March 18, 2021

Nikki Gilmore
Chief Administrative Officer
Village of Pemberton
PO Box 100
Pemberton, BC
V0N 2L0

Dear Nikki:

Re: Nkwûkwma (Benchlands) Rezoning Application

Please accept this correspondence and attachments as Skénkenam Development Limited Partnership's application to amend the Village's Official Community Plan and Zoning Bylaw. The submission includes the following:

- Project Narrative
- Development Proposal
- Bylaw Amendments
- Supporting Figures
- Supporting Appendices
- Application Fee (Cheque payable in the amount of $72,200)

In addition, the purchase of the property is still pending, therefore some of the required information is not yet finalized. Lil'wat Capital Assets (partner in Skénkenam Development Limited Partnership) has a current Purchase Agreement for the subject lands. The transaction is not expected to be finalized until early May 2021. At the date of the closing on the purchase of the subject lands, the parcels will be registered in the Land Title Office (currently the lands remain in the Crown land registry). As a result, a few of the submission requirements are not completly finalized, notably:

Owner authorization – Authorization is currently being finalized by FLNRORD's Crown Land Opportunities and Remediation division. It should be available early next week.

Legal Title – As noted, the lands are currently in the Crown land registry. The registration of the properties in the Land Title registry (and legal descriptions) will be finalized just prior to the land purchase. This includes all anticipated encumbrances on the property, notably utility, trail, and access rights of ways.

Site Disclosure Form (Site Profile) – The form and report are complete and included in the submission, but the final legal descriptions (PIDs) for the subject lands in the Land Title Office are not yet available given the legal title is pending.

As requested, this submission provides two hard copies and the digital format.

We look forward to working with the Village on this development application.

Sincerely,

[redacted]

Caroline Lamont

Copies:

Lisa Pedrini, Development Services Manager, Village of Pemberton
Cameron Chalmers, Cameron Chalmers Consulting

AN APPLICATION TO AMEND THE VILLAGE OF PEMBERTON OFFICIAL COMMUNITY PLAN AND ZONING BYLAW

BENCHLANDS

NKWÚKWMA

Submitted by Skénkenam Development Limited Partnership

March 2021

Skénkenam Development Limited Partnership is making application to develop certain lands within the Pemberton Benchlands, as referenced in the Village of Pemberton Official Community Plan (OCP). Skénkenam Developments Limited Partnership (Skénkenam DLP) is a partnership between Lil'wat Capital Assets Limited Partnership (a wholly owned company of the Lil'wat Nation) and Pemberton Benchlands Development Corp..

The following provides an overview of the status of the property, considers applicable municipal plans and policy together, consultation, updates of the Neighbourhood Concept Plan, and the development proposal.

1. Background

In 2006, the Village of Pemberton initiated a public planning process for the lands known as the Pemberton Benchlands, which was completed in 2008 with the Village approval of the Benchlands Neighbourhood Concept Plan (NCP) . The NCP policy directions have since been incorporated into the current OCP, recognizing this growth area as fundamental in the planning for the community's mid and long term housing needs. Phase 1 parcels of the NCP were approved for development and built-out during the past decade.

The Benchlands location was selected for residential growth by the municipality, due to its proximity to the downtown, location above the Lillooet River and Pemberton Creek floodplains, and outside the Agricultural Land Reserve. The main access road for the Benchlands development was identified as Eagle Drive, which was constructed in Phase 1. This main access road, developed on fairly steep slopes, was built to ensure that the access to the site was independent of existing neighbourhoods (although the road connects to the Dogwood extension - part of the adjacent and pre-existing neighbourhood).

The NCP has established *"a land use and servicing framework for the future development of a unique hillside neighbourhood adjacent to Pemberton's commercial village centre"*. The NCP sets a *"high standard for development"* and reflects the policies of the Village. Key policy directions recognized in the NCP, include:

- preservation of a small town, rural lifestyle
- vibrant and accessible Village centre with a range of amenities
- comprehensive network of parks and trails
- diversity of housing forms within close proximity to Village amenities
- urban form that respects the current character of the Village
- stable and diverse economy that capitalizes on the natural recreation and situational amenities of the Village.

Phase 1 (which was also previously provincially held land) of the NCP was sold to local land developers. The Lil'wat Nation had an accommodation interest in the Pemberton Benchlands since 2005, when they signed an agreement with the Provincial Government for the Phase 1 land disposition. Phase 1 of the NCP considered 54 single family lots (with 41 suites).

Phase 2 of the NCP considered three privately held properties west of Pemberton Valley Road, north of Eagle Drive and south of Collins Road. The owners of these properties have not yet pursued rezoning or subdivision in accordance with the concept plan. Only one of the current owners participated in the NCP. The second access to the Benchlands site must achieve permission from these property owners to be realized. The second access is also extremely constrained by ALR land and hazardous slopes.

2. Land Purchase

In March 2016, the Lil'wat Nation initiated inquiries with the Village of Pemberton regarding the status of the lands that comprise the NCP, specific to the OCP and zoning designations. In April 2017, the Nation approached the province regarding the acquisition of 60 hectares of their unceded territory. Later that year the province indicated that they would proceed with the requested land disposition. After almost two years of site investigations, the province signed an Offer to Purchase with Lil'wat Capital Assets to purchase the subject lands, with closing now scheduled for May 2021.

This development application is requesting approval for the development of Phase 3, 4 and 7 of the NCP. The purchase has been divided into two component. Phases 6 and 8 do not form part of the current development application as extensive contamination caused from the former gun and rifle range has been discovered. A condition of the sale of the lands from the province is the remediation of the contaminated parcels. No development applications can be considered until the remediation plan has been approved by the provincial government.

Further, the lands described as DL 8820, (Phase 5) are part of the purchase but are currently within the jurisdiction of the Squamish Lillooet Regional District. In accordance with the Regional Growth Management Strategy the parcel will need to be incorporated into the municipality through a boundary extension process, which will be initiated later in 2021.

3. Subject Lands

The lands currently subject to this zoning bylaw amendment application are Crown lands, legal described as, and shown in Figure 1- Location Plan:

Legal Description	Area
Block A DL 8556	10.48 ha
Block J DL 202	9.69 ha
Block I DL 202	11 ha
TOTAL	31.17 ha

The subject lands are currently vacant, except for existing infrastructure (i.e. water reservoir and service lines and a gravel access road), and an informal network of rogue mountain bike/walking trails constructed throughout the property. The gravel access road currently provides access to the Section 56 Fat Tug mountain bike trail. Statutory Right of Ways will be registered prior to the land sale, to secure access by the existing uses of the Village by Pemberton, Squamish Lillooet Regional District and the Canadian Broadcasting Corporation as well as the community trail network. A portion of the lands were also home to a small community ski hill with a rope tow.

The Pemberton Wildlife Association and the Royal Canadian Mounted Policy used a portion of the adjacent Block K, DL 8410 and DL 202, and DL 2297 from the late 1970's - 2005 as a rifle range and gun range. The ranges have since been relocated. The ranges were approximately 2.6 ha in size. In 2019, Skénkenam DLP retained SLR Consultants to investigate the contamination of the site from the discarded cartridges and casings. The development lands, as part of this application, are not impacted by the contamination and a Site Profile confirming the status of the land, has been included in the submission.

4. Official Community Plan Land Use Designations

The Village's statutory land use designations are contained within the Official Community Plan Bylaw (No. 654, 2011), as amended. The OCP contains many policies, strategies and actions specific to *Community Planning Directions* considering growth management; small town character; community facilities and life long learning; recreation; infrastructure; transportation; a healthy and diverse economy; agriculture; livable, affordable and secure housing; the natural environment; and collaborative local decision making. The development plan as part of this submisstion has recognized and reflected these policy directions, including the designations below:

Map #	
A	Urban Growth Boundary designation *"The UGB encompasses and designates lands suitable for future urban-type development patterns".*
B	Residential, Open Space & Greenways, Public Parks and Civic & Institutional · ***Residential*** *- means the local neighbourhoods including single family and multifamily uses together with complementing parks, open spaces and civic spaces. Home based businesses are permitted subject to certain requirements.* · ***Open Space and Greenways*** *- means major recreational or* · *wildlife greenway corridors, riparian corridors of key streams and rivers,* · *selected areas within the 200 year floodplain and areas identified as ecological reserves or conservation areas.* · ***Public Parks*** *- means public lands permanently set aside for community parks, recreation areas and trails.* · ***Civic and Institutional*** *- means services related to health and welfare, places of worship; schools and other educational facilities; and other government functions (municipal offices, parks, utilities, airport, parking, and assembly).*
C	Development Permit for Intensive Residential *DPA#5 – Intensive Residential has been established to ensure that neighbourhoods embrace and accommodate a mix of residential densities to facilitate livable, cohesive and compatible neighbourhoods.*
H	Heritage and Indigenous Cultural Sites A
G	Proposed Open Space & Greenways and Proposed Public Parks
H	Proposed Trails
J	Eagle Ridge Drive, Collector Road *Primary access for the Benchlands is provided along the proposed collector road which links individual neighbourhood clusters to Pemberton Meadows Road, a designated collector road, while protecting existing neighbourhoods from an excessive increase in through traffic. The Collector Street creates a coherent street hierarchy that will ensure safety, access and an enhanced public realm.*
K	Development Permit for Environmental Protection (DPA#1) and Riparian Areas For the purpose of the protection of the natural environment in accordance with the Local Government Act. *Riparian Areas comprise a 30 meter strip of land on each side of the stream, measured from the High Water Mark (HWM). For a stream in a ravine narrower than 60 meters (excluding the HWM stream width), the riparian area is measured from the high water mark to a point 30 meters beyond the top of the ravine bank. For a stream in a ravine 60 meters wide or wider (excluding the high water stream*

	width), the riparian area is measured from the high water mark to a point 10 meters beyond the top of the ravine bank.
L	Slopes >40% along the western boundary of DL 2297 and Block A, DL 8410 *Identify and protect people and buildings, structures and other development from natural hazardous conditions, notably flooding, unstable slopes and wildland fire; and mitigate or rehabilitate hazardous conditions where possible.* Floodplain – *the lands oare above the designated flood plain.*
M	Fire Protection Boundary designation
N	Regional Context Statement – Area 2 *"It appears that these lands have been overlooked in the approval of the Benchlands NCP and subsequent boundary extension request…The Village requests that the SLRD initiate an amendment for Parcel #2 to the Settlement Area Map for an urban area designation. The Village will add these lands to their next boundary extension request to the province."* Despite an extensive technical review and public consultation process, Council resolved not to proceed with the boundary extension which had considered including DL 8820.
O	Benchlands Special Planning Area *The Benchlands SPA proposes a mixed use, residential neighbourhood that links the hillside with the existing Village. The neighbourhood is to be composed of a broad range of single family and multi-family housing units, neighbourhood commercial services, an elementary school, a community playfield, and an integrated network of parks and trails providing connections to Pemberton's village centre and to the backcountry. The information and policy directions contained within the Benchlands Neighbourhood Concept Plan shall be directly referenced in any future amendments, rezonings or development permits.*

3. Neighbourhood Concept Plan Designations

The Neighbourhood Concept Plan has been incorporated into the Village of Pemberton's Official Community Plan. Key policy directions of the NCP were added to the Official Community Plan in 2013, and indicated that the information and policies be directly referenced in any future amendments, rezonings or development permits. The OCP policies highlight the Benchlands' key land use, connectivity, servicing and phasing considerations:

- total of 503 units, both single family (with secondary suites) and multi-family homes
- 5% of the housing dedicated to community housing (to be achieved through density bonusing)
- site design will include a public common with park and neighbourhood commercial, with higher density housing clustered in this area
- joint elementary school and neighbourhood park, with a community playfield
- series of public nature parks on the three landmark knolls and provide active and passive recreation opportunities, protect environmentally sensitive areas, preserve view corridors, reduce the visual impact of development and support wildlife movement.
- smaller neighbourhood parks throughout
- comprehensive network of recreation trails
- Hillside Street Standards to reduce the physical and environmental impact streets

- proposed collector loop street linking individual neighbourhood clusters while protecting existing neighbourhoods from an excessive increase in through traffic.
- rear lanes to eliminate driveways, strengthen visual prominence of street fronting homes, and direct cars to rear of property.
- pedestrian oriented neighbourhood centre
- potable water system, gravity sanitary sewer connection, storm water management system to simulate pre-development conditions using detention ponds, utility services including underground hydro, telephone, cable and gas (although there is not gas line service to Pemberton)
- be a vibrant and safe neighbourhood, sustainable initiatives related to housing, transportation, environmental management, fire hazard mitigation, and hillside development management.

The NCP identified several directives for the realization of the development considering the diverse and changing land ownership, it has been anticipated that the development of the Benchlands will take place over many years and therefore there should be flexibility in the implementation, specifically:

- collaboration among landowners and the Village of Pemberton will be required, particularly in the preparation of Development Servicing Agreements.
- policy recommendations are made for implementation tools and mechanisms specifically related to land use, urban design, environment, and transportation.

5. Current Zoning

As mentioned, the Nkwûkwma lands are currently zoned (Zoning Bylaw No. 832, 2018) as follows:

	R-1 Residential One
Block I, DL 202	**Permitted Principal Uses:**
Block A, DL 8556	Dwelling, Detached
Block L, DL 202	**Permitted Accessory Uses:**
	Bed and Breakfast, Home Occupation, Secondary Suite, Short-Term Vacation Rental
	Min. Lot Size: 700 m2
	Min. Lot Width: 18 m

Although the Neighbourhood Concept Plan anticipated a primarily single-family development, the proposed mid-size and small lots would not be in accordance with the minimum lot size and width of the R-1 Residential One zone. At early preapplication meetings with the Village, it was understood that a mix of residential housing forms and densities was preferable as evident in this development application focusing on affordable options. This development application considers a range of residential uses, together with the trails, parks, utilities and open spaces.

6. Housing Needs

The OCP is required to ensure that there are sufficient lands designated within municipal boundaries for future housing needs. At the time of the OCP's adoption, Pemberton would need approximately 130-260 new residential units during the next five years (2014-2019) at a annual growth rate of

approximately 1-2%. BC Stats have more recently projected Pemberton's annual growth rate between 2016-2019 was approximately 2.25% which would require closer to 300 units. It appears that the projections were consistent with local demand and the new residential supply (source: Village of Pemberton Development Services Department, Feb 2021).

Year	Single Family	Suites/Carriage/ Aux Units	Manufactured	Multifamily	Total
2014	1	0	0	0	1
2015	3	3	0	0	6
2016	6	4	6	45	61
2017	7	3	1	0	11
2018	48	15	0	45	108
2019	9	2	0	4	15
2020	16	9	2	0	27
2021	2	1	0	0	3
TOTAL	92	37	9	94	232

Local real estate reporting (WREC January 2021) indicates that even with the pandemic the housing market in Pemberton is stronger than ever. In 2020 the total value of transactions in the valley exceeded 135 million dollars (increase by 40%). The reports indicate that the most popular unit was single family despite the limited number of new listings (resulting in values increasing 22% largely due to the strength of the single-family market). The report states that *"demand and price appreciation can be attributed to increased public awareness of the area, low interest rates, Covid factors similar to those influencing Whistler, and value as compared to Whistler for workers in the local economy".* The report indicates *"strong interest in Tiyayta, and Sunstone and for any new condo/townhouse developments offered. Pemberton will continue to see increasing demand for real estate."*

The Village completed the *Age-Friendly (Seniors) Housing Needs Assessment* in 2019. The report indicates that in April 2019, *"provincial regulations now require local governments to complete housing needs assessments for their communities by April 2022 and every five years thereafter. As a basis for determining current and projected housing needs, local governments are required to collect approximately 50 kinds of data"* considering population, income, significant economic sectors and available and anticipated housing units. The reports are also required to identify the number of housing units required to meet current housing and anticipated housing needs for at least the next five years by housing type, key areas of local need, the number and percentage of households in core housing needs and extreme core needs and provide a standardized summary.

Age-Friendly (Seniors) Housing Needs Assessment defines affordable housing as: *"housing that a single person or household can afford to rent or purchase without spending more than 30% of their before tax income. For homeowners, these costs include mortgage payments, strata fees, mortgage and home insurance, as well as utilities. For renters, costs include rent and some utilities. The 30% measurement is a common standard for defining affordability nationally and provincially"*.

The Village of Pemberton has identified that the implementation of the *Affordable Housing Plan* as a top strategic action in 2020-21. In March 2020 Council endorsed *the 2020-2021 Affordable Housing Work Program*, which identifies policy development and other opportunities for the delivery of needed housing. The first initiative is the completion of a *Housing Options Study* that will report to

"Council describing a range of housing options, with an accounting of possible impacts and an analysis of the community tolerances for each housing type" (source *Affordable Housing Work Program* March 10, 2020). The *Options Report* has been prepared and includes the following:

- accessory dwelling units/carriage,
- lock off suites in townhomes,
- tiny homes
- duplexes,
- suites in duplexes,
- 3-4 plexes and
- low rise apartments.

The municipality is now turning to updating the OCP, based on affordable housing needs.

The application introduces three size ranges for single family homes, suites, duplexes, townhomes and apartments. The applicant will also consider the other housing options that may be possible as recently identified in the Village's Options report.

7. Agricultural Land Reserve

The subject lands are not within the designated Agricultural Land Reserve. The Village's OCP has designated agricultural buffer areas which comprise part of the NCP, but is not assigned to any of the property subject to this application.

8. Early Consultation

Skenkanem Developments believe early and often consultation is important for the proposed development and has therefore commenced discussion with Village staff, Council (Committee of the Whole), stakeholder groups (trails groups and adjacent land owners), the Lil'wat Nation and Pemberton community. The following provides an overview of the outreach to date:

DATE	VILLAGE	PROVINCE	LIL'WAT	COMMUNITY
March 2016	First contact with Village staff (asking for details on the NCP, zoning, etc)			
Spring 2016		Discussions with the province on the land sale		
May 2016			Chiefs and Council endorsement of land acquisition for development	
Fall 2016		Provincial staff Letter of Interest to pursue lands sale to Lil'wat Nation	Community Open in Lil'wat, describing the Project	

DATE	VILLAGE	PROVINCE	LIL'WAT	COMMUNITY
Nov 2016		Province reviews letter of interest		
Feb 2017		Crown Land Acquisition and Development request to province		
March 2017	Meeting with Village staff and provincial Crown land rep	Initial meeting with Village staff and provincial Crown land rep		
April 2017	Initial meeting with Mayor about purchase/development			
May 2017	Met with senior Village staff and Village engineering consultant			
June 2017	Council workshop about existing Neighbourhood Concept Plan and plans for development in the future			
August 2017		Decision has been made by the province to proceed with this Crown land disposition project (moving ahead with preparing the land value and offer to purchase)		
June 2018	Met with Village staff and engineer considering servicing costs			
Nov 2018			Community Open House	
April 2019	Met with Village planner			
May 2019		Purchase Agreement signed.		
August 2019	Initial Meeting with Village staff since offer to purchase, outlined proposed process to rezoning			
Sept 2019			Lil'wat Business Group Site Visit (arch site and areas of concern)	Met with adjacent property owners
Oct 2019	Meeting with Skénkenam Development Team and Village Staff		Chiefs and Council Site Visit (including arch site and AOC)	

DATE	VILLAGE	PROVINCE	LIL'WAT	COMMUNITY
Nov. 2019			Community Open House	Met with adjacent property owner
Nov 2019 & Dec 2019	Meeting with Skénkenam and Village planning contractor			Met with PVTA and PORCA
Feb 2020	Meeting with Skénkenam Team, Village professionals and consultants			Met with adjacent property owner
March 2020				Advertise and held Public Information Meeting Nkwûkwma Facebook Page posted with survey
April 2020		Purchase Agreement extended due to Covid-19		
Sept. 2020		Purchase Agreement extended due to contaminated site findings		
Jan. 2021		Purchase Agreement extended to further understand implications of contamination		
Feb. 2021	Meeting with Skénkenam and Village professionals + planning consultant			

The project took a pause first due to the pandemic, and then later to quantify the extent of the gun/rifle range contamination. It is the intent to provide an extensive community outreach program as the development application goes through review by the Village including a second public information meeting and the statutory public hearing. Additional approaches will be applied, given the challenges Covid restrictions on public engagement and comment. An Communitications Plan was prepared in 2020 and is attached as Appendix A. This will be updated for the next phase of the outreach.

9. Lil'wat Traditional Territory and Reconcilliation

In 2010, the Village of Pemberton and Lil'wat Nation signed a *Protocol Agreement* that *"recognize and acknowledge that the Lil'wat Nation asserts aboriginal title to all lands within its traditional territory"*, and that by *"building a government to government relationships will create a level of certainty for our respective communities and jurisdictions and ensure an important dialogue to improve the quality of life for all residents".* A key component of *the Protocol Agreement* is coordinated land use planning and management.

Lil'wat Nation's Traditional Territory encompasses close to 800,000 ha of land resources, of which includes the subject lands known as Nkwûkwma ("upstream"). These unceded lands, include significant archaeological sites, which further confirms the Lil'wat traditional use of the lands.

The Village's Official Community Plan further encourages dialogue and collaboration with the Lil'wat Nation supporting joint interests. The Nkwûkwma neighbourhood has and will be integrating the Indigenous land use approaches into its principles, design and development.

The first contact the Lílwat7úl had with Europeans was in 1793 when Alexander Mackenzie made his overland journey to the Pacific Ocean. Over the next two centuries traders, miners and settlers arrived in Lílwat Territory. As the colony of British Columbia prospered, the Lílwat7úl, like other First people, were systematically stripped of their lands, rights and resources. Eventually, the people were restricted to 10 tiny reserves totally 2,930 ha or .004 per cent of Lílwat Traditional Territory. Source: Lil'wat.ca

10. Economic Impact

The proposed development activities include the land purchase, civil servicing and the construction of the initial phases of single family and multifamily homes. These activities will create direct employment in the project as well as indirect employment for area businesses. The creation of employment will aid in the economic rejuvenation in the Sea to Sky region, as the Lil'wat and surrounding areas work towards economic recovery from the pandemic.

The estimated cost of the Phase 1 activities alone is approximately $27.5 million (minus land) and will be completed within 5 years. The initial phase will also likely have off-site infrastructure improvements that will not only facilitate the new housing but also introduce employment for residents of the Pemberton valley who have also been hit hard by the Covid-19 restrictions. In particular, the new development will provide employment for local construction trades while boosting the retail, and the service sector. The development will also increase the property tax base and improve local services, including but not limited to roads, storm water drainage, water service, new parks and trails, FireSmart protection and community amenity contributions.

11. Climate Action

In early February 2021, the Village hosted a workshop on the municipal *Community Climate Action Plan*. At this meeting, "big moves" and strategies were discussed. Athough the *Action Plan* is still a work in progress, the proposed Nkwûkwma neighbourhood will be interested to learn about the implementation approach, that may be incorporated into the development. The "big moves" consider:

Transportation - A complete zero-emission transportation system connects our communities and regions.

- Shift beyond the Car
- Electrify Passenger Transportation
- Decarbonize Commercial Transportation

Buildings - Our community's buildings are exceptially energy efficient and powered, heated and cooled with 100% renewable energy

- Step Up New Buildings
- Decarbonize Existing Buildings

Waste - Our community diverts 95+% of its organics from land fill and captures at least 75% of the landfill gas, with maximum value possible

- Close the loop on waste

In considering the new development, many of the community's comments/directions maybe considered through the planning approvals process, in particuarlar:

- Close proximity (walkable) to Downtown
- Ground oriented multifamily buildings
- Use of renewable resources
- Beautiful and positive buildings that deliver high quality living and works spaces for inhabitants
- Prioritize people over cars
- Energy efficient buildings and infrastructure
- Efficient use of existing spaces (flexible zoning)
- Community gardens
- Active transportation
- Proximity to reduce the need town a vehicle
- Increasing transportation accessibility
- Safe confortable and convenient bike routes
- Comprehensive bike lanes separate from roads
- Prioritizing pedestrian connections
- Remote working/flexible design
- Transit service potential

Skénkenam will continue to follow *the Community Climate Action Plan* initiatve and work with the Village to provide a development that addresses the community's sustainability goals.

12. Development Proposal

The initial phases of the Nkwûkwma on the Benchlands provide a updated design for the planned neighbourhood that reflects the housing needs of the Pemberton area, while considering the sensitive terrain, the natural environment and sustainability development. The proposed subdivision layout has resulted from extensive investigations and planning to provide a well designed neighbourhood.

a. Updating the Neighbourhood Concept Plan Inputs

As noted, the original NCP was approved by the Village in 2008, and while the terrain of the lands has not changed, new or additional information was needed to ensure the directions for the development were appropriate for the community moving forward.

In the fall of 2019, Lil'wat and their development partners retained an extensive consulting team to update the information contained within the Neighbourhood Concept Plan, specifically:

- Ekistics (Planning and Architecture)*
- InterCAD (Civil Engineering)*
- Kontur (Geotechnical Engineering)
- Howes Technical Advantage (Transportation)
- Cascade Environmental Resource Group (Environment)
- Lil'wat Nation/Arrowstone (Archaelogical Research)
- Rollo and Associates (Market Absorption)

**original NCP consultants*

The consulting team then proceeded to undertake a detailed review of the site, which included an updated analysis of: aerial photos, topography, landforms, slopes and aspects. This data was then combined with the geotechnical hazard information, environmental sensitivity, archaeological findings, and current site conditions to create a site constraints plan.

It is important to note that this updating information considers all six of the parcels being transferred from the province to the Lil'wat Nation, athough only the three most eastern parcels are part of this development application.

i. Land Planning:

Ekistics complied the information and prepared the following updated maps:

Figure 2 - Aerial
Figure 3 - Landform
Figure 4 - Slope
Figure 5 - Aspect

The analysis has also been incorporated into a three dimensional overlay, providing a greater visual understanding of the lands. This will be provided to the Village in digital form.

ii. Geotechnical

The assessment that was prepared by Kontur: *"observed potential of naturally occurring geologic hazards, including locations of potential hazards, options as to the nature of the hazard, consequesnces and influence areas fo the identified potential hazards".* In particular the assessment focused on rock instablilities, rockfall, snow avalanche, debris flows/torrents and flooding. Figure 6 provides a map illustration of the findings.

The complete report is attached as Appendix B and has informed the Development Constraints map. It is the inent that Nkwûkwma will undertake the required mitigation works to the Eagle Drive access, as previously determined by the Village.

iii. Environmental

The environmental consultants prepared both an Initial Environmental Review (IER) and a preliminary Riparian Assesssment Area assessment. The site is relatively un-developed and forested, except for two water reservoirs, an access road and walking/biking trails. The IER considered the existing environmental conditions (physical, terrestrial, and vegetation) and provided the biogeoclimatic zone classification and terrestrial ecosystem mapping. As well, rare and endangered ecological communites; wildlife and wildlife habitats; valued ecosystems, aquatic environment; socioeconomic and other undertakings in the area were recorded.

The report provided baseline conditions and identified potential environmental constraints. The IER then included conclusions and recommendations including additional investigations related to a screech owl nest survey, RAR assessment (completed), rare and endangered plant and wildlife surveys (little brown myotis and sharp tailed snake), as well as construction management and landscaping guidelines.

The IER is attached as Appendix C and has informed the Development Constraints Map.

The environmental consultants also prepared a preliminary Riparian Area Regulations (RAR) Assessment which provided a Detailed Assessment methodology related to Pemberton Creek and three unnamed watercourses.

The RAR Assessment and map are attached as Appendix D and has informed the Development Constraints map.

iv. Archaeology

A Preliminary Field Reconnaissance was prepared for the subject lands by the Lil'wat Nation/Arrowstone Archaeological Research and Consulting under the provisions of the Lil'wat Heritage Investigation Permit. The site work identified eight (8) Areas of Concern including a Pictograph Site for all six parcels as shown in Figure 7 - Archaeological Areas of Concern.

v. Site Contamination

As previously noted, a portion of the lands purchased by the Lil'wat Nation was utilized as a rifle and gun range until the early 2000's. The current land development application, however, does not include any lands subject to this contamination. None of the Schedule 2 uses are present on the lands subject to this application as noted in Figure 8 - Contamination Areas.

vi. Market Assessment

The applicant retained Rollo and Associates to prepare an Aborption Study for the Nkwûkwma Benchlands. The initial study was undertaken in 2017 at the request of the provincial government and then in advance of the public information the report was updated to reflect the conditions in 2020. The 2020 study is attached as Appendix E.

The report considers the housing demand (population, age groups), housing supply (maintainers and new demand) and then forcasts the absorption. This report was also prepared for all three phases of potential development, while this submission only considers 267 units (450+ units for build up). The report considers both medium and low growth scenarios, below the medium growth trend is highlighted:

- 9 – 19 single family homes can be absorbed per year (7-16 years or 2030-2039)
- 4 – 13 ground-oriented multi units can be absorbed per year (9-29 years or 2032-2052)
- 1 – 3 apartment units can be absorbed per year (13-40 years or 2036-2063)

Subject to the unit type Phases 1 and 2 will have an average absorption of approximately 13-15 years or 2036-2038. Given the recent reports from local real estate companies, however, this seems conservative.

b. Site Constraints and Development Potential

Figure 9 - Site Constraints Plan incorporates all the technical findings from the existing site conditions (and also includes current recreational trails).

The information contained within the Site Constraints Plan provided the basis for Figure 10 – Development Potential Plan which effectively identifies those area that have good development potential, constrained development potential and no development potential. The Development Potential Plan provided the template for the preparation of the Development Plan.

c. Public Information Meeting/Survey

On March 11, 2020 two public meetings were held with the community to introduce the Nkwûkwma project. The format of the meeting included a presentation focusing on:

- Understanding the Land
- Proejct Team
- Updating the Neighbourhood Concept Plan
- Growing Smart (Why grow? Why here? Why now?)

- A Sustainable Community
- Technical Findings
- Housing Diversity

Those in attendance asked questions about the development lands and provided addition comments and directions related to housing mix, site constraints/opportunities, community amenities, and neighbourhood impacts. Comment sheets were also provided as well as an online survey. The Findings of the meeting are outlined in Appendix F and consulted in the preparation of the Proposed Devleopment Plan and this development application.

d. Proposed Development Plan

Figure 11 - Development Plan proposes a mixed density residential neighbourhood for the 31.2 ha (77.1 acres) of land, that follows two benches within the site. The development will be serviced by a main arterial road which will later connect provide a looping road accessing subsequent phases.

As evident in the NCP and update technical analyses, the subject lands have various constraints that limit the development potential. Below is a table that compares the land use as outlined in the NCP with Nkwûkwma development proposal. Note that the NCP considers all phases of the project, yet the proposal only considers three phases, regardless this comparison provides a sense that the land use mix is not only consistent but provides for more open space.

Proposed Land Use	NCP (all phases)	Skénkenam Development
Residential + Development Reserve	50.4%	41%
Public Natural Areas	20.6%	10%
Elementary School	1.2%	0%
Community Playing Field	1.6%	0%
Civic and Infrastructure	0.4%	1%
Parks (Nature and Active)	11.7%	37%
Streets and Lanes	12.0%	11%
TOTAL	100%	100%

i. Residential Uses

The project includes a mix of residential densities as shown in the table below:

	No. of Units	% Mix	Min Frontage (m)	Avg Lot Size (m2)
Large Single Family	24	9%	18	630
Medium Single Family	40	15%	15	525
Small Single Family	47	17.5%	12	420
Dupexes	24	9%	11 (per side)	330 (per side)
Townhomes	92	34.5%		
Apartments	40	15%		
TOTAL	267	100%		

The units per hectare (acre) is approximately 8.56 (3.5 upa), as the constraints to the development site provide undulating terrain with open spaces, trails and parks flowing between residential pods.

Figure 12 - Lot and Housing Typologies provides more detail on the layout of the proposed residential uses.

ii. Commercial/Flexible Uses

The 2008 NCP included a 400 m^2 site for neighbourhood commercial uses, such as a corner store or café. At this time the development application does not specifically include or exclude a commercial or community use, but propose that as the neighbourhood builds out, potential space could be accommodated in the apartment building (Phase 2B). It is recommended that the zoning be flexible to consider such a commercial or community use space that services the immediate neighbourhood, and considered at the time of the apartment building's Development Permit approval. It is not the intent that the space be programed to be a destination from outside the Benchlands.

iii. Elementary School and Playing Field

The 2008 NCP provided a site for an elementary school and community playing field. In discussions with School District #48, the applicant was advised in a letter dated March 13, 2020 (attached as Appendix G) that the School Board no longer requires the designated 1.2 ha school site. The letter indicates that although the District has no interest in the school site, they may be interesting in the allocation of building lot(s) to support the Pemberton Secondary School residential construction program. It is understood that the dedication of such lands for this purpose could be considered under the community amenity contribution of the development.

At the public meeting, most in attendance indicated that the type of recreation provided in the neighbourhood should embrace the existing trails and unique environmental conditions (it was felt that The Ridge/Sunstone had addressed the playing field node). In

addition, there was emphaisis on ensuring access to existing trails, retaining and upgrading trails trails (with a focus on intermediate + kid friendly options). There was also a stated need for trailhead improvements, such as parking, washrooms and facilities (tools, bike wash). The site was not considered to be suitable for formal playing fields but open spaces and trails.

iv. Parks and Open Spaces

The current proposal has identified parks and open spaces as natural areas. Figure 11, the Development Plan also designates the proposed parks and open space. The park locations have balanced the recreation needs of the neighbourhood together with amenities for the greater community. Further community consultation and Indigenous planning principles will inform the plan for parks and open spaces considering the natural terrain, existing trails, archaeological areas and development parcels.

