16	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
Parcel 37-Townhouses	1363	8	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
Parcel 3-Condominium	1363	12	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
	Subtotal	**327**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**269.5**	**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)
Skiers	36	700	252	252	252	252	252	252	252	252	252
	Subtotal	**700**	**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)
Lizard Creek - Dining	97	54.7	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
Kelseys - Dining	97	204.4	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
Daylodge - Dining	97	358.6	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
Mean Bean	97	26.8	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
Powder House Inn	97	232.2	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
	Subtotal	**1439**	**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
Corrected Daily Peak Flow Projections**	989 (actual)	811***(actual)	1181 (actual)	1036 (actual)	1058 (actual)	844 (actual)	1095 (actual)	687 (actual)	1102.6 (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

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 (ppm)
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: 14-DEC-17
Report Date: 20-DEC-17 14:44 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2035300

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 1
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2035300-1 WWTP INFLUENT							
Sampled By: HB on 13-DEC-17 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	72	DLHC	70	mg/L		14-DEC-17	R3916764
Total Suspended Solids	114	DLHC	6.0	mg/L		18-DEC-17	R3916119
pH	7.83		0.10	pH		14-DEC-17	R3913876
L2035300-2 WWTP EFFLUENT							
Sampled By: HB on 13-DEC-17 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		14-DEC-17	R3913494
Biochemical Oxygen Demand	<2.0		2.0	mg/L		14-DEC-17	R3916764
Chemical Oxygen Demand	15		10	mg/L		15-DEC-17	R3914319
Orthophosphate-Dissolved (as P)	0.399		0.010	mg/L		15-DEC-17	R3913925
Coliform Bacteria - Fecal	<1		1	CFU/100mL		14-DEC-17	R3914265
Phosphorus (P)-Total	0.430		0.020	mg/L	15-DEC-17	16-DEC-17	R3914585
Total Suspended Solids	<3.0		3.0	mg/L		18-DEC-17	R3916119
pH	7.88		0.10	pH		14-DEC-17	R3913876
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	31.5	DLHC	0.10	mg/L		15-DEC-17	R3914494
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	31.5		0.11	mg/L		18-DEC-17	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		15-DEC-17	R3914494
L2035300-3 ELKRIVER UPSTREAM							
Sampled By: HB on 13-DEC-17 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		14-DEC-17	R3913494
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		15-DEC-17	R3913925
Coliform Bacteria - Fecal	7		1	CFU/100mL		14-DEC-17	R3914265
Phosphorus (P)-Total	<0.020		0.020	mg/L	15-DEC-17	16-DEC-17	R3914585
Total Suspended Solids	<3.0		3.0	mg/L		18-DEC-17	R3916119
pH	8.32		0.10	pH		14-DEC-17	R3913876
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	1.87		0.020	mg/L		15-DEC-17	R3914494
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.87		0.050	mg/L		18-DEC-17	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-DEC-17	R3914494
L2035300-4 ELKRIVER OUTFALL							
Sampled By: HB on 13-DEC-17 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		14-DEC-17	R3913494
Orthophosphate-Dissolved (as P)	0.014		0.010	mg/L		15-DEC-17	R3913925
Coliform Bacteria - Fecal	<1		1	CFU/100mL		14-DEC-17	R3914265
Phosphorus (P)-Total	<0.020		0.020	mg/L	15-DEC-17	16-DEC-17	R3914585
Total Suspended Solids	<3.0		3.0	mg/L		18-DEC-17	R3916119

* 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
L2035300-4 ELKRIVER OUTFALL							
Sampled By: HB on 13-DEC-17 @ 14:45							
Matrix: WATER							
pH	8.06		0.10	pH		14-DEC-17	R3913876
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	0.331		0.020	mg/L		15-DEC-17	R3914494
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.331		0.050	mg/L		18-DEC-17	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-DEC-17	R3914494
L2035300-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 13-DEC-17 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		14-DEC-17	R3913494
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		15-DEC-17	R3913925
Coliform Bacteria - Fecal	32		1	CFU/100mL		14-DEC-17	R3914265
Phosphorus (P)-Total	<0.020		0.020	mg/L	15-DEC-17	16-DEC-17	R3914585
Total Suspended Solids	<3.0		3.0	mg/L		18-DEC-17	R3916119
pH	8.31		0.10	pH		14-DEC-17	R3913876
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	1.90		0.020	mg/L		15-DEC-17	R3914494
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.90		0.050	mg/L		18-DEC-17	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-DEC-17	R3914494

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-BC-IC-CL	Water	Nitrite in Water by IC	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrite is detected by UV absorbance.

NO3-BC-IC-CL	Water	Nitrate (as N)	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrate is detected by UV absorbance.

P-T-COL-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

ALS Environmental
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Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 F
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-
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: 1-8
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

L2035300-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	1 - 800 - 258 - 7669	FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke	
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 1		QUOTE NO:		
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H/ ☒ F M A + ☐ F ☐ F ☒ P ☐ ( )		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	2017– 12 – 13	14:00	Water		X	X								temp = 6.0 C
1	WWTP Influent BOD	2	2017– 12 – 13	14:00	Water									X		temp = C
2	WWTP Effluent Routine	3	2017– 12 – 13	14:15	Water		X	X							X	temp = C
2	WWTP Effluent BOD	4	2017– 12 – 13	14:15	Water									X		temp = 11.0 C
2	WWTP Effluent Nutrient	5	2017– 12 – 13	14:15	Water				X	X	X	X	X			temp = C
2	WWTP Effluent Bacti	6	2017– 12 – 13	14:15	Water	X										temp = C
3	Elkriver Upstram Routine	7	2017– 12 – 13	14:30	Water		X	X								temp = C
3	Elkriver Upstream Nutrient	8	2017– 12 – 13	14:30	Water				X	X	X	X	X			temp = 0.7 C
3	Elkriver Upstream Bacti	9	2017– 12 – 13	14:30	Water	X										temp = C
4	Elkriver Outfall Routine	10	2017– 12 – 13	14:45	Water		X	X								temp = C
4	Elkriver Outfall Nutrient	11	2017– 12 – 13	14:45	Water				X	X	X	X	X			temp = 0.1 C
4	Elkriver Outfall Bacti	12	2017– 12 – 13	14:45	Water	X										temp = C
5	Elkriver downstream Routine	13	2017– 12 – 13	15:00	Water		X	X								temp = C
5	Elkriver downstream Nutrient	14	2017– 12 – 13	15:00	Water				X	X	X	X	X			temp = -0.3 C
5	Elkriver downstream Bacti	15	2017– 12 – 13	15:00	Water	X										temp = C

Ambient air temp -5°C

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ R(◊ R	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2017– 12– 13 TIME: 5:00 pm	RECEIVED BY: DATE: 12/14/2017 TIME: 9:06
SEND INVOICE TO:	☒ SAM DIFFERE		RELINQUISHED BY:	DATE: TIME:	RECEIVED BY: DATE: TIME:
INVOICE FORMAT:	☐ A ☐				
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? X Yes ___ No ___ N/A	Sample Temperature: 2 °C Frozen? X Yes ___ No	Cooling Method? X Icepacks ___ Ice ___ None

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

Date Received: 22-DEC-17
Report Date: 03-JAN-18 16:45 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2038730

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 2
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2038730-1 WWTP INFLUENT							
Sampled By: HB on 20-DEC-17 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	153	DLHC	75	mg/L		22-DEC-17	R3921889
Total Suspended Solids	248	DLHC	9.0	mg/L		27-DEC-17	R3922275
pH	7.81		0.10	pH		23-DEC-17	R3919263
L2038730-2 WWTP EFFLUENT							
Sampled By: HB on 20-DEC-17 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Biochemical Oxygen Demand	<2.0		2.0	mg/L		22-DEC-17	R3921889
Chemical Oxygen Demand	<10		10	mg/L		02-JAN-18	R3928227
Orthophosphate-Dissolved (as P)	0.325		0.010	mg/L		23-DEC-17	R3918968
Coliform Bacteria - Fecal	1		1	CFU/100mL		22-DEC-17	R3923816
Phosphorus (P)-Total	0.337		0.020	mg/L	29-DEC-17	30-DEC-17	R3925591
Total Suspended Solids	<3.0		3.0	mg/L		27-DEC-17	R3922275
pH	8.08		0.10	pH		23-DEC-17	R3919263
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	35.7	DLHC	0.10	mg/L		22-DEC-17	R3927009
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	35.7		0.11	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		22-DEC-17	R3927009
L2038730-3 ELKRIVER UPSTEAM							
Sampled By: HB on 20-DEC-17 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	0.023		0.010	mg/L		23-DEC-17	R3918968
Coliform Bacteria - Fecal	<1		1	CFU/100mL		22-DEC-17	R3923816
Phosphorus (P)-Total	<0.020		0.020	mg/L	29-DEC-17	30-DEC-17	R3925591
Total Suspended Solids	<3.0		3.0	mg/L		27-DEC-17	R3922275
pH	8.51		0.10	pH		23-DEC-17	R3919263
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	1.98		0.020	mg/L		22-DEC-17	R3927009
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.98		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-17	R3927009
L2038730-4 ELKRIVER OUTFALL							
Sampled By: HB on 20-DEC-17 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	0.025		0.010	mg/L		23-DEC-17	R3918968
Coliform Bacteria - Fecal	<1		1	CFU/100mL		22-DEC-17	R3923816
Phosphorus (P)-Total	0.026		0.020	mg/L	29-DEC-17	30-DEC-17	R3925591
Total Suspended Solids	<3.0		3.0	mg/L		27-DEC-17	R3922275

* 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
L2038730-4 ELKRIVER OUTFALL							
Sampled By: HB on 20-DEC-17 @ 14:45							
Matrix: WATER							
pH	8.46		0.10	pH		23-DEC-17	R3919263
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	2.63		0.020	mg/L		22-DEC-17	R3927009
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.63		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-17	R3927009
L2038730-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 20-DEC-17 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		23-DEC-17	R3918968
Coliform Bacteria - Fecal	1		1	CFU/100mL		22-DEC-17	R3923816
Phosphorus (P)-Total	<0.020		0.020	mg/L	29-DEC-17	30-DEC-17	R3925591
Total Suspended Solids	4.7		3.0	mg/L		27-DEC-17	R3922275
pH	8.44		0.10	pH		23-DEC-17	R3919263
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	2.03		0.020	mg/L		22-DEC-17	R3927009
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.03		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-17	R3927009

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

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
EXTEMP10	11C - Samples Received with temperature >10 Degrees C
EHR	FCC - Exceeded Recommended Holding Time prior to receipt at the lab.

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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-BC-IC-CL	Water	Nitrite in Water by IC	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrite is detected by UV absorbance.

NO3-BC-IC-CL	Water	Nitrate (as N)	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrate is detected by UV absorbance.

P-T-COL-ED	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-ED	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.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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.

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Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 25
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-6
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-66
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-

L2038730-COFC

CHAIN OF CUSTODY FORM

PAGE

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 2 #15			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H/ ☒ EMAIL ☐ F ☐ F ☒ P ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

Ambient air - -4°C

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	2017– 12 – 20	14:00	Water		X	X								temp = 10.5 °C
	WWTP Influent BOD	2	2017– 12 – 20	14:00	Water									X		temp = C
2	WWTP Effluent Routine	3	2017– 12 – 20	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2017– 12 – 20	14:15	Water									X		temp = 11.5 °C
	WWTP Effluent Nutrient	5	2017– 12 – 20	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2017– 12 – 20	14:15	Water	X										temp = C
3	Elkriver Upstram Routine	7	2017– 12 – 20	14:30	Water		X	X								temp = 0.6 °C
	Elkriver Upstream Nutrient	8	2017– 12 – 20	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	9	2017– 12 – 20	14:30	Water	X										temp = C
4	Elkriver Outfall Routine	10	2017– 12 – 20	14:45	Water		X	X								temp = 0.8 °C
	Elkriver Outfall Nutrient	11	2017– 12 – 20	14:45	Water				X	X	X	X	X			temp = C
	Elkriver Outfall Bacti	12	2017– 12 – 20	14:45	Water	X										temp = C
5	Elkriver downstream Routine	13	2017– 12 – 20	15:00	Water		X	X								temp = 0.5 °C
	Elkriver downstream Nutrient	14	2017– 12 – 20	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti	15	2017– 12 – 20	15:00	Water	X										temp = C

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ R(◊ R	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2017-12-20	RECEIVED BY:	DATE: 22-Dec-17
SEND INVOICE TO:	☒ SAME DIFFERE		HUNGRY BAYTALUKE	TIME: 5:00 pm	MM	TIME: 9:20
INVOICE FORMAT:	☐ H/ ☐ P ☐		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: 11 °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: 28-DEC-17
Report Date: 05-JAN-18 15:55 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2039659

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 3
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2039659-1 WWTP INFLUENT							
Sampled By: HB on 27-DEC-17 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	267		2.0	mg/L		29-DEC-17	R3928698
Total Suspended Solids	380	DLHC	15	mg/L		02-JAN-18	R3928051
pH	7.93		0.10	pH		29-DEC-17	R3925307
L2039659-2 WWTP EFFLUENT							
Sampled By: HB on 27-DEC-17 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Biochemical Oxygen Demand	<2.0		2.0	mg/L		29-DEC-17	R3928698
Chemical Oxygen Demand	16		10	mg/L		05-JAN-18	R3929399
Orthophosphate-Dissolved (as P)	0.173		0.010	mg/L		29-DEC-17	R3925095
Coliform Bacteria - Fecal	64		1	CFU/100mL		28-DEC-17	R3926968
Phosphorus (P)-Total	0.213		0.020	mg/L	02-JAN-18	03-JAN-18	R3928417
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-18	R3928051
pH	8.20		0.10	pH		29-DEC-17	R3925307
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	45.0	HTD	0.10	mg/L		03-JAN-18	R3927696
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	45.0		0.10	mg/L		03-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-17	R3927696
L2039659-3 ELKRIVER UPSTREAM							
Sampled By: HB on 27-DEC-17 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		29-DEC-17	R3925095
Coliform Bacteria - Fecal	1		1	CFU/100mL		28-DEC-17	R3926968
Phosphorus (P)-Total	<0.020		0.020	mg/L	02-JAN-18	03-JAN-18	R3928417
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-18	R3928051
pH	7.68		0.10	pH		29-DEC-17	R3925307
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	2.03		0.020	mg/L		28-DEC-17	R3927696
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.03		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-17	R3927696
L2039659-4 ELKRIVER OUTFALL							
Sampled By: HB on 27-DEC-17 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	0.091		0.010	mg/L		29-DEC-17	R3925095
Coliform Bacteria - Fecal	21		1	CFU/100mL		28-DEC-17	R3926968
Phosphorus (P)-Total	0.114		0.020	mg/L	02-JAN-18	03-JAN-18	R3928417
Total Suspended Solids	4.0		3.0	mg/L		02-JAN-18	R3928051

* 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
L2039659-4 ELKRIVER OUTFALL							
Sampled By: HB on 27-DEC-17 @ 14:45							
Matrix: WATER							
pH	7.88		0.10	pH		29-DEC-17	R3925307
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	21.3		0.020	mg/L		28-DEC-17	R3927696
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	21.3		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	0.013		0.010	mg/L		28-DEC-17	R3927696
L2039659-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 27-DEC-17 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		30-DEC-17	R3925667
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		29-DEC-17	R3925095
Coliform Bacteria - Fecal	<1		1	CFU/100mL		28-DEC-17	R3926968
Phosphorus (P)-Total	<0.020		0.020	mg/L	02-JAN-18	03-JAN-18	R3928417
Total Suspended Solids	3.3		3.0	mg/L		02-JAN-18	R3928051
pH	8.20		0.10	pH		29-DEC-17	R3925307
NO2, NO3 (BC codes) and Sum of NO2/NO3							
Nitrate (as N)							
Nitrate (as N)	1.99		0.020	mg/L		28-DEC-17	R3927696
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.99		0.050	mg/L		02-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-17	R3927696

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-BC-IC-CL	Water	Nitrite in Water by IC	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrite is detected by UV absorbance.

NO3-BC-IC-CL	Water	Nitrate (as N)	EPA 300.0

This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrate is detected by UV absorbance.

