



Development Permit

DP2306E (Ryan)

Date: September 11, 2023

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

1. This Development Permit is issued to Benedict Leo Ryan of Balfour, BC 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 T DISTRICT LOT 7077 KOOTENAY DISTRICT PLAN 1003 EXCEPT (1) PARCEL 1 (SEE 27951I) AND (2) PART INCLUDED IN PLAN NEP20338 (PID 015-978-001) 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 'Country Residential (RC)' and are located within a Development Permit Area pursuant to the Electoral Area E Official Community Plan Bylaw No. 2260 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 two fences within 15m of Laird Creek. 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 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 site plan titled "7096 Grays Road, Riparian Assessment" prepared by Renae Mackas, dated September 11, 2023 and attached to this permit as Schedule 3.
 - 6.3 Development is authorized in accordance with the terms described in the report titled "7096 Grays Road, Riparian Assessment" prepared by Masse Environmental Consultants and dated September 11, 2023 attached to this permit as Schedule 3. Compliance with all recommendations is required. Recommendations can be categorized as follows:

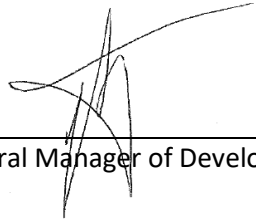
- 6.3.1 The proposed development within the 15 m WDP area of Laird Creek consists of construction of a 1.8 m (6') high fence along two sections on the west boundary of the subject property within a previously disturbed area, as well as an already-installed gate across the northwest property corner at the end of the upper section of fence.
- 6.3.2 The upper fence at the property corner is ~ 30 m long. The already-installed gate (~5 m long) is located at the north end of the upper fence. The second section of fence located midway down the property is ~45 m long. The fencing locations are detailed in the proposed Site Plan (attached as Schedule 2). Fence design and installation includes:
 - 6.3.2.1 Fencing materials will consist of wooden posts installed at ~ 9' intervals (already installed at the upper fence location), top and bottom rails, and fence panels made out of a non-reflective corrugated sheet metal.
 - 6.3.2.2 The gate consists of multiple "N-frame" panels constructed out of 2"x4" lumber (see Photo 5), which will be covered with non-reflective corrugated sheet metal as used for the fences.
 - 6.3.2.3 The fences will be installed with an ~ 6" gap between ground level and the bottom of the fence panels, to allow for small mammal and reptile passage under the fence.
 - 6.3.2.4 Holes for the fence posts on the lower fence will be dug manually to a depth of ~0.75 m (~2.5') within the imported fill material. No disturbance of natural ground materials is anticipated.
 - 6.3.2.5 The portion of the subject property along the west bank of Laird Creek is not wide enough to allow for machinery access from the north. The Owner will bring materials over to the west bank by foot.
- 6.3.3 Protection of trees and vegetation within the SPEA:
 - 6.3.3.1 Disturbance of native vegetation is not expected to occur on the west bank where the fencing will be installed, as these areas are already highly disturbed with minimal vegetation present
 - 6.3.3.2 Non-reflective fencing material is proposed to minimize the risk of overheating vegetation on the bank of Laird Creek.
- 6.3.4 The following mitigation measures should be implemented to reduce the risk of sediment input into Laird Creek and Kootenay Lake.
 - 6.3.4.1 Work activities should be modified or stopped as required during periods of inclement weather.
 - 6.3.4.2 In the event of heavy rainfall, additional mitigation measures such covering soils may be required to ensure sediment-laden water does not enter the waterbodies.
 - 6.3.4.3 Disturbed soils should be revegetated as soon as possible.
- 6.3.5 To minimize disturbance to fish, wildlife and their habitat, the following measures will be implemented:
 - 6.3.5.1 Fencing panels will be installed with a 6" gap at the bottom to allow for movement of small animals underneath the fence.
 - 6.3.5.2 The fencing panels will be made out of non-reflective materials to minimize light pollution which can cause visual disturbance to birds which can affect movement and behavioural patterns.

- 6.3.5.3 Any foot crossing over Laird Creek will be restricted to as few locations as possible, and if possible, boards (or a similar surface) should be placed across the stream during low water and/or avoid walking on gravels during periods where Kokanee eggs or alevin may be present (i.e., early August to end of March, (MoE 2009, Thorley 2019)).
 - 6.3.5.4 If fence installation will take place during the nesting bird period (early-April to mid-August) and an active nest is detected, a QEP will be contacted to determine if mitigation measures are necessary to minimize disturbance to nests.
 - 6.3.6 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:
 - 6.3.6.1 The amount of soil disturbance should be minimized, and any disturbed soils should be revegetated.
 - 6.3.6.2 Disturbance of soils or storage of materials will be avoided near the Japanese knotweed patch at the upper fence area.
 - 6.3.6.3 It is recommended that the one small patch of Japanese knotweed be properly treated and removed to minimize the risk of further spread (refer to Appendix 2 for location), per the following:
 - 6.3.6.3.1 Digging (i.e., removal of all shoot and root tissues) can be effective if done thoroughly and repeatedly (likely over several years). This method should not be used along the edge of the stream bank, as it may compromise bank stability and could lead to the erosion of exposed soils into the creek.
 - 6.3.6.3.2 Cutting of stems can be undertaken, but will only be effective if repeated several times a year. Cutting should be repeated until root reserves are depleted (usually several years). Cutting is most effective when followed up by herbicide application.
 - 6.3.6.3.3 Extreme care must be undertaken during any manual removal to properly contain any knotweed root and stem fragments to prevent further propagation. All materials must be double-bagged in transparent bags and disposed of at the Ootischenia Landfill. Notify the landfill attendant that the bags contain Japanese knotweed.
 - 6.3.6.3.4 Chemical control with a systemic herbicide, either by injection or wipe-on application, will be the most effective control strategy. Any chemical control should be completed by a certified pesticide applicator.
 - 6.3.6.4 A post construction site visit will be conducted by Masse once fences are complete to assess compliance and completion of the project.
 - 6.3.6.5 An environmental summary report will be prepared by a Qualified Environmental Professional (QEP) from Masse, and submitted to the RDCK.
7. 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 \$ 2365.00 to ensure the landscaping requirements as set forth in Section 6 are completed and in accordance with the following provisions:

- 7.1 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.
- 7.2 The Permittee shall complete the landscaping works required by this Permit prior to September 11, 2025. Within this time period the required landscaping must be inspected and approved by the Regional District.
- 7.3 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.
- 7.4 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.
- 7.5 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. This Development Permit does not constitute a building permit.

14. 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.