There has also been stated interest in a tobogganing hill and outdoor skating rink (perhaps on the stormwater drainage pond in Staehli Park).

v. Trails and Non-Motorized Circulation

At this time the proposed trail network has not yet been established as it is the intent to work with the Village and trail interests to provide recreation and commuting trails that work with the terrain and meet the needs of the community.

Through the public information session, the following comments were received about trails and connectivity:

- Retain and improve Fat Tug access, and Lower Fat Tug
- Provide new blue and green trails
- Retain existing kid friendly/learning trails
- Recognize existing trails for off-leash dog walking
- Provide trailhead improvements (parking, washroom, tools, and water)
- Provide easier grades in accessing the trails throughout Benchlands

The community also indentified a desire to have commuting pedestrian and bike trails (Valley Trail type) throughout to the neighbourhood to provide separation between vehicles and bikes/pedestrians. These separated trails can be established with input from the Village and community trail users through the planning process.

vi. Lil'wat Archaeological Areas and Indigenous Planning Principles

As indicated in the Preliminary Field Reconnaissance, there are eight (8) areas that need additional investigations to determine the presence of archaeological. Figure 13 - Development Archaeological Areas of Concern indicates that there are sites within this development application.

AO 1 - A floodplain bench above the left (north) bank of Pemberton Creek, south of the Waterfall Trail.

AOC 10 - consists of a large, very prominent rock outcropping with a southeast view of the Pemberton Valley.

AOC 9 - Newly identified archaeological site Benchlands-T1, a rock shelter with an associated pictograph panel.

AOC 11 - A prominent rocky knoll/bedrock outcropping with multiple ledges and a view to the southeast of the Pemberton Valley.

As part of the purchase, an archeological covenant will be registered on title. As these lands are the Traditional Territory of the Lil'wat Nation, the design and layout of the parks, natural and protected areas as well as the design of the housing sites will reflect Indigenous planning principles (for example valuing people, stories, ceremonies, and two-eyed seeing for the benefit of all). This will recognize Lil'wat's sacred histories, embracing recognition and reconciliation.

One Eye the strengths of Indigenous knowledges and ways of knowing, and the other eye the strengths of Western knowledges and ways of knowing ... and learning to use both these eyes together.

The Lil'wat Nation Land Use Plan outlines Management Direction for Land Developent as below (Lil'wat Land Use Plan, p53 accessed at https://lilwat.ca/wp-content/uploads/2015/03/LLUP-Phase-1-August-2006-FINAL.pdf)

8.6.2 Management Direction for Land Development

Management Direction	***Strategy***
Undertake land development that minimizes environmental disturbance.	*Ensure that all Lil'wat Nation development is sustainable, and adheres to such concepts as Smart Growth and low impact design.*
	Oppose land development that leads to sprawl, inefficient use of land, and dependency on motor vehicles.
	Seek to develop communities that focus on mixed use, pedestrian-oriented, and attractive designs.
	Plant native vegetation in land developments
Undertake culturally appropriate land developments	*Locate developments away from culturally sensitive sites*
	Ensure barriers to cultural sites are not created as a result of new development.

e. Engineering Report – Road Access and Site Servicing

Attached as Appendix H is the Development Servicing Report prepared by InterCAD. This firm was also the company that prepared the servicing report for the NCP and considers the road network, water distribution and demand, santitary sewer demand and flow, and stormwater management.

The required fee has also been included in the application package to undertake the required servicing modelling for off-site improvements. The servicing report will consider these off-stie improvements once the existing capacity and new infrastructure is determined.

In addition, Ekistics has prepared proposed concepts for the Road Cross-Sections, recognizing Hillside standards, which are attached as Figure 14. The main access road would be a public road, whereby the local roads could be strata roads. It is the intent that the road network will accommodate transit use (turnaround), in short and long term.

f. Traffic Impact Assessment

A draft Traffic Impact Assessment has been completed by Howes Technical Advantage. The assessment has considered the existing scenario, background traffic, project traffic (trip generation, site traffic and site traffic distribution), future volumes and analysis. The report is considered draft until input on the Village has had an opportunity to review it. The report is attached as Appendix I.

g. Phasing

The NCP recognizes that the phasing of the project will be dependant on market conditions, housing demand and absorption. This development application only considers three parcels, due to information related to the existing contaminated sites. Phase 2 is not owned by the applicant and would need to be initiated by the respective property owners. The proposal considers two phases, each with three (3) respective sub-phases as shown in Figure 15 – Phasing Plan. The land uses reflect both the terrain available as well as trying to provide a diversity of housing products.

It is also the intent to phase the clearing, so that the existing character of the site will remain in tact until development is needed.

h. Community Amenity Contributions

The NCP also references community housing as a possible amenity, but this is subject to the Village's current OCP and other policy directions (the NCP was adopted before Council approved the Community Amenity Contribution Policy). This rezoning submission, recognizes that there are certain characteristics on the property that could be unique amenities to the community for credit as amenity contributions. In addition, the applicant understands that a with a large multi-phased development there is an opportunity to make cash (per unit) contributions to a larger community amenity, such as an outdoor pool. A site has already been secured for a pool from a gift from the Den Duyf Family.

Schedule B of the Village's OCP, lists amenity zoning priorities, which was prepared during the public consultation process at the time. It was the intent that the amenities listed be achieved through density bonusing provisions (community amenity contribution negotiations). It further states that some development may be more suited to certain amenities (given location or form of development) or alternatively cash contributions. Below is a listing of the priorities identified in the early 2000's:

Top Priorities	Medium Priorities	Other Amenities
Arena	Curling Rink	Community Kitchen
Indoor Pool	Performing Arts Stage	Outdoor Skating Rink
Public Washrooms	Outdoor Pool	Public Use Airport Building
Parks	Seniors Centre	Squash/Racquet Ball
Trails	Regulation Indoor Gym	Bus Shelters
Agri-tourism	Seniors Housing/Care	Track
Affordable/Special Needs Housing		Public Shower Facility
		Indoor Tenis
		Campground
		Equestrian Stadium
		Clubhouse

In addition to these priorites there are also several opportunties to provide amenities on site such as additional trail improvements, off-site services (that benefit the greater community) and archaeological protection/recognition. The preference is to work with the Village of Pemberton

on a community amenity contribution program that is appropriate. The notes from the March 2020 Public Information Meeting have also identified other community amenities (Appendix F).

i. Wildfire Management

It is understood the the Village has a Wildfire Management Plan. The applicant will rely on direction from Village professionals with regard to any additional investigations or requirements during site development and/or protection of the neighbourhood.

13. Bylaw Amendments

As noted , this development application requires an amendment to both the Official Community Plan and the Zoning Bylaw.

a. OCP Amendment

As indicated that proposed development application will require a minor amendment to the Official Community Plan particular to the land use map's designation of the school site and playing field. The OCP schedules also have fairly defined land use designations, (as well as trails, and parks) that should provide more flexibility to ensure that the proposed development meets community needs over time. In addition the OCP amendment should include an updated Lil'wat Cultural Sites (Schedule D), Land Constraints (Schedule F) and ESA's (Schedule K).

A draft amending bylaw can be provided on request.

b. Zoning Amendment

The lands are currently zoned R-1 that permits single family use. It is the applicant's preference to zone the property a Comprensive Development zone that will permit flexibility in the location of the uses, but ensure the requested density. The proposed uses will include:

- Residential uses of single family (three sizes, the larger two (2) lot sizes permitting suites), duplexes (may consider suites in duplexes), townhomes (lockoffs), and apartments
- Commercial/Community Use Flex Use
- Parks and Open Spaces (active parks, natural protection areas, archaeological protectin areas, and natural areas)
- Utilities and Infrastructure (reservioirs, roads, etc), and
- Trails/trail heads

14. Application + Supporting Information

In accordance with Village of Pemberton requirements, the following documents are attached within Appendix J:

- Completed Application Form
- Certificant of Title (encumbrances provided upon request)
- Rezoning Fee Calculation
- Provincial Authorization
- Site Profile

It is understood that through the review process, the Village may ask for additional information.

LIST OF FIGURES

APPENDICES

** both to be provided by March 15, 2021

SKENKENAM DEVELOPMENTS - NKWUKWMA NEIGHBOURHOOD

PEMBERTON B.C.

Subject:	**Pre-Application Communications and Outreach Plan**
Date:	January 2020
Purpose:	• To provide information to and collect information from the Pemberton community and stakeholders on the proposed Pemberton (Benchlands) Skenkenam Development in advance of submitting the application to rezoning the property. • To fulfill the "Pre-Application" requirement for a re-zoning application for developer-led community engagement.
Timeline:	The intent is to meet with the Pemberton community and stakeholders through late January 2020 through to mid March 2020 for the first and second phases of Development
Background:	The Skenkenam Development lands have been identified for future development as early as the 1999 Official Community Plan, due to its proximity to the village centre and location upland of the Lillooet River floodplain. The lands known as the Benchlands are designated as the primary source of land for future residential development in the Village of Pemberton Official Community Plan (OCP). In 2008, the Village completed the Benchlands Neighbourhood Concept (NCP) Plan which involved the comprehensive planning of the site through the exploration of development opportunities with the full engagement of residents and stakeholders during the analysis of the site. In 2009 the NCP land use plan was adopted into the Official Community Plan, and most of Phase 1 has been developed and houses constructed. Based on the Village's land use policy directions, the Lil'wat entered into negotiations with the provincial government to acquire 60 hecatares of Crown land. The province and the Lil'wat Nation have executed an Offer to Purchase the lands with an anticipated closing date in early 2020. The Lil'wat Nation is developing the project with a private sector developer it has worked with previously. Although the Village has recognized that the lands would be subject to future development, the property will require rezoning to permit the proposed residential uses. Pemberton has been growing steadily over the past few years, whereby the local community and stakeholders may not be aware of the development potential of the site and/or the progressive planning policies applied in the NCP. The proposed communications and outreach plan will provide updated information about the subject lands and the proposed development, collecting input from the community and stakeholders on the expansion of the Nkwukwma (Benchlands) neighbourhood, prior to submitting a formal rezoning application.
Approach:	Skenkenam Developments have engaged an extensive consulting team to review and where appropriate, update the information from the approved NCP. In addition, the unit type and mix of the proposed development have been revised to better match the affordability needs of residents (more smaller lots and multifamily development).

SKENKENAM DEVELOPMENTS - NKWUKWMA NEIGHBOURHOOD

PEMBERTON B.C.

Approach:	The first phase of the outreach will provide history to the developments site, local absorption of residential units and updated site information notably transportation, geotechnical, environmental, archeological, and topographical considerations. The new information also provides information related to the existing contaminated site (former gun range) as well as servicing needs. The community and stakeholders will be asked to provide additional comments on the site opportunities and constraints for development. The second phase of the outreach will finalize the development opportunities and constraints and present a land use plan based on the information received from the background investigations and community consultation. The community and stakeholders will be asked to provide comments on the new development plan.
Communications:	The proposed outreach will be advertised through the following: ▪ Village ENews/Website ▪ Pique Newsmagazine ▪ Direct email/phone contact with local stakeholders groups (i.e. Stewardship Pemberton, PVTA/PORCA, seniors, SLRD, Downtown Businesses, Chamber, Tourism Pemberton, etc.). ▪ Door to door paper notification to properties within 300 m existing Benchlands neighbourhood) ▪ Notification sign on the property
Meeting Formats: **Meeting Formats:**	**Round One:** Skenkenam Developments has proposed a series presentations in early 2020. **Proposed Meetings:** ▪ Public Meeting (one in day time, one in evening) – the public meeting will include a breakout component, whereby residents will received the new information then be invited to provide more detailed input on a series of topic areas, notably: transportation, environment, residential absorption, recreation and trails, housing type/affordability, community amenities, etc. ▪ Additional Public Meeting in Mount Currie. After the presentation, community and stakeholder will be offered the opportunity to have follow-up with the proponent to get into greater detail, if requested. **Round Two:** Skenkenam Developments would reconvene the Round One meetings and present the updated "*development opportunity and constraints"* map and proposed development plan. The intent is to collect input on the proposed development plan, considering specific considerations in break out groups (similar to Round One). The second round of meetings has been proposed for March 2020. **Proposed Meetings:** ▪ Joint Meeting of Lil'wat Nation Council and Village of Pemberton Council ▪ ADRC and APC Meeting (also invite SLRD staff) ▪ 2 Public Meetings (one in day time, one in evening) – the public meeting will include a breakout component, whereby residents will be provided a draft site plan for consideration. After the presentation, community and stakeholder will be offered the opportunity to have follow-up with the proponent to get into greater detail, if requested.

SKENKENAM DEVELOPMENTS - NKWUKWMA NEIGHBOURHOOD

PEMBERTON B.C.

Key Messages:	The Skenkenam (Benchlands) development: ▪ consistent with Village land use planning policy since 1999. ▪ provides a long-term economic development generator for the Lil'wat Nation, with *build out* **occurring over a 30+ year time span**. ▪ fulfills the objectives of the Neighbourhood Concept Plan and more recent municipal policies considering sensitive development practices together with a quality neighbourhood located out of the flood plain and ALR, that benefits the Pemberton community. ▪ will clean up of the existing contaminated site. ▪ provides long term, affordable housing options for the long term needs of Pemberton. ▪ committed to keeping Pemberton residents and stakeholders informed and involved throughout the planning approvals process.

KONTUR
GEOTECHNICAL CONSULTANTS
inc.

GEOTECHNICAL ASSESSMENT
Residential Development
Pemberton Benchlands, Pemberton, BC

Document Type: Issued for Review

Date: February 26, 2020

Project No.: **K-191204-00**

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APPENDICES

1.0 INTRODUCTION

As requested, Kontur Geotechnical Consultants Inc. (Kontur) has completed a geotechnical assessment of the proposed residential development, Pemberton Benchlands, Pemberton, BC. The purpose of the assessment was to provide a characterization of observed potential naturally occurring geologic hazards, including locations of the potential hazards, opinions as to the nature of the hazard, consequences and influence areas of the identified potential hazards. Kontur's assessment of potential naturally occurring geologic hazard events follow the generally accepted guidelines provided by the Engineers and Geoscientists of British Columbia (EGBC) "Guidelines for Legislated Landslide Assessment for Proposed Residential Developments in BC", dated May 2010.

As the Village of Pemberton does not provide a level of geologic hazard acceptability, Kontur has referenced the British Columbia Ministry of Transportation and Infrastructure (MOTI) guidance for acceptability of geologic hazard occurrence. The MOTI guidelines are:

- 1 in 475 years for damaging events related to landslides;
- 1 in 200 years for damaging events related to flooding;
- 1 in 300 years for damaging events related to snow avalanches;
- 1 in 10,000 years for life threatening events.

It should be noted that MOTI does not provided acceptability limits for hazard risk associated with development and the approving authority must determine risk acceptability for development approval.

Specifically, this assessment focused on the following naturally occurring geologic hazard events:

- Slope instabilities;
- Rockfall;
- Snow Avalanche;
- Debris flows/ torrents;
- Flooding.

Attached to this report are a Site Plan, Test Pit Logs, Site Photos and an Appendix D for the "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC".

2.0 SOURCES OF INFORMATION

This geotechnical assessment is based on the following information:

- Historic aerial photographs extending back over a time frame of over about 70 years, specifically aerial photographs for the years 1948, 1950, 1958, 1962, 1969, 1973, 1977, 1981, 1986, 1990, 1994, 2005 and 2016 were reviewed;
- Topographic mapping of the subject property provided by Ekistics;
- A Development Yield Plan and Conceptual Phasing Plan provided by Ekistics;
- Previous experience by Kontur personnel in the vicinity of the proposed development;
- Site reconnaissance by senior Kontur personnel to observe, record and photograph features of geotechnical significance.

3.0 UNDERSTANDING OF PROJECT

The subject property consists of the following lots:

- DL 8820, Lillooet District;
- Lot 1, DL 202, District Plan KAP 76575;
- Lot 49, DL 164. Lillooet District Plan 883;
- Lot 48, DL 164, Lillooet District Plan 883 Except Plan H10996;
- DL 2297, Lillooet District;
- Block A, DL 202, Lillooet District;
- Block I, DL 202, Lillooet District;
- Block H, DL 202, Lillooet District;
- DL 8410, Lillooet District;
- Block A, DL 8556, Lillooet District.

A site plan of the subject property is attached to this report.

Based on discussions with the developer and a review of the Development Yield Plan it is understood that the proposed development generally consists of single-family and multi-family residential lots. Single-family residential lots are generally to be located in the central northern, southeastern and central southern portions of the property, multi-family residential is generally to be located along the western side of the proposed subdivision and the central and eastern portions of the property with apartments being proposed for the central portion of the property. No development is proposed for the northernmost lot of the property. The proposed subdivision layout provided by Ekistics is attached to this report. Proposed access to the property would be from Eagle Drive.

4.0 SITE DESCRIPTION

4.1 General

The subject property was located northeast of the Village of Pemberton. The property is irregular in shape being comprised of ten (10) connected lots. The eastern property boundary is irregular and defined by existing single-family lots along the west side of Eagle Drive. The southern boundary is generally a straight line in an east-west direction with a minor jog to the north about half way along heading west, then changes direction to the northwest at about a 45° angle for the westernmost third. The western boundary is a straight line oriented in a north-south direction. The northern boundary is a straight line oriented in an east-west direction with a significant jog to the south abut a third of the way to the east and then continues in an east-west direction. The property is bounded by single family residential lots, Pemberton Valley Road and small areas of undeveloped land to the east, undeveloped land to the south and west and farmland to the north.

Anthropogenic development of the subject property included a gravel access road to communication towers located in the northwest corner of the property, south of the northernmost lot. Two water reservoirs were constructed in the southeastern portion of the property with an access road.

A watercourse was located in the southwest portion of the property flowing from northwest to southeast, transitioning to a west to east flow in the southernmost portion of the property. The watercourse did not

have water flow at the time of site reconnaissance and generally consisted of a gully up to about 1m in depth and 3m in width. The gully did not appear to be significantly eroded and had some vegetation. Another identified watercourse was located in the central portion of the property flowing from a small pond to the south where it appears to infiltrate int the ground. At the time of site reconnaissance, the pond was shallow and the watercourse hade no water flow. The gully was shallow (less than about 0.5m) with a width of less than abut 1m. Pemberton Creek flows from west to east in the southeast corner of the southern most lot in a deeply incised channel. The creek is wide and is a significant watercourse with high (up to about 4m to 5m) banks on the north side and lower banks on the south side. Exposed soils n the creek banks appeared to consist of dense silty sand with some gravel.

The subject property is located in mountainous terrain on the eastern side of a bedrock hill with a peak elevation of about 950m. The hill contained very steep bedrock bluffs cresting at an elevation of about 700m. The subject property elevations ranged from about 220m for the northernmost property boundary and about 260m in the area of the eastern property boundary to about 400m along the western property boundary. A north facing bedrock-controlled slope was located north of the communication towers with the crest at an elevation of about 360m. A bedrock knoll was located in the central portion of the property with a height of about 25m and about 30m in diameter.

Talus deposits were noted in the southwest corner of the property in a band that trended to the northwest away from the property. Isolated large boulders up to about 3m diameter were noted on the slopes below the talus deposits. An additional talus deposit, not connected to the above-mentioned talus deposit, was noted along the western property boundary extending from about 125m south of the southern boundary of the northernmost lot to about 200m north of the boundary and about 75m into the property. Isolated talus and colluvium deposits were noted throughout the northeastern portion of the northernmost lot extending to the crest of the slope about 50m south of the south boundary (near the communication tower). A talus deposit was also noted in the central portion of the property on the south side of the bedrock knoll.

Vegetation generally consisted of widely spaced coniferous trees with trunk diameters up to about 600mm.

4.2 Soil Conditions

Based on a review of surficial geology plan Open File 5324 "Surficial Geology and Landslide Inventory of the Upper Sea to Sky Corridor" obtained from the Geologic Survey of Canada the subject property consists of bedrock though the central and northeast portions of the property, are underlain by Glaciofluvial Terrace Sediments consisting of sand and gravel, stratified to massive, forming flat surface perched well above alluvial deposits or associate with meltwater channels in the southern portion of the property, with Talus Rubble and block accumulations at the bottom of steep slopes in aprons and cones along the southwest property boundary and Colluvial Veneer rock fragments in a matrix of boulders, gravel, sand, silt, usually less than 3m thick formed by bedrock weathering or reworking of unconsolidated deposits within the northernmost lot of the property.

A geotechnical exploration program consisting of fifteen (15) test pits generally excavated in the area identified on the surficial geology map as Glaciofluvial Terrace Sediments. The test pits were excavated with a subcontracted backhoe with test pits locations determined in conjunction with the environmental

review. Test pits were logged and sampled by Kontur personnel with samples being returned to Kontur's laboratory for further visual classification. The depths of test pits ranged from about 0.2m to 2.4m.

The test pits generally encountered a layer of compact SILTY SAND with some gravel overlying either till-like soils (TP19-01 and TP19-02), bedrock (TP19-03 through TP19-06, TP19-09 and TP19-10) or COBBLES AND BOULDERS with a silty sand and gravel matrix. Test pits TP19-08 and TP19-15 encountered a very thin layer of ORGANIC SILT (0.03m thick) below the silty sand layer. The organic silt was underlain by SANDY SILT in both test pits. The sandy silt was underlain by till-like soils in TP9-08 and broken, weathered rock in TP19-15. Test pits TP 19-11 and TP19-12 encountered COBBLES, BOULDERS with a silty sand and gravel matrix at surface, underlain by the SILTY SAND layer. Test pit TP19-11 encountered sand and gravel below the silty sand and TP19-12 encountered cobbles and boulders in a silty sand with some gravel matrix below the silty sand. TP19-07 encountered bedrock at surface. The table below summarizes the soils encountered in the test pits and detailed test pit logs are attached to this report.

UNIT	SOIL DESCRIPTION	DEPTH TO TOP OF LAYER (m)	LAYER THICKNESS (m)	COMMENTS
Unit A	SILTY SAND with some gravel, compact	0.0 to 0.3m	0.2 to 1.8	Interbedded with Unit C in TP 19-15
Unit B	SILTY SAND with some gravel, dense to very dense, (Till-like)	0.6 to 1.5	0.3	Bottom of till-like layer encountered in TP19-04 only
Unit C	ORGANIC SILT	0.6 to 0.9	0.03	Localized very thin layer
UNIT D	COBBLES AND BOULDERS in a silty sand with some gravel matrix	0.0 to 1.5	0.3	At surface in TP 19-11 and TP19-12 and below Unit A in TP19-12, TP19-13 and TP19-14
Unit E	Bedrock	0.0 to 2.4		

Frequent bedrock outcrops were noted during site reconnaissance in the central portion of the property (bedrock knoll) and in the northern portion of the property in the area of the communication towers. Talus slopes were noted along the southern portion of the western property boundary.

Observations during site reconnaissance and geotechnical explorations generally concur with the published surficial geology map.

4.3 Groundwater Conditions

No groundwater was observed in the test pits nor were any significant surface water runoff or seepage noted on any of the hillsides (other than noted watercourses).

5.0 DISCUSSION, COMMENTS AND RECOMMENDATIONS

5.1 General

The subject property is located in an area gentle to steep slopes and subsurface conditions generally ranging from bedrock to talus cover overlying bedrock to silty sand with some gravel overlying till-like soils underlain by bedrock. It is considered that the subsurface soils are generally suitable for construction of residential buildings with adequate bearing capacity and settlements within typical tolerances for such buildings.

The sections below provided comments and recommendations with regards to potential naturally occurring geologic hazards within and adjacent to the subject property that could influence proposed developments.

5.2 Geologic Hazards

As previously discussed, the subject property is located in mountainous terrain with nearby watercourses, there fore the potential for such natural events as snow avalanche, debris flows, debris slides, rockfall and other landslides to influence the proposed development should be considered.

Based on observations and interpretations during site reconnaissance and historical aerial photographs review, Kontur has developed a geotechnical characterization of the subject property, mountain slopes and drainage basins within and adjacent to the subject property. This characterization forms the basis from which Kontur's opinions are provided regarding the likelihood of naturally occurring geologic events influencing proposed developments.

5.3 Slope Stability

The subject property contains slopes which are generally bedrock controlled and covered with relatively thin veneers or mantles of overlying soil. The global stability of the bedrock-controlled slopes are considered adequate for static and seismic conditions. No significant indications (curved or leaning trees, undulating ground surface, etc.) were noted during the site reconnaissance; however, some surficial soil movement may occur in areas where the bedrock has soil overburden steeper than about 1.5H: 1V (Horizontal: Vertical).

The northern banks of Pemberton Creek are steep without vegetation, indicating ongoing erosion of the creek banks. Geotechnical setbacks from the toe of the creek banks of 30m should be maintained to mitigate potential slope instabilities caused by erosion of the creek bank.

The probability of slope instabilities influencing the property is considered to be very low.

5.4 Debris Flows/ Debris Floods

No significant indications of previous flooding or debris events within the subject property were noted during the site reconnaissance, desk top reviews or geotechnical exploration. Small watercourses were located in the southwestern and central portions of the property. Both watercourses were dry at the time of site reconnaissance and had some vegetation growing within the gullies. The banks of both watercourses were smooth and no significant erosion noted. This indicates that the water flows in these watercourses are not eroding the surficial soils and blockage of the watercourses allowing for buildup and sudden release of water and debris is very low.

Pemberton Creek flows through a small area of the southeast corner of the subject property. The banks of the creek are steep and free of vegetation, indicating ongoing erosion. The creek bank on the south side on the creek is lower than the north bank and debris flow/ flood events would likely flow to the south.

The probability of debris flows/ flood influencing the subject property is considered to be low.

5.5 Rockfall

Based on review of aerial photographs, the talus deposits located in the area of the southwestern property originate from very steep bedrock bluffs up to about 500m above the elevation of the property. Field observations of loose isolated boulders originating from the same source were noted up to about 75m from the western property boundary at the north end to about 175m along the diagonal boundary in the southwest corner of the property.

The talus deposit in the central portion of the western property boundary originating from lower bedrock bluffs extended about 75m east of the boundary and appeared to be confined by a gully.

A talus deposit located in the central portion of the property, associated with the bedrock knoll, was limited in extent to about 75m from the bluff.

Loose boulders were noted in the area of bedrock bluffs located in the northeastern portion of the property. Rockfall mitigation of the existing Eagle Drive below some of these bluffs consists of rock anchoring and a rockfall fence. Similar bluffs exist throughout this area and extensive on-slope or catchment structures would be required to reduce the potential hazard to very low.

Isolated, localized talus/ colluvium deposits located on the eastern side of the northern portion of the property were generally limited in extent from the source bluffs. This area is identified on the attached site plan in blue hatch. It is considered that the potential hazard from rockfall in this area could be reduced to very low with on-slope and/or catchment structures (fencing/ ditches and berm). Development in this area should be reviewed by a Geotechnical Engineers on a site specific basis.

Recommended setbacks to mitigate the rockfall hazards presented for bedrock bluffs are shown on the attached Site Plan. Setbacks for southwestern, western and central talus deposits and the rockfall area on the eastern portion of the property are identified with black hatching and proposed development should avoid these areas. Implementation of rockfall barriers of other mitigative measures is considered to be economically prohibitive.

5.6 Snow Avalanche

In general, avalanche paths can be identified by vegetation consisting of deciduous trees such as aspen or cottonwood, grouped together and separated from the surrounding coniferous trees. No area fitting this description were noted during site reconnaissance or aerial photograph review. The probability of snow avalanches influencing the subject property is considered to be very low.

6.0 CLOSURE

The above noted and attached information presents Kontur's understanding of the proposed development, interpretations of site conditions and opinions as to the existence of naturally occurring geologic hazards, within and adjacent to the subject property, and the influence areas that could affect the proposed development. The lack of comprehensive historical records with respect to naturally occurring geologic hazards within or adjacent to the subject property limits the ability of Kontur to complete a quantitative assessment of specifically identified hazards. Therefore, Kontur has provided a qualitative assessment based on Kontur's experience and interpretations of existing site conditions. Some understanding of terminology and associated ranges of annual probability of occurrence connected with this approach is provided in a reference prepared by the Resource Inventory Committee, Government of British Columbia, Slope Stability Task Force (1996), as shown in Table A below.

TABLE A
Relative Terms and Ranges of Annual Probability of Hazard Occurrence
(Resource Inventory Committee, 1996)

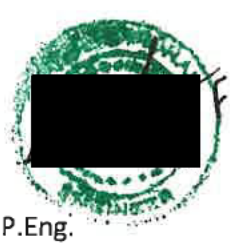
Relative Term of Probability	Range of Annual Probability of Occurrence (Pa)	Comments
Very High	>1/20	Indicates the hazard is imminent and well within the lifetime a person or typical structure. Events occurring with a return interval of 1/20 or less generally have clear and relatively fresh signs of disturbance.
High	1/100 to 1/20	Indicates that the hazard can happen within the approximate lifetime of a person or typical structure. Events are clearly identifiable from deposits and vegetation but may not appear fresh.
Moderate	1/500 to 1/100	Indicates that the hazard, within a given lifetime, is not likely but possible. Signs of previous events, such as vegetation damage may not be easily noted.
Low	1/2500 to 1/500	Indicates the hazard is of uncertain significance
Very Low	<1/2500	

Kontur trusts that the information described above meets your current requirements. If you should have any concerns or questions, please do not hesitate to contact the undersigned.

Sincerely,

Kontur Geotechnical Consultants Inc.

Per:



Evan Sykes, P.Eng.
Principal | Geotechnical Engineer

Reviewed by:

Mathew Yip, M.Eng., P.Eng.
Principal | Geotechnical Engineer

Attachments: Site Plan (Figure 1)
Development Yield Plan Draft v1.0 (Ekistics) with Rockfall Setbacks (Figure 2)
Test Pit Location Plan (Figure 3)
Test Pit Logs

APPENDIX A

Interpretation and Use of Study and Report Document

INTERPRETATION AND USE OF STUDY AND REPORT DOCUMENT

1.0 STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental engineering or consulting.

2.0 COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3.0 BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4.0 USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5.0 INTERPRETATION OF THE REPORT

Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

To avoid misunderstandings, KONTUR should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by KONTUR. Further, KONTUR should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with KONTUR's recommendations. Any reduction from the level of services normally recommended will result in KONTUR providing qualified opinions regarding adequacy of the work.

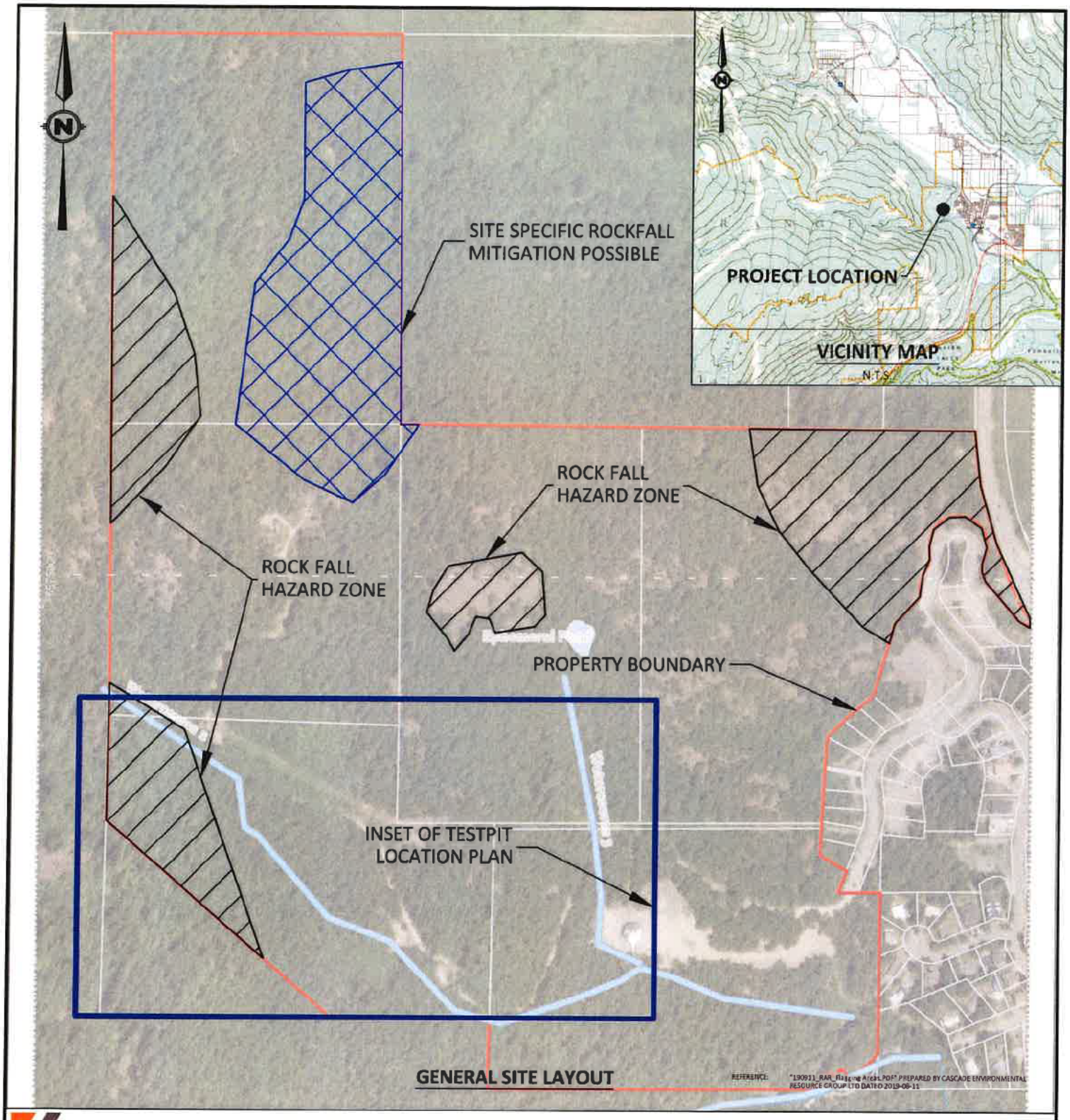
6.0 ALTERNATE REPORT FORMAT

When KONTUR submits both electronic file and hard copies of reports, drawings and other documents and deliverables (KONTUR's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by KONTUR shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by KONTUR shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of KONTUR's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except KONTUR. The Client warrants that KONTUR's instruments of professional service will be used only and exactly as submitted by KONTUR.

