CITY OF
PORT ALBERNI

AGENDA - REGULAR MEETING OF COUNCIL
Monday, August 12, 2024 @ 2:00 PM
In the City Hall Council Chambers & Via Video-Conference
4850 Argyle Street, Port Alberni, BC

The following pages list all agenda items received by the deadline [12:00 noon on the Wednesday before the scheduled meeting]. A sample resolution is provided for most items in italics for the consideration of Council. For a complete copy of the agenda including all correspondence and reports please refer to the City's website portalberni.ca or contact Corporate Services at 250.723.2146 or by email corp_serv@portalberni.ca

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A. CALL TO ORDER & APPROVAL OF THE AGENDA

1. Council would like to acknowledge and recognize that we work, live and play in the City of Port Alberni which is situated on the unceded territories of the Tseshaht [ċišaaʔatḥ] and Hupačasath First Nations.
2. Late items identified by Councillors.
3. Late items identified by the Corporate Officer.
4. Notice of Video Recording (live-streaming and recorded/broadcast on YouTube).

That the agenda be approved as circulated.

B. ADOPTION OF MINUTES - Page 6

1. Minutes of the Special meeting held at 12:00 pm and Regular Council meeting held at 2:00 pm on July 8, 2024, and minutes of the Special meeting held at 5:00 pm on July 29, 2024 be adopted, as presented.

C. DELEGATIONS

D. UNFINISHED BUSINESS

Includes items carried forward from previous Council meetings.

E. STAFF REPORTS

Members of the public may be recognized by Council to speak to a report if the report is a response to their correspondence or an application.

1. **Removal of Accounts**
   Staff to provide Council with information regarding removal of the accounts portion from the agenda.

F. BYLAWS

Bylaws are required for the adoption of regulations, financial plans, changes to land use policy and to approve borrowing. A bylaw requires four separate resolutions to be adopted and must be considered over a minimum of two [2] Council meetings. Each reading enables Council to reflect on the bylaw before proceeding further.

1. **Utility Bylaw Amendments 2024** - Page 14

   a. *THAT "Waterworks Bylaw No. 5107, 2024" be now finally adopted, signed by the Mayor and Corporate Officer and numbered 5107.*

   b. *THAT "Sewer Connection and Regulation Bylaw No. 5108, 2024" be now finally adopted, signed by the Mayor and Corporate Officer and numbered 5108.*

   c. *THAT "Solid Waste Collection and Disposal Bylaw No. 5109, 2024" be now finally adopted, signed by the Mayor and Corporate Officer and numbered 5109.*

2. **OCP and Zoning Bylaw Amendments | 3850 5th Avenue** - Page 24
   Report dated August 1, 2024 from the Manager of Planning requesting Council consideration of first and second reading of the proposed bylaws and authorization to advance the bylaws to a Public Hearing.

   a. *THAT "Official Community Plan Amendment (3830 5th Avenue) Bylaw No. 5094" be now introduced and read a first time.*

   b. *THAT "Zoning Bylaw Amendment (3850 5th Avenue) Bylaw No. 5113" be now introduced and read a first time.*

   c. *THAT "Official Community Plan Amendment (3850 5th Avenue) Bylaw No. 5094" be read a second time.*

   d. *THAT "Zoning Bylaw Amendment (3850 5th Avenue) Bylaw No. 5113" be read a second time.*

   e. *THAT the amending bylaws be advanced to a Public Hearing on Monday, September 9, 2024 at 6:00 pm in City Hall, Council Chambers.*

G. CORRESPONDENCE FOR ACTION

Correspondence addressed to the Mayor and Council where there is a specific request may be included on an agenda. Correspondence regarding personnel matters, legal action and/or items of a confidential nature will not be included. Correspondence addressed to Council that is administrative or operational in nature will be circulated to Council weekly and referred to the appropriate department for review and follow-up where necessary.

1. **Alberni Valley Tyee Club | Salmon Festival** - Page 59
   Letter received August 3, 2024, 2024 from the Alberni Valley Tyee Club requesting access to the Somass Lands public walkway.

   THAT Council authorize the Alberni Valley Tyee Club access to the Somass Lands public walkway on Thursday, August 29, 2024 to Monday, September 2, 2024 for the purpose of the Salmon Festival weigh station subject to:

   - *provision of standard liability insurance in the amount of $5M [minimum].*

2. **Alberni Valley Community Forest Corporation | Community Donation** - Page 62
Letter dated July 25, 2024 from the Alberni Valley Community Forest Corporation requesting Council support in their selection for the 2024 community donation.

   a. *THAT Council support the recommendation from the Alberni Valley Community Forest Corporation to provide a donation to the Navy League Cadet Corps 113 in the amount of $5,000 towards the purchase of a boat trailer to help with launching and transportation of their vessels to training locations.*

   b. *THAT Council support the recommendation from the Alberni Valley Community Forest Corporation to provide a donation to the Western Vancouver Island Industrial Heritage Society in the amount of $5,000 towards the upgrading and maintenance of the Speeder and passenger cars for use in this years run along the waterfront and special theme events.*

3. **Laura Donovan | Suicide Prevention Support for Indigenous Children** - Page 63
Email dated July 29, 2024 from Laura Donovan requesting Council provide a letter in support of improved suicide prevention for children.

   THAT Council for the City of Port Alberni provide a letter addressed to the Minister of Education in support of improved suicide prevention for children.

4. **Long Shots Events | Alberni Shores Event** - Page 70
Letter dated August 7, 2024 from B. Howells, Long Shot Events requesting a letter of support for the proposed Alberni Shores Festival.

   THAT Council direct staff to prepare a letter of support to B. Howells of Long Shot Events to be presented to Mosaic for the purpose of a proposed Alberni Shores Festival at Macktush Campground.

H. PROCLAMATIONS

I. CORRESPONDENCE FOR INFORMATION

Correspondence found here provides information to Council. Correspondence regarding personnel matters, legal action and/or items of a confidential nature will not be included. Correspondence addressed to Council that is administrative or operational in nature will be circulated to Council weekly and referred to the appropriate department for review and follow-up where necessary.

1. **Correspondence Summary** - Page 72
   a. Truck Loggers Association | ForestryWorksforBC Campaign
   b. Ministry of Agriculture and Food | Drought Challenges
   c. Ministry of Municipal Affairs | Invitation to meet with the Health Authorities of BC during the upcoming UBCM Convention
   d. Environment Assessment Office | Review of the *Environmental Assessment Act, 2018*
   e. BC Emergency Health Services | Port Alberni receiving Community Paramedic
   f. Adventure Sport Park | Survey results
   g. BC Care Providers Association | Home Health – Intermunicipal Business Licence
   h. BC Wildfire Service | Provincial Wildfire Update – July 16, 2024

i. North Island College | Strategic Plan and Year 3 Dashboard Report
j. City of Abashiri |Condolences for Councillor John Douglas
k. Ministry of Housing | Small-Scale Multi-Unit Housing [SSMUH]
l. Public Safety Canada – Crime Prevention Branch | National Strategy to Reduce Gun and Gang Violence
m. Tetra Tech | Dam Safety Review – Lizard Lake Dam and Bainbridge Dam
n. BC Active Transportation Infrastructure Grants Program | 2024/25 Program Intake
o. Ministry of Environment and Climate Change Strategy | Community Wood Smoke Reduction Program and Environmental Data Quality Assurance Regulation [EDQAR]
p. R. Toso, Mobius Books | Argyle Street Design
q. Alberni-Clayoquot Regional District | News Release – Rail Corridor Study
r. Alberni-Clayoquot Regional District | Keeping you Connected June 2024

J. REPORT FROM IN-CAMERA

K. COUNCIL REPORTS

1. **Council and Regional District Reports**
THAT the Council reports outlining recent meetings and events related to the City's business, be received.

L. NEW BUSINESS

New items of business requiring Council direction as well as an opportunity for Council to raise issues as a result of the business of the meeting or to identify new items for subsequent meetings by way of a 'Notice of Motion'.

1. **Public Bench Standards | Recommendations from the July 29th Committee of the Whole**
   a. *THAT Council for the City of Port Alberni direct staff to develop City-wide park, memorial and pedestrian bench standards including a placement strategy associated with a needs analysis.*
   b. *THAT Council for the City of Port Alberni direct staff to terminate the contract for bench placement and advertising effective December 31, 2024.*

2. **Corporate Strategic Plan Review** - Page 291
Report dated July 29, 2024 from the Deputy Director of Corporate Services providing a summary of the June 26, 2024 Corporate Strategic Plan review session.

THAT Council receive the report 'Corporate Strategic Plan Review' dated July 29, 2024.

3. **2024 Council Committee Appointments** - Page 293
Report dated July 24, 2024 from the Deputy Director of Corporate Services requesting approval of Council appointments.

THAT amendments to the Council appointments to Committees and Council representatives to public bodies, commissions and select committees be approved, as follows:

- *August Deputy Mayor [Insert Name]*
- *Community Investment Program [Insert Name]*
- *Liaison, AV Community Forest Corporation [Insert Name]*
- *Liaison, Learning Council/North Island College [Insert Name]*
- *Liaison, School District #70 [Insert Name]*
- *Member, Tsawak-qin Public Advisory Group [Insert Name]*

4. **City of Port Alberni Event Support| Councillor Dame**
THAT Council consider providing approval to events and festivals for a 5 [five] year period subject to event organizers working with City administration for operational items and costing.

M. QUESTION PERIOD

An opportunity for the public to ask questions of Council on decisions or recommendations made during the course of the meeting. A maximum of three [3] questions will be permitted per speaker. For those participating electronically, please use the 'Raise your Hand' feature.

N. ADJOURNMENT

That the meeting adjourn at PM.

MINUTES OF THE IN-CAMERA MEETING OF COUNCIL
MONDAY, July 8, 2024 @ 12:00 p.m.
City Hall Committee Room | 4850 Argyle Street, Port Alberni, BC

PRESENT: Mayor S. Minions
Councillor D. Dame
Councillor J. Douglas
Councillor D. Haggard
Councillor C. Mealey
Councillor T. Patola
Councillor C. Solda

Regrets:

Staff: M. Fox, Chief Administrative Officer
A. McGifford, Director of Finance
D. Leurebourg, Director of Corporate Services

Call to order: @ 12:30 p.m.

MOVED and SECONDED, THAT Council conduct a special Council meeting closed to the public on the basis that one or more matters covered under Section 90 of the Community Charter will be considered, specifically outlined as follows:

Section 90 (1)(c) labour relations or other employee relations;

Section 90 (1)(e) the acquisition, disposition or expropriation of land or improvements, if the council considers that disclosure could reasonably be expected to harm the interests of the municipality;

Section 90 (1)(i) the receipt of advice that is subject to solicitor-client privilege, including communications necessary for that purpose;

Section 90 (1)(k) negotiations and related discussions respecting the proposed provision of a municipal service that are at their preliminary stages and that, in the view of the council, could reasonably be expected to harm the interests of the municipality if they were held in public;

CARRIED

The meeting was adjourned at 1:44 p.m.

CERTIFIED CORRECT

_____ _____

Mayor Corporate Officer

MINUTES OF THE REGULAR MEETING OF COUNCIL
Monday, July 8, 2024 @ 2:00 PM
In the City Hall Council Chambers & Via Video-Conference
4850 Argyle Street, Port Alberni, BC

Present: Mayor S. Minions
Councillor D. Dame
Councillor Douglas
Councillor D. Haggard
Councillor C. Mealey
Councillor C. Solda
Councillor T. Patola

Staff: M. Fox, Chief Administrative Officer
D. Leurebourg, Director of Corporate Services
J. Pelech, Information Services Manger

Gallery: 4

A. ***CALL TO ORDER & APPROVAL OF THE AGENDA***

The meeting was called to order at 2:00 PM.

MOVED AND SECONDED, THAT the agenda be adopted as printed and circulated.
CARRIED

B. ***ADOPTION OF MINUTES***

MOVED AND SECONDED, THAT the minutes of the Special meeting held at 12:30 pm and Regular Council meeting held at 2:00 pm on June 24, 2024 be adopted, as presented.
CARRIED

C. ***DELEGATIONS***

D. ***UNFINISHED BUSINESS***

E. ***STAFF REPORTS***

1. **Accounts**

MOVED AND SECONDED, THAT the certification of the Director of Finance dated July 8, 2024, be received and the cheques numbered 155160 to 155228 inclusive, in payment of accounts totalling $656,058.17, be approved.
CARRIED | Res. No. 24-250

F. BYLAWS

1. **Utility Bylaw Amendments 2024**

MOVED AND SECONDED, THAT "Waterworks Bylaw No. 5107, 2024" be now introduced and read a first time.
CARRIED | Res. No. 24-251

MOVED AND SECONDED, THAT "Waterworks Bylaw No. 5107, 2024" be read a second time.
CARRIED | Res. No. 24-252

MOVED AND SECONDED, THAT "Waterworks Bylaw No. 5107, 2024" be read a third time.
CARRIED | Res. No. 24-253

MOVED AND SECONDED, THAT "Sewer Connection and Regulation Bylaw No. 5108, 2024" be now introduced and read a first time.
CARRIED | Res. No. 24-254

MOVED AND SECONDED, THAT "Sewer Connection and Regulation Bylaw No. 5108, 2024" be read a second time.
CARRIED | Res. No. 24-255

MOVED AND SECONDED, THAT "Sewer Connection and Regulation Bylaw No. 5108, 2024" be read a third time.
CARRIED | Res. No. 24-256

MOVED AND SECONDED, THAT "Solid Waste Collection and Disposal Bylaw No. 5109, 2024" be now introduced and read a first time.
CARRIED | Res. No. 24-257

MOVED AND SECONDED, THAT "Solid Waste Collection and Disposal Bylaw No. 5109, 2024" be read a second time.
CARRIED | Res. No. 24-258

MOVED AND SECONDED, THAT "Solid Waste Collection and Disposal Bylaw No. 5109, 2024" be read a third time.
CARRIED | Res. No. 24-259

G. CORRESPONDENCE FOR ACTION

1. **HMCS Alberni Museum and Memorial**

MOVED AND SECONDED, THAT Council authorize City flags fly at half-mast on August 21, 2024 to commemorate the 80th anniversary of the sinking of the HMCS Alberni on behalf of HMCS Alberni Museum and Memorial.
CARRIED | Res. No. 24-260

2. **Alberni District Fall Fair Association | Annual Fall Fair & Parade**
MOVED AND SECONDED, THAT Council authorize the Alberni District Fall Fair Association access to City streets on Saturday, September 7, 2024 from 11:00 am to approximately 12:00 pm for the purpose of a parade from 9th Avenue along Bute Street and along 10th Avenue to Alderwood Street, subject to:
- *the notification of emergency services and BC Transit;*
- *consultation with all affected businesses/residents;*
- *City approved Traffic Safety Plan including qualified Traffic Control personnel as required; and*
- *provision of standard liability insurance in the amount of $5M.*

CARRIED | Res. No. 24-261

3. **Union of British Columbia Municipalities | 2024 – 2034 Canada Community-Building Fund Agreement**
MOVED AND SECONDED, THAT the Mayor and the Corporate Officer be authorized to execute the 2024-2034 Community Works Fund Agreement.
CARRIED | Res. No. 24-262

4. **Alberni Valley Makerspace**
MOVED AND SECONDED, THAT Council direct staff to prepare a letter of support for Alberni Valley Makerspace to accompany an application to the Clean BC Plastics Action Fund.
CARRIED | Res. No. 24-263

5. **Municipal Insurance Association of BC**
MOVED AND SECONDED, THAT Council confirm Councillor Solda as Voting Delegate and Councillor Haggard as alternate, for Municipal Insurance Association of BC AGM Tuesday, September 17, 2024 in conjunction with the UBCM Convention.
CARRIED | Res. No. 24-264

H. PROCLAMATIONS

I. CORRESPONDENCE FOR INFORMATION

The Director of Corporate Services summarized correspondence to Council as follows:

a. Union of BC Municipalities | Council 2024 Resolution Endorsement
b. Ministry of Emergency Management and Climate Readiness | Disaster Resilience and Innovation Funding (DRIF) Program
c. Ministry of Environment and Climate Change Strategy | Single-Use and Plastic Waste Prevention Regulation
d. BC Emergency Health Services | Deployment of fire resources
e. E-Comm 911 | 2023 Annual Report

J. REPORT FROM IN-CAMERA

K. COUNCIL REPORTS

1. **Council and Regional District Reports**
   MOVED AND SECONDED, THAT the Council reports outlining recent meetings and events related to the City's business, be received.
   CARRIED

L. NEW BUSINESS

1. **Graffiti [Councillor Solda] | Notice of Motion from June 24, 2024**
   MOVED AND SECONDED, THAT Council direct staff to review mechanisms to address graffiti in the downtown area.
   CARRIED | Res. No. 24-265

2. **Early Approval for Replacement of Multiplex Dehumidifier**
   MOVED AND SECONDED, THAT Council for the City of Port Alberni amend the 2024-2028 Financial Plan – Capital Plan to include the addition and installation of a Dehumidifier with Heat Recovery Chiller system for the Multiplex up to a net cost of $560,000 with funds coming from Canada Community-Building Fund – Community Works Fund.
   CARRIED | Res. No. 24-266

M. QUESTION PERIOD

N. ADJOURNMENT

MOVED AND SECONDED, THAT the meeting adjourn at2:31 pm.
CARRIED

CERTIFIED CORRECT

Mayor

Corporate Officer

MINUTES OF THE SPECIAL MEETING OF COUNCIL
Monday, July 29, 2024 @ 5:00 PM
In the City Hall Council Chambers & Via Video-Conference
4850 Argyle Street, Port Alberni, BC

Present: Mayor S. Minions [Electronically]
Councillor D. Dame
Councillor D. Haggard
Councillor C. Mealey @ 5:46 p.m.
Councillor C. Solda [Chair]
Councillor T. Patola

Staff: M. Fox, Chief Administrative Officer
D. Leurebourg, Director of Corporate Services
S. Darling, Deputy Director of Corporate Services | Recording Secretary
J. Pelech, Manager Information Services

Gallery: 24

Introductory Remarks from Mayor Minions and Councillors on the passing of Councillor John Douglas.

A. ***CALL TO ORDER & APPROVAL OF THE AGENDA***

The meeting was called to order at 5:00 PM.

MOVED AND SECONDED, THAT the agenda be approved, as circulated.
CARRIED

B. ***ADOPTION OF MINUTES***

C. ***DELEGATIONS***

1. **1052162 BC Ltd. | Request for Reconsideration Remedial Action Requirement from June 24, 2024 Regular Council Meeting**
   Micah G. Goldberg of Watson Goepel LLP presented the appeal for 1052162 BC Ltd.

D. ***UNFINISHED BUSINESS***

E. ***STAFF REPORTS***

1. **Briefing | Request for Reconsideration Remedial Action Requirement**
   MOVED AND SECONDED, THAT Council confirm the resolution for a remedial action requirement issued June 24, 2024 as follows:
   WHEREAS Division 12 of Part 3 of the Community Charter authorizes Council to impose a remedial action requirement on the owner of a building or structure which is in a hazardous condition, including a requirement to demolish or remove the building or structure or to otherwise deal with it in accordance with the directions of Council or a person authorized by Council;
   AND WHEREAS Division 12 of Part 3 of the Community Charter authorizes Council to declare a building or other structure to be a nuisance and so dilapidated or unclean as to be offensive to the community, and to impose a remedial action requirement on the owner of such a building or structure, including a requirement to demolish or remove the building or structure or to otherwise deal with it in accordance with the directions of Council or a person authorized by Council;
   AND WHEREAS 1052162 BC Ltd. is the registered owner (the "Owner") of the property at 5170 Argyle St and having a legal description of: LT 24 BLK 86 DL 1 ALD PL VIP197 & LT 23 BLK 86 DL1 ALD PL VIP197 (the "Property");

AND WHEREAS section 17 of the Community Charter provides that the authority of Council to require that something be done includes the authority to direct that, if a person subject to the requirement fails to take the required action, the Municipality may fulfill the requirement at the expense of the person;
AND WHEREAS Council passed a previous resolution for a remedial action requirement on the Property on January 22, 2024 [the "January Remedial Action Requirement"], which has not been carried out by the Owner within 30 days of receiving notice, or at all;
NOW THEREFORE, the Council of the City of Port Alberni, in open meeting assembled, resolves as follows:

1. *THAT Council hereby considers that the building located on the Property (the "Structure") is unsafe and contravenes the BC Building Code and the Port Alberni Building Standards Bylaw No. 4975, 2018, and therefore is in a hazardous condition within the meaning of Section 73 of the Community Charter;*
2. *THAT Council hereby considers that the Structure and the discarded materials and refuse about the Structure on the Property are a nuisance and are so dilapidated and unclean as to be offensive to the community, within the meaning of Section 74 of the Community Charter;*
3. *THAT Council hereby requires, pursuant to its powers under Section 72(2)(b) of the Community Charter, that the Owner, within 30 days of the date this Resolution is sent to the Owner, do all things necessary to apply for a demolition permit for the Structure under the Port Alberni Building Standards Bylaw;*
4. *THAT the Owner, within 30 days of receiving a demolition permit under Section 3 of this Resolution, must demolish the Structure and remove all resulting debris, and comply with all requirements of the demolition permit and the Building Standards Bylaw in relation to the demolition, including but not limited to requirements for the abatement and handling of hazardous materials;*
5. *THAT the Owner may request that Council reconsider the terms of this Resolution by providing the City with written notice within 14 days of the date on which notice of this Resolution is sent to the Owner under Section 77 of the Community Charter; and*
6. *THAT if the Owner has not completed any requirement imposed by this Resolution within the time limit for so doing, City staff and contractors are authorized to enter on to the Property for the purpose of and to fulfil the applicable requirement(s) without further notice to and at the expense of the Owner, and may recover the cost of so doing from the Owner, together with costs and interest, as a debt and in the same manner as municipal taxes in accordance with sections 17, 258 and 259 of the Community Charter.*

A recorded vote was requested.
In Favour: *Mayor Minions, Councillors Dame, Mealey, Patola and Solda*
Opposed: *Councillor Haggard*
CARRIED | Res. No. 24-267

F. BYLAWS

G. CORRESPONDENCE FOR ACTION

H. PROCLAMATIONS

I. CORRESPONDENCE FOR INFORMATION

J. REPORT FROM IN-CAMERA

K. COUNCIL REPORTS

L. NEW BUSINESS

M. QUESTION PERIOD

O. ADJOURNMENT

MOVED AND SECONDED, THAT the meeting adjourn at 5:53 p.m.
CARRIED

CERTIFIED CORRECT

Mayor

Corporate Officer

CITY OF PORT ALBERNI

BYLAW NO. 5107

A BYLAW TO AMEND WATERWORKS BYLAW NO. 4494

The Municipal Council of the City of Port Alberni in Open Meeting Assembled enacts as follows:

1. **Title**

   This Bylaw may be known and cited for all purposes as **"Waterworks Bylaw No. 5107, 2024"**.

2. **Amendments**

   Waterworks Bylaw No. 4494 is hereby amended as follows:

   Schedules "A" and "B" attached to Waterworks Bylaw No. 4494 are hereby deleted and Schedules "A" and "B" attached hereto are substituted and shall become effective for the third billing period of 2024 [September 1, 2024].

3. **Repeal**

   Upon effect of Bylaw No. 5107, " Waterworks Bylaw No. 5088, 2024" shall be hereby repealed.

READ A FIRST TIME this 8th day of July, 2024.

READ A SECOND TIME this 8th day of July, 2024.

READ A THIRD TIME this 8th day of July, 2024.

ADOPTED this day of , 2024.

Mayor

Corporate Officer

SCHEDULE "A" TO WATERWORKS BYLAW, NO. 5107

METERED CONSUMPTION RATES AND BILLING

1. Rates for Water Consumption

Rates for Water Consumption are calculated on the basis of cubic metre (m^3). One m3 equals 1,000 litres.

Customer Category	Description	Volume Rate
Single Family Residential	Service to a single-family dwelling unit is billed at the residential unit rate	First 60 m^3: $0.75 per m^3 Over 60 m^3: $0.99 per m^3
Multifamily Residential	Service that is shared by two or more single family dwelling units, including duplexes, apartments, and condominiums, is billed at the multifamily rate	$0.75 per m^3
Commercial	Service to commercial and light industrial units	$0.65 per m^3
Industrial	Service to specific high-volume customers	$0.46 per m^3
Outside Residential	Single family residential outside City boundaries	First 60 m^3: $1.01 per m^3 Over 60 m^3: $1.35 per m^3
Special Service Agreement	Bulk provision to Hupacasath First Nation; Tseshaht First Nation; Beaver Creek	$0.58 per m^3

2. Fixed System Charge

Fixed System Charges are calculated monthly, based on the size of Meter in metric (millimetre or mm) measure.

Meter Size millimetres	**Meter Size** inches	**Inside City Boundaries Monthly Charge**	**Outside City Boundaries Monthly Charge**
16	5/8	$ 22.62	$ 30.56
19	3/4	$ 22.62	$ 30.56
25	1	$ 46.99	$ 63.44
38	1 1/2	$ 60.67	$ 81.89
50	2	$ 79.33	$ 107.06
75	3	$ 125.56	$ 169.52
100	4	$ 177.86	$ 240.09
150	6	$ 301.02	$ 406.42
200	8	$ 440.79	$ 595.07
250	10	$ 597.12	$ 806.14

3. Billing Period

Unless otherwise determined by resolution of Council, Meters shall be read and the Water Consumption determined of at least three times a year and the resulting charges shall be due and payable on the date stated as the "Due Date".

SCHEDULE "B" TO WATERWORKS BYLAW, NO. 5107

UNMETERED CONSUMPTION RATES AND BILLING

1. Rates for Water Consumption

Category of Single Family Residential or Commercial Premises	Monthly Rate
(a) Unmetered (refusals)	$ 184.19
(b) Inside City Boundaries - awaiting Meter installation	$ 46.05
(c) Outside City Boundaries - awaiting Meter installation	$ 62.13

The establishment of a rate for unmetered (refusals) Premises in (a) above does not interfere with or relieve an Owner from the obligation under Section 34 of this Bylaw to have a Meter installed on their Premises.

2. Fire Line Rates

The monthly rate for all Fire Lines shall be $31.50.

3. Billing Period

Unless otherwise determined by resolution of Council, accounts for the above shall be billed every four months in advance and shall be due and payable on the date stated on the invoice. No prepayment for any service shall prevent the amount of any increase being charged to and collected from any Owner.

CITY OF PORT ALBERNI

BYLAW NO. 5108

A BYLAW TO AMEND
SEWER CONNECTION AND REGULATION BYLAW, NO. 3224

The Municipal Council of the City of Port Alberni in Open Meeting Assembled enacts as follows:

1. **Title**

This Bylaw may be known and cited for all purposes as **"Sewer Connection and Regulation Bylaw No. 5108, 2024"**.

2. **Amendments**

Sewer Connection and Regulation Bylaw, Bylaw No. 3224 is hereby amended by:

(a) Deleting Schedule 'A' and substituting it with Schedule 'A' attached hereto and forming part of this bylaw.

(b) Amending Schedule 'B' Customer Service Charges as follows:

1. **Septage Dump Fee**
A charge of $190.00 per load shall be charged for dumping of septage by tanker trucks.

7A. **Fish Processing Facilities**

7 A02 Liquid Industrial Wastes discharged from fish processing facilities into the City's Sewerage System will be subject to user charges set out in Table 1 below. These charges are in addition to the usual charges associated with any connection to and use of the City's Sewerage System:

Table 1 Special User Charges for Fish Processing Facilities		
Quality Indicator	***Concentration***	***Fee***
a) **Biochemical Oxygen Demand (BOD5)**	0 - 0.69 tonne per day	No Charge
	0.7 - 1.6 tonne per day	$435 per tonne
	over 1.6 tonne per day	Not Permitted
(b) **Total Suspended Solids (TSS)**	0 - 1.1 tonne per day	No Charge
	1.2 - 2.6 tonne per day	$237 per tonne
	Over 2.6 tonne per day	Not Permitted

3. **Repeal**

Upon effect of Bylaw No. 5108, **"Sewer Connection and Regulation Bylaw, No. 5089, 2023"** shall be hereby repealed.

READ A FIRST TIME this 8th day of July, 2024.

READ A SECOND TIME this 8th day of July, 2024.

READ A THIRD TIME this 8th day of July, 2024.

ADOPTED this day of , 2024.

Mayor

Corporate Officer

CITY OF PORT ALBERNI
SEWER CONNECTION AND REGULATION BYLAW
SCHEDULE "A"
METERED CONSUMPTION RATES AND BILLING

1. Rates for City Sewerage System

1.1. Rates for Sewer User Consumption

Rates for connection to the City Sewerage System for all users are based on water consumption in of cubic metres (m^3). One cubic metre is 1,000 litres. Sewer user consumption rates are as follows:

Customer Category	Description	Volume Rate
Residential	Service to a single family dwelling unit is billed at the residential unit rate	$0.53 per m^3
Non-Residential (low volume)	Service that is not to a single family dwelling and that is consuming less than 35,000 cubic meters of water per year is billed for sewer at the non-residential low use rate	$0.74 per m^3
Non-Residential (high volume)	Service that is not to a single family dwelling and that is consuming more than 35,000 cubic meters of water per year is billed for sewer at the non-residential high rate	$0.65 per m^3

1.2. Fixed System Charge

Fixed System Charges are calculated monthly based on the size of water meter.

Meter Size (millimetres)	Meter Size (inches)	Monthly Charge
16	5/8	$ 23.47
19	3/4	$ 23.47
25	1	$ 23.47
38	1 1/2	$ 48.89
50	2	$ 48.89
75	3	$136.88
100	4	$136.88
150	6	$136.88

200	8	$136.88
250	10	$293.33

2. Billing Period

Unless otherwise determined by resolution of Council, Meters shall be read and the Water Consumption and Fixed System Charge determined at least three times a year and the resulting charges shall be due and payable on the date stated as the "Due Date".

CITY OF PORT ALBERNI

BYLAW NO. 5109

A BYLAW TO AMEND
SOLID WASTE COLLECTION AND DISPOSAL BYLAW NO. 5030, 2021

The Municipal Council of the City of Port Alberni in Open Meeting Assembled enacts as follows:

1. **Title**

   This Bylaw may be known and cited for all purposes as **"Solid Waste Collection and Disposal Bylaw No. 5109, 2024"**

2. **Amendments**

   Solid Waste Collection and Disposal Bylaw No. 5109, 2024 is hereby amended by:

   a) Deleting Schedule 'A' and substituting it with Schedule 'A' attached hereto and forming part of this bylaw.

3. **Repeal**

   Upon effect of Bylaw No. 5109, **"Solid Waste Collection and Disposal Bylaw No. 5109, 2024"** shall be hereby repealed.

READ A FIRST TIME this 8th day of July, 2024.

READ A SECOND TIME this 8th day of July, 2024.

READ A THIRD TIME this 8th day of July, 2024.

ADOPTED this day of , 2024.

Mayor

Corporate Officer

F.1(c)

CITY OF PORT ALBERNI
SCHEDULE "A"

Garbage / Solid Waste Disposal

Charges

1. Eligible Residence – Curbside Collection Annual Fee

Cart Size (litres)	Equivalent Standard 80 litre can (approx.)	Annual Fee Effective as of September 1, 2024
80 L	1	$180.00
120 L	1.5	$190.00
240 L	3	$422.00
360 L	4.5	$633.00

Waste collection fees are included 3 times per year on your City of Port Alberni utility bill. A pricing structure based on the size of your garbage can is used.

2. Requested additional curbside pick-up

Cart Size (litres)	Garbage	Recycling	Service Fee
80 L	Request by Owner	Not Available	$7.50
120 L	Request by Owner	Not Available	$7.50
240 L	Request by Owner	Not Available	$17.00

3. Standard Container Exchange Fee

Request to change garbage cart size by owner	$50.00 per request

4. City Assisted Set Out/Set Back Service Fee

Properties approved by Manager of Operations will approve and then apply the set out and set back fee for all City carts in this program.	$52.00 Annual fee

5. Replacement Fee for Cart

Request for replacement of Lost/Stolen/Damaged* cart by owner	Actual cost of replacement of a cart

*Damaged carts will first have in-house repairs attempted to fix damage if found cart is damaged beyond repair, replacement charges will occur and replacement cart will be delivered to property.

CITY OF PORT ALBERNI

Regular Council Meeting
For the Meeting of August 12, 2024

Date: August 1, 2024
File No: 3360-20-3830 5th Avenue

To: Mayor and Council
From: M. Fox, CAO
Subject: **DEVELOPMENT APPLICATION – OCP and Zoning Bylaw Amendments at 3830 5th Avenue, Port Alberni**
LOT 1 DISTRICT LOT 1 ALBERNI DISTRICT PLAN EPP114008 (PID: 031-881-327)

Applicant: David Poiron dba Uchucklesaht Capital Assets, Inc.

Prepared by:	Supervisor:	CAO Concurrence:
B. McLoughlin *Manager of Planning*	*Dir. of Development Services |* *Deputy CAO*	*M. Fox, CAO*

RECOMMENDATION

*THAT "Official Community Plan Amendment (*3830 5th Avenue*) Bylaw No. 5094" be now introduced and read a first time.*

*THAT "Zoning Bylaw Amendment (*3830 5th Avenue*) Bylaw No. 5113" be now introduced and read a first time.*

*THAT "Official Community Plan Amendment (*3830 5th Avenue*) Bylaw No. 5094" be read a second time.*

*THAT "Zoning Bylaw Amendment (*3830 5th Avenue*) Bylaw No. 5113" be read a second time.*

THAT the amending bylaws No.'s 5094 and 5113 be advanced to a Public Hearing on Monday September 9, 2024 at 6:00 pm in City Hall, Council Chambers

PURPOSE

To consider Official Community Plan Amendment Bylaw No. 5094 and Zoning Amendment Bylaw No. 5113 that would enable a multi-residential development at 3830 5th Avenue. A new Comprehensive Development (CD) zone is proposed for the site.

BACKGROUND

The Uchucklesaht Tribe Government (UTG) and its Capital Assets Corporation are proposing to build a 112-unit multi-residential development at 3830 5th Avenue. The project would provide rental "workforce housing" in Port Alberni which commonly targets moderate and middle incomes. UTG's primary goal for the project is to build housing and create a long-term revenue generating asset. More information is contained in the attached letter from UTG dated July 25, 2024.

Subject Property and Site Context

The subject property is currently vacant, and was previously a playing field for the former Redford Elementary School. The field and the former school were purchased by UTG in 2018, with the building converted to provide services, programs, and office space (now named Nucci). The property is designated *Institutional* in the OCP and

is classified *P1 Institutional* in *Zoning Bylaw No. 5105, 2024.* The surrounding neighbourhood is mostly residential and characterized by single-detached homes.

Location	South of Morton Street between 5th and 4th Avenues, approximately 95 metres north of Redford Street.
Current Land Use	*Institutional (INS)*
Current Zoning	*P1 Institutional*
Proposed Land Use	*Multi-Family Residential (MFR)*
Proposed Zoning	*New "Comprehensive Development" zone (CD).*
Total Area	8785 m^2 (2.17 acres)
Official Community Plan (OCP)	• *Schedule A - Land Use Map* • *Schedule B - Development Permit Areas Map* • *Section E Implementation – 1.0 Development Permit Areas* • *Section D Plan Policies – 4.0 Residential* • *Section D Plan Policies – 4.3 Multi-family Residential (MFR)*

Figure 1 – Subject Property Map

Port Alberni Rental Housing Need

The Statistics Canada's 2021 census data contains insight into the need for rental housing in Port Alberni. This information is available through the Municipal Quality of Life Dashboard. According to StatsCan:

- 28.7% of rental households in Port Alberni are in '*Core Housing Need*' (out of 2,565 rental households).
- 53.4% of rental households in Port Alberni are in dwellings that are '*Not Acceptable*', meaning they are not in adequate condition, not suitable in size, or not affordable (out of 2,630 rental households).

ALTERNATIVES/OPTIONS

1. *THAT "Official Community Plan Amendment (*3830 5th Avenue*) Bylaw No. 5094" be now introduced and read a first time.*

   *THAT "Zoning Bylaw Amendment (*3830 5th Avenue*) Bylaw No. 5113" be now introduced and read a first time.*

   *THAT "Official Community Plan Amendment (*3830 5th Avenue*) Bylaw No. 5094" be read a second time.*

   *THAT "Zoning Bylaw Amendment (*3830 5th Avenue*) Bylaw No. 5113" be read a second time.*

   THAT the amending bylaws No.'s 5094 and 5113 be advanced to a Public Hearing on Monday September 9, 2024 at 6:00 pm in City Hall, Council Chambers

1. *Council may decline to give first reading which means the application does not proceed.*

2. *Council may direct staff to provide additional information.*

ANALYSIS

Below is a summary of the proposed amendments to the OCP and Zoning Bylaw:

a) Change the OCP land use designation of 3830 5th Avenue from *'Institutional'* to *'Multi-Family Residential'*.

b) Add 3830 5th Avenue to *Development Permit Area No. 1 Multiple Family Residential* in the OCP.

c) Add new Comprehensive Development zone for 3830 5th Avenue to the Zoning Bylaw.

d) Change the classification on 3830 5th Avenue to the new zone on the Zoning Bylaw map.

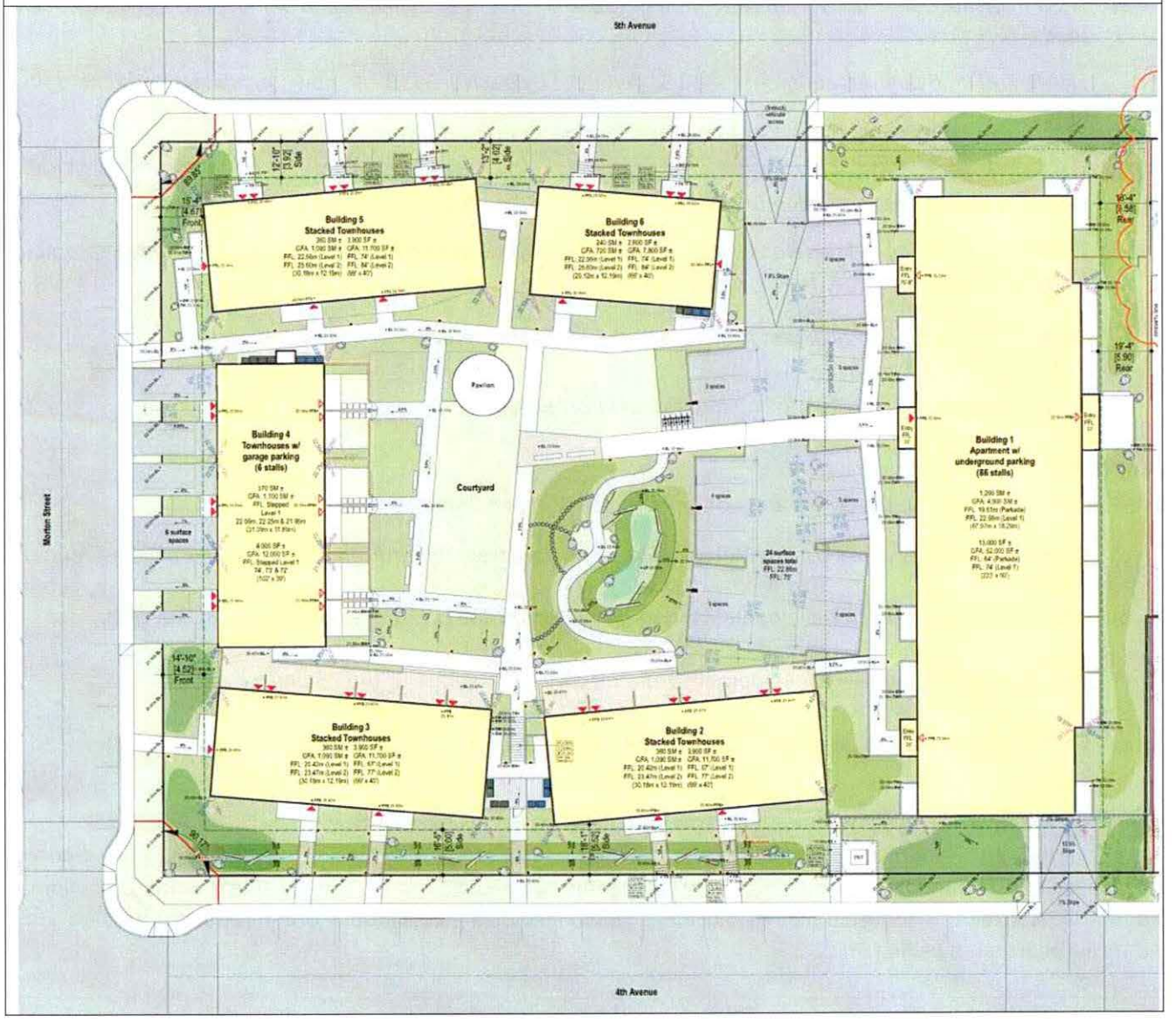
Proposed Development (3830 5th Avenue)

The 112-unit multi-residential development would include a mix of apartments and townhouses. The proposed site plan includes a total of six (6) buildings: one (1) apartment building, one (1) side-by-side townhouse building, and four (4) stacked townhouse buildings. Buildings would include a mix of studio, one-bedroom, two-bedroom, and three-bedroom dwelling units.

Table 1 – Building Composition

BUILDINGS AND UNITS		BEDROOMS	
Total No. Buildings	6	Studio	4
		One	51
Total Dwelling Units	112	Two	29
Apartment Units	74	Three	28
Townhouse Units	38		

Figure 4 – Proposed Site Plan



Official Community Plan

The development aligns with community growth and housing policies in the OCP, and proposed CD zone aligns with the *Multi-Family Residential* (MFR) land use designation in the OCP. The location also meets OCP criteria (4.4.3) for the re-designation of land to MFR:

- The property is within 800 m of a commercial node (10th Avenue and Redford Street)
- The property is located one-block of an arterial road (Redford Street).
- The land use, setbacks, building heights, and 20-metre road right-of-way provide an adequate transition between the multi-storey buildings and the surrounding neighbourhood (see cross section drawings in attached development plans).

OCP Section C, 4.3.4 - Multi-Family Residential, *Council Policy*	*When considering re-designation of areas to Multi-Family Residential (MFR), the City shall consider the following criteria:* • *Should be within walking distance (approximately 800 metres) of commercial, recreational, public/institutional nodes, or community scale parks;* • *Should be located on or in proximity to major collectors or arterial roads in order reduce traffic impacts on local roads;* • *An adequate transition between lower density housing, and compatibility with adjacent land uses must be provided;*

If amendments are adopted, the subject property would be added to *Development Permit Area No. 1 Multiple Family Residential*. Parking, lighting, landscaping, and open space details would be reviewed against the design guidelines at permitting stage to improve livability, and control how the site interacts with neighbouring properties.

Zoning Bylaw

The proposal involves creating a new zone specifically for this development at 3830 5th Avenue. The new zone would be added to the Zoning Bylaw, but would only apply to this property. The proposed scale of development is greater than what currently exists in the surrounding low-density residential neighbourhood, however the property is well-situated for increased density as it is located within walking distance of services and public transit routes.

CD Zone Site Development Regulations

The proposed CD zone enables shorter setbacks and a greater building height than the nearest comparable *RM3 High Density Multi-Residential* zone. Accordingly, the applicant has provided cross-sections and a shadow analysis to demonstrate how the development would interact with adjacent lands (see attached development plans). The proposed scale of development and CD zone regulations are appropriate for the location and surrounding neighbourhood.

Parking and Access

A total of 122 on-site parking spaces would be provided for a ratio of 1.09 parking spaces per dwelling unit. The Zoning Bylaw normally requires 1.25 space per dwelling unit, however the property is located near a public transit route (Redford Street) and 22 bike parking spaces are also provided. Plans also show 32 street parking spaces along flanking streets (see attached development plans). It should be expected that street parking near the new dwellings will be used by those residents due to convenience. See Table 3 for a breakdown of parking provided.

Table 3 – Vehicle and Bicycle Parking

On-Site Parking Spaces	122
Apartment Building (underground)	*86*
Townhouse Buildings (driveway, parking, garage)	*36*
Bicycle Parking (Secure Storage)	22
Street Parking (Additional)	32

During the public pre-engagement process, residents voiced concern about the anticipated use of street parking. Residents noted that many of the neighborhood's street parking spaces are currently used by staff and patrons of the Nucci building at 4841 Redford Street. In response to these parking concerns, the applicant has submitted a letter (attached) committing to the following actions:

- Construction of a new parking lot with 15 spaces on the Nucci property (see Figure 5).
- Improvements to existing parking at Nucci including re-painting lines.
- Directing staff at Nucci to park on-site.
- Working with the City on signage for 4th and 5th Avenue to discourage use of street parking by staff and patrons of Nucci.

Traffic Impact Assessment

A Traffic Impact Assessment (TIA) for this application was conducted by a registered traffic engineer. The TIA assessed the neighborhood's capacity to handle traffic from the development as well as proposed parking and access designs. The TIA notes the following:

- The 8 proposed site accesses are deemed safe and properly designed. Proposed accesses have clear sightlines along adjacent streets, including down the slope towards Redford Street on 4th Avenue and 5th Avenue.
- As the surrounding road network primarily services low-density residential homes, it has excess capacity to absorb traffic created by the proposed development without significant issue. The area's grid road system provides several routing options in the event of traffic congestion.
- No off-site improvements are recommended as a result of the proposed development.
- Combined on-site parking (112 spaces) and adjacent street parking provide ample parking for the development.

Figure 5 – Proposed Additional Parking Lot at Nucci

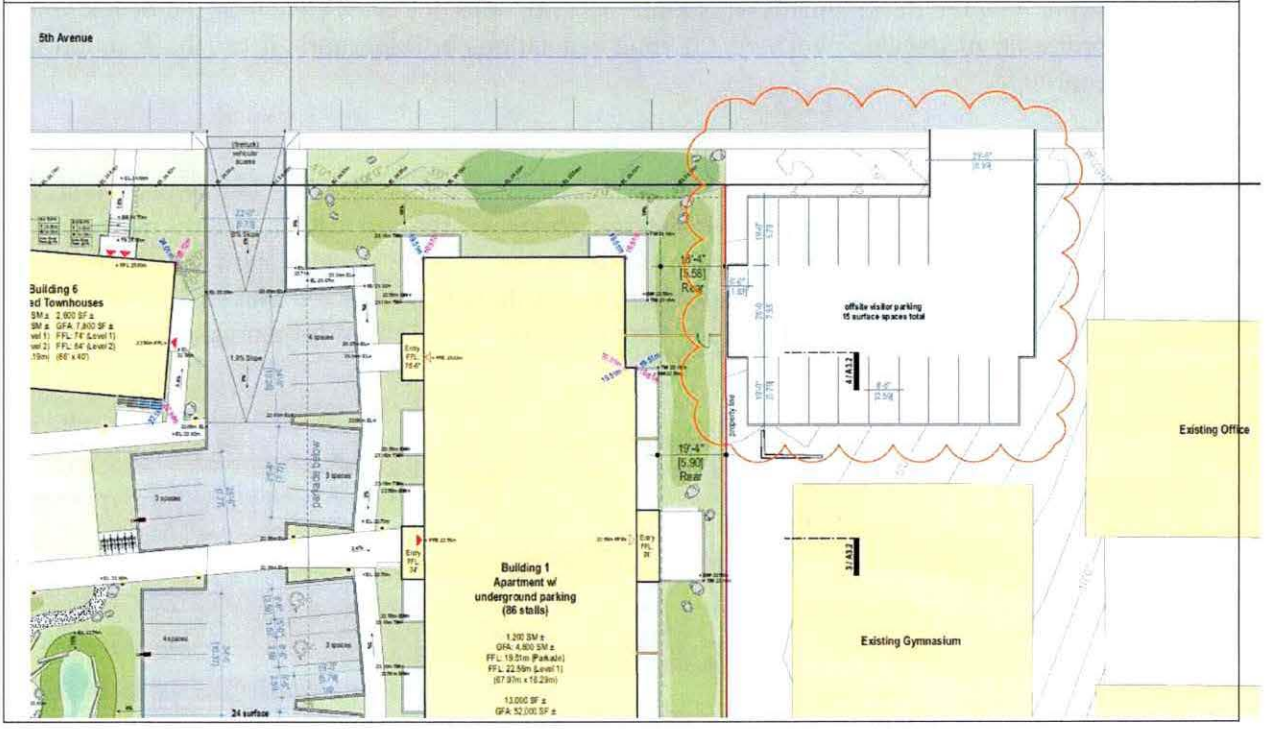


Figure 6 – Proposed Central Courtyard

Usable Open Space

The proposal includes 3,130 m^2 of usable open space for residents. This is more than is required by the Zoning Bylaw. The proposal includes a mix of private patios, decks, and a large central courtyard with a shelter that compliments higher density development (Figure 6).

Infrastructure

The applicant has submitted a servicing report and civil plans from a professional engineer. Additional review will be done when detailed designs are submitted at permitting stage. The developer is responsible for the cost to design and install any necessary upgrades. Preliminary review indicates the following:

- New storm and sanitary sewer main will be required on 4th Avenue to connect the property with the wastewater collection system.
- Road upgrades are proposed around the perimeter of the site, including side walks, parallel parking stalls, and curb bulges at intersections (see attached development plans).
- A private fire hydrant may be required to service the development.

General Summary of Potential Impacts and Benefits

- 112 market units is a substantial amount of new housing, which will provide much needed options for renters in Port Alberni.
- The surrounding neighbourhood is mostly single detached homes at present. Residents will experience impacts commonly associated with more people living in the neighbourhood, including traffic and road noise.
- There will be increased use of street parking by new residents. This is common for multi-residential development.

- Analysis shows that most surrounding properties will not be significantly impacted by cast shadows due to the relatively low building height, wide road right of ways, and orientation of the buildings. However, some properties on 4th Avenue and 5th Avenue will experience new cast shadows in the morning and late afternoon during winter months.
- The development may impact views of Mount Arrowsmith for properties on 4th Avenue.
- More people living within walking distance of businesses in the Redford commercial area will help with neighbourhood economic development.
- In principle, infill development in core neighbourhoods is more efficient for the municipality to service compared to new neighbourhoods at the community boundary.

IMPLICATIONS

Proposed Bylaws No. 5094 and 5113 would re-designate the property at 3830 5th Avenue to *Multi-Family Residential* in the OCP and would create a new Comprehensive Development (CD) zone to enable a multi-residential development. If adopted by Council, the new zone would only apply to this property.

The proposed zone would allow smaller setbacks and a higher building height than permitted in existing multi-residential zones, and would allow a higher density development than is present on adjacent properties. There may be impacts to neighbouring properties including increased shadows and increased use of street parking, however, the development would provide 112 much needed market rental units.

COMMUNICATIONS

The development application was referred to the Advisory Planning Commission (APC) at their meeting on September 21st, 2023. The APC passed a motion recommending Council support the application. The meeting's *Summary Minutes* are attached to this report.

A Public Hearing is required as the application includes a proposed OCP Bylaw amendment. If Council chooses to advance the application to a Public Hearing, staff will proceed with all required statutory notices. This includes notification to owners and occupants within 100 metres of the site and notice in the newspaper as required by sections 465 and 466 of the LGA.

Summary of Feedback from OCP Pre-Engagement

In accordance with *Section 475* of the *Local Government Act* (LGA), the City provided an additional opportunity for members of the community to receive information and provide input. This is required for all OCP amendments.

A Public Information Meeting was hosted by the applicant on Wednesday October 18th, 2023. City staff mailed notice of the meeting to all owners and occupants of property within 100 metres of the site (91 letters total). Staff attended the meeting and collected 14 written letters/emails from attendees. A detailed summary of pre-engagement comments is attached to this report, key topics of discussion included:

- Concern for traffic safety, lack of parking, and management of off-site parking.
- Concern for the height/scale of development and impacts to surrounding properties (shadows, reduced views, reduced privacy).
- Concern that development isn't compatible with character of surrounding low-density neighbourhood.

BYLAWS/PLANS/POLICIES

1. Official Community Plan Bylaw No. 4602
   Below is a summary of amending Bylaw No. 5094:
   a) Change the OCP land use designation of 3830 5th Avenue from *'Institutional'* to *'Multi-Family Residential'*.
   b) Add 3830 5th Avenue to *Development Permit Area No. 1 Multiple Family Residential* in the OCP.

2. *Zoning Bylaw No. 5105, 2024:*
   Below is a summary of amending Bylaw No. 5113:
   a) Add new Comprehensive Development zone for 3830 5th Avenue to the Zoning Bylaw.
   b) Change the classification on 3830 5th Avenue to the new zone on the Zoning Bylaw map.

3. *Council's 2023 – 2027 Corporate Strategic Plan*
   The proposed development aligns with the following goals:
   - *5.1.2: Encourage the infilling of vacant lots and buildings to enable those sites to contribute to vibrancy*
   - *5.2: Safe and accessible housing options exist for all members of the community*

SUMMARY

The City has received an application for amendments to the OCP and Zoning Bylaw that would enable a multi-residential development at 3830 5th Avenue. The application proposed to change the subject property to *Multi-Family Residential* in the OCP and rezone it to a new Comprehensive Development zone. The proposed development would be higher density than the surrounding neighbourhood, but would create 112 purpose-built market rentals within the community.

Staff recommend that Official Community Plan Amendment Bylaw No. 5094, and Zoning Amendment Bylaw No. 5113 be given first and second readings, and that Council advance the application to a Public Hearing on Monday September 9, 2024.

ATTACHMENTS/REFERENCE MATERIALS

1. *Supplemental Zoning Information*
2. *Summary of Relevant OCP Policy*
3. *Development Plans – 3830 5th Avenue*
4. *Summary of OCP Pre-Engagement Feedback*
5. *Letter re: Workforce Housing – Uchucklesaht Tribe Government, July 25 2024*
6. *Letter re: Nucii Parking – Uchucklesaht Tribe Government, July 25 2024*
7. *Advisory Planning Commission September 21st, 2023 Meeting Minutes*
8. *"Official Community Plan Amendment (3830 5th Avenue) Bylaw No. 5094"*
9. *"Zoning Amendment (3830 5TH Avenue) Bylaw No. 5113"*

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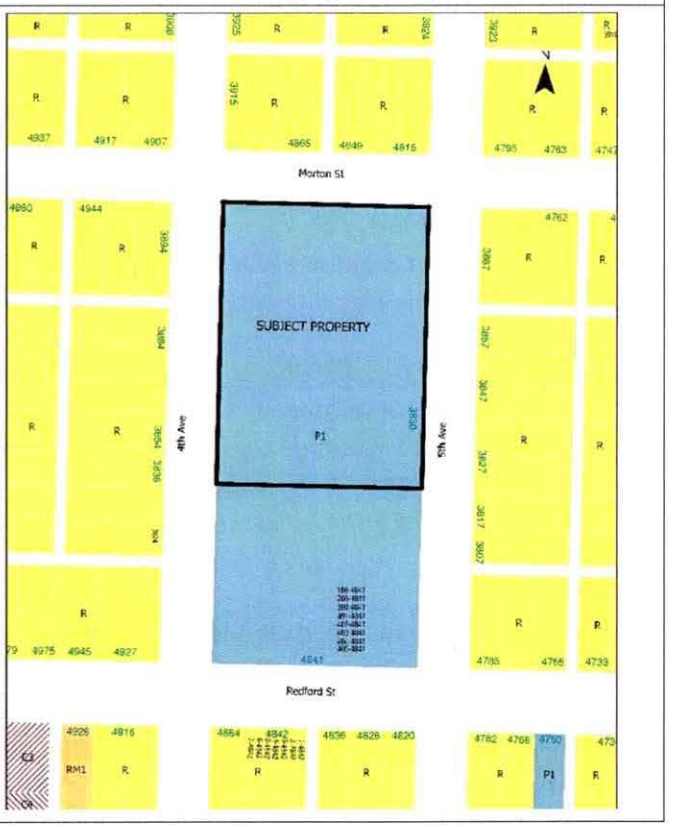
SUPPLEMENTAL OCP and ZONING INFORMATON

OCP Land Use Map

Zoning Bylaw Map



Comparison of Site Development Regulations in Zoning Bylaw				
Site Regulations	***CD Zone (proposed)***	***RM3***	***P1 (current)***	***R (surrounding properties)***
Min. Setback (front)	4.5 m	6 m	7.5 m	3 m
Min. Setback (rear)	5.5 m	9 m	9 m	5 m
Min. Setback (east)	3.5 m	5 m	1.5 m	1.5 m
Min. Side Setback (west)	4.5 m			
Max. Building Height	15 m	14 m	12.5 m	11 m
Max. Floor Area Ratio	1.2	1.2	-	-
Max. Lot Coverage	40%	50%	40%	70%

SUMMARY OF RELEVANT OCP POLICY

The following table contains *Official Community Plan Bylaw* policy statements relevant to the property at 3830 5th Avenue.

OCP Section	***OCP Policy Text***
Section C - 1.1 Growth	• To encourage the efficient use of land and infrastructure, and development of compact built form by encouraging sensitive in-fill and intensive forms of development in key locations of the City.
Section C - 1.5 Community	Residential • To ensure that a range of housing choice is provided in order to meet the needs of current and future residents.
Section C - Table 3 – Multi-Family Residential	• This type of residential should be located in proximity to community services or major amenities.
Plan Policies - 4.0 Residential	• A wider choice of housing options translates into greater access to housing and a more livable community for a greater range of age groups. This is a fundamental objective in creating complete and inclusive communities.
Plan Policies - 4.0 Residential – Multi-Family Housing	Typically, this form of housing is within or adjacent to established single-family residential neighbourhoods. • They are also typically situated near strategic amenity or service locations such as commercial nodes, parks, schools, community facilities, or in relation to significant transportation corridors. • The objective is to facilitate compact urban form which reduces vehicle trips, increases the likelihood of social interaction, increases the economic viability of commercial nodes, and leads to a more sustainable lifestyle.
Plan Policies - 4.0 Residential – Affordable Housing	... A range of affordable housing options should be provided to accommodate a wide range of lifestyles and economic profiles such as young families, seniors, singles, those on a fixed income or are low-income households. Such housing can consist of a range of forms including multi-family, high density detached single-family residential, or secondary suites within or associated with single-family dwellings in single-family neighbourhoods. [The OCP] promotes integration of such housing throughout the community in order to provide greater housing diversity.
4.1 General Provisions	Council Policy ... 2. The provision of a wide-range of housing choice for the benefit of all demographic and socioeconomic segments is encouraged. ...

	3. The City supports efforts to provide integrated special needs, affordable, and rental housing within the community. ... 4. The City will encourage greater residential density in locations near commercial nodes and near transit routes.
4.3 Multi-Family Residential (MFR)	Council Policy ... 3. Land designated Multi-Family Residential (MFR) on Schedule "A" (Land Use Map) shall be designated as a Development Permit Area to control the form and character of development in order to ensure an appropriate fit with the adjacent neighbourhood. 4. When considering re-designation of areas to Multi-Family Residential (MFR), the City shall consider the following criteria: • Should be within walking distance (approximately 800 metres) of commercial, recreational, public/institutional nodes, or community scale parks; • Should be located on or in proximity to major collectors or arterial roads in order reduce traffic impacts on local roads; • An adequate transition between lower density housing, and compatibility with adjacent land uses must be provided;
3.6 Heritage	Council Policy ... 2. New developments shall identify impacts and mitigation strategies in order to protect viewscapes or view corridors, and natural open space or vegetation that has heritage significance.

Building 1 - Looking North

Building 1 & 2 - Looking Southwest

Building 3, 4 & 5 - Looking North

Building 1, 2 & 3 - Looking East

Building 4, 5 & 6 - Looking Southwest

Building 3, 4 & 5 - Looking South

Project Team Contacts

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Drawing List

See other discipline drawings for their drawing lists

NOT FOR CONSTRUCTION – FOR REVIEW ONLY

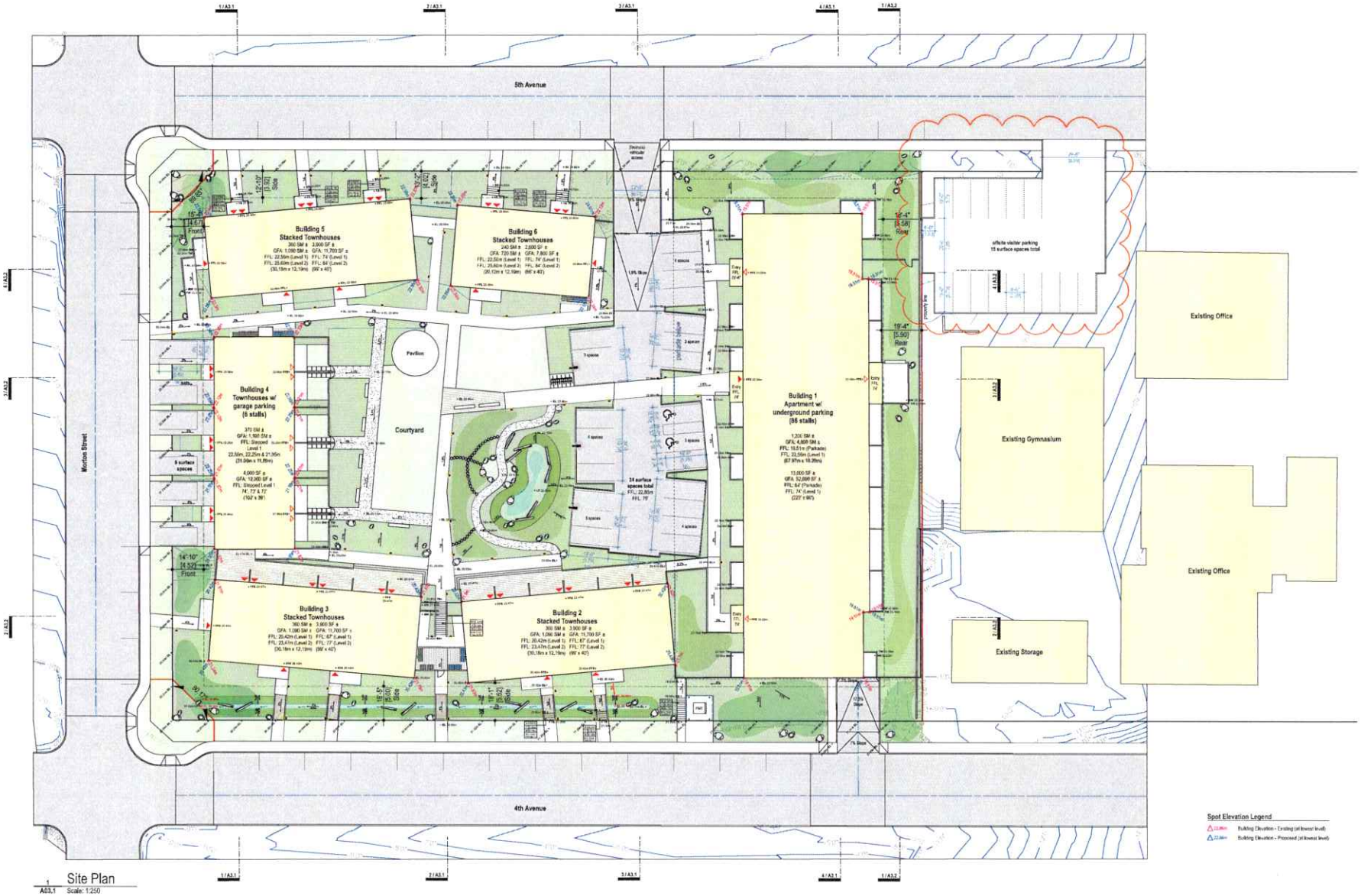
CHECKWITCH POIRON ARCHITECTS INC

Checkwitch Poiron Architects Inc. www.cparch.ca
940 Commercial Street, Nanaimo, BC V9R 5G3 250.714.1983
501-432 Pender Street W, Vancouver, BC V6B 1T6

Redford Housing

4841 Redford Street, Port Alberni

Client: Uchucklesaht Capital Assets LP
Drawn By: dp
Reviewed By: dp
Project Number: 2107
Sheet Name: Renderings; Contacts; Drawing List
Scale: n/a
Date: 2023.06.06
Sheet Number: A01



1 Site Plan
A03.1 Scale: 1:250

CHECKWITCH POIRON ARCHITECTS INC

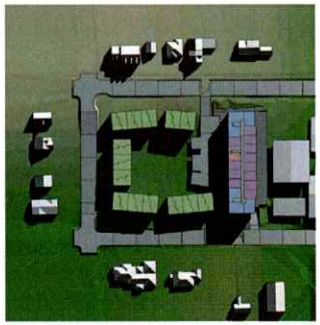
Checkwitch Poiron Architects Inc.
www.cparch.ca

Redford Housing
4841 Redford Street, Port Alberni

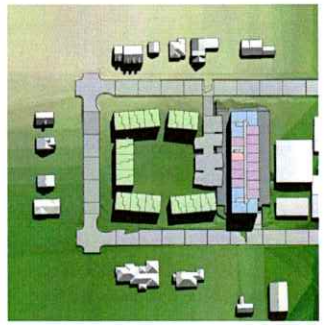
NOT FOR CONSTRUCTION - FOR REVIEW ONLY

Client: Uchucklesaht Capital Assets LP
Drawn By: dp
Reviewed By: dp
Project Number: 2107
Sheet Name: Site Plan
Sheet Number: A03.1
Scale: n/a
Date: 2024.03.26
Issue No.: 78
Issued For: DP R2

Winter Solstice - 9:00am

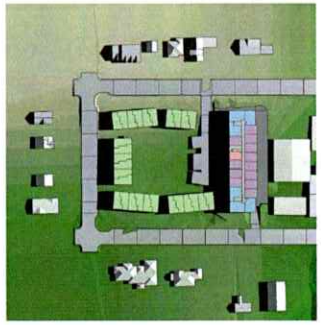


Spring / Autumn Equinox - 9:00am

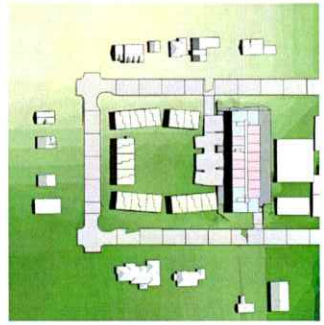


Summer Solstice - 9:00am

Winter Solstice - 12:00pm

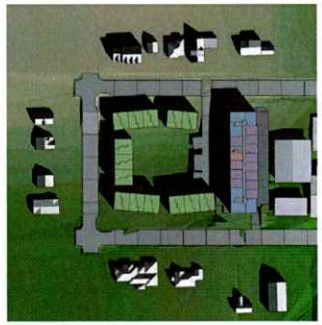


Spring / Autumn Equinox - 12:00pm

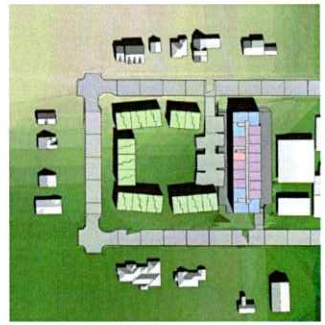


Summer Solstice - 12:00pm

Winter Solstice - 3:00pm



Spring / Autumn Equinox - 3:00pm



Summer Solstice - 3:00pm

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Redford Housing
4841 Redford Street, Port Alberni

Uchucklesaht Capital Assets LP

Shadow Studies - Plan View

A03.5

Project Information – Areas

Apartment (Building 1)

Level	Studio	1 Bedroom*	2 Bedroom*	3 Bedroom	Residential	Utility	Storage	Circulation	Subtotal	Parking	Total	Patios	Decks
P	0	0	0	0	0	870	827	535	7,232	25,140	32,372	0	0
1	1	10	6	0	10,652	42	0	2,497	13,191	0	13,191	1,872	0
2	1	12	6	0	11,379	32	0	1,780	13,191	0	13,191	0	2,136
3	1	12	6	0	11,379	32	0	1,780	13,191	0	13,191	0	2,136
4	1	12	6	0	11,379	32	0	1,780	13,191	0	13,191	0	2,136
–	4	46	24	0	44,789	1,008	827	8,372	59,996	25,140	85,136	1,872	6,408

Subtotal Units Apartment: 74

All areas in square feet

* includes a single 1 bedroom accessible unit on each level (4 total)

* includes 2 bedroom accessible units on level 1 (2 total)

Townhouses (Buildings 2-6)

Bldg	Studio	1 Bedroom	2 Bedroom	3 Bedroom	Residential	Utility	Storage	Circulation	Subtotal	Parking	Total	Patios	Decks
2	0	0	2	6	9,708	32	1,842	0	11,583	0	11,583	180	1,153
3	0	2	1	6	10,211	151	1,221	0	11,583	0	11,583	272	1,153
4	0	0	0	6	11,732	34	0	0	11,766	0	11,766	1,986	558
5	0	2	1	6	10,210	151	1,221	0	11,583	0	11,583	272	751
6	0	1	1	4	6,785	32	905	0	7,722	0	7,722	182	501
–	0	5	5	28	48,645	402	5,190	0	54,237	0	54,237	2,594	4,115

Subtotal Units Townhouses: 38

All areas in square feet

Totals

Studio	1 Bedroom	2 Bedroom	3 Bedroom	Residential	Utility	Storage	Circulation	Subtotal	Parking	Total	Patios	Decks
4	51	29	28	93,435	1,410	6,016	8,372	108,232	25,140	134,372	4,766	10,523

Total Units: 112

All areas in square feet

Parking Required

	Units	Provided	Spaces/Unit
Apartment	74	86	–
Townhouses	38	36	–
Total	**112**	**122**	**1.09**

1.07 spaces per dwelling unit (target)

Useable Open Space Required

	Factor	Required	Provided	
Studio - 2 Bedroom	194	16,296	–	
3 Bedroom	485	13,580	–	
Total		**29,876**	**33,681**	*includes all deck/patio space*
All areas in square feet unless noted in square metres (sm)		**2,777 sm**	**3,130 sm**	*includes all deck/patio space*

Total Landscaped Area

Total Site	94,529	8,785 sm
Total Building Area	31,326	2,896 sm
Total Parking	16,290	956 sm
Total Landscaped	**58,643**	**5,450 sm***

All areas in square feet unless noted in square metres (sm)

* area provided by Landscape Architect

Lot Coverage

Building 1	13,191	1,226 sm
Building 2	3,861	359 sm
Building 3	3,861	359 sm
Building 4	3,678	354 sm
Building 5	3,861	359 sm
Building 6	2,574	239 sm
Total	**31,326**	**2,896 sm**
Lot Size		**8,785 sm**
Lot Coverage		**33.0%**

B1 Building Height - Max. Allowable

NW Parkade Corner - Finished Grade	64'0"	19.51m
NW Corner - Finished Grade	74'0"	22.56m
NE Corner - Finished Grade	74'0"	22.56m
SE Corner - Finished Grade	74'0"	22.56m
SE Inset Corner - Finished Grade	74'0"	22.56m
SW Inset Corner - Finished Grade	74'0"	22.56m
SW Corner - Finished Grade	74'0"	22.56m
SW Parkade Corner - Finished Grade	64'0"	19.51m
Total	**572'1"**	**174.38m**
Average Height of Corners	**71'6"**	**21.80m**
B1 Building Height	**47'6"**	**14.48m**
B1 Max. Building Height	**49'3"**	**15.00m**

B2 Building Height - Max. Allowable

NW Corner - Finished Grade	67'0"	20.42m
NE Corner - Finished Grade	75'4"	22.97m
SE Corner - Finished Grade	76'0"	23.16m
SW Corner - Finished Grade	67'0"	20.42m
Total	**285'4"**	**86.97m**
Average Height of Corners	**71'4"**	**21.74m**
B2 Building Height	**31'5"**	**9.56m**
B2-B6 Max. Building Height	**36'2"**	**11.00m**

B3 Building Height - Max. Allowable

NW Corner - Finished Grade	67'0"	20.42m
NE Corner - Finished Grade	75'6"	23.02m
SE Corner - Finished Grade	75'4"	22.97m
SW Corner - Finished Grade	67'0"	20.42m
Total	**284'11"**	**86.83m**
Average Height of Corners	**71'3"**	**21.71m**
B3 Building Height	**31'6"**	**9.58m**
B2-B6 Max. Building Height	**36'2"**	**11.00m**

B4 Building Height - Max. Allowable

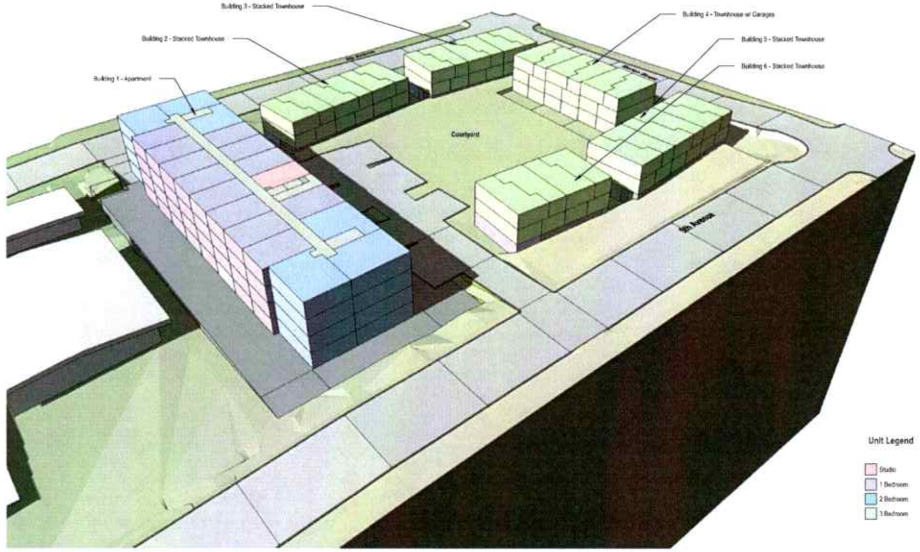
NW Corner - Finished Grade	72'0"	21.95m
NE Corner - Finished Grade	74'0"	22.56m
SE Corner - Finished Grade	74'0"	22.56m
SW Corner - Finished Grade	72'0"	21.95m
Total	**292'1"**	**89.02m**
Average Height of Corners	**73'0"**	**22.26m**
B4 Building Height	**34'3"**	**10.43m**
B2-B6 Max. Building Height	**36'2"**	**11.00m**

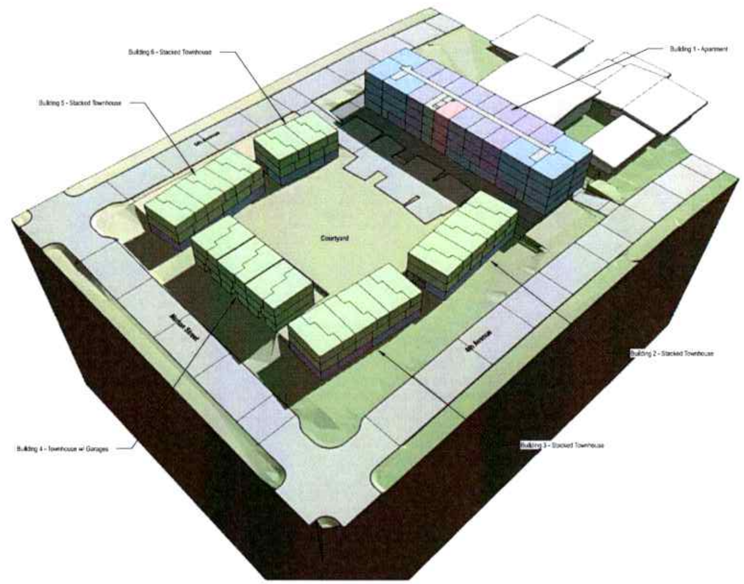
B5 Building Height - Max. Allowable

NW Corner - Finished Grade	74'0"	22.56m
NE Corner - Finished Grade	81'8"	24.88m
SE Corner - Finished Grade	82'3"	25.06m
SW Corner - Finished Grade	74'0"	22.56m
Total	**311'11"**	**95.06m**
Average Height of Corners	**78'0"**	**23.77m**
B5 Building Height	**32'1"**	**9.78m**
B2-B6 Max. Building Height	**36'2"**	**11.00m**

B6 Building Height - Max. Allowable

NW Corner - Finished Grade	74'0"	22.56m
NE Corner - Finished Grade	82'3"	25.06m
SE Corner - Finished Grade	81'0"	24.70m
SW Corner - Finished Grade	74'0"	22.56m
Total	**311'3"**	**94.88m**
Average Height of Corners	**77'10"**	**23.72m**
B6 Building Height	**32'3"**	**9.83m**
B2-B6 Max. Building Height	**36'2"**	**11.00m**





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Redford Housing

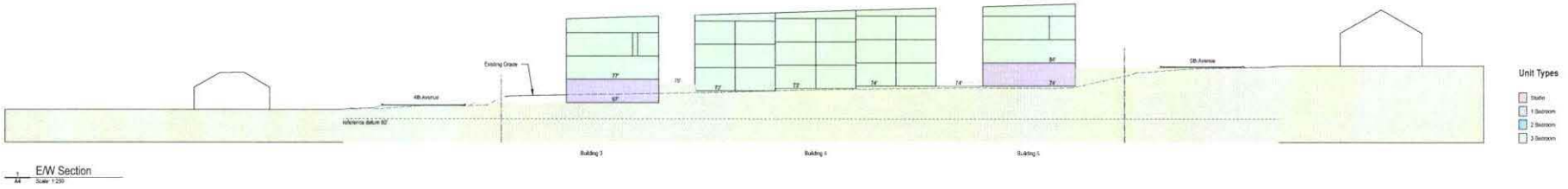
4841 Redford Street, Port Alberni

NOT FOR CONSTRUCTION – FOR REVIEW ONLY

Client	Drawn By	Reviewed By	Sheet Number
Uchucklesaht Capital Assets LP	dp	dp	A3

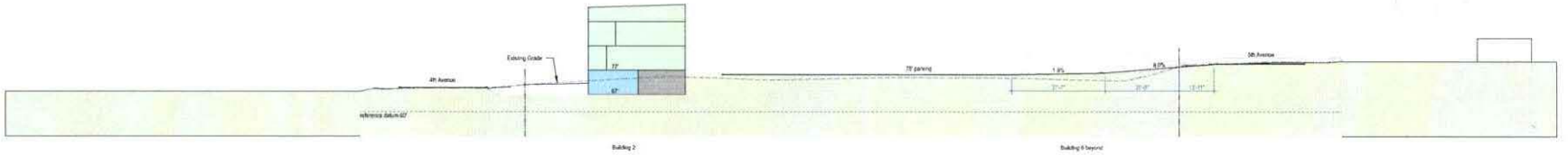
Project Number	Sheet Name
2107	Project Information; Site Perspectives

Scale	Date	Issue No.	Issued For	Revision
n/a	2023.06.08	70	OCP / Rezoning	–



1 E/W Section
A4 Scale: 1:250

2 E/W Section
A4 Scale: 1:250



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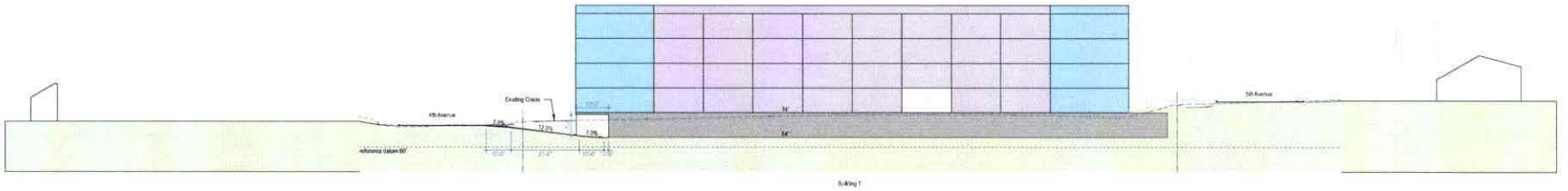

4 E/W Section
A4 Scale: 1:250

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Redford Housing
4841 Redford Street, Port Alberni

NOT FOR CONSTRUCTION - FOR REZONING ONLY

Client: Uchucklesaht Capital Assets LP	Drawn By: dp	Approved By: dp	Sheet Number: A4
Project Number: 2107	Sheet Name: Site Sections		
Scale: n/a	Date: 2023.06.08	Issue No.: 70	Issued For: OCP / Rezoning

CHECKWITCH POIRON ARCHITECTS INC.

