July 8, 2016

File No.:VA101-00246/47-A.01
Cont. No.:VA16-00932

FS 64925
EMS 550121
OHS 550122

Mr. Todd Goodsell
Sr. Permitting Specialist
KGHM Ajax Mining Inc. (124 Seymour, Kamloops)
200 - 124 Seymour St.
Kamloops, British Columbia
Canada, V2C 2E1

Dear Todd,

Re: Peterson Creek Water Temperature Effects due to Pipeline Diversion and Flow Modifications

Knight Piésold Ltd. (KP) has been retained to provide an assessment of predicted water temperature effects in Peterson Creek due to the proposed Ajax Project. A similar assessment was undertaken previously (KP, 2015a), but has been updated to reflect changes to the Peterson Creek Diversion System, removal of the Peterson Creek Downstream Pond from Project design and to address the following Information Requests (IR):

IR Tracking Number	Agency Comment
DFO-058	What is the expected increase in water temperature to lower Peterson Creek downstream of the Peterson Creek Diversion Pond to the confluence of Thompson River from the predicted water losses from the Project?
FLNRO-249	p 6.7-58 "no measurable effects on water temperature…are anticipated". KGHM mentions in the sentence above this one that difference in water temperature could be up to 2.1°C. This is significant if the creek is already at 20°C.
FLNRO-250	p 6.7-57 if Peterson creek temperature increases at the point of diversion and this impacts downstream habitat, has this habitat impact been accounted for?

Since submission of the environmental assessment for the Ajax Project, the design of the water diversion system from Jacko Lake has been revised in response to comments received from FLNRO, DFO, and the SSN. Water will no longer be diverted from Jacko Lake around the north end of the open pit before discharging into the Peterson Creek Downstream Pond. The spillway outlet at the irrigation dam on the southeast arm of Jacko Lake will be upgraded to allow flows and rainbow trout to continue to bypass the dam at lake water elevations greater than 892 masl. Flow will be within a natural channel for the first approximately 150 m downstream of the Jacko Lake dam before entering a buried culvert. The design will address concerns regarding circulation within the southeast arm of Jacko Lake and will allow the SSN to retain the asserted Aboriginal fishery downstream of the dam. The Project is expected to cause changes in surface water flows in Peterson Creek and a section of the creek downstream of Jacko Lake will be diverted past the mine rock storage facilities and open pit via a buried gravity flow culvert. The design also no longer includes the Peterson Creek Downstream Pond. Please see supplementary memo 0706_KAM Peterson Creek Diversion System Update (Norwest 2016) for details. These design changes could in turn affect water quality in Peterson Creek, therefore this water temperature impacts assessment presents the following:

1. Changes in water temperature in Peterson Creek between Jacko Lake and the culvert outfall location under baseline (in stream) and operational (via culvert) conditions.
2. Changes in water temperature in lower Peterson Creek due to modified hydrologic conditions.

1 – PETERSON CREEK DIVERSION

1.1 BASELINE CONDITIONS

Currently, water discharges from Jacko Lake via an outlet on the southeast arm into Peterson Creek. Discharge from the lake is controlled by a flow gate operated by the Water Bailiff, although during high flows water can flow over the spillway crest. This typically occurs annually during freshet and/or autumn storms. Peterson Creek then flows east through the Ajax property before bearing south towards Peterson Creek Park, the City of Kamloops and the Peterson Creek confluence with the South Thompson River. Between Jacko Lake and the Mine property boundary, the average channel gradient is approximately 0.5% (5 m/1,000 m). The lower 1.8 km within the Ajax property is currently a ponded wetland and flow velocity is low due to beaver activity and damming.

Water temperature data have been collected at stations just downstream of the outlet of Jacko Lake (JACSEEP) and approximately 3 km downstream of the outlet near Goose Lake Road (PETER). The stations were installed in 2007 and operated sporadically until 2013. The stations were removed for winter in 2009, 2010 and 2011, but were left in over winter in 2008 and 2012.

Unfortunately, the winter and late fall temperature data are not reliable at either station. This is likely due to the sensors either being out of water and exposed to air temperatures, or the sensors being frozen in ice. In both cases, the recorded temperatures are not reflective of liquid water temperatures. The temperature time series data were compared to in-situ instantaneous observations collected during water quality sampling to validate the open water season (March to November) record. The raw 15-minute time series data are shown on Figure 2. For analysis, erroneous winter data and any anomalous values (e.g. during station maintenance) were removed. Corrected monthly mean values are shown in Tables 2 and 3.

