

# FRONTIER STREET OFFICIAL COMMUNITY PLAN AND ZONING AMENDMENT

## Village of Pemberton

October 5, 2023

The owners of 7451 & 7453 Frontier Street would like to redevelop the existing lots to a mixed use residential and commercial building consistent with the neighbouring Expedition Station and Elements also in downtown Pemberton. Currently the lots are subdivided, so an application to amalgamate the lots would be made. This summary provides an overview of the development plans together with accompanying concept plans and renderings as prepared by Stark Architecture (dated October 4, 2023).

The following narrative provides a brief overview of the subject lands and the proposed development concept.

### SUBJECT LANDS:

#### Location

The lands are located on the north-west corner of Frontier Street and Camus Street in downtown Pemberton. The Community Barn is just south of Camus fronting the east side of Frontier Street with its parking lot immediately east of the subject lands. The property was purchased by Linda and Stuart Sambell in 2021.

#### Context

The subject lands are physically in the centre of the downtown. The site also offers excellent visibility from the street and spectacular views to the southwest to Mount Currie (Ts'zil). The site is also adjacent to the Pemberton Community Barn and within the pedestrian focused downtown, where new residents will be able to walk to most local shops and services. The downtown also has transit service, close by (in front of the Blackbird Bakery).

#### Legal Description

The legal descriptions are Lot 1 & 2, Block 3, District Lot 203, LD, Plan 1624, PID: 011-506-571 & 011-506-580



### Existing Use

The site currently accommodates an existing single-family home and garage (Lot 2) with a landscaped yard and shed (Lot 1). The site survey is provided in **Attachment #2**. The rear of the property is serviced by an improved laneway, running perpendicular to Camus Street.

### Land Use Designations

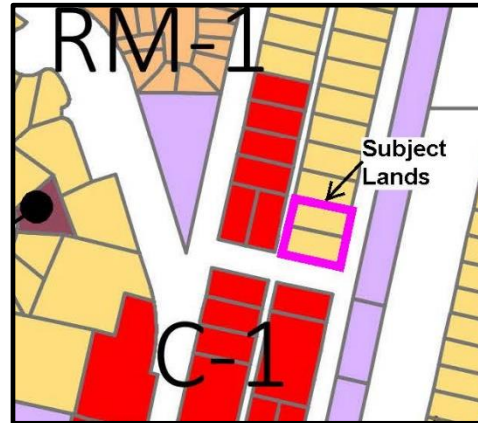
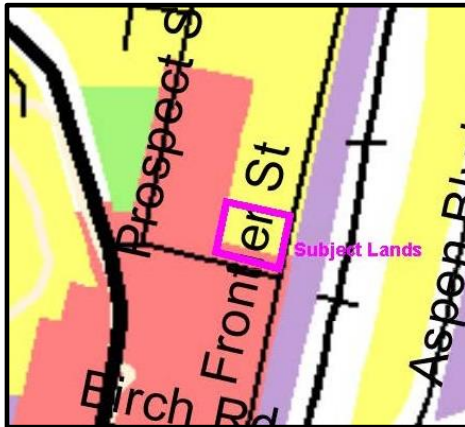
The current OCP and Zoning Bylaw designations reflect the previous owners desire to retain their low-density residential use.

**Official Community Plan** - The lands are currently designated as **Residential** use within the Urban Growth Boundary. Sanitary and water connections appear to be nearby. A future sidewalk has been anticipated on Camus Street, and the property is within the floodplain. The lands are not designated as a Development Permit Area, likely given its existing single family residential use.

The following provides the designations of the lands in the OCP Maps:

A	Within Urban Growth Boundary
B	Land Use <b>Residential</b>
C	Development Permit <b>No designation</b>
G	Proposed Open Space & Greenways and Proposed Public Parks Pemberton Community Barn just south on the west side of Frontier Street
I-1	Water Servicing Indicates an existing watermain
I-2	Sanitary Servicing Adjacent to sewer main
J-1	Transportation Both Frontier and Camus are Local Roads
J-2	Public Transportation and Sidewalks Proposed Sidewalk on Camus
L	Land Constraints <b>Floodplain</b>
M	Fire Protection Within the Village of Pemberton Fire Protection Area

**Zoning Bylaw Designation** – The site is zoned R-1 Residential and is intended to accommodate detached dwellings within residential neighbourhoods. Permitted uses are detached dwellings, accessory of a Bed and Breakfast, home occupation, secondary suite, and short-term vacation rentals. The site and building regulations respond to single family considerations with significant setbacks, and limited building coverage and height.



### Property Dimensions and Area

The two lots are identical in size each measuring 20.117 m x 40.234 m with an area of 809.4 m<sup>2</sup>. The total size of the development site is 1618.8 m<sup>2</sup> or 0.40 acres. The site's primary frontage is Frontier Street, secondary frontage Camus Street and rear access via a public laneway.

### Access

**Vehicular:** There are currently access points for vehicles directly from Frontier Street and Camus Street, as well as Menzel Lane.

**Pedestrian/Cycling** – There is currently no sidewalk along the existing road frontages.

**Transit** – There are two transit routes that service Pemberton (one to Whistler, the other to Xit'olacw and Mount Currie), although lines stop directly at the LCAI site (the only stop in the Village is at the Blackbird Bakery downtown).

## PROPOSED DEVELOPMENT

### Intent

The Sambells purchased the property in 2021, and apply to amend the Official Community Plan (OCP) and the Zoning Bylaw to permit land uses more consistent with the existing and contemplated development in the downtown (i.e. Expedition Station and south with the Elements, and Blueshore/Pemberton Valley Supermarket buildings).

Pre-Application discussions with the Village of Pemberton generally supported the infill opportunity, which would provide additional commercial retail and services as well as apartment units in a mixed-use building, (commercial uses only on the ground floor).

The concept plan which proposes a mixed residential and commercial use introduces land use directions that are consistent with the current OCP policies specifically:

- Maintain the downtown as the dominant commercial node, as well as a cultural and social focal point of the Pemberton area

- Make efficient use of land that is deemed appropriate for development through embracing applicable Smart Growth Principles
- Offer an interesting, convenient and pedestrian-friendly downtown

Further as noted in the OCP, the Downtown Enhancement Strategy identifies the following principles in consideration of future planning and development of the area:

- Provide a mix of land uses at increased densities;
- Be environmentally, socially and economically sustainable;
- ensure great, focused and designed open spaces;
- Be pedestrian, bike and stroller friendly and accessible;
- Provide a strong sense of arrival;
- Ensure appropriate parking and transit facilities;
- Be economically vibrant;
- Showcase the natural assets;
- Share Pemberton’s authentic identity; and
- Work together to meet stakeholder and community needs.

The proposed building has been thoughtfully designed to include the below features:

- Designed to maximise commercial space along Frontier Street with 3m of patio spill out space on both Frontier and Camus Street.
- Wrap around covered patio on Frontier and Camus Street. The patio is higher than the pedestrian walkway to create separation.
- Quiet residential entry off Camus Steet, visually marked by providing different canopy treatment above.
- Landscaping integrated into the façade, softening the building.
- The building purposely steps back in set locations to visually reduce the building mass into four smaller volumes. The setbacks are positioned to signify entrances into the residential lobby and commercial spaces.
- The residential units at levels 2-4 are intentionally setback from Frontier and Camus Street between 2-3m.

### Preliminary Concept

Proposed to rezone the two lots to a Comprehensive Development Zone allowing for a mixed residential/commercial use building. Proposed four stories maximum with level 1 commercial and 1.8 FAR. The proposal is to construct a four-storey building with an FAR of 1.8. The commercial (and ancillary uses) are proposed on the ground floor with surface and underground parking accessed from the existing lane<sup>2</sup>. The residential uses above will include three (3) storeys of residential with 33 units. The following provides an overview of the development by floor:

Residential Unit Mix	# Units	Area of Units (m <sup>2</sup> )
<b>Level 1</b>	5	CRU units (4 x 93.5 m <sup>2</sup> 1 x 110.3 m <sup>2</sup> )
<b>Level 2 Residential</b>	4	1 bdrm (56-65 m <sup>2</sup> )
	5	1 bdrm + den (75-81 m <sup>2</sup> )
	1	2 bdrm (81 m <sup>2</sup> )

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October 5, 2023

	1	2 bdrm + Den (94 m <sup>2</sup> )
<b>Level 3 Residential</b>	4 5 1 1	1 bdrm (56-65 m <sup>2</sup> ) 1 bdrm + den (75-81 m <sup>2</sup> ) 2 bdrm (81 m <sup>2</sup> ) 2 bdrm + Den (94 m <sup>2</sup> )
<b>Level 4 Residential (Penthouse)</b>	4 6 1	1 bdrm (56-65 m <sup>2</sup> ) 1 bdrm + den (75 m <sup>2</sup> ) 2 bdrm + Den (94 m <sup>2</sup> )
<b>Total Commercial Units</b>	5	
<b>Total Residential Units</b>	33	

All units to have a private deck from 7.8 m<sup>2</sup>. The total interior storage for bikes ski's & general storage is 171m<sup>2</sup>.

The following provides a comparison of the current R-1 zoning, immediately adjacent C-1 zoning, and the proposed development (which could be zoned as a comprehensive development). The red highlighted font shows differences among the C-1 zone and the proposed development.

	R-1	C-1	Proposed
<b>Permitted Uses</b>	Dwelling, Detached	Commercial, Civic, Restaurant Service uses.	<b>Residential</b> and Commercial, Restaurant and Service uses.
<b>Permitted Accessory Uses</b>	Bed and Breakfast Home Occupation Secondary Suite Short-Term Vacation Rental	Residential Bed and Breakfast Home Occupation	
<b>Max FAR</b>		2.5	1.8
<b>Max Lot Coverage:</b>	40%	100%	80%
<b>Min Lot Size</b>	700 m <sup>2</sup>	220 m <sup>2</sup>	809.4 m <sup>2</sup>
<b>Min Lot Width</b>	18 m	12 m	20.117 m x 40.234 m
<b>Min Principal Building Width</b>	7.6 m		
<b>Min Front Setback</b>	6 m	0 m	0 m
<b>Min Rear Setback</b>	5 m	5 m	5 m
<b>Min Interior Side Setback*</b>	1.5 m	0	<b>0</b>
<b>Min Exterior Side Setback:</b>	4.6 m	0	0
<b>Max Building Height, Principal: 10.5 m</b>	10.5 m	10.5 m	<b>17 m</b>
<b>Max Building Height, Accessory: 4.6 m</b>	4.6 m	4.6	n/a

*\*The total of two interior lot lines setbacks shall not be less than 4.5 m with at least one of the interior lots line setbacks not being less than 1.5 m.*

## Parking

The development concept would generate the following parking generation:

	Generation	Requirement	Proposed	Proposed
<b>28 x 1-bedroom units</b>	1 space/unit	28	1 space/unit	28
<b>5 x 2-bedroom units</b>	1.75 space/unit	8.75	1.25 space/unit	6
<b>Visitor</b>	0.25 space/unit	8.25	Visitor overnight, commercial during daytime onsite	6
<b>484 m<sup>2</sup> commercial</b>	0.25 space/100 m <sup>2</sup> *	1.21		
<b>Total Parking</b>		46.21		40
<b>Total Loading</b>	1 space <500 m <sup>2</sup>	1	1 space <500 m <sup>2</sup>	1

\*neighbourhood commercial

It is the intent that a parking space on site be provided for every unit minimum. Additional (and new) on-street parking spaces can also be provided along Frontier and Camus Street for the commercial uses. A variance will be required for the on-street loading stall. The applicant would then like to be considered for cash-in-lieu parking for the on site deficit, as well with applying small car and tandem parking opportunities, where applicable. The applicant requests a variance to reduce the parking stall width from 3.05m to 2.74m. The reduction aligns with typical parking stall widths in neighbouring municipalities such as Whistler. E-charge connections can also be considered, in accordance with the Zoning Bylaw being 1 EV charging space for every ten stalls (4 EV charging stalls will be required).

## SUPPORTING TECHNICAL REPORTS

Additional direction is required regarding any technical reports that may be required in support of the OCP and zoning amendment applications, such as site servicing and traffic. The applicant has included the Kontur report for reference (May 2023).

The main issue appears to be the flood protection level. In previous discussion with the Village and Kontur it was confirmed that in accordance with the **Flood Hazard Area Land Use Management Guidelines (FMLUG)** a flood plain bylaw may be modified...provided the subject property is in the flood plain fringe area and that there is not erosion of channel avulsions hazards in the immediate vicinity. It is confirmed by Kontur that the recommended FCL could be reduced by the freeboard (0.6m) – resulting in a FCL of **211.5** or about 1.0-1.5 m above existing grade.

In addition, the Pemberton Building Bylaw allows for the Building Official to exercise the authority to provide an exemption whereby **a report by a professional engineer** who has assessed the condition of the land certifies in the report that the land may be safely used for its intended purposes subject to the following conditions.

1. the owner covenants with the Village to use the land only in the manner certified in the report, as enabling the safe use of the land for the intended use.
2. a covenant containing conditions for reimbursing the Village for any expenses that may be included by it because of the breach of the covenant.
3. registration of the Section 219 covenant on title.

It is understood that Kontur cannot give assurance that the areas below FCL would be safe for intended use as flood damage could occur. It would be up to Pemberton to decide if it could be classified as a hardship case. The proposed development has the first floor below the FCL, but the intent would be to have all EOT facilities, mechanical and electrical above the FCL. This will allow the commercial space to have a comfortable association with the street level. A similar variance occurred with the Elements Building.

## COMMUNITY AMENITY CONTRIBUTIONS

The applicants are aware of the Village's voluntary request for Community Amenity Contributions (CACs) and Affordable Housing as a rezoning provides value through increased development rights that in-turn should be off-set by the capital or cash contribution of community amenities and affordable housing. The current CAC policy, however, is dated and likely will not be updated until the provincial government introduces their new legislation, slated for late October 2023.

In addition, the Village has prepared a Housing Needs Assessment which indicates a significant need for housing through to 2028. In addition, the study highlights the need for a flexible and diverse housing stock, supply more non-market and rental housing options, and address the high cost of homeownership. It is understood that the Village is working through more recent development applications for new housing product (ranging from rental, ownership and non-market units). The applicants would like to better understand how the subject application could best contribute to a community amenities and affordable housing. It would be helpful to meet and discuss the most appropriate approach for the Village.



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Website: [www.pemberton.ca](http://www.pemberton.ca)

## DEVELOPMENT PROJECT APPLICATION FORM

Application Type:

- (OR)** OCP Bylaw Amendment &/or Zoning Bylaw Amendment
- (SO)** Subdivision
- (DP)** Development Permit
- (DVP)** Development Variance Permit
- (TUP)** Temporary use Permit
- Other** (Please Specify): \_\_\_\_\_

### Site/Property Information

Civic Address (if applicable): 7451 & 7453 Frontier Street, Pemberton, BC

Legal Description: Lot 1 & 2 Block 3 District Lot 203 Lillooet District Plan 1624

PID: 011-506-571 & 011-506-580

Parcel Size: 1,619m<sup>2</sup>

Current land use: Residential

Existing Zone: R-1 Residential

Existing OCP land use designation: Residential

Applicable Development Permit Area Designations: Fire Protection Area & Flood Area

### Proposal Information

Project Name: 7451 & 7453 Frontier Street


Project Description: Proposed to rezone the two lots to a Comprehensive Development Zone allowing for a mixed residential/commercial use building.  
Proposed four stories maximum with level 1 commercial and 1.8 FAR

Proposed Zone: Comprehensive Development Zone



Detailed List of Variances required, if any: Maximum building height changed from 10.5m to 17m, Maximum FAR 1.8, Maximum lot coverage changed from 40% to 80%, Front, interior side and exterior side setbacks reduced to 0m, Parking stall amount per unit reduced from 1.75 for 2 bedrooms to 1.25, Allowance for combined visitor & commercial stalls with a reduced visitor rate from 0.25 per unit to 0.13	
Proposed Number of New Dwellings: 33	
New SFD Count: N/A	New Townhouse Count: N/A
New Apartment Count: 33	Other:
Proposed Number of New Lots: N/A	
Parking Stalls required per current Zoning Bylaw: 48	
Parking Stalls proposed: 41	
Proposed New Non-Residential floor space (square meters): 484m <sup>2</sup> (CRU space)	
Application Fee as calculated by Applicant: \$6,650	

**Owner and Agent Information**

Land Owner Name(s): Stuart Alan Sambell & Linda Jayne Sambell	Phone: 604 932 2280
Email: stusambell@gmail.com	Mailing Address: 4767 Pilot House Road, West Vancouver, BC, V7W 1J2, Canada
Owner Signature: 	Signature Date: October 6, 2023
Owners Agent Name:	Phone:
Email:	Mailing Address:
Agent Signature:	Signature Date:

**Pre-Application Meeting**

It is strongly recommended that prior to submitting an application an applicant meet with Village of Pemberton Development Services Department to review application requirements. The intent of the pre-application will be to confirm specific submission requirements.

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 processed.