**Signing
for**



Sangita Sudan, General Manager of Development and Community Sustainability Services

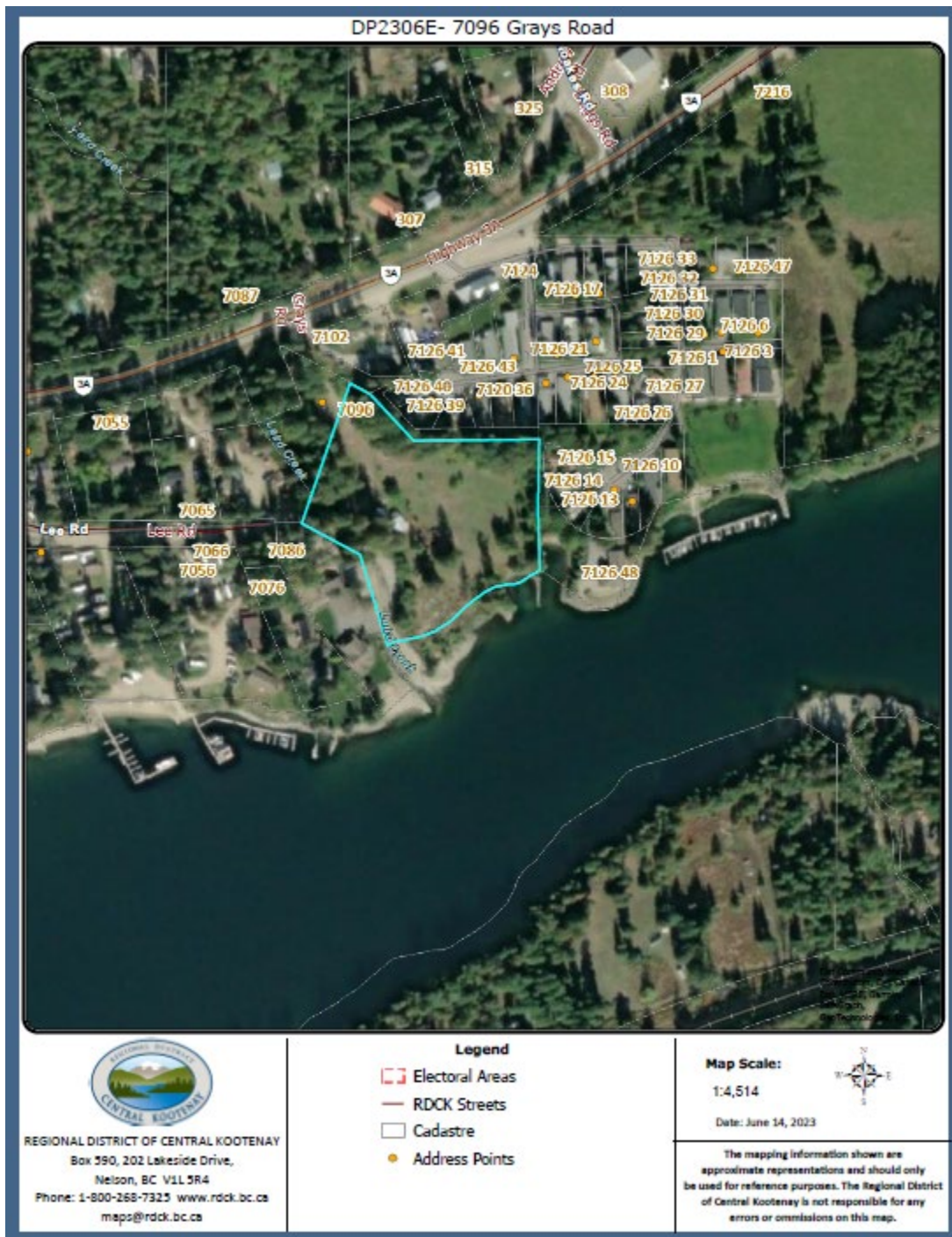
October 13, 2023

Date of Approval (date of review and approval)

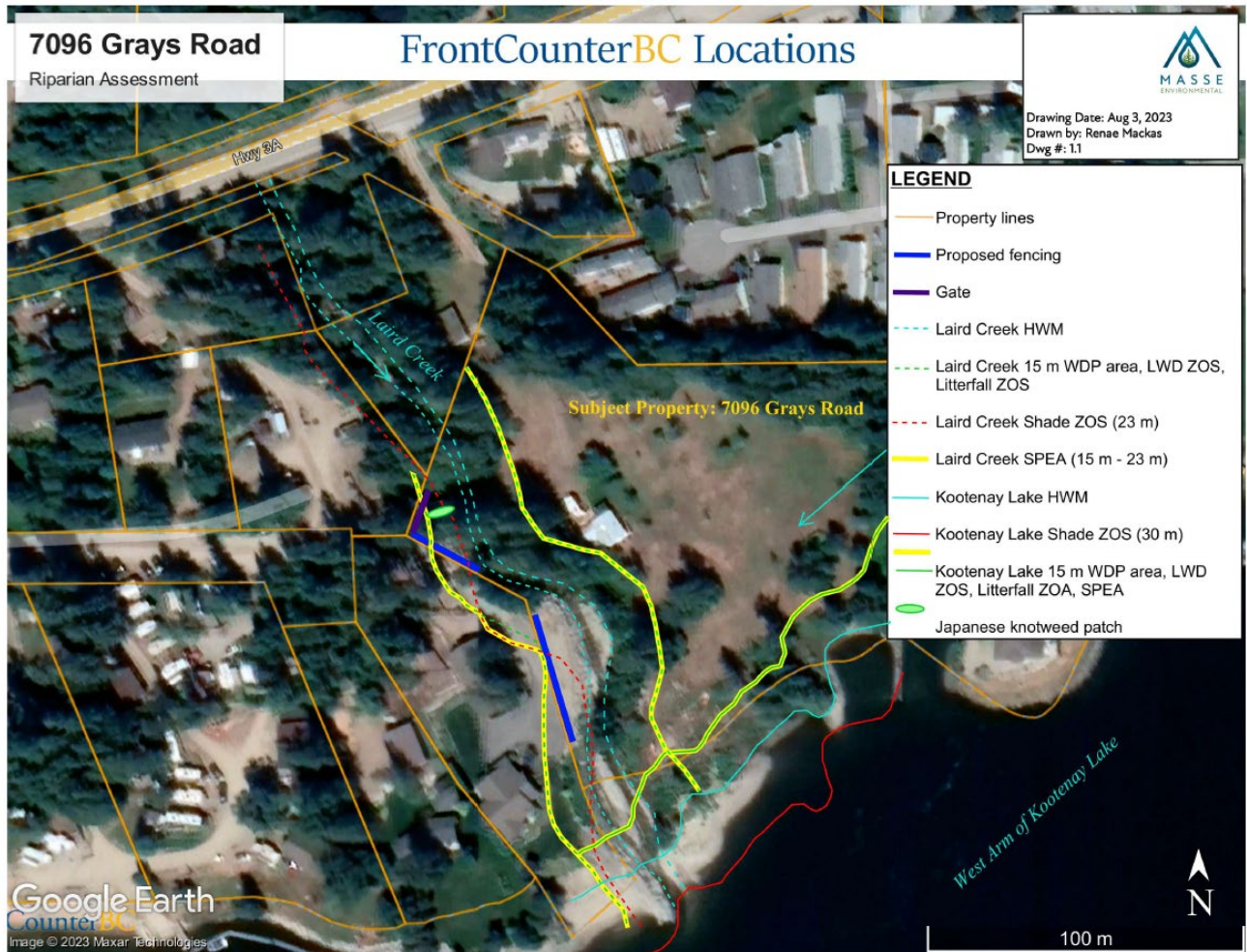
October 19, 2023

Date of Issuance (pending receipt of securities)