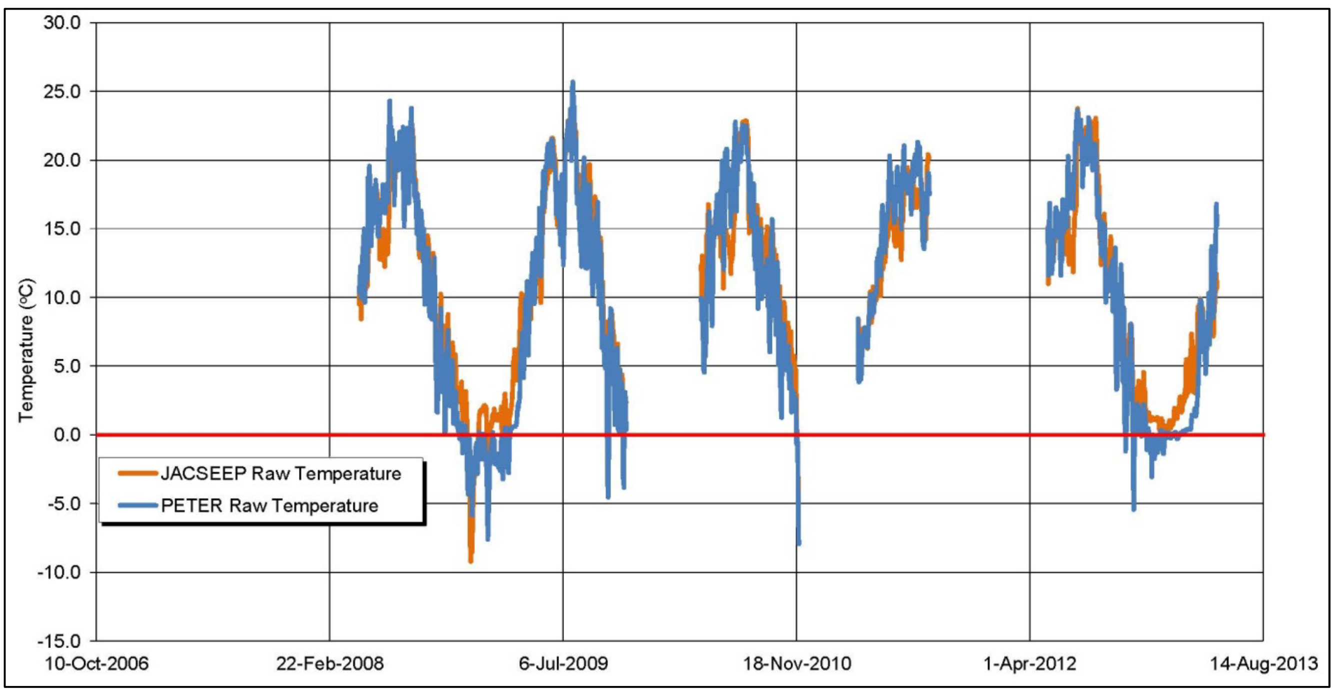

Figure 1 Raw Water Temperature Data

Table 1 JACSEEP Monthly Mean Water Temperatures (°C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008				9.69	13.41	14.86	20.22	19.02	13.00	7.98	4.61	
2009			2.96	8.32	13.14	18.83	20.48	17.99	14.63	6.05	3.16	
2010				11.77	13.37	14.26	19.24	16.62	13.29	9.69	4.31	
2011			8.38	7.59	11.54	14.97	17.87	17.12				
2012					13.85	14.26	19.62	20.58	13.11	7.36	3.55	
2013			5.43	8.11	10.38							

NOTES:

1. HIGHLIGHTED CELLS HAVE FEWER THAN 15 DAYS OF RECORD
2. JACSEEP STATION IS LOCATED AT THE OUTLET OF JACKO LAKE.
3. DATA RECORDED DURING DECEMBER TO FEBRUARY ARE CONSIDERED UNRELIABLE.

Table 2 PETER Monthly Mean Water Temperatures (°C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008				10.91	14.90	17.36	20.27	18.82	12.06	5.69	2.61	
2009			0.56	7.13	14.25	19.00	20.36	16.68	12.75	4.39	1.78	
2010				9.36	11.21	17.58	20.17	16.09	11.05	7.25	2.59	
2011			6.25	7.08	12.96	17.63	18.60	18.00				
2012					14.43	15.95	20.88	19.32	11.93	5.57	2.11	
2013			1.74	8.41	13.44							

NOTES:

1. HIGHLIGHTED CELLS HAVE FEWER THAN 15 DAYS OF RECORD
2. PETER STATION IS LOCATED UPSTREAM OF GOOSELAKE ROAD.
3. DATA RECORDED DURING DECEMBER TO FEBRUARY ARE CONSIDERED UNRELIABLE.

The recorded changes in water temperatures within the study reach are presented in Table 3 along with concurrent mean monthly flow and air temperature data (KP, 2015b).

Table 3 Measured Water Temperature Change in Peterson Creek between Jacko Lake Outlet and Proposed Culvert Outfall Location

Month	Discharge (m³/s)	Air Temperature (°C)	Inlet Water Temperature (JACSEEP) (°C)	Outlet Water Temperature (PETER) (°C)	Water Temperature Change (°C)
Mar	0.02	0.7	4.2	1.1	-3.0
Apr	0.06	5.5	8.0	7.5	-0.5
May	0.14	10.7	13.1	13.6	0.5
Jun	0.08	14.2	15.4	17.5	2.1
Jul	0.01	18.7	19.5	20.1	0.6
Aug	0.00	18.1	18.3	17.8	-0.5
Sep	0.01	13.2	13.5	11.9	-1.6
Oct	0.01	5.7	7.8	5.7	-2.0
Nov	0.01	0.2	3.9	2.3	-1.6

NOTES:

1. WATER TEMPERATURE DATA BASED ON CONCURRENT MEASURED RECORD FROM 2008-2013
2. DISCHARGE VALUES BASED ON MEASURED DATA AT JACKSEEP
3. AIR TEMPERATURE DATA BASED ON CONCURRENT MEASURED DATA

Under baseline conditions, increases in water temperature through the study reach (Peterson Creek between the outlet of Jacko Lake and Goose Lake Road) are the result of exposure to air temperatures higher than water temperatures and solar radiation. Decreases in temperature are the result of air temperatures lower than water temperatures and possibly an increased influence from inflows in the spring and fall (groundwater, runoff or non-lake fed tributaries). When outflows from Jacko Lake are low, in March, April, August and September, any contributing groundwater could potentially have a larger effect on the overall stream temperature through the reach.