Redford Housing

4841 Redford Street, Port Alberni

Uchucklesaht Capital Assets LP

Site Sections

2023.06.08

OCP / Rezoning

A5

Summary of Pre-engagement

Application: OCP21-09/ZON21-14	
Address: 3850 5th Avenue	Date: October 30, 2023
Applicant: David Poiron dba Uchucklesaht Capital Assets Inc.	

RE: Application to amend Official Community Plan to change land designation from Institutional to Multi-Family Residential

Description:	On Wednesday October 4th, 2023, a letter was mailed to all owners and occupants of property within 100 metres of 3850 5th Avenue. This letter contained a description of the requested OCP amendment, along with a subject property map, site plan, and conceptual drawing. The letter notified recipients of an applicant-hosted public information meeting being held from 5:30 pm to 7:30 pm on Wednesday October 18th at the Nucci Community Room, 4841 Redford Street. The letter also provided instructions on how to contact City staff with comments on the proposal either in-person at City Hall, or by email or phone. The letter requested that all feedback be received by Friday October 27th.
Details:	A total of 91 letters were mailed to property owners, occupants within 100 metres of the 3850 5th Avenue. The distance of the mail-out is consistent with the City of Port Alberni's *Development Procedures Bylaw No 5076, 2023.* City staff attended the public information session to observe and provide information. A total of 14 written letters/emails were also received in response to the mailed letter. Respondents included residents both inside and outside the 100 metre mailing area.
Summary of Responses:	Areas of Support • Support for redeveloping/repurposing the property at 3850 5th Avenue. • Support for providing housing, but at a lower density. • Support for Uchucklesaht First Nation as long-term property owner and important part of community. Areas of concern: **Scale of Development** • Concern that the proposed density is too high and not consistent with surrounding low-density neighborhood. • Concern with general impacts of increased density – congestion. • Concern that proposed height of apartment buildings is too high and not consistent with surrounding neighborhood.

	• Concern that there is no transition between the low-density single-family neighborhood and proposed high density development. • Concerns that relaxed CD zone height/setback requirements will negatively impact surrounding neighborhood. • Concern that proposal does not fit with the area's existing character. **Impact on Community** • Concern that views will be blocked – particularly Mount Arrowsmith view. • Concerns for impact of development's shadows on neighbouring properties. • Concern that development will reduce surrounding property values. • Concern that development will reduce overall privacy for neighbours. • Concern that high-level outward facing windows and patios have sightlines into neighbouring properties/homes. • Concern development would change the character of the quiet, low density, "small town living" neighbourhood. • Concern that long construction process would disrupt the neighbourhood. • Concerns over losing community greenspace and that insufficient greenspace is included in plans. • Concern over losing a local recreation area. • Concern that increased density requires additional services that can't/won't be provided. • Concern for lack of available school space in City. • Concerns for neighborhood connectivity, development should also service community. • Concern for light pollution from development. • Concern for whether pets will be permitted within rental units. **Nuisance and Crime** • Concern that non-resident foot traffic will increase in neighborhood. • Concern that crime will increase. **Parking, Access, and Traffic** • Concern there is not enough on-site parking for residents – proposal is below required 1.25 spaces/dwelling unit required for multi-family in Zoning Bylaw. • Concern that reduced parking will result in significant on-street parking use and create problems for local residents. • Concern for poor management of on-street parking issues. • Concern for traffic congestion in area. • Concern for vehicle/pedestrian safety in neighborhood. • Concern that current traffic configurations (e.g. 2 way stop/4 way stop) is not adequate for expected increase in traffic. • Safety concern for neighbourhood access points (where 5th Ave/4th meet Redford Street) due to steep grade and busy road way (route used by Catalyst and San Group). Concerned that congestion will worsen safety. • Concern that on-street parking will reduce visibility at neighborhood access points.

	• Additional concern for neighborhood access points during dangerous winter weather. • Concern that there is no loading space and no space for recreation vehicle parking (e.g. boats & trailers). • Concern that staff of 4841 Redford already use street parking and additional street parking can't be accommodated. • Concern that neighbours won't have any available parking for guests. **Utilities** • Concern that sewer infrastructure is not adequate for scale of development and needs improvement. • Concern for impact to neighborhood's water pressure. • Concern that the proposal and required infrastructure maintenance will result in increased taxes for Port Alberni residents. • Concern over lack of civil plans provided by applicant to date. **Technical** • Disagree with changing the OCP and Zoning Bylaw to allow multi-family housing. • Concerned with use of CD zone – concerned that development is being exempt from existing zoning bylaw requirements. Unsure why the property isn't being rezoned to an existing high-density zone. • Concern that old census data in the Housing Needs Assessment is being used to guide density decision. • Concern that plans have not incorporated any considerations for impact to surrounding properties. • Concern that residents won't be heard/considered. • Concern with developments position in relation to tsunami hazard zone. • Concern for incorporating mobility & accessibility designs into all of development. • Concern that the 100 m notice mailing radius is not large enough and that more people should be notified. • Concern that notices were received too late.

The following photos were submitted by a resident who attended the Public Information Meeting showing existing street parking on 4th Avenue.

Uchucklesaht Tribe Government

July 25, 2024

City of Port Alberni
4850 Argyle St
Port Alberni, BC V9Y 1V8

Attention: Brian McLoughlin

RE: Rezoning & Development Permit for 4841 Redford – Workforce Housing

Dear Brian,

The Uchucklesaht Tribe Government (UTG), and its Capital Assets Corporation, through which the proposed multi-family housing project is being undertaken, is a willing, proactive, long-time community-minded leader, with a proven record of completing economically sustainable projects to serve the needs of Port Alberni and region that we call home. However, we are not a Provincial or Federal Housing agency with the mandate to provide low-cost housing to the community as a whole. Our mandate is to create viable and sustainable economic initiatives that generate revenue to support the housing, health, food security, and education of our citizens, first and foremost. Fortunately, as we have proven with our Thunderbird building, we can, indeed support programs for our citizens, and safe, secure, desirable housing for the community at large.

In our role as a responsible participant in the community we have adjusted our direction for the proposed project from our letter dated January 13, 2023 to provide better Workforce Housing options to residents of Port Alberni that align with their income levels and housing needs.

Our primary goals for the project remain unchanged, to provide much needed multi-family market rental housing in Port Alberni and create a long-term revenue generating asset for the Uchucklesaht people. To balance these goals with our desire to take local rents targets for Workforce Housing into account, we are aligning the project to work with BC Builds as a project partner. This partnership with BC Builds will help to offset the current market construction costs of the townhouses and apartments. The BC Builds requirements include energy performance, adaptability and affordability targets that we will be working to try meet.

Suite A, 5251 Argyle Street, Port Alberni, British Columbia, V9Y 1V1
Phone (250) 724 1832 Fax (250) 724 1806 Toll Free 1 888 724 1832

Without a partnership like BC Builds, the provision of Workforce Housing would not be feasible as Uchucklesaht Tribe Government's economic mandate is provide multi-generational, sustainable income for both the Uchucklesaht Tribe and Uchucklesaht Citizens. Any requirement of affordable housing and/or a residential rental tenure, without the benefits of a BC Builds partnership, removes opportunity for financial independence on the project. Further, it places the onus of affordable housing, resultant of past poor housing and growth management practices, on an Indigenous organization that is still struggling to recover from colonial practices of the past.

Uchucklesaht, and its Capital Assets Corporation, do not agree to participate in Affordable Housing Agreements or Residential Rental Tenure clauses with the City of Port Alberni as we believe that doing so will effectively undermine our ability as a Government, to act in the interest of our citizens and, frankly, the community at large. However, we are excited to partner with BC Builds to try and align the project to meet their targets and requirements to provide a diverse rental housing option at rental rates that align with the community of Port Alberni.

Sincerely,

Ryan Anaka
Deputy Chief Administrative Officer / Director of Lands and Resources
Uchucklesaht Tribe Government

cc: Darren Moss (Tectonica Management Inc.)
David Poiron, Architect AIBC (Checkwitch Poiron Architect Inc.)

Uchucklesaht Tribe

Government

July 25, 2024

City of Port Alberni
4850 Argyle St
Port Alberni, BC V9Y 1V8

Attention: Brian McLoughlin

RE: Nucii (4841 Redford) – On-Street Parking

Dear Brian,

In response to the concerns raised by neighbours regarding the current use of street parking by staff and patrons of our existing Nucii Building, located at 4841 Redford Street, the Uchucklesaht Tribe Government (UTG) will be implementing the following changes immediately to improve the situation:

1. All staff will be directed to limit their parking to onsite parking and street parking directly adjacent to the Nucii building;
2. UTG will collaborate with the City of Port Alberni, and cover the costs, to install Resident Only signage on the street parking on the west side of 4th Avenue and east side of 5th Avenue to the north of the Nucii Building Site to further discourage use by staff and patrons of Nucii; and,
3. UTG will regularly patrol the area for the next 6 months to assess compliance.

In addition to the immediate steps outlined above, The Uchucklesaht Tribe Government will also begin planning and permitting efforts to complete the following:

1) Re-painting of onsite parking stalls to improve organization of onsite parking and,
2) Construction of a new parking lot on the northeast corner of the site to accommodate 15 new parking stalls for Nucii staff and patrons before the end of 2025.

Suite A, 5251 Argyle Street, Port Alberni, British Columbia, V9Y 1V1
Phone (250) 724 1832 Fax (250) 724 1806 Toll Free 1 888 724 1832

We value our relationship with our neighbours and hope the above steps help to mitigate the concerns voiced regarding the current use of street parking.

Sincerely,

Ryan Anaka
Deputy Chief Administrative Officer / Director of Lands and Resources
Uchucklesaht Tribe Government

cc: Darren Moss (Tectonica Management Inc.)
David Poiron, Architect AIBC (Checkwitch Poiron Architect Inc.)

Summary Report / Minutes of the Advisory Planning Commission Meeting held on September 21, 2023 at 12:00 p.m. (Council Chambers, Port Alberni City Hall, 4850 Argyle Street)

Commission Members Present
Ed Francoeur (Chair)
Stefanie Weber (Vice-Chair)
Callan Noye
Sandy McRuer
Dan Holder
Harley Wylie (Alt. – Tseshaht (c̓ išaaʔath̓) F.N)
Derrin Fines (P.A.F.D. Liaison)

Staff
Brian McLoughlin, Manager of Planning
Haley Stevenson, Planner I
Scott Smith, Director of Dev. Services/Deputy CAO
Donna Monteith, Interim Director of Corporate Services

Guests
Applicant/s: D. Poiron, K. Parker

Regrets
Councillor Serena Mayer, (Hupačasath F.N)
Joe McQuaid
Ken Watts (ECC, Tseshaht (c̓ išaaʔath̓) F.N)
Christine Washington, (SD70 Liaison)
S./Sgt. Mike Thompson, (R.C.M.P. Liaison)
Wayne Mihalicz (Parks Liaison)
Councillor Dustin Dame (Council Liaison)

Alternates (not in attendance)
Larry Ransom (Alt.– S.D.70)
TBD (Alt.– RCMP)
Councilor Deb Haggard (Alt. Council Liaison)

1. **Acknowledgements and Introductions**
   - The Chair acknowledged that this meeting is being held within the un-ceded, traditional territories of the Hupačasath Nation and the Tseshaht (c̓ išaaʔath̓) First Nation.

2. **Adoption of previous meeting minutes:**
   - Summary Report / Minutes from the APC Meetings held on August 17, 2023

   (S. Weber / C. Noye) CARRIED

3. **DEVELOPMENT APPLICATION: Official Community Plan and Zoning bylaw**
   3830 5th Avenue
   Lot 1, District Lot 1, Alberni District, Plan EPP114008 PID: 031-881-327
   APPLICANT: D. Poiron dba Checkwitch Poiron Architects Inc., agent for Uchucklesaht Capital Assets Inc., Inc. No. BC0965357

   - The Manager of Planning presented a summary of the application. A full report dated September 21, 2023 was included in the Agenda package for this meeting.

   - Attendees discussed the proposed OCP and Zoning Bylaw amendments and requested clarification from staff and applicants as needed.

   - APC asked for clarification on Comprehensive Development (CD) zones and their use in Port Alberni. Staff clarified that CD zones can be useful for infill development where design flexibility is needed. Creating a new zone also eliminates the need for numerous variances, while ensuring more rigorous review and public process. Staff confirmed that the proposed CD zone would only be applied to the subject property and that Council had approved a three CD zones in recent years.

- APC noted that the scale and density of development may not be compatible with the surrounding neighborhood. APC asked for additional context on how this issue is considered. Staff noted that several factors are considered when reviewing the scale of a development, including building heights, setbacks, width of public right of ways, shadow analysis, etc. Staff noted that proposed the scale and density of a development is for APC and Council to consider. Staff often support infill development given the need for housing.

- .Staff noted that there are several occurrences of 3 to 4-storey residential buildings in typically single-detached residential neighborhoods throughout the City.

- APC discussed the development's proposed parking, including whether enough is provided, how it may meet emerging vehicle trends, and how impacts of surrounding on-street parking may be managed. It was noted that on-street parking can become crowded and dangerous, but that given the wide roads and distance from a main thoroughfare this location can accommodate additional parking.

- APC noted that a decrease in traditional vehicle use will likely not be immediate and that an on-street parking management strategy may be needed in the meantime.

- APC asked about the site's soil depth. This question was referred to the applicant who noted that preliminary investigations indicate that the site contains rock but that it is not located at the immediate surface. The applicant added that provided parking spaces were based on preliminary studies which indicated 1 space/household plus extra spaces for the larger units is appropriate. They noted that if transportation trends shift in the future, parking areas may be repurposed.

- APC asked who the property manager would be. The applicant clarified that the property would be managed by the owner (Uchucklesaht Capital Assets Inc.).

- APC asked whether the rental units will be targeted to any particular demographic. The applicant clarified that the intent of the development is to provide rental units to the greater community.

- APC asked about the development's intended rental structure. The applicant clarified that the units will be market value rentals and also noted that owners do intend to use the property to generate revenue for their organization.

- It was noted that a lack of affordable housing can often be a barrier to economic opportunities for individuals, businesses, and organizations and that initiatives such as this can significantly benefit a community.

Motions:

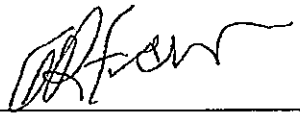
1. *That the Advisory Planning Commission recommends to City Council that Council support the application.*

(S. Weber / H. Wylie) CARRIED

4. **Updates from the Director of Development Services**
   - Zoning Bylaw modernization.
   - 3325 Johnston Road.

5. **Other Business**

6. **Adjournment** – The meeting adjourned at 12:33 pm. The next meeting is scheduled for 12:00 pm on **Thursday, October 19, 2023.**



(Chair)

DRAFT-APC-SummaryMinutes-Sep21-2023

CITY OF PORT ALBERNI

BYLAW NO. 5094

A BYLAW TO AMEND THE OFFICIAL COMMUNITY PLAN FOR THE CITY OF PORT ALBERNI

The Municipal Council of the City of Port Alberni in Open Meeting Assembled Enacts as follows:

1. Title

   This Bylaw may be known and cited for all purposes as **"Official Community Plan Amendment (3850 5th Avenue) Bylaw No. 5094".**

2. Official Community Plan Amendments

   Respecting the following property legally described as *Lot 1, District Lot 1, Alberni District, Plan EPP114008 (PID: 031-881-327)* and located at **3830 5th Avenue** as shown outlined in bold on Schedule "A" attached hereto and forming part of this bylaw, the following amendments apply:

   2.1 **Schedule A (Land Use Map)** that forms an integral part of Official Community Plan Bylaw, No. 4602 is hereby amended to change the designation on the property from 'Institutional' use to **'Multi-Family Residential'** use.

   2.2 **Schedule B (Development Permit Areas Map)** that forms an integral part of Official Community Plan Bylaw, No. 4602 is hereby amended to include the property in 'Development Permit Area No. 1 (Multiple Family Residential)'.

READ A FIRST TIME this day of , 2024.

READ A SECOND TIME this day of , 2024.

A PUBLIC HEARING WAS HELD this day of , 2024.

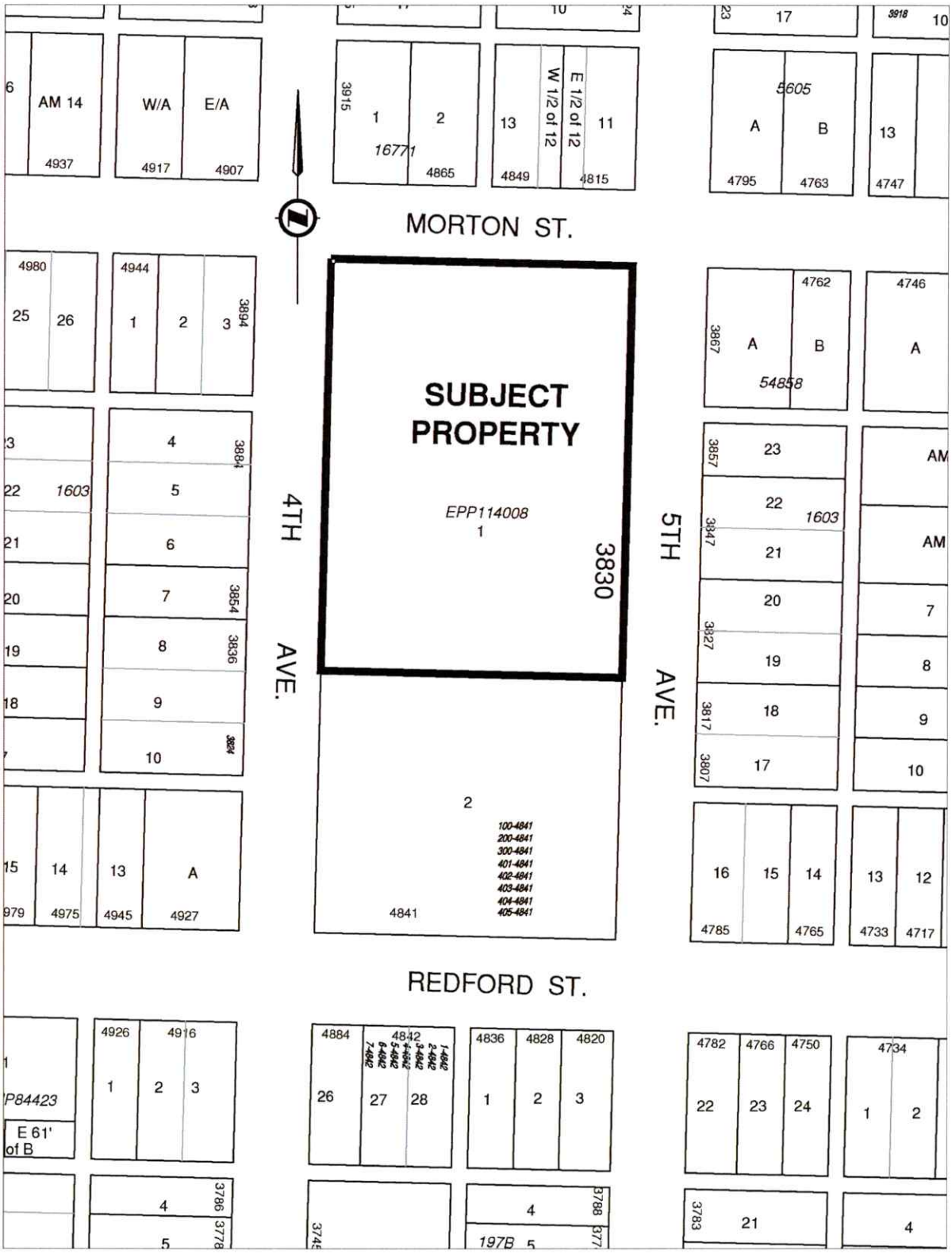
READ A THIRD TIME this day of , 2024.

FINALLY ADOPTED this day of , 2024.

Mayor

Corporate Officer

Schedule "A" to Bylaw 5094



OCP2021-09-3830-5thAve-Uchucklesaht-AmendBylaw5094

CITY OF PORT ALBERNI

BYLAW NO. 5113

A BYLAW TO AMEND PORT ALBERNI ZONING BYLAW NO. 5105

The Municipal Council of the City of Port Alberni in Open Meeting Assembled Enacts as follows:

1. Title
   This Bylaw may be known and cited for all purposes as **"Zoning Amendment (3830 5th Avenue), Bylaw No. 5113"**.

2. Zoning Text Amendments:
   2.1 Adding the following text to Establishment of Zones Section 5.1:
   "CD4 Comprehensive Development – 3830 5th Avenue"
   2.2 Zoning Bylaw No. 5105, 2024 is hereby amended by adding the following text under Section 5:

CD4 – COMPREHENSIVE DEVELOPMENT – 3830 5th Avenue

8.4 The purpose of this zone is to provide for in-fill development of multi-residential units.

8.4.1 Permitted *uses*

Principal Uses	*Accessory Uses*
Multi-residential dwellings	*Home occupation*

8.4.2 Site Development Regulations

Minimum Lot Area	8,779 m^2	(94,496 ft^2)
Maximum *Coverage*	40%	
Minimum *Setbacks*:		
Front yard	4.5 m	(14.76 ft)
Rear yard	5.5 m	(18.04 ft)
Side yard (east)	3.5 m	(11.48 ft)
Side yard (west)	4.5 m	(14.76 ft)
Maximum *Floor Area Ratio*	1.2	
Maximum number of dwelling units	112	

8.4.3 Building Height

Maximum Height, Building 1	15 m	(49.21 ft)
Maximum Height, Buildings 2, 3, 4, 5	11 m	(36.1 ft)

8.4.4 Parking

8.4.4.1 Vehicle parking must be provided at the following minimum rates:

Type	Bed(s)	Spaces per Dwelling unit
Multi-family	Studio	0.75
Multi-family	1 bed	0.75
Multi-family	2 bed	1.25
Multi-family	3 bed	1.5

8.4.4.2 Secure bicycle storage will be provided at a rate of 0.19 spaces per dwelling unit.

8.4.4.3 Driveway parking access directly onto Morton Avenue is permitted for multi-residential units described as Building 4, as an exception to section 7.4.13 of this bylaw.

8.4.5 Useable Open Space

A total of 3,291 m^2 of *Usable Open Space* must be provided.

8.4.6 Landscaping

8.4.6.1 Landscape screening to be provided at west property line between Building 1 and adjacent property.

8.4.6.2 Respecting Buildings 2, 3, 4, and 5, privacy screening must be installed between entrances of dwelling units facing the courtyard.

8.4.7 Signage

All signage must meet the requirements for multi-family zones in Port Alberni Sign Bylaw No. 4843.

8.4.8 Conditions of *Use*

(a) Groups of multi-residential dwellings are permitted, as an exception to section 6.1 of this bylaw.

(b) Limits to *Home Occupation* listed as section 6.15.6(g) apply to this zone.

3. Zoning Map Amendments

3.1 The property legally described as Lot 1, District Lot 1, Alberni District, Plan EPP114008 PID: 031-881-327, and located at 3830 5th Avenue, as shown outlined in heavy black line on Schedule B attached hereto and forming part of this bylaw, is hereby rezoned from 'P1 Institutional' to 'CD4 Comprehensive Development – 3830 5th Avenue'.

3.2 Schedule "A" (Zoning District Map) which forms an integral part of Port Alberni Zoning Bylaw No. 5074 is hereby amended to denote the zoning outlined in Section 2 above.

READ A FIRST TIME this day of , 2024.

READ A SECOND TIME this day of , 2024.

A PUBLIC HEARING WAS HELD this day of , 2024.

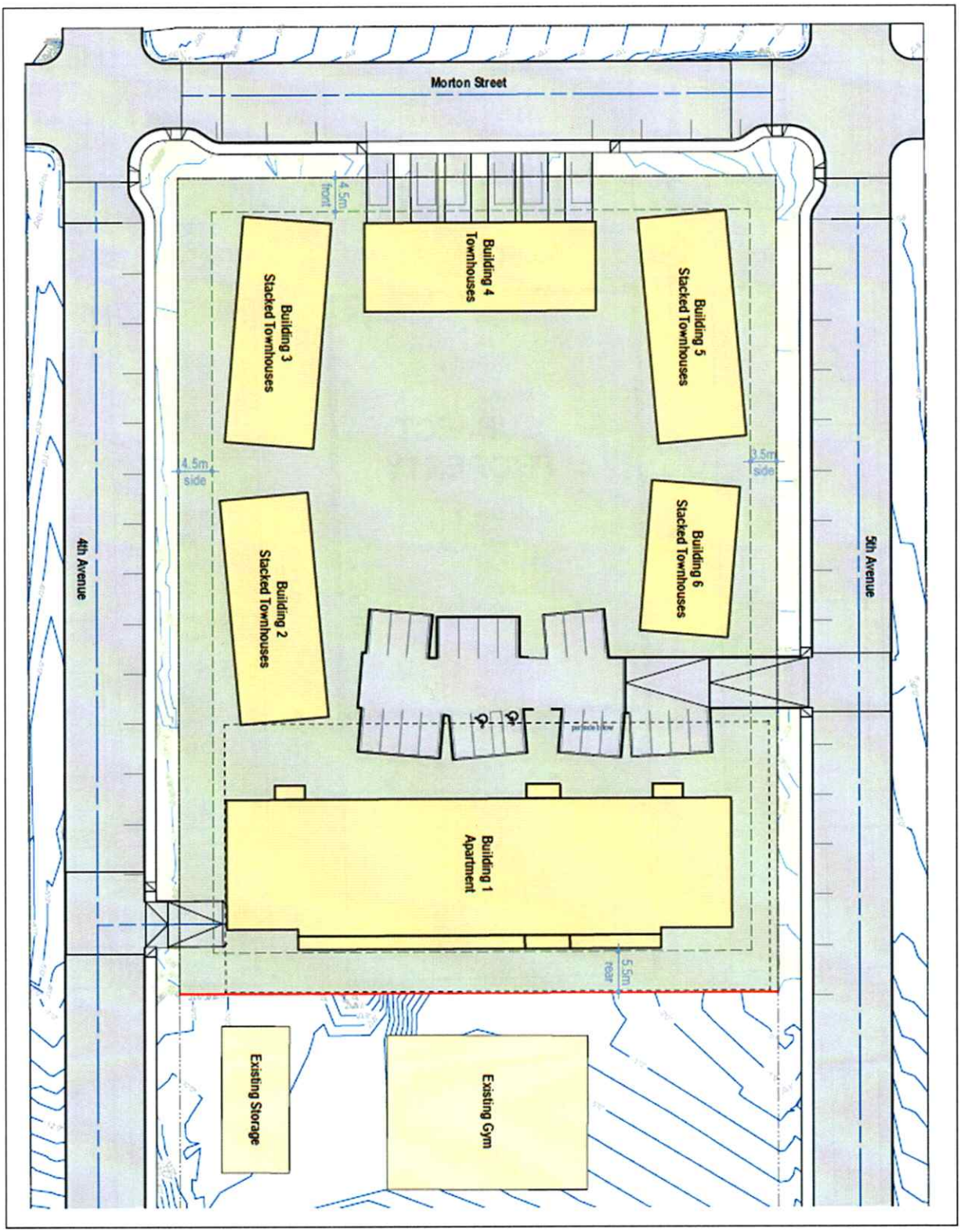
READ A THIRD TIME this day of , 2024.

FINALLY ADOPTED this day of , 2024.

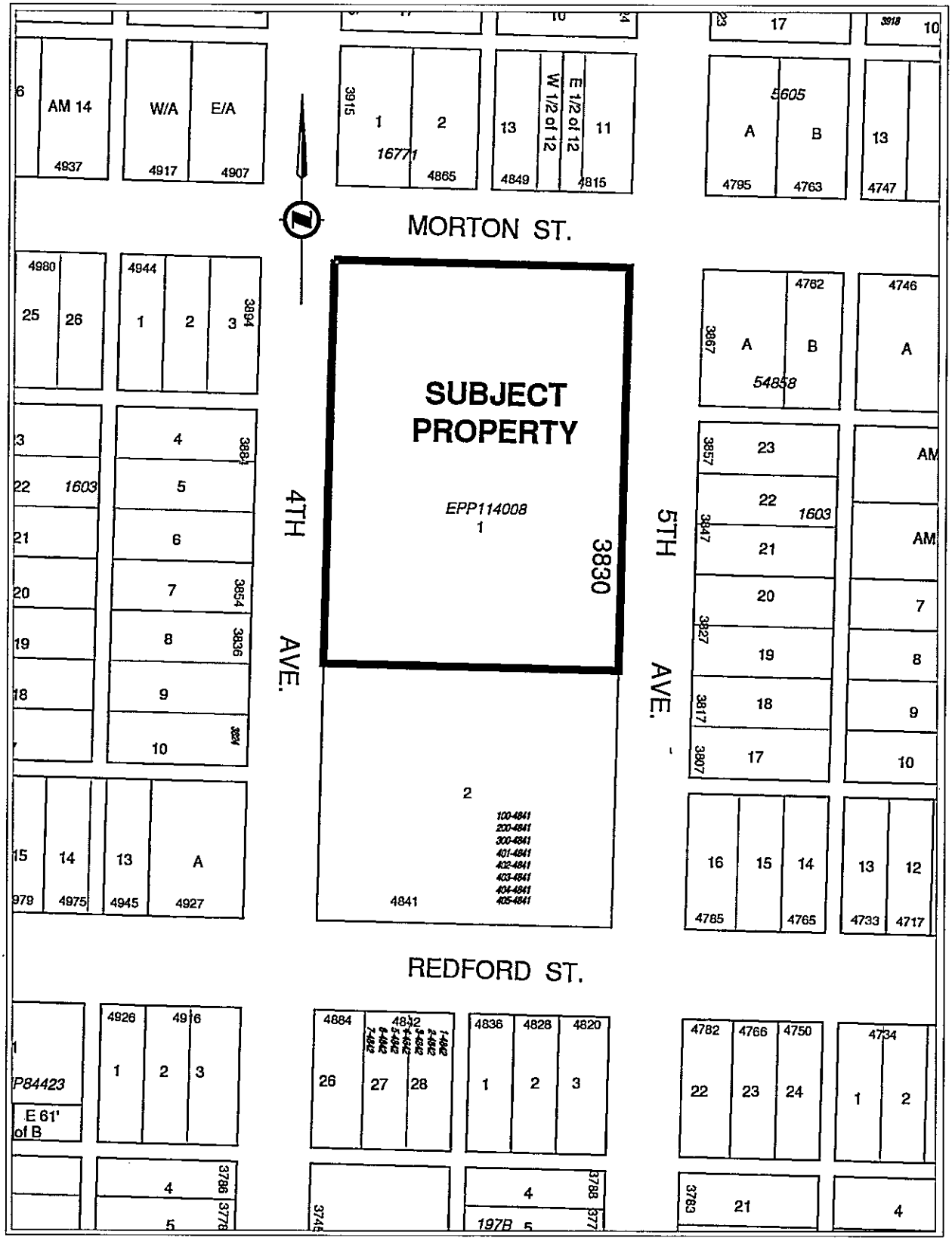
Mayor

Corporate Officer

Schedule "A" to Bylaw No. 5113
Site Plan



Schedule "B" to Bylaw No. 5113



From: carolyn jasken <carolyn_jasken@hotmail.com>
Sent: August 3, 2024 11:08 AM
Subject: Somass public pathway (with photo included)

Dear Mayor & Council,

On behalf of the Alberni Valley Tyee Club, I am writing to inform you about our upcoming event, the 3 day Labour Day salmon Derby

As you may know, we normally collaborate with the Port Authority , utilizing Clutesi Haven marina, Tyee Landing and Argyle Pier. This arrangement has served us well over the years accommodating the needs of the labour day derby and the fisherman. This year a new Salmon Festival society has formed and is finalizing arrangements with several major sponsors. The festival will feature vendors, live entertainment, A boat show that brings Suzuki Canada and local marine businesses together, a beverage garden that brings the local breweries together, a kids and teen zone for inclusivity. A talent competition for all, a bull head derby for sponsored prizes and more seafood culinary treats and demos. The train will be operating that weekend and the harbour quay has activities & live music planned. To sweeten the derby we have included an additional $10,000 bonus prize bringing the largest salmon caught to $15,000.

We have borrowed the old somass lunch horn to signal when there is a new leader on the board adding to the festivities and sparking curiosity among tourists and locals. Additionally the Tseshaht will be providing a cultural blessing for the salmon and the fisherman on the Friday night before the start of the weekend event.

The community and outside support for this years salmon festival has been overwhelming. It's clear the community has been mourning the loss of such events here and iconic structures, and vessels such as the mars bombers and supportive volunteer figures in the community. We are all working together to bring this event to life, aiming to be a positive beacon in the community and solidify our identity as the "Ultimate Fishing Town" Much like our species of salmon charting the same course home.

For the past few years, the derby has been set up at the Argyle Pier to support businesses at the quay during challenging times. Although this location has adequate space, it does present some logistical challenges for derby participants last minute to adequately accommodate a festival and derby. This year the festival will be set up at Tyee landing to stream line efficiencies and accommodate a larger event, utilizing the property as intended for public spaces and events.

During a recent site tour, I noticed a big divide between the harbour quay and Tyee Landing between the derby and the festival and we thought it best if we keep the derby and festival together, as well, suitable for the fishermans needs. I noticed that the Somass public walkway was closed due to site work going on farther down the path. We have learned that this is a temporary inconvenience and that there may be a possibility of utilizing the wide pathway for

our donated , self contained trailer. Ideally we would love to open up the walkway to the kids zone with a bouncy castle or set up the salmon BBQ at the end working with the prevailing winds. We have now been advised that this may not be feasible at this late stage, but if it remains an option we would appreciate your approval.

The Tyee Club wishes to set up the See Groups fully contained, enclosed and secured car trailer for our weigh station to accommodate the fisherman and be included in the festival. We believe the derby and festival are intrinsically connected and should not be separated.

After meeting with the Port authority it was determined that using tyee dock and tyee landing is feasible. They are working quickly to facilitate the fishermans requirements for dock space. There is already a 4 sided cleaning station already in place for our convenience for the derby.. The weigh station is a bit more tricky to accommodate close to the ramp and docks for easy access. We propose setting up the weigh station in a small section of the somass lands, adjacent to the Port authority jurisdiction near the ramp and dock against the fence by the power box at Tyee landing. This would allow the fisherman to easily weigh their fish and return to their boats and not impede on the somass pathway or the port authority ramp walkway or the stage area. The trailers tongue (opening ramp) would face Fishermans harbour. We are fully insured for $5million and have the city and Port authority indemnified annually

We hope to work together to ensure the public can enjoy the event and see the fish weighed in for the derby and enjoy the new public waterfront space. Our goal is to raise proceeds for salmon enhancements, infrastructure supports, and community enhancements, making future derbies and festivals even better. This will be a great trial for future infrastructure needs.

Additionally, I've ordered a banner designed by JAL for the sign at the bottom of Johnston to inform travelers about the festival and derby at the harbour and guide them to Port Alberni.

The dates we would need for set up and take away:
August 29, Aug 30, Aug 31, Sept 1, Sept 2
Space requirement : 20x8.5 feet (ish) Folding ramp down can add another 8 feet, however if need be i can put the tongue in Port Authority jurisdiction. Ideally 30x8.5 feet

Thank you for taking the time. reading this windy letter
Like our 5 species of salmon, it is my hope that we can all start charting the same course home

Carolyn Jasken
President AV Tyee Club
Port Alberrni Salmon Festival committee
Ultimate Fishing Town
Dancing with Salmon project 2020

July 25, 2024

City of Port Alberni
4850 Argyle Street
Port Alberni, BC V9Y 1V8

Attention: Mayor Minions and Council

Dear Mayor Minions:

The volunteer Board of Directors of the Alberni Valley Community Forest Corporation advertised for requests for donation support and 4 organizations put in applications for funding. The Board of Directors request the donation funds for 2024 be allocated in the following manner:

- $5,000 allocated to the Navy League Cadet Corps 113 for the purchase of a boat trailer to help with launching and transportation of their vessels to training locations. This purchase will greatly enhance the training capabilities of the Navy League.
- $5,000 allocated to the Western Vancouver Island Industrial Heritage Society for the upgrading and maintenance of the Speeder and passenger cars for use in this years run along the waterfront and special theme events.

Thank you for your consideration and we look forward to being part of the projects as outlined above.

Please let us know if you would like more clarification.

Sincerely,

Jim Sears
Alberni Valley Community Forest Corporation
Board Chair

From: donovanfamily <donovanfamily@gmail.com>
Sent: July 29, 2024 1:15 AM
To: CityPa <citypa@portalberni.ca>
Subject: Suicide Prevention Support for Indigenous Children

Greetings,

My name is Laura Donovan, a member of the Odanak First Nation, living on the territories of the Coast Salish peoples. I want to thank you for your willingness to read this letter, as it may be triggering and difficult to read. I am fully aware of the significant impact suicide has had on every one of our communities.

I have been a Tattooer for 15 years, starting in Selkirk, Manitoba, and now in Surrey, BC. I have tattooed countless memorials for fellow Indigenous community members, using my craft to heal and provide good medicine. I never expected that I would end up tattooing memorials to honor my daughter.

I would like to share information about my 16-year-old daughter Felicity, an Indigenous student and a proud Abenaki member of the Odanak First Nation. Felicity died by suicide in December 2023.

In October 2023, she reached out for suicide prevention support at school, and a call was made to an external agency for help. I did not learn about the details of this call or the support the school had committed to provide until January 2024. At that time, I discovered that the school principal had contacted a different external support agency, informing them that Felicity had not presented as at risk and was not on their radar.

Additionally, I learned that the Surrey School District had a suicide prevention protocol that was not followed and did not have a suicide prevention program or plan to address students presenting with thoughts of suicide, nor support for staff providing this support to students.

On July 22nd, I met with the BC Minister of Education to share Felicity's experience and the experiences of many Indigenous families who have shared their stories with me over the years. In the spirit of Truth and Reconciliation, to honor the lives of all Indigenous children lost to suicide and to ensure Every Child Matters, I have requested the following from the Minister:

1. The Ministry of Education ensures all schools in British Columbia are funded and equipped to provide suicide prevention support and training to staff and students based on current evidence-based practices. I request this with the understanding that all children and staff will benefit from this honor.
2. The Ministry of Education performs an audit of the suicide prevention support provided to Felicity and our family.

I am reaching out to ask if you municipal leadership will add your voice to my call to provide improved suicide prevention support for children in your municipality. Please consider providing me with a letter addressed to the British Columbia Minister of Education, the Honourable Rachna Singh, in support of my request, with a CC to my email at donovanfamily@gmail.com. The Minister's email is ECC.Minister@gov.bc.ca.

If you have any questions or would like more information that will enable you to provide a letter of support, please reach out to me, and I will respond promptly.

I have attached supporting information for your reference:
1. A picture of Felicity.
2. A record of the call the School Counsellor made to a suicide prevention program where Felicity asked for support.
3. A record of the call the Principal made to another suicide prevention program, informing them Felicity was not presenting as at risk or on their radar.
4. A letter of support from the Chief and Council of Odanak First Nation.

Thank you for your time and attention,

Laura Donovan (Felicity's Mom)

Brief Service Stats Report

Brief Service Stat Report Generation

Entered By: Olivia Roxburgh
Created Date: 20-Oct-2023
Effective Stat Date: 20-Oct-2023 [set]

Worker: Olivia Roxburgh
Program: Suicide Prevention, Education

Contact Type: Phone
Contact: CHRISTA FINDLAY

Organization: ELGIN PARK SECONDARY

Program Details

Referring Professional
First name
Christa

Last name
Findlay

Community agency or institution
Surrey School District

Phone number
[redacted]

Preferred time to call
during the school day

Email address
[redacted]

Service Requested

Name of youth being referred
Felicity Donovan

Date of Birth
Mon, 02/26/2007 - 00:00

School
Elgin Park Secondary

Community of residence
White Rock

Does the young person have a safety plan in place?
Yes

Please describe the safety plan
Student is creating a safety plan and sharing it with her parents today.

C-SSRS Suicidal Ideation Severity
Have you wished you were dead or wished you could go to sleep and not wake up?
Yes

Please describe
Student attempted suicide about a month ago.

Have you actually had any thoughts of killing yourself?
Yes

Please describe
Last time I had these thoughts was last weekend when I was really stressed out about school and life.

Have you been thinking about how you might kill yourself?
Yes

Please describe
I have tried to hang myself with my belt. I am unsure if I am safe currently or if I am a danger to myself but I'm still really down.

Have you had these thoughts and had some intention of acting on them?
Yes

Please describe
I tried to hang myself but was found by my sister and was very thankful that she found me. I was praying to god that someone would find me in time because I wanted to be saved.

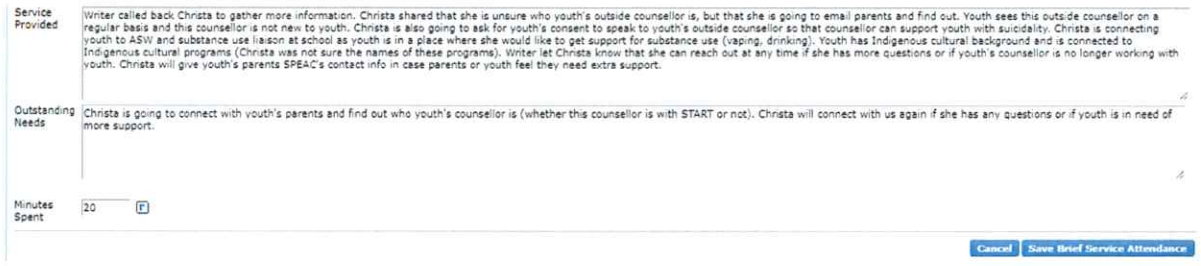
Have you started to work out or worked out the details of how to kill yourself?
Yes

Did you intend to carry out this plan?
Yes

Please describe
I tried but I was found.

Have you ever done anything, started to do anything, or prepared to do anything to end your life?
Yes

Please describe
I tried to hang myself. I told my parents about what I did and they have taken me to the hospital, gotten me a counselor and I have an appointment with a psychiatrist on November 11th.


Service Provided
Writer called back Christa to gather more information. Christa shared that she is unsure who youth's outside counsellor is, but that she is going to email parents and find out. Youth sees this outside counsellor on a regular basis and this counsellor is not new to youth. Christa is also going to ask for youth's consent to speak to youth's outside counsellor so that counsellor can support youth with suicidality. Christa is connecting youth to ASW and substance use liaison at school as youth is in a place where she would like to get support for substance use (vaping, drinking). Youth has Indigenous cultural background and is connected to Indigenous cultural programs (Christa was not sure the names of these programs). Writer let Christa know that she can reach out at any time if she has more questions or if youth's counsellor is no longer working with youth. Christa will give youth's parents SPEAC's contact info in case parents or youth feel they need extra support.
Outstanding Needs
Christa is going to connect with youth's parents and find out who youth's counsellor is (whether this counsellor is with START or not). Christa will connect with us again if she has any questions or if youth is in need of more support.
Minutes Spent
20
Cancel
Save Brief Service Attendance

Hi everyone,

I had a call this evening from Principal Kavita Sharma from Elgin Park Elementary School regarding deceased youth F.D. PID #1819082
The phone number for the principal is [redacted]

The principal was requesting information regarding START protocol. Specifically, for when START communicates/ collects collateral with the school and the ROI process. I explained to the principal that the ROI is part of confidentiality and the youth because they were 16 years of age at the time would have signed ROI during the assessment (first meeting with clinician). The principle asked when START would get in touch with the school and I let her know that the supervisor would have to contact her to disclose more information. She went on to reiterate that youth's dad earlier today spoke with a clinician and he had sent the principal an email regarding the gaps in care between school and START.

Principal said the school counsellor found out youth was seeing START clinician once family had mentioned it to them (Krista - School Counsellor). Writer requested if at that time school counsellor had called START to collect collateral. She went on to say that youth at school was not presenting as being at risk or on their radar. Therefore, this was not done. I reiterated to the principal a couple times that the supervisor will have to contact them as I do not have all the information and we would need permission from the family to release any information regarding youth. The principal expressed that a meeting may be needed to discuss how we all can do better in the future.

I was under the impression that B would be follow up, however, I spoke with B and they informed me that it would be Aldo.

Also, in regards to reporting, because there is no longer an open Paris file, we have not been documenting the conversations.

Lastly, which details does the team need to know in order for the information to be relayed safely and delicately, when we receive calls similar to todays.
Thus far, Gen and Katie have spoken to dad and I spoke with the school principal.

Regards,

Taj Sahota (She/Her)

Crisis Clinician

The START Team- Supporting Children and Youth through Mental Health Crisis

Shirley Denn Pavilion

9634 King George Boulevard

Surrey, BC V3T 0G7

Phone: 604 585 5561 Fax: 604 585 5560

July 25th, 2024

Honourable Rachna Singh
British Columbia Minister of Education
ECC.Minister@gov.bc.ca

Object: letter of support for the Donovan family

Kwai,

On December 21, 2023, the Abenaki of Odanak lost a member, Miss Felicity Donovan. She was only 16 years old. Her family has been waiting for answers on the support provided to their daughter to prevent her suicide. No parent should be in their position.

On behalf of the Abenaki Council of Odanak, we would like to support the Donovan family in their requests:

1. The Ministry of Education ensures all schools in British Columbia are funded and equipped to provide suicide prevention support and training to staff and students based on current evidence-based practices. I request this with the understanding that all children and staff will benefit from this honor;
2. The Ministry of Education performs an audit of the suicide prevention support provided to Felicity and our family.

Wlwni,

Chief Rick O'Bomsawin
Abenaki Council of Odanak
reception@cnodanak.com
1-450-568-2810

cc: donovanfamily@gmail.com

1/1

☑ Council
☑ Mayor
☑ CAO
☐ Finance
☑ Corporate Services
☑ Agenda
☐ Economic Development
☐ Engineering/PW
☐ Parks, Rec. & Heritage
☐ Development Services
☐ Community Safety
☐ Other
File # 8100-01 RCM Aug 12/24.

Long Shot EVENTS
5226 Wilkinson Rd
Port Alberni, BC V9Y 7E1
longshoteventsinc@gmail.com
1-250-650-5427

August 8, 2024

Dear Mayor and Council,

I hope this message finds you well. My name is Ben Howells, and I am the CEO of Long Shot Events. I am writing to formally request a letter of support from the Port Alberni Council for an exciting event proposal that I will be presenting to Mosaic in late August. The proposed event, *Alberni Shores*, is a family festival with a strong emphasis on outdoor recreation and family values. We are seeking approval to rent the MacTush Campground as the venue for this event.

The *Alberni Shores* festival is designed to celebrate the natural beauty of our area while fostering community spirit and family togetherness. While our pitch is currently tailored to MacTush Campground, the event could be adapted to other suitable locations within the region.

Having lived in Port Alberni for over five years, my team and I are incredibly excited at the prospect of contributing to the vibrancy and livability of our community through this event. Our organization has a proven track record of success with similar projects, and we are confident that this festival will shine a bright light on the unique charm and beauty of Port Alberni.

We believe that the support of the Port Alberni Council would be instrumental in helping us secure approval from Mosaic, and in bringing this vision to life. I have attached a draft of our event pitch for your review, though please note that it is still a work in progress.

Thank you for considering our request. We look forward to the possibility of the support of the Port Alberni Council to make *Alberni Shores* a reality.

Sincerely,

Benjamin Howells, CEO
Long Shot Events Inc

OFFICE OF THE MAYOR

October 31, 2019

File No. 0220-01

To whom it may concern,

Re: Cumberland Village Works – Celebrating Music, Culture and Community

---

Cumberland Village Works has a legendary reputation. Vig and Melissa are long-standing community members who have successfully infused our community with live music, making significant contributions to arts and culture in the Comox Valley. The events produced by Cumberland Village Works have supported economic development and made a positive impact on the vibrancy of our community, which was particularly valuable during tough economic times. The events produced by Vig and Melissa have put Cumberland on the map as the Village with some of the best live music events and venues in the Province.

We appreciate Cumberland Village Works' contributions to the arts, and commitment to our community. Their event *Cumberland Wild* is a large music event with thousands of attendees that takes place close to Cumberland's downtown and residential neighbourhoods. Melissa, Vig and their production partners are always professional and proactive to ensure that the event goes smoothly and has a positive impact on our residents. This has included innovative solutions such as Atmosphere's silent disco.

Over the years, Vig and Melissa have shown success in other areas through their willingness to partner and support other businesses and a variety of not for profit organizations. They engage community through the events themselves, by encouraging volunteerism, by supporting local not for profits in their own fundraising efforts, and advocating for arts and culture. Cumberland Village Works is ever changing, bringing new and innovative events and programming into the community and the region.

I encourage you to fund the request from Cumberland Village Works. Please do not hesitate to contact me if you would like more information.

Yours sincerely,

Leslie Baird
Mayor

PO Box 340, 2673 Dunsmuir Avenue, Cumberland, B.C. V0R 1S0 Tel (250) 336-2291 Fax (250) 336-2321
mayor.baird@cumberland.ca cumberland.ca

THE TRUCK LOGGERS ASSOCIATION
Our strength is in our roots.

FORESTRY WORKS FOR BC

July 8, 2024

Port Alberni Mayor and Council
City of Port Alberni
4850 Argyle St
Port Alberni, BC V9Y 1V8

Sent Via Email: C/O mike_fox@portalberni.ca

RE: ForestryWorksforBC

Dear Mayor Minions and Port Alberni City Council Members

We are writing to local governments across British Columbia to introduce the ForestryWorksforBC campaign, a new grassroots initiative to raise awareness about the critical role forestry plays in the well-being of rural and urban communities.

The ForestryWorksforBC campaign is a collective effort that represents over 1000 forest-based organizations and companies, including many small and medium sized and intergenerational family-owned businesses across British Columbia. We believe that a better and brighter future in this province needs a strong forest sector.

Forestry matters in every corner of B.C. From hospitals to schools, roads, and communities; forestry has been the foundation of all that we hold dear in this province. Forestry is a renewable sector – and it has been a thriving sector while harvesting just a fraction of one percent of the forest land base each year. But the future of forestry in BC is uncertain.

Harvest levels have dropped by 42% since 2018 and half of BC's mills have been lost in the last two decades. Today, harvest levels have fallen to less than 60% of the sustainable allowable annual cut (AAC) set by the province's chief forester.

When access to the AAC is unreliable, harvest levels drop, government revenues for critical services decline, and the impact reaches every British Columbian. Here are a few quotes from voices across the province:

- *"I don't see a future in my industry in BC... It kills me to leave this Province as my family all live here. My wife is a nurse... her hospital is severely understaffed and (they will) will cry to see another hole to fill."*
- *"As businesses disappear, so do the jobs and many small communities have nothing to replace them with. The communities themselves become unstable."*
- *"I am 24 years old...I used to think this was a career I could cherish but I can no longer see myself pursuing a lifelong career in forestry."*

- *"Our province is losing some of its most productive workers, successful contractors and essential investment dollars every day."*

Through the ForestryWorksforBC campaign, people are rallying their voices to let our provincial leaders know these impacts are too much, and that without reliable and timely access to the AAC, we have a lot more to lose than mills.

We ask that you include a discussion of this important topic on the next council meeting agenda and consider joining other communities in sending a letter to provincial representatives to let them know that ForestryWorks for your communities too. You can see a template letter on our website at https://forestryworksforbc.ca/send-the-message/.

To learn more, please review the attached press release and visit our website. We will follow up shortly to request an opportunity to bring a delegation to present to Council about our concerns and this important initiative.

Yours truly,

W.R. (Bob) Brash
Executive Director

Attachments (3)

www.tla.ca

New Initiative Calls on British Columbians to Stand Up For Forestry

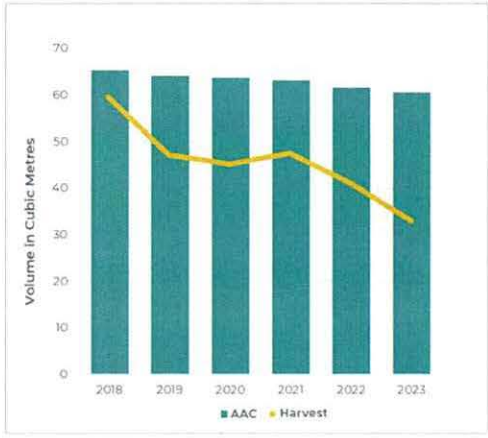
VANCOUVER, British Columbia, June 3, 2024 – A new grassroots initiative is encouraging British Columbians to be better informed on B.C'.s forest sector and take action through various activities including online letters and informing local governments to raise the importance of forestry to British Columbians.

Across the province, small, medium and large forest companies, family-owned enterprises and local businesses have joined forces through ForestryWorksForBC, a new grassroots initiative to address the sectors' uncertain future and its impact on British Columbians and communities that rely on the revenues from forestry to support critical services like roads, schools, and health care.

"Forestry matters in every corner of B.C., from hospitals, schools and roads and communities; forest jobs and forest revenues have been the foundation of all that we hold dear in this province," said Bob Brash, executive director of the Truck Loggers Association. "Ensuring reliable and timely access to the allowable annual cut (AAC) means we can build affordable, climate-friendly homes for British Columbians; and we can keep people in their homes and communities with good paying jobs."

In the last 20 years nearly half of all B.C. sawmills have closed. Some of this is the result of natural forces like wildfire and mountain pine beetle but increasing policy changes and escalating complexity have created instability and reduced cutting permits and investment. Today harvest levels are less than 60 per of the AAC set by the Province's chief forester.

A Rapid Decline in Harvest Levels



Source: BC AAC and Harvest Levels 2018-2023 - COFI.org

Dean Garofano, president and chief operating officer at Delta Forestry Group, has been conducting crew talks across the company and hanging posters around the mill to build momentum for the campaign. "Our workers see the lack of logs coming in, and they are concerned about the future not just for themselves but the communities they call home," said Garofano. "This initiative gives everyone who cares about forestry and the future of this province a voice – when BC's forest sector does well, we all do better."

- 30 -

For More Information:
Visit: www.forestryworksforbc.ca
Email: hello@forestryworksforbc.ca

Forestry Works for BC

Forestry matters in every corner of BC. From hospitals, schools and roads and communities; forestry has been the foundation of all that we hold dear in this province.

A Stronger BC Needs a Stronger Forest Sector

- Help with people's everyday costs
- Deliver more homes for people, faster
- Strengthen health and mental health care
- Deliver services people rely on
- Support a stronger, cleaner economy
- Build infrastructure for the future

Get Involved

It is not trees versus jobs; its quality of life and an allowable annual cut we can all count on. It's time BC's leaders commit to **both** because **ForestryWorksforBC**.

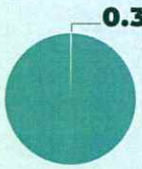
- **Send a message to government** — by mail or on our website
- **Follow us on social media** and share the campaign with your community
- **Ask your MLA and MLA candidates how they'll help ensure** that forestry provides for BC into the future

Who We Are

We are British Columbians who believe a stronger BC means affordable housing, reliable healthcare, climate solutions, and thriving communities.

We believe a better and brighter future in this province needs sustainable forestry.

The Future of BC Forestry is Uncertain



The allowable annual cut (AAC) in BC is **1/3 of one percent** of all the forest land in the province

...**but**...government-issued cutting permits have slowed

...**and now**...harvest levels are less than 60% of the sustainable AAC.

Take action! Send your MLA letter today!

hello@ForestryWorksForBC.ca
ForestryWorksForBC.ca

FORESTRY WORKS FOR BC

#ForestryWorksForBC

From: Raymond, Mark AF:EX <Mark.Raymond@gov.bc.ca>
Sent: July 19, 2024 11:54 AM
To: AGRIServiceBC AF:EX <AgriServiceBC@gov.bc.ca>
Subject: Addressing Drought Challenges: Important Resources for Local Governments and their Agricultural Communities

Dear Mayor and Council and Chief Administrative Officer,

We are reaching out to local governments across British Columbia regarding the increasing challenges posed by drought and extreme weather events on our freshwater resources, which have significantly impacted the agriculture sector in recent years and are expected to continue doing so. We are writing to ensure you are aware of the information, tools, financial supports, and other resources available to help both local governments and their agricultural constituents prepare for and respond to drought conditions.

To help with these goals, we encourage you to:

- **Get the information out!** Review and share the 2024 Quick Guide to Drought Resources, a comprehensive two-page document that highlights water-related resources and supports, available through the link above or at our Drought in Agriculture webpage (http://www.gov.bc.ca/AgDrought), with your staff and the agricultural communities within your jurisdiction.
- **Sign up for and promote our Regional AgriService BC E-bulletins** (a link is also available in the Quick Guide), which provide timely and regionally specific information on programs, events, and resources.
- **Visit the Investment Agriculture Foundation website** for information on funding opportunities available to local governments through the Agriculture Water Infrastructure Program and Beneficial Management Practices Program - Plans & Designs to support your agricultural community.

For more information on:

- Agricultural resources, please contact AgriService BC at AgriServiceBC@gov.bc.ca or 1-888-221-7141.
- Current drought levels in your area, visit the Drought Information Portal.
- Water licensing, please contact FrontCounter BC at FrontCounterBC@gov.bc.ca or 1-877-855-3222.

We would like to extend our sincere appreciation for your local government's dedication to sustainable water management and support of your agricultural community during these challenging times. Thank you for your continued commitment and leadership.

Warm regards,

Mark Raymond

Mark Raymond
Executive Director
Extension and Support Services Branch
B.C. Ministry of Agriculture and Food

BRITISH COLUMBIA Ministry of Agriculture and Food

From: MUNI UBCM Meeting Requests MUNI:EX <MUNI.UBCM.MeetingRequests@gov.bc.ca>
Sent: Friday, July 19, 2024 11:43 AM
Subject: Invitation to Meet with the Health Authorities of British Columbia During UBCM Convention
Importance: High

This message is being sent to all Union of BC Municipalities (UBCM) Member Municipalities, Regional Districts, and First Nations on behalf of the Ministry of Municipal Affairs.

Subject:	Invitation to Meet with the Health Authorities of British Columbia During UBCM Convention
Intended Recipient(s):	Mayors/Regional District Chairs/Islands Trust Chair/CAOs/Chiefs and Chief Councillors and cc: General Email/Administrative Support staff/Alternates

If you have received this message in error, please forward it to the appropriate person in your organization.

2024 UBCM Convention – Ministries, Agencies, Commissions, and Corporations (MACC) Staff Meetings

Senior staff from the Regional Health Authorities and the Provincial Health Services Authority (PHSA) are pleased to offer UBCM Delegates an opportunity to meet to discuss matters related to the following:

Regional Health Authorities (Northern Health Authority; Interior Health Authority; Fraser Health Authority; Vancouver Coastal Health Authority; Island Health)

- When most people think about health care, the first thing they think of are hospitals. While many services are offered in the hospitals operated by the regional health authorities, they also offer a wide range of other important services such as:
    - Home and community care
    - Long-term care
    - Seniors care
    - End of life care
    - Mental health & substance use
    - Environmental health
    - Public health
    - Healthy Living
    - Infant & Youth
    - Sexual Health
    - Lab and medical imaging services
    - Indigenous health

Provincial Health Services Authority:

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- PHSA has a unique role in B.C.'s health authority system: to ensure that B.C. residents have access to a coordinated provincial network of high-quality specialized health-care services.
- PHSA programs provide care and services through specialized hospitals and centres across B.C. such as BC Children's Hospital and BC Cancer.
- PHSA is also responsible for specialized health services, which are delivered across the province in collaboration with regional health authorities, such as cardiac, trauma, perinatal and stroke services. Through BC Emergency Health Services, PHSA oversees the BC Ambulance Service and Patient Transfer Services.

To request a meeting with the Regional Health Authorities or the PHSA, please complete the form located at: https://www.civicinfo.bc.ca/UBCMMeetingRequest/Staff.

The deadline to submit online meeting requests is **Wednesday, August 21**. Decisions regarding MACC staff meeting requests will be communicated by September 11 to the contact(s) identified on your meeting request form.

As a reminder, meetings will be held **Monday, September 16 to Thursday, September 19** at the Fairmont Waterfront Hotel.

If you have any questions, please contact the MACC Staff Meeting Coordinator, Sarah Staszkiel, by phone at: 778 405-1784, or the Assistant MACC Staff Meeting Coordinator, Casey Cathcart by phone at: 778 405-3140. You may also reach out via email at: MUNI.UBCM.MeetingRequests@gov.bc.ca.

Regards,

Birgit Schmidt, Director
MUNI UBCM Convention Coordinator
Local Government Division | Ministry of Municipal Affairs
Phone: 778 698-3260 | Email: Birgit.Schmidt@gov.bc.ca

BRITISH COLUMBIA

☑ Council ☑ Economic Development
☑ Mayor ☑ Engineering/PW
☑ CAO ☑ Parks, Rec. & Heritage
☐ Finance ☑ Development Services
☑ Corporate Services ☐ Community Safety
☐ Agenda ☐ Other RCM Aug 12/24
File # 0400-20 - EAO

File: ARCS-048-22339 / ARRP IN

Reference: 410993

July 10, 2024

SENT VIA EMAIL

To whom it may concern:

The Environmental Assessment Office (EAO) wishes to notify you of its upcoming legislative review of the *Environmental Assessment Act, 2018* (the Act). The Act outlines the process for conducting assessments for major projects in British Columbia that are reviewable under the Act and carrying out monitoring, compliance, and enforcement activities on those projects.

As required by the Act, the Minister of Environment and Climate Change Strategy must initiate a review of the Act within five years of the Act coming into force (December 16, 2019). This means the review must begin by December 16, 2024, as seen below:

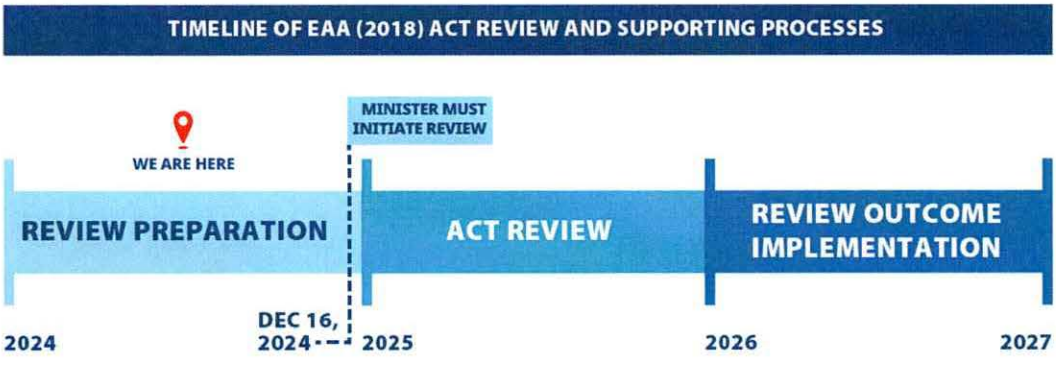


Figure 1: Timeline of the Environmental Assessment Act (2018) Act Review and Supporting Processes.

...2

Environmental Assessment Office

Office of the Associate Deputy Minister

Mailing Address:
PO Box 9426 Stn Prov Govt
Victoria BC V8W 9V1

Location:
2nd Fl – 836 Yates St
Victoria BC V8W 1L8

As part of the review preparation phase, the EAO will be engaging with First Nations, industry associations, and other associations including the Union of BC Municipalities (UBCM), to identify potential areas of focus for the review. This initial engagement, which will take place during the summer of 2024, will focus only on issues identification so that the EAO can be sure it understands what the key issues are with the Act. The EAO will not consider making changes to the Act until after the Act Review has begun.

If you would like to notify us of any issue with the Act and/or its regulations that you have identified, please contact UBCM with this information. Once the Act Review has begun, local governments, and all other interested and affected groups, will have the chance to participate in a future round of engagement.

Further information

If you have any questions related to the Act Review or the upcoming engagement of industry associations, please contact EAO.ActReview@gov.bc.ca.

Sincerely,

Chris Trumpy
A/Chief Executive Assessment Officer and Associate Deputy Minister

BC Emergency Health Services
Provincial Health Services Authority

July 9, 2024

Mayor Sharie Minions
District of Port Alberni
sharie_minions@portalberni.ca

Dear Mayor Minions,

We are pleased to advise you and your council that BC Emergency Health Services (BCEHS) has selected Port Alberni as one of the new areas to receive Community Paramedic services. This position will serve all peoples in the Port Alberni and surrounding area and was a collaborative effort with June Graham, President of the Alberni-Clayoquot Métis Society amidst planning for the opening of their Métis Health Centre.

The commitment of the British Columbia Emergency Health Services (BCEHS) to Indigenous communities is exemplified by the inclusion of Community Paramedic services in Port Alberni. This initiative not only supports improved healthcare access but also aligns BCEHS with the Truth and Reconciliation Calls to Action #19, 20, 22 and 23. By prioritizing culturally sensitive healthcare delivery, BCEHS aims to address health disparities and promote wellness initiatives tailored to the specific needs of Indigenous peoples. This commitment underscores our dedication to reconciliation, respecting Indigenous sovereignty, and fostering collaborative approaches to enhance healthcare outcomes.

Community Paramedicine is a proactive care delivery approach that complements the existing healthcare teams in your community, extending the reach of primary care and enhancing patient outcomes.

The program objectives are to:

1. Bridge gaps identified in a patient's health care plan in collaboration with local primary health care providers.
2. Build on the existing skill sets of primary or advanced care paramedics to help improve access to high-quality health care.
3. Provide in-home client services aimed at chronic disease management, including medication reviews, care plan education, and vital signs monitoring.

Community Paramedics (CPs) also engage in community outreach and health promotion activities, including walking groups, healthy living seminars, AED/CPR training, wellness clinics and Indigenous cultural gatherings. BCEHS has been working closely with the Ministry of Health and the province's health authorities to expand the program further to include more Indigenous communities and rural areas throughout the province. Since launching in 2016, the program has expanded to 95 full-time positions in 92 communities across the province.

If you have any questions about the Community Paramedicine Initiative in your community, please don't hesitate to contact Amy Poll, our Director of Community Programs at Amy.Poll@bcehs.ca.

Sincerely,

Jennie Helmer
Chief Operations Officer
BC Emergency Health Services

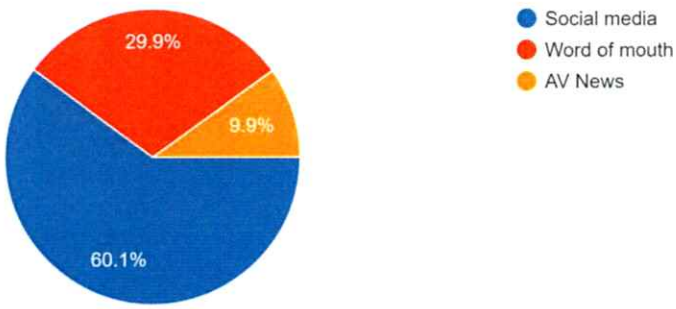
cc:
Amy Poll, Director Community Programs, BCEHS
Rob Evans, Sr. Provincial Executive Director, Emergency Dispatch / Clinical Hub & Community Paramedicine, BCEHS
Deb Trumbley, Interim Senior Provincial Executive Director, Clinical Operations, BCEHS | for Fraser Health, Coastal Health, Island Health
Kaoru Bracewell, Director Island North, BCEHS
Monica Morgan, Manager Community Programs, BCEHS
Leanne Blancher, Manager Community Programs, BCEHS
Lyndsay Esson, Clinical Operations Manager Oceanside, BCEHS
June Graham, President Alberni-Clayoquot Métis Society
Brandy Lauder, Chief councillor
Ken Watts, Elected Chief Councillor
Wilfred Cootes Jr, Chief Councillor

BMX PA SK8 PA MTB PA premiere. west coast. adventure sport. skills park.

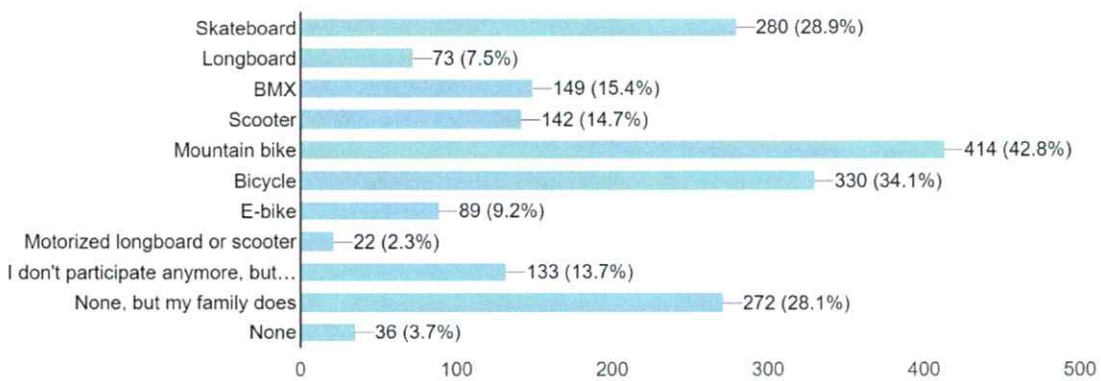
Community Futures Alberni-Clayoquot
Growing communities one idea at a time since 1985

Results of General Survey (All Ages)
968 Responses

How did you hear about this survey?
955 responses



1. Which of these activities do you participate in?
968 responses



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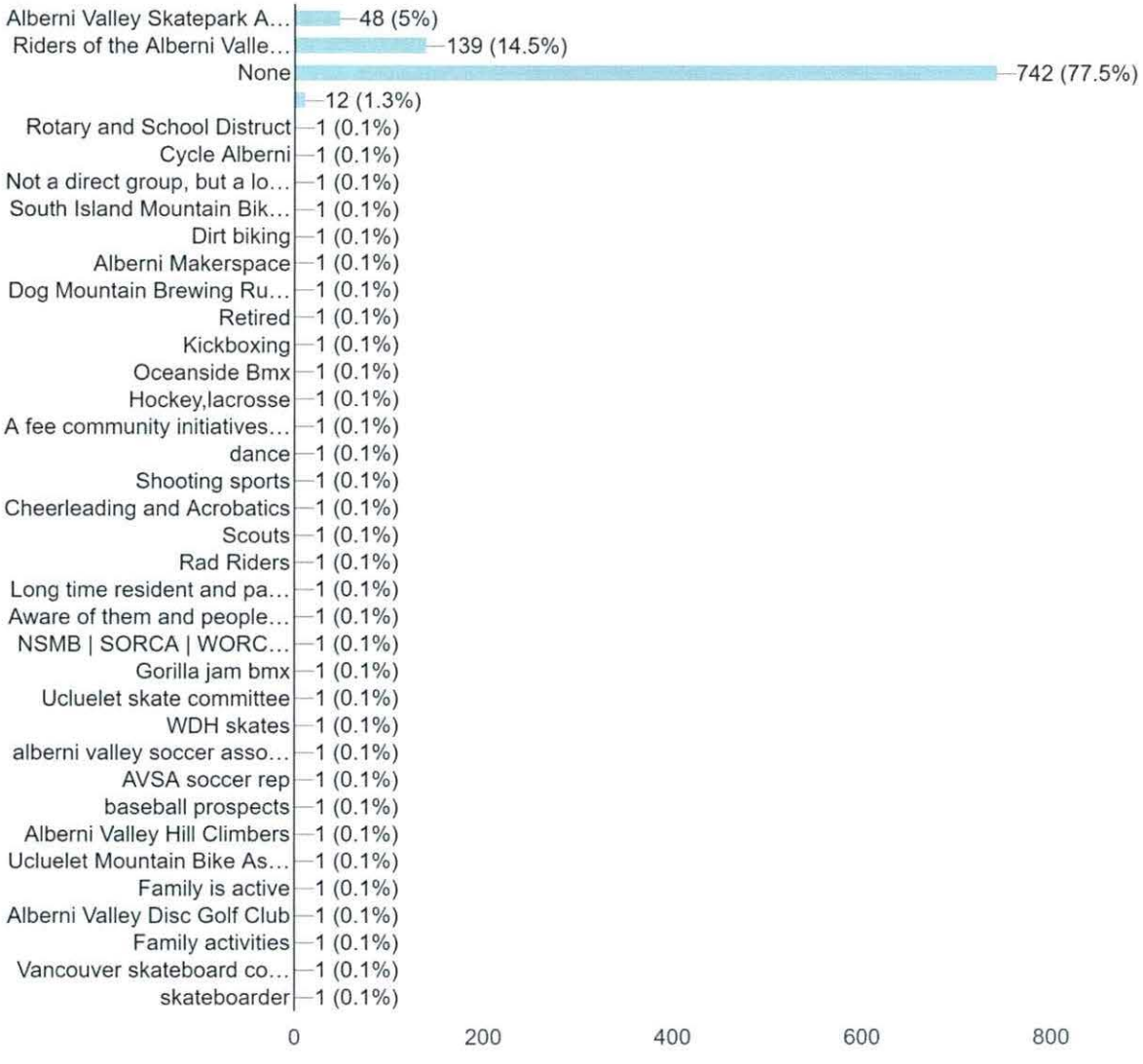
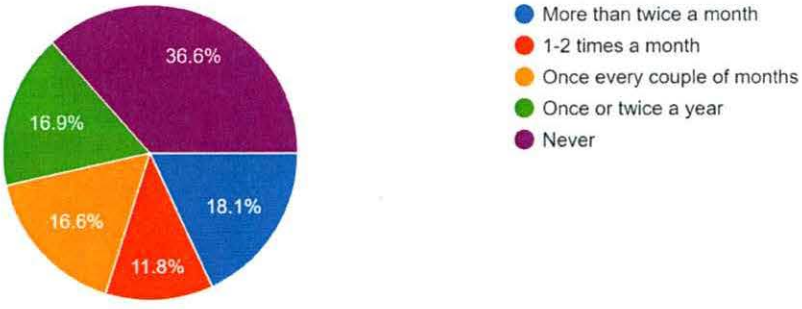
2. Which adventure sport groups are you part of?