P-T-COL-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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-
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax:
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: 1-800
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-8

L2039659-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 3			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ EXCEL ☒ PDF ☐		pmajer@skircr.com		

ANALYSIS REQUESTED:

Ambient air temp -24°C

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	2017– 12 – 27	14:00	Water		X	X								temp = 11.9 C
		WWTP Influent BOD	2	2017– 12 – 27	14:00	Water									X		temp = C
		WWTP Effluent Routine	3	2017– 12 – 27	14:15	Water		X	X							X	temp = 12.4 C
		WWTP Effluent BOD	4	2017– 12 – 27	14:15	Water									X		temp = C
		WWTP Effluent Nutrient	5	2017– 12 – 27	14:15	Water				X	X	X	X	X			temp = C
		WWTP Effluent Bacti	6	2017– 12 – 27	14:15	Water	X										temp = C
		Elkriver Upstram Routine	7	2017– 12 – 27	14:30	Water		X	X								temp = 0.3 C
		Elkriver Upstream Nutrient	8	2017– 12 – 27	14:30	Water				X	X	X	X	X			temp = C
		Elkriver Upstream Bacti	9	2017– 12 – 27	14:30	Water	X										temp = C
		Elkriver Outfall Routine	10	2017– 12 – 27	14:45	Water		X	X								temp = 2.9 C
		Elkriver Outfall Nutrient	11	2017– 12 – 27	14:45	Water				X	X	X	X	X			temp = C
		Elkriver Outfall Bacti	12	2017– 12 – 27	14:45	Water	X										temp = C
		Elkriver downstream Routine	13	2017– 12 – 27	15:00	Water		X	X								temp = C
		Elkriver downstream Nutrient	14	2017– 12 – 27	15:00	Water				X	X	X	X	X			temp = 0.2 C
		Elkriver downstream Bacti	15	2017– 12 – 27	15:00	Water	X										temp = C

TURN AROUND REQUIRED:	◉ ROUTINE	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2017-12-27	RECEIVED BY:	DATE: 28-Dec-17
SEND INVOICE TO:	☒ SAME AS REPORT ☐			HUNGRY BAYTALUKE	TIME: 5:00 pm	MM	TIME: 12:30
INVOICE FORMAT:	☐ HARDMAIL ☐ EMAIL ☐			RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
					TIME:		TIME:

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:	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: 05-JAN-18
Report Date: 13-JAN-18 11:59 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2041935

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 4
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2041935-1 WWTP INFLUENT							
Sampled By: HB on 04-JAN-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	237	DLHC	75	mg/L		05-JAN-18	R3932671
Total Suspended Solids	306	DLHC	9.0	mg/L		06-JAN-18	R3929766
pH	7.53		0.10	pH		09-JAN-18	R3932366
L2041935-2 WWTP EFFLUENT							
Sampled By: HB on 04-JAN-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.052		0.050	mg/L		08-JAN-18	R3930387
Biochemical Oxygen Demand	4.7		2.0	mg/L		05-JAN-18	R3932671
Chemical Oxygen Demand	35		10	mg/L		11-JAN-18	R3933275
Orthophosphate-Dissolved (as P)	0.362		0.010	mg/L		07-JAN-18	R3929811
Coliform Bacteria - Fecal	800	DLA	100	CFU/100mL		05-JAN-18	R3930029
Phosphorus (P)-Total	0.626		0.020	mg/L	12-JAN-18	12-JAN-18	R3933945
Total Suspended Solids	4.0		3.0	mg/L		06-JAN-18	R3929766
pH	7.52		0.10	pH		09-JAN-18	R3932366
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	40.6	HTD	0.10	mg/L		09-JAN-18	R3932016
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	40.7		0.10	mg/L		10-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	0.034		0.010	mg/L		05-JAN-18	R3932016

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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.
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
The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.			
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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

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.

Quality Control Report

Client: FERNIE ALPINE RESORT UTILITIES CORPORATION
1505 - 17TH AVENUE SW
CALGARY AB T2T 0E2
Contact: PATRICK MAJER

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-BC-CL	**Water**							
Batch R3932671								
WG2696522-2 LCS								
Biochemical Oxygen Demand			90.4		%		85-115	05-JAN-18
WG2696522-1 MB								
Biochemical Oxygen Demand			<2.0		mg/L		2	05-JAN-18
COD-T-COL-CL	**Water**							
Batch R3933275								
WG2697268-3 DUP		**L2041935-2**						
Chemical Oxygen Demand		35	38		mg/L	7.3	20	11-JAN-18
WG2697268-2 LCS								
Chemical Oxygen Demand			99.4		%		85-115	11-JAN-18
WG2697268-1 MB								
Chemical Oxygen Demand			<10		mg/L		10	11-JAN-18
WG2697268-4 MS		**L2041935-2**						
Chemical Oxygen Demand			97.2		%		70-130	11-JAN-18
FCC-MF-CL	**Water**							
Batch R3930029								
WG2695072-1 MB								
Coliform Bacteria - Fecal			<1		CFU/100mL		1	05-JAN-18
NH3-F-CL	**Water**							
Batch R3930387								
WG2695355-6 LCS								
Ammonia, Total (as N)			100.2		%		85-115	08-JAN-18
WG2695355-5 MB								
Ammonia, Total (as N)			<0.050		mg/L		0.05	08-JAN-18
NO2-IC-N-CL	**Water**							
Batch R3932016								
WG2695774-2 LCS								
Nitrite (as N)			100.0		%		90-110	05-JAN-18
WG2695774-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	05-JAN-18
NO3-IC-N-CL	**Water**							
Batch R3932016								
WG2695774-2 LCS								
Nitrate (as N)			99.3		%		90-110	05-JAN-18
WG2695774-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	05-JAN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-COL-ED	**Water**							
Batch R3933945								
WG2697655-7 DUP		**L2041935-2**						
Phosphorus (P)-Total		0.626	0.615		mg/L	1.7	20	12-JAN-18
WG2697655-10 LCS		**KONELAB_TP**						
Phosphorus (P)-Total			91.1		%		80-120	12-JAN-18
WG2697655-12 LCS		**KONELAB_TP**						
Phosphorus (P)-Total			96.8		%		80-120	12-JAN-18
WG2697655-2 LCS		**KONELAB_TP**						
Phosphorus (P)-Total			94.5		%		80-120	12-JAN-18
WG2697655-1 MB								
Phosphorus (P)-Total			<0.020		mg/L		0.02	12-JAN-18
WG2697655-11 MB								
Phosphorus (P)-Total			<0.020		mg/L		0.02	12-JAN-18
WG2697655-9 MB								
Phosphorus (P)-Total			<0.020		mg/L		0.02	12-JAN-18
WG2697655-8 MS		**L2041935-2**						
Phosphorus (P)-Total			N/A	MS-B	%		-	12-JAN-18
PH-CL	**Water**							
Batch R3932366								
WG2696239-5 LCS								
pH			7.02		pH		6.9-7.1	09-JAN-18
PO4-DO-COL-ED	**Water**							
Batch R3929811								
WG2694961-3 DUP		**L2041935-2**						
Orthophosphate-Dissolved (as P)		0.362	0.362		mg/L	0.1	20	07-JAN-18
WG2694961-2 LCS								
Orthophosphate-Dissolved (as P)			109.4		%		70-130	07-JAN-18
WG2694961-1 MB								
Orthophosphate-Dissolved (as P)			<0.010		mg/L		0.01	07-JAN-18
WG2694961-4 MS		**L2041935-2**						
Orthophosphate-Dissolved (as P)			N/A	MS-B	%		-	07-JAN-18
TSS-CL	**Water**							
Batch R3929766								
WG2694789-5 LCS								
Total Suspended Solids			106.2		%		85-115	06-JAN-18
WG2694789-4 MB								
Total Suspended Solids			<3.0		mg/L		3	06-JAN-18

Quality Control Report

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	04-JAN-18 14:00	09-JAN-18 14:00	0.25	120	hours	EHTR-FM
	2	04-JAN-18 14:15	09-JAN-18 14:00	0.25	120	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC							
	2	04-JAN-18 14:15	09-JAN-18 10:42	3	5	days	EHT

Legend & Qualifier Definitions:

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

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2041935 were received on 05-JAN-18 12:00.

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

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

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

ALS 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
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 To
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-98
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 T

L2041935-COFC

CHAIN OF COUSTODY FOR

OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION	ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East		
CITY:	CALGARY PROV: ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669 FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 4	QUOTE NO:	
PO NO.:	ALS CONTACT: Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HA ☒ EMAI pmajer@skircr.com ☐ ☐ ☒ ☐		

ANALYSIS REQUESTED:

Ambient Air Temp -10°C

WO#	SAMPLE IDENTIFICATION	DATE (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	2018 – 1 – 4	14:00	Water		X	X								temp = 13.0 C
	WWTP Influent BOD 2	2018 – 1 – 4	14:00	Water									X		temp = C
2	WWTP Effluent Routine 3	2018 – 1 – 4	14:15	Water		X	X							X	temp = 14.2 C
	WWTP Effluent BOD 4	2018 – 1 – 4	14:15	Water									X		temp = C
	WWTP Effluent Nutrient 5	2018 – 1 – 4	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti 6		14:15	Water	X										temp = C
	Elkriver Upstram Routine 7	2018 – 1 – 4	14:30	Water		X	X								temp = River C
	Elkriver Upstream Nutrient 8	2018 – 1 – 4	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti 9	2018 – 1 – 4	14:30	Water	X										temp = C
	Elkriver Outfall Routine 10	2018 – 1 – 4	14:45	Water		X	X								temp = Froze C
	Elkriver Outfall Nutrient 11	2018 – 1 – 4	14:45	Water				X	X	X	X	X			temp = C
	Elkriver Outfall Bacti 12	2018 – 1 – 4	14:45	Water	X										temp = C
	Elkriver downstream Routine 13	2018 – 1 – 4	15:00	Water		X	X								temp = Over C
	Elkriver downstream Nutrient 14	2018 – 1 – 4	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti 15	2018 – 1 – 4	15:00	Water	X										temp = C

FOR LAB USE ONLY

not rec'd Jan 05/21

TURN AROUND REQUIRED:	◉ R R SPECIFY DATE: ________ (surcharge may apply)	RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2018 – 1 – 4 TIME: 5:00 pm	RECEIVED BY:	DATE: 05/01 TIME: 12pm
SEND INVOICE TO:	☒ SAME ☐ DIFFERE	RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:
INVOICE FORMAT:	☐ HA ☐ ☐				
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: 10 °C
Frozen? __Yes ✓No
Cooling Method? ✓Icepacks __Ice __None

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

Date Received: 12-JAN-18
Report Date: 19-JAN-18 13:26 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2044250

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 5
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2044250-1 WWTP INFLUENT							
Sampled By: HB on 10-JAN-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	114	DLHC	20	mg/L		12-JAN-18	R3938519
Total Suspended Solids	136	DLHC	9.0	mg/L		15-JAN-18	R3937550
pH	7.69		0.10	pH		17-JAN-18	R3939206
L2044250-2 WWTP EFFLUENT							
Sampled By: HB on 10-JAN-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-JAN-18	R3933921
Biochemical Oxygen Demand	<2.0		2.0	mg/L		12-JAN-18	R3938519
Chemical Oxygen Demand	16		10	mg/L		16-JAN-18	R3938193
Orthophosphate-Dissolved (as P)	0.220		0.010	mg/L		13-JAN-18	R3934213
Coliform Bacteria - Fecal	11		1	CFU/100mL		12-JAN-18	R3934647
Phosphorus (P)-Total	0.279		0.020	mg/L	18-JAN-18	18-JAN-18	R3939283
Total Suspended Solids	<3.0		3.0	mg/L		15-JAN-18	R3937550
pH	7.97		0.10	pH		17-JAN-18	R3939206
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	36.6	DLHC	0.10	mg/L		12-JAN-18	R3935319
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	36.6		0.11	mg/L		15-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		12-JAN-18	R3935319

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

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client ID	Qualifier	Description
L2044250-2	WWTP EFFLUENT	EHR	FCC - Exceeded Recommended Holding Time prior to receipt at the lab.

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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ED		ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA	
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: ?
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800
Fort McMurray AB, Bay 1, 245 Mecdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 78
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-5
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free:
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-80

L2044250-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ EXCEL ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

Ambient Temp oc -12

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	2018 – 1 – 10	14:00	Water		X	X								temp = 8.9 C
1	WWTP Influent BOD 2	2018 – 1 – 10	14:00	Water									X		temp = 8 - 9 C
2	WWTP Effluent Routine 3	2018 – 1 – 10	14:15	Water		X	X							X	temp = C
2	WWTP Effluent BOD 4	2018 – 1 – 10	14:15	Water									X		temp = 13.7 C
2	WWTP Effluent Nutrient 5	2018 – 1 – 10	14:15	Water				X	X	X	X	X			temp = C
2	WWTP Effluent Bacti 6	2018-1-10	14:15	Water	X										temp = C
	Elkriver Upstram Routine	2018 – 1 – 10	14:30	Water		X	X								temp = River C
	Elkriver Upstream Nutrient	2018 – 1 – 10	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	2018 – 1 – 10	14:30	Water	X										temp = C
	Elkriver Outfall Routine NO	2018 – 1 – 10	14:45	Water		X	X								temp = Frozen C
	Elkriver Outfall Nutrient SAMPLE	2018 – 1 – 10	14:45	Water				X	X	X	X	X			temp = C
	Elkriver Outfall Bacti HOLD	2018 – 1 – 10	14:45	Water	X										temp = C
	Elkriver downstream Routine	2018 – 1 – 10	15:00	Water		X	X								temp = Over C
	Elkriver downstream Nutrient	2018 – 1 – 10	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti	2018 – 1 – 10	15:00	Water	X										temp = C

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

SEND INVOICE TO: ☒ SAME AS REPORT ☐

INVOICE FORMAT: ☐ HARDMAIL ☐ EMAIL ☐

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

RELINQUISHED BY:	DATE: 2018 – 1 – 10	RECEIVED BY:	DATE: 12/01
HUNGRY BAYTALUKE	TIME: 5:00 pm		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE: 9:40 am
	TIME:		TIME:

FOR LAB USE ONLY

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

G:/QUALITY/00_DOCUMENTS/1C_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

Date Received: 18-JAN-18
Report Date: 25-JAN-18 16:58 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2046540

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WEEK 6 HB
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2046540-1 WWTP INFLUENT							
Sampled By: HB on 17-JAN-18 @ 14:00							
Matrix:							
Miscellaneous Parameters							
Biochemical Oxygen Demand	234	DLHC	75	mg/L		19-JAN-18	R3944725
Total Suspended Solids	254	DLHC	13	mg/L		23-JAN-18	R3944462
pH	7.88		0.10	pH		25-JAN-18	R3945124
L2046540-2 WWTP EFFLUENT							
Sampled By: HB on 17-JAN-18 @ 14:15							
Matrix:							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-JAN-18	R3941107
Biochemical Oxygen Demand	<2.0		2.0	mg/L		19-JAN-18	R3944725
Chemical Oxygen Demand	<10		10	mg/L		21-JAN-18	R3940320
Orthophosphate-Dissolved (as P)	0.079		0.010	mg/L		19-JAN-18	R3939885
Coliform Bacteria - Fecal	2		1	CFU/100mL		18-JAN-18	R3939789
Nitrate (as N)	35.1	DLHC	0.10	mg/L		18-JAN-18	R3939685
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		18-JAN-18	R3939685
Phosphorus (P)-Total	0.099		0.020	mg/L	23-JAN-18	24-JAN-18	R3944448
Total Suspended Solids	<3.0	DLHC	3.0	mg/L		23-JAN-18	R3944462
pH	7.97		0.10	pH		25-JAN-18	R3945124
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	35.1		0.11	mg/L		19-JAN-18	
L2046540-3 ELKRIVER UPSTREAM							
Sampled By: HB on 17-JAN-18 @ 14:30							
Matrix:							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-JAN-18	R3941107
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		19-JAN-18	R3939885
Coliform Bacteria - Fecal	<1		1	CFU/100mL		18-JAN-18	R3939789
Nitrate (as N)	2.01		0.020	mg/L		18-JAN-18	R3939685
Nitrite (as N)	<0.010		0.010	mg/L		18-JAN-18	R3939685
Phosphorus (P)-Total	<0.020		0.020	mg/L	23-JAN-18	24-JAN-18	R3944448
Total Suspended Solids	3.3	DLHC	3.0	mg/L		23-JAN-18	R3944462
pH	8.32		0.10	pH		25-JAN-18	R3945124
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.01		0.050	mg/L		19-JAN-18	
L2046540-4 ELKRIVER OUTFALL							
Sampled By: HB on 17-JAN-18 @ 14:45							
Matrix:							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-JAN-18	R3941107
Orthophosphate-Dissolved (as P)	0.012		0.010	mg/L		19-JAN-18	R3939885
Coliform Bacteria - Fecal	2		1	CFU/100mL		18-JAN-18	R3939789
Nitrate (as N)	0.315		0.020	mg/L		18-JAN-18	R3939685
Nitrite (as N)	<0.010		0.010	mg/L		18-JAN-18	R3939685
Phosphorus (P)-Total	<0.020		0.020	mg/L	23-JAN-18	24-JAN-18	R3944448
Total Suspended Solids	3.3	DLHC	3.0	mg/L		23-JAN-18	R3944462
pH	8.25		0.10	pH		25-JAN-18	R3945124
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
L2046540-4 ELKRIVER OUTFALL							
Sampled By: HB on 17-JAN-18 @ 14:45							
Matrix:							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.315		0.050	mg/L		19-JAN-18	
L2046540-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 17-JAN-18 @ 15:00							
Matrix:							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-JAN-18	R3941107
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		19-JAN-18	R3939885
Coliform Bacteria - Fecal	1		1	CFU/100mL		18-JAN-18	R3939789
Nitrate (as N)	10.1	DLHC	0.10	mg/L		18-JAN-18	R3939685
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		18-JAN-18	R3939685
Phosphorus (P)-Total	<0.020		0.020	mg/L	23-JAN-18	24-JAN-18	R3944448
Total Suspended Solids	4.0	DLHC	3.0	mg/L		23-JAN-18	R3944462
pH	8.20		0.10	pH		25-JAN-18	R3945124
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	10.1		0.11	mg/L		19-JAN-18	

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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 F
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-55
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878
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 Fa
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645

L2046540-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS week 5 of 4			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H/ ☒ EMAIL ☐ F ☐ F ☒ P ☐ ( )		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	WWTP Influent Routine	1	2018 – 1 – 17	14:00	Water		X	X								temp = 10.4 C
	WWTP Influent BOD	2	2018 – 1 – 17	14:00	Water									X		temp = 10.4 C
	WWTP Effluent Routine	3	2018 – 1 – 17	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 1 – 17	14:15	Water									X		temp = 12.6 C
	WWTP Effluent Nutrient	5	2018 – 1 – 17	14:15	Water				X	X	X	X	X			temp = 12.6 C
	WWTP Effluent Bacti	6	2018-1-17	14:15	Water	X										temp = C
	Elkriver Upstram Routine	7	2018 – 1 – 17	14:30	Water		X	X								temp = 0.5 C
	Elkriver Upstream Nutrient	8	2018 – 1 – 17	14:30	Water				X	X	X	X	X			temp = 0.5 C
	Elkriver Upstream Bacti	9	2018 – 1 – 17	14:30	Water	X										temp = 0.5 C
	Elkriver Outfall Routine	10	2018 – 1 – 17	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2018 – 1 – 17	14:45	Water				X	X	X	X	X			temp = 1.9 C
	Elkriver Outfall Bacti	12	2018 – 1 – 17	14:45	Water	X										temp = 1.9 C
	Elkriver downstream Routine	13	2018 – 1 – 17	15:00	Water		X	X								temp = C
	Elkriver downstream Nutrient	14	2018 – 1 – 17	15:00	Water				X	X	X	X	X			temp = 0.9 C
	Elkriver downstream Bacti	15	2018 – 1 – 17	15:00	Water	X										temp = 0.9 C