# 7451 & 7453 FRONTIER ST - REZONING APPLICATION



## DRAWING LIST - REZONING

SHEET	SHEET NAME
RZ00	7451+7453 FRONTIER STREET
RZ01	CONTEXT PLAN + PHOTOS
RZ02	PROJECT DATA & LEVEL 1 SITE PLAN
RZ03	AREAS- OPTION 3
RZ04	EXCLUSIONS
RZ05	STREET SECTIONS
RZ06	SUN STUDIES
RZ07	3D - CORNER OF FRONTIER + CAMUS
RZ08	3D - ALONG FRONTIER
RZ09	3D - CORNER OF CAMUS + MENZEL LANE
RZ10	STREET ELEVATIONS
TOTAL: 11	

**STARK**



**CONTEXT PLAN + PHOTOS**

FRONTIER STREET  
PEMBERTON, BC

**RZ01**

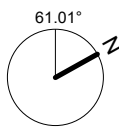
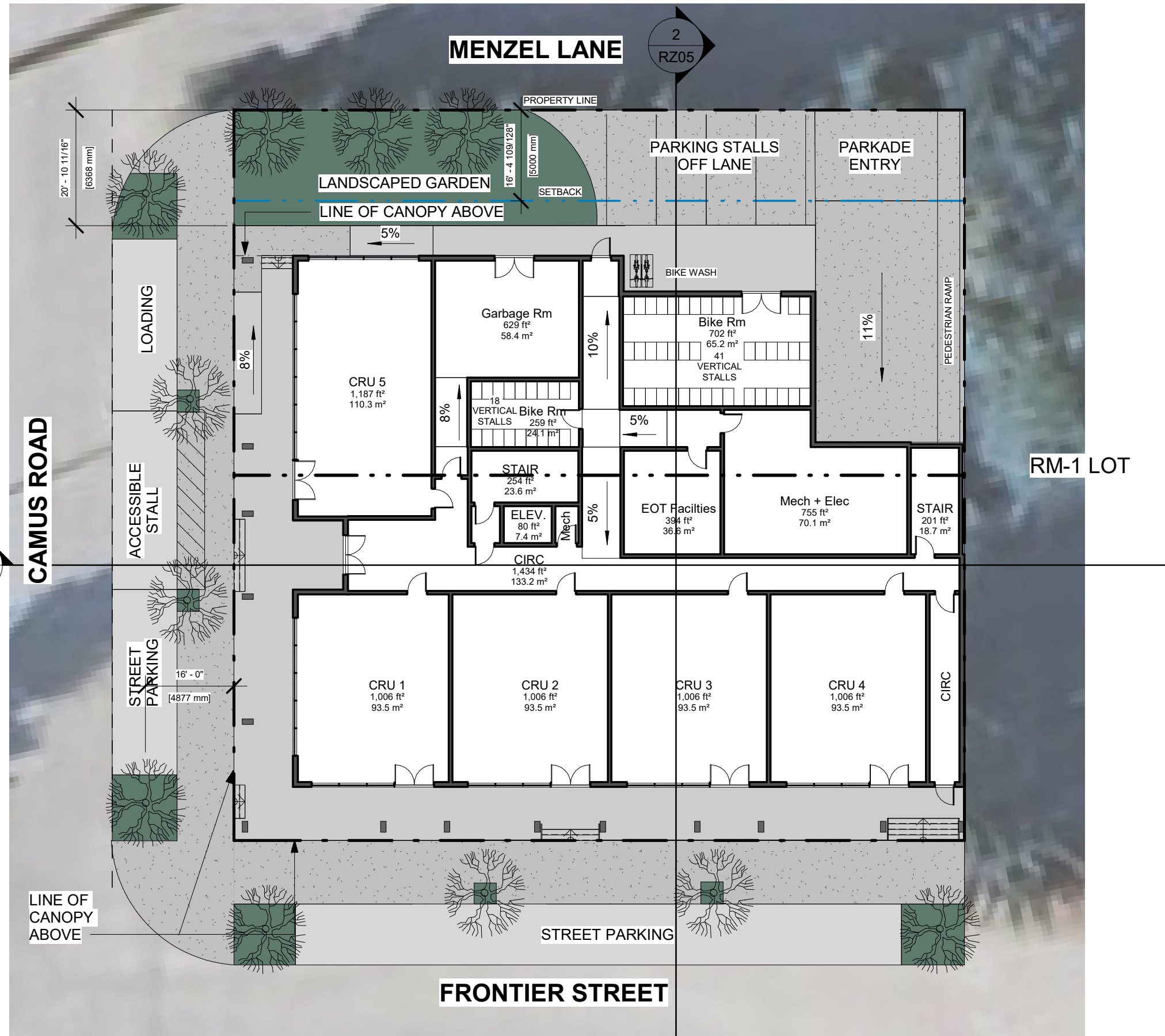
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**STARK**

**FRONTIER STREET - REZONING DATA**

**CIVIC ADDRESS:** 7451 & 7453 FRONTIER STREET, PEMBERTON BC  
**LEGAL ADDRESS:** LOT 1 & 2 BLOCK 3 DISTRICT LOT 203 LILLOOET DISTRICT PLAN 1624  
**OCP LAND USE DESIGNATION:** RESIDENTIAL  
**ZONING:** R-1 RESIDENTIAL  
**REZONING PROPOSED:** COMPREHENSIVE DEVELOPMENT ZONE  
**DPA ZONES:** FIRE PROTECTION AREA, FLOOD AREA  
**SITE AREA:** 1,619m<sup>2</sup> (17424sq.ft)

1. OCP / ZONING DATA	BYLAW	PROPOSED	
PROPOSED USE:	RESIDENTIAL	RESIDENTIAL / COMMERCIAL	
OCP AMENDMENT REQUIRED?:		YES	
REZONING REQUIRED?:		YES	
LOT AREA (MIN.)	700 sq m	1,619 sq m	17,424 SF
LOT WIDTH (MIN.)	18 m	40.23 m	
MAX. BUILDING HEIGHT	10.5 m	17 m	
MAX LOT COVERAGE	40 %	80%	
FAR:	N/A	1.8	
MAX. GFA	N/A	2,914 m <sup>2</sup>	31,363 SF
BUILDINGS PER LOT	1	1	
SETBACK FRONT	6 m	0 m	
SETBACK REAR	5 m	5 m	
SETBACK INTERIOR SIDE	1.5 m	0 m	
SETBACK EXTERIOR SIDE	4.6 m	0 m	



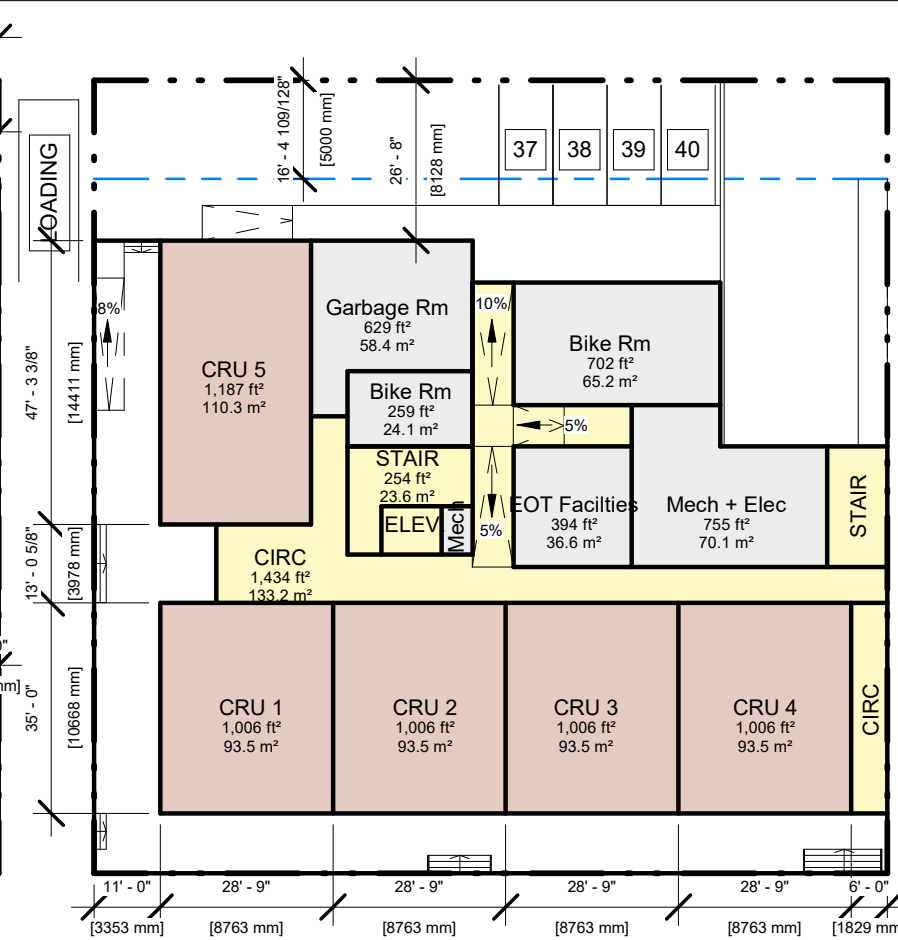
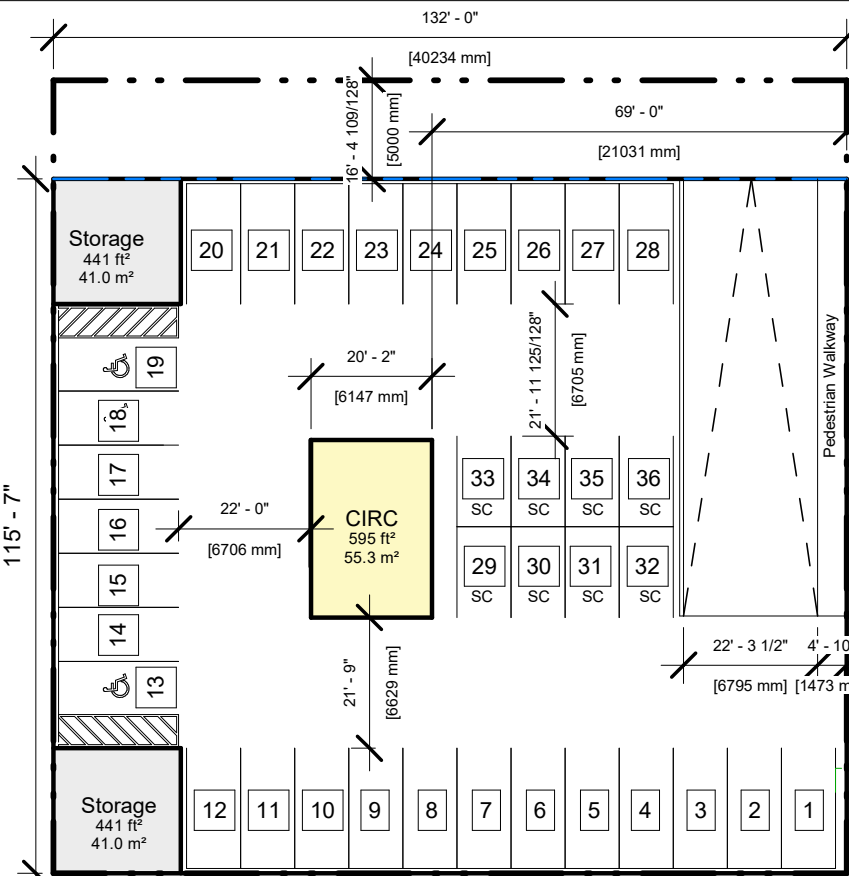
**PROJECT DATA & LEVEL 1 SITE PLAN**

FRONTIER STREET  
PEMBERTON, BC

**RZ02**

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**STARK**



**GROSS FLOOR AREA**

PARKADE	1477 ft <sup>2</sup>	137.3 m <sup>2</sup>
LEVEL 1	10171 ft <sup>2</sup>	944.9 m <sup>2</sup>
LEVEL 2	10083 ft <sup>2</sup>	936.7 m <sup>2</sup>
LEVEL 3	10083 ft <sup>2</sup>	936.7 m <sup>2</sup>
LEVEL 4	9806 ft <sup>2</sup>	911.1 m <sup>2</sup>
<b>TOTAL</b>	<b>41620 ft<sup>2</sup></b>	<b>3866.6 m<sup>2</sup></b>

**EXCLUSIONS**

PARKADE	1477 ft <sup>2</sup>	137.3 m <sup>2</sup>
LEVEL 1	4959 ft <sup>2</sup>	460.7 m <sup>2</sup>
LEVEL 2	1329 ft <sup>2</sup>	123.4 m <sup>2</sup>
LEVEL 3	1329 ft <sup>2</sup>	123.4 m <sup>2</sup>
LEVEL 4	1328 ft <sup>2</sup>	123.3 m <sup>2</sup>
<b>TOTAL</b>	<b>10421 ft<sup>2</sup></b>	<b>968.2 m<sup>2</sup></b>

**TOTAL GFA** 31199 ft<sup>2</sup> 2898.5 m<sup>2</sup>  
**SITE AREA** = 17,424 ft<sup>2</sup> 1,619 m<sup>2</sup>  
**FAR 1.8**

**COMMERCIAL RENTABLE AREA**

LEVEL 1	5212 ft <sup>2</sup>	484.2 m <sup>2</sup>
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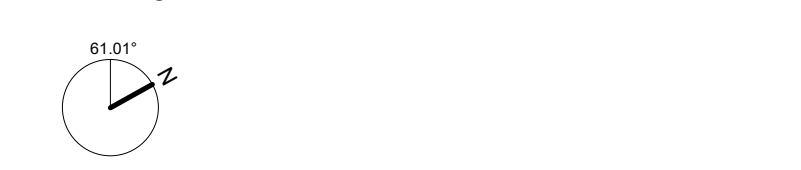
**RESIDENTIAL RENTABLE AREA**

LEVEL 2	8754 ft <sup>2</sup>	813.3 m <sup>2</sup>
LEVEL 3	8754 ft <sup>2</sup>	813.3 m <sup>2</sup>
LEVEL 4	8479 ft <sup>2</sup>	787.7 m <sup>2</sup>
<b>TOTAL</b>	<b>25987 ft<sup>2</sup></b>	<b>2414.2 m<sup>2</sup></b>

**PARKADE**



**LEVEL 3**



**LEVEL 1**



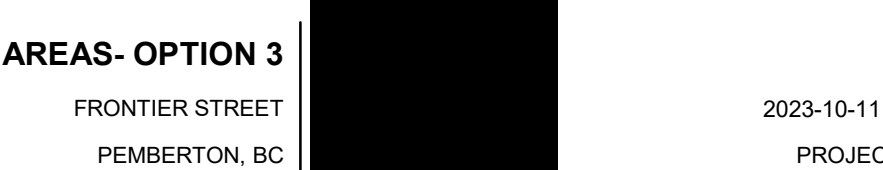
**LEVEL 4**



**LEVEL 2**



**LEVEL 3**



**AREAS PER USE/ UNIT COUNT**

1 BED	21194 ft <sup>2</sup>	1969.0 m <sup>2</sup>	28
2 BED	4793 ft <sup>2</sup>	445.3 m <sup>2</sup>	5
CIRC	6637 ft <sup>2</sup>	616.6 m <sup>2</sup>	
CRU	5212 ft <sup>2</sup>	484.2 m <sup>2</sup>	
SERVICES	3784 ft <sup>2</sup>	351.6 m <sup>2</sup>	

**PARKING REQUIRED**

COMMERCIAL	484.2 m <sup>2</sup>	0.25*100m2	2
1 BED	28	1 /UNIT	28
2 BED	5	1.75 /UNIT	9
LOADING (<500M2)			1
VISITOR		@ 0.25 *UNIT	8
			48

**PARKING PROPOSED**

1 BED	28	1 /UNIT	28
2 BED	5	1.25 /UNIT	6
LOADING (<500M2)			1
VISITOR/COMMERCIAL* @ 0.13 *UNIT			6
			41

\*COMMERCIAL PARKING PROPOSED TO BE USED DURING DAYTIME HOURS & VISITOR PARKING DURING EVENING HOURS

4 EV SPACES WILL BE PROVIDED

**AMENITIES**

ALL UNITS TO HAVE A PRIVATE DECK FROM 84ft<sup>2</sup> / 7.8m<sup>2</sup> IN SIZE

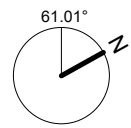
TOTAL INTERIOR STORAGE FOR BIKES SKI'S & GENERAL STORAGE OF 1,843 ft<sup>2</sup> / 171m<sup>2</sup>

