Appendix 9

Notes of Levels Survey; Audet 2018

Level Survey – Dam Crest to Discharge at Creek

HI(m)	FS(m)	BS(m)	ELEVATION (m)	LOCATION
100.14		0.14	100	BM BRIDGE
	2.62		97.52	CREEK @ BRIDGE
	1.66		98.48	TP1
101.86		3.38		
	0.35		101.51	TP2
104.39		2.88		
	1.78		102.61	DAM CREST

5.09 m elev diff top of dam to creek at bridge

4.13 m. elev diff top of dam to road below bridge

A. J. Audet, July 2018

Instrument Utilized: Wilde RDS

Appendix 10

Riparian Areas Regulation: Assessment Report; Cynthia Hannah, 2007

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Riparian Areas Regulation Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date: 2007-09-11

I. Primary QEP Information

First Name	Cynthia	Middle Name	Louise		
Last Name	Hannah				
Designation	R.P.Bio.	Company	FishFor Contracting Ltd		
Registration #	1276	Email	fishfor@telus.net		
Address	127 Twillingate Road				
City	Campbell River	Postal/Zip	V9W 1T9	Phone #	250-826-6602
Prov/state	BC	Country	Canada		

II. Secondary QEP Information (use Form 2 for other QEPs)

First Name		Middle Name	
Last Name			
Designation		Company	
Registration #		Email	
Address			
City		Postal/Zip	Phone #
Prov/state		Country	

III. Developer Information

First Name	Mike	Middle Name	
Last Name	Riesterer		
Company	Oyster Bay Investments Ltd		
Phone #	604-275-6244	Email	G5management@shaw.ca
Address	8811 Ash Street		
City	Richmond	Postal/Zip	V6Y 3B4
Prov/state	BC	Country	Canada

IV. Development Information

Development Type	Rural Residential Outside of Municipality		
Area of Development (ha)	10.5	Riparian Length (m)	~ 5470
Lot Area (ha)	10.5	Nature of Development	New
Proposed Start Date	October 2007	Proposed End Date	May 2008

V. Location of Proposed Development

Street Address (or nearest town)	Old Island Highway, Oyster Bay		
Local Government	Regional District of Comox Strathcona	City	Campbell River
Stream Name	Mayfly Creek (local name)		
Legal Description (PID)	Lot 1 Part NE ¼ of Section 26, Plan 552C, Twp 4, Comox District	Region	1-Vancouver Island
Stream/River Type	2 Streams, 5 Wetlands, 2 ditches	DFO area	South Coast
Watershed Code	UTM 10,344582,5529850 * Identifier for each waterway is listed in Section 2		
Latitude	49° 53' 46"	Longitude	125° 09' 53"

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed. Insert that form immediately after this page

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

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Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

A total of 9 waterways were located and assessed. The waterways on Lot 1 include Mayfly Creek, two non fish-bearing ditchlines, 5 wetlands and a tributary stream. The main drainage on the property is locally known as Mayfly Creek or Stream 5. Descriptions of the waterways are listed below.

Mayfly Creek Drainage:

Mayfly Creek, also known locally as Stream 5 flows into Oyster Bay ~1.5km northwest of the Oyster Bay Shoreline Park. It has been sampled and studied extensively by the Oyster Bay Streamkeepers Association. The Association has been involved in enhancement activities on the stream. A thorough assessment of the drainage was completed by the Oyster Bay Streamkeepers beginning in 1997. There are many wetlands associated with Mayfly Creek.

Mayfly Creek supports coho salmon and both sea run and resident cutthroat trout.

Through the studies that were conducted by the Oyster Bay Streamkeepers, it was determined that Mayfly Creek has inadequate summer water flows (it was mostly dry in July 2006) as well as flashy winter flows. Several enhancement projects have been undertaken to try to alleviate some of the problems that face the drainage. An artificial beaver dam was constructed for water storage and winter flow regulation, after it was discovered that a natural beaver dam further upstream was degrading due to a lack of new beaver activity. Instream complexing of pool creation and bank protection was completed in the lowest reach of the stream. Effectiveness monitoring of the projects determined that although the summer base flows had improved, they were still inadequate. It was also determined that the water stored behind the artificial dam was overflowing during the winter and much of this was escaping the Mayfly Creek Watershed.

Mayfly Creek offers spawning and rearing habitat for both cutthroat trout and coho salmon in the reaches downstream of the wetland, although these habitats are limited due to the low summer water levels. Some work has been done to improve fish access although ongoing effectiveness is unknown. Coho salmon have not been located upstream of the wetland, but these reaches are utilized by cutthroat trout.

The previous owner of the property (Weyerhaeuser Company Limited) established a covenant that protects a 50m buffer along Mayfly Creek. The covenanted areas were legally surveyed in March 2001. This covenant has and will protect the riparian area along Mayfly Creek from the construction of any building or mobile home as well as from any removal of vegetation. There has been some windfall of the riparian area. Upstream of the Lot 1 area, the wetland surrounding Mayfly Creek has expanded considerably and the covenant area no longer provides a sufficient buffer area. This will be addressed in an RAR for the upstream lots.

Ditchline 1 was built to convey seasonal flows to a constructed enhancement pond. It is shallow and the concrete weir prevents fish access upstream from the enhancement pond adjacent to Mayfly Creek. The shallow banks have been eroded at times and water has flowed unconfined from the ditchline. However, due to the slope, it would not be feasible to make the ditchline deeper. The SPEA is dominated by grasses and salmonberry and contains a few trees. It is within an area that was previously harvested for timber resources.

The Highway 19A ditchline has no intact SPEA. The SPEA has been cleared regularly as part of highway right-of-way maintenance. The riparian vegetation and the vegetation within the ditchline are dominated by rushes, grasses and trailing blackberry. This ditchline drains directly to Mayfly Creek. A ditch weir preventing fish access was installed in conjunction with the installation of a new access road to the property under the authority of Fisheries and Oceans and the Ministry of Transportation and Highways. The ditchline has been deemed detrimental to fish if they were to access it.

Tributary 1 drains Wetland 4 and flows directly to Mayfly Creek. Several sections are confined within road ditchlines or are located immediately adjacent to roads, resulting in the SPEAs being impacted or reduced. The roads are permanent structures and will not be deactivated under the current plans. The stream is frequently poorly confined and shallow. The flows are seasonal. It contains abundant understorey brush, dominated by salmonberry, red-osier dogwood, hardhack, and thimbleberry. The overstorey vegetation is predominantly young fir trees, maple and alder.

Wetland 1 captures overland runoff and drains towards Mayfly Creek. It is a wet site with multiple small channels within it and seasonal standing water. It is theoretically fish accessible from Mayfly Creek and it is likely that at least the portions of the wetland closest to Mayfly Creek are utilized by fish. The vegetation consists of an understorey salmonberry, hardhack, wild mint, sedges and rushes, with an overstorey of mixed coniferdeciduous forest. The SPEA to the south has been mostly cleared, however the area within the covenant on Mayfly Creek is intact. There has been some standing tree loss in the SPEA due to windthrow.

Wetland 2 is a small drainage draining directly to Mayfly Creek. It contains sedges, rushes, ferns and a few alder trees. The area has been harvested for timber. The only portion of the SPEA that is intact is directly adjacent to Mayfly Creek.

Wetland 3 is a small wetland adjacent to Tributary 1. It is mostly vegetated with red-osier dogwood, alder, sedges and salmonberry. There are a few mature alder trees. There is not much overstorey vegetation as the area was previously harvested.

Wetland 4 is a larger wetland from which Tributary 1 sources. The SPEA immediately adjacent to Tributary 1 is intact, and the outer portions of the SPEA were harvested. The site is very wet with abundant standing water and sedges growing throughout. The vegetation is dominated by salal, sedges, ferns, salmonberry and alder.

The Stonefly Creek Wetland is a large beaver pond and associated wetland within the Stonefly Creek drainage. There is ongoing beaver activity and the wetland edges are not always well defined. The flooding of the pond has resulted in the wetland expanding across an access road in one location. The SPEA on the waterway was previously harvested. The wetland perimeter is vegetated with sedges, salmonberry and hardhack.