Ambient over 30c -3

TURN AROUND REQUIRED:	◉ R ( ) R	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE:	2018 – 1 – 17	RECEIVED BY:	DATE: 1/18
SEND INVOICE TO:	☒ SAME ☐ DIFFERE		HUNGRY BAYTALUKE	TIME:	5:00 pm		TIME: 9:40
INVOICE FORMAT:	☐ H/ ☐ F ☐		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

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

Date Received: 29-JAN-18
Report Date: 05-FEB-18 16:19 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2050121

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WK #7 FOR #4
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2050121-1 WWTP INFLUENT							
Sampled By: HB on 25-JAN-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	117	DLHC	75	mg/L		30-JAN-18	R3954718
Total Suspended Solids	176	DLHC	9.0	mg/L		31-JAN-18	R3950008
pH	8.11		0.10	pH		30-JAN-18	R3947606
L2050121-2 WWTP EFFLUENT							
Sampled By: HB on 25-JAN-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-FEB-18	R3950168
Biochemical Oxygen Demand	<2.0		2.0	mg/L		30-JAN-18	R3954718
Chemical Oxygen Demand	12		10	mg/L		01-FEB-18	R3951452
Orthophosphate-Dissolved (as P)	0.090		0.010	mg/L		30-JAN-18	R3947098
Coliform Bacteria - Fecal	7		1	CFU/100mL		29-JAN-18	R3947315
Phosphorus (P)-Total	0.097		0.020	mg/L	04-FEB-18	05-FEB-18	R3954467
Total Suspended Solids	<3.0		3.0	mg/L		31-JAN-18	R3950008
pH	7.98		0.10	pH		30-JAN-18	R3947606
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	36.2	DLHC	0.10	mg/L		29-JAN-18	R3947249
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	36.2		0.11	mg/L		30-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		29-JAN-18	R3947249
L2050121-3 ELKRIVER UPSTREAM							
Sampled By: HB on 25-JAN-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-FEB-18	R3950168
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		30-JAN-18	R3947098
Coliform Bacteria - Fecal	<1		1	CFU/100mL		29-JAN-18	R3947315
Phosphorus (P)-Total	<0.020		0.020	mg/L	04-FEB-18	05-FEB-18	R3954467
Total Suspended Solids	4.7		3.0	mg/L		31-JAN-18	R3950008
pH	8.35		0.10	pH		30-JAN-18	R3947606
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.95		0.020	mg/L		29-JAN-18	R3947249
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.95		0.050	mg/L		29-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-JAN-18	R3947249
L2050121-4 ELKRIVER OUTFALL							
Sampled By: HB on 25-JAN-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-FEB-18	R3950168
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		30-JAN-18	R3947098
Coliform Bacteria - Fecal	1		1	CFU/100mL		29-JAN-18	R3947315
Phosphorus (P)-Total	<0.020		0.020	mg/L	04-FEB-18	05-FEB-18	R3954467
Total Suspended Solids	<3.0		3.0	mg/L		31-JAN-18	R3950008

* 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
L2050121-4 ELKRIVER OUTFALL							
Sampled By: HB on 25-JAN-18 @ 14:45							
Matrix: WATER							
pH	8.25		0.10	pH		30-JAN-18	R3947606
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.66		0.020	mg/L		29-JAN-18	R3947249
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.66		0.050	mg/L		29-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-JAN-18	R3947249
L2050121-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 25-JAN-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-FEB-18	R3950168
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		30-JAN-18	R3947098
Coliform Bacteria - Fecal	4		1	CFU/100mL		29-JAN-18	R3947315
Phosphorus (P)-Total	<0.020		0.020	mg/L	04-FEB-18	05-FEB-18	R3954467
Total Suspended Solids	4.7		3.0	mg/L		31-JAN-18	R3950008
pH	8.36		0.10	pH		30-JAN-18	R3947606
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.97		0.020	mg/L		29-JAN-18	R3947249
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.97		0.050	mg/L		29-JAN-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-JAN-18	R3947249

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

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
EHR	Bacteriological, BOD, NO2/NO3, PO4 - Exceeded Recommended Holding Time prior to receipt at the lab.
EXTEMP10	13C - Samples Received with temperature >10 Degrees C

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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5195 Toll Free: 1-800-668-9878
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 F
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645

L2050121-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS wk # 7 for # 4			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDCOPY ☒ EMAIL ☐ FAX ☐ EDD ☒ PDF ☐ ( )		pbaier@skircr.com		

ANALYSIS REQUESTED:

Ambient air 0°C

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	2018 – 1 – 25	14:00	Water		X	X								temp = 12.1 C
	WWTP Influent BOD	2	2018 – 1 – 25	14:00	Water									X		temp = C
	WWTP Effluent Routine	3	2018 – 1 – 25	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 1 – 25	14:15	Water									X		temp = 11.9 C
	WWTP Effluent Nutrient	5	2018 – 1 – 25	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2018 – 1 – 25	14:15	Water	X										
	Elkriver Upstram Routine	7	2018 – 1 – 25	14:30	Water		X	X								temp = 0.8 C
	Elkriver Upstream Nutrient	8	2018 – 1 – 25	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	9	2018 – 1 – 25	14:30	Water	X										temp = C
	Elkriver Outfall Routine	10	2018 – 1 – 25	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2018 – 1 – 25	14:45	Water				X	X	X	X	X			temp = 1.6 C
	Elkriver Outfall Bacti	12	2018 – 1 – 25	14:45	Water	X										temp = C
	Elkriver downstream Routine	13	2018 – 1 – 25	15:00	Water		X	X								temp = 0.7 C
	Elkriver downstream Nutrient	14	2018 – 1 – 25	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti	15	2018 – 1 – 25	15:00	Water	X										temp = C

TURN AROUND REQUIRED:	● ROUTINE	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2018 – 1 – 25	RECEIVED BY:	DATE: 29-Jan-18
SEND INVOICE TO:	☒ SAME AS REPORT			HUNGRY BAYTALUKE	TIME: 5:00 pm	MM	TIME: 9:40
INVOICE FORMAT:	☐ HARDCOPY ☐ EMAIL			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	18 °C	✓ Icepacks ___ Ice ___ None
	Frozen? ___ Yes ✓ No	

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\Hungry's CoC for ALS full EMS.xls

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

Date Received: 02-FEB-18
Report Date: 09-FEB-18 16:01 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2052150

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - WINTER 2017 EMS WK # 8 FOR # 5
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2052150-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	103	DLHC	20	mg/L		02-FEB-18	R3956914
Total Suspended Solids	148	DLHC	5.0	mg/L		07-FEB-18	R3957426
pH	8.03		0.10	pH		02-FEB-18	R3954927
L2052150-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		08-FEB-18	R3957532
Biochemical Oxygen Demand	<2.0		2.0	mg/L		02-FEB-18	R3956914
Chemical Oxygen Demand	12		10	mg/L		06-FEB-18	R3956616
Orthophosphate-Dissolved (as P)	0.196		0.010	mg/L		03-FEB-18	R3953309
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-FEB-18	R3953271
Phosphorus (P)-Total	0.225		0.020	mg/L	08-FEB-18	09-FEB-18	R3958170
Total Suspended Solids	4.0		3.0	mg/L		07-FEB-18	R3957426
pH	8.06		0.10	pH		02-FEB-18	R3954927
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	29.2	DLHC	0.10	mg/L		02-FEB-18	R3954569
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	29.2		0.11	mg/L		05-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		02-FEB-18	R3954569
L2052150-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		08-FEB-18	R3957532
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		03-FEB-18	R3953309
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-FEB-18	R3953271
Phosphorus (P)-Total	<0.020		0.020	mg/L	08-FEB-18	09-FEB-18	R3958170
Total Suspended Solids	4.0		3.0	mg/L		07-FEB-18	R3957426
pH	8.46		0.10	pH		02-FEB-18	R3954927
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.79		0.020	mg/L		02-FEB-18	R3954569
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.79		0.050	mg/L		05-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		02-FEB-18	R3954569
L2052150-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		08-FEB-18	R3957532
Orthophosphate-Dissolved (as P)	0.073		0.010	mg/L		03-FEB-18	R3953309
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-FEB-18	R3953271
Phosphorus (P)-Total	0.088		0.020	mg/L	08-FEB-18	09-FEB-18	R3958170
Total Suspended Solids	<3.0		3.0	mg/L		07-FEB-18	R3957426

* 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
L2052150-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 14:45							
Matrix: WATER							
pH	8.28		0.10	pH		02-FEB-18	R3954927
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	9.09		0.020	mg/L		02-FEB-18	R3954569
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	9.09		0.050	mg/L		05-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		02-FEB-18	R3954569
L2052150-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 01-FEB-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		08-FEB-18	R3957532
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		03-FEB-18	R3953309
Coliform Bacteria - Fecal	5		1	CFU/100mL		02-FEB-18	R3953271
Phosphorus (P)-Total	<0.020		0.020	mg/L	08-FEB-18	09-FEB-18	R3958170
Total Suspended Solids	4.7		3.0	mg/L		07-FEB-18	R3957426
pH	8.45		0.10	pH		02-FEB-18	R3954927
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.83		0.020	mg/L		02-FEB-18	R3954569
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.83		0.050	mg/L		05-FEB-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		02-FEB-18	R3954569

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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 Enviro
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www.alsenvi

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Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587
1595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586
3 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
- 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

L2052150-COFC

2150

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2017 EMS wk # 8 for # 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDCOPY ☒ EMAIL ☐ FAX ☐ EDD ☒ 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.)
	WWTP Influent Routine	1	2018 – 2 – 1	14:00	Water		X	X								temp = 9.7 C
	WWTP Influent BOD	2	2018 – 2 – 1	14:00	Water									X		temp = 9.7 C
		3														
	WWTP Effluent Routine		2018 – 2 – 1	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 2 – 1	14:15	Water									X		temp = C
	WWTP Effluent Nutrient	5	2018 – 2 – 1	14:15	Water				X	X	X	X	X			temp = 10.6 C
	WWTP Effluent Bacti	6	2018 – 2 – 1	14:15	Water	X										temp = 10.6 C
	Elkriver Upstream Routine	7	2018 – 2 – 1	14:30	Water		X	X								temp = C
	Elkriver Upstream Nutrient	8	2018 – 2 – 1	14:30	Water				X	X	X	X	X			temp = 10.5 C
	Elkriver Upstream Bacti	9	2018 – 2 – 1	14:30	Water	X										temp = 10.5 C
	Elkriver Outfall Routine	10	2018 – 2 – 1	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2018 – 2 – 1	14:45	Water				X	X	X	X	X			temp = 11.1 C
	Elkriver Outfall Bacti	12	2018 – 2 – 1	14:45	Water	X										temp = 11.1 C
	Elkriver downstream Routine	13	2018 – 2 – 1	15:00	Water		X	X								temp = C
	Elkriver downstream Nutrient	14	2018 – 2 – 1	15:00	Water				X	X	X	X	X			temp = 10.6 C
	Elkriver downstream Bacti	15	2018 – 2 – 1	15:00	Water	X										temp = 10.6 C

FOR LAB USE ONLY

Ambient air temp - 7oC

TURN AROUND REQUIRED:	● R (ϕ R	SPECIFY DATE:	(surcharge may apply)		
SEND INVOICE TO:	☒ SAME ☐ DIFFERENT				
INVOICE FORMAT:	☐ EXCEL ☐				
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com				

RELINQUISHED BY:	DATE:	2018 – 2 – 1	RECEIVED BY:	DATE:	2/2
HUNGRY BAYTALUKE	TIME:	5:00 pm		TIME:	9:15
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 2 °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-MAR-18
Report Date: 21-MAR-18 16:48 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2068142

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING 2018 EMS WK #1
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2068142-1 WWTP INFLUENT							
Sampled By: HB on 14-MAR-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	99	DLHC	75	mg/L		16-MAR-18	R3993069
Total Suspended Solids	238	DLHC	8.0	mg/L		19-MAR-18	R3990449
pH	8.00		0.10	pH		15-MAR-18	R3986687
L2068142-2 WWTP EFFLUENT							
Sampled By: HB on 14-MAR-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		19-MAR-18	R3988309
Biochemical Oxygen Demand	<2.0		2.0	mg/L		16-MAR-18	R3993069
Chemical Oxygen Demand	<10		10	mg/L		19-MAR-18	R3988308
Orthophosphate-Dissolved (as P)	0.270		0.010	mg/L		16-MAR-18	R3987001
Coliform Bacteria - Fecal	2		1	CFU/100mL		15-MAR-18	R3986837
Phosphorus (P)-Total	0.282		0.020	mg/L	16-MAR-18	17-MAR-18	R3987271
Total Suspended Solids	<3.0		3.0	mg/L		19-MAR-18	R3990449
pH	8.04		0.10	pH		15-MAR-18	R3986687
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	35.0	DLHC	0.10	mg/L		15-MAR-18	R3986720
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	35.0		0.11	mg/L		16-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		15-MAR-18	R3986720
L2068142-3 ELKRIVER UPSTREAM							
Sampled By: HB on 14-MAR-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		19-MAR-18	R3988309
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		16-MAR-18	R3987001
Coliform Bacteria - Fecal	3		1	CFU/100mL		15-MAR-18	R3986837
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-MAR-18	17-MAR-18	R3987271
Total Suspended Solids	5.7		3.0	mg/L		19-MAR-18	R3990449
pH	8.40		0.10	pH		15-MAR-18	R3986687
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.89		0.020	mg/L		15-MAR-18	R3986720
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.89		0.050	mg/L		16-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-MAR-18	R3986720
L2068142-4 ELKRIVER OUTFALL							
Sampled By: HB on 14-MAR-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		19-MAR-18	R3988309
Orthophosphate-Dissolved (as P)	0.172		0.010	mg/L		16-MAR-18	R3987001
Coliform Bacteria - Fecal	<1		1	CFU/100mL		15-MAR-18	R3986837
Phosphorus (P)-Total	0.175		0.020	mg/L	16-MAR-18	17-MAR-18	R3987271
Total Suspended Solids	<3.0		3.0	mg/L		19-MAR-18	R3990449

* 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
L2068142-4 ELKRIVER OUTFALL							
Sampled By: HB on 14-MAR-18 @ 14:45							
Matrix: WATER							
pH	8.27		0.10	pH		15-MAR-18	R3986687
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	14.8		0.020	mg/L		15-MAR-18	R3986720
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	14.8		0.050	mg/L		16-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-MAR-18	R3986720
L2068142-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 14-MAR-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		19-MAR-18	R3988309
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		16-MAR-18	R3987001
Coliform Bacteria - Fecal	<1		1	CFU/100mL		15-MAR-18	R3986837
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-MAR-18	17-MAR-18	R3987271
Total Suspended Solids	5.0		3.0	mg/L		19-MAR-18	R3990449
pH	8.42		0.10	pH		15-MAR-18	R3986687
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.91		0.020	mg/L		15-MAR-18	R3986720
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.91		0.050	mg/L		16-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-MAR-18	R3986720

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 14
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: 1-8
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Fr
Saskatoon SK, 619 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1

L2068142-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 1			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐		ppmajor@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	WWTP Influent Routine	1	2018 – 3 – 14	14:00	Water		X	X								temp = 11 °C
	WWTP Influent BOD	2	2018 – 3 – 14	14:00	Water									X		temp = 11 °C
	WWTP Effluent Routine	3	2018 – 3 – 14	14:15	Water		X	X							X	temp = °C
	WWTP Effluent BOD	4	2018 – 3 – 14	14:15	Water									X		temp = °C
	WWTP Effluent Nutrient	5	2018 – 3 – 14	14:15	Water				X	X	X	X	X			temp = 12.5 °C
	WWTP Effluent Bacti	6	2018 – 3 – 14	14:15	Water	X										temp = °C
	Elkriver Upstram Routine	7	2018 – 3 – 14	14:30	Water		X	X								temp = °C
	Elkriver Upstream Nutrient	8	2018 – 3 – 14	14:30	Water				X	X	X	X	X			temp = 1.4 °C
	Elkriver Upstream Bacti	9	2018 – 3 – 14	14:30	Water	X										temp = °C
	Elkriver Outfall Routine	10	2018 – 3 – 14	14:45	Water		X	X								temp = 3.6 °C
	Elkriver Outfall Nutrient	11	2018 – 3 – 14	14:45	Water				X	X	X	X	X			temp = °C
	Elkriver Outfall Bacti	12	2018 – 3 – 14	14:45	Water	X										temp = 3.6 °C
	Elkriver downstream Routine	13	2018 – 3 – 14	15:00	Water		X	X								temp = °C
	Elkriver downstream Nutrient	14	2018 – 3 – 14	15:00	Water				X	X	X	X	X			temp = 1 °C
	Elkriver downstream Bacti	15	2018 – 3 – 14	15:00	Water	X										temp = °C

Ambient air -5°C

TURN AROUND REQUIRED:	● ROUTINE	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2018 – 3 – 14	RECEIVED BY:	DATE: 3/15
SEND INVOICE TO:	☒ SAME AS REPORT			HUNGRY BAYTALUKE	TIME: 5:00 pm		TIME: 9:00
INVOICE FORMAT:	☐ HARDMAIL ☐ FAX ☐ PDF ☐			RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
					TIME:		TIME:

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:	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: 22-MAR-18
Report Date: 29-MAR-18 14:09 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2071001