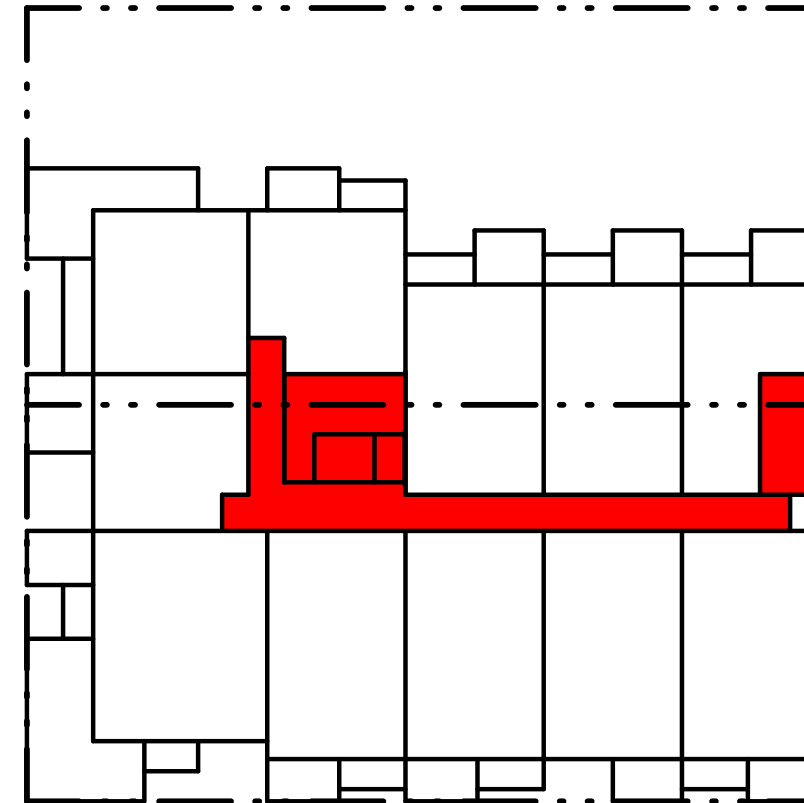
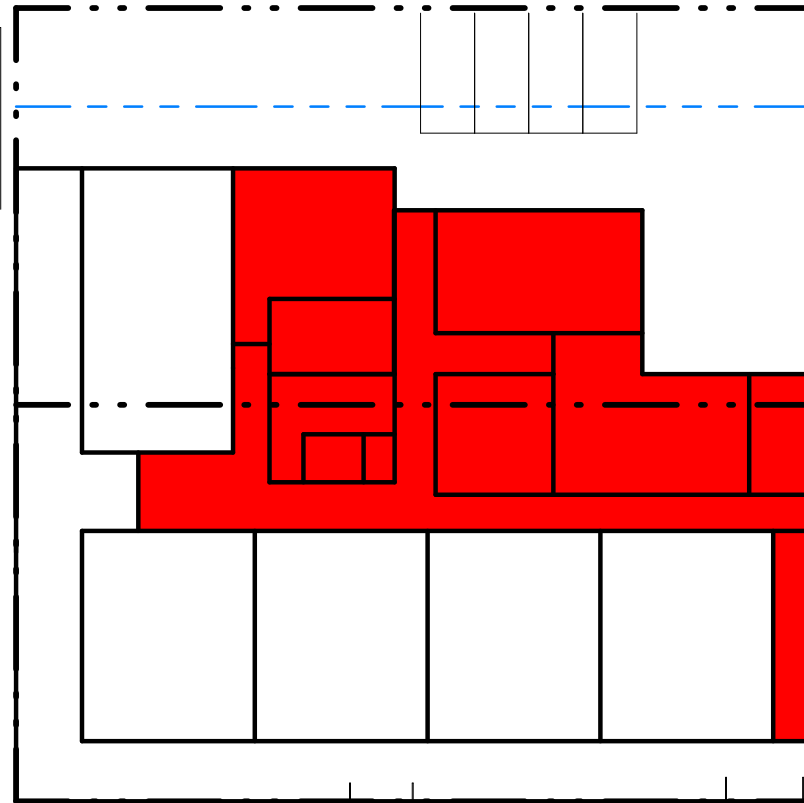
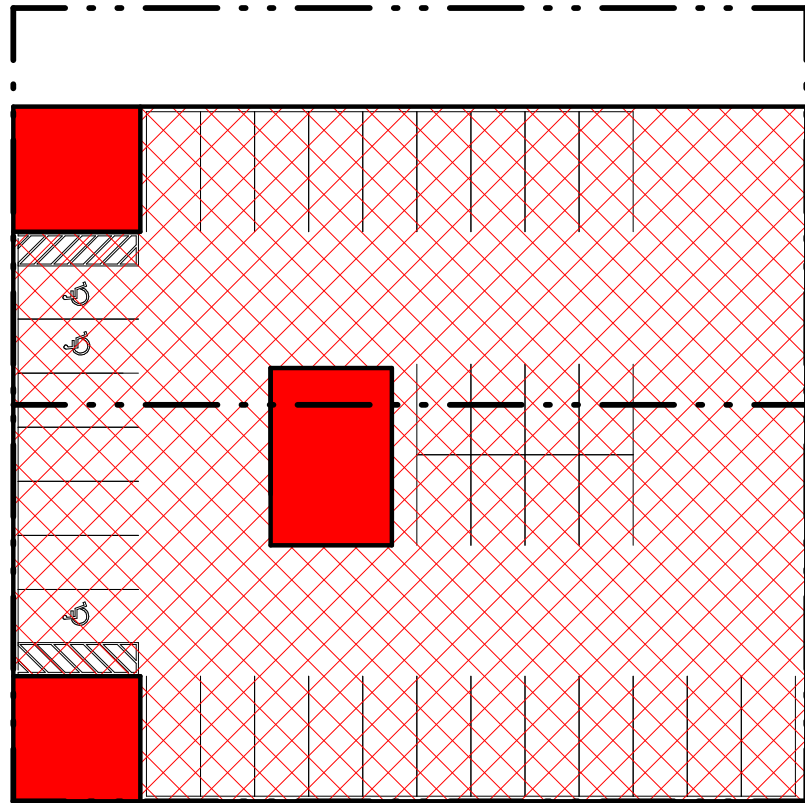
CLASS A BIKE STALLS  
 BIKE ROOM 01: 41  
 BIKE ROOM 02: 18

**AREAS- OPTION 3**

FRONTIER STREET  
 PEMBERTON, BC

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 PROJECT NO. 1682





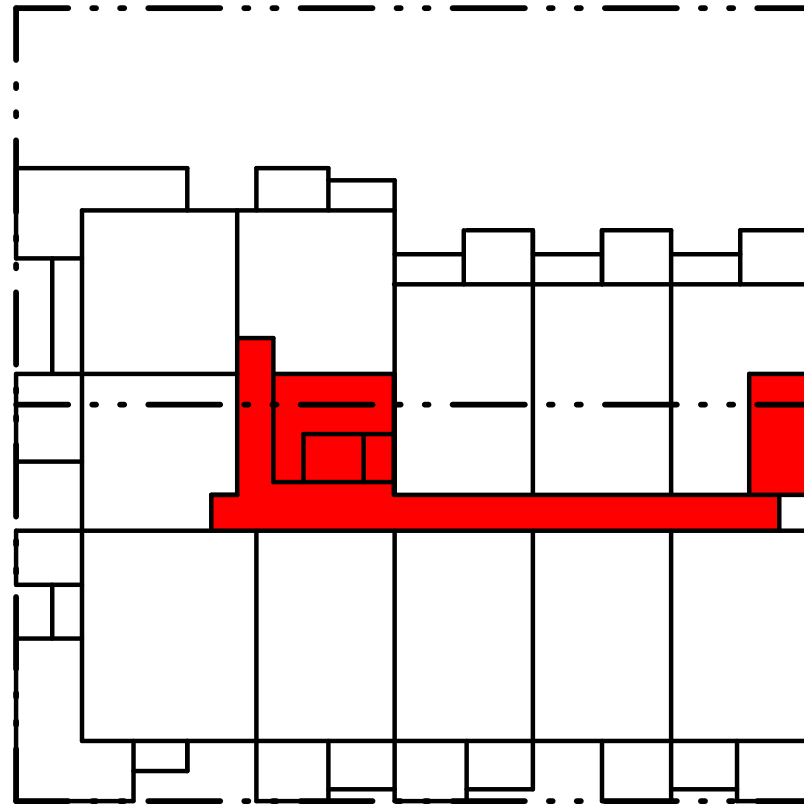
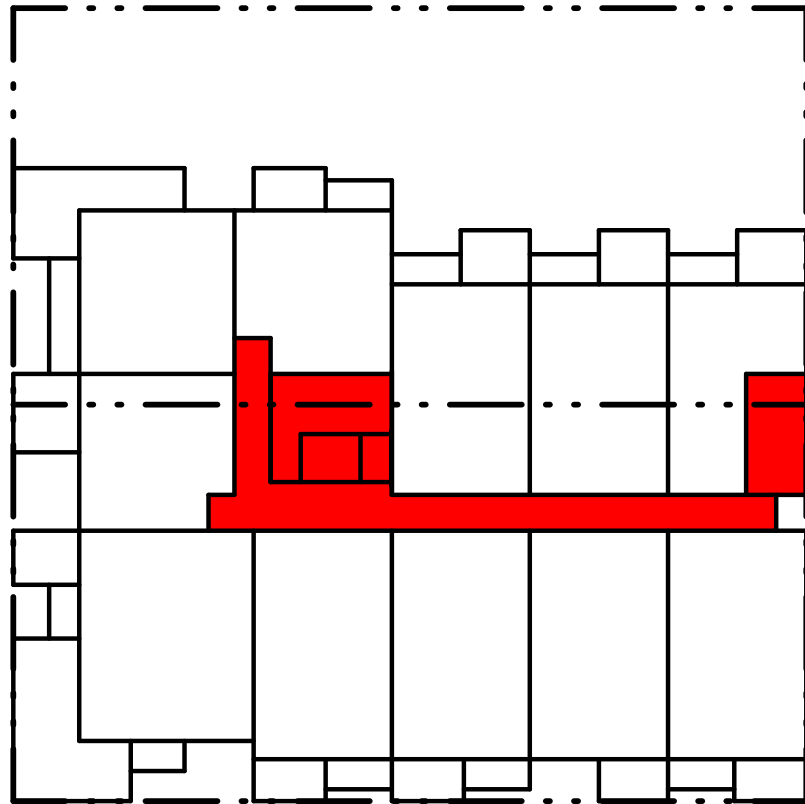
**EXCLUSIONS**

PARKADE	1477 ft <sup>2</sup>	137.3 m <sup>2</sup>
LEVEL 1	4959 ft <sup>2</sup>	460.7 m <sup>2</sup>
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	10421 ft <sup>2</sup>	968.2 m <sup>2</sup>

PARKADE - EXCLUSIONS

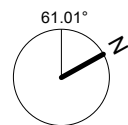
LEVEL 1 - EXCLUSIONS

LEVEL 2- EXCLUSIONS



LEVEL 3 - EXCLUSIONS

LEVEL 4 - EXCLUSIONS

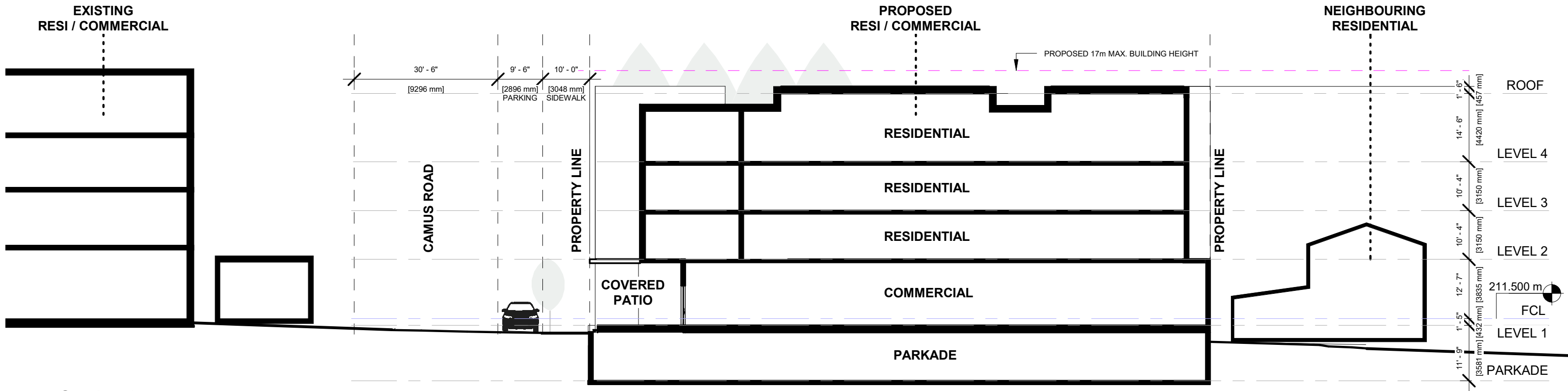


**EXCLUSIONS**  
FRONTIER STREET  
PEMBERTON, BC

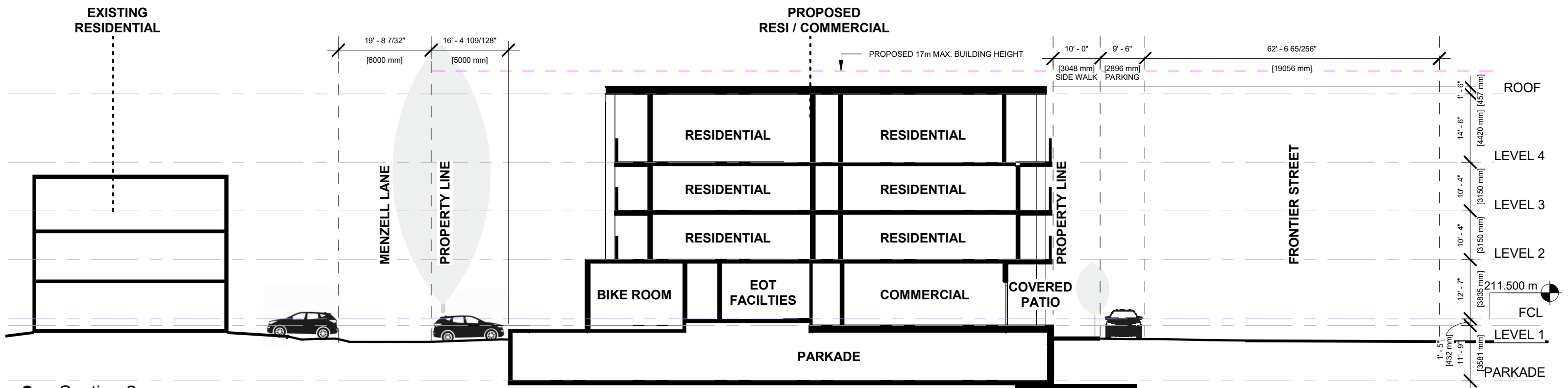


**RZ04**  
2023-10-11 3:53:27 PM  
PROJECT NO. 1682

**STARK**



**1 Section 1**  
scale : 1" = 20'-0"



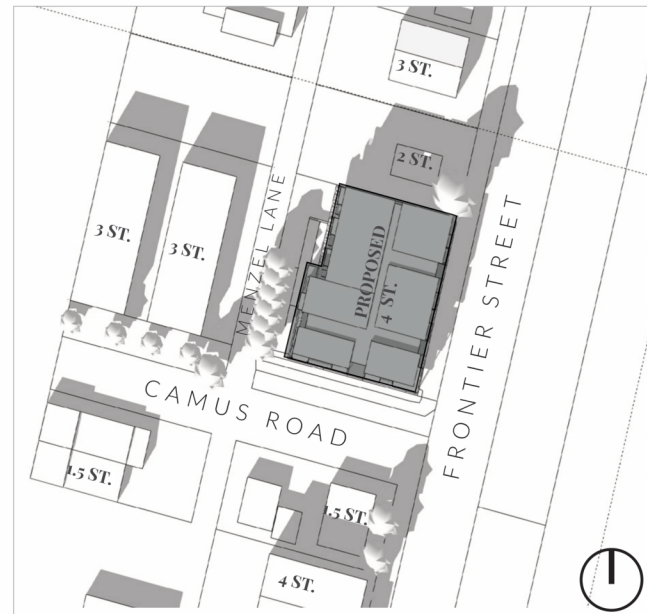
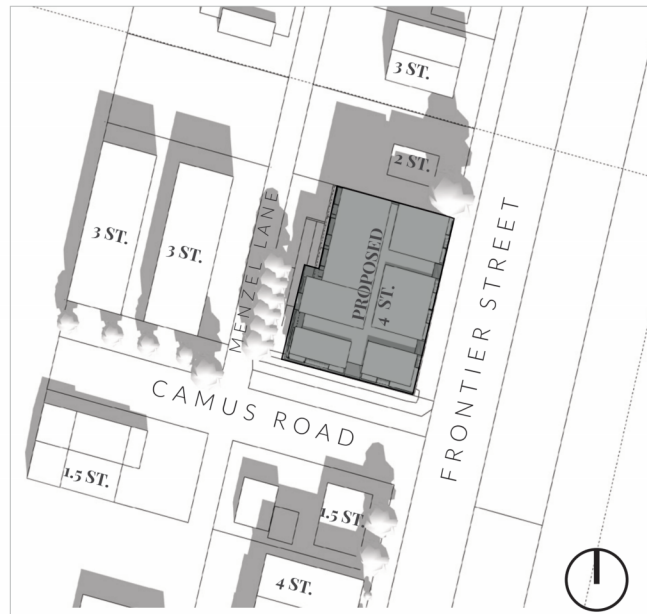
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**STREET SECTIONS**  
FRONTIER STREET  
PEMBERTON, BC

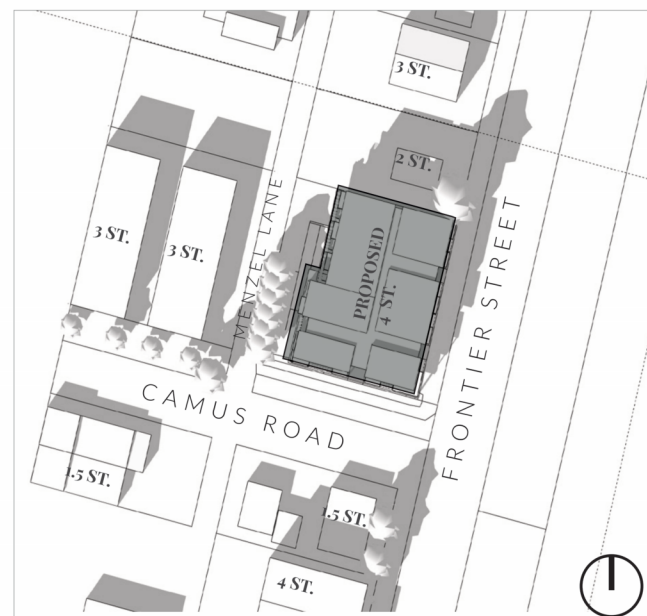
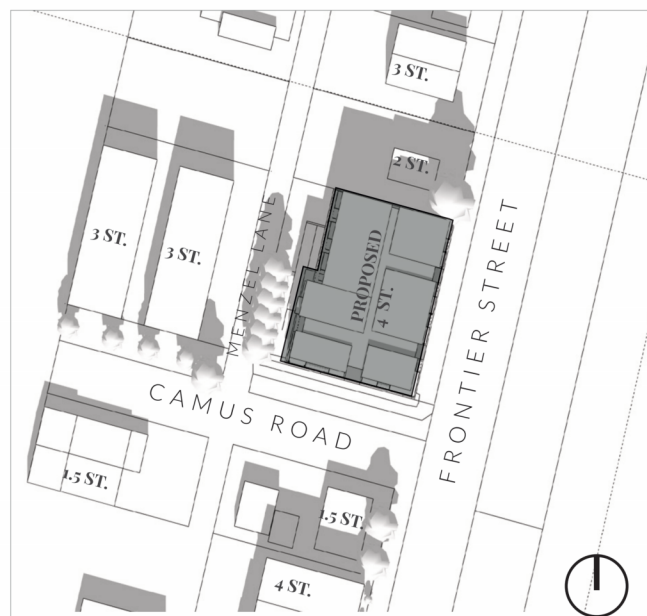
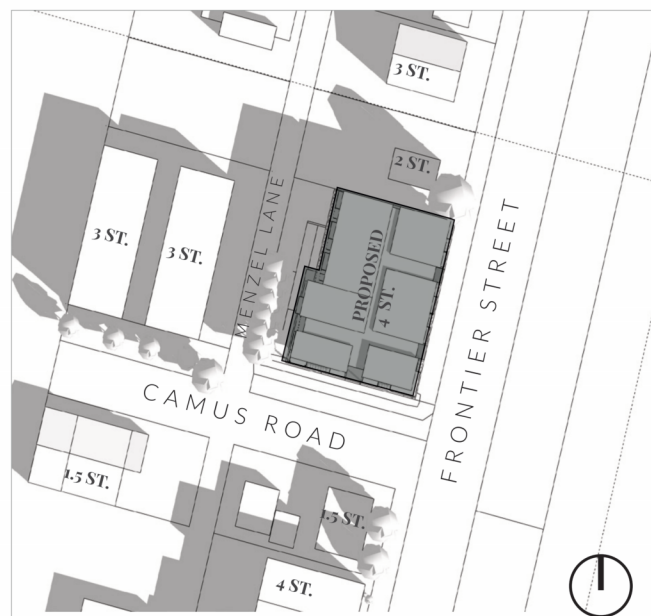
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PROJECT NO. 1682