Due to the paucity of reliable winter water temperature data, a qualitative analysis of the expected temperature changes was conducted. Photo 1 shows the JACSEEP station in January 2013, and Photo 2 shows Peterson Creek upstream of the PETER station in February 2014.

Photo 1 JACSEEP (January 9, 2013)

Photo 2 Upstream of PETER (February 2, 2014)

The above photos show that there can be substantial snow and ice cover present during the winter months. Because of this, it is likely that the small amount of flow present would be insulated from the atmospheric changes in temperature. Furthermore, flows in the winter are likely dominated by groundwater outflows which are not sensitive to air temperature changes.

1.2 PROJECT AFFECTED CONDITIONS

During Project construction and operation Peterson Creek flows will be diverted through the Mine property via a gravity pipeline. The outlet from Jacko Lake will be modified to allow water to discharge as lake levels rise, up to a maximum discharge of 0.3 m^3/s. Outflows will be capped at 0.3 m^3/s and additional inflow will be retained in Jacko Lake (causing lake level to rise) until inflows recede and lake levels drop. Outflows from Jacko Lake will flow into an approximately 2.7 km long, 1000 mm diameter buried culvert that will divert water past the mine rock storage facilities and open pit, before discharging to the existing Peterson Creek downstream of the Project site, as shown on Figure 2. Given the culvert grade, it is expected that the culvert will flow less than half full, with a maximum water depth of approximately 0.3 m at a discharge or 0.3 m^3/s.

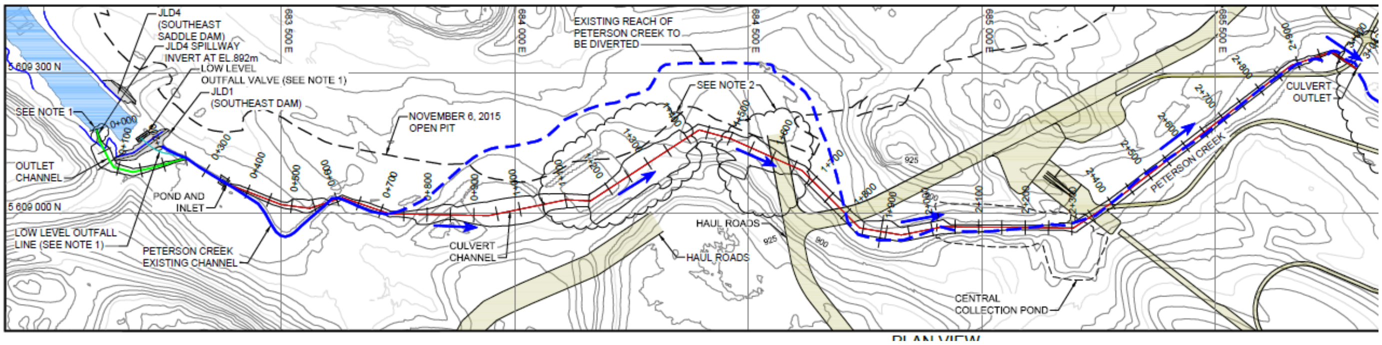

Figure 2 **Proposed Peterson Creek Diversion**

NOTES:

1. NORWEST FIGURE C224-KA39-5610-10-002

1.2.1 Stream Temperature Model Development

Temperature changes due to diversion of Peterson Creek were modelled using the Stream Segment Temperature Model (SSTEMP) Version 2.0 developed by the USGS Biological Resource Division (Bartholow, 2002). SSTEMP models stream temperature within a single stream reach for a single time period. The program requires inputs describing the average stream geometry, as well as hydrology, meteorology and stream shading. The model then predicts the mean water temperature at a specified distance downstream. At a high level, the model balances the energy inputs or outputs between the following:

1. Upstream flow, which has a known temperature
2. Atmospheric inputs, primarily net solar radiation and air temperature
3. Flow inputs to the assessed reach, including groundwater and surface runoff, but not including significant tributaries

The balance of these terms determines at the outflow temperature, as shown on Figure 3.