Schedule 1: Subject Property



Schedule 2: "7096 Grays Road, Riparian Assessment" prepared by Renae Mackas, dated August 03, 2023



Schedule 3: "7096 Grays Road, Riparian Assessment" prepared by Masse Environmental Consultants and dated September 11, 2023



7096 Grays Road
Riparian Assessment



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

September 11, 2023

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

Project Number 2023-1016

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1 INTRODUCTION

Masse Environmental Consultants Ltd. (Masse) was retained by Benny Ryan (Owner) to conduct a riparian assessment to accompany an application for a Watercourse Development Permit (WDP) on his property at 7096 Grays Road (PID 015-978-001, LOT T DISTRICT LOT 7077 KOOTENAY DISTRICT PLAN 1003 EXCEPT (1) PARCEL 1 (SEE 279511) AND (2) PART INCLUDED IN PLAN NEP20338) in Balfour, BC. The Owner is proposing to construct a fence along two sections of the western property boundary, which is within the 15 m WDP area for Laird Creek.

A site visit was completed on January 13, 2023, by Fiona Lau B.Tech., A.Sc.T. and Renae Mackas, R.P.Bio. to conduct a riparian assessment on the property for proposed fencing located within the 15 m WDP area for Laird Creek. The riparian assessment evaluates the existing conditions of the property and riparian areas (of both Laird Creek and Kootenay Lake), 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
- RDCK Floodplain Management Bylaw No. 2080 (2009)
- British Columbia *Riparian Areas Regulation*
- Kootenay Lake Shoreline Management Guidelines
- 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
- On the Living Edge: Your Handbook for Waterfront Living
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting

This report has been prepared by Renae Mackas, BSc, RPBio, and 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 along the north shore of the west arm of Kootenay Lake along Highway 3A in Area E of Balfour, BC (see Appendix 1 for Location Map). The property covers 4.5 acres in size, has 114 m of frontage along Kootenay Lake and is bordered by private properties and MoTI Right of Way (RoW) to the north and east, private property to the west and Kootenay Lake to the south. The property was previously part of a District Lot (7077) that was subdivided and sold to the current Owner.

The project area is within the Interior Cedar Hemlock very dry warm variant 1 (ICHxw) biogeoclimatic subzone, which occurs at low elevations along Kootenay Lake and Kootenay River (MacKillop and Ehman 2016). The ICHxw subzone is transitional between dry and moist climatic regions and is characterized by very hot, very dry summers; and mild winters with low snowfall. Spring and summer are also dry and warm. The snowpack is moderately shallow and typically persists for a short duration in January and February. Winter rain-on-snow events are frequent and snow-free areas are common, particularly on warm-aspect sites (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

The property is generally flat and gently sloping towards the shoreline of Kootenay Lake. The property has been partially disturbed from historical vegetation clearing activities, residential development and fill and riprap placement along the west property boundary. Refer to Section 2.2.2 for Existing Development and Section 3.2 for Riparian Vegetation for detailed descriptions.

2.2.1 Watercourses

Two watercourses were mapped within the subject property: Laird Creek located along the west property boundary (Cover Photo and Photo 1), and Kootenay Lake (Photo 2) located along the south property boundary.

Laird Creek

Laird Creek is a 2nd order stream that originates ~ 8 km north of the subject property, with its headwaters in Noakes-Haiseldean Lakes Recreation site. Much of the Laird Creek watershed lies within south-facing slopes, which make this creek subject to “flashy” runoff during spring freshet (Apex 2018). Laird Creek, has been mapped by the Province as Crown Land below the HWM, although this is not shown on either Parcel Map or the RDCK Public Web Map, and is only available through FrontCounter BC. The entire property is situated within the fluvial fan of Laird Creek and partially within the floodplain areas of Kootenay Lake and Laird Creek. The HWM of Laird Creek was evaluated using high-water indications and presence of terrestrial vegetation along the banks. The riparian setbacks will be measured from the HWM line as depicted on the Site Plan (Appendix 2). Refer to Section 3 for definition of “HWM”.

Kootenay Lake

Kootenay Lake’s main inflows include the Lower Duncan River to the north and the Kootenay River to the south. It drains through the west arm into the Kootenay River. Kootenay Lake typically experiences one seasonal water level increase annually which occurs in the late spring and early summer months. Lake levels can vary by up to 4 m throughout the year affecting the extent of exposed shoreline.

The foreshore of Kootenay Lake along the southern property boundary is defined as the active floodplain between high-water and low-water. During the site visit, the visible high-water mark (HWM) of Kootenay Lake is located ~10-15 m south of the property boundary as shown on the attached Site Plan (Appendix 2). The HWM was evaluated using high-water indications and presence of terrestrial vegetation on banks.



Photo 1. Laird Creek at subject property, facing downstream towards Kootenay Lake.



Photo 2. View of Kootenay Lake from subject property.

2.2.2 Existing Development

On the east side of Laird Creek, much the subject property has been historically cleared for a field, fruit orchard and residential development, with a ~5-15 m strip of native shrubs and trees retained along the east creek bank and a 30 m strip retained along the Kootenay Lake foreshore. The riparian area along the west bank of Laird Creek has been impacted by previous development activities prior to property subdivision. Between 2003 and 2006, the previous owner (current owner of 7086 Lee Road) conducted development activities along the west bank of Laird Creek within the riparian area. The purpose of this development is unknown; however, could have been for erosion and scour protection along the creek. This work included: placement of imported fill (~1 m in depth) to create a level area (along ~ 150 m of the west bank of Laird Creek) (Photo 3); armouring of a 46 m long section of the creek bank with rock (Photo 4); and placement of an asphalt driveway. Asphalt within the bounds of the subject property has since been removed, but the underlying fill material remains and the area is void of vegetation. According to the Owner, these areas currently have ~15 cm of compacted gravel fill over top of several feet of a mixed gravel/cobble fill. This area has also been used to stockpile snow from snow clearing activities along the driveway of 7086 Lee Road.

An old timber bridge (3.7 m wide by 7 m long) crosses Laird Creek at UTM 11U 500147.5496192 through an easement shared with the property owner of 7086 Lee Road. This easement was created during the subdivision of the property. A gate and fence posts have been installed by the Owner along the northwest property corner on the west side of Laird Creek to discourage unauthorized access and crossing of the bridge (Photo 5 and Photo 6), as the bridge is currently unsafe (personal communication Benny Ryan). For the purposes of this assessment, the gate and fence posts are included as part of the proposed development under the Watercourse Development Permit.



Photo 3. Fill placement along west side of Laird Creek and proposed alignment of lower fencing area.



Photo 4. Angular rock placed along west bank of Laird Creek below placed fill.



Photo 5. Southwest-facing view of gate and proposed upper fencing area, taken from bridge crossing of Laird Creek. Approximate extent of fencing shown in red.



Photo 6. Upstream view of old timber bridge crossing Laird Creek.