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC- SPRING 2018 EMS WK#2
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2071001-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	93	DLHC	75	mg/L		23-MAR-18	R3999291
Total Suspended Solids	196	DLHC	10	mg/L		26-MAR-18	R3996318
pH	7.87		0.10	pH		27-MAR-18	R3996929
L2071001-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		26-MAR-18	R3995667
Biochemical Oxygen Demand	<2.0		2.0	mg/L		23-MAR-18	R3999291
Chemical Oxygen Demand	17		10	mg/L		27-MAR-18	R3996940
Orthophosphate-Dissolved (as P)	0.703	DLHC	0.050	mg/L		23-MAR-18	R3994659
Coliform Bacteria - Fecal	800	DLA	100	CFU/100mL		22-MAR-18	R3994579
Phosphorus (P)-Total	0.751		0.020	mg/L	27-MAR-18	28-MAR-18	R3997798
Total Suspended Solids	<3.0		3.0	mg/L		26-MAR-18	R3996318
pH	7.97		0.10	pH		27-MAR-18	R3996929
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	14.3		0.020	mg/L		22-MAR-18	R3994246
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	14.3		0.050	mg/L		23-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-MAR-18	R3994246
L2071001-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		26-MAR-18	R3995667
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		23-MAR-18	R3994659
Coliform Bacteria - Fecal	18		1	CFU/100mL		22-MAR-18	R3994579
Phosphorus (P)-Total	<0.020		0.020	mg/L	27-MAR-18	28-MAR-18	R3997798
Total Suspended Solids	<3.0		3.0	mg/L		26-MAR-18	R3996318
pH	8.31		0.10	pH		27-MAR-18	R3996929
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.01		0.020	mg/L		22-MAR-18	R3994246
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.01		0.050	mg/L		23-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-MAR-18	R3994246
L2071001-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		26-MAR-18	R3995667
Orthophosphate-Dissolved (as P)	0.111		0.010	mg/L		23-MAR-18	R3994659
Coliform Bacteria - Fecal	91		1	CFU/100mL		22-MAR-18	R3994579
Phosphorus (P)-Total	0.116		0.020	mg/L	27-MAR-18	28-MAR-18	R3997798
Total Suspended Solids	6.0		3.0	mg/L		26-MAR-18	R3996318

* 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
L2071001-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 14:45							
Matrix: WATER							
pH	8.18		0.10	pH		27-MAR-18	R3996929
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.80		0.020	mg/L		22-MAR-18	R3994246
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.80		0.050	mg/L		23-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-MAR-18	R3994246
L2071001-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 21-MAR-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		26-MAR-18	R3995667
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		23-MAR-18	R3994659
Coliform Bacteria - Fecal	9		1	CFU/100mL		22-MAR-18	R3994579
Phosphorus (P)-Total	<0.020		0.020	mg/L	27-MAR-18	28-MAR-18	R3997798
Total Suspended Solids	3.3		3.0	mg/L		26-MAR-18	R3996318
pH	8.32		0.10	pH		27-MAR-18	R3996929
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.03		0.020	mg/L		22-MAR-18	R3994246
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.03		0.050	mg/L		23-MAR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-MAR-18	R3994246

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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Toll Free: 1-800-667-7645 Fax: 306-668-8383

L2071001-COFC

1001

SEND REPORT TO: **CHAIN OF CUSTODY FORM** PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 2			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐		pbaier@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	WWTP Influent Routine	1	2018 – 3 – 21	14:00	Water		X	X								temp = 10 °C
	WWTP Influent BOD	2	2018 – 3 – 21	14:00	Water									X		temp = 10 °C
	WWTP Effluent Routine	3	2018 – 3 – 21	14:15	Water		X	X							X	temp = °C
	WWTP Effluent BOD	4	2018 – 3 – 21	14:15	Water									X		temp = 12.4 °C
	WWTP Effluent Nutrient	5	2018 – 3 – 21	14:15	Water				X	X	X	X	X			temp = °C
	WWTP Effluent Bacti	6	2018 – 3 – 21	14:15	Water	X										temp = 12.4 °C
	Elkriver Upstram Routine	7	2018 – 3 – 21	14:30	Water		X	X								temp = 9.7 °C
	Elkriver Upstream Nutrient	8	2018 – 3 – 21	14:30	Water				X	X	X	X	X			temp = °C
	Elkriver Upstream Bacti	9	2018 – 3 – 21	14:30	Water	X										temp = 9.7 °C
	Elkriver Outfall Routine	10	2018 – 3 – 21	14:45	Water		X	X								temp = °C
	Elkriver Outfall Nutrient	11	2018 – 3 – 21	14:45	Water				X	X	X	X	X			temp = °C
	Elkriver Outfall Bacti	12	2018 – 3 – 21	14:45	Water	X										temp = 5.1 °C
	Elkriver downstream Routine	13	2018 – 3 – 21	15:00	Water		X	X								temp = °C
	Elkriver downstream Nutrient	14	2018 – 3 – 21	15:00	Water				X	X	X	X	X			temp = °C
	Elkriver downstream Bacti	15	2018 – 3 – 21	15:00	Water	X										temp = 3.1 °C

TURN AROUND REQUIRED:	◉ ROUTINE	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2018 – 3 – 21 TIME: 5:00 pm	RECEIVED BY:	DATE: 3/22 TIME: 9:46
SEND INVOICE TO:	☒ SAME AS REPORT		RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:
INVOICE FORMAT:	☐ EXCEL ☐ PDF ☐					

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:	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-MAR-18
Report Date: 06-APR-18 15:42 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2073990

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING 2018 EMS WK #3
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2073990-1 WWTP INFLUENT							
Sampled By: HB on 28-MAR-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	97	DLHC	20	mg/L		29-MAR-18	R4004519
Total Suspended Solids	113	DLHC	8.0	mg/L		03-APR-18	R4004697
pH	7.51		0.10	pH		06-APR-18	R4006171
L2073990-2 WWTP EFFLUENT							
Sampled By: HB on 28-MAR-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-18	R4002475
Biochemical Oxygen Demand	<2.0		2.0	mg/L		29-MAR-18	R4004519
Chemical Oxygen Demand	13		10	mg/L		02-APR-18	R4003550
Orthophosphate-Dissolved (as P)	0.485		0.010	mg/L		31-MAR-18	R4000713
Coliform Bacteria - Fecal	48		1	CFU/100mL		29-MAR-18	R4000574
Phosphorus (P)-Total	0.537		0.020	mg/L	04-APR-18	05-APR-18	R4005480
Total Suspended Solids	<3.0		3.0	mg/L		03-APR-18	R4004697
pH	7.64		0.10	pH		06-APR-18	R4006171
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	34.2	HTD	0.10	mg/L		02-APR-18	R4001868
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	34.2		0.10	mg/L		02-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-MAR-18	R4001868
L2073990-3 ELKRIVER UPSTREAM							
Sampled By: HB on 28-MAR-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-18	R4002475
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		31-MAR-18	R4000713
Coliform Bacteria - Fecal	5		1	CFU/100mL		29-MAR-18	R4000574
Phosphorus (P)-Total	<0.020		0.020	mg/L	04-APR-18	05-APR-18	R4005480
Total Suspended Solids	4.7		3.0	mg/L		03-APR-18	R4004697
pH	8.25		0.10	pH		06-APR-18	R4006171
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.09		0.020	mg/L		29-MAR-18	R4001868
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.09		0.050	mg/L		02-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-MAR-18	R4001868
L2073990-4 ELKRIVER OUFALL							
Sampled By: HB on 28-MAR-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-18	R4002475
Orthophosphate-Dissolved (as P)	0.071		0.010	mg/L		31-MAR-18	R4000713
Coliform Bacteria - Fecal	21		1	CFU/100mL		29-MAR-18	R4000574
Phosphorus (P)-Total	0.086		0.020	mg/L	04-APR-18	05-APR-18	R4005480
Total Suspended Solids	13.3		3.0	mg/L		03-APR-18	R4004697

* 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
L2073990-4 ELKRIVER OUFALL							
Sampled By: HB on 28-MAR-18 @ 14:45							
Matrix: WATER							
pH	8.05		0.10	pH		06-APR-18	R4006171
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	5.95		0.020	mg/L		29-MAR-18	R4001868
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	5.95		0.050	mg/L		02-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-MAR-18	R4001868
L2073990-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 28-MAR-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-18	R4002475
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		31-MAR-18	R4000713
Coliform Bacteria - Fecal	4		1	CFU/100mL		29-MAR-18	R4000574
Phosphorus (P)-Total	<0.020		0.020	mg/L	04-APR-18	05-APR-18	R4005480
Total Suspended Solids	3.3		3.0	mg/L		03-APR-18	R4004697
pH	8.25		0.10	pH		06-APR-18	R4006171
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.16		0.020	mg/L		29-MAR-18	R4001868
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.16		0.050	mg/L		02-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		29-MAR-18	R4001868

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-024
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-98
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-987
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-6
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7

L2073990-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	1 - 800 - 258 - 7669	FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke	
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 3		QUOTE NO:		
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H/ ☒ F MAI ☐ F ☐ F ☒ P ☐ ( )		pmaje@skircr.com		

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	1	2018 – 3 – 28	14:00	Water		X	X								temp = 11.6 C
	WWTP Influent BOD	2	2018 – 3 – 28	14:00	Water									X		temp = 11.6 C
	WWTP Effluent Routine	3	2018 – 3 – 28	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 3 – 28	14:15	Water									X		temp = 12.2 C
	WWTP Effluent Nutrient	5	2018 – 3 – 28	14:15	Water				X	X	X	X	X			temp = 12.2 C
	WWTP Effluent Bacti	6	2018 – 3 – 28	14:15	Water	X										temp = C
	Elkriver Upstram Routine	7	2018 – 3 – 28	14:30	Water		X	X								temp = 2.9 C
	Elkriver Upstream Nutrient	8	2018 – 3 – 28	14:30	Water				X	X	X	X	X			temp = 2.9 C
	Elkriver Upstream Bacti	9	2018 – 3 – 28	14:30	Water	X										temp = 2.9 C
	Elkriver Outfall Routine	10	2018 – 3 – 28	14:45	Water		X	X								temp = 3.6 C
	Elkriver Outfall Nutrient	11	2018 – 3 – 28	14:45	Water				X	X	X	X	X			temp = 3.6 C
	Elkriver Outfall Bacti	12	2018 – 3 – 28	14:45	Water	X										temp = 3.6 C
	Elkriver downstream Routine	13	2018 – 3 – 28	15:00	Water		X	X								temp = 2.3 C
	Elkriver downstream Nutrient	14	2018 – 3 – 28	15:00	Water				X	X	X	X	X			temp = 2.3 C
	Elkriver downstream Bacti	15	2018 – 3 – 28	15:00	Water	X										temp = 2.3 C

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ R(ϕ R **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☒ SAM DIFFERE

INVOICE FORMAT: ☐ A Z ☐ ☐

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

RELINQUISHED BY:	DATE: 2018 – 3 – 28	RECEIVED BY:	DATE: 29-Mar-18	
HUNGRY BAYTALUKE	TIME: 5:00 pm	[illegible]	TIME: 9:15	
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
	TIME:		TIME:	

FOR LAB USE ONLY

Cooler Seal Intact? √Yes ___No ___N/A | Sample Temperature: 8 °C | Frozen? ___Yes √No | Cooling Method? √Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

Date Received: 05-APR-18
Report Date: 11-APR-18 16:04 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2076246

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC-SPRING 2018 EMS WK #4
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2076246-1 WWTP INFLUENT							
Sampled By: HB on 04-APR-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	143	DLHC	75	mg/L		05-APR-18	R4007837
Total Suspended Solids	194	DLHC	10	mg/L		10-APR-18	R4008391
pH	8.16		0.10	pH		10-APR-18	R4008242
L2076246-2 WWTP EFFLUENT							
Sampled By: HB on 04-APR-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-APR-18	R4007177
Biochemical Oxygen Demand	<2.0		2.0	mg/L		05-APR-18	R4007837
Chemical Oxygen Demand	16		10	mg/L		10-APR-18	R4008025
Orthophosphate-Dissolved (as P)	0.184		0.010	mg/L		06-APR-18	R4005998
Coliform Bacteria - Fecal	<1		1	CFU/100mL		05-APR-18	R4006381
Phosphorus (P)-Total	0.207		0.020	mg/L	09-APR-18	10-APR-18	R4007717
Total Suspended Solids	<3.0		3.0	mg/L		10-APR-18	R4008391
pH	8.06		0.10	pH		10-APR-18	R4008242
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	34.4	DLHC	0.10	mg/L		06-APR-18	R4006388
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	34.5		0.11	mg/L		07-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	0.075	DLHC	0.050	mg/L		06-APR-18	R4006388
L2076246-3 ELKRIVER UPSTREAM							
Sampled By: HB on 04-APR-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-APR-18	R4007177
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-APR-18	R4005998
Coliform Bacteria - Fecal	<1		1	CFU/100mL		05-APR-18	R4006381
Phosphorus (P)-Total	<0.020		0.020	mg/L	09-APR-18	10-APR-18	R4007717
Total Suspended Solids	3.0		3.0	mg/L		10-APR-18	R4008391
pH	8.38		0.10	pH		10-APR-18	R4008242
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.20		0.020	mg/L		06-APR-18	R4006388
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.20		0.050	mg/L		07-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-APR-18	R4006388
L2076246-4 ELKRIVER OUTFALL							
Sampled By: HB on 04-APR-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-APR-18	R4007177
Orthophosphate-Dissolved (as P)	0.182		0.010	mg/L		06-APR-18	R4005998
Coliform Bacteria - Fecal	5		1	CFU/100mL		05-APR-18	R4006381
Phosphorus (P)-Total	0.220		0.020	mg/L	09-APR-18	10-APR-18	R4007717
Total Suspended Solids	<3.0		3.0	mg/L		10-APR-18	R4008391

* 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
L2076246-4 ELKRIVER OUTFALL							
Sampled By: HB on 04-APR-18 @ 14:45							
Matrix: WATER							
pH	8.04		0.10	pH		10-APR-18	R4008242
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	34.6	DLHC	0.10	mg/L		06-APR-18	R4006388
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	34.6		0.11	mg/L		07-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		06-APR-18	R4006388
L2076246-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 04-APR-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		09-APR-18	R4007177
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		06-APR-18	R4005998
Coliform Bacteria - Fecal	<1		1	CFU/100mL		05-APR-18	R4006381
Phosphorus (P)-Total	<0.020		0.020	mg/L	09-APR-18	10-APR-18	R4007717
Total Suspended Solids	3.0		3.0	mg/L		10-APR-18	R4008391
pH	8.40		0.10	pH		10-APR-18	R4008242
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.27		0.020	mg/L		06-APR-18	R4006388
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.27		0.050	mg/L		07-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		06-APR-18	R4006388

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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: 1-80
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 7
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-8

L2076246-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 4			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H ☒ EMAIL ☐ F ☐ F ☒ P ☐ ( )		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.)
	WWTP Influent Routine	1	2018 – 4 – 4	14:00	Water		X	X								temp = 10.7 C
	WWTP Influent BOD	2	2018 – 4 – 4	14:00	Water									X		temp = 10.7 C
	WWTP Effluent Routine	3	2018 – 4 – 4	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 4 – 4	14:15	Water									X		temp = 13.2 C
	WWTP Effluent Nutrient	5	2018 – 4 – 4	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2018 – 4 – 4	14:15	Water	X										temp = 13.2 C
	Elkriver Upstram Routine	7	2018 – 4 – 4	14:30	Water		X	X								temp = C
	Elkriver Upstream Nutrient	8	2018 – 4 – 4	14:30	Water				X	X	X	X	X			temp = 3.2 C
	Elkriver Upstream Bacti	9	2018 – 4 – 4	14:30	Water	X										temp = 3.2 C
	Elkriver Outfall Routine	10	2018 – 4 – 4	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2018 – 4 – 4	14:45	Water				X	X	X	X	X			temp = 4.6 C
	Elkriver Outfall Bacti	12	2018 – 4 – 4	14:45	Water	X										temp = 4.6 C
	Elkriver downstream Routine	13	2018 – 4 – 4	15:00	Water		X	X								temp = C
	Elkriver downstream Nutrient	14	2018 – 4 – 4	15:00	Water				X	X	X	X	X			temp = 0.8 C
	Elkriver downstream Bacti	15	2018 – 4 – 4	15:00	Water	X										temp = 0.8 C

Ambient Air @ -6 oc

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ R ( ) R	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2018 – 4 – 4	RECEIVED BY:	DATE: 5/Apr/18
SEND INVOICE TO:	☒ SAME ☐ DIFFERE			HUNGRY BAYTALUKE	TIME: 5:00 pm	MM	TIME: 9:05
INVOICE FORMAT:	☐ H ☐ P ☐			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: 2 °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-APR-18
Report Date: 19-APR-18 14:37 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2079242

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC-SPRING 2018 EMS WK #5
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2079242-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	37	BODP	20	mg/L		12-APR-18	R4016108
Total Suspended Solids	66.3		3.0	mg/L		16-APR-18	R4015866
pH	7.97		0.10	pH		18-APR-18	R4017285
L2079242-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-18	R4014117
Biochemical Oxygen Demand	<2.0		2.0	mg/L		12-APR-18	R4016108
Chemical Oxygen Demand	<10		10	mg/L		17-APR-18	R4016385
Orthophosphate-Dissolved (as P)	0.205		0.010	mg/L		13-APR-18	R4010289
Coliform Bacteria - Fecal	1		1	CFU/100mL		12-APR-18	R4011171
Phosphorus (P)-Total	0.223		0.020	mg/L	16-APR-18	17-APR-18	R4015970
Total Suspended Solids	<3.0		3.0	mg/L		16-APR-18	R4015866
pH	8.08		0.10	pH		18-APR-18	R4017285
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	25.3	DLHC	0.10	mg/L		12-APR-18	R4010335
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	25.3		0.11	mg/L		13-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		12-APR-18	R4010335
L2079242-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 14:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-18	R4014117
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		13-APR-18	R4010289
Coliform Bacteria - Fecal	11		1	CFU/100mL		12-APR-18	R4011171
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-APR-18	17-APR-18	R4015970
Total Suspended Solids	7.7		3.0	mg/L		16-APR-18	R4015866
pH	8.37		0.10	pH		18-APR-18	R4017285
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.73		0.020	mg/L		12-APR-18	R4010335
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.73		0.050	mg/L		13-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-APR-18	R4010335
L2079242-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 14:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-18	R4014117
Orthophosphate-Dissolved (as P)	0.010		0.010	mg/L		13-APR-18	R4010289
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-APR-18	R4011171
Phosphorus (P)-Total	0.023		0.020	mg/L	16-APR-18	17-APR-18	R4015970
Total Suspended Solids	11.0		3.0	mg/L		16-APR-18	R4015866

* 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
L2079242-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 14:45							
Matrix: Water							
pH	8.22		0.10	pH		18-APR-18	R4017285
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.232		0.020	mg/L		12-APR-18	R4010335
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.232		0.050	mg/L		13-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-APR-18	R4010335
L2079242-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 11-APR-18 @ 15:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-18	R4014117
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		13-APR-18	R4010289
Coliform Bacteria - Fecal	22		1	CFU/100mL		12-APR-18	R4011171
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-APR-18	17-APR-18	R4015970
Total Suspended Solids	9.0		3.0	mg/L		16-APR-18	R4015866
pH	8.34		0.10	pH		18-APR-18	R4017285
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.87		0.020	mg/L		12-APR-18	R4010335
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.87		0.050	mg/L		13-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-APR-18	R4010335

* 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).
RRQC	Refer to report remarks for information regarding this QC result.

