



Development Permit

DP2305E (Drinkwater)

Date: July 25, 2023

Issued pursuant to Section 490 and 491 of the *Local Government Act*

1. This Development Permit is issued to Drinkwater Enterprises LTD and Flatbow Construction LTD of Harrop, British Columbia as the registered owner (hereinafter called the "Permittee") and shall only apply to those lands within the Regional District of Central Kootenay, in the Province of British Columbia legally described as LOT 4 DISTRICT LOT 222 KOOTENAY DISTRICT PLAN 1189 (PID 016-217-667) as shown on the attached Schedules 1 and 2, forming part of this Permit, referred to hereafter as the "said lands".
2. This Development Permit is issued subject to compliance with all of the bylaws of the Regional District of Central Kootenay applicable thereto, except as specifically varied or supplemented by this Permit.
3. This Development Permit shall not have the effect of varying the use or density of land as specified in the applicable Zoning Bylaw of the Regional District of Central Kootenay, nor a Floodplain Specification under Section 524 of the Local Government Act.
4. The said lands have been designated Rural Residential (RR) and Agriculture (AG) and are located within a Watercourse Development Permit Area (WDPA) pursuant to the *Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013* as amended.
5. The Permittee has applied to the Regional District of Central Kootenay for a Watercourse Development Permit in order to permit the construction of a clear span bridge and upgrade of an existing access road within 15 m of Harrop Creek and to use land and structures situated on the said lands for this purpose. Pursuant to this Development Permit and subject to the terms and conditions herein contained, as well as all other applicable Regional District Bylaws, the Regional District of Central Kootenay hereby authorizes the use of the said lands for this purpose.
6. The Permittee is required to obtain approval in writing from the Regional District of Central Kootenay prior to the construction any new buildings, external additions to existing buildings or for any deviation from the development authorized under Section 5 and Schedule 2 and 3 of this Development Permit. Furthermore, the Permittee is hereby advised of the following requirements:
 - 6.1 The Regional District of Central Kootenay Building Department requires that the Permittee obtain a demolition permit and/or building permit prior to the removal of any existing buildings and structures, the renovation, expansion or alteration of any existing building and the construction of any new building.
 - 6.2 Development is authorized in accordance with the terms described in the report titled "899 Lewis Road, Riparian Assessment" prepared by Masse Environmental Consultants Ltd., dated April 07, 2023 and attached to this permit as Schedule 3. Compliance with all recommendations is required. Recommendations can be categorized as follows:
 - 6.2.1 The following mitigation measures will be implemented to protect existing vegetation within the SPEA:

- 6.2.1.1 Clearing of vegetation will be kept to the minimum possible area required for access, staging, construction works, and safety considerations.
- 6.2.1.2 The boundaries of the project site will be clearly marked before the crews arrive. All vegetation outside of these boundaries will be retained.
- 6.2.1.3 Salvage and retain topsoil during road upgrade works, stockpile away from the stream (>15 m) and re-use in revegetation areas.
- 6.2.2 Encroachment into the SPEA is limited to the access road, bridge construction and restoration area. Further development beyond these areas is discouraged to preserve the function of the riparian vegetation, and to promote re-establishment of vegetation within the restoration area.
- 6.2.3 In order to prevent sediment from entering Harrop Creek and minimize potential impacts to fish habitat, exposed soils will be minimized with respect to extent and duration. The contractor will ensure that there are sufficient materials (silt fences, straw bales and tarps) available on-site for emergency protection measures when required during adverse weather conditions. Work next to the stream shall be halted during heavy rain events.
- 6.2.4 The following stormwater management measures shall be implemented:
 - 6.2.4.1 On the east side of the creek, the access road will be sloped inwards towards the bank and a swale created along the toe of slope on the inside edge of the road to capture run-off water from the hillside and reduce surface flow from discharging into the riparian area.
 - 6.2.4.2 Road surface approaches at each bridge end shall be sloped away from the creek.
- 6.2.5 The proposed bridge structure has been engineered to withstand a 200 year flood event as per conditions of the Water Sustainability Act (WSA).
- 6.2.6 To minimize disturbance to fish, wildlife and their habitat, the following measures will be implemented:
 - 6.2.6.1 If possible, conduct bridge installation works during the instream works window (July 16- Aug 15).
 - 6.2.6.2 If clearing activities will take place during the nesting bird period (early-April to mid-August), a nesting sweep conducted by a QEP is recommended prior to clearing activities commencing. If an active nest is identified during the construction works, the QEP is to be notified and develop appropriate mitigation measures.
 - 6.2.6.3 Follow the Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MOE 2013) if any active raptor nests are discovered within 100 m of the project location. Active raptor nests are legally protected at all times of the year and some inactive nests (ex: Bald Eagle nests) are similarly protected. A QEP should be retained to determine the appropriate mitigation measures to protect raptors and their habitat.

- 6.2.7 The following mitigation measures are recommended to reduce the establishment and proliferation of invasive plant species on site:
- 6.2.7.1 The amount of soil disturbance should be minimized.
 - 6.2.7.2 Pull invasive spotted knapweed within the disturbed area along the west side of the creek where revegetation is proposed.
- 6.2.8 To mitigate for the loss of riparian vegetation within the SPEA, the disturbed area above the armored bank upstream was identified for mitigation through revegetation.
- 6.2.8.1 Revegetation will include the planting of 8 native trees and 15 native shrubs within the identified disturbed riparian area, as well as re-seeding of all disturbed soils generated by the bridge and road upgrade works with an Interior Forestland seed mix to prevent erosion and establishment of invasive weeds.
- 6.2.9 General Planting and Maintenance Guidelines
- 6.2.9.1 Planting should not occur during periods of hot dry weather unless they are irrigated daily.
 - 6.2.9.2 Trees shall be spaced at >3 m apart and shrubs spaced >1 m apart.
 - 6.2.9.3 Minimize impact to the existing shrubs located within the revegetation area.
 - 6.2.9.4 Locally adapted native plants are preferable to those collected or grown outside the region.
 - 6.2.9.5 Planting holes shall be a minimum of 3 times the size of the pot.
 - 6.2.9.6 Salvaged topsoil from road upgrade works and / or compost shall be mixed into each planting hole.
 - 6.2.9.7 Use transplant fertilizer (ie. Mykes Mycorrhizae Tree and Shrub or similar) as per manufacturers specifications in each planting hole.
 - 6.2.9.8 Seed to be spread on disturbed soils at a rate of 25 kg/ha.
 - 6.2.9.9 Plantings which do not survive should be replaced to ensure complete establishment of native plants, and exclusion of exotic plants.
 - 6.2.9.10 Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
 - 6.2.9.11 Regularly irrigate new plantings during the plant establishment period for a minimum of 3 years and thereafter as required.
 - 6.2.9.12 Pull any invasive weeds on a yearly basis prior to going to seed.
- 6.2.10 A post construction site visit will be conducted once the bridge, road upgrade works and riparian planting are complete to assess compliance and completion of the project.
- 6.2.11 An environmental summary report will be prepared by a Qualified Environmental Professional (QEP) and submitted to the RDCK.

1. As a condition of the issuance of this Permit, the Regional District shall hold an irrevocable Letter of Credit submitted by the Permittee in the amount of \$1793.00 to ensure the landscaping requirements as set forth in Section 6 are completed and in accordance with the following provisions:
 - 6.1 A condition of the posting of the Letter of Credit is that should the Permittee fail to carry out the works and services as herein above stated, according to terms and conditions of this permit within the time provided, the Regional District may use the Letter of Credit to complete these works or services by servants, agents or contractors, and any surplus shall be paid over to the Permittee. If the amount of funds is insufficient to cover the actual cost of completing the works, then the Permittee shall pay such deficiency to the Regional District immediately upon receipt of the Regional District's bill for same.
 - 6.2 The Permittee shall complete the landscaping works required by this Permit prior to July 25, 2025. Within this time period the required landscaping must be inspected and approved by the Regional District.
 - 6.3 If the landscaping is not approved within this time period, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is completed or has the option of drawing from the Letter of Credit to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter into the property to undertake the required landscaping for which the Letter of Credit was submitted.
 - 6.4 If the landscaping is approved within this time period without the Regional District having to draw the on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.
 - 6.5 A hold back of 10% of the original amount of the Letter of Credit shall be retained until a final inspection is undertaken within 12 months of the date of the original inspection and approval was given to the landscaping. If the landscaping receives approval at final inspection, the 10% hold back will be returned to the Permittee. If after the final inspection, approval of the landscaping is not given, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is approved or has the option of drawing on the Letter of Credit the funds to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter onto the property to undertake the required landscaping for which the Letter of Credit was submitted.
2. The said lands shall be developed strictly in accordance with the terms and conditions of this Development Permit and the requirements of all applicable Regional District Bylaws as well as any plans and specifications which may, from time to time, be attached to this Permit shall form a part thereof.
3. In accordance with the Local Government Act, if the development authorized by this Development Permit is not commenced within two years of the date of this Permit, this Permit shall lapse.
4. In accordance with the Local Government Act, 'Notice' shall be filed in the Land Title Office that the said lands are subject to this Development Permit.
5. The terms of this Development Permit including subsequent amendments, are binding on all persons who acquire an interest in the said lands associated with this Permit.
6. It is understood and agreed that the Regional District has made no representations, covenants, warranties, guarantees, promises, or agreement (verbal or otherwise) with the Permittee other than

those in this Development Permit. It is solely the responsibility of the Permittee to ensure that the requirements of all other applicable government agencies are satisfied.