SPRING EQUINOX



FALL EQUINOX



9 AM

12 PM

2 PM

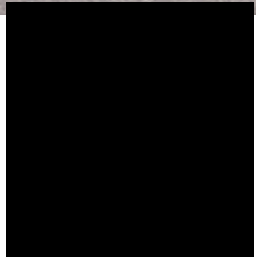
4 PM







**3D - CORNER OF FRONTIER + CAMUS**  
FRONTIER STREET  
PEMBERTON, BC



**RZ07**  
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PROJECT NO. 1682

**STARK**



**3D - ALONG FRONTIER**  
FRONTIER STREET  
PEMBERTON, BC



**RZ08**  
2023-10-11 3:53:31 PM  
PROJECT NO. 1682

**STARK**



**3D - CORNER OF CAMUS + MENZEL LANE**

FRONTIER STREET  
PEMBERTON, BC

**RZ09**

2023-10-11 3:53:33 PM  
PROJECT NO. 1682

**STARK**



FRONTIER STREET ELEVATION



CAMUS ROAD ELEVATION

**STREET ELEVATIONS**

FRONTIER STREET  
PEMBERTON, BC



**RZ10**

2023-10-11 3:53:34 PM  
PROJECT NO. 1682

**STARK**

Stuart Sambell  
**c/o Stark Architecture**  
Unit 210 – 38026 Second Ave  
Squamish, BC  
V8B 0C3

Attention:



**RE: Flood Construction Level  
Mixed Residential Retail Development  
7451 & 7453 Frontier Street, Pemberton, BC**

Dear Stuart Sambell,

## 1.0 INTRODUCTION

In accordance with your recent authorization, Kontur Geotechnical Consultants Inc. (Kontur) has completed this review of Flood Construction Level (FCL) for the above-referenced project. The purpose of this study was to review available information and determine an appropriate FCL for the subject properties and discuss restrictions on suitable land use with respect to the recommended FCL.

This letter, which summarizes the findings of the FCL review, has been prepared in accordance with standard and widely accepted geotechnical engineering principles and practices for similar projects in this region. This letter does not address any environmental issues or considerations related to the proposed project.

Review and use of this letter should be completed in accordance with the attached *Interpretation and Use of Study and Report* document. It is included as an integral part of this letter and should be read in conjunction with all parts of this letter.

## 2.0 UNDERSTANDING OF PROJECT

Based on a discussion with representative for the property owner the project generally consists of the construction of a mixed-use building with the lower level being for retail/ commercial and the upper levels for residential.

## 3.0 SOURCES OF INFORMATION

The following sources of information were reviewed as part of this study:

- Site Reconnaissance by senior Kontur personnel to assess existing site conditions;
- Surficial geology map “*Surficial Geology and Landslide Inventory of the Upper Sea to Sky Corridor*”;
- Relevant information obtained from the Squamish Lillooet Regional District (SLRD) online web-mapping applications;
- Report titled “*Lillooet River Floodplain Mapping – Final Report*” prepared by Northwest Hydraulic Consultants Ltd. (NHC), dated November 22, 2018; and,



- Plan showing Topography and Site Features prepared by Doug Bush Survey Services Ltd. (DBSS).

## **4.0 SITE DESCRIPTION**

### **4.1 General**

The subject properties are located on the northern side of Camus Street between Frontier Street and Menzel Lane within the Village of Pemberton. The properties were rectangular in shape with a north-south dimension of about 40m and an east-west dimension of about 40m. The properties were bonded by a single-family residential lot to the north, Frontier Street to the east, Menzel Lane to the west and Camus Street to the south.

### **4.2 Surface Conditions**

The subject properties were generally flat lying at an elevation of about 210m.

The northern property (7453 Frontier Street) contained a two-level single family residential building with the southern lot (7451 Frontier Steet) containing a small shed.

Vegetation generally consisted of grass lawns with a couple of large coniferous trees and some deciduous trees along the property boundaries.

### **4.3 Soil Conditions**

A review of the surficial geology map "*Surficial Geology and Landslide Inventory of the Upper Sea to Sky Corridor*" indicates the subject properties are underlain by Fan Deposits consisting of poorly sorted sand and gravel with diamictons; generally, 2 to 15m thick.

Kontur has not completed any subsurface exploration within the subject property.

### **4.4 Groundwater Conditions**

No seepage was noted within the subject properties during site reconnaissance; however, based on Kontur's previous experience in the area groundwater can typically be encountered about 2m below ground surface. The depth to groundwater table was unknown at the time of this report.

## **5.0 COMMENTS AND RECOMMENDATIONS**

### **5.1 General**

It is understood that the property owner is proposing a multi-level building with retail/Commercial units on the first level and residential units on the upper levels. The lower level would have area below the FCL provided in the NHC report. The sections below address the risks associate with such an approach.

### **5.2 Flood Construction Level**

A review of the NHC report indicates the recommended FCL for the subject property is 212.1m geodetic including a 0.6m freeboard. A review of topographic information contained in the survey plan prepared by Doug Bush Survey Services Ltd. (DBSS), dated August 12, 2021 indicates existing elevations within the



subject property range from about 210.0m along the northern property boundary to about 210.5m along the southern property boundary. Based on the above discussion the recommended FCL would be about 1.6m to 2.1m above the existing grade. A review of the Flood Hazard Area Land Use Management Guidelines provided by the BC Ministry of Water, Land and Air Protection Section 1.3 indicates that subject to review by and if acceptable to the local government, a flood plain bylaw may be modified. This discretion extends to the reduction of elevation requirements, where flood plain mapping exists, by the freeboard, provided the subject property is in the flood plain fringe area and that there are not major erosion or channel avulsions hazards in the immediate vicinity. As the subject property is on the fringe of the flood hazard as defined by the NWH report and there are no major erosion or channel avulsions in the immediate vicinity the recommended FCL could be reduced by the freeboard (0.6m) provided in the report. This would result in a FCL of 211.5m or about 1.0m to 1.5m above existing grade. It should be noted that parking is permitted below FCL by British Columbia floodproofing guidelines.

### 5.3 Flood Depth

The NHC report provides estimated ranges of Flood Depths during the 50-, 100- and 200-year flood events. The table below summarizes the Flood8 Depth estimates for the referenced flood events. The Flood Depth maps are attached to this report.

Flood Event Return Period (Yrs)	Estimated Flood Depth Range (m)	Description
50	0.0	N/A
100	0 to 0.5	Most houses are dry; walking in moving water or driving is potentially dangerous; basements and underground parking may be flooded; potentially causing evacuations
200	0.5 to 1.0	Water on ground floor,; basements and underground parking flooded; potentially causing evacuation; electricity failed; vehicles are commonly carried off roadways.

### 5.4 Flood Hazard Rating

The NHC report provides a Flood Hazard Rating for the 50-, 100- and 200- year flood events. The Flood Hazard Rating is based on the Flood Depth x (Flow Velocity + 0.5m/s).



Flood Event Return Period (Yrs)	Degree of Flood Hazard (m)	Description
50	0.0	N/A
100	Low (<0.75)	Caution: Flood zone with shallow flowing water or deep standing water.
200	Low (<0.75)	Caution: Flood zone with shallow flowing water or deep standing water.

## 5.5 Discussion

Based on the above discussion flooding for the subject property would only occur in the case of a 100 year or greater return period. For the design 200-year flood event the flood levels above existing grade are anticipated to be greater than 1.0m. Based on the inverse relationship for Flood Hazard versus Flood Depth, it is expected that deeper flood levels would result in slower water flow velocities. It is considered that the relatively low flow rates are associated with deeper water and shallow flood events with faster flow rates. As described in the Flood Hazard table above, the Degree of Flood Hazard is less than 0.75m shallow flowing water or standing deeper water. The NHC report indicates that a Degree of Flood Hazard between 0.75m and 1.25, would result in flowing water that would be dangerous for some (i.e. children). Hence it can be extrapolated that a Degree of Flood Hazard less than 0.75m could be resisted by a typical person, even children.

Part 16 and 16.1 of the Pemberton Building Bylaw allows for the Building Official to exercise the authority to provide an exemption to the for land that the Building Official considered that construction would be subject to flooding provided a report by a professional engineer who has assessed the condition of the land and certifies in the report the land may be safely used for its intended purposes. Section 16.2 indicates that if the report required under Section 16.1 is not provided or the engineer or geoscientist determines that the land cannot be used safely for the intended use a building permit may not be issued. Section 16.3 indicates that if the engineer or geoscientist certifies that land may be used safely for the use intended if used in accordance with the conditions specified in the report provided to the Chief Building Official, a permit may be issued subject to the following conditions:

- a) the owner covenants with the Village to use the land only in the manner certified by the engineer or geoscientist as enabling the safe use of the land for the use intended;
- b) the covenant contains conditions for reimbursing the Village for any expenses that may be incurred by it as a result of a breach of the covenant; and
- c) the covenant is registered under section 219 of the Land Title Act (British Columbia).

Based on the above discussion Kontur cannot provide the assurance that the subject property can be used for residential/ commercial/ retail space below the FCL of 211.5m as such space would be considered habitable space by the Flood Management Land Use Guidelines and damage to the building and goods stored within without suitable precautions, would be possible. However, Section 1.3 of the Flood Management Land Use Guidelines further indicates that the review of the local government may not





support modification on technical grounds, but the applicant may nevertheless demonstrate a hardship. A valid hardship should only be recognized where the physical characteristics of the lot and size of the lot are such that building development proposals, consistent with land use zoning bylaws, cannot occur unless included requirements are reduced. In order to avoid setting difficult precedents these sites should be unique to the subject property and environs. In the case of the subject property, it is understood that similar difficulties would be present for several properties in the Pemberton downtown core.

Should the Village of Pemberton permit construction of retail/ commercial space below the FCL as indicated in the NHC report the following precautions are recommend:

- No area used for habitation below FCL be used for installation of heating, ventilating, electrical switches, major electrical switchgear or other equipment susceptible to damage by floodwaters unless the space is protected by engineered flood control doors or tanked up to the required elevation with continuous floodproofed concrete walls.
- There should be no openings or vents allowing floodwaters to enter electrical/ mechanical rooms, habitable spaces or storage areas.
- All cracks, ducts and pipes must be adequately sealed with non-shrink grout and all walls below the FCL are protected by the installation of an impermeable waterproof barrier.
- All windows below the FCL should be waterproofed.
- All drains within the building should have backwater preventers or valves installed to prevent backflow into areas below FCL as noted above.

Areas below recommended FCL may be used for parking, as it is not considered to be habitable space by provincial guidelines. If such space is to be developed there must be unobstructed pedestrian ingress and egress to areas above FCL as in directed in the "Flood Hazard Area Land Use Management Guidelines" 2004. No storage should be permitted in the below FCL areas. Electrical and mechanical equipment must be located above FCL. Any parts of the building constructed below FCL should be constructed with "flood resistant" materials not easily damaged by floodwater.

## **6.0 CLOSURE**

The geotechnical comments and recommendations presented in this letter are based on the referenced information and Kontur's understanding of the project as described herein. If site conditions or project parameters differ from those described in this letter, Kontur should be notified promptly to review geotechnical aspects of the project and provide additional or modified comments and recommendations, as deemed appropriate. Contractors should make their own assessments of subsurface conditions at this site and select the construction means and methods that are most appropriate for encountered site conditions.

This letter has been prepared for the exclusive use of Stuart Sambell and/or their designated agents or consultants for the intended purpose described herein, that being for determination of suitable waterproofing for a proposed mixed-use building. Any use of the information contained in this letter for other than its intended purpose or by any other party must first be verified in writing by Kontur. Kontur does not accept any responsibility or damages because of any other party relying on or using the information, interpretations, opinions, comments, and/or recommendations that are contained in this letter.



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.**  
**EGBC Permit to Practice #1000925**

Per:

Reviewed by:

Evan Sykes, P.Eng.  
Project Manager | Geotechnical Engineer

Matthew Yip MEng PEng  
Principal | Geotechnical Engineer

Cc: Caroline Lamont, Bethel Corporation, clamont@bethelcorp.ca

**Attachments:** Interpretation and Use of Study and Report Document  
Flood Hazard Maps



## 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.

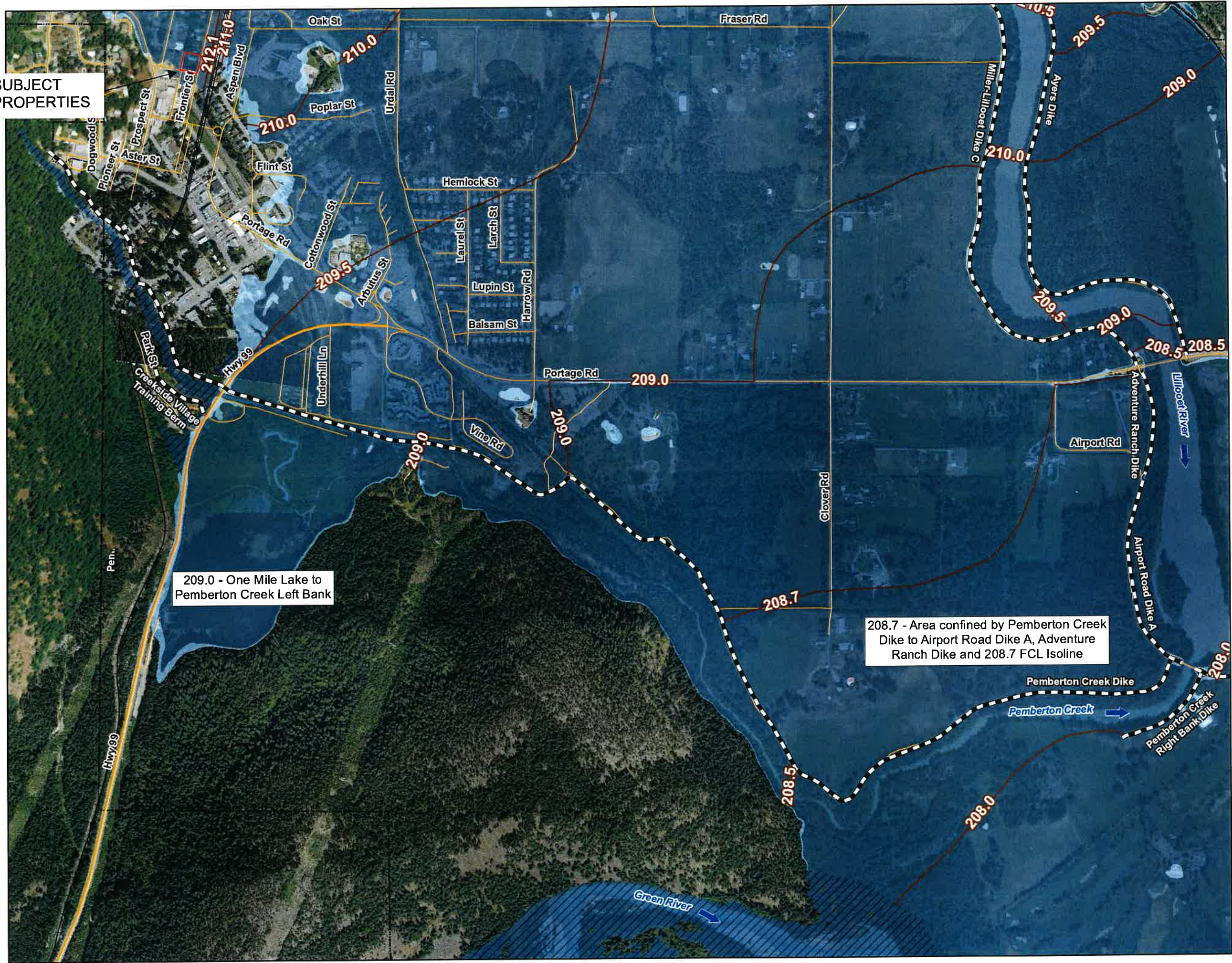
### 6.0 ALTERNATE REPORT FORMAT

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.