957 responses



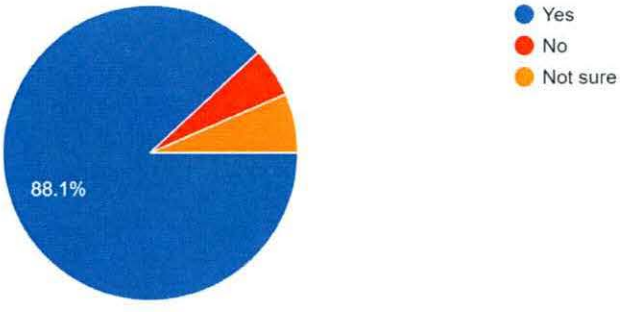
3. How often have you travelled to another community to use a skateboard park, a pump track or a mountain bike park?

968 responses



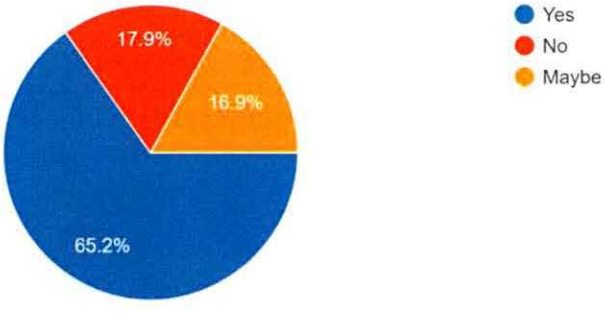
4. Do you support expanding/upgrading the current skateboard park to include a pump track, a mountain bike skills park, and a set of mountain bike jump lines?

968 responses



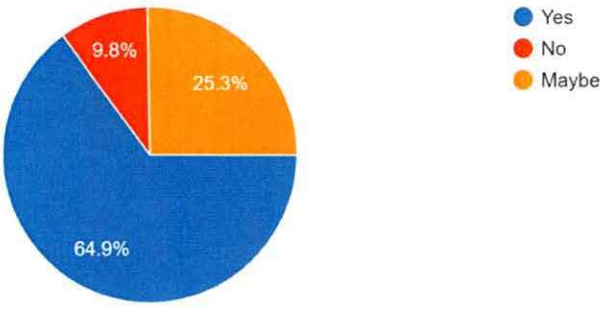
5. Would you use the proposed Adventure Sport Park?

968 responses



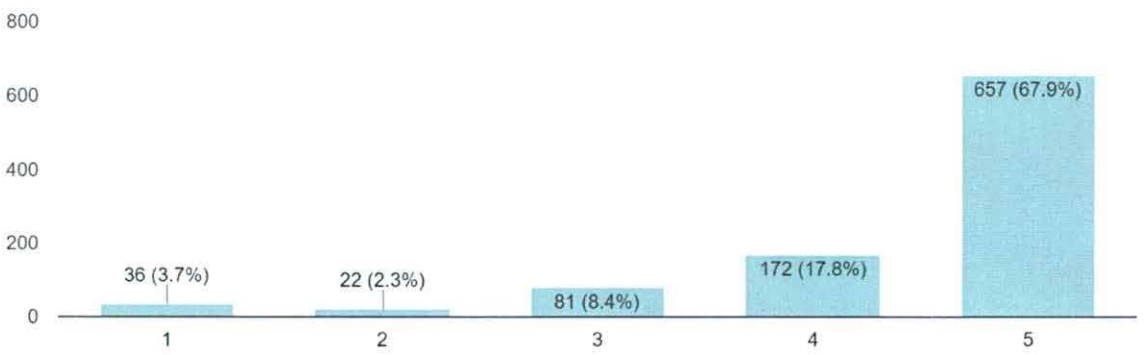
6. Would you visit the proposed park to watch day-to-day activities or events happening there?

968 responses



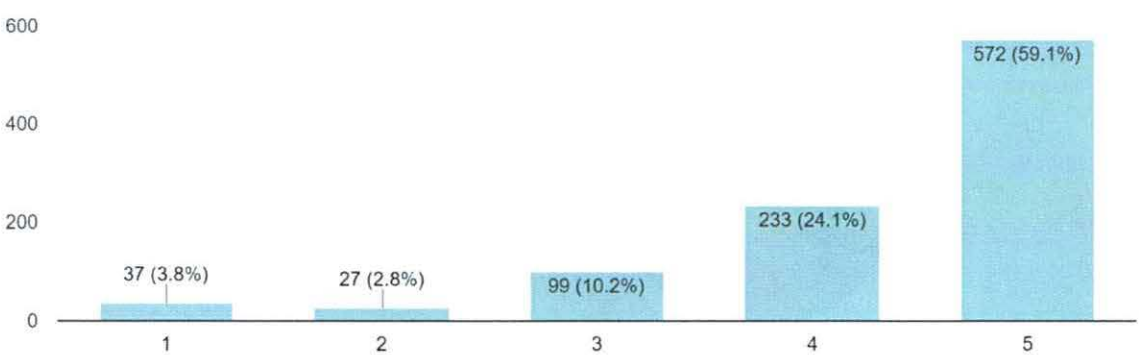
7. How important do you think it is for our community to have an Adventure Sport Park?

968 responses



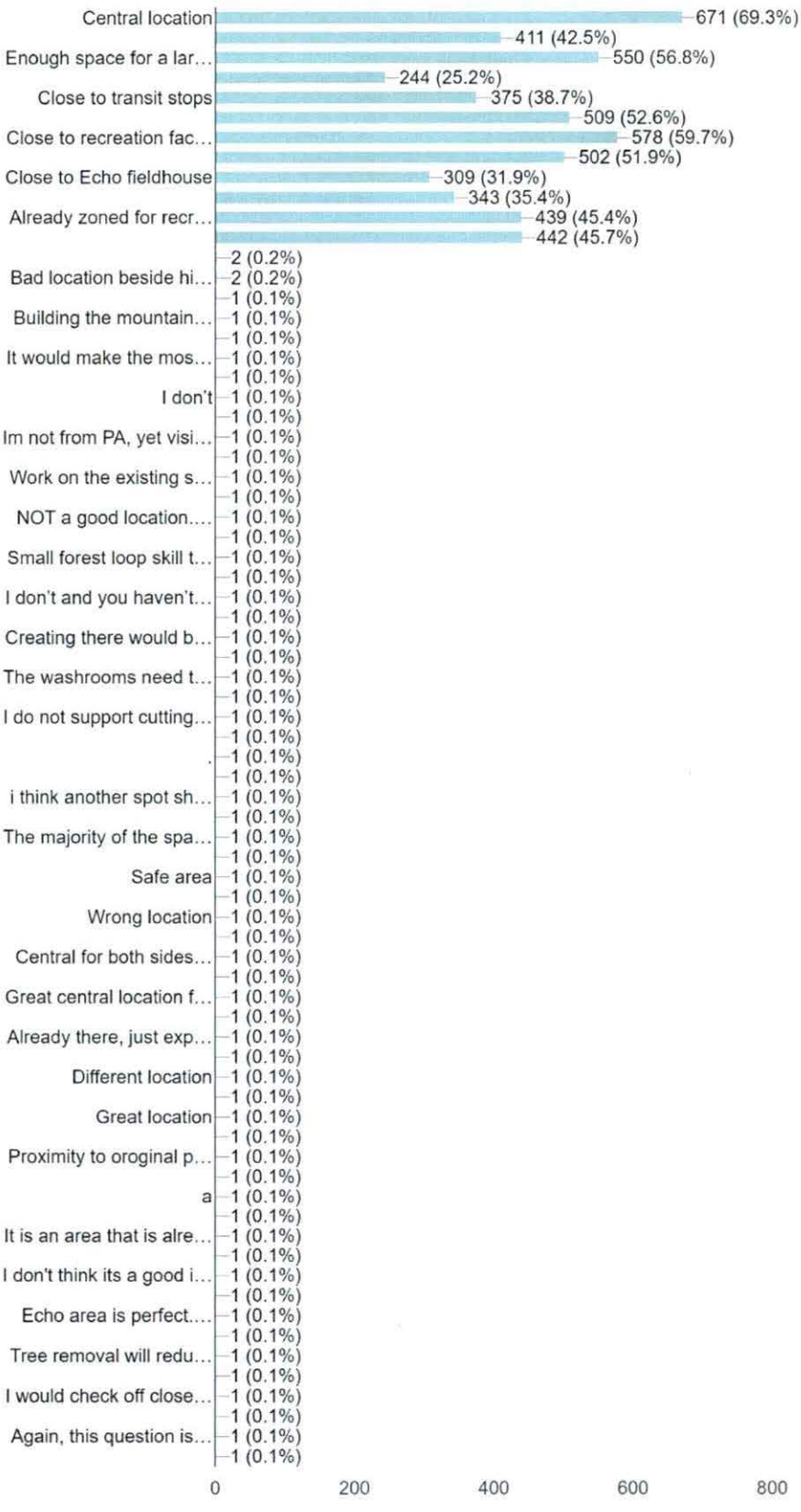
9. With 5 as the highest rating, how do you rate the proposed location?

968 responses



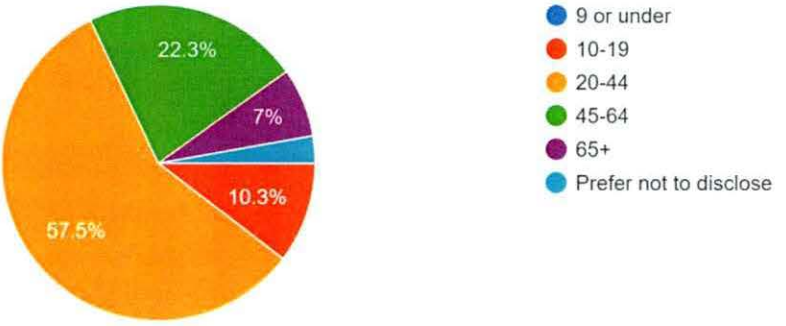
10. Check off the reasons you believe the Echo Centre area is a good location for the proposed park.

968 responses



12. How old are you?

968 responses

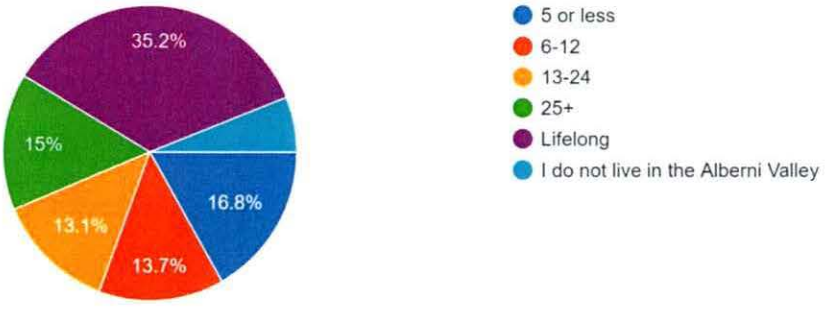


13. What community do you live in?

968 responses

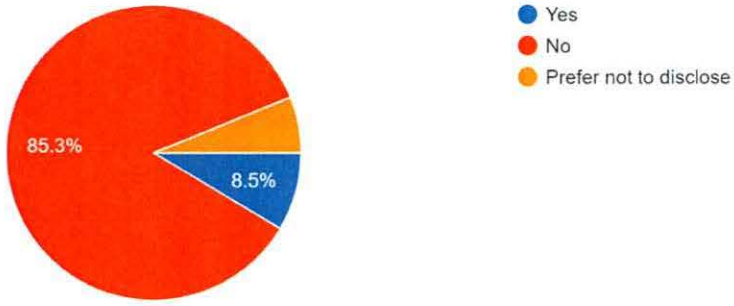
14. How many years have you lived in the Alberni Valley?

968 responses



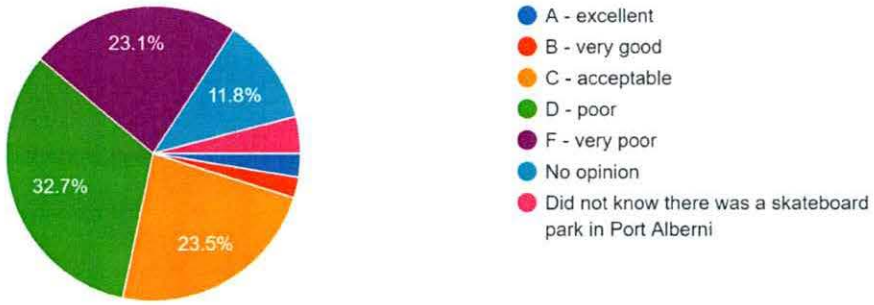
15. Are you a First Nations person? We ask this question so that we can demonstrate the park is of value to local First Nations communities and will benefit First Nations youth.

948 responses



16. If you could give a letter grade to existing, 1990s-era skateboard park in Port Alberni, what would it be?

968 responses



Narrative Responses in Favour of the Park

Themes:

- Safe, healthy activity for youth to do
- Growing interest in these sports
- Tourism
- Community recruitment efforts

"It will help kids with similar interests find one another and have a safe meeting place"
"Skateboarding and all action sports are only growing. It gives kids a great place to learn sport though individualism all while being in a community, instead of the mainstream team sports."

"It is a low-maintenance, high use facility that has been shown to provide healthy activities for youth and adults all over Canada,"
"Besides the fact that the two skateparks were unfortunately built to the wrong specifications there has always been a strong community of people who could use these facilities. Mountain biking trails and apparatus were built out in the wilderness during the early 90's by a small group of individuals who were looking to increase their skills. And there are many different types of wheeled sports that our community doesn't truly have a place specifically built for. Not only would it better support all wheeled sports I believe it would stop people from doing these activities in less than ideal places that have proven to be dangerous."
"Youth and adults alike need a facility like this to keep out of trouble, form friendships, and stay in shape. The old skatepark is an embarrassment compared to the level of skateparks in towns across BC, and difficult to enjoy for those that still try to use it"
"Because we don't have one. Where as other places such as Cumberland and Quallicum do. I feel like our biking community is just as strong as other communities with these amenities. Why can't we at least be on par with them. Plus it will bring more riders into our community, adding to our economy."
"Our kids need more opportunities and places for activities like this, if there's nothing for kids families will leave. Our town needs to grow not shrink"
"Huge opportunity for youth to access a place to safely build their skill set. Should not be hindered based on the location of other skate parks, or pump tracks. Not everyone has the ability to be driven to nanaimo or other cities. Also be great for the youth to have a local spot to do keep entertained. Team sports are not for everyone."
"Port Alberni has the opportunity to be a world-class tourism destination, part of this is involving and contributing to the community in ways that support a development of skills and community building in the sports that could bring important visitors"
"I want to live in a community that encourages people to exercise, participate in outdoor activities and use bicycles as a form of transportation. Outdoor amenities promote a healthier lifestyle for our youth, can help to support sports based businesses and also make the city more attractive to new residents."
"The town is seeing a higher volume of young people, lots of kids are being born and it's an amazing place for children to play outside and create memories with other kids in the community. My childhood was spent at the skatepark and I've made lifelong memories, friends and learned many life skills by being apart of a group. Please build a new park !!!"
"Getting kids outside and exercising is ALWAYS beneficial."
"I feel it is vitally important to have many types of activities, especially for adolescents. Many kids don't like or can't participate in organized sports and the more different types of activities there are available, the better for everyone (including attracting people to our town or to be able to stay in town for them)."
"My children use the current skatepark but it is out dated and poorly planned. We travel out of town regularly to other communities to skate"
"Port Alberni desperately needs safe and engaging leisure opportunities for children, youth, and families. I fully support any initiatives that explore the option of brining this to our community!"
"With the growing population of young families in our community I think it's very important to expand our outdoor recreation to accommodate the change in population. We are definitely in competition with areas such as Cumberland and Comox Valley when deciding where to live and our cost of living is still less although our recreation facilities are definitely lacking, this would be a huge added bonus to our community."

"I feel Port Alberni is transitioning towards a more youthful and active population. Anything that can be done to encourage younger families to move here is worth an investment. Of course active families won't move here just because we have a new skatepark/pumptrack. They will move here because the city feels more alive and energetic. Because the culture feels welcoming to them. A skate/bikepark is a nice piece of the puzzle in helping to build that welcoming active culture."
"We need more outdoor activities that are easily accessible to everyone. Port Alberni has excellent potential to be a leading destination for outdoor enthusiasts of all kinds. These kind of parks are highly used by many people in a lot of other comparable towns that have already invested in their bicycle and outdoor parks."
"Kids need something to do in this town. Something to get them outside, get them socializing, give then a sense of purpose. I believe the city should help create opportunities by building the infrastructure to participate in sports such as cycling and skating."
"A variety of reason, actually; Our current park is fairly outdated, and not built as well as it could be. (no coping, coping falling off, ramps could be a bit better) As well, Port Alberni is lacking youthful activities to keep the youth out of trouble. A well structured and well maintained/periodically supervised skatepark would go along way to keeping local riders, as well as children and adults alike occupied. Considering again how our park is fairly dated, local rider tend to prefer to venture out of town to ride, myself included sometimes. Finally, with a upgraded skatepark, mountain bike trails, and a pump track, would further entice tourism in Port Alberni. As alluded to above locals tend to travel out of town to ride. Why? Better parks. I've seen people from Victoria, courtneay, Nanaimo, and even from out of country come to our park, and audibly say it sucked. They never stay longer than 20 minutes unless they know some of the locals. A better park setup would do wonder to fix this."
"Because Powell River managed to get an awesome skate/BMX park installed years ago, right beside the rec complex, and it's used every day by people of all age and skill ranges. There's no reason that Port can't have what Powell has, as demographic- and population-wise the cities are quite similar. My son found his love for biking thanks to that park, and I'd love for him to be able to continue his passion in a similar setting, as well as give other children in the community the chance to discover that same passion in a safe, centralized area."
"We need one for kids and adults to have more outdoor recreational activities. People travel to other cities for skateparks and pumptracks. It should be relatively easy for Port Alberni to build these facilities, they cost much less than a pool. I think it is really sad that we are surrounded by cities, towns and villages with better skateparks. There are pumptracks in campgrounds. There is a private skatepark at Arrowvale Farm that is better than the Port Alberni skatepark!"
"It would be an amazing thing for the community. People of all ages could use it. Great for families. Keeps kids out of trouble. A must must must"
"It's a great fit for Port Alberni because there is already an existing community that participate in those sports to justify building the facility. I imagine it will serve all ages and skill levels but most importantly it will provide more healthy options for our youth to enjoy. It will also help the local economy by appealing to tourists or by drawing visitors specifically to use the park or compete at special events."
"Every other community has one except Port Alberni. We travel to Nanaimo, Cumberland and Langford for our family to build skills at parks located at these locations... it's time to have the same amenity brought to the Alberni Valley."

Narrative Responses Against the Park

Area of Concern	# of Instances Cited	Narrative Excerpts
Cost/Funding	12 Representing 1.2% of respondents	"...Do it in the acrd and let them pay for it. Acrd already benefits from parks and rec infrastructure that they don't pay their fair share for." "It would be nice to have, but not if the taxpayers have to pay for it." "I feel there are better ways to spend our money e.g. community pool" "I can't see a purpose for it, just another toy for some to waste taxes on"
Perceived loss of trees *Note: The intent is to retain as many trees as possible. The location at Echo Park is also not confirmed.*	16 Representing 1.7% of respondents	"It shouldn't we are just removing more trees, crappy mayor being a nerd removing the trees. Why not use a parking lot where trees are not harmed." "i think having the trees and forested area is more importent compard to some bike park" "NOT a good location. preserve the trees and trails. They are more valuable than concrete."
Age/Demographics of Community, User Groups	1 Representing 0.1% of respondents	"Since the demographics indicate there are MORE Seniors than Youth in our Community and Seniors don't do these type of activities - if they do, it's RARE. I support a NEW POOL for ALL AGE GROUPS. il" *[Note: Data from 2021 Census indicated the following:* *8,995 residents aged 5-39 in Port Alberni, representing 35% of the population, and an increase of 20% since 2016.]*
Public Safety	5 Representing 0.5% of respondents	"...One thing I find concerning is the close proximity to Wood Elementary and ADSS. The alcohol and marijuana consumed both night and day is very prevalent and concerning. There are also people who drive their vehicles there, smash their bottles, etc. This public safety concern should be examined." *[Note: This project has received a letter of support from School District #70. Any vandalism that prevents use of the park by skateboarders (smashing bottles) would not be an activity of interest to skateboarders.]*
Perceived Lack of Parking	5 Representing 0.5% of respondents	"The current location is already terrible with parking, remember they are also building a daycare right there. Just for bringing little kids in a vehicle it could be a nightmare."

		[Note: There are 148 parking spaces in the nearest vicinity. This does not include parking that may be available at North Island College, the Athletic Hall, the Multiplex, the Stadium, and ADSS. *The Echo Park area has over 1,000 parking spaces within 1,000 feet of the current skateboard park.]*

Other Considerations Brought Forward

Topic	# of Instances Cited	Narrative Excerpts
Quality of Work	5 Representing 0.5% of respondents	"Please hire people that know what there doing when it comes to design and construction of the skate and bike park. Not just city workers trying to build jumps." "It needs proper consultation from experts in the skateboard/mountain bike building community. Having generic contractors as good as they are these parks require specific knowledge to create a sage functional park." "Please do not just add a pump track to the existing skatepark. ...The park needs to be replaced and constructed by a reputable skatepark builder."
Maintenance	4 Representing 0.4% of respondents	"When looking at other communities such as Tofino, Nanaimo etc, the skateparks are in highly public spaces and taken care of by the city. Our seems somewhat neglected at times." "A better location with more vertical elevation is needed. The proposed location also has water drainage problems that make building trail here challenging and not optimal."

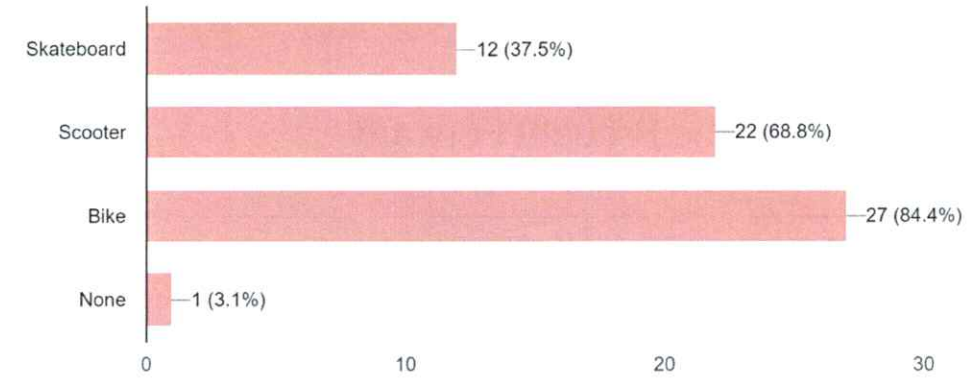
Other Feedback

- Current park has value to users - riders love 'the curb' (the giant double ledge setup), the middle pyramid ramp and yellow downrail are all constantly used. *Note: The park has been professionally assessed and cannot be restored.*
- Amenities - lighting, natural shade, seating, water stations/ water bottle filling stations, washrooms/ washroom access, garbage bins, signage (park rules, dogs on leash/no dogs)
- Include local artwork/ artists - graffiti/ skate culture inspired
- Consideration for event hosting - stage, power, space, food trucks
- Incorporate multiple skill levels (beginner, intermediate, expert areas); include nearby areas for younger children/ non-skaters - playground/play area
- All or a portion of the park covered for all season/ rainy day use
- Security needed to monitor the park at night

Results of Youth Survey (Grades 3-8
32 Responses

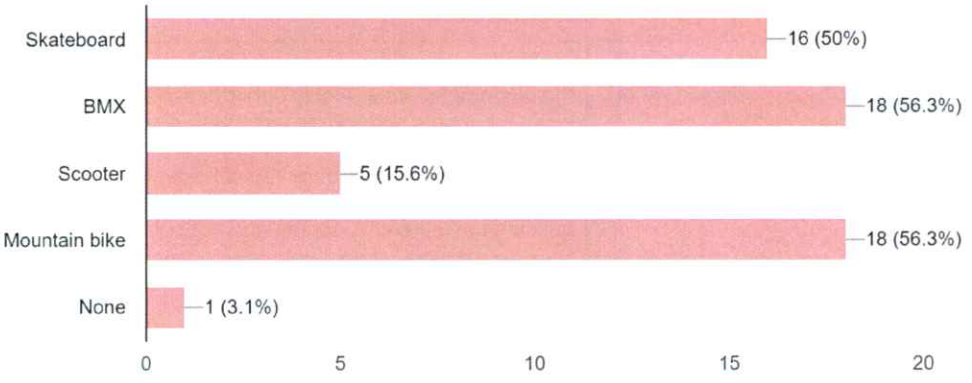
1. Which of these activities do you already do?

32 responses



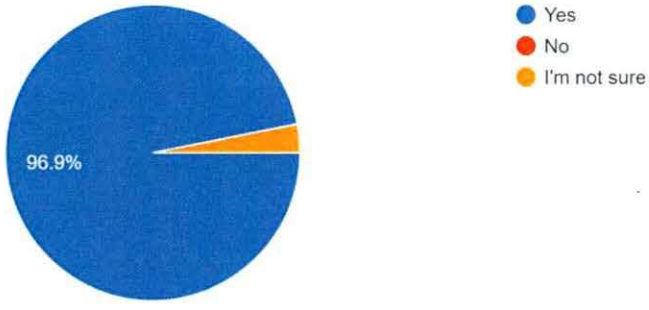
2. Which of these activities would you like to learn?

32 responses



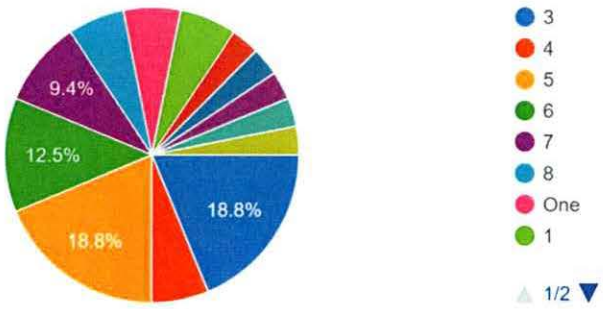
3. Do you want Port Alberni to have an Adventure Sport Park?

32 responses



5. What grade are you in?

32 responses



"Why do you think Port Alberni should (or should not) have an Adventure Sport Park?"

Top Responses:

1. Fun; Something to Do (18 Responses)
2. No other similar parks nearby (7 Responses)
3. Learn/ Improve skills (6 Responses)
4. Safe space to hang out with friends (5 Responses)
5. Current park isn't suitable (2 Responses)
6. Exercise + health (2 Responses)

BMX PA SK8 PA MTB PA premiere. west coast. adventure sport. skills park.

Community Futures Alberni-Clayoquot
Growing communities one idea at a time since 1985

Adventure Sport Park

Data Sheet for Common Concerns

Will all the trees be cut down?

No. The desire is to retain as many trees as possible.

Will the all-wheels park (aka. skateboard park) be noisy?

Skateboarding noise is considered negligible at 50 feet and produces similar noise levels as a playground.

Decibel level comparison:

50	Office noise
60	Conversational speech
65	A skateboard park (loudest levels anticipated)
70	Normal street noise
85	Noisy restaurant
125	Chainsaw

The loudest sounds recorded in the study were 65-71 decibels at a distance of 50 feet which is "comparable to the level of a moderate conversation between two individuals" as quoted in a study conducted by the Noise Control Officer of the City of Portland, Oregon. The distance between the current skateboard park and the nearest townhome is 375 feet.

"Skatepark noise, according to every study conducted on the subject, consistently falls well below ordinary recreational standards and is completely appropriate for residential areas."
- From a review of the Portland study here

What about parking?

The park design will take parking and access points into account.
There are 148 parking spaces in the nearest vicinity.

110 Echo fieldhouse lot (2 are parking spaces for persons with disabilities)
10 Kendall Avenue lot
12 Along Kendall Avenue roadway
16 Roger Street gravel lot

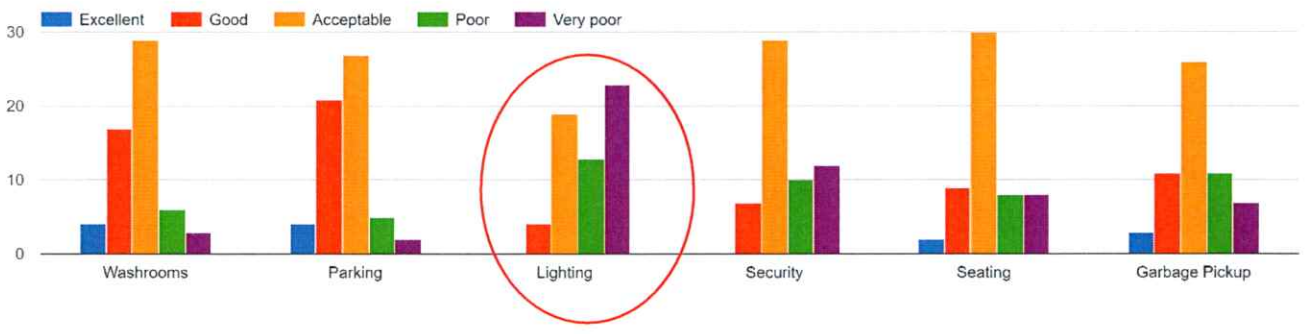
This does not include parking that may be available at North Island College, the Athletic Hall, the Multiplex, the Stadium, and ADSS.

The Echo Park area has over 1,000 parking spaces within 1,000 feet of the current skateboard park.

What about lighting?

The park design will take lighting into account. A survey distributed to members of the Alberni Valley Skatepark Association in 2022 indicated a strong desire for improved lighting.

6. How would you rate the park amenities?



From: Tiffany Trownson <tiffany@bccare.ca>
Sent: July 17, 2024 5:39 PM
To: Sharie Minions <sharie_minions@portalberni.ca>; Dustin Dame <Dustin_Dame@portalberni.ca>; john_douglas@portalberni.c; Debbie Haggard <debbie_haggard@portalberni.ca>; Charles Mealey <Charles_Mealey@portalberni.ca>; Todd Patola <Todd_Patola@portalberni.ca>; Cindy Solda <cindy_solda@portalberni.ca>
Subject: Home Health - Intermunicipal Business Licence

Dear Mayor Minions and Council,

As one of the 12 municipalities included in the **Central Vancouver Island Intermunicipal Mobile Business Licence partnership**, I am reaching out on behalf of our home health members and the seniors they serve across Vancouver Island.

Last count, there are 300 private home health organizations across BC. Currently, home health operators are not included in the eligibility for Intermunicipal Mobile Business Licences (IMBLs), which requires them to hold a separate business licence in all communities they serve. By nature of their work, home health care service providers are mobile, and therefore should be considered eligible for IMBLs.

Below is a detailed summary of BCCPA's position as it pertains to this issue.

Re: Intermunicipal Mobile Business Licence for Home Health Care

Recommendation

BCCPA recommends **the members of the Central Vancouver Island Intermunicipal Mobile Business Licence partnership** (City of Campbell River, Town of Comox, City of Courtenay, Village of Cumberland, City of Duncan, Town of Ladysmith, Town of Lake Cowichan, City of Nanaimo, Municipality of North Cowichan, City of Parksville, City of Port Alberni, and Town of Qualicum Beach**) support the inclusion of home health care in the eligibility of intermunicipal mobile business licences**. This licence is currently available for construction, trades, mobile hair salons, and catering.

By acting in this area municipal governments can support the sustainability of the private home health sector, and support seniors to age in their place of choice. Further, reducing costs for operators will lead to more competitive pricing for seniors.

Supporting an aging population:

By the end of the decade, close to one in four Canadians will be a senior, up from 17% now. [1]
RBC has identified Canada's aging demographic as one of the two most significant existential threats facing the country over the coming decade (the first being climate change). This will

result in broad economic and health system challenges for Canadians and a host of other countries across the world. Action is needed now to support an aging demographic.

A recent (2020) National Institute of Ageing (NIA)/TELUS Health Survey found that 91 percent of Canadians of all ages, and almost 100 percent of Canadians 65 years of age and older, plan on supporting themselves to live safely and independently in their own home for as long as possible.[2] However, as referenced by NIA, about one-quarter of Canadians aged 75 and over has at least one unmet need with respect to their activities of daily living. Many older adults who live alone also experience issues such as loneliness, falls, malnutrition, and inactivity.

About home health care:

Home care and home support options (respectively medical care, and non-medical support, together referred to as home health care) enable seniors to get the help they need at home. Services range from publicly subsidized care, which is delivered through the health authorities, to customized private-pay options, which can include medical care, transportation, companionship, and home making. **Commonly, family paid home support provides seniors and their families with more flexibility and greater ability to ensure that they can focus on the things that will really help them stay independent for as long as possible.**

Business Licences on Vancouver Island:

Business licences are issued to ensure that local and visiting businesses are operating safely and legally, including complying with health and safety and zoning requirements. Home health businesses provide smaller jobs with less employees than trades and contractors, with less threat of safety hazards such as fires or damage to property, that would require first responders or management of public services. Comparatively, mobile home health services generate less profit margins than trades and contractors; if the cost of the business licence exceeds the cost of revenue, lack of competition in the market will impact service availability in the community.

Under the current system, home health care providers operating in the North Shore areas are required to hold distinct business licences for all locations in which they operate, regardless of the location of their physical office. By the nature of their work, home health providers are mobile, and commonly operate across several municipalities, adjusting their operations to accommodate client needs, and the availability of workers. This means that the vast majority work across multiple jurisdictions. Currently, across the province there are 17 intermunicipal mobile business licence partnerships between 104 communities.

The cost of multiple licences (the cost of which varies considerably across jurisdictions) add up to be significant for smaller organizations, which are already run on slim margins, and are experiencing increased cost pressures relating to staffing, and inflationary pressures. The administrative cost of applying for and managing multiple licences is also burdensome. Reducing financial and administrative costs for operators will lead to more competitive pricing for seniors.

BCCPA and EngAge BC are recommending that this program be expanded to include home health care service providers.

About BCCPA

BC Care Providers Association (BCCPA) is the leading voice for B.C.'s continuing care sector. Our growing membership base includes over 450 long-term care, assisted living, and commercial members from across British Columbia.

BCCPA members support more than 19,000 seniors annually in long-term care and assisted living settings and 6,500 independent living residents. Additionally, our members deliver almost 2.5 million hours of home care and home support services each year.

Thank you for your consideration, I look forward to hearing from you.

Tiffany Trownson
Director of Public Affairs | EngAge BC
BC Care Providers Association
EngAge BC

1424-4710 Kingsway
Burnaby, BC, V5H4M2
w 604-736-4233 ext #243
www.bccare.ca

From: Rob Schweitzer <rob.schweitzer@bcwildfire.gov.bc.ca>
Sent: July 16, 2024 11:00 AM
To: CityPa <citypa@portalberni.ca>
Subject: ATTN: Mayor and Council, Chair and Board, CAOs | Provincial Wildfire Update - July 16, 2024

BRITISH COLUMBIA | BC Wildfire Service

Hello Mayor and Council, Chair and Board, and CAOs,

As we enter the core months of wildfire season, I am committing to providing regular updates on the wildfire situation in British Columbia. As a valued partner in wildfire management, it is critical for you to remain engaged and up-to-date on wildfire activity in your area.

I would encourage you to take advantage of the wildfire situation resources that are available. There is a large amount of information available on the BCWS Map and Dashboard, which is available on desktop, on mobile browsers, and as a mobile app. Automatic updates to this page occur in near real-time from our wildfire dispatch system, and fire information officers usually update wildfire incident pages that have increased levels of response twice a day. There are several links throughout this email that will assist in navigating this information.

In addition to the wildfire information presented below, I can advise that B.C. has reached out to our external wildfire partners for increased wildfire personnel to supplement our own BCWS and contract crew resources. BCWS has requested the following resources:

- One 25-pack unit crew and one AREP from Nova Scotia arrived at the Prince George Fire Centre on July 12.
- Five additional 25-pack unit crews are requested through CIFFC.
- Incident Management Teams are requested from Australia.

☑ Council
☑ Mayor
☑ CAO
☐ Finance
☑ Corporate Services
☑ Agenda
☐ Economic Development
☐ Engineering/PW
☐ Parks, Rec. & Heritage
☐ Development Services
☐ Community Safety
☑ Other Fire
RCM Aug 12/24
File # 0400-20 Hof

I.1(h)

- Two CL415s (water-scooping aircraft) and a birddog (scouting aircraft) have arrived from Ontario. Additional aircraft are requested through CIFFC.
- Additional requests for out-of-province resources are underway with international partners.

These resource requests have been submitted early in anticipation of increased activity later in July and August. Both CIFFC and U.S. are at prep 4 (out of 5), with B.C. and Alberta currently at the highest prep levels nationally. With heightened wildfire activity across Canada and in the US, resource sharing becomes challenging and early requests are essential to ensure that B.C. is supported through our resource-sharing agreements.

Out-of-province resources do not replace the vast wildfire community we rely on in BC. We currently have active standing arrangements with 55 private companies to provide wildfire suppression services and additionally rely on privately held heavy equipment contractors to support suppression. There are many additional contract opportunities that can be offered through contacting a local fire centre.

As mentioned, I will provide further updates as we head into core fire season. Your support and amplification of official messaging is greatly appreciated.

Thank you,

Rob Schweitzer

A/ Assistant Deputy Minister

Ministry of Forests, BC Wildfire Service

Provincial Summary

The hot and dry weather trend continues through the province today. We will continue to see a steady temperature build from high 20s to mid 30s throughout the southern half of B.C..

We can expect to see thunderstorms over eastern portions of B.C. through the middle of the week, over the Columbias and North

Rockies. Later this week, a pickup in winds is forecasted across the province, which has potential for an increase in fire activity.

Over the weekend, we welcomed partners from Nova Scotia; one 20-person unit crew and an agency representative. With hot, dry weather anticipated to continue through many areas of the province, these firefighters will support our staff and contractors to meet objectives on new and existing fires for the next two weeks. Additional out-of-province resources include two CL415 aircraft and one birddog aircraft from Ontario, stationed in Williams Lake.

Forest fuels remain dry and susceptible to new starts. To reduce the risk of human-caused wildfires, a province-wide Category 1 (campfire) ban is in effect. Please stay up to date on current fire conditions and adhere to all fire bans and restrictions in your area, including those enforced by your regional district or local authority.

Provincial Information Officer | FIREINFO@gov.bc.ca | (250) 312-3051

WILDFIRE DASHBOARD

The wildfire dashboard has a provincial summary, wildfire statistics, assigned resources, fire prohibition information, and other relevant resources.

WILDFIRE MAP

The wildfire map has information on every active wildfire in B.C. Detailed information for large incidents can be found under the Response tab of the incident webpage.

Web and Mobile App Reference Guide

Statistics

Visit the BC Wildfire Service Dashboard for the most up-to-date wildfire statistics available.

CURRENT STATISTICS

Resources

Connect with your local Fire Centre, stay current on the latest Wildfire news, and learn more about how we can work together to build resilience and keep your community safe.

CONNECT

Access contact channels for general inquiries, Fire Information and feedback

COLLABORATE

Access the Wildfire Collaborative Partnership Guide for local governments

STAY CURRENT

Visit the BC Wildfire Service blog to read the latest information bulletins

This message was sent to you by BC Wildfire Service
4000 Airport Rd
Kamloops, BC, V2B 7X2
Canada

From: NIC President <president@nic.bc.ca>
Sent: July 23, 2024 1:36 PM
To: CityPa <citypa@portalberni.ca>
Subject: NIC's Strategic Plan Year 3 Dashboard Report

Dear Mayor and Council,

I am very pleased to share *BUILD 2026 Strategic Plan and Year 3 Dashboard*, which provides updates on the itemized, measurable goals of our strategic plan. *BUILD 2026* was developed through meaningful consultation with the Nations and communities we have the privilege to serve. Your ongoing input continues to inform this responsive document, as it navigates us toward our mission of working together to build healthy and thriving communities, one student at a time.

BUILD 2026 serves in tandem with NIC's overarching Indigenization plan, *Working Together*. These plans are further supported by *Journeying Together* (connecting international students and faculty with Indigenous perspectives), *Widening Our Doorways* (ensuring all learning at NIC is relevant and accessible), *Thriving Together* (NIC's first people plan) and *The CARE² Plan* (supporting the mental health and wellbeing of all members of the college community). The six plans and their dashboard reports (as published) are shared on Engage NIC, where we encourage your feedback.

If you have thoughts about how North Island College can better support the communities in our region through post-secondary education, please contact Emily Haagerup (Emily.Haagerup@nic.bc.ca or 250-334-5270) who will be pleased to coordinate a connection for us.

Thank you for your continued support and guidance.

Sincerely,

NORTH ISLAND COLLEGE
NIC

Lisa Domae, PhD, RPP
President and CEO
North Island College
2300 Ryan Road, Courtenay, BC V9N 8N6
250.334.5270
lisa.domae@nic.bc.ca

North Island College is honoured to acknowledge the traditional territories of the combined 35 First Nations of the Nuu-chah-nulth, Kwakwaka'wakw and Coast Salish traditions, on whose traditional and unceded territories the College's campuses are situated.

I.1(i)

CITY OF ABASHIRI

City Hall,
Minami 6, Higashi 4,
Abashiri, Hokkaido, JAPAN 093-8555

July 16, 2024

The Family of Councillor John Douglas
c/o The City of Port Alberni
B.C., CANADA

Dear Mr. Douglas' family,

It was great sadness that we learned of the passing of former Port Alberni Mayor, John Douglas.

I remember so well the hospitality extended to me when I visited Port Alberni in 2012. Mayor Douglas' kindness to my delegation and I, on our visit to Port Alberni was most appreciated. Those who came with me on our visit to Port Alberni have asked me to extend their condolences to you and your family.

May his soul rest in peace

Yours truly,
CITY OF ABASHIRI

水谷洋一

Yoichi Mizutani
Mayor

ABASHIRI CITY COUNCIL

City Hall,
Minami 6, Higashi 4,
Abashiri, Hokkaido, JAPAN 093-8555

July 16, 2024

The family of Councillor John Douglas
c/o The City of Port Alberni

Dear Councillor Douglas' family,

We would like to express our sincere condolences on the recent passing of Councillor and former Port Alberni Mayor John Douglas. The Abashiri City Council sends its thoughts and prayers to you and your family at this difficult time.

We truly respect his many years of distinguished service and pray that he may rest in peace.

Yours truly,
ABASHIRI CITY COUNCIL
平賀貴幸
Takayuki HIRAGA, Chairperson

Abashiri - Port Alberni Sister City Society
網走・ポートアルバーニ姉妹都市交流協会

c/o City Hall, Minami 6, Higashi 4,
Abashiri, Hokkaido, JAPAN 093-8555

The family of Mr. John Douglas
Port Alberni, British Columbia,
Canada

Dear Mr. Douglas' family,

We would like to express our sincere condolences on the recent passing of former Port Alberni Mayor John Douglas.

Many of us had the honour and the pleasure to know Mr. Douglas as a result of the Twinning relationship between Port Alberni and Abashiri. He was a great supporter of our Sister City Societies.

The Abashiri - Port Alberni Sister City Society sends its thoughts and prayers to you and your family at this difficult time. Please accept our most sincere condolences.

Sincerely,

加藤 博

Hiroshi KATO, President
On behalf of the Abashiri - Port Alberni Sister City Society

BRITISH COLUMBIA

July 24, 2024 Reference: 68879

Dear Mayors and Chairs:

Last year, to support our government's ongoing work in tackling the housing crisis and providing more homes to meet the needs of British Columbians, we passed legislation requiring local governments to update their zoning bylaws to make it easier to build Small-Scale Multi-Unit Housing (SSMUH). I would like to acknowledge the tremendous work that most local governments across BC have undertaken to comply with this new legislation.

As you are aware, the compliance date for zoning bylaw amendments was June 30, 2024. All local governments were required to notify the Ministry of Housing that they have amended their bylaws in accordance with the SSMUH requirements in Bill 44: H*ousing Statutes (Residential Development) Amendment Act*, 2023 legislation by the compliance date.

The Province will be working to ensure that all local governments are in compliance with the legislation. We will be undertaking a comprehensive evaluation of the implementation of the legislation by local governments, including consideration of how recommended provincial standards have been applied, to ensure it is effective at creating the conditions across BC to get more housing built and does not deter building much needed homes for people.

As you are aware the deadline to apply for an extension to the compliance date for the SSMUH requirements has passed. Local governments that have applied for an extension for part of their community were still required to adopt an amended zoning bylaw by June 30, 2024 for all areas for which they have not requested an extension. If your local government has applied for an extension, please be assured the Ministry of Housing is currently processing applications, and decisions will be communicated as they are made.

Office of the Minister of Housing

Website: www.gov.bc.ca/housing

Mailing Address:
PO Box 9074 Stn Prov Govt
Victoria BC V8W 9E9
Phone: 236 478-3970

Location:
Parliament Buildings
Victoria BC V8V 1X4
Email: HOUS.Minister@gov.bc.ca

Local governments who have not complied with the legislative requirements or requested an extension may receive a 30-day compliance notice. After the 30 days, the Province can issue a Ministerial Order overriding the local government zoning bylaw to comply with the legislation and putting the basic site standards from the SSMUH policy manual in place until the local government passes their own bylaw amendments. By ensuring SSMUH zoning has been adopted, we are supporting building more homes for people faster by reducing delays for anyone who wants to build this type of housing.

Please express my gratitude to your council colleagues and staff for all of their hard work to bring about these changes to make it easier for families to build this much needed housing in your community. I look forward to our continued work together to ensure that all British Columbians have access to the homes that they need.

Sincerely,

Ravi Kahlon
Minister of Housing

cc: Chief Administrative Officers
City Managers

From: Gang Initiatives /Initiatives Contre Les Gangs (PS/SP) <ganginitiatives-initiativescontrelesgangs@ps-sp.gc.ca>
Sent: July 26, 2024 10:52 AM
To: Gang Initiatives /Initiatives Contre Les Gangs (PS/SP) <ganginitiatives-initiativescontrelesgangs@ps-sp.gc.ca>
Cc: Stoneberg, Juli-Symata (she, her | elle, la) <juli-symata.stoneberg@PS-SP.GC.CA>; Davies, Jacqueline PSSG:EX <jacqueline.davies@gov.bc.ca>
Subject: Public Safety Canada - British Columbia Stakeholder Engagement Questionnaire on Canada's National Strategy to Reduce Gun and Gang Violence

Good Day,

We are reaching out to you from Public Safety Canada's (PS) Crime Prevention Branch. As part of the ongoing efforts to address the issue of gun and gang violence in our country through programs such as the *Initiative to Take Action Against Gun and Gang Violence* (ITAAGGV), PS has committed to develop a National Strategy to combat gun and gang violence in collaboration with Provincial and Territorial partners (the "Strategy"). PS equally committed to consulting external stakeholders to further inform this development process. Additional information on the ITAAGGV and other related initiatives are available here.

Officials from the Policing and Security Branch with the Government of British Columbia have identified your organization as a stakeholder who ought to be included in this consultation effort. It is within this context that we are soliciting your views by sharing the attached concept paper and brief questionnaire. The concept paper is essentially being used as a primer for discussion and exchanges on the future strategy. It is broadly aligned on existing departmental mandates (public safety and justice-related) as well as investments made by Federal, Provincial, Territorial and Municipal partners to address gun and gang violence since 2018. It lays out both context, key priorities areas of activities and strategic objectives. It also offers initial feedback received from Provincial and Territorial partners earlier this fiscal year (Annex A of the paper).

We would thus be grateful if you could take the time review the paper, provide feedback through the brief questionnaire and submit the latter at ganginitiatives-initiativescontrelesgangs@ps-sp.gc.ca by October 1st, 2024 at the latest.

As per regular consultation process undertaken by the Federal government, this targeted effort is meant to help inform this particular Strategy's ongoing development process. For more information about this initiative, please contact us at: ganginitiatives-initiativescontrelesgangs@ps-sp.gc.ca.

(Please note that while this email is addressed to our own inbox, all stakeholders recommended by your province have been BCC'd in this email and respond directly to the emails provided above).

Privacy Notice Statement

Public Safety Canada is committed to protecting the privacy rights of individuals and safeguarding the personal information under its control according to the *Privacy Act*.

1.1.(1)

Personal information collected through this questionnaire will be used for the purpose of guiding the development of the National Strategy to Reduce Gun and Gang Violence. Elements of personal information which will be collected may include an your name and contact information. This information will be used and disclosed only for the purpose in the associated Personal Information Bank (PIB). Your information will not be disclosed to any third parties without your consent unless required by law. For more information about the collection, use and retention of your personal information, please refer to the PIB PSU 938, Outreach Activities.

Your participation in this questionnaire is voluntary. By completing this questionnaire, you consent to the collection, use, and disclosure of your personal information as described in this privacy notice statement. You may withdraw your consent at any time by contacting ganginitiatives-initiativescontrelesgangs@ps-sp.gc.ca. Refusal to provide personal information or withdrawal of consent may limit our ability to create a comprehensive National Strategy to Reduce Gun and Gang Violence that addresses the complex nature of criminality across the country.

Please note that comments you enter in any open text box field could be deemed identifiable depending on the information provided. In order to protect your privacy and the privacy of others, please do not add personal information of any kind as well as opinions and views of, or about, individuals in open text areas.

You have the right to the protection of, access to and correction of your personal information. Instructions for obtaining this information is outlined on the Public Safety Canada Access to Information and Privacy (ATIP) website.

https://gcdocs.ps-sp.gc.ca/cs/cs/app/nodes/40294836https://gcdocs.ps-sp.gc.ca/cs/cs/app/nodes/40294836Any questions, comments, concerns or complaints you may have regarding Public Safety Canada's handling of your personal information may be directed to our Access to Information and Privacy Coordinator by emailing atip-aiprp@ps-sp.gc.ca. If you are not satisfied with Public Safety's response to your privacy concern, you have the right to file a complaint with the Privacy Commissioner of Canada regarding the institution's handling of your personal information.

Jon O'Sullivan
Senior Policy Analyst | Analyste Politique Principal
Policy and Program Development Initiatives | Initiatives d'élaboration de politiques et de programmes
Crime Prevention Branch| Le secteur de la prévention du crime
Public Safety Canada | Sécurité publique Canada
Jon.osullivan@ps-sp.gc.ca
Tel : (613) 292-8317

Public Safety Canada | Sécurité publique Canada

Concept Paper: National strategy to reduce gun and gang violence

CONTEXT

Statistics[1] [2]

- Homicides have been increasing across the country, with increases every year since 2018.
- Firearm-related homicides have also been increasing in recent years (41% in 2022; 40% in 2021)
    - 46% of the firearm-related homicides in 2021 were identified as gang-related (latest data available)
    - 23% of overall homicides in Canada are identified as gang-related (2022)
- The gang-related homicide rate in 2022 was the highest recorded in Canada since data began being collected in 2005 (0.52 per 100k population)

Risk Factors

- Risk factors vary between communities across the country and provide additional context in understanding factors driving gun and gang violence.

    - **Individual** – factors such as prior delinquency, illegal gun ownership, drug trafficking, anti-social attitudes, aggression, alcohol and drug use, violent victimization rate
    - **Peer group** – factors such as a high commitment to delinquent peers, street socialization, presence of gang members in class, friends who use drugs or are gang members
    - **School** – factors such as poor school performance, low education aspirations, few teacher role models, education frustration, low attachment to school, learning difficulties
    - **Family** – factors such as family disorganization (i.e., parent-child separation/ disrupted families, parental drug and/or alcohol abuse), family violence, neglect and drug addiction, family members in gang, lack of adult role models, parent criminality, extreme economic deprivation, intergenerational trauma, impact of colonialism
    - **Community** – factors such as social disorganization (i.e., high poverty, residential mobility), high crime in neighbourhood, presence of gangs in neighbourhood, availability of drugs and/or firearms in community, cultural norms supporting gang behaviour, feeling unsafe in neighbourhood, systemic racism

Emerging risk factors (radicalization, etc.)

- **Social Media –** factors such as negative social media glamourizing gang life/culture, online peers/influencers, drill rap, use of social media to intimidate and/or provoke violence.

[1] Number, percentage and rate of gang-related homicide victims (statcan.gc.ca)
[2] Police-reported crime in Canada, 2022 (statcan.gc.ca)

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FPT Investments

- The Government of Canada has invested over $1 billion since 2018 to combat gun and gang violence across the country through the: Initiative to Take Action Against Gun and Gang Violence (ITAAGGV), including the Gun and Gang Violence Action Fund (GGVAF) and Youth Gang Prevention Fund (YGPF); and Building Safer Communities Fund (BSCF).

- Provinces/Territories (PTs) have similarly invested significant resources and efforts to curb gun and gang violence, including but not limited to using GGVAF resources to strengthen and/or complement initiatives in their respective jurisdictions.

ASSUMPTIONS

- Primary Areas of Activities: Since 2018, we have collectively prioritized investments in 3 distinct (yet intertwined) areas of activities, and that we ought to keep this as a basis to inform the development of a coherent strategy:

    - ***Area 1 – Investing in Communities*:** providing long-term, sustainable funding for communities to develop and maintain prevention, empowerment, intervention, and rehabilitation initiatives

    - ***Area 2 – Leadership and Collaboration*:** Promoting collaboration, partnerships, and knowledge transfer/sharing to support stakeholders

    - ***Area 3 – Support Enforcement-based Activities* :** Engaging in enforcement, suppression, prosecution, and corrections activities to reduce gang activity with a primary focus on deterrence

- Long-Term Investments: While statistically gun and gang violence has been on the rise across Canada, investments of this nature must be planned and implemented through a long-term horizon to allow for real, lasting shift to materialize.

- Beyond the 3 Areas: We ought to find ways to increase our collaboration with other government departments (FPT-wise) and other level of governments (i.e. municipalities and Indigenous communities) who are mandated to intervene fields that are outside our mandated area of operations (i.e. employment, housing, education, public health, etc.) and for which related investments are just as key (if not more) to enhance our collective ability to curb gun and gang violence in the long run.

- Data standardization & Reporting: There is the need to pursue a path towards standardization of gun and gang-related terms and their use to help improve data sharing across jurisdictions. Similarly, agreeing on identifying key terms and datasets used in gang violence reporting would assist in identifying/bridging gaps in data collection and reporting. Efforts will also need to be made to ensure impacted jurisdictions have the means they need to capture/report data and results in a timely manner. Data sharing for law enforcement entities can also be challenging given privacy concerns, technical issues and other considerations.

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WHAT ARE WE TRYING TO ACHIEVE?

- Create a flexible, whole of Canada approach to reducing gun and gang violence that builds on investments made to date, considers factors beyond community safety and justice (i.e. socio-economic, etc.) while leaving room for jurisdictions to implement novel and/or bespoke approaches.

- Progressively and deliberately increase collaboration amongst FPT, academia, NGOs/ community organizations to better understand problems/limitations in jurisdictions across the country and help identify novel/bespoke approaches to tackling gun and gang violence.

- Where they intersect, align our efforts with the relevant findings and recommendations of the Mass Casualty Commission[3] and in area of Reconciliation with Indigenous Peoples[4].

- Bring Canada in-line with key international partners who have also developed national strategies on the topic. A review of successful measures will be consulted to identify those which could be adopted or applied in a Canadian context.

[3] The Commission presented a definition of a mass casualty event (recommendation V.1), and several gang-related shootings fit this definition. Several other recommendations from the Commission are relevant to our work / objectives. This includes adopting a public health approach to mass casualty incidents (V.2), addressing gender-based and domestic violence for at-risk individuals (V.8), enabling ease of reporting and reducing fear of retaliation (V.9), strengthening rural wellbeing through inclusion (C.1), and strengthening community safety and wellbeing practices (C.14-16). Please refer to full list of relevant recommendations (V.1, V.2, V.8, V.9, V.16, C.1, C.2, C.12, C.14, C.15, C.16, C. 21, C.24, C.25, C.26, C.32) available at: Turning-the-Tide-Together-List-of-Recommendations.pdf (masscasualtycommission.ca)

[4] This will require taking into account: the Truth and Reconciliation Commission Calls to Action; Les Femmes Michif Otipemisiwak Miskotahâ; the National Inquiry into Missing and Murdered Indigenous Women and Girls Recommendations; and the implementation of the United Nations Declaration on the Rights of Indigenous Peoples Act Action Plan, again, where they intersect.

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ANNEX A: WHAT WE HEARD (From the initial FPT Tiger Team Meeting, Sept 28, 2023)

- Thematic areas are broadly aligned with where most PTs are focusing at the moment.
- There is interest in:
  - *information / intelligence sharing between jurisdictions.* It will be necessary to ensure that there is alignment / standardization in the datasets so that it can be easily shared and understood between jurisdictions. Information sharing between jurisdictions will also allow for broader understanding of different initiatives that are showing positive results.
  - *undertaking a whole of government approach to tackle the problem*. This includes regional and municipal governments, as well as other federal and provincial/territorial departments involved in both the crime prevention / community safety as well as those related to the social determinants of health (e.g., healthcare, employment, education, etc.).
  - the ability to track emerging regions and striking a balance to recognize both the existing needs of areas facing significant issues and those that are just beginning to see these problems.
  - exploring the international aspect of gun and gang violence, particularly as it relates to illegal firearms / smuggling. There's also an interest in national migration patterns of gangs and illegal (particularly ghost) firearms.
  - Various sources of crime guns include straw purchasing, theft, and smuggling, etc.
  - including other community stakeholders / NGOs into the process.
  - exploring the links between radicalization and gang involvement. Ideologically Motivated Violent Extremism (IMVE) has been increasing in Canada[5] and there may be links between what draws youth to IMVE-related activities and gang-related activities. This includes looking through online / social media lens, as that is often how individuals are radicalized.
- Some PTs, but more specifically municipalities (through the CMNCP) have mentioned that they have limited reporting capacity (lack of dedicated financial and/or human resources). Discussions around supporting these jurisdictions will be key in ensuring that data is collected, analyzed, and shareable in a timely manner with reliable data and analysis projects/results available to a broader stakeholder audience.
- A "Pan-Canadian" strategy may be incompatible with differing jurisdictional priorities – thus the need to focus on a flexible approach.

[5] Protecting National Security in Partnership with all Canadians - Canada.ca

STAKEHOLDER ID & QUESTIONS FOR STAKEHOLDERS

1. Name of the organization 2. Location (city and province) 3. Organization Website (if unavailable, please provide a short narrative of your organization work related to gun and gang violence) 4. Name of the respondent 5. Contact information (email)
Question 1 (Context): Recognizing the broad spectrum of gun and gang violence root causes, are there other risk factors driving gun and gang violence you believe ought to be highlighted? If so, please list them and add a short descriptor for each.
Question 2 (Assumptions): are the three (3) priority areas of activities illustrated in the concept paper sufficiently comprehensive or should they be augmented/amended? If the latter, please provide additional details on your suggested additions.
Question 3 (Assumptions): on the issue of data standardization and reporting, and beyond what we already have access to through, for example, Statistics Canada data: i. are there additional types of datasets you believe ought to be deliberately collected and shared across jurisdictions? ii. can you identify challenges your organization may be facing in either accessing, maintaining and/or sharing data with other jurisdictions?
Question 4 (General): how would you recommend information sharing efforts be augmented to ensure broader access to the most up to date information?
Question 5 (General): do you have additional suggestions to assist in better capturing diverse regional, cultural and/or historical context within the proposed National Strategy?
Question 6 (General): please provide any additional comments you may have that could inform our current work towards developing this National Strategy.

TETRA TECH

Dam Safety Review
Lizard Lake Dam and Bainbridge Dam

PRESENTED TO
City of Port Alberni

MAY 5, 2023
ISSUED FOR USE
FILE: 704-ENG.DMPA03031

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EXECUTIVE SUMMARY

Tetra Tech Canada Inc. (Tetra Tech) completed Dam Safety Reviews (DSR) for the Lizard Lake Dam and Bainbridge Lake Dam. Both dams are owned and operated by the City of Port Alberni (the City). The purpose of both dams is to store and supply drinking water to the City. A DSR is part of the dam safety management system, with the overarching goal to protect people, property, and the environment from the harmful effects of the failure of a dam or its ancillary systems. This executive summary is solely intended to provide an overview, the full report should be read for additional details and context.

For this DSR, the hydrotechnical and geotechnical performance of the dams was reviewed, as well as the Operation, Maintenance and Surveillance (OMS) Manual, Dam Emergency Plan (DEP), and associated surveillance documentation. The DSR was generally completed as an audit style review, where previous assessments were reviewed and compared to current standards of practice, and as required analysis work was completed to evaluate the impact of these changes on the results. Additionally, an inundation study was performed to evaluate the extent of flooding likely to follow a potential breach of the dams.

This is the second DSR completed for these structures, the previous was completed by EBA Engineering Consultants Ltd. in 2012 (EBA is now owned and operated by Tetra Tech). It is noted that in the spirit of developing an unbiased DSR, this assignment is being completed by a separate team of professionals with no historical or technical connection to these dams.

The following is a brief summary of what is understood about both structures and their location, based on information from the OMS Manual, as-constructed drawings and site visit observations.

- Lizard Lake Dam is a zoned earthfill embankment which was built in 1984/1985. The embankment is approximately 320 m long, 6 m to 7 m tall and retains a lake with a capacity of roughly 545,000 m^3. The dam has a low-level outlet (LLO) through it and a concrete spillway. Lizard Lake collects water from a catchment of 2.56 km^2; of which, 0.21 km^2 is the surface of the lake.

- Bainbridge Lake Dam is a zoned earthfill embankment which was built in 1962/1963. The embankment is approximately 130 m long, 4 m high and retains a lake with a capacity of roughly 1,230,000 m^3. There is a LLO through the dam structure; and in a separate location along the reservoir shoreline there is a spillway. There is also a buried water supply intake line 300 m west of the dam; where it is buried appears to be an embankment that contains the reservoir, so the integrity of the embankment must be maintained for the function of the reservoir. Bainbridge Lake collects water from a catchment area of 13.2 km^2, of which 0.25 km^2 is the lake surface.

- Both Dams are located on mountainous terrain above the Alberni Inlet. The Dams retain separate lakes, both of which drain into small creeks discharging into China Creek. China Creek flows into the Alberni Inlet. The area downstream of the dams is generally forested, and currently used for industrial and recreation purposes. Within the identified inundation zone for both Dams there is a gravel pit, an equipment yard, a large campground, power lines, and water supply pipelines. Additionally, within the inundation zone of Lizard Lake there are 2 concrete dams (a few meters tall) the China Creek Water Supply Dam (operated by the City) and the China Creek Hydroelectric Dam (operated by a joint partnership between local First Nations and the City).

The dam safety management system and performance of the Lizard Lake Dam and Bainbridge Lake Dam, in consideration of current regulations and guidelines was reviewed for this DSR. This DSR has reconfirmed the Consequence Classification for both dams as **Very High** based on the findings of the inundation study. The classification is based on the expected Economic and Infrastructure losses; loss of life from either dam breach is expected to be less than 10, based on predicted flow velocity and depth.

A visual inspection of the dams was performed on July 12, 2022, by Angie Ramey, P.Eng. and Alex Huang, E.I.T. of Tetra Tech accompanied by Amar Giri, Waterworks Chargehand of the City of Port Alberni. Based on the visual review, the dams appeared to be performing as intended; minor maintenance related to vegetation clearing and concrete patching of cracks in the spillway are recommended, see Table E-1.

The key assessment parameters and findings from the hydrotechnical and geotechnical review are:

- Based on the Very High Consequence Classification, the dams were assessed for the following:
  - An Inflow Design Flood (IDF) with an annual exceedance probability which is 2/3 of the way between the 1/1,000-year flood and the Probable Maximum Flood (PMF). The IDF for Lizard Lake is estimated at 49 m^3/s, while the IDF for Bainbridge Lake is estimated at 261 m^3/s.
  - An earthquake design ground motion (EDGM) with a return period halfway between the 1/2,475-year and the 1/10,000-year event. The EDGM use for both dams is 0.81g. This was determined using an extrapolation method considered appropriate for a screening level review. A site specific probabilistic seismic hazard assessment should be conducted to confirm this value and the seismic acceleration contributions from different fault zones.
- Lizard Lake Dam Hydrotechnical Performance:
  - No survey or LiDAR information for Lizard Lake Dam or the surrounding areas are available. Parameters such as the dam minimum crest elevation, was extracted from the previous DSR completed in 2012 and as-constructed drawings. A ground and aerial survey should be performed to validate the parameters used.
  - The dam is assessed to have adequate available freeboard while the lake level is at the maximum normal elevation during a 1/1,000-year wind event. The dam also has adequate available freeboard during the passage of the IDF event with a wind event of 1/2-year. This meets the current Canadian Dam Association (CDA) guideline targets for freeboard.
- Lizard Lake Dam Geotechnical Performance:
  - The dam meets the CDA target Factor of Safety (FOS) during static conditions for stability, however it does not meet the target FOS for pseudo-static or post-seismic conditions. This assessment was based on assumed material properties for the dam fill and foundation; as limited factual data to confirm soil types is available it is recommended that a field program is completed to confirm material properties. Liquefaction or cyclic softening might be possible and should be evaluated based on the findings from the field program.
  - Internal erosion is possible through the dam, in particular near the LLO. Routine surveillance should look for signs of internal erosion at the toe of the dam and at the LLO.
- Bainbridge Lake Dam Hydrotechnical Performance:
  - The Bainbridge Dam was not surveyed recently. LiDAR information was collected by the province in 2019. The analysis was completed using dam structure information from the previous DSR (completed in 2012), the as-constructed drawings, and the 2019 LiDAR. A ground survey should be performed to validate the dam crest and spillway elevation parameters used.
  - The dam is assessed to have adequate available freeboard while the lake level is at the maximum normal elevation during a 1/1,000-year wind event. The dam would be overtopped during the passage of the IDF with no wind event applied. This does not meet CDA freeboard targets.

- Bainbridge Lake Dam Geotechnical Performance:
  - The dam meets the target FOS for static stability conditions, but does not for pseudo-static or post seismic conditions. The dam foundation is loose to compact sand and is expected to undergo liquefaction. The dam should be upgraded to address this. This assessment is based on drilling data collected in 2014.
  - Internal erosion is possible through the dam if the upstream blanket is damaged (due to the shorter flow path and resulting higher hydraulic gradients), so routine surveillance should look for signs of internal erosion. Additionally, it is understood that there is a buried abandoned metal pipeline near the water intake; this abandoned line increases the risk of internal erosion and failure of the embankment in this location. Seepage was observed near the toe of this embankment during the site inspection. The seepage should be monitored for changes in rate or signs of turbidity. The City should also review the risk this abandoned line poses and consider infilling the line with grout to fill the void.

During the review of the dam safety management system, non-conformances were identified. In particular, routine surveillance should be documented so that typical operating conditions are understood. Also, both the OMS Manual and the DEP require improvement so that someone unfamiliar with the dams, could read the documents and safely operate the facilities and respond to emergency conditions.

Many of the findings in this DSR, were previously identified in the 2012 DSRs and the 2014 Assessment; however, limited activities have taken place to address the identified issues. This should be rectified by increasing available resources (staff and/or funding) so that identified deficiencies and non-conformances can be addressed. These activities are key to secure a safe water supply to the City of Port Alberni.

The identified deficiencies and non-conformances and recommendations to address these are presented in Table E-1, and are repeated from Section 8.0 of this report. Suggested priorities (Low, Medium, High or Very High) are also provided. Low, medium, high and very high priority recommendations should be addressed within 5, 3, 1 and 0.5 year(s) respectively. The priority assigned is in consideration of the level of effort, as well as the urgency of the deficiency or non-conformance.

In reviewing this table, the reader should keep in mind that a DSR is a “snapshot in time” and the observations, conclusions, and recommendations provided are based on the information provided at the time of the DSR including staff interviews and the site visit observations. Any significant change to site conditions may necessitate a review and update to the recommendations in this DSR.

Table E-1 Prioritized DSR Recommendations

ID #	Dam	Deficiency or Non-Conformance	Recommendation Report Section	Recommended Action	Priority
1	Both	Previous assessment reports from 2012 and 2014 identified high priority dam safety deficiencies and non-compliances. It appears that limited work has been performed to address these and City staff were not aware of these outstanding recommendations.	7.0	The dam safety management system should be updated and improved so that recommendations are tracked and addressed in a timely manner.	Very High (0.5 years)
2	Bainbridge Lake Dam	Clear seepage was observed near the toe of the embankment, near the Water Supply Intake line. This embankment appears to retain the reservoir so integrity must be maintained. As there are buried lines through this embankment this area has a high potential for internal erosion to occur.	4.2.5 and 6.4	1: Area of seepage should be reviewed during routine inspection. Rate of seepage and observations on turbidity should be noted. 2: A plan should be added to the DEP for actions to take if turbidity is observed.	Very High (0.5 years)
3	Both	Surveillance and surveillance documentation for the dams, should be improved to meet regulatory requirements.	7.1	1: Weekly routine inspections should be documented. 2: The Annual Formal Inspection should be more detailed (at minimum use standard template from BC Dam Safety). Consider including a summary report with details on maintenance/inspections and operating conditions that occurred in the calendar year in addition to the inspection form. 3: Measurements from the standpipe installed near the toe of Bainbridge Dam should be collected as part of routine inspections so typical groundwater conditions and variation are understood. 4: It is understood that the dams are inaccessible during the winter months due to snow. Remote surveillance technology, such as cameras, should be considered so that there is year-round surveillance.	Very High (0.5 years)

ID #	Dam	Deficiency or Non-Conformance	Recommendation Report Section	Recommended Action	Priority
4	Bainbridge Lake Dam	Geotechnical and hydrotechnical deficiencies identified for the dam. Including: 1: Dam is predicted to overtop during the design flood event. The hydraulic assessment completed, relied on elevations and dimensions shown on as-constructed drawings from 1960s. Dams settle over time, and survey methods/datums/units have changed and improved since these drawings were created. The elevations of the spillways and dam crests are key parameters used to determine if a dam can safely pass a design flood so should be verified. 2: Dam does not meet the target FOS for pseudo-static or post-seismic stability. Most of the foundation is expected to liquefy during the design earthquake event. This would result in movement and sliding of the structure, and release of the reservoir.	5.1, 6.2.2 and 6.3	The dams should be improved and upgraded. Suggested steps: 1a: Survey the dam crest, spillway elevation and dimensions and low areas along the reservoir shore (see Figure 5-5). Compare results to parameters used for hydraulic assessment. 1b: Confirm findings from hydraulic freeboard assessment using survey of dam crests and spillways. Also, consider low areas on surrounding lake shore. 2a: A site specific probabilistic seismic hazard assessment should be completed. The findings should be used in the seismic upgrade design. 2b: A conceptual seismic upgrade design should be prepared, and a detailed field exploration program should be conducted to refine the conceptual design (Cone Penetration Testing, geophysics testing and additional sampling of dam core and shell material with advanced laboratory strength testing). 3: Prepare upgrade design for the dam that addresses both the hydrotechnical and geotechnical deficiencies.	High (work should be started within 1 year, aim to construct upgrade within the next 5 years)
5	Lizard Lake Dam	The results of the stability assessment indicate the dam is not stable seismically or during post-seismic conditions. The geotechnical assessment is based on assumed geometry, soil conditions for fill and foundation as shown on the as-constructed drawings. Drawings without supporting documentation (photos, lab testing) do not provide the necessary data to confirm material properties of the dam fill or foundation.	6.1 and 6.3	1: The findings from the assessment should be verified by collecting subsurface information through a field program (drilling, geophysics, etc.). 2: The geotechnical assessment should be updated based on collected subsurface information. 3: The dam should be upgraded if required.	High (work should be started within 1 year, aim to construct upgrades within the next 5 years)

ID #	Dam	Deficiency or Non-Conformance	Recommendation Report Section	Recommended Action	Priority
6	Both	The Operation, Maintenance and Surveillance Manual and Dam Emergency Plan do not meet current regulatory requirements.	7.2	See list of improvements in Section 7.2. Using current templates from BC Dam Safety would provide a good starting base to ensure all necessary information is included.	High (1 years)
7	Both	Based on the site visit the following requires maintenance: 1:Both dam spillways had moss growing which can damage the concrete and impeded visual inspection. 2: Vertical cracking in Bainbridge Lake Dam spillway. 3: Vegetation growing around Bainbridge Lake Dam LLO outlet, and areas of standing water near toe of Lizard Lake Dam.	4.0	1: Clear moss from spillways. 2: Patch cracking in spillway. 3: Clear vegetation around these areas so complete visual inspection is possible. The outlet of the LLO and the areas of standing water should be reviewed as part of the routine inspections as they are locations where internal erosion is more likely to be observed.	Medium (3 years)
8	Lizard Lake Dam	A high resolution survey (ground survey, LiDAR or DEM) is not available for this dam or immediate downstream area. Without this data, reasonable assumptions were made for this DSR assessments. These assumptions should be validated. 1: For the Inundation Study, a surface was manually created using information from 20 m contour lines. 2: For the hydraulic assessment the dam crest and spillway elevations and dimensions were based on the as-constructed drawing form the 1980s. 3: For the stability assessment, the ground surface was modeled based on the as-constructed drawings and field observations.	5.1, 5.2 and 6.3	The following survey data should be collected and used to validate the models: 1: Collect a ground survey of the dam crest and spillway elevations and dimensions. 2: Collect an aerial survey (LiDAR, or UAV LiDAR) of the dam, and downstream creek channel including Williams Creek and China Creek.	Medium (3 years)

ID #	Dam	Deficiency or Non-Conformance	Recommendation Report Section	Recommended Action	Priority
9	Bainbridge Lake Dam	The abandoned water intake line, increases the risk of internal erosion, as it leaves voids in the embankment structure.	4.2.5 and 6.4	Review risk the line poses. If risk is unacceptable, infill line with grout.	Low (5 years)

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ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AE	Associated Engineering Services Ltd.
AOA	Archaeological Overview Assessment
ASL	Above Sea Level
CDA	Canadian Dam Association
DEM	Digital Elevation Model
DCPT	Dynamic Cone Penetration Test
EC	Environment Canada
EDGM	Earthquake Design Ground Motion
ENV	BC Ministry of Environment and Climate Change Solutions
FOS	Factor of Safety
IDF	Inflow Design Flood
LIDAR	Light Detection and Ranging
LL	Liquid Limit
LLO	Low-Level Outlet
MOF	BC Ministry of Forests (formerly known as FLNRORD, for BC Ministry of Forests Lands, Natural Resource Operation and Rural Development)
NBCC	National Building Code of Canada
NOWL	Normal Operating Water Level
NRCan	Natural Resources Canada
PGA	Peak Ground Acceleration
PL	Plastic Limit
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMSA	Probable Maximum Snow Accumulation
SARA	Species at Risk Act
SPT	Standard Penetration Test
SSP	Shared Socioeconomic Pathways
USCS	Unified Soil Classification System
UTM	Universal Transverse Mercator

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of City of Port Alberni and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than City of Port Alberni, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) completed Dam Safety Reviews (DSR) for the Lizard Lake Dam and Bainbridge Lake Dam, both of which are owned and operated by the City of Port Alberni (the City). The purpose of both dams is to create reservoirs that are used to supply drinking water to the City. A DSR is part of the dam safety management system, having the overarching goal to protect people, property, and the environment from harmful effects of failure of a dam or its ancillary systems. The purpose of a DSR is to:

- Confirm the design, construction, and operation of a dam conform to applicable dam safety standards and governing regulatory requirements; and
- Identify deficiencies and non-conformances, if any, and propose remedial actions.

This report documents the review and assessment completed for the dams. The scope of work is based on our proposal "Dam Safety Review Proposal Lizard Lake and Bainbridge Dams" dated November 23, 2021. Recommendations have been made to address or mitigate identified deficiencies and non-conformances. In this report, recommendations are identified by the bold text (**Recommendation)** and are summarized at the end of the report in Section 8.0.