The Client recognizes and agrees that electronic files submitted by KONTUR have been prepared and submitted using specific software and hardware systems. KONTUR makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX B
Figures



KONTUR GEOTECHNICAL CONSULTANTS
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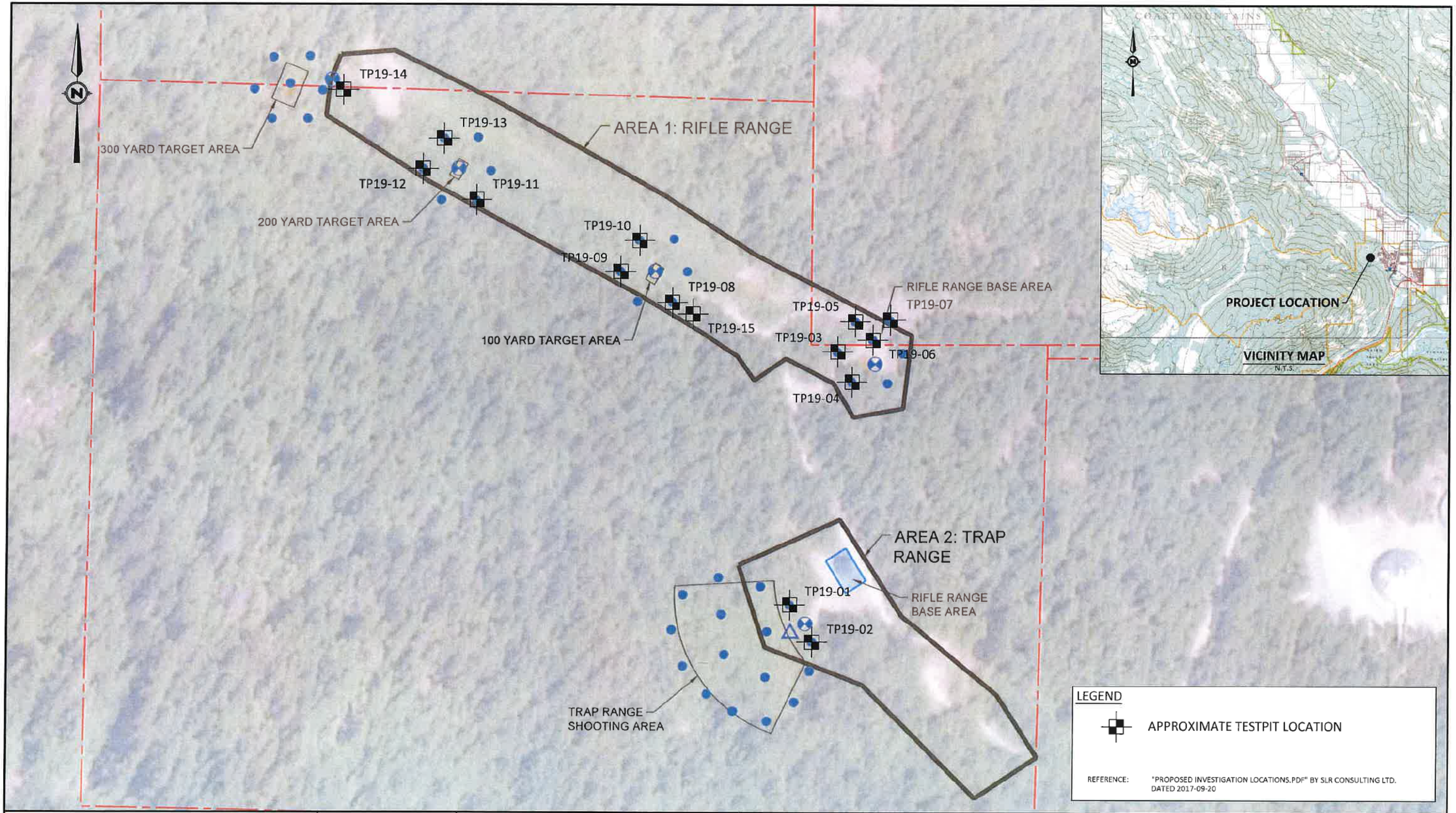
t. +1 (778) 730-1747 | toll-free. +1 (833) 301-7575 | e. info@kontur.ca | www.kontur.ca

TITLE: ROCKFALL HAZARD AREAS	DATE: 2019-10-23	PROJECT NO.: K-191204-00
	SCALE: 1:5500	DWG NO.: FIGURE 1
CLIENT: SKENKENAM DEVELOPMENTS INC.		
PROJECT: PROPOSED BENCHLANDS DEVELOPMENT PEMBERTON, B.C.		

NO.	REVISIONS	DATE
0	ISSUED FOR REPORT	2020-02-21

DRAFT: JL	DESIGN: -	CHECK: EGS

February 26, 2020 2:32:13 PM



January 3, 2020 10:36:32 AM

KONTUR GEOTECHNICAL CONSULTANTS inc.
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SEAL

REVISIONS

NO	DESCRIPTION	DATE
0	ISSUED FOR REPORT	2020-01-03

TITLE: TESTPIT LOCATION PLAN

CLIENT: BETHEL LAND CORPORATION

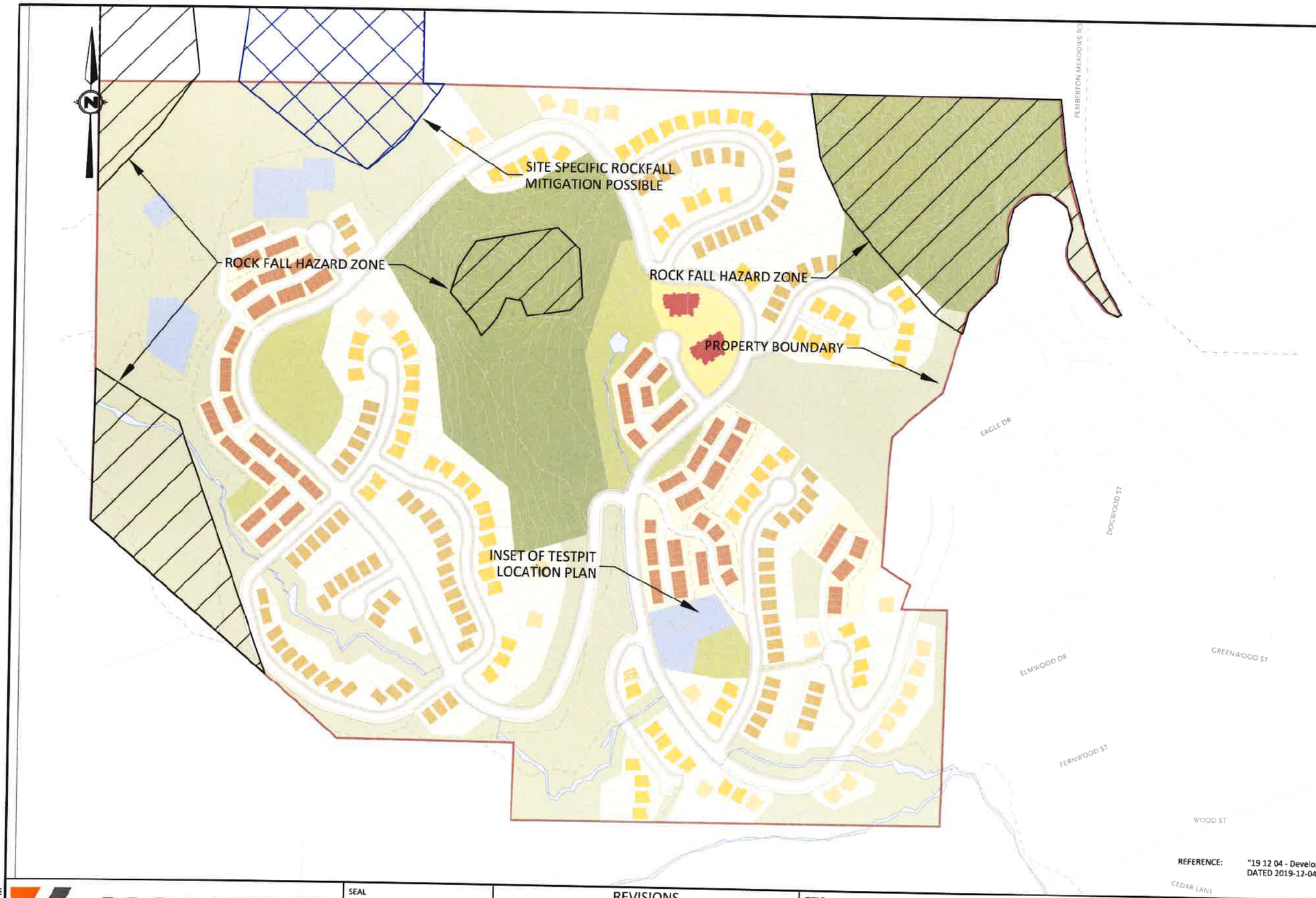
PROJECT LOCATION: BENCHLAND, PEMBERTON B.C.

PROJECT NO.: K-191204-00

DATE: 2020-01-03 | SCALE: 1:1500 | DWG NO.: G100

DRAFT: JL | DESIGN: - | CHECK: EGS

DEVELOPMENT YIELD PLAN DRAFT V1.0



LEGEND

- Site Boundary — 61.521 ha | 152.02 ac
- Legal Property Lines
- 5m Contour
- ALR Boundary
- Surveyed + Realigned Streams
- Draft Trail Locations
- Draft Sidewalk Locations

LAND USE

28%	Single Family Development Areas	14.16 ha | 34.99 ac
8%	Strata Townhome Development Areas	3.99 ha | 9.86 ac
1%	Apartment Development Areas	0.56 ha | 1.38 ac
2%	Civic Infrastructure	0.94 ha | 2.32 ac
4%	Neighbourhood Park	1.86 ha | 4.60 ac
17%	Nature Park	8.39 ha | 20.75 ac
28%	Natural Area	13.84 ha | 34.20 ac
12%	Public Road ROW	5.85 ha | 14.46 ac
100%		49.59 ha | 122.54 ac

DRAFT YIELD

	Large Single Family | 18m	24
	Medium Single Family | 15m	86
	Small Single Family | 12m	104
	Townhome | 6m	194
	Apartment	40
	TOTAL	448

REFERENCE: "19 12 04 - Development Yield Plan.PDF" BY EKISTICS ARCHITECTURE INC. DATED 2019-12-04

February 26, 2020 2:31:56 PM

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SEAL

REVISIONS

NO	DESCRIPTION	DATE
0	ISSUED FOR REPORT	2020-02-21

TITLE: ROCKFALL HAZARD ZONE DEVELOPMENT PLAN

CLIENT: SKENKENAM DEVELOPMENTS INC.

PROJECT LOCATION: BENCHLAND, PEMBERTON B.C.

PROJECT NO.:		
K-191204-00		
DATE: 2020-02-21	SCALE: 1:6000	DWG NO.: FIGURE 3
DRAFT: JL	DESIGN: -	CHECK: EGS

APPENDIX C
Test Pit Logs

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-01

CLIENT Bethel Land Corporation
PROJECT NUMBER K-191204-00
PROJECT NAME Proposed Residential Subdivision
PROJECT LOCATION Benchlands, Pemberton BC
EXCAVATION DATE 2019-10-22
TEST PIT LOCATION
EXCAVATION METHOD Test Pit
ELEVATION
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
GROUNDWATER DEPTH AT TIME OF EXCAVATION
EQUIPMENT TYPE Tracked Excavator
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲ 20 40 60 80) / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	POCKET PEN. (kPa) (⊙ 100 200 300 400) / FIELD VANE SHEAR (kPa) (Peak ● Remold ○ 40 80 120 160)	FINES CONTENT (%) (□ 20 40 60 80) / PLASTIC & LIQUID LIMIT WATER CONTENT (PL MC LL 20 40 60 80)	GROUNDWATER
1		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		SILTY SAND, some gravel, some cobble, grey brown, moist, (dense to very dense), (TILL-LIKE)	1.4							

Bottom of test pit at 1.5m.

Kontur Geotechnical Consultants Inc.
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Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-02

CLIENT Bethel Land Corporation
PROJECT NUMBER K-191204-00
PROJECT NAME Proposed Residential Subdivision
PROJECT LOCATION Benchlands, Pemberton BC
EXCAVATION DATE 2019-10-22
TEST PIT LOCATION
EXCAVATION METHOD Test Pit
ELEVATION
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
GROUNDWATER DEPTH AT TIME OF EXCAVATION
EQUIPMENT TYPE Tracked Excavator
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
1		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
2		SILTY SAND, some gravel, some cobble, occassional boulder, grey brown, moist, (dense to very dense), (TILL-LIKE)	1.5							

Bottom of test pit at 2.0m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-03

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
0.1 0.2 0.3		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								

Bedrock encountered at 0.3m
Bottom of test pit at 0.3m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-04

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m ▩ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
0.5		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		SILTY SAND, some gravel, some cobble, occassional boulder, grey brown, moist, (dense to very dense), (TILL-LIKE)	0.6							

Bedrock encountered at 0.9
Bottom of test pit at 0.9m.

Kontur Geotechnical Consultants Inc.
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Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-05

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m ▩ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
0.1		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		Bedrock encountered at 0.15m								
		Bottom of test pit at 0.2m.								

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-06

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m □ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
0.1 0.2 0.3		SILTY SAND and crushed rocks, trace rootlets, brown, moist, (compact to dense)								

Bedrock encountered at 0.3m
Bottom of test pit at 0.3m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-07

CLIENT Bethel Land Corporation
PROJECT NUMBER K-191204-00
PROJECT NAME Proposed Residential Subdivision
PROJECT LOCATION Benchlands, Pemberton BC
EXCAVATION DATE 2019-10-22
TEST PIT LOCATION
EXCAVATION METHOD Test Pit
ELEVATION
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
▽ **GROUNDWATER DEPTH AT TIME OF EXCAVATION**
EQUIPMENT TYPE Tracked Excavator
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m □ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
0.1		Bedrock Outcrop								

Bottom of test pit at 0.2m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-08

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m (□) 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak (●) Remold (○) 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
1		Interbed layer of orgnic silt (about 0.03m thick)	0.9							
		SANDY SILT, some gravel, trace roots, grey, moist, (firm)	0.9							
		SILT, some sand, some gravel, grey mottled orange, (dense to very dense), pockets of organic silt, (TILL-LIKE)	1.5							
2										

Bottom of test pit at 2.4m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-09

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak (●) Remold (○) 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
1		Bedrock encountered at 0.9m	0.9							

Bottom of test pit at 1.2m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-10

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m (□) 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak (●) Remold (○) 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
1		Bedrock encountered at 0.9m	0.9							

Bottom of test pit at 1.2m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-11

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION 1.8m
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		COBBLES BOULDERS, SILTY SAND AND GRAVEL, (compact)								
1		SILTY SAND, some gravel, some cobbles, occassional boulders, trace rootlets, brown, (compact)	0.3							
		SAND AND GRAVEL, some cobbles, trace to some silt, grey, moist, (compact to dense)	1.2							▽

Bottom of test pit at 1.8m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-12

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		COBBLES BOULDERS, SILTY SAND AND GRAVEL, (compact)								
		SILTY SAND, some gravel, some cobbles, occassional boulders, trace rootlets, brown, (compact)	0.3							
1		COBBLES BOULDERS, SAND AND GRAVEL, (dense to very dense)	0.9							

Refusal at 1.1m depth

Bottom of test pit at 1.1m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-13

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
1		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		COBBLES BOULDERS, SAND AND GRAVEL, (dense to very dense)	1.2							

Refusal at 1.3m depth
Bottom of test pit at 1.4m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-14

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SPT 'N' VALUE BLOWS/0.3m (▲) 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	POCKET PEN. (kPa) (⊙) 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) (□) 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
1		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		COBBLES BOULDERS, SAND AND GRAVEL, (dense to very dense)	1.5							

Refusal at 1.8m depth
Bottom of test pit at 1.8m.

Kontur Geotechnical Consultants Inc.
Unit 65, 1833 Coast Meridian Road
Port Coquitlam, B.C. V3C 6G5
Telephone: (778) 730 1747

RECORD OF TEST PIT : TP19-15

CLIENT Bethel Land Corporation
PROJECT NAME Proposed Residential Subdivision
EXCAVATION DATE 2019-10-22
EXCAVATION METHOD Test Pit
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EQUIPMENT TYPE Tracked Excavator

PROJECT NUMBER K-191204-00
PROJECT LOCATION Benchlands, Pemberton BC
TEST PIT LOCATION
ELEVATION
GROUNDWATER DEPTH AT TIME OF EXCAVATION
LOGGED BY JL **CHECKED BY** EGS

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT 'N' VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m ⊠ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400 / FIELD VANE SHEAR (kPa) Peak ● Remold ○ 40 80 120 160	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT WATER CONTENT PL MC LL 20 40 60 80	GROUNDWATER
		SILTY SAND, some gravel, some cobbles, trace rootlets, brown, moist, (compact)								
		Interbed layer of orgnic silt (about 0.03m thick)	0.6							
1		SANDY SILT, some gravel, trace roots, grey, moist, (firm)	0.6							
		WEATHERED ROCKS, broken, rocks are subangular	1.2							

Refusal at 1.5m depth

Bottom of test pit at 1.5m.

APPENDIX D
Photos

Photograph 1 – Talus Deposit, Large Boulders - P1

Photograph 2 – Communication Towers – P2

Photograph 3 – Overhanging Bluff, Rockfall Source– P3

Photograph 4 – Talus Deposit – P4

Photograph 5 – Moss Covered Talus Slope – P5

Photograph 6 – Bedrock Bluff, Talus Source – P5

Photograph 7 – Mossy Talus Slope – P7

Photograph 8 – Mossy Talus Slope – P7

Photograph 9 – Loose Boulders – P8

Photograph 10 – Slope, No Talus – P9

Photograph 11 – Old Access Road – P10

Photograph 12 – Bedrock Bluff Rockfall Source – P11

Photograph 13 – Large Loose Boulders – P13

Photograph 14 – Lower Access Road – P14

Photograph 15 – Loose Boulders Above Lower Access Road – P15

Photograph 16 – Bedrock Bluff Lower Access Road – P16

Photograph 17 – Bedrock Slope Above Lower Access Road – P18

Photograph 18 – Bedrock Slope – P18

Photograph 19 – Bedrock Slope – P19

Photograph 20 – Loose Boulders – P26

Photograph 21 – Talus Deposit – P27

Photograph 22 – Bedrock Bluff, Talus Source – P27

Photograph 23 – Bedrock with some Broken Rock on Slope Below Ridge – P28

Photograph 24 – Talus Slope Below Ridge – P28

Photograph 25 – Bedrock Ridge – P30

Photograph 26 – Large Boulder – P23

Photograph 27 – Large Boulder – P22

Photograph 28 – Bedrock Controlled Slope, No Loose Boulders – P21

Photograph 29 – South End of Bounder Field Looking North – P24

Photograph 30 – Bedrock Controlled Slope, South End Boulder Field – P24

APPENDIX E
Appendix D: Landslide Assurance Statement

APPENDIX D: *LANDSLIDE ASSESSMENT ASSURANCE STATEMENT*

Note: This Statement is to be read and completed in conjunction with the "*APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia*", March 2006/Revised September 2008 ("*APEGBC* Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the *APEGBC* Guidelines.

To: The *Approving Authority* Date: February 24, 2020

Village of Pemberton

Box 100, 7400 Prospect St Pemberton, BC V0N 2L0

Jurisdiction and address

With reference to (check one):

- ☒ Land Title Act (Section 86) – Subdivision Approval
- ☐ Local Government Act (Sections 919.1 and 920) – Development Permit
- ☐ Community Charter (Section 56) – Building Permit
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Variance
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- ☐ British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4 4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

DL 8820, Lillooet District; Lot 1 CL 202 DP KAP 76575; Lot 49, DL 164 LDP 883; Lot 48, DL 164 LDP 883 except Plan H10996; DL 2297 Lillooet District; Block A, DL 202 Lillooet District; Block I, DL 202, Lillooet District; Block H, DL 202, Lillooet District; DL 8410, Lillooet District; Block A, DL 8556, Lillooet District

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist.*

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- X 1. Collected and reviewed appropriate background information
- X 2. Reviewed the proposed *residential development* on the Property
- X 3. Conducted field work on and, if required, beyond the Property
- X 4. Reported on the results of the field work on and, if required, beyond the Property
- X 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
  - X 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
  - X 6.2 estimated the *landslide hazard*
  - X 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
  - X 6.4 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
  - ___ 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
  - ___ 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
  - ___ 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

_X_ 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used

_X_ 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*

_X_ 8.3 compared this guideline with the findings of my investigation

_X_ 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison

_X_ 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*

_X_ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

☐ the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)

☒ the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions[1] contained in the attached *landslide assessment* report,

Check one

☒ for subdivision approval, as required by the Land Title Act (Section 86), "that the land may be used safely for the use intended"

Check one

☒ with one or more recommended registered covenants.

☐ without any registered covenant.

☐ for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

☐ for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"

Check one

☐ with one or more recommended registered covenants.

☐ without any registered covenant.

☐ for flood plain bylaw variance, as required by the "Flood Hazard Area Land Use Management Guidelines" associated with the Local Government Act (Section 910), "the development may occur safely".

☐ for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

Evan Sykes, P.Eng.
Name (print)

February 24, 2020
Date

[redacted]
Signature

[1] When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

[redacted]
Address

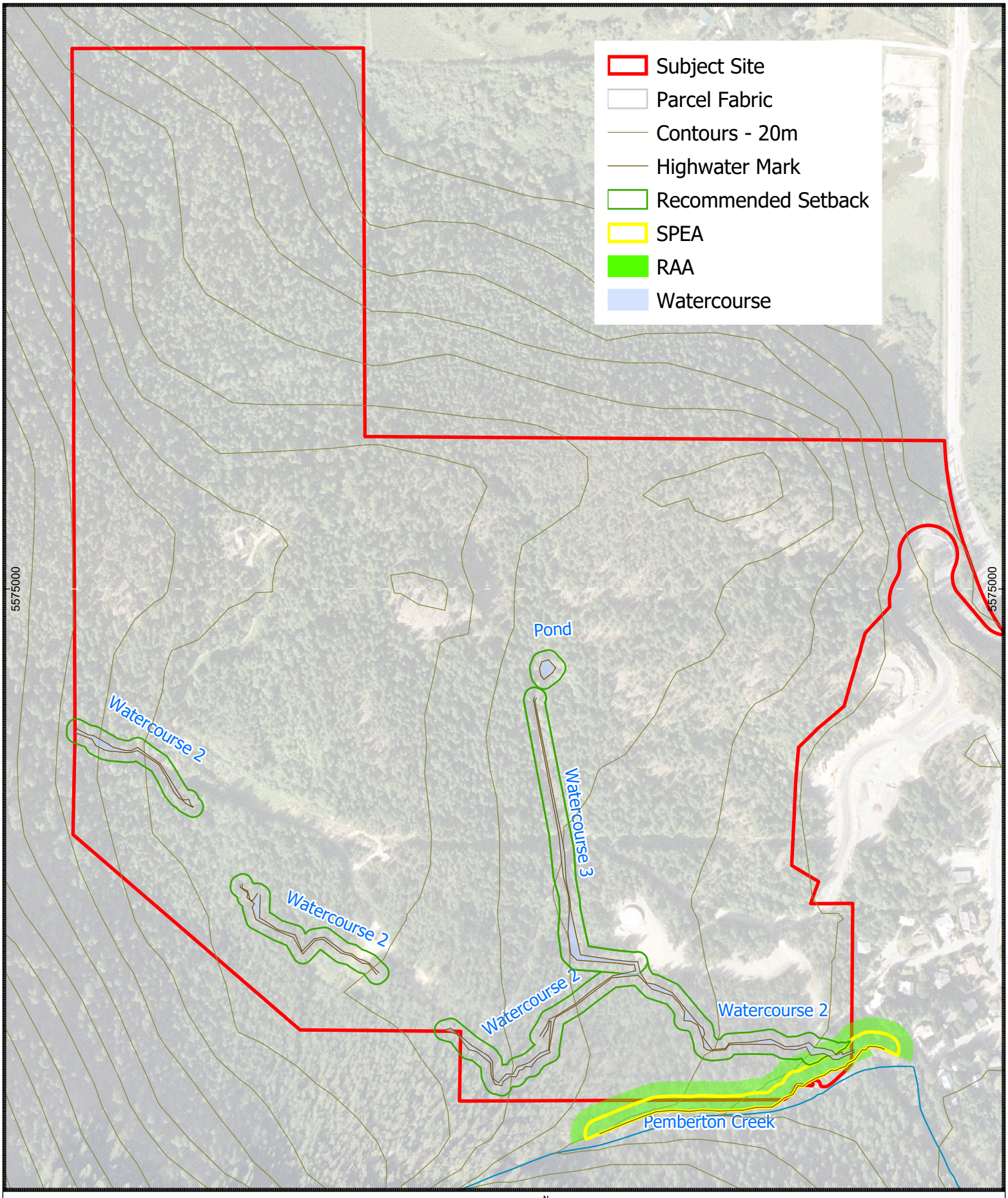
[redacted]

[redacted]
Telephone

(Affix Professional seal here)

If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm Kontur Geotechnical Consultants Inc.
and I sign this letter on behalf of the firm. (Print name of firm)



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Date: 2019-10-25 2:02 PM
CERG File#: 263-20-01
Projection: UTM 10N NAD83

CASCADE ENVIRONMENTAL
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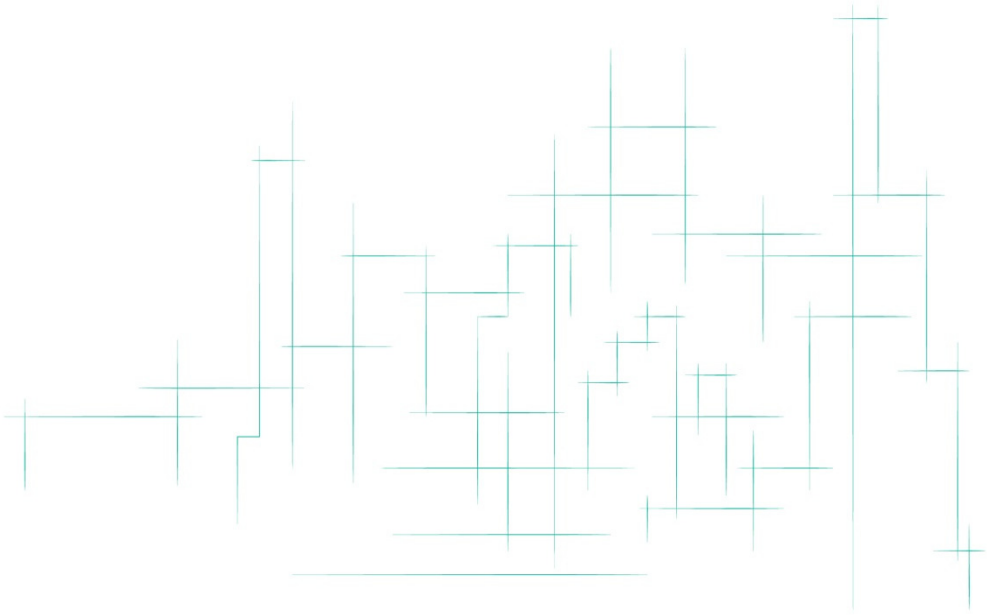
Meters

Riparian Assessment Regulation map
Skénkenam Developement GP Inc
Pemberton Benchlands
Pemberton, British Columbia

ROLLO LTD
+ ASSOCIATES
Land Economists – Development Strategists

Pemberton Benchlands Absorption Study

For: Skenkenam Developments GP



February 2020

ROLLO
+ ASSOCIATES

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Executive Summary

G. P. Rollo & Associates, Land Economists (GPRA) has been retained by Skenkenam Developments GP to prepare an Absorption Study for the lands, to assess the market demand and potential absorption of residential lands for the Pemberton residential market in general and the Benchlands in particular.

1) The Benchlands would contain 193 single family homes, 24 duplexes, 198 townhomes, and 40 apartment units.

2) Though it has a strong agricultural and diversifying local economy, Pemberton is largely a bedroom community of Whistler, as is much larger Squamish to a lesser extent. Whistler restricts residential development and Squamish will attempt to focus primarily on multifamily infill, increasing single family market interest and prices in Pemberton.

3) Pemberton projects to grow from 2,951 people (2019) to between about 6,935 and 10,165 by 2066.

4) Development is constrained in Pemberton by rugged topography and ALR designation.

5) Assuming Phase 2 Benchlands market absorption starts in 2023/2024, **absorption will likely take about 30 years**, following the annual new demand projection pictured below and 40% single family market share for the medium growth scenario.

Pemberton Annual New Housing Demand with Replacement and Benchlands Single Family Absorption at 30% and 40% Market Shares

	Units per year			30% absorption			40% absorption		
	Single family	G. O. M.	Apartment	Single family	G. O. M.	Apartment	Single family	G. O. M.	Apartment
2020 - 29									
High	45	32	8	14	10	2	18	13	3
Medium	35	22	5	10	6	1	14	9	2
Low	25	11	2	7	3	1	10	4	1
2030 - 39									
High	48	18	5	14	5	1	19	7	2
Medium	38	13	3	11	4	1	15	5	1
Low	29	8	2	9	2	1	11	3	1
2040 - 49									
High	34	8	2	10	2	1	14	3	1
Medium	28	6	2	8	2	1	11	2	1
Low	22	4	1	7	1	0	9	2	0
2047 - 56**									
High	39	40	10	12	12	3	16	16	4
Medium	36	39	9	11	12	3	14	15	4
Low	32	35	9	10	11	3	13	14	3
2057 - 66**									
High	34	31	7	10	9	2	13	12	3
Medium	30	28	7	9	8	2	12	11	3
Low	26	25	6	8	8	2	11	10	2

** Includes replacement

Table of Contents

1 Introduction

The Benchlands neighbourhood is a 96-hectare site in the Village of Pemberton, including about 7 hectares already built or under development, on a hillside near downtown Pemberton. Skenkenam Developments GP and Lil'wat First Nation have expressed interest in developing the remainder into a mix of single family and multifamily homes.

G. P. Rollo & Associates, Land Economists (GPRA) has been retained by Skenkenam Developments GP to prepare an Absorption Study for the lands, to assess the market demand and potential absorption of residential lands for the Pemberton residential market in general and the Benchlands in particular.

GPRA has completed the following tasks in completion of this Absorption Study for the Pemberton Benchlands:

1) Met with Cornerstone Developments (formerly the client) and Lil'wat First Nation to discuss the site and Pemberton Real Estate Market.
2) Discussed factors shaping demand for Pemberton residential development, as well as potential new competing developments, with realtors, developers and Village of Pemberton staff familiar with the Pemberton market. Based on the above, GPRA described trends and factors shaping the absorption potential for Benchlands residential development.
3) Estimated and projected Pemberton population and housing demand by housing type over the next 47 years based on past trends and current and expected future conditions.
4) Estimated reasonable target shares of the Pemberton market for the Benchlands site and a resulting absorption schedule.

2 Assumptions and Limiting Conditions

This Absorption Study is governed by the following assumptions and limiting conditions:

1) The development potential of the Benchlands is drawn from the Benchlands Neighborhood Plan.
2) GPRA has prepared a lengthy 50 year population and housing demand forecast in order to accommodate not only the several hundred housing units planned for the Benchlands, but also numerous other projects being marketed and planned in the Village and surrounding Squamish-Lillooet Regional District.
3) All statistical information provided in this study has been drawn from sources deemed to be reliable, for which we assume no responsibility, but which we believe to be correct.
4) No responsibility is assumed for legal matters, questions of survey, and opinions of title.
5) Statements contained within this study which involve matters of opinion, whether or not identified as such, are intended as opinion only and not as representations of fact.