7. This Development Permit does not constitute a building permit.
8. This Development Permit shall come into force and effect 14 days after the date of issuance unless a Waiver of Appeal is received from the Permittee at which time the Development Permit shall be deemed to be issued upon receipt of the Waiver of Appeal. OR If a Notice of Appeal is received the Development Permit shall be suspended until such time as the Board of the Regional District of Central Kootenay has decided the Appeal.

S Sudan

Sangita Sudan, General Manager of Development and Community Sustainability Services

September 6, 2023

Date of Approval (date of review and approval)

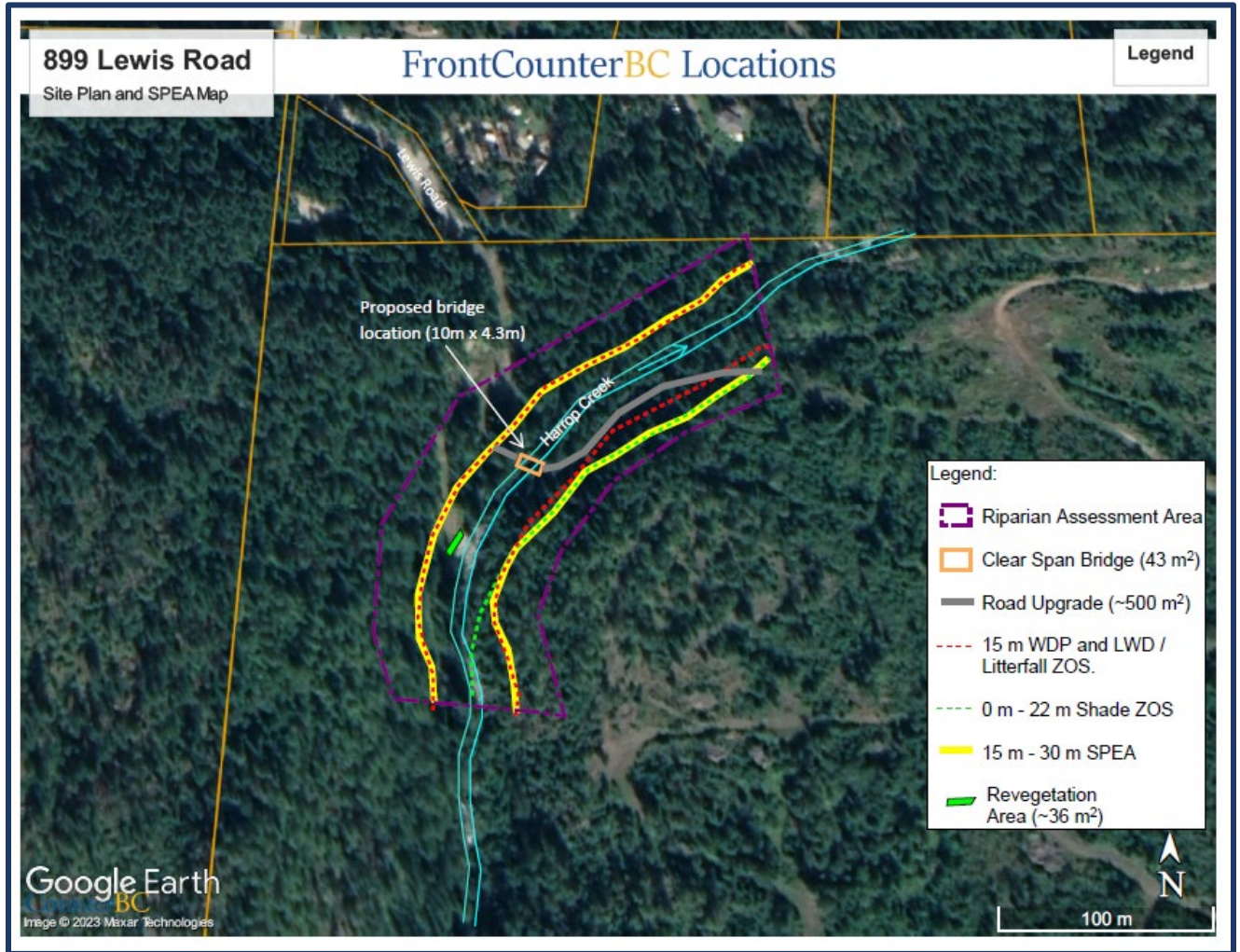
September 11, 2023

Date of Issuance (pending receipt of securities)

Schedule 1: Subject Property



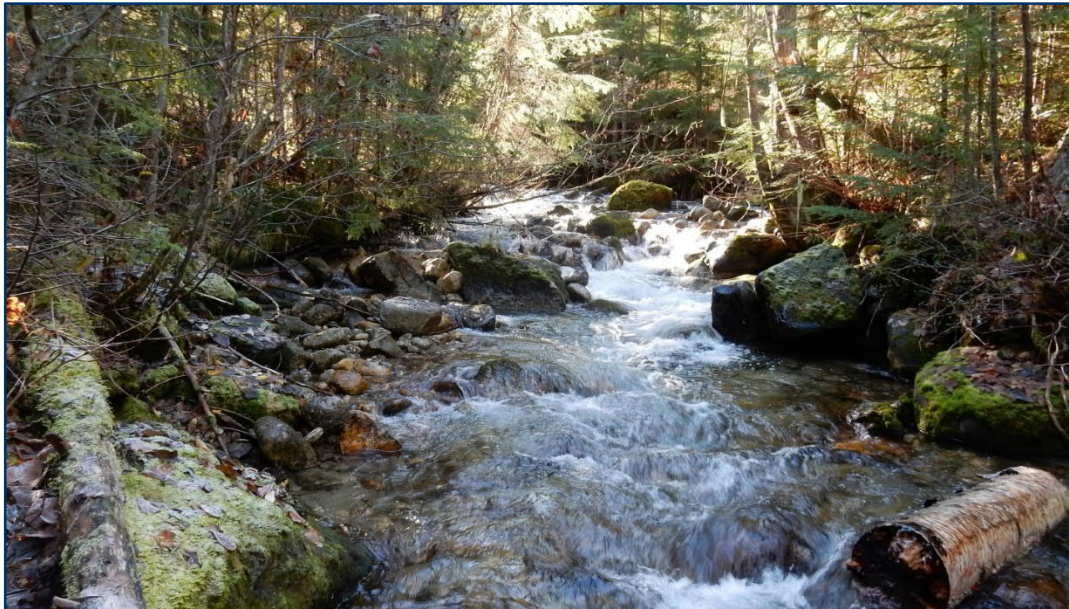
Schedule 2: "899 Lewis Road, Site Plan and SPEA Map prepared by Masse Environmental and submitted as Appendix 3 of "899 Lewis Road, Riparian Assessment" prepared by Masse Environmental Consultants Ltd., dated April 07, 2023



Schedule 3: "899 Lewis Road, Riparian Assessment" prepared by Masse Environmental Consultants Ltd., dated April 07, 2023



899 Lewis Road
Riparian Assessment



Prepared for:
Regional District of Central Kootenay
202 Lakeside Drive
Nelson, BC, V1L 5R4

April 7, 2023

Prepared by:
Masse Environmental Consultants
812 Vernon Street
Nelson, BC, V1L 4G4

Project Number 2023-1021

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1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Michael Drinkwater (Owner) to conduct a riparian assessment to accompany an application for a Watercourse Development Permit (WDP) on his property at 899 Lewis Road (PID 016-217-667, LOT 4 PLAN NEP1189 DISTRICT LOT 222 KOOTENAY LAND DISTRICT) in Harrop, BC. The Owner is proposing to construct a clear span bridge and upgrade an existing access road, located within the 15 m WDP area for Harrop Creek (also known as Mill Creek).

A site visit was completed on March 6, 2023, by Fiona Lau B.Tech., A.Sc.T. to conduct a riparian assessment for the proposed bridge and access road upgrade. The assessment area was limited to 100 m upstream and 100 m downstream of the proposed bridge to a width of 30 m on each side of the stream, as the proposed development is confined to the lower section of Harrop Creek within the property boundary and upstream riparian areas are difficult to access due to steep slopes and dangerous conditions. The riparian assessment evaluates the existing conditions of the riparian area for Harrop Creek, identifies habitat values, assesses potential environmental impacts, and recommends measures to mitigate or compensate for the alteration of the riparian area to maintain environmental values. It is based on the following regulatory framework and best management practices documents:

- RDCK Electoral Area 'E' Rural Official Community Plan Bylaw No. 2214, 2011
- British Columbia Riparian Areas Regulation
- British Columbia Water Sustainability Act
- British Columbia Wildlife Act
- Federal Fisheries Act
- Federal Migratory Birds Convention Act
- Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia

This report has been prepared by Fiona Lau B.Tech., A.Sc.T.

I, Fiona Lau, hereby certify that:

- a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act;
- b) I am qualified to carry out this part of the assessment of the development proposal made by the developer;
- c) I have carried out my assessment of the development proposal, and my assessment is set out in this Assessment Report; and

- d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2 PROJECT OVERVIEW

2.1 Site Location

The subject property is located 1.6 km southwest from the Harrop/Procter ferry terminal at the end of Lewis Road in Harrop, BC (see Appendix 1 for Location Map). The property covers ~49.3 ha in size and is bordered by private properties to the north, east and west and Crown Land to the south. The property can also be accessed off Harrop Creek Road where the existing residence is located. Harrop Creek, which flows through the property along the western portion is registered Crown Land below the high water mark (HWM).