FORM 1

Riparian Areas Regulation Qualified Environmental Professional - Assessment Report

Section 2. Results of Riparian Assessment (SPEA width)

Mayfly Creek was assessed using a simple assessment. The SPEA is 30m.

The wetlands, tributary stream and ditchline were assessed using a detailed assessment

The wetlands have a SPEA of 15m and 30m to the south side

The ditchlines have a SPEA of 2m.

The tributary stream has a setback of 10m

Section 2. Results of Simple Riparian Assessment – Mayfly Creek

Date: 2007-09-11

Stream	X
Wetland	X
Lake	
Area	

Potential Riparian Width(m)

30
30
30
30
30
30
30
30
30
30
30

I, Cynthia Hannah, R.P.Bio., hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of assessment of the development proposal made by the developer Oyster Bay Developments Inc.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

Average 30

Existing or Potential Vegetation Category 1

	Yes	No**
Fish bearing	X	

**If non fish-bearing, insert non-fish bearing status report

I, Cynthia Hannah, R.P.Bio., hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Inc.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

	Permanent	Non Permanent*
Stream Flow	X	

*If non permanent flow, indicate how this was determined?

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I, Cynthia Hannah, R.P.Bio.), hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Developments Inc.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

SPEA Width (m) 30m

Comments

Mayfly Creek ha 2 road crossings, one is currently used and the other is deactivated. Other than these roads, there are no permanent structures within the Mayfly Creek SPEA

2. Results of Detailed Riparian Assessment – Wetland 1

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 wetland

Stream	
Wetland	X
Lake	
Ditch	
Number of reaches	1
Reach #	1

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

Method employed if other than TR

	LC	SH	TR
SPVT Type			X

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No: 1 — If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m)	15					
Litter fall and insect drop ZOS (m)	15					
Shade ZOS (m) max	30	South bank	Yes	X	No	

Ditch: Justification description for classifying as a ditch (manmade, no

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	significant headwaters or springs, seasonal flow)					
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report	
SPEA maximum	30	(For ditch use table3-7)				

Segment No:	2	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m)	15					
Litter fall and insect drop ZOS (m)	15					
Shade ZOS (m) max	15	South bank	Yes		No	X
SPEA maximum	15	(For ditch use table3-7)				

I, Cynthia Hannah, R.P.Bio., hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2. Results of Detailed Riparian Assessment – Wetland 2

Refer to Chapter 5 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 wetland

Stream	
Wetland	X
Lake	
Ditch	
Number of reaches	1
Reach #	1

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio., hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

	LC	SH	TR
SPVT Type			X

Method employed if other than TR:

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons
LWD, Bank and Channel Stability ZOS (m)	15	

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Litter fall and insect drop ZOS (m)	15						
Shade ZOS (m) max	30	South bank	Yes	X	No		
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)						
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report		
SPEA maximum	30	(For ditch use table3-7)					

Segment No	2	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m)	15					
Litter fall and insect drop ZOS (m)	15					
Shade ZOS (m) max	15	South bank	Yes		No	X
SPEA maximum	15	(For ditch use table3-7)				

I, Cynthia Hannah, RPBio hereby certify that

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.,

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and

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

2. Results of Detailed Riparian Assessment – Wetland 3

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type)	1 wetland
Stream	
Wetland	X
Lake	
Ditch	
Number of reaches	1
Reach #	1

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio. hereby certify that

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*,

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.,

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and

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

Polygon No	1			Method employed if other than TR
	LC	SH	TR	
SPVT Type			X	

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Polygon No: 1

	LC	SH	TR
SPVT Type			X

Method employed if other than TR:

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No: 1 — If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m)	15					
Litter fall and insect drop ZOS (m)	15					
Shade ZOS (m) max	30	South bank	Yes	X	No	

Ditch: Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)

Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report	

SPEA maximum: 30 (For ditch use table3-7)

Segment No: 2 — If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m)	15					
Litter fall and insect drop ZOS (m)	15					
Shade ZOS (m) max	15	South bank	Yes		No	X

SPEA maximum: 15 (For ditch use table3-7)

I, Cynthia Hannah, RPBio, hereby certify that:

m) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
n) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;
o) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
p) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2. *Results of Detailed Riparian Assessment – Stonefly Wetland*

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 wetland

Stream	
Wetland	X
Lake	
Ditch	
Number of reaches	1
Reach #	1

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, If No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio, hereby certify that:

q) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

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r) I am qualified to carry out this part of the assessment of the development proposal made by the developer Dexter Bay Investments Ltd. ,
a) I have carried out an assessment of the development proposal and my assessment is set out in the Assessment Report, and
b) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

SPVT Type: LC | SH | TR: X

Method employed if other than TR:

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No: 1 — If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m): 15

Litter fall and insect drop ZOS (m): 15

Shade ZOS (m) max: 30 — South bank: Yes: X | No:

Ditch: Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow):

Ditch Fish Bearing: Yes | No | If non-fish bearing insert no fish bearing status report:

SPEA maximum: 30 (For ditch use table3-7)

Segment No: 2 — If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons

LWD, Bank and Channel Stability ZOS (m): 15

Litter fall and insect drop ZOS (m): 15

Shade ZOS (m) max: 15 — South bank: Yes | No: X

SPEA maximum: 15 (For ditch use table3-7)

I, Cynthia Hannah, RPBio , hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*,
r) I am qualified to carry out this part of the assessment of the development proposal made by the developer Dexter Bay Investments Ltd.;
a) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and
b) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2. *Results of Detailed Riparian Assessment – Ditchline 1*

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 ditchline

Stream:
Wetland:
Lake:
Ditch: X

Number of reaches: 1

Reach #: 1

only provide widths if a ditch)

	Channel Width(m)		Gradient (%)
starting point	1.2		
upstream	1.2		1
	1.4		
	1.4		
	1.0		
	1.2		
downstream	1.0		0.5
	1.4		
	1.4		
	1.1		
	1.2		
Total: minus high flow	11.1		
mean	1.2		
	R/P	C/P	S/P
Channel Type			

I, Cynthia Hannah, R.P.Bio, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*.
f) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.
g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No
SPVT Polygons		x

Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio, hereby certify that
u) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
v) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;
w) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and
x) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

	LC	SH	TR
SPVT Type			x

Method employed if other than TR

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons			
LWD, Bank and Channel Stability ZOS (m)	2				
Litter fall and insect drop ZOS (m)	2				
Shade ZOS (m) max	2	South bank	Yes	X	No
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)		This drainage is manmade. It was built to direct water to a rearing pond that was built to provide juvenile coho rearing habitat. It captures road runoff as well as some water that overflows from the Mayfly Creek wetland during high		

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					flows	
Ditch Fish Bearing	Yes		No	X	If non-fish bearing insert no fish bearing status report	When this ditch was built, a 1m high concrete barrier weir was installed to prevent fish access to the ditchline and to help in aeration of the downstream pond
SPEA maximum	2m	(For ditch use table3-7)				

I, Cynthia Hannah, RPBio, hereby certify that:

v) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

w) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.

x) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and

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

Comments

2. *Results of Detailed Riparian Assessment – Highway 19 Ditchline*

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 ditchline

Stream	
Wetland	
Lake	
Ditch	X
Number of reaches	1
Reach #	1

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	1.6	
upstream	1.4	0.5
	1.4	
	1.6	
	1.7	
	1.4	
downstream	1.6	0.5
	1.7	
	1.5	
	1.7	
	1.8	
Total: minus high flow	14.2	
mean	1.6	

I, Cynthia Hannah, R.P.Bio, hereby certify that:

f) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

g) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;

h) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

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

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Channel Type	R/P	C/P	S/P	

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		x	Tick yes only if multiple polygons. If No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio., hereby certify that

y) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

z) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;

aa) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

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

Polygon No	1			Method employed if other than TR
	LC	SH	TR	
SPVT Type			x	

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons
LWD, Bank and Channel Stability ZOS (m)	2	
Litter fall and insect drop ZOS (m)	2	
Shade ZOS (m) max	2	South bank: Yes X No

Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)	This drainage is manmade. It captures runoff from Highway 19 and has no significant headwaters

Ditch Fish Bearing	Yes		No	X	If non-fish bearing insert no fish bearing status report	Under the direction from DFO, a rock weir was installed in this ditchline to prevent fish access as it does not provide suitable habitat.