This study is qualified in its entirety by, and should be considered in light of these limitations, conditions, and considerations. If, for any reason, major changes should occur which influence the basic assumptions stated previously, the findings and recommendations contained in these analyses should be reviewed with such conditions in mind and revised if necessary.

3 Context and Site

The Village of Pemberton is a community of 2,951 people (2019 estimate based on 2016 Census and BC Statistics estimate), with strong agricultural roots, a large and growing role as a bedroom community for Whistler, and local economy that is starting to expand as the population grows. It is a small part of the Squamish-Lillooet Regional District (44,884 population based on 2016 Census and BC Statistics estimate), but appears to be poised for significant growth.

Figure 1: Regional Location

Whistler's growth is capped, and while some in the development community expect the cap to be raised as has happened previously, it is expected to continue to restrain residential construction in the Resort Municipality of Whistler. Also many of Whistler properties' prices are controlled, mostly tied to Core Consumer Price Index[1], increasing relative attractiveness of properties in Pemberton and Squamish in terms of investment potential.

Pemberton is closer than Squamish to Whistler (about 30 minutes versus 45) and housing is more affordable[2]. Squamish is larger (19,512 people) with a more developed local

[1] Core Consumer Price Index is a popular measure of inflation, which omits energy and food cost inflation.
[2] MLS sales data show 20 single family sales between 2014 and 2015, averaging about $242 per square foot of gross building area, and 44 so far 2016-2017, averaging $316. Townhomes are up from $230 to $310 per square foot over the same period (with no listed sales in 2014). Squamish townhouse and single family home average sales prices per square foot currently sit around $400, up from the mid-$200s to early $300s in 2014 and 2015.

economy and proximity to Vancouver of about an hour – within commuting distance along a scenic highway and about the same distance as rapidly-growing Abbotsford.

Pemberton also has stunning scenery, surrounded by mountains, most notably Mt. Currie to the south. Much of the land is, however, quite steep – or in the Agricultural Land Reserve (ALR) – constraining growth potential. Also local employment opportunities are limited, but an increasingly active business / industrial park and other businesses are poised to stimulate employment growth in the near future as severely limited internet access improves. While Pemberton's location may dissuade industries with National trade areas, Pemberton's affordable space and high potential quality of life for employees can bring competitiveness for some industries with a regional or Greater Vancouver focus.

Figure 2: Site Location

The Benchlands site is located moderately well for growth in the Village. The terrain can be steep and rocky, which can add to servicing costs and make competitive pricing more challenging. Most properties are likely to have attractive mountain views, but only about half would be south toward Mt. Currie, the most striking vista. Being right next to downtown has advantages for multimodal accessibility, even in a small town, and there is some scarcity of developable land is Pemberton – most of the land in the 2007 Benchlands Neighbourhood Plan is left as natural area or ALR or becomes parkland.

Figure 3: Benchlands Neighbourhood Plan (courtest of EKISTICS)

Figure 3 above shows the 2020 Benchlands Neighbourhood Plan. Parks and natural areas are represented in greens, and yellow through dark orange represent residences with increasing density. At completion, the Benchlands would contain:

- 28 large single family homes
- 67 medium single family homes
- 98 small single family homes
- 24 duplex units
- 198 townhomes
- 40 apartment units

This would total 455 units, meeting a substantial portion of Pemberton's housing needs over the coming decades.

Its convenient location and topographical and regulatory restrictions to development of many other local sites should facilitate it capturing a large market share and faster absorption than might otherwise be expected for such a large site in such a small community.

4 Pemberton Housing Demand

GPRA based housing demand projections for the Village of Pemberton on projected population growth and propensities for people in age groups to maintain single-family, ground-oriented multifamily, and apartment homes. To some degree within a region, housing availability and pricing may determine population distribution – and not the other way around – which is taken into consideration, but population trends provide a workable starting point for housing demand analysis.

4.1 Population

BC Stats projects the Squamish-Lillooet Regional District growing from 46,269 people in 2019 to 64,331 in 2041, with annual growth rates easing down from a 2019 high of 1.9% to 1.2% by 2041. Adjusting this regional projection slightly to incorporate 2011 and 2016 Canadian Census data, GPRA sees the region as a whole growing from 44,884 in 2019 to 62,405 in 2041, then continuing the 1.2% annual growth to 2066's 84,591 total. The BC Stats projection is viewed by GPRA as a rigorous and suitable basis for our modelling.

Pemberton's population growth over the past 18 years has been faster and more volatile than the region's as a whole. While the region grew 29% over this period, Pemberton grew 70%. Pemberton sustained a 3.1% loss from 2010-2011 as Olympic affordable athlete's housing in Whistler was made available to regional residents and a subsequent market chill saw growth slower than the region (1.1% annual average 2011-2016 vs 2.2%). Still, over the 2001 to 2019 period Pemberton's share of the regional population grew from 5.0% to 6.6%. Around 2014, Pemberton's population recovered, and housing prices and construction interest have since picked up considerably as noted in Section 3.

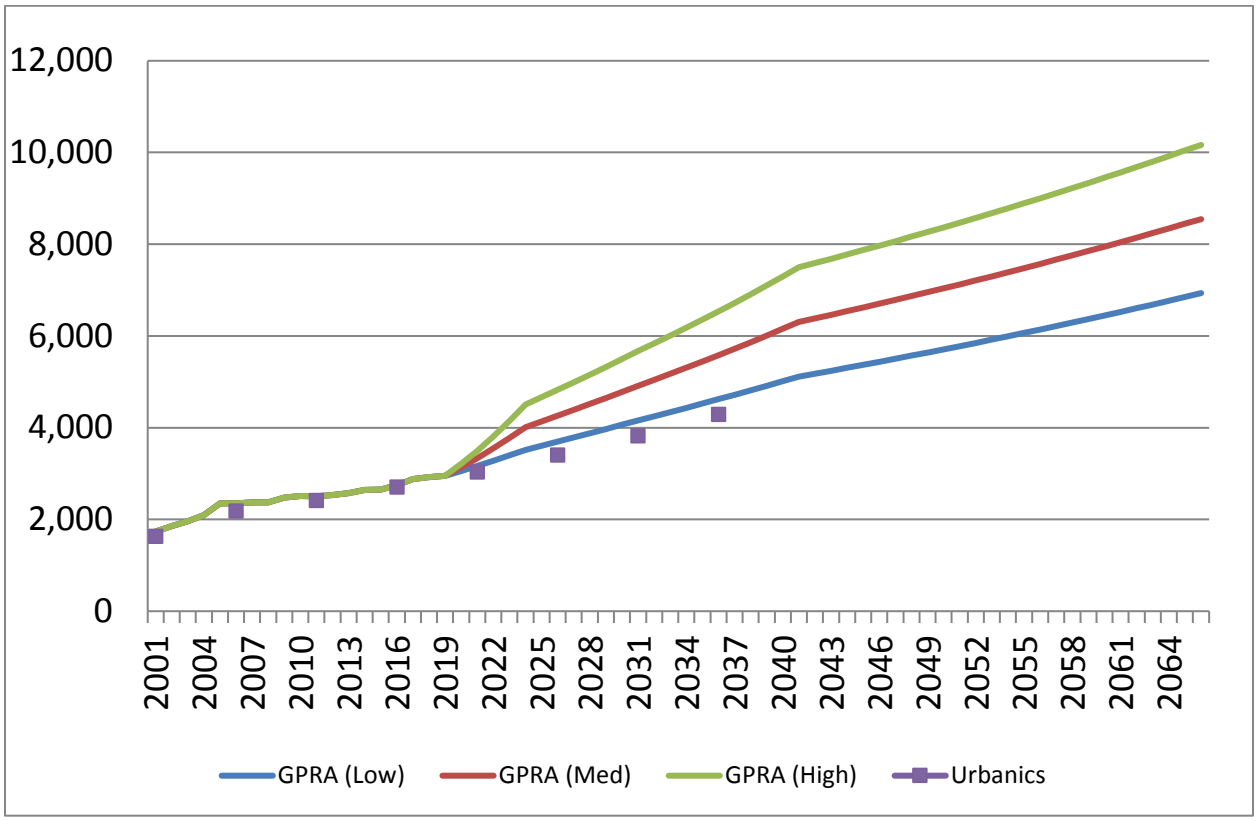
GPRA projects Pemberton's future growth below as a share of regional growth, for three scenarios characterized as follows:

Low Growth Scenario: The growth in Pemberton's share of the regional population 2001-2019 continues to 2041, then levels off at 8.20%. This incorporates the recent post-Olympic shock period, and may approximate impacts of several more big exoduses punctuating by growth over the next 50 years due to large unforeseen events like Whistler housing booms or employment downturns. Delta Lands' Soo Valley project is perhaps unlikely now but would compete heavily if it were to go in, and the long-proposed Brohm Ridge resort near Squamish has powerful supporters that may one day push it through, with unpredictable consequences for Pemberton. Pemberton's population in this scenario hits 3,696 in 2026, 4,621 in 2036, and 6,935 in 2066.

Medium Growth Scenario: A midway scenario between Low Growth and High Growth, Pemberton's share of the regional population grows to 10.1% by 2041, then levels off. There may be another shock to Pemberton's population growth like 2011's, or some smaller ones, but not likely multiple significant population decline events. Population hits 4,157 in 2026, 5,405 in 2036, and 8,257 in 2066.

High Growth Scenario: The growth in Pemberton's share of the regional population 2001-*2010* continues to 2041, then levels off at 12%. This sees the recent post-Olympic shock period as a temporary disruption to a previous growth trend that is more indicative of Pemberton's position in the region. It assumes no massive economic downturns or housing market disruptions like 2011's and has rapid construction to get back on track with regional population share growth by 2026. Population hits 4,826 in 2026, 6,535 in 2036, and 10,165 in 2066.

Figure 4: Village of Pemberton 50-Year Population Projections



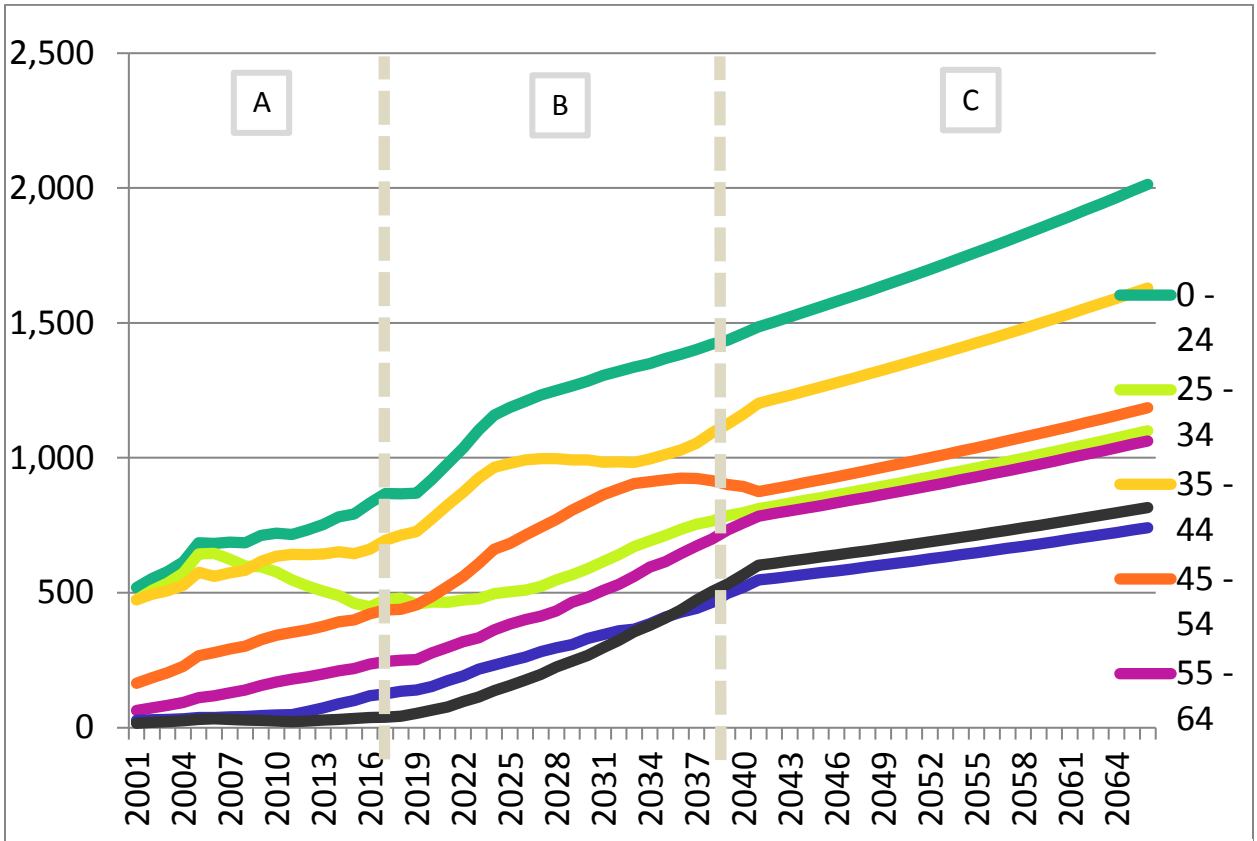
Low, Medium, and High Growth Scenario projections are plotted in Figure 4 above. Also plotted are Pemberton projections to 2036 from a wider regional 2016 Urbanics study of population, housing, and employment.[3] All scenarios were modelled, and the Medium Growth Scenario, which GPRA believes is most likely, is described in additional detail.

[3] Urbanics has Whistler growing steadily, despite its housing cap, which would reduce the growth pressure on Pemberton.

4.1.1 Age Groups

Pemberton is young, with the average resident in 2016 of 34 years old versus 38 for the SLRD and 42 for BC. Only 5.6% of residents were age 65+ and the largest age groups were 0-24 (778 people), 35-44 (619), and 25-34 (419). The 45-54 group has been growing rapidly and there has also been some growth in the older groups (Figure 5 below), but Pemberton is particularly attractive to young families and those who may seek the types of employment or activities largely centred in Whistler but also desire more living space than they can afford in the larger centres. GPRA thus bases Pemberton's projected age group breakdown on regional BC Stats age group projections, but adjusts each age group's share up or down by the current local-regional difference. Pemberton projects to age significantly over the coming 50 years, though remain younger than the region as a whole. Interestingly one potential barrier to growth is a lack of indoor recreation facilities (ice rink or pool), whereby in recent years several Pemberton high school students attend Whistler Secondary for sports academies. Added population pressure may help fund such infrastructure and facilitate further growth.

Figure 5: Village of Pemberton Medium Growth Scenario Population By Age Group



A: BC Stats regional population data; Census Pemberton age group data; GPRA interpolation
B: BC Stats regional population projection; GPRA Pemberton age group projections
C: GPRA regional population projection; GPRA Pemberton age group projections

4.2 Housing

4.2.1 Household Maintainers

GPRA modelled Pemberton housing demand by housing type (single family, ground-oriented multifamily, and apartment), based on population projections by age group and household maintainer[4] rates, with some consideration to changes in Pemberton's regional housing niche.

Household maintainer data is not available for 2016. Maintainer data also begins to lose reliability when broken down by age group and building type for a small population, due in part to rounding for privacy reasons. To estimate current numbers of maintainers of each housing type at each age group, GPRA used 2011 SLRD rates, multiplied by Pemberton's 2016 population, then adjusted to match Pemberton's housing mix, which has more multifamily and less single-family housing than the SLRD[5] (Table 1 below).

Table 1: Household Maintainer Rates: SLRD 2011 Detailed; Pemberton 2011 and 2016

Maintainer Age:	0 – 24	25 – 34	35 – 44	45 – 54	55 – 64	65 – 74	75+	SLRD 2011 Total	Pemberton 2011 Total	Pemberton 2016 Total
Single family house	0.6%	8.3%	26.2%	26.5%	39.2%	34.7%	37.0%	17.4%	5.8%	12.2%
Apartment in 5+ storey building	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%
Movable dwelling	0.2%	1.0%	2.6%	4.7%	3.6%	6.0%	7.0%	2.2%	1.4%	1.6%
Semi-detached house	0.0%	3.3%	4.0%	3.8%	2.9%	3.4%	1.2%	2.4%	2.9%	2.5%
Row house	0.6%	9.2%	8.9%	7.5%	6.2%	7.2%	5.3%	5.7%	12.3%	14.6%
Apartment in duplex	1.0%	5.1%	4.6%	5.3%	5.0%	4.3%	2.9%	3.5%	10.5%	1.9%
Apartment in 1 – 4 storey building	1.8%	10.1%	8.2%	5.3%	5.7%	7.2%	4.5%	5.5%	5.8%	4.7%
Other single attached house	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Total	4.4%	38.3%	54.7%	53.6%	63.1%	63.6%	57.5%	38.0%	38.8%	37.5%

Housing maintainership generally rises with resident age, dramatically as young adults leave their parents' homes, and then again somewhat as older adults' children leave home, with perhaps some slight fall in older age as some people move in with family or enter other types of accommodation. Younger adults favour more affordable, often more central multifamily housing types – as do older seniors in some markets – while middle-aged adults typically favour single-family homes.

[4] The primary person responsible for the financial upkeep of a household

[5] Pemberton 2011 housing mix is also shown on Table 1; based on historical Village permit data, the rapid rise in single family homes and decline in apartments in duplex seems not to suggest substantial construction (and demolition) but a broad reclassification between Censuses.

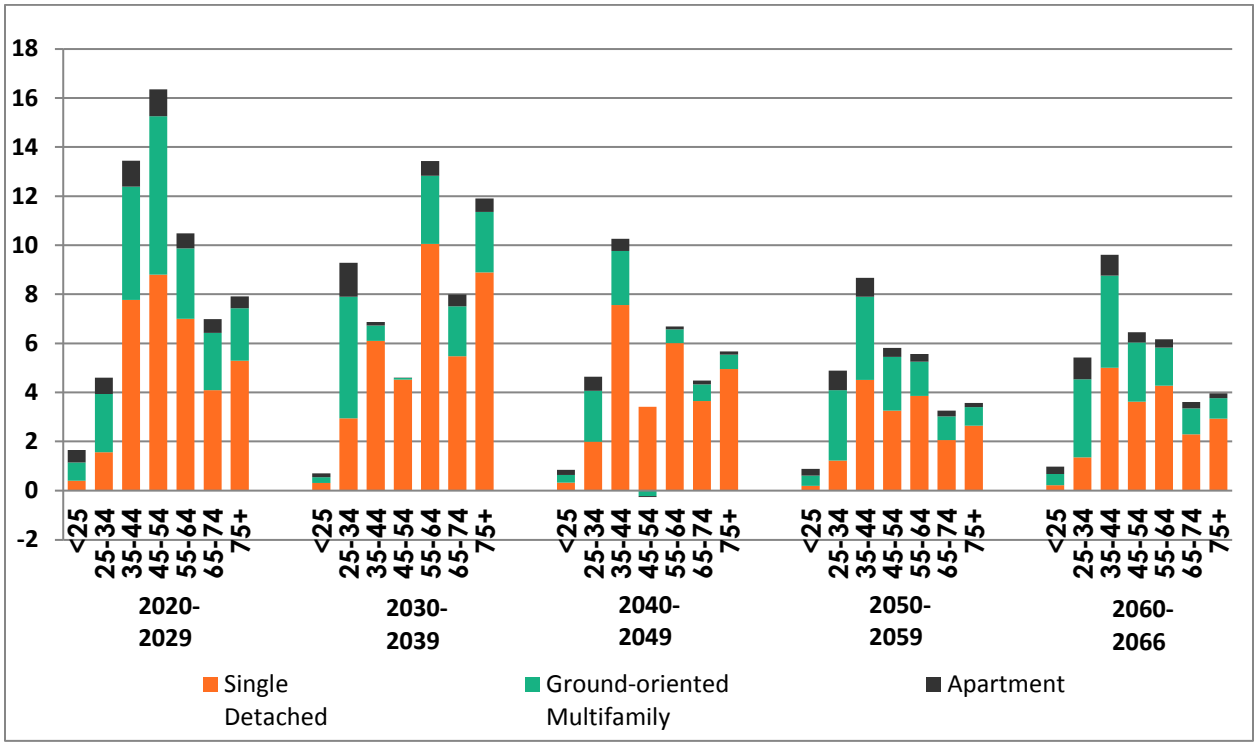
Pemberton's 12.2% single-family housing population-wide maintainer rate numbers are extremely low, even considering the youthful demographic mix. After consultation with industry experts, GPRA believes that this may reflect Pemberton's role as an affordable housing option for Whistler workers. However, Squamish is a much larger centre and also in part a Whistler bedroom community, and it is focussing primarily on multifamily infill over the medium term, which may substantially effect Pemberton's role going forward.

4.2.2 Pemberton Net New Housing Demand Projection

With constrained single-family supply in competitor communities and prices climbing out of reach for many regional workers, Pemberton may grow disproportionately in SLRD single-family market share. GPRA has thus adjusted the mix of maintainer rates for each age group[6], ultimately resulting in age-specific single family home maintainer rates that vary between 1% and 35%, still somewhat lower than SLRD rates, but much higher than current rates (and producing slightly reduced multifamily rates).

In 2016 Pemberton was dominated by multifamily housing, with over ½ of homes in ground-oriented multifamily buildings and only 1/3 single family, but single family homes will likely lead new construction over the forecast period.

Figure 6: *Annual* Net New Housing By Type and Maintainer Age: Medium Growth



[6] Single family home maintainer rates for each age group were doubled for each age group, then all rates (including single family) adjusted down making each total age group-specific household maintainer rate unchanged. This adjustment is fully realized by 2046, with rates in the interim smoothed between existing and adjusted.

Figure 6 shows modelled average **annual** demand for **net** new housing for 10-year periods over the next 47 years. Total new housing demand is expected to be slightly higher, as some existing structures will be replaced, especially in the later decades.

Figure 7: Average *Annual* Net New Housing Demand By Type: 3 Scenarios

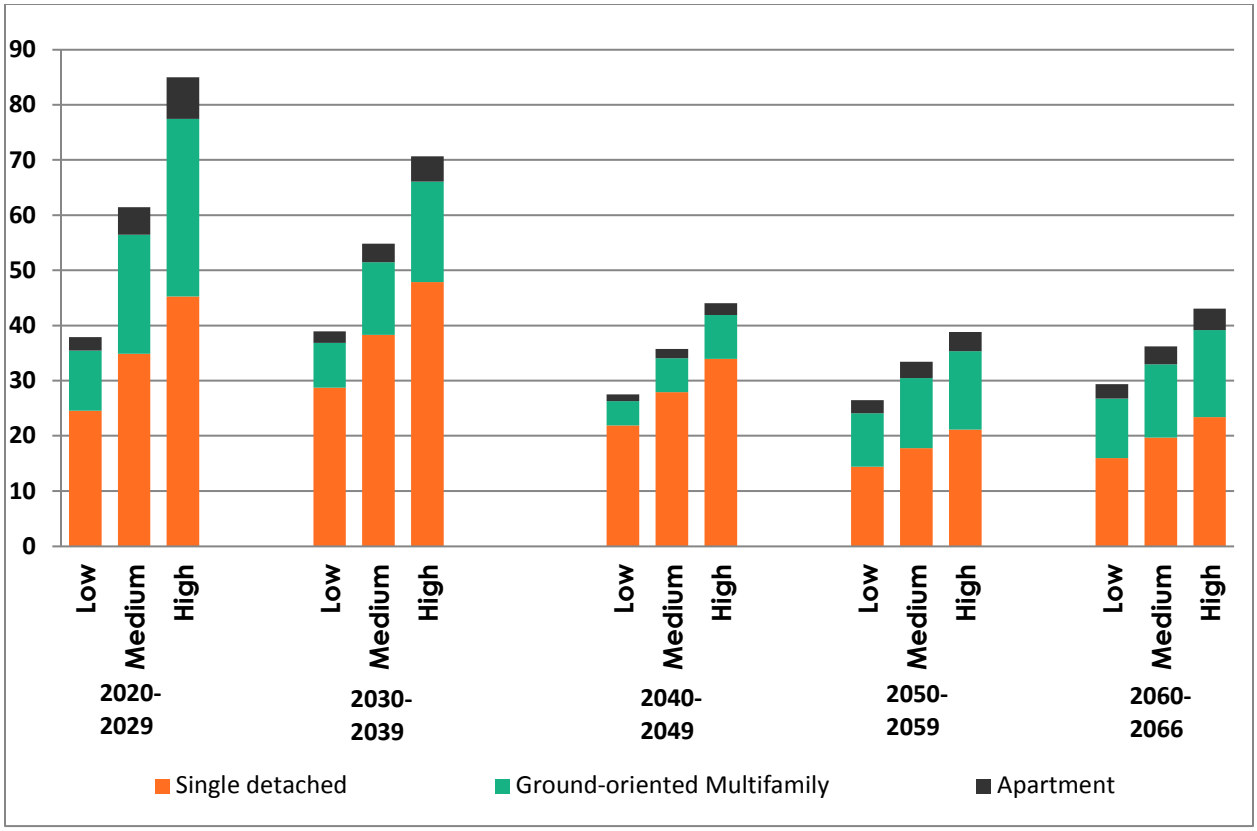


Figure 7 shows aggregates age groups, for **all three growth scenarios**, into average **annual** demand for **net** new housing for 10-year periods over the next 47 years. In all 3 growth scenarios, demand is expected to grow more quickly in the shorter term and more slowly toward the end of the projection period. This is largely a function of SLRD projections growing increasingly conservative with time to 2041, as well as GPRA capping intra-regional growth share assumptions thereafter.

The mix of net new housing tips increasingly toward single family homes for a time, as Pemberton inches closer to the regional housing stock split in response to Squamish multifamily focus, then returns to a more equal single family/multifamily distribution. Another factor driving higher single family housing growth in the early decades is the rapid growth in the older age groups, in response to the same region-wide.[7] Pemberton's most populous age groups continue to be those under 55, but markedly less so than today, and the older groups typically favour single family homes.

[7] After 2041, GPRA holds age group distribution constant, rather than extrapolating from BC Stats trends

Table 2: Cumulative Net New Housing Demand in Pemberton

	2029	2039	2049	2059	2066
Single family house (high)	452	931	1,270	1,481	1,645
Single family house (med)	349	732	1,011	1,189	1,326
Single family house (low)	246	533	752	896	1,007
Ground-oriented Multifamily (high)	322	504	584	726	836
Ground-oriented Multifamily (med)	216	347	468	529	622
Ground-oriented Multifamily (low)	109	190	234	331	407
Apartment (high)	75	121	143	177	204
Apartment (med)	50	83	100	129	152
Apartment (low)	24	45	57	81	99
High Growth Total	**850**	**1,556**	**1,997**	**2,385**	**2,686**
Medium Growth Total	**614**	**1,162**	**1,579**	**1,846**	**2,100**
Low Growth Total	**379**	**768**	**1,043**	**1,308**	**1,514**

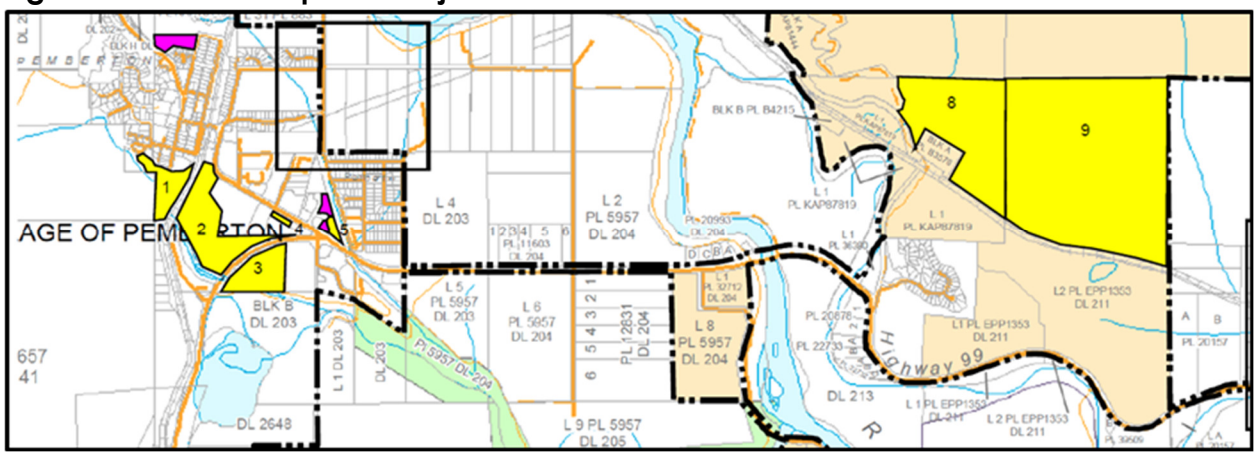
Table 2 summarizes **cumulative total net new** housing demand over the projection period. In the next 10 years, about 379-850 total net new units are demanded, growing to 1,514-2,686 by 2066. The medium growth scenario shows 2,100 total net new units by 2066, including 1,326 single family homes, 622 ground-oriented multifamily homes, and 152 apartments.

To this can be added some demand for replacing aging existing stock, estimated at 50% by 2059 (502 units) and 70% by 2066 (702 units), bringing the total demand for all growth scenarios above the count of anticipated units touched on in the following section, though perhaps spread over a longer time frame than some development proponents might target.

5 Pemberton Benchlands Absorption

5.1 Local Competition

Figure 8: Other Anticipated Projects



As mentioned in Section 3, much of Pemberton is ALR land or on steep hillsides and not easily developed. That said, the Village has identified a number of projects underway at various stages of development:

Benchlands: As noted in Section 3, a mix of mostly small and medium-lot single family plus 28 larger lots, 198 townhomes, and 40 apartment units. The project is expected to yield 455 total units at build-out.

1: Harmony Reach (formerly Wye Lands): A mix of roughly 500 square metres of commercial space along with 80 townhome units. This project is currently in the process of DP Application. This project is most proximate to the Benchlands and offers a significant number of townhouse units that could compete with the Benchlands depending on timing.

2: Tiyata: Small lot single family. This is the most similar to Benchlands of the big Pemberton projects in that it is close to Downtown and mostly small lots expected to site somewhat affordable homes. Development was stalled until prices rose because land required expensive dyke work. The first 3 phases have now sold out, with no information available currently about future phases. Tiyata is at a similar development stage as The Ridge. 44 single family units have been sold; plans indicate over 200 units total at build-out, including some apartments in a mixed-use building.

3: Mount Currie View Mobile Home: A small project offering an expansion of the existing mobile home park to include 13 new mobile home pads. This project does not appear to be in competition with the Benchlands in any significant way. Approved and under construction.

4: Crestline: All multifamily, at the development permit stage. 36 stacked townhome and garden apartment units are planned, although there is no current marketing information on this project.

5: Orion: A multifamily apartment project currently under construction that will offer 45 units in a 3 storey building. Given the timing Orion does not project to serve as competition for any of the apartment units planned for the Benchlands.

6 (pink lot at the north end of map): Sanctuary (formerly Silverthorne): A multifamily development to feature a mix of townhomes and apartments (38 and 56 units respectively). Currently at the preliminary planning stage with no application currently submitted to the Village.

7 (two small pink lots between 4 & 5): Crabapple Court (Gateway II & Coombs): Preliminary planning stages indicate two small townhome projects being planned for Crabapple Court on two lots. One lot is planned for 13 townhomes while the other is planning for 30 townhomes.

8: The Ridge: A mix of large, medium, and small lot single family, and multifamily. The first 37 single family lots have been sold with 7 estate lots remaining. On a hillside facing Mt. Currie, likely most properties will have excellent views. This may generally target higher price points than Benchlands. 104 total units at build-out including some townhomes that have yet to come to market.

9: Sunstone: A mix of primarily large lot single family and multifamily. Beside The Ridge and with large lots, Sunstone is aimed at similar markets but farther in the future. It has sold through 39 lots from Phase 1A, with a further 24 single family lots currently marketing for Phase 1B. Plans indicate 52 two and three bedroom townhomes, with the first 16 currently offered for sale under the name Elevate at Sunstone.

Other Downtown Infill: The Village of Pemberton expects perhaps up to 300 infill units over the next 30+ years, most of which would follow development of the Benchlands. GPRA expects these would be mostly townhouses and apartments.

In all, **1,100 – 1,200 future units are anticipated**, including the Benchlands and various unspecified small developments. This represented more than 30 years of supply in the Low Growh Scenario (1,043), about 20 years of supply in the Medium Growth Scenario (1,162), and less than twenty years of supply in the high growth scenario (1,556), excluding unit replacement in all cases. Including unit replacement, it represents 39% of the total new units required by 2066 under the Medium Density Scenario (2,802).

None of The Ridge, Sunstone or Tiyata detail the housing type breakdown for future phases though all mention both single and multifamily. There may be some flexibility to respond to future market demands, but GPRA expects these are intended to be largely single family (although Tiyata may see a sizeable number of duplexes).

Assuming various Downtown infill is mostly townhomes, hillside developments mostly single family homes, and Sunstone target about 50+ townhomes and the rest single family, and Tiyata adds in some mixed-use building apartments plus single family, total anticipated construction would break down as about 500+ singles, 500+ ground-oriented multifamily, and 150+ apartments. This mix would absorb at about the same pace per scenario as mentioned in general terms above, though ground-oriented multifamily may take a little longer in the high growth scenario.