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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

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Edmonton AB, 9936 - 67th Avenue, T6
Calgary AB, Bay 7, 1313 - 44th Avenue
Saskatoon SK, 819 - 58th Street East,

L2079242-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
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	2018 – 4 – 11	14:00	Water		X	X								temp = 7.4 C
	WWTP Influent BOD	2	2018 – 4 – 11	14:00	Water									X		temp = 7.4 C
2	WWTP Effluent Routine	3	2018 – 4 – 11	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 4 – 11	14:15	Water									X		temp = 11.3 C
	WWTP Effluent Nutrient	5	2018 – 4 – 11	14:15	Water				X	X	X	X	X			temp = 11.3 C
	WWTP Effluent Bacti	6	2018 – 4 – 11	14:15	Water	X										temp = C
3	Elkriver Upstram Routine	7	2018 – 4 – 11	14:30	Water		X	X								temp = 5.4 C
	Elkriver Upstream Nutrient	8	2018 – 4 – 11	14:30	Water				X	X	X	X	X			temp = 5.4 C
	Elkriver Upstream Bacti	9	2018 – 4 – 11	14:30	Water	X										temp = 5.4 C
4	Elkriver Outfall Routine	10	2018 – 4 – 11	14:45	Water		X	X								temp = 3.5 C
	Elkriver Outfall Nutrient	11	2018 – 4 – 11	14:45	Water				X	X	X	X	X			temp = 3.5 C
	Elkriver Outfall Bacti	12	2018 – 4 – 11	14:45	Water	X										temp = 3.5 C
5	Elkriver downstream Routine	13	2018 – 4 – 11	15:00	Water		X	X								temp = 7.7 C
	Elkriver downstream Nutrient	14	2018 – 4 – 11	15:00	Water				X	X	X	X	X			temp = 7.7 C
	Elkriver downstream Bacti	15	2018 – 4 – 11	15:00	Water	X										temp = 7.7 C

Ambient air + 3°C

FOR LAB USE ONLY

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

SEND INVOICE TO: ☒ SAME AS REPORT

INVOICE FORMAT: ☐ 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:	2018 – 4 – 11	RECEIVED BY:	DATE:	4/12
HUNGRY BAYTALUKE	TIME:	5:00 pm		TIME:	9:10
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: 7 °C

Frozen? ___Yes ___No

Cooling Method? ___Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

Date Received: 19-APR-18
Report Date: 24-APR-18 17:28 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2082258

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - SPRING 2018 EMS WK #6
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2082258-1 WWTP INFLUENT							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	28.9	DLHC	6.0	mg/L		19-APR-18	R4022290
Total Suspended Solids	45.3		3.0	mg/L		23-APR-18	R4022078
pH	8.17		0.10	pH		23-APR-18	R4021864
L2082258-2 WWTP EFFLUENT							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		23-APR-18	R4021168
Biochemical Oxygen Demand	<2.0		2.0	mg/L		19-APR-18	R4022290
Chemical Oxygen Demand	<10		10	mg/L		23-APR-18	R4021818
Orthophosphate-Dissolved (as P)	0.220		0.010	mg/L		20-APR-18	R4018218
Coliform Bacteria - Fecal	17		1	CFU/100mL		19-APR-18	R4018303
Phosphorus (P)-Total	0.248		0.020	mg/L	23-APR-18	24-APR-18	R4022111
Total Suspended Solids	<3.0		3.0	mg/L		23-APR-18	R4022078
pH	8.27		0.10	pH		23-APR-18	R4021864
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	11.4		0.020	mg/L		19-APR-18	R4018067
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	11.4		0.050	mg/L		20-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-APR-18	R4018067
L2082258-3 ELKRIVER UPSTREAM							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 14:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		23-APR-18	R4021168
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		20-APR-18	R4018218
Coliform Bacteria - Fecal	1		1	CFU/100mL		19-APR-18	R4018303
Phosphorus (P)-Total	<0.020		0.020	mg/L	23-APR-18	24-APR-18	R4022111
Total Suspended Solids	5.3		3.0	mg/L		23-APR-18	R4022078
pH	8.38		0.10	pH		23-APR-18	R4021864
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.57		0.020	mg/L		19-APR-18	R4018067
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.57		0.050	mg/L		20-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-APR-18	R4018067
L2082258-4 ELKRIVER OUTFALL							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 14:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		23-APR-18	R4021168
Orthophosphate-Dissolved (as P)	0.013		0.010	mg/L		20-APR-18	R4018218
Coliform Bacteria - Fecal	30		1	CFU/100mL		19-APR-18	R4018303
Phosphorus (P)-Total	0.022		0.020	mg/L	23-APR-18	24-APR-18	R4022111
Total Suspended Solids	6.7		3.0	mg/L		23-APR-18	R4022078

* 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
L2082258-4 ELKRIVER OUTFALL							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 14:45							
Matrix: Water							
pH	8.28		0.10	pH		23-APR-18	R4021864
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.199		0.020	mg/L		19-APR-18	R4018067
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.199		0.050	mg/L		20-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-APR-18	R4018067
L2082258-5 ELKRIVER DOWNSTREAM							
Sampled By: Hungry Baytaluke on 18-APR-18 @ 15:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		23-APR-18	R4021168
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		20-APR-18	R4018218
Coliform Bacteria - Fecal	2		1	CFU/100mL		19-APR-18	R4018303
Phosphorus (P)-Total	<0.020		0.020	mg/L	23-APR-18	24-APR-18	R4022111
Total Suspended Solids	7.3		3.0	mg/L		23-APR-18	R4022078
pH	8.38		0.10	pH		23-APR-18	R4021864
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.73		0.020	mg/L		19-APR-18	R4018067
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.73		0.050	mg/L		20-APR-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-APR-18	R4018067

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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

(ALS)

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-41
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel:
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-51
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 78
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-522
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-

L2082258-COFC

CHAIN OF CUSTODY FORM

PAGE / OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION	ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East		
CITY:	CALGARY PROV: ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669 FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2018 EMS wk # 6	QUOTE NO:	
PO NO.:	ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com	
REPORT FORMAT:	☒ ☒ ☐ ☐ ☒ ☐	pmajer@skircr.com	

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION		DATE (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	2018 – 4 – 18	14:00	Water		X	X												temp = C
	WWTP Influent BOD	2	2018 – 4 – 18	14:00	Water									X						temp = C
2	WWTP Effluent Routine	3	2018 – 4 – 18	14:15	Water		X	X							X					temp = C
	WWTP Effluent BOD	4	2018 – 4 – 18	14:15	Water									X						temp = C
	WWTP Effluent Nutrient	5	2018 – 4 – 18	14:15	Water				X	X	X	X	X							temp = C
	WWTP Effluent Bacti	6	2018 – 4 – 18	14:15	Water	X														temp = C
3	Elkriver Upstream Routine	7	2018 – 4 – 18	14:30	Water		X	X												temp = C
	Elkriver Upstream Nutrient	8	2018 – 4 – 18	14:30	Water				X	X	X	X	X							temp = C
	Elkriver Upstream Bacti	9	2018 – 4 – 18	14:30	Water	X														temp = C
4	Elkriver Outfall Routine	10	2018 – 4 – 18	14:45	Water		X	X												temp = C
	Elkriver Outfall Nutrient	11	2018 – 4 – 18	14:45	Water				X	X	X	X	X							temp = C
	Elkriver Outfall Bacti	12	2018 – 4 – 18	14:45	Water	X														temp = C
5	Elkriver downstream Routine	13	2018 – 4 – 18	15:00	Water		X	X												temp = C
	Elkriver downstream Nutrient	14	2018 – 4 – 18	15:00	Water				X	X	X	X	X							temp = C
	Elkriver downstream Bacti	15	2018 – 4 – 18	15:00	Water	X														temp = C

FOR LAB USE ONLY

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

SEND INVOICE TO: ☒ ☐

INVOICE FORMAT: ☐ ☐ ☐

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

RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2018 – 4 – 18	TIME: 5:00 pm	RECEIVED BY:	DATE: TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY: DK	DATE: 04/19/18 TIME: 8:50

FOR LAB USE ONLY

Cooler Seal Intact? ✓ Yes __No __N/A

Sample Temperature: 6 °C

Frozen? ✓ Yes __No

Cooling Method? ✓ Icepacks __Ice __None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

Date Received: 06-DEC-18
Report Date: 19-DEC-18 13:46 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2206878

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL 2018 EMS WK #1
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2206878-1 WWTP INFLUENT							
Sampled By: HB on 05-DEC-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	42	DLHC	20	mg/L		07-DEC-18	R4392847
Total Suspended Solids	66.7		3.0	mg/L		11-DEC-18	R4393639
pH	7.89		0.10	pH		10-DEC-18	R4389590
L2206878-2 WWTP EFFLUENT							
Sampled By: HB on 05-DEC-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-DEC-18	R4393652
Biochemical Oxygen Demand	<2.0		2.0	mg/L		07-DEC-18	R4392847
Chemical Oxygen Demand	<10		10	mg/L		10-DEC-18	R4389749
Orthophosphate-Dissolved (as P)	0.132	HTD	0.050	mg/L		09-DEC-18	R4384278
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-DEC-18	R4382187
Nitrate (as N)	21.4		0.020	mg/L		07-DEC-18	R4388287
Nitrate and Nitrite (as N)	21.4		0.050	mg/L		11-DEC-18	
Nitrite (as N)	0.021		0.010	mg/L		07-DEC-18	R4388287
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		18-DEC-18	R4400354
Total Suspended Solids	<3.0		3.0	mg/L		11-DEC-18	R4393639
pH	8.22		0.10	pH		10-DEC-18	R4389590
L2206878-3 ELKRIVER UPSTREAM							
Sampled By: HB on 05-DEC-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-DEC-18	R4393652
Orthophosphate-Dissolved (as P)	0.0111	HTD	0.0050	mg/L		09-DEC-18	R4384278
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-DEC-18	R4382187
Nitrate (as N)	1.68		0.020	mg/L		07-DEC-18	R4388287
Nitrate and Nitrite (as N)	1.68		0.050	mg/L		11-DEC-18	
Nitrite (as N)	<0.010		0.010	mg/L		07-DEC-18	R4388287
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		18-DEC-18	R4400354
Total Suspended Solids	<3.0		3.0	mg/L		11-DEC-18	R4393639
pH	8.44		0.10	pH		10-DEC-18	R4389590
L2206878-4 ELKRIVER OUTFALL							
Sampled By: HB on 05-DEC-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-DEC-18	R4393652
Orthophosphate-Dissolved (as P)	0.0370	HTD	0.0050	mg/L		09-DEC-18	R4384278
Coliform Bacteria - Fecal	5		1	CFU/100mL		06-DEC-18	R4382187
Nitrate (as N)	2.52		0.020	mg/L		07-DEC-18	R4388287
Nitrate and Nitrite (as N)	2.52		0.050	mg/L		11-DEC-18	
Nitrite (as N)	<0.010		0.010	mg/L		07-DEC-18	R4388287
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		18-DEC-18	R4400354
Total Suspended Solids	<3.0		3.0	mg/L		11-DEC-18	R4393639
pH	8.34		0.10	pH		10-DEC-18	R4389590
L2206878-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 05-DEC-18 @ 15:00							
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
L2206878-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 05-DEC-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-DEC-18	R4393652
Orthophosphate-Dissolved (as P)	0.0099	HTD	0.0050	mg/L		09-DEC-18	R4384278
Coliform Bacteria - Fecal	<1		1	CFU/100mL		06-DEC-18	R4382187
Nitrate (as N)	1.66		0.020	mg/L		07-DEC-18	R4388287
Nitrate and Nitrite (as N)	1.66		0.050	mg/L		11-DEC-18	
Nitrite (as N)	<0.010		0.010	mg/L		07-DEC-18	R4388287
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		18-DEC-18	R4400354
Total Suspended Solids	4.0		3.0	mg/L		11-DEC-18	R4393639
pH	8.43		0.10	pH		10-DEC-18	R4389590

* 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.
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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax
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:
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax:

L2206878-COFC

CHAIN OF CUSTODY FORM

PAGE ___ OF ___

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 256 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 1			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com		
REPORT FORMAT:	☒ HARDCOPY ☒ EDD ☐ EXCEL ☐ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

Please ship 8 large hard sided coolers W
BOD_2 x6
Routine 5 x 6
Nutrient 4 x 6
bacti 4 x 6

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.)
FOR LAB USE ONLY	WWTP Influent Routine	1	2018 – 12 – 5	14:00	Water		X	X								temp = 8.6 C
	WWTP Influent BOD	2	2018 – 12 – 5	14:00	Water									X		temp = 8.6 C
	WWTP Effluent Routine	3	2018 – 12 – 5	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2018 – 12 – 5	14:15	Water									X		temp = 12.1 C
	WWTP Effluent Nutrient	5	2018 – 12 – 5	14:15	Water				X	X	X	X	X			temp = 12.1 C
	WWTP Effluent Bacti	6	2018 – 12 – 5	14:15	Water	X										temp = C
	Elkriver Upstream Routine	7	2018 – 12 – 5	14:30	Water		X	X								temp = C
	Elkriver Upstream Nutrient	8	2018 – 12 – 5	14:30	Water				X	X	X	X	X			temp = 0.8 C
	Elkriver Upstream Bacti	9	2018 – 12 – 5	14:30	Water	X										temp = 0.8 C
	Elkriver Outfall Routine	10	2018 – 12 – 5	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2018 – 12 – 5	14:45	Water				X	X	X	X	X			temp = 1.2 C
	Elkriver Outfall Bacti	12	2018 – 12 – 5	14:45	Water	X										temp = 1.2 C
	Elkriver downstream Routine	13	2018 – 12 – 5	15:00	Water		X	X								temp = C
	Elkriver downstream Nutrient	14	2018 – 12 – 5	15:00	Water				X	X	X	X	X			temp = 0.5 C
	Elkriver downstream Bacti	15	2018 – 12 – 5	15:00	Water	X										temp = 0.5 C

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

SEND INVOICE TO: ☒ SAME AS REPORT ☐ DIFFERENT

INVOICE FORMAT: ☐ HARDCOPY ☐ EDD ☐ EXCEL ☐ PDF

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

RELINQUISHED BY:	DATE: 2018 – 12 – 5	RECEIVED BY:	DATE: 12/6
HUNGRY BAYTALUKE	TIME: 5:00 pm		TIME: 9:20
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	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: 13-DEC-18
Report Date: 28-DEC-18 10:57 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2209949

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL 2018 EMS WEEK #2
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2209949-1 WWTP INFLUENT							
Sampled By: HB on 12-DEC-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	42	DLHC	20	mg/L		13-DEC-18	R4401508
Total Suspended Solids	48.0	DLHC	9.0	mg/L		17-DEC-18	R4400807
pH	7.97		0.10	pH		13-DEC-18	R4395413
L2209949-2 WWTP EFFLUENT							
Sampled By: HB on 12-DEC-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-DEC-18	R4405928
Biochemical Oxygen Demand	<2.0		2.0	mg/L		13-DEC-18	R4401508
Chemical Oxygen Demand	<10		10	mg/L		18-DEC-18	R4402051
Orthophosphate-Dissolved (as P)	0.152		0.0050	mg/L		15-DEC-18	R4396544
Coliform Bacteria - Fecal	<1		1	CFU/100mL		13-DEC-18	R4396156
Nitrate (as N)	27.9	DLHC	0.10	mg/L		13-DEC-18	R4396158
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		13-DEC-18	R4396158
Phosphorus (P)-Total	0.219		0.0050	mg/L		21-DEC-18	R4409788
Total Suspended Solids	<3.0		3.0	mg/L		17-DEC-18	R4400807
pH	8.00		0.10	pH		13-DEC-18	R4395413
L2209949-3 ELKRIVER UPSTREAM							
Sampled By: HB on 12-DEC-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.062		0.050	mg/L		20-DEC-18	R4405928
Orthophosphate-Dissolved (as P)	0.0104		0.0050	mg/L		15-DEC-18	R4396544
Coliform Bacteria - Fecal	<1		1	CFU/100mL		13-DEC-18	R4396156
Nitrate (as N)	2.10		0.020	mg/L		13-DEC-18	R4396158
Nitrite (as N)	<0.010		0.010	mg/L		13-DEC-18	R4396158
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		21-DEC-18	R4409788
Total Suspended Solids	4.7		3.0	mg/L		17-DEC-18	R4400807
pH	5.56		0.10	pH		13-DEC-18	R4395413
L2209949-4 ELKRIVER OUTFALL							
Sampled By: HB on 12-DEC-18 @ 16:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-DEC-18	R4405928
Orthophosphate-Dissolved (as P)	0.0198		0.0050	mg/L		15-DEC-18	R4396544
Coliform Bacteria - Fecal	11		1	CFU/100mL		13-DEC-18	R4396156
Nitrate (as N)	0.124		0.020	mg/L		13-DEC-18	R4396158
Nitrite (as N)	<0.010		0.010	mg/L		13-DEC-18	R4396158
Phosphorus (P)-Total	0.0106	RRV	0.0050	mg/L		21-DEC-18	R4409788
Total Suspended Solids	<3.0		3.0	mg/L		17-DEC-18	R4400807
pH	4.88		0.10	pH		13-DEC-18	R4395413
L2209949-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 12-DEC-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-DEC-18	R4405928
Orthophosphate-Dissolved (as P)	0.0198		0.0050	mg/L		15-DEC-18	R4396544

* 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
L2209949-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 12-DEC-18 @ 15:00							
Matrix: WATER							
Coliform Bacteria - Fecal	1		1	CFU/100mL		13-DEC-18	R4396156
Nitrate (as N)	2.08		0.020	mg/L		13-DEC-18	R4396158
Nitrite (as N)	<0.010		0.010	mg/L		13-DEC-18	R4396158
Phosphorus (P)-Total	<0.0050	RCR	0.0050	mg/L		27-DEC-18	R4411807
Total Suspended Solids	<3.0		3.0	mg/L		17-DEC-18	R4400807
pH	8.32		0.10	pH		13-DEC-18	R4395413

* 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).
RCR	Result Confirmed After Data Review
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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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.