SPEA maximum	2m	(For ditch use table3-7)	

I, Cynthia Hannah, R.P.Bio., hereby certify that,

y) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

z) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;

aa) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

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

Comments

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

2. Results of Detailed Riparian Assessment – Tributary 1

Refer to Chapter 3 of Assessment Methodology

Date: 2007-09-11

Description of Water bodies involved (number, type): 1 tributary

Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	1
Reach #	1

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	2.4	
upstream	2.4	1
	1.8	
	1.4	
	1.6	
	1.3	
downstream	1.4	1
	1.4	
	1.8	
	1.8	
	2.0	
Total minus high flow	15.6	
mean	1.7	

	R/P	C/P	S/P
Channel Type	X		

I, Cynthia Hannah, R.P.Bio. hereby certify that:

m) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

n) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;

o) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

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

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		x	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Cynthia Hannah, R.P.Bio., hereby certify that:

cc) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

dd) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.;

ee) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

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

Polygon No	1

	LC	SH	TR
SPVT Type			x

Method employed if other than TR

Zone of Sensitivity (ZOS) and resultant SPEA

Segment	1	If two sides of a stream involved, each side is a separate segment. For all water

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

No:			bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	10							
Litter fall and insect drop ZOS (m)	10							
Shade ZOS (m) max	5.1	South bank	Yes		No	X		
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)							
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report			
SPEA maximum		(For ditch use table3-7)						

I, Cynthia Hannah, RPBio, hereby certify that

cc) I am a qualified environmental professional as defined in the Riparian Areas Regulation made under the *Fish Protection Act*,

dd) I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd.,

ee) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and

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

Comments

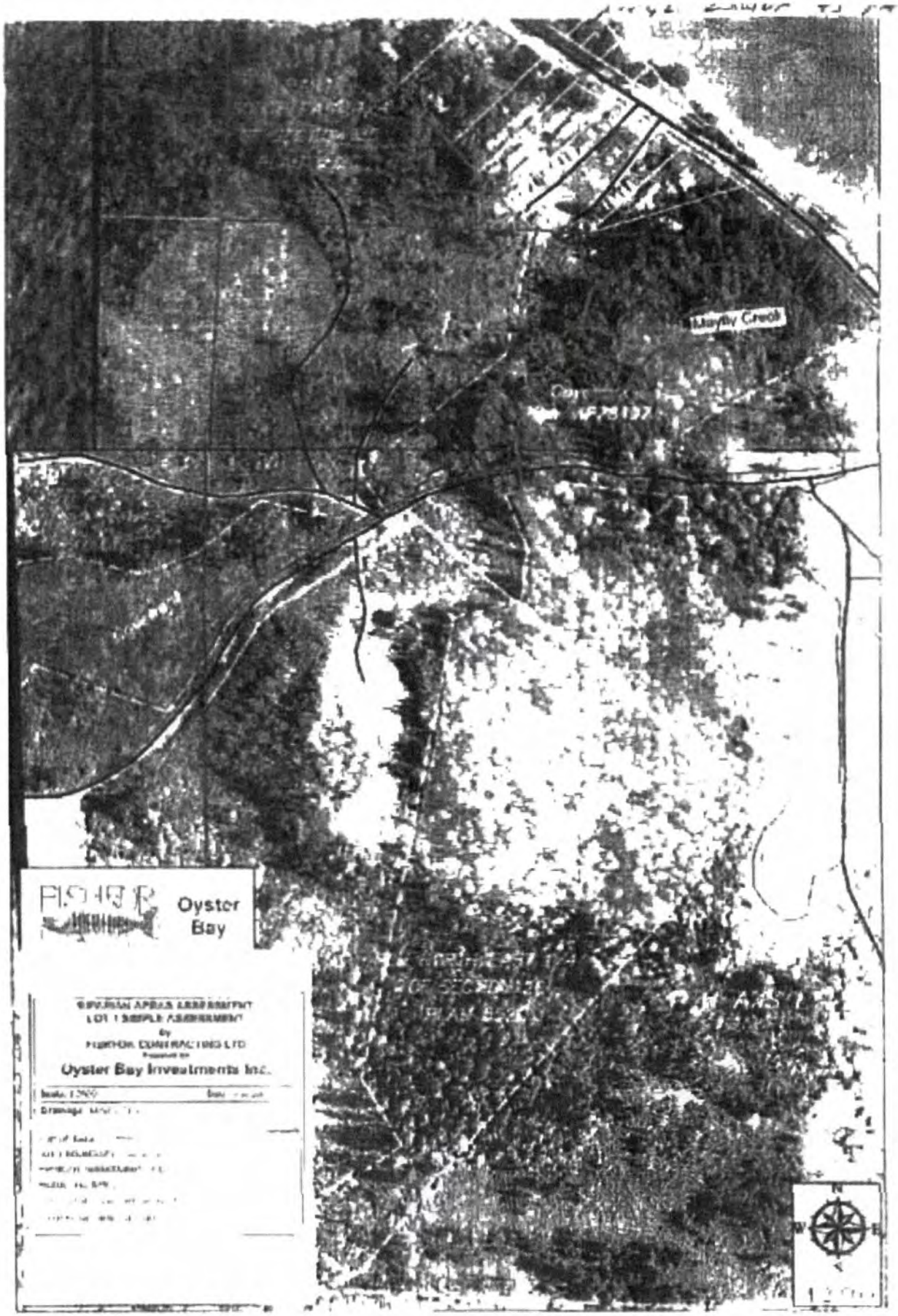
Although this drainage is confined within a ditchline for most of its length, it has a significant headwater wetland (Wetland 4) and is considered a stream