2.3 Proposed Development

The proposed development within the 15 m WDP area of Laird Creek consists of construction of a 1.8 m (6') high fence along two sections on the west boundary of the subject property within a previously disturbed area, as well as an already-installed gate across the northwest property corner at the end of the upper section of fence. The purpose of the gate and fence is to restrict unauthorized access across the bridge, minimize encroachment and disturbance (i.e., snow plowing and piling) into the riparian area, protect existing and future vegetation, as well as create a permanent privacy screen (pers. comm. Benny Ryan).

The upper fence at the property corner is ~ 30 m long. The already-installed gate (~5 m long) is located at the north end of the upper fence. The second section of fence located midway down the property is ~45 m long. The fencing locations are detailed in the proposed Site Plan (Appendix 2). Fence design and installation includes:

- Fencing materials will consist of wooden posts installed at ~ 9' intervals (already installed at the upper fence location), top and bottom rails, and fence panels made out of a non-reflective corrugated sheet metal.
- The gate consists of multiple “N-frame” panels constructed out of 2”x4” lumber (see Photo 5), which will be covered with non-reflective corrugated sheet metal as used for the fences.
- The fences will be installed with an ~ 6” gap between ground level and the bottom of the fence panels, to allow for small mammal and reptile passage under the fence.
- Holes for the fence posts on the lower fence will be dug manually to a depth of ~0.75 m (~2.5') within the imported fill material. No disturbance of natural ground materials is anticipated.
- The portion of the subject property along the west bank of Laird Creek is not wide enough to allow for machinery access from the north. The Owner will bring materials over to the west bank by foot.

In time, the Owner intends to restore the previously disturbed riparian areas by replanting with native trees and shrubs, per the Recommendations for Riparian Planting by Masse Environmental (Appendix 3). As there is no machine access along the west side of the property, this work will need to be completed by hand and may take up to several years. Through discussions with the RDCK, it is understood that the planting will be undertaken outside the scope of the scope of this WDP, however if any deviations from the Recommendations for Riparian Planting are expected, these should be discussed with the RDCK and may necessitate an additional WDP.

3 REGULATORY OVERVIEW

To determine whether the 15 m WDP setback from the HWM of Kootenay Lake and Laird Creek align with 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 2.

As per the RAPR, the large woody debris (LWD) and litter ZOS were plotted 15 m inland from the HWM of Laird Creek and Kootenay Lake, with the shade ZOS plotted 0-23 m from the HWM from Laird Creek and 0 m from Kootenay Lake. The SPEA setback is determined based on the ZOS with the greatest width.

Therefore, within the subject property the SPEA from the HWM of Laird Creek is 15 -23 m and from the HWM of Kootenay Lake is 15 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 Laird Creek.

Feature Type	Channel Width	SPVT ¹	Zones of Sensitivity			SPEA
			LWD	Litter fall	Shade	
Laird Creek	7.7 m	TR	15 m	15 m	23 m	15-18m
Kootenay Lake	N/A	TR	15 m	15 m	0 m	15 m

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

3.1 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines documents (EEC 2016, KLP 2020) were used to help determine site specific risk for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 39 and the FIM indicates that the foreshore is located within an area with high juvenile rearing potential (EEC 2016, KLP 2020). Table 2 provides the environmental and archaeological risk results identified in the FIM along the shoreline of the property.

Table 2. Environmental and archaeological Potential results.

Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Archaeological Potential	Enhanced Engagement Required
High	Yes	Boundary between Yellow and Orange	Yes

4 ENVIRONMENTAL RESOURCES

4.1 Fish and Aquatic Habitat

4.1.1 Laird Creek

Laird Creek supports Bull Trout (*Salvelinus confluentus*), Kokanee (*Oncorhynchus nerka*), Rainbow Trout (*O. mykiss*), and Westslope Cutthroat Trout (*O. clarkii lewisi*) (HabitatWizard 2023). Noakes and Haiseldean Lakes, ~8 km upstream of the subject property, were stocked with Rainbow Trout in the 1930s, and Noakes Lakes with Westslope Cutthroat Trout as recently as 2004 (FIDQ). The culvert which conveys Laird Creek flow under Highway 3A is perched by ~ 1 m and represents a barrier to fish migration, particularly during low flow periods (Photo 7).

Within the extent of the subject property, Laird Creek is approximately 7.7 m wide, and has a gradient of ~ 4.5%. The stream channel has a cascade-pool morphology and is relatively confined by the steep channel banks (Photo 8 and Photo 9). The right (west) bank has been previously lined with riprap along the southern portion of the neighbouring property (Photo 9 and Photo 10). Streambed substrates are dominated by cobble and boulders (Photo 11), and side bars are present during low water periods. Instream cover was minimal, limited to overhanging vegetation, boulders, and shallow pools present during high water periods. This reach of the creek provides moderate rearing and spawning habitat for salmonids. The Owner confirmed that recent surveys undertaken by the province detected Kokanee spawning within Laird Creek from its outlet to Highway 3A.



Photo 7. Perched culvert outlet under Hwy 3A.



Photo 8. Upstream view of Laird Creek by proposed upper fencing location.



Photo 9. Downstream view of Laird Creek by lower fencing location, with riprap along bank.



Photo 10. View of right bank and lower fencing location, with riprap along bank.



Photo 11. Cobble and boulder substrates in Laird Creek.

4.1.2 Kootenay Lake

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Rainbow Trout, Bull Trout, Kokanee, White Sturgeon (*Acipenser transmontanus*), Westslope Cutthroat Trout, and Burbot (*Lota lota*). Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the initial site visit. No known white sturgeon spawning is reported in this area (EEC 2016). Shore spawning Kokanee were recorded in the vicinity of the Laird Creek outlet in the 70s (Thorley 2019), and the lake foreshore at the mouth of Laird Creek is designated under the provincial *Land Act* as a Section 16 Land Reserve. More recent surveys have not detected spawners here (Thorley 2019).

The foreshore of the property consists of a gently sloped beach (~4% gradient) with substrates dominated by cobble and gravel (Photo 12), and some accumulated sands at the mouth of Laird Creek (Photo 13). No

emergent vegetation was observed, and cover was considered moderate for juvenile fish, but limited for adult fish. This section of shoreline is considered to have high juvenile rearing potential (EEC 2016), particularly given its proximity to a suitable spawning stream. The foreshore also provides staging and migration habitat for adult fish that access the lower reach of Laird Creek (e.g., spawning Kokanee), and the area around the mouth of Laird Creek is also likely frequented by fish that feed on emerging Kokanee fry (e.g., Bull Trout, Rainbow Trout) and insects.



Photo 12. Kootenay Lake shoreline along property foreshore.



Photo 13. Mouth of Laird Creek into Kootenay Lake.