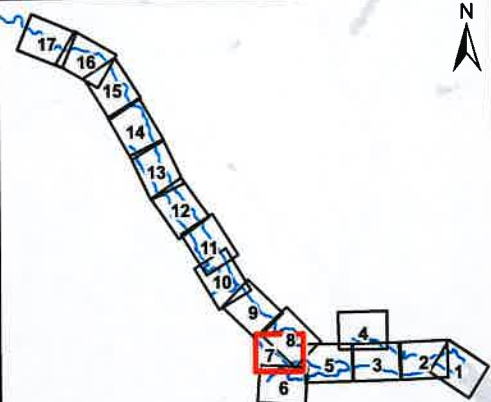
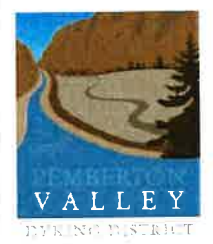
The Client recognizes and agrees that electronic files submitted by KONTUR have been prepared and submitted using specific software and hardware systems. KONTUR makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

SUBJECT PROPERTIES



209.0 - One Mile Lake to Pemberton Creek Left Bank

208.7 - Area confined by Pemberton Creek Dike to Airport Road Dike A, Adventure Ranch Dike and 208.7 FCL Isoline



- Flow Direction
- Dike
- FCL Isoline
- Railway
- Major Road
- Local Road
- Pemberton Valley Dyking District
- Flood Extents Including 0.6m Freeboard
- Flood Extents
- Flood Extents - Tributaries

Please refer to General Notes on Map Index Sheet



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Units: METRES Vertical Datum: CGVD(2013)

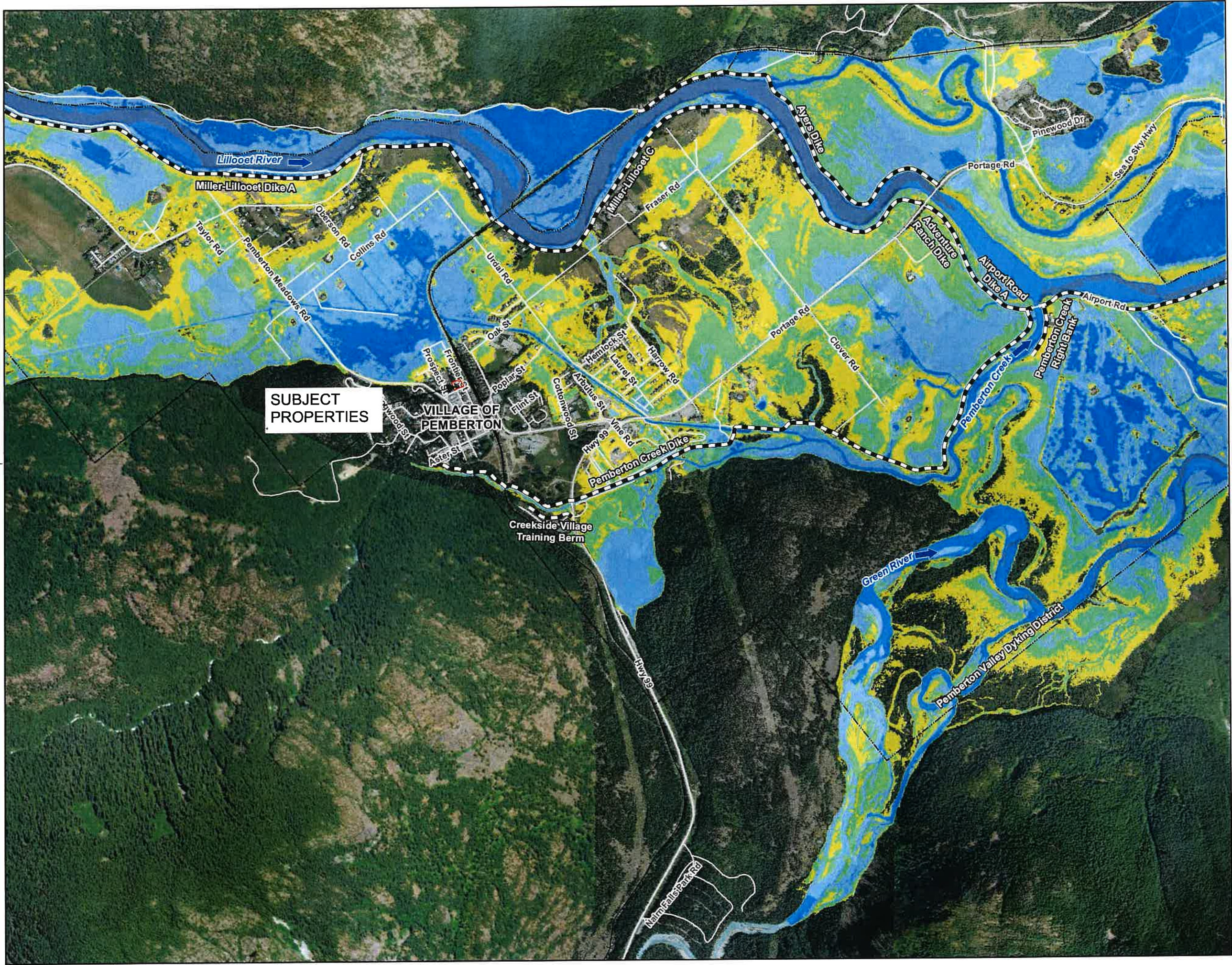
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Job Number	3002903	Date	31-AUG-2018
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LILLOOET RIVER FLOODPLAIN STUDY

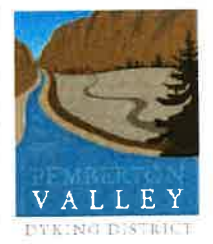
**200-YEAR DESIGNATED FLOODPLAIN MAPS INCLUDING FREEBOARD**

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SHEET 4 ↑

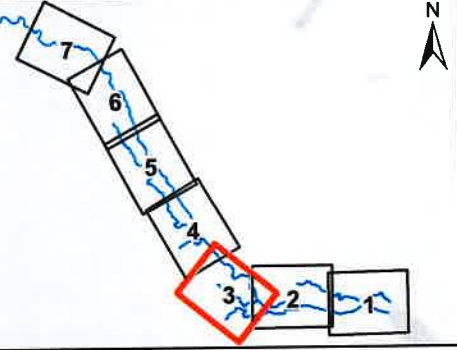
↓ SHEET 2






VALLEY  
DYING DISTRICT



nhc  
northwest hydraulic consultants



 Flow Direction  
 Dike  
 Pemberton Valley Dyking District

**Depth (m)**

	0 to 0.5
	0.5 to 1.0
	1.0 to 2.0
	2.0 to 5.0
	> 5.0; River

**0-0.5m:** Most houses are dry; walking in moving water or driving is potentially dangerous; basements and underground parking may be flooded, potentially causing evacuation.


**0.5-1.0m:** Water on ground floor; basements and underground parking flooded, potentially causing evacuation; electricity failed; vehicles are commonly carried off roadways.

**1.0-2.0m:** Ground floor flooded; residents evacuate.

**2.0-5.0m:** First floor and often roof covered by water; residents evacuate.

Please refer to General Notes on Map Index Sheet

SCALE - 1:20,000



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 Units: METRES Vertical Datum: CGVD(2013)

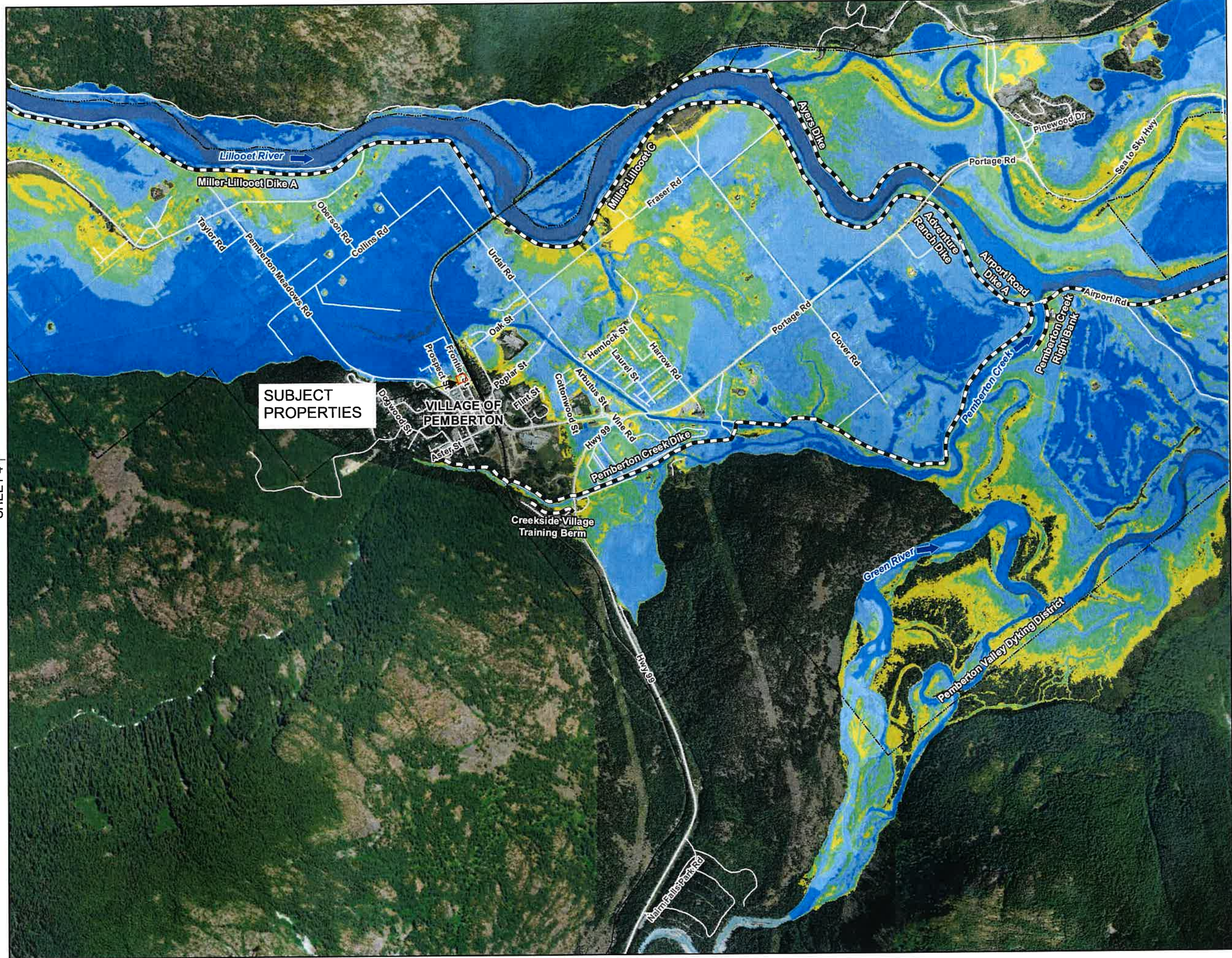
Engineer CTL	GIS MAO	Reviewer MCM
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Job Number 3002903	Date 31-AUG-2018
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LILLOOET RIVER FLOODPLAIN STUDY

**FLOOD DEPTH  
50-YEAR LILLOOET EVENT**

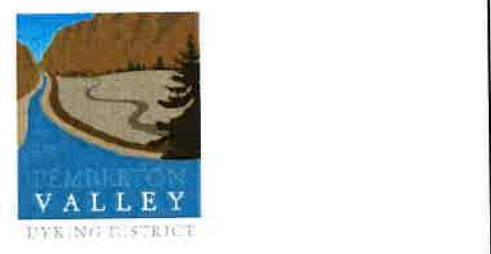
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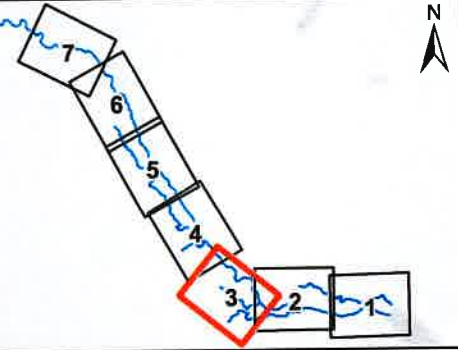
SHEET 4 ↑

SUBJECT PROPERTIES

VILLAGE OF PEMBERTON



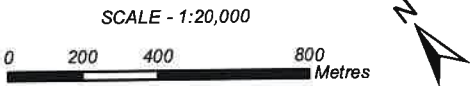
**nhc**  
northwest hydraulic consultants



➔ Flow Direction  
 Dike  
 Pemberton Valley Dyking District  
**Depth (m)**  
 0 to 0.5  
 0.5 to 1.0  
 1.0 to 2.0  
 2.0 to 5.0  
 > 5.0; River

**0-0.5m:** Most houses are dry; walking in moving water or driving is potentially dangerous; basements and underground parking may be flooded, potentially causing evacuation.  
**0.5-1.0m:** Water on ground floor; basements and underground parking flooded, potentially causing evacuation; electricity failed; vehicles are commonly carried off roadways.  
**1.0-2.0m:** Ground floor flooded; residents evacuate.  
**2.0-5.0m:** First floor and often roof covered by water; residents evacuate.

Please refer to General Notes on Map Index Sheet

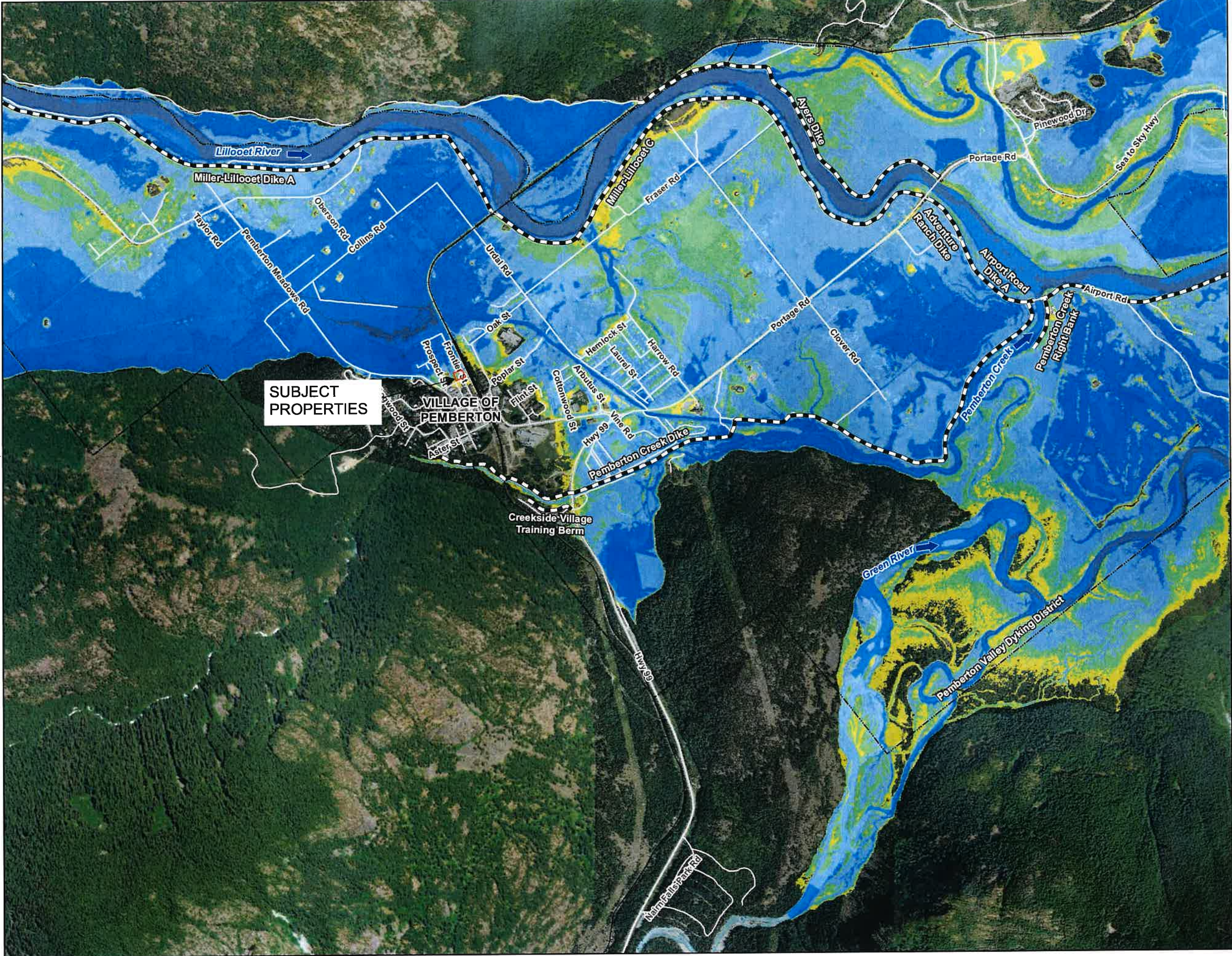


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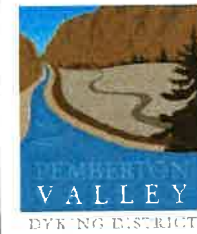
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Job Number 3002903	Date 31-AUG-2018	

LILLOOET RIVER FLOODPLAIN STUDY

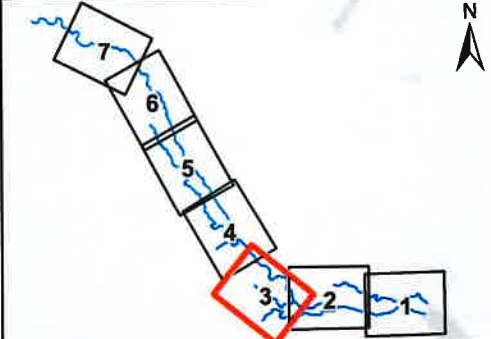
**FLOOD DEPTH  
100-YEAR LILLOOET EVENT**



SHEET 4 ↑



**nhc**  
northwest hydraulic consultants



- Flow Direction
- Dike
- Pemberton Valley Dyking District
- Depth (m)**
- 0 to 0.5
- 0.5 to 1.0
- 1.0 to 2.0
- 2.0 to 5.0
- > 5.0; River

**0-0.5m:** Most houses are dry; walking in moving water or driving is potentially dangerous; basements and underground parking may be flooded, potentially causing evacuation.

