

December 18, 2017

WWAL Project: 17-009-01

Rudy Bowolin Enterprises  
5662 Avoca Rd East  
Craigellachie, B.C.  
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Via email: lbowolin@gmail.com

**Re: WATER LICENSING AND WATER QUALITY ASSESSMENT: PROPOSED SUBDIVISION  
OF LOT 7220, KDYD, 5597 AVOCA ROAD EAST, CRAIGELLACHIE, BC.**

Western Water Associates Ltd. (WWAL) is pleased to provide this letter report in support of a subdivision application for the property at 5597 Avoca Road East, Craigellachie, B.C. The site is located within Electoral Area "E" in the Columbia Shuswap Regional District (CSRD). This letter provides information on the proposed water sources for each proposed lot in the subdivision, and evaluates a water quality sample originating from Sweet Creek. A map attached to this report depicts the proposed subdivision and key features discussed in the report.

**PROJECT BACKGROUND**

A proposal to subdivide the subject property into two parcels (one lot plus remainder) was submitted to the CSRD in the fall of 2016. Under the CSRD Subdivision Servicing Bylaw No. 641 ("the Bylaw"), all new parcels created by subdivision must be provided with an independent on-site water system (where community water service is not available). In this case, a water well was installed on Proposed Lot 1 to serve as the principal water source. In February 2017, WWAL issued a report entitled "Hydrogeological Evaluation of Well Water Quantity and Quality for the Proposed Subdivision of Lot 7220, KDYD, 5597 Avoca Road East, Craigellachie, BC". The report concluded the well installed on Proposed Lot 1 met the CSRD Subdivision Bylaw sustainable yield requirement and was of sufficient water quality to be considered potable (WWAL 2017).

The water source proposed for the Remainder Lot was to be a pre-existing conditional surface water licence attached to the parcel (Licence C38198). Issued in 1971, licence C38198 permits the extraction of water from nearby Sweet Creek and includes both irrigation and domestic water use purposes. The domestic portion of the licence is for 1,000 gallons per day (4.54 m<sup>3</sup>/day) and for the full year. The Irrigation portion of the licence is for 150 acre-feet/year (506.9 m<sup>3</sup>/day), for the period between April 1 and September 30. At present, the existing distribution system from Sweet Creek provides water services to both the proposed Remainder Lot and the Proponents' residence at 5662 Avoca Road East. A figure attached to this report depicts the outline of the proposed subdivision as well as the proponent's current residence property.

In November of 2016, the CSRD reviewed the proposed subdivision and issued a number of comments requiring follow up, including the following:

- Existing water licence C38198 required updating with the Ministry of Forests Lands and Natural Resource Operations (MFLNRO) to reflect current water uses and legal descriptions for the parcels to which it applies.
- Sweet Creek was not registered as an “Eligible Source” from which surface water could be withdrawn. To receive approval for this water source, a Development Variance Permit application was required to be submitted to the CSRD.
- A Qualified Professional (WWAL) was required to manage all aspects of developing the independent water systems for Lot 1 and the Remainder Lot, which included an assessment of water quality.

### **PROPOSED REMAINDER WATER SOURCE**

The Proponents of the subdivision have applied for a Development Variance Permit to continue using Sweet Creek to service both the proposed Remainder Lot and their residence on 5662 Avoca Road.

It is our understanding that the existing surface water licence will be amended by the MFLNRO to include updated water uses and legal descriptions once the CSRD subdivision application is approved. WWAL has reviewed the water license amendment application submitted by the proponent to the MFLNRO (Tracking Number 100190905). In this application, it was requested that the entire domestic portion of the existing licence be attached to the Proponents’ residence property at a quantity of 4.54 m<sup>3</sup>/day. For the Remainder Lot, where gravel pit operations occur, the entire Irrigation portion of the existing licence will be updated to Commercial – Processing & Manufacturing water uses at a quantity of 49.38 m<sup>3</sup>/day. (Personnel communication with Jeff Nitchoryk, MFLNRO).

At present, there is no residence or domestic water use on the proposed Remainder Lot. If and when a residence is constructed on the proposed Remainder Lot, it will be necessary to amend the existing water licence to include domestic water use. We understand that the MFLNRO cannot complete the water licence amendment until the subdivision is complete and new legal descriptions for the parcels in question are created. We suggest that when the MFLNRO completes their amendment, a domestic allotment be created for the proposed Remainder parcel equal to the CSRD Bylaw requirement of 2.275 m<sup>3</sup>/day. This allotment can either come from the domestic allotment of 4.54 m<sup>3</sup>/day that has been requested to be attached to the proponents current residence, or from the Commercial use which will be attached to the proposed Remainder.