4.2 Vegetation

The riparian areas of Laird Creek consist of a mix of intact mature forest (i.e., undisturbed areas along the east bank, Photo 14), cleared area (i.e., left bank beyond strip of native vegetation, Photo 15), and disturbed areas with minimal vegetation (i.e., areas associated with previous fill import, (Photo 16 and Photo 17). Areas of mature forest had several large western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), and western hemlock (*Tsuga heterophylla*). The understory was dominated by alder (*Alnus sp.*), Douglas maple (*Acer glabrum*), beaked hazelnut (*Corylus cornuta*), thimbleberry (*Rubus parviflorus*), snowberry (*Symphoricarpos albus*) and rose (*Rosa sp.*). Several thickets of red osier dogwood (*Cornus sericea*) and willow (*Salix sp.*) were also present along the left bank. The agricultural field on the left bank was mainly grasses. An ~6m x 1m patch of invasive Japanese knotweed (*Reynoutria japonica*) is present adjacent to the upper fencing area, and a few patches of knapweed (*Centaurea sp.*) and curled dock (*Rumex crispus*) were observed on the left bank across from the lower restoration area. Vegetation identification was limited due to snow cover and winter conditions.

Riparian vegetation along the Kootenay Lake shoreline is relatively sparse, consisting mainly of mature lodgepole and western white pine (*Pinus contorta* and *P. monticola*), young black cottonwood (*Populus balsamifera*), red osier dogwood and grasses (Photo 18).

Table 3. Plant species observed in the riparian area of the property.

Common Name	Scientific Name	Common Name	Scientific Name
Trees		Shrubs cont'd.	
western red cedar	<i>Thuja plicata</i>	thimbleberry	<i>Rubus parviflorus</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>	red osier dogwood	<i>Cornus sericea</i>
western hemlock	<i>Tsuga heterophylla</i>	common snowberry	<i>Symphoricarpos albus</i>
lodgepole pine	<i>Pinus contorta</i>	willow sp.	<i>Salix sp.</i>
western white pine	<i>Pinus. monticola</i>	beaked hazelnut	<i>Corylus cornuta</i>
black cottonwood	<i>Populus balsamifera</i>	Herbaceous	
Shrubs		Japanese knotweed*	<i>Reynoutria japonica</i>
alder sp.	<i>Alnus sp.</i>	knapweed sp.*	<i>Centaurea sp.</i>
Douglas maple	<i>Acer glabrum</i>	curled dock*	<i>Rumex crispus</i>
rose sp.	<i>Rosa sp.</i>		

*invasive species



Photo 14. Patches of mature forest along east bank of Laird Creek, visible in upper portion of photo.



Photo 15. View of cleared area along the east bank in the southern portion of the subject property.



Photo 16. Disturbed area with minimal vegetation along upper fence alignment. Photo provided by Owner.



Photo 17. Disturbed area with minimal vegetation along lower fence alignment. Photo provided by Owner.



Photo 18. Sparse riparian vegetation along Kootenay Lake shoreline of subject property.

4.3 Wildlife

4.3.1 Reptiles and Amphibians

The vegetated riparian area and exposed areas along Laird Creek banks provide suitable habitat for northern alligator lizard (*Elgaria coerulea*), western skink (*Plestiodon skiltonianus*), garter snakes (*Thamnophis* spp.) and northern rubber boa (*Charina bottae*).

4.3.2 Birds

Vegetation within the subject property provides habitat for songbirds and raptors. Shorebirds and waterfowl also likely use the Kootenay Lake shoreline and mouth of Laird Creek. No nests were observed during the site visit, however the vegetation present has a potential to support nesting songbirds. A large stick nest, likely belonging to bald eagle or osprey (*Haliaeetus leucocephalus* or *Pandion haliaetus*) was observed in a tree on the south side of Kootenay Lake, approximately 250 m east of the subject property.

4.3.3 Mammals

Vegetation present within the subject property and along Kootenay Lake shoreline provides potential forage habitat for wildlife such as ungulates, bears, and small mammals including bats. Several deer tracks were observed on the shoreline at the time of the site visit, crossing Laird Creek at the stream mouth. These tracks, and past observations from the Owner, suggest that large mammals tend to use the foreshore of Kootenay Lake as a migration corridor, rather than crossing Laird Creek over the steep banks in the vicinity of the proposed restoration area.

4.4 Species at Risk

A 10 km buffer around the subject property was used to query BC Conservation Data Center (BC CDC) and Wildlife Species Inventory records using the Habitat Wizard Query tool (Habitat Wizard 2023). Based on this query, 11 species at risk occurrences are known within 10 km of the property:

- 1) Banded tigersnail (*Anguispira kochi*; provincially Blue-listed) observations in Kokanee Creek Park, ~9 km west. The subject property provides suitable habitat for this species, as it is typically associated with moist, well-vegetated forests near lake and stream shores (Forsyth 2004).
- 2) Western bumble bee (*Bombus occidentalis*; provincially Blue-listed, Threatened under COSEWIC) observation from Kokanee Creek Park, ~9km west of the subject property. Suitable habitat for this species exists on the subject property for this species.
- 3) Western screech-owl, macfarlanei subspecies (*Megascops kennicottii macfarlanei*; provincially (Blue-listed, Threatened under COSEWIC and SARA)- Provincial records include a historical (from 1971) occurrence from the general Nelson area, and vocalizations detected in 2006 from the Taghum area, approximately 7.5 km southeast of the property. This species is considered unlikely to occur on the subject property with regular frequency given the relatively young/disturbed state of the riparian vegetation; and lack of large wildlife trees with cavities (COSEWIC 2012).
- 4) Western skink (provincially Blue-listed, Special Concern under COSEWIC and SARA) observation from the north side of Highway 3A, ~ 7 km west of the subject property. Suitable habitat for this species is present in the subject property.
- 5) The Upper Kootenay River White Sturgeon population (provincially Red-listed, Endangered under COSEWIC and SARA). The closest Critical Habitat area for this species is located ~9 km away from the subject property at Crawford Creek Delta (Environment Canada 2014).
- 6) Whitebark pine (*Pinus albicaulis*, provincially Blue-listed, Endangered under COSEWIC and SARA), from Penilynn Lake, approximately 7.5 km northeast of the subject property. This species is associated with high elevation sites and is not considered to have potential to occur on the subject property.
- 7) Great blue heron (*Ardea Herodias*), provincially Blue-listed observations from Kootenay Lake around Kokanee Park and Balfour ferry terminal.
- 8) Northern rubber boa, Special Concern under COSEWIC and SARA observations from private properties on the north side of Highway 3A, the closest of which was ~1.3 km from the subject property.
- 9) Three at-risk bat species observations from ~ 6.8 km west of the subject property: fringed myotis (*Myotis thysanodes*, provincially Blue-listed), hoary bat (*Lasiurus cinereus*, provincially Blue-listed), and little brown myotis (*Myotis lucifugus*, provincially Blue-listed and Endangered under COSEWIC and SARA).

The property overlaps with federally-mapped polygon of critical habitat for the Southern Mountain population of woodland caribou (*Rangifer tarandus*). No permitting or regulatory requirements under the *Species at Risk Act* apply to this species or its critical habitat on private land. Given the relatively disturbed/developed nature of the property and surrounding area, this species is considered unlikely to occur on the property.

4.5 Archeological and Heritage Resources

Kootenay Lake is part of the traditional territory of the Ktunaxa, Sinixt and Syilx (Okanagan) First Nations and archaeological evidence is documented at multiple shoreline sites. 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. Potential impacts associated with the fence construction include disruption of wildlife movement, spread of invasive vegetation, and temporary disturbance to fish and wildlife associated with transport of materials across the creek and during fence construction.