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone, which occurs at low-mid elevations along Kootenay Lake and Kootenay River (MacKillop and Ehman 2016). The ICHdw1 subzone is characterized by moist, warm springs, hot and dry summers and dry winters with moderately shallow snowpack. Winter rain-on-snow events are frequent and snow-free areas are common, particularly on warm-aspect sites. The ICHdw1 is a highly productive biogeoclimatic unit (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

The assessment area has a northern aspect and has mixed topography ranging from gently sloping areas to steep embankments >60% slope. The assessment area has been disturbed from historical timber clearing activities and blow down (Photo 1). The area has mostly regenerated with young hemlock and has an average stand age of <50 years. The forest on the subject property is currently managed by the Owner and provides road access to the Harrop-Procter Community Co-op, who manages a licensed 40 ha parcel above the subject property for fuel treatment reduction purposes. Refer to Section 2.2.2 for Existing Development and Section 3.2 for Riparian Vegetation for detailed descriptions of the subject property.

Harrop Creek is the only watercourse located on the subject property (Photo 2). It is a 4th order stream that originates from Mill Lake, is ~12 km in length and flows in a north direction into the West Arm of Kootenay Lake. Fish and aquatic habitat descriptions are described in Section 4.1.



Photo 1. Steep bank within assessment area, on east side of Harrop Creek.



Photo 2. Harrop Creek looking downstream within assessment area.

2.2.1 Existing Development

Existing development within the riparian assessment area includes an existing access road (Photo 3) from Lewis Road to a domestic water system pump house located on the west side of Harrop Creek just upstream of the proposed bridge location. The pump house is a wood structure (~3m x 3m) located ~3 m from the creek bank (Photo 4). This access road continues upstream for ~ 100 m to the water intake location. Erosion and scour protection work was completed by the previous owner along a 20 m section of stream bank on the left bank (west side) of Harrop Creek (UTM 11 U495657.5493703), upstream of the pump house (Photo 5). Works included riparian vegetation removal, re-grading of bank and placement of riprap to protect private property and the domestic water infrastructure. According to Google Aerial imagery, the disturbed soils within the work area appear to have been re-seeded. This was not visible during the site visit, due to the snow cover.

Historically an old timber bridge crossing existed at approximately the proposed bridge location providing access from Lewis Road into the property (Photo 6). Remnants of the timber sills on each side of the creek are still evident, but cannot be seen in the photo. Along the east and west sides of the creek an old access road existed providing the only access across the property from the west side of the creek (Photo 7). Natural regeneration of shrubs and trees were present along the edges of the old road and along the stream bank where the old bridge existed (Photo 8).



Photo 3. Existing access road above the pump house along the west side of Harrop Creek.



Photo 4. Domestic water system pumphouse structure, located just upstream of the proposed bridge crossing.



Photo 5. View of armoured rock bank upstream of bridge crossing and pump house.



Photo 6. Proposed bridge crossing location looking east (Photo Credit Michael Drinkwater).



Photo 7. View of old access road on east side of Harrop Creek.



Photo 8. Trees regenerated on old access road next to Harrop Creek on right (east) bank.

2.3 Proposed Development

The proposed development within the 15 m WDP area of Harrop Creek includes:

- Construction of a 10 m long by 4.3 m wide clear span bridge (43 m²);
- Upgrading and widening the existing access road on the east and west sides of Harrop Creek (~560 m² overall road footprint); and
- Revegetation of a disturbed area along the west side of Harrop Creek upstream of bridge (36 m²).

The subject site for the proposed clear span bridge crossing was a former bridge crossing that was removed. The new bridge will provide access to the east side of Harrop Creek, connecting the Owner's private land on both sides of the creek. SNT Engineering Ltd was retained to determine the ideal bridge location and design the bridge. The old bridge crossing was selected to be the best location available, as it would minimize disturbance to the riparian area without major earth works being required for road upgrades. The upgraded access road will require further cutting into the bank (~1-2 m width) to provide a ~4-5 m wide road path. The new bridge will be a steel girder bridge installed on a single row of precast concrete lock block footings with a timber deck. The proposed revegetation is located within a previously disturbed riparian area above the rock armoured bank which would benefit from the planting of native trees and shrubs.

Refer to Appendix 2 for Engineering Bridge Design and Appendix 3 for Proposed Site Plan.

3 REGULATORY OVERVIEW

To determine whether the 15 m WDP setback from the HWM of Harrop Creek aligns with the Riparian Area Protection Regulation (RAPR) criteria, a detailed assessment of the subject property was conducted to calculate the Streamside Protection and Enhancement Area (SPEA) setbacks. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1 and Appendix 3.

As per the RAPR, the large woody debris (LWD) and litter ZOS were plotted 15 m inland from the HWM of Harrop Creek with the shade ZOS plotted 0 m – 22 m from the HWM from Harrop Creek. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA from the HWM of Harrop Creek is 15 -22 m.

The BC Riparian Areas Protection Regulation (BC 2015) defines "High Water Mark" and "Stream" as follows:

“High Water Mark” means the visible high water mark of a stream where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the stream a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain.”

“Stream” includes any of the following that provides fish habitat:

- (a) a watercourse, whether it usually contains water or not;
- (b) a pond, lake, river, creek or brook;
- (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b).

Table 1. Results of detailed RAPR assessment for Harrop Creek.

Feature Type	Channel Width	SPVT ¹	Zones of Sensitivity			SPEA
			LWD	Litter fall	Shade	
Harrop Creek	8.5 m	TR	15 m	15 m	0-22 m	15-22m

¹ SPVT: site potential vegetation type (TR-tree)

The Owner has acquired the following permits from Front Counter BC for the proposed bridge work:

- Section 11 Notification for a clear span bridge (File number 4008152)
- Road Use Crown Land Tenure across Harrop Creek (File number 4406307)

4 ENVIRONMENTAL RESOURCES

4.1 Fish and Aquatic Habitat

Fish species present in Harrop Creek include Brook Trout (*Salvelinus fontinalis*), Bull Trout (*Salvelinus confluentus*), Rainbow Trout (*Oncorhynchus mykiss*), Kokanee (*Oncorhynchus nerka*) and Longnose Dace (*Rhinichthys cataractae*) (Masse 2021 and Masse 2002). Bull Trout are a blue listed species in BC, and while Kokanee are not a listed species they are considered culturally and recreationally significant in the Kootenays.

Channel morphology within the assessment area is cascade-pool with substrate materials consisting predominantly of cobble with some boulders and pockets of gravel (Photo 9). The stream gradient in this section of the creek is ~6% with an average bankful channel width of 7.5 m. The bankful channel width at the proposed bridge crossing is 6 m. Instream cover for fish is provided by large boulders, some deep pools, and large woody debris. This section of stream provides both rearing, some overwintering and potential spawning habitat for salmonids.



Photo 9. View downstream of proposed bridge crossing showing cascade pool habitat (Photo credit Michael Drinkwater).



Photo 10. View upstream of proposed bridge crossing showing boulders and large woody debris habitat (Photo credit Michael Drinkwater).

4.2 Vegetation

The riparian area of Harrop Creek consists of a mix of western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*) and paper birch (*Betula papyrifera*). The understory vegetation consists of alder (*Alnus* sp.), Douglas maple (*Acer glabrum*), western yew (*Taxus brevifolia*), mountain ash (*Sorbus sitchensis*), thimbleberry (*Rubus parviflorus*) and falsebox (*Pachistima myrsinites*) (Photos 11-13). Knapweed (*Centaurea* sp) was observed within a disturbed cleared area upstream of the project site, where bank armoring works occurred (Photo 14). Species identification was limited due to snow cover on the site during the site visit.



Photo 11. View of typical riparian vegetation along stream bank (Photo credit Michael Drinkwater).

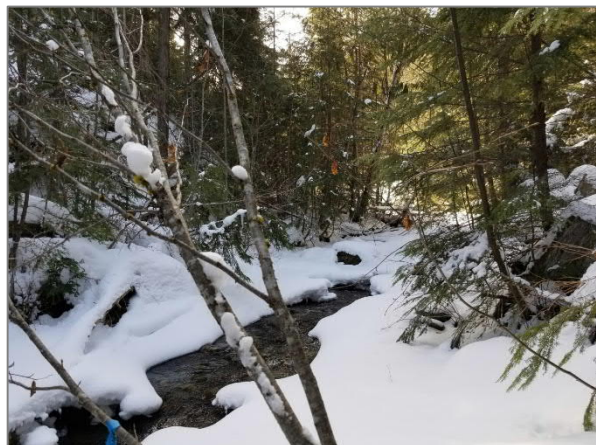


Photo 12. View of young forest along the creek banks looking upstream of the bridge site.



Photo 13. View of riparian area downstream of the bridge site.



Photo 14. View of riparian vegetation removed along top of armoured bank upstream of site, where proposed revegetation will occur.

4.3 Wildlife

4.3.1 Reptiles and Amphibians

The riparian area along Harrop Creek banks provides suitable habitat for northern alligator lizard (*Elgaria coerulea*), Coeur d'Alene salamander (*Plethodon idahoensis*), garter snakes (*Thamnophis* spp.), and western toad (*Anaxyrus boreas*). Incidental observation of an adult western toad was observed ~850 m downstream of the site within the stream channel in August 2021 during a fish salvage by Fiona Lau of Masse Environmental (Photo 15).