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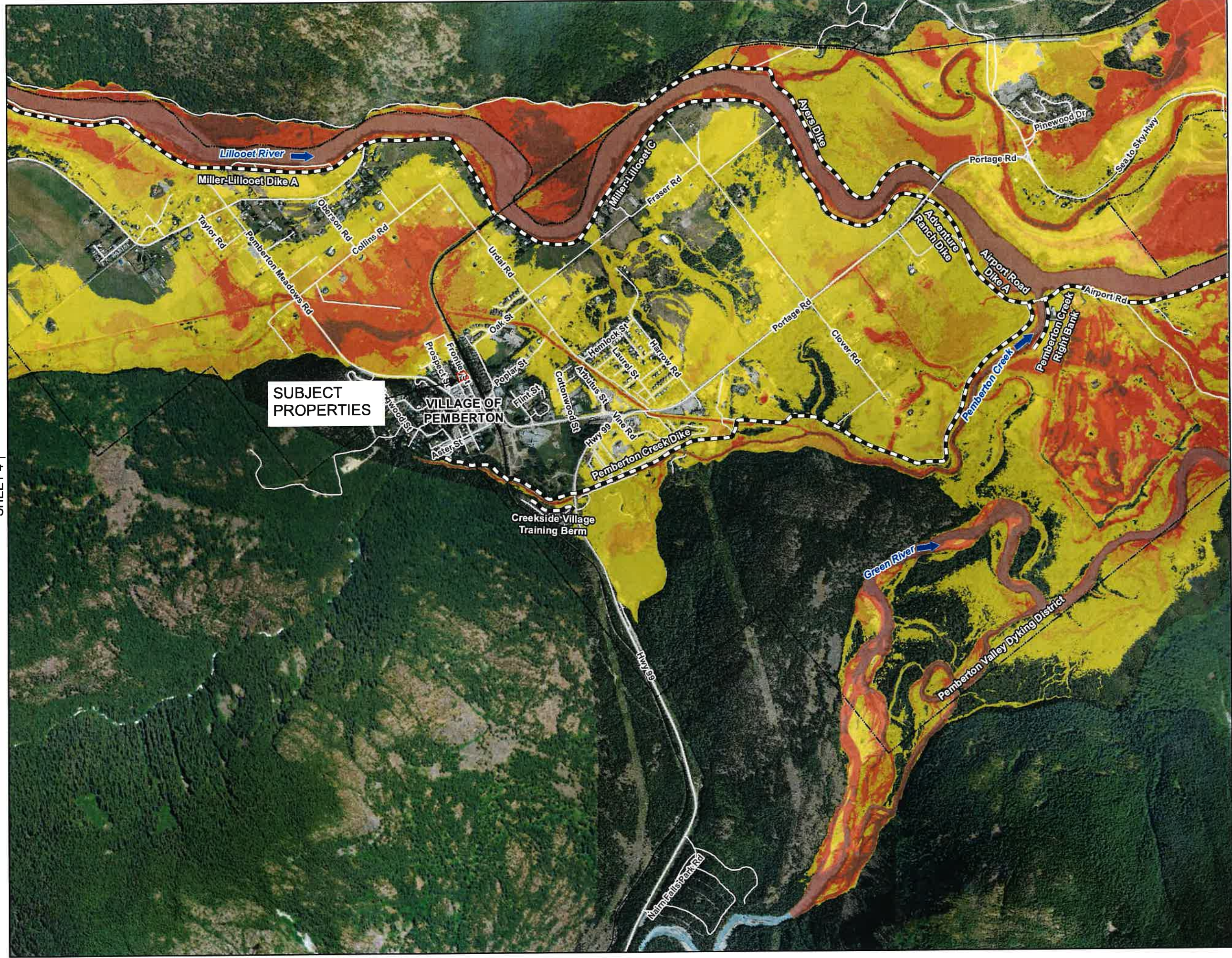
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Job Number	3002903	Date	31-AUG-2018
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LILLOOET RIVER FLOODPLAIN STUDY

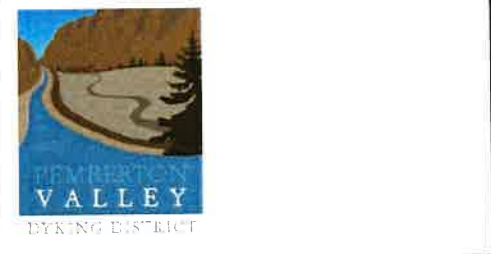
**FLOOD DEPTH  
200-YEAR LILLOOET EVENT**

MAO\_0\_13002903\_Lillooet\_RiverGIS195\_GIS\_Sea3002903\_Lillooet\_FloodOverview\_Depth.mxd

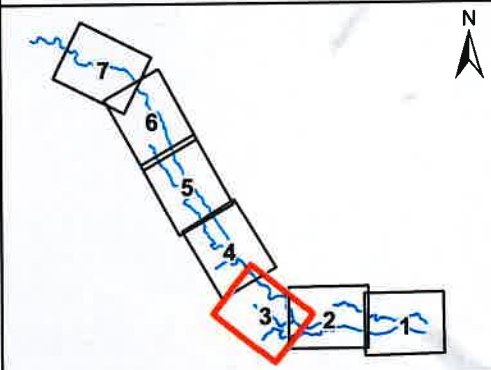


SHEET 4 ↑

↓ SHEET 2



**nhc**  
northwest hydraulic consultants



- Flow Direction
  - Dike
  - Pemberton Valley Dyking District
  - Hazard Rating (m³m/s)**  
Hazard Rating = Depth x (Velocity + 0.5)
  - Low: < 0.75
  - Moderate: 0.75 - 1.25
  - Significant: 1.25 - 2.5
  - Extreme: > 2.5
- Low:** Caution - Flood zone with shallow flowing water or deep standing water.
- Moderate:** Dangerous for some (i.e. children) - flood zone with deep or fast flowing water.
- Significant:** Dangerous for most people - flood zone with deep fast flowing water.
- Extreme:** Dangerous for all - flood zone with deep, fast flowing water.
- Please refer to General Notes on Map Index Sheet



Coordinate System: NAD 1983 UTM ZONE 10N  
Units: METRES Vertical Datum: CGVD(2013)

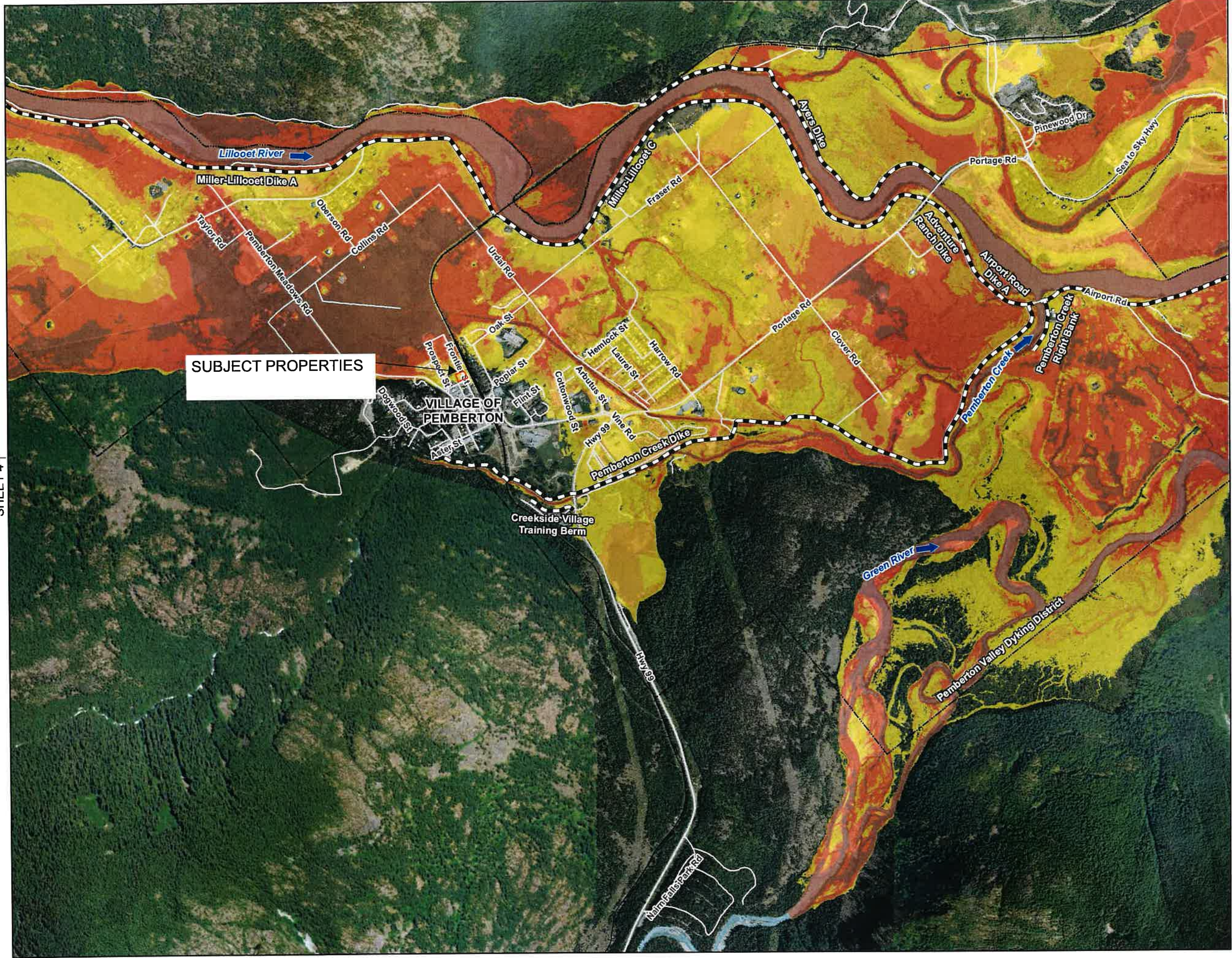
Engineer	GIS	Reviewer
CTL	MAO	MCM

Job Number	Date
3002903	31-AUG-2018

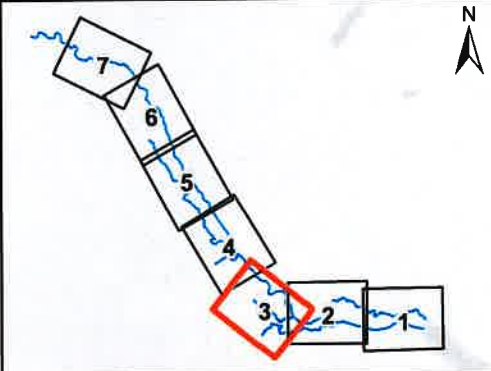
LILLOOET RIVER FLOODPLAIN STUDY

**FLOOD HAZARD RATING  
50-YEAR LILLOOET EVENT**





**nhc**  
northwest hydraulic consultants



- Flow Direction
- Dike
- Pemberton Valley Dyking District
- Hazard Rating (m<sup>3</sup>/m/s)**
- Hazard Rating = Depth x (Velocity + 0.5)
- Low: < 0.75
- Moderate: 0.75 - 1.25
- Significant: 1.25 - 2.5
- Extreme: > 2.5
- Low:** Caution - Flood zone with shallow flowing water or deep standing water.
- Moderate:** Dangerous for some (i.e. children) - flood zone with deep or fast flowing water.
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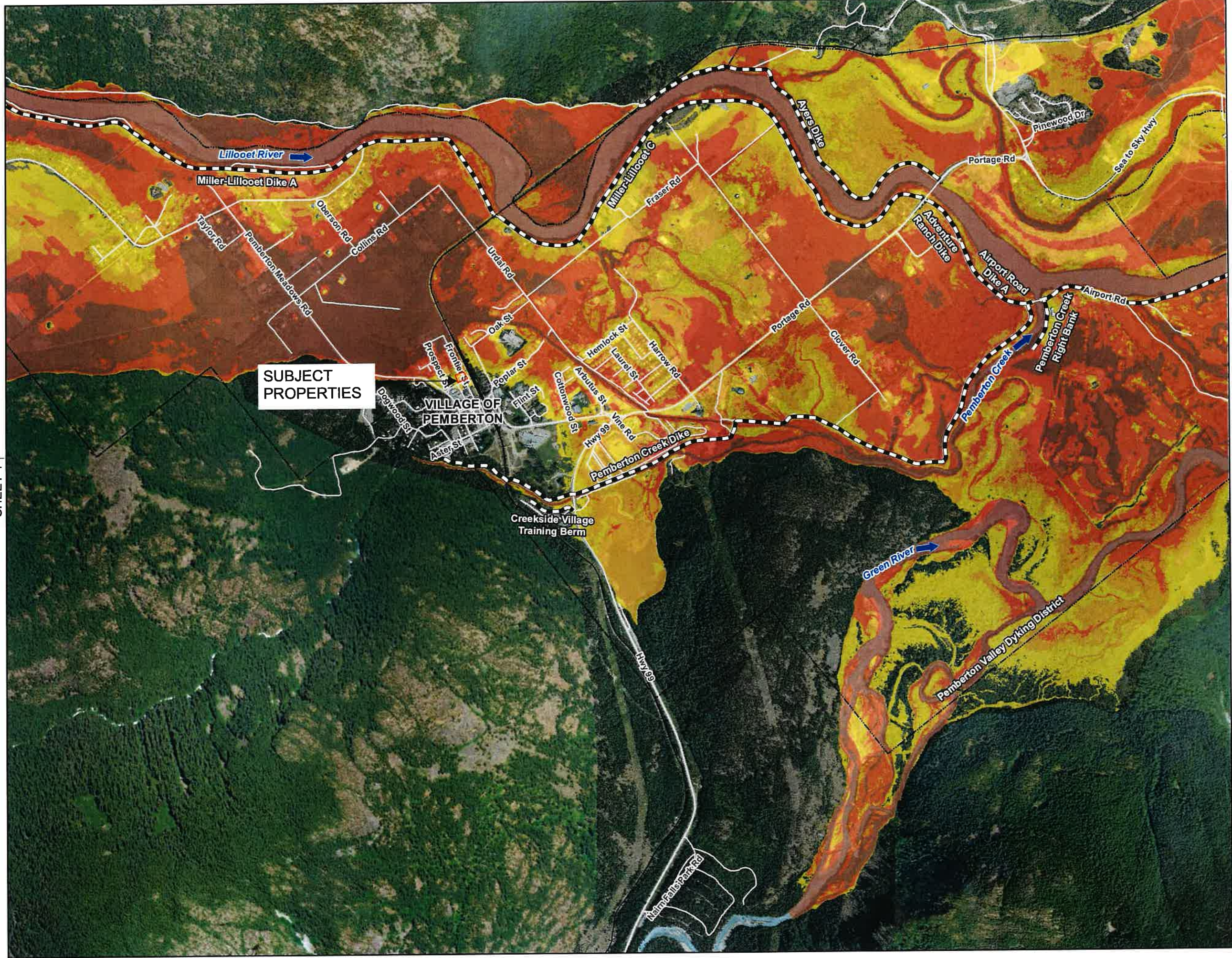


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Units: METRES Vertical Datum: CGVD(2013)

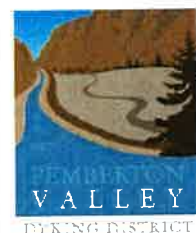
Engineer	GIS	Reviewer
CTL	MAO	MCM
Job Number	Date	
3002903	31-AUG-2018	

LILLOOET RIVER FLOODPLAIN STUDY


**FLOOD HAZARD RATING**  
**100-YEAR LILLOOET EVENT**




SHEET 4 ↑

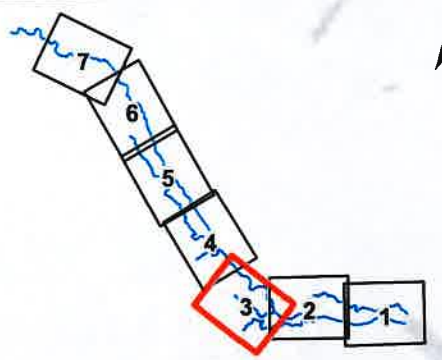


**VALLEY**  
DYKING DISTRICT



**nhc**  
northwest hydraulic consultants





➡ Flow Direction

▬ Dike

▭ Pemberton Valley Dyking District

**Hazard Rating (m\*m/s)**  
Hazard Rating = Depth x (Velocity + 0.5)

- Low: < 0.75
- Moderate: 0.75 - 1.25
- Significant: 1.25 - 2.5
- Extreme: > 2.5

**Low:** Caution - Flood zone with shallow flowing water or deep standing water.


**Moderate:** Dangerous for some (i.e. children) - flood zone with deep or fast flowing water.

**Significant:** Dangerous for most people - flood zone with deep fast flowing water.


**Extreme:** Dangerous for all - flood zone with deep, fast flowing water.

Please refer to General Notes on Map Index Sheet

SCALE - 1:20,000



0 200 400 800 Metres



Coordinate System: NAD 1983 UTM ZONE 10N  
Units: METRES Vertical Datum: CGVD(2013)

Engineer	CTL	GIS	MAO	Reviewer	MCM
Job Number	3002903	Date	31-AUG-2018		

**LILLOOET RIVER FLOODPLAIN STUDY**

**FLOOD HAZARD RATING**  
**200-YEAR LILLOOET EVENT**

SHEET 3 OF 7

MAO, O:\3002903\_Lillooet\_River\GIS\95\_GIS\_Sea\3002903\_Lillooet\_FloodOverview\_Hazard100yr.mxd

# ***PRELIMINARY SERVICING REPORT***

**Proposed Mixed Use Development  
7451 & 7453 Frontier Street, Pemberton, BC**

**November 17, 2023**

*Reviewed by:*  
**Tyler Ezzy, P.Eng.**  
Project Manager

*Prepared by:*  
**Jason Morden, E.I.T.**  
Project Engineer

***R.F. BINNIE & ASSOCIATES LTD.***

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Squamish, BC V8B 0G2  
Main: 604-892-8222



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## APPENDICES

- Appendix A: Existing Satellite Imagery
- Appendix B: Existing Village of Pemberton GIS Utility Plan
- Appendix C: FUS Fire Flow Estimate
- Appendix D: Conceptual Stormwater Management Plan
- Appendix E: Conceptual Sanitary Catchment Plan
- Appendix F: Conceptual Water Servicing Plan

## 1 INTRODUCTION

This report has been created to fulfill the Village of Pemberton’s requirements for a conceptual servicing report, water system plan, sanitary catchment plan, and stormwater management plan to support the rezoning of 7451 & 7453 Frontier Street, Pemberton BC. Included herein is a description of the existing surrounding infrastructure as well as the servicing requirements for a commercial residential development within the subject lots.