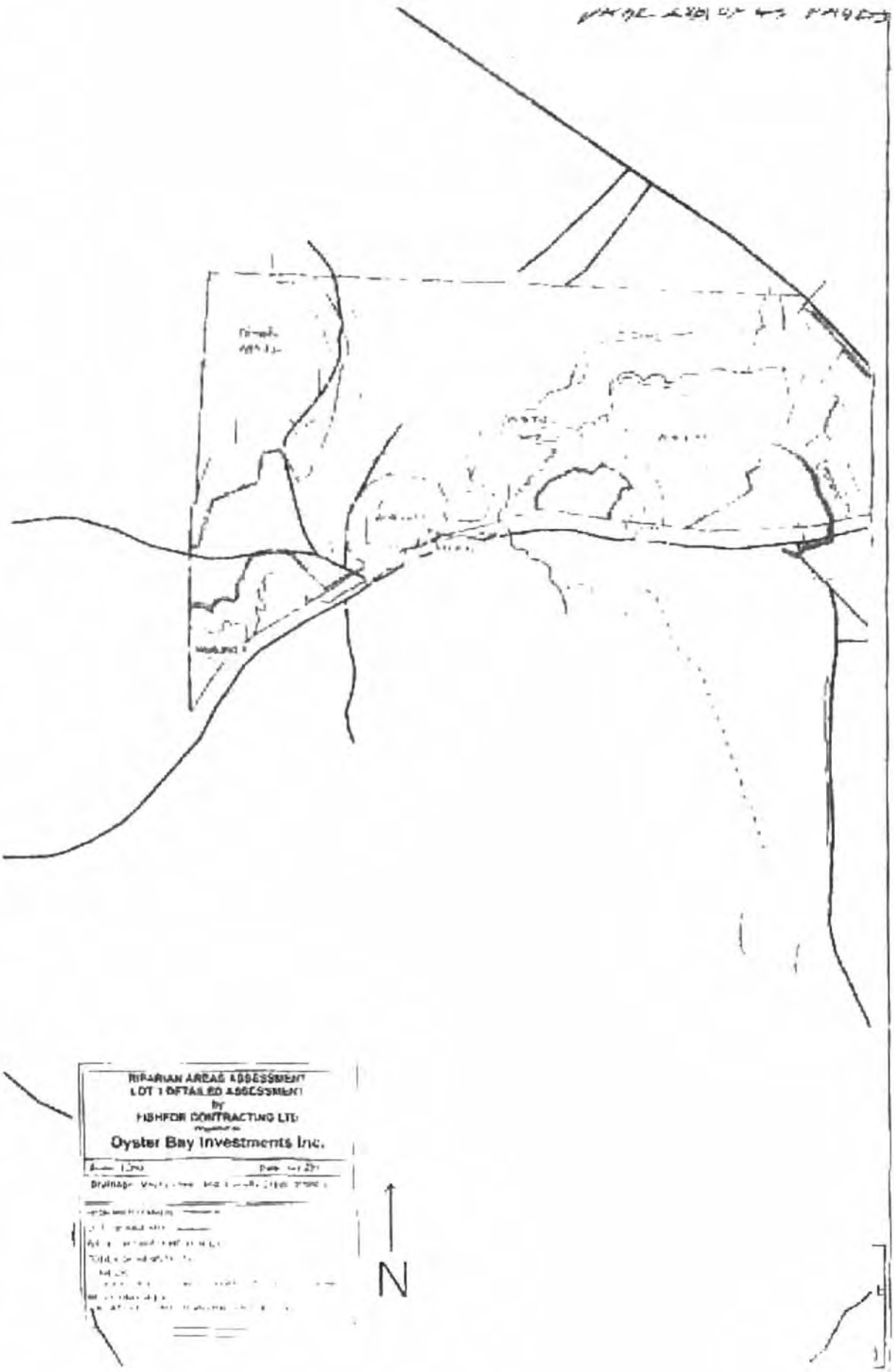
FORM 1
Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Section 3. Site Plan

Insert jpg file below

Site Plan


Oyster Bay
Oyster Bay Investments Inc.


RIPARIAN AREAS ASSESSMENT
LOT 1 DETAILED ASSESSMENT
by
FISHFOR CONTRACTING LTD.
Oyster Bay Investments Inc.
N

Section 4. Measures to Protect and Maintain the SPEA

This section is required for detailed assessments. Attach text or document files as need, for each element discussed in chapter 3 ("Detailed Assessment Methodology"). It is suggested that documents be converted in PDF before inserting into the assessment report. Use your "return" button on your keyboard after each line. You must address and sign off each measure. If a specific measure is not being recommended a justification must be provided.

Measures that will apply to Murphy Creek as it was done under a Simple Assessment.

1. Danger Trees

I, Cynthia Hanson, R.P.Bio. hereby certify that

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer, Oyster Bay Investments Ltd

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

As the proposed development is the subdivision of the property into large residential lots, there is no immediate need for a danger tree assessment. If the subsequent property owner proposes any development close to the riparian area, it would be advisable at that time to have a qualified professional conduct a danger tree assessment for their safety and protection of any buildings in the vicinity of the SPEA. Any trees that are deemed unsafe and that are required to be removed from the SPEA will need to be replaced following the provincial criteria (http://srmwww.gov.bc.ca/sry/csd/downloads/forms/vegetation_riparian/treereplace.pdf). Any felled trees within the SPEA must be left as coarse woody debris.

2. Windthrow

I, Cynthia Hanson, R.P.Bio. hereby certify that

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer, Oyster Bay Investments Ltd

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

There is abundant Interior windthrow in this area, however at this point most areas outside of the SPEA have already been cleared so there will not be changes in the stand characteristics. If any tree removal is planned in the future adjacent to a SPEA, a windthrow assessment must be conducted first to ensure that the removal of trees will not impact the ability of the SPEA to withstand wind.

3. Slope Stability

I, Cynthia Hanson, R.P.Bio. hereby certify that

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer, Oyster Bay Investments Ltd

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

The property has gentle slopes and there are no indications of slope stability issues related to the project as outlined in Table 3.8 in the Riparian Areas Regulation Assessment Methods.

4 Protection of Trees

I [illegible], P.T.Bio, hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act;
b. I am qualified to carry out this part of the assessment of the development proposal made by the developer [illegible] Ltd.;
c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Machine activity directly adjacent to the SPEA must be minimized as much as feasible and machines must use caution when working around the rooting zones of trees that are located in the SPEA. Soil disturbance such as trenching or cutting within the rooting zones of trees in the SPEA must be avoided.

what is Adjacent?

In order to protect the trees in the SPEA, if there is any site disturbance proposed immediately adjacent to the SPEA, then a root protection zone, at a minimum, should be established at the drip line of the trees in the SPEA. This protection zone is required to be demarcated with a durable and obvious barrier such as orange snow fencing. If any future development requires this protection, a qualified professional will be required to be retained to demarcate the root protection zone.

The following generalized guidelines have been taken from the Riparian Areas Regulation Assessment Methods for Measures to Protect Trees in the SPEA. It is important to note that many may not apply to the development of this lot, but have been included to cover all potential situations. Some have been reworded slightly.

Construction "Do Not's" immediately adjacent to the drip line root protection zone of the SPEA for Protection of Trees in the SPEA:

- Do not trench through the root zone of a tree
- Do not pave around trees
- Do not change the ground level around the tree
- Do not allow any parking under trees
- Do not allow concrete washout or other pollutants to contaminate the soil around trees or enter the SPEA

Construction Do's immediately adjacent to the drip line root protection zone of the SPEA for Protection of Trees in the SPEA:

- Erect a physical barrier to protect trees in the SPEA that may be affected by works outside of the SPEA. This physical barrier to keep machines away from the trees should provide for the majority of the trees' root systems to be undisturbed
- Communicate tree protection plans to all contractors and sub contractors involved in the projects. Write damage clauses into any service contract to provide financial penalties to any contractors who damage trees
- Monitor the impacts of construction activities. If roots have been cut make sure they weren't shattered by a backhoe or other equipment. Broken roots should be cut cleanly with a saw
- Mulch about the base of trees to retain moisture
- Vertical mulching may be necessary where roots that have been severely impacted by machinery or fill
- Prune broken limbs with clean cuts
- It is recommended that an ISA Certified Arborist is retained to provide advice on the rooting zone for SPEA trees, to oversee installation of the physical barrier separating the

SPEA from the land use area and to undertake any corrective actions required if substantial construction is proposed in close proximity to the drip line

5 Encroachment

I, Cynthia Hannah, R.P.Bio. hereby certify that

a I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*

b I am qualified to carry out this part of the assessment of the development proposal made by the developer. Okalol Bay Investments Ltd

c I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

To protect the SPEA it is essential to have the boundary demarcated to prevent encroachment into the area. This is very important, as there are areas where the vegetated riparian area is narrower than the width of the SPEA. At this point in time clearly marking the SPEA with flagging tape would be adequate. By clearly marking or fencing these areas off, they will be allowed to return to a naturally vegetated state. There may be some flexibility to improve the SPEA in areas that have been previously harvested by planting native species and removing invasives, but this would require approval from the appropriate agencies. Disclosures will be included with the sale of each property that the SPEA must be demarcated with a physical barrier to ensure that it is protected from encroachment when the property is developed

6 Sediment and Erosion Control

I, Cynthia Hannah, R.P.Bio. hereby certify that

a I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*

b I am qualified to carry out this part of the assessment of the development proposal made by the developer. Okalol Bay Investments Ltd

c I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

Road maintenance and the installation of any services along the identified ditchlines must be done when the site is dry to eliminate sediment transport potential. If new roads are constructed ditchlines should be disconnected from fish habitat to prevent road fines transport to fish habitat.

Any machine ruts or other soil disturbance that occurs during subdivision activities within the area outside of the SPEA must not be directed towards the SPEA. Any surface water resulting from soil disturbance must be allowed to infiltrate the ground rather than flow overland towards or away from the SPEA.