4.3.2 Birds

An American dipper and a couple other small unidentified songbirds were observed during the site visit within the riparian area. The subject property provides potential nesting habitat for songbirds and sapsuckers, although no nests were observed during the site visit. As the forest is relatively young, it is unlikely that raptors use this area for nesting; however may visit the area for feeding opportunities, as there are many eagles, ospreys and herons which inhabit the shoreline and riparian areas along Kootenay Lake which is ~700 m away from the site.

4.3.3 Mammals

Mammals that are expected to use the riparian area around the subject property include American black bear (*Ursus americanus*), white tail deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), cougar (*Puma concolor*), coyote (*Canis latrans*), elk (*Cervus elaphus*) and snowshoe hare (*Lepus americanus*), with wolverine (*Gulo gulo*), grizzly bear (*Ursus arctos*), moose (*Alces alces*) who may also frequent this area.



Photo 15. Western toad observed 850 m downstream of site in Harrop Creek in Summer of 2021.



Photo 16. Elk tracks observed in the snow along the old access road east of Harrop Creek.

4.4 Species at Risk

The BC Conservation Data Center (CDC) occurrence data and critical habitat for Federally listed species at risk were queried within iMap BC (BC 2023), using a 10 km buffer around the center point of the subject property. The query results are presented in

Table 2. Seven species at risk were identified within this buffer including those seen from personal sightings from Fiona Lau (Masse). Potential occurrence on the property was assessed as likely, possible, unlikely, or unknown, according to known species habitat affinities and the habitat profile of the property, and in proximity to mapped occurrences.

Table 2. Species at risk with potential occurrence based on iMap BC 10 km radius query.

Common Name (Scientific Name)	Likelihood of Occurrence on Subject Property	Comment	BC Conservation Status ¹	COSEWIC ² / SARA ²
Banded Tigersnail (<i>Anguispira kochi</i>)	Unlikely	CDC occurrence mapped ~ 4.5 km northwest of the subject property, at Kokanee Creek Provincial Park. Occurs in moist deciduous/coniferous forests, near shores of lakes and streams (Shape ID: 120189, Occurrence ID: 15025).	Blue	NAR
Great Blue Heron (<i>Ardea Herodias</i>)	Unlikely	Observed along Kootenay Lake Shoreline ~ 700 m away	Blue	SC
Western Bumble Bee (<i>Bombus occidentalis</i>)	Possible	CDC occurrence mapped ~6 km north west of the subject property at Kokanee Creek Provincial Park (Shape ID: 131768, Occurrence ID: 16454). Associated with open coniferous, deciduous, and mixed-wood forests.	Blue	T
Western Skink (<i>Plestiodon skiltonianus</i>)	Possible	CDC occurrence mapped ~1.8 km northwest of the subject property (Shape ID: 29931, Occurrence ID: 6940).	Blue	SC

Common Name (Scientific Name)	Likelihood of Occurrence on Subject Property	Comment	BC Conservation Status ¹	COSEWIC ² / SARA ²
Western Toad (<i>Anaxyrus boreas</i>)	Possible	Incidental observation by Fiona Lau ~850 m NE of the site within riparian area of Harrop Creek.	Yellow	SC
White Sturgeon (Upper Kootenay River Population) (<i>Acipenser transmontanus</i> pop. 1)	Unlikely	Found in Kootenay Lake (Shape ID: 1370, Occurrence ID: 4745). Associated with deep lakes and large rivers. Is not expected to occur on the subject site.	Red	E
Whitebark pine (<i>Pinus albicaulis</i>)	Unlikely	CCD occurrence is mapped within ~8.6 km southeast of the subject property (Shape ID: 136831, Occurrence ID: 17120). Habitat is subalpine and timberline zones, so it is not expected at the subject site.	Blue	E

¹Red = Species that is at risk of being lost (extirpated, endangered, or threatened) within British Columbia. Blue = Species considered to be of special concern within British Columbia. ²(E)Endangered = Facing imminent extirpation or extinction. (T)Threatened = Likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. (SC)Special concern = May become a threatened or an endangered species because of a combination of biological characteristics and identified threats. Information sources: British Columbia Conservation Data Centre, and personal sightings.

4.5 Archeological and Heritage Resources

Harrop is part of the traditional territory of the Ktunaxa, Sinixt and Syilx (Okanagan) First Nations and archaeological evidence is documented at multiple sites along the shoreline and mountain sides of Kootenay Lake. A review of archaeological resources on this property is outside the scope of this report. Archaeological Chance Find Procedures are provided in Appendix 4 for guidance on which protocols to follow in the event of a chance archaeological find, to ensure that archaeological sites are documented and protected as required for compliance with the BC Heritage Conservation Act.

5 IMPACT ASSESSMENT

The proposed works were assessed based on current site conditions and proposed construction activities within the SPEA. Impacts associated with the bridge construction and road upgrade works include the removal of young trees and shrubs within the project footprint and potential for sedimentation into Harrop Creek during bridge construction and road upgrade works. Provided that measures to protect the SPEA (detailed below) are followed, any negative impacts from the bridge construction and road upgrades to fish and wildlife are anticipated to be minimal.

6 MEASURES TO PROTECT THE INTEGRITY OF THE SPEA

This section provides measures to protect the integrity of the SPEA as described in RAPR, as well as recommended best management practices.

6.1 Danger Trees

No hazard tree indicators were observed during the site assessments. A certified danger tree assessor was not retained as a part of this assessment.

6.2 Windthrow

Windblown trees were observed along the east slope of the creek within the SPEA upstream of the project site. Increased windthrow risk is considered low in and around the project site from proposed development activities as trees are relatively young and removal activities restricted to the road alignment. Further assessment of windthrow risk is beyond the scope of this report, and any such assessment should be led by a Registered Professional Forester (RPF).

6.3 Slope Stability

No slope stability hazard indicators were observed during the site visit. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P.Geol. or P.Eng.

6.4 Protection of Trees and Vegetation in the SPEA

The proposed work will require some clearing of vegetation prior to the commencement of work to accommodate construction activities. The following mitigation measures will be implemented to protect existing vegetation within the SPEA:

- Clearing of vegetation will be kept to the minimum possible area required for access, staging, construction works, and safety considerations.
- The boundaries of the project site will be clearly marked before the crews arrive. All vegetation outside of these boundaries will be retained.
- Salvage and retain topsoil during road upgrade works, stockpile away from the stream (>15 m) and re-use in revegetation areas.

6.5 Encroachment

Encroachment into the SPEA is limited to the access road, bridge construction and restoration area. Further development beyond these areas is discouraged to preserve the function of the riparian vegetation, and to promote re-establishment of vegetation within the restoration area.

6.6 Sediment and Erosion Control

In order to prevent sediment from entering Harrop Creek and minimize potential impacts to fish habitat, exposed soils will be minimized with respect to extent and duration. The contractor will ensure that there are sufficient materials (silt fences, straw bales and tarps) available on-site for emergency protection measures when required during adverse weather conditions. Work next to the stream shall be halted during heavy rain events.

6.7 Stormwater Management

The following stormwater management measures shall be implemented:

- On the east side of the creek, the access road will be sloped inwards towards the bank and a swale created along the toe of slope on the inside edge of the road to capture run-off water from the hillside and reduce surface flow from discharging into the riparian area.
- Road surface approaches at each bridge end shall be sloped away from the creek.

6.8 Floodplain Concerns

The subject property is within a Non Standard Flooding Erosion Area of Harrop Creek as mapped by the RDCK. According to the Flood and Steep Creek Geohazard Risk Prioritization Report (BGC 2019), Harrop Creek is considered to have a geohazard, consequence and priority rating of “high” for a debris flood. The proposed bridge structure has been engineered to withstand a 200 year flood event as per conditions of the Water Sustainability Act (WSA). It was noted during the site assessment, that bank armoring and erosion protection work has been completed upstream of the bridge to prevent erosion of private land and protection of the domestic water system infrastructure (pump house and piping). No residential structures are proposed within the Non Standard Flooding Erosion Area. Further comment or assessment of floodplain concerns is outside the scope of this report and any such assessment should be led by a Hydrotechnical Engineer.

6.9 Protection of Fish Wildlife Habitat

To minimize disturbance to fish, wildlife and their habitat, the following measures will be implemented:

- If possible, conduct bridge installation works during the instream works window (July 16- Aug 15).
- If clearing activities will take place during the nesting bird period (early-April to mid-August), a nesting sweep conducted by a QEP is recommended prior to clearing activities commencing. If an active nest is identified during the construction works, the QEP is to be notified and develop appropriate mitigation measures.
- Follow the Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MOE 2013) if any active raptor nests are discovered within 100 m of the project

location. Active raptor nests are legally protected at all times of the year and some inactive nests (ex: Bald Eagle nests) are similarly protected. A QEP should be retained to determine the appropriate mitigation measures to protect raptors and their habitat.

6.10 Invasive Plant Management

Construction activities can potentially increase prevalence of invasive plant species which can out-compete native riparian vegetation, causing damage to habitat and ecosystem function. The following mitigation measures are recommended to reduce the establishment and proliferation of invasive plant species on site:

- The amount of soil disturbance should be minimized.
- Pull invasive spotted knapweed within the disturbed area along the west side of the creek where revegetation is proposed.

7 REVEGETATION PLAN

To mitigate for the loss of riparian vegetation within the SPEA, the disturbed area above the armored bank upstream was identified for mitigation through revegetation (~36 m²; Photo 17, Appendix 3). This area has been partially revegetated through natural regeneration of thimbleberry. Revegetation will include the planting of 8 native trees and 15 native shrubs within the identified disturbed riparian area (refer to Table 3 for recommended species), as well as re-seeding of all disturbed soils generated by the bridge and road upgrade works with an Interior Forestland seed mix (Table 4) to prevent erosion and establishment of invasive weeds.