The proposed water distribution infrastructure from the intake on Sweet Creek, which services both the Remainder Lot and the Proponents’ residence on 5662 Avoca Road East, has been in place for several decades. The CSRD has expressed some concern over the potential for shared works to be a future issue between these two properties. At present, both the proposed Remainder Lot and the lot on which the Proponents reside are owned by the Proponents. In the event that ownership of either property changes hands, a Joint Works Agreement between stakeholders could be developed which clearly outlines the responsibilities of all users of the shared water infrastructure. Alternatively, a separate intake and distribution line into Sweet Creek could be constructed.

## WATER QUALITY TESTING AND RESULTS

To assess water quality from Sweet Creek, a water quality sample was collected on November 23, 2017 by WWAL junior hydrogeologist Paul Williamson, M.Sc., G.I.T. from the kitchen tap in the Proponents' residence. Prior to collecting the sample, the tap was opened for 15 minutes to flush any stagnant, non-representative water from the system. To avoid cross contamination, a disposable pair of nitrile gloves was worn throughout sample collection. The sample was collected in clean, laboratory supplied bottles and transported to the laboratory in an ice-filled cooler within 24 hours. Water quality testing was completed by CARO Analytical in Kelowna, BC, a laboratory accredited by the Canadian Association of Laboratory Accreditation (CALA).

WWAL defines the term potability as water which is pure enough and of sufficient quality to be consumed or used with low risk of immediate or long-term harm. Under this definition, select biological, chemical and physical parameters must be at concentrations below health-based Maximum Allowable Concentrations (MAC), as outlined in the Guidelines for Canadian Drinking Water Quality (GCDWQ). The GCDWQ also outlines Aesthetic Objectives (AO), which address select parameters that may affect the taste, odour and/or colour of water. Exceedances of these parameters do not mean the water is not potable, but indicate that treatment to address subjective taste, odour or staining concerns may be desired.

Table 1 provides a summary of water quality results, and the complete laboratory report is provided as an attachment.

Total coliforms were detected in the water sample at concentrations that exceed the GCDWQ. This result was somewhat expected, given that the water originates from an untreated, surface source. Total coliforms are a naturally occurring group of bacteria that are prevalent throughout the environment. They are generally measured to provide insight into the microbial condition of a water source and their detection can be an indicator of bacterial contamination that may require further treatment (GOC 2017). Total coliform bacteria, and potentially *E.Coli* and other pathogenic bacteria may be present year round and appropriate treatment should be put in place.

All other parameters analyzed were within MAC and AO Guidelines. Turbidity in the sample collected was measured at 0.27 NTU. The potential exists for turbidity to be elevated in and around the spring freshet. Such events should be taken into account in the design of any water treatment system.

Several readily available treatment methods, including filtration and/or disinfection, are available to reduce the concentrations of total coliforms present in the water source. A specialist in home water quality treatment should be contacted for potential treatment options. It should be noted that the Ministry of Health does not regulate or monitor the water quality of private domestic water sources. Operation and maintenance of a treatment system is solely the responsibility of the homeowner.