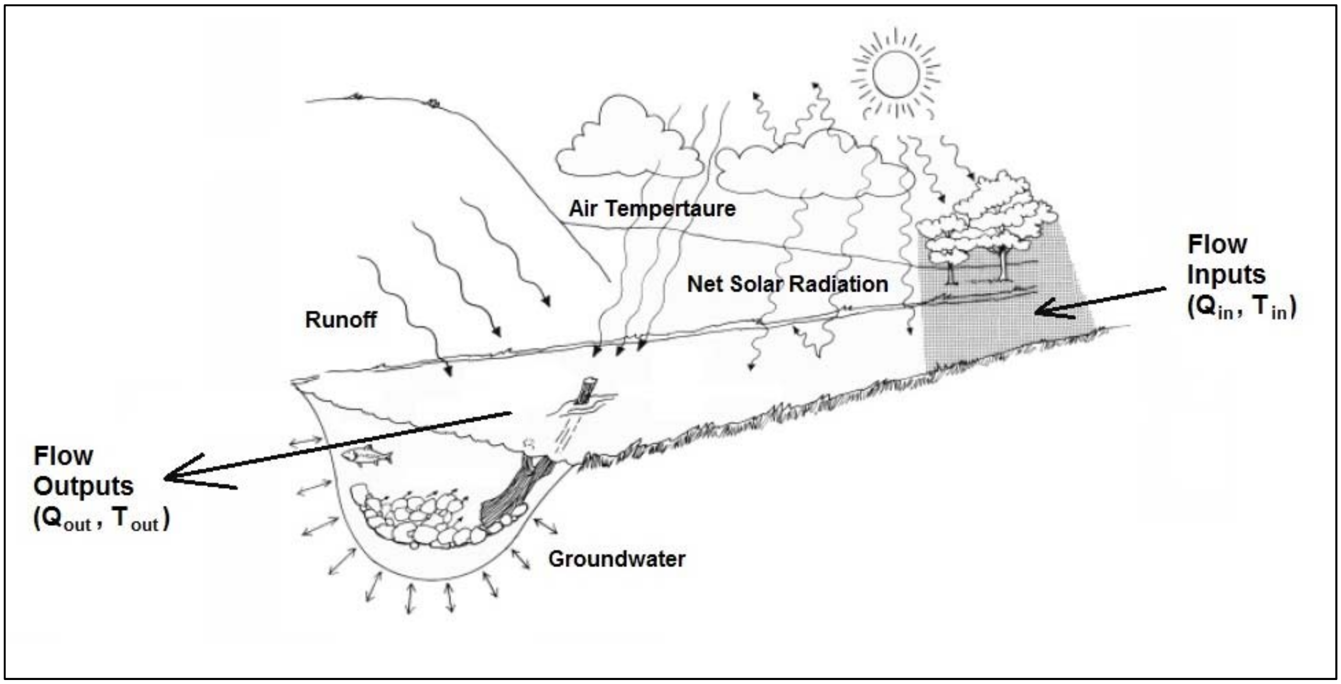

Figure 3 SSTEMP Energy Balance

SSTEMP input parameters are divided in four categories: hydrology, stream geometry, meteorology and shade as shown in Figure 3.

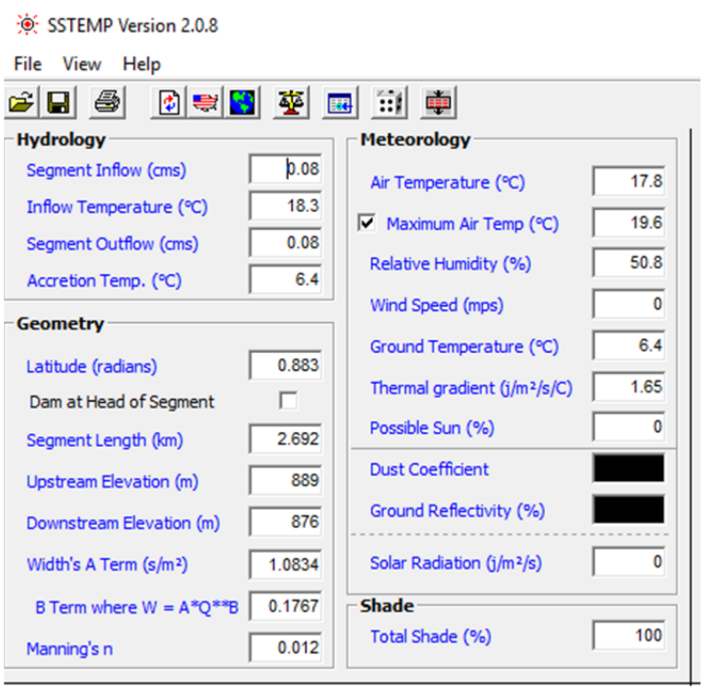

Figure 4 SSTEMP Input Screen for Peterson Creek Diversion

Parameter selection was based on values presented in the 2014 Climatology Report (KP, 2015b), Environment Canada data for Kamloops and guidance from the SSTEMP User Manual (Bartholow, 2002) and described below. Input parameters are presented in Appendix A.

1.2.2 Diversion Pipeline Temperature Effects

In order to assess effects on stream temperature due to flow diversion through a closed culvert, a monthly model was developed. Inflow discharge values to the modelled reach were taken from BGC (2016) for Jacko Lake outflows during baseline and Project operations (Year 18). This year of mine life produces the largest flow reduction and is expected to produce the greatest change in instream temperature as a result. These results show outflow from Jacko Lake during April to August and no discharge between September and March (BGC, 2016). Outflow from the diversion pipeline were set equal to inflow as the culvert is a closed system.