This is the second (2nd) DSR for these structures; the previous DSR was completed by EBA Engineering Consultants Ltd. in 2012 (EBA is now owned and operated as Tetra Tech). It is noted that in the spirit of developing an unbiased DSR, this assignment is being completed by a separate team of professionals with no historical or technical connection to these dams.

A DSR is a "snapshot in time" and the observations, conclusions, and recommendations provided are based on the information provided, staff interviews and the site visit observations. Any significant change to site conditions may necessitate a review and update to the recommendations in this DSR.

2.0 APPLICABLE REGULATION AND GUIDELINES

Water dams in BC are regulated by the Ministry of Forests (MOF), through the Water Sustainability Act and the associated BC Dam Safety Regulation dated February 5, 2021 (Regulation). The Regulation specifies minimum requirements for general safety, operation, surveillance, emergency planning, activities occurring near a dam, documentation and record keeping. The minimum requirements are based on the Consequence Classification of the dam, which is determined by considering incremental consequences from a potential dam breach. MOF has published several technical resources, guidelines and templates on dam safety and technical engineering design requirements, including identifying other dam safety organizations that should be considered. Regulations and guidelines referenced and consulted for this report include:

- BC Ministry of Forests (MOF):
  a. Water Sustainability Act – Dam Safety Regulation (BC Reg 11/2021)
  b. Plan Submission Requirements for the Construction and Rehabilitation of Small Dams (July 2018)
  c. Downstream Consequence of Failure Classification Interpretation Guidelines (March 2017)
- CDA – Dam Safety Guidelines 2007 (2013 Edition), and related technical bulletins; and
- Engineers and Geoscientists of BC (EGBC):
  – Professional Practice Guidelines for Site Characterization for Dam Foundations V1.2 (2016); and

- Professional Practice Guideline for Legislated Dam Safety Reviews in BC.

A DSR EGBC assurance statement is provided in Appendix A.

3.0 FACILITY DESCRIPTION

3.1 Background Information Sources

Background information for this DSR was provided by the City and was reviewed to understand the structure design, history and operation of each dam. The reports and data provided is summarized in the table below.

Table 3-1: Background Documents and Data Provide for Review

Type	Name / Description	Author	Date
As- Constructed Drawings	Bainbridge Lake Dam – 4 pages. Dimensions noted to be in imperial units.	Associated Engineering Services Ltd.	September 1963
As- Constructed Drawings	Lizard Lake Dam - 12 pages	Associated Engineering Services Ltd.	June 1984
Report — DSR	2012 Dam Safety Review Bainbridge Lake Dam Port Alberni, BC	EBA Engineering Consultants Ltd.	June 2012
Report — DSR	2012 Dam Safety Review Lizard Lake Dam	EBA Engineering Consultants Ltd	June 2012
Report — Assessment	Bainbridge Lake Dam – Geotechnical Assessment	Tetra Tech EBA Inc.	Draft – August 2014
Survey – Bathymetry	101Bathy-Bainbridge	n/a	2015
Survey – Bathymetry	101Bathy-Lizard	n/a	2015
Photos	2 China Creek Electric Dam 4 China Creek Water Supply Dam and Caretaker's House	n/a	n/a
Reservoir Water Level Records	Scans of forms tracking water levels in both lakes between 2017 and 2021	City of Port Alberni	n/a
Issued for Record Drawings	Bainbridge Lake Intake Improvement – 3 drawings	City of Port Alberni	January 2018
Dam Management Plans	Operation, Maintenance and Surveillance (OMS) Manual	City of Port Alberni	April 2022
Dam Management Plans	Emergency Preparedness Plan	City of Port Alberni	April 2022
Dam Surveillance Records	Site Surveillance Forms – Scans of routine and annual inspection forms. 4 inspection records were available for each dam between 2012 and 2022 (see summary in Section 7.1).	City of Port Alberni	Lizard: 2016, 2019, 2020 and 2021 Bainbridge: 2018, 2019, 2020, 2021

Additionally, the following publicly available LiDAR data from the BC Open LiDAR Portal was used for the assessments:

- BC_092f017_xl1m_UTM10_2019
- BC_092f026_xl1m_UTM10_2019
- BC_092f027_xl1m_UTM10_2019

It is noted that the available LiDAR only provides coverage of Bainbridge Lake and China Creek downstream of the China Creek Water Dam. LiDAR was not available for Lizard Lake Dam, reservoir, Lizard Lake Watershed, Williams Creek, China Creek Water Dam or China Creek Hydroelectric Dam.

Additionally, publicly available hydraulic, geotechnical, environmental, and archeological data was also accessed as part of the assessments. This data is described in the appropriate sections of this report as applicable.

3.2 General Location

Lizard Lake Dam and Bainbridge Lake Dam are used to retain water reservoirs for a drinking water source for the City. Both dams and their reservoirs are components of separate systems that are operated independently of each other. The dams and reservoirs are located about 4 to 12 km southeast of the City, and are accessible by gated, radio controlled logging roads.

Water discharges from Lizard Lake via the low-level outlet (LLO) or spillway into Williams Creek. Williams Creek joins China Creek where water flows through the China Creek Hydroelectric Dam and then to the China Creek Water Dam where there is an intake, treatment and filtration system for the City's water supply[1]. From China Creek Water Dam, the drinking water is transported to the City in an above ground pipeline. Lizard Lake is operated to maintain water levels in China Creek which are controlled by opening or closing the Lizard LLO depending on seasonal variations and water levels in China Creek. China Creek flows to Alberni Inlet where there is a Campground and Marina at the creek mouth.

Drinking water is sourced directly from the Bainbridge Lake reservoir where it flows through a siphoned line, through a buried pipeline to a pump station for treatment. Water overflow from Bainbridge Lake flows over the spillway or through the LLO into McFarland Creek, which eventually joins China Creek, downstream of the Hydroelectric/Water Dams. It is understood the China Creek/Lizard Lake water supply pipeline crosses McFarland Creek.

It is understood that the China Creek and Lizard Lake are the main source of water used by the City. The Bainbridge Lake supply is used less frequently, typically only when the water supply from China Creek has high turbidity levels. It is also understood that there are no other drinking water sources available for the City.

Figures showing the location and features of the dams are attached to this report. Additionally, as-constructed drawings of the dams are reproduced for referenced as Appendix B. Elevations of the dams described in this report are based on those shown on these drawings (with conversion from imperial to metric units as appropriate) and have not been reconfirmed with recent survey.

[1] Both the China Creek Hydroelectric Dam and China Creek Water Dam are small concrete gravity dams, a few meters high and retain small reservoirs.

3.3 Lizard Lake Dam

The Lizard Lake Dam is an earthfill embankment that includes a clay core. It is supported by rockfill zones on both the upstream and downstream and includes a transition filter layer and filter cloth on the downstream side. The upstream and downstream slopes are sloped at 2H:1V. The dam was constructed in 1984-1985 and was designed by Associated Engineering Services Ltd. (AE). The dam crest can be accessed by vehicles, access is controlled by a locked gate. Key features of the dam and reservoir are summarized in Table 3-2.

Table 3-2: Lizard Lake Dam Geometry and Features Summary[1]

Dam	Length (m)	Max Height (m)	Min Crest Elevation (m elevation)	Min. Crest Width (m)	Reservoir Capacity (m^3)	Outlet(s)
Lizard Lake	320	6 to 7 (highest adjacent to spillway)	734.5	3.6	545,000 up to elevation 732 m	LLO Spillway

1: Data sources include the OMS Manual, 2012 DSR and as-constructed drawings

The dam has two outlets a spillway and a LLO, details of which are:

- The spillway is concrete with a 6.5 m wide crest and square sides. The spillway is a chute, with baffles near the toe to dissipate energy as the water discharges into a plunge pool. From the site visit the plunge pool appeared to be constructed on bedrock and was armoured in places with concrete (possibly shotcrete). The spillway concrete is understood to be reinforced with rebar, and there are buried drain pipes on both sides that drain to the dam toe. A bridge crosses over the spillway providing access to the right[2] (north) side of the dam and is about 2.5 m to 3.0 m above the spillway. A staff gauge is mounted on the side of the spillway for measuring flow, with 0 m on the staff gauge corresponding to the sill. A log boom is located in the reservoir upstream of the spillway to protect it from debris. The invert elevation of the spillway is 731.0 m (AE, 1984).
- The LLO is located left of the spillway (south). The pipe is understood to be 0.4 m in diameter and ductile iron. It is encased in concrete on the upstream side and encased in gravel wrapped in geotextile on the downstream side. The opening is controlled via a gate valve that is accessed by a manhole through the upstream side of the dam crest. The LLO discharges into a 2 m wide concrete box set into the downstream toe of the dam. Inside the box is a v-notched weir and staff gauge mounted for measuring and tracking flow. It is understood there is also a 75 mm galvanized steel pipe inside the valve manhole that can be used to measure water levels in the pipe but is not routinely used. The invert of the pipe inlet and outlet is 728.0 and 727.9 m respectively (AE, 1984). It is understood that the LLO is routinely operated and adjusted during the summer months based on observed water levels in China Creek.

Both the spillway and LLO drain into the Williams Creek channel, which flows parallel to a portion of the downstream dam toe, then flows north away from the dam area. Williams Creek joins China Creek approximately 2.3 km downstream of the dam.

3.4 Bainbridge Lake Dam

The Bainbridge Lake Dam is an earthfill embankment, that includes a clay core described as an “impervious core”. It is supported by coarse grained material on both the upstream and downstream which is described as “random pervious compacted fill”. The upstream and downstream sides are sloped at 3H:1V and 2.5H:1V respectively. The clay core material is understood to extend from the centerline of the dam and along the base of the embankment

[2] In this report right and left are based on standing on the dam crest facing downstream.

into the reservoir about 50 m upstream of the dam, with the intent to function as a seepage blanket. The blanket is shown on the as-constructed drawings as being placed 0.9 m thick. The dam was constructed in 1962-1963 and was designed by AE.

Key features of the dam and reservoir are summarized in Table 3-3.

Table 3-3: Bainbridge Lake Dam Geometry and Features[1]

Dam	Length (m)	Max Height (m)	Min Crest Elevation (m)	Min. Crest width (m)	Reservoir Capacity (m^3)	Outlet(s)
Bainbridge	130	4.0	151.2 (design height) 150.6 (impervious core)	2.7	1,230,000 at elevation 150 m	Emergency LLO Spillway City water source intake line and abandoned pipe

1: Data sources include the OMS Manual, 2012 DSR and as-constructed drawings

The dam has a LLO pipe through the right side of the dam structure adjacent to the abutment. The pipe is 0.9 m in diameter and is understood to be steel encased in concrete. The LLO intake is located 40 m upstream of the dam on a platform built in the reservoir. The platform has a staff gauge mounted on it. The platform is near a peninsula and can be accessed using a ladder placed from shore. A specialized key is required to turn the valve. The LLO pipe extends about 10 to 15 m downstream of the dam, and discharges into a flat forested, swampy area. It is understood that LLO is not routinely used and would only be operated if needed during an emergency.

The following appurtenant structures are separate from the dam but are required for the operation of the reservoir:

- Approximately 150 m to the right of the dam (west) is an ogee crested concrete weir that functions as the spillway for the reservoir. The spillway is built across a natural channel, the weir is about 0.5 m high. The spillway is approximately 30 m wide and the middle notch is about 10 cm to 20 cm lower and 6 m wide. Downstream of the spillway, water flows into a natural channel away from the dam. Bedrock was visible in the channel during the site visit. A staff gauge is located on the spillway and another in the lake upstream of the spillway. There is also a log boom in the reservoir upstream of the spillway to protect the spillway from debris. The invert elevation of the spillway is 150 m (1961 AE, value converted from 492.5 ft).
- Approximately 300 m to the right of the dam (west) are buried water supply intake lines. Where the lines are buried appears to be an embankment that contains the reservoir, so the integrity of the embankment must be maintained for the function of the reservoir. There are two lines.
  - A new HDPE siphon line was installed in September 2017, by placing the line over the existing embankment and burying it (i.e. the existing slope was not excavated into). This HDPE line extends 65 m into the reservoir where there is a screened intake. A valve is located next to the siphon to allow pressurized air to be blown into the line to clear the screen on the inlet when required.
  - A former water supply line, in the lake the pipe is corrugated steel and buried in the embankment it is either steel or PVC pipe. This former line was removed from service by closing the two valves (i.e., it has not been infilled with grout or formally decommissioned).

Both the spillway and LLO drain to McFarland Creek, which flows away from the dam. McFarland Creek joins China Creek approximately 3 km downstream of the dam.

4.0 SITE VISIT

A visual review of the dams was performed on July 12, 2022, by Angie Ramey, P.Eng. and Alex Huang, E.I.T. of Tetra Tech accompanied by Amar Giri of the City of Port Alberni. Mr. Giri is the Waterworks Chargehand for the City, he coordinates routine surveillance of the dams and directs operation and maintenance activities.

The site visit involved visual review of the site access and signage; reservoir; dam including: abutments, crest, downstream face, exposed portion of upstream face, and spillway; downstream toe; and downstream potential inundation area. Also, during the site visit and as a follow up meeting, discussions were held regarding the dam management system, fulfilling the staff interview requirement of a DSR and providing greater understanding of the City's Dam Safety Management System.

The weather at the time of the site visit was sunny and approximately 20 to 25°C. Based on Environment Canada Daily Data for Port Alberni, a total of 3.4 mm of rain had fallen over the previous week, with the majority of the days being sunny and temperatures ranging from 9 to 30°C. The water levels in both reservoirs were low at the time of site visit, so the review occurred during relatively dry conditions.

Dam inspection checklists, photographs and figures documenting conditions observed during the site visit are provided for reference in Appendix C.

4.1 Lizard Lake Dam

4.1.1 Dam

The visible portions of the crest, upstream and downstream dam faces appeared to be in good condition. The vegetation on the embankment was well controlled, and clearing extended to the toe of the dam. The Owner representative indicated that clearing occurs twice per year. Riprap with d_{50} estimated of approximately 20-30 cm (photo 21) was observed on upstream slope and on portions of downstream slope, and appeared well interlocked. There were no signs of bulging, lateral movement, tension cracks and no evidence of erosion observed (photos 2 and 3).

4.1.2 Downstream Dam Toe

Standing water was observed in two locations near the right downstream toe of the dam (photos 17 and 18). There was also standing water in ditches that extended perpendicular to the dam. Visual review was impeded by vegetation near the standing water. It is recommended that vegetation clearing efforts extend further from the toe of the dam where standing water is observed, to improve access and visibility for routine inspections, as it is more likely internal erosion may be observed in these locations **(Recommendation).** As the dam is about 8 m high, clearing along the entire length of the dam should extend at least 4 m from the downstream toe slope break.

The left downstream toe of dam between the left abutment and the LLO was saturated and wet (water a few centimeters deep, but no significant puddles/ponding). No signs of internal erosion or flow were observed. The approximate locations where seepage and standing water were observed are identified on the site location plan Figure 1 in Appendix C.

4.1.3 Spillway

There was limited flow over the concrete spillway at the time of the review (flow appeared to be from waves only). The log boom protecting the spillway was in good condition and no debris was observed on the log boom or spillway (photo 7). The spillway includes baffle blocks and a plunge pool (photo 14). Plastic underdrain pipes on both sides of the spillway were clear of debris and showed no signs of flow (photos 19 and 20). The surface of the chute had moss or algae growth which impeded visual review, this type of vegetation can also damage the concrete surface (photos 13 and 14). Any moss or algae should be cleared so the spillway surface is clearly visible and so damage to the concrete surface is prevented (**Recommendation)**.

The downstream channel that the spillway flows into appeared to be in bedrock. The channel was overgrown so was not reviewed during the site visit.

4.1.4 LLO

The LLO valve is accessed from a manhole on the dam crest, upstream of the centerline and to the south of the spillway (photo 4). The LLO drains into a box on the downstream face of the embankment (photo 5). The box includes a V-notch weir for measuring flow. The outlet valve was not tested during this visual review. Signs of seepage around the edges of the concrete box were not observed during the site visit.

4.1.5 Instrumentation

A rain gauge was installed on the bridge over the spillway (photo 10) and staff gauges were installed at the sill of the spillway (photo 12) and the LLO outlet box (photo 6).

4.1.6 Shoreline and Reservoir

The reservoir is surrounded by moderately steep to steep forested slopes. Portions of the slopes appeared to have recent logging activity. There were no signs of instabilities or landslides observed (photo 22).

4.1.7 Access, Signage and Public Safety

The access roads to the dam are radio controlled forestry roads that are controlled by locked gates that prevent public access (photo 24). An additional locked gate is installed at the dam crest to prevent vehicle access (photo 25). Signs identifying the owner, emergency contact information and restricting various other activities such as camping are posted frequently around the dam (photos 1, 16, 23, 24, 25). The signs meet the requirements of BC Dam Safety regulation.

4.2 Bainbridge Lake Dam

4.2.1 Dam

The visible portions of the crest, upstream and downstream dam faces appeared to be in good condition. The vegetation was well controlled, with only small shrubs, that appeared to be recent regrowth (less than knee height) (photo 11). Owner representative described that vegetation clearing occurs twice per year. There were no signs of bulging, lateral movement, tension cracks or evidence of erosion observed (Photos 2 and 3).

The upstream slope of the dam was covered in grass (i.e., no riprap armouring), however no signs of erosion from waves were noted.

4.2.2 Downstream Dam Toe

Vegetation clearing extended about 5 m from the toe of the dam. The ground surface downstream of the dam toe, between the access road and right abutment, was saturated and there was standing water in a puddle about 10 m wide and 10 cm deep immediately adjacent to the right abutment (near the LLO pipe). Signs of seepage flow or turbidity in the water was not observed (Photo 19).

4.2.3 LLO

The inlet valve for the LLO is located on a platform in the lake (photo 1 and 10), which requires a ladder to access. The outlet for the LLO is a 0.9 m concrete pipe located approximately 10 to 15 m downstream of the dam toe (photo 3). The LLO was not operated as part of the site visit, it is understood it is only tested during annual site visits by the Provincial Dam Safety Officer.

The area surrounding the outlet is overgrown, which impeded visual review and limited access (Photo 4). The vegetation should be cleared so the outlet structure is accessible and clearly visible **(Recommendation).**

4.2.4 Spillway

The spillway is a concrete sill built across a natural channel (Photo 21). Water was flowing over the notch at the time of the review, as the notch is relative wide the flow rate was not estimated. The concrete was covered with moss and algae (Photo 22). There were vertical cracks in the sill in two locations and vegetation was growing from the cracks (Photo 22). The moss and vegetation growth on the spillway should be cleared to prevent further damage to the structure, and the cracks in the concrete should be patched **(Recommendation).**

A log boom protects the spillway from floating debris (Photo 20). The log boom appeared securely anchored and there was no debris caught on the log boom or in the spillway.

From discussions with City it is understood that beavers are occasionally a concern in Bainbridge Lake as they will attempt to block the spillway, however there was no signs of beaver activity observed during the 2022 site visit.

4.2.5 Water Intake

The water intake lines are buried in an embankment (Photos 15 and 16). Seepage was observed near the downstream toe of the embankment. The flow rate was estimated to be 1-2 L/min (Photo 19). The seepage was clear, although the ditch where the seepage drains into had red/iron-colored precipitate/algae. This area should be reviewed during routine surveillance to ensure the integrity of the embankment, surveillance should look for signs of internal erosion, and the estimated seepage turbidity and rate recorded, so changes can be identified and addressed **(Recommendation)**. An increase in seepage could indicate internal erosion and a decrease in seepage could indicate that the flowing water has found a different flow path (such as into the abandoned pipe), both situations could be of concern. Additionally, any observation of turbidity should be noted and addressed as this indicates internal erosion is actively occurring.

4.2.6 Instrumentation

A groundwater monitoring well is installed near the downstream toe of the dam in a stickup casing (Photo 1). The casing was locked. From discussions with the City, it is understood that water levels in the well are not routinely collected. To understand variability of water levels and the phreatic surface in the dam, lake water levels and standpipe water levels should be measured and recorded as part of routine inspections **(Recommendation).**

Staff gauges were installed at the LLO intake platform, the water supply intake, spillway, and upstream of log boom (Photos 21 and 25).

4.1.7 Shoreline and Reservoir

The reservoir is surrounded by moderately steep to steep forested slopes. Portions of the slopes appeared to have recent logging activity. There were no signs of instabilities or landslides observed (Photo 9).

4.1.8 Access and Signage and Public Safety

The roads to access the dam are forestry roads that are controlled by locked gates. A second gate on Mt. Arrowsmith Ski Road further limits public access (Photo 14). Signs identifying the owner, emergency contact information and restricting various other activities such as camping and using the area for burial purposes, are posted frequently around the dam (Photos 1, 16, 23, 24, 25). The signs meet the requirements of BC Dam Safety regulation.

It is understood from conversations with the City, that the public are regularly observed hiking and walking in this area.

4.3 Downstream Inundation Area

The potential downstream inundation zone was driven and reviewed during the site visit to understand the potential impacts and population at risk. The locations visited and findings were:

1. China Creek Water Dam and caretaker's house. The water supply intake dam is a concrete gravity dam 3 m to 5 m high. The water intake pipe is located through the right side of the dam, from which water flows to the adjacent filtration and pumping station. It is understood that City staff visit the area daily. Approximately 100 m downstream of the dam is the caretaker's house, which is situated about 4 to 5 m above China Creek and permanently occupied. The area is downstream of Lizard Lake Dam.

2. Near the confluence of McFarland Creek and China Creek is a large borrow pit area and equipment yard, Coastal Bridge & Construction Ltd/Dolans Concrete Gravel Pit. The area is relatively flat and is occupied by heavy equipment and a few business buildings. This area was driven past and it appeared to be in operation, with a few pieces of equipment moving in the yard. The area is downstream of both Lizard Lake Dam and Bainbridge Lake Dam.

3. Franklin River Road crosses over China Creek with a bridge. In this location, the creek was estimated to be about 20 m wide and the bridge deck about 10 m above the water. The area is downstream of both Lizard Lake Dam and Bainbridge Lake Dam.

4. China Creek Campground and Marina is located at the mouth of China Creek and Alberni Inlet. The campground appeared very popular with many RV's and families in the area. It is understood that campground has parking capacity for 200 RVs. The area is downstream of both Lizard Lake Dam and Bainbridge Lake Dam.

In addition to the downstream locations visited, it is understood that downstream of Lizard Lake Dam is the China Creek Hydroelectric Dam (a run-of-the-river dam on China Creek), which is owned in a joint partnership by the Hupacasath First Nation, Synex Energy Resources, Ucluelet First Nation and the City of Port Alberni. The City provided photos of this dam, which show it is a concrete dam a few meters high. It is understood that people are routinely located at this dam.

5.0 DAM SAFETY EVALUATION – HYDROTECHNICAL REVIEW

A hydrotechnical review of the dams was completed for this DSR. The scope of work completed includes:

- Hydraulic Performance and Freeboard Assessment including: reviewing published information for the watershed to characterize it to estimate runoff; estimating the 1,000-year and Probable Maximum Precipitation amounts to then determined the Inflow Design Flood (largest flood event that the dam must withstand, in consideration of guidance criteria and the dam's current Consequence Classification); determine lake stage-volume and outlet stage-discharge relationships for the IDF, and evaluate freeboard in consideration of waves (freeboard is the distance from water surface to dam crest).
- A Dam Breach Inundation Study for both dams.
- A review of previously determined Consequence Classifications for both dams, in consideration of the new inundation study, and guidelines provided by CDA (2013) and BC Dam Safety (2017).

These are described in the subsections below.

5.1 Hydraulic Performance / Freeboard

The hydrotechnical assessment of the Lizard and Bainbridge dams follows the guidance from the CDA Technical Bulletin *Hydrotechnical Consideration for Dam Safety* (CDA, 2007). The current practice for the selection of the flood that a dam should be able to withstand, the Inflow Design Flood (IDF), is based on the Consequence Classification that would result from the failure of the dam.

5.1.1 Inflow Design Flood (IDF)

Both the Bainbridge and Lizard dams were classified as Very High Consequence in the respective 2012 DSRs and reconfirmed in this DSR (see Section 5.3). For this Consequence Classification, the CDA recommends an IDF with annual exceedance probability that is 2/3 of the way between the 1/1,000-year flood and the Probable Maximum Flood (PMF).

The PMF is defined as the most severe flood that may be reasonably expected to occur at a particular location. It is generated by the Probable Maximum Precipitation (PMP). Two PMF scenarios were considered for this project:

- Summer-autumn PMF generated by the summer-autumn PMP; and
- Spring PMF, which is defined as the maximum of two cases:
  - PMF calculated as a combination of the spring PMP and a snow accumulation with a frequency of 1/100-year.
  - PMF calculated as a combination of the Probable Maximum Snow Accumulation (PMSA) with a rainstorm frequency of 1/100-year.

These scenarios are further illustrated in Figure 5-1.

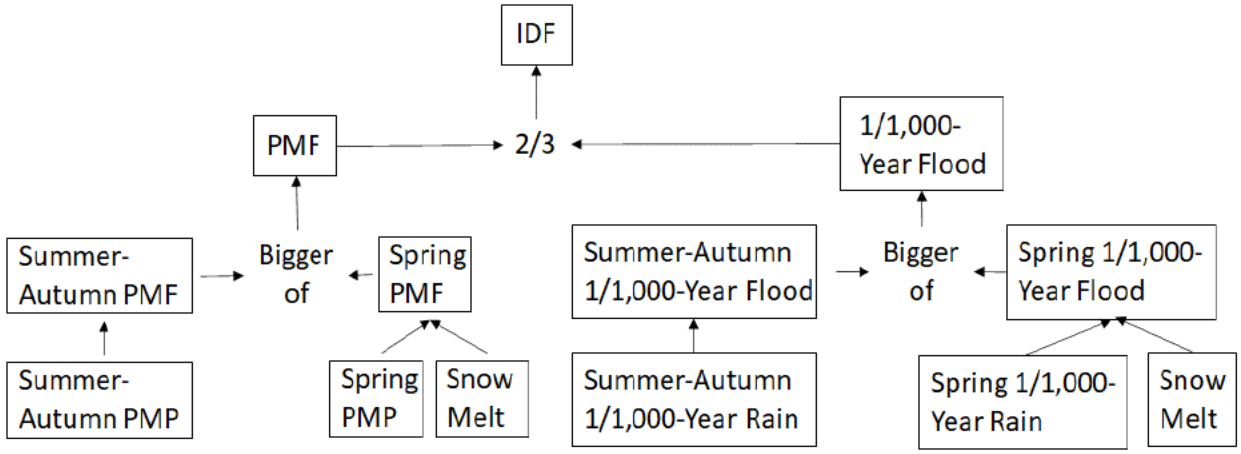

Figure 5-1: Flow Chart of Scenarios Considered for IDF Calculation

5.1.1.1 Probable Maximum Precipitation

For this study, the MetPortal tool developed by DTN was used to determine the 24-hour PMP. The MetPortal site for British Columbia was developed as part of the British Columbia Extreme Flood Project initiated by the British Columbia Ministry of Forests (MOF), the regulator of BC water dams. The tool maximized observed significant storms and transposed these to climatologically and topographically similar areas (DTN, 2020). For this study, the closest transposition point (#28316) is located approximately 2.5 km from Lizard Lake and 9.0 km from Bainbridge Lake.

Climate change projection under a Shared Socioeconomic Pathways (SSP) 5.85 scenario was calculated using the IDF_CC Tool 6.0 developed by Western University (Simonovic, Schardong, Srivastav, & Sandink, 2015). SSP 5.85 is the most conservative scenario of greenhouse gas concentration trajectories stated in Assessment Report 5 of the United Nations Intergovernmental Panel on Climate Change (IPCC). The consensus amongst climate change scientists is that the SSP 5.85 scenario is the likely the climate change projection based on the current level of human activity (EGBC, 2020). The IDF_CC tool also provided rainfall depths for return periods from 1/2-year up to 1/100-year. The PMP and PMP with Climate Change values are summarized in Table 5-1.

Table 5-1: 24-Hour Duration Rainfall Depths with and without Climate Change

Return Period	Depth (mm)	Depth with Climate Change (mm)
2	97	110
10	143	163
25	165	189
50	181	205
100	196	222
PMP	524	594

MetPortal also provided a seasonal adjustment factor for the spring months (February, March, April). The spring PMP are summarized in Table 5-2. All 3 of these PMPs were considered for the IDF calculation as illustrated in Figure 5-1.

Table 5-2: Spring 24-hour Duration PMP Depths

Month	February	March	April
Depth (mm)	594	564	475

5.1.1.2 Snowmelt During PMP

Extreme Flood Guide (Alberta Transportation, 2004) suggests two basic modelling approaches: temperature index and energy budget, with the energy budget approach being more preferable. The energy budget method is typically complex and requires extensive meteorological data; however, for a rain-on-snow situation in a forested watershed, several simplifications can be made. The solar radiation can be assumed to be minimal, and the atmosphere can be assumed to be saturated. In a heavily forested watershed, the wind effects can also be neglected. The snowmelt for this study was calculated using the generalized energy budget equation for rain-on-snow events from *Runoff From Snowmelt* (USACE, 1998). The equation is as follows:

$$M = (3.38 + 0.0126P_r)T_a + 1.3$$

Where:

M = snowmelt, mm/day

P_r = daily rainfall, mm

T_a = mean temperature of the saturated air, °C

The CDA recommends using the 1/100-year temperature as the critical temperature (CDA, 2007). A statistical analysis was conducted on temperature data from Port Alberni Cox Lake (station ID: 266) for February, March, and April. The 1/100-year temperature and the resulting snowmelt is presented in Table 5-3.

Table 5-3: 1/100-Year Temperature and the Resulting Snowmelt

Month	February	March	April
1/100-Year Temperature (°C)	10.9	12.9	17.5
Snowmelt (mm)	120	137	165

5.1.1.3 1/1,000-Year Rainfall

The estimation of the 1/1,000-year flood follows the guidance in *Guidelines on Extreme Flood Analysis* (Alberta Transportation, 2004). The 1/1,000 rainfall is calculated by interpolating between the 1/100-year rainfall (222 mm) and the PMP (594 mm). The PMP is assigned a return period of 1/10,000-years. The 1/1,000-year rainfall depth was calculated to be **374 mm**.

5.1.1.4 1/1,000-Year Snowmelt

Two 1/1,000-year snowmelt scenarios are considered:

- Scenario 1 – rainfall dominated: a 1/1,000-year spring rainfall event is combined with average snowmelt.
- Scenario 2 – snowmelt dominated: a 1/1,000-year snowmelt is combined with an average spring rainfall event.

The average snowmelt was calculated using the average temperature. The 1/1,000-year snowmelt was calculated using the 1/1,000-year temperature. The results are summarized in Table 5-4. Scenario 1 was determined to be the critical scenario as the difference between the 1/1,000-year spring rainfall and the average spring rainfall is significantly larger than the difference in the snowmelt dominated scenario.

Table 5-4: 1000 year Snowmelt depths for Each Scenario (mm)

Scenario	February	March	April
1 – Rainfall Dominated	45	62	83[1]
2 – Snowmelt Dominated	53	57	70

1 – The snowmelt equation considers the coinciding rainfall. The average snowmelt estimated is higher than the 1/1,000-year snowmelt since the 1/1,000-year rainfall during the snowmelt is significantly higher than the average rainfall.

5.1.1.5 Inflow Design Flood (IDF)

The flood event 2/3 between the 1,000-year and PMF was calculated for February, March and April to determine the critical event to define the IDF. The rainfall for March and April were reduced by 5% and 20% respectively based on the seasonality factors provided by MetPortal. A summary of the IDF rainfall and snowmelt for each month is presented in Table 5-5. February produced the largest combination of rainfall and snowmelt and is therefore selected as the critical IDF event.

Table 5-5: IDF Depths for February, March and April

	February	March	April
Rainfall			
PMP (mm)	594	564	475
1/1,000-Year Rainfall (mm)	374	356	299
IDF Rainfall (mm)	521	495	417
Snowmelt			
Snowmelt During PMP (mm)	120	137	165
Snowmelt During 1/1,000-Year Rainfall (mm)	45	62	83
IDF Snowmelt (mm)	95	112	138
Total			
IDF Depth (mm)	**616 (Determined critical event)**	607	554

5.1.1.6 Hydrologic Model

A hydrologic model was developed in HEC-HMS version 4.10 to simulate the hydrologic process and determine the flow and volume of runoff during the spring IDF events. Watershed delineation was completed using Natural Resources Canada (NRC) digital elevation model (DEM) and the delineation tool in PCSWMM version 7.5.3406. The overall China Creek catchment and the contributing Bainbridge Lake and Lizard Lake catchments are shown in Figure 5-2. The size of the Bainbridge Lake catchment is 13.2 km^2, of which 0.25 km^2 is the surface of the lake. The size of the Lizard Lake catchment is 2.56 km^2, of which 0.21 km^2 is the surface of the lake.

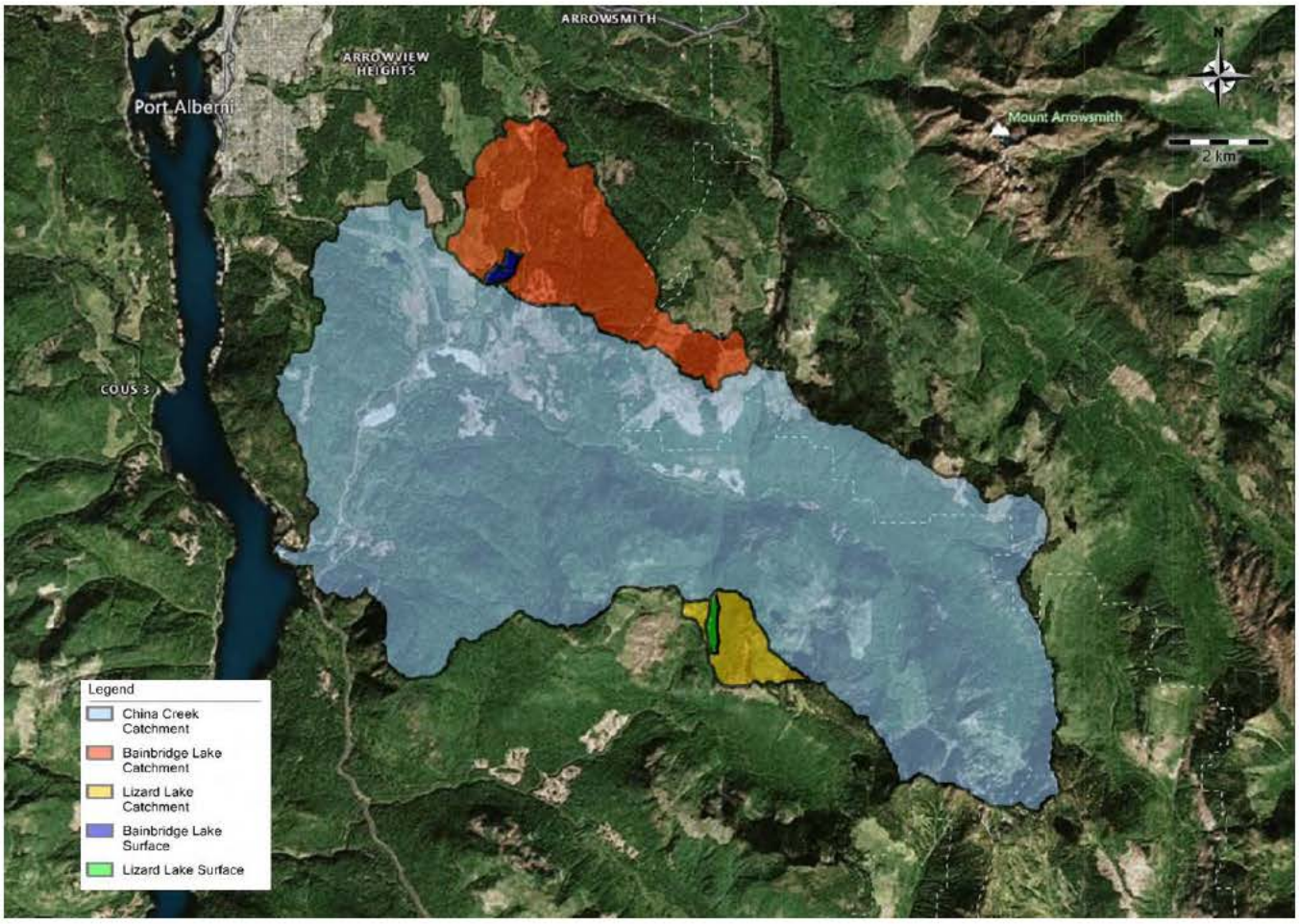

Figure 5-2: Bainbridge Lake and Lizard Lake Catchment, and China Creek Overall Catchment

The HEC-HMS model was calibrated against a flow event that occurred between August 7th and August 25th in 1991 and validated against a flow event that occurred between June 10th and June 30th in 1994. The calibration and validation process should be considered high-level as several uncertainties exist:

- The flow data and rainfall data are recorded daily. This timeframe is the same length as the entirety of the design event. The temporal resolution is not high enough to develop a detailed hyetograph based on historical trends.
- The amount of rainfall recorded by the Environment Canada (EC) gauge is a point value and may not reflect the amount of rain fallen over the entire extent of the catchment.

- The watershed landcover properties during the time of the calibration and validation events are unknown (these characteristics are often impacted by logging activities and/or forest fires).
- Information regarding the waterbodies within the China Creek catchment were not available at the time of the events.
- The operations of the two dams along China Creek at the time of the events are unknown.

To account for the uncertainty within the parameters, a Monte Carlo simulation was used to perform a sensitivity analysis through 8,000 combinations of various parameter values (curve number, lag time, manning's n) to establish a range of possible runoff rates likely to take place within the watershed. The uncertainty analysis assumes that the watershed properties do not change dramatically (e.g., landslides or forest fires). The lakes are assumed to be at their maximum normal elevation (spillway crest elevations) at the start of the event. The resulting water elevation for Bainbridge and Lizard Lakes are presented in Figure 5-3 and Figure 5-4. The 95th percentile was used for the freeboard assessment. As the results show, the Bainbridge Lake Dam will overtop during the IDF, regardless of waves. Note that the assessment does not consider overtopping flow across the dam crest, thus the elevation shown is likely higher than what would be observed should overtopping occur.

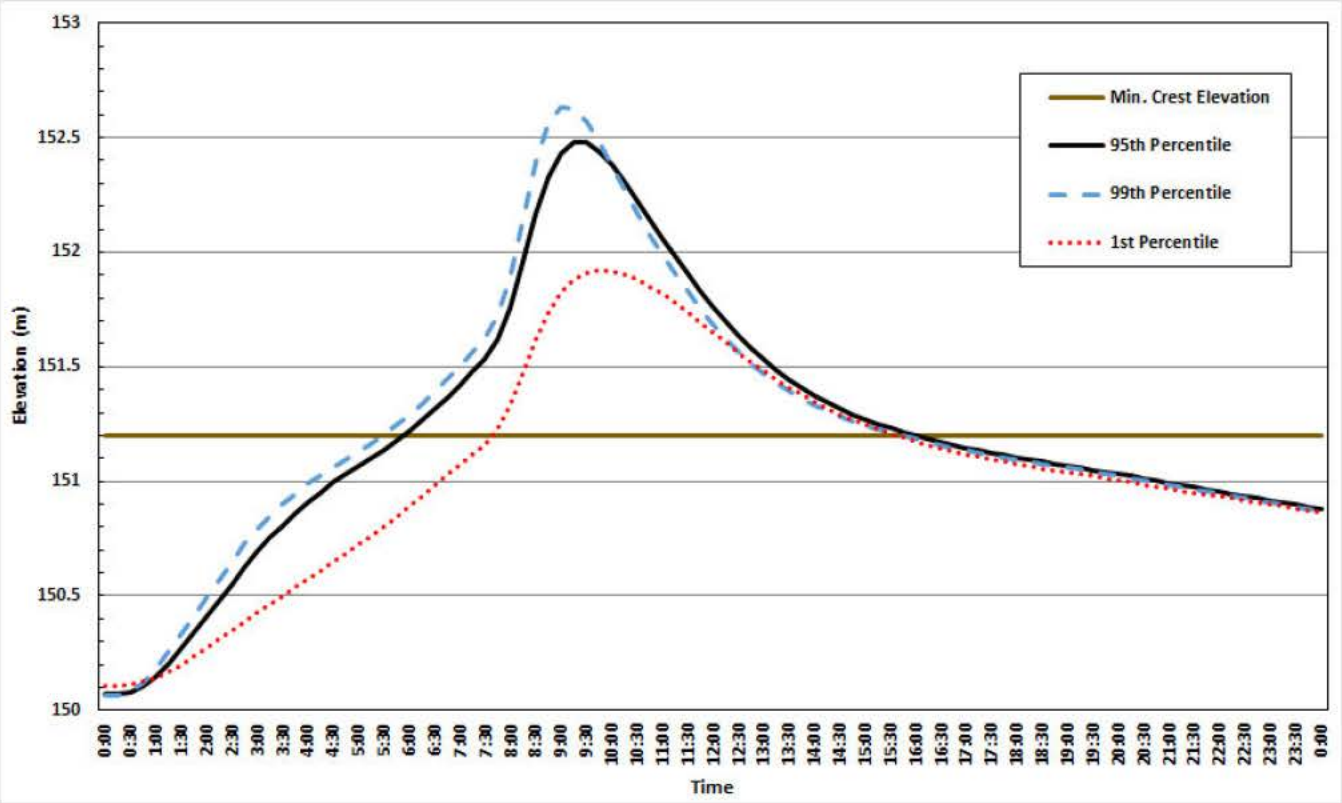

Figure 5-3: Bainbridge Lake Estimated Water Elevation During IDF Event

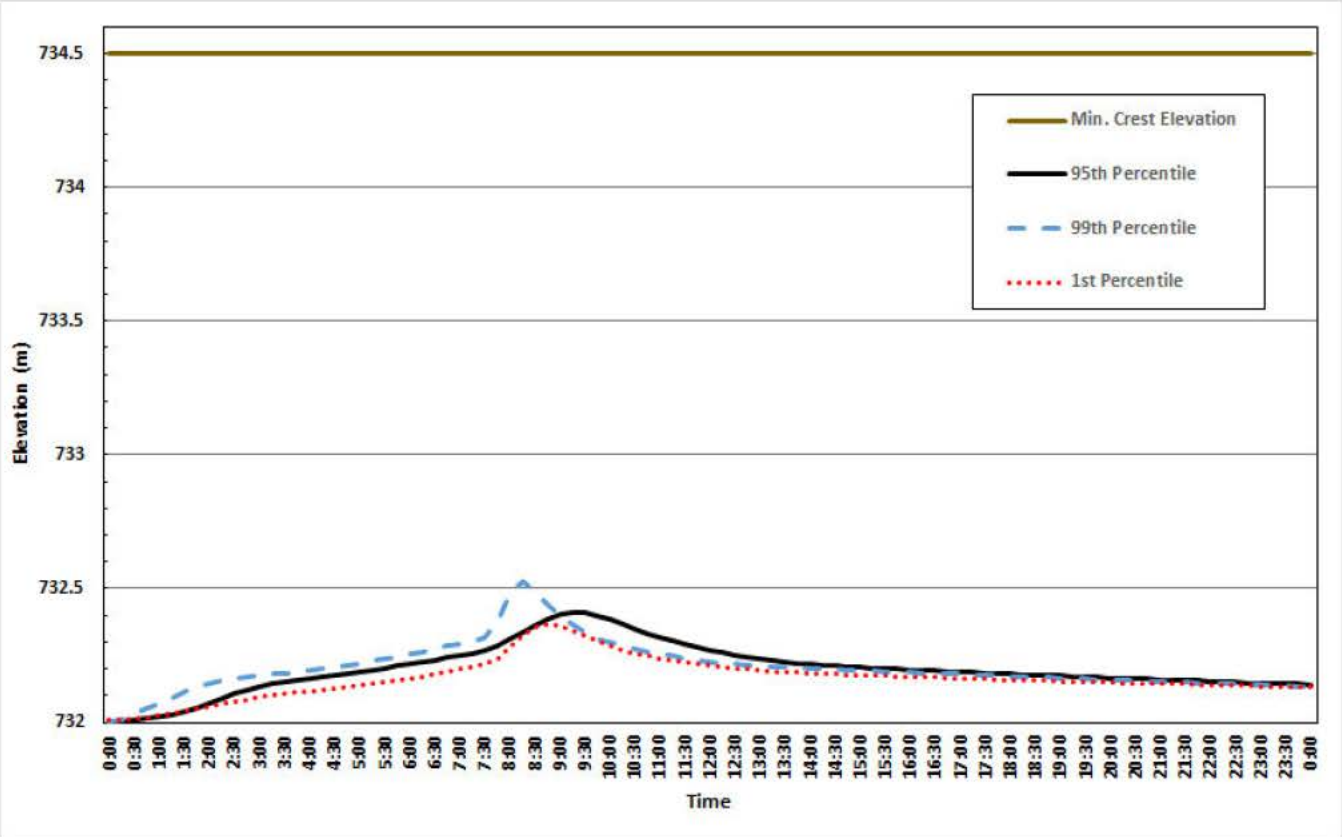

Figure 5-4: Lizard Lake Estimated Water Elevation During IDF Event

5.1.1.7 Freeboard Assessment

The CDA defines the freeboard as the vertical distance between the reservoir level and the crest of the containing structure. For Dams of Very High Consequence Classification, the crest of the embankment structure should be set such that the structure is protected against the following cases:

- No overtopping by 95% of the waves caused by the most critical wind with a frequency of 1/1,000-year when the reservoir is at its maximum normal elevation.
- No overtopping by 95% of the waves caused by the most critical wind with a frequency of 1/2-year when reservoir is at its maximum extreme level during the passage of the IDF.

Port Alberni AUT climate station (station ID: 8045) contains hourly wind data from 1994 to 2021 and Port Alberni Airport climate station (station ID: 264) contains hourly wind data from 1969 to 1995. The frequency analysis was completed following the procedures in *On the Methodology of Selecting Design Wave Height* (Goda, 1989). The results of the analysis are summarized in Table 5-6.

Table 5-6: Results of Frequency Analysis on Hourly Wind Data

	1/2-Year Wind Speed (m/s)	1/1,000-Year Wind Speed (m/s)
Northerly Wind	6.84 ± 0.11 m/s	12.36 ± 1.22 m/s
Southerly Wind	14.01 ± 0.44 m/s	23.89 ± 2.02 m/s

Wind-driven deep-water waves within the reservoir were calculated following the procedures in *Shore Protection Manual* (USACE, 1984). The significant wave height was calculated as:

$$H_s = 1.616 * 10^{-2} * U_A * F^{1/2}$$

$$T = 6.238 * 10^{-1}(U_A * F)^{1/3}$$

$$U_A = 0.71 * U^{1.23}$$

Where

H_s = significant wave height (m)

F = fetch length (km)

T = wave period (s)

U = wind speed (m/s)

U_A = wind stress factor

The fetch of Bainbridge Lake and Lizard Lake are estimated to be 0.65 km and 1.2 km respectively based on satellite imagery. In accordance with the CDA (CDA, 2007), a factor of 1.37 was applied to the significant wave height to determine the average of the highest 5% of all waves.

Wind setup, the "piling up" of water at the downwind end of a body of water, was calculated using the equation in *Hydrotechnical Consideration for Dam Safety* (CDA, 2007):

$$S = \frac{U^2 * F}{Kd}$$

Where:

S = wind setup above still water level (m)

U = wind speed (m/s)

F = fetch length (m)

d = average reservoir depth (m)

K = constant = 4850

Wave runup, which is the height of water running up the slope of an embankment due to waves breaking against it, is calculated using an empirical chart from *Hydraulic Structures* (Smith, 1995). The chart returns runup values based on the wave height, wavelength, and embankment slope.

Computed values for wind setup and wave runup are included in the freeboard assessment summary presented in Table 5-7 and Table 5-8. Lizard Lake Dam has adequate freeboard under both flood and normal operating scenarios. Bainbridge Lake Dam has sufficient freeboard under the maximum normal operating conditions but will overtop during the passage of the IDF, regardless of wave height. This finding is consistent with the previous 2012 DSRs. It is noted that the dam spillway and crest elevations, are based on elevations shown on the as-constructed drawings (AE, 1963 and 1984). A survey of the dam crest and the spillway should be completed to confirm the

values used in the calculations **(Recommendation)**. If the IDF event will indeed overtop Bainbridge Lake Dam, then the dam should be upgraded (**Recommendation)**. Upon further review of the LiDAR, we have also identified several low spots along the shoreline of the Bainbridge Reservoir (highlighted in Figure 5-5). These low spots are at a similar elevation to the crest of the dam. A more detailed review of these low spots will be required during the dam upgrade design process, so these areas should also be surveyed **(Recommendation).**

Table 5-7: Summary of Freeboard Assessment for Bainbridge Lake Dam

Scenario	Lake Level at Max Normal Elev.	Lake Level During Passage of IDF
Crest Elevation (m)	151.2	
Still Pool Lake Level (m)	150.0	152.5[1]
Wind Frequency	1/1,000	1/2
Wind Setup (m)	0.0	0.0
Wave Runup (m)	0.5	0.2[2]
Required Freeboard (m)	0.5	0.2
Combined Elevation (m)	150.5	152.7
Available Freeboard (m)	0.7	<0.0

1 – Overtopped. The assessment did not consider overtopping flow across dam crest. This elevation is likely higher than what would be observed should overtopping occur.
2 – Assumes no changes from erosion to the embankment slope despite overtopping.

Table 5-8: Summary of Freeboard Assessment for Lizard Lake Dam

Scenario	Lake Level at Max Normal Elev.	Lake Level During Passage of IDF
Crest Elevation (m)	734.5	
Still Pool Lake Level (m)	732.0	732.4
Wind Frequency	1/1,000	1/2
Wind Setup (m)	0.0	0.0
Wave Runup (m)	1.1	0.6
Required Freeboard (m)	1.1	0.6
Combined Elevation (m)	733.1	733.0
Available Freeboard (m)	1.4	1.5

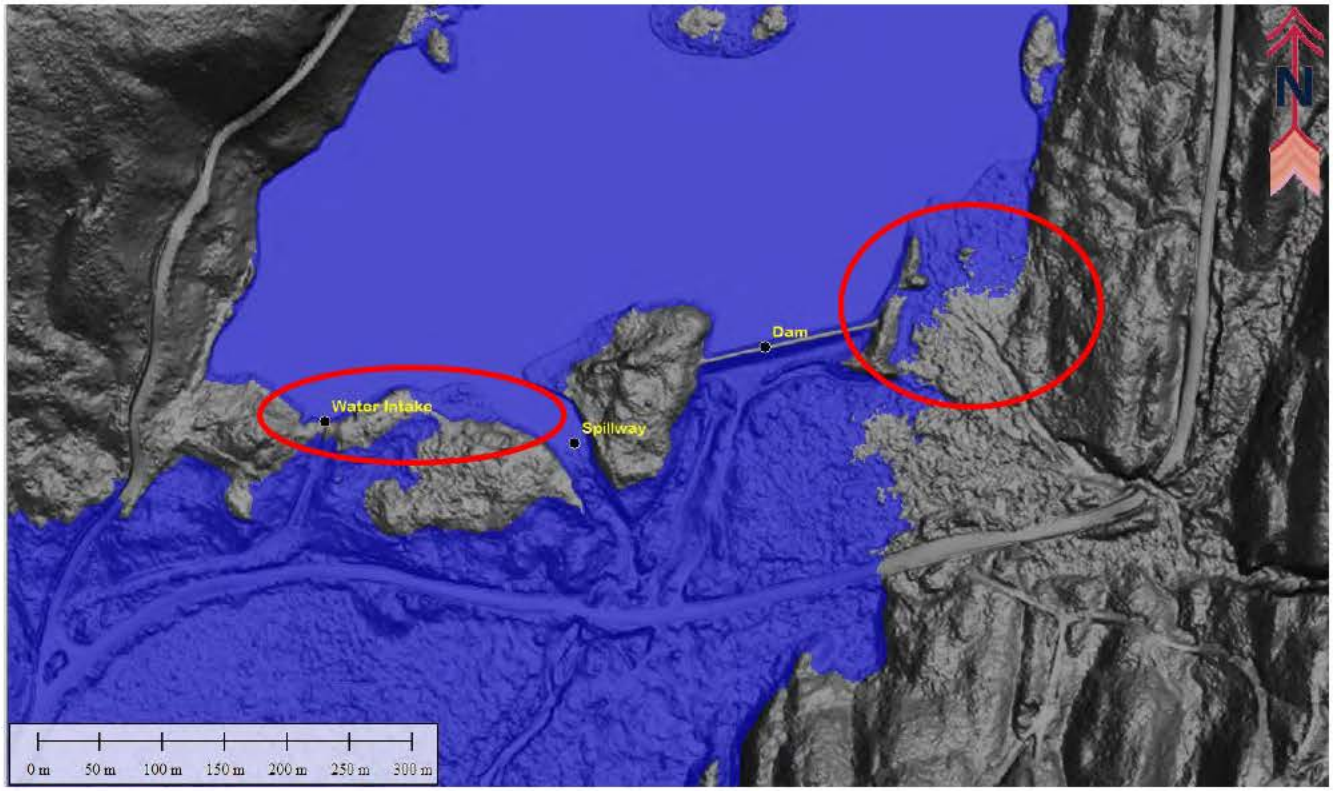

Figure 5-5: Bainbridge Lake Shore and Dam Crest, during high water (blue) compared to low areas of Lake Shoreline (identified with Red Circles)

5.2 Inundation Study

A dam breach inundation study was completed to estimate the discharge from a potential breach of the dams and the resulting inundation of the downstream channel and floodplain. Two categories of failures were considered:

- Sunny-day Failure – Sudden dam failure during normal operations; and
- Flood-induced Failure – Dam failure resulting from a flood event.

The estimation of the breach parameters follows the guidance of *USACE report TD-39* (Brunner, 2014). For earthfill embankment dams, two potential breach types are possible:

1. Overtopping failure when the reservoir elevation exceeds the crest of the dam and a head cut erosion process starts on the downstream side of the dam embankment. The head cut will continue to erode through the embankment and widen at the same time until it reaches the natural bed elevation.

2. Piping failure when water seeps through the dam at a rate significant enough to internally erode the dam material and transport it out of the dam embankment. The "pipe" will grow and as a result the flow will increase, thus promoting greater erosion of material. Eventually, the material forming the dam embankment above the piped area will slough and possibly cave completely, releasing even greater amounts of water.

Both dams drain into China Creek; as such, five different failures were considered as summarized in Table 5-9. Overtopping breach was not considered for the Lizard Lake Dam as the structure has adequate freeboard. Simultaneous breaching of both dams was also not examined as such scenario has low probability to occur, since failure of 1 dam would not result in the failure of the other dam. Cascading failures of China Creek hydroelectric dam and water supply dam were not considered as the China Creek structures were beyond the scope of this assessment. Case 2 and Case 5 results in the largest peak outflow for the breach of each respective dam, so inundation maps for these outflow breaches were created and are provided in Appendix D.

Table 5-9: Bainbridge and Lizard Lake Dams Breach Combinations

	Bainbridge Breach	Lizard Breach
Case 1	Overtopping	X[1]
Case 2	**Flood-induced Piping**	**X**
Case 3	Sunny-day Piping	X
Case 4	X	Sunny-day Piping
Case 5	**X**	**Flood-induced Piping**

1 – "X" indicates no breach scenario evaluated

Several regression equations exist based on historical data for earthfill dams, earthfill dams with impervious cores, and rockfill dams to estimate the dimensions of a breach and the failure time, as outlined in *Using HEC-RAS for Dam Break Studies* (Brunner, 2014). These include: Froehlich (1995a), Froehlich (2008), MacDonald and Langridge-Monopolis (1984) and Von Thun and Gillette (1990). HEC-HMS was used to simulate the breach.

The hydrographs extracted from HEC-HMS were then used as the inflow boundary conditions in a HEC-RAS V6.3 two-dimensional hydrodynamic model. Publicly available 0.75 arc seconds resolution DEM from Natural Resources Canada (NRCan) was used for the modeling (resolution of 20 m or lower). The DEM was supplemented with LiDAR data collected in 2019 and available through the Province of British Columbia Open LiDAR Port. The LiDAR section is highlighted in Figure 5-6. It should be noted that the NRCan surface does not provide a detailed resolution of the river channel. Manual editing was needed to increase the resolution of sections of China Creek by linearly interpolating between known elevations extracted from topographic map contours. Williams Creek draining from Lizard Lake into China Creek was also not modeled due to model limitations and its inability to accurately model steep channel slopes. This section is also highlighted in Figure 5-6.

Inundation maps showing the flood extent, water depth, and peak arrival time are presented in Appendix D. Map 1-1 to 1-3 shows the inundation during the IDF event with no breaches through either dams. Map 2-1 to 2-3 is the inundation resulting from Case 5, which is the highest Lizard Lake Dam breach outflow. Map 3-1 to 3-3 shows the inundation resulting from Case 2, which is the highest Bainbridge Lake Dam breach outflow.

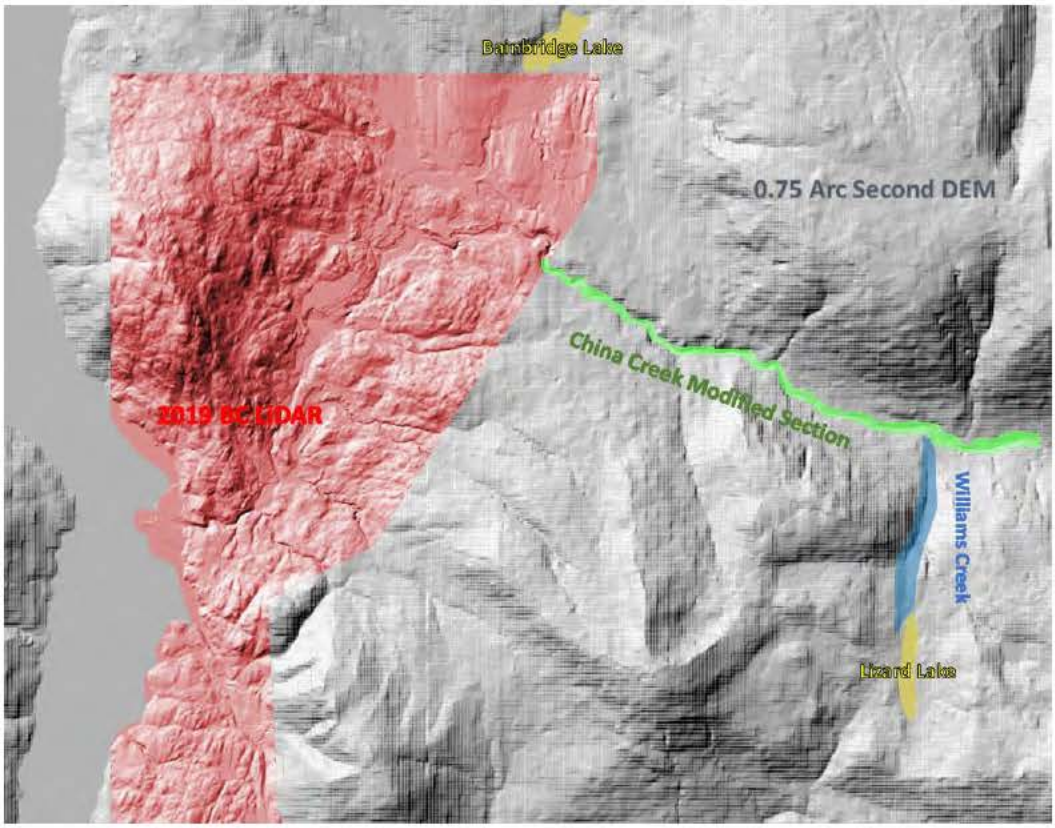

Figure 5-6: Surface Used in Hydrodynamic Model

5.3 Consequence Classification

The CDA guideline (2013) and BC Dam Safety Guideline (2017) classify dams based on the **incremental** consequence of a postulated dam failure (CDA, 2007). This classification is then used to determine dam safety management frequencies and loading criteria for analysis (flood and earthquake magnitudes).

The **incremental** consequences of failure are defined as the total incremental damage associated from a dam failure as compared to the same event had the dam not failed. The criteria for dam consequence classification are outlined in Table 5-10, and considers population at risk, loss of life, environmental and cultural losses, and infrastructure and economic losses. The consequence classification is determined by the highest potential consequences from these four categories of loss.

The 2012 DSR previously determined the Consequence Classification of both the Bainbridge Lake Dam and the Lizard Lake Dam as Very High. This finding was based on a qualitative review of a postulated breach (i.e., no formal inundation study had been done). For the 2012 DSRs, Bainbridge Lake Dam was classified as a Very High consequence dam in all four loss categories, whereas the Lizard Lake Dam had a High consequence classification for loss of life and a Very High consequence for environmental and cultural losses, and economic and social losses. For this DSR, the consequence classification was re-evaluated based on the findings from the Inundation Study (Section 5.2).

Table 5-10: Dam Consequence Classification Criteria (CDA, 2013)

Dam Classification	Population at Risk [1]	Loss of Life [2]	Environmental and Cultural Values Incremental Losses	Infrastructure and Economic Incremental Losses
Low	None	0	▪ Minimal short-term loss ▪ No long-term loss	▪ Low economic losses ▪ Area contains limited infrastructure or services
Significant	Temporary only	Unspecified	▪ No significant loss or deterioration of fish or wildlife habitat ▪ Loss of marginal habitat only ▪ Restoration or compensation in kind highly possible	▪ Losses to recreational facilities, seasonal workplaces, and infrequently used transportation routes
High	Permanent	≤ 10	▪ Significant loss or deterioration of *important* fish or wildlife habitat ▪ Restoration or compensation in kind highly possible	▪ High economic losses affecting infrastructure, public transportation, and commercial facilities[3]
Very High	Permanent	≤ 100	▪ Significant loss or deterioration of *critical* fish or wildlife habitat ▪ Restoration or compensation in kind possible but impractical	▪ Very high economic losses affecting important infrastructure or services (e.g., highway, industrial facility, storage facilities for dangerous substances)
Extreme	Permanent	> 100	▪ Major loss of *critical* fish or wildlife habitat ▪ Restoration or compensation in kind impossible	▪ Extreme losses affecting critical infrastructure or services (e.g., hospital, major industrial complex, major storage facilities for dangerous substances)

Table adapted from Table 2-1 of CDA Dam Safety Guidelines (CDA, 2013).

[1] Definitions for Population at Risk:

None – There is no identifiable population at risk, so there is no possibility of loss of life other than through unforeseeable misadventure.

Temporary – People are only temporarily in the dam-breach inundation zone (e.g., seasonal cottage use, passing through on transportation routes, participating in recreational activities).

Permanent – The population at risk is ordinarily located in the dam-breach inundation zone (e.g., as permanent residents); three consequence classes (High, Very High, Extreme) are proposed to allow for more detailed estimates of potential loss of life (to assist in decision-making if the appropriate analysis is carried out).

[2] Implications for Loss of Life:

Unspecified – The appropriate level of safety required at a dam where people are temporarily at risk depends on the number of people, the exposure time, the nature of their activity, and other conditions. A higher class could be appropriate, depending on the requirements. However, the design flood requirement, for example, might not be higher if the temporary population is not likely to be present during the flood season.

[3] The BC Dam Safety Guideline on Downstream Consequence of Failure Classification Interpretation (2017) clarifies that if a dam is the sole source of water for a community and the water system could be down for an extended period of time, the consequence classification of the dam should be high or greater depending on the number of residents, business and the other critical infrastructure that would be affected.

5.3.1 Loss of Life

To review the consequence classification, the potential loss of life in the populated inundated areas was examined. The potential for loss of life depends on highly uncertain and variable factors, such as time of day, advance warning, the response of the individuals. The CDA states “No simple, reliable, or universally applicable methodology is

available – different methods can produce very different estimates of loss of life" (CDA, 2013). For this assessment, we utilized *Guidelines for Estimating Life Loss for Dam Safety Risk Analysis* by U.S. Department of the Interior Bureau of Reclamation (U.S. Department of the Interior Bureau of Reclamation , 2014). The document provides an empirical method that relies on case history data. The method employs a graphical approach that provides the fatality rate based on DV (depth x velocity). The fatality rate multiplied by the population at risk (PAR) provides the estimated number of lives lost.

Tetra Tech identified three locations with permanent/semi-permanent populations: Coastal Bridge & Construction Ltd., Dolans Concrete Gravel Pit, and China Creek Campground and Marina. These areas are shown on the inundation maps in Appendix D. The China Creek hydroelectric dam and water supply dam have staff in the vicinity of the dams on a regular basis, including a permanent caretaker at the water supply dam. The estimated fatality rate for no dam failure and the failure cases is summarized in Table 5-11. In the table, Coastal Bridge & Construction Ltd and Dolans Concrete Gravel Pit were considered to be in the same general area. The China Creek hydroelectric dam and water supply are not included in Table 5-11, as they cannot be assessed quantitatively as high resolution topographic information is not available for this location. It was noted during the site visit that the care keeper's house at China Creek Water Supply dam is elevated above the channel so it is unlikely to be inundated.

Case 1, 4, and 5 saw no incremental increase in fatality rate. Case 2 saw an increase in fatality rate from <0.01 to 0.01 – 0.02 at Coastal Bridge & Construction Ltd/Dolans Concrete Gravel Pit and Case 3 saw an increase from no fatality to <0.01 at the gravel pit. For a Very High classification, the incremental loss of life is defined as more than 10 people (CDA, 2007). For this number of potential fatalities, the Case 2 PAR would have to be more than 500 people (500 x 0.02 = 10 people) and the Case 3 PAR would have to be more than 1,000 people (1,000 x 0.01 = 10 people). Based on the observations during the site visit, the incremental loss of life is likely to be less than 10 people as most areas would have similar level of fatality rate with or without a breach; therefore, a High classification is considered appropriate for this loss category, for both dams.

Table 5-11: Fatality Rate for No Failure and Failure Scenarios Due to Flood Water

Scenario	Coastal Bridge & Construction Ltd/Dolans Concrete Gravel Pit Fatality Rate	China Creek Campground & Marina Fatality Rate
IDF No Failure	**<0.01**	**<0.01**
Case 1 – Bainbridge Overtopping Failure	<0.01	<0.01
Case 2 – Bainbridge Flood Induced Piping Failure	0.01 – 0.02	<0.01
Case 5 – Lizard Flood Induced Piping Failure	<0.01	<0.01
Mean Annual Flow (Sunny)- No Failure	-[1]	-[1]
Case 3 – Bainbridge Sunny Day Piping Failure	<0.01	-[1]
Case 4 – Lizard Sunny Day Piping Failure	-[1]	-[1]

1 – Flood water does not reach the PAR

5.3.2 Economic and Social Losses

The incremental impact following the failure of either the Bainbridge Lake Dam or the Lizard Lake Dam is likely to impact the following sites and the associated infrastructure based on the inundation mapping:

- Both dams: China Creek Campground & Marina;
- Both dams: Coastal Bridge & Construction Ltd and the adjacent Dolan's gravel pit;
- Both dams: Multiple TELUS and BC Hydro power supply lines;
- Both dams: The City's water supply infrastructure including water supply pipelines. Specifically, a failure of Bainbridge Lake Dam could damage the water supply pipeline from China Creek Water Supply Dam, resulting in loss of both drinking water sources for the City; and it is understood that there are no other drinking water sources available;
- Both dams: the forest road network which would delay access to repair the breached dam and the other major infrastructure. Loss of this road network could cutoff road access to the community of Bamfield (population of about 200 people); and
- Failure of Lizard Lake Dam is expected to damage the China Creek Hydroelectric Dam and China Creek Water Supply Dam since these are situated in the China Creek channel. No high-resolution topographic information is available for these locations, so the inundation extent is approximate and cannot be used to quantify the expected losses.

Based on a qualitative review of the economic and social losses, these are considered important infrastructure (specifically loss of water supply for the City) so the consequence classification for both dams for this category of loss should remain at Very High. A detailed economic assessment would be required to lower this category of loss, however in our opinion this is not required at this time.

5.3.3 Environmental and Cultural Losses

A desktop study of available online resources was conducted to determine the known presence of Federally-Listed Species at Risk and their habitat in the inundation zone. The results were as follows:

- Three occurrences of Northern Red-legged frog (Rana Aurora) were identified within the inundation zone – this species is listed as Special Concern on Schedule 1 of Species at Risk Act (SARA);
- Two occurrences of Marbled Murrelet (sea bird) (Brachyramphus Marmoratus) critical habitat were identified within and near the inundation zone – the species is listed as Threatened on Schedule 1 of SARA;
- Parts of the inundation zone fall within Little Brown Myotis (bat) (Myotis Lucifugus) critical habitat – this species is listed as Endangered on Schedule 1 of SARA; and
- Parts of the inundation zone fall within Northern Myotis (bat) (myotis Septentrionalis) critical habitat – this species is listed as Endangered on Schedule 1 of SARA.

Additionally, a desktop online search was conducted to identify known archaeological and cultural resources at or near the inundation zone. There are no publicly available records within the inundation zone.

As both dams contain drinking water (i.e., no hazardous materials such as from waste storage dams), it is anticipated that restoration or compensation for environmental losses are possible, so the controlling category of loss would be at most Very High. As this is the consequence from the Economic and Social Loss category, no additional evaluation of environmental or cultural losses is required at this time.

5.3.4 Summary

The Consequence Classification for both Bainbridge Lake Dam and Lizard Lake Dam should remain at Very High given the controlling categories of loss of economic and social losses. Losing access to drinking water for the City is by far the greatest consequence of potential dam failure of either dam.

6.0 DAM SAFETY EVALUATION - GEOTECHNICAL REVIEW

For this DSR, an audit style review of available geotechnical information was completed and is summarized in the following subsections. The review for each dam included:

- Review of available design information, construction records and publicly available geological maps to determine an understanding of the dam fill and foundation conditions. Comments on whether the construction records have sufficient details to be confident in the composition of the dams and if the foundation preparation and design is appropriate in consideration of current standards of practice. Additionally, comments on if the measured and observed performance match design expectations.
- Determine screening level seismic loading for the dams, in consideration of earthquake design ground motion (EDGM) with respect to the new seismic hazard values published by NRCan for the 2020 National Building Code of Canada (NBCC). The EDGM was selected based on the consequence classification of both dams as Very High.
- Assessment of stability using a 2D model created using the software Geostudio (2021) to compare to previous findings.
- Screening review of seismic stability in consideration of liquefaction and deformation potential.
- Review of seepage analysis to determine if it is appropriate and provides sufficient information to assess piping, internal erosion and pore water pressure concerns.

Where appropriate, recommendations have been made to address the identified deficiencies and non-conformances. Recommendations are focused on identifying work that should be completed to bring the dams into compliance with current standards of practice.

6.1 Dam Fill and Subsurface Conditions

Provided background reports and publicly available mapping for the area were reviewed to understand the dam fill and foundation conditions. For surficial geology and bedrock mapping, a 1:50,000 scale terrain map “92 F/2, Alberni Inlet”, dated 1972 and a geospatial dataset maintained by EMLCI (BC Geological Survey Open File 1994-6) were reviewed with respect to mapped soil types in the area of the two dams. Details from these sources were cross referenced with other available sources of background information such as the BC Ministry of Environment Soil Survey Reports and Geoscience BC bedrock geology maps to corroborate the review findings.

The as-constructed drawings described are reproduced for reference in Appendix B.

6.1.1 Lizard Lake Dam

Surficial and Bedrock Geology Mapping

The mapping review indicated that surficial geology in the area of the dam consists of:

- Sandy soils (particle size up to 2 mm nominal diameter), glacial till in origin (mapped as morainal till), with blanket to veneer type surface expression.
- Sandy soils (particle size up to 2 mm nominal diameter), colluvial in origin, with veneer type surface expression.

Colluvial soils are generally expected to be loose to compact as these are soils formed from relocated erosional materials (for example landslide debris). Till origin soils may be loose to very dense depending on the depositional environment of the soil; glacial ice contact materials would be expected to be less dense than basal till soils, which would have been overridden by glaciers and are generally very dense.

The bedrock geology in the area of the dam consists of rocks belonging to the Karmutsen Formation. The Karmutsen Formation includes basalt pillowed flows, pillow breccia, hyaloclastite tuff and breccia, massive amygdaloidal flows, minor tuffs, interflow sediment and limestone lenses. Based on the "blanket" to "veneer" surface expressions described for the surficial geology, bedrock is expected to be relatively close to surface.

As-constructed Documentation

Details of the Lizard Lake Dam are shown on the "As Constructed" drawings titled Lizard Lake Dam, dated September 1985, by Associated Engineering (drawings V67H-21-101 to -110). Review of these drawings indicates the Lizard Lake Dam is an earthfill embankment structure that was constructed using the following general sequence and materials:

- Foundation preparation is described to have involved excavation and removal of loose soils and organics throughout the footprint of the dam. Additionally, a 3.0 m wide key trench was excavated near the middle of the dam to expose dense till.
- The drawings show that the foundation was variable along the alignment of the dam, with the constructed embankment ranging in height from 0 to 7 m. The tallest sections of the dam are near station 0+080, 0+170 and 0+230.
- A core zone constructed of "Till" (Zone C). Gradation of the Zone C material is not described on the drawings. The core zone is shown as being constructed with a crest width of 2.0 m; outside slopes of the core zone varied along the alignment of the dam as follows:
  - Sta. 0+000 (south end of dam, near access gate) to Sta. 0+130: typical sections show 1.5H:1V outside slopes.
  - Sta. 0+140 to Sta. 0+320 (north end of dam): typical sections show 0.5H:1V upstream slope, 1.5H:1V downstream slope.
  - The drawings show that natural ground elevations were above the crest of dam near Sta. 0+130 to 0+140 and 0+280 and 0+290 and it is assumed that there is no core zone in these locations.
- Filter cloth was placed on the crest, the downstream side of the core zone and the downstream dam foundation. There are no details on the type of filter cloth (e.g., woven, nonwoven, apparent opening size, etc.).
- Crushed rock - A 500 mm thick layer of 75 mm minus nominal size crushed rock (Zone B) was placed on the filter cloth. A gradation curve for the 75 mm minus material indicates that the material has a maximum particle size of 80 mm and a maximum fines content of 10%.

- Rockfill - A zone of rockfill (Zone A) was constructed on the outside of the embankment. A gradation curve for the rockfill indicates the material has a maximum particle size of 200 mm and a maximum fines content of 10%. The material is shown as placed with a crest width of 4.0 m, outside slopes of 2H:1V, and a minimum thickness of 500 mm on the embankment crest.

Subsurface Investigation

No subsurface investigations have occurred for Lizard Lake Dam based on the information provided.

6.1.2 Bainbridge Dam

Surficial and Bedrock Geology Mapping

The mapping review indicated that surficial geology in the area of the dam consists of fluvial soils described as gravel having rounded particles up to 256 mm nominal diameter, with fan type surficial expression. Fluvial soils are expected to be loose to compact in consistency as these soils are deposited by flowing water.

The review indicated that bedrock geology in the area of the dam consists of the following:

- Nanaimo Group of undivided sedimentary rocks. Nanaimo Group rocks include conglomerate, coarse to fine sandstone, siltstone, shale and coal.
- Island Plutonic Suite. The Island Plutonic Suite includes granodiorite, quartz diorite, quartz monzonite, diorite, agmatite, feldspar porphyry, minor gabbro and aplite rocks.

As-constructed Documentation

Details of the Bainbridge Dam are shown on the “As Constructed” drawings titled Bainbridge Lake Dam, dated September 1963, by AE (drawings 626 W-314, to -317). Review of the drawings indicates the following general conditions of the Bainbridge Dam foundation and fill:

- Information from two test pits is shown on the drawings and is summarized in Table 6-1. However, the locations of the test pits are not shown on the drawings.
- Foundation preparation is not documented or shown on the as-constructed drawings.
- The dam was constructed with an “impervious” core zone and upstream blanket. The core zone is depicted as 2.4 m wide with vertical sides. The upstream blanket is depicted as 0.9 m thick and extends 50 m into Bainbridge Lake from the centerline of the dam.
- A zone of “Random Pervious Compacted Fill” was placed upstream and downstream of the core zone and forms the dam shell. The random fill was placed with a crest width of 2.4 m, 3H:1V upstream slopes, 2.5H:1V downstream slopes, and a minimum thickness of 0.6 m above the core zone.