Other than the Benchlands, Tiyata has the largest indicated number of units at 200, but only 44 single family have been sold out of 65 lots that have been planned to date. The remaining 135 units are undefined and likely reserved for future phases of development. Sunstone is the next largest single development but they are well advanced into their sales and marketing, thus minimizing competition with the Benchlands. It is also likely suited to a more affluent market segment than that characterising most prospective Pemberton buyers. The other developments listed appear competitive or advanced relative to the Benchlands.

However, significant additional local competition not yet considered could push Benchlands absorption back, despite widespread ALR and hilly terrain development restrictions. The Benchlands' 40% share of Village-anticipated Pemberton housing is a very high market share in most contexts.

5.2 Benchlands Market Share and Absorption

As shown in Table 3 below, if absorption begins in 2023, then at constant 40% market share:

- 9 – 19 single family homes can be sold per year, allowing full absorption around 2040 with low population growth, around 2035 with medium population growth, or around 2032 with high population growth.
- 4 – 13 ground-oriented multi units can be absorbed per year in the first few years, but the absorption of these types is expected to slow over time. However, in the 2050s and 2060s unit replacement enters the formula, and annual absorption increases to 14 – 16 in the 2050s and 10 – 12 in the 2060s. This allows full absorption of the project's duplexes and townhomes some time from 2051 – 2059 depending on growth scenario.
- Similarly, 1 – 3 apartments can be absorbed per year in the first few years, but the absorption of these types is expected to slow over time. However, in the 2050s and 2060s unit replacement enters the formula, and annual absorption increases to 3 – 4 in the 2050s and 2 – 3 in the 2060s. This allows full absorption of the project's apartments some time in 2040 in the High Density Scneario, 2051 in the Medium Density Scenario, and 2055 in the Low Density Scenario.

And at 30% market share:

- 7 – 14 single family homes can be sold per year, allowing full absorption around 2047 with low population growth, around 2040 with medium population growth, or around 2036 with high population growth.
- 3 – 10 ground-oriented multi units can be absorbed per year in the first few years, but the absorption of these types is expected to slow over time. However, in the 2050s and 2060s unit replacement enters the formula, and annual absorption increases to 11 – 12 in the 2050s and 8 – 9 in the 2060s. This allows full absorption of the project's duplexes and townhomes some time from 2055 – 2066 depending on growth scenario.
- Similarly, 1 – 2 apartments can be absorbed per year in the first few years, but the absorption of these types is expected to slow over time. However, in the 2050s and 2060s unit replacement enters the formula, and annual absorption increases to 3 in the 2050s and 2 in the 2060s. This allows full absorption of the project's apartments some time from 2050 – 2059.

In summary, the project is expected to be full absorbed by 2066 under all scenarios, even the Low Growth Scenario with 30% absorption.

Table 3: Pemberton Annual New Housing Demand with Replacement and Benchlands Single Family Absorption at 30% and 40% Market Shares

	Units per year			30% absorption			40% absorption		
	Single family	G. O. M.	Apartment	Single family	G. O. M.	Apartment	Single family	G. O. M.	Apartment
2020 - 29									
High	45	32	8	14	10	2	18	13	3
Medium	35	22	5	10	6	1	14	9	2
Low	25	11	2	7	3	1	10	4	1
2030 - 39									
High	48	18	5	14	5	1	19	7	2
Medium	38	13	3	11	4	1	15	5	1
Low	29	8	2	9	2	1	11	3	1
2040 - 49									
High	34	8	2	10	2	1	14	3	1
Medium	28	6	2	8	2	1	11	2	1
Low	22	4	1	7	1	0	9	2	0
2047 - 56**									
High	39	40	10	12	12	3	16	16	4
Medium	36	39	9	11	12	3	14	15	4
Low	32	35	9	10	11	3	13	14	3
2057 - 66**									
High	34	31	7	10	9	2	13	12	3
Medium	30	28	7	9	8	2	12	11	3
Low	26	25	6	8	8	2	11	10	2

** Includes replacement

The Benchlands' townhomes are expected to take the longest period of time to sell out, simply because this product type contains the most units. **GPRA therefore believes that close to 30 years is a reasonable absorption timeframe**, in part because this corresponds to the most likely medium growth scenario, as well as development pressures on market share and population modelling precautions discussed below.

This absorption window is based on a market share (40%) that leans on Village-anticipated development and is higher than GPRA typically recommends targeting, but local experts assert that there is little developable land unaccounted for[8]. In a high growth scenario, as would be needed tor 25-year absorption, added development pressure might be sufficient to incentivise allowing development on sites thus far unconsidered and reduce the Benchlands' market share, nudging absorption up closer to 30 years.

Population projections, as previously noted, may err on the conservative, especially approaching and beyond 2041 where this conservative leaning is by design as a precaution to avoid colossal misstep amid increasing uncertainty. The low growth scenario not only spreads absorption over a longer time period, but also pushes more of it into later time periods which are increasingly likely to underestimate growth and overestimate absorption time.

Absorption would improve with increased Pemberton population growth. If Whistler does not raise its housing cap at all over the projection period, and/or the District of Squamish is highly successful in focussing development to multifamily infill, it is plausible that regional housing demand could push Pemberton population growth beyond the high growth scenario described in Section 4.1. If resulting population pressure in Pemberton does not prompt release of new lands for development, projects like the Benchlands could speed up considerably. Pemberton is also an increasingly popular second home location, and this could increase demand beyond that which is estimated through Census population-based projection and improve absorption.

[8] The Lil'wat First Nation could have additional potentially developable land that if it was pursued would most likely follow the Benchlands. For the purposes of this study we assume that these lands will not proceed during the forecast period and thereby will not impact Benchlands absorption.

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

DIVERSITY OF HOUSING

View Homes

- Retain the trees

Traditional homes

- AC and heating combination are great?
- Tiyata is not cohesive with the community
- Metal roofs fire smart communities x 3
- Use more wood! X 3
- Passive houses
- Proximity to town makes this community great
- Variety

Standard Homes

- Seniors housing is key x 4
- Solar access is key
- Do opposite of Tiyata
- Supply is an issue, I cannot __ a house
- Single level housing
- Two car garages are important
- Don't build cookie cutter homes
- Variety good
- Avoid cheap Hardie board siding.
- Public transportation is key x 3
- Serviced lots or built houses
- Seniors housing x 2
- Car in garage is not possible

Neighbourhood Duplex

- Avoid Sprawl
- Built in are great space savers
- Midsize homes are preferred
- Quality housing is key
- Natural Landscape x 3
- Modern does not fit the community
- Don't like the Hardie siding
- Affordability for each type of housing
- Wildlife attraction – garbage
- Need for housing for elderly houses and need for
- Big garages x4
- off-street parking is key

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PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

DIVERSITY OF HOUSING

Family Townhomes

- Sunlight and depression
- On demand hot water
- Accessible home is key and something to age in
- Limited amount of seniors housing
- Consider the impacts of short-term rentals
- Support more development it creates affordability
- Walking to daily needs is key
- Large phase project
- Townhouses need to respond to the context
- Seniors housing
- Long term care housing
- Complexity of design guidelines make it easy for builders

Hillside Apartments

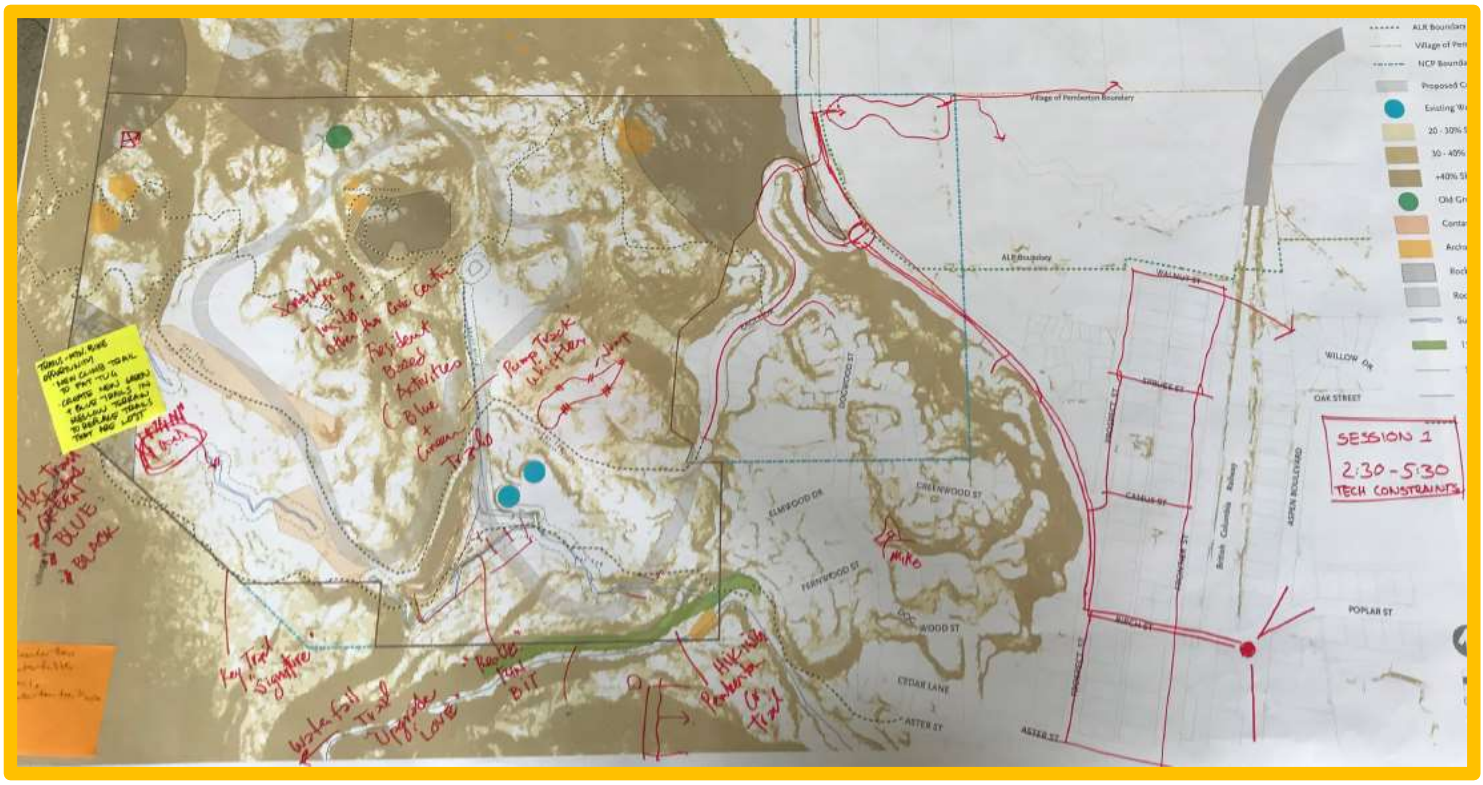
- The community needs affordable apartments
- Community is important we need people in these houses
- Lots of diversity of housing
- Difficult to get into the market
- Skeptical of the affordability
- It is not affordable for younger families
- Traffic impacts are a problem

Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

SITE CONSTRAINTS

- Somewhere to go inside other than the community centre
- Blue and Green Trails
- Resident based activities
- Pump track whistler (jump)
- Key Trail “signature” this was Fat Tug
- Trails Mountain bike opportunity new climb trail (fat tug)
- Create new green and blue trails in mellow terrain replace trails that are lost
- Pemberton waterfalls trail…?
- Waterfall Trail Upgrade “love”
- (Lower Fat Tug) really fun bit
- Hiking Pemberton Creek Trail
- (there seemed to be red marker showing various routes and connectivity not sure if it is traffic or drainage)



Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

SITE CONSTRAINTS

- Avoid Skyridge development in Squamish
- Banjo Connector, and Kaos circled with “dogs”
- Sketched in Fernwood Drive

Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

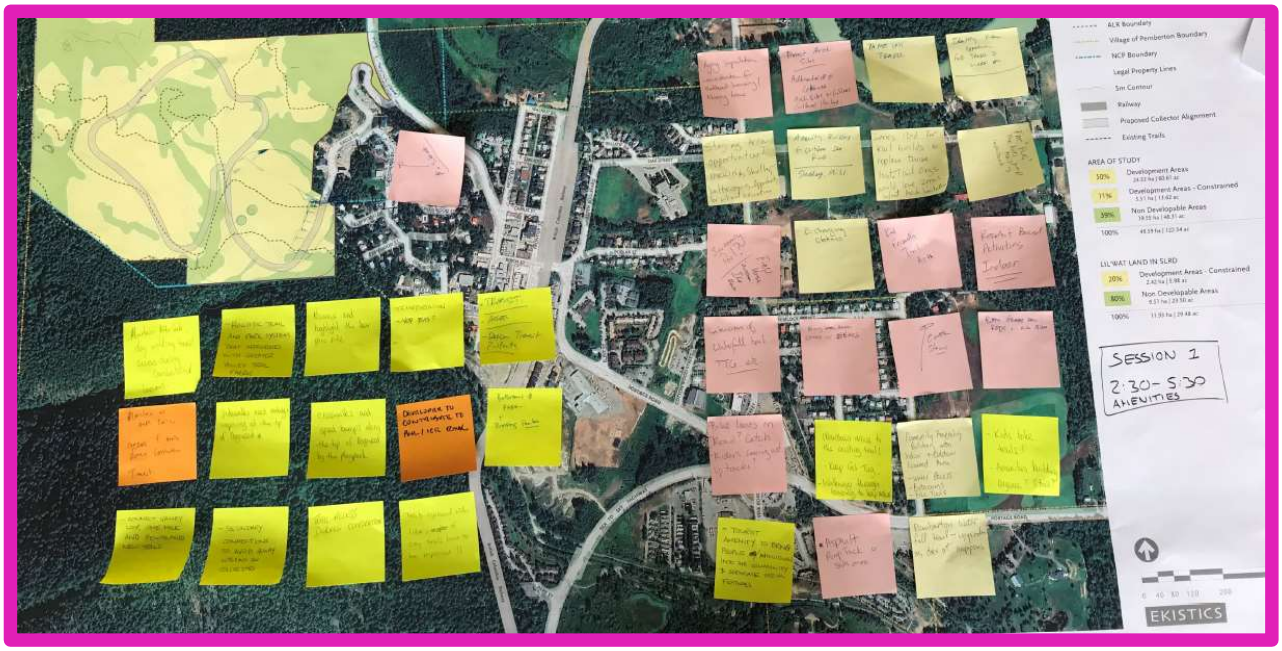
COMMUNITY AMENITIES

- No sidewalks on Dogwood, need one
- Current Staircase and Road
- Transit
- Access
- Designated Transit Pullouts
- Bathrooms in park and drinking fountain
- Developer to Contribute to pool land ice rink
- Transportation VoP bus
- Preserve and highlight the bear paw site
- Crosswalks and speed bumps along the top of Dogwood by the play park
- Holistic Trail and Park System that integrates with the Greater Valley Trail Fabric
- Sidewalks need making and improving at the top of Dogwood
- Trail access during construction
- Secondary connections to avoid always walking on collectors
- Connect valley loop, one mile and Benchlands new trails
- Maintain all mtn trails
- Access to trails during construction
- Transit
- Mountain bike, dog walking trail access during construction and beyond
- Bike lands on road
- Catch riders coming up tracks
- Extension waterfront trail TTG etc.
- Every house comes with ebikes
- Mountain access to the existing trails
- Keep fat tug
- Walkways through housing to keep access
- Community Amenity Building with Indoor and outdoor covered area
- Water access
- Bathrooms
- Bike tools

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

COMMUNITY AMENITIES

- Community Centre Stairs (this was pointing at)
- Kid friendly trail area
- Resident based activities indoor
- Easy grade for kids and ride bike
- Kids bike trails
- Amenity buildings, daycare? Store?
- Fat Pug the kids trail jump is important
- Identify future opportunities for trails to work on
- Aging population consideration for sheltered housing, nursing home
- Staging area opportunities, shelter, bathroom, opportunity for Lil'wat Education
- Protect Arch sites
- Acknowledge and celebrate arch sites and Lil'wat cultural heritage
- Amenity Building and outdoor ice rink
- Sledding hill
- E charging stations
- Every house comes with ebikes
- Kid friendly trail area
- Zones ID's for trail builds to replace those lost. Trail Prigs would live zones without arch limitations
- Resident based activities indoor



Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

NEIGHBOURHOOD IMPACTS (Transportation)

- Connection to clover road
- Construction access
- Emergency Access at the Glen
- Fraser Street open up access emergency
- Important walking routes
- Street sign exists at Fraser Road (is it a public road)
- Access one of Cottonwood different – Daycare
- One road in and one out of Village
- Pedestrian crossing at downtown roundabout
- Train impact and volume of traffic
- Dogwood traffic at corner
- Traffic calming for park
- Trail access extend (upper trail from staircase)
- Lack of sidewalk on Dogwood
- Dogwood is narrow
- Aster and Dogwood roundabout? Slow traffic
- Transit regional and local
- Rail spur makes crossing difficult
- Stream water issue can anything be done (in Staehli Park)
- Eagle drive improvement part of development
- Eagle drive closed in the winter, road maintenance
- ALR limits road access
- Tight corner on Eagle Drive
- Secondary access point off Meadows Road
- Eagle Drive needs sidewalk, no sidewalk
- Construction traffic
- Phasing
- Ongoing community access
- Wildlife corridor upper on SLRD site

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

NEIGHBOURHOOD IMPACTS (Transportation)

Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

COMMENT FORMS (AND FB SURVEY) – *There Are Still Some Coming In…albeit slowly.*

What do you like about Pemberton and how can Benchlands strengthen it?

- By not developing the area
- More affordable housing
- I like the scenery, friendliness to active transportation, prominence of agriculture, sense of community, small town fee and recreation opportunities
- Access to activities in nature
- Provide more density of housing near town Small town character and affordable housing
- Small town character and affordable housing

How can the Benchlands enhance the character of Pemberton?

- Provide more density of housing near to town to promote downtown area business and pedestrian traffic. Providing more activities to occupy or educate the youth
- Continue enhancing nature & outdoor lifestyle while providing affordable housing.
- By only developing the neighbourhood if the majority of lots are pre sold. Don't nuke the area and cut down all the trees and then try to sell the real estate over tr next 10 years. There is too much on the market now.
- Diversity of housing, community amenities and improve trails and walkability

Given that housing diversity is important in Pemberton, what types of housing are needed at Benchlands?

- Not only single-family dwellings! Duplexes or four-plexes similar to converted homes in Vancouver would be great to see.
- Smaller foot print homes on bigger size Lots and homes built properly to sustain wildfires. Also a neighbourhood that can provide some isolation from wildfire. The housing should be build with better energy efficency and more environmently friendly material.
- Single family townhomes
- Stand alone houses in the $500,000 range, for normal working families
- All types

What sustainable transportation elements are best suited to the Benchlands?

- 4-season walkable paths and safe bike access for snow-months
- Properly lit road side walk and bycicle path. Car commuter parking lot.
- Bus stop & bike trails
- Biking trails. A bike park like the "bike ranch" in Kamloops area. Totally enhanced the ***juniper subdivision*** there.
- Sidewalkes

Local services, shops, and employment are key to a complete community. What type of commercial amenities or services would be additive to the Benchlands community?

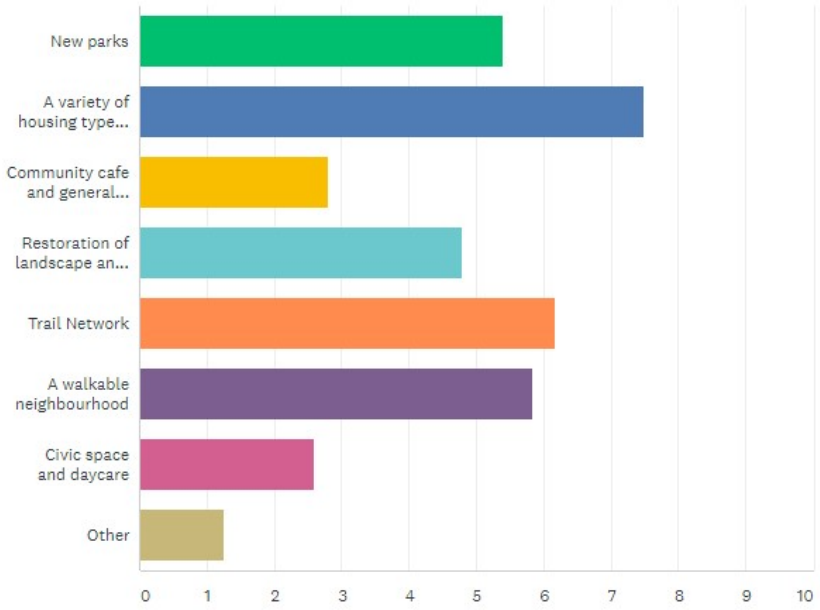
- I don't think that area is suitable for commercial activity - that should be kept in town or the industrial area. The population is too low there and it's too isolated from town.
- Grocery store, bike and ski shop
- There is enough commercial zoning in Pemberton already
- Rec centre, school, more so parks

Black font is afternoon session Red font is evening session

PUBLIC INFORMATION MEETING (VERBATIM) COMMENTS
MARCH 11, 2020

- Corner store

What are the top community benefits? Please rank your preference with 1 being most important and 7 being least important.



"Other" community benefits recognized above.

- Access to bike and hiking trails
- Contributions to community facilities developed elsewhere in Pemberton

Further Comment

- I think this area should be residential to house people to support the townsite. I think cafes and stores would not do well there and would draw people away from the village
- Please don't create a lame "trail network" because this subdivision is destroying a great trail network. Hire a professional mountain bike trail builder.
- If the SLRD parcel and Victor Lees parcel were to be included, would a secondary road that connects to Collins Road be a possibility
- Nicely done
- Aging population, care houses, sheltered living
- Aspect – sunlight in winter
- Suites

SCHOOL DISTRICT NO. 48

♦ *Squamish* ♦ *Whistler* ♦ *Pemberton*

March 13, 2020

Kerry Mehaffey
Chief Executive Officer
Lil'wat Nation
82 Ir 10 Rd.
Mount Currie, BC, V0N 2K0

Subject: Pemberton Benchlands Property

Dear Ms. Mehaffey,

At the Board meeting held on Wednesday, March 11th, the Board of Education determined that the proposed 1.2 hectare school site located in the Pemberton Benchlands development is not required by the District for future school needs. The Board is, however, in favor of our district staff working with Lil'wat Nation regarding your offer to make future building lots available to support the District's residential construction program.

I would appreciate if you could confirm a future date for us to have discussion regarding the two lots for the residential construction program.

Please let me know if you have any questions. I look forward hearing back from you.

Yours Sincerely

[redacted]

Mohammed Azim
Secretary-Treasurer
School District No. 48 (Sea to Sky)

[redacted]

Box 100 | 7400 Prospect Street
Pemberton BC V0N 2L0
P: 604.894.6135 | F: 604.894.6136
Email: admin@pemberton.ca
Website: www.pemberton.ca

DEVELOPMENT-GENERAL INFORMATION

Application:

- [X] OCP Bylaw Amendment &/or Zoning Bylaw Amendment **(Form OR13)**
- [ ] Development Permit **(Form MDP13)**
- [ ] Major or Minor Development Permit **(Form Minor DP)**
- [ ] Development Variance Permit **(Form DVP13)**
- [ ] Temporary Use Permit **(Form MDP13)**
- [ ] Subdivision, Bare Land Strata Approval & Strata Title Conversion **(Form SUB13)**
- [ ] Antenna System Siting Review **(Form ANT 13)**

All Applications **Please include Application Requirements Form (Checklist)**

SITE

Civic Address: Extension of Eagle Drive, Benchlands

Legal Description:
PID: currently in Crown land registry Lot:
District Lot(DL): See list in submission Plan:

OWNER(S)

Owner Name(s): Crown Land Opportunities, Ministry of Forest, Lands, Natural Resource Operations and Rural Development, Province of BC

Mailing Address: [redacted]

Home:
Work: [redacted]
Cell:
Email: [redacted]

OWNER(S) AGENT IF APPLICABLE

Agent's Name: Skénkenam Developments

Work: [redacted]
Fax:
Cell:
Email: [redacted]

Mailing Address: [redacted]

☐ *If applicable* Please include Owner's Authorization

X Owners authorization is forthcoming

Owner Signature *Date*

X

Authorized Agent Signature *Date* March 18, 2021

COMMENTS:

Application No

Fee: $ 72,200

VILLAGE OF PEMBERTON
DEVELOPMENT APPLICATION REQUIREMENTS AND FORMS

APPLICATION REQUIREMENTS FOR AN OFFICIAL COMMUNITY PLAN BYLAW AMENDMENT AND/OR ZONING BYLAW AMENDMENT

1. Pre-Application Meeting

It is strongly recommended that prior to submitting an application to amend the Official Community Plan and/or the Zoning Bylaw, an applicant should meet with the Village of Pemberton's Development Services Department to review application requirements. The intent of the pre-application will be to confirm specific submission requirements for each proposal.

It is important to have the Village identify the information required for the application since any applications deemed incomplete by the Development Services Department will not be accepted and subsequently returned to the applicant.

2. Submission Checklist

- ☒ Complete Application Form *(Form OR13)*
- ☒ Application Fee *(in accordance with Development Procedures Bylaw No. 725, 2013)*
- ☐* Certificate of State of Title or of Indefeasible Title *(dated no more than thirty (30) days prior to submission of the application must accompany the application as a proof of ownership)*
- ☐* Copy of Charges on Title *(i.e. covenants, rights of way, statutory building schemes, etc)*
- ☐* Owners Agent Authorization *(if applicable)*
- ☐** Site Profile (*as per* http://www.env.gov.bc.ca/epd/remediation/site_profiles/index.htm)

**The lands are currently within the Crown land registry. The legal descriptions are included in the application overview, but the lots will be registered in the Land Title Office for the purchase - with new legal descriptions issued. The Owners Authorization is forthcoming.*

***The Site Profile has been included but is also awaiting the final legal descriptions from the Land Title registery*

3. Property Information

Legal Description:

See notes above and application*

PID#: *pending*

Civic Address: *Extension of Eagle Drive*

Property Size*: *31.17*

Current OCP Land Use Designation *(Schedules A and B of the OCP Bylaw):*

Benchlands Sub Area Plan Area

Proposed OCP Land Use Designation *(Schedules A and B of the OCP Bylaw):*

see submission

Existing Use/Development on the Property: *see submission*

Proposed Use/Development of the Property: *see submission*

Lands within Agricultural Land Reserve: *No*

4. Project Summary Information Checklist *(provide in written format)*

- [x] Description of Proposed Development
- [x] Rationale in Support of the Proposed Development
- [x] Overview of the Proposed OCP and/or Zoning Bylaw Amendment(s)
- [x] Consistency with OCP Policies and Maps
- [x] Proposed OCP Policy Amendment(s)
- [x] Proposed OCP Map Amendment(s)
- [x] Proposed Zoning Regulation Amendment(s)
- [x] Proposed Zoning Bylaw Map Amendment(s)

5. Supporting Plans and Illustrations Checklist

(hard copies include full size plans and reductions as well as a digital copy)*

- [x] Location Context Plan
- [x] Conceptual Site Plan *(indicating development footprints, approximate density, parks/playgrounds, preservation areas, access roads, trails. parking, transit stops, watercourses, agricultural lands, etc.)*
- [x] Site Development Statistics *(approximate area, unit count, building coverage, area, height, parking, loading, bike racks, etc.)*
- [x] Environmental Review *(refer to Schedule B of the OCP)*
- [x] Geotechnical and Slope Stability Study *(by a qualified professional)*
- [x] Viewscape Analysis
- [x] Archeological Overview *(by a qualified professional)*
- [x] Lot Grading Plan
- [x] Stormwater Management Plan
- [x] Traffic Impact Study
- [ ] Photographs of the property
- [x] Existing Subdivision (Legal) Plan
- [x] Proposed Subdivision Plan *CONCEPT*
- [x] Existing and Proposed Slope Analysis
- [x] Aerial Photo Map
- [ ] Additional Information *early consulta* _____

6. Servicing Information

(written text and hard copies of plans to include full size plans and reductions as well as a digital copy)*

- [x] Location Plan for Road Access Points
- [x] Description of Existing or Proposed Storm Drainage flows
- [x] Description of Existing or Proposed Water Service Connections
- [x] Description of Existing or Proposed Available Sewer Service Connections
- [x] Description of Existing or Proposed Road Access
- [x] Location Plan of Existing and Proposed Water and Sewer connections
- [x] Information to be provided regarding development for the Village to perform an independent evaluation of the water and sanitary requirements in context of the existing systems:

WILL BE PROVIDED ON REQUEST

- AutoCAD based base plan illustrating the onsite collection/distribution system of each utility. Base plan must be referenced to legal cadastral.
- Sanitary catchment plan complete with calculations and expected pipe inverts.
- Water system plan complete with all expected fixtures (fire hydrants, air valves etc. if applicable) and load calculations. Fire Underwriters Survey fire flow calculation sheet under a Professional Engineer's seal.

- Proposed onsite and offsite works in AutoCAD format for each utility as supported above.
- Preliminary ground elevations within the development.

APPLICATION FORM FOR AN AMENDMENT TO THE OFFICIAL COMMUNITY PLAN AND/OR ZONING BYLAWs (OR13)

I/We hereby make application under the provisions of Part 26 of the *Local Government Act* and the Village's Development Procedure Bylaw No. 725, 2013 for:

- ☒ An Amendment to the Official Community Plan Bylaw and/or
- ☒ An Amendment to the Zoning Bylaw

to permit development on lands legally described as:

Block A, DL 202
Block A, DL 8556
Block J, DL 202

Lot: _____, Plan: _____, District Lot: _____, LLD.

THIS APPLICATION IS MADE WITH MY FULL KNOWLEDGE AND CONSENT

Pending

_____ _____

Registered owner's signature Date

Where the applicant is NOT the REGISTERED OWNER, the application must be signed by the REGISTERED OWNERS designated AGENT and proof thereof must be registered in the office of the Village of Pemberton.