7 Stormwater Management

I, Cynthia Hannah, R.P.Bio. hereby certify that

a I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*

b I am qualified to carry out this part of the assessment of the development proposal made by the developer. Okalol Bay Investments Ltd

c I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report, and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

If any ditchlines are built they must not discharge directly to the streams or SPEAs. They must direct water on the forest floor and allow for it to infiltrate the soil.

Stormwater Management will need to be addressed as the future property owner develops their lot. As the lot is a large rural property, the footprint and subsequent impervious areas will

generally be smaller percentages of the total property size than those associated with urban residential developments. It is still important to manage stormwater and a plan to capture small storm runoff (less than 50% of the rainfall event that occurs once per year, on average) will need to be implemented as the property is developed. The goal is to get storm runoff into the ground, recharging the aquifer rather than draining through ditches. Ditches can not direct water into the SPEA

6 Floodplain Concerns (highly mobile channel)

I, Cynthia Hannah, R.P.Bio., hereby certify that:

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b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Oyster Bay Investments Ltd

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

There are no large active floodplains that need to be addressed. The site is wet and building sites should be chosen carefully to avoid flooding. If foundations are to be excavated, extreme caution must be used not to divert water from any existing drainages. If during any excavation water is diverted from an existing waterway the property owner will be responsible for notifying DFO and they will be responsible for any costs associated with the restoration work required to restore the drainage patterns.

Section 5. Environmental Monitoring

Attach text or document files explaining the monitoring regimen. Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF before inserting into the PDF version of the assessment report. Include: actions required, reporting schedule, construction phase plan, and requirement for a post-development report.

Prior to the sale of the property, the SPEAs must be located on the ground so that they will be visible to the new property owners. To ensure that the SPEA is protected from future development/encroachment a disclosure will be included with the sale of the property that states the requirement to protect the SPEA and that they (future property owners) are responsible to demarcate it with a physical barrier that suits their proposed development. There are many options for demarcating the SPEA. A simple hedge can be planted along the SPEA boundary. Developments will require an RAR amendment to reflect the proposed developments and at this point the barrier to encroachment can be discussed with the QEP.

For the subdivision of the property there are no environmental monitoring requirements. Once the property has been subdivided the new property owner will require plans for isolation of the SPEA from their land use, sediment and erosion control plans and stormwater management plans prior to any development. The future property owner may require the services of an environmental monitor during development depending on the location and kind of development they plan. Environmental Monitoring requirements are site specific. If any works are proposed in the vicinity of the SPEA, an environmental monitor may be required to ensure that the SPEA is protected. An environmental monitor should be retained to ensure that any stormwater management and/or sediment and erosion control devices are installed correctly and are functioning as intended.

Any excavation on this property has the potential to divert water from the existing watercourses. Anyone excavating on site must be familiar with this sensitive hydrological system and should consult an environmental professional if there is potential that they may impact any of the existing drainages. The property owner will be required to pay for any restoration work required as a result of poorly planning excavation and/or building that diverts water.

The developer is responsible for ensuring that all of the personnel working on site are aware of the environmental consideration and constraints for this site. The QEP is available to provide guidance in this area if needed, however this is not required as long as the developer notifies the QEP in writing that the necessary pre-work discussion has been conducted.

Once the subdivision activities are completed the QEP must be notified by the developer and a follow up site visit by the QEP or a qualified person who is acceptable to the QEP will be done to ensure there was no encroachment into the SPEA and that there is no surface runoff being directed towards the SPEA.

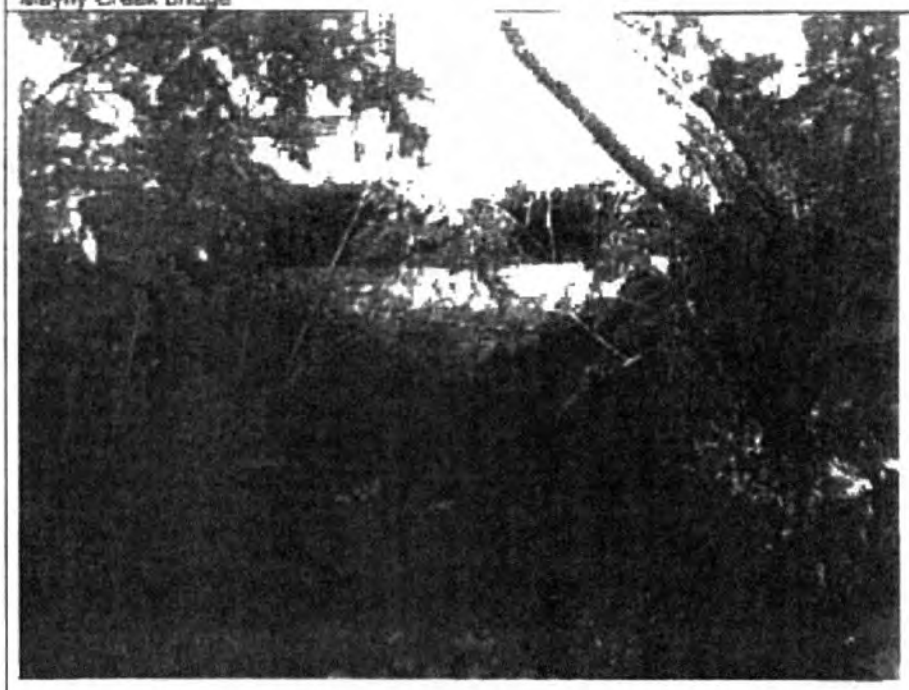
If the proposed subdivision and property sale is delayed more than 2 years the QEP will need to have a site visit to ensure there have not been any changes to the high water mark and that the high water mark is still clearly marked at regular intervals.

The QEP will submit a final sign-off letter once she is satisfied that the subdivision has been completed in a manner that is in accordance with this assessment.