Provided that measures to protect the SPEA (detailed below) are followed, any negative impacts from the fencing to fish and wildlife are anticipated to be negligible. Overall, the riparian habitat quality and function is expected to be enhanced by the fencing, as it will help to prevent further encroachment and disturbance of these areas.

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

Potential for windthrow risk to trees located in the SPEA was assessed and no indication of potential risk was identified. 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

The purpose of the previous development on the west side of Laird Creek (including riprap lining of the bank) is not known, but it may have been in part for erosion and scour protection along the creek. No other 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

Disturbance of native vegetation is not expected to occur on the west bank where the fencing will be installed, as these areas are already highly disturbed with minimal vegetation present (see Photo 16 and Photo 17). Non-reflective fencing material is proposed to minimize the risk of overheating vegetation on the bank of Laird Creek. Overall, the proposed fencing is expected to provide additional protection to vegetation within the SPEA by preventing further encroachment and disturbance (e.g., plowing of snow into the riparian area/creek and cutting of riparian vegetation).

6.5 Encroachment

The proposed fencing will prevent further encroachment and disturbance to the SPEA from the property to the west.

6.6 Sediment and Erosion Control

The following mitigation measures should be implemented to reduce the risk of sediment input into Laird Creek and Kootenay Lake.

- Work activities should be modified or stopped as required during periods of inclement weather.
- In the event of heavy rainfall, additional mitigation measures such covering soils may be required to ensure sediment-laden water does not enter the waterbodies.
- Disturbed soils should be revegetated as soon as possible.

6.7 Stormwater Management

The proposed fencing will not increase the impervious area of the property and will not measurably modify the existing surface drainage patterns along the west bank of Laird Creek.

6.8 Floodplain Concerns

The subject property is within a Non Standard Flooding Erosion Area as mapped by the RDCK (Fan Name Laird Creek-2-W, Fan Type D, Rating E). The proposed fencing is not considered a structure and therefore does not trigger the need for a geotechnical report.

6.9 Protection of Fish Wildlife Habitat

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

- Fencing panels will be installed with a 6” gap at the bottom to allow for movement of small animals underneath the fence.
- The fencing panels will be made out of non-reflective materials to minimize light pollution which can cause visual disturbance to birds which can affect movement and behavioural patterns.
- Any foot crossing over Laird Creek will be restricted to as few locations as possible, and if possible, boards (or a similar surface) should be placed across the stream during low water and/or avoid walking on gravels during periods where Kokanee eggs or alevin may be present (i.e., early August to end of March, (MoE 2009, Thorley 2019)).
- If fence installation will take place during the nesting bird period (early-April to mid-August) and an active nest is detected, a QEP will be contacted to determine if mitigation measures are necessary to minimize disturbance to nests.

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, and any disturbed soils should be revegetated.
- Disturbance of soils or storage of materials will be avoided near the Japanese knotweed patch at the upper fence area.

- It is recommended that the one small patch of Japanese knotweed be properly treated and removed to minimize the risk of further spread (refer to Appendix 2 for location), per the following:
 - Digging (i.e., removal of all shoot and root tissues) can be effective if done thoroughly and repeatedly (likely over several years). This method should not be used along the edge of the stream bank, as it may compromise bank stability and could lead to the erosion of exposed soils into the creek.
 - Cutting of stems can be undertaken, but will only be effective if repeated several times a year. Cutting should be repeated until root reserves are depleted (usually several years). Cutting is most effective when followed up by herbicide application.
 - Extreme care must be undertaken during any manual removal to properly contain any knotweed root and stem fragments to prevent further propagation. All materials must be double-bagged in transparent bags and disposed of at the Ootischenia Landfill. Notify the landfill attendant that the bags contain Japanese knotweed.
 - Chemical control with a systemic herbicide, either by injection or wipe-on application, will be the most effective control strategy. Any chemical control should be completed by a certified pesticide applicator.

7 ENVIRONMENTAL MONITORING

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

8 CONCLUSION

Overall, the measures to protect the SPEA will help mitigate the environmental impacts potentially caused by the proposed fencing. In general, fences have the potential to disrupt wildlife movement, however this has been mitigated through fence design. The space between the bottom of fence panels and ground will allow for passage of small wildlife, and non-reflective materials will be used to prevent light pollution which can disorient migrating birds. Larger wildlife is expected to preferentially use the Kootenay Lake foreshore to cross Laird Creek, however the gap between fences will also allow for passage along the steeper banks of Laird Creek in the vicinity of the fence.

Temporary disturbance to vegetation, fish and wildlife may occur during transport of materials to the west side of the creek and during fence installation. The west bank of Laird Creek is already used as a residential driveway, so any wildlife present are likely accustomed to a similar level of background disturbance. By

minimizing the number of access points and crossing areas and minimizing disturbance to substrate when crossing the stream by foot, any resulting disturbance is not expected to be of a level that is detrimental to these species.

Provided that measures to protect the SPEA are followed, any negative impacts from the fencing to fish and wildlife are anticipated to be negligible. Overall, the riparian habitat quality and function is expected to be enhanced by the fencing, as it will help to prevent further encroachment and disturbance of these areas.

9 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



Renae Mackas, BSc, RPBio
Masse Environmental Consultants

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APPENDIX 1. SITE LOCATION MAP

7096 Grays Road, Balfour



March 3, 2023
tilecache

WARNING: MAP IS NOT PRINTED TO SCALE

Site Location Map

GeoBC, DataBC, TomTom, © OpenStreetMap contributors

Cadastral data from ParcelMap BC
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APPENDIX 2. PROPOSED SITE PLAN SHOWING SPEA SETBACKS