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: 1-800-668-9878 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 East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 2			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

L2209949-COFC

Ambient air temp -10C

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	2018 – 12– 12	14:00	Water		X	X											temp = 8.9 C
	WWTP Influent BOD	2	2018 – 12– 12	14:00	Water									X					temp = 8.9 C
	WWTP Effluent Routine	3	2018 – 12– 12	14:15	Water		X	X							X				temp = 11.4 C
	WWTP Effluent BOD	4	2018 – 12– 12	14:15	Water									X					temp = 11.4 C
	WWTP Effluent Nutrient	5	2018 – 12– 12	14:15	Water				X	X	X	X	X						temp = 11.4 C
	WWTP Effluent Bacti	6	2018 – 12 - 12	14:15	Water	X													temp = 11.4 C
	Elkriver Upstream Routine	7	2018 – 12– 12	14:30	Water		X	X											temp = 0.9 C
	Elkriver Upstream Nutrient	8	2018 – 12– 12	14:30	Water				X	X	X	X	X						temp = 0.9 C
	Elkriver Upstream Bacti	9	2018 – 12– 12	14:30	Water	X													temp = 0.9 C
	Elkriver Outfall Routine	10	2018 – 12– 12	14:45	Water		X	X											temp = 0.9 C
	Elkriver Outfall Nutrient	11	2018 – 12– 12	14:45	Water				X	X	X	X	X						temp = 0.9 C
	Elkriver Outfall Bacti	12	2018 – 12– 12	14:45	Water	X													temp = 0.9 C
	Elkriver downstream Routine	13	2018 – 12– 12	15:00	Water		X	X											temp = 0.4 C
	Elkriver downstream Nutrient	14	2018 – 12– 12	15:00	Water				X	X	X	X	X						temp = 0.4 C
	Elkriver downstream Bacti	15	2018 – 12– 12	15:00	Water	X													temp = 0.4 C

TURN AROUND REQUIRED:	● REGULAR	SPECIFY DATE: ____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2018– 12– 12	RECEIVED BY:	DATE: 12/13
SEND INVOICE TO:	☒ SAME ☐ DIFFERENT		HUNGRY BAYTALUKE	TIME: 5:00 pm		TIME: 9:00
INVOICE FORMAT:	☐ HARDMAIL ☐ FAX ☐ PDF		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:

5°

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: 20-DEC-18
Report Date: 04-JAN-19 14:58 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2213201

Project P.O. #: NOT SUBMITTED
Job Reference: FARUC - FALL 2018 EMS WK #3
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-JAN-19 15:03

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2213201-1 WWTP INFLUENT							
Sampled By: HB on 19-DEC-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	65	DLHC	20	mg/L		22-DEC-18	R4415949
Total Suspended Solids	98.8	DLHC	6.0	mg/L		23-DEC-18	R4414188
pH	7.72		0.10	pH		24-DEC-18	R4414029
L2213201-2 WWTP EFFLUENT							
Sampled By: HB on 19-DEC-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-DEC-18	R4417495
Biochemical Oxygen Demand	<2.0		2.0	mg/L		22-DEC-18	R4415949
Chemical Oxygen Demand	<10		10	mg/L		28-DEC-18	R4419125
Orthophosphate-Dissolved (as P)	0.335	DLHC	0.050	mg/L		22-DEC-18	R4412127
Coliform Bacteria - Fecal	6		1	CFU/100mL		20-DEC-18	R4412754
Nitrate (as N)	21.2		0.020	mg/L		20-DEC-18	R4412308
Nitrite (as N)	<0.010		0.010	mg/L		20-DEC-18	R4412308
Phosphorus (P)-Total	0.445		0.020	mg/L	03-JAN-19	04-JAN-19	R4427733
Total Suspended Solids	<3.0		3.0	mg/L		23-DEC-18	R4414188
pH	8.09		0.10	pH		24-DEC-18	R4414029
L2213201-3 ELKRIVER UPSTREAM							
Sampled By: HB on 19-DEC-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-DEC-18	R4417495
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		22-DEC-18	R4412127
Coliform Bacteria - Fecal	3		1	CFU/100mL		20-DEC-18	R4412754
Nitrate (as N)	1.88		0.020	mg/L		20-DEC-18	R4412308
Nitrite (as N)	<0.010		0.010	mg/L		20-DEC-18	R4412308
Phosphorus (P)-Total	<0.020		0.020	mg/L	03-JAN-19	04-JAN-19	R4427733
Total Suspended Solids	<3.0		3.0	mg/L		23-DEC-18	R4414188
pH	8.41		0.10	pH		24-DEC-18	R4414029
L2213201-4 ELKRIVER OUTFALL							
Sampled By: HB on 19-DEC-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-DEC-18	R4417495
Orthophosphate-Dissolved (as P)	0.0220		0.0050	mg/L		22-DEC-18	R4412127
Coliform Bacteria - Fecal	21		1	CFU/100mL		20-DEC-18	R4412754
Nitrate (as N)	0.170		0.020	mg/L		20-DEC-18	R4412308
Nitrite (as N)	<0.010		0.010	mg/L		20-DEC-18	R4412308
Phosphorus (P)-Total	0.028		0.020	mg/L	03-JAN-19	04-JAN-19	R4427733
Total Suspended Solids	6.0		3.0	mg/L		23-DEC-18	R4414188
pH	8.25		0.10	pH		24-DEC-18	R4414029
L2213201-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 19-DEC-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-DEC-18	R4417495
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		22-DEC-18	R4412127

* 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
L2213201-5 ELKRIVER DOWNSTREAM							
Sampled By: HB on 19-DEC-18 @ 15:00							
Matrix: WATER							
Coliform Bacteria - Fecal	6		1	CFU/100mL		20-DEC-18	R4412754
Nitrate (as N)	1.73		0.020	mg/L		20-DEC-18	R4412308
Nitrite (as N)	<0.010		0.010	mg/L		20-DEC-18	R4412308
Phosphorus (P)-Total	<0.020		0.020	mg/L	03-JAN-19	04-JAN-19	R4427733
Total Suspended Solids	<3.0		3.0	mg/L		23-DEC-18	R4414188
pH	8.39		0.10	pH		24-DEC-18	R4414029

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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.

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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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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L2213201-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION	ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East		
CITY:	CALGARY PROV: ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669 FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 3	QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com
REPORT FORMAT:	☒ [illegible] ☒ [illegible] pmajer@skircr.com ☐ [illegible] ☐ [illegible] ☒ [illegible] ☐ [illegible]		

ANALYSIS REQUESTED:

Ambient Air- 0°C

WO#	SAMPLE IDENTIFICATION	DATE (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	2018 – 12– 19	14:00	Water		X	X												temp = 8.1 C
	WWTP Influent BOD 2	2018 – 12– 19	14:00	Water									X						temp = C
	WWTP Effluent Routine 3	2018 – 12– 19	14:15	Water		X	X							X					temp = C
	WWTP Effluent BOD 4	2018 – 12– 19	14:15	Water									X						temp = 11.8 C
	WWTP Effluent Nutrient 5	2018 – 12– 19	14:15	Water				X	X	X	X	X							temp = C
	WWTP Effluent Bacti 6	2018 – 12– 19	14:15	Water	X														temp = C
	Elkriver Upstream Routine 7	2018 – 12– 19	14:30	Water		X	X												temp = C
	Elkriver Upstream Nutrient 8	2018 – 12– 19	14:30	Water				X	X	X	X	X							temp = 2.3 C
	Elkriver Upstream Bacti 9	2018 – 12– 19	14:30	Water	X														temp = C
	Elkriver Outfall Routine 10	2018 – 12– 19	14:45	Water		X	X												temp = C
	Elkriver Outfall Nutrient 11	2018 – 12– 19	14:45	Water				X	X	X	X	X							temp = 2.2 C
	Elkriver Outfall Bacti 12	2018 – 12– 19	14:45	Water	X														temp = C
	Elkriver downstream Routine 13	2018 – 12– 19	15:00	Water		X	X												temp = C
	Elkriver downstream Nutrient 14	2018 – 12– 19	15:00	Water				X	X	X	X	X							temp = 2.1 C
	Elkriver downstream Bacti 15	2018 – 12– 19	15:00	Water	X														temp = C

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ [illegible] SPECIFY DATE: ______ (surcharge may apply)	RELINQUISHED BY:	DATE:	2018– 12– 19	RECEIVED BY:	DATE:	12/20
		HUNGRY BAYTALUKE	TIME:	5:00 pm		TIME:	8:45
SEND INVOICE TO:	☒ [illegible] ☐ [illegible]	RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
INVOICE FORMAT:	☐ [illegible] ☐ [illegible] ☐ [illegible]		TIME:			TIME:	

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

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

Date Received: 28-DEC-18
Report Date: 07-JAN-19 10:25 (MT)
Version: FINAL

Client Phone: 403-258-7669

Certificate of Analysis

Lab Work Order #: L2214870

Project P.O. #: NOT SUBMITTED
Job Reference: F A R U C - FALL 2018 EMS WK # 4
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2214870-1 WWTP INFLUENT							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	157	BODP	75	mg/L		28-DEC-18	R4425752
Total Suspended Solids	298	DLHC	23	mg/L		02-JAN-19	R4425290
pH	7.34		0.10	pH		04-JAN-19	R4427594
L2214870-2 WWTP EFFLUENT							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-19	R4427380
Biochemical Oxygen Demand	<2.0		2.0	mg/L		28-DEC-18	R4425752
Chemical Oxygen Demand	18		10	mg/L		29-DEC-18	R4419329
Orthophosphate-Dissolved (as P)	0.262		0.0050	mg/L		29-DEC-18	R4418962
Coliform Bacteria - Fecal	48		1	CFU/100mL		28-DEC-18	R4419159
Nitrate (as N)	31.3		0.020	mg/L		28-DEC-18	R4418887
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-18	R4418887
Phosphorus (P)-Total	0.335		0.0050	mg/L		02-JAN-19	R4423468
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-19	R4425290
pH	7.83		0.10	pH		04-JAN-19	R4427594
L2214870-3 ELKRIVER UPSTREAM							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-19	R4427380
Orthophosphate-Dissolved (as P)	0.0091		0.0050	mg/L		29-DEC-18	R4418962
Coliform Bacteria - Fecal	<1		1	CFU/100mL		28-DEC-18	R4419159
Nitrate (as N)	1.91		0.020	mg/L		28-DEC-18	R4418887
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-18	R4418887
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		02-JAN-19	R4423468
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-19	R4425290
pH	8.35		0.10	pH		04-JAN-19	R4427594
L2214870-4 ELKRIVER OUTFALL							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-19	R4427380
Orthophosphate-Dissolved (as P)	0.0230		0.0050	mg/L		29-DEC-18	R4418962
Coliform Bacteria - Fecal	59		1	CFU/100mL		28-DEC-18	R4419159
Nitrate (as N)	0.280		0.020	mg/L		28-DEC-18	R4418887
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-18	R4418887
Phosphorus (P)-Total	0.0180	RRV	0.0050	mg/L		02-JAN-19	R4423468
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-19	R4425290
pH	8.20		0.10	pH		04-JAN-19	R4427594
L2214870-5 ELKRIVER DOWNSTREAM							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-19	R4427380
Orthophosphate-Dissolved (as P)	0.0105		0.0050	mg/L		29-DEC-18	R4418962

* 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
L2214870-5 ELKRIVER DOWNSTREAM							
Sampled By: KIRKLAND MATCHIM on 27-DEC-18 @ 15:00							
Matrix: WATER							
Coliform Bacteria - Fecal	<1		1	CFU/100mL		28-DEC-18	R4419159
Nitrate (as N)	1.86		0.020	mg/L		28-DEC-18	R4418887
Nitrite (as N)	<0.010		0.010	mg/L		28-DEC-18	R4418887
Phosphorus (P)-Total	<0.0050	RRV	0.0050	mg/L		02-JAN-19	R4423468
Total Suspended Solids	<3.0		3.0	mg/L		02-JAN-19	R4425290
pH	8.33		0.10	pH		04-JAN-19	R4427594

* 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).
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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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.

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: 1-800-
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Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-6
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free:
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-

L2214870-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Kirkland Matchim
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 4			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com		
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.)
FOR LAB USE ONLY	WWTP Influent Routine	1	2018 – 12– 27	14:00	Water		X	X												temp = 12.0 C
	WWTP Influent BOD	2	2018 – 12– 27	14:00	Water									X						temp = 12.0 C
	WWTP Effluent Routine	3	2018 – 12– 27	14:15	Water		X	X							X					temp = 12.6 C
	WWTP Effluent BOD	4	2018 – 12– 27	14:15	Water									X						temp = 12.6 C
	WWTP Effluent Nutrient	5	2018 – 12– 27	14:15	Water				X	X	X	X	X							temp = 12.6 C
	WWTP Effluent Bacti	6	2018 – 12– 27	14:15	Water	X														temp = 12.6 C
	Elkriver Upstream Routine	7	2018 – 12– 27	14:30	Water		X	X												temp = 0.5 C
	Elkriver Upstream Nutrient	8	2018 – 12– 27	14:30	Water				X	X	X	X	X							temp = 0.5 C
	Elkriver Upstream Bacti	9	2018 – 12– 27	14:30	Water	X														temp = 0.5 C
	Elkriver Outfall Routine	10	2018 – 12– 27	14:45	Water		X	X												temp = 0.3 C
	Elkriver Outfall Nutrient	11	2018 – 12– 27	14:45	Water				X	X	X	X	X							temp = 0.3 C
	Elkriver Outfall Bacti	12	2018 – 12– 27	14:45	Water	X														temp = 0.3 C
	Elkriver downstream Routine	13	2018 – 12– 27	15:00	Water		X	X												temp = 0.0 C
	Elkriver downstream Nutrient	14	2018 – 12– 27	15:00	Water				X	X	X	X	X							temp = 0.0 C
	Elkriver downstream Bacti	15	2018 – 12– 27	15:00	Water	X														temp = 0.0 C

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

SEND INVOICE TO: ☒ SAME AS REPORT

INVOICE FORMAT: ☐ HARDMAIL ☐ FAX ☐

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

RELINQUISHED BY:	DATE:	2018– 12– 27	RECEIVED BY:	DATE:	28/12
Kirkland Matchim	TIME:	5:00 pm		TIME:	9:20
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 4 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\Hungry's CoC for ALS MI EMS.xls

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

Date Received: 03-JAN-19
Report Date: 10-JAN-19 10:28 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2216097

Project P.O. #: NOT SUBMITTED
Job Reference: F A R U C - FALL 2018 EMS WK # 5
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2216097-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	178	DLHC	75	mg/L		04-JAN-19	R4436287
Total Suspended Solids	277	DLHC	15	mg/L		03-JAN-19	R4427534
pH	7.77		0.10	pH		07-JAN-19	R4432731
L2216097-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.092	RRV	0.050	mg/L		07-JAN-19	R4430507
Biochemical Oxygen Demand	<2.0		2.0	mg/L		04-JAN-19	R4436287
Chemical Oxygen Demand	20		10	mg/L		07-JAN-19	R4431928
Orthophosphate-Dissolved (as P)	0.501		0.010	mg/L		04-JAN-19	R4428652
Coliform Bacteria - Fecal	54		1	CFU/100mL		03-JAN-19	R4429074
Nitrate (as N)	35.1	DLHC	0.10	mg/L		04-JAN-19	R4429300
Nitrite (as N)	0.109	DLHC	0.050	mg/L		04-JAN-19	R4429300
Phosphorus (P)-Total	0.689		0.020	mg/L	05-JAN-19	06-JAN-19	R4429575
Total Suspended Solids	3.3		3.0	mg/L		03-JAN-19	R4427534
pH	7.90		0.10	pH		07-JAN-19	R4432731
L2216097-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		07-JAN-19	R4430507
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		04-JAN-19	R4428652
Coliform Bacteria - Fecal	<1		1	CFU/100mL		03-JAN-19	R4429074
Nitrate (as N)	1.66		0.020	mg/L		04-JAN-19	R4429300
Nitrite (as N)	<0.010		0.010	mg/L		04-JAN-19	R4429300
Phosphorus (P)-Total	<0.020		0.020	mg/L	05-JAN-19	06-JAN-19	R4429575
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-19	R4427534
pH	8.34		0.10	pH		07-JAN-19	R4432731
L2216097-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.116	RRV	0.050	mg/L		07-JAN-19	R4430507
Orthophosphate-Dissolved (as P)	0.033		0.010	mg/L		04-JAN-19	R4428652
Coliform Bacteria - Fecal	39		1	CFU/100mL		03-JAN-19	R4429074
Nitrate (as N)	1.33		0.020	mg/L		04-JAN-19	R4429300
Nitrite (as N)	0.041		0.010	mg/L		04-JAN-19	R4429300
Phosphorus (P)-Total	0.033		0.020	mg/L	05-JAN-19	06-JAN-19	R4429575
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-19	R4427534
pH	8.29		0.10	pH		07-JAN-19	R4432731
L2216097-5 ELKRIVER DOWN STREAM							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		07-JAN-19	R4430507
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		04-JAN-19	R4428652