Table 6-1: Bainbridge Dam As-Constructed Drawing Testpit Log Summary

Soil Description	Test Pit 1001	Test Pit 1002
	Elevation Encountered (Layer Thickness) meters	
Topsoil and Disturbed Sand and Gravel	147.2 – 147.8 (0.6)	-
Sand and Gravel, varying amounts of cobbles, topsoil / organic matter, loose.	145.8 – 147.2 (1.4)	144.8 – 148.1 (3.3)
Peat or Organic Silt	-	143.6 – 144.8 (1.2)
Sand and Gravel, loose.	142.0 – 145.8 (3.8)	139.0 – 143.6 (4.6)
Bedrock	140.0 – 142.0 (2.0+)	136.4 – 139.0 (2.6+)

Subsurface Investigation

A geotechnical drilling exploration of three (3) boreholes drilled to a maximum depth of 9.9 m was undertaken by Tetra Tech in 2014 to characterize the conditions of the dam. The three boreholes terminated on what was inferred to be bedrock; during the 2022 site visit bedrock was observed immediately downstream of the spillway channel, which provides evidence of bedrock being shallow in the area. Two of the boreholes were drilled through the dam crest (14BH02 and 14BH03) and the other was drilled downstream of the dam toe (14MW01). A standpipe was installed in the borehole near the dam toe, although it is understood that readings have not been collected since installation.

The conditions encountered in the 2014 drill holes are summarized in Table 6-2 below and the borehole logs have been re-produced for reference in Appendix E. The geotechnical investigation report (Tetra Tech, 2015) should be referenced for additional context and information.

Given that the boreholes were drilled through the dam crest and foundation, limited information is available for the dam shell fill outside of what was noted on the as-constructed drawings. It is assumed the dam shell material is similar to the dam crest, and that it was locally sourced and would be a similar gradation to the sand and gravel in the foundation.

Groundwater was observed at approximately 4.5 m depth (at the approximate elevation of the base of the embankment) in holes drilled through the embankment crest (14BH02 and 14BH03). Groundwater was observed at approximately 1.0 m depth in the hole drilled near the dam toe (14MW01). This observation was made the day of drilling and is likely that the groundwater was influenced by the drilling fluid and may not represent normal groundwater conditions. No readings from the standpipe piezometer following installation were available for review for this DSR.

Table 6-2: Bainbridge Dam – 2014 Drilling program Soil Subsurface Summary

Soil	Locations Encountered[1]	Elevation Range (m local datum)	Layer Thickness (m)	Soil Description	USCS[3]	Moisture Content	SPT[4] (N)	DCPT[5] (blows per 300 mm)
Dam Fill - Random Pervious Fill	2, 3	150.5 – 151.0	0.3 – 0.5	Sand and Gravel, rootlets.	SP	-	-	14 – 23
Dam Fill - Core	2, 3	146.5 – 150.7	4.0 – 4.2	Clay, silty, some sand to sandy, trace to some gravel, medium plastic.	CL	7.9 – 13.6	11 – 13	4 – 43
Sand and Gravel (upper)	1, 2, 3	143.5 – 147.0	1.5 – 3.0	Sand and Gravel, trace silt, trace clay.	SP	13.6 – 27.5	11 – 59	15 – 120
Gravel and Sand	1	142.5 – 145.5	3.0	Gravel, sandy, to Gravel and Sand, some silt, trace cobbles.	GP	15.3 – 15.4	23 – 24	-
Silty Sand (upper)	2, 3	141.1 – 144.5	1.0 – 2.4	Sand, silty, some gravel.	SM	35.4	-	-
Sand and Gravel (lower)	3	145.5 – 147.0	1.5	Sand and Gravel, trace silt, some rootlets.	SW-SP	19.8	19	-
Peat	3	141.9 – 142.5	0.6	Peat, some clay, some sand, some gravel, some silt.	Peat	40.0 – 57.5	-	-
Sand (lower)	1	140.9 – 142.5	1.6	Sand, some silt, some gravel, trace clay.	SP	15.5	10	-
Silty Sand (lower)	1, 3	140.0 – 140.9 (location 1) 141.3 – 141.9 (location 3)	0.6 – 0.9	Sand, silty, trace to some gravel.	SM	15.8	20 - 83	-

Soil	Locations Encountered[1]	Elevation Range (m local datum)	Layer Thickness (m)	Soil Description	USCS[3]	Moisture Content	SPT[4] (N)	DCPT[5] (blows per 300 mm)
Inferred Bedrock[2]	1, 2, 3	140.0 (location 1) 141.1 (location 2) 141.3 (location 3)	-	-	-	-	-	-

1: Location 1 = 14MW01, located at the dam toe near the dam right abutment. Location 2 = 14BH02, located on the dam crest near the dam right abutment. Location 3 = 14BH03, located on the dam crest near the mid-length of the dam.
2: Bedrock inferred by refusal of the auger drill.
3: USCS: unified soil classification system description
4: SPT: Standard Penetration Test, unfactored blow counts to drive sampler 300 mm.
5: DCPT: dynamic cone penetration test

6.2 Seismic Stability

6.2.1 Determination of EDGM

The site is located in a region of high seismicity. For the stability assessment, Earthquake Design Ground Motion (EDGM) return periods for the dams were selected in consideration of dam safety guidelines (CDA, 2013). As both dams are classified as Very High Consequence, the EDGM selected was halfway between 1/2,475-year and 1/10,000-year return period earthquake.

Peak Ground Acceleration (PGA) were determined based on values published by Natural Resources Canada (NRCan), based on the 2020 National Building Code of Canada (NBCC). This is an updated from the previous 2012 DSR where values from the 2010 NBCC were used. In general, the changes in the NRCan models are that larger earthquake motions are predicted for Vancouver Island.

Based on available data for the dam foundation, site class D "stiff soil" is considered appropriate for both dams, so site class D data was accessed from the NRCan earthquake hazard tool for the Port Alberni area.

The NBCC only publishes PGAs up to the 1/2,475-year event. To determine the PGA of the EDGM, the published magnitudes were extrapolated using the log-log method as described by NRCan[3]. Values used in the log-log calculation of are summarized in Table 6-3 (NRCan, 2021). The log-log calculated EDGM is considered a screening level reference value for use in preliminary assessments only. For detailed design, a site specific probabilistic seismic hazard assessment should be completed to support future assessments and designs **(Recommendation**).

Table 6-3: Determination of the Screening Level EDGM for Lizard Lake and Bainbridge Dams

Parameter	Source	Acceleration (g)
1/475-year PGA	NRCan 2020 NBCC Value	0.28
1/2,475-year PGA	NRCan 2020 NBCC Value	0.57
1/10,000-year PGA	Calculated using Log-Log extrapolation	1.05
EDGM	Extrapolated between 1/2,475-year PGA and calculated 1/10,000-year PGA	0.81

The previous DSR determined an EDGM PGA of 0.49g based on an extrapolated 5,000-year period earthquake in consideration of the 2010 NBCC seismic models. Using the updated 2020 NBCC seismic hazard models the EDGM PGA is now 0.81g, which is an increase of 40% compared to the previous assessment.

[3] https://earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/lowprobability-en.php

6.2.2 Liquefaction Potential

Lizard Lake Dam

In general, liquefaction is considered a potential hazard in loose, saturated, granular soils. The as-constructed drawings indicate that efforts were made to remove the loose liquefiable foundation soils, and compact the embankment soils during construction. However, there is limited background documentation to support this (i.e. inspection reports by a qualified engineer describing proof rolls, density testing or photographs), limited document was typical practice for 1980s construction. Considering the dam is in a region of high seismicity, and the Very High consequence of failure of the structure, a screening level liquefaction assessment should be completed for the dam based on site specific subsurface information, to adequately evaluate the pseudo-static and post-seismic stability of the structure. Therefore, a field program should be completed to characterize the dam fill and foundation (**Recommendation).**

Bainbridge Dam

2014 Assessment Review

A liquefaction assessment was undertaken as part of the scope of the 2014 geotechnical assessment of Bainbridge Lake Dam (Tetra Tech, 2015). For the assessment, soils were assessed using the method of Idriss and Boulanger (2008). The following data sources were used in the assessment:

- Standard Penetration (SPT) test and soil composition data obtained in the 2014 drilling program.
- A PGA of 0.49 g. This PGA was based on the NBCC 2010 seismic hazard values and considered a 1/5,000-year earthquake.

The liquefaction triggering assessment identified layers within the foundation that are susceptible to liquefaction during the assessed earthquake and recommended that the dam be upgraded. Additionally, the assessment also included a screening level review of the deformation potential of the dam, which identified more than 1 m of deformation was possible.

DSR Update

The liquefaction assessment was updated for this DSR. The soil grain size distributions, material properties and SPT densities from the 2014 drilling program were used for the updated assessment with the following methods:

- Cyclic softening susceptibility of the dam's fine-grained core soils was reviewed using the method of Bray and Sancio (2006).
- The updated screening level EDGM of 0.81g was used with the Boulanger and Idriss (2014) screening method.

The updated liquefaction review found that:

- Based on Atterberg Limit testing of 1 sample of fill collected from the dam core, the material is deemed not susceptible to cyclic softening. However, it is emphasized that this is only 1 result and additional data is typically required to be confident that there is limited variability in the material properties, considering the size of the dam.
- The foundation soils of the dam are considered susceptible to liquefaction. Sand and gravel soils were encountered in the foundation that are considered loose to compact based on the relatively low SPT blow counts. These soils are in a zone that is permanently saturated. As the earthquake hazard for the area has increased since 2014, the identified zone and depth of potential liquefaction has increased. Most of the foundation soils are considered likely to liquefy during the design earthquake.

An updated deformation analysis was not performed given the previous assessment identified that substantial deformation (>1 m) is possible. Additionally, the liquefaction potential indicates that flow-slides are possible, resulting in much larger deformations that cannot be predicted from a screening level review. Seismic upgrades are recommended so that the dam meets the target FOS during an earthquake and deformation is limited **(Recommendation).**

6.3 Stability Review

Slope stability modeling was undertaken for the Lizard Lake Dam and Bainbridge Lake Dams to review and update the findings from the 2012 Dam Safety Reviews (EBA, 2012a and 2012b) and 2014 Geotechnical Assessment (Tetra Tech, 2014). Preliminary modeling was performed to evaluate the stability of the dams in alignment with current guidelines (CDA, 2013).

- For Lizard Lake Dam, the static and pseudo-static stability was reviewed. However, post-seismic stability was not evaluated at this time as additional information on the dam/foundation conditions would be required to understand if post-seismic strength reduction (liquefaction or cyclic softening) of the soils is likely.
- For Bainbridge Lake Dam the static, pseudo-static and post-seismic stability was reviewed.
- Rapid draw-down was not considered for this review. Although the dams have LLOs, the size of the outlet pipes is relatively small compared to the area of the lake, so it is assumed as water levels lowered there would be adequate time for the soils in the reservoir slopes to drain.

Two-dimensional, limit equilibrium stability modeling was undertaken using the commercially available software Slope/W 2021 by GeoStudio (version 11.0.1.21429). Stability modeling used the Morgenstern-Price method, which solves for moment equilibrium and interslice and shear forces. For the analysis, the Factor of Safety (FOS) of potential slip surfaces was calculated, which is the ratio of resisting forces to driving forces of a potential slope failure. A FOS of 1.0 indicates that forces are at equilibrium (some slope deformation is possible), with larger FOS numbers indicating higher levels of calculated stability.

For the slope stability models, the geometry of the critical section (selected based on the highest section of the dam) and surrounding topography was determined using the as-constructed drawings, publicly available LiDAR for Bainbridge Lake Dam area (considered good resolution), and the DEM for the area of Lizard Lake Dam (considered low resolution). The main differences in geometry for this assessment compared to the 2012/2014 assessments are:

- Lizard Lake Dam: the geometry used was different than the previous DSR. The previous DSR stability modeling showed the ground sloping up away from the downstream toe of the dam. Based on this DSR's field observations, the ground surface was modeled as flat at the downstream dam toe. This change is expected to decrease the FOS because the presence of additional material near the toe of a slope increases the resistance forces in the model.
- Bainbridge Lake Dam: The geometry was updated based on the LiDAR with the main difference being the downstream toe is modeled as gently sloping downstream (away), instead of flat.

The phreatic surface shown in the dams was drawn based on the assumed Normal Operating Water Level (NOWL), and site observations. A seepage model was not created as additional subsurface information would be required. The following information was used to draw the location of the phreatic surface in the models.

- Lizard: NOWL of 732.0 m (based on the findings from this DSR and unchanged since previous DSR), and seepage is routinely observed near the downstream dam toe indicating the phreatic surface is at ground surface.

- Bainbridge: NOWL of 150.0 m (based on this DSR hydraulic study, which is about 0.5 m lower than 2014 assessment which used lake level observations at time of drilling), and the phreatic surface was drawn based on groundwater observations during the 2014 drilling.

The entry and exit locations for the slip surfaces were specified in consideration of failure surfaces which would result in release of the reservoir. As both dam crests are relatively narrow (minimum crest width of 3.6 m for Lizard and 2.7 m for Bainbridge), even a relatively shallow failure could rapidly retrogress releasing the reservoir, so the entire dam crest was considered for an entry location.

Seismic slope stability analyses were undertaken using pseudo-static methods. For seismic stability modeling a horizontal seismic coefficient of 0.41g was applied to the models, which represents half of the EDGM, (in consideration of Hynes-Griffin and Franklin, 1984). Loss of soil strength during a seismic event was not analyzed, as the results from the seismic loading (shaking) alone are expected to significantly impact and deform the structure regardless of strength loss or liquefaction of the material.

In general material properties were selected based on the previous modeling, as the strengths were reviewed and appeared reasonable. Material properties used in stability models are summarized in Table 6-4 and Table 6-5, below.

- No change in material properties was made for Lizard Lake Dam, as no new factual data is available to justify changes. In the models, an additional foundation material layer of sand and gravel was added, this is because the as-constructed drawings describe a key trench was excavated to reach dense till, implying material at surface was not dense. This assumption should be confirmed by collecting factual information from a field program.
- For Bainbridge Lake Dam, the material properties were mostly unchanged from 2014, except for the post-seismic modeling used a normalized residual shear strength ratio (changing strength with depth), instead of a single shear strength as this is considered current practice. The shear strength ratio was selected based on minimum SPT blow counts in the identified liquefiable layers based on published charts in Boulanger and Idriss (2014). Additionally, the thickness of the zone of liquefaction has increased, based on the larger EDGM (see Section 6.2.2).

Table 6-4: Lizard Lake Dam Stability Model Material Properties

Material	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (°)
Dam Fill - Zone A Dam Shell 200 mm minus nominal size crushed rock, max 10% fines	19	-	45
Dam Fill - Zone B Dam Shell 75 mm minus nominal size crushed rock, max 10% fines	19	-	45
Dam Fill - Zone C Core zone "Till"	19	0	34
Foundation - Sand and Gravel	19	-	33
Foundation - "Till-Like" Soil	20	2	34

Table 6-5: Bainbridge Dam Stability Model Material Properties

Material	Unit Weight (kN/m^3)	Static / Psuedo-static		Liquified / Residual Strength
		Cohesion (kPa)	Friction Angle (°)	Post Earthquake - Residual Strength Ratio (Sr/σ'_{vc})
Dam Fill - Pervious Fill (Sand and gravel)	19	-	35	-
Dam Fill – Core (silty clay)	19	3	24	-
Foundation - Sand and Gravel and compact silty sand	19	-	32	0.16 (min 15 kPa)
Foundation - Peat	18	25	-	-
Foundation – Silty Sand Dense	20	2	30	-
Bedrock	Impenetrable			

The determined FOS from the modeling, compared to target minimum levels and previous assessment findings are presented in the Table 6-6 and Table 6-7, with stability modeling figures attached in Appendix F. Generally, there are limited changes in the results compared to previous studies; both dams were previously identified as having FOS below design targets for pseudo-static and post seismic conditions, and this continues to be the case. The dams should be upgraded so that the dams meet the target FOS during and following an earthquake and so that deformation is limited **(Recommendation).**

The key difference in the findings from this DSR's stability modeling is that the downstream static stability of Lizard Lake Dam is lower, with a FOS decreasing to 1.6 from 2.1 due to a change in the model geometry. The findings should be confirmed and refined by collecting factual subsurface data to support the material properties of the dam fill and foundation, and by collecting survey data to confirm the model geometry (**Recommendation).**

Table 6-6: Lizard Lake Dam Stability Analysis Results

Scenario	Target Minimum FoS[1]	Previous DSR (2012)		2023 DSR	
		Seismic Acceleration (g)	Determined FoS	Seismic Acceleration (g)	Determined FoS
Static – upstream	1.5	0	2.3	0	No change in understanding. Not recalculated
Static - downstream	1.5	0	2.1	0	**1.6**
Seismic – upstream	1.0	0.5 (full PGA)	<1.0	0.41g (half of PGA)	No change in understanding. Not recalculated
Seismic – Downstream	1.0	0.5 (full PGA)	<1.0	0.41g (half of PGA)	**0.6**
Post Seismic – upstream	1.2	0	1.1	No change in understanding. Not recalculated[2]	
Post Seismic - downstream	1.2	0	0.5		

1: Target Minimum FOS is based on CDA Guidelines (2013), in consideration of BC Dam Safety Technical Guideline "Plan Submission Requirements" (2018).

2: Post seismic modeling has not been revised, as a field exploration program should be performed to collected data that the revised post-seismic strength would be based on.

Table 6-7: Bainbridge Lake Stability Analysis Results

Scenario	Target Minimum FoS[1]	Previous DSR (2012) and Assessment (2014)		2023 DSR	
		Seismic Acceleration (g)	Determined FoS	Seismic Acceleration (g)	Determined FoS
Static – upstream	1.5	0	2.4	0	No change in understanding. Not recalculated
Static - downstream	1.5	0	1.7	0	1.8
Seismic – upstream	1.0	0.2 (half PGA)	~1.0	0.41g (half of PGA)	No change in understanding. Not recalculated
Seismic – Downstream	1.0	0.2 (half PGA)	~1.0	0.41g (half of PGA)	0.7
Post Seismic – upstream	1.2	0	1.8	0	2.0
Post Seismic - downstream	1.2	0	0.8	0	1.0

1: Target Minimum FOS is based on CDA Guidelines (2013), in consideration of BC Dam Safety Technical Guideline "Plan Submission Requirements" (2018).

6.4 Internal Erosion Potential

The previous 2012 and 2014 assessments identified the following considerations for internal erosion potential:

- Bainbridge Lake Dam: the coarse dam fill was judged to provide an adequate filter of the silty clay dam core material, based on samples collected during the drilling program and assuming that the coarse dam fill is locally sourced and has a similar gradation of the foundation soils. However, it was noted that the foundation soils encountered are gap graded so may be internally unstable. Monitoring for seepage and turbidity was recommended. Additionally, the assessment noted that the dam required upgrades for seismic stability, so any changes to the dam should consider internal erosion and incorporate adequate filters.
- Lizard Lake Dam: Seepage has been routinely observed near the downstream dam toe since the dam was constructed, however turbidity in the seepage has not been observed. Based on the assumption the dam was constructed as shown on the as-constructed drawings, it was considered that the dam core would be adequately protected from internal erosion processes by the geotextile and filter layer. Additionally, the previous review described that if the foundation is dense glacial till, the material is deemed to have a low susceptibility to internal erosion. Recommendations were provided to routinely observe the seepage near the dam toe as changes in seepage rate or seepage turbidity may indicate internal erosion is occurring.

For this audit style DSR, the existing information was reviewed and considered based on current standards of practice. The following are the findings for internal erosion processes based on available information:

Lizard Lake Dam

The hydraulic gradient through the dam fill and foundations are relatively high, which provides driving force for internal erosion processes to initiate and progress. The hydraulic gradient through the dam fill is estimated to be 1/3 (0.33), and through the foundation of 1/5.5 (0.18).

The as-constructed drawings show potential grain size distribution ranges for the fill planned to be used for the different dam zones, however there is no lab testing to confirm material placed. Additionally, there is no information available describing the type and overlap of geotextile placed; different types of geotextiles may be adequate for a filter however many types may not. Lastly, there is no specified grainsize distributions or plasticity requirements for the dam core (Zone C).

From the information available, the coarse dam fill (shell material) is considered internally stable, however contact erosion could be occurring between the dam fill and foundation depending on what the foundation material is. The core material may be susceptible to many types of internal erosion processes (backwards piping erosion, suffusion, contact erosion), in consideration that it is fine grained and there is a large hydraulic gradient. Subsurface data would be required to evaluate this further.

The dam's LLO structure has several features that make it more susceptible to internal erosion processes. The LLO system includes a pipe with various features: 1) on the upstream side of the dam is encased in concrete 2) near the middle of the dam the pipe is encased in concrete and cut-off walls extend from the encased section and 3) on the downstream side the pipe is surrounded by coarse grained fill that is wrapped in filter cloth to act as a drain. The pipe includes a manhole to access a valve at mid-length of the pipe's alignment. In addition, there are two smaller pipes that parallel the main pipe: 1) A galvanized steel pipe located upstream of the manhole, encased in the same concrete as the pipe and capped inside the manhole; 2) a pipe downstream of the manhole that is plastic, perforated and wrapped in filter cloth in the area where the pipe is encased in drain material. It is not clear if either end of this smaller pipe is capped, considering the age of the dam it is assumed it was installed to act as a drain for the embankment material.

Regarding the LLO pipes the following is noted:

- Encasement in concrete, as was done for the upstream length, is good practice to prevent preferential seepage pathways from developing along through penetrating structures.
- Seepage cut-off walls, installed along the pipe's mid length, were historically thought to reduce the risk of internal erosion along penetrating structures by increasing the length of the seepage pathway. However, case histories of dam failures indicated that seepage cut-off walls increase the risk of internal erosion as the structures impede the ability to sufficiently compact the soils around them.
- The perforated pipe downstream of the manhole increases the potential for internal erosion.

In summary, the LLO pipe creates preferential seepage pathways that may result in internal erosion. Therefore, the downstream side of the dam should be regularly inspected for signs of internal erosion (turbidity, increased seepage), with additional attention during and after high water levels as internal erosion processes are more likely to occur during times of high water when hydraulic gradients are large.

Bainbridge Lake Dam

The hydraulic gradient through the dam and foundation depends on the performance of the upstream blanket that is shown on the as-built drawings to extend 50 m into the lake. If the upstream blanket is intact without defects, the hydraulic gradient through the foundation and dam core is expected to be relatively low as the purpose of the blanket is to increase the length of the flow path (hydraulic gradient would be approximately 1/60 or 0.02). However, if there are defects in the blanket, such as thin areas with leaks, the hydraulic gradient would be moderate, for the dam fill in the range of 1/4.5 (0.22) and for the dam foundation 1/6.5 (0.15). Routine monitoring of instrumentation in the dam and foundation would be required to understand variability and if the upstream blanket is performing as intended, however this type of instrumentation is not currently installed in the dam.

The soil properties of the dam fill and foundation soils is understood from the 2014 drilling program. The previous assessments identified that the dam fill would filter the dam core. For this DSR, the gradation of the dam fill was reviewed for internal stability (suffusion potential) and concludes that the soils are considered broadly graded and susceptible to this internal erosion process (if hydraulic gradients are high), based on criteria from US Bureau of Reclamation Guidelines (2019).

There are 2 through penetrating structures for Bainbridge Lake Dam:

- LLO pipe, which is understood to be surround by medium to coarse, compact sand. Based on this information, the sand should provide a drainage layer around the pipe and not significantly increase the potential for internal erosion.
- There are 2 water intake lines buried in an embankment that contains the reservoir (see Section 3.3 for description), the integrity of which needs to be maintained to prevent release of the reservoir. The new water supply line was placed on surface and buried, which does not increase the risk of internal erosion. However, the abandoned line increases the risk of internal erosion as it provides a void, that water may seep into over time as the pipe deteriorates or the pipe may collapse. The City should review the risk of this pipe and consider decommissioning the line using a permanent infilling method such as grouting (**Recommendation).** It is noted that clear seepage was observed near the toe of this embankment during the DSR Site Visit, additional attention should be given to this area during routine inspections to look for changes and signs of internal erosion (see Section 4.2.5).

In summary, internal erosion processes are possible at both dams. Additional subsurface data would need to be collected for Lizard Lake Dam to understand the potential and if mitigation methods are required. Routine surveillance should continue to inspect the seepage downstream of the dams for changes in flow rate or turbidity, as this indicates internal erosion is occurring. Routine inspections should give particular attention to the downstream areas where there is seepage or standing water, the downstream side of the LLO pipes and water intake pipes, as well as the dam crest above these pipes to monitor for settlement or sinkholes.

7.0 DAM SAFETY MANAGEMENT REVIEW

The elements of an effective Dam Safety Management System are described in the CDA Guidelines (2013), and essentially follow the Plan-Do-Check-Act philosophy, broken down into the following elements:

- Planning: Work program components, execution responsibilities, standards and procedures, resources, and schedules.
- Implementation: Operation, Maintenance and Surveillance and emergency preparedness.
- Checking and Reviewing: Dam surveillance and DSRs, program peer reviews or review boards, program audits, incident investigations, testing of emergency preparedness, and equipment tests.
- Corrective Actions – to follow up from: reviews and audits, incident investigations, deficiencies and non-conformances during DSRs, inspection, monitoring, equipment testing, or emergency preparedness tests.
- Reporting: Periodic reporting to management.
- Supporting Processes: Staff training and qualification, program communication, record keeping, and management.

This program is supported by technical advisors, routine surveillance and site specific documentation.

From our site visit and discussion with City staff, the dams are well maintained and operated. The City staff are knowledgeable on maintenance activities and surveillance indicators. However, the accompanying documentation for the dam should be improved so that a new staff member unfamiliar with the dam system could read the documents and know how to safely operate the dams and respond during an emergency.

Based on the Consequence Classification of “Very High” for both dams, Table 7-1 summarizes the minimum frequency of Dam Safety Management activities that the City should review and begin implementing. Specific areas identified for improvement of surveillance or Dam Management Plans are discussed in the next subsections.

As a general comment on dam safety management practices, the previous DSRs were performed for both Dams in 2012 and a geotechnical assessment of Bainbridge Lake Dam occurred in 2014. These reports identified several High Priority dam safety deficiencies and non-compliances such as overtopping potential and seismic instability. It appears that limited work has been performed to address these previously identified deficiencies, and City staff were not aware of these outstanding recommendations. The dam safety management system should be updated and improved so that recommendations are tracked and addressed in a timely manner. (**Recommendation).**

Table 7-1: Minimum Frequency of Dam Safety Management Activities, based on the BC Dam Safety Regulation (11/2021)

Item #	Activity	Minimum Frequency for Very High Classification
1	Redetermine classification of dam*	Annually
2	Conduct site surveillance	Weekly, unless specified in the OMS Manual
3	Conduct formal inspection	Annually
4	Test operation of (a) mechanical components of dam, and (b) electrical and communication equipment	Annually, unless specified in the OMS Manual
5	Collect readings from instrumentation and analyze and interpret the readings	Annually, unless specified in the OMS Manual
6	Review contact information in Dam Emergency Plan*	Annually
8	Review Operation Maintenance and Surveillance (OMS) Manual and Dam Emergency Plan*	Every 7 years
9	Dam Safety Review*	Every 10 years

*Submit document or revised document to Dam Safety Officer
Note, Item #7 applies to Low Consequence dams, that do not have Emergency Plans, so has not been included in this Table.

7.1 Surveillance

Based on the OMS Manual and discussions with the City, the following is understood about the surveillance and maintenance activities at the dams:

- Lizard Lake Dam is inspected weekly between May and September. The dam is inspected monthly for the remainder of the year when it is accessible (snow in the winter blocks access).
- Bainbridge Lake Dam is inspected daily or weekly during between May and September and weekly or monthly during the winter.

The site visits and routine inspections for the dams are not typically documented. A dam surveillance form is typically completed once per year for the Annual Formal Inspection. These forms documenting the City's Formal Inspections were provided for this DSR review, with key information summarized in Table 7-2 and Table 7-3 below.

- It is noted that only recent inspections were available for review as part of this DSR, (no records between 2012 and 2016, and inconsistent records between 2016 and 2019), which is a non-conformance from what is expected for documentation of a Dam Safety Management System for Very High Consequence dams.
- Both reservoirs are inspected annually via boat.
- A dive inspection of both dam's LLOs and the Bainbridge Lake water supply intake was performed in 2016. The City indicated that no concerns were identified from the inspection.
- Both reservoirs have staff gauges that are surveyed/calibrated to reference elevation. These water levels are recorded on a form as part of the routine inspections.

- Lizard Lake has a rain gauge installed, rainfall in the gauge is recorded when the dam is visited/inspected.
- Lizard Lake Dam LLO is routinely adjusted throughout the year as part of water management activities. There is a weir on the downstream side of the LLO for measuring and adjusting flow.
- The Bainbridge Lake Dam LLO is opened and tested annually during the Provincial Dam Safety Officer inspection.
- There is an automatic turbidity sensor in the Bainbridge Lake water supply intake. High turbidity measured by the sensor would trigger an inspection of the intake.
- The dams are typically cleared of vegetation twice per year.
- Beavers are sometimes observed and removed from Bainbridge Lake as they attempt to block the spillway. There have been no beaver problems at Lizard Lake Dam.
- A monitoring well is located downstream of Bainbridge Lake Dam. It was installed in 2014 but the water levels are not regularly measured.
- The previous DSR occurred in 2012, 10 years ago which follows the minimum requirement for review frequency.

Table 7-2: Lizard Lake Dam Formal Annual Inspection Surveillance Summary

Date	Water Level at Spillway Sill (m, negative is below sill)	Low Level Outlet Open / flow rate	Comments of Note
July 29, 2021	-0.07	Yes / flow rate not recorded	Seepage near left downstream toe of dam Alders growing to the right of the weir
July 15, 2020	Spillway flowing. Depth not recorded.	Yes / flow rate not recorded	No comments
April 11, 2019	+0.05	Yes / flow rate not recorded	Seepage near left downstream toe of dam Log boom clear of debris
June 14, 2016	Not recorded	Yes / 15 L/s	No comments

Table 7-3: Bainbridge Lake Dam Formal Annual Inspection Surveillance Summary

Date	Water Level at Spillway Sill	Comments of Note
July 29, 2021	4" above sill	Wet/dam area near downstream end of LLO.
April 8, 2020	2.20 m	Wet area near downstream end of LLO.
April 25, 2019	2.21 m	Wet area near downstream end of LLO.
January 31, 2018	2.31 m +0.05 m above sill	Beaver observed near spillway Wet area near downstream end of LLO.

The following lists our recommendations to improve surveillance activities for the dams **(Recommendation)**:

- Annual Inspections: The forms that are being used for the Annual Inspections are more typical of a routine inspection and do not include enough detail for a Formal Inspection. The Formal Annual Inspection template from BC Dam Safety (reproduced for reference as Appendix G) should begin to be used. The formal inspections should include details on flow rate and depth through the spillway and LLO, as well as additional comments on observations made and recommended corrective actions. This is mandatory to meet the standards of the BC Dam Safety Regulation.
- Additionally, as part of the annual inspection, it would improve documentation if a summary report was written annually, describing the routine inspections, instrumentation measurements, and any significant changes from typical performance highlighted. The summary report should discuss if it was a wet or dry year (seasonal precipitation), the range of water levels in the lakes, a summary of when water was sourced from the different intakes, a summary of when the LLOs were open, a summary of maintenance and if any additional inspections were performed, such as dive inspections or reservoir inspections. The Formal Inspection forms, water level forms, rain gauge forms and standpipe measurements would be attached to this summary report. By documenting this information in a single report, document retention and understanding of typical performance and usual observations are greatly improved, which will enhance succession planning and long term dam and reservoir management. The CDA Dam Safety guidelines suggest utilizing this type of annual report however it is not a requirement by BC Dam safety, so is only offered as a suggestion and not a recommendation.
- The weekly surveillance inspections should be documented on an inspection form.
- It is understood that the dams are inaccessible during the winter months due to snow. Remote surveillance technology, such as cameras, should be considered so that there is year-round surveillance.
- Readings from the standpipe piezometer installed near the toe of Bainbridge Lake Dam should be collected during the routine inspections. Understanding typical conditions and variability in groundwater conditions allows changes in performance to be identified and responded to.

7.2 OMS Manual and DEP

The Operation, Maintenance and Surveillance Manual (OMS) and Emergency Preparedness Plans (Dam Emergency Plan – DEP), dated April 2022 were reviewed. The documents are both relatively brief, and do not meet all the requirements for these plans from BC Dam Safety. It is recommended that both documents are updated and expanded, using the current templates available from BC Dam Safety[4] **(Recommendation).** General comments for improvement of both documents include:

The OMS Manual should be expanded to include the following details:

- Access to the dams, describing the locked gates, who has keys, and the radio controlled road systems. Maps showing directions to the dams should be added.
- List of downstream structures should be expanded to include Dolans Pit, Coastal Bridge & Construction, China Creek Hydroelectric Dam, and the China Creek Campground. Copies of inundation maps from this DSR should be included as appendixes to the documents.
- List of hydraulic works should be adjusted to accurately reflect current dam conditions. In particular, the old/abandoned and new water intake lines at Bainbridge Lake should be described.

[4] Available through: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/dam-safety/technical-resources

- Add additional details describing routine surveillance and maintenance activities. In particular: annual boat inspections of reservoir, recording rain gauge at Lizard Lake Dam, annual test of LLO for Bainbridge Lake Dam, monitoring for signs of beaver activity, checking that the log boom is clear of debris, monitoring the turbidity sensor on the water intake from Bainbridge Lake, reading the monitoring well at the toe of Bainbridge Lake Dam, monitoring locations where wet/damp or standing water is regularly observed at the toe of the dam, and identifying locations where seepage is regularly observed at the toe of the dam, including an estimated rate.
- Describe documentation procedures, for what is recorded and where it is recorded for the routine inspections. Describes how maintenance items for the dam are documented and addressed.

A DEP describes a planned response for emergency situations that includes roles and responsibilities, what is defined as an emergency situation, how the emergency is escalated or de-escalated, and who is notified. The following should be added to improve the existing plan:

- Reference table of the last time the emergency phone numbers and/or plan were tested. Based on the Very High Consequence Classification of the dams, the phone numbers should be tested a minimum of annually.
- Descriptions of types of potential emergency events and planned actions. Types of emergencies would include observations of seepage with a high turbidity rate, cracking/slumping/subsidence/sinkholes in the dam or reduced freeboard. Actions could include: lowering the water level, opening the LLO, removing blockage from the spillway; seeking an external dam safety professional for advice/response; notifying the Dam Safety Officer, notifying the Ministry of Environment; and evacuation of the downstream inundation area. Typically, there would be different levels of observations, each with different responses. The BC Dam safety suggests using the following 3 categories:
  - Level 1: unusual event, slowly developing;
  - Level 2: potential dam failure situation, rapidly developing; and
  - Level 3: dam failure appears imminent or is in progress.
- Describe roles and responsibilities for what actions during an emergency event.
- Describe the response following an earthquake, flood or extreme weather event, including expected timeframes for inspecting the dams following these events.
- List of downstream structures should be expanded to include Dolans Pit, China Creek Hydroelectric Dam, and the China Creek Campground. Copies of inundation maps from this DSR should be attached to the documents.
- Include maps showing the dam locations and access.
- It is also suggested that information on inspection/surveillance frequency is moved from the Emergency Plan to the OMS Manual.

The City should also consider conducting a test of their emergency response plan, as this will help identify timeframe of response and gaps in the plan. Successful evacuations and resulting reduced loss of life during dam emergencies and failures, are attributed to testing exercises and dam emergency simulations.

8.0 SUMMARY AND RECOMMENDATIONS

The dam safety management system and performance of the Lizard Lake Dam and Bainbridge Lake Dam, in consideration of current regulations and guidelines was reviewed for this DSR. The audit style review for the dam safety management system and geotechnical assessment, and comprehensive style review for the hydrotechnical assessment, indicated the following:

- The current Consequence Classification of **Very High** for both dams is adequate from a dam safety management perspective and was reconfirmed from the findings of the inundation study.
- Dam surveillance and documentation should be improved.
- The hydrotechnical assessment indicated that Lizard Lake Dam has adequate freeboard during the IDF and normal operating conditions, however Bainbridge Lake Dam does not and is expected to overtop. This is similar findings as the previous 2012 DSR.
- The stability analysis results for both dams were previously identified that they do not meet the target FOS during pseudo-static (seismic) and post seismic conditions; this continues to be the case.
- Internal erosion is considered a possible failure mode for both dams.
- The OMS Manual is limited in detail and should be updated to meet the requirements outlined by BC Dam Safety.
- The DEP is limited in detail and should be updated to meet the requirements outlined by BC Dam Safety.

The dams appear to be well maintained and operated. However, several deficiencies and non-conformances were identified that could reasonably lead to dam failure in consideration of the following definitions from BC Dam Safety (BC Dam Safety, 2013).

- Deficiencies – *An unacceptable dam performance condition has been confirmed, based on the CDA Guidelines, BC Dam Safety Regulations, or other specified safety standard.*
- Non-Conformances – *Established procedures, systems, and instructions are not being followed, or they are inadequate or inappropriate and should be revised.*

The identified deficiencies are predominantly inherent to the original design and construction of the facilities compared to current engineering design and understanding of flood and seismic events. Additionally, non-conformances were identified with the City's Dam Safety Management System. In particular, routine surveillance should be documented so that typical (baseline) operating conditions are understood, and the OMS and DEP updated and improved so that someone unfamiliar with the dams could read the documents to safely operate the systems and understand how to respond in an emergency.

Many of the findings in this DSR were previously identified in the 2012 DSRs and the 2014 Assessment, however limited action has been taken and it appeared that City staff were not aware of these outstanding recommendations. The dam safety management system should be updated and improved so that recommendations are tracked and addressed in a timely manner, to ensure that the City of Port Alberni's water supply is secure, reliable, and does not create an unacceptable risk to downstream areas.

The identified deficiencies and non-conformances that require attention are presented in Table 8-1 with recommendations to address them. Suggested priorities (Low, Medium, High or Very High) are also provided. Low, medium, high and very high priority recommendations should be addressed within 5, 3, 1 and 0.5 year(s) respectively. The priority assigned considers the level of effort and work required to address them as well as the urgency of the deficiency or non-conformance.

Table 8-1: Prioritized DSR Recommendations

ID #	Dam	Deficiency or Non-Conformance	Recommendation Report Section	Recommended Action	Priority
1	Both	Previous assessment reports from 2012 and 2014 identified high priority dam safety deficiencies and non-compliances. It appears that limited work has been performed to address these and City staff were not aware of these outstanding recommendations.	7.0	The dam safety management system should be updated and improved so that recommendations are tracked and addressed in a timely manner.	Very High (0.5 years)
2	Bainbridge Lake Dam	Clear seepage was observed near the toe of the embankment, near the Water Supply Intake line. This embankment appears to retain the reservoir so integrity must be maintained. As there are buried lines through this embankment this area has a high potential for internal erosion to occur.	4.2.5 and 6.4	1: Area of seepage should be reviewed during routine inspection. Rate of seepage and observations on turbidity should be noted. 2: A plan should be added to the DEP for actions to take if turbidity is observed.	Very High (0.5 years)
3	Both	Surveillance and surveillance documentation for the dams, should be improved to meet regulatory requirements.	7.1	1: Weekly routine inspections should be documented. 2: The Annual Formal Inspection should be more detailed (at minimum use standard template from BC Dam Safety). Consider including a summary report with details on maintenance/inspections and operating conditions that occurred in the calendar year in addition to the inspection form. 3: Measurements from the standpipe installed near the toe of Bainbridge Dam should be collected as part of routine inspections so typical groundwater conditions and variation are understood. 4: It is understood that the dams are inaccessible during the winter months due to snow. Remote surveillance technology, such as cameras, should be considered so that there is year-round surveillance.	Very High (0.5 years)

ID #	Dam	Deficiency or Non-Conformance	**Recommendation** Report Section	Recommended Action	Priority
4	Bainbridge Lake Dam	Geotechnical and hydrotechnical deficiencies identified for the dam. Including: 1: Dam is predicted to overtop during the design flood event. The hydraulic assessment completed, relied on elevations and dimensions shown on as-constructed drawings from 1960. Dams settle over time, and survey methods/datums/units have changed and improved since these drawings were created. The elevations of the spillways and dam crests are key parameters used to determine if a dam can safely pass a design flood so should be verified 2: Dam does not meet the target FOS for pseudo-static or post-seismic stability. Most of the foundation is expected to liquefy during the design earthquake event. This would result in movement and sliding of the structure, and release of the reservoir.	5.1, 6.2.2 and 6.3	The dams should be improved and upgraded. Suggested steps: 1a: Survey the dam crest, spillway elevation and dimensions and low areas along the reservoir shore (see Figure 5-5). Compare results to parameters used for hydraulic assessment. 1b: Confirm findings from hydraulic freeboard assessment using survey of dam crests and spillways. Also, consider low areas on surrounding lake shore. 2a: A site specific probabilistic seismic hazard assessment should be completed. The findings should be used in the seismic upgrade design. 2b: A conceptual seismic upgrade design should be prepared, and a detailed field exploration program should be conducted to refine the conceptual design (Cone Penetration Testing, geophysics testing and additional sampling of dam core and shell material with advanced laboratory strength testing). 3: Prepare upgrade design for the dam that addresses both the hydrotechnical and geotechnical deficiencies.	High (work should be started within 1 year, aim to construct upgrade within the next 5 years)
5	Lizard Lake Dam	The results of the stability assessment indicate the dam is not stable seismically or during post-seismic conditions. The geotechnical assessment is based on assumed geometry, soil conditions for fill and foundation as shown on the as-constructed drawings. Drawings without supporting documentation (photos, lab testing) do not provide the necessary data to confirm material properties of the dam fill or foundation.	6.1 and 6.3	1: The findings from the assessment should be verified by collecting subsurface information through a field program (drilling, geophysics, etc.). 2: The geotechnical assessment should be updated based on collected subsurface information. 3: The dam should be upgraded if required.	High (work should be started within 1 year, aim to construct upgrades within the next 5 years)

ID #	Dam	Deficiency or Non-Conformance	**Recommendation** Report Section	Recommended Action	Priority
6	Both	The Operation, Maintenance and Surveillance Manual and Dam Emergency Plan do not meet current regulatory requirements.	7.2	See list of improvements in Section 7.2. Using current templates from BC Dam Safety would provide a good starting base to ensure all necessary information is included.	High (1 years)
7	Both	Based on the site visit the following requires maintenance: 1:Both dam spillways had moss growing which can damage the concrete and impeded visual inspection. 2: Vertical cracking in Bainbridge Lake Dam spillway. 3: Vegetation growing around Bainbridge Lake Dam LLO outlet, and areas of standing water near toe of Lizard Lake Dam.	4.0	1: Clear moss from spillways. 2: Patch cracking in spillway. 3: Clear vegetation around these areas so complete visual inspection is possible. The outlet of the LLO and the areas of standing water should be reviewed as part of the routine inspections as they are locations where internal erosion is more likely to be observed.	Medium (3 years)
8	Lizard Lake Dam	A high resolution survey (ground survey, LiDAR or DEM) is not available for this dam or immediate downstream area. Without this data, reasonable assumptions were made for this DSR assessments. These assumptions should be validated. 1: For the Inundation Study, a surface was manually created using information from 20 m contour lines. 2: For the hydraulic assessment the dam crest and spillway elevations and dimensions were based on the as-constructed drawing form the 1980s. 3: For the stability assessment, the ground surface was modeled based on the as-constructed drawings and field observations.	5.1, 5.2 and 6.3	The following survey data should be collected and used to validate the models. 1: Collect a ground survey of the dam crest and spillway elevations and dimensions. 2: Collect an aerial survey (LiDAR, or UAV LiDAR) of the dam, and downstream creek channel including Williams Creek and China Creek.	Medium (3 years)

ID #	Dam	Deficiency or Non-Conformance	**Recommendation** Report Section	Recommended Action	Priority
9	Bainbridge Lake Dam	The abandoned water intake line, increases the risk of internal erosion, as it leaves voids in the embankment structure.	4.2.5 and 6.4	Review risk the line poses. If risk is unacceptable, infill line with grout.	Low (5 years)

9.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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/pd

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
PERMIT NUMBER: 1001972

10.0 REFERENCES

Documents and Guidelines listed in Report Sections 2.0 and 3.1 and the following:

Alberta Transportation. (2004). *Guidelines on Extreme Flood Analysis.* Alberta Transportation.

APEGBC. (2017). *Flood Mapping in BC.* APEGBC.

Associated Engineering. (September 1963). *Bainbridge Lake Dam. As-Constructed Drawings (4 Sheets).*

Associated Engineering. (September 1985). *Lizard Lake Dam. As-Constructed Drawings (12 Sheets), File V67H.*

Brunner, G. (2014). *Using HEC-RAS for Dam Break Studies.* Davis: U.S. Army Corps of Engineers.

CDA. (2007). *Hydrotechnical Considerations for Dam Safety.* Canadian Dam Association .

CDA. (2013). Dam Safety Guidelines 2007 (2013 Edition).

DTN. (2020). *Probable Maximum Precipitation Guidelines for British Columbia.* DTN, LLC.

EBA Consultants. (2012). *2012 Dam Safety Review, Bainbridge Lake Dam, Port Alberni, BC. File: N13101499.*

EBA Consultants. (2012). *2012 Dam Safety Review, Lizard Lake Dam. File: N13101499.*

EGBC. (2020). *Developing Climate Change-Resilient Designs for Highway Infrastructure in British Columbia.* Engineers and Geoscientists British Columbia .

Foster, M. F. (2000). Method for Assessing the Relative Likelihood of Failure of Embankment Dams by Piping. *Canadian Geotechnical Journal*, 1025-1061.

Goda, Y. (1989). On the methodology of selecting design wave height. *Coastal Engineering 1988*, 899-913.

Ministry of Energy, Mines and Low Carbon Innovation. (2022). *Health, Safety and Reclamation Code for Mines in British Columbia* . Victoria: Crown Publications.

NRCan. (2021, April). *Low Probability Hazard and the National Building Code*. Retrieved from https://earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/lowprobability-en.php.

Province of British Columbia. (2016, February 29). Dam Safety Regulation. *Water Sustainability Act*. Victoria, BC, Canada: Queen's Printer.

Rivard, P. (1981). Report on Seepage Control and Exit Gradients Beneath Dams. *Government of Canada, Department of Regional Economic Expansion.*

Sherard, J. (1979). Sinkholes in Dams of Coarse, Broadly Graded Soils. *13th ICOLD Congress*.

Simonovic, S., Schardong, A., Srivastav, R., & Sandink, D. (2015). *IDF_CC Web-based Tool for Updating Intensity-Duration-Frequency Curves to Changing Climate – ver 6.0.* Retrieved from Western University Facility for Intelligent Decision Support and Institute for Catastrophic Loss Reduction: https://www.idf-cc-uwo.ca

Smith, C. (1995). *Hydraulic Structures.* Saskatoon .

Tetra Tech Canada Inc. (2015). *Bainbridge Lake Dam, Geotechnical Assessment. File: V13103321-01.*

U.S. Department of the Interior Bureau of Reclamation . (2014). *Guidelines for Estimating Life Loss for Dam Safety Risk Analysis.* U.S. Department of the Interior Bureau of Reclamation .

USACE. (1984). *Shore Protection Manual Volume II.* Washington: US Army Corps of Engineers.

USACE. (1998). *Runoff From Snowmelt.* U.S. Army Corps of Engineers.

USACE. (2017). Internal Erosion Risks for Embankments and Foundations. Part D – Embankments and Foundations.

USBR. (2012). Design Standards No. 13 Embankment dams.

USBR. (2019). Best Practices in Dam and Levee Safety Risk Analysis Presentation Series, Chapter 6, Internal Erosion Risks for Embankments and Foundations.

APPENDIX A

SITE VISIT CHECKLISTS AND PHOTOGRAPHS

APPENDIX C1: DAM SAFETY REVIEW ASSURANCE STATEMENT – WATER RESERVOIR DAMS

Note: This statement is to be read and completed in conjunction with the current *APEGBC Professional Practice Guidelines – Legislated Dam Safety Reviews in British Columbia*, ("APEGBC Guidelines") and is to be provided for dam safety review reports for the purposes of the *Dam Safety Regulation*, BC Reg. 40/2016 as amended. Italicized words are defined in the APEGBC Guidelines.

To: The Owner(s) Date: March 3, 2023

John Stephen, City of Port Alberni

Name

Address

With reference to the *Dam Safety Regulation*, B.C. Reg. 40/2016 as amended.

For the dam:

UTM (Location): 49.144656°, -124.674800° 49.201269°, -124.734409°

Located at (Description): Lizard Lake Bainbridge Lake

Name of dam or description: Lizard Lake Dam Bainbridge Lake Dam

Provincial dam number: Lizard Lake Dam: D710105-00 Bainbridge Lake Dam: D710100-00

Dam function: Both: Water storage for drinking water

Owned by: Both: City of Port Alberni

(the "Dam")

Current Dam classification is:

Check one

- ☐ Low
- ☐ Significant
- ☐ High
- ☒ Very High
- ☐ Extreme

The undersigned hereby gives assurance that he/she is a Qualified Professional Engineer.

I have signed, sealed and dated the attached dam safety review report on the Dam 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 (see Guideline Section 3.2):

x 1. Collected and reviewed available and relevant background information, documentation and data

x 2. Understood the current classification for the Dam, including performance expectations

x 3. Undertaken an initial facility review

x 4. Reviewed and assessed the Dam safety management obligations and procedures

x 5. Reviewed the condition of the Dam, reservoir and relevant upstream and downstream portions of the river

x 6. Interviewed operations and maintenance personnel

x 7. Reviewed available maintenance records, the Operations, Maintenance and Surveillance (OMS) Manual and the Dam Emergency Plan

LLO gates not tested during site visit 8. Confirmed proper functioning of flow control equipment

x 9. After the above, reassess the consequence classification, including the identification of required dam safety criteria

x 10. Carried out a dam safety analysis based on the classification in 9. above

x 11. Evaluated facility performance

x 12. Identified, characterized and determined the severity of deficiencies in the safe operation of the Dam and non-conformances in dam safety management system

x 13. Recommended and prioritized actions to be taken in relation to deficiencies and non-conformances

x 14. Prepared a dam safety review report for submittal to the regulatory authority by the Owner and reviewed the report with the Owner

x 15. The dam safety review report has been reviewed in meeting the intent of APEGBC Bylaw 14(b)(2)

Based on my dam safety review, the current dam classification is:

Check one

☒ Appropriate

☐ Should be reviewed and amended

I undertook the following type of dam safety review:

Check one

☒ Audit

☐ Comprehensive

☐ Detailed design-based multi-disciplinary

☐ Comprehensive, detailed design and performance

I hereby give my assurance that, based on the attached dam safety review report, at this point in time:

Check one

☐ The Dam is reasonably safe in that the dam safety review did not reveal any unsafe or unacceptable conditions in relation to the design, construction, maintenance and operation of the Dam as set out in the attached dam safety review report

☐ The Dam is reasonably safe but the dam safety review did reveal non-conformances with the *Dam Safety Regulation* as set out in section(s) ____ of the attached dam safety review report.

☒ The Dam is reasonably safe but the dam safety review did reveal deficiencies and non-conformances as set out in section(s) 8 of the attached dam safety review report.

☐ The Dam is not safe in that the dam safety review did reveal deficiencies and/or non-conformances which require urgent action as set out in section(s) ____ of the attached dam safety review report.

Angie Ramey, P.ENG.
Name

8 May 2023
Date

Signature

1 - 4376 Boban Drive, Nanaimo, BC V9T 6A7
Address

778-674-2285
Telephone

(Affix Professional Seal here)

If the Qualified Professional Engineer is a member of a firm, complete the following:

I am a member of the firm Tetra Tech Canada Inc.
and I sign this letter on behalf of the firm. (Print name of firm)

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
PERMIT NUMBER: 1001972

APPENDIX B

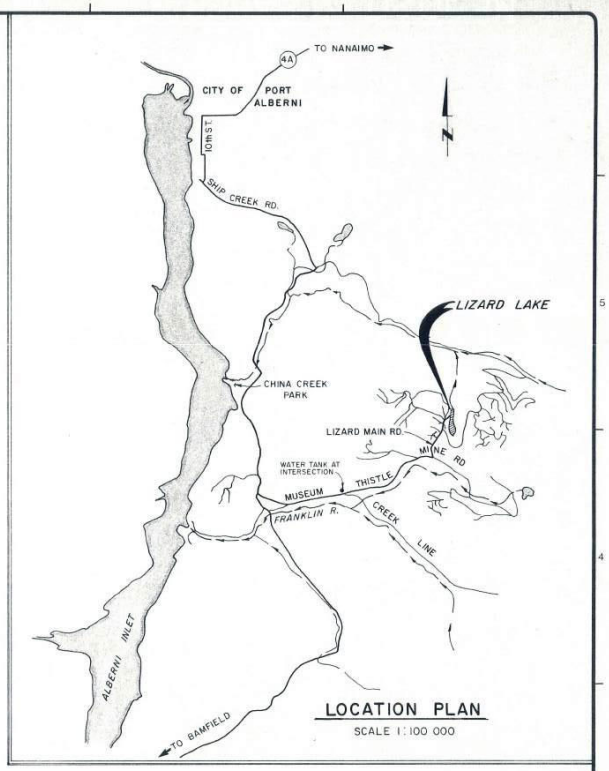
DESIGN AND AS-CONSTRUCTED DRAWINGS

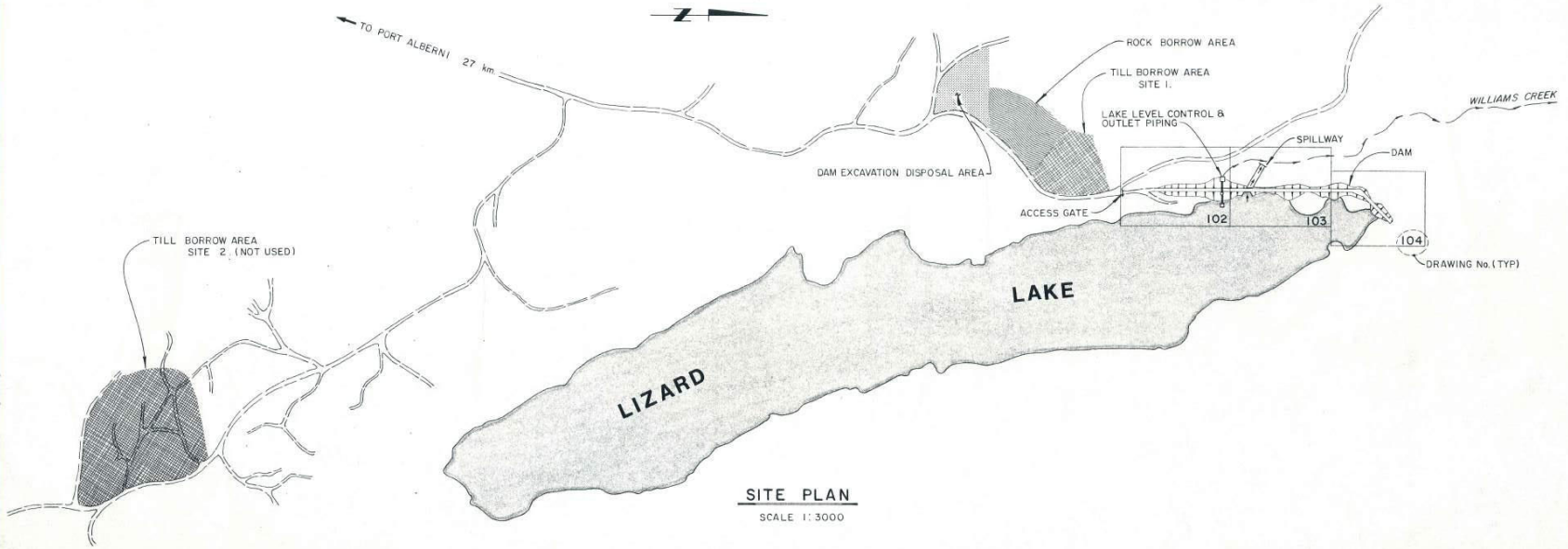
CITY OF PORT ALBERNI

LIZARD LAKE DAM

ASSOCIATED ENGINEERING SERVICES LTD.

NANAIMO B C





ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

NO	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
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0	18/6/84		D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	
DESIGNED	D.S.
CHECKED	D.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

D. Shilladeer
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

SITE & LOCATION PLANS

DRAWING NUMBER	REV.	SHEET
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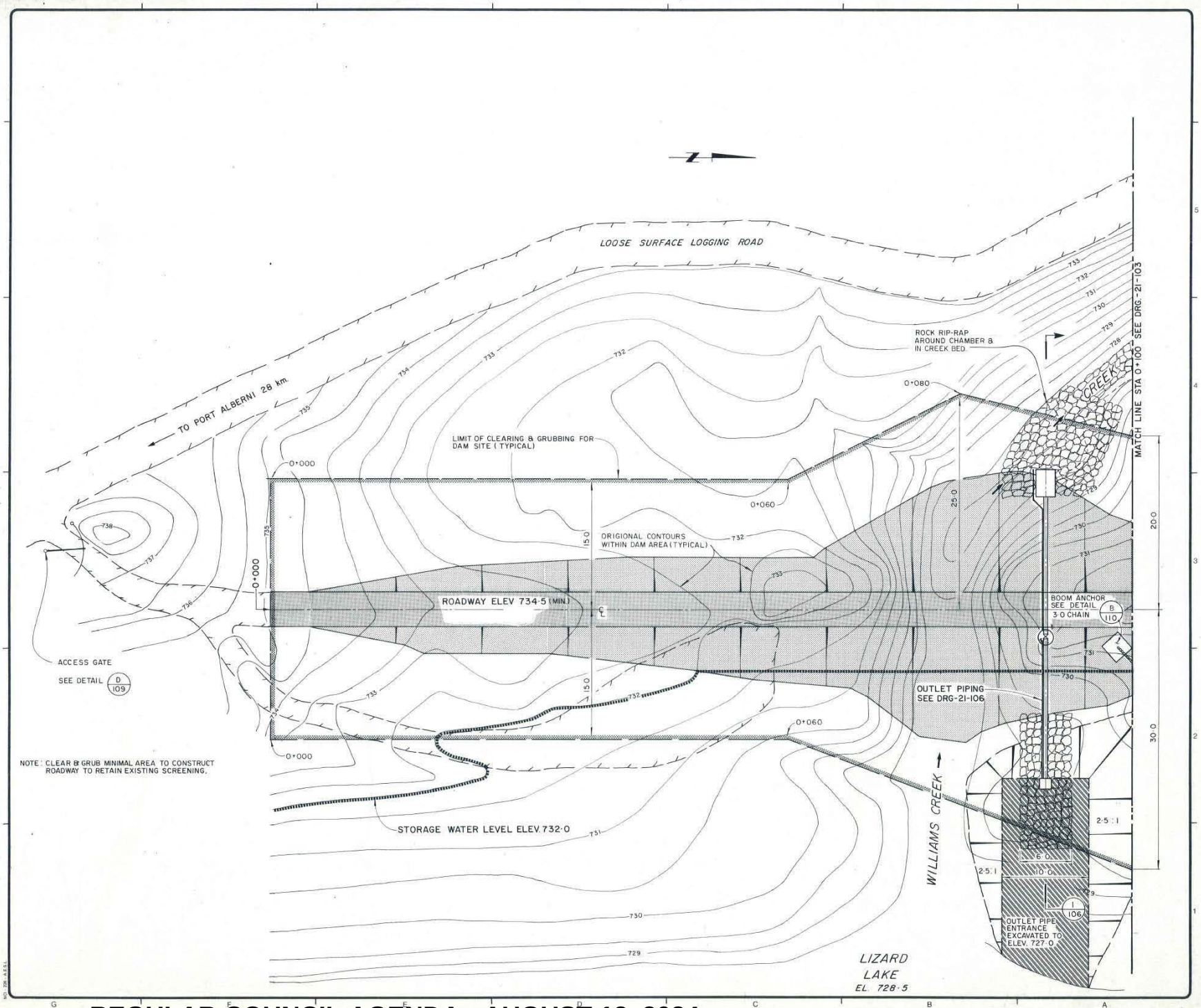

ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

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0	18/6/84	[illegible]	D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
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DRAWN	[illegible]
DESIGNED	D.S.
CHECKED	D.S.
APPROVED	[illegible]
APPROVED	[illegible]
DATE	JUNE 1984

D. Shillabeer
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

DAM - PLAN VIEW
STA 0+000 - STA 0+100

DRAWING NUMBER	REV.	SHEET
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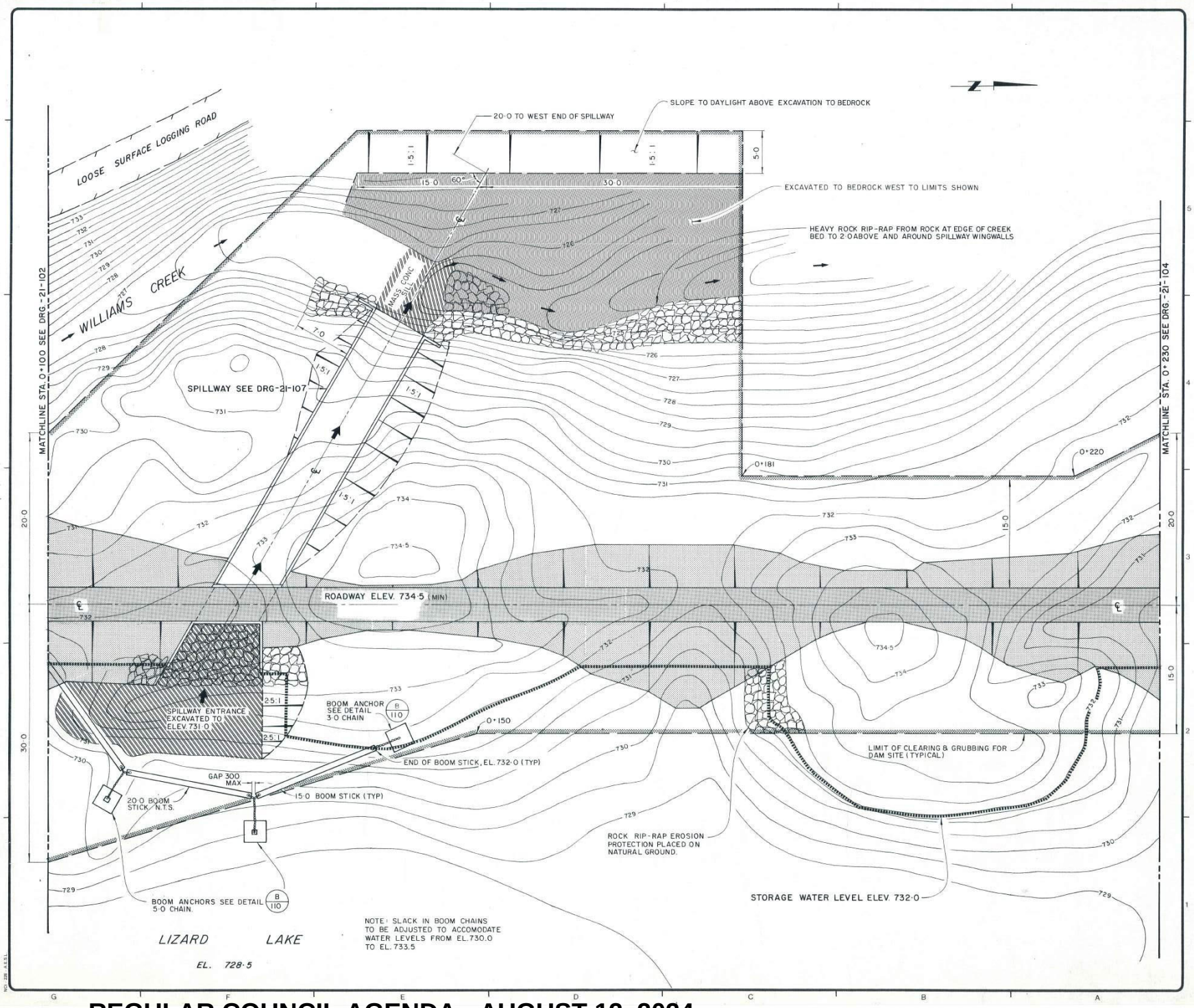

ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

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REVISIONS

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CHECKED	D.S.
APPROVED	[illegible]
APPROVED	R. Sharp
DATE	JUNE 1984

D. Shildrick
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

DAM - PLAN VIEW
STA.0+100 - STA.0+230

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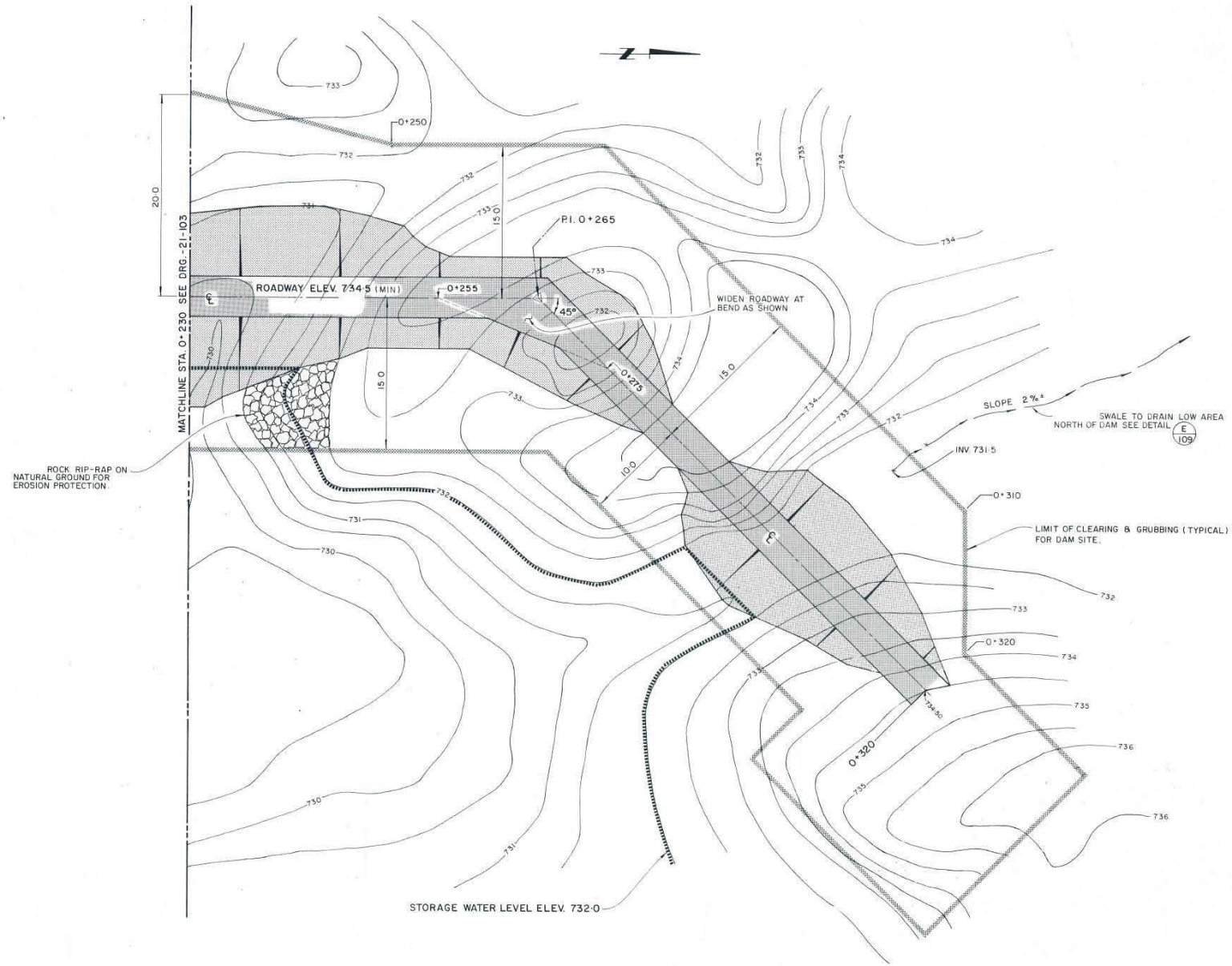

ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

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REVISIONS

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DESIGNED	D.S.
CHECKED	D.S.
APPROVED	[illegible]
APPROVED	R Sharp
DATE	JUNE 1984

D. Shillabeer
June 12th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

DAM - PLAN VIEW
STA. 0+230 - STA 0+320

DRAWING NUMBER	REV.	SHEET
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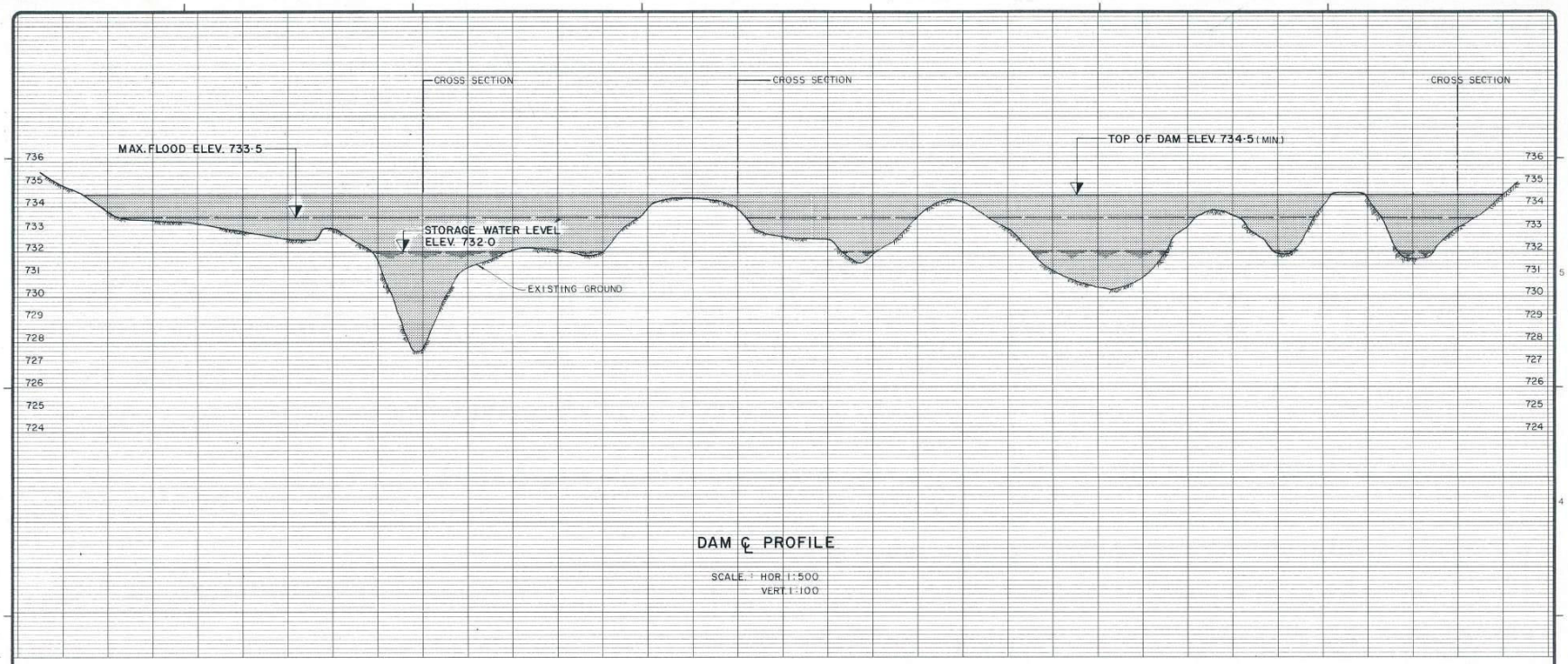
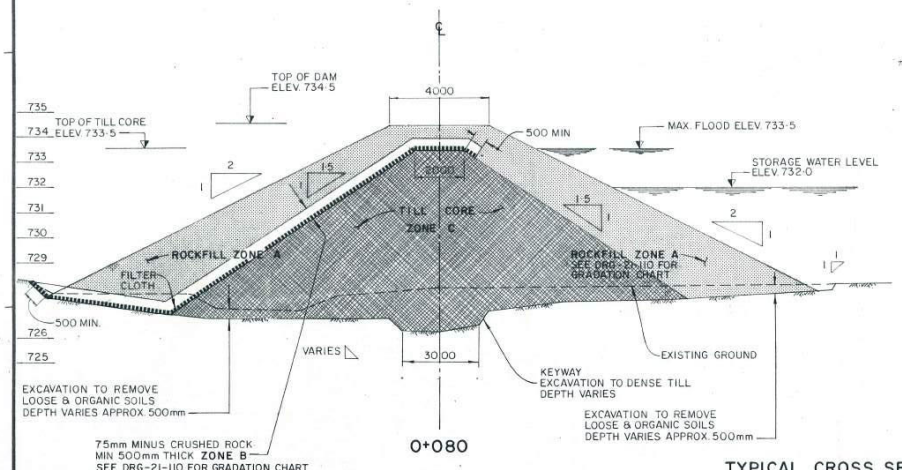
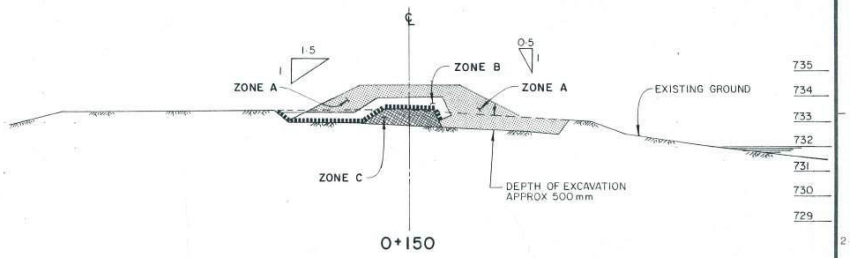
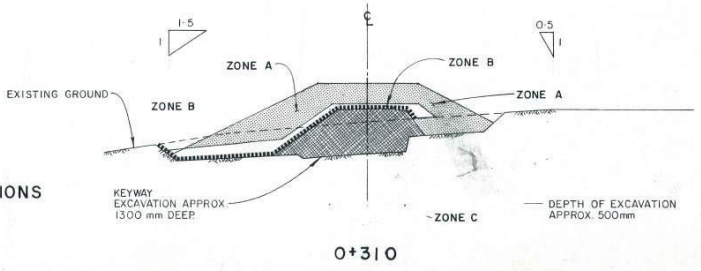


DAM ℄ PROFILE

SCALE: HOR. 1:500
VERT. 1:100







TYPICAL CROSS SECTIONS

SCALE: 1:100

NOTES: 1. DEPTH OF EXCAVATION WAS DETERMINED BY THE ENGINEER ON SITE
2. DETAILED NOTES TYPICAL ALL SECTIONS.
3. TILL CORE SIDE SLOPES 1·5:1 STA. 0+000 TO STA. 0+130, BEYOND STA. 0+140, WEST SIDE SLOPE 1·5:1, EAST 0·5:1, SEE TYP. SECTIONS.