FOR OFFICE USE ONLY:

Application/File No.: _____

Application Fee received $_____ Receipt No.: _____

Date received: _____

_____

Signature of Official

Box 100 | 7400 Prospect Street
Pemberton BC V0N 2L0
P: 604.894.6135 | F: 604.894.6136
Email: admin@pemberton.ca
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Home:
Work: [redacted]
Cell:
Email: [redacted]

OWNER(S) AGENT IF APPLICABLE

Agent's Name: Skénkenam Developments

Work: [redacted]
Fax:
Cell:
Email: [redacted]

Mailing Address: [redacted]

☐ *If applicable* Please include Owner's Authorization

X Owners authorization is forthcoming

Owner Signature *Date*

X [redacted]

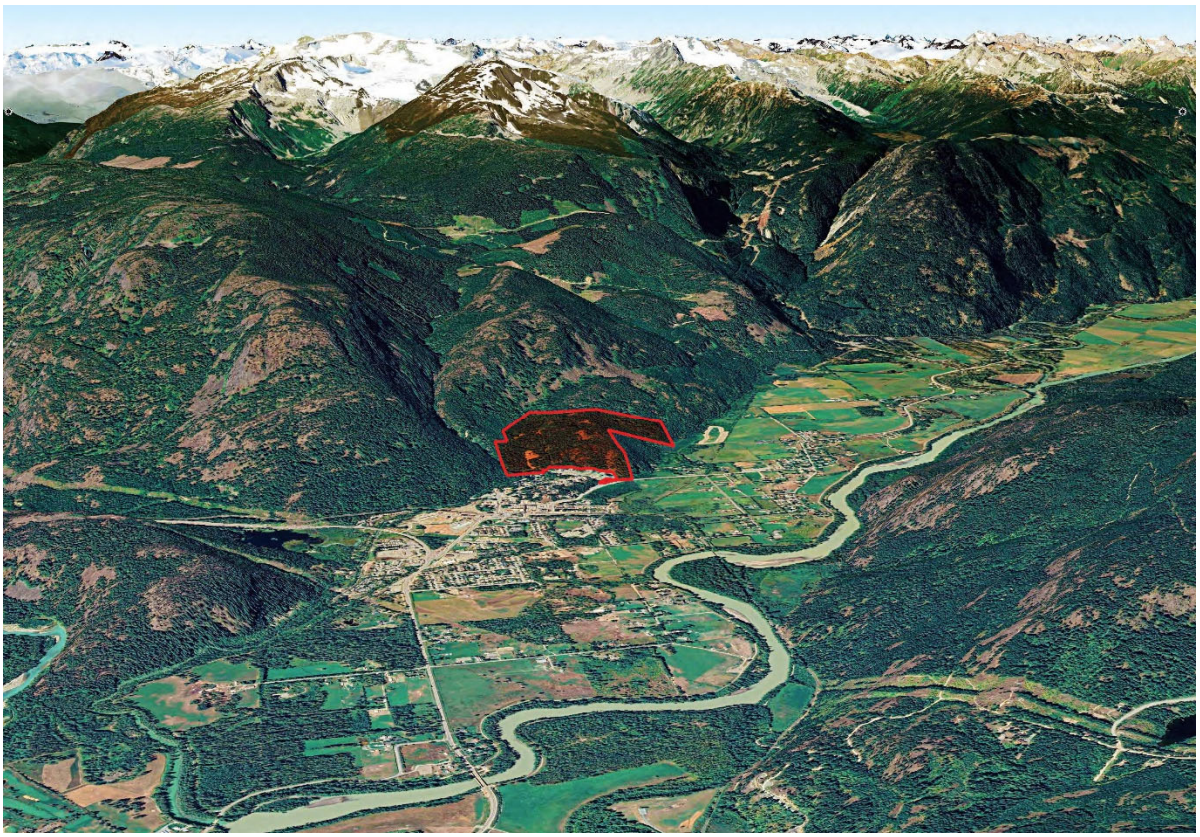
Authorized Agent Signature *Date* March 18, 2021

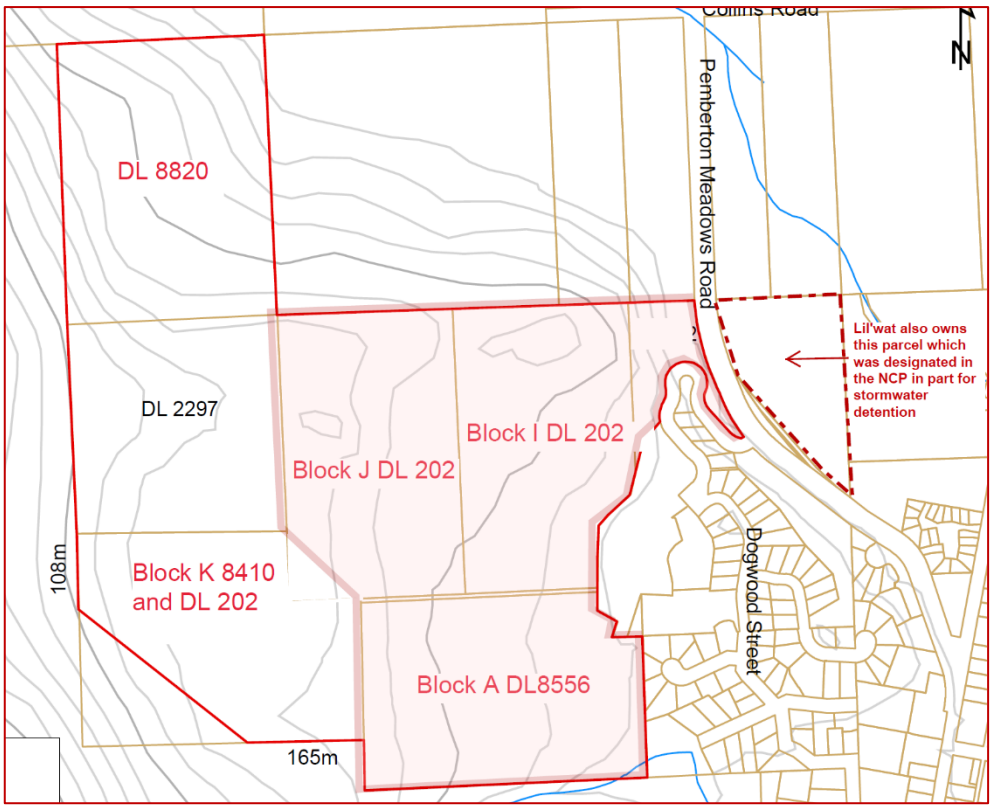
COMMENTS:

Application No

Fee: $ 72,200

Figure 1 – Location Plan



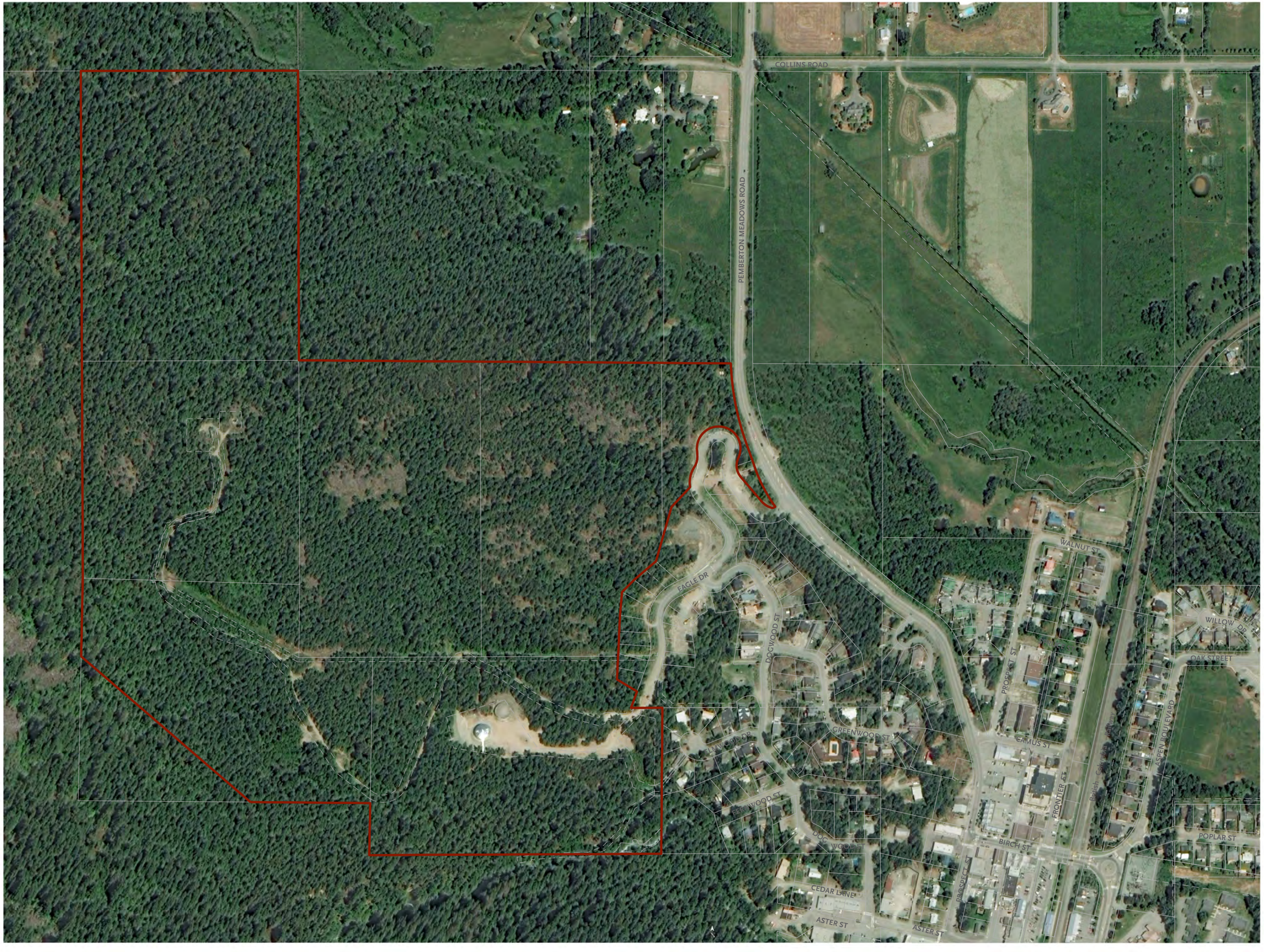


Legal Parcels

SKENKENAM LANDS
PEMBERTON BC

Figure 2

AERIAL ANALYSIS



LEGEND

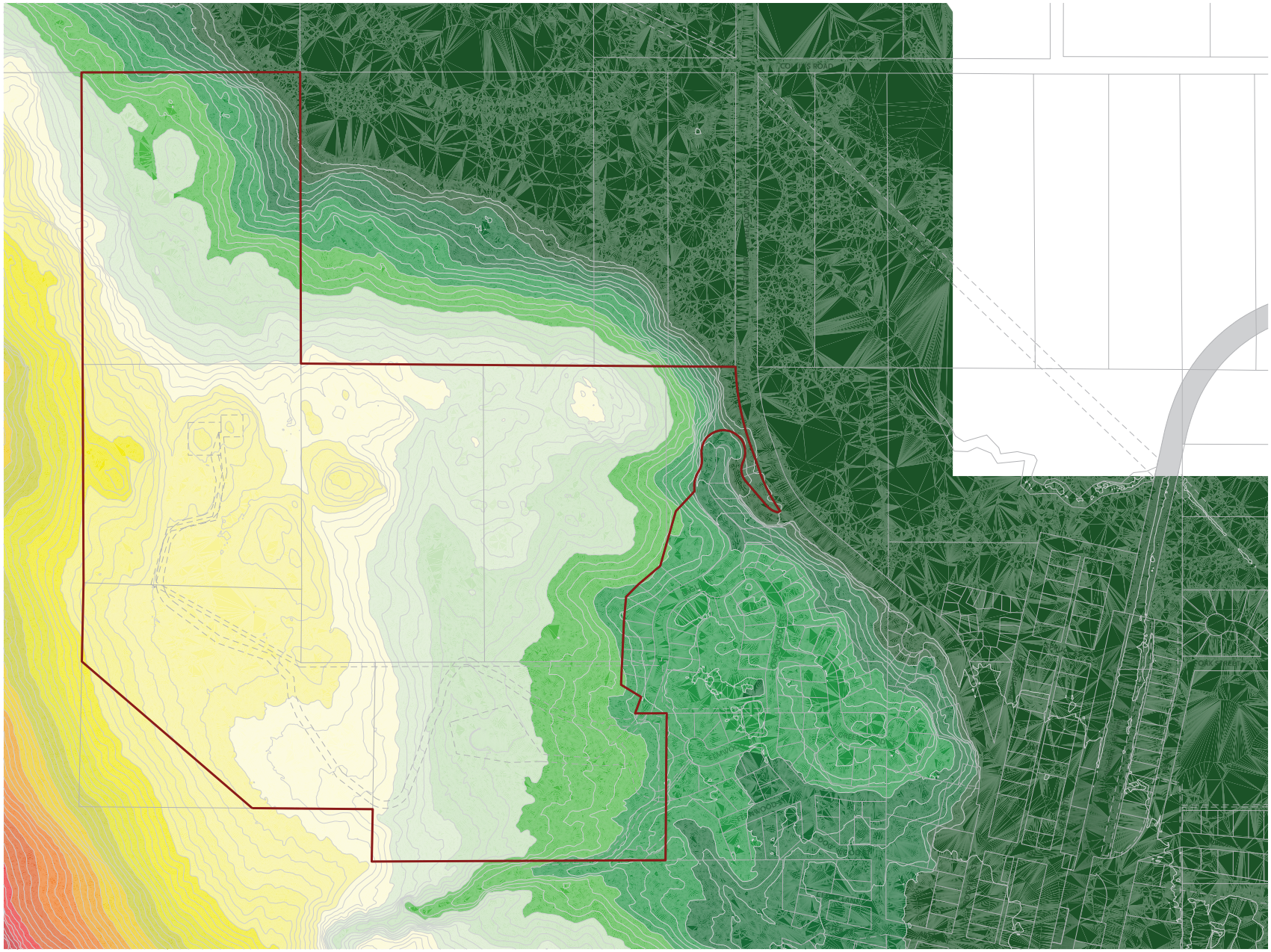
DECEMBER 2019

Site Boundary
61.52 ha | 152.02 ac

Legal Property Lines

0 25 50 75 125 250m

EKISTICS



SKENKENAM LANDS
PEMBERTON BC

Figure 3

LANDFORM ANALYSIS

LEGEND

DECEMBER 2019

- Site Boundary
  61.52 ha | 152.02 ac
- Legal Property Lines
- 5m Contour

- 540m - 560m
- 520m - 540m
- 500m - 520m
- 480m - 500m
- 460m - 480m
- 440m - 460m
- 420m - 440m
- 400m - 420m
- 380m - 400m
- 360m - 380m
- 340m - 360m
- 320m - 340m
- 300m - 320m
- 280m - 300m
- 260m - 280m
- 240m - 260m
- 220m - 240m
- 200m - 220m

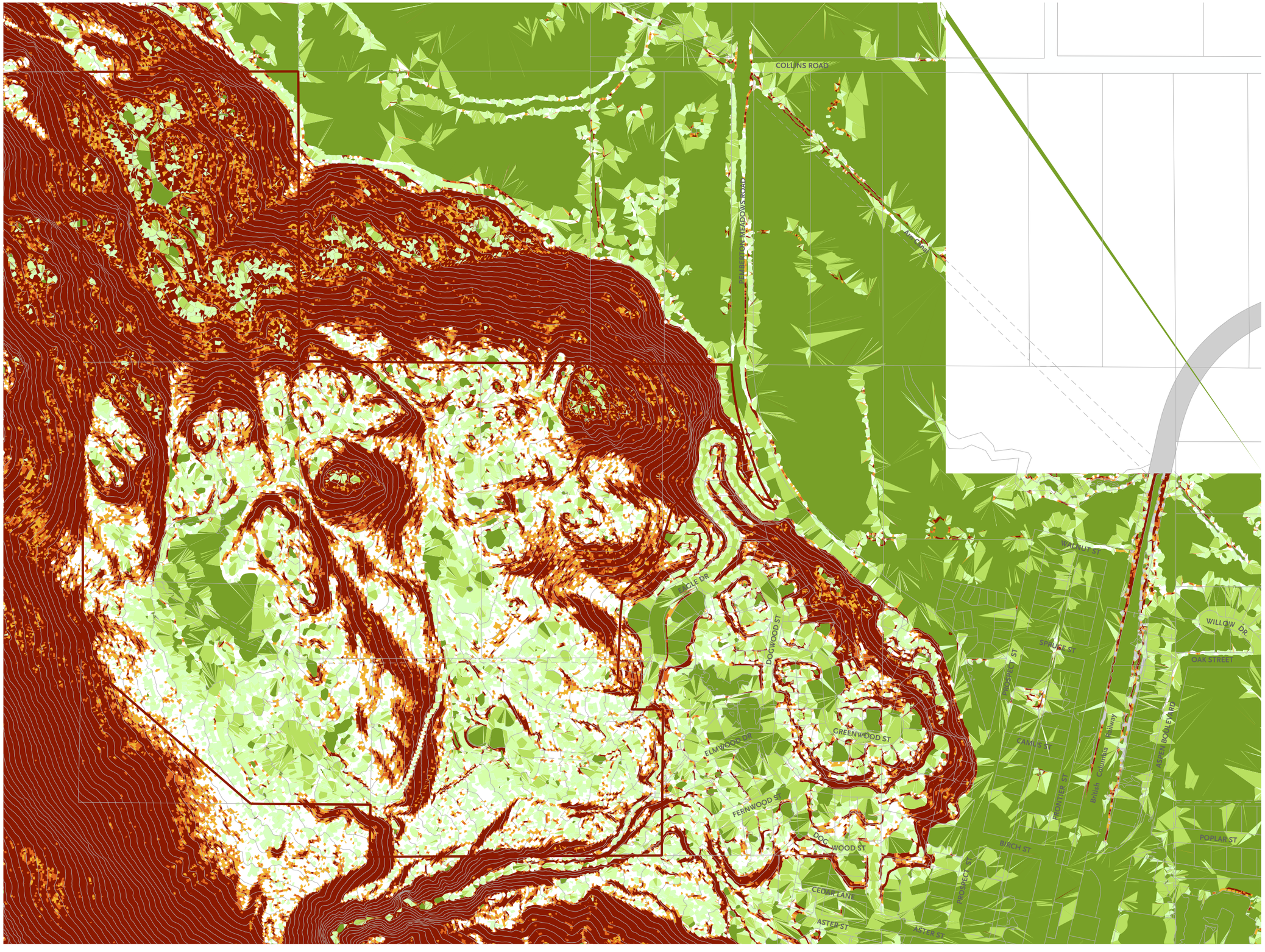
0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

Figure 4

SLOPE ANALYSIS



LEGEND — DECEMBER 2019

- Site Boundary
  61.52 ha | 152.02 ac
- Legal Property Lines
- 5m Contour

- 0 - 5% Slope
- 5 - 10% Slope — *flat*
- 10 - 15% Slope
- 15 - 20% Slope — *gentle*
- 20 - 25% Slope — *moderate*
- 25 - 30% Slope
- 30 - 35% Slope — *steep*
- 35 - 40% Slope
- +40% Slope — *extreme*

0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

Figure 5

ASPECT ANALYSIS

LEGEND

DECEMBER 2019

- Site Boundary
  61.52 ha | 152.02 ac
- Legal Property Lines
- 5m Contour

NORTH
WEST
EAST
SOUTH

0 25 50 75 125 250m

EKISTICS

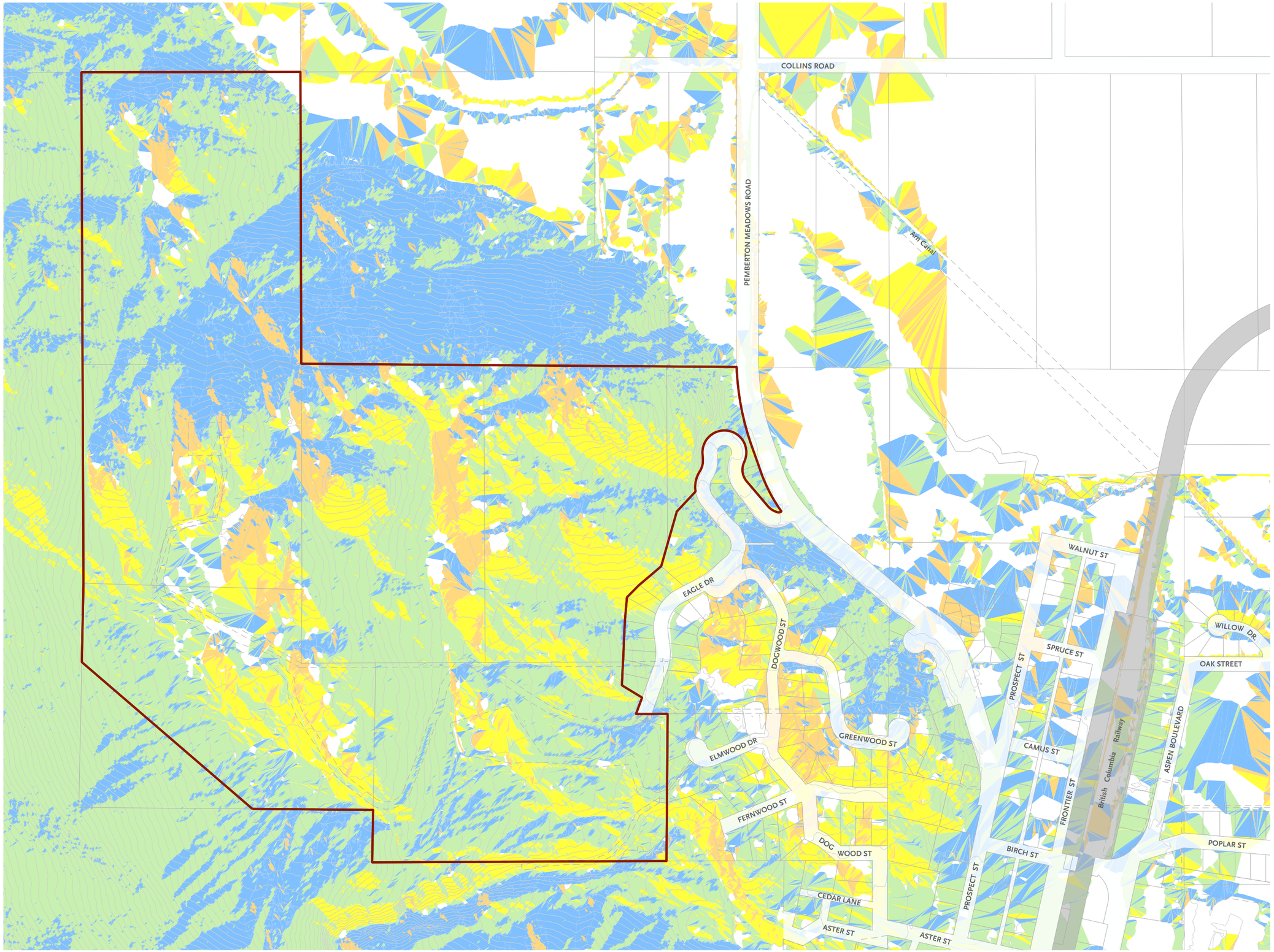
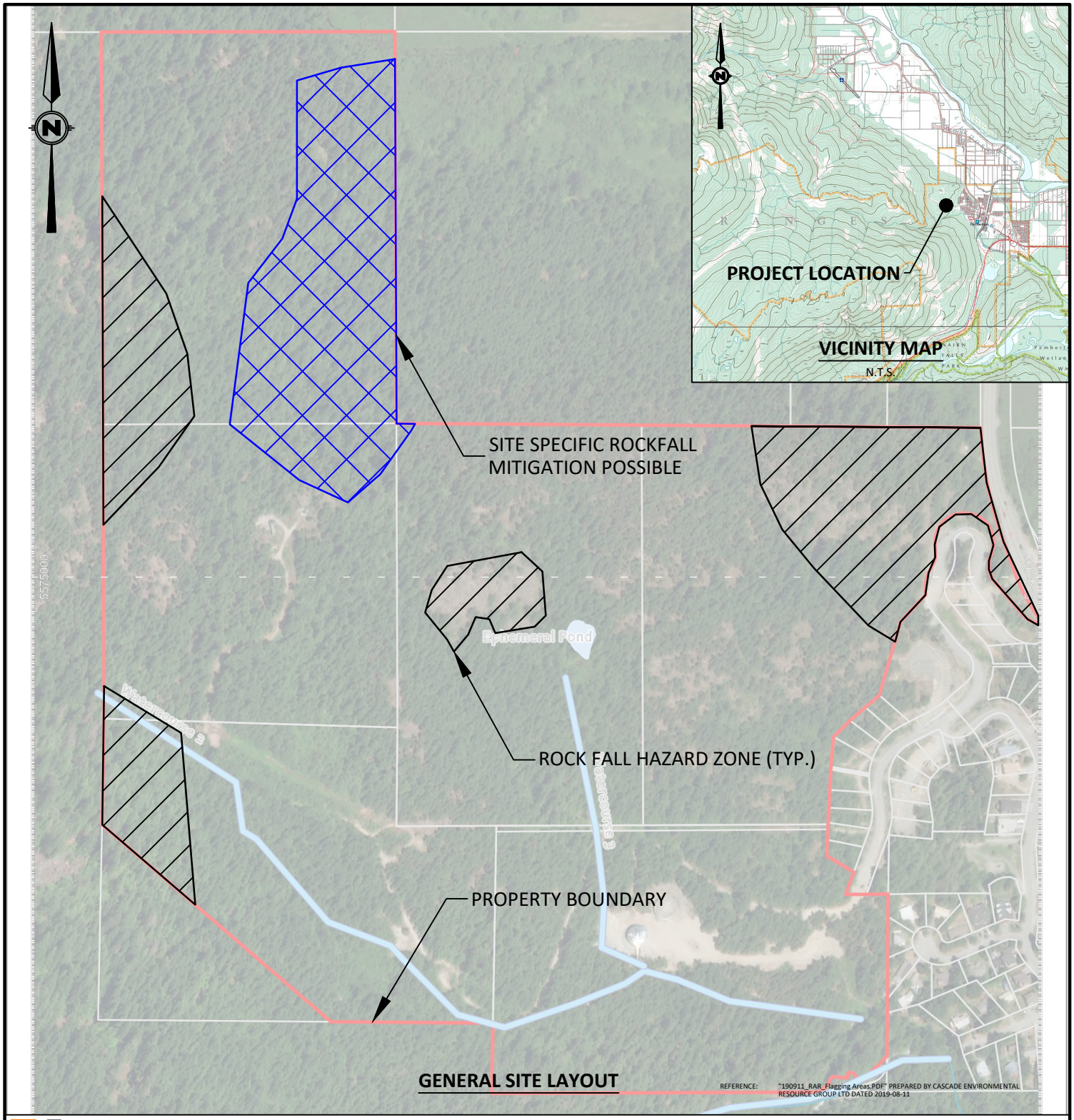


Figure 6



KONTUR GEOTECHNICAL CONSULTANTS inc.
Unit 65, 1833 Coast Meridian Rd., Port Coquitlam, B.C. V3C 6G5
t. +1 (778) 730-1747 | toll-free. +1 (833) 301-7575 | e. info@kontur.ca | www.kontur.ca

TITLE: PRELIMINARY ROCKFALL HAZARD AREAS	DATE: 2019-10-23	PROJECT NO.: K-191204-00
	SCALE: 1:5500	DWG NO.: FIGURE 1

CLIENT: BETHEL LAND CORPORATION	NO.	REVISIONS	DATE
	0	ISSUED FOR REVIEW	2019-10-23
PROJECT: PROPOSED BENCHLANDS DEVELOPMENT PEMBERTON, B.C.			

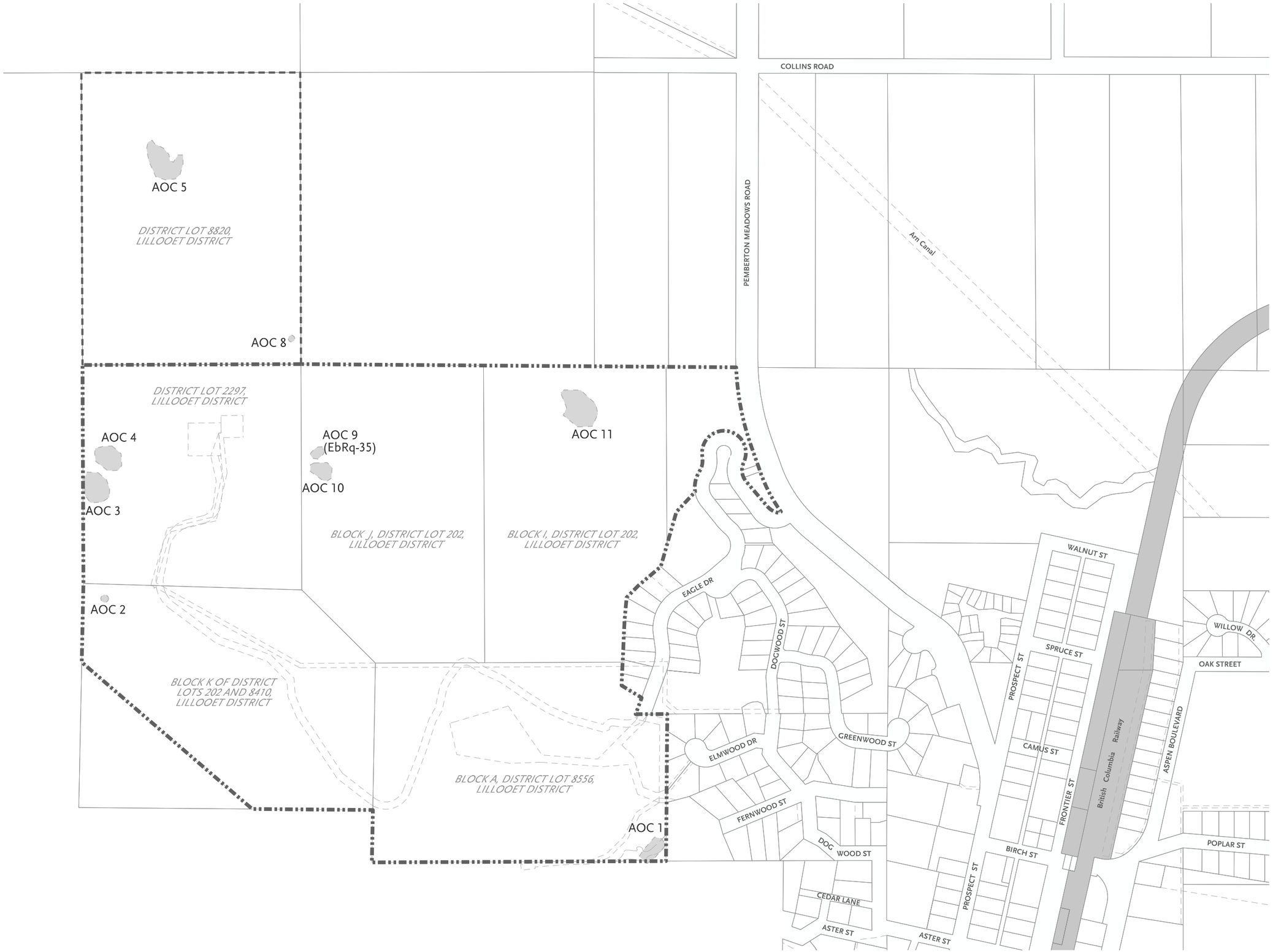
DRAFT: JL | DESIGN: - | CHECK: EGS

December 5, 2019 11:13:09 AM

SKENKENAM LANDS
PEMBERTON BC

Figure 7

ARCHAEOLOGICAL AREAS OF CONCERN



LEGEND — FEBRUARY 2021

- Area of Study
  49.59 ha | 122.54 ac
- Lil'wat Land in SLRD
  11.93 ha | 29.48 ac
- Legal Property Lines
- Right-Of-Way
- *BLOCK* Property Legal Description
- Archaeological Areas of Concern

SCALE 1:5000

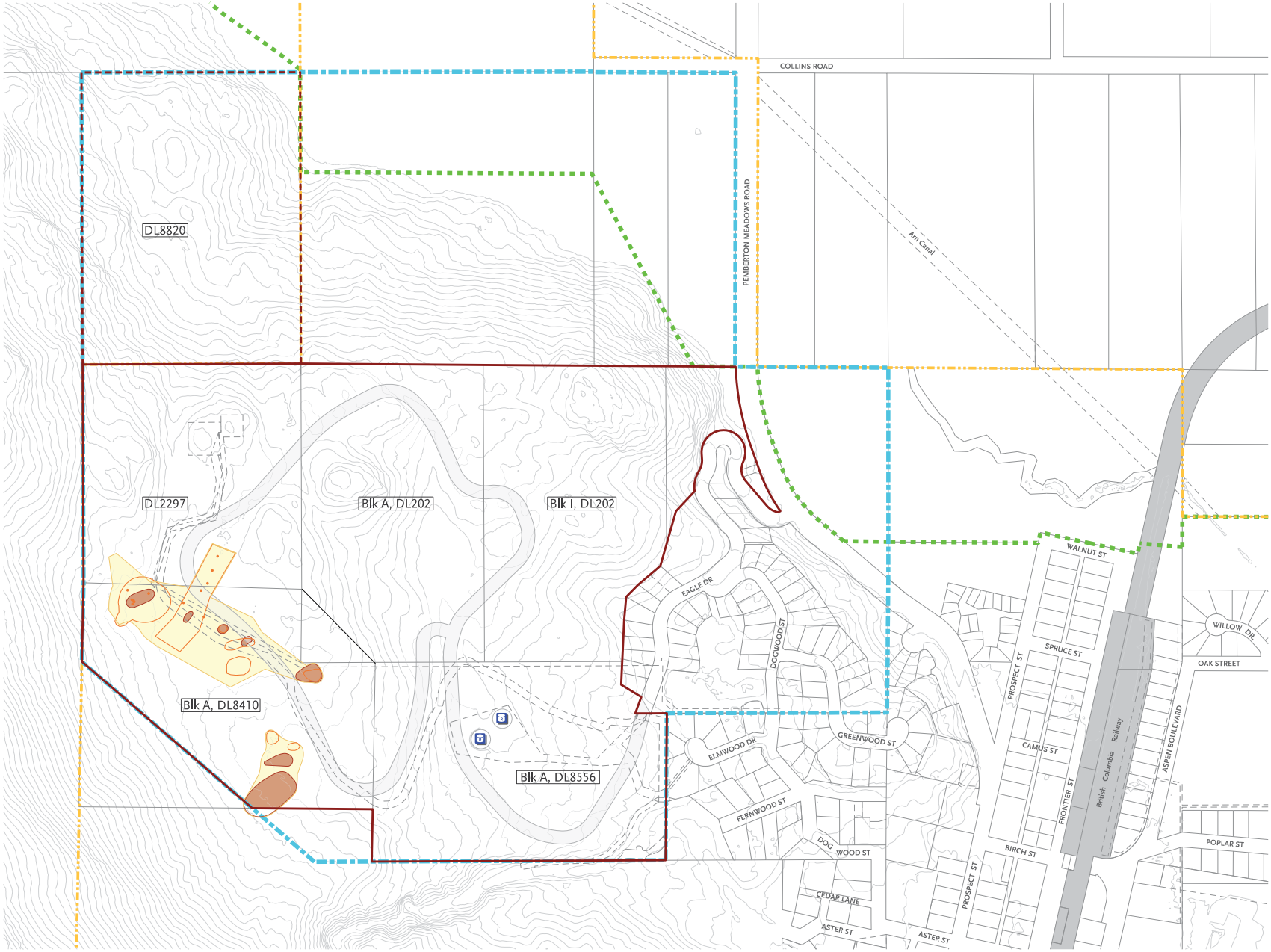
0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

SOIL CONTAMINATION BY TYPE - SLR 2020

Figure 8



LEGEND — SEPTEMBER 2020

- Area of Study
  49.59 ha | 122.54 ac
- Lil'wat Land in SLRD
  11.93 ha | 29.48 ac
- Legal Parcel Lines
- DL2297 Legal Parcel Number
- Legal Easements
- ALR Boundary
- Village of Pemberton Boundary
- NCP Boundary
- 5m Contour
- Proposed Collector Alignment
- Existing Water Reservoirs
- Soil Contamination Extent - SLR 2020