* 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
L2216097-5 ELKRIVER DOWN STREAM							
Sampled By: HUNGRY BAYTALUKE on 02-JAN-19 @ 15:00							
Matrix: WATER							
Coliform Bacteria - Fecal	2		1	CFU/100mL		03-JAN-19	R4429074
Nitrate (as N)	1.63		0.020	mg/L		04-JAN-19	R4429300
Nitrite (as N)	<0.010		0.010	mg/L		04-JAN-19	R4429300
Phosphorus (P)-Total	<0.020		0.020	mg/L	05-JAN-19	06-JAN-19	R4429575
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-19	R4427534
pH	8.34		0.10	pH		07-JAN-19	R4432731

* 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).
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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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 S
Fort St. John BC, Box 256, 983
Grand Prairie AB, 9595 - 111 S
Fort McMurray AB, Bay 1, 245
Edmonton AB, 9936 - 67th Ave
Calgary AB, Bay 7, 1313 - 44th
Saskatoon SK, 819 - 58th Stree

153-6700
513-2191
87-2311
: 403-291-0298
-668-8383

L2216097-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com		
REPORT FORMAT:	☒ HARD MAIL ☐ FAX ☒ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

Ambient air - 2 °C

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	2019 – 1– 2	14:00	Water		X	X								temp = 11.0 C
	WWTP Influent BOD	2	2019 – 1– 2	14:00	Water									X		temp = C
	WWTP Effluent Routine	3	2019 – 1– 2	14:15	Water		X	X							X	temp = C
2	WWTP Effluent BOD	4	2019 – 1– 2	14:15	Water									X		temp = 13.1 C
	WWTP Effluent Nutrient	5	2019 – 1– 2	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2019 – 1– 2	14:15	Water	X										temp = C
3	Elkriver Upstream Routine	7	2019 – 1– 2	14:30	Water		X	X								temp = 0.1 C
	Elkriver Upstream Nutrient	8	2019 – 1– 2	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	9	2019 – 1– 2	14:30	Water	X										temp = C
4	Elkriver Outfall Routine	10	2019 – 1– 2	14:45	Water		X	X								temp = 3.9 C
	Elkriver Outfall Nutrient	11	2019 – 1– 2	14:45	Water				X	X	X	X	X			temp = C
	Elkriver Outfall Bacti	12	2019 – 1– 2	14:45	Water	X										temp = C
5	Elkriver downstream Routine	13	2019 – 1– 2	15:00	Water		X	X								temp = C
	Elkriver downstream Nutrient	14	2019 – 1– 2	15:00	Water				X	X	X	X	X			temp = 0.2 C
	Elkriver downstream Bacti	15	2019 – 1– 2	15:00	Water	X										temp = C

FOR LAB USE ONLY

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

SEND INVOICE TO: ☒ SAME AS REPORT TO ☐

INVOICE FORMAT: ☐ HARD ☐ FAX ☐

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

RELINQUISHED BY:	DATE:	2019– 1– 2	RECEIVED BY:	DATE:	1/3
Hungry Baytaluke	TIME:	5:00 pm		TIME:	9:40
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 7 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

Date Received: 10-JAN-19
Report Date: 17-JAN-19 15:39 (MT)
Version: FINAL

Client Phone: 800-258-7669

Certificate of Analysis

Lab Work Order #: L2218795

Project P.O. #: NOT SUBMITTED
Job Reference: F A R U C - FALL 2018 EMS WK # 6
C of C Numbers:
Legal Site Desc:

Justine Buma-a
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2218795-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	98		75	mg/L		10-JAN-19	R4448890
Total Suspended Solids	180	DLHC	9.0	mg/L		12-JAN-19	R4443411
pH	7.46		0.10	pH		16-JAN-19	R4450012
L2218795-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-JAN-19	R4449308
Biochemical Oxygen Demand	<2.0		2.0	mg/L		10-JAN-19	R4448890
Chemical Oxygen Demand	11		10	mg/L		14-JAN-19	R4446389
Orthophosphate-Dissolved (as P)	0.113		0.010	mg/L		11-JAN-19	R4441769
Coliform Bacteria - Fecal	<1		1	CFU/100mL		10-JAN-19	R4441760
Nitrate (as N)	27.8	DLHC	0.10	mg/L		10-JAN-19	R4441548
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		10-JAN-19	R4441548
Phosphorus (P)-Total	0.132		0.020	mg/L	16-JAN-19	17-JAN-19	R4452507
Total Suspended Solids	<3.0		3.0	mg/L		12-JAN-19	R4443411
pH	7.86		0.10	pH		16-JAN-19	R4450012
L2218795-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 14:30							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-JAN-19	R4449308
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		11-JAN-19	R4441769
Coliform Bacteria - Fecal	8		1	CFU/100mL		10-JAN-19	R4441760
Nitrate (as N)	1.66		0.020	mg/L		10-JAN-19	R4441548
Nitrite (as N)	<0.010		0.010	mg/L		10-JAN-19	R4441548
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-JAN-19	17-JAN-19	R4452507
Total Suspended Solids	<3.0		3.0	mg/L		12-JAN-19	R4443411
pH	8.31		0.10	pH		16-JAN-19	R4450012
L2218795-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 14:45							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-JAN-19	R4449308
Orthophosphate-Dissolved (as P)	0.012		0.010	mg/L		11-JAN-19	R4441769
Coliform Bacteria - Fecal	1		1	CFU/100mL		10-JAN-19	R4441760
Nitrate (as N)	0.049		0.020	mg/L		10-JAN-19	R4441548
Nitrite (as N)	<0.010		0.010	mg/L		10-JAN-19	R4441548
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-JAN-19	17-JAN-19	R4452507
Total Suspended Solids	<3.0		3.0	mg/L		12-JAN-19	R4443411
pH	8.15		0.10	pH		16-JAN-19	R4450012
L2218795-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-JAN-19	R4449308
Orthophosphate-Dissolved (as P)	<0.010		0.010	mg/L		11-JAN-19	R4441769

* 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
L2218795-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 09-JAN-19 @ 15:00							
Matrix: WATER							
Coliform Bacteria - Fecal	5		1	CFU/100mL		10-JAN-19	R4441760
Nitrate (as N)	1.62		0.020	mg/L		10-JAN-19	R4441548
Nitrite (as N)	<0.010		0.010	mg/L		10-JAN-19	R4441548
Phosphorus (P)-Total	<0.020		0.020	mg/L	16-JAN-19	17-JAN-19	R4452507
Total Suspended Solids	<3.0		3.0	mg/L		12-JAN-19	R4443411
pH	8.32		0.10	pH		16-JAN-19	R4450012

* 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

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

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.

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-ED	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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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.

L2218795-COFC

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 East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Fall 2018 EMS wk # 6			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil@ALSGlobal.com		
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.)
FOR LAB USE ONLY																
1	WWTP Influent Routine	1	2019 – 1– 9	14:00	Water		X	X								temp = 10.8 C
	WWTP Influent BOD	2	2019 – 1– 9	14:00	Water									X		temp = C
2	WWTP Effluent Routine	3	2019 – 1– 9	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2019 – 1– 9	14:15	Water									X		temp = 1.1 C
	WWTP Effluent Nutrient	5	2019 – 1– 9	14:15	Water				X	X	X	X	X			temp = 1.1 C
	WWTP Effluent Bacti	6	2019 – 1– 9	14:15	Water	X										temp = 1.1 C
3	Elkriver Upstream Routine	7	2019 – 1– 9	14:30	Water		X	X								temp = 0.4 C
	Elkriver Upstream Nutrient	8	2019 – 1– 9	14:30	Water				X	X	X	X	X			temp = 0.4 C
	Elkriver Upstream Bacti	9	2019 – 1– 9	14:30	Water	X										temp = 0.4 C
4	Elkriver Outfall Routine	10	2019 – 1– 9	14:45	Water		X	X								temp = 0.6 C
	Elkriver Outfall Nutrient	11	2019 – 1– 9	14:45	Water				X	X	X	X	X			temp = 0.6 C
	Elkriver Outfall Bacti	12	2019 – 1– 9	14:45	Water	X										temp = 0.6 C
5	Elkriver downstream Routine	13	2019 – 1– 9	15:00	Water		X	X								temp = 0.3 C
	Elkriver downstream Nutrient	14	2019 – 1– 9	15:00	Water				X	X	X	X	X			temp = 0.3 C
	Elkriver downstream Bacti	15	2019 – 1– 9	15:00	Water	X										temp = 0.3 C

TURN AROUND REQUIRED:	• R(ϕR	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE:	2019– 1– 9	RECEIVED BY:	DATE: 1/10
SEND INVOICE TO:	☒ SAMDIFFERF		Hungry Baytaluke	TIME:	5:00 pm		TIME: 9:00
INVOICE FORMAT:	☐ AZ ☐ ☐		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: 2 °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: 25-MAY-18
Report Date: 06-JUN-18 17:32 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2100515

Project P.O. #: NOT SUBMITTED
Job Reference: FERNIE ALPINE RESORT - MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2100515-1 WWTP INFLUENT							
Sampled By: Hungry Baytaluke on 23-MAY-18 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	62	DLHC	20	mg/L		26-MAY-18	R4064400
Total Suspended Solids	75.2	DLHC	4.0	mg/L		29-MAY-18	R4062473
pH	8.20		0.10	pH		05-JUN-18	R4073647
L2100515-2 WWTP EFFLUENT							
Sampled By: Hungry Baytaluke on 23-MAY-18 @ 15:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-JUN-18	R4072570
Biochemical Oxygen Demand	<2.0		2.0	mg/L		26-MAY-18	R4064400
Orthophosphate-Dissolved (as P)	0.166	DLHC	0.010	mg/L		26-MAY-18	R4056769
Coliform Bacteria - Fecal	1		1	CFU/100mL		25-MAY-18	R4057944
Phosphorus (P)-Total	0.382		0.020	mg/L	31-MAY-18	01-JUN-18	R4064323
Total Suspended Solids	<3.0		3.0	mg/L		29-MAY-18	R4062473
pH	8.08		0.10	pH		05-JUN-18	R4073647
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	35.7	DLHC	0.10	mg/L		26-MAY-18	R4061674
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	35.7		0.11	mg/L		29-MAY-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		26-MAY-18	R4061674

* 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-ED	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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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: 7
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: 78
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax:

L2100515-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION	ATTN:	PATRICK MAJER
ADDRESS:	2559 - 29TH Street North East		
CITY:	CALGARY PROV: ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473 FAX: 403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	Fernie Alpine Resort - Monthly EMS	QUOTE NO:	
PO NO.:	ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com	
REPORT FORMAT:	☒ H/ ☒ EMAI ☐ E ☐ E ☒ P ☐ ( )	pmajer@skircr.com	

ANALYSIS REQUESTED:

Notes: Ambient air temp - 24 °C

WO#	SAMPLE IDENTIFICATION	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 500 ml 1	2018 - 5 – 23	14:00	Water		X	X								13.8 °C
	WWTP Influent BOD 1 litre 2	2018 - 5 – 23	14:00	Water									X		
	WWTP Effluent Routine 500 ml 3	2018 - 5 – 23	15:00	Water		X	X								14.3 °C
	WWTP Effluent BOD 500 ml 4	2018 - 5 – 23	15:15	Water									X		
	WWTP Effluent Nutrients 250 ml + H2SO4 5	2018 - 5 – 23	15:30	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 250 ml 6	2018 - 5 – 23	15:45	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ● R(○ R SPECIFY DATE: ________ (surcharge may apply)

SEND INVOICE TO: ☐ SAM ☐ DIFFERE

INVOICE FORMAT: ☐ H/ ☐ P ☐ E

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

RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2018 - 5 – 23 TIME: 5:00 pm	RECEIVED BY:	DATE: TIME:
RELINQUISHED BY:	DATE: TIME:	RECEIVED BY: [signature]	DATE: 05/25/2018 TIME: 9:14

FOR LAB USE ONLY

Cooler Seal Intact? __Yes __No __N/A

Sample Temperature: 18 °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: 27-JUL-18
Report Date: 10-AUG-18 16:06 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2137279

Project P.O. #: NOT SUBMITTED
Job Reference: FERNIE ALPINE RESORT-MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2137279-1 WWTP INFLUENT							
Sampled By: HB on 26-JUL-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	86	DLHC	20	mg/L		27-JUL-18	R4153954
Total Suspended Solids	167	DLHC	5.0	mg/L		01-AUG-18	R4154513
pH	7.86		0.10	pH		04-AUG-18	R4160231
L2137279-2 WWTP EFFFLUENT							
Sampled By: HB on 26-JUL-18 @ 15:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		10-AUG-18	R4163175
Biochemical Oxygen Demand	<2.0		2.0	mg/L		27-JUL-18	R4153954
Orthophosphate-Dissolved (as P)	0.225		0.0050	mg/L		28-JUL-18	R4146467
Coliform Bacteria - Fecal	9		1	CFU/100mL		27-JUL-18	R4148087
Phosphorus (P)-Total	0.305	DLHC	0.050	mg/L		01-AUG-18	R4154368
Total Suspended Solids	<3.0		3.0	mg/L		01-AUG-18	R4154513
pH	7.90		0.10	pH		04-AUG-18	R4160231
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	18.1		0.020	mg/L		27-JUL-18	R4151389
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	18.1		0.050	mg/L		31-JUL-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		27-JUL-18	R4151389

* 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.

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:	2559 - 29TH Street North East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	Fernie Alpine Resort - Monthly EMS			QUOTE NO:	
PO NO.:		ALS CONTACT:	Lydmyla Shvets@ALSGlobal.com		
REPORT FORMAT:	☒ H/ ☒ F M/ ☐ F ☐ F ☒ P ☐ ( )		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 500 ml	1	2018 - 7 – 26	14:00	Water		X	X								17.5 °C
	1	WWTP Influent BOD 1 litre	2	2018 - 5 – 26	14:00	Water									X		
	2	WWTP Effluent Routine 500 ml	3	2018 - 5 – 26	15:00	Water		X	X								19.1 °C
	2	WWTP Effluent BOD 500 ml	4	2018 - 5 – 26	15:15	Water									X		
	2	WWTP Effluent Nutrients 250 ml + H2SO4	5	2018 - 5 – 26	15:30	Water				X	X	X	X	X			
	2	WWTP Effluent Bacteriological 250 ml	6	2018 - 5 – 26	15:45	Water	X										

Ambient air t 26°C

FOR LAB USE ONLY

L2137279-COFC

TURN AROUND REQUIRED:	◉ R(◊ R	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: HUNGRY BAYTALUKE	DATE: 2018 - 5 – 26	RECEIVED BY:	DATE: 7/6/18
SEND INVOICE TO:	☐ SA ☐ DIFFERF			TIME: 5:00 pm		TIME: 9:33
INVOICE FORMAT:	☐ H/ ☐ ☐		RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
				TIME:		TIME:

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: 5 °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: 17-AUG-18
Report Date: 11-SEP-18 17:09 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2148834

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER-AUGUST 2018 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2148834-1 WWTP INFLUENT							
Sampled By: BC on 16-AUG-18 @ 16:15							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	149	DLHC	75	mg/L		18-AUG-18	R4181742
Total Suspended Solids	238	DLHC	9.0	mg/L		23-AUG-18	R4182478
pH	7.77		0.10	pH		07-SEP-18	R4205624
L2148834-2 WWTP EFFFLUENT							
Sampled By: BC on 16-AUG-18 @ 16:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-AUG-18	R4189000
Biochemical Oxygen Demand	4.1	BODP	2.0	mg/L		18-AUG-18	R4181742
Orthophosphate-Dissolved (as P)	0.184	DLHC	0.010	mg/L		18-AUG-18	R4176114
Coliform Bacteria - Fecal	6		1	CFU/100mL		17-AUG-18	R4176247
Phosphorus (P)-Total	0.295	DLHC	0.050	mg/L		24-AUG-18	R4183425
Total Suspended Solids	<3.0		3.0	mg/L		23-AUG-18	R4182478
pH	8.33		0.10	pH		07-SEP-18	R4205624
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	17.9	HTD	0.020	mg/L		31-AUG-18	R4202629
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	17.9		0.050	mg/L		05-SEP-18	
Nitrite in Water by IC							
Nitrite (as N)	0.015	HTD	0.010	mg/L		31-AUG-18	R4202629

* 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

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, 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:	Bo Choroszewski
PROJECT NAME AND NO.:	Wastewater -August 2018 Monthly EMS			QUOTE NO:	
PO NO.:		ALS CONTACT:	Nancy Sonompil		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐		pmajer@skircr.com		

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	2018-08-16	16:15	Water		X	X								18.8°C
	WWTP Influent BOD	2018-08-16	16:15	Water									X		18.8°C
	WWTP Effluent Routine	2018-08-16	16:30	Water		X	X								18.9°C
	WWTP Effluent BOD	2018-08-16	16:30	Water									X		18.9°C
	WWTP Effluent Nutrients	2018-08-16	16:30	Water				X	X	X	X	X			18.9°C
	WWTP Effluent Bacteriological	2018-08-16	16:30	Water	X										18.9°C

FOR LAB USE ONLY

L2148834-COFC

TURN AROUND REQUIRED:	◉ ROUTINE	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Kirkland Matchim	DATE:	RECEIVED BY:	DATE: 8/17/2018
SEND INVOICE TO:	☐ SAME AS REPORT			TIME:		TIME:
INVOICE FORMAT:	☐ HARDMAIL ☐ FAX ☐ PDF ☐		RELINQUISHED BY: BO CHOROSZEWSKI	DATE: 2018-08-16 TIME: 16:45	RECEIVED BY:	DATE: TIME:
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@sklfernie.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: 26-OCT-18
Report Date: 03-NOV-18 13:14 (MT)
Version: FINAL

Client Phone: 403-254-7669

Certificate of Analysis

Lab Work Order #: L2187829

Project P.O. #: NOT SUBMITTED
Job Reference: WASTEWATER-OCTOBER 2018 MONTHLY EMS
C of C Numbers:
Legal Site Desc:

Nancy Sonompil, B. Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2187829-1 WWTP INFLUENT							
Sampled By: BC on 25-OCT-18 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	39	DLHC	20	mg/L		26-OCT-18	R4308764
Total Suspended Solids	61.0		3.0	mg/L		28-OCT-18	R4307596
pH	8.06		0.10	pH		30-OCT-18	R4308559
L2187829-2 WWTP EFFLUENT							
Sampled By: BC on 25-OCT-18 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-NOV-18	R4314475
Biochemical Oxygen Demand	<2.0		2.0	mg/L		26-OCT-18	R4308764
Orthophosphate-Dissolved (as P)	0.269		0.0050	mg/L		27-OCT-18	R4302291
Coliform Bacteria - Fecal	<1		1	CFU/100mL		26-OCT-18	R4301986
Nitrate (as N)	<2.0	DLHC	2.0	mg/L		27-OCT-18	R4305551
Nitrite (as N)	<1.0	DLHC	1.0	mg/L		27-OCT-18	R4305551
Phosphorus (P)-Total	0.380		0.0050	mg/L		29-OCT-18	R4305327
Total Suspended Solids	<3.0		3.0	mg/L		28-OCT-18	R4307596
pH	8.32		0.10	pH		30-OCT-18	R4308559

* 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.