Photo 17. Proposed revegetation area along top of armored bank.

Table 3. Recommended native plant species.

Species	Scientific Name	Pot Size
Interior Douglas fir	<i>Pseudotsuga menziesii</i>	#1 or larger
Western red cedar	<i>Thuja plicata</i>	#1 or larger
Douglas maple	<i>Acer glabrum</i>	#1 or larger
Red osier dogwood	<i>Cornus sericea</i>	#1, #2 or cuttings
Bebbs willow	<i>Salix bebbiana</i>	#1, #2 or cuttings
Scoulers willow	<i>Salix scouleriana</i>	#1, #2 or cuttings
Mountain alder	<i>Alnus incana</i>	#1 or #2

Table 4. Interior Forestland Mix

Species	Weight %
Intermediate Wheatgrass	50
Perennial Ryegrass	22
Hard Fescue	13
Annual Ryegrass	11
Canada Bluegrass	3
Red Top	1

General Planting and Maintenance Guidelines

- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Trees shall be spaced at >3 m apart and shrubs spaced >1 m apart.
- Minimize impact to the existing shrubs located within the revegetation area.
- Locally adapted native plants are preferable to those collected or grown outside the region. The species listed in
- Table 3 are available from Sagebrush Nursery in Oliver <https://sagebrushnursery.com> , or Tipi Mountain Native Plants <http://tmnp.tipimountain.com/> near Kimberley.
- Planting holes shall be a minimum of 3 times the size of the pot.
- Salvaged topsoil from road upgrade works and / or compost shall be mixed into each planting hole.
- Use transplant fertilizer (ie. Mykes Mycorrhizae Tree and Shrub or similar) as per manufacturers specifications in each planting hole.
- Seed to be spread on disturbed soils at a rate of 25 kg/ha.
- Plantings which do not survive should be replaced to ensure complete establishment of native plants, and exclusion of exotic plants.
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.

- Regularly irrigate new plantings during the plant establishment period for a minimum of 3 years and thereafter as required.
- Pull any invasive weeds on a yearly basis prior to going to seed.

8 ENVIRONMENTAL MONITORING

A post construction site visit will be conducted once the bridge, road upgrade works and riparian planting are complete to assess compliance and completion of the project. An environmental summary report will be prepared by a Qualified Environmental Professional (QEP) and submitted to the RDCK.

9 CONCLUSION

Overall, the proposed development within the SPEA will cause some loss of riparian vegetation; however, by using the existing road alignment this will minimize riparian vegetation removal and earthworks. The revegetation plan as proposed will help mitigate some of the environmental impacts caused by riparian vegetation removal within the SPEA and provided that measures to protect the SPEA are followed, any negative impacts from the bridge construction to fish and wildlife are anticipated to be negligible.

10 CLOSURE

This report has been prepared by a Qualified Environmental Professional (QEP) who has not acted for, or as an agent(s) of the RDCK and was at the expense of the property owner.

I, Fiona Lau, certify that I am qualified to carry out this assessment; and that the assessment methods under the Regulation have been followed; and that, in my professional opinion:

- (i) if the development is implemented as proposed, or
- (ii) if the streamside protection and enhancement areas identified in the report are protected from the development, and
- (iii) if the developer implements the measures identified in the report to protect the integrity of those areas from the effects of the development,

then there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area.

If you have any comments or questions, please do not hesitate to contact the undersigned.

Sincerely,



Fiona Lau, BTech., AScT

fiona@masseenvironmental.com



Sylve Masse, MSc, RPBio

Masse Environmental Consultants

11 REFERENCES

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[RDCK]. 2013. Electoral Area 'F' Official Community Plan Bylaw No. 2214, 2011.

APPENDIX 1. SITE LOCATION MAP

RDCK Map



REGIONAL DISTRICT OF CENTRAL KOOTENAY
Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

Legend

 Electoral Areas

Project Location Map
899 Lewis Road, Harrop, BC

Map Scale:

1:50,000

Date: March 19, 2023



The mapping information shown are approximate representations and should only be used for reference purposes. The Regional District of Central Kootenay is not responsible for any errors or omissions on this map.

APPENDIX 2. ENGINEERED DRAWINGS

MICHAEL DRINKWATER PROPERTY

PRIVATE BRIDGE

MILL CREEK CROSSING HARROP, BC

DRAWING SCHEDULE

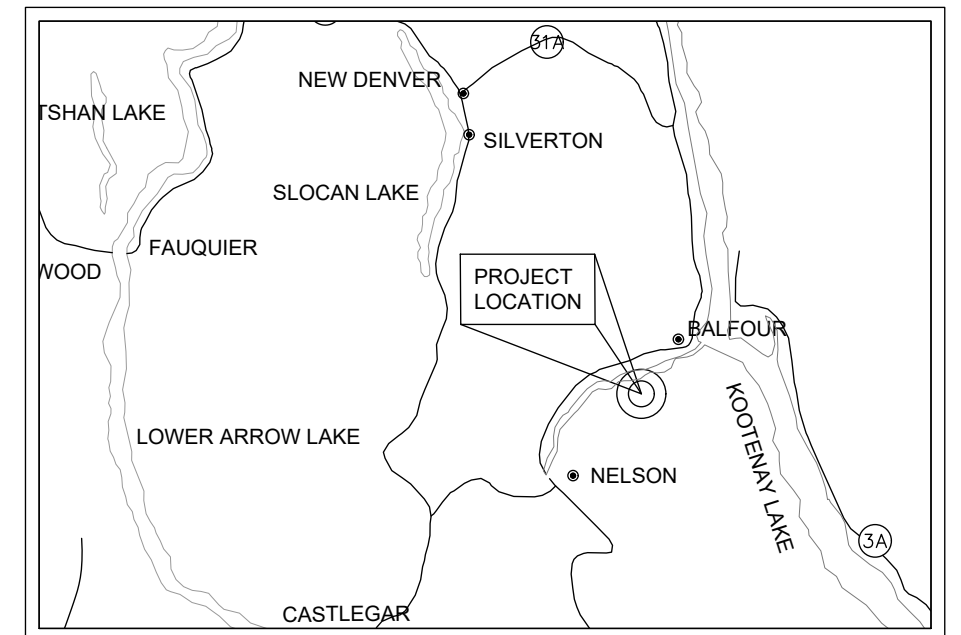
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MDMILLS-21-01-102	ELEVATIONS	1	2022/10/19



**PRELIMINARY
FOR
PERMIT APPLICATION
ONLY**



SUITE 3 - 385 BAKER STREET
NELSON, BC, V1L 4H6
Tel (250) 354-7683
info@snteng.ca
www.snteng.ca

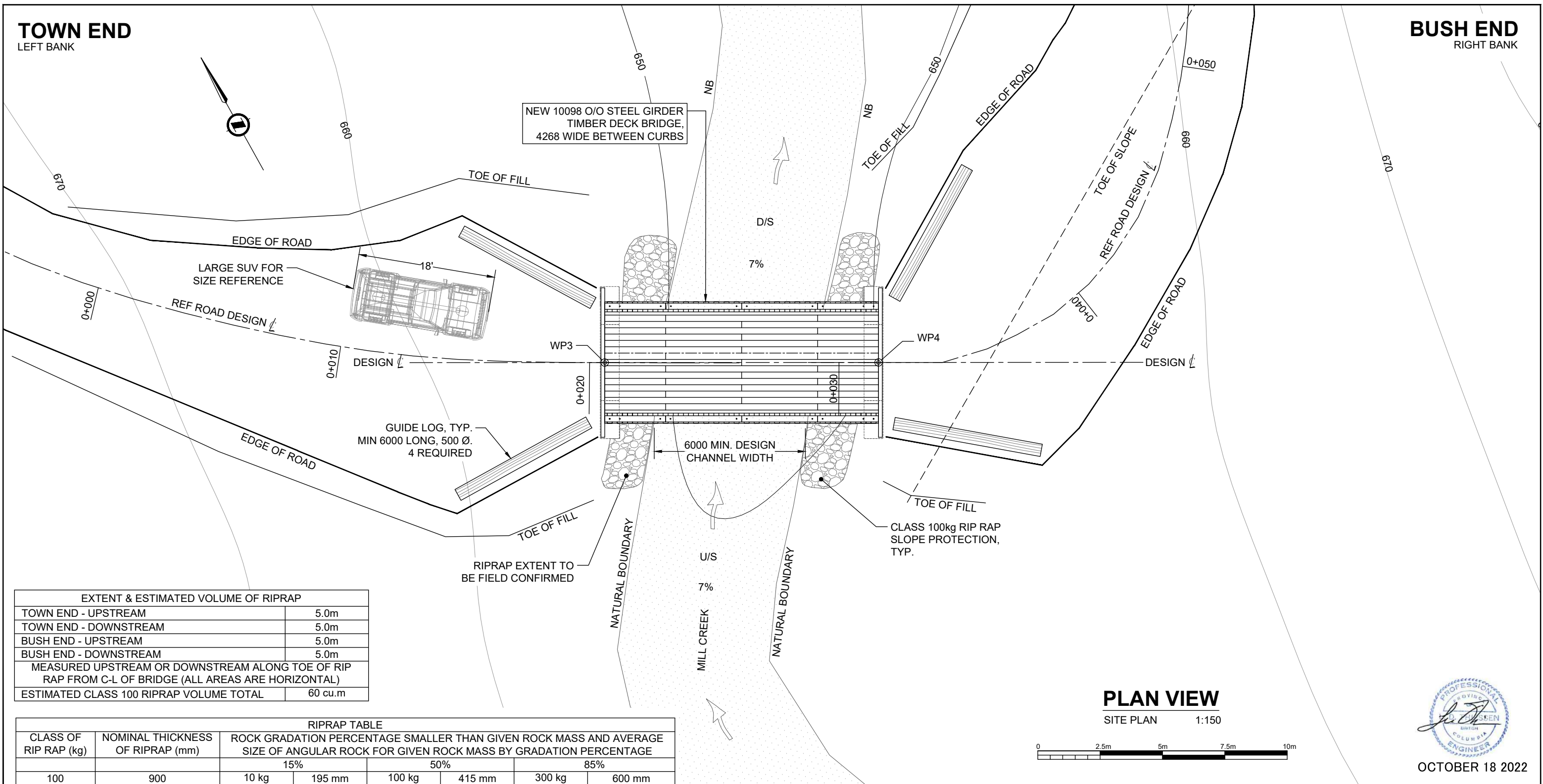
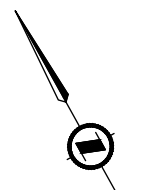