ASSOCIATED ENGINEERING SERVICES LTD.
AESL

DRAWING REFERENCE

NO	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
1	16/7/84		O.S.	ISSUED FOR CONST.
0	18/6/84		O.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	
DESIGNED	O.S.
CHECKED	O.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

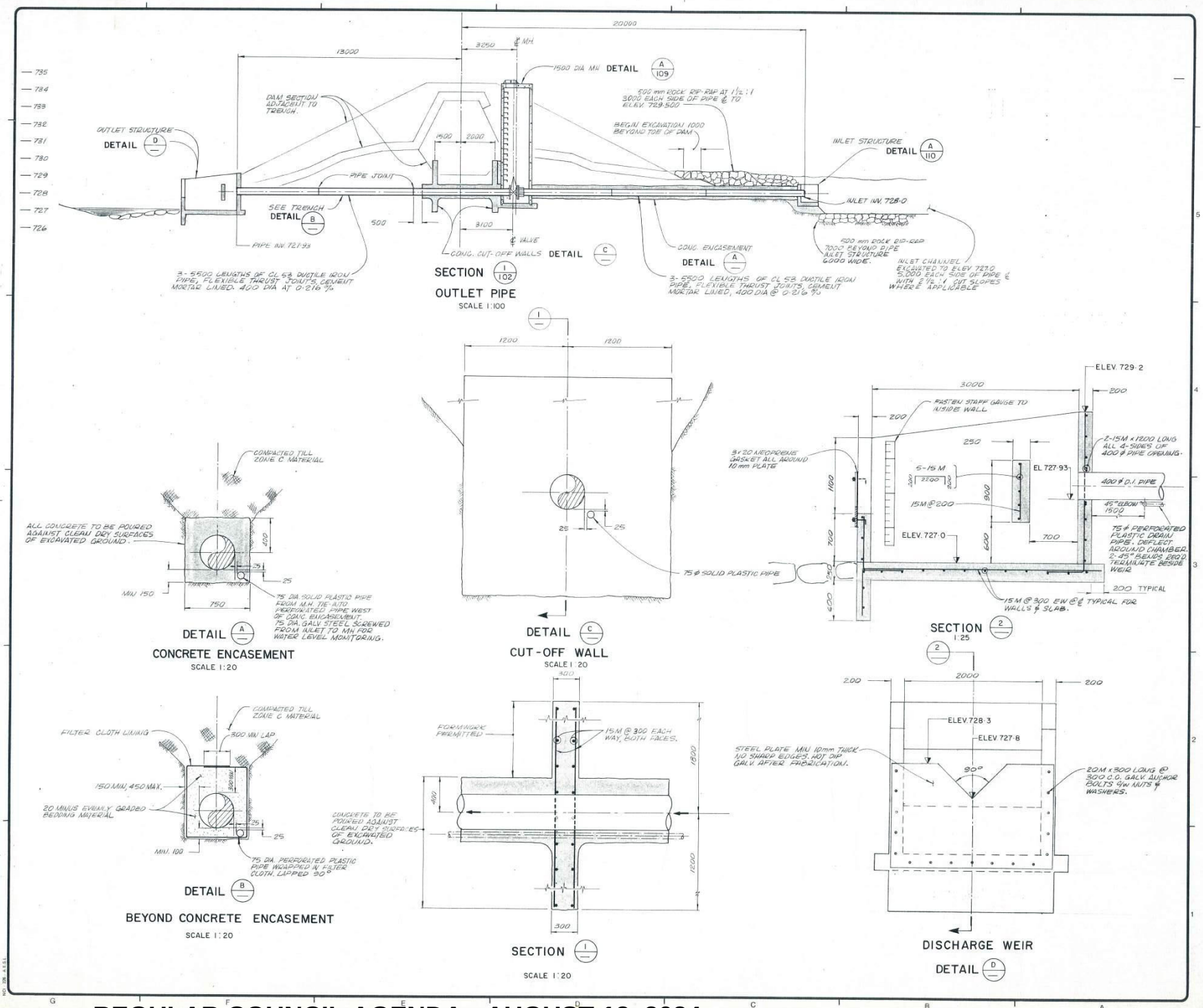
D. Skillicorn
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

TYPICAL DAM CROSS SECTIONS & ℄ PROFILE

DRAWING NUMBER	REV.	SHEET
V67H-21-105	2	5/10



ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

NO	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
1	18/7/84		D.S.	ISSUED FOR CONST.
0	18/6/84		D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	
DESIGNED	D.S.
CHECKED	D.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

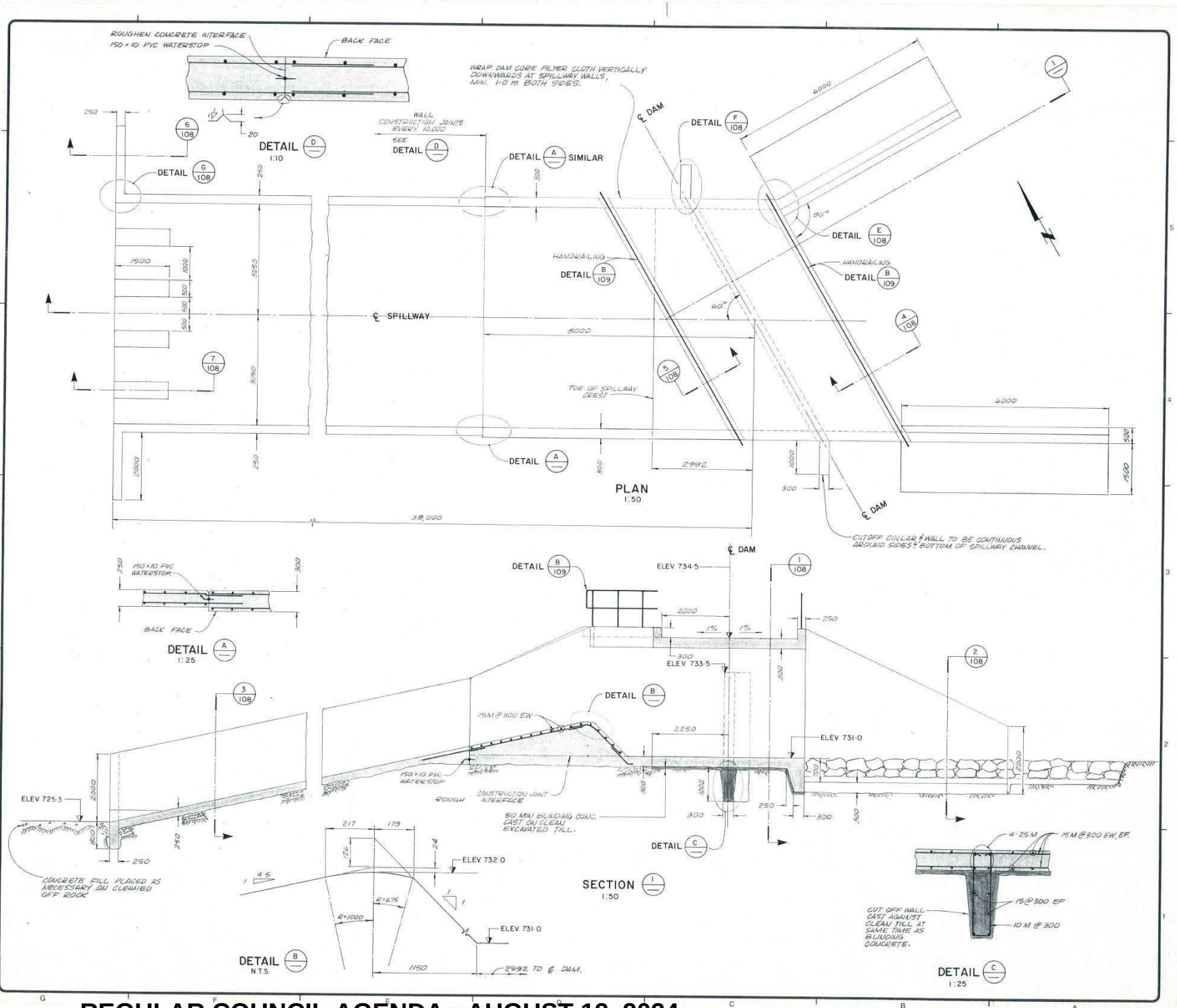
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

OUTLET PIPING & DISCHARGE WEIR MISC. DETAILS

DRAWING NUMBER	REV.	SHEET
V67H-21-106	2	6/10



ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

NO.	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
1	16/7/84		D.S.	ISSUED FOR CONST.
0	18/6/84		D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	
DESIGNED	D.S./D.B.H.
CHECKED	D.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

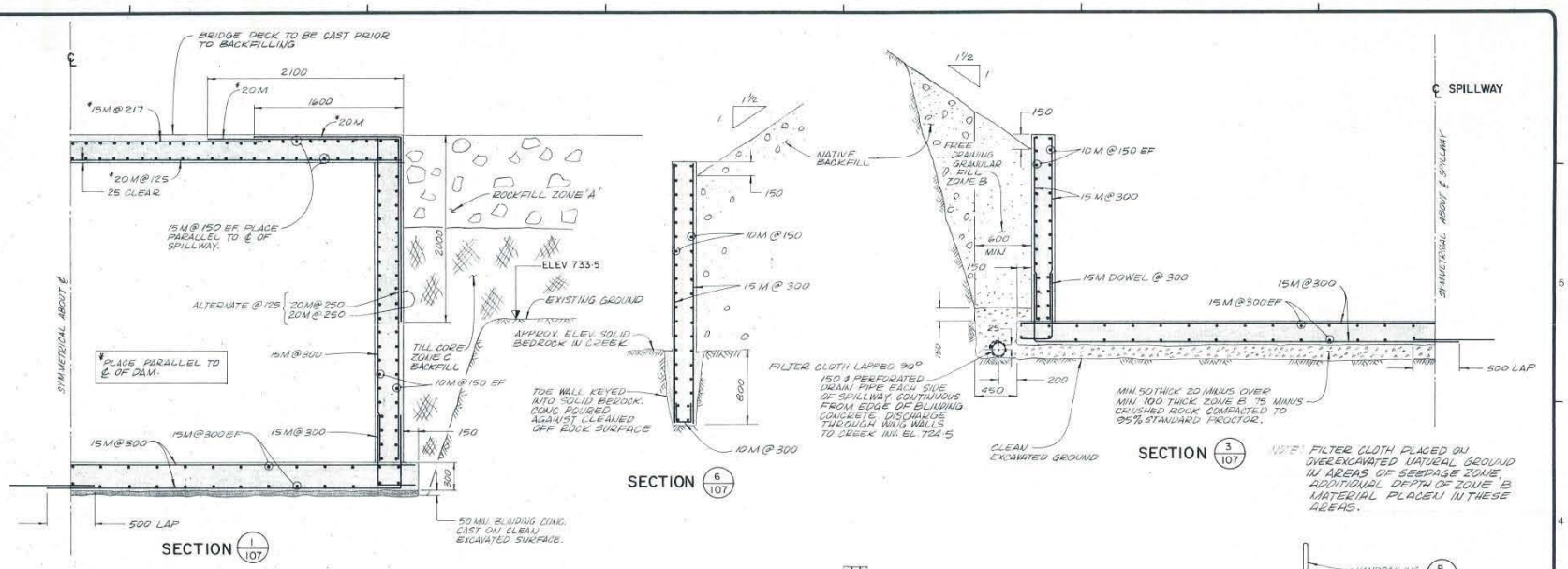
D. Stilwell
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

SPILLWAY
PLAN & SECTION

DRAWING NUMBER	REV.	SHEET
V67H-21-107	2	7/10



NOTES:

1. CLEAR COVER - FORMED SURFACES 50 UNLESS NOTED
   CAST AGAINST GROUND 75.
2. LAP LENGTHS UNLESS NOTED

10M	15M	
500	700	WALLS : HORIZONTAL
400	500	WALLS : VERTICAL
400	500	SLABS : LONGITUDINAL & TRANSVERSE

3. BRIDGE DESIGNED FOR MS 200 LOADING.

ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

NO.	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
1	16/7/84		D.S.	ISSUED FOR CONST.
0	28/6/84		D.S.	ISSUED FOR TENDER

REVISIONS

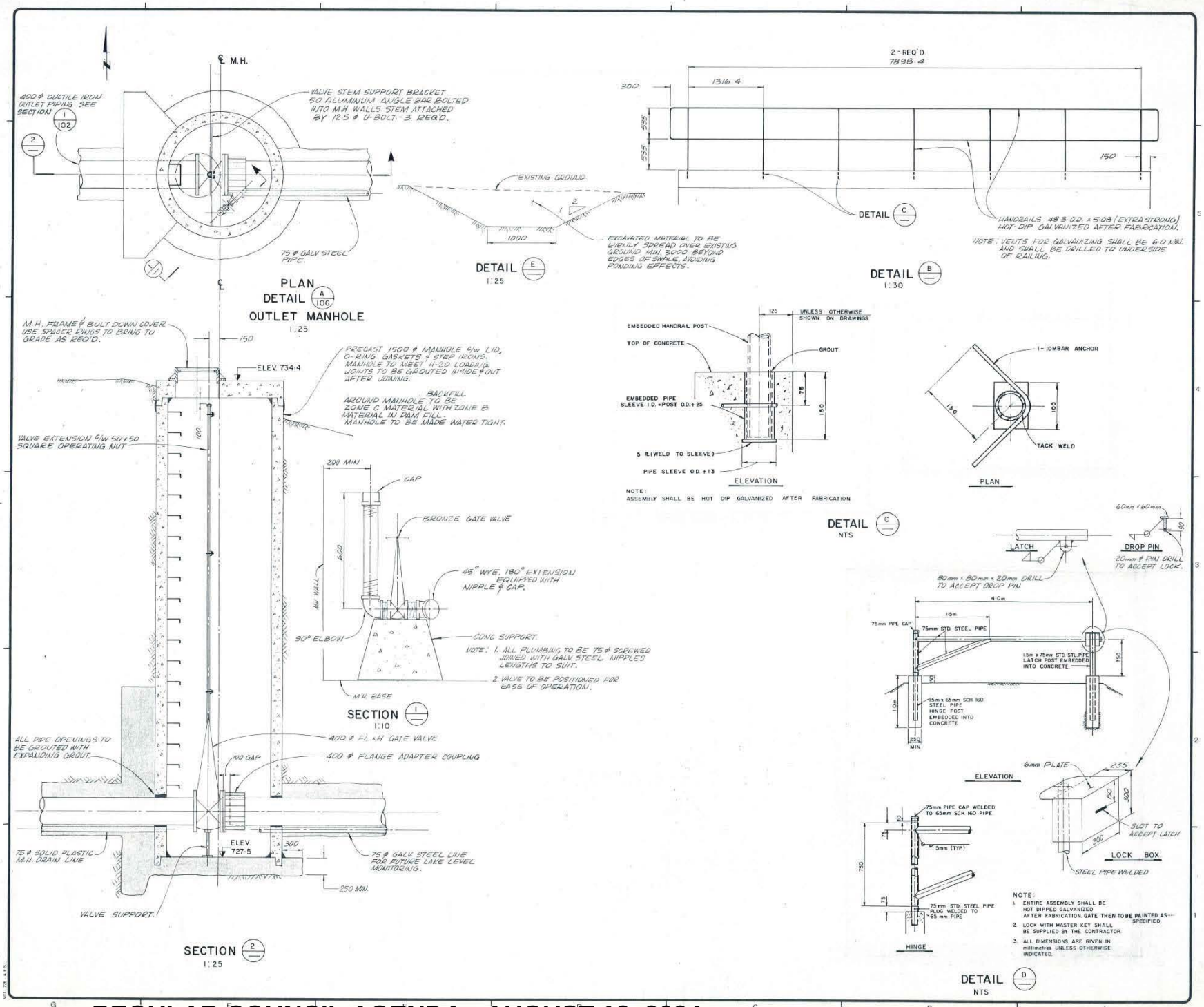
JOB NUMBER	V67H
SCALE	1:25
DRAWN	
DESIGNED	DBH
CHECKED	D.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

SPILLWAY REINFORCING DETAILS

DRAWING NUMBER	REV.	SHEET
V67H-21-108	2	8/10



ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

NO.	DATE	BY	ENG.	SUBJECT
2	9/85	[illegible]	[illegible]	AS CONSTRUCTED
1	16/7/84	[illegible]	D.S.	ISSUED FOR CONST
0	18/6/84	[illegible]	D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	[illegible]
DESIGNED	D.S.
CHECKED	D.S.
APPROVED	[illegible]
APPROVED	[illegible]
DATE	JUNE 1984

PROFESSIONAL ENGINEER D. SHILLABEER

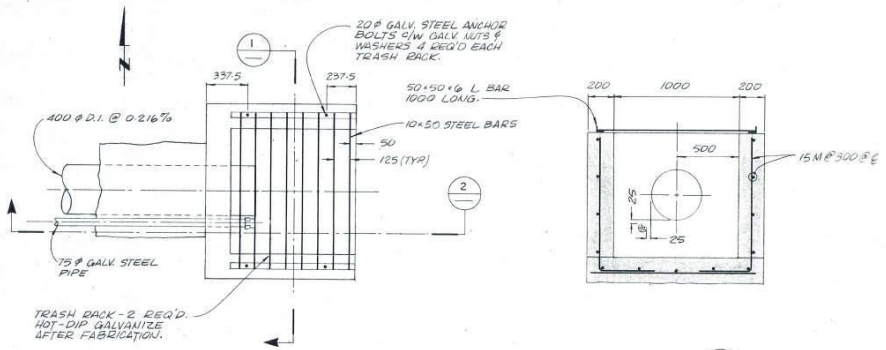
D. Shillabeer June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

MISCELLANOUS DETAILS

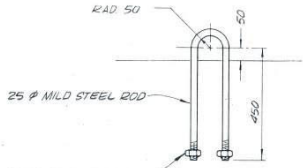
DRAWING NUMBER	REV.	SHEET
V67H-21-109	2	9/10



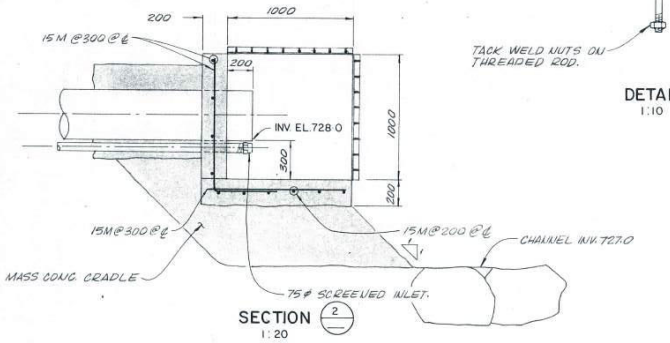
PLAN
INLET STRUCTURE
DETAIL (A/102)
1:20

SECTION (1)
1:20

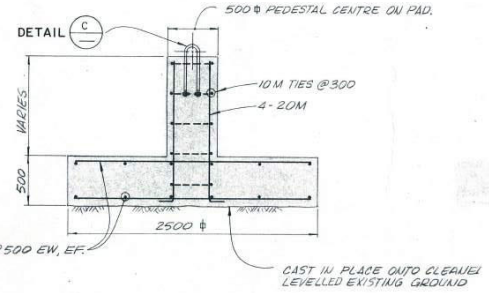
NOTES: 1. PROVIDE 2-15M × 12.00 LONG 4 SIDES OF 400 ϕ PIPE
2. SEE DRG 21-108 FOR TYPICAL REINFORCING NOTES.



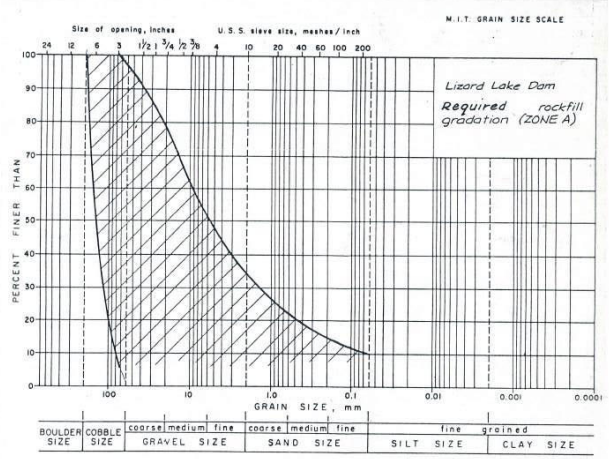
DETAIL (C)
1:10



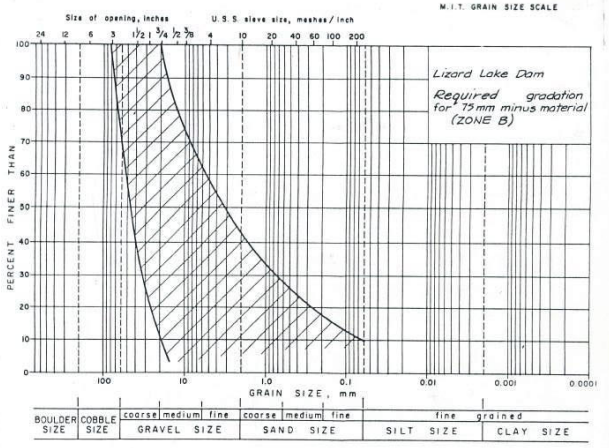
SECTION (2)
1:20



DETAIL (B/103)
1:25



ZONE A



ZONE B

ASSOCIATED ENGINEERING SERVICES LTD.
AESL

DRAWING REFERENCE

NO.	DATE	BY	ENG.	SUBJECT
2	9/85			AS CONSTRUCTED
1	16/11/84		D.S.	ISSUED FOR CONST.
0	18/6/84		D.S.	ISSUED FOR TENDER

REVISIONS

JOB NUMBER	V67H
SCALE	AS SHOWN
DRAWN	
DESIGNED	D.S.
CHECKED	D.S.
APPROVED	
APPROVED	
DATE	JUNE 1984

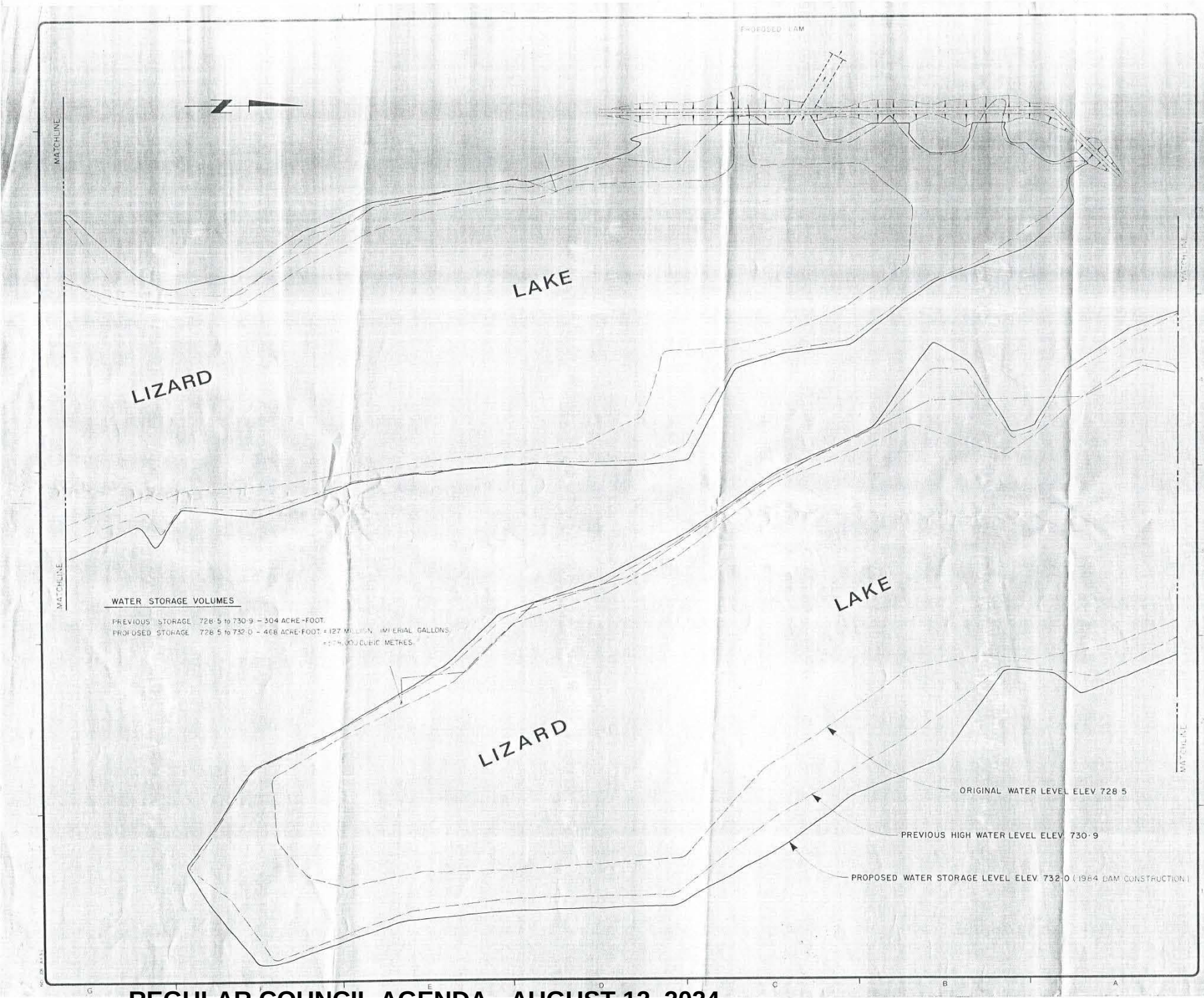
D. Shillabeer
June 18th 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

MISCELLANEOUS DETAILS

DRAWING NUMBER	REV.	SHEET
V67H-21-110	2	10/10



ASSOCIATED ENGINEERING SERVICES LTD.

AESL

DRAWING REFERENCE

REVISIONS

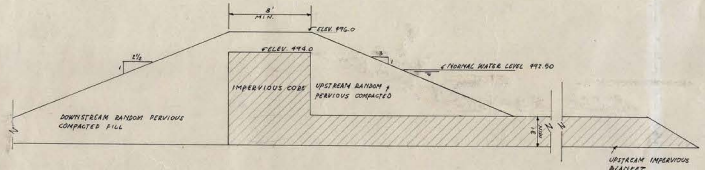
V67H
1:1000
JUNE 1984

CITY OF PORT ALBERNI

LIZARD LAKE DAM

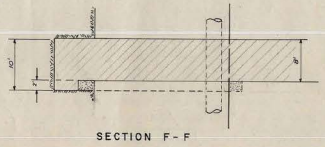
PLAN SHOWING LAKE WATER LEVELS

DRAWING NUMBER: V67H-21-001 | REV. | SHEET: 1/1

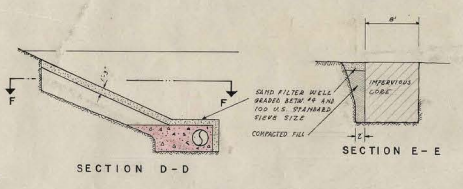


TYPICAL SECTION OF DAM AND BLANKET A-A

SCALE: 1" = 5'



SECTION F-F

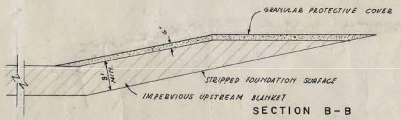


SECTION D-D

SECTION E-E

SECTIONS OF WEST ABUTMENT CORE TRENCH

SCALE: 1" = 10'



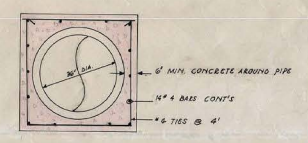
SECTION B-B

DATA OF TESTHOLE No 1001

DEPTH	ELEV	INSPECTORS FIELD LOG
0	483'	
2'	481'	TOP SOIL AND DISTURBED SAND AND GRAVEL SAND AND GRAVEL - FINE TO MEDIUM, WITH TOPSOIL, LOOSE
9.8'	473.2'	SAND AND GRAVEL; FINE TO MEDIUM, LOOSE, WATER BEARING
19'	464'	BEDROCK - NOT SAMPLED
25.5	457.5'	END OF HOLE

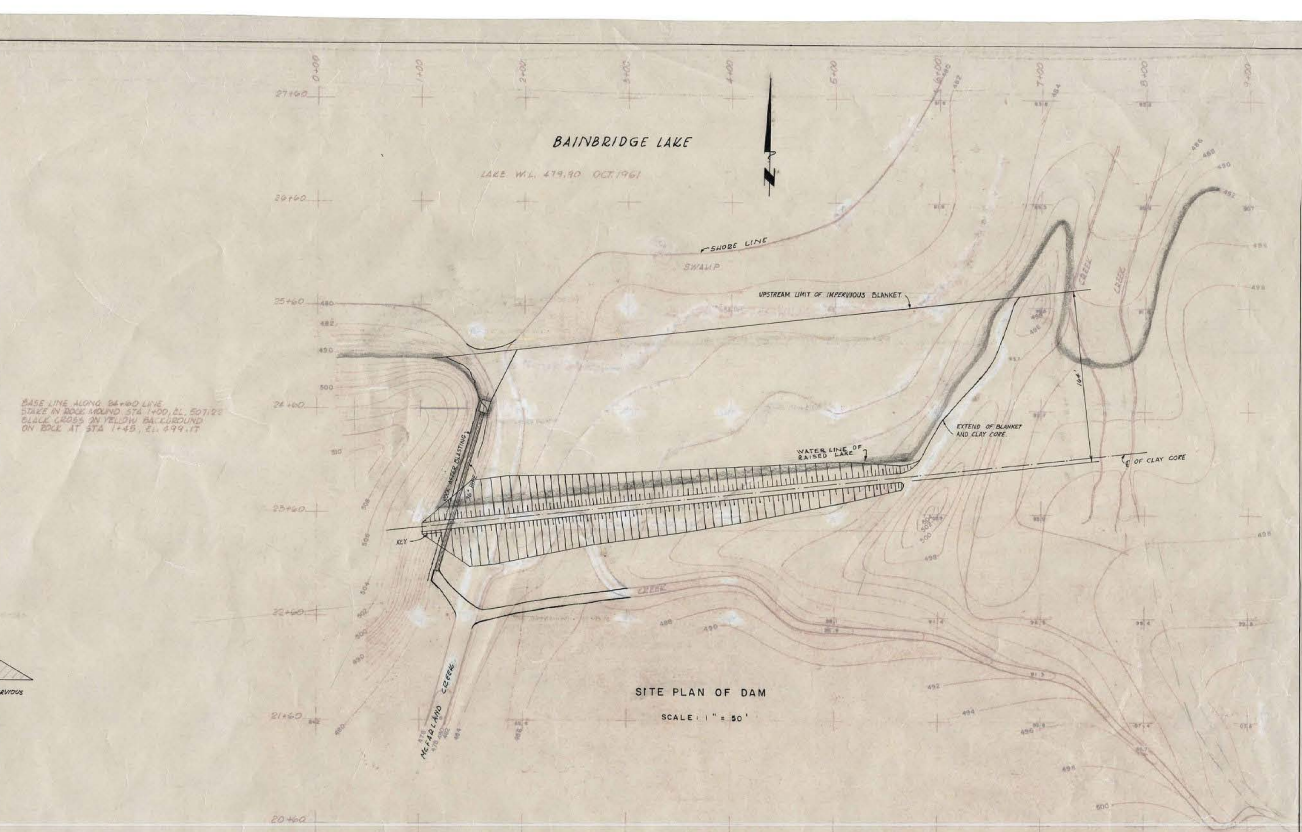
DATA OF TESTHOLE No 1002

DEPTH	ELEV	INSPECTORS FIELD LOG
0	486'	
		SAND - GRAVEL AND COBBLES, SOME ORGANIC MATTER THROUGHOUT LOOSE
11'	475'	
		PEAT OR ORGANIC SILT
15'	471'	
		SAND & GRAVEL - SLIGHTLY SILTY LOOSE, LIGHT BROWN IN COLOUR
26'		
		SAND - COARSE, ANGULAR, LIGHT GREY SILTY BINDER, GRADING INTO DECOMPOSED GRANITE
30'	456'	
		ROCK
38½'	443.5'	END OF HOLE



SECTION Y-Y OF TYPICAL 36" LOW LEVEL PIPE

SCALE: ½" = 1'-0"



SITE PLAN OF DAM

SCALE: 1" = 50'

REVISIONS		
DATE	BY	SUBJECT
SEPT 18 1962		AS CONSTRUCTED

ASSOCIATED ENGINEERING SERVICES LTD.
Consulting Engineers
REGINA EDMONTON VANCOUVER

CITY OF PORT ALBERNI, B.C.

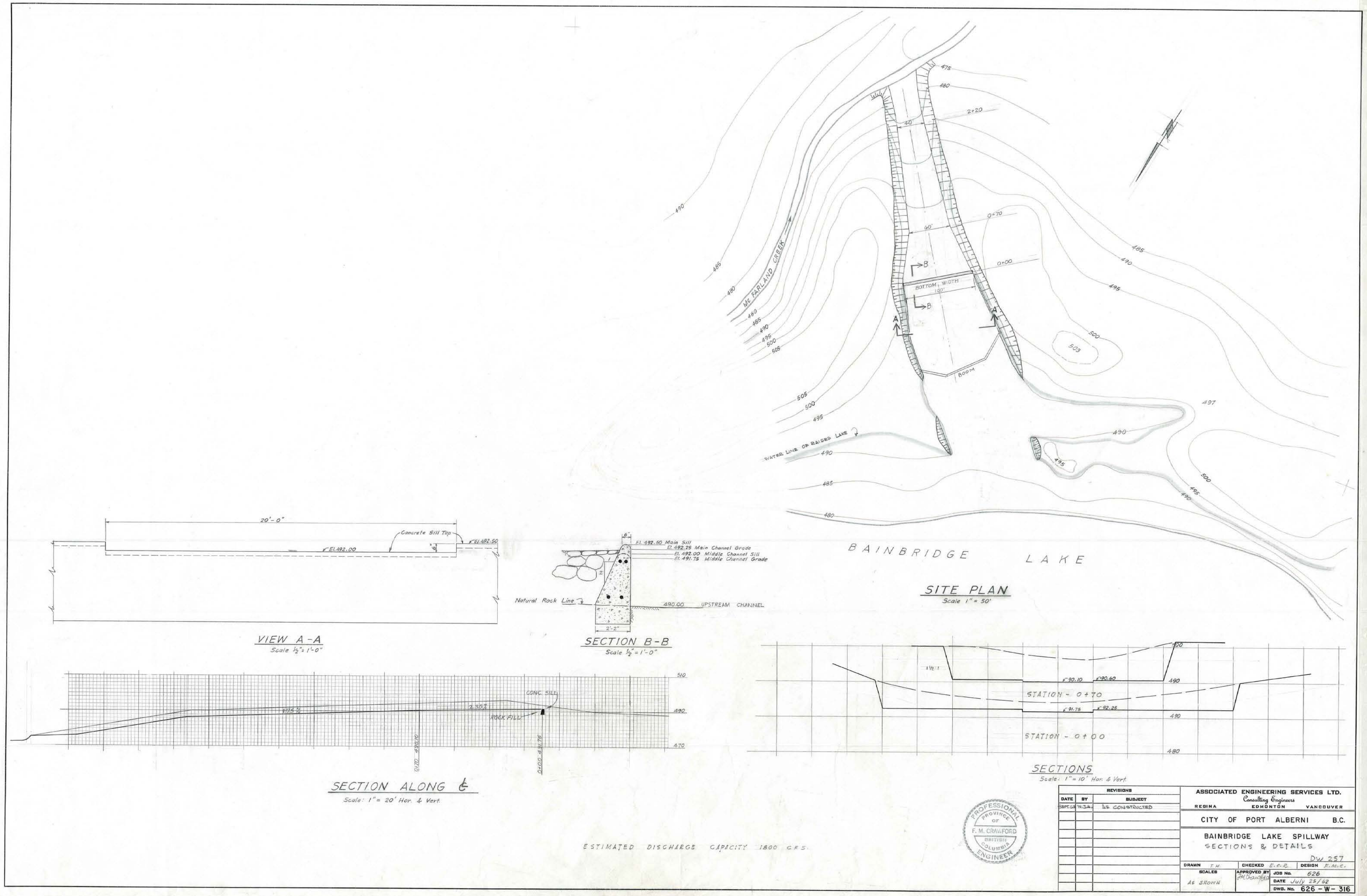
SITE PLAN OF BAINBRIDGE LAKE DAM
CROSS SECTIONS AND DETAILS

DW 257

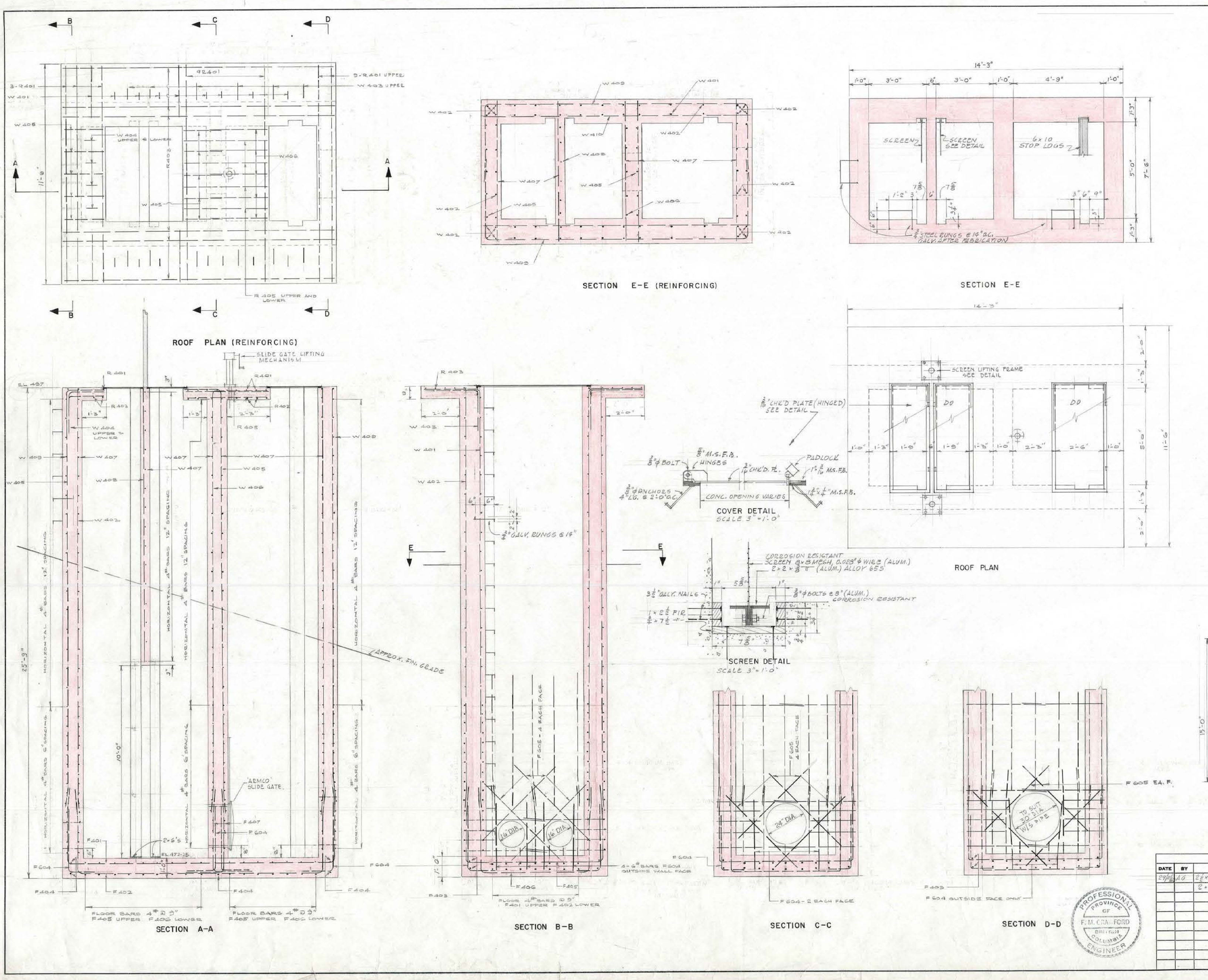
DRAWN	TRACED	CHECKED
V.W.		F.M.C.

SCALES	APPROVED BY	JOB No.	DATE
AS SHOWN		626	JULY 18, 1962

DWG. No. 626-W-314



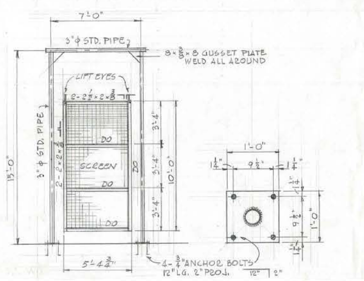
MC FARLAND CREEK
BOTTOM WIDTH 100'
WATER LINE OF RAISED LAKE
BAINBRIDGE LAKE
SITE PLAN
Scale 1" = 50'
20'-0"
Concrete Sill Top
El. 492.00
El. 492.50
VIEW A-A
Scale ½" = 1'-0"
El. 492.50 Main Sill
El. 492.25 Main Channel Grade
El. 492.00 Middle Channel Sill
El. 491.75 Middle Channel Grade
Natural Rock Line
490.00 UPSTREAM CHANNEL
2'-2"
SECTION B-B
Scale ½" = 1'-0"
CONC SILL
ROCK FILL
SECTION ALONG ℄
Scale: 1" = 20' Hor. & Vert.
STATION - 0+70
STATION - 0+00
SECTIONS
Scale: 1" = 10' Hor. & Vert.
ESTIMATED DISCHARGE CAPACITY 1800 C.F.S.
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
F. M. CRAWFORD
REVISIONS
DATE
BY
SUBJECT
AS CONSTRUCTED
ASSOCIATED ENGINEERING SERVICES LTD.
Consulting Engineers
REGINA EDMONTON VANCOUVER
CITY OF PORT ALBERNI B.C.
BAINBRIDGE LAKE SPILLWAY
SECTIONS & DETAILS
DW 257
DRAWN
CHECKED
DESIGN
SCALES
AS SHOWN
APPROVED BY
JOB No. 626
DATE July 25/62
DWG. No. 626-W-316



REINFORCING SCHEDULE

MARK	NO	SIZE	LENGTH	SKETCH	LOCATION
F 401	7	1/2"	22'-0"	4'-2 / 13'-10 / 4'-0	FLOOR SLAB
402	7		22'-0"	4'-8 / 12'-9 / 4'-7	
403	4		13'-11"	ST	
404	5		7'-2"	ST	
405	16		15'-0"	3'-11 / 7'-1 / 4'-0	
406	16		14'-8"	4'-7 / 5'-6 / 4'-7	
407	8		5'-0"	1'-6 / 3'-6	
F 604	10	3/4"	5'-0"	1'-6" / 3'-6"	
605	24		5'-6	ST	
W 401	18	1/2"	24'-4"	2'-8" / 21'-8	WALLS
402	49		21'-8"	ST	
403	12		4'-4"	1'-8 / 2'-8	
404	8		3'-7"	1'-8 / 1'-11	
405	10		23'-7"	1'-11 / 21'-8	
406	5		24'-7"	2'-11 / 21'-8	
407	143		7'-3"	ST	
408	6		14'-5"	ST	
409	64		22'-0"	4'-0 / 13'-11" / 4'-1	
410	64		13'-11"	ST	
R 401	14	1/2"	11'-2"	ST	ROOF SLAB
402	8		7'-0"	ST	
403	12		13'-11"	ST	
405	8		4'-2"	ST	
E 401	5	1/2"	20'-0"	ST	EXTRA BARS

GENERAL NOTES:
1. CLEARANCE OF REINFORCING BARS:
   2" WALLS, 1½" SLABS
   3" CONCRETE POURED AGAINST GROUND.
2. ALL BARS IN SLABS MUST BE SUPPORTED ON BOLSTERS & HIGH CHAIRS SPACED AT 5'-0" MAX.
3. THE REINFORCING SHALL BE CHECKED BY THE CONTRACTOR BEFORE ORDERING MATERIALS.
4. CONCRETE STRENGTH: SEE SPEC'S.
5. REINFORCING BARS: SEE SPEC'S.



LIFTING FRAME FOR SCREENS - ELEVATION

REVISIONS		
DATE	BY	SUBJECT
29/11/63	AG	2½×2×3/8 L'S CHANGED TO 2×2×3/8 L'S (SCREEN)

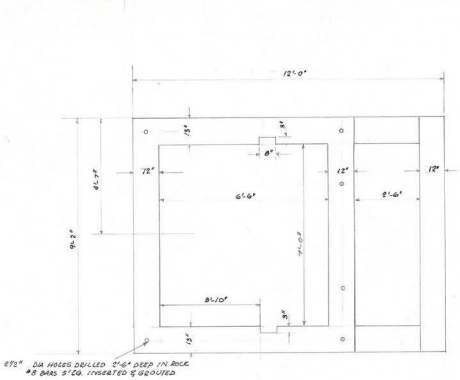
ASSOCIATED ENGINEERING SERVICES LTD.
Consulting Engineers
REGINA EDMONTON VANCOUVER

CITY OF PORT ALBERNI, BC.

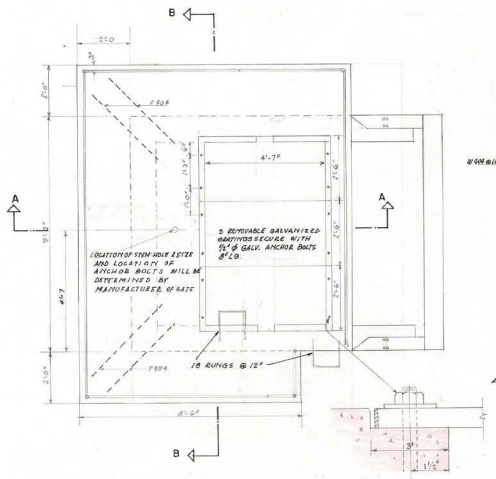
BAINBRIDGE LAKE
WATER SUPPLY INTAKE SCREENS
DETAILS & REINFORCEMENT DW 257

DRAWN F.M.C. CHECKED E.C.R. DESIGN F.M.C.
SCALES 1/2" = 1'-0" OR AS NOTED
APPROVED BY F.M. Crawford
JOB No. 626
DATE JULY 25, 1962
DWG. No. 626-W-317

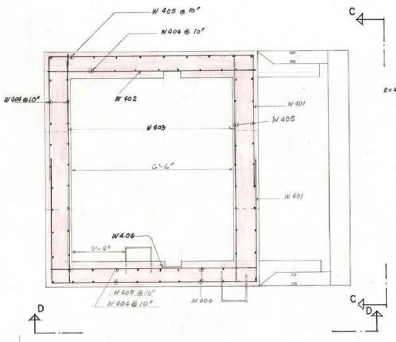
PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — F.M. CRAWFORD



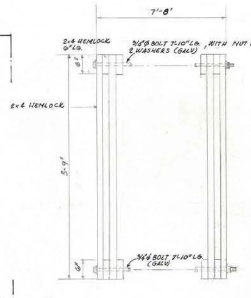
BOTTOM PLAN



TOP PLAN



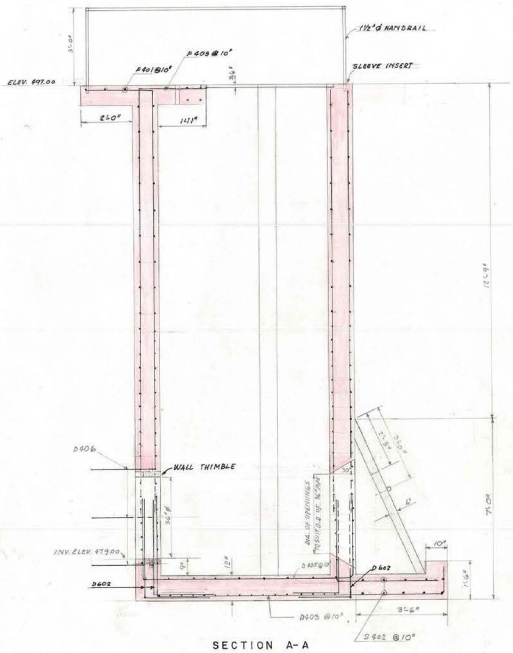
SECTION E-E



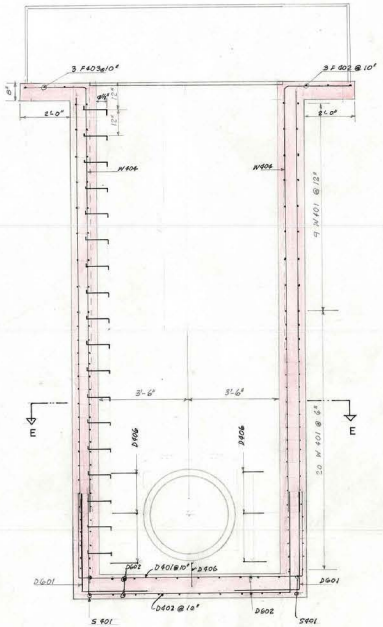
TRASH RACK

MARK	Ø	No	LENGTH	DESCRIPTION	LOCATION
W 401	½	58	18'-2	6" 8'-2" 6"	WALL
W 402	½	58	8'-2	ST	
W 403	½	28	8'-8	ST	
W 404	½	36	14'-1	10'-6 3'-7	
S 0 S	½	38	16'-6	ST	
W 601	⅜	16	5'-0"	ST	
F 401	½	3	12'-0	ST	TOP SLAB
F 402	½	8	10'-2	ST	
F 403	½	5	8'-10"	ST	
F 404	½	6	6'-0	ST	
D 401	½	9	18'-7	9'-0 8'-7 9'-0	BOTTOM SLAB
D 402	½	8	16'-0	4'-0 8'-0 4'-0	
D 403	½	9	16'-1	4'-0 11'-1 1'-0	
D 404	½	10	7'-0	4'-0 3'-0	
D 405	½	10	14'-1	3'-0 8'-1 3'-0	
D 406	½	7	8'-6	2'-6 1'-0	
D 601	⅜	16	6'-3	3'-9" 2'-6	
D 602	⅜	16	8'-0	5'-6 2'-6	
S 401	½	4	17'-6	ST	
S 801	1"	6	5'-0	ST	
S 602	½	10	8'-10	ST	
EXTRA	½	4	20	ST	

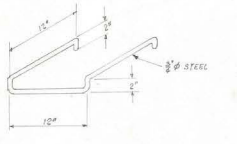
GENERAL NOTES:
1. CLEARENCE OF REINFORCING BARS
   1"CLEAR
   1½" WALLS
   3" CONCRETE POURED AGAINST GROUND
2. ALL BARS IN BEAMS & SLAB MUST BE SUPPORTED ON BOLSTERS & HIGH CHAIRS SPACED @ 6'-0" MAX.
3. THE CONTRACTOR SHALL CHECK THE REINFORCING SCHEDULE BEFORE ORDERING MATERIAL
4. CONCRETE STRENGTH - SEE SPEC'S
5. REINFORCING BARS - SEE SPEC'S



SECTION A-A



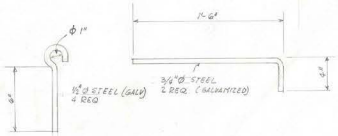
SECTION B-B



RUNG DETAIL (36 REQ)

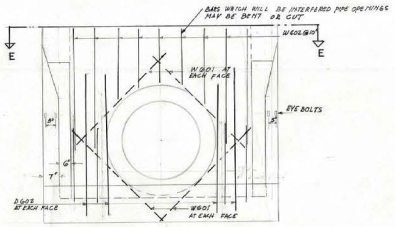
GALVANIZED AFTER FABRICATION

N.T.S.



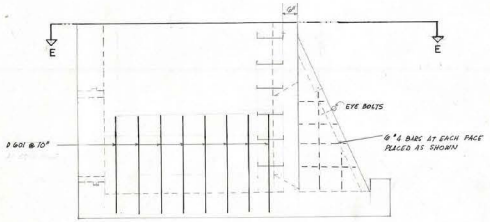
EYE BOLT AND LOCKING ROD FOR LOCKING RACK

N.T.S.



VIEW C-C

SHOWING REINFORCING AROUND INLET AND OUTLET OPENINGS



VIEW D-D

SHOWING 3/4"Ø REINFORCING

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA F. M. CRAWFORD

REVISIONS		
DATE	BY	SUBJECT

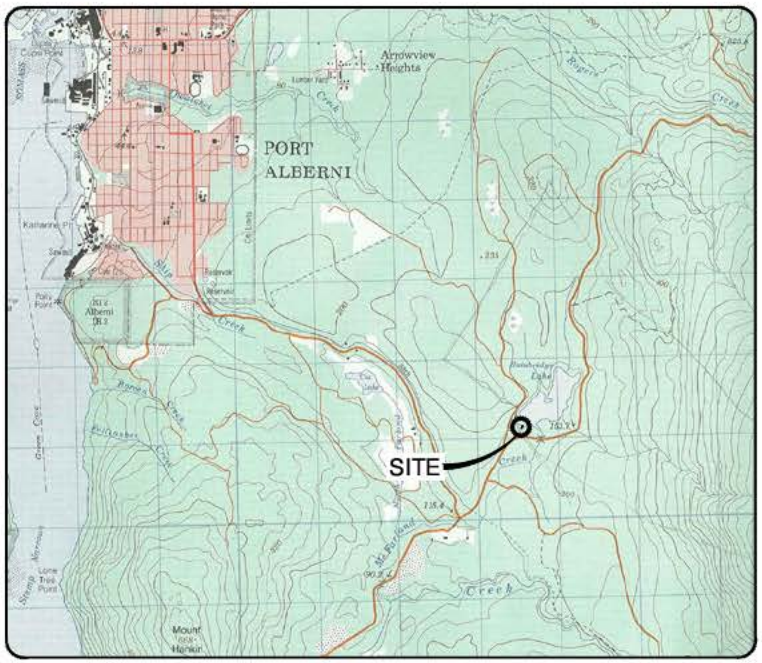
ASSOCIATED ENGINEERING SERVICES LTD.
Consulting Engineers
REGINA EDMONTON VANCOUVER

CITY OF PORT ALBERNI, B.C.

OUTLET CHAMBER FOR BAINBRIDGE LAKE Dwr 257
DETAILS AND REINFORCEMENT

DRAWN	CHECKED	DESIGN
V.W.		D.F.M.

SCALES	APPROVED BY	JOB No.	626
½"=1'-0" ON AS SHOWN		DATE	JULY 18, 1962
		DWG. No.	626-W-315



LOCATION PLAN
SCALE 1:30,000

LEGEND

EXISTING	DESCRIPTION	CONSTRUCTED
300 PVC WM	WATERMAIN (SIZE NOTED)	50ØØ HDPE WM W
	VALVE	
	AIR VALVE	
	WATER MANHOLE	
	EDGE OF GRAVEL ROAD	
	TREELINE	
	DITCHLINE	
	TOP OF BANK	
	TOE OF SLOPE	
	R.O.W. LINE	
	IRON PIN	
	TRAVERSE HUB	
375Ø PVC SD	STORM DRAIN	
150	EXISTING CONTOURS	
	TREE	
	ROCK	

GENERAL NOTES:

1. ALL LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE.
2. ALL OR ANY STRUCTURES NOT NECESSARILY SHOWN.
3. PROJECT ELEVATIONS ARE BASED ON HUB TH15 LOCATED ON THE EAST SIDE OF THE SCREEN CHAMBER AT THE BAINBRIDGE LAKE INTAKE ELEV. 151.541m.

DRAWING LIST:

9225-163-01	LOCATION PLAN, NOTES, LEGEND, AND DRAWING LIST
9225-163-02	INTAKE PLAN & PROFILE STA. 1+000 TO 1+180
9225-163-03	MISCELLANEOUS DETAILS

REFERENCE DRAWINGS

DATA REFERENCE: NAD 83 (CSRS)
INTEGRATED SURVEY MONUMENT:
LOCATION: LOCAL SURVEY (TH15)
DESCRIPTION: INTAKE CHAMBER
ELEVATION: SOUTH EAST EDGE
SURVEYED BY: 151.541
FIELD BOOK NUMBER: PT
PMS REFERENCE NUMBER: 9021-BSM.fbk

STAMP

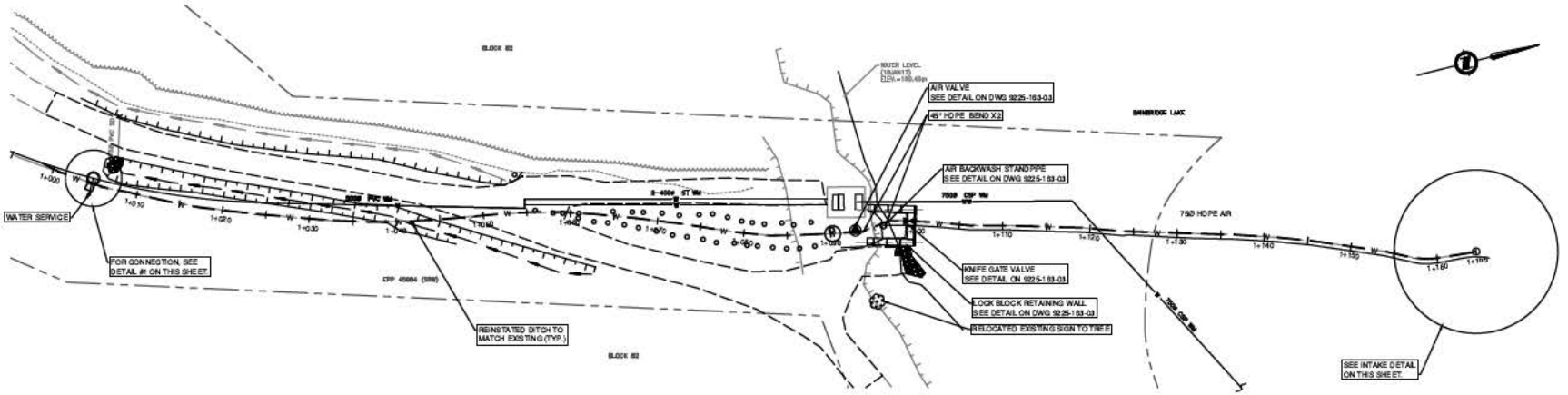
NO.	DATE	BY	REVISIONS	ENG.
5	23JAN18	JES	FOR RECORD	KND
4	03AUG17	KND	FOR CONSTRUCTION	KND
3	13MAY17	CJK	FOR TENDER	KND
2	03MAY17	CJK	FOR APPROVALS	KND
1	10 APR17	CKD	95% SUBMISSION	KND

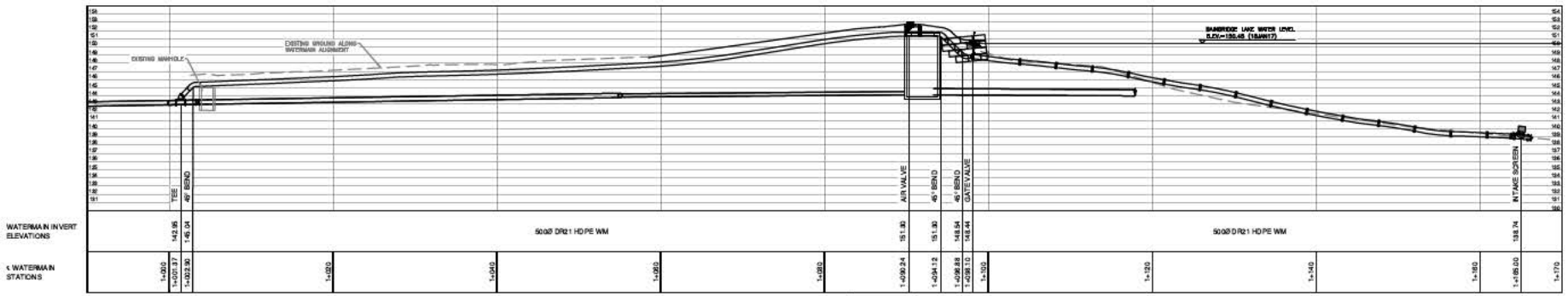
DESIGN BY KND DATE JANUARY 2017
DRAWN BY CACH DATE JANUARY 2017
CHECKED BY CD DATE APRIL 2017
APPROVED BY CD DATE APRIL 2017

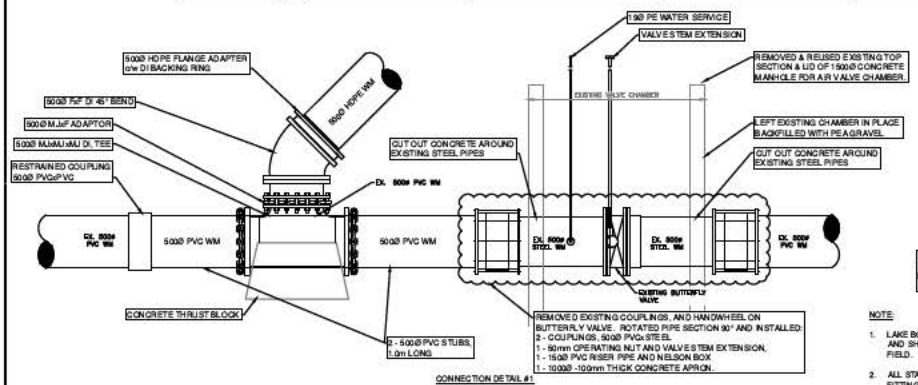
CITY OF PORT ALBERNI
ENGINEERING DEPARTMENT

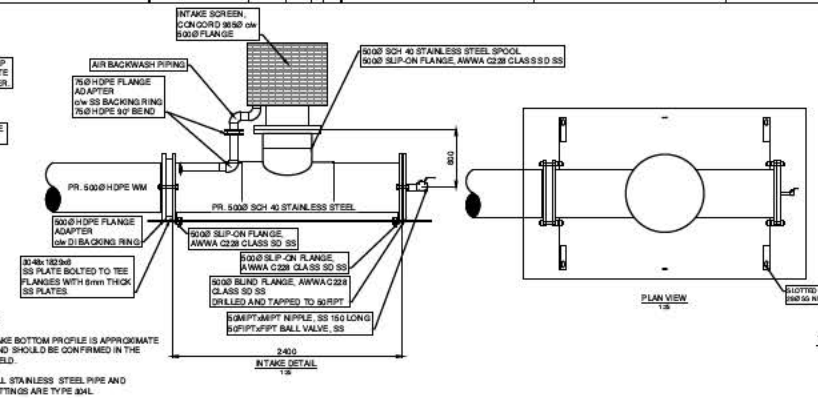
SCALE HORIZ N/A SCALE VERT. N/A
SHEET 1 OF 3
DRAWING NUMBER 9225-163-01

PROJECT BAINBRIDGE LAKE INTAKE IMPROVEMENTS
TITLE LOCATION PLAN, NOTES, LEGEND, AND DRAWING LIST.









REFERENCE DRAWINGS

DATA REFERENCE: NAD 83 (CSRS)
INTEGRATED SURVEY MONUMENT: LOCAL SURVEY (TH 15)
LOCATION: INTAKE CHAMBER
DESCRIPTION: SOUTH EAST EDGE
ELEVATION: 151.541
SURVEYED BY: PT
FIELD BOOK NUMBER: 9221-BSM/tbk
PMS REFERENCE NUMBER:

STAMP

NO.	DATE	BY	REVISIONS	ENG.
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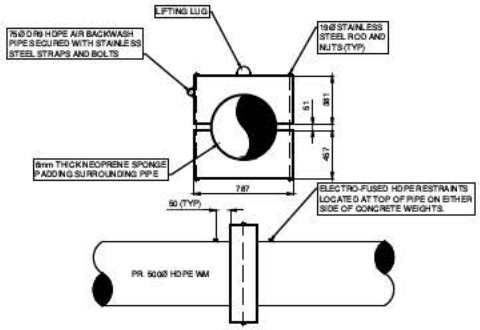
4	03AUG17	KND	FOR CONSTRUCTION	KND
3	19MAY17	DJK	FOR TENDER	KND
2	03MAY17	DJK	FOR APPROVALS	KND
1	10 APR17	DAG	95% SUBMISSION	KND

DESIGN BY	DATE
KND	JANUARY 2017
DRAWN BY	DATE
CACH	JANUARY 2017
CHECKED BY	DATE
CD	APRIL 2017
APPROVED BY	DATE
CD	APRIL 2017

CITY OF PORT ALBERNI
ENGINEERING DEPARTMENT

SCALE HORIZ	1:250
SCALE VERT	1:250
SHEET	2 OF 3
DRAWING NUMBER	9225-163-02

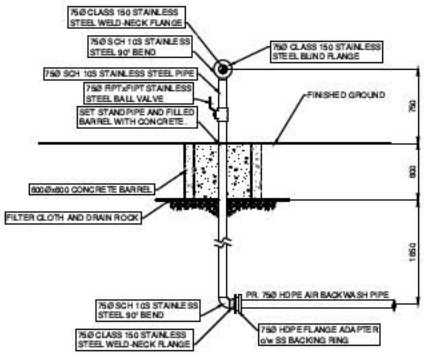
PROJECT: BAINBRIDGE LAKE INTAKE IMPROVEMENTS
TITLE: INTAKE PLAN & PROFILE STA. 1+000 TO 1+180



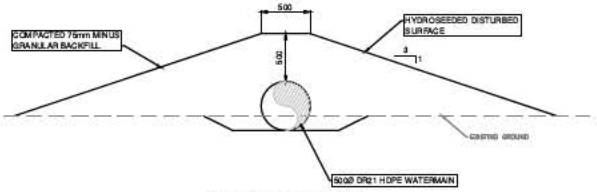
CONCRETE WEIGHT DETAIL
NOT TO SCALE

NOTE:

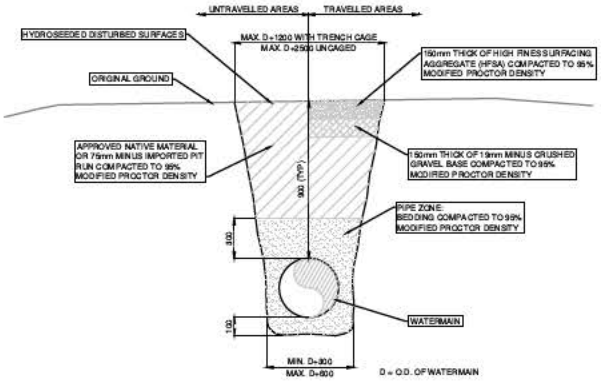
1. CONCRETE WEIGHT DETAILED DESIGN PROVIDED BY CONTRACTOR'S ENGINEER.



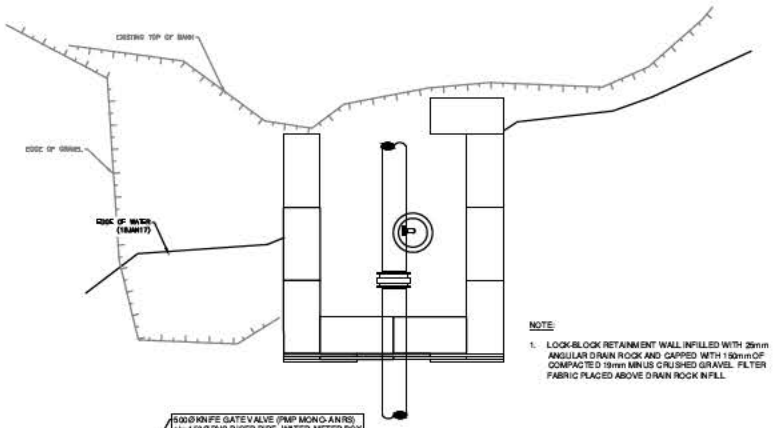
AIR BACKWASH STAND PIPE DETAIL
1:25



TYPICAL OVERLAND TRENCH DETAIL
1:25

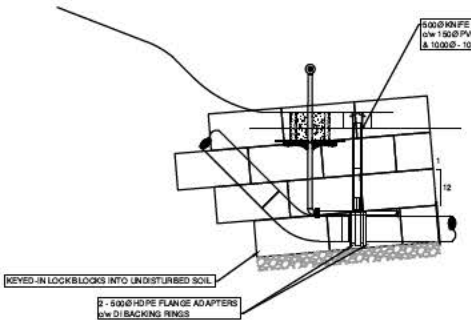


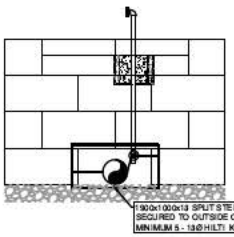
TYPICAL UNDERGROUND TRENCH DETAIL
NOT TO SCALE



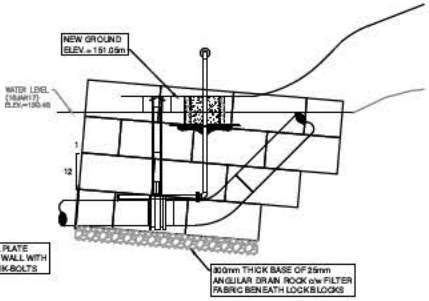
NOTE:

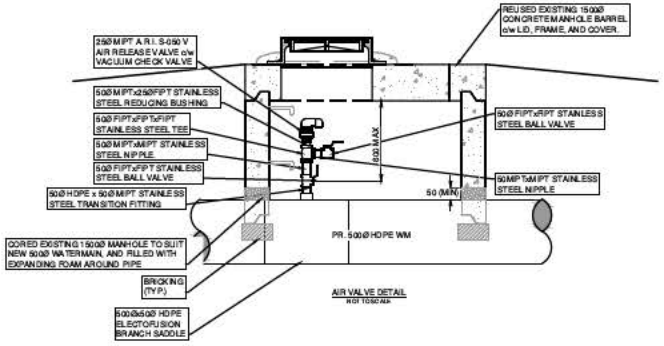
1. LOCKBLOCK RETAINMENT WALL INFILLED WITH 25mm ANGULAR DRAIN ROCK AND CAPPED WITH 150mm OF COMPACTED 19mm MINUS CRUSHED GRAVEL. FILTER FABRIC PLACED ABOVE DRAIN ROCK INFILL.





LOCKBLOCK RETAINING WALL DETAIL
1:50





AIR VALVE DETAIL
NOT TO SCALE

REFERENCE DRAWINGS

DATA REFERENCE: NAD 83 (CSRS)
INTEGRATED SURVEY MONUMENT: LOCAL SURVEY (TH 15)
LOCATION: INTAKE CHAMBER
DESCRIPTION: SOUTH EAST EDGE
ELEVATION: 151.541
SURVEYED BY: PT
FIELD BOOK NUMBER: 9021-BSM.fbk
PMS REFERENCE NUMBER:

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4	03AUG17	KND	FOR CONSTRUCTION	KND
3	19MAY17	DJK	FOR TENDER	KND
2	09MAY17	DJK	FOR APPROVALS	KND
1	10 APR17	DAGI	95% SUBMISSION	KND

DESIGN BY KND DATE JANUARY 2017
DRAWN BY CACH DATE JANUARY 2017
CHECKED BY CD DATE APRIL 2017
APPROVED BY CD DATE APRIL 2017

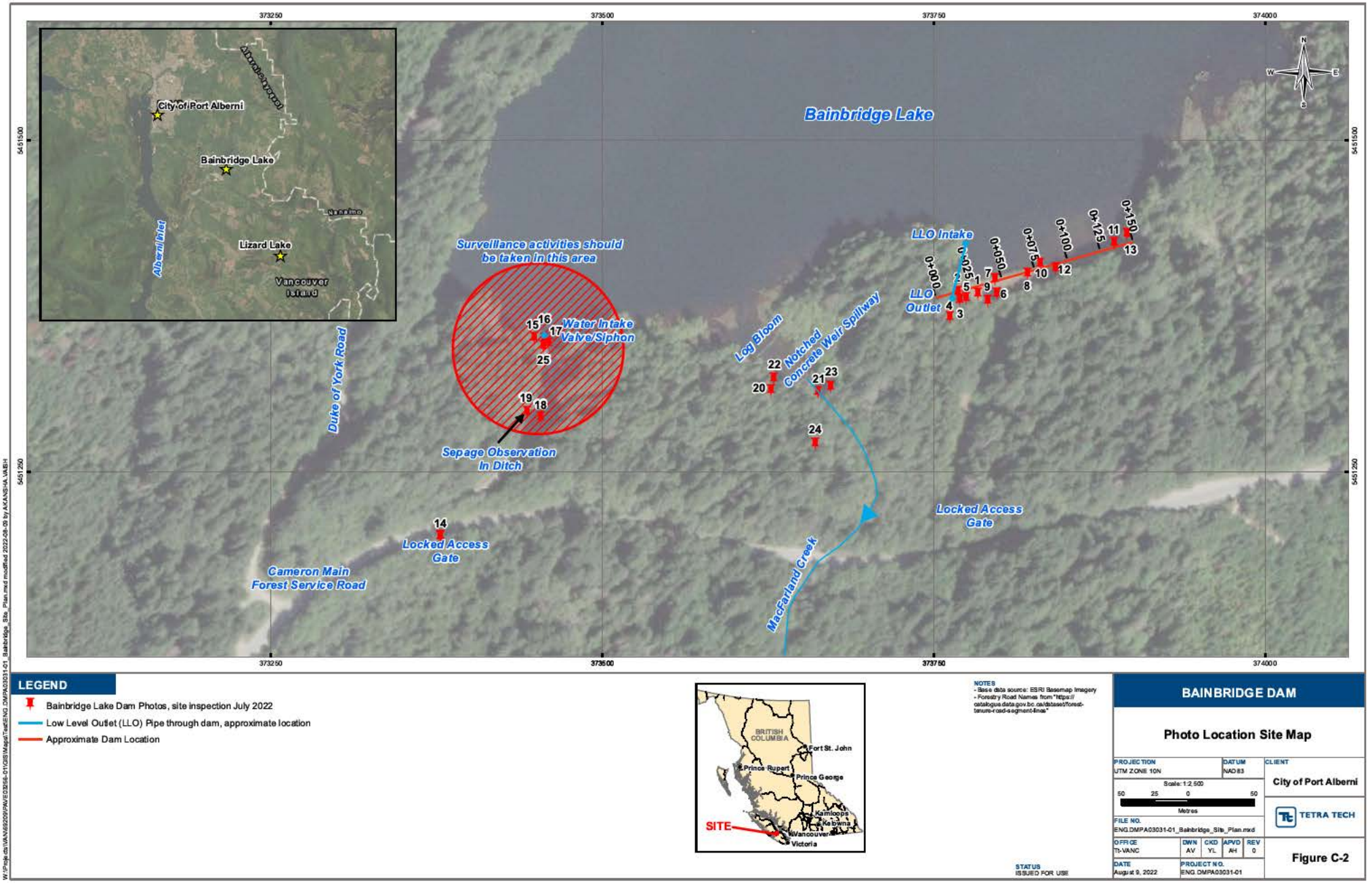
CITY OF PORT ALBERNI
ENGINEERING DEPARTMENT

SCALE HORIZ. AS SHOWN SCALE VERT. AS SHOWN
SHEET 3 OF 3
DRAWING NUMBER 9225-163-03

PROJECT BAINBRIDGE LAKE INTAKE IMPROVEMENTS
TITLE MISCELLANEOUS DETAILS

APPENDIX C

SITE REVIEW – DAM SAFETY INSPECTION CHECKLISTS



LEGEND

- Bainbridge Lake Dam Photos, site inspection July 2022
- Low Level Outlet (LLO) Pipe through dam, approximate location
- Approximate Dam Location

NOTES
- Base data source: ESRI Basemap Imagery
- Forestry Road Names from "https://catalogue.data.gov.bc.ca/dataset/forest-tenure-road-segment-lines"

STATUS
ISSUED FOR USE

BAINBRIDGE DAM

Photo Location Site Map

PROJECTION	DATUM	CLIENT
UTM ZONE 10N	NAD83	City of Port Alberni

Scale: 1:2,500
50 25 0 50
Metres

TETRA TECH

FILE NO.
ENG.DMPA03031-01_Bainbridge_Site_Plan.mxd

OFFICE	DWN	CKD	APVD	REV
TI-VANC	AV	YL	AH	0

DATE
August 9, 2022

PROJECT NO.
ENG.DMPA03031-01

Figure C-2

W:\Projects\VAN\69209\PAVE\D3\5E-01\03\Maps\Task\ENG.DMPA03031-01_Bainbridge_Site_Plan.mxd modified 2022-08-09 by AKANSHA.VAEH

TETRA TECH

DAM SAFETY CHECKLIST

Structure: Bainbridge Lake Dam

Date of Inspection	July 12, 2022
File	704-ENG.DMPA03031
Owner	City of Port Alberni
Consequence Classification	Very High
Inspection Performed By	Angie Ramey, P.Eng and Alex Huang, EIT

Conditions at Time of Inspection

Temperature (°C)	20 to 25
Weather	☒Sunny ☐Scattered Cloud ☐Overcast ☐Raining ☐Snowing
Wind	☒None ☐Light ☐Moderate ☐High

Structure Data

Staff Gauge Reading (m)	2.17	**Current Freeboard (m)**	2
Minimum Crest Width (m)	2.7	**Crest Length (m)**	130
Max Dam Height[1] (m)	4	**Slope Angle (u/s)**	3H:1V
Reservoir Volume (m^3)	1,230,000	**Slope Angle (d/s)**	2.5H:1V

Surrounding Conditions

Upstream Conditions & Hazards	Downstream Conditions & Hazards
Large reservoir, forested slopes around. No signs of instability/landslides.	MacFarland Creek that flows into China Creek. Gravel Pit and China Creek Campground Below

Do the following appear to be in satisfactory condition based on inspection?