SOIL CONTAMINATION EXTENTS BY TYPE - SLR 2020

- Lead Concentrations Greater Than CSR RL Standards
- Copper Concentrations Greater Than 2000 mg/kg
- Copper Concentrations Greater Than 200 mg/kg
- Metals Concentrations Greater Than Applicable CSR RL Standards

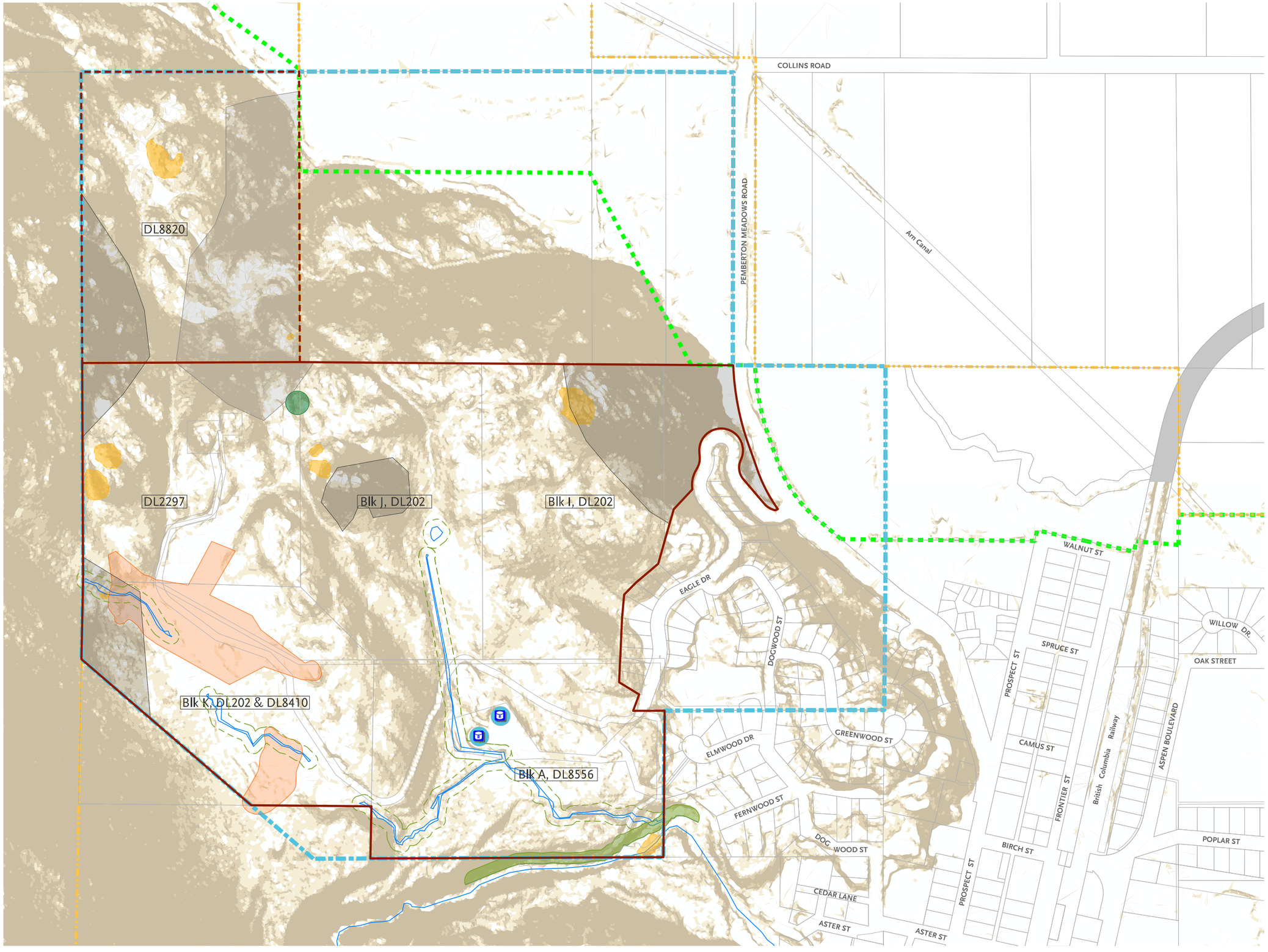
0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

Figure 9

SITE CONSTRAINTS



LEGEND — MARCH 2021

- Area of Study
  49.59 ha | 122.54 ac
- Lil'wat Land in SLRD
  11.93 ha | 29.48 ac
- Legal Property Lines
- 5m Contour
- ALR Boundary
- Village of Pemberton Boundary
- NCP Boundary
- Proposed Collector Alignment
- Existing Water Reservoirs
- 20 - 30% Slope
- 30 - 40% Slope
- +40% Slope
- Old Growth Douglas Fir
- Contaminated Sites
- Archaeological Areas of Concern
- Rockfall Hazard Zone
- Rockfall Mitigation
- Surveyed Watercourse
- 15m SPEA Setback
- 10m Recommended RAR Setback
- Pemberton Creek

SCALE 1:5000

0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

Figure 10

DEVELOPMENT POTENTIAL PLAN

COLLINS ROAD
PEMBERTON MEADOWS ROAD
Arn Canal
WALNUT ST
EAGLE DR
DOGWOOD ST
SPRUCE ST
PROSPECT ST
WILLOW DR.
OAK STREET
ELMWOOD DR
GREENWOOD ST
CAMUS ST
FRONTIER ST
British Columbia Railway
ASPEN BOULEVARD
FERNWOOD ST
DOG WOOD ST
BIRCH ST
POPLAR ST
CEDAR LANE
ASTER ST
ASTER ST
PROSPECT ST

Note the site contaminiation is not up to date for DL 2297 and Block K, DL 8410

LEGEND — NOVEMBER 2019

- Site Boundary — *61.52 ha | 152.02 ac*
- Legal Property Lines
- 5m Contour
- ALR Boundary
- Pemberton Creek

VILLAGE OF PEMBERTON LANDS

51%	Development Areas	*25.21 ha | 62.30 ac*
12%	Development Areas - Constrained	*5.81 ha | 14.35 ac*
37%	Non Developable Areas	*18.57 ha | 45.89 ac*
100%		*49.59 ha | 122.54 ac*

SLRD LANDS

20%	Development Areas - Constrained	*2.42 ha | 5.98 ac*
80%	Non Developable Areas	*9.51 ha | 23.50 ac*
100%		*11.93 ha | 29.48 ac*

0 25 50 75 125 250m

EKISTICS

SKENKENAM LANDS
PEMBERTON BC

Figure 11

DEVELOPMENT YIELD PLAN DRAFT V3.0

PEMBERTON MEADOWS ROAD
EAGLE DR
DOGWOOD ST
GREENWOOD ST
ELMWOOD DR
FERNWOOD ST
DOG WOOD ST
CEDAR LANE

LEGEND — JANUARY 2021

- Site Boundary — *31.23 ha | 77.17 ac*
- Legal Parcel Lines
- 5m Contour
- ALR Boundary
- Surveyed + Realigned Streams
- Existing Water Reservior

PROPOSED LAND USE - DRAFT V2.0

28%	Single Family Development Areas	*8.63 ha | 21.33 ac*
6%	Strata Townhome Development Areas	*2.03 ha | 5.02 ac*
1%	Apartment Development Areas	*0.22 ha | 0.54 ac*
1%	Civic Infrastructure	*0.37 ha | 0.91 ac*
3%	Neighbourhood Park	*1.06 ha | 2.62 ac*
34%	Nature Park	*10.75 ha | 26.56 ac*
10%	Natural Area	*2.99 ha | 7.39 ac*
11%	Public Road ROW	*3.34 ha | 8.25 ac*
6%	Development Reserve	*1.84 ha | 4.55 ac*
100%		*31.23 ha | 77.17 ac*

DRAFT YIELD

	Large Single Family | 18m	*24*	*9%*
	Medium Single Family | 15m	*40*	*15%*
	Small Single Family | 12m	*47*	*18%*
	Duplex Single Family | 11m	*24*	*9%*
	Townhome | 6m	*92*	*34%*
	Apartment	*40*	*15%*
	TOTAL	*267*	*100%*

0 25 50 75 125 250m

EKISTICS

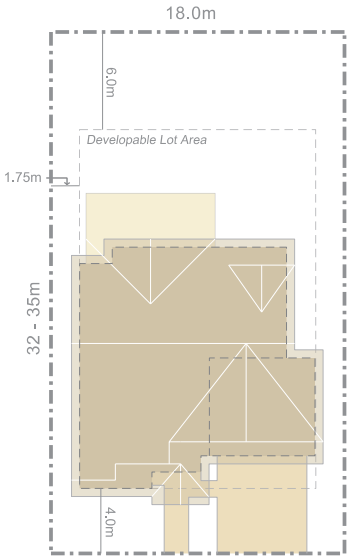
Lot and Housing Typologies

Skenkenam | Pemberton, BC

December, 2019

Figure 12

Single Family Lot | Large



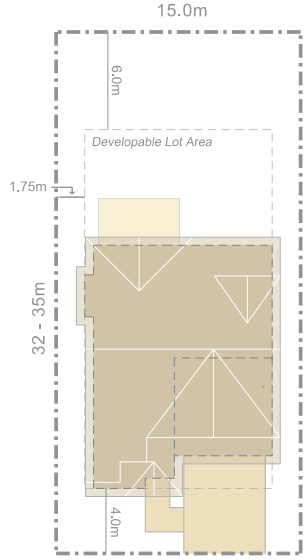
LOT DIMENSIONS

Minimum Lot Size:	580m² (0.14ac)
Typical Lot Width:	18.0m (~59')
Minimum Lot Depth:	32m (~105')
Front Yard Setback:	4.0m
Garage Setback:	6.0m
Rear Yard Setback:	6.0m
Side Yard Setback:	1.75m
Lot Access:	Street

HOUSE DIMENSIONS

Basement Living Area:	1,000 sq ft
Main Floor Living Area:	1,550 sq ft
Upper Floor Living Area:	800 sq ft
Garage:	420 sq ft
Total Home:	3,770 sq ft
Storeys	3

Single Family Lot | Medium



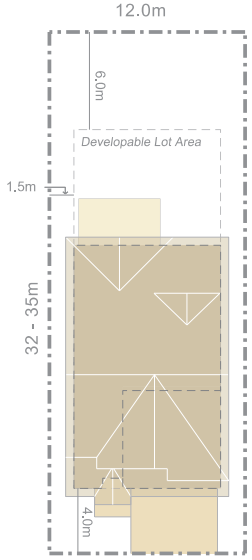
LOT DIMENSIONS

Minimum Lot Size:	480m² (0.12ac)
Typical Lot Width:	15.0m (~49')
Minimum Lot Depth:	32m (~105')
Front Yard Setback:	4.0m
Garage Setback:	6.0m
Rear Yard Setback:	6.0m
Side Yard Setback:	1.75m
Lot Access:	Street

HOUSE DIMENSIONS

Basement Living Area:	750 sq ft
Main Floor Living Area:	1,245 sq ft
Upper Floor Living Area:	800 sq ft
Garage:	400 sq ft
Total Home:	3,195 sq ft
Storeys	3

Single Family Lot | Small



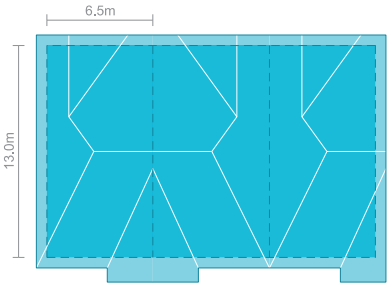
LOT DIMENSIONS

Minimum Lot Size:	400m² (0.10ac)
Typical Lot Width:	12.0m (~40')
Minimum Lot Depth:	32m (~105')
Front Yard Setback:	4.0m
Garage Setback:	4.0m
Rear Yard Setback:	6.0m
Side Yard Setback:	1.50m
Lot Access:	Street

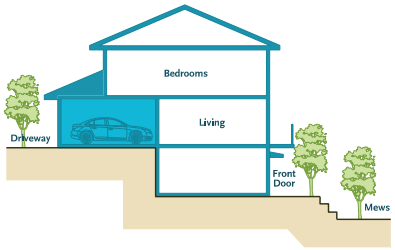
HOUSE DIMENSIONS

Basement Living Area:	650 sq ft
Main Floor Living Area:	1,050 sq ft
Upper Floor Living Area:	750 sq ft
Garage:	400 sq ft
Total Home:	2,850 sq ft
Storeys	3

Strata Townhome | Walkout



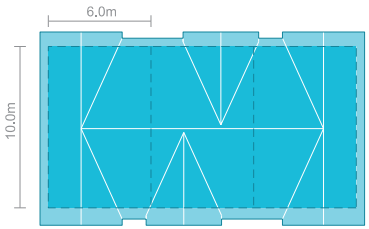
Typical Section



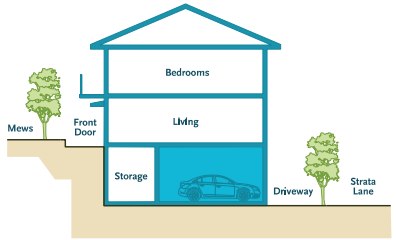
UNIT STATISTICS

Basement Living Area:	470 sq ft
Main Floor Living Area:	470 sq ft
Upper Floor Living Area:	675 sq ft
Side-by-Side Garage:	440 sq ft
Total Home:	2,055 sq ft
Storeys	3

Strata Townhome | Walkup



Typical Section



UNIT STATISTICS

Basement Living Area:	220 sq ft
Main Floor Living Area:	585 sq ft
Upper Floor Living Area:	640 sq ft
Side-by-Side Garage:	425 sq ft
Total Home:	1,870 sq ft
Storeys	3

SKENKENAM LANDS
PEMBERTON BC

Figure 13

DEVELOPMENT YIELD PLAN DRAFT V3.0 RESERVOIR + AOC

LEGEND — JANUARY 2021

- Site Boundary *31.23 ha | 77.17 ac*
- Legal Parcel Lines
- 5m Contour
- ALR Boundary
- Surveyed + Realigned Streams
- Existing Water Reservoir
- Archaeological AOC
- Proposed Future Water Reservoir

PROPOSED LAND USE - DRAFT V2.0

28%	Single Family Development Areas	*8.63 ha | 21.33 ac*
6%	Strata Townhome Development Areas	*2.03 ha | 5.02 ac*
1%	Apartment Development Areas	*0.22 ha | 0.54 ac*
1%	Civic Infrastructure	*0.37 ha | 0.91 ac*
3%	Neighbourhood Park	*1.06 ha | 2.62 ac*
34%	Nature Park	*10.75 ha | 26.56 ac*
10%	Natural Area	*2.99 ha | 7.39 ac*
11%	Public Road ROW	*3.34 ha | 8.25 ac*
6%	Development Reserve	*1.84 ha | 4.55 ac*
100%		*31.23 ha | 77.17 ac*

DRAFT YIELD

	Large Single Family | 18m	*24*	*9%*
	Medium Single Family | 15m	*40*	*15%*
	Small Single Family | 12m	*47*	*18%*
	Duplex Single Family | 11m	*24*	*9%*
	Townhome | 6m	*92*	*34%*
	Apartment	*40*	*15%*
	TOTAL	*267*	*100%*

0 25 50 75 125 250m

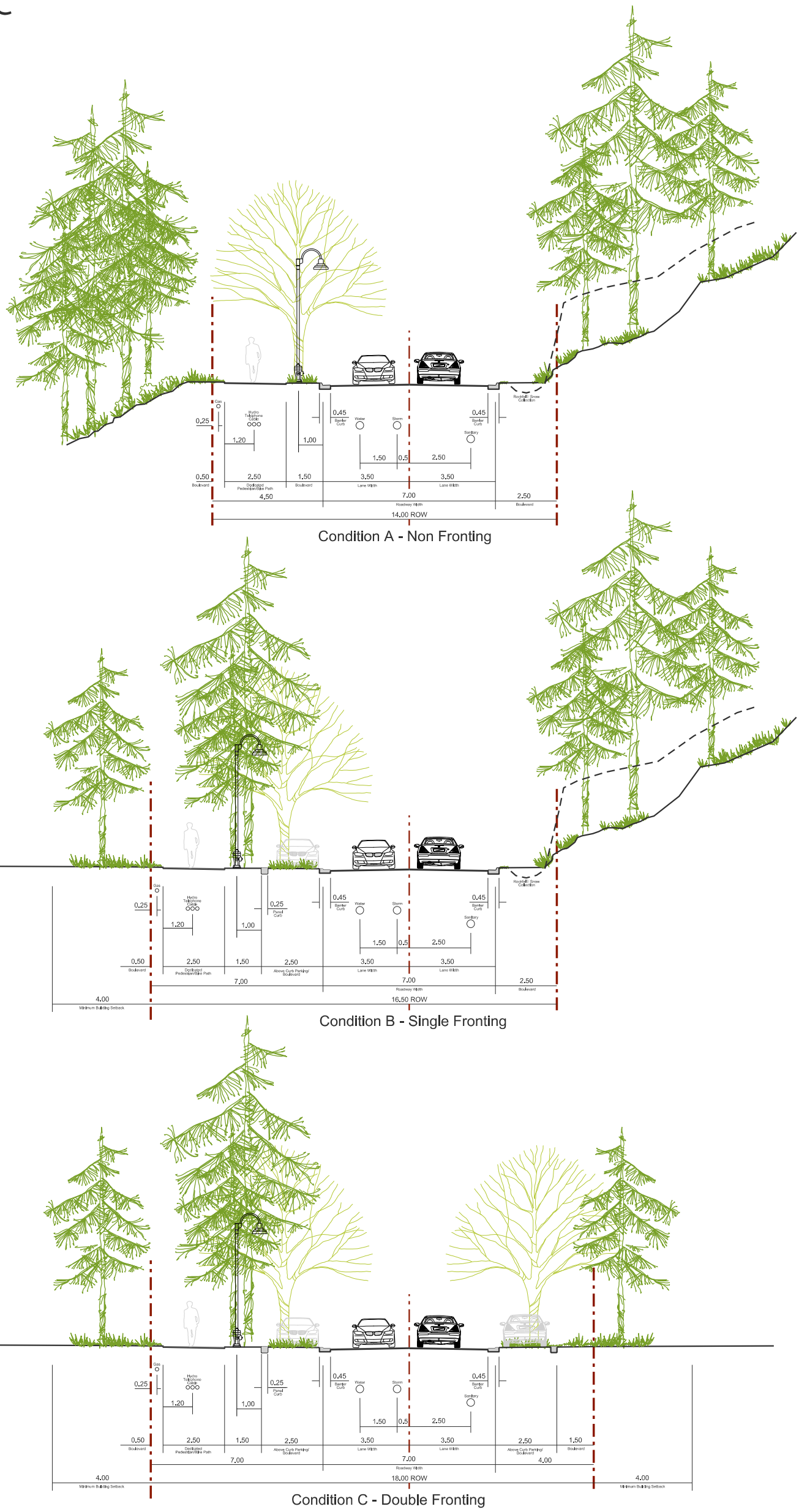
EKISTICS

Benchlands | Pemberton BC

Proposed Collector Standard

January 2020

DRAFT

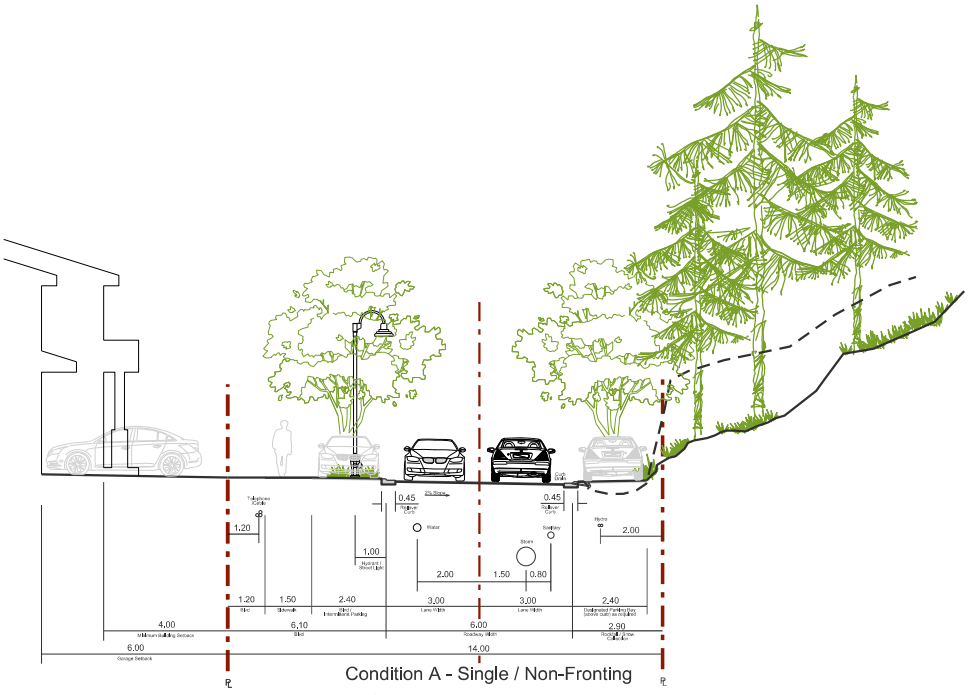


Benchlands | Pemberton BC

Proposed Local + Strata Standard

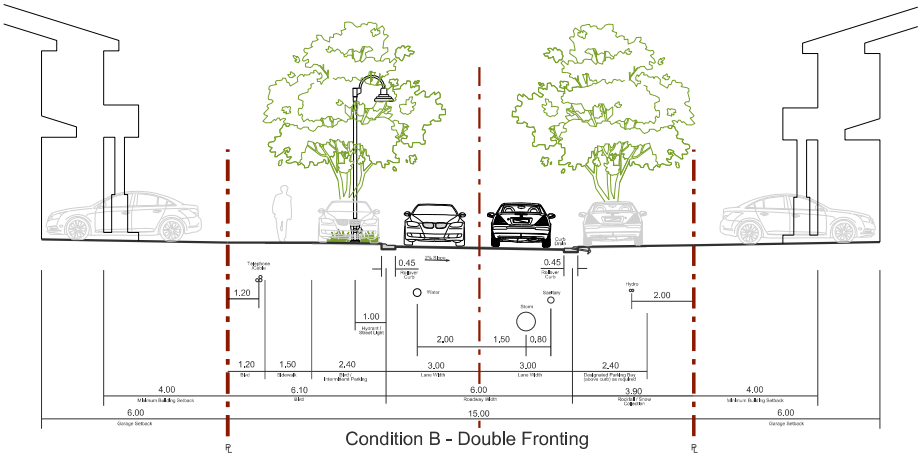
January 2020

DRAFT



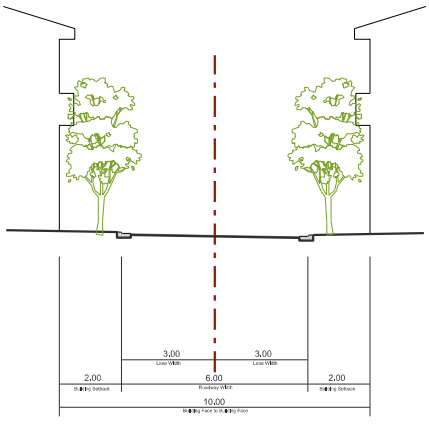
Condition A - Single / Non-Fronting

DRAFT



Condition B - Double Fronting

DRAFT



Strata Road

SKENKENAM LANDS
PEMBERTON BC

Figure 15

DEVELOPMENT PHASING PLAN DRAFT V3.0

LEGEND — JANUARY 2021

- Site Boundary — *31.23 ha | 77.17 ac*
- Legal Property Lines
- 5m Contour
- ALR Boundary
- Surveyed + Realigned Streams
- Phase Boundary
- (#) Phase Name
- Phase 1
- Phase 2

PROPOSED LAND USE - DRAFT V2.0

28%	Single Family Development Areas	*8.63 ha | 21.33 ac*
6%	Strata Townhome Development Areas	*2.03 ha | 5.02 ac*
1%	Apartment Development Areas	*0.22 ha | 0.54 ac*
1%	Civic Infrastructure	*0.37 ha | 0.91 ac*
3%	Neighbourhood Park	*1.06 ha | 2.62 ac*
34%	Nature Park	*10.75 ha | 26.56 ac*
10%	Natural Area	*2.99 ha | 7.39 ac*
11%	Public Road ROW	*3.34 ha | 8.25 ac*
6%	Development Reserve	*1.84 ha | 4.55 ac*
100%		*31.23 ha | 77.17 ac*

DRAFT YIELD

	Large Single Family | 18m	*24*	*9%*
	Medium Single Family | 15m	*40*	*15%*
	Small Single Family | 12m	*47*	*18%*
	Duplex Single Family | 11m	*24*	*9%*
	Townhome | 6m	*92*	*34%*
	Apartment	*40*	*15%*
	TOTAL	*267*	*100%*

0 25 50 75 125 250m

EKISTICS

Bethel Land Corporation
401 - 37989 Cleveland Ave
Squamish, B.C.
V6B 0C8

Attention: **Caroline Lamont**
Land Development Manager

Re: **Nkwûkwma Development (Pemberton Benchlands)**
Development Servicing Report

At your request and to support the proposed Nkwûkwma Development (Pemberton Benchlands) rezoning submission to the Village of Pemberton, InterCAD has carried out an engineering study relating to on-site road access and site servicing of the development layout as prepared by EKISTICS. The results of our study are summarized below.

1. Introduction

The objective of this study is to provide a general overview of the access and servicing requirements for the proposed Pemberton Benchlands development.

A Neighbourhood Concept Plan (NCP) was previously prepared for the site and presented to the Village of Pemberton in 2005. This NCP was subsequently adopted into the Village of Pemberton (VoP) Official Community Plan (OCP) in 2007. Anticipated site servicing requirements were presented as part of this NCP, however, evolving site constraints and limitations have since required that the development layout be revisited, and servicing requirements re-evaluated based on this revised layout.

The current development plan proposes approximately 267 units, consisting of single-family lots, townhomes, and an apartment complex.

Servicing for Phase 1 of the Benchlands (herein referred to as Phase 1) was previously completed in 2005. Most of the remaining undeveloped areas of the Benchlands are substantially higher in elevation and constrained primarily by rugged site topography, archaeological sites, existing creeks, and rockfall hazard zones.

Note there is a portion of the upper Benchlands that will be subject to future, long-term development and a separate rezoning application. A gun range previously occupied these lands and as such has resulted in the area being contaminated by traces of total metals and hydrocarbons. These contaminated lands are excluded from this rezoning application and will be subject to an approved contamination remediation plan prior to being rezoned. It is however important to consider the future

expansion of this area in the infrastructure planning and assessment of the Benchlands site and existing infrastructure.

The proposed servicing plans for roads, water distribution, sanitary sewers and drainage are appended to this report with specific commentary below.

2. Road Network

The road network for the Benchlands is illustrated in *Appendix A – Road Network Plan*. The concept of the plan is to access the developable lands in the upland areas using a collector road that extends from existing Eagle Ridge Drive and loops onto itself while linking the various developable benches.

Given the rugged and often steep topography, frequent use of maximum road grades as permitted by the VoP Subdivision and Development Control Bylaw (#677, 2011) will be required to access the developable benches throughout the Benchlands. Significant cut and fill slopes may also be required at some locations.

The topography also constrains the horizontal alignment flexibility of the road network. In many cases, the roads must have sufficient length to maintain a maximum grade of 12% or less (8% through intersections) while also minimizing the impact caused by major cut and fill slopes. This results in lower design speeds to help facilitate tighter curve radii and better accommodate the challenging site topography.

With the future expansion of the development into the upper portions of the Benchlands (the area excluded from this rezoning application), it is expected that the collector road would be extended and loop around onto the lower collector, establishing a ring-road configuration. A combination of local roads and cul-de-sacs would branch off the collector extension.

Specific design requirements such as right-of-way widths, local road and cul-de-sac lengths, changes in vertical grades, etc. have also been considered. A full design criteria summary has been prepared for the Benchlands development to help elaborate on the design requirements noted above. It is expected the proposed road network will be designed and constructed to satisfy these requirements. See *Appendix B – Road Design Criteria Summary*.

Note that the lanes reflected in the road network are considered conceptual in nature and have not been reviewed as part of the road network analysis. Lanes should be limited to 12% grade and will need to accommodate single-unit trucks and, in some cases, fire truck turning movements.

3. Water Distribution Plan

The water distribution plan for the Pemberton Benchlands is illustrated in *Appendix C – Water Distribution Plan*.

There are currently two existing reservoirs within the Pemberton Benchlands site with a top water level (TWL) of approximately 290m in elevation and a combined capacity of approximately 3,130m^3. The reservoirs are supplied by three wells in Pioneer Park and Foughberg Park, drawing water from the Pemberton Creek Fan Aquifer. These reservoirs provide adequate water pressure to service lands below elevation 260m (pressure zone 1), encompassing existing Phase 1 of the Benchlands and the remainder of the Pemberton Village.

The entirety of the proposed development is located above the pressure zone 1 boundary with significant elevation change. Servicing of these lands will require the construction of a new reservoir and associated pump stations within the Benchlands to service the proposed development. A new reservoir is being proposed within the upper limits of the current development boundary, with a TWL of approximately 350m elevation. This reservoir will feed two additional pressure zones (zones 2 and 3) above the existing 260m zone 1 pressure zone elevation. Each zone will encompass an elevation range of approximately 50m. The reservoir will require a volume of approximately 1,800m^3, based on 366m^3 of balancing storage, 1080m^3 of fire storage and 362m^3 of emergency storage.

To supply the reservoir, a pump station will be required adjacent to the two existing zone 1 reservoirs that draws water from the existing supply main. From this pump station, a new zone 2 water supply / distribution main will provide water to the new reservoir as well as distribute water to the pressure zone 2 system.

A second pump station will be located beside the new reservoir, consisting of a series of domestic pumps that will have the ability to provide both daily domestic and fire flow demands to pressure zone 3. A small number of lots within the current development are within zone 3, as well as the whole extent of the future development to the west.

Zone 3 will be serviced by the pump station noted above and not by an additional zone 3 reservoir as originally envisioned in the NCP due to complications in positioning and accessing a reservoir in the upper lands of the future development. Only one location within the future development would provide adequate elevation to supply zone 3 by gravity; investigation related to this location found conflict with a significant archeological site as well as extremely challenging road grades / alignment issues to reach the reservoir site having to traverse steep slopes and hazardous rockfall zones.

Note that the existing zone 1 reservoirs supply and distribution mains will also require relocation so as to follow the proposed alignment of the collector road and suit the new development layout. A standby generator will accompany both proposed pump stations for emergency backup purposes. Detailed engineering analysis will be required to determine the exact sizing of the pump station and piping systems, and to confirm locations and operating parameters for the pressure reducing stations.

Water Demands

To understand the impact the development will have on the existing Village of Pemberton water distribution network, anticipated daily demands have been determined for the development as it is reflected in *Appendix C*, along with future demands for long-term development build-out.

Populations of both proposed and future development phases for the purpose of calculating water demands are as follows:

	Single Family Units	Single Family Population	Townhome Units	Townhome Population	Apartment Units	Apartment Population	Total Population
Proposed	135	405	92	249	40	68	**722**
Future	81	243	106	287	-	-	**530**
Total	**216**	**648**	**198**	**536**	**40**	**68**	**1,252**

Note:
(1) Population counts are based on the following: 3 persons per single-family unit; 2.7 persons per townhome unit; 1.7 persons per apartment unit.
(2) Number of units are based on Ekistics development plan, dated 18-Jan-2021.

Table 1: Development Populations

The daily demands per capita are as follows:

Average Daily Domestic Flow (L/capita/day)	Maximum Daily Domestic Flow (L/capita/day)	Peak Hour Domestic Flow (L/capita/day)
455	910	1,820

Note:
(1) Per capita demands are derived from Village of Pemberton Bylaw 677 – Section 3.2.
(2) These daily demand flows do not account for fire suppression / sprinkler system flows.

Table 2: Residential Daily Demand Per Capita

Considering the populations and per capita demands above, the daily demands anticipated for the development are determined as:

Land use	Daily Demands		
	Average Daily Domestic Flow (L/day)	**Maximum Daily Domestic Flow** (L/day)	**Peak Hour Domestic Flow** (L/hour)
Proposed			
Single Family	184,275	368,550	30,713
Townhomes	113,295	226,590	453,180
Apartments	30,940	61,880	123,760
Proposed Total	**328,510**	**657,020**	**1,314,040**
Future			
Single Family	110,565	221,130	442,260
Townhomes	130,585	261,170	522,340
Apartments	-	-	-
Future Total	**241,150**	**482,300**	**964,600**
TOTAL	**569,660**	**1,139,320**	**2,258,640**

Table 3: Daily Water Demands

A minimum fire flow of 120L/s is expected given that the proposed development includes townhomes and apartments; it is expected that this fire flow can be achieved with the proposed watermain network. However, the fire flow storage within the proposed reservoir is approximately 1080m^3, of which is enough volume to provide a 150L/s fire flow (for commercial and institutional uses) for up to 2 hours (not including emergency storage).