7096 Grays Road

Riparian Assessment

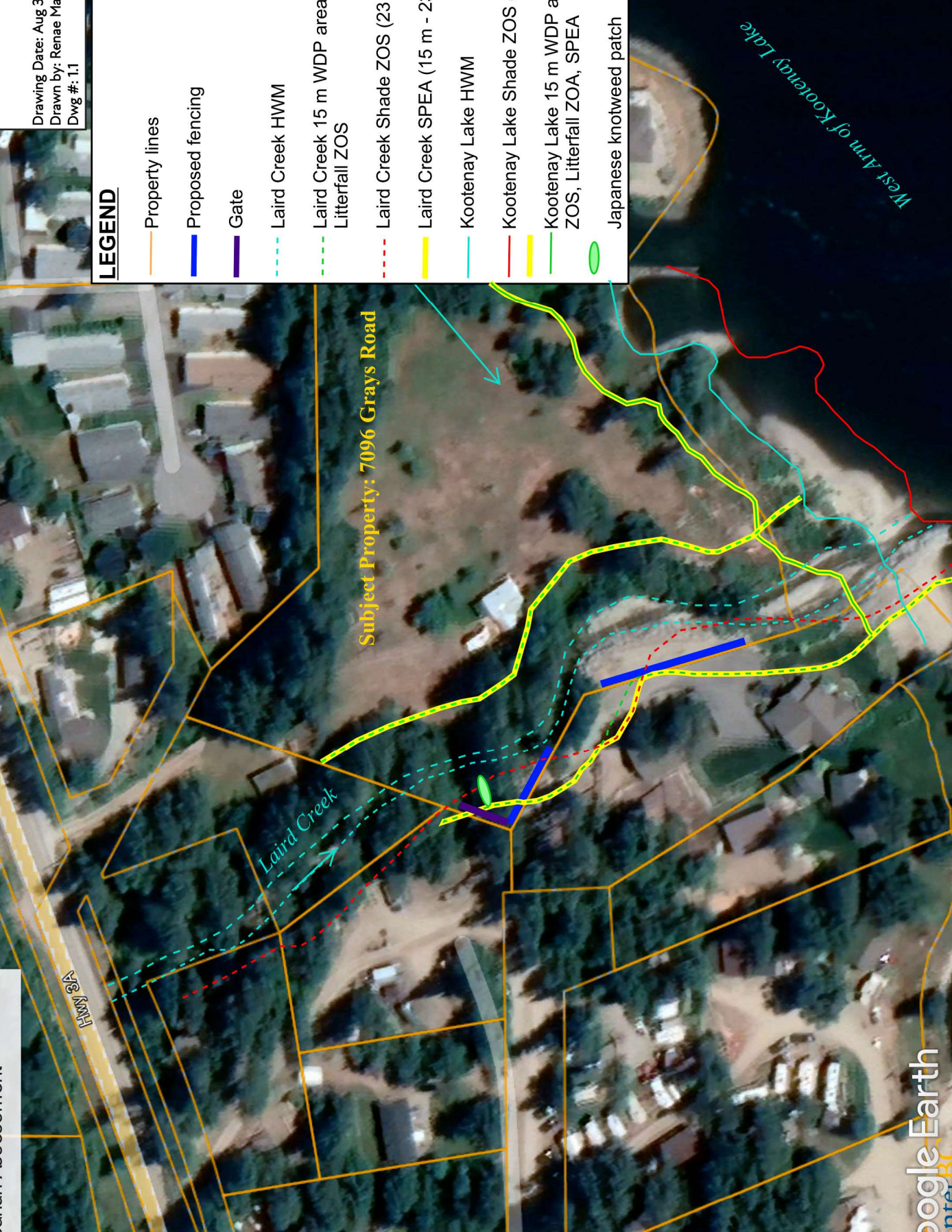
FrontCounterBC Locations



Drawing Date: Aug 3, 2023
Drawn by: Renae Mackas
Dwg #: 11

LEGEND

- Property lines
- Proposed fencing
- Gate
- Laird Creek HWM
- Laird Creek 15 m WDP area, LWD ZOS, Litterfall ZOS
- Laird Creek Shade ZOS (23 m)
- Laird Creek SPEA (15 m - 23 m)
- Kootenay Lake HWM
- Kootenay Lake Shade ZOS (30 m)
- Kootenay Lake 15 m WDP area, LWD ZOS, Litterfall ZOA, SPEA
- Japanese knotweed patch



100 m

APPENDIX 3. RECOMMENDATIONS FOR RIPARIAN PLANTING



Benny Ryan
7096 Grays Road, Balfour BC
Email: bennysonholiday@gmail.com

March 13, 2023

Re: Recommendations for Riparian Restoration at 7096 Grays Road

Dear Mr. Ryan,

We understand that you intend to conduct riparian planting in an effort to help restore riparian health within two previously disturbed areas along Laird Creek at 7096 Gray's Road. The two sites have been identified as: Upper Site and Lower Site. The Lower Site has a warm/dry south facing aspect with high sun exposure and has been degraded from the removal of native riparian vegetation and topsoil and the placement and compaction of pit run fill material. The Upper Site is partly shaded and has experienced some vegetation removal and grading activities. In order to help promote health and survivorship of the plants within the proposed restoration areas we have prepared this letter with recommendations around site preparation, plant species selection and sourcing, and general planting/maintenance considerations.

Site Preparation:

- To the extent feasible, the ground surface of the proposed restoration areas should be roughened or scarified to create micro-sites for vegetation. Material removed from planting holes (see below) can be contoured around the sites to help with the creation of micro-sites.

Planting:

- A list of preferred native plant species and recommended pot sizes is included in Table 1.
- In general, larger stock is recommended if possible, as it is anticipated to have a higher success rate and less issues with drought.
- Plant trees at ≥ 3 meter spacing.
- Plant shrubs at ≥ 1 m spacing. A mixture of perennials and grasses can be interspersed throughout, as desired.
- Focus red osier dogwood and willow species along the top of bank.

- Prepare planting holes at least three times as wide as the pot and loosen the bottom of hole to a depth of ~10 cm.
- Given the low nutrient content of the underlying substrate soil amendments are strongly recommended:
 - Add topsoil and compost into each planting hole. If native soils are available, mix in topsoil/compost with native soils at 50/50 ratio.
 - Use transplant fertilizer (ie. Mykes Mycorrhizae Tree and Shrub or similar) as per manufacturers specifications in each planting hole.
- Install plants by gently loosening root bulbs, place in hole and backfill soil around each plant to top of root bulb. Gently compact the mixed soil around each plant to eliminate air pockets.
- Spread bark mulch (3-4" deep) on the ground around plants to help retain moisture. Keep area around stem free of mulch.
- Water each plant immediately after planting.
- For disturbed areas to be re-seeded, rake top 2 inches of area to loosen soil, add layer of topsoil as needed. Mix fertilizer with recommended seed mix (Table 2) as per manufacturers instructions. Spread seed/fertilizer mix on soil at a rate of 25 kg/Ha and rake in to ensure soil contact.

General Planting and Maintenance Guidelines and Considerations

- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Regular irrigation of new plantings and seed is recommended during the growing season (May to September) to help plant establishment period for a minimum of 5 years and thereafter as required. If water for irrigation is to be withdrawn from Laird Creek, ensure that withdrawal is in compliance with the existing Water License for your property.
- Dryland erosion seed blend, specially formulated with drought tolerant species for soil stabilization on semi -arid sites is available at Interior Seed & Fertilizer <https://interiorseedandfertilizer.ca> (Table 2).
- Locally adapted native plants are preferable to those collected or grown outside the region. Species can be collected and transplanted from the subject property (outside of the riparian areas). Alternatively, the species listed in Table 1 are available from Sagebrush Nursery in Oliver <https://sagebrushnursery.com>, or Nupqu Native Plants <https://nupqu.com/native-plants-nursery-home/> near Kimberley.
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
- Remove invasive weeds on a yearly basis prior to going to seed. Invasive plants that were observed during Masse's site visit include knapweed species (Photo 1), curled dock (Photo 2), and Japanese knotweed. Specific instructions around treatment and removal of Japanese knotweed were

provided in the Riparian Assessment report, and may be stipulated by the RDCK in their approval of the WDP for fence installation.

- When transporting materials across Laird Creek, restrict crossing to as few locations as possible. Place boards (or a similar surface) across the stream during low water and/or avoid walking on gravels during periods where Kokanee eggs or alevin may be present (i.e., early August to end of March).
- Follow the Archeological Chance Find Procedure (Appendix 3 of Riparian Assessment report) in the event of a chance archeological find, to ensure that archaeological sites are documented and protected as required for compliance with the BC Heritage Conservation Act.