Embankment	Yes	No	N/A[2]
Crest	X		
U/S Slope	X		
D/S Slope	X		
D/S Toe	X		
Left Abutment[3]	X		
Right Abutment[3]	X		

Appurtenances	Yes	No	N/A[2]
Inlet			X
Outlet	X		
Spillway		X	
Auxiliary Spillway			X
Drains			X
Inlet Controls			X
Outlet Controls			X

Other	Yes	No	N/A[2]
Reservoir	X		
Reservoir U/S Slopes	X		
Internal Dykes			X
Log Boom	X		
Instruments	X		

[1] Maximum Dam Height Includes Natural Pillar
[2] N/A = Not Applicable or Unknown
[3] Right / Left Based on Facing Downstream

Tetra Tech Canada Inc.
#1 - 4376 Boban Drive
Nanaimo, BC V9T 6A7 CANADA
Tel 250.756.2256 Fax 250.756.2686

1.0 General Observations – Does the Pond Have?

Item		Yes	No	Photo	Item		Yes	No	Photo
1.1	Crest Accessible by Vehicle		X		1.7	Currently Pumping / Siphoning		X	
1.2	Public Access	X			1.8	Safety Boom	X		20
1.3	Signage	X		13, 14	1.9	Evidence of Repairs		X	
1.4	Decant / Overflow Structure	X		21	1.10	Current Construction		X	
1.5	Gates / Valves	X		16	1.11	Proposed Construction		X	
1.6	Auxiliary Spillway		X		1.12	Other:		X	

Comments:

- Access to dam is controlled by a locked gate.
- Signs posted at the dam identifying owner, emergency contact information and no camping allowed. Signs are in good condition.
- Roads to access dam are forestry roads that are controlled by locked gates. Understood from conversation that people access the area/walk on trails near it.
- Owner representative described that the reservoir is inspected annually by boat.
- Beaver activity occasionally observed in reservoir. Beavers are trapped/removed when observed.

2.0 Embankment Observations

Item		Upstream Slope		Downstream Slope		Crest		Photo	Comments
		S	UN	S	UN	S	UN		
2.1	Vegetation	X		X		X		6, 11	
2.2	Erosion Protection	X		X		X			
2.3	Visually Uniform Surface (No Bulging / Signs of Instability)	X		X		X		7,8,10, 11	
2.4	No Evidence of Erosion / Washout / Breach	X		X		X			
2.5	No Animal Burrows	X		X		X			
2.6	No Lateral Movement / Tension Cracks, Crest Visually Horizontal	X		X		X			
2.7	No Evidence of Ruts / Ponding / Settlement	X		X		X			
2.8	No Evidence of Seepage or Piping	X		X		X			
2.9	Other								No comments

Embankment Comments:

- Upstream slope protected with grass. No signs of erosion from waves.
- Vegetation well controlled. Owner representative described that clearing occurs 2x per year. Small shrubs (less than 0.5m high) observed growing on dam on downstream slope and near waterline, but appears to be recent growth.

3.0 Downstream Toe

	Item	S	UN	N/A	Photo	Comments
3.1	No Ponded Water or Evidence of Seepage	X			5,	Wet/damp area near right downstream toe of dam (near low level outlet)
3.2	Toe Drain			X		
3.3	Toe Ditch (Note if Flow in Ditch)			X		
3.4	Toe Berm			X		
3.5	Animal Burrows	X				
3.6	Other					No comments

Downstream Toe Comments:

- Ground is damp between access road and right abutment. Standing water immediately adjacent to right abutment, about 10 m wide in radius, and 10 cm deep. No signs of seepage flow/turbidity/internal erosion.

4.0 Outlet – Low Level Outlet

	Item	S	UN	N/A	Photo	Comments
4.1	Outlet Slope Appears Stable			X		
4.2	Erosion Protection	X				
4.3	Vegetation		X		3,4	
4.4	No Debris in Channel / Outlet	X				
4.5	No Sediment Accumulation	X				
4.6	Other					No comments

Outlet Comments:

- Exit for low level outlet is located about 10 to 15 m downstream of dam toe. Outlet is a concrete pipe 0.9 m in diameter, and discharges into a wetland area. Concrete headwall adjacent to outlet.
- Area around outlet is overgrown, which impeded visual inspection/access
- Inlet valve is located on platform in the lake (Photo 1 and 10), a ladder/scaffolding is brought to site to access the outlet, a key is required to operate the valve
- Outlet valve is opened/tested annually. Outlet drains reservoir so is typically in closed position.

4.0 Outlet – Water Supply Lines

	Item	S	UN	N/A	Photo	Comments
4.1	Outlet Slope Appears Stable			X		
4.2	Erosion Protection	X		X		
4.3	Vegetation	X				
4.4	No Debris in Channel / Outlet	X				
4.5	No Sediment Accumulation	X				
4.6	Other	X			18,19	Seepage near downstream toe

Outlet Comments:

- Two water lines are located about 100 m right (west) of the spillway. One line is an old line and was been abandoned by closing the inlet valves. The other line is new and was placed over the embankment and drains as a siphon. Both lines are buried. (Photo 15 and 16)
- A valve is located on the shoreline that allows pressurized air to be blown into the line to clean the screens on the inlet. (Photo 16)
- Seepage was observed from the toe of the dam near the water lines. Flow rate estimated as 1-2 L/min. Seepage clear, no signs of turbidity. Ditch seepage drains into has red/iron-coloured precipitate/algae.

S = Satisfactory
UN = Unsatisfactory

5.0 Outlet – Spillway

Item		S	UN	N/A	Photo	Comments
4.1	Outlet Slope Appears Stable	X			23, 24	
4.2	Erosion Protection	X				
4.3	Vegetation	X				
4.4	No Debris in Channel / Outlet	X				
4.5	No Sediment Accumulation					
4.6	Other		X		21,22	Concrete covered with moss/algae. Small crack with vegetation growing

Outlet Comments:

- Log boom protecting spillway appears in good condition.
- Spillway is a concrete sill built across a natural channel. Bedrock is visible in channel base/sides.
- Spillway is about 30 m wide, near middle is a section about 15 to 20 cm lower that is 6 m wide.
- Water was flowing over middle lower section at the time of the inspection.
- Concrete is covered with moss/algae.
- Concrete is cracked in 1 location and small shrub/tree was growing in crack.

7.0 Instrumentation

Item		S	UN	N/A	Photo	Comments
5.1	Piezometers	X			1	Groundwater monitoring well at toe of dam
5.2	Slope Inclinometers			X		
5.3	Survey Monuments			X		
5.4	Staff Gauge	X			21,25	
5.5	Other					No comments.

Instrumentation Comments:

- Groundwater well at toe of dam in stickup casing. Casing is locked. Owner representative said it was not routinely read.
- Staff gauges installed at LLO, water intake, spillway and upstream of log boom. Staff gauges installed to same elevation so readings between them are consistent and reference elevation.

S = Satisfactory
UN = Unsatisfactory

Photo 1: Groundwater monitoring well installed near the downstream dam toe near the access road.

Photo 2: Low level outlet, intake conduit chamber in lake, near the west end of the dam.

Photo 3: Low level outlet, conduit exit. Concrete pipe 0.9 m in diameter. Exit is downstream of the dam near the west side.

Photo 4: Overgrown area where low level outlet, exit drains. Note concrete wall in photo.

Photo 5: Seepage/wet area at the downstream toe of the west end of the dam.

Photo 6: Looking east along downstream dam toe.

Photo 7: Standing on dam crest looking east along upstream slope, with Bainbridge Lake on the left and the dam crest on the right.

Photo 8: Downstream embankment toe looking west.

Photo 9: Standing on dam crest looking north towards Bainbridge Lake.

Photo 10: Standing on dam crest looking west along the upstream slope. Low level outlet intake to right of dam (red arrow)

Photo 11: Looking west along downstream dam slope and toe.

Photo 12: Minor vegetation growing on the face of the downstream slope on the east end of the dam.

Photo 13: Example of dam safety signage posted near the dam.

Photo 14: Signs on the locked gate at the entrance of the access road.

Photo 15: Looking north at Bainbridge Lake. Buoy (red arrow) indicates the water supply intake entrance location.

Photo 16: Old intake valve (red arrow), new syphon intake system (blue arrow), and sediment screen air flushing valve (yellow arrow).

Photo 17: Water supply intake line (left), and sediment screen air flushing line (right)

Photo 18: Seepage observed at downstream toe, downstream (south) of the water supply intakes. Location of seepage (circled in yellow).

Photo 19: Close up of seepage observed at downstream toe near water supply lines. Red/iron-colour appears to be from algae or precipitate and not turbidity/sediment in the seepage.

Photo 20: Log boom protecting the entrance to the spillway.

Photo 21: Concrete weir spillway with rectangular notched center. Staff gauge left of spillway in photo

Photo 22: Condition of the concrete weir, moss growing on concrete and vegetation growing through a cracks.

Photo 23: McFarland Creek channel immediately downstream of the spillway, looking upstream.

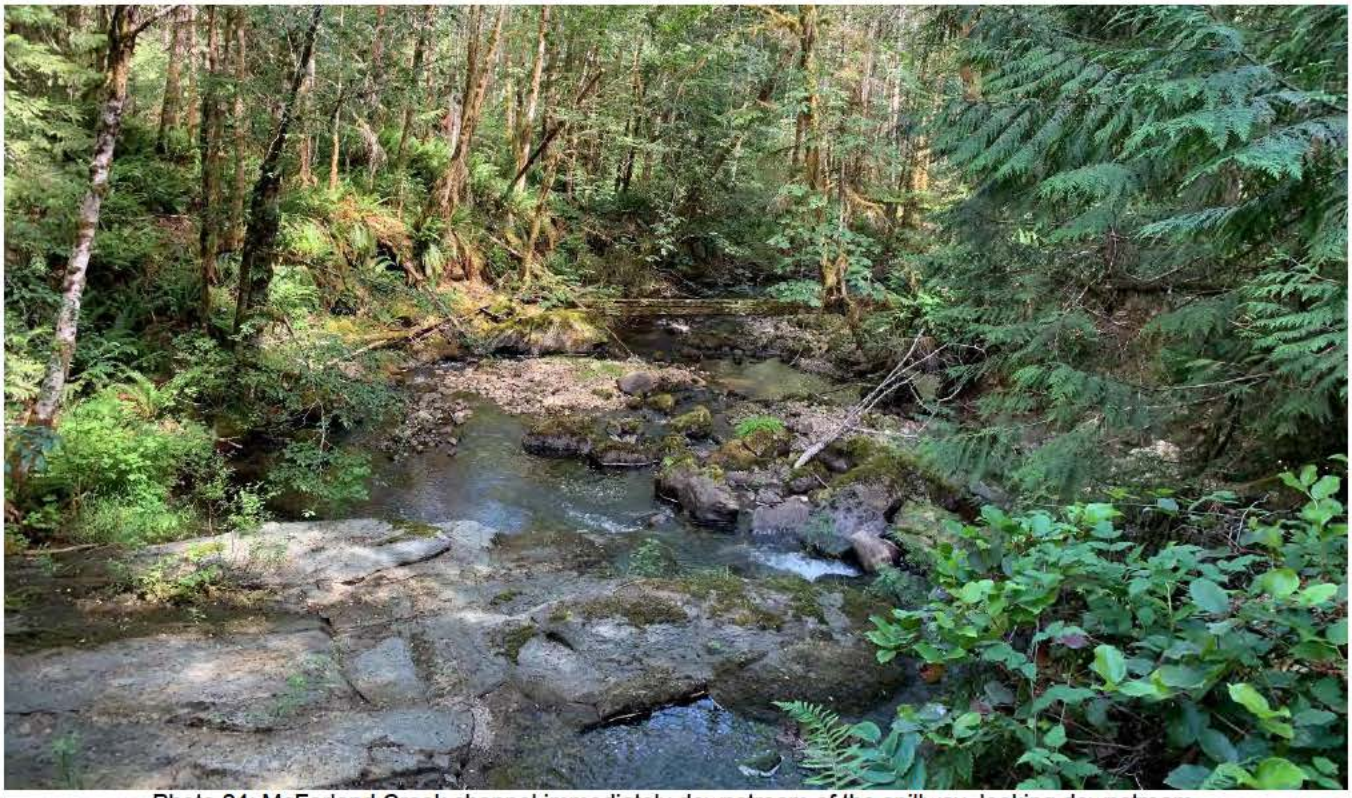
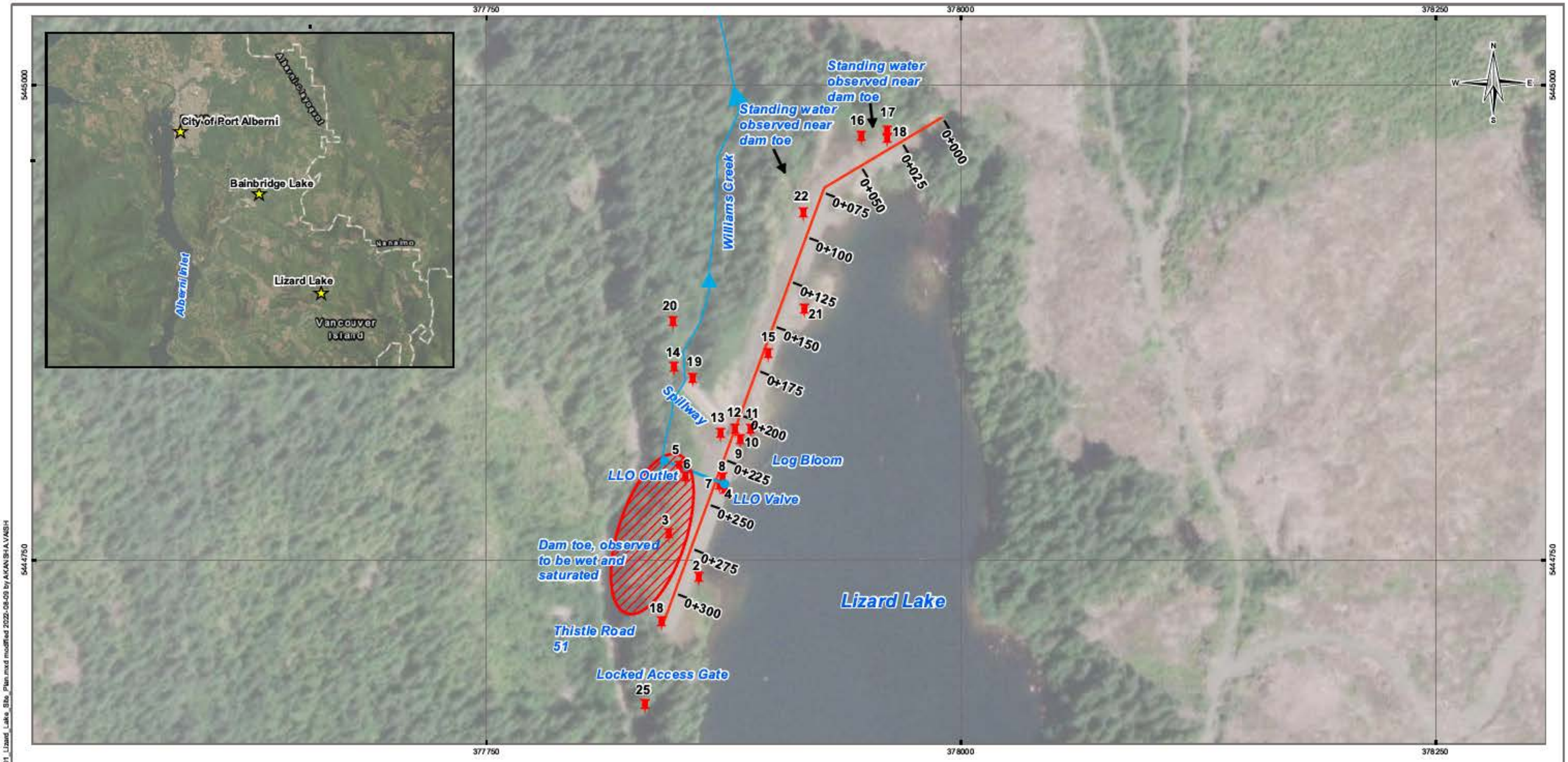


Photo 24: McFarland Creek channel immediately downstream of the spillway, looking downstream.

Photo 25: Staff gauge installed in Bainbridge Lake near water supply intake lines.



LEGEND

- Lizard Lake Dam Photos, site inspection July 2022
- Low Level Outlet (LLO) Pipe through dam, approximate location
- Approximate Dam Location

NOTES
- Base data source: ESRI Basemap Imagery
- Forestry Road Names from "https://catalogue.data.gov.bc.ca/dataset/forest-tenure-road-segment-lines"

STATUS
ISSUED FOR USE

LIZARD LAKE

Photo Location Site Map

PROJECTION: UTM ZONE 10N				DATUM: NAD 83	CLIENT: City of Port Alberni
Scale: 1:2,000 (25 12.5 0 25 Metres)					TETRA TECH
FILE NO.: ENG.DMPA03031-01_Lizard_Lake_Site_Plan.mxd					
OFFICE: Tt-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Figure C-1
DATE: August 9, 2022	PROJECT NO.: ENG.DPMA03031-01				

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TETRA TECH

DAM SAFETY CHECKLIST

Structure: Lizard Lake Dam

Date of Inspection	July 12, 2022
File	704-ENG.DMPA03031
Owner	City of Port Alberni
Consequence Classification	Very High
Inspection Performed By	Angie Ramey, P.Eng. and Alex Huang, EIT

Conditions at Time of Inspection

Temperature (°C)	20 to 25
Weather	☒Sunny ☐Scattered Cloud ☐Overcast ☐Raining ☐Snowing
Wind	☒None ☐Light ☐Moderate ☐High

Structure Data

Staff Gauge Reading (m)	0.0	**Current Freeboard (m)**	3
Minimum Crest Width (m)	3.6	**Crest Length (m)**	320
Max Dam Height[1] (m)	6 to 8	**Slope Angle (u/s)**	2H:1V
Reservoir Volume (m^3)	545,000	**Slope Angle (d/s)**	2H:1V

Surrounding Conditions

Upstream Conditions & Hazards	Downstream Conditions & Hazards
Reservoir with forested/logged slopes above. Slopes are moderately steep to steep. No signs of instability/landslides. Duck Lake located above, that flows into Lizard Lake.	Williams Creek which flows into China Creek. China Creek, has an electric dam, water dam, gravel pit, and China Creek Campground.

Do the following appear to be in satisfactory condition based on inspection?

Embankment	Yes	No	N/A[2]
Crest	X		
U/S Slope	X		
D/S Slope	X		
D/S Toe	X		
Left Abutment[3]	X		
Right Abutment[3]	X		

Appurtenances	Yes	No	N/A[2]
Inlet			X
Outlet	X		
Spillway	X		
Auxiliary Spillway			X
Drains	X		
Inlet Controls			X
Outlet Controls			X

Other	Yes	No	N/A[2]
Reservoir	X		
Reservoir U/S Slopes	X		
Internal Dykes			X
Log Boom	X		
Instruments	X		

[1] Maximum Dam Height Includes Natural Pillar
[2] N/A = Not Applicable or Unknown
[3] Right / Left Based on Facing Downstream

Tetra Tech Canada Inc.
#1 - 4376 Boban Drive
Nanaimo, BC V9T 6A7 CANADA
Tel 250.756.2256 Fax 250.756.2686

1.0 General Observations – Does the Pond Have?

Item		Yes	No	Photo	Item		Yes	No	Photo
1.1	Crest Accessible by Vehicle	X			1.7	Currently Pumping / Siphoning		X	
1.2	Public Access		X		1.8	Safety Boom	X		7
1.3	Signage	X		1, 16, 23, 25	1.9	Evidence of Repairs		X	
1.4	Decant / Overflow Structure	X		11, 13, 14	1.10	Current Construction		X	
1.5	Gates / Valves	X		4, 5	1.11	Proposed Construction		X	
1.6	Auxiliary Spillway		X		1.12	Other:			

Comments:

- Crest accessible by vehicle. Controlled by a locked gate.
- Signs posted at the dam identifying owner, emergency contact information and no camping allowed. Signs are in good condition.
- Roads to access dam are forestry roads that are controlled by locked gates, so public access to the dam is unlikely.
- Valve for low level outlet was open. Understood that the opening is adjusted based on water levels measured at the downstream China Creek Dam (also owned by the City of Port Alberni).
- Owner representative described that the reservoir is inspected annually by boat.

2.0 Embankment Observations

Item		Upstream Slope		Downstream Slope		Crest		Photo	Comments
		S	UN	S	UN	S	UN		
2.1	Vegetation	X		X		X		1, 2, 3	
2.2	Erosion Protection	X		X		X		2, 21	
2.3	Visually Uniform Surface (No Bulging / Signs of Instability)	X		X		X		2, 3, 15	
2.4	No Evidence of Erosion / Washout / Breach	X		X		X			
2.5	No Animal Burrows	X		X		X			
2.6	No Lateral Movement / Tension Cracks, Crest Visually Horizontal	X		X		X			
2.7	No Evidence of Ruts / Ponding / Settlement	X		X		X			
2.8	No Evidence of Seepage or Piping	X		X		X			
2.9	Other								No other comments

Embankment Comments:

- Vegetation well controlled. Owner representative described that clearing occurs twice per year.
- Riprap armouring on upstream slope and in portions of downstream slope, d50 estimated to be 20-30 cm.

S = Satisfactory
UN = Unsatisfactory

3.0 Downstream Toe

Item		S	UN	N/A	Photo	Comments
3.1	No Ponded Water or Evidence of Seepage	X			3, 17, 18	Ponded water, but no signs of internal erosion
3.2	Toe Drain			X		
3.3	Toe Ditch (Note if Flow in Ditch)			X		
3.4	Toe Berm			X		
3.5	Animal Burrows	X				None observed
3.6	Other					No other comments

Downstream Toe Comments:

- Standing water observed in 2 locations near right downstream toe of dam. Standing water is in ditches that are perpendicular to dam (former low points/drainage). Near standing water is more vegetation growth which impeded visual inspection.
  - Ditch was 1.5 m wide, and 20 to 30 cm deep, no signs of flowing water.
  - Ditch 0.5 to 1.0 m wide and 10 cm deep, no signs of flowing water.
- Wet/damp area near left downstream toe of dam between left abutment and LLO. No signs of internal erosion or flow.

4.0 Outlet – Low Level Outlet

Item		S	UN	N/A	Photo	Comments
4.1	Outlet Slope Appears Stable			X		
4.2	Erosion Protection	X			4, 5	
4.3	Vegetation	X				
4.4	No Debris in Channel / Outlet	X				
4.5	No Sediment Accumulation	X				
4.6	Other					No comments

Outlet Comments:

- Outlet valve accessed/controlled from manhole on dam crest. Opened/closed based on water levels at the China Creek water dam.
- LLO drains into a box with a V-notch weir for measuring flow. Staff gauge in box read 728.02 m.
- V notch 1 m wide, 90°, 55 cm deep. Flow over V-notch as time of inspection was 22 cm deep.

S = Satisfactory
UN = Unsatisfactory

4.0 Outlet – Spillway

Item		S	UN	N/A	Photo	Comments
4.1	Outlet Slope Appears Stable	X			13	
4.2	Erosion Protection	X				
4.3	Vegetation		X			Algae growing on spillway.
4.4	No Debris in Channel / Outlet	X				
4.5	No Sediment Accumulation	X				
4.6	Other					

Outlet Comments:

- Concrete spillway. Concrete at sides of spillway visually appeared in good condition.
- Algae growing on spillway base, vegetation impeded visual inspection and can damage the concrete.
- Plunge pool below, edges of plunge pool are concrete/shotcrete and bedrock.
- Spillway sill 6.8 m wide and about 2.5 to 3.0 m deep.
- Plastic underdrain pipes on both sides of spillway were clear of debris, no signs of flow.
- Log boom protecting spillway appears in good condition, no debris caught on it.
- Concrete bridge over spillway.

5.0 Instrumentation

Item		S	UN	N/A	Photo	Comments
5.1	Piezometers			X		
5.2	Slope Inclinometers			X		
5.3	Survey Monuments			X		
5.4	Staff Gauge	X			6, 12	
5.5	Other	X			10	Rain gauge

Instrumentation Comments:

- Staff gauge in spillway and in LLO exit/weir box. Both installed/calibrated to elevation.
- Rain gauge installed on bridge over spillway. Water level recorded during routine inspections.

S = Satisfactory
UN = Unsatisfactory

Photo 1: Looking along dam crest (left) and Lizard Lake (right).

Photo 2: Looking northeast along dam upstream slope, towards the spillway inlet (red arrow) and the low-level outlet manhole (blue arrow).

Photo 3: Looking northeast along dam downstream slope towards spillway outlet (red arrow) and the exit structure of the low-level outlet (blue arrow). Toe of dam is wet/moist from seepage

Photo 4: Low-level outlet, manhole to access valve on the upstream slope.

Photo 5: Downstream end of the low-level outlet draining to Williams Creek through a sharp crested V-notch weir.

Photo 6: Staff gauge inside the low-level outlet exit structure.

Photo 7: Log boom protecting the inlet of the spillway.

Photo 8: Bridge across spillway, inlet (right) and outlet (left).

Photo 9: Spillway inlet wingwall structure.

Photo 10: Rainfall gauge installed on the bridge crossing over the spillway.

Photo 11: Spillway inlet looking downstream under the bridge structure.

Photo 12: Staff gauge installed at the spillway sill, 0 is the sill elevation.

Photo 13: Looking down concrete spillway chute from bridge crossing. Four baffle blocks at the end. Algae growing on spillway.

Photo 14: Looking up concrete spillway chute. Algae growing on spillway base.

Photo 15: Standing on dam crest looking southwest towards the spillway.

Photo 16: Example of posted signage on the ends of the dam.

Photo 17: Standing water at downstream toe of the dam, near the north end (looking towards dam).

Photo 18: Standing water at downstream toe of the dam, near the north end (looking downstream/away from dam). Note vegetation growing around standing water

Photo 19: Underdrain pipe exit at the northern wall of the concrete spillway chute. No flow from underdrain observed.

Photo 20: Underdrain pipe exit at the southern wall of the concrete spillway chute. No flow from underdrain observed.

Photo 21: Riprap on the upstream slope of the dam.

Photo 22: Looking southeast towards Douglas Peak at the forested slopes draining into Lizard Lake.

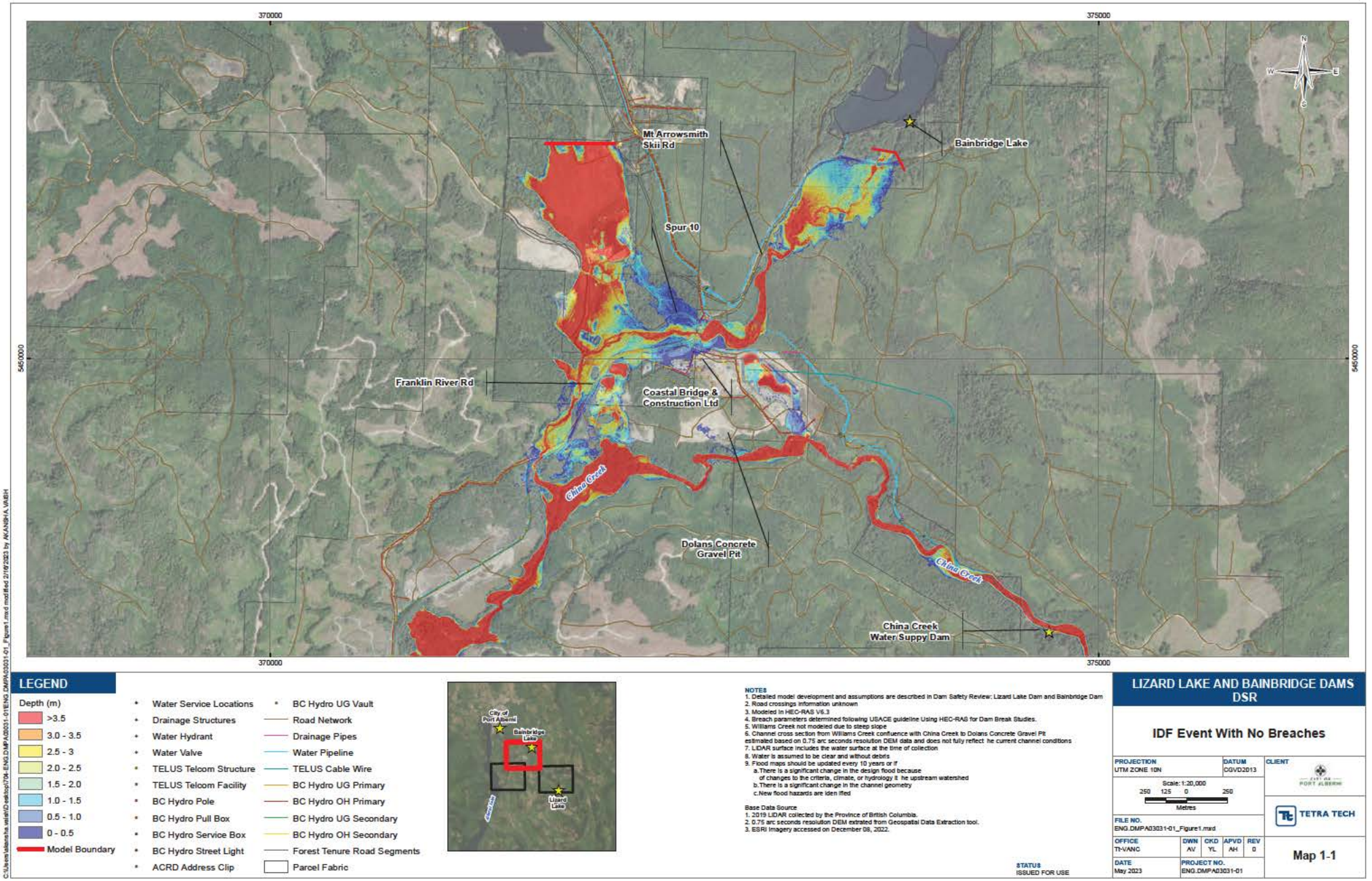
Photo 23: Example of signage along access road 800 m before the main gate.

Photo 24: Main gate on road leading to the reservoir. Multiple warning signs installed.

Photo 25: Locked gate at dam crest, note multiple signs regarding dam safety and access to area.

APPENDIX D

INUNDATION STUDY – DAM BREACH MAPS



NOTES
1. Detailed model development and assumptions are described in Dam Safety Review: Lizard Lake Dam and Bainbridge Dam
2. Road crossings information unknown
3. Modeled in HEC-RAS V6.3
4. Breach parameters determined following USACE guideline Using HEC-RAS for Dam Break Studies.
5. Williams Creek not modeled due to steep slope
6. Channel cross section from Williams Creek confluence with China Creek to Dolans Concrete Gravel Pit estimated based on 0.75 arc seconds resolution DEM data and does not fully reflect he current channel conditions
7. LiDAR surface includes the water surface at the time of collection
8. Water is assumed to be clear and without debris
9. Flood maps should be updated every 10 years or if
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Base Data Source
1. 2019 LiDAR collected by the Province of British Columbia.
2. 0.75 arc seconds resolution DEM extrated from Geospatial Data Extraction tool.
3. ESRI Imagery accessed on December 08, 2022.

STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

IDF Event With No Breaches

PROJECTION	DATUM	CLIENT
UTM ZONE 10N	CGVD2013	CITY OF PORT ALBERNI

Scale: 1:20,000
250 125 0 250
Metres

TETRA TECH

FILE NO.				
ENG.DMPA03031-01_Figure1.mxd				
OFFICE	DWN	CKD	APVD	REV
TH-VANC	AV	YL	AH	0
DATE	PROJECT NO.			
May 2023	ENG.DMPA03031-01			

Map 1-1

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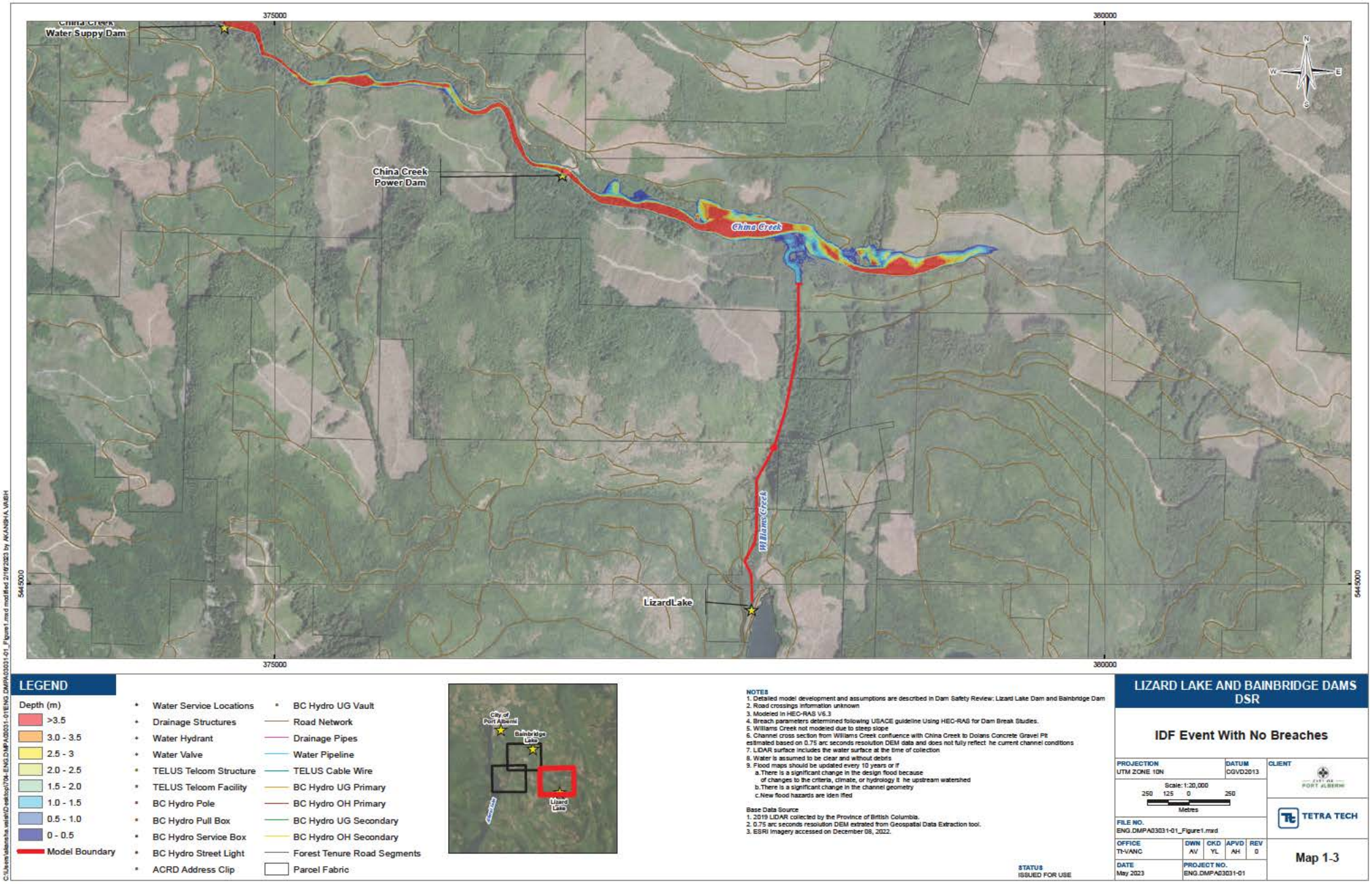

LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
1.5 - 2.0	TELUS Telcom Structure	TELUS Cable Wire	
1.0 - 1.5	TELUS Telcom Facility	BC Hydro UG Primary	
0.5 - 1.0	BC Hydro Pole	BC Hydro OH Primary	
0 - 0.5	BC Hydro Pull Box	BC Hydro UG Secondary	
Model Boundary	BC Hydro Service Box	BC Hydro OH Secondary	
	BC Hydro Street Light	Forest Tenure Road Segments	
	ACRD Address Clip	Parcel Fabric	

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STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

IDF Event With No Breaches

PROJECTION: UTM ZONE 10N			DATUM: CGVD2013		CLIENT: CITY OF PORT ALBERNI
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FILE NO.: ENG.DMPA03031-01_Figure1.mxd					
OFFICE: TI-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Map 1-3
DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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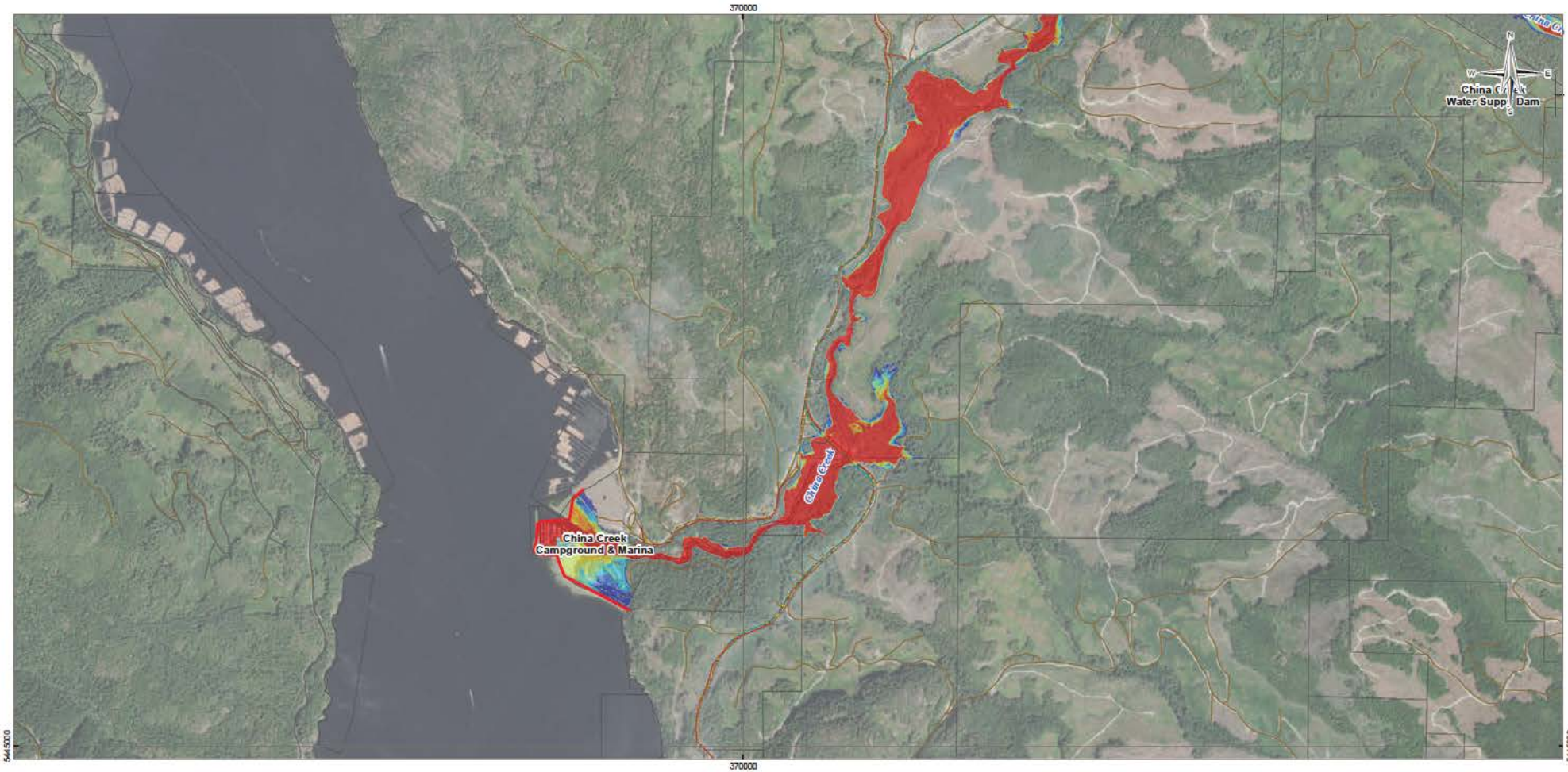

LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
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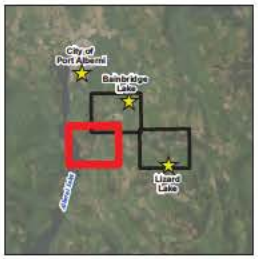

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STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

IDF Event With No Breaches

PROJECTION: UTM ZONE 10N				DATUM: CGVD2013	CLIENT: CITY OF PORT ALBERNI
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FILE NO.: ENG.DMPA03031-01_Figure1.mxd					
OFFICE: TI-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Map 1-2
DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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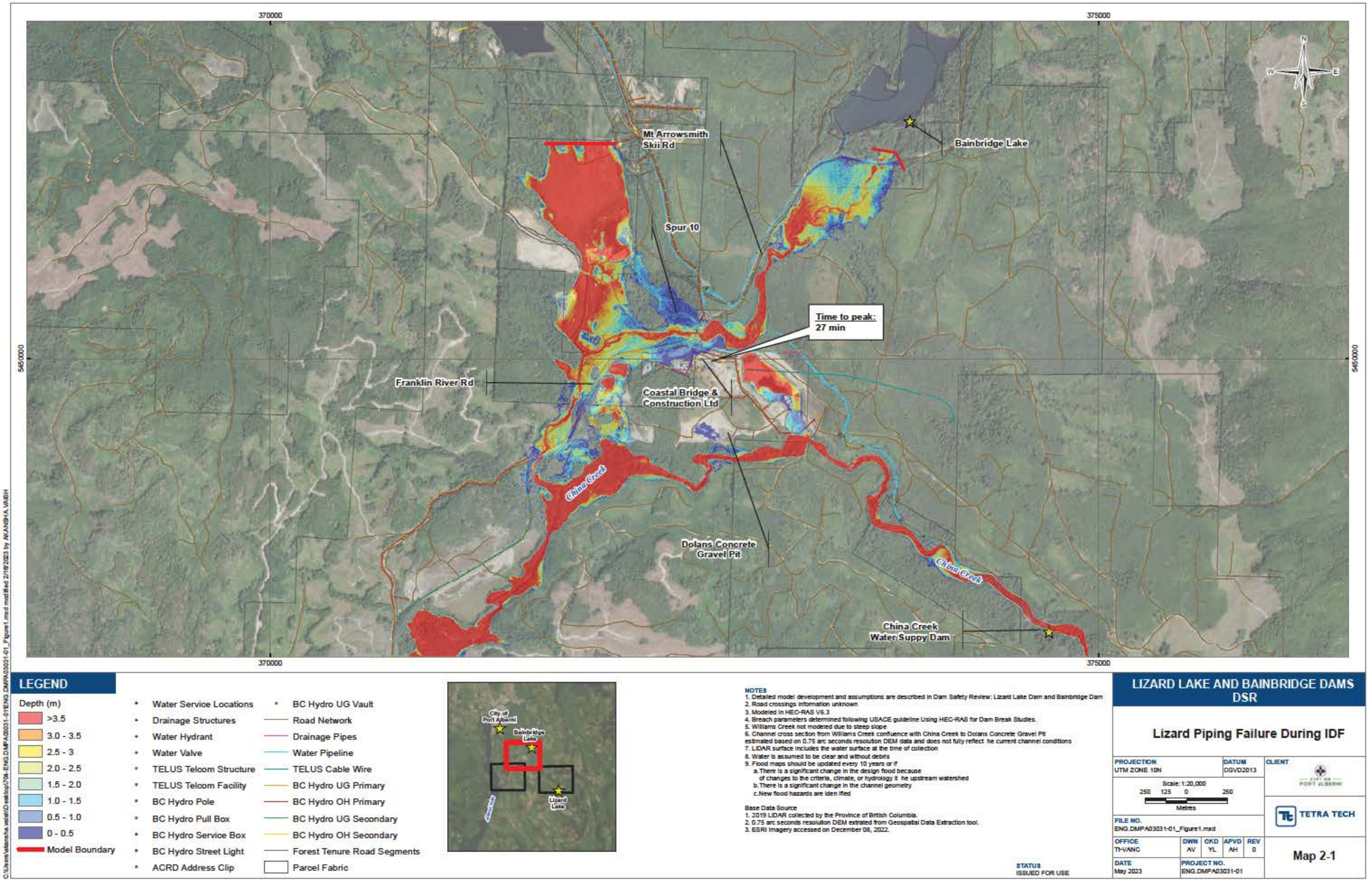

LEGEND

Depth (m)
- >3.5
- 3.0 - 3.5
- 2.5 - 3
- 2.0 - 2.5
- 1.5 - 2.0
- 1.0 - 1.5
- 0.5 - 1.0
- 0 - 0.5
- Model Boundary

- Water Service Locations
- Drainage Structures
- Water Hydrant
- Water Valve
- TELUS Telcom Structure
- TELUS Telcom Facility
- BC Hydro Pole
- BC Hydro Pull Box
- BC Hydro Service Box
- BC Hydro Street Light
- ACRD Address Clip
- BC Hydro UG Vault
- Road Network
- Drainage Pipes
- Water Pipeline
- TELUS Cable Wire
- BC Hydro UG Primary
- BC Hydro OH Primary
- BC Hydro UG Secondary
- BC Hydro OH Secondary
- Forest Tenure Road Segments
- Parcel Fabric

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STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

Lizard Piping Failure During IDF

PROJECTION	DATUM	CLIENT
UTM ZONE 10N	CGVD2013	CITY OF PORT ALBERNI

Scale: 1:20,000
250 125 0 250
Metres

TETRA TECH

FILE NO.				
ENG.DMPA03031-01_Figure1.mxd				
OFFICE	DWN	CKD	APVD	REV
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DATE	PROJECT NO.			
May 2023	ENG.DMPA03031-01			

Map 2-1

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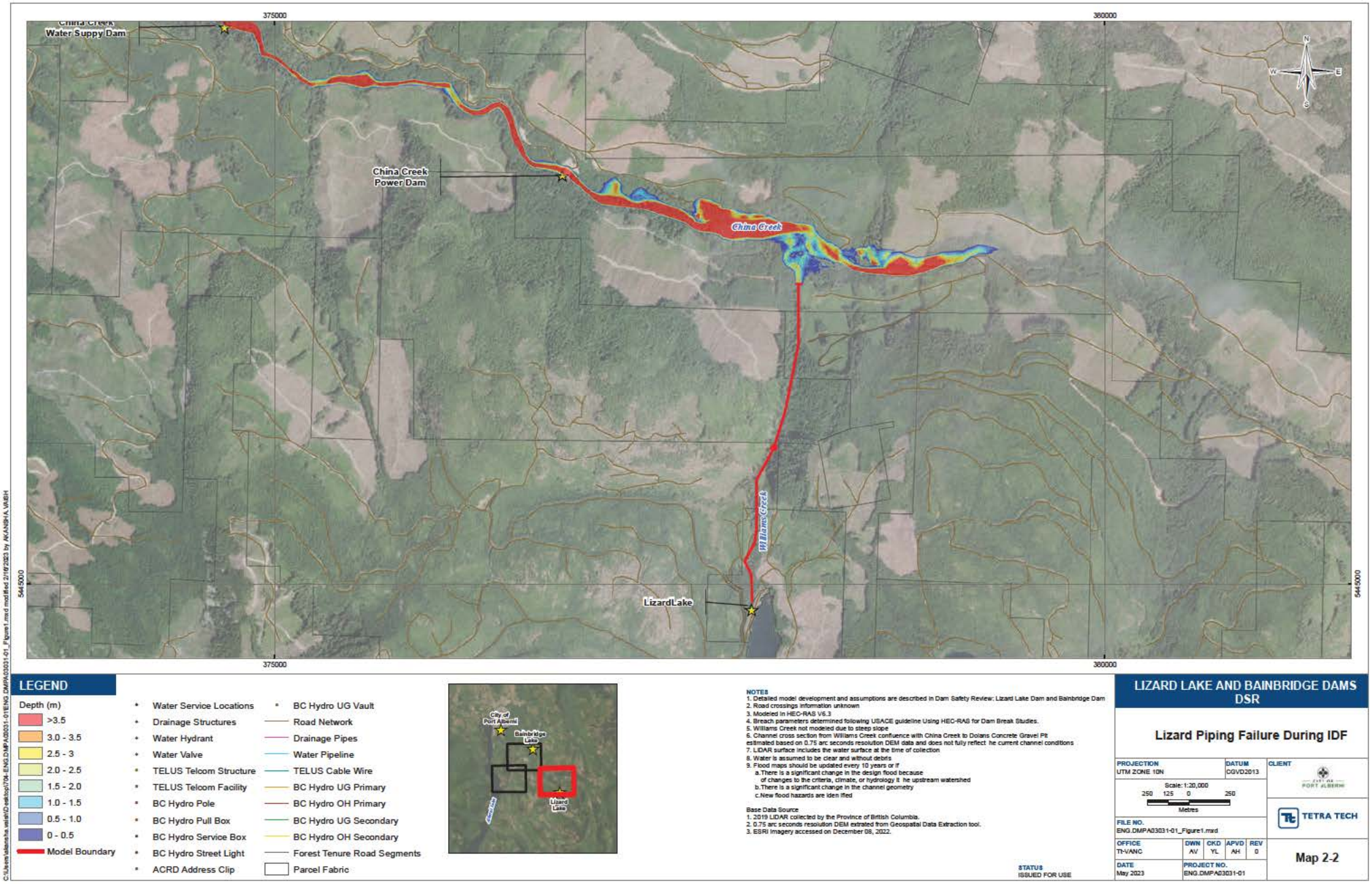

LEGEND

Depth (m)			
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3.0 - 3.5	Drainage Structures	Road Network	
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Lizard Piping Failure During IDF

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DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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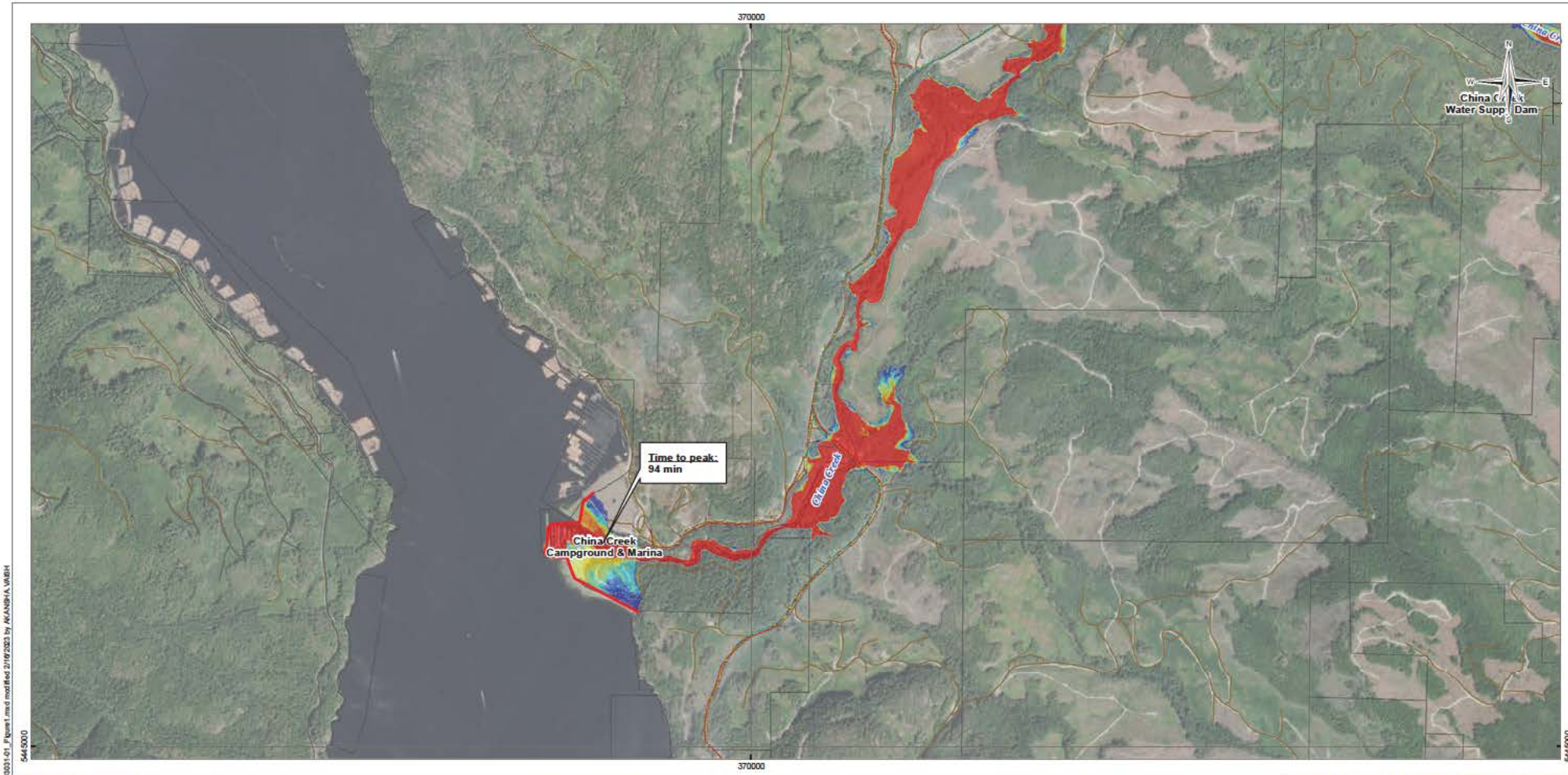
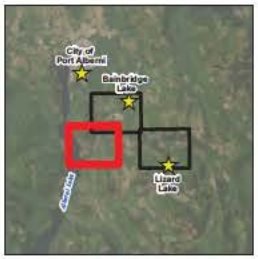


LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
1.5 - 2.0	TELUS Telcom Structure	TELUS Cable Wire	
1.0 - 1.5	TELUS Telcom Facility	BC Hydro UG Primary	
0.5 - 1.0	BC Hydro Pole	BC Hydro OH Primary	
0 - 0.5	BC Hydro Pull Box	BC Hydro UG Secondary	
Model Boundary	BC Hydro Service Box	BC Hydro OH Secondary	
	BC Hydro Street Light	Forest Tenure Road Segments	
	ACRD Address Clip	Parcel Fabric	



NOTES
1. Detailed model development and assumptions are described in Dam Safety Review: Lizard Lake Dam and Bainbridge Dam
2. Road crossings information unknown
3. Modeled in HEC-RAS V6.3
4. Breach parameters determined following USACE guideline Using HEC-RAS for Dam Break Studies.
5. Williams Creek not modeled due to steep slope
6. Channel cross section from Williams Creek confluence with China Creek to Dolans Concrete Gravel Pit estimated based on 0.75 arc seconds resolution DEM data and does not fully reflect he current channel conditions
7. LiDAR surface includes the water surface at the time of collection
8. Water is assumed to be clear and without debris
9. Flood maps should be updated every 10 years or if
   a. There is a significant change in the design flood because of changes to the criteria, climate, or hydrology it he upstream watershed
   b. There is a significant change in the channel geometry
   c. New flood hazards are iden ified

Base Data Source
1. 2019 LiDAR collected by the Province of British Columbia.
2. 0.75 arc seconds resolution DEM extrated from Geospatial Data Extraction tool.
3. ESRI Imagery accessed on December 08, 2022.

STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

Lizard Piping Failure During IDF

PROJECTION: UTM ZONE 10N			DATUM: CGVD2013		CLIENT: CITY OF PORT ALBERNI
Scale: 1:20,000 (250 125 0 250 Metres)					TETRA TECH
FILE NO.: ENG.DMPA03031-01_Figure1.mxd					
OFFICE: TI-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Map 2-3
DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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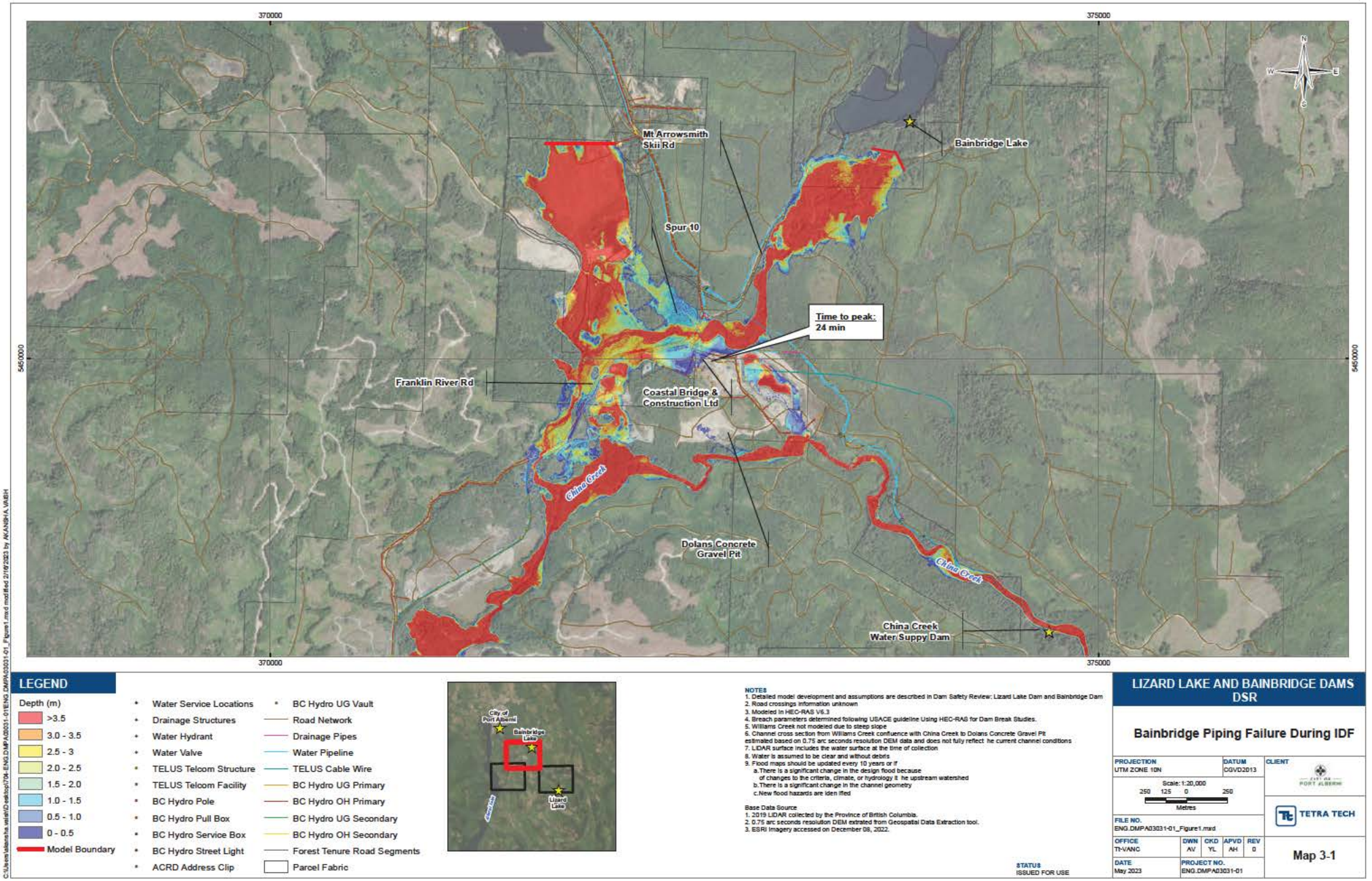

LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
1.5 - 2.0	TELUS Telcom Structure	TELUS Cable Wire	
1.0 - 1.5	TELUS Telcom Facility	BC Hydro UG Primary	
0.5 - 1.0	BC Hydro Pole	BC Hydro OH Primary	
0 - 0.5	BC Hydro Pull Box	BC Hydro UG Secondary	
Model Boundary	BC Hydro Service Box	BC Hydro OH Secondary	
	BC Hydro Street Light	Forest Tenure Road Segments	
	ACRD Address Clip	Parcel Fabric	

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3. ESRI Imagery accessed on December 08, 2022.

STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

Bainbridge Piping Failure During IDF

PROJECTION	DATUM	CLIENT
UTM ZONE 10N	CGVD2013	CITY OF PORT ALBERNI

Scale: 1:20,000
250 125 0 250
Metres

TETRA TECH

FILE NO.				
ENG.DMPA03031-01_Figure1.mxd				
OFFICE	DWN	CKD	APVD	REV
TH-VANC	AV	YL	AH	0
DATE	PROJECT NO.			
May 2023	ENG.DMPA03031-01			

Map 3-1

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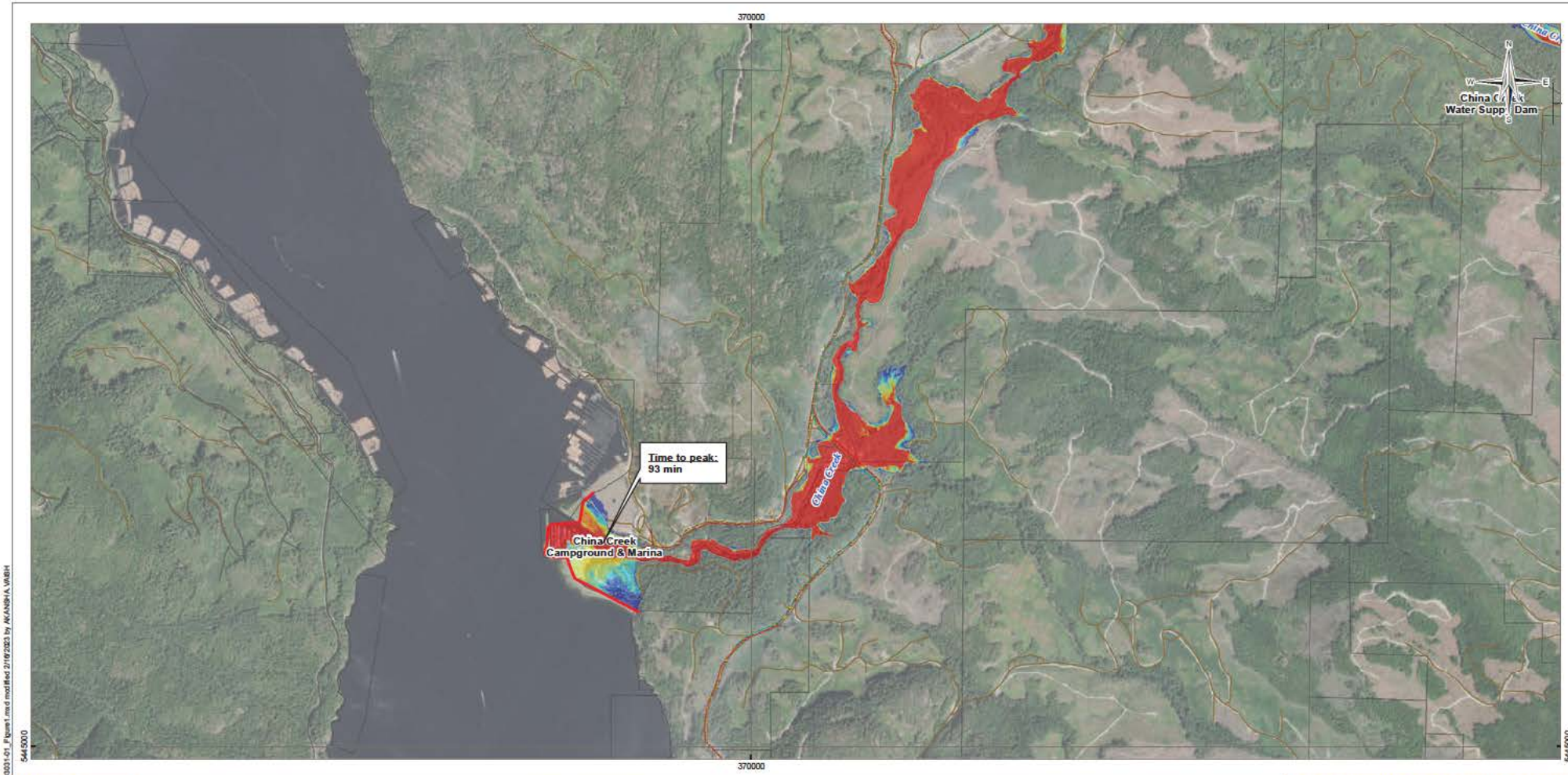
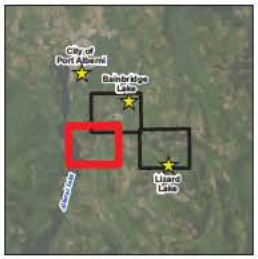


LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
1.5 - 2.0	TELUS Telcom Structure	TELUS Cable Wire	
1.0 - 1.5	TELUS Telcom Facility	BC Hydro UG Primary	
0.5 - 1.0	BC Hydro Pole	BC Hydro OH Primary	
0 - 0.5	BC Hydro Pull Box	BC Hydro UG Secondary	
Model Boundary	BC Hydro Service Box	BC Hydro OH Secondary	
	BC Hydro Street Light	Forest Tenure Road Segments	
	ACRD Address Clip	Parcel Fabric	



NOTES
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   b. There is a significant change in the channel geometry
   c. New flood hazards are iden ified

Base Data Source
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2. 0.75 arc seconds resolution DEM extrated from Geospatial Data Extraction tool.
3. ESRI Imagery accessed on December 08, 2022.

STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

Bainbridge Piping Failure During IDF

PROJECTION: UTM ZONE 10N			DATUM: CGVD2013		CLIENT: CITY OF PORT ALBERNI
Scale: 1:20,000 (250 125 0 250 Metres)					TETRA TECH
FILE NO.: ENG.DMPA03031-01_Figure1.mxd					
OFFICE: TI-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Map 3-2
DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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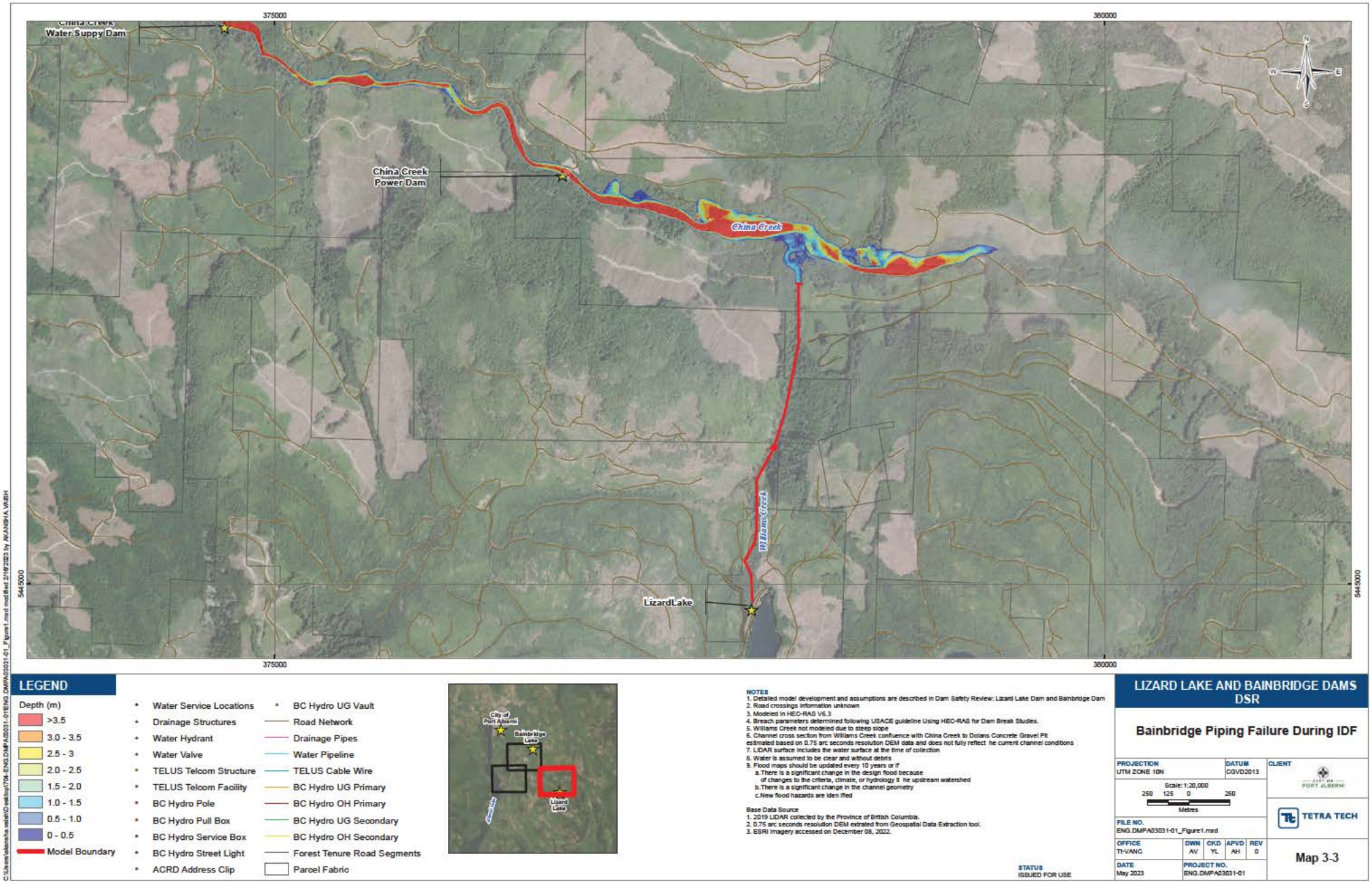

LEGEND

Depth (m)			
>3.5	Water Service Locations	BC Hydro UG Vault	
3.0 - 3.5	Drainage Structures	Road Network	
2.5 - 3	Water Hydrant	Drainage Pipes	
2.0 - 2.5	Water Valve	Water Pipeline	
1.5 - 2.0	TELUS Telcom Structure	TELUS Cable Wire	
1.0 - 1.5	TELUS Telcom Facility	BC Hydro UG Primary	
0.5 - 1.0	BC Hydro Pole	BC Hydro OH Primary	
0 - 0.5	BC Hydro Pull Box	BC Hydro UG Secondary	
Model Boundary	BC Hydro Service Box	BC Hydro OH Secondary	
	BC Hydro Street Light	Forest Tenure Road Segments	
	ACRD Address Clip	Parcel Fabric	

NOTES
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2. 0.75 arc seconds resolution DEM extrated from Geospatial Data Extraction tool.
3. ESRI Imagery accessed on December 08, 2022.