**Table 1 – Summary of Water Quality Results**

Parameter	Units	Concentration	GCDWQ
Sample Date	November 23, 2017		
<b>General</b>			
pH [lab]	pH units	6.87	n/a
Conductivity [lab]	us/cm	575	n/a
Turbidity	NTU	0.26	n/a
Total Dissolved Solids	mg/L	46.8	AO ≤ 500
Hardness (as CaCO <sub>3</sub> )	mg/L	36.9	n/a
Fluoride	mg/L	<0.10	MAC = 1.5
Nitrate (as N)	mg/L	0.025	MAC = 10
Nitrite (as N)	mg/L	<0.010	MAC = 1
Chloride	mg/L	0.73	AO ≤ 250
Sulfate	mg/L	4.8	AO ≤ 500
<b>Total Metals</b>			
Aluminum	mg/L	0.0135	n/a
Antimony	mg/L	<0.00020	MAC = 0.006
Arsenic	mg/L	<0.00050	MAC = 0.01
Barium	mg/L	<0.0050	MAC = 1
Cadmium	mg/L	<0.000010	MAC = 0.005
Calcium	mg/L	12.5	n/a
Chromium	mg/L	<0.00050	MAC = 0.05
Iron	mg/L	<0.010	AO ≤ 0.30
Lead	mg/L	<0.00020	MAC = 0.01
Manganese	mg/L	0.00037	AO ≤ 0.05
Selenium	mg/L	<0.00050	MAC = 0.01
Sodium	mg/L	1.23	AO < 200
Uranium	mg/L	0.00315	MAC = 0.02
Zinc	mg/L	0.0042	AO ≤ 5
<b>Microbiological</b>			
Total Coliforms	CFU/100 mL	41	MAC < 1
<i>E. Coli</i>	CFU/100 mL	<1	MAC < 1

Notes:

1. GCDWQ = Guidelines for Canadian Drinking Water Quality. Exceedances highlighted in orange.
2. AO = Aesthetic Objective, a subjective taste or odour concern.

## CONCLUSIONS AND RECOMMENDATIONS

- CI** The existing surface water license for Sweet Creek will be updated by the MFLNRO to reflect current water uses and legal descriptions for the parcels to which it applies, once the proposed subdivision application has been approved by the CSRD. Additionally, a Development Variance Permit application has been submitted to the CSRD by the Proponents to classify Sweet Creek as an “Eligible Source” for the purposes of this subdivision.

We note that the water licence amendment application submitted by the proponent is to transfer the complete domestic allotment from the proposed Remainder to the parcel on which the proponents currently reside. This does not leave a domestic allotment for the

proposed Remainder. A domestic allotment should be left for the Proposed Remainder of at least 2.275 m<sup>3</sup>/day.

- C2** Water quality testing of the Sweet Creek water source indicates that total coliforms were present at concentrations that exceed GCDWQ MAC. The potential also exists that turbidity of the water source may increase above the levels measured in the November 23 sample. All other tested parameters were below GCDWQ criteria.

Based on the above conclusions, the following recommendations are made:

- R1** To address elevated concentrations of total coliforms and the potential that pathogenic bacteria may also be present in the Sweet Creek source, appropriate water treatment (e.g. filtration and UV Disinfection) should be put in place for any domestic users of the Sweet Creek source. A water treatment specialist should be contacted to discuss potential treatment options for both lots serviced by Sweet Creek. The selection, operation and maintenance of such systems are solely the property owners' responsibility. This recommendation applies to both the existing users of the water at 5662 Avoca Road East and to any future residences on the proposed Remainder Lot.
- R2** At this point, based on the water licence amendment application submitted, the water license for the proposed Remainder Lot will be updated to include only Commercial – Processing & Manufacturing water uses. A domestic allotment should be left for the Proposed Remainder of at least 2.275 m<sup>3</sup>/day. This should be communicated to the MFLNRO and a new water licence amendment application submitted if necessary.
- R3** The two properties serviced by Water Licence C38198 from Sweet Creek currently fall under the same ownership. If ownership of either property changes hands, it is recommended that a Joint Works Agreement between owners be executed or a separate intake and distribution line into Sweet Creek be constructed.

## CLOSURE

We trust that the professional opinions and advice presented in this document are sufficient for your current requirements. If you have any questions or concerns or if we can be of additional service, please contact the undersigned.

## WESTERN WATER ASSOCIATES LTD.



**Paul Williamson M.Sc., GIT**  
**Hydrogeologist**

**Ryan Rhodes, P.Geo.**  
**Senior Hydrogeologist**

**Attachments:**

Figure Showing Proposed Subdivision and Parcel on which the Proponents Reside  
Laboratory Water Quality Report

**REFERENCES**

Government of Canada (GOC), 2017b. Drinking Water Quality Guidelines: Guideline Technical Document – Total Coliforms. Online source: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-total-coliforms.html>

Western Water Associates Ltd. (WWAL). 2017 Hydrogeological Evaluation of Well Water Quantity and Quality for the Proposed Subdivision of Lot 7220, KDYD, 5597 Avoca Road East, Craigellachie, B.C.