Table 1. Recommended plant list

Common Name	Latin name	Recommended Pot Size
Trees		
Douglas fir	<i>Pseudotsuga menziesii</i>	#2 or larger
Lodgepole pine	<i>Pinus contorta</i>	#2 or larger
Western white pine	<i>Pinus. monticola</i>	#2 or larger
Black cottonwood	<i>Populus balsamifera</i>	#1 or larger
Shrubs		
Beaked hazelnut	<i>Corylus cornuta</i>	#1 or larger
Blue elderberry	<i>Sambucus cerulea</i>	#1 or larger
Douglas maple	<i>Acer glabrum</i>	#1 or larger
Nootka rose	<i>Rosa nutkana</i>	#1 or larger
Red osier dogwood	<i>Cornus sericea</i>	#1 or larger
Saskatoon	<i>Amelanchier alnifolia</i>	#1 or larger
Scoulers willow or sitka willow	<i>Salix scouleriana or sitka</i>	#1 or larger
Sitka alder	<i>Alnus crispa</i>	#1 or larger
Common snowberry	<i>Symphoricarpos albus</i>	#1 or larger
Oregon grape	<i>Mahonia aquifolium</i>	#1 or larger
Perennials and grasses		
Bluebunch wheatgrass	<i>Pseudogenaria spicata</i>	#1
Junegrass	<i>Koeleria macrantha</i>	#1
Common yarrow	<i>Achillea millefolium</i>	#1
Old mans whiskers	<i>Geum trifolium</i>	#1
Golden aster	<i>Heterotheca villosa</i>	#1
Canada goldenrod	<i>Solidago canadensis</i>	#1

Table 2. Recommended seed mix blend.

Dryland Erosion	% by species
Rocky Mountain fescue	27%
perennial ryegrass	13%
sheep fescue	27%
Annual ryegrass	8%
Creeping red fescue	10%
Canada bluegrass	10%
Native wildflower mix*	5%

*Note: To be determined with seed supplier based on availability and cost, but should target native species with high drought tolerance such as yarrow (*Achillea millefolium*), Canada goldenrod (*Solidago canadensis*), brown-eyed susan (*Rudbeckia triloba*) and blanketflower (*Gaillardia*). Do not substitute with “pollinator mixes”, as these often contain non-native species that are very aggressive/invasive.



Photo 1. Knapweed. Photo Credit: CKISS.



Photo 2. Curled dock. Photo Credit: PNW Pest Management Handbooks.

We trust that this information meets your requirements. If you have any questions, please feel free to contact us.

Sincerely,

Renae Mackas, RPBio
renae@masseenvironmental.com

Fiona Lau, BTEch., ASCT
fiona@masseenvironmental.com

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.bcaca.ca. The proponent may also wish to contact the Ktunaxa Nation Council's Cultural Resources Stewardship Technician for direction (1-250-420-2739; nikapell@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 Altered Rock (FAR), bone, antler and tooth.

Lithics: What to look for

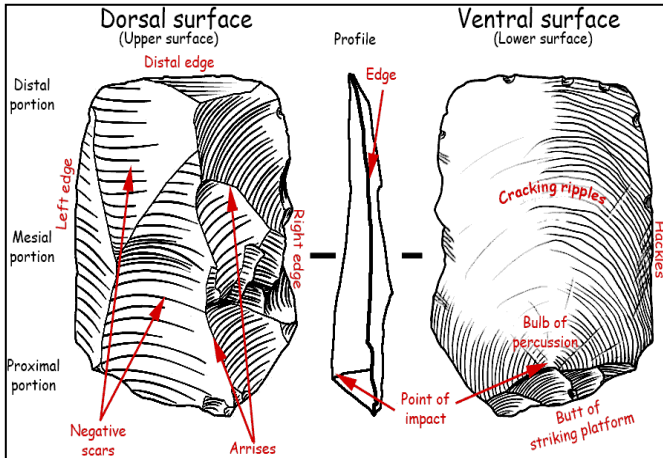


Image 1: Basic flake morphology



Image 2: Examples of lithic flakes

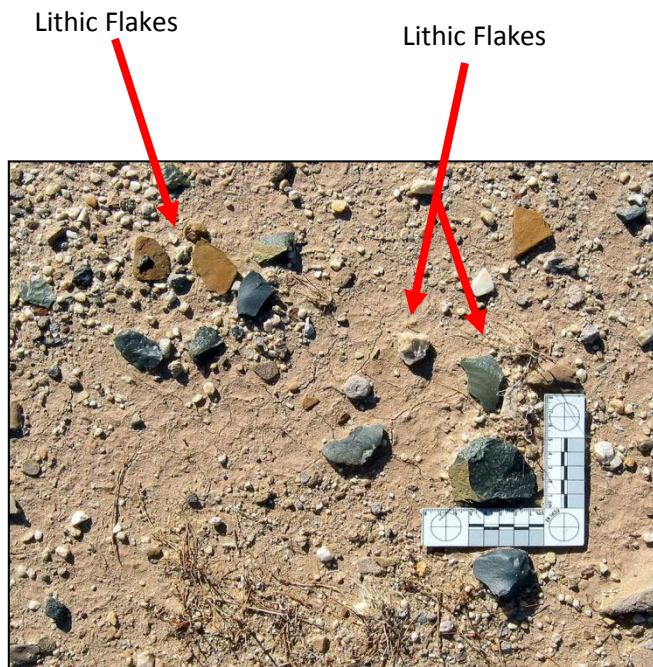


Image 3: Example of lithic scatter found on ground surface



Image 4: Example of formed lithic artifacts

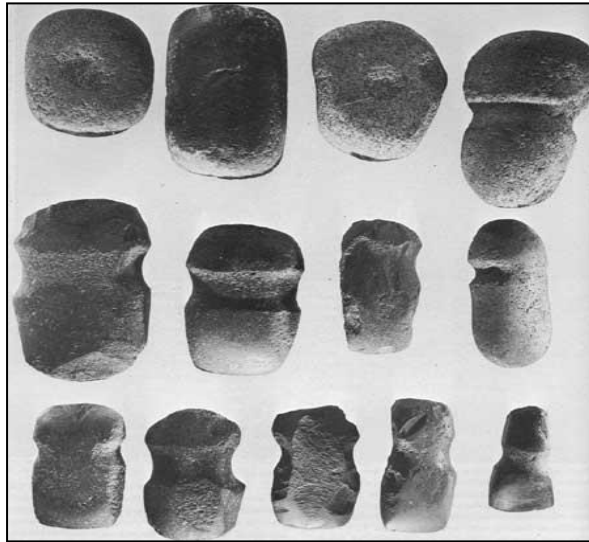


Image 5: Ground stone artifacts

Bone, Tooth and Antler Artifacts: What to Look For

- Obvious shaping
- Incising
- Unnatural holes



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 FAR and charcoal, and
- depressions in the earth associated with FAR, 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 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 FAR 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 FAR
- 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