Inflow water temperature values are based on measured data from JACSEEP. The model assumed that the air temperature in the culvert would be comparable to air temperature outside the culvert, however solar radiation input will be absent. This is a conservative assumption from a warming standpoint as air temperature inside the culvert is expected to be cooler than air temperature around the culvert due to the effects of soil insulation, lack of solar radiation and air cooling inside the culvert. Given these inputs, the energy balance reduces to a balance between inflow temperature and warming or cooling from air temperature as the water travels through the culvert.

1.3 COMPARISON BETWEEN BASELINE AND OPERATIONAL CONDITIONS

Under existing conditions, the measured temperature data indicate a slight cooling over the 2.7 km reach of Peterson Creek between Jacko Lake and Goose Lake Road during April and August, and warming during May, June and July. The warming in June is quite large, with an average increase of 2.1°C.

During operations, the model indicates a slight cooling of the water as it travels through the culvert, as air temperature is slightly cooler than the inflow temperature. When compared to baseline conditions, water in Peterson Creek downstream of the culvert during operations is expected to be cooler in all months except April, as shown in Table 4.

Table 4 Water Temperature Comparison between Culvert and Peterson Creek Conditions

	Parameter	April	May	June	July	August
Existing Conditions	Measured Inflow Temperature (°C)	8.0	13.1	15.4	19.5	18.3
	Measured Outflow Temperature (°C)	7.5	13.6	17.5	20.1	17.8
	Temperature Change over reach (°C)	-0.5	0.5	2.1	0.6	-0.5
Operations (Year 18)	Measured Inflow Temperature (°C)	8.0	13.1	15.4	19.5	18.3
	Predicted Outflow Temperature (°C)	7.8	12.9	15.1	18.9	17.8
	Temperature Change over reach (°C)	-0.2	-0.2	-0.3	-0.6	-0.5
Temperature Change due to Project Operations (°C)		0.3	-0.7	-2.4	-1.2	0.0

The difference in temperature between baseline (in Peterson Creek) and operational (in culvert) conditions are compared in Table 4. It should be noted that the absolute magnitude of changes may not be reliable due to the difference in methodology (measured data vs. modelled conditions), but the direction and relative magnitude of changes are reasonable expectations. In May, June and July under baseline conditions, water heats more in-stream than in the culvert due to the increased exposure to energy inputs. When air temperatures are cool and surface flows are low in early spring and late summer, water temperature in Peterson Creek is influenced by cooler groundwater inflows, which decrease water temperatures more in-stream than in the culvert. Consequently, diversion of water through the culvert can be expected to reduce water temperatures in summer, but increase them in early spring and late-summer.

2 – WATER TEMPERATURE CHANGES IN LOWER PETERSON CREEK

2.1 BASELINE CONDITIONS

In order to assess potential water temperature changes in lower Peterson Creek due to reduced flows, a SSTEMP model was developed for Peterson Creek, just upstream of Bridal Veil Falls. Measured temperature data were available for this location between late July 2015 and early June 2016, as shown in Table 5 and Figure 5.