# Proposed Subdivision

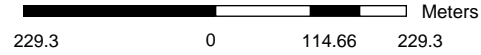


Dec 12, 2017

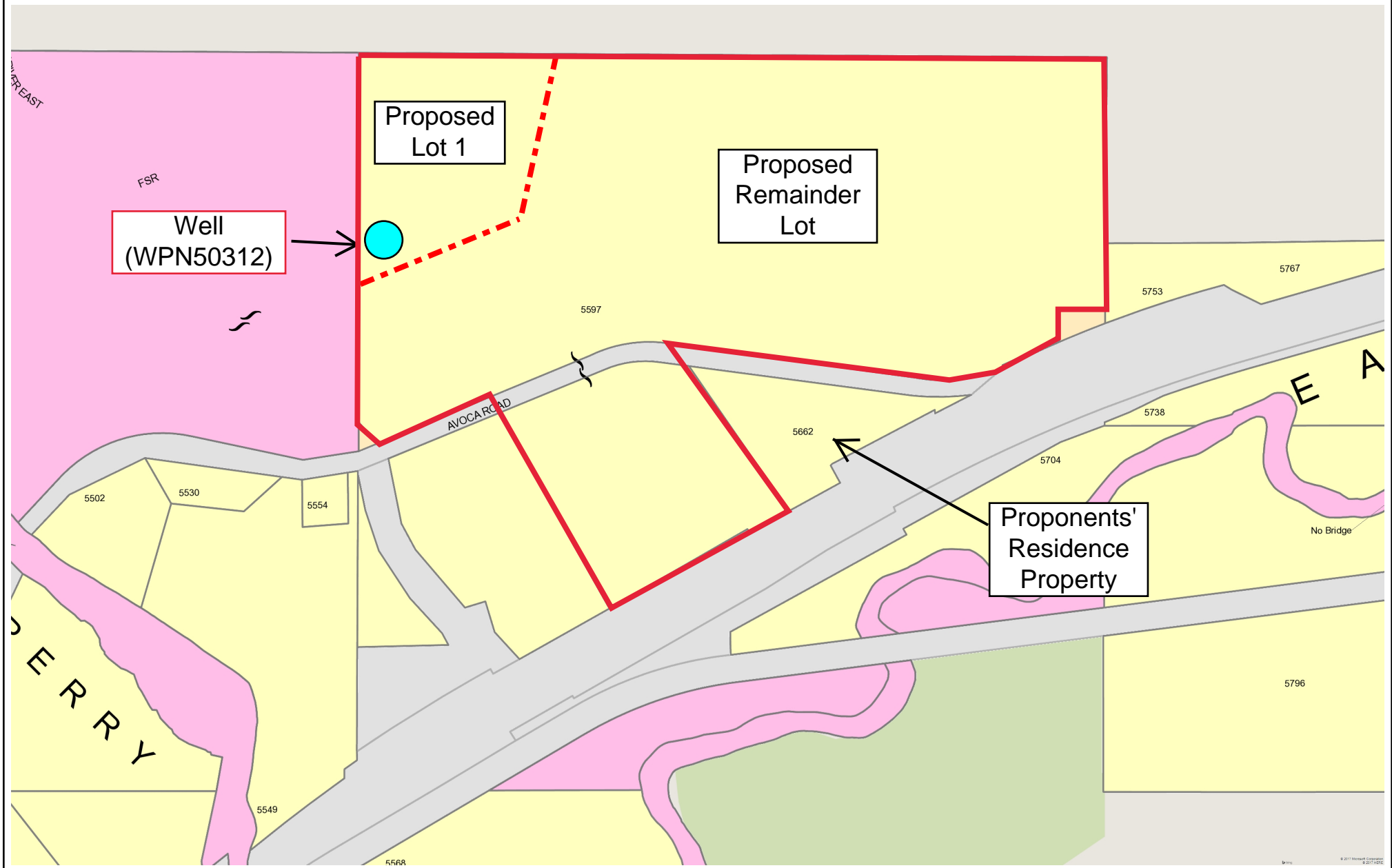
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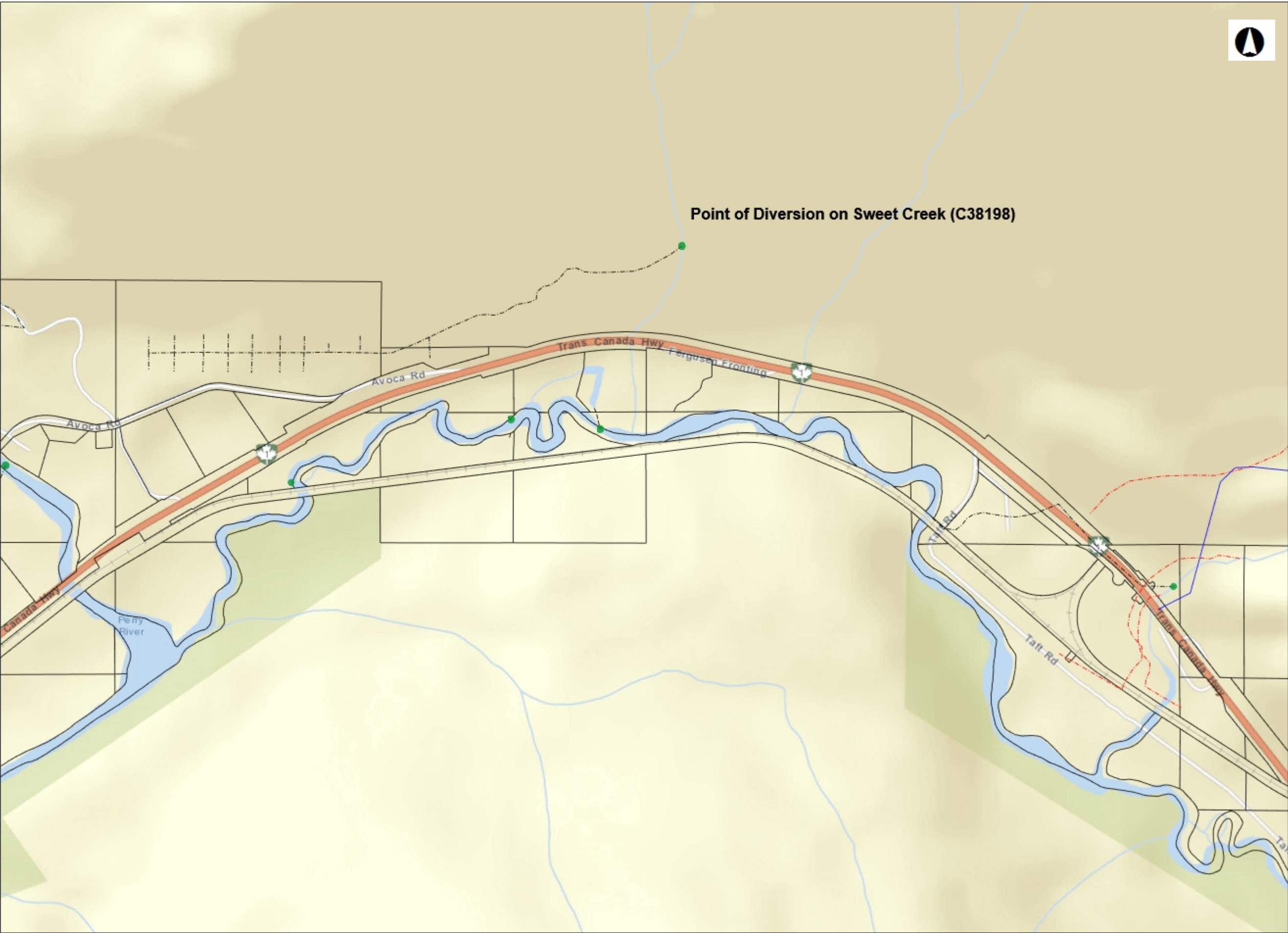
Scale 1: 9,028



## Map Notes







Water Resources Atlas -  
Point of Diversion and  
Linear Works Associated  
(C38198)

Points of Diversion

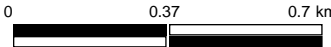
STATUS

- Active Application
- Active Application and Licence
- Inactive
- Active Licence

Water Licensed Works Line:  
FCODE

FEATURE\_CODE

- Accessway
- Access Road
- Conduit - Water
- Dam
- Dike
- Ditch
- Dugout
- Flume
- Penstock
- Pipeline - Water
- Pond
- Rearing Channel
- Rearing Pond
- Release Channel
- Reservoir
- Reservoir - Balancing
- Road (Paved Divided)
- Road (Paved Undivided)



1: 18,056

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Key Map of British Columbia





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