The following documents were reviewed and considered in the preparation of this report:

- Village of Pemberton Subdivision and Development Control Bylaw No. 677, 2011
- Master Municipal Construction Document (MMCD) Design Guideline Manual, 2022
- Doug Bush Survey, DWG 21202D\_Metric, 2021-08-13
- Stark Architecture, 7451 & 7453 Frontier Street – Rezoning Application Drawing Set, 2023-10-11
- BC1Call Record Drawings, Requested 2023-11-07
- Flood Construction Level memo, Kontur Geotechnical Consultants, May 10, 2023

## 2 EXISTING CONDITIONS

The site currently exists as two separate lots zoned as R-1 (Residential) which combine to equal 0.16 ha in area. 7451 Frontier Street consists mostly of landscaped areas and 7453 Frontier Street hosts a house with a gravel driveway. The site fronts Camus Street to the south, Frontier Street to the east and Menzel Lane to the west. The existing grade is relatively flat, sloping northwards at approximately 210m elevation.

### 2.1 Existing Water System

150mm diameter PVC watermains supply water under both Camus Street and Frontier Street. Additionally, an asbestos cement watermain lies under Menzel Lane with an unknown diameter. Various record drawings suggest conflicting diameters for the Menzel Lane watermain, varying from 50mm in diameter to 200mm in diameter. The nearest fire hydrant is located on the north side of Camus Street outside the southwest corner of 7451 Frontier Street. Refer to Appendix F for a plan that shows the existing water system surrounding the site.

### 2.2 Existing Storm System

A 300mm diameter concrete storm sewer exists under Menzel Lane to the west of the proposed development site. This existing storm sewer outlets to a ditch north of the site within Menzel Lane. There is an existing AE 24x54 precast concrete oil interceptor upstream of the headwall outlet to the ditch. Per available record drawings, 100mm diameter storm services exist for both 7451 & 7453 Frontier Street to the existing 300mm diameter storm sewer within Menzel Lane.

A storm sewer drains east within Camus Street, collecting the drainage of the right-of-way, but no details were available at the time of this report. No stormwater features are apparent within the Frontier Street frontage. Refer to Appendix D for a plan that displays existing stormwater features.

### **2.3 Existing Sanitary System**

A 300mm diameter sanitary sewer main exists under Camus Street which flows east towards Frontier Street. Based on available record drawing information, the material of this existing sanitary sewer main is unknown. A 200mm diameter sanitary sewer exists within Menzel Lane that flows north to an existing lift station at Walnut Street, where sewage is pumped back up Menzel Lane via a 75mm diameter force main to the Camus Street gravity sewer.

### **2.4 Existing BCHydro Utilities**

Overhead powerlines exist on the south side of Camus Street and the west side of Menzel Lane bordering the site. Underground primary lines exist on the north side of Camus Street bordering the site. These underground ducts are concrete encased and may limit the servicing connection locations for the proposed development site.

## **3 PROPOSED DEVELOPMENT**

7451 & 7453 Frontier Street are proposed to be consolidated and rezoned from Residential to Comprehensive Development to support a multi-story mixed use commercial and residential building. Details of the proposed development can be found on the Stark Architecture plans submitted for rezoning, dated October 11, 2023. The first floor at 211.07m elevation is proposed to contain primarily commercial units, while the three floors located above are residential. An underground parkade is also included. The proposed development includes 5 commercial units and 33 residential units that include 28 one-bedroom units and 5 two-bedroom units.

## **4 STORMWATER MANAGEMENT**

It's feasible to service the proposed development per the Village of Pemberton bylaw requirements and standard engineering design guidelines. Off-site infrastructure improvements will need to be confirmed during design.

### **4.1 Storm Service Connection**

Considering that the designers of the Menzel Lane storm sewer specified 100mm diameter service laterals to both lots, there is likely capacity in the main for future development discharge if release rate is controlled. Neither service is suitable for this proposed land use as the capacity is likely not sufficient to convey required flows, and because the bylaw requires a minimum diameter of 150mm for commercial/industrial land uses. It's feasible to connect a building service to this existing 300mm diameter concrete storm sewer to convey the proposed developments rainfall runoff. Capacity and condition of the pipe will need to be confirmed during design.

Any services off the existing Menzel lane storm sewer will need special design consideration to the shallow depth as the existing sewer and services have less than 600mm cover. As well, special consideration will need to be given to ensure the Menzel Lane Sewer's HGL is lower than the service invert during rainfall events. Provided the above is satisfactory, it's feasible to provide a service connection to the property line at an elevation of approximately 209.2m. Should this not be acceptable, a connection towards the sewer under Camus Street is feasible.

#### 4.2 Stormwater Treatment

Water quality improvement devices should not be required for the development per the Village of Pemberton Subdivision and Development Control Bylaw and the Master Municipal Contract Document (MMCD) Design Criteria. Additionally, readers should note that record drawings suggest an existing precast concrete oil interceptor within Menzel Lane downstream of the development's likely discharge location. The capacity of this existing oil interceptor should be confirmed during design.

#### 4.3 Stormwater Detention

Changing the land use will result in an increase in impermeable area and an increase in stormwater runoff if proper civil design and construction is not completed. The Village of Pemberton requirement is to limit post-development peak runoff rates to the 5-year return period pre-development peak runoff rates. This is typically completed through restricting flow through an orifice at the downstream end of the on-site system, and detaining as much rainfall as required to limit flow to the pre-determined level.

To quantify the design peak release rate, the rational method can be used to estimate pre-development flows.

$$Q = RAIN;$$

where  $R =$  Runoff coefficient,  $A =$  Catchment area in Hectares (ha),  
 $I =$  rainfall intensity (mm/hr), and  $N = 1/360$

Following the Village of Pemberton Subdivision and Development Control Bylaw and Master Municipal Contract Document (MMCD) Design Criteria, inputs for the pre-development estimate can be assumed to equal:

- $R(\text{pre}) = 0.32$  (MMCD suburban residential with 0.9 adjustment factor)
- $T_c(\text{pre}) = 10$  minutes (MMCD single family lot)
- $I(5\text{-year return period, } T_c = 10 \text{ minutes}) = 26.77\text{mm/hr}$

*Rainfall intensity interpolated from Village of Pemberton DWG VOP-S16 – Rainfall Intensity Data (Village of Pemberton Subdivision and Development Control Bylaw No. 677, 2011)*

Using the above parameters, the five-year return period pre-development runoff can be estimated as:

$$Q_{5-pre} = 0.32 * 0.16 \text{hectare} * 26.77 \text{mm/hr} * \frac{1}{360} = 0.004 \text{m}^3/\text{s}$$

Similar to the pre-development calculation, the following parameters can be used to estimate the 10-year post-development peak site discharge:

- R(post) = 0.80 (MMCD commercial)
- Tc(post) = 5 minutes (MMCD commercial development)
- I(10-year return period, Tc = 5 minutes) = 44.49mm/hr

The ten-year return period post-development peak uncontrolled runoff can then be estimated as:

$$Q_{10-post} = 0.80 * 0.16 \text{hectare} * 44.49 \text{mm/hr} * \frac{1}{360} = 0.016 \text{m}^3/\text{s}$$

Using these values and assumptions, the detention volume required to limit flows to the pre-development rates, can then be estimated using the modified rational method. The Village of Pemberton Bylaw is unclear on which return period storm events are required to be limited to 5-year pre-development rates, so it is assumed that the standard practice of controlling up to 10-year return period post-development flows will be required.

$$V_{10-post \text{ to } 5-pre} = 5.6 \text{m}^3$$

This estimate assumes that no infiltration will take place on site, as the site layout will likely not allow infiltration.

## 5 SANITARY SERVICING

It is feasible to convey the sanitary sewage away from the development via a gravity system into the existing 200mm diameter sanitary sewer in operation that flows north on Menzel Lane. This is possible while fulfilling the VoP's Subdivision and Development Control Bylaw requirements including a minimum pipe diameter of 150mm and a minimum slope of 1%. Based on available record drawing information, the invert at the property line for the 150mm diameter sanitary service may be approximately 208.8m. Design consideration needs to be given to the storm sewer and watermain crossings. Refer to Appendix E for a conceptual servicing overview.

The existing 200mm diameter sanitary sewer flows north to a sanitary lift station at Walnut Street which then pumps back to Camus. The capacity of the 200mm diameter sanitary sewer, lift station, and downstream infrastructure capacity shall be confirmed during design.



Should the above servicing option not work due to crossings, an alternative deeper servicing option is feasible directly into the main across Camus street. This option may be challenging provided the watermain, hydro ducts, and unconfirmed storm sewer.

## 5.1 Design Flows

Residential unit counts and commercial use areas were taken from architectural drawings for rezoning application by Stark Architecture dated October 11, 2023 to estimate sanitary flows. Assuming a Population Equivalent (PE) of 2 per bedroom, the PE can be estimated to equal 76 for the 38 bedrooms. The gross floor area of the commercial area is assumed to equal 945m<sup>2</sup> or 0.0945ha, per Stark drawings.

Section 4.2 of the Village of Pemberton Subdivision and Development Control Bylaw and the Master Municipal Construction Documents (MMCD) methodology was considered as the basis for the initial loading estimate. The following was assumed:

- For residential units, an Average Daily Flow (ADF) of 410L/capita/day may be assumed,
- For commercial units, an Average Daily Flow (ADF) of 22,500L/hectare/day may be assumed,
- An Infiltration rate (I) of 0.17L/s/ha may be assumed,
- A commercial Population Equivalent of 75 people/hectare.

Considering the above assumptions:

- The average daily flow for the residential units can be estimated as

$$\circ \text{ ADF} = \frac{410L}{\text{capita} \cdot \text{day}} * 76 \text{capita} * \frac{1 \text{day}}{24 \text{Hr}} * \frac{1 \text{Hr}}{3600 \text{s}} = 0.36L/\text{s};$$

- The average daily flow for the 1<sup>st</sup> floor commercial units can be estimated as

$$\circ \text{ ADF} = \frac{22,500L}{\text{hectare} \cdot \text{day}} * 0.0945 \text{hectare} * \frac{1 \text{day}}{24 \text{Hr}} * \frac{1 \text{Hr}}{3600 \text{s}} = 0.02L/\text{s};$$

- The peaking factor can be estimated as:

$$\circ \text{ PF} = 1 + \frac{14}{4 + \left(\frac{84}{1000}\right)^{0.5}} = 4.26;$$

- The Peak Sewage Flow can be estimated as

$$\circ \text{ Peak Sewage Flow} = \sum \text{ADF} \times \text{PF} = 1.53L/\text{s};$$

- The infiltration rate can be estimated using the total site area as

$$\circ \text{ I} = \frac{0.17L}{\text{s} \cdot \text{day}} * 0.1619 \text{hectare} = 0.03L/\text{s};$$

- And the design flow for the development can be estimated to equal
  - *Peak Sewage Flow + I = 1.56L/s*

## 6 WATER SERVICING

Tying into the Village of Pemberton's existing 150mm diameter PVC watermain within Camus Street or Frontier Street is feasible. Servicing the site off Frontier may be more favorable as it may be easier to isolate while utilizing existing valves.

The existing hydrant on the north side of Camus Street will likely need to be relocated to suit the future frontage design of the proposed development. As well, a new valve on the existing 150mm diameter Camus Street water main at the intersection of Menzel Lane should be considered during detailed design to isolate the Camus Street watermain from the Menzel Lane AC watermain.

### 6.1 Design Criteria for Water Servicing Demand

Section 3 of the Village of Pemberton Subdivision and Development Control Bylaw and the Master Municipal Construction Document (MMCD) Design Guideline Manual were considered as the basis for the initial water servicing assessment.

Inputs as per the Bylaw requirements:

- Average Daily Demand (ADD) = 455 L/capita/day
- Maximum Daily Demand (MDD) = 910 L/capita/day
- Peak Hourly Demand (PHD) = 1820 L/capita/day
- For commercial units, an Equivalent Population (EP) of 90 people per hectare may be assumed as per MMCD Design Guidelines,

Additional inputs for calculation of water servicing demand:

- For residential units, an Equivalent Population (EP) of 76 may be assumed for the proposed 38 Bedrooms (EP of 2/BR)
- Commercial area for design flow calculations assumed to be 0.0945ha, based on gross floor area for level one.

### 6.2 Calculated Domestic and Commercial Demand

Based on the design criteria, the water system demand for the proposed mixed-use commercial and residential development can be estimated as:

- ADD = 0.45 L/s
- MDD = 0.90 L/s

- PHD = 1.79 L/s

### 6.3 Calculated Fire Flow

Fire flow demand of 250 L/s is estimated using the Fire Underwriters Society (FUS) method. Refer to the FUS fire flow estimate is included in Appendix C of this report for assumptions and calculations.

Maximum watermain velocities during fire flow events should be reviewed with the water system model during design. It is likely that off-site watermain upgrades will be required considering that a 250L/s flow would cause velocities in the existing 150mm diameter watermain to exceed the maximum 3.5L/s requirement during fire flow events as calculated using the FUS method.

Readers should note that the Village of Pemberton Subdivision and Development Control Bylaw states that “the minimum allowable design velocity under fire flow conditions should be 3.5m/s”. This statement should be interpreted as being erroneous, and that 3.5m/s is that maximum allowable design velocity under fire flow conditions.

### 6.4 Required Water Pressure

The required water pressure at the site should be per bylaw requirements, MMCD guidelines, and good engineering judgement. The VoP requirements are copied below for reader convenience.

**VoP Bylaw Table 3.2 – Design Pressures**

Minimum pressure at peak demand	300 kPa (44 psi)
Maximum allowable pressure	850 kPa* (123 psi)
Minimum pressure for Fire Flow plus Max Day Demand	150 kPa (22 psi)

### 6.5 Proposed Development Watermain Tie-In Capacity

It’s feasible for the water service to tie directly into the 150mm diameter watermain on Camus Street. An analysis of the existing capacity of the water network is not included in this report. The existing system’s pressures and available flow should be confirmed prior to design.

## 7 CLOSURE

This report has been prepared to provide a conceptual servicing strategy to support the rezoning application, as required by the Village of Pemberton staff. Generally, this site is serviceable, and may be serviced off the existing sanitary sewer and storm sewer in Menzel Lane, and off the existing watermain under Camus Street or frontier street. Further analysis of the system is required to determine the existing system's capacity and possible required upgrades. As well, further civil engineering design work is required to complete preliminary and detailed design.

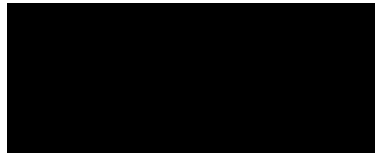
Should additional information be required, please contact the undersigned.

***Prepared by:***

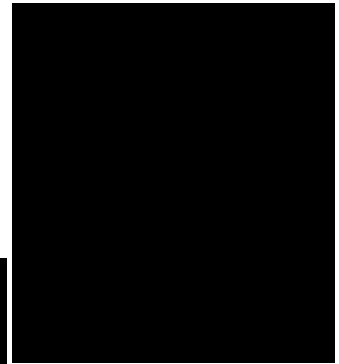


**Jason Morden, E.I.T.**  
Project Engineer

***Reviewed by:***



**Ler Ezzy, P.Eng.**  
Project Manager



# APPENDIX A

## EXISTING SATELLITE IMAGERY



Figure 1 – Satellite Image, Village of Pemberton GIS 2021

# APPENDIX B

## EXISTING VILLAGE OF PEMBERTON GIS UTILITY PLAN



Figure 2 - Existing utilities, Village of Pemberton GIS 2021



# APPENDIX C

## FUS FIRE FLOW ESTIMATE

## Preliminary FUS Fire Flow Estimate

FILE NO: 23-0862  
DATE: November 14, 2023  
LOCATION: 7451 & 7453 Frontier Street, Pemberton  
CALC. BY: BC

- A) TYPES OF CONSTRUCTION: Type V Wood Frame Construction
- B) AVERAGE FLOOR AREA: 932 m<sup>2</sup>
- C) NO. OF STORIES: 4
- D) FIRE FLOW FORMULA:  $f = 220 * c * a^{0.5}$   
a = Total floor area (if needed) a = 3,729 m<sup>2</sup>  
The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.  
c = Coefficient related to the type of construction c = 1.5  
= 1.5 for wood frame construction (structure essentially all combustible).  
= 1.0 for ordinary construction (brick or masonry walls, combustible floor and interior).  
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).  
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).  
f = 20,000 L/min
- E) OCCUPANCY:  
Non combustible -25%  
Limited combustible -15%  
Combustible No charge  
Free Burning 15%  
Rapid Burning 25%  
ADD OR SUBTRACT (±) -15 % of D 17,000 L/min
- F) AUTOMATIC SPRINKLERS (yes/no): yes  
Complete automatic sprinkler protection= -50%  
Complete automatic sprinkler protection, and fire resistive or non-combustible -75%  
SUBTRACT (-) 50 % of E -8,500 L/min
- G) EXPOSURES:  
0 to 3 25% Max  
3.1 to 10 20% Max  
10.1 to 20 15% Max  
20.1 to 30 10% Max  
30.1 to 45 5% Max  
DISTANCE: ADD  
1. South 24 metres 8 %  
2. East metres %  
3. West 20 metres 15 %  
4. North 4 metres 16 %  
TOTAL 39 % of E
- H) UNROUNDED FIRE FLOW REQUIREMENT 15,130 L/Min (E-F+G)  
ROUNDED FIRE FLOW REQUIRED 15,000 L/min (nearest 1,000)  
250 L/sec

Notes:

Calculations based on areas from architectural drawings provided Oct 24, 2023  
Building assumed to be construction type V (wood frame construction)  
Assume limited combustible contents based on residential occupancy  
Assume that water supply is standard and fully supervised per BCBC