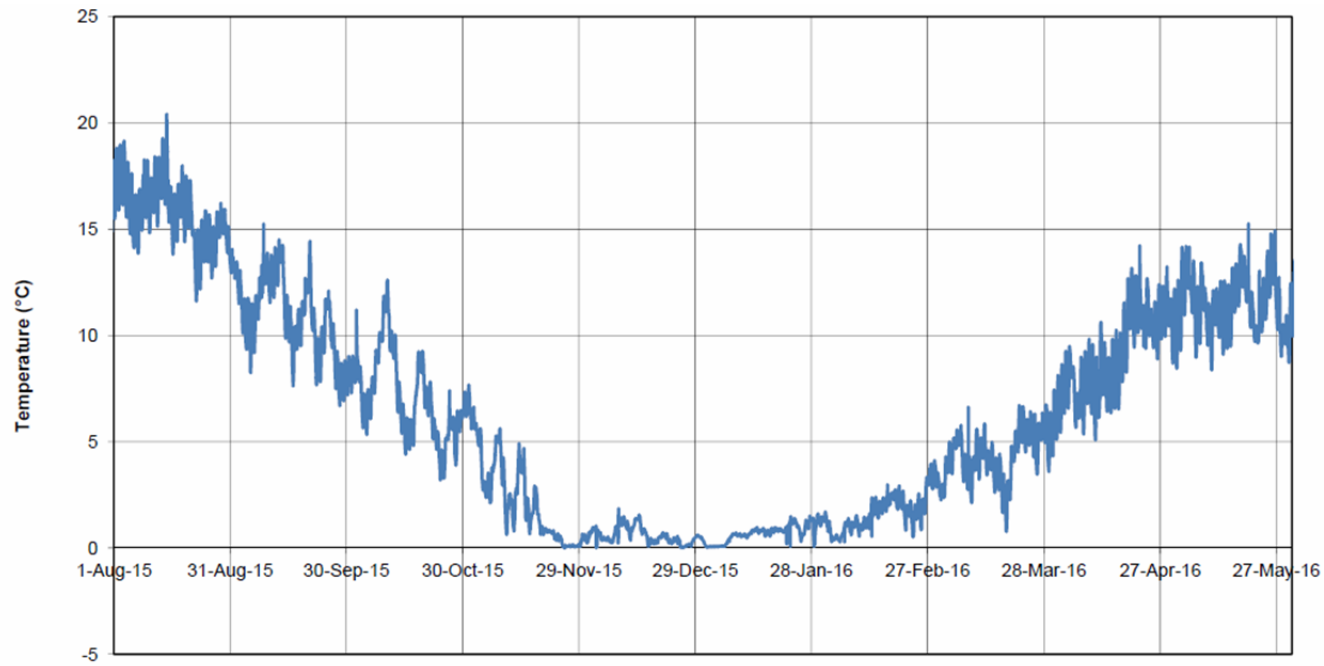

Figure 5 Lower Peterson Creek Measured Temperature Data

Table 5 Lower Peterson Creek Measured Temperature Data

	Mean Monthly Temperature (°C)											
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2015							16.81	15.73	10.87	7.11	2.13	0.57
2016	0.74	1.68	4.45	9.19	11.45	13.53						

NOTES:

1. HIGHLIGHTED CELLS HAVE ONLY 2 DAYS OF RECORD (

A baseline SSTEMP model was developed using baseline inflow water temperature and discharge data scaled from PC02 by drainage area proration. The model was set up to represent a 1 km reach of stream and inputs were based on information presented in the Climatology report (KP, 2015b), the Water Balance Model report (BGC, 2016) and guidance from the SSTEMP user manual (Bartholow, 2002). The model was run on a monthly time step year round using the water temperature data from 2015-2016. Input parameters are presented in Appendix A.

Predicted water temperature changes under existing conditions over the 1 km reach are shown in Table 6 and indicate that water temperature decreases through the reach. This indicates that the model results are dominated by groundwater and runoff inputs, which are cooler than surface water in April to October.

2.2 PROJECT AFFECTED CONDITIONS

An operations (Year 18) model was developed from the baseline model, by adjusting model inflow to match predicted Project flow changes. The model assumed the volume of water entering as accretion to the modelled reach of lower Peterson Creek was the same as under existing conditions, as the Project footprint and operations will not affect these parameters. Input parameters are presented in Appendix A. In this way, the operations model is used to predict the relative change in stream temperature due to changes in streamflow.

2.3 COMPARISON BETWEEN BASELINE AND OPERATIONAL CONDITIONS

Existing and Operations water temperatures at the downstream end of the modeled reach are compared in Table 6 and indicate that reduced flows are expected to cause water temperatures to be similar or slightly cooler than baseline conditions. This result is attributed to:

- The relatively small change in flow from baseline conditions during summer.
- Groundwater inputs are a higher proportion of the flow in the Operation condition and are cooler than inflow temperatures during April to October.
- Reduced flows reduce the mean water velocity, so exposure to atmospheric conditions is lengthened.

Table 6 Water Temperature Comparison between Existing and Year 18 conditions in Lower Peterson Creek

Scenario	Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Conditions	Measured Inflow Temperature (°C)	0.7	1.7	4.5	9.2	11.5	13.5	16.8	15.7	10.9	7.1	2.1	0.6
	Predicted Outflow Temperature (°C)	0.0	0.0	3.1	8.8	11.2	13.1	16.0	15.1	10.5	4.8	0.0	0.0
	Temperature Change over reach (°C)	-0.7	-1.7	-1.4	-0.4	-0.2	-0.4	-0.8	-0.7	-0.3	-2.3	-2.1	-0.6
Operations (18 year)	Change in flow from Existing (%)	-27%	-29%	-37%	-23%	-8%	-9%	-5%	-3%	-38%	-47%	-37%	-27%
	Measured Inflow Temperature (°C)	0.7	1.7	4.5	9.2	11.5	13.5	16.8	15.7	10.9	7.1	2.1	0.6
	Predicted Outflow Temperature (°C)	0.0	0.0	2.7	8.7	11.2	13.1	16.0	15.0	10.5	4.6	0.0	0.0
	Temperature Change over reach (°C)	-0.7	-1.7	-1.8	-0.5	-0.3	-0.4	-0.8	-0.7	-0.3	-2.5	-2.1	-0.6
Temperature Change Rate due to Flow Changes (°C/km)		0.0	0.0	-0.4	-0.1	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0

It is noted that the model results predict a reach outflow temperature of 0°C during November to February. This result is caused by air temperatures below 0°C and isn't realistic. During this period, we expect snow and ice to insulate water from freezing air temperatures and that water temperatures will be dominated by groundwater flow rates and temperature, which will be unaffected by the Project in lower Peterson Creek. Consequently, although the magnitude of temperature change during winter likely isn't correct, the result of negligible difference between baseline and operational conditions is considered appropriate.

3 – CONCLUSIONS

The objectives of this assessment are to determine water temperature impacts due to the following:

1. Diversion of Peterson Creek into a buried culvert between Jacko Lake and Goose Lake Road
2. Modified hydrologic conditions in lower Peterson Creek.