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.

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 St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-55
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Fr
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-152
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 T
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll F

L2187829-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:	Bo Choroszewski
PROJECT NAME AND NO.:	Wastewater -October 2018 Monthly EMS
QUOTE NO:	
PO NO.:	
ALS CONTACT:	Nancy Sonompil
REPORT FORMAT:	☒ [illegible] ☒ [illegible] pmajer@skircr.com ☐ [illegible] ☐ [illegible] ☒ [illegible] ☐ [illegible]

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE (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	2018-10-25	14:00	Water		X	X								11.9°C
	WWTP Influent BOD	2018-10-25	14:00	Water									X		11.9°C
	WWTP Effluent Routine	2018-10-25	14:15	Water		X	X								13°C
2	WWTP Effluent BOD	2018-10-25	14:15	Water									X		13°C
	WWTP Effluent Nutrients	2018-10-25	14:15	Water				X	X	X	X	X			13°C
	WWTP Effluent Bacteriological	2018-10-25	14:15	Water	X										13°C

FOR LAB USE ONLY

TURN AROUND REQUIRED: ● [illegible] ○ [illegible] SPECIFY DATE: ________ (surcharge may apply)

SEND INVOICE TO: ☐ [illegible] ☐ [illegible]

INVOICE FORMAT: ☐ [illegible] ☐ [illegible] ☐ [illegible]

RELINQUISHED BY:		DATE:		RECEIVED BY:		DATE:	10/26
Kirkland Matchim		TIME:			(signature)	TIME:	9:00
RELINQUISHED BY:		DATE:	2018-10-25	RECEIVED BY:		DATE:	
BO CHOROSZEWSKI		TIME:	14:30			TIME:	

6°

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: ____°C

Frozen? __Yes __No

Cooling Method? __Icepacks __Ice __None

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

NAUTILUS ENVIRONMENTAL

Acute Toxicity Test Results

Sample collected December 27, 2017

Final Report

January 9, 2018

Submitted to: **Fernie Alpine Resort Utilities Corportation**
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/ 1718-0590	27-Dec-17 at 1645h	28-Dec-17 at 1035h	29-Dec-17 at 1345h	2.0°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v) [95% CL]
Wastewater	>100 [NA]

CL = Confidence Limit, LC = Lethal Concentration,

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.2 (2.5-3.9) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.0 (2.2-4.0) g/L KCl
Reference toxicant CV	9.6%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, December 12, 2017
LC = Lethal Concentration; CL = Confidence Limit

Harjot Sandhu

Report By:
Harjot Sandhu, BSc
Biologist

Jacklyn Poole

Reviewed By:
Jacklyn Poole, BSc
Laboratory Supervisor

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

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	LSL Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	22-L plastic pails with polyethylene liners
Test volume	20 L
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	CETIS version 1.9.0.8
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 FFR116 Reference 178-0590

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2017/12/29	1345*	FP	1	SS
1	2017/12/30	1100	SS		KD
2	2017/12/31	1050	AP	-	LC
3	2018/01/01	1015	FP	-	AP
4	2018/01/02	1000	AP	1	HS

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH:	7.9
Initial EC (µS/cm):	1115
Initial DO (mg/L):	10.5
Initial Temp (°C):	13.7
Salinity (ppt):	0
Nets used: yes / (no)	

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%	8.8			

Test Chemistry and Biology

Conc.	CTL	6	12	25	50	100		
pH (units) (range: 5.5-8.5)								
Day 0	7.8	8.1	8.1	8.1	8.1	8.0		
Day 4	8.1	8.2	8.2	8.1	8.1	8.0		
EC (uS/cm)								
Day 0	495	529	561	647	885	1176		
Day 4	490	543	564	673	829	1218		
DO (mg/L) (70-100% saturation at test temp.)								
Day 0	8.7	8.7	8.7	8.8	8.8	8.8		
Day 4	8.7	8.7	8.7	8.7	8.7	8.7		
Temperature (°C) (range: 14-16°C)								
Day 0	14.0	14.0	14.0	14.0	14.0	14.0		
Day 4	14.0	14.0	14.0	14.0	14.0	14.0		
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	8	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	3.1	0.3
3	3.0	0.3
4	2.8	0.3
5	3.1	0.3
6	3.0	0.3
7	3.1	0.3
8	2.8	0.3
9	2.8	0.3
10	2.6	0.3

Loading Density (g/L): 0.13

Mean Length (cm): 2.9

Length Range (cm): 2.6 - 3.1

Mean Weight (g): 0.3 (Must be ≥0.3g)

Weight Range. (g): 0.2-0.3

Test Organism Information

Batch 20171128R

Source LSL

Days Held 31

Percent stock mortality 0.82 (7 days prior to test, must be ≤2%)

Test Volume (L) 20L

Comments :

Reviewed By: TM Date Reviewed: 2018/01/03

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: 17 - S - 30	

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	Hungry / Dec 27 / 17 / 16:45	Fernie Alpine Resort	Grab	Effluent	x

Relinquished By	Date / Time	Received By (HQ)	Date / Time
HUNGRY BAYTALUKE	Dec 27 / 17 @ 17:00	DU	2017/12/28 10:35 am

Written by SG on 1995/05/12
Revised by KS on 2002/12/09

HydroQual Laboratories Ltd.

File: F2000020.xls / test request
Form: F2000020 v 3.0

2 X 20L Pails
DROPOFF good condition
2°C NOS/I

END OF REPORT

NAUTILUS ENVIRONMENTAL

Acute Toxicity Test Results

Sample collected April 25, 2018

Final Report

May 10, 2018

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/ 1718-1006	25-Apr-18 at 1645h	26-Apr-18 at 1030h	27-Apr-18 at 1140h	13°C

TEST TYPES

- Rainbow trout 96-h LC50 test

RESULTS

Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v) [95% CL]
WASTEWATER	>100 [NA]

CL = Confidence Limit, LC = Lethal Concentration,

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	4.2 (3.7-4.6) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.1 (2.3-4.3) g/L KCl
Reference toxicant CV	10.5%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, April 5, 2018
LC = Lethal Concentration; CL = Confidence Limit

Report By:
Linda Fan, BSc
Biologist

Reviewed By:
Madison Lehti, BSc
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	LSL Fish Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	22-L plastic pails with polyethylene liners
Test volume	20 L
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 178-10060 Chamber 9

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2018/04/27	1140	AP	1	JP
1	2018/04/28	0800	NLL	-	AP
2	2018/04/29	0805	ST	-	SS
3	2018/04/30	[illegible]	[illegible]	-	JP
4	2018/05/01	1045	ST/AP	-	JP

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.7
Initial EC (µS/cm): 608.
Initial DO (mg/L): 8.5
Initial Temp (°C): 19.1
Salinity (ppt): 0
Nets used: yes / no

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%	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	12	25	50	100		
pH (units) (range: 5.5-8.5)								
Day 0	7.4	7.4	7.5	7.5	7.5	7.6		
Day 4	8.2	8.3	8.3	8.3	8.3	8.3		
EC (uS/cm)								
Day 0	554	573	572	580	591	597		
Day 4	546	572	574	579	586	604		
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	8.4	8.4	8.5	8.4	8.4	8.5		
Temperature (°C) (range: 14-16°C)								
Day 0	14	14	14	14	14	14		
Day 4	16	16	16	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	*9	10	10	10	10	10		
Day 3	9	10	10	10	10	10		
Day 4	9	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 ¥	3.9	0.7
2	3.6	0.6
3	3.7	0.7
4	3.6	0.5
5	3.9	0.5
6	3.4	0.5
7	3.5	0.6
8	3.6	0.6
9	3.6	0.6
10	3.6	0.6

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.59
Length Range (cm): 3.2-3.9
Mean Weight (g): 0.5 (Must be ≥0.3g)
Weight Range: (g): 0.3-0.6

Test Organism Information

Batch 20180331R
Source LSL
Tank # 1
Days Held at 15 ± 2°C 45 (Must be ≥14 days)
Percent stock mortality 0.74 (7 days prior to test, must be ≤2%)
Test Volume (L) 20

Comments: ¥ 1 trout found outside bucket (jumped) - not included in mortality, or weight calculations.

Reviewed By: JP Date Reviewed: 2018/05/02

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

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						
LC 50						

Sample Received intact (y / n)

Notes: S = single treatment, D = multiple treatments

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: 17 - S - 30	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

1718-1006

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Hungry / April 25 / 18 / 16:45	Fernie Alpine Resort	Grab	Effluent	x
	2X20L Pails				
	Dro Poff				
	# 138				
	NOS/I				
	good				

Relinquished By	Date / Time
HUNGRY BAYTALUKE	Apr 25 / 18 @ 17:00

Received By (HQ)	Date / Time
DY	2018/04/26 10:30

END OF REPORT

NAUTILUS ENVIRONMENTAL

Acute Toxicity Test Results

Sample collected December 27, 2018

Final Report

January 14, 2019

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 / 1819-0589	27-Dec-18 at 1645h	31-Dec-18 at 0815h	01-Jan-19 at 1340h	10.1°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)	3.2 (2.7-3.5) g/L KCl[1]
Reference toxicant historical mean (2 SD Range)	3.8 (2.8-5.1) g/L KCl
Reference toxicant CV	9.6%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, December 19, 2018
LC = Lethal Concentration; CL = Confidence Limit

Report By:
Alvin Pham, BSc
Biologist

Reviewed By:
Madison Lehti, 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 FER116 Reference 1819-0598 & 881 Chamber 5

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	~~2018~~ 2019/01/01	1340 *	AP	1	SS
1	2019/01/02	1115	LF	-	LF
2	2019/01/03	0835	AP	-	LF
3	2019/01/04	0815	LF	-	LF
4	2019/01/05	1630	AP/CB	1	CB

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH:	7.0
Initial EC (µS/cm):	956
Initial DO (mg/L):	8.5
Initial Temp (°C):	18.7
Salinity (ppt):	0

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%	8.7			

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	L	12	25	50	100		

pH (units) (range: 5.5-8.5)

Day 0	7.9	7.8	7.8	7.8	7.6	7.5		
Day 4	8.0	7.9	7.9	7.9	7.8	7.7		

EC (uS/cm)

Day 0	425	454	486	549	724	939		
Day 4	393	461	488	551	732	941		

DO (mg/L) (70-100% saturation at test temp.)

Day 0	8.8	8.8	8.6	8.8	8.8	8.7		
Day 4	8.8	8.8	8.5	8.6	8.7	8.8		

Temperature (°C) (range: 14-16°C)

Day 0	15	15	15	15	15	15		
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	3.3	0.5
2	3.7	0.6
3	3.5	0.5
4	3.5	0.5
5	3.5	0.5
6	3.2	0.4
7	3.2	0.4
8	3.5	0.4
9	3.7	0.6
10	3.0	0.3

Loading Density (g/L): 0.3 (must be ≤0.5 g/L)
Mean Length (cm): 3.4
Length Range (cm): 3.0-3.7
Mean Weight (g): 0.5 (Must be ≥0.3g)
Weight Range (g): 0.3-0.6

Test Organism Information

Batch 20181030TR
Source LSL
Tank # 2
Days Held at 15± 2 C (must be ≥14 days): 63
Percent stock mortality (7 days prior to test, must be ≤2%): 0%
Test Volume (L): 18

Comments :

Reviewed By: TM Date Reviewed: 2019/01/08

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

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

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: 17 - S - 30	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Kirkland / Dec. 27 / 18 / 16:45	Fernie Alpine Resort	Grab	Effluent	x
1819-0589 2018/12/31					
9:15 Manitoulin					
S.C. 2x 20L pails					
NO3/NO2 Good Condition					
10.1°C 1/4					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Kirkland Matchim	Dec 27 / 18 @ 17:00		

19580478

END OF REPORT

CERTIFICATE OF INSURANCE

BROKER
Toole Peet & Co. Limited
P.O. Box 4650 Station C
1135 - 17th Avenue SW
Calgary, AB T2T 5R5
BROKER'S CLIENT ID:

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policies below.

INSURED'S FULL NAME AND MAILING ADDRESS

Environmental Diagnostics Inc. and Sabau Holdings Inc.
#140, 5050 - 106 Ave. SE
Calgary, AB T2C 5E9

COMPANIES AFFORDING COVERAGE

COMPANY **A**	**Markel Canada Limited -Certain Lloyd's Underwriter's under contract MKL2019001**
COMPANY **B**	**Economical Insurance**
COMPANY **C**	
COMPANY **D**	

COVERAGES

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated, notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain. The insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.

LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS

TYPE OF INSURANCE	CO LTR	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS OF LIABILITY	
COMMERCIAL GENERAL LIABILITY CLAIMS MADE OR ☑ OCCURRENCE ☑ PRODUCTS AND / OR COMPLETED OPERATIONS ☐ EMPLOYERS' LIABILITY ☑ CROSS LIABILITY ☑ TENANT'S LIABILITY ☑ NON-OWNED AUTOMOBILES ☑ HIRED ☑ CONTRACTUAL LIABILITY	**A**	BINDER	3/30/2019	3/30/2020	EACH OCCURRENCE -BODILY INJURY, PROPERTY DAMAGE, PERSONAL INJURY	$ **2,000,000**
					GENERAL AGGREGATE	$ **2,000,000**
					PRODUCTS - Comp/Ops Agg.	$ **Included**
					TENANT'S LEGAL LIABILITY	$ **500,000**
					MED EXP (any one person)	$ **2,500**
					NON-OWNED AUTO	$ **2,000,000**
						$
						$
AUTOMOBILE LIABILITY ☑ DESCRIBED AUTOMOBILES ☐ ALL OWNED AUTOMOBILES ☐ LEASED AUTOMOBILES **ALL AUTOMOBILES LEASED IN EXCESS OF 30 DAYS WHERE THE INSURED IS REQUIRED TO PROVIDE INSURANCE	**B**	64019971P	9/18/2018	9/18/2019	BODILY INJURY PROPERTY DAMAGE COMBINED	$ **2,000,000**
					BODILY INJURY (Per Person)	$
					BODILY INJURY (Per Accident)	$
					PROPERTY DAMAGE	$
EXCESS LIABILITY ☐ UMBRELLA FORM ☐ OTHER THAN UMBRELLA FORM (Specify)						$
						$
OTHER LIABILITY (SPECIFY) ☑ ENVIRONMENTAL CONSULTING PROFESSIONAL (ERRORS AND OMISSIONS) LIABILITY-CLAIMS MADE COVERAGE	**A**	BINDER	4/20/2019	4/20/2020	LIMIT ANY ONE CLAIM/POLICY AGGREGATE	$ **3,000,000**
☑ ENVIRONMENTAL IMPAIRMENT LIABILITY (Claims Made)	**A**	BINDER	3/30/2019	3/30/2020	EACH CLAIM	$ **1,000,000**
					AGGREGATE EACH POLICY PERIOD (OFF SITE THIRD PARTY)	$ **1,000,000**

ADDITIONAL INSURED	**DESCRIPTION OF OPERATIONS, LOCATIONS/ AUTOMOBILES/ SPECIAL ITEMS**
	Environmental Diagnostics: Environmental Site Assessment, Risk Management Plans, Remedial Action Plans, Soil and Groundwater Remediation. Sabau Holdings Inc.: Holding Company

CERTIFICATE HOLDER	1	**CANCELLATION**
To Whom It May Concern		Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 0 days written notice to the certificate holder named to the left, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives

SIGNATURE OF AUTHORIZED REPRESENTATIVE	FAX NUMBER **(403) 228-0231**	EMAIL ADDRESS eshea@toolepeet.com
PRINT NAME INCLUDING POSITION HELD **Erica Shea, Account Manager**	COMPANY **Toole Peet & Co. Limited**	DATE **April 16, 2019**