KEY PLAN

U.T.M. E: 495690 N: 5493750 ZONE: 11 U

TOWN END
LEFT BANK

BUSH END
RIGHT BANK

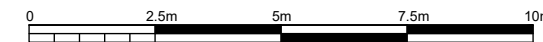


EXTENT & ESTIMATED VOLUME OF RIPRAP	
TOWN END - UPSTREAM	5.0m
TOWN END - DOWNSTREAM	5.0m
BUSH END - UPSTREAM	5.0m
BUSH END - DOWNSTREAM	5.0m
MEASURED UPSTREAM OR DOWNSTREAM ALONG TOE OF RIP RAP FROM C-L OF BRIDGE (ALL AREAS ARE HORIZONTAL)	
ESTIMATED CLASS 100 RIPRAP VOLUME TOTAL	60 cu.m

RIPRAP TABLE							
CLASS OF RIP RAP (kg)	NOMINAL THICKNESS OF RIPRAP (mm)	ROCK GRADATION PERCENTAGE SMALLER THAN GIVEN ROCK MASS AND AVERAGE SIZE OF ANGULAR ROCK FOR GIVEN ROCK MASS BY GRADATION PERCENTAGE					
		15%	50%	85%			
100	900	10 kg	195 mm	100 kg	415 mm	300 kg	600 mm

PLAN VIEW

SITE PLAN 1:150



OCTOBER 18 2022

HYDRO TECHNICAL DESIGN:

DRAINAGE AREA: 43.3 SQ. KM
 AVERAGE STREAM GRADIENT AT CROSSING: 7.0 %
 Q2 ESTIMATED DEPTH CHANNEL: 0.60 m
 V2 ESTIMATED LOCAL MAXIMUM VELOCITY: 2.88 m/sec
 Q2 INSTANTANEOUS FLOW: 11.91 m3/sec
 Q200 ESTIMATED CHANNEL DEPTH: 1.20 m
 V200 ESTIMATED LOCAL MAXIMUM VELOCITY: 3.48 m/sec
 Q200 INSTANTANEOUS FLOW: 32.54 m3/sec
 FREEBOARD: 900 mm
 STREAM BED MATERIAL: BOULDERS TO 600 mm

NOTES:

- NO SURVEY DATA AVAILABLE FOR THIS SITE. FIELD REVIEW COMPLETED BY SNT ON NOV 1, 2021.
- ALL DIMENSIONS IN MM UNLESS OTHERWISE NOTED.
- ALL ELEVATIONS AND ROAD STATIONS IN M UNLESS OTHERWISE NOTED.
- RIPRAP SOURCE TO BE CONFIRMED.
- STEEL SUPERSTRUCTURE IS USED AND LOAD RATING IS UNKNOWN.

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	PERMIT TO PRACTICE #: 1001678	SUITE 3 - 385 BAKER STREET NELSON, BC, V1L 4H6 Tel (250) 354-7683 info@snteng.ca www.snteng.ca	MICHAEL DRINKWATER PROPERTY													
	SCALE: AS SHOWN	Designed LES THIESSEN Date 2021/12/02 Drawn M. DAVIES Date 2021/12/02	PROJECT: PRIVATE BRIDGE STREAM NAME: MILL CREEK LOCATION: HARROP, BC	DRAWING TITLE: GENERAL ARRANGEMENT												
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TOWN END

LEFT BANK

BUSH END

RIGHT BANK

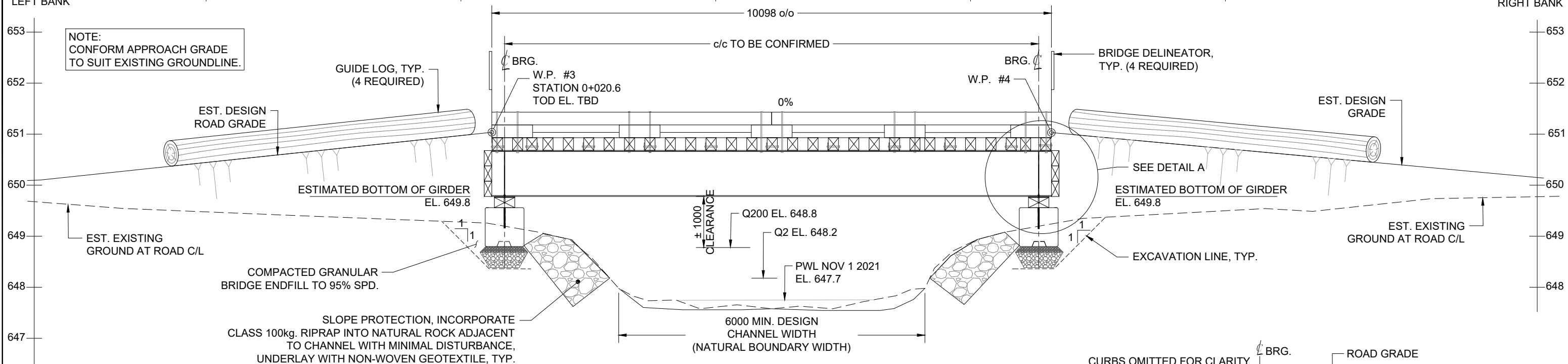
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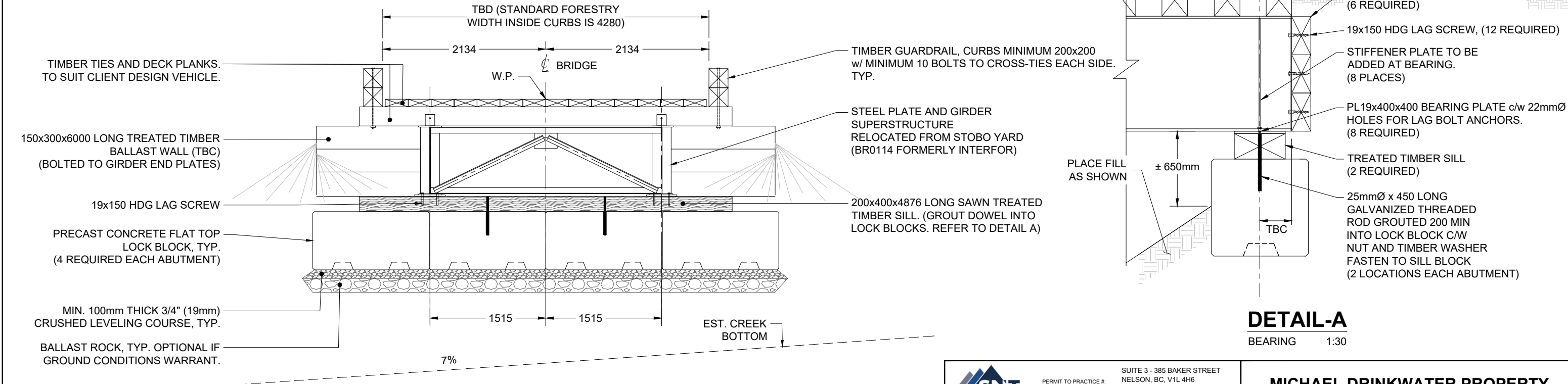
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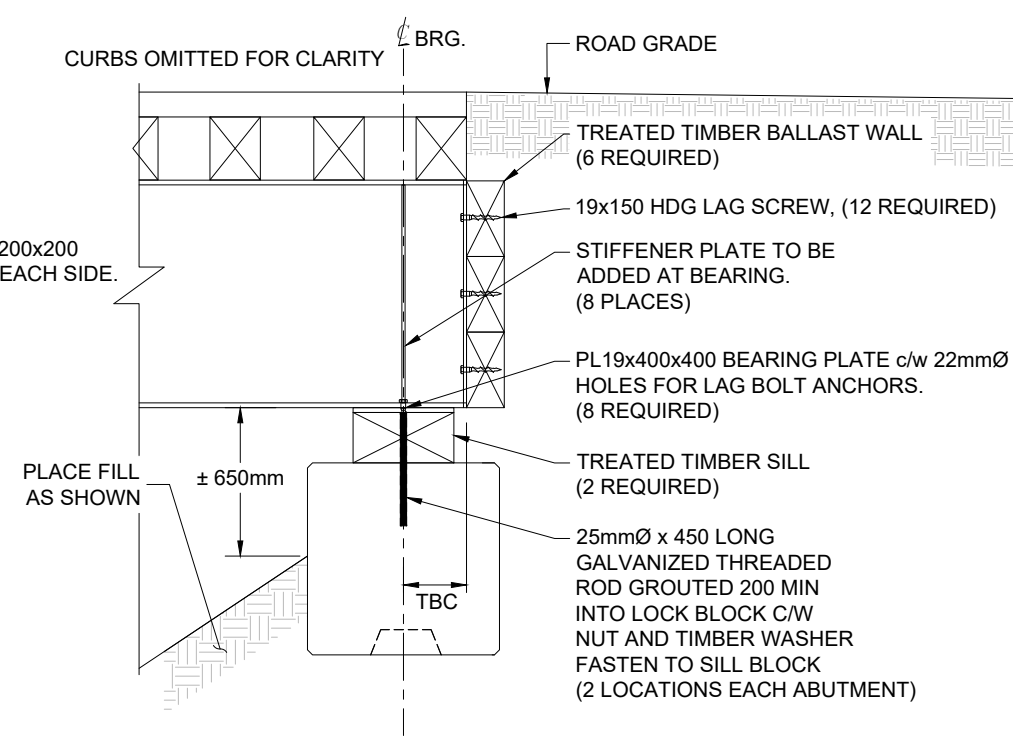
ELEVATION