The assessment relies on measured data to define baseline conditions and energy balance modeling to assess operating conditions. Energy balance modelling was conducted with the SSTEMP software (Bartholow, 2002). Simplistically, the SSTEMP model can be considered a balance between:

- Inflow, which includes a flow rate and temperature
- Atmospheric inputs, primarily net solar radiation and air temperature. During winter, these inputs tend to reduce the inflow temperature, while in summer they tend to increase inflow temperature.
- Modelled reach inflow (accretion), primarily groundwater and event runoff. The temperature of these inputs is relatively constant throughout the year so tend to warm the reach inflows in winter and cool reach inflows in summer.

With respect to the objectives:

1. The diversion culvert represents a change in atmospheric conditions and modelled reach inflow, inflow rate and temperature are not changed. In May, June and July, water heats more in-stream than in the culvert due to the increased exposure to energy inputs. As air temperatures and flows drop, water temperature in Peterson Creek is influenced by cool inflows (groundwater or non-lake fed tributaries), which decrease water temperatures more in-stream and these cooling inflows aren't present in the culvert. Consequently, diversion of water through the culvert can be expected to reduce water temperatures in summer, but increase them in spring and autumn, relative to baseline
2. In lower Peterson Creek, inflow rate is changed due to project operation, but atmospheric and accretion inflows are unchanged. This is expected to result in negligible or slight decreases in water temperature due to the increased influence of groundwater inputs and slower average velocity, which increases exposure to atmospheric conditions. During summer, when atmospheric conditions would tend to increase stream temperature, inflow changes are relatively modest.

Temperature effects in Peterson Creek have not been assessed at multiple locations throughout the creek as the results are highly dependent on local groundwater inputs, aspect and shading. Rather, the approach has been to assess the relative effects at two locations due to Project induced changes. These results indicate relatively modest temperature effects due to the Project. It is therefore inferred that effects to other reaches of Peterson Creek will also be minor.

We trust this letter meets your current requirements. If you have any questions or comments, please contact the undersigned.

Yours truly,
Knight Piésold Ltd.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — T. J. PERKINS # 32079 — 8 Jul 2016

Prepared: Toby Perkins, M.A.Sc., P.Eng.
Senior Engineer

Reviewed: FOR Stephanie Eagen, R.P.Bio.
Senior Scientist

Approval that this document adheres to Knight Piésold Quality Systems: O.G.

<u>Attachments</u>

Appendix A Model input parameters

References

Bartholow, J.M. 2002. SSTEMP for Windows: The Stream Segment Temperature Model (Version 2.0). US Geological Survey computer model and documentation. Available on the Internet at http://www.fort.usgs.gov/

BGC Engineering (BGC), 2016. Ajax Project, 2016 Water Balance Model Update. Draft letter, 10 June 2016. BGC Engineering, Vancouver, BC

Knight Piésold Ltd. (KP), 2015a. Peterson Creek Water Temperature Effects due to Pipeline Diversion, VA15-02023. Knight Piésold Ltd., Vancouver, BC.

Knight Piésold Ltd. (KP), 2015b. 2014 Climatology Report, Rev 1, VA101-246/33-3. Knight Piésold Ltd., Vancouver, BC.

SSTEMP_Input_Pipeline Diversion

ID#	Month	Day	Segment Inflow (m3/s)	Inflow Temperature (deg C)	Downstream Flow (m3/s)	Accretion Temperature (deg C)	Latitude	Segment Length (km)	Upstream Elevation	Downstream Elevation	Width's A Term	Width's B Term	Manning's N	Air Temperature (deg C)	Maximum Air Temp (deg C)	Relative Humidity (%)	Wind Speed (m/s)	Ground Temperature (deg C)	Thermal Gradient	Percent Possible Sun (%)	Solar Radiation (J/m2/s)	Total Shade (%)
4	4	15	0.126	8	0.126	6.4	0.883	2.692	889	876	1.0834	0.1767	0.012	6.5	8.9	56.5	0	6.4	1.65	0	0	100
5	5	15	0.224	13.1	0.224	6.4	0.883	2.692	889	876	1.0834	0.1767	0.012	11.1	14.8	56.2	0	6.4	1.65	0	0	100
6	6	15	0.097	15.4	0.097	6.4	0.883	2.692	889	876	1.0834	0.1767	0.012	14.7	18	57.4	0	6.4	1.65	0	0	100
7	7	15	0.08	19.5	0.08	6.4	0.883	2.692	889	876	1.0834	0.1767	0.012	18.7	21.1	48.6	0	6.4	1.65	0	0	100
8	8	15	0.08	18.3	0.08	6.4	0.883	2.692	889	876	1.0834	0.1767	0.012	17.8	19.6	50.8	0	6.4	1.65	0	0	100