It is uncertain whether any upgrades to the existing water supply are required to service the projected additional demands (i.e. new supply wells if the existing supply is found to be inadequate, etc.). The Village of Pemberton should advise as to whether any upgrades are anticipated.

4. Sanitary Sewer Plan

The proposed sanitary sewer servicing plan for the Benchlands is illustrated in *Appendix D –Sanitary Sewer Schematic*.

A sanitary sewer pump station exists at the intersection of Eagle Ridge Drive and Pemberton Meadows Road, of which was constructed as part of the Phase 1 development. A sanitary sewer trunk main extends uphill from this pump station to the end of existing Eagle Ridge Drive. A sanitary forcemain

also connects the pump station to a gravity sewer line at the intersection of Prospect Street and Pemberton Meadows Road, where effluent eventually makes its way to the Pemberton Wastewater Treatment Facility.

Due to the relatively steep terrain, the sanitary sewer will use a gravity system in proposed roads and lanes. Servicing easements will also be required periodically throughout the development (with appropriate construction and maintenance access), namely at the termination of downhill cul-de-sacs.

The proposed collector road will carry a sanitary sewer trunk main that extends from the upper areas of the proposed development, picking up sanitary sewer branches from connecting local streets and cul-de-sacs. The trunk main will tie into the existing sanitary sewer trunk in Eagle Ridge Drive. Sanitary trunk main extensions are also anticipated as part of the future, long-term development into the lands currently excluded from the rezoning application. The future lots serviced by these trunk extensions will also flow to the existing Phase 1 pump station.

Sanitary Flow Contribution

Based on the anticipated populations of the proposed and future phases of the development (per *Section 3* above), the anticipated effluent flows that will be directed to the existing sanitary sewer trunk main in Eagle Ridge Drive and in turn to the existing pump station adjacent Pemberton Meadows Road have been determined. Per Village of Pemberton Bylaw 677 – Section 4.2, a residential average domestic flow rate of 410L/capita/day and an infiltration rate of 0.17L/s/ha was adopted for the peak flow calculations. The peaking factor was calculated per MMCD Design Guidelines (2014) – Section 3.4. The peak flows that will be introduced into the existing sanitary sewer trunk main in Eagle Ridge Drive for both the proposed and future build-outs are as follows:

	Population (persons)	**Average Daily Domestic Flow** (L/day)	**Inflow and Infiltration** (L/day)	**Average Daily Domestic Flow + Infiltration** (L/day)	**Peaking Factor** -	**Peak Flow** (L/s)
Proposed	722	296,020	159,805	455,825	3.31	11.4
Future (1)	1252	513,320	267,762	781,082	3.13	21.7

Note:
(1) Future population and flows are inclusive of proposed populations (i.e. total population after full development build-out.

Table 4: Sanitary Flow Contributions

It is assumed that the existing trunk in Eagle Ridge Drive has adequate capacity to convey the flow introduced from the upland Benchlands development given that the first phase of multi-phase projects typically take into consideration future project expansion, however, this should be verified by the Village of Pemberton. The Village should also confirm that the existing Phase 1 pump station, along

with the remainder of the system up to and including the Pemberton Wastewater Treatment Facility has adequate capacity to support the development, or, if any offsite servicing upgrades are anticipated.

For some lots with exceptionally steep terrain, individual private pumping may be required to move effluent up from the building locations to the proposed gravity system. This should be explored and evaluated through detailed design.

5. Stormwater Management Plan

The purpose of an Integrated Stormwater Management Plan (ISMP) is to demonstrate clear intent of how the development intends to be proactive in applying land-use planning tools to protect property and aquatic habitat, while at the same time accommodating land development and population growth. An ISMP applies a science-based understanding of how natural watersheds function and how this function is affected by land use change. The methodology normally relies on a roundtable process that brings people with knowledge about future land use needs, high-value ecological resources and chronic flooding problems, with the objective of effectively integrating planning, engineering and ecological perspectives. The outcome of this process is to:

- develop watershed performance targets based on site-specific rainfall data, supplemented by streamflow data and on-site soils investigations; and
- translate these performance targets into design guidelines that can be applied at the site level to mitigate the impacts of land development.

The fundamental stormwater management concept is to simulate natural (pre-development) conditions in which much of the day-to-day rainfall either evaporates, supports vegetation, or soaks into the ground rather than flowing directly into watercourses. Therefore, the underlying objective of stormwater management facilities is to intercept stormwater runoff from impervious surfaces and direct it into absorbent areas and/or groundwater retention zones such as rock pits; thereby providing a 'disconnect' between the source of the runoff and the conveyance system. However, such measures are usually insufficient to entirely mitigate the effects of urban development, so detention basins/ponds are also used to attenuate peak storm events.

It is expected that a detailed ISMP will be provided with the initial phase of the Benchlands expansion, per the VoP Subdivision and Development Control Bylaw (#677, 2011), Section 5.2, of which will govern the subsequent phases of the development. It is however important to recognise the stormwater management objectives of the project and their potential implications on the planning of the Benchlands development.

It is noted that Phase 1 implemented a system of surface water collection (open ditches) along all roads, and much of the drainage was routed through a detention pond. While this requires additional roadway widths of approximately 2 metres, the use of open drainage promotes infiltration and groundwater recharge, and helps to improve stormwater quality. For these same reasons, the use of open drainage systems within the proposed Benchlands development is also encouraged.

The conceptual drainage plan is illustrated in *Appendix E – Drainage Master Plan*. This plan represents the anticipated post-development drainage patterns and identifies preferred locations of detention facilities. The intent is that drainage from undeveloped areas will be routed into natural drainage water courses, using ditches, pipes and culverts as needed. To holistically understand the proposed function of stormwater management across the site after full build-out, the future phases of the development have been included in the assessment below.

The drainage system comprises of two catchment areas, both of which will drain into detention ponds before infiltrating or overflowing into existing drainage channels and existing stormwater infrastructure. Each catchment is described below:

Catchment 1 comprises of all the developable land captured in this rezoning application as well as a portion of the future developable area currently omitted from this application. Because of the steep terrain, runoff from the development will be collected into a piped drainage system on the main collector road (Eagle Ridge Drive extension) and will eventually discharge into the existing storm water detention pond in Al Staeshli Park. Little is known about this existing detention pond and the downstream infrastructure; it is assumed that the pond flows directly into an existing piped system in Dogwood Street and eventually discharges into Pemberton Creek near Aster Street.

The existing capacity of the detention pond is unknown, although the pond will likely require upsizing to accommodate the additional detention requirements introduced from the upland development. Preliminary calculations suggest that this detention pond will require approximately **1,700m³** holding capacity (which includes a safety factor of 1.5) to ensure post-development runoff rates are moderated to pre-development conditions.

The original Pemberton Benchlands Neighbourhood Concept Plan (2007) contemplated that this pond would convey a similar catchment to what is currently presented in this rezoning application and should therefore have been constructed with adequate capacity for this approved future development. However, the existing condition of this pond should be evaluated with the Village of Pemberton to understand its current functional effectiveness, along with the capacity of the downstream system. If sufficient capacity can not be built into this infrastructure, it may be necessary to upgrade the drainage system on Eagle Ridge Drive such that flows can be directed to a new detention pond on the eastern side of Pemberton Meadows Road, before being discharged into a watercourse running adjacent the Arn Canal.

Note there may be an opportunity to incorporate other, smaller, detention facilities throughout the development to reduce the size of this overall catchment and therefore the size of the Al Staeshli Park detention pond. This should be explored further through detailed design.

Catchment 2 is entirely within the area of future development. This catchment will be directed to a new detention pond located in the upper Benchlands, before being discharged into an existing natural drainage watercourse, which eventually finds its way to Pemberton Creek.

6. Closing

We trust that the information discussed above suits your current needs. Please contact the undersigned if you have any questions or would like to discuss any aspect in further detail.

Yours truly,

[redacted]

Daniel Arnold, EIT

[redacted]

Stephen Clinton, PEng

Appended:

- Appendix A – Road Network Plan
- Appendix B – Road Design Criteria Summary
- Appendix C – Water Distribution Plan
- Appendix D – Sanitary Sewer Schematic
- Appendix E – Drainage Master Plan

Appendix A

Road Network Plan

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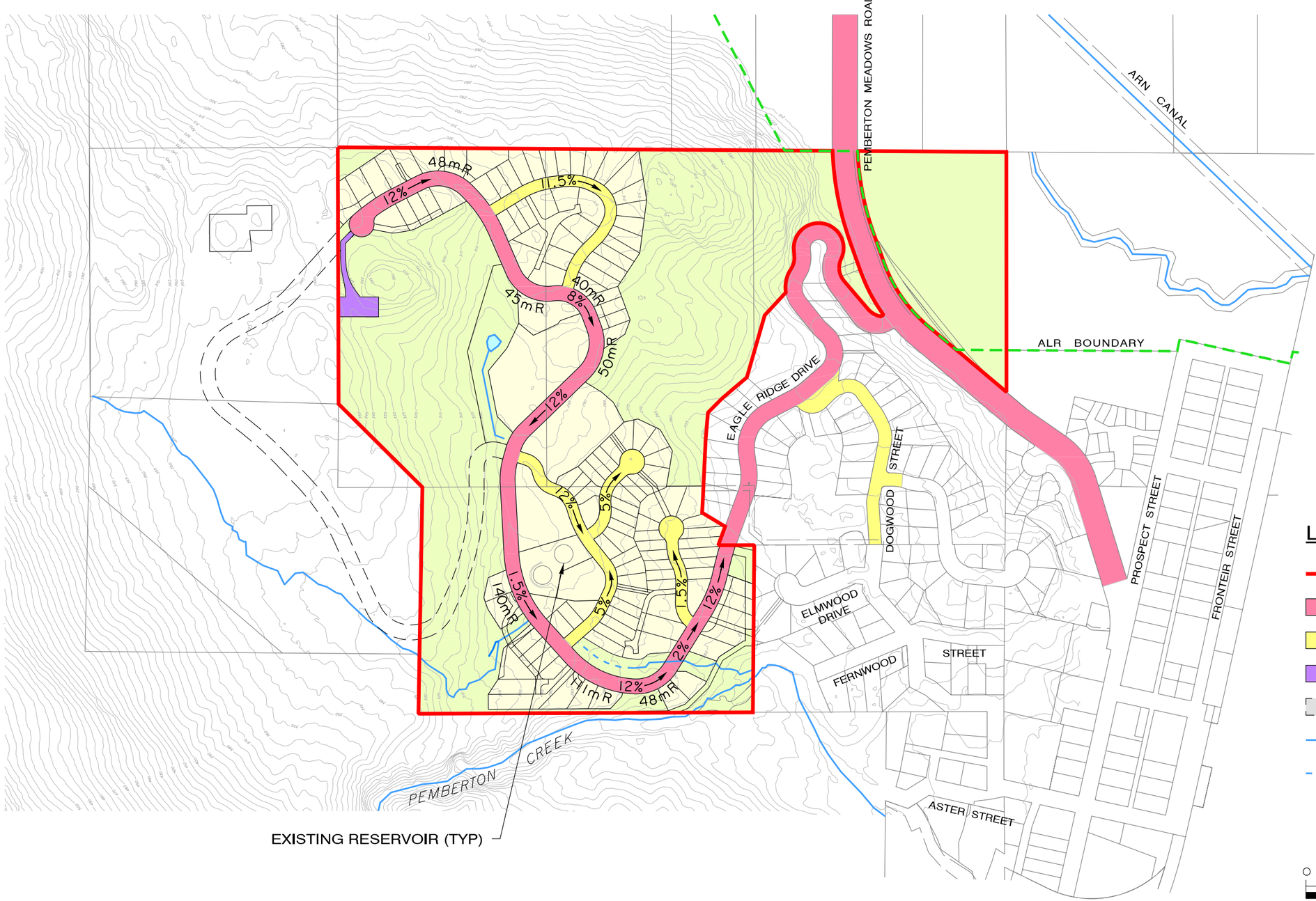

InterCAD Services Ltd. CONSULTING ENGINEERS

Bethel Land Corporation
Nkwukwma Development

ROAD NETWORK PLAN

Appendix B

Road Design Criteria Summary

InterCAD

ROAD DESIGN CRITERIA SUMMARY

Client : **Lil'Wat Nation / Bethel Land Corporation Partnership** File: **AE51**

Project: **Nkwukwma Development (Pemberton Benchlands)** Date: **Feb 4, 2021**

1. Design Speed

Criteria	VoP Subdivision Bylaw No.677	VoP Hillside Development Guidelines	Proposed for Nkwukwma Development
Collector Road	50km/hr [1]	-	30km/hr [3]
Local Road	50km/hr [1]	20-40km/hr [2]	30km/hr [3]

1 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.3.1

2 Suggested design speed for Local Roads per Village of Pemberton Hillside Development Design Guidelines (2019), Streetscape Design.

3 A 30km/hr design speed has been adopted to reduce the required horizontal curve radii of road alignments (see following section), such that road alignments can better accommodate the challenging site topography. 30km/hr design speed is also consistent with the already-built Phase 1 of the Pemberton Benchlands.

2. Horizontal Curve Radii

Criteria	VoP Subdivision Bylaw No.677	TAC	Proposed for Nkwukwma Development
Collector Road	30m [1]	30m [2 3]	30m
Local Road	30m [1]	30m [2 3]	30m

1 Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.4.1 defers to TAC Geometric Design Guide (2017) for horizontal alignment design.

2 See TAC Geometric Design Guide (2017), Figure 3.2.4. Calculated minimum radii are for low speed urban design.

3 Assumes roadway crossfall is 2% normal crown (conservative estimate, as a superelevated road would allow smaller radii).

3. Vertical Gradients

Criteria	VoP Subdivision Bylaw No.677	TAC	Proposed for Nkwukwma Development
Minimum Grade	-	0.5% [1]	1% [2]
Maximum Grade			
Collector Road	12% [3] (14%) [4]	12% [5]	12%
Local Road	10% [3] (12%) [4]	15% [5]	12% [4]
Approach Distance for Minor Road [6]	3% for minimum 15m [7]	3% (max 5-6%) for 20m [8]	3% for minimum 15m [7]
Uphill Cul-de-sac Grades	12% [9]	-	12% [9]
Downhill Cul-de-sac Grades	10% (max. 5% for last 50m) [10]	-	10% (max. 5% for last 50m) [11]
Cul-de-sac Bulb Grades	5% [11]	-	5% [11]

1 See TAC Geometric Design Guide (2017), Section 3.3.2.5.

2 A minimum 1.0% grade has been adopted to ensure adequate / positive surface drainage is achieved on local and collector roads (including through intersections and at curb returns).

3 See Village of Pemberton Subdivision Bylaw No.677 (2011), Table 6.2.

4 Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.16.2 states that maximum roadway grades may be increased by 2% greater than those shown in Table 6.2, subject to Village of Pemberton approval. However, MMCD Design Guidelines (2014), Section 5.19.1 states that this is not recommended in cold climates. MMCD Design Guidelines (2014), Table 5.4 also suggests that the maximum grade for a Local Road is 12% (excluding an additional 2% grade).

5 See TAC Geometric Design Guide (2017), Table 3.3.1.

6 "Grade bench" for approaching road. Assumes that the minor road is approaching a stop condition. Also applies for Culs-de-sacs.

7 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.16.3.a.viii.

8 See TAC Geometric Design Guide (2017), Section 9.7.3.4. TAC notes that this approach distance can be reduced to one to two car lengths on minor roadways with minor traffic volumes. Where physical and economical considerations dictate, an approach grade of 5-6% is acceptable.

9 Village of Pemberton Subdivision Bylaw No.677 (2011), Table 6.2 specifies a maximum grade of 10% for culs-de-sacs in uphill conditions. However, per Section 6.16.3.a.xi (Hillside Standards) of the Bylaw, the maximum allowable grade is noted as 12%.

10 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.16.3.a.x.

11 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.16.3.a.ix.

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4. Vertical Curve K Values

Criteria	MMCD [1]	TAC	Proposed for Nkwukwma Development
Minimum Crest	4 [2]	2 [3]	7 (4) [5]
Minimum Sag	4 [2]	2 [4]	6 (4) [5]
Approaching Stop Condition	-	-	2 [6]

1 Village of Pemberton Subdivision Bylaw No.677 (2011), Hillside Standards, Section 6.16.3.d defers to MMCD Design Guidelines (2014) - Hillside Road Alignment Standards, Section 5.4 for alignment design criteria.

2 See MMCD Design Guidelines (2014), Table 5.19.4. Note that these values correspond to a 40km/hr design speed, as outlined in the same table.

3 See TAC Geometric Design Guide (2017), Table 3.3.2. Assumes that the road is illuminated and at 0% grade.

4 See TAC Geometric Design Guide (2017), Table 3.3.5. Assumes that the road is illuminated and at 0% grade.

5 Non-bracketed K values will be used where possible; these K Values are consistent with a typical 50km/hr design speed and provide greater stopping sight distance. Bracketed K values will be utilized only when challenging site topography warrants smaller vertical curves. Bracketed K values also meet minimum TAC stopping sight distance requirements, when distances are adjusted for roadways on grade (see below).

6 Greater K values will be utilized where site topography permits. A K value of 2 also meets BC Building Code fire access requirements; see BC Building Code, Section 3.2.5.6.

5. Stopping Sight Distances

Criteria	Down Grades				0%	Up Grades			
	12%	9%	6%	3%		3%	6%	9%	12%
Minimum Distance [1]	37m	35m	35m	35m	35m	31m	30m	29m	29m

1 See TAC Geometric Design Guide (2017), Table 2.5.3.

6. Rights-of-way and Road Lengths

Criteria	VoP Subdivision Bylaw No.677	TAC	MMCD	Proposed for Nkwukwma Development
Maximum Cul-de-sac Length [1]	150m (210m) [2]	-	200m [3]	150m (210m) [2]
Minimum Right-of-Way Width				
Collector Street	20m / 21m [4]	20m to 24m [5]	15m / 18.5m [6]	18m
Local Street	20m / 21m [4]	15m to 22m [7]	14m / 15.4m [8]	15m
Cul-de-sac	18m [4]	-	-	18m [4]
Cul-de-sac Terminus Radius	15m R [4]	-	-	15m R [4]

1 Distance is measured from the edge of the intersecting road through to the center of the cul-de-sac bulb.

2 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.6.2. Where secondary emergency access is provided, a cul-de-sac length of 210m is allowed.

3 See MMCD Design Guidelines (2014), Section 5.9.

4 See Village of Pemberton Subdivision Bylaw No.677 (2011), Table 6.1. Where there is no development adjacent the road, a 20m right-of-way is recommended. Where development is on both sides of the road, a 21m right-of-way is suggested.

5 See TAC Geometric Design Guide (2017), Table 2.6.5 The right-of-way width varies depending on design speed. A 50km/hr design speed denots a 20m right-of-way, whereas a 24m right-of-way is suggested for an 80km/hr design speed.

6 See MMCD Design Guidelines (2014), Table 5.19.3. Where development is adjacent one side of the road, a 15m right-of-way is recommended. Where development is on both sides of the road, an 18.5m right-of-way is suggested.

7 See TAC Geometric Design Guide (2017), Table 2.6.5 The right-of-way width varies depending on design speed. A 30km/hr design speed denots a 15m right-of-way, whereas a 22m right-of-way is suggested for a 50km/hr design speed.

8 See MMCD Design Guidelines (2014), Table 5.19.3. Where development is adjacent one side of the road, a 14m right-of-way is recommended. Where development is on both sides of the road, a 15.4m right-of-way is suggested.

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7. Intersections

Criteria	VoP Subdivision Bylaw No.677	TAC	Proposed for Nkwukwma Development
Minimum Spacing between Intersections	60m [1]	60m [2]	60m
Maximum Grade through Intersections	-	- [3]	8% [4]

1 See Village of Pemberton Subdivision Bylaw No.677 (2011), Section 6.9.3.a. This spacing is applicable for intersections along Collector Roads.

2 See TAC Geometric Design Guide (2017), Section 9.4.2.2. This spacing is applicable for intersections along Collector Roads.

3 TAC Geometric Design Guide (2017) Section 3.3.5.1.6, notes that an at-grade intersection occurring on a roadway with moderate to steep grades, should ideally have reduced gradient through the intersection, desirably less than 3%. This however, typically applies to intersections with greater design speeds (at or above 50km/hr).

4 Municipalities in the Greater Vancouver area commonly adopt a maximum grade of 8% for major roads through an intersection. Reference City of Coquitlam Subdivision and Development Servicing Bylaw No.3358 (2003), Section 5.11; City of Burnaby Design Criteria Manual, Section 6.4.1. The overarching design criteria for intersections will be to ensure that sight lines and sight distances (adjusted for approaching grades) are met, in accordance with the TAC Geometric Design Guide (2017), Chapter 3 and Chapter 9.

Appendix C

Water Distribution Plan

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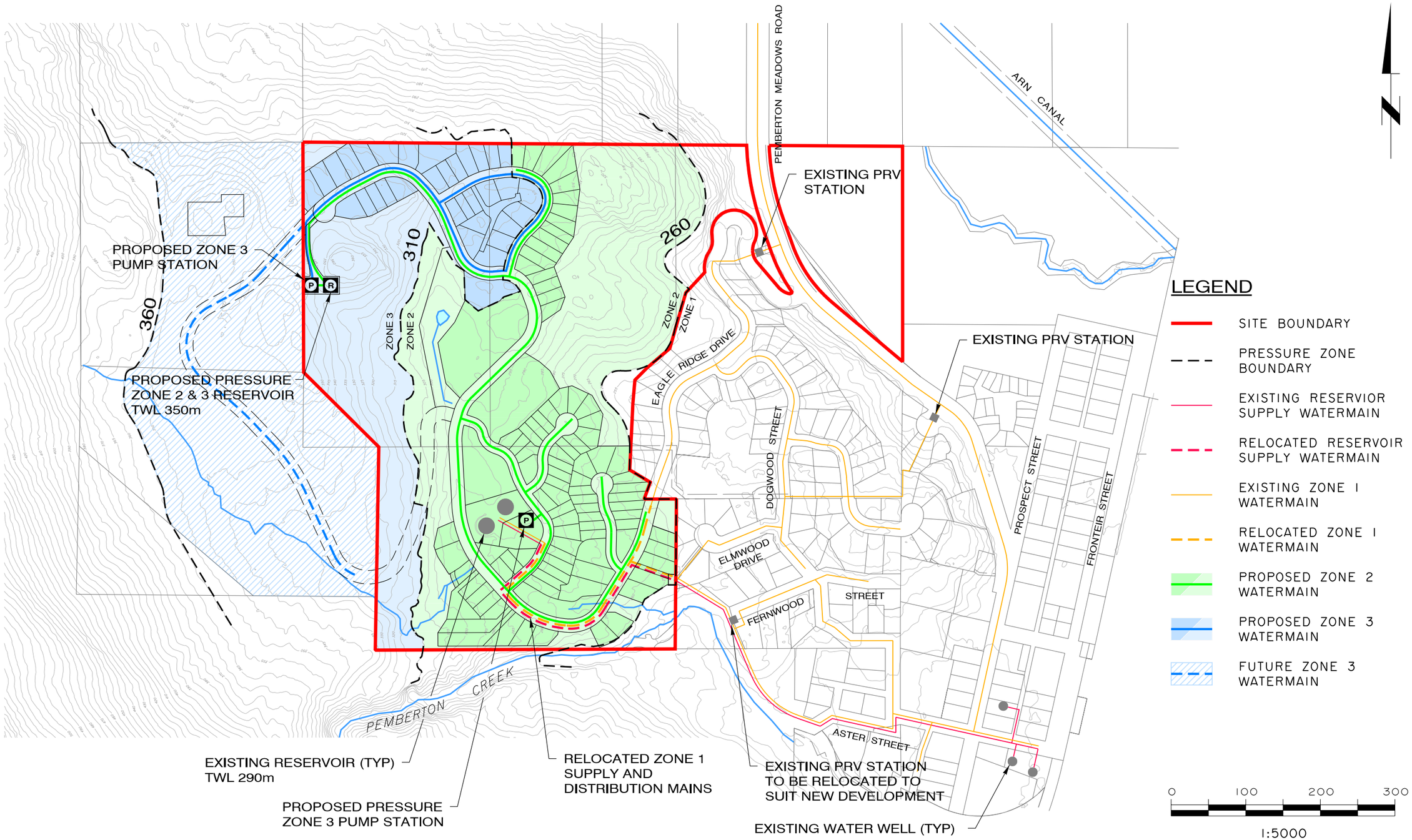

InterCAD Services Ltd. CONSULTING ENGINEERS

Bethel Land Corporation
Nkwukwma Development

WATER DISTRIBUTION PLAN

Appendix D

Sanitary Sewer Schematic

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InterCAD Services Ltd. CONSULTING ENGINEERS

PEMBERTON MEADOWS ROAD

ARN CANAL

EXISTING
SANITARY
LIFT STATION

EAGLE RIDGE DRIVE

DOGWOOD STREET

ELMWOOD DRIVE

FERNWOOD STREET

PROSPECT STREET

FRONTEIR STREET

ASTER STREET

PEMBERTON CREEK

EXISTING RESERVOIR (TYP)

LEGEND

- SITE BOUNDARY
- EXISTING SANITARY LIFT STATION
- EXISTING SANITARY SEWER
- EXISTING SANITARY FORCEMAIN
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER
- PROPOSED CATCHMENT
- FUTURE CATCHMENT

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Bethel Land Corporation
Pemberton, Benchlands

SANITARY SEWER SCHEMATIC

Appendix E

Drainage Master Plan

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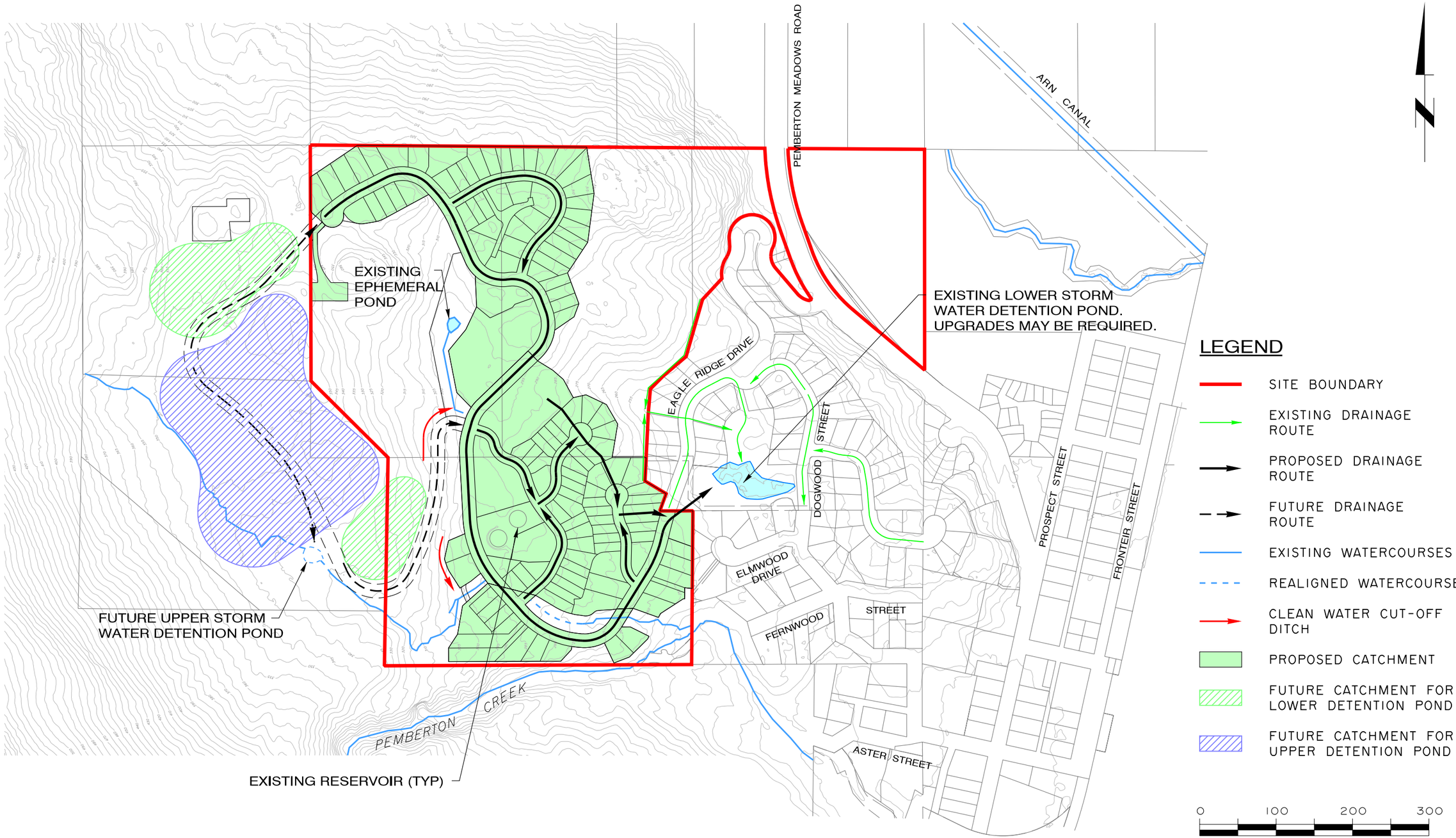

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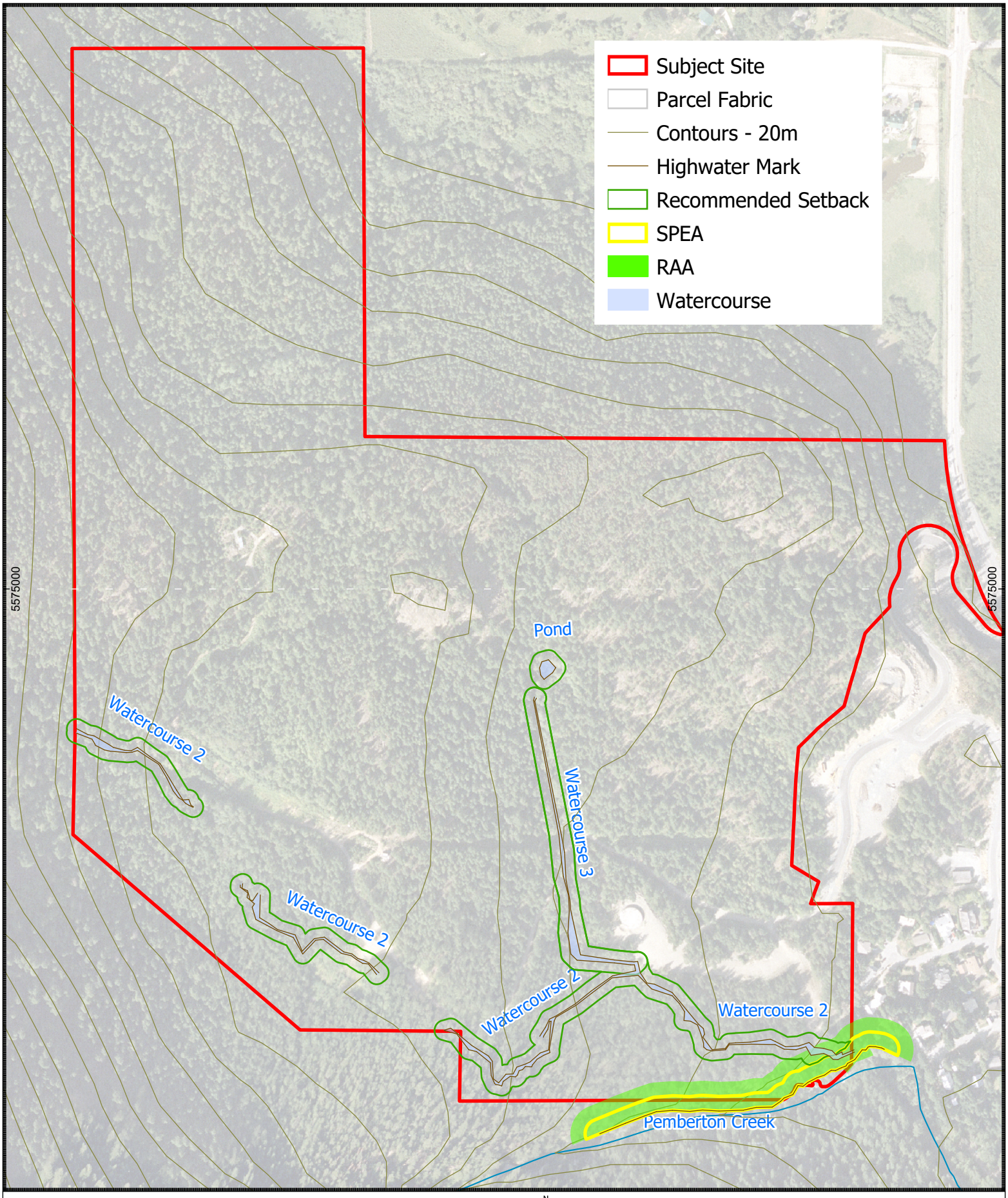
DRAINAGE MASTER PLAN



GIS Cartographer: Nicola Church
Date: 2019-10-25 2:02 PM
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Projection: UTM 10N NAD83

CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

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Riparian Assessment Regulation map
Skénkenam Developement GP Inc
Pemberton Benchlands
Pemberton, British Columbia