# APPENDIX D

## CONCEPTUAL STORMWATER MANAGEMENT PLAN

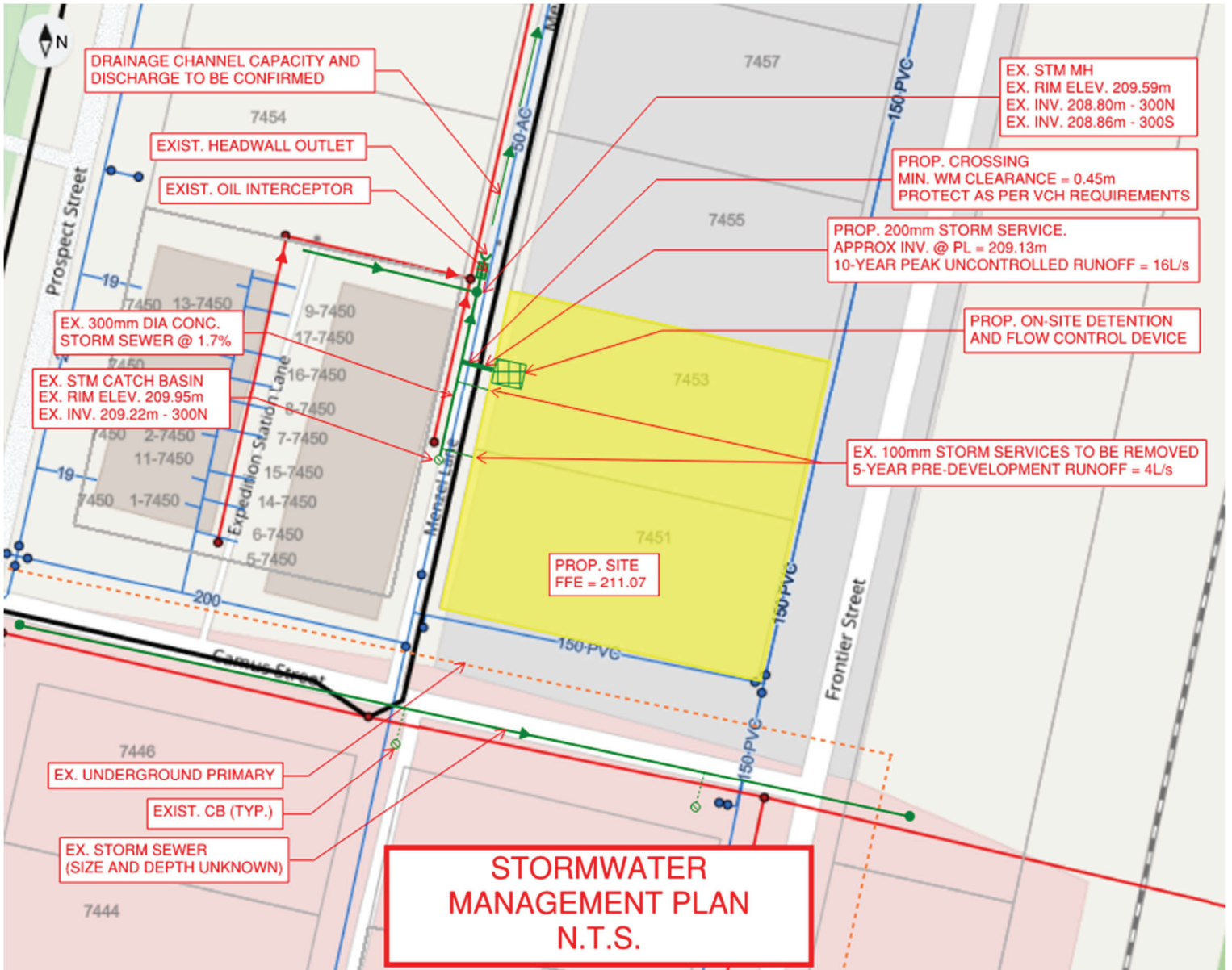


Figure 3 – Conceptual Stormwater Management Plan

# APPENDIX E

## CONCEPTUAL SANITARY CATCHMENT PLAN

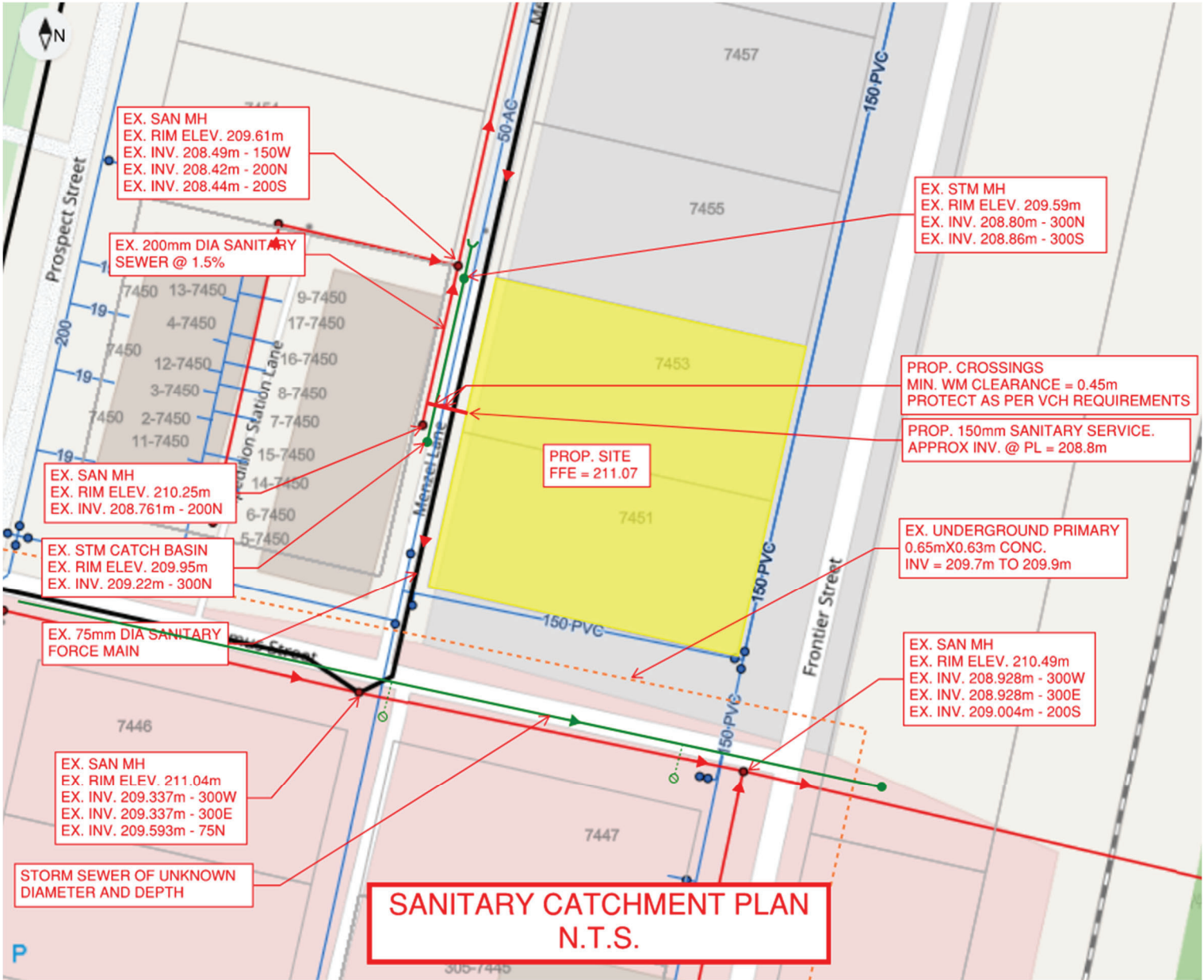


Figure 4 – Conceptual Sanitary Catchment Plan

# APPENDIX F

## CONCEPTUAL WATER SERVICING PLAN

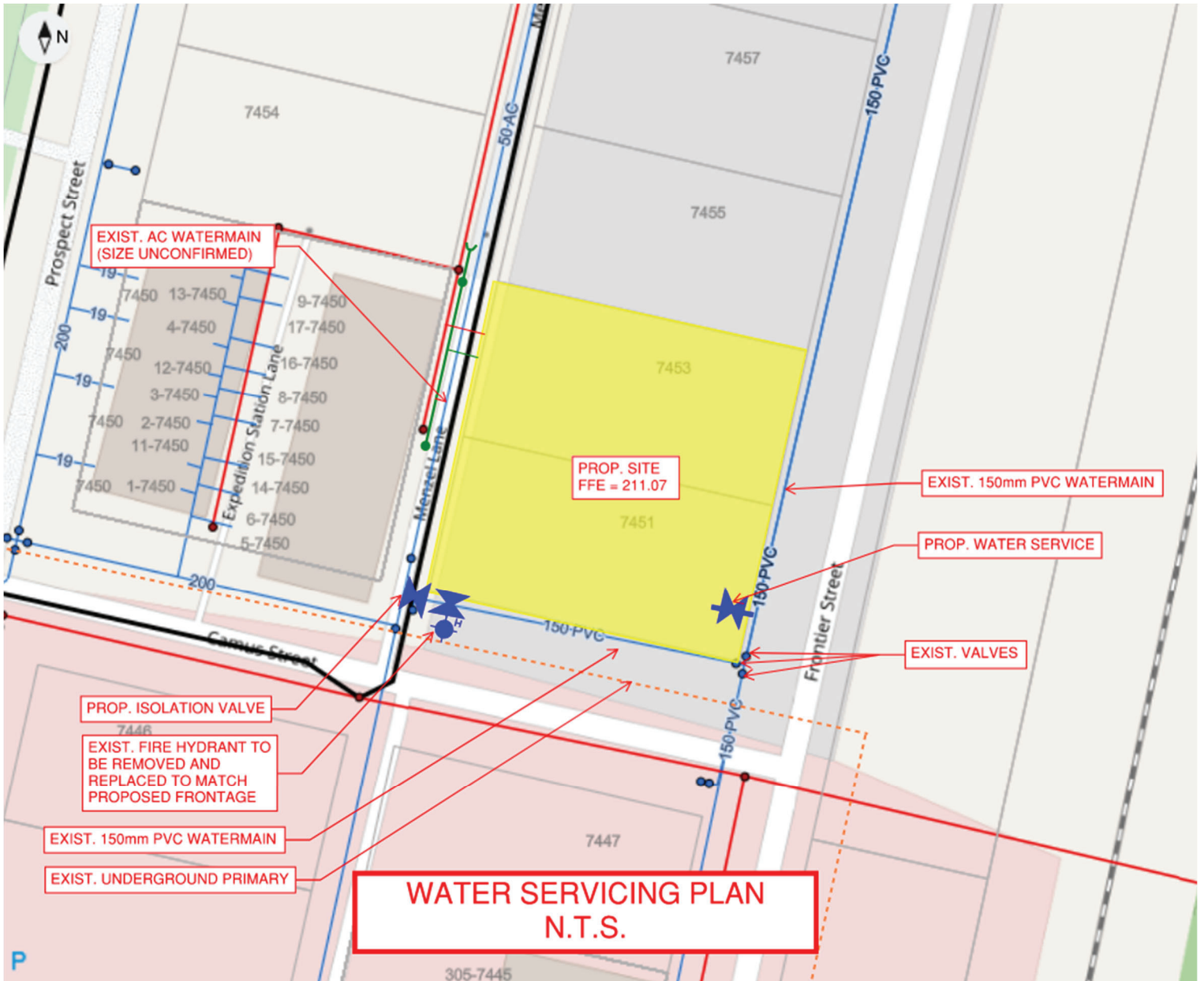
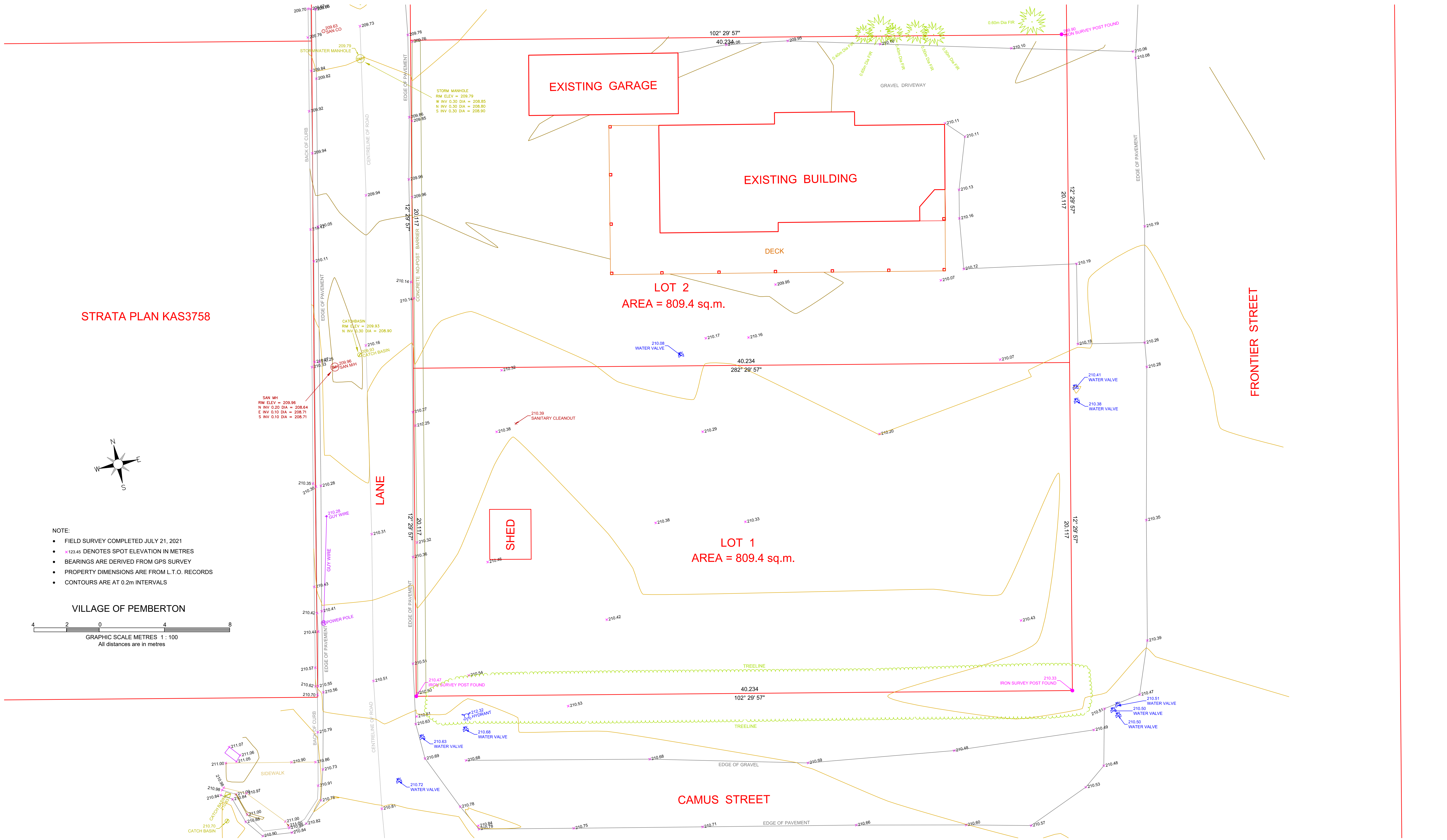


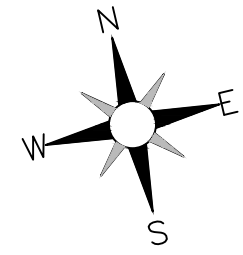
Figure 5 – Conceptual Water Servicing Plan



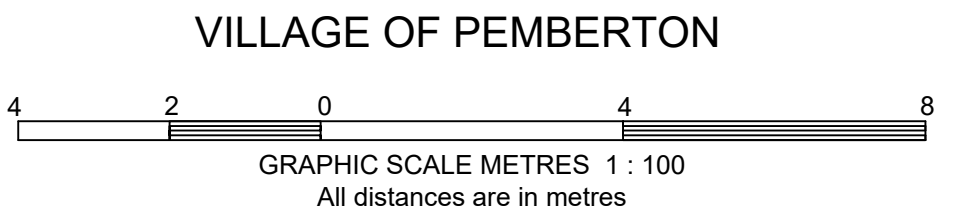
# PLAN SHOWING TOPOGRAPHY AND SITE FEATURES SITUATED UPON LOTS 1 & 2, BLOCK 3, D.L. 203, LILLOOET DISTRICT, PLAN 1624



STRATA PLAN KAS3758



- NOTE:
- FIELD SURVEY COMPLETED JULY 21, 2021
  - \*123.45 DENOTES SPOT ELEVATION IN METRES
  - BEARINGS ARE DERIVED FROM GPS SURVEY
  - PROPERTY DIMENSIONS ARE FROM L.T.O. RECORDS
  - CONTOURS ARE AT 0.2m INTERVALS



DOUG BUSH SURVEY SERVICES Ltd.  
Douglas J. Bush, ASCT, RSIS  
Applied Science Technologist (Geomatics)  
Unit 18, 1370 Alpha Lake Road, Whistler, B.C. V8E 0H9  
Phone 932-3314 / Fax: 932-3039  
E-mail: dougb@dbss.ca / http://dbss.ca

Revision :

Notes:

ELEVATIONS ARE GEODETIC CVD28 DERIVED FROM WATER RESOURCES MONUMENT NO. 1068 LOCATED ON THE WEST SIDE OF THE PEMBERTON MEADOWS HIGHWAY IN D.L. 202 ELEVATION USED = 211.324 METRES

Plan date:  
August 12, 2021

Files:  
21311.CRD

P.I.D.: 011-506-571  
P.I.D.: 011-506-580

Client: STARK ARCHITECTURE

Project: 7451 & 7453 FRONTIER STREET

Certified Correct.

Douglas J. Bush ASCT, RSIS  
Applied Science Technologist (Geomatics)

This 13th day of August, 2021

SCALE: 1:100

JOB NO.: J21311

DWG.: 21202D\_METRIC

SHEET:

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