Label View of Mayfly Creek facing north from the road crossing

Label Resulting SPEA from Mayfly Creek facing east from the road crossing

Label Mayfly Creek bridge

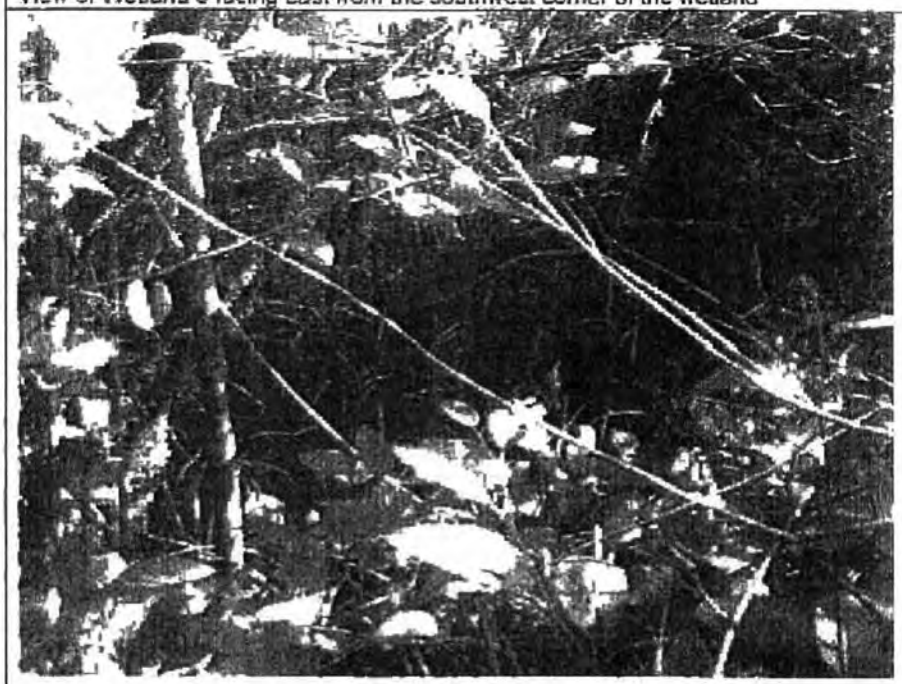


Label View of Wetland 1 facing northwest from the south border of the wetland

Label View of SPEA southeast of Wetland 1

Label Northeast edge of Wetland 2

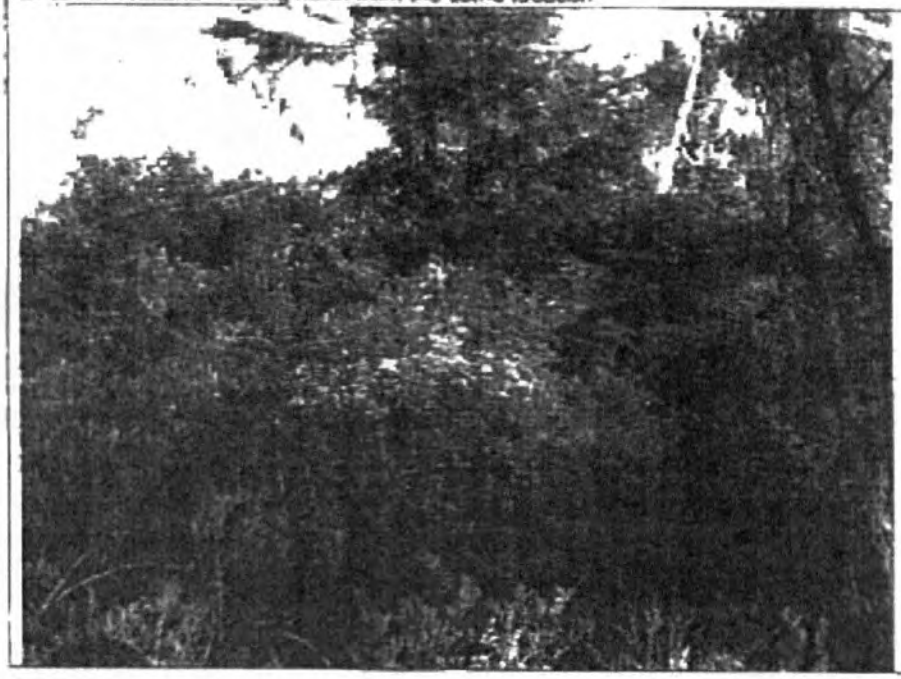
Label	View of Wetland 3 facing east from the southwest corner of the wetland



Label	SPEA of Wetland 3 facing east from the same location of the previous photo.

Label: View of Wetland 4 facing south from the portion of the wetland closest to the access road on the north edge of the wetland

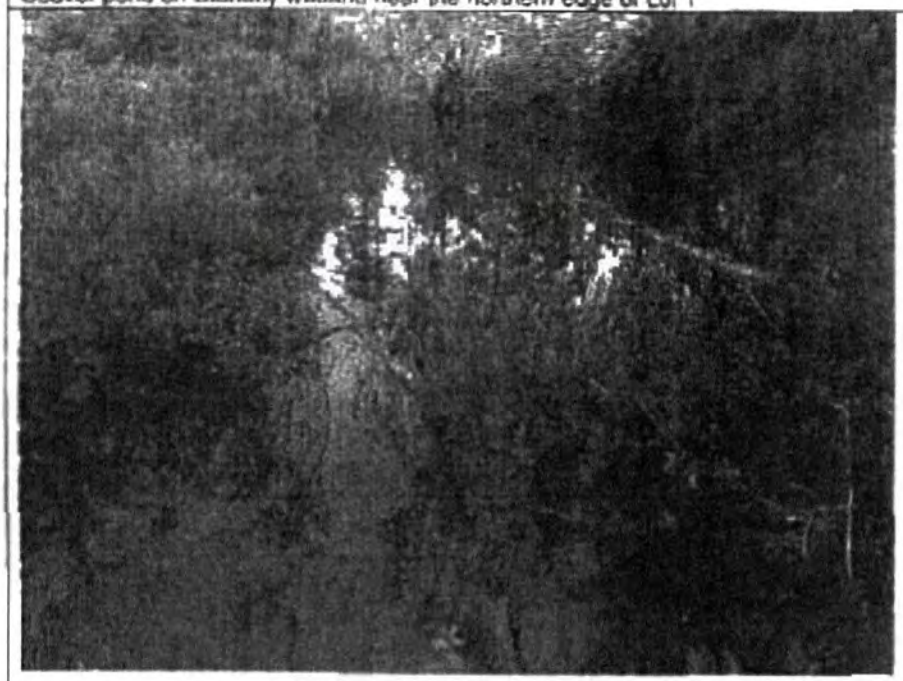
Label: SPEA of Wetland 4 facing north from the same location



FORM 1

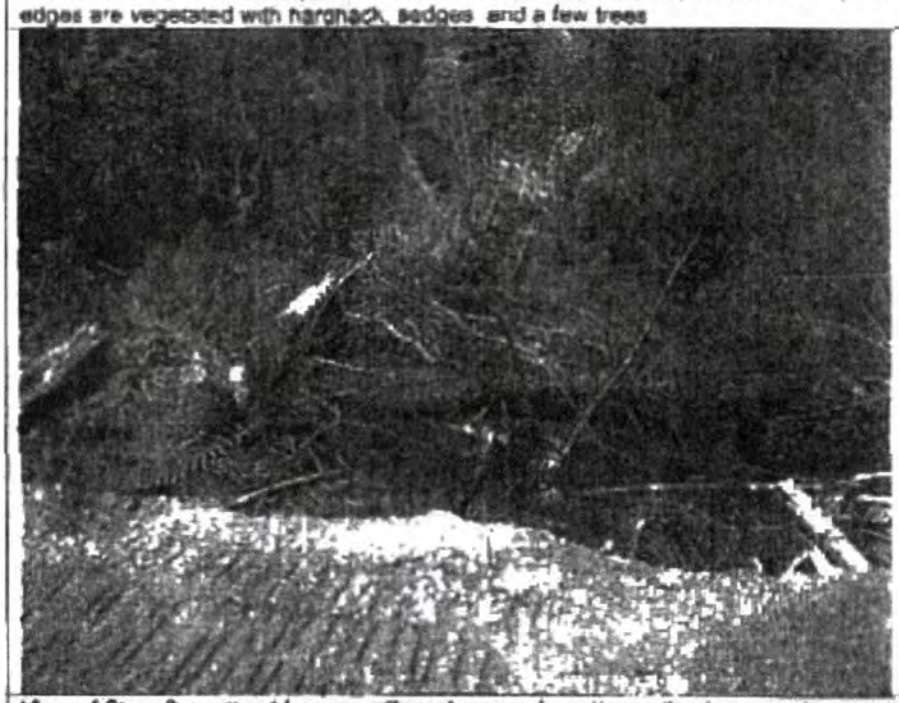
Riparian Areas Regulation Qualified Environmental Professional - Assessment Report

Label: Beaver pond on Stonefly wetland near the northern edge of Lot 1



Label: Trail that has been built to the beaver pond on Stonefly wetland

Label | The built road is located adjacent to the beaver pond on Stonefly wetland. The pond edges are vegetated with hardhack, sedges and a few trees