STATUS
ISSUED FOR USE

LIZARD LAKE AND BAINBRIDGE DAMS DSR

Bainbridge Piping Failure During IDF

PROJECTION: UTM ZONE 10N			DATUM: CGVD2013		CLIENT: CITY OF PORT ALBERNI
Scale: 1:20,000 (250 125 0 250 Metres)					TETRA TECH
FILE NO.: ENG.DMPA03031-01_Figure1.mxd					
OFFICE: TI-VANC	DWN: AV	CKD: YL	APVD: AH	REV: 0	Map 3-3
DATE: May 2023	PROJECT NO.: ENG.DMPA03031-01				

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APPENDIX E

BAINBRIDGE DAM BOREHOLE LOGS

(REPRODUCED FROM TETRA TECH 2015)

Project: Bainbridge Dam Geotechnical Investigation	Client: The City of Port Alberni	PROJECT NO. - BOREHOLE NO.
Port Alberni, BC	Contractor: Drillwell Enterprises	V13103321-01-14MW01
UTM: 5451366 m N 373775 m E	Investigation Method: Hollow Stem Auger	ELEVATION: 147 m

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT	Elevation (m)
0	SAND and GRAVEL TOPSOIL, trace silt, some rootlets, damp, loose, brown		SPT1	8	16.8	147.0
1	Ā ! "#" Ā$#					146.0
2	GRAVEL, sandy, some silt, trace cobbles (inferred),wet, compact, brown; angular gravel; fine to med grained sand		SPT2	24	15.4	145.0
3	GRAVEL and SAND, some silt, wet, compact, brown: angular gravel; fine to coarse grained sand		SPT3	23	15.3	144.0
4						143.0
5	SAND (SM), some silt, some gravel, trace clay, moist, loose, brown and grey SPT4: 62% sand, 17% silt, 15% gravel, 6% clay - first 6" of the SPT sunk from the weight of the hammer		SPT4	10	15.5	142.0
6						141.0
7	SAND (SM), silty, trace gravel, wet, very dense, brown and white at 6.1 m 74% sand, 25% silt, 1 % gravel		SPT5	83	13	140.0
8	End of Borehole at 7 m (refusal on bedrock) - Groundwater encountered from 1.5 m - Rock paste observed on drill bit - Borehole backfilled and monitoring well installed on completion - Borehole Location obtained from field measurements relative to existing infrastructure - Borehole elevations were determined relative to the dam crest using a laser level					139.0
9						138.0
10						137.0
11						136.0

PLASTIC M.C. LIQUID (20 40 60 80)

STANDARD PENETRATION (N) (20 40 60 80)

UNC. COMPRESSIVE STRENGTH (kPa) (50 100 150 200)

POCKET PEN. (kPa) (100 200 300 400)

TETRA TECH EBA

LOGGED BY: CC	COMPLETION DEPTH: 7 m
REVIEWED BY: AW	COMPLETE: 3/25/2014
DRAWING NO: 1	Page 1 of 1

GEOTECHNICAL V13103321-01.GPJ EBA.GDT 14/08/01

Project: Bainbridge Dam Geotechnical Investigation	Client: The City of Port Alberni	PROJECT NO. - BOREHOLE NO.
Port Alberni, BC	Contractor: Drillwell Enterprises	V13103321-01-14BH02
UTM: 5451384 m N 373780 m E	Investigation Method: Solid Stem Auger	ELEVATION: 151 m

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	DCPT (N)	MOISTURE CONTENT	Elevation (m)
0	SAND and GRAVEL TOPSOIL, rootlets, brown, moist				14		151.0
					23		
	CLAY (CI) (FILL), silty, sandy, some gravel, hard, med plastic, moist, grey brown		G1		7	11.1	
1					4		150.0
					6		
			G2		9		
2					8		149.0
					10		
					9		
3					8		148.0
	- becomes trace gravel, firm and low plastic at 3.0 m		SPT1	11	13	11.4	
					12	13.3	
			G3		11		
4	- becomes some silt, some gravel at 3.8 m				13	9.2	147.0
					37		
	SAND and GRAVEL(SP), trace silt, wet, compact (Soil Description inferred from 14BH03)		G4		21	16.5	
5					16		146.0
					19		
					41		
6					39		145.0
	- becomes dense		G5		27		
					25		
7					21		144.0
					19		
					15		
	SAND (SM), silty, some gravel, some clay, moist, compact to dense, brown grey		G6		15	14.8	
8	G6: 54% sand, 22% silt, 13% gravel, 11% clay				17		143.0
					37		
					26		
9					35		142.0
			G7			13.2	
10	End of Borehole at 9.9 m (refusal on bedrock - inferred) - Grounwater encountered from 4.5 m - Borehole backfilled upon completion, up to 3 m with bentonite pellets, and from 0 - 3 m with cuttings - Borehole Location obtained from field measurements relative to existing infrastructure						141.0
11							140.0

PLASTIC — M.C. — LIQUID (20 40 60 80)

○DYNAMIC CONE○ 20 40 60 80

■STANDARD PENETRATION (N)■ 20 40 60 80

◆UNC. COMPRESSIVE STRENGTH (kPa)◆ 50 100 150 200

▲POCKET PEN. (kPa)▲ 100 200 300 400

TETRA TECH EBA

LOGGED BY: CC	COMPLETION DEPTH: 9.9 m
REVIEWED BY: AW	COMPLETE: 3/24/2014
DRAWING NO: 1	Page 1 of 1

GEOTECHNICAL V13103321-01.GPJ EBA.GDT 14/08/01

Project: Bainbridge Dam Geotechnical Investigation	Client: The City of Port Alberni	PROJECT NO. - BOREHOLE NO.
Port Alberni, BC	Contractor: Drillwell Enterprises	V13103321-01-14BH03
UTM: 5451388 m N 373820 m E	Investigation Method: Hollow Stem Auger	ELEVATION: 151 m

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	DCPT (N)	MOISTURE CONTENT	Elevation (m)
0	SAND and GRAVEL TOPSOIL , rootlets, damp, brown				19		151.0
	CLAY (CI) (FILL), silty, some sand, trace gravel, wet, stiff, brown-grey				16		
					10		
1					8		150.0
					7		
			SPT1	13	9	11.8	
					6	7.9	
2					10		149.0
					15		
					15		
3	- becomes damp and brown at 3.0 m		SPT2	11	17	13.6	148.0
					24		
					39		
4					39		147.0
					43		
5	SAND and GRAVEL (SP), trace silt, trace clay, wet, compact SPT3: 48% sand, 44% gravel, 6% silt, 2% clay		SPT3	11	28	19.7	146.0
					42		
					65		
					80		
6					120		145.0
	- becomes very dense at 6.0 m					27.5	
			SPT4	59		13.6	
	SAND, silty, some gravel, wet, very dense, brown					35.4	
7							144.0
	SAND and GRAVEL (SW-SP), trace silt, wet, compact, brown 52.5% sand, 40% gravel, 7.5% fines		SPT5	19		19.8	
8							143.0
	PEAT, some clay, some sand, some gravel, some silt, dark brown and black, moderate decomposition, somewhat dry, fibres recognizable but vague, slight smell					57.5	
9							142.0
	Average organic content: 21.5 SAND (SM), silty, some gravel, wet, compact, brown 62% sand, 21% fines, 17% gravel		SPT6	20		40 15.8	
10	End of Borehole at 9.7 m (refusal on bedrock - inferred) - Groundwater encountered from 4.5 m - Borehole backfilled upon completion, up to 3 m with bentonite pellets, and from 0 - 3 m with cuttings - Borehole Location obtained from field measurements relative to existing infrastructure						141.0
11							140.0

PLASTIC — M.C. — LIQUID (20 40 60 80)

○ DYNAMIC CONE ○ (20 40 60 80)

■ STANDARD PENETRATION (N) ■ (20 40 60 80)

◆ UNC. COMPRESSIVE STRENGTH (kPa) ◆ (50 100 150 200)

▲ POCKET PEN. (kPa) ▲ (100 200 300 400)

120

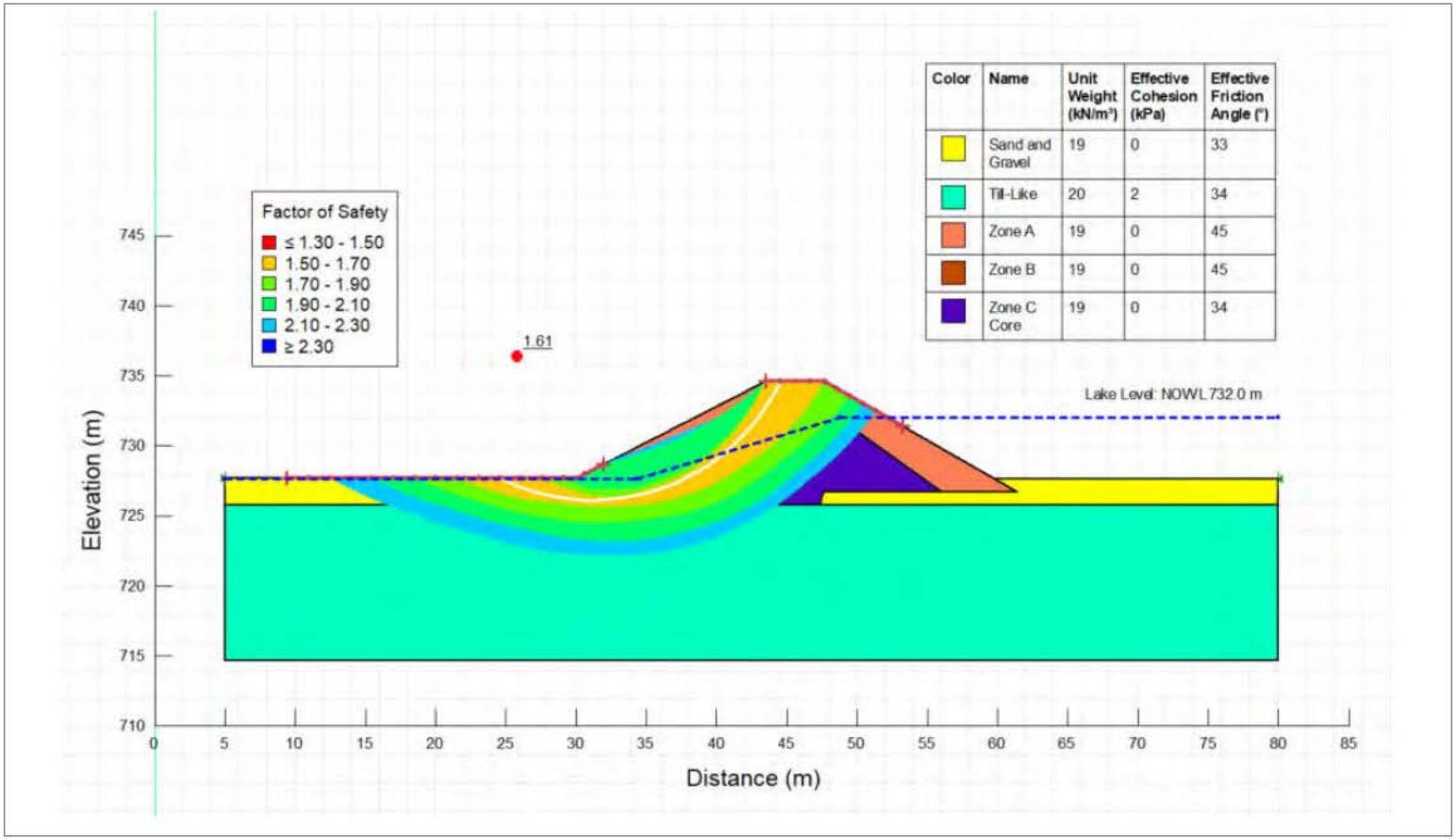
TETRA TECH EBA

LOGGED BY: CC	COMPLETION DEPTH: 9.7 m
REVIEWED BY: AW	COMPLETE: 3/24/2014
DRAWING NO: 1	Page 1 of 1

GEOTECHNICAL V13103321-01.GPJ EBA.GDT 14/08/01

APPENDIX F

GEOTECHNICAL STABILITY MODELS



LEGEND

Stability Model: Static downstream stability
Seismic Load: 0g

NOTES

STATUS

CLIENT
City of Port Alberni

TETRA TECH

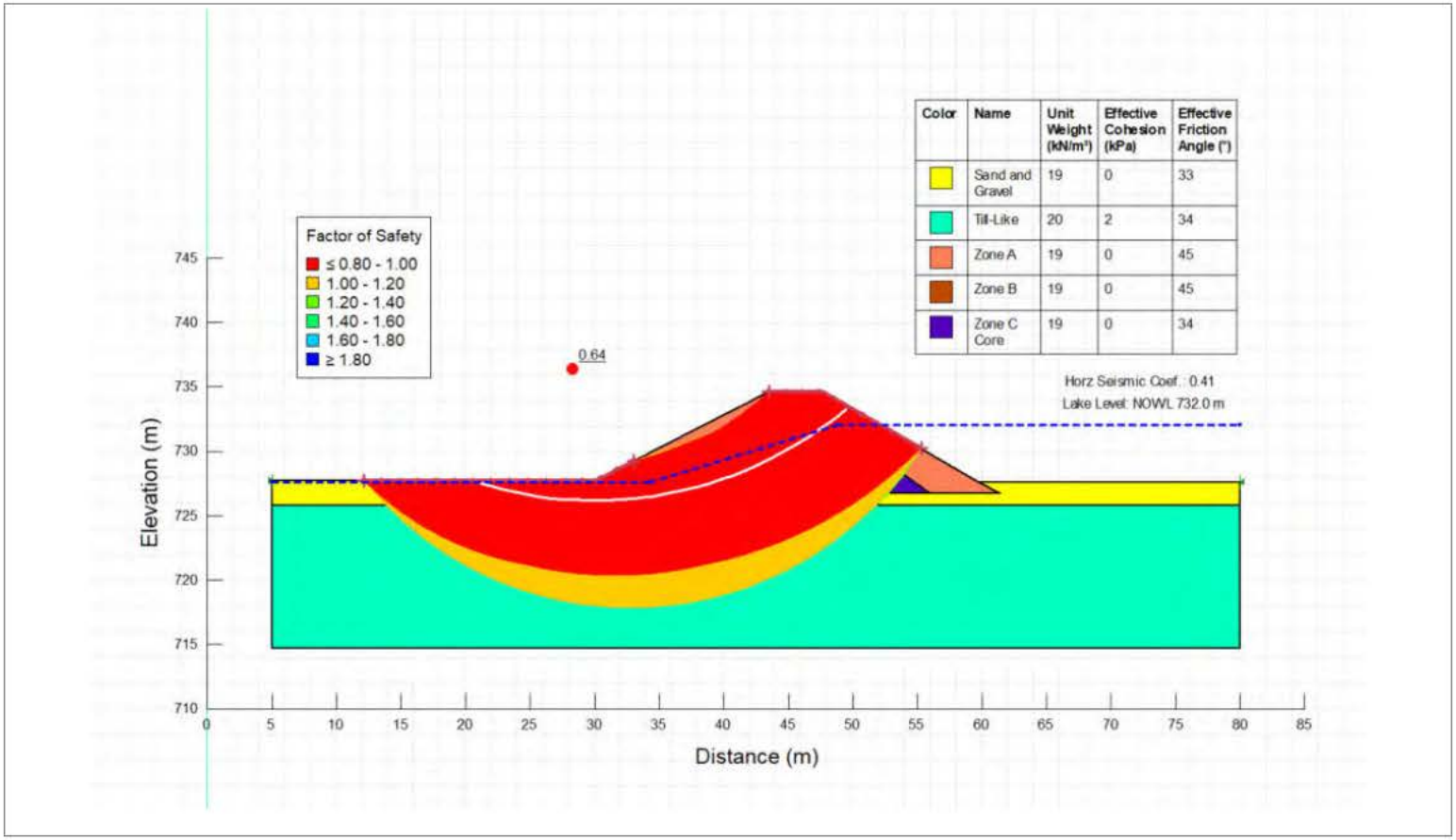
Port Alberni Water Dams DSR

Lizard Lake Dam

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 1



LEGEND

Stability Model: Seismic downstream stability
Seismic Load: 0.41g

NOTES

STATUS

CLIENT
City of Port Alberni

Port Alberni Water Dams DSR

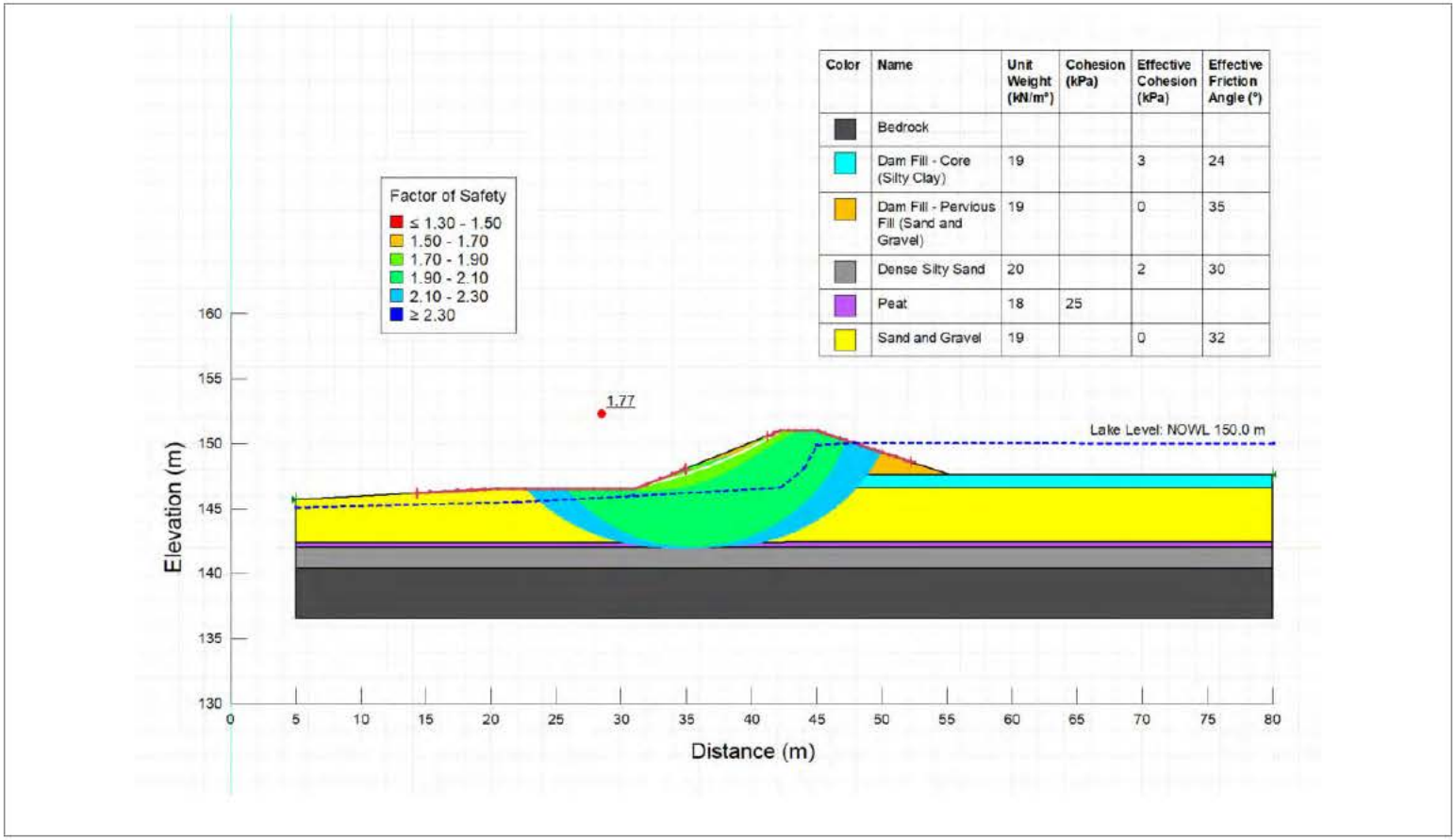
Lizard Lake Dam

TETRA TECH

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 2



Color	Name	Unit Weight (kN/m³)	Cohesion (kPa)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Bedrock				
	Dam Fill - Core (Silty Clay)	19		3	24
	Dam Fill - Pervious Fill (Sand and Gravel)	19		0	35
	Dense Silty Sand	20		2	30
	Peat	18	25		
	Sand and Gravel	19		0	32

LEGEND

Stability Model: Static downstream stability
Seismic Load: 0g

NOTES

STATUS

CLIENT
City of Port Alberni

TETRA TECH

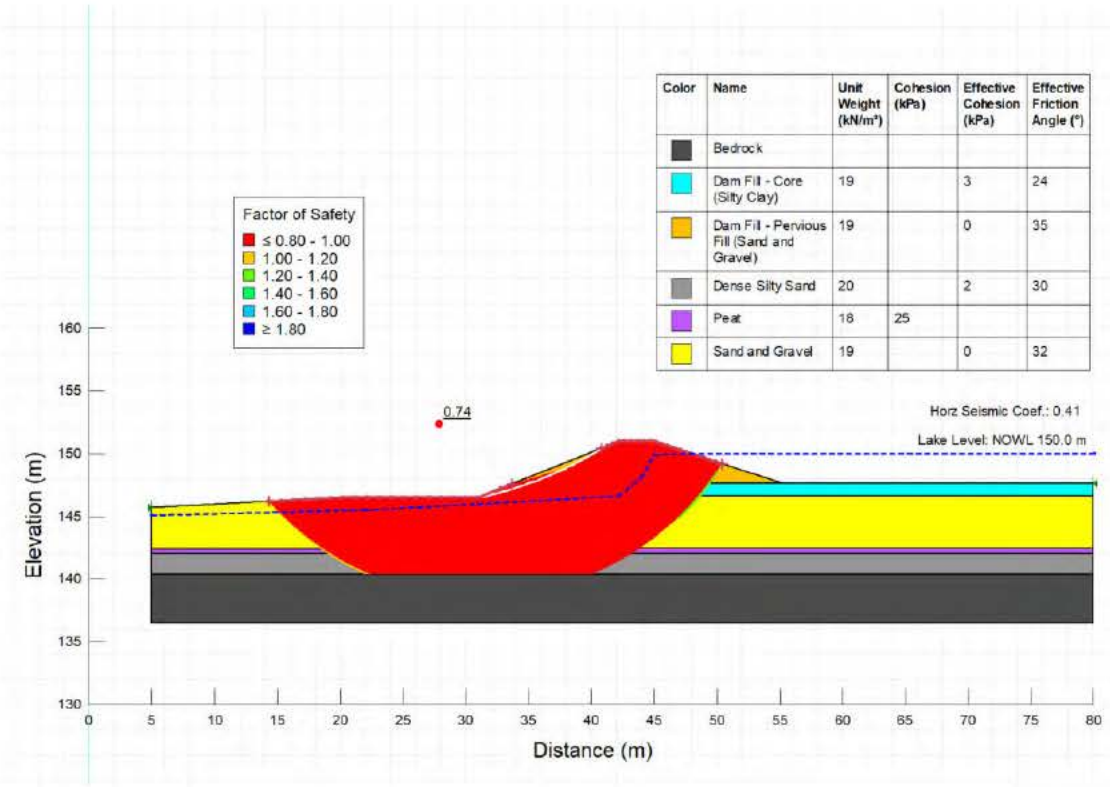
Port Alberni Water Dams DSR

Bainbridge Lake Dam

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 3



LEGEND

Stability Model: Seismic downstream stability
Seismic Load: 0.41g

NOTES

STATUS

CLIENT
City of Port Alberni

Port Alberni Water Dams DSR

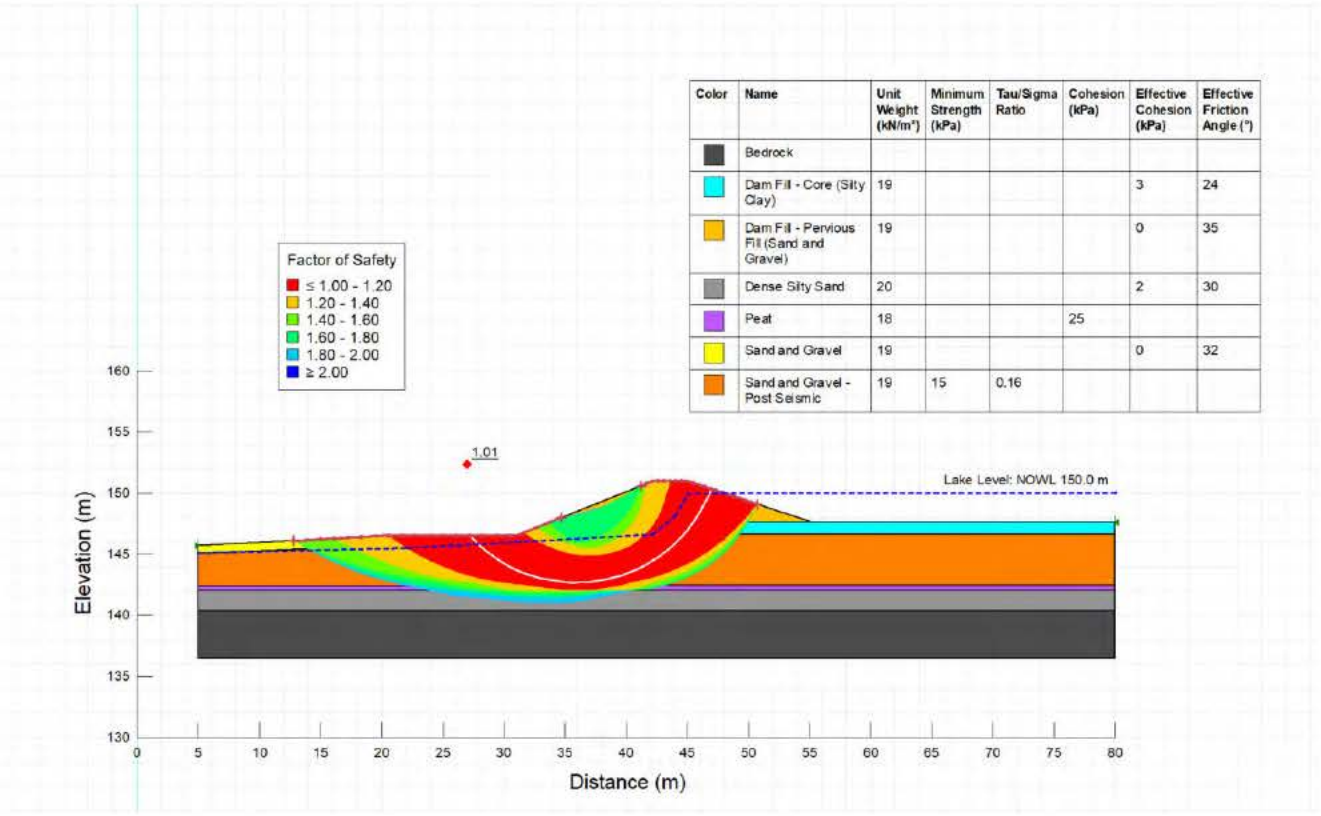
Bainbridge Lake Dam

TETRA TECH

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 4



Color	Name	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Bedrock						
	Dam Fill - Core (Silty Clay)	19				3	24
	Dam Fill - Pervious Fill (Sand and Gravel)	19				0	35
	Dense Silty Sand	20				2	30
	Peat	18			25		
	Sand and Gravel	19				0	32
	Sand and Gravel - Post Seismic	19	15	0.16			

LEGEND

Stability Model: Post-seismic, downstream stability
Seismic Load: 0g

NOTES

STATUS

CLIENT
City of Port Alberni

Port Alberni Water Dams DSR

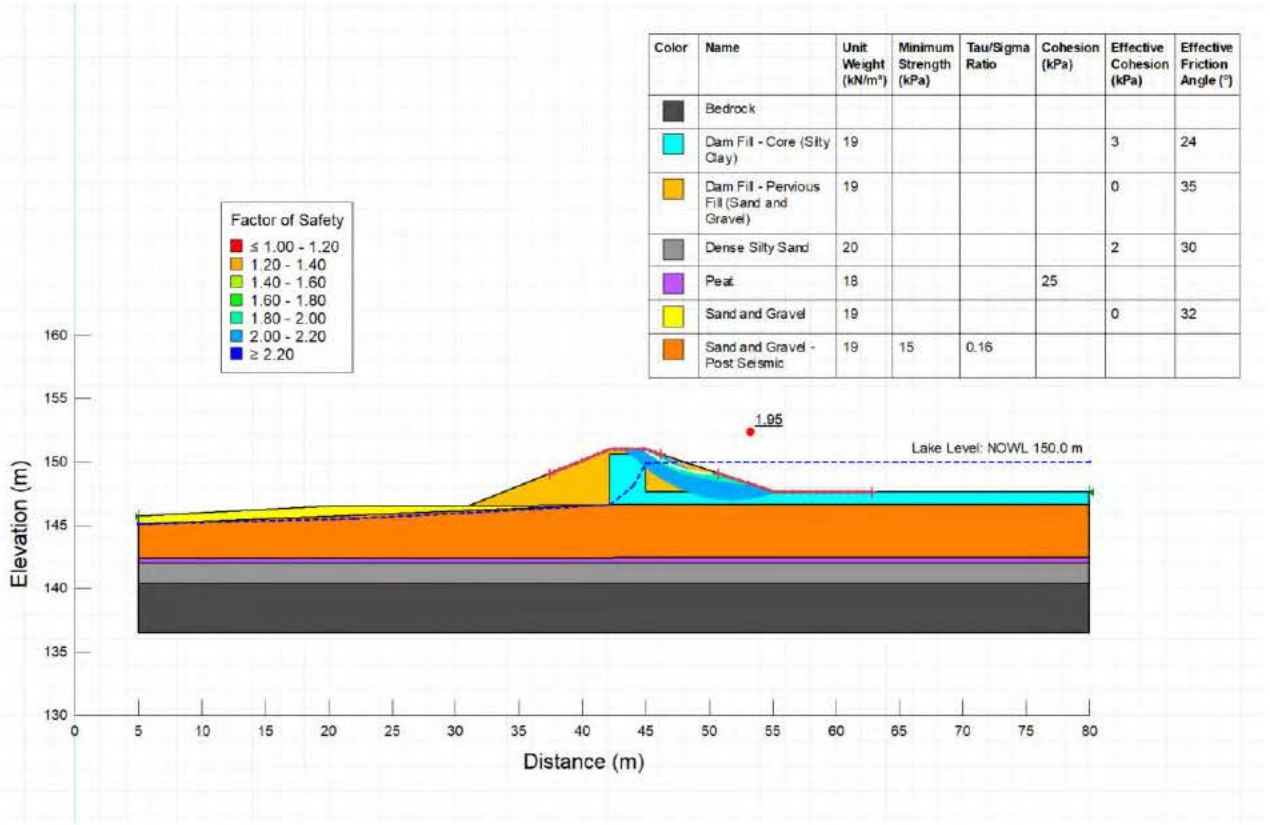
Bainbridge Lake Dam

TETRA TECH

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 5



Color	Name	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Effective Cohesion (kPa)	Effective Friction Angle (°)
	Bedrock						
	Dam Fill - Core (Silty Clay)	19				3	24
	Dam Fill - Pervious Fill (Sand and Gravel)	19				0	35
	Dense Silty Sand	20				2	30
	Peat	18			25		
	Sand and Gravel	19				0	32
	Sand and Gravel - Post Seismic	19	15	0.16			

LEGEND

Stability Model: Post Seismic Upstream Stability
Seismic Load: 0g

NOTES

STATUS

CLIENT
City of Port Alberni

Port Alberni Water Dams DSR

Bainbridge Lake Dam

TETRA TECH

PROJECT NO.	DWN	CKD	APVD	REV
DMPA03031	ER	ER	AR	0

OFFICE: Nanaimo
DATE: May 2023

Figure: 6

APPENDIX G

BC DAM SAFETY – FORMAL ANNUAL INSPECTION TEMPLATE

Formal Annual Inspection

It is recommended that you customize this form to fit your dam.

Pre-Inspection Information

Name of Dam: _____ Inspection Date: _____
Current Weather: _____ Weather During Last Week: _____
Name of Creek, Stream, River: _____ Water Licence #: _____
Dam Owner: _____
Address: _____
City, Province: _____ Postal Code: _____
Name of Principle Contact Person: _____
Principle Contact's Bus Phone: _____ Principle Contact's Cell Phone: _____
Principle Contact's Email: _____

Person Responsible for this Inspection: _____ Phone #: _____
Other Inspection Participants: _____

Date of Last Annual Inspection: _____ Was last Annual Inspection Report reviewed?: _____
Were dam deficiences identified that required follow-up? _____
Date of Last Dam Safety Report(DSR): _____ Was last DSR Report reviewed? _____
Were recommendations from the last DSR Report implemented? _____
Repairs or modifications since last formal inspection? (where, when) _____
Failures/Incidents/Breaches since last formal inspection? _____
Has all the maintenance done in the last year been documented?_____
Are the Works Currently Fully Operational? _____

Dam Information

Type of Dam: _____ Max. Height of Dam: _____
Are dam materials well known? _____ Are foundation conditions well known? _____
Are dam construction details well known? _____ Construction Date: _____

Failure Consequence Classification

Circle current Failure Consequence Classification (based on BC Dam Safety Regulation)

Low Significant High VeryHigh Extreme

Hydrology

Drainage Area Size: _____ Reservoir Area: _____
Inflow Design Flood (IDF): _____ m^3/s IDF Return Period: _____
1000 yr Flood: _____ m^3/s (If available): _____
Probable Maximum Flood: _____ m^3/s (If available): _____
Spillway Crest Elevation: _____ Spillway Width: _____
Spillway Capacity: _____ Net Freeboard (while spillway passing IDF): _____
Gross Freeboard (@ full supply level): _____ Freeboard (at time of visit): _____
Reservoir Storage Volume: _____ Licenced Storage Volume: _____

Emergency Preparedness Plan (EPP)

Has the emergency contact information in the EPP been updated this year and distributed as required? _____

Other Key Information

Person Responsible for Formal Inspection: _____ **Date:** _____

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	

Embankment Dam

1. Upstream Slope

VEGETATION Yes/No ☐ ☐ ☐ ☐ ☐ _____

Type _____ Location _____

Recommendations: _____

SLOPE PROTECTION ☐ ☐ ☐ ☐ ☐ _____

Type None/Grass/Riprap/Other

Notes _____

EROSION Yes/No Location _____ ☐ ☐ ☐ ☐ ☐ _____

Type Wave/Runoff/Unknown

Length _____ Width _____

Notes _____

INSTABILITIES ☐ ☐ ☐ ☐ ☐ _____

Slides Yes/No/Could not Inspect

Length _____ Width _____ Location _____

Notes/Causes _____

Cracks Yes/No Transverse/Longitudinal/Other ☐ ☐ ☐ ☐ ☐ _____

Quantity _____ Length _____ Width _____

Location _____

Notes/Causes _____

Bulges/Depressions/Hummocky Yes/No ☐ ☐ ☐ ☐ ☐ _____

Size _____ Height _____ Depth _____

Location _____

Notes/Causes _____

OTHER ☐ ☐ ☐ ☐ ☐ _____

Burrows, Ruts, Other Concerns

Location _____

Notes/Causes _____

2. Crest

ACCESS ☐ ☐ ☐ ☐ ☐ _____

Is there public access to the crest? (Yes/No)

Is the crest marked or signed? (Yes/No)

Is vehicle access to the crest restricted? (Yes/No)

VEGETATION

Trees Yes/No ☐ ☐ ☐ ☐ ☐ _____

Location _____

Notes _____

Brush None/Sparse/Dense ☐ ☐ ☐ ☐ ☐ _____

Location _____

Notes _____

Ground Cover Bare/Grass/Other ☐ ☐ ☐ ☐ ☐ _____

Quantity (bare/sparse/adequate/dense)

Appearance (too tall/too short/good)

Notes _____

EROSION Yes/No Location _____ ☐ ☐ ☐ ☐ ☐ _____

Type Wave/Runoff/Unknown

Length _____ Width _____

Notes _____

SETTLEMENT ☐ ☐ ☐ ☐ ☐ _____

Location _____

Notes/Causes _____

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	
INSTABILITIES	☐	☐	☐	☐	☐	_____
Cracks Transverse/Longitudinal/Other						
Quantity _____ Length _____ Width _____						
Location _____						
Notes/Causes _____						
OTHER						
Burrows, Ruts, Other Concerns	☐	☐	☐	☐	☐	_____
Location _____						
Notes/Causes _____						

3. Downstream Slope

VEGETATION	☐	☐	☐	☐	☐	_____
Trees Yes/No						
Location _____						
Notes _____						
Brush None/Sparse/Dense	☐	☐	☐	☐	☐	_____
Location _____						
Notes _____						
Ground Cover Bare/Grass/Other	☐	☐	☐	☐	☐	_____
Notes _____						
SLOPE PROTECTION	☐	☐	☐	☐	☐	_____
Type None/Grass/Other						
Notes _____						
EROSION Yes/No Location _____	☐	☐	☐	☐	☐	_____
Location _____						
Notes _____						
INSTABILITIES	☐	☐	☐	☐	☐	_____
Slides Length _____ Width _____ Location _____						
Notes/Causes _____						
Cracks Yes/No Transverse/Longitudinal/Other	☐	☐	☐	☐	☐	_____
Quantity _____ Length _____ Width _____						
Location _____						
Notes/Causes _____						
Bulges/Depressions/Hummocky Yes/No	☐	☐	☐	☐	☐	_____
Size _____ Height _____ Depth _____						
Location _____						
Notes/Causes _____						
OTHER						
Burrows, Ruts, Other Concerns	☐	☐	☐	☐	☐	_____
Location _____						
Notes/Causes _____						
SEEPAGE	☐	☐	☐	☐	☐	_____
Wet Area/Flow/Boil/Sinkhole						
Flow Rate _____						
Location _____						
Aquatic Vegetation Yes/No						
Rust Colored Deposits Yes/No						
Sediment in Flow Yes/No						
Other _____						
Notes/Causes _____						
EMBANKMENT DRAINS Yes/No	☐	☐	☐	☐	☐	_____
Type _____						
Flow rate _____ Size _____ Number _____						
Location _____						
Notes _____						
MONITORING INSTRUMENTATION CONDITION	☐	☐	☐	☐	☐	_____
☐ None found ☐ Piezometers ☐ Weir ☐ Flume						
Notes _____						

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	

Concrete Dam

1. Upstream Side and Crest

ALIGNMENT/OFFSETS ☐ ☐ ☐ ☐ ☐ _____

Movement at Joints? _____

Settlement? _____

JOINT FILLER _____ ☐ ☐ ☐ ☐ ☐ _____

Any Loss? _____

Vegetation? _____

UNUSUAL CRACKS ☐ ☐ ☐ ☐ ☐ _____

New? _____

Efflorescence? _____

Displacement? _____

DETERIORATION ☐ ☐ ☐ ☐ ☐ _____

Concrete Breakdown? _____ Diagnosis: _____

Erosion _____

Scour _____

2. Downstream Side

ALIGNMENT/OFFSETS ☐ ☐ ☐ ☐ ☐ _____

Movement at Joints? _____

Settlement? _____

JOINT FILLER ☐ ☐ ☐ ☐ ☐ _____

Any Loss? _____

Vegetation? _____

UNUSUAL CRACKS ☐ ☐ ☐ ☐ ☐ _____

New? _____ Type? _____

Efflorescence? _____

Displacement? _____

DETERIORATION ☐ ☐ ☐ ☐ ☐ _____

Concrete Breakdown? _____ Diagnosis: _____

Erosion _____

Scour _____

UNUSUAL LEAKAGE ☐ ☐ ☐ ☐ ☐ _____

Increase? _____ Clear? _____

Weir? _____ Flow Estimate? _____

DRAINS ☐ ☐ ☐ ☐ ☐ _____

Flow? _____ Calcite Build-up? _____

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	

Spillway

GENERAL CONDITIONS

Type _____ Gated? - Yes/No

Notes _____

1. Spillway Crest or Control Section

OBSTRUCTION

Debris Yes/No

Location _____

Notes _____

Vegetation None/Sparse/Dense

Location _____

Notes _____

Other (beaver activity, trash rack problems, etc.)

_____

LOG BOOM Yes/No Reguired? Yes/No

Condition: Logs _____ Connections _____ Anchors _____

Notes _____

SPILLWAY CREST MATERIALS

Condition _____

Notes _____

SPILLWAY GATES Yes/No _____ Type: _____

Condition _____

Notes _____

OTHER SPILLWAY CREST PROBLEMS

Damage _____

Location _____

Notes/Cause _____

2. Spillway Conveyance Section: Channel, Chute or Conduit

OPEN CHANNEL CROSS SECTION _____

CHANNEL OBSTRUCTION _____

SPILLWAY CONVEYANCE MATERIALS _____

OTHER SPILLWAY CONVEYANCE PROBLEMS _____

Damage _____

Location _____

Notes/Cause _____

3. Energy-Dissipating or Terminal Section

EROSION CONTROL STRUCTURE

Type Endwall/Headwall/Plunge pool/impact basin/Baffled chute/Rock lined channel/Other/None

_____

Notes _____

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	

Low Level Outlet

GENERAL

Gate Type _____ ☐ None ☐ ☐ ☐ ☐ ☐ _____

ACCESS TO VALVE/GATE Under all circumstances? Yes/No ☐ ☐ ☐ ☐ ☐ _____

☐ Not accessible ☐ from shore ☐ Walkway ☐ By boat ☐ Other

Notes _____

Walkway Condition _____

LOW LEVEL OUTLET COMPONENTS

Valve Control Device ☐ ☐ ☐ ☐ ☐ _____

☐ Yes ☐ None ☐ No Stem ☐ Damaged stem ☐ Other

Other/Notes _____

Operational under all conditions? ☐ ☐ ☐ ☐ ☐ _____

☐ Yes ☐ No ☐ Poorly

Tested Annually? Yes/No Tested as per OMS manual? Yes/No

Notes _____

Valve / Gate ☐ ☐ ☐ ☐ ☐ _____

Location _____

Condition _____

Leakage ☐ Yes ☐ No ☐ ☐ ☐ ☐ ☐ _____

Flow Rate _____

Outlet Pipe ☐ ☐ ☐ ☐ ☐ _____

☐ Metal ☐ Plastic ☐ Concrete ☐ Other _____

Diameter _____

Condition _____

Outlet Obstruction (note vegetation, sediment blockage, etc.)

Notes _____

OUTLET EROSION CONTROL STRUCTURE ☐ ☐ ☐ ☐ ☐ _____

Type _____

Concrete Condition _____ ☐ ☐ ☐ ☐ ☐ _____

Outlet Area Seepage ☐ ☐ ☐ ☐ ☐ _____

Description _____

Flow Estimate _____

Location _____

Undermining ☐ ☐ ☐ ☐ ☐ _____

Location _____

Notes/Cause: _____

Downstream Channel _____ ☐ ☐ ☐ ☐ ☐ _____

Free Draining? _____

Blockages or Potential Blockages? _____

Erosion Control? Rip-Rap? _____

	Required Action					Photo #s
	None	Monitor	Maintenance	Repair	N / A	

Other Key Information

Is site access adequate for safe operation, maintenance and surveillance? _____
Instrumentation adequate for site conditions? _____
Are there concerns about reservoir slope stability? _____
Any there other concerns in the watershed that could impact the dam? _____
Operational Constraints that impact Dam Safety? _____
Are the required Public Safety signs in place (for dams on Crown land)? _____
Other comments on Public Safety: _____
Should new development in the downstream inundation zone initiate a review of the Failure Consequence Classification?:
Yes/no? _____Comments: _____

Maintenance

In the last year have the spillway gates been exercised and tested in accordance with the OMS? _____
If so, when and by whom? _____
In the last year has the low level outlet gate been exercised and tested in accordance with the OMS? _____
If so, when and by whom? _____
Is the instrumentation well maintained? _____

NOTES:

Required Action					Photo #s
None	Monitor	Maintenance	Repair	N / A	

SKETCH OF ISSUES:

APPENDIX H

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

DAM SAFETY REVIEW REPORT

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. The content of this report represents the best judgment of TETRA TECH based on the available information. The observations, conclusions, and recommendations developed for this report are deemed to be valid as of the date of the site inspection. If any conditions change (e.g., loading, reservoir level, etc.), however, the dam performance may be altered and a reassessment is required. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as Canadian Dam Association's Dam Safety Guidelines, ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

From: BC Active Transportation Grants Program MOTI:EX <BCATgrants@gov.bc.ca>
Sent: August 1, 2024 2:31 PM
Subject: B.C. Active Transportation Grants Program – 2024/25 Intake Date

Hello,

We are pleased to announce that the 2024/25 B.C. Active Transportation Infrastructure Grants Program will be accepting applications beginning September 3, 2024. In the meantime, we have updated the program website with this year's Program Guidelines, FAQ, instructional videos, and more. This will allow applicants to review resources and prepare required documents ahead of the intake launch, all while accessing any needed support from the BC Active Transportation Team.

The program website will have an easy-to-use online application which will allow organizations to save their application, share the draft application within the organization, and provides prompts and other features. To access the application, your organization will require a BCeID which provides a secure and unique access to the new portal. Click here to determine if your organization has a BCeID or here if you require one.

Continuing from previous years, Indigenous governments and/or partnerships between Indigenous and local governments may apply to the grant program year-round through a new rolling intake option.

If you have any questions or require assistance with your application, please contact program staff at BCATgrants@gov.bc.ca or by telephone at 778 974-5469.

Thanks,
B.C. Active Transportation Infrastructure Grants Program Team

I.1(n)

From: Lab Standards and Quality Assurance ENV:EX <LabStandards@gov.bc.ca>
Sent: July 17, 2024 5:04 PM
Subject: EDQAR Notification: Implementation Date Change

To whom it may concern,

The province has changed the effective date of the new Environmental Data Quality Assurance Regulation (EDQAR) from August 1, 2024 to **August 1, 2026**.

The EDQAR applies to *Environmental Management Act* authorization holders and outlines requirements on sampling, analysis, quality control and reporting. The regulation also includes qualification criteria for laboratories producing environmental data.

The province appreciates the efforts that laboratories and authorization holders have taken to date towards meeting the updated EDQAR requirements. The date for the new requirements to come into effect has been extended to ensure that all authorization holders including industry and local governments are aware of the new requirements and to allow authorization holders and laboratories additional time to meet laboratory accreditation standards.

During the extension period, educational guidance materials will be developed.

Updated information is available at on the EDQAR web page, and new information will be posted to this site as it becomes available.

Kind regards,

Laboratory Standards and Quality Assurance Unit,
Environmental Monitoring and Analysis Branch
Environmental Protection Division

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy
2nd Floor, 1520 Blanshard Street
Victoria, BC V8W 3K1

We respectfully acknowledge that we live and work on the traditional territories of lək̓ʷəŋən (Lekwungen) speaking people, also know as the Xwsepsum (Esquimalt) and Songhees First Nations.

☑ Council ☐ Economic Development
☑ Mayor ☐ Engineering/PW
☑ CAO ☐ Parks, Rec. & Heritage
☐ Finance ☐ Development Services
☐ Corporate Services ☑ Other Fire
☐ Agenda RCM Aug 12/24
File # 0400-20-WSEP

From: ENV WSEP ENV:EX <WSEP@gov.bc.ca>
Sent: July 19, 2024 9:53 AM
To: ENV WSEP ENV:EX <WSEP@gov.bc.ca>; Dorat, Jean-Nicolas ENV:EX <Jean-Nicolas.Dorat@gov.bc.ca>
Cc: Robles, Jerome ENV:EX <Jerome.Robles@gov.bc.ca>
Subject: Community Wood Smoke Reduction Program 2024-2025 - Request for proposal / incentive to exchange old woodstove // Your feedback required by Sept 15th

Good day,

Hope you and your team are doing well today!

I am writing to you on behalf of the BC Ministry of Environment and Climate Change Strategy's **Community Wood Smoke Reduction Program** to inform you about this incentive that can help enhance air quality in your community. The health benefits of a good air quality can be significant!

The Community Wood Smoke Reduction Program is now open for proposal submissions for the 2024-2025 season. The program is provincially funded and, in partnership with the BC Lung Foundation, provides the incentives to promote the **exchange of old wood stoves to enhance air quality.**

You can find the program documents on our website at:
Program guidance and presentation:
Provincial Community Wood Smoke Reduction Program 2023/2024 (gov.bc.ca)

The proposal requirements can be found here:
Provincial Community Wood Smoke Reduction Program: Project Proposal (gov.bc.ca)

And the program criteria can be found here:
Community Criteria for Pursuing Local Community Wood Smoke Reduction Programs (gov.bc.ca)

If you are interested in participating, please do not hesitate to contact me directly,
and I can assist you with your proposal submission for the 2024-2025 season;
Or you can apply directly and send your proposal document at wsep@gov.bc.ca. The deadline for final submissions is September 15th, 2024.

Looking forward to your response,
Regards.
JN

BRITISH COLUMBIA

Jean-Nicolas Dorat, P.Eng. PMP (Pronouns: he/his)
Environment Management Officer, Clean Air Unit
Air | Environmental Protection Initiatives Branch
Ministry of Environment and Climate Change Strategy
☎ 250-899-0692
jean-nicolas.dorat@gov.bc.ca | gov.bc.ca/airquality)

☑ Council ☐ Economic Development
☑ Mayor ☑ Engineering/PW
☑ CAO ☐ Parks, Rec. & Heritage
☐ Finance ☐ Development Services
☑ Corporate Services ☐ Community Safety
☑ Agenda RCM Aug12/24 ☐ Other
File # S.330-20: Argyle 1st-3rd.

To the mayor and council of Port Alberni,

Hello, my name is Ryan Toso. I am one of the owners of Mobius Books which is at 5016 Argyle Street. Thank you for taking the time to read my letter to you. I would have preferred to appear in person, but I hadn't realised how challenging it is to make a presentation in person. I would have liked to be able to ask and answer any questions that arise. This letter will have to suffice.

I am asking that you, the mayor and council, take another look at the streetscape design for Argyle Street between 1st and 3rd. I understand the need for the storm and sanitary sewer separation, and I am grateful at the foresight to redesign the street while it is under construction.

I was made aware of the construction not too much longer after we had opened the bookstore. I was told at that time that there would be public engagement and consultation. Unfortunately, this did not happen.

In looking at both of the design proposals, I like the added bike lanes, the boulevards and trees. However, in the option 2 which was selected the number of parking stalls are reduced by 50%. As well, they are re-aligned from the current angle parking that is along all of Argyle to parallel parking. Plus, that parallel parking is on a hill.

I have sought feedback from my customers and have attached a number of signatures from locals who agree with me that we would like you to reconsider. Parking is already limited in the area and further reduction would likely have a large impact on my business as well as others in the area.

A fairly substantial number of my customers have mobility issues and have communicated to me that if they can't park out front, they won't be able to shop in my store. I know that this already happens when all the parking stalls are full.

I also do have concerns about the maintenance of the chosen design and who will responsible for clearing snow to provide the customers with safe access to the shops.

Lower Argyle from Harbour Road to 1st was redesigned with a large sidewalk and angle parking. Argyle above 3rd has angle parking. To switch back and forth is going to be awkward. And if the plan is to redo lower Argyle, that would be cost prohibitive.

So, I ask that you take another look at the design proposal. Take into consideration the needs of small retailers such as myself. Remember that our aging population might have challenges with walking long distances. Acknowledge that a lot of drivers do not have the skills to parallel park, especially on a hill. And please support your local small retailers.

Thank you for your attention in this matter,

Ryan Toso

Mobius Books Ltd.

5016 Argyle Street

Port Alberni, BC

V9Y1V4

250.736.1008

Argyle streetscape design

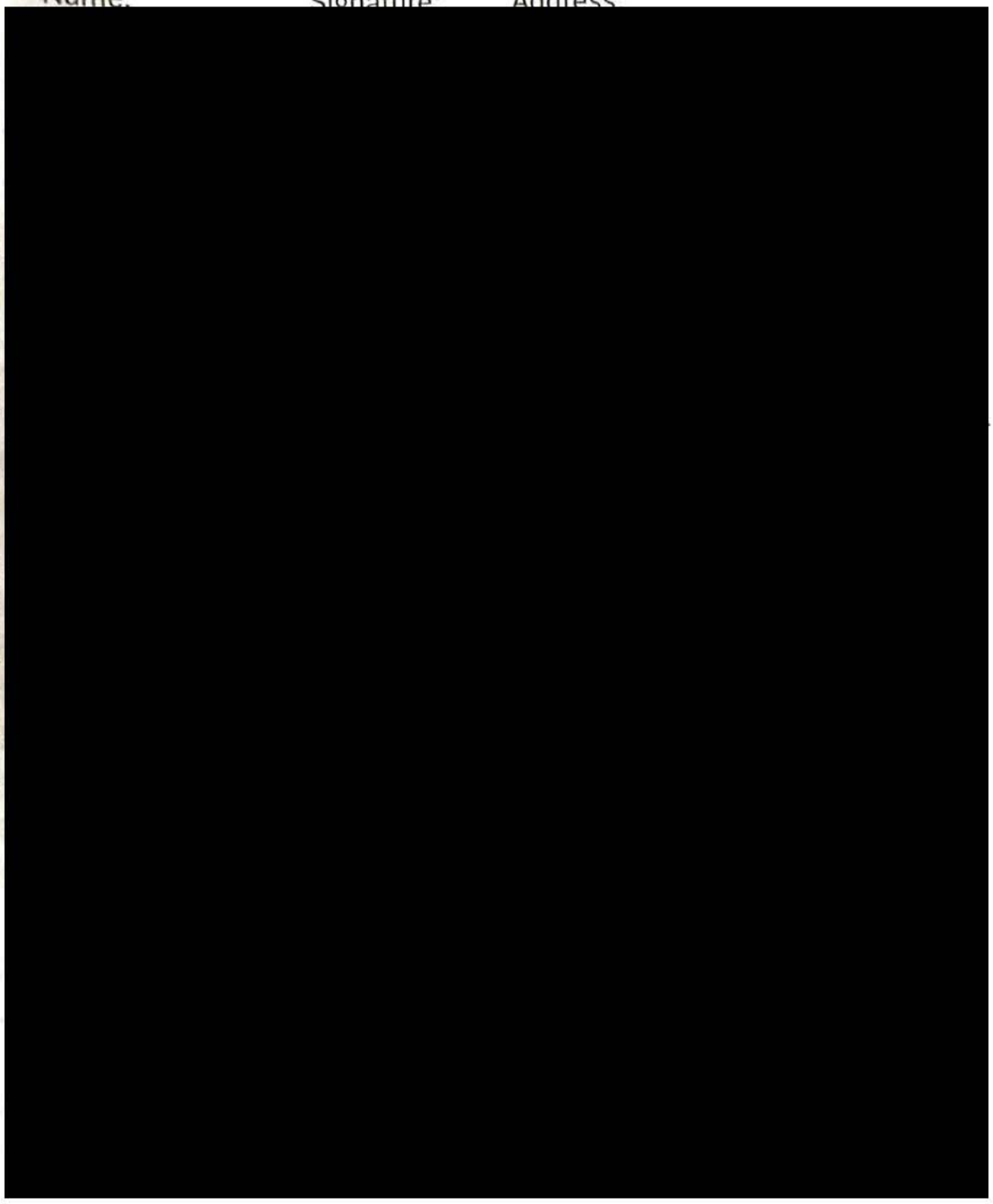
I want to remind you about the upcoming sewer separation project on Argyle street between 1st and 3rd. The city is also planning to redesign the street and parking. They have chosen option 2, which will reduce parking to three parallel stalls for each section of road between the alley and the avenue. As a result, parking along Argyle between 1st and 3rd will be reduced by 50%. This will create challenges for our customers, many of whom have mobility issues. It will also make it difficult for our businesses to survive after the construction period due to the lack of parking. Therefore, I plan to propose to the council that they reconsider this design and instead maintain the existing design on lower Argyle. I am asking for your support by signing the petition that I will present to the council. Thank you.

Ryan Toso

Mobius Books Ltd.

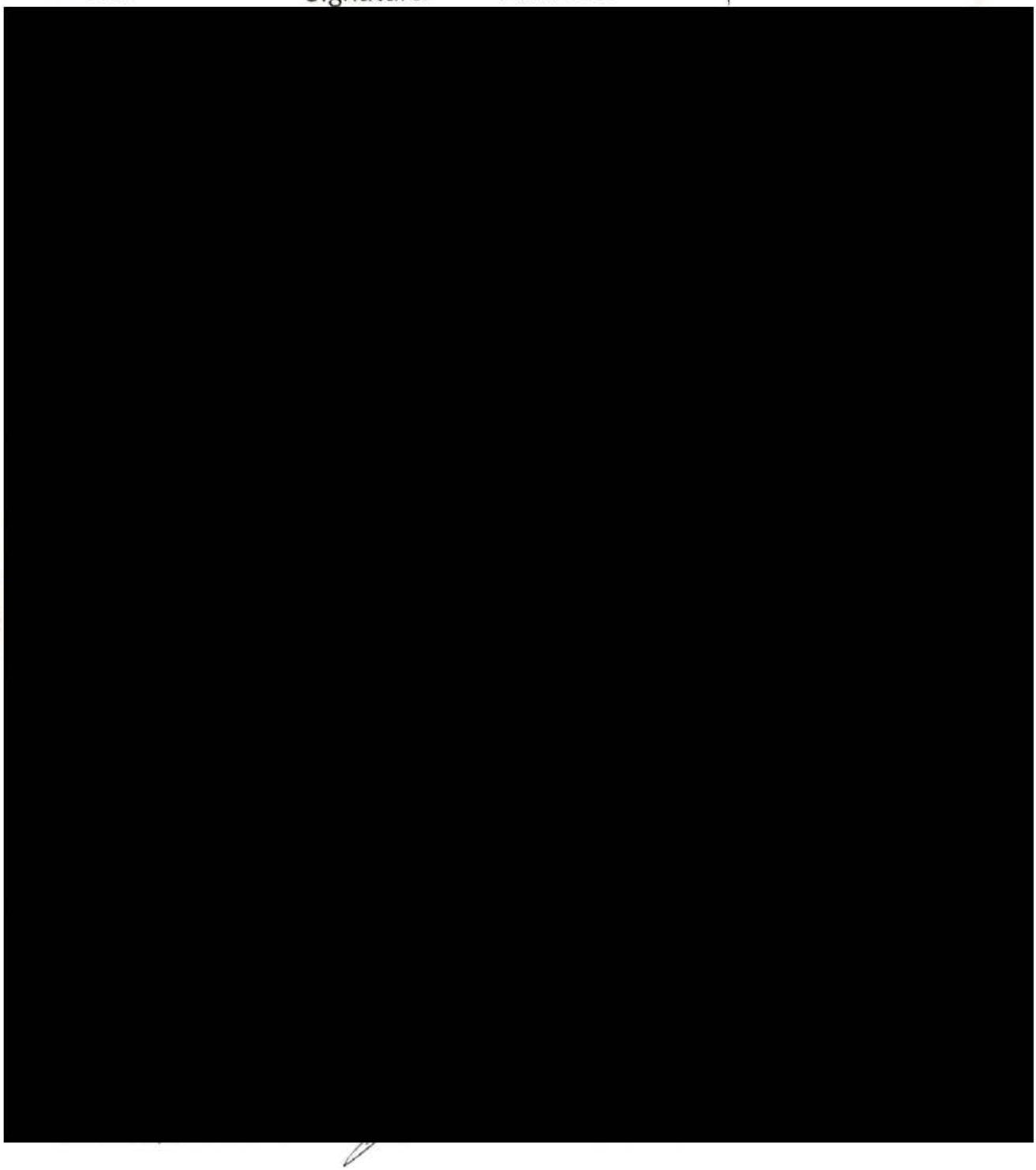
The undersigned would like the council to reconsider the Argyle streetscape design.

Name: Signature: Address:



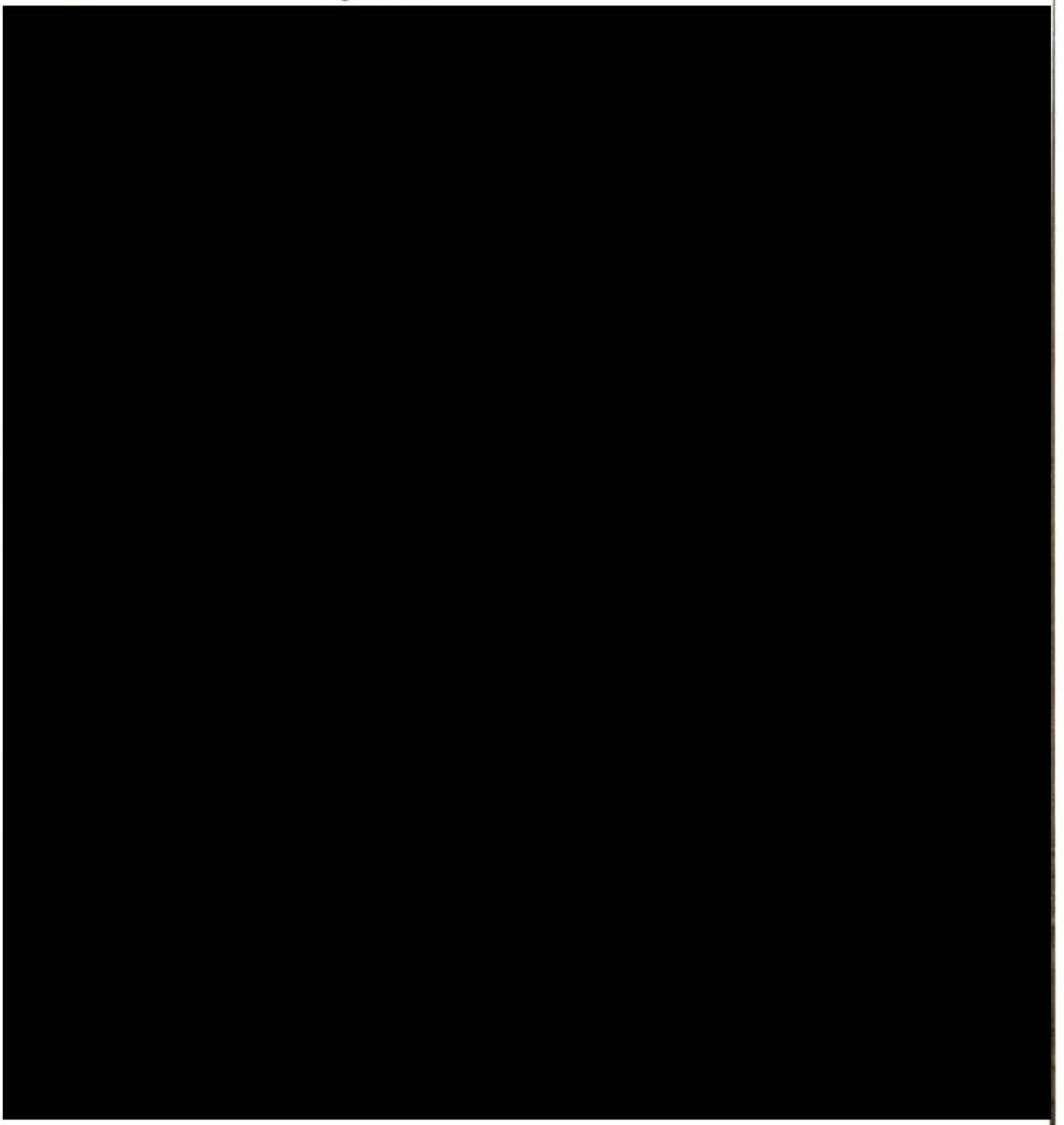
The undersigned would like the council to reconsider the Argyle streetscape design.

Name: Signature: Address:



The undersigned would like the council to reconsider the Argyle streetscape design.

Name: Signature: Address:



The undersigned would like the council to reconsider the Argyle streetscape design.

	Name:	Signature:	Address:
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ALBERNI-CLAYOQUOT REGIONAL DISTRICT

☑ Council ☐ Economic Development
☑ Mayor ☐ Engineering/PW
☑ CAO ☐ Parks, Rec. & Heritage
☐ Finance ☐ Development Services
☑ Corporate Services ☐ Community Safety
☑ Agenda August 12 RCM ☐ Other
File # 0400-20 ACRD

RECEIVED
JUL 04 2024
CITY OF PORT ALBERNI

FOR IMMEDIATE RELEASE
July 4, 2024

ACRD, Tseshaht, and Hupacasath working together on Rail Corridor Study

Alberni-Clayoquot Regional District, Tseshaht First Nation, and Hupacasath First Nation are working together on a Rail Corridor Study to develop an Alberni Valley vision for the Island Rail Corridor.

The study will involve documenting the history of rail in the Alberni Valley, reviewing existing infrastructure conditions, identifying needs and opportunities for the corridor, culminating in the identification of a preferred option and a strategy for moving that option forward. The study will be completed by HDR Corporation in February 2025.

"How the Island Rail Corridor can and should be used has been a long-standing point of discussion for communities across Vancouver Island, including those within the Alberni Valley. This specific study engages First Nations, impacted communities and interested groups to develop a shared common vision for the future of the corridor. We encourage people to consider and share their views through the lens of business/economic impacts, social, recreational, and cultural possibilities, as well as climate and environmental opportunities." said Daniel Sailland, Chief Administrative Officer.

Public engagement and consultation with key groups will be an important component of the project as well and will inform the concepts and opportunities considered during the study. A range of opportunities for public participation will be offered, including in-person and online events and tools.

As a result of the 2021 Court of Appeal for British Columbia decision and ensuing action by the Government of Canada and Province of BC, the lands upon which the rail corridor sits are being reverted to the First Nations whose territories the corridor transects.

Input from the Tseshaht and Hupacasath communities is vitally important, as partners in the Rail Corridor Study, as title holders to segments of rail corridor, and on whose traditional territory the rail line is located.

"Ensuring that everyone is involved and able to contribute recognizes the important role of community feedback in creating a future plan for the region," added Sailland. "It is equally important for Tseshaht and Hupacasath Nations to have the opportunity to explore the possible benefits they may have by engaging these lands. We look forward to working together to learn more about the interests and opportunities that could be available for the corridor and our shared community."

The project is getting underway now with preliminary reviews and assessments. The first engagement events are expected to be held in September – more information will be shared closer to the date.
For more information about the Rail Corridor study to follow along in the process and provide input, visit letsconnectacrd.ca/railstudy

-30-

For more information,
Daniel Sailland, Chief Administrative Officer
250-720-2700

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

KEEPING YOU CONNECTED

Highlights from the Alberni-Clayoquot Regional District (ACRD) Board of Directors Meetings - June 2024

JUNE 12 & 26 MEETINGS

ACRD EMERGENCY PROGRAM
The ACRD Emergency Program Executive Committee Terms of Reference were amended to include the CAO for the City of Port Alberni and CAO for the ACRD as committee members.

WEST COAST TRANSIT
A schedule change was approved for West Coast Transit to address the gap in midday services as well as a change in transit rate to include a discounted rate for Seniors.

BUILDING ENERGY EFFICIENCY ASSESSMENT
The Board of Directors gave their support for the grant funding application to the Local Government Infrastructure Planning Grant Program for the Building Energy Efficiency Assessment for 7 ACRD buildings.

Priority in the following order:
1. ACRD 5th Ave Administrative Building
2. Beaver Creek Fire Hall
3. Harold Bishop Fire Hall
4. Sproat Lake Fire Department - Lakeshore Fire Hall
5. East Bamfield Fire Hall
6. Bamfield Community Parks - Eileen Scott Centennial Park Building
7. Long Beach Airport Terminal Building.

UNION OF BC MUNICIPALITIES (UBCM) CONVENTION
Directors will be requesting meetings with Ministers at the upcoming UBCM Convention in September to discuss the following topics: Emergency Evacuation and Transportation Routes, Drought, and Inclusive Governance.

DEVELOPMENT VARIANCE APPLICATION DVA24002
Development Variance Application DVA24002 for a property in Haggard Cove was deferred to allow staff to meet with residents and applicants.

TOFINO GENERAL HOSPITAL
The Regional Hospital District Board approved the reallocation of funds from the Tofino General Hospital Admitting Triage Project to Tofino General Hospital Crisis Quiet Room project, as requested by Island Health.

ADVISORY PLANNING COMMISSIONS
The Board of Directors appointed the following individuals to the Advisory Planning Commissions (APC) for two-year terms:
Bamfield APC - John Mass, Kevin McAughtrie, Glenn Ballman, Brian McKay, Stella Wenstob, Tom Campbell, and James Willock
Beaufort APC - George Haack, Steve King, Lisa Aylard, and Graham Tate
Long Beach APC - Scott MacDonald, Carol Sedgwick, Jamie Pleune, Terry Graff, and Julie Edwards
Sproat Lake APC - Walter Konkin, Roberta Jensen, Ken Watts, Harley Wiley, Joann Bessler, and Mark Molander

☑ Council ☐ Economic Development
☑ Mayor ☐ Engineering/PW
☑ CAO ☐ Parks, Rec. & Heritage
☐ Finance ☐ Development Services
☑ Corporate Services ☐ Community Safety
☑ Agenda Aug 12/24 RCM ☐ Other
File # 0400-20 ACRD

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ALBERNI-CLAYOQUOT REGIONAL DISTRICT

KEEPING YOU CONNECTED

Highlights from the Alberni-Clayoquot Regional District (ACRD) Board of Directors Meetings - June 2024

ADVISORY PLANNING COMMISSIONS CONTINUED
Beaver Creek APC - Christy Arsenault, and Brad Jasken
Cherry Creek APC - Lynn Krupek, Denis Francoeur, and Lars Banke

NOTICE ON TITLE
Notice on Title will be registered for a building contravention on 5661 Strick Road.

LOG TRAIN TRAIL
The Board of Directors gave their support to apply to the Local Government Infrastructure Planning Grant Program for a Condition Assessment of the bridges on the Regional Parks Log Train Trail.

2023 STATEMENT OF FINANCIAL INFORMATION
The ACRD 2023 Statement of Financial Information, including all statements and schedules, was approved.

ACRD ACCESSIBILITY PLAN
The ACRD Accessibility Plan was adopted and the next step will be to move forward with Action Planning.

CONTRACTS & AGREEMENTS:
- Food Security Emergency Planning Consulting Services contract awarded to Upland Agricultural Consulting Ltd.
- South Long Beach and Sproat Lake OCP Updates Consulting Services contract awarded to Urban Systems
- Water Tender Fire Apparatus contract awarded to HUB Fire Engines and Equipment Ltd.

LEASES:
- Dan Harrison for lease lot LS-L2024009 at Tofino-Long Beach Airport effective July 1, 2024-July 1, 2027

PERMITS:
To be considered at a future meeting, subject to notifying neighbouring properties:
- Temporary Use Permits: TUP24005 (Long Beach), TUP24002 (Sproat Lake)

Issued:
- Development Variance Application: DVE24003 (Beaver Creek), DVD22003 (Sproat Lake)
- Temporary Use Permits: TUP23006 (Sproat Lake), TUP24001 (Beaver Creek), TUP21002R (Cherry Creek)

REZONING AND BYLAWS:
- Rezoning Applications: Bylaws 1475, 1476, and 1483 (RF22013 - Cherry Creek) were adopted, Bylaws 1498 and 1499 had their 1st readings (RD23017 - Sproat Lake), Bylaw 1481 was considered a first time (RE23002 - Beaver Creek), Bylaw P1488, had three readings (RA23004 - Bamfield)
- Bylaw P1500, Zoning Bylaw Text Amendment for Small Scale Multi Unit Housing - Secondary Suites was adopted
- Bylaw P1496 and P1497 were adopted (former Land Use Contracts)
- Bylaw No. F1167, 2024, Security Issuing Bylaw was adopted for the District of Tofino borrowing for their wastewater treatment plant.

LETTERS OF SUPPORT:
- BC Parks to rename Maquinna Park to Nismaaqkin Park
- Regional District of Nanaimo for the Legislative Reform Initiative.

The next meetings of the ACRD Board of Directors take place on July 24 and August 28 at 1:00 PM

CITY OF PORT ALBERNI

Regular Council Meeting
For the Meeting of August 12, 2024

Date: July 29, 2024
File No: 0640-30-Corporate Strategic Plan

To: Mayor & Council
From: M. Fox, CAO
Subject: **Corporate Strategic Plan Review**

Prepared by:	Supervisor	CAO Concurrence:
S. DARLING	*D. LEUREBOURG*	
Deputy Director of Corporate Services	*Director of Corporate Services*	*M. Fox, CAO*

RECOMMENDATION[S]

THAT Council receive the report 'Corporate Strategic Plan Review' dated July 29, 2024.

PURPOSE

For Council to receive a summary of the June 26th *Corporate Strategic Plan* review session.

BACKGROUND

Adopted by Council on May 8, 2023, the City of Port Alberni *Corporate Strategic Plan: 2023-2027* is Council's leadership document that guides and aligns municipal work and spending.

During the development of the strategic plan, Council explored many possible paths to building a strong, successful Port Alberni. Through discussions, Council elected to focus on five strategic priorities: Responding to demographic change • Enabling the new economy • Provision and maintenance of quality services • Environmental leadership • Fostering a complete community (safe, healthy and inclusive). The five strategic priorities are supported by 20 goals and 41 strategies.

On June 26, 2024 Council held a Strategic Plan review session to assess the progress of ongoing projects and initiatives, discuss upcoming developments, and ensure alignment with the overall strategic direction of the municipality.

By reviewing the Strategic Plan regularly, Council can track progress, identify areas for improvement, and ensure that priorities are being addressed in a timely and efficient manner. Ultimately, the Strategic Plan review session allows Council to ensure that the municipality is on track to achieve its long-term vision and objectives, and to make any necessary adjustments to stay on course.

Much of the work done and services provided by the City are not specifically mentioned in the Strategic Plan. For this, a separate Action Plan was developed in alignment with Council's Strategic Plan. The *Now, Next, Later Corporate Strategic Action Plan* serves as a roadmap tool which organizes work into three-time horizons, from immediate to long term, and from most urgent to least urgent.

ALTERNATIVES/OPTIONS

That Council receive the report 'Corporate Strategic Plan Review' dated July 29, 2024.

ANALYSIS

Council's Strategic Plan review session held on June 26, 2026 covered a variety of key points and overview of action items for ongoing and upcoming projects and initiatives.

Main projects for 2024 were reviewed, including updates on Somass Lands, Quay to Quay Pathway, Burde Street construction and design, Master Plans, Official Community Plan, Argyle Street construction and design, plans for the proposed Aquatic Centre and various other ongoing initiatives as outlined in the *Now, Next, Later Corporate Strategic Action Plan*.

Council will next review the Strategic Plan in fall of 2024.

IMPLICATIONS

N/A

COMMUNICATIONS

None at this time.

BYLAWS/PLANS/POLICIES

City of PA Strat Plan_2023_Web.pdf (portalberni.ca)
Corporate Strategic Action Plan (Now, Next, Later) | City of Port Alberni

SUMMARY

During the Strategic Plan review session held on June 26, 2026, Council discussed a range of ongoing projects and initiatives to ensure alignment with the overall strategic direction of the municipality in accordance with the objectives set out in the *2023-2027 Corporate Strategic Plan*.

ATTACHMENTS

None

Copy: S, Smith, Director of Development Services/Deputy CAO

CITY OF PORT ALBERNI

Regular Council Meeting
For the Meeting of August 12, 2024

Date: July 24, 2024
File No: 0540-01

To: Mayor & Council
From: M. Fox, CAO
Subject: **2024 Council Committee Appointments**

Prepared by:	Supervisor	CAO Concurrence:
S. DARLING	*D. LEUREBOURG*	
Deputy Director of Corporate Services	*Director of Corporate Services*	*M. Fox, CAO*

RECOMMENDATION[S]

THAT amendments to the appointments to Committees and Council representatives to public bodies, commissions and select committees be approved, as follows:

- *August Deputy Mayor [Insert Name]*
- *Community Investment Program [Insert Name]*
- *Liaison, AV Community Forest Corporation [Insert Name]*
- *Liaison, Learning Council/North Island College [Insert Name]*
- *Liaison, School District #70 [Insert Name]*
- *Member, Tsawak-qin Public Advisory Group [Insert Name]*

PURPOSE

For Council to appoint an interim Councillor to those public bodies, commissions and select committees. served by the former Councillor John Douglas.

BACKGROUND

At its December 2023 organizational meeting, Council approved the 2024 appointments to Committees and Council representatives to public bodies, commissions and select committees. Consideration to appoint an interim Councillor to those previously held by Councillor John Douglas is required as follows:

- Deputy Mayor [August]
- Community Investment Program [City]
- Liaison, AV Community Forest Corporation
- Liaison, Learning Council/North Island College
- Liaison, School District #70
- Member, Tsawak-qin Public Advisory Group

ALTERNATIVES/OPTIONS

1. That amendments to the appointments to Committees and Council representatives to public bodies, commissions and select committees be approved, as follows:
   - August Deputy Mayor [Insert Name]
   - Community Investment Program [Insert Name]
   - Liaison, AV Community Forest Corporation [Insert Name]
   - Liaison, Learning Council/North Island College [Insert Name]
   - Liaison, School District #70 [Insert Name]
   - Member, Tsawak-qin Public Advisory Group [Insert Name]
2. That Council direct staff to permit the noted vacancies until such time as the By-Election has taken place.

ANALYSIS

Option 1 - Consideration from Council is required with respect to Deputy Mayor appointments as well as appointments to Committees and Council representatives to public bodies, commissions and select committees.
To avoid any disruption to City/community business and to remain informed of the same, staff are recommending that Council approve appointments to Committees and Council representatives to public bodies, commissions and select committees as amended.

Option 2 - Staff have engaged with each associated organization for which Councillor Douglas was appointed to determine the potential impacts should a vacancy remain until such time a By-election is held. It was determined that a short-term vacancy will not affect committee/commission business; however, Tsawak-qin Public Advisory Group indicated that it would be their preference to have an interim Council Liaison appointed to ensure a continued City presence during what is a critical time for Forest Management in the Valley.

IMPLICATIONS

No additional implications further to those noted in Option 2 above.

COMMUNICATIONS

Staff will communicate Council direction to each of the affected organizations.

BYLAWS/PLANS/POLICIES

"Council Procedures Bylaw 2013, Bylaw No. 4830".

SUMMARY

This report has been provided to appoint an interim Councillor to those served by the former Councillor John Douglas to Committees and Council representatives to public bodies, commissions and select committees.
It is being recommended that Council approve schedules and appointments as distributed so as to avoid any disruption to City/community business.

ATTACHMENTS

- 2024 Council Appointments and Deputy Mayor Schedule

Copy: S, Smith, Director of Development Services/Deputy CAO
W. Thorpe, Director of Park, Recreation and Culture

CITY OF PORT ALBERNI
COUNCIL APPOINTMENTS

1. **Mayor Sharie Minions**
   The Mayor is the head and chief executive officer of the City with duties prescribed by the Community Charter. Further to these duties the Mayor will participate in the following:
   - Court of Revision
   - Director, Alberni-Clayoquot Regional District
   - Member, Alberni-Clayoquot Regional District Emergency Program Executive Committee
   - Member, Forestry Worker Supports and Community Resilience Council [Provincial]
   - Member, North Island-Sunshine Coast Regional Advisory Committee (NISCRAC)

2. **Councillor Dustin Dame**
   - Liaison, Advisory Planning Commission *(Alternate: Councillor Haggard)*
   - Liaison, AV Transition Town Society
   - Liaison, Uptown Merchants Association
   - Member, Audit Committee

3. **Councillor John Douglas**
   - Liaison, AV Community Forest Corporation
   - Liaison, Learning Council/North Island College
   - Liaison, School District #70
   - Liaison, Community Investment Program
   - Member, Tsawak-qin Public Advisory Group

4. **Councillor Debbie Haggard**
   - Director, Alberni-Clayoquot Regional District
   - Member, Alberni Clayoquot Health Network
   - Member, Alberni-Clayoquot Regional District Alberni Valley Aquatic Centre Advisory Committee
   - Member, Community Action Team
   - Member, Personnel Committee

5. **Councillor Charles Mealey**
   - Member, Advisory Traffic Committee
   - Member, Alberni Clayoquot Continuing Care Society
   - Member, Alberni Valley Heritage Commission
   - Member, Personnel Committee

6. **Councillor Todd Patola**
   - Court of Revision
   - Member, Air Quality Council
   - Member, Audit Committee
   - Trustee, Vancouver Island Regional Library Board (VIRL) (*Alternate: Councillor Haggard)*
   - Member, Personnel Committee

7. **Councillor Cindy Solda**
   - Court of Revision
   - Liaison, Alberni Valley Chamber of Commerce
   - Liaison, Alberni Valley Regional Airport Advisory Committee
   - Liaison, West Coast Native Healthcare Society
   - Member, Alberni-Clayoquot Regional District Accessibility Committee (*Alternate: Councillor Dame*)
   - Member, Alberni-Clayoquot Regional District Emergency Program Executive Committee
   - Member, Audit Committee
   - Member, Alberni-Clayoquot Regional District Transportation Advisory Committee (*Alternate: Councillor Mealey*)

SCHEDULE OF APPOINTMENTS FOR THE DEPUTY MAYOR FOR REGULAR AND COMMITTEE OF THE WHOLE MEETINGS

January & July	Cindy Solda	April & October	Debbie Haggard
February & September	Todd Patola	May & November	Charles Mealey
March & August	John Douglas	June & December	Dustin Dame

Deputy Mayor outside of formal meetings will be determined based on Council liaison appointments

CITY OF PORT ALBERNI COUNCIL APPOINTMENTS
Regional District of Alberni Clayoquot Representatives **Mayor Minions (allocated 5 votes), Councillor Haggard (allocated 5 votes)** **Alternates (in order)** Councillors Patola, Solda, Mealey, Douglas & Dame
Personnel Committee Councillors Haggard, Mealey & Patola
Audit Committee Councillors Dame, Patola & Solda
Community Investment Program John Douglas (Councillor), Colleen May (City), Willa Thorpe (City) Community Members: Joshua Dahling, Callan Noye, Colin Schult
Court of Revision Mayor Minions, Councillors Patola & Solda
Board of Variance Boris Lehner, John McNabb, James Lee
Advisory Planning Commission Dustin Dame (Councillor), Serena Mayer (Hupacasath), Sgt. Mike Thompson (RCMP), Derrin Fines (Fire), Manager of Parks [Wayne Mihalicz] (City), Chris Washington (SD70), Ken Watts (Tseshaht) Community Members: Jack Roland, Daniel Holder, Joe McQuaid, Sandy McRuer, Callan Noye, Stefanie Weber, Jack Roland
Alberni Valley Heritage Commission Charles Mealey (Councillor), Claudia Romaniuk (AVCAC), Jolleen Dick (AVCC) Elliot Drew (McLean Mill), Penny Cote (ACRD), Pam Craig (SD70), Gareth Flostrand (ADHS), Ed Ross (Tseshaht), Richard Spencer (WVIIHS), Jennifer Robinson (City), Ken Watson (PAMHS), Vacant (YPAV), Vacant (Hupacasath) Community Member: Colin Schult
Advisory Traffic Committee Charles Mealey (Councillor), Kathy Deschamps (Diversified Transportation), Jim MacDonald (City), A/Sgt. Jordan Hamlyn (RCMP), Jessica Learn (MOTI), Travis Cross (Fire), Larry Ransom (SD70), Caroline Robinson (ICBC)
Port Alberni Port Authority Arne Elias (July 1, 2021 - June 30, 2024)
Air Quality Council Todd Patola (Councillor) & Mike Owens (Fire)

Distribution: PACMA, Tanis Feltrin/Annie O'Connor - **via email**
File Drawer in Reception Area, Council Members

Updated: March 4, 2024