ROAD C/L 1:75



ELEVATION

ABUTMENT 1:50



DETAIL-A

BEARING 1:30



OCTOBER 18 2022

PRELIMINARY FOR PERMIT APPLICATION ONLY

		SUITE 3 - 385 BAKER STREET NELSON, BC, V1L 4H6 Tel (250) 354-7683 info@snteng.ca www.snteng.ca		MICHAEL DRINKWATER PROPERTY													
SCALE: AS SHOWN		Designed LES THIESSEN Date 2021/12/02 Drawn M. DAVIES Date 2021/12/02		PROJECT: PRIVATE BRIDGE STREAM NAME: MILL CREEK LOCATION: HARROP, BC													
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REVISIONS		DESIGN ENGINEER LES THIESSEN P. ENG		SNT PROJECT No. MDMILLS-21-01													
				DRAWING No. MDMILLS-21-01-102													

CANCEL PRINTS BEARING PREVIOUS LETTER

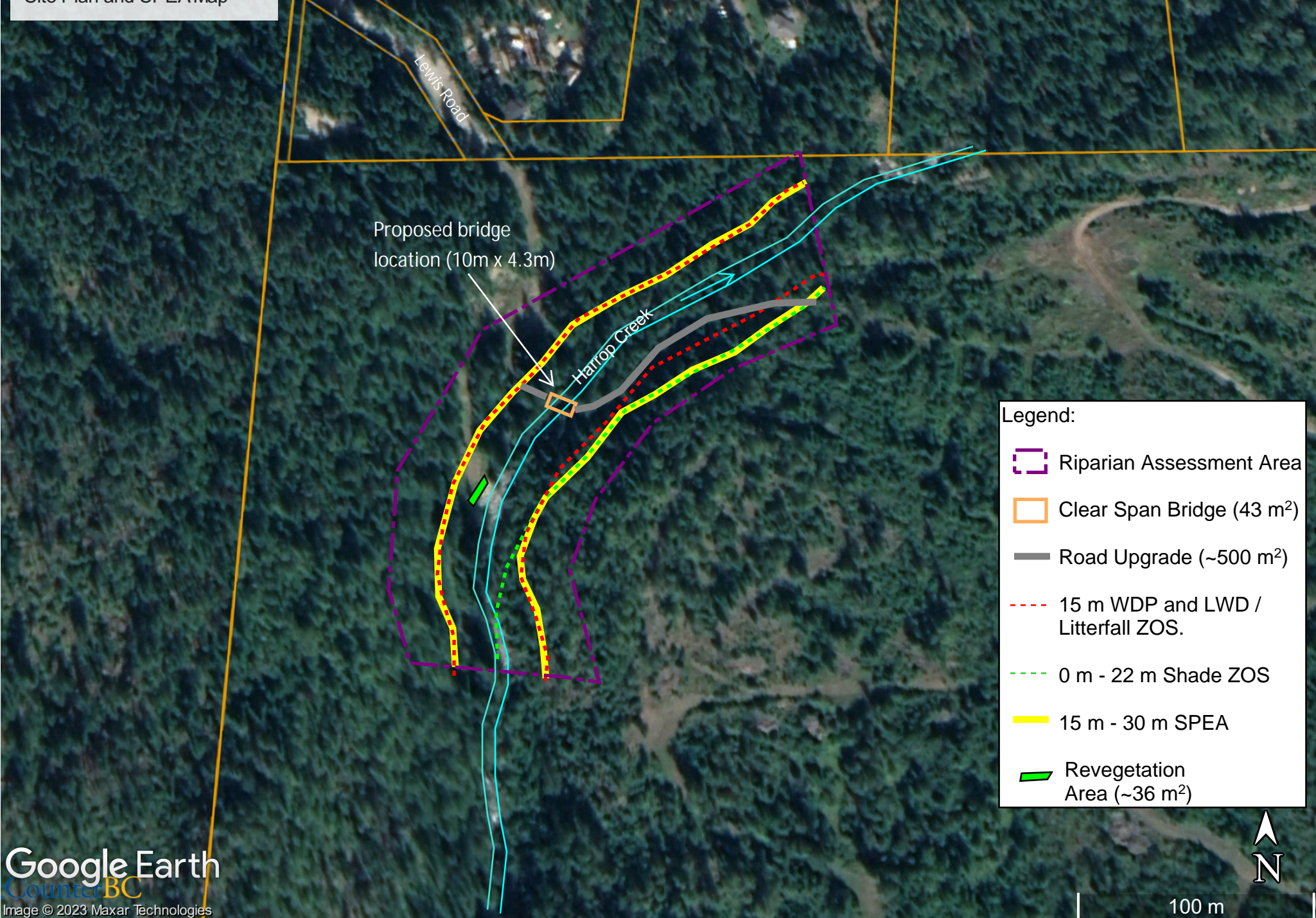
APPENDIX 3. PROPOSED SITE PLAN SHOWING SPEA SETBACKS

899 Lewis Road

Site Plan and SPEA Map

FrontCounterBC Locations

Legend



APPENDIX 4. ARCHAEOLOGICAL CHANGE FIND PROCEDURE

Chance Find Procedures for Archaeological Material

This document provides information on how a developer and/or their contractor(s) can manage for potential archaeological material discoveries while undertaking construction and/or maintenance activities. This document can provide assistance to in-field contractors in the identification of archaeological remains and the procedures to follow if a discovery is made. The discovery of human remains initiates a different course of action and is outlined separately.

Under the provincial *Heritage Conservation Act (HCA)*, archaeological sites that pre-date 1846 are automatically protected whether on public or private land. Protected sites may not be damaged, altered or moved in any way without a Section 12 or 14 Permit as issued through the *HCA*. It is illegal to collect or remove any heritage object from an archaeological site unless authorized to do so under permit.

1. Activities occurring outside of known Archaeological Sites:

When archaeological material is encountered outside of known archaeological site areas work in the vicinity must stop immediately no matter what type of material or feature has been identified. Alteration to an archaeological site can only occur under a Section 12 (Site Alteration Permit) or Section 14 (Heritage Inspection Permit) *Heritage Conservation Act* permit. Such permit applications should be prepared by a professional archaeologist.

If archaeological material is discovered during the course of construction activities:

1.1 Stop Work: Halt all work in the area of the discovery and safely secure the area. Contact the project manager or site foreman.

1.2 Contact an Archaeologist: An archaeologist should be contacted as soon as possible. For a list of qualified archaeologists in the area, the proponent is directed to the BC Association of Professional Consulting Archaeologists website: www.bcapa.ca. The proponent may also wish to contact the Ktunaxa Nation Council's Archaeology Technician Nathalie Allard for direction (1-250-426-9549; nallard@ktunaxa.org).

1.3 Archaeologist provides guidance: The archaeologist will direct the proponent on the next courses of action, which will include notifying the Archaeology

Branch and First Nations with interest in the area.

2. Activities Occurring within Known Archaeological Site Boundaries:

Land altering activity within a previously recorded archaeological site must be conducted under a Section 12 HCA Site Alteration Permit (SAP), in some cases with an onsite archaeological monitor. It is common for additional archaeological material and features to be encountered during activities occurring within previously recorded archaeological sites. Minor finds (lithic flakes, diffuse charcoal or fire altered rock) may not require work to stop, however significant finds require a level of assessment by a professional archaeologist, and it is up to the onsite project manager to determine the level of significance based on criteria presented below.