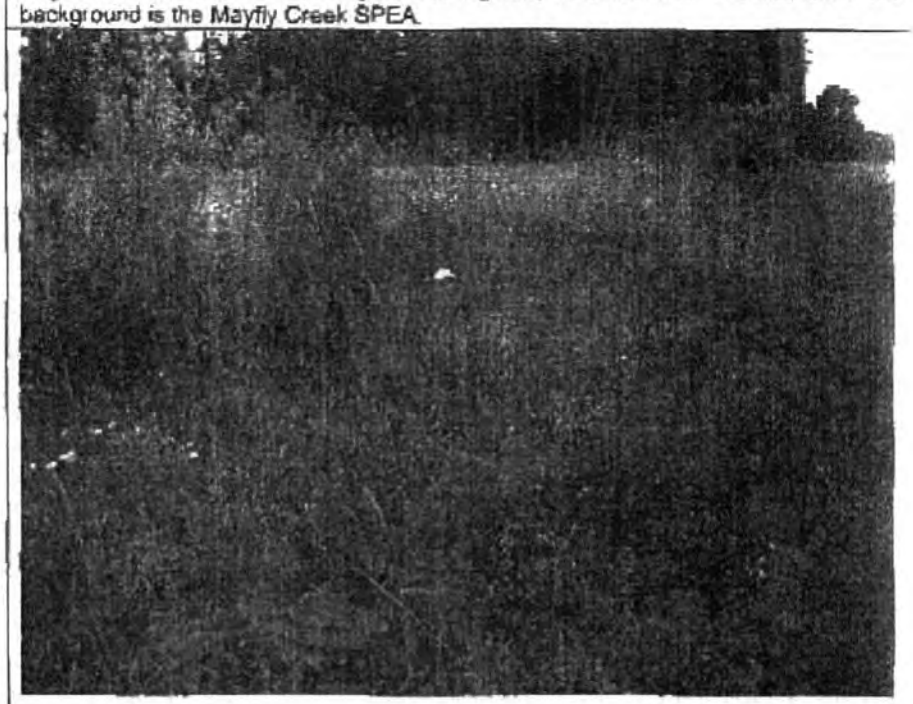
Label | View of Stonefly wetland facing northwest, near where the wetland crosses the access road.

Label	View of rSPEA from Stonefly wetland facing southeast. 
Label	View of Ditchline 1 facing north from where the ditchline crosses the access road connecting to the highway. 

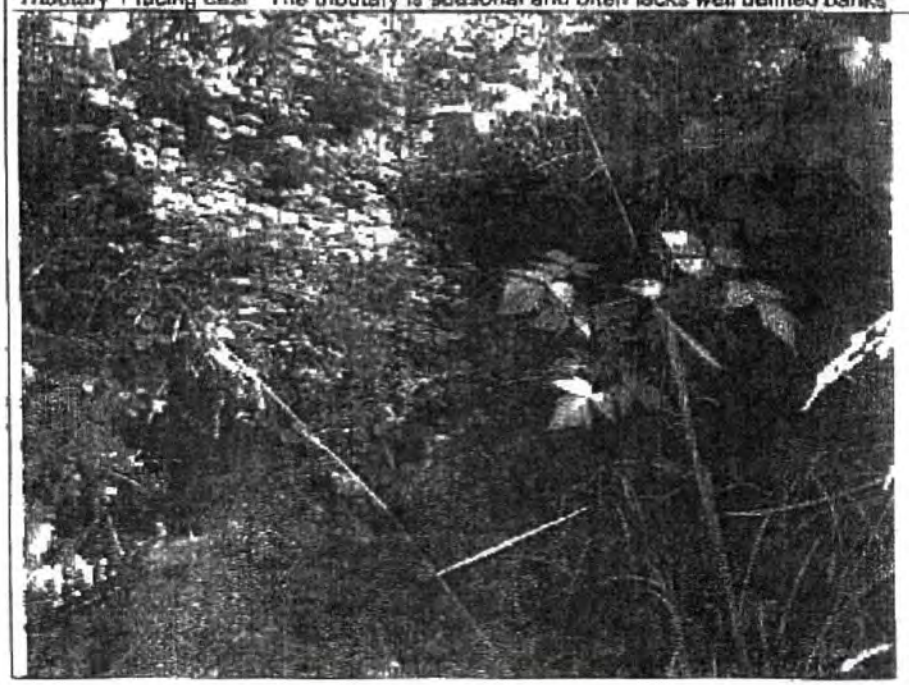
Label View of Ditchline 1 SPEA facing east, immediately to the north of the road crossing

Label Northwest view of Highway 19A ditchline near the new access road crossing.

Label | Vegetation and SPEA located adjacent to Highway 19A ditchline. The tree line in the background is the Mayfly Creek SPEA.



Label | Tributary 1 facing east. The tributary is seasonal and often lacks well defined banks.



Label SPEA for Tributary 1 facing northwest, near the confluence with Mayfly Creek

Label Confluence where Tributary 1 flows to Mayfly Creek. The channel is poorly defined

Submission Instructions
Riparian Areas Regulation – Qualified Environmental Professional – Assessment Report
RAR-QEP-AR

Forms you will need to complete are

- Form 1 which has the database information, the description of the fisheries resources, development site plan, measures to protect and maintain the SPEA, and environmental monitoring
- Form 2, if more QEPs are part of the project team
- Either Form 3 the detailed assessment form(s) or Form 4 simple assessment form(s) which is for the results of the riparian assessment (SPEA width). Use enough copies of the form to complete the assessment of the site
- Form 5 is the photo form(s). Duplicate for additional photos

NB: See the Guidelines and the Assessment Methods for detailed instructions on the information required for completing the Assessment Report

A complete Riparian Assessment Report based on the template forms must be converted to a *single* Portable Document Format PDF file prior to uploading onto the Notification System

The Assessment Report must be complete by submitting the information specified, and posted to provide notification to the local government, Ministry of Water, Land and Air Protection and the Department of Fisheries and Oceans Canada

Tips for working with MS Word Template Forms

Using the forms

Before beginning, print a hard copy of the form and the guidance files for reference
Open the template
Enter data only in the shaded fields on the form
Use TAB to move from one field to another, SHIFT-TAB to go in reverse
Text and digital photos may be inserted from other applications
The amount of text that can be entered in each box is limited and cannot be changed by the user. boxes with date information, for example, require input like: yyyy mm dd

Saving the completed form

Assign name to the completed form
Save a word document (*.doc file)
Do not overwrite the Template (*.dot file) with your completed form
If you do overwrite the template, you can download a new copy from this web site

END OF DOCUMENT

Appendix 11

Oyster Bay Flooding Issues; Janes Feedman Kyle, LAW CORPORATION

JANES FREEDMAN KYLE
LAW CORPORATION

Suite 340 - 1122 Mainland Street
Vancouver, BC V6B 5L1
Phone: 604.687.0549 Fax: 604.687.2696
www.jfklaw.ca

Jeff Langlois
Direct Line: 604.687.0549, ext. 114
E-mail: jlanglois@jfklaw.ca

June 5, 2013

File No. 1177-001

Delivered by email (a.audet@cadillacmining.com)

Andre J. Audet
2580 Crystal Drive
Courtney, BC V9N 9K1

Dear Sirs/Mesdames:

Re: Oyster Bay Flooding Issues

We write to advise that we have been retained to act as counsel for Tim Osler and Brenda Edge. We write in regard to Mr. Osler's letter to you, dated May 11, 2013, which you have answered on May 21, 2013.

Our client has acted in good faith to resolve issues relating to the flooding caused by the beaver dam on Mayfly Creek. To reiterate, our client is concerned that the elevated water levels behind the beaver dam located on your property, that occur in the late fall, winter and early spring limits the flow down the Mayfly Creek channel and allows the contained water to escape from the pond. This water is discharged down numerous uncontrolled channels, and a portion of this flow has resulted in flooding to our client's property. Mr. Osler has taken a number of proactive steps to resolve this issue, and now only asks for your cooperation in granting permission to briefly access your property to alter the beaver dam on Mayfly Creek upstream of the Iron River Road. As indicated previously, Mr. Osler has volunteered to bear the cost of this work.

In his letter of May 11, 2013, Mr. Osler recounted numerous steps he has taken to seek approval for this plan. All indications are that his plans to alter the beaver dam will be officially sanctioned and supervised by the appropriate authorities. While we thank you for your acknowledgement that the current situation is unacceptable and should be corrected, your insistence that "an environmental assessment" be conducted prior to the beaver dam being removed is not warranted. No environmental assessment has been requested by the Regional Manager of at the Ministry of Forests, Lands and Natural Resources. Accordingly, we do not understand the basis for you continuing to delay a decision on this matter. We would appreciate

if you could articulate your concerns so that we can arrive at a negotiated solution to this problem.