SSTEMP_Input_Lower Peterson Creek_Existing

ID#	Month	Day	Segment Inflow (m3/s)	Inflow Temperature (deg C)	Downstream Flow (m3/s)	Accretion Temperature (deg C)	Latitude	Segment Length (km)	Upstream Elevation	Downstream Elevation	Width's A Term	Width's B Term	Manning's N	Air Temperature (deg C)	Maximum Air Temp (deg C)	Relative Humidity (%)	Wind Speed (m/s)	Ground Temperature (deg C)	Thermal Gradient	Percent Possible Sun (%)	Solar Radiation (J/m2/s)	Total Shade (%)
1	1	15	0.0028	0.74	0.003	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-4.5	-0.5	88.5	2	6.4	1.65	20.9	27.0	100
2	2	15	0.0034	1.68	0.0036	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-2.4	2	79.5	2.3	6.4	1.65	33.9	65.2	100
3	3	15	0.0237	4.45	0.0249	6.4	0.883	1	585	535	5.1197	0.0842	0.035	1.5	3.8	66.1	2.6	6.4	1.65	45	109.3	50
4	4	15	0.2274	9.19	0.2387	6.4	0.883	1	585	535	5.1197	0.0842	0.035	6.5	8.9	56.5	2.7	6.4	1.65	49	150.1	60
5	5	15	0.3588	11.45	0.3767	6.4	0.883	1	585	535	5.1197	0.0842	0.035	11.1	14.8	56.2	2.3	6.4	1.65	52.4	182.9	60
6	6	15	0.1547	13.53	0.1625	6.4	0.883	1	585	535	5.1197	0.0842	0.035	14.7	18	57.4	2.4	6.4	1.65	51.2	181.1	65
7	7	15	0.1175	16.81	0.1233	6.4	0.883	1	585	535	5.1197	0.0842	0.035	18.7	21.1	48.6	2.3	6.4	1.65	61.2	217.5	70
8	8	15	0.1129	15.73	0.1186	6.4	0.883	1	585	535	5.1197	0.0842	0.035	17.8	19.6	50.8	2.1	6.4	1.65	64.3	182.3	70
9	9	15	0.0039	10.87	0.0041	6.4	0.883	1	585	535	5.1197	0.0842	0.035	12.9	15.2	59.7	2.3	6.4	1.65	58.7	132.5	55
10	10	15	0.0055	7.11	0.0057	6.4	0.883	1	585	535	5.1197	0.0842	0.035	5.6	8.4	74	2.2	6.4	1.65	39.2	75.4	45
11	11	15	0.0039	2.13	0.0041	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-0.1	3.5	84.2	2.5	6.4	1.65	23.5	34.0	40
12	12	15	0.003	0.57	0.0031	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-4.9	-1.7	87.8	2.1	6.4	1.65	18.6	22.4	100

SSTEMP_Input_Lower Peterson Creek_Ops (Yr 18)

ID#	Month	Day	Segment Inflow (m3/s)	Inflow Temperature (deg C)	Downstream Flow (m3/s)	Accretion Temperature (deg C)	Latitude	Segment Length (km)	Upstream Elevation	Downstream Elevation	Width's A Term	Width's B Term	Manning's N	Air Temperature (deg C)	Maximum Air Temp (deg C)	Relative Humidity (%)	Wind Speed (m/s)	Ground Temperature (deg C)	Thermal Gradient	Percent Possible Sun (%)	Solar Radiation (J/m2/s)	Total Shade (%)
1	1	15	0.0021	0.74	0.0023	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-4.5	-0.5	88.5	2	6.4	1.65	20.9	27.02486	100
2	2	15	0.0024	1.68	0.0026	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-2.4	2	79.5	2.3	6.4	1.65	33.9	65.22553	100
3	3	15	0.0151	4.45	0.0163	6.4	0.883	1	585	535	5.1197	0.0842	0.035	1.5	3.8	66.1	2.6	6.4	1.65	45	109.3465	50
4	4	15	0.175	9.19	0.1863	6.4	0.883	1	585	535	5.1197	0.0842	0.035	6.5	8.9	56.5	2.7	6.4	1.65	49	150.1428	60
5	5	15	0.329	11.45	0.3469	6.4	0.883	1	585	535	5.1197	0.0842	0.035	11.1	14.8	56.2	2.3	6.4	1.65	52.4	182.853	60
6	6	15	0.1404	13.53	0.1482	6.4	0.883	1	585	535	5.1197	0.0842	0.035	14.7	18	57.4	2.4	6.4	1.65	51.2	181.1041	65
7	7	15	0.1118	16.81	0.1176	6.4	0.883	1	585	535	5.1197	0.0842	0.035	18.7	21.1	48.6	2.3	6.4	1.65	61.2	217.5204	70
8	8	15	0.1092	15.73	0.1149	6.4	0.883	1	585	535	5.1197	0.0842	0.035	17.8	19.6	50.8	2.1	6.4	1.65	64.3	182.2907	70
9	9	15	0.0024	10.87	0.0026	6.4	0.883	1	585	535	5.1197	0.0842	0.035	12.9	15.2	59.7	2.3	6.4	1.65	58.7	132.4625	55
10	10	15	0.0029	7.11	0.0031	6.4	0.883	1	585	535	5.1197	0.0842	0.035	5.6	8.4	74	2.2	6.4	1.65	39.2	75.3578	45
11	11	15	0.0025	2.13	0.0027	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-0.1	3.5	84.2	2.5	6.4	1.65	23.5	33.9946	40
12	12	15	0.0022	0.57	0.0023	6.4	0.883	1	585	535	5.1197	0.0842	0.035	-4.9	-1.7	87.8	2.1	6.4	1.65	18.6	22.44979	100