2.1 Significant Cultural Finds that Require a Professional Archaeologist (described in detail in Section 4)

- Intact archaeological features, which can include but are not limited to hearths, cultural depressions (e.g. cache pits, house depressions) and rock alignments or forms (e.g. tipi rings, cairns, blinds)
- Significant archaeological materials, which include but are not limited to, the presence of formed lithic tools (e.g. projectile point, microblade core, scraper), a dense concentration of lithic waste flakes, or artistic items
- Human Remains (described in detail in Section 3)

2.2 Archaeological Site Management Options

- 2.2.1 **Site Avoidance:** If the boundaries of a site have been delineated, redesign the proposed development to avoid impacting the site. Avoidance is normally the fastest and most cost effective option for managing archaeological sites. Site avoidance could also be achieved through minimizing ground disturbance by looking for alternative constructive methods.
- 2.2.2 **Mitigation:** If it is not feasible to avoid the site through project redesign, it is necessary to conduct systematic data collection and analysis within the site prior to its loss. This could include surface collection and/or excavation. This work can be time-consuming and therefore expensive to conduct.
- 2.2.3 **Protection:** It may be possible to protect all or portions of the site which will be impacted through installation of barriers during the development period and possibly for a longer period of time. Methods for barrier construction could include fencing around site boundaries or applying

geotextile to the ground surface and capping it with fill. The exact method used would be site-specific.

3. Chance Find Procedures for Identified Human Remains

Procedures in the event of the discovery of human remains during construction are covered in depth by an Archaeology Branch Policy Statement, found on their website at www.for.gov.bc.ca/archaeology, and are summarized below.

- 3.1 Stop all construction activities immediately in the area of found or suspected human remains and contact the RCMP and/or Office of the Coroner.
- 3.2 The coroner must determine whether the remains are of contemporary forensic concern or archaeological/aboriginal.
- 3.3 If the remains are found to be of aboriginal ancestry then the next step involves the relevant First Nations collaboratively determining the appropriate treatment of those remains.

The key to respectfully dealing with ancient aboriginal remains is to involve the appropriate First Nations as early as possible in the process. However this must be done in a manner that does not interfere with the coroner's office ability to conduct their business in the manner that they see fit.

4. Site Identification Guide

The following are characteristics typical to site types found within the Ktunaxa Traditional Territory.

4.1 Artifact Scatters

Lithic (stone) scatters from the production and maintenance of stone tools are the most common type of archaeological site found in the region. Other materials that may be represented in artifact scatters are Fire Broken Rock (FBR), bone, antler and tooth.

Lithics: What to look for

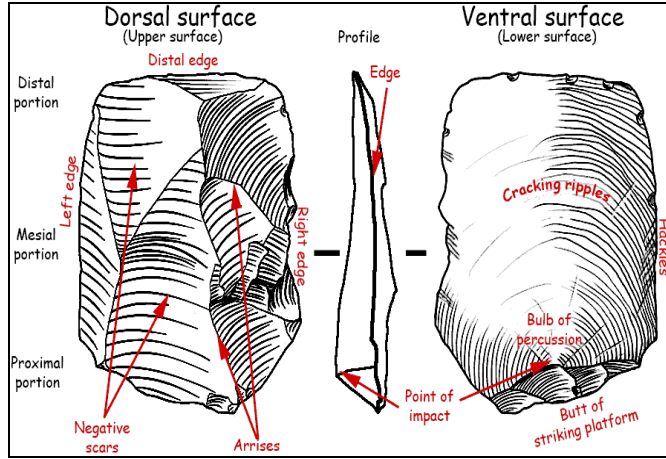


Image 1: Basic flake morphology



Image 2: Examples of lithic flakes

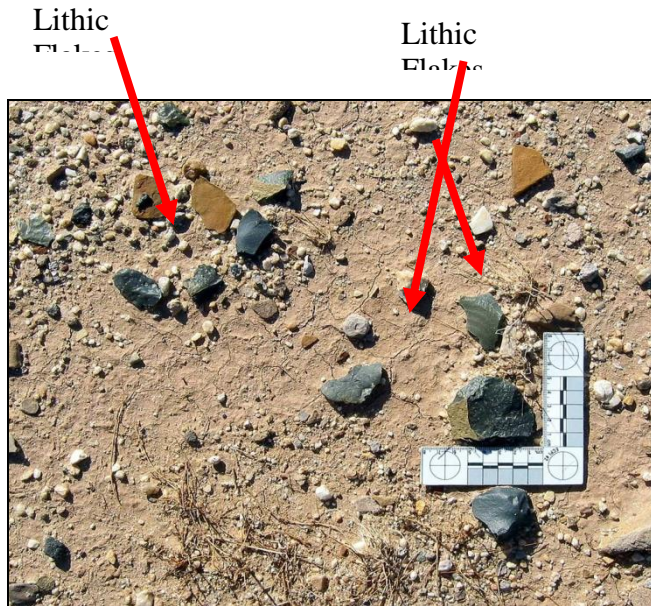


Image 3: Example of lithic scatter found on ground surface



Image 4: Example of formed lithic artifacts

Zakōqnuuk

Zaqam

Lower Kootenay

Tobacco Plains

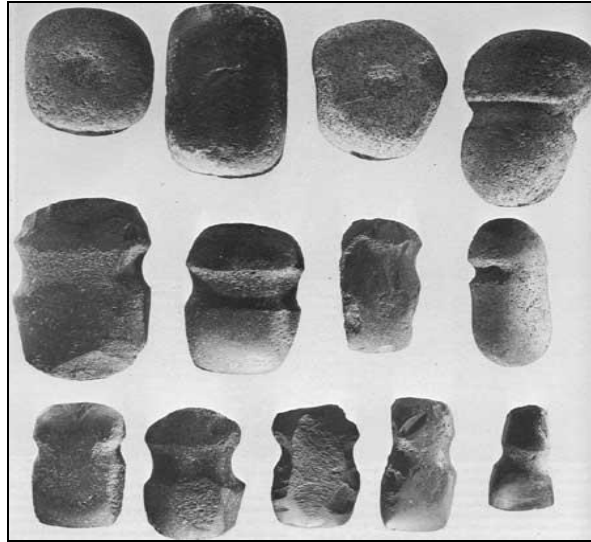


Image 5: Ground stone artifacts

Bone, Tooth and Antler Artifacts: What to Look For

- Obvious shaping
- Incising
- Unnatural holes



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Lower Kootenay

Tobacco Plains

Image 6: Bone and Antler artifacts

4.2 Fire Broken Rock and Hearths

Fire-broken rock (FBR) results from the use of fire during cooking, heating and processing activities. FBR is often associated with other features including hearths and cultural depressions, but can also be thinly scattered in concentrations away from the features with which they were first associated.

When looking for FBR, note concentrations of roughly fractured rock from rapid heating and cooling, rock showing signs of burning or oxidation and/or reddening or blackening of surrounding matrix.

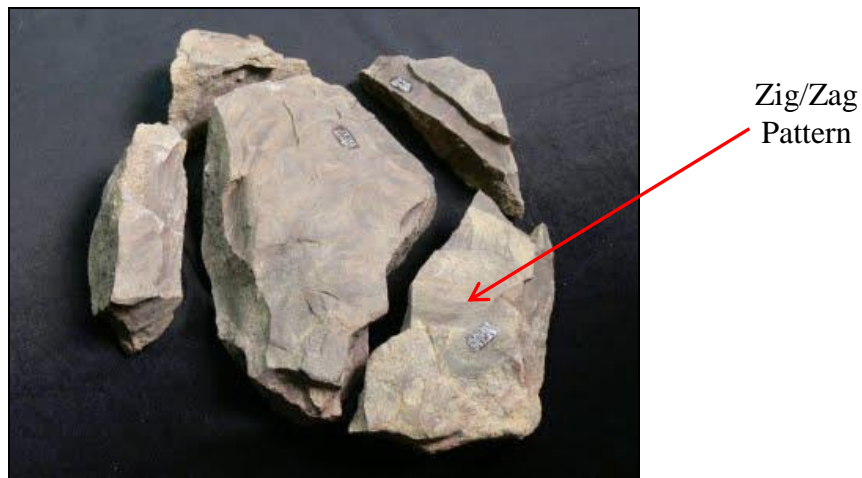


Image 7: Example of FBR; note the zig/zag pattern of breakage common to FBR. A hearth feature is evidence of a fire pit or other fireplace feature of any period. Hearths were used for cooking, heating, and processing of some stone, wood, faunal, and floral resources and may be either lined with a wide range of materials like stone or left unlined. Occasionally site formation processes (e.g., farming or excavation) deform or disperse hearth features, making them difficult to identify without careful study.

Hearths: What to look for

- FBR
- reddening or blackening of the associated soil/sediment
- charcoal
- layering of FBR and charcoal, and
- depressions in the earth associated with FBR, reddened or blackened matrix and charcoal.



Image 8: Example of a hearth uncovered along the wall of an excavation unit

4.3 Cultural Depressions

Any depression seen on the ground surface that appears to have been excavated by man can be a cultural depression and have archaeological significance. These “pits” were dug for a variety of reasons such as for food storage, cooking or as a base for a dwelling.

They can range in size from 1m across to 7-10m across, and are usually found associated with other artifacts such as FBR and lithic scatters.

To identify a cultural depression, look for:

- Subtle to deep scours on the ground surface that are circular to rectilinear in shape
- A raised rim along the edge of a depression
- Depressions associated with artifacts and FBR
- Depressions associated with fire reddening and blackening of the matrix



Image 9: Example of a large cultural depression in a natural setting

4.6 Rock Alignments

There are several types of rock alignments that occur within the culture area, which include tipi rings, medicine wheels, cairns and blinds. When attempting to identify rock alignments, look for a group of rocks that look purposefully placed as in a circle, pile or line; isolated groups of rock that do not seem to belong to that landscape; and/or rocks which form a pattern.



Image 10: Example of a Cairn or piling of rocks



Image 11: Example of a tipi ring in a natural setting

Takisqnuuk

Taqam

Lower Kootenay

Tobacco Plains