As to your statement that the flooding of Mr. Osler's property is a "self-created" emergency that you are not prepared to deal with at this time, our response is that Mr. Osler is entitled to the use and enjoyment of his property, free from flooding or other nuisances which are caused by easily correctable issues relating to your property.

We ask that you direct future correspondence to our firm, but urge you to cooperate with Mr. Osler's proposal. Mr. Osler's proposal requires nothing of you but your consent for very short term access to the property to minor modifications that will resolve the flooding issues on our client's property.

We ask that you respond to this letter by June 11, 2013.

Yours truly,

James Freedman Kyle Law Corporation

Per:

Jeff Langlois
JLL/ alm

Edith Watson

From: John Neill
Sent: August 27, 2019 11:48 AM
To: 'alison.maclean@bcassessment.ca'
Subject: FW: LiDAR data request for Mayfly dam assessment

Alison – Mr Baldwin's letter:

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Monday, August 26, 2019 14:18
To: John Neill <JNeill@srd.ca>
Cc: Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>; Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Subject: RE: LiDAR data request for Mayfly dam assessment

John – I'm still hoping to access your LiDAR data on the Mayfly Creek area – any update on your end?

I'm also working on putting a meeting together with Mr Audet for the week of Sept 16th 2019. Is Strathcona Regional District prepared to attend a meeting with Mr Audet to review his concerns? Of interest to Mr Audet is the land covenants held by the SRD on his land – at least be permitted to work (remove artificial beaver dam) within covenant area? **Confirmation of SRD's willingness to attend a meeting with Mr Audet is requested.**

Does the SRD have any notes on file justifying the covenants being established? Covenants are dated 2005.

John B

From: Baldwin, John FLNR:EX
Sent: August 1, 2019 1:04 PM
To: 'John Neill' <JNeill@srd.ca>
Subject: RE: LiDAR data request for Mayfly dam assessment

John Thanks – everything helps to get a better understanding – John B

From: John Neill <JNeill@srd.ca>
Sent: August 1, 2019 12:41 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: RE: LiDAR data request for Mayfly dam assessment

Hi John,

I'm afraid no luck so far! Will the attached help? I had to zoom in a little to get the contour layer to activate.

Regards,

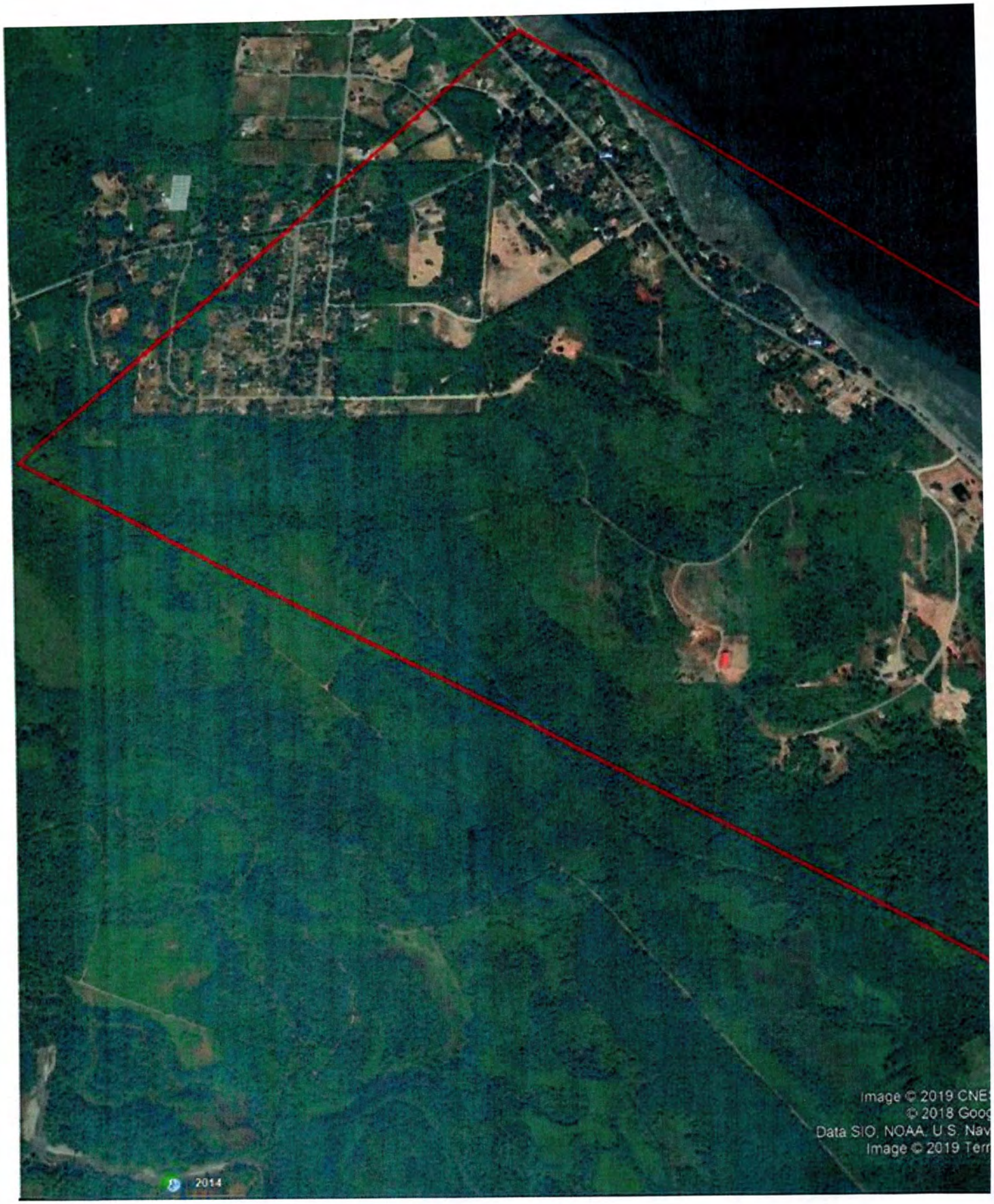
John

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Wednesday, July 31, 2019 11:12
To: John Neill <JNeill@srd.ca>

Cc: Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>
Subject: RE: LiDAR data request for Mayfly dam assessment

John – any luck with accessing the Mayfly LiDAR data?

A larger LiDAR map covering more of the area round Mayfly Creek and Mr. Audet's property would be good. Is this possible?



Is SRD prepared to meet with Mr Audet to review his concerns?

John B

From: John Neill <JNeill@srd.ca>
Sent: July 24, 2019 9:16 AM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: RE: LiDAR data request for Mayfly dam assessment

Hi John – I'm attempting to get the LiDAR layer for you. Our GIS Analyst is on sabbatical so I've asked our manager if she can access his files.

Regards,

John

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Thursday, July 18, 2019 08:44
To: John Neill <JNeill@srd.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>
Subject: FW: LiDAR data request for Mayfly dam assessment

John – This office is still working on the Mayfly Creek/Audet file, and would like to have access to SRD's LiDAR information for the Mayfly Creek area- is this possible?

Give me a call at 250-756-3179 here in Nanaimo if you require more info.

Thanks John B

From: Bartle, Hardy T FLNR:EX
Sent: Wednesday, July 17, 2019 11:13 AM
To: Baldwin, John FLNR:EX
Cc: Simpson, Forrest FLNR:EX
Subject: LiDAR data request for Mayfly dam assessment

Hello John. As discussed yesterday please request las files from your contacts within local government.

I suggest we ask for a large area of interest as illustrated within:
We will use the data to create a georeferenced map to support field work, interrelate historical air photographs to field work and search:

1. The area for paleo streams that may have once flowed towards the wetland. Such streams, if discernable within the LiDAR, may explain the fan like shape of the terrain the wetland sits upon.
2. For evidence of paleo terraces and beach ridges that should be within the area. Paleo terraces and beach fronts have been documented at similar elevations upon Quadra Island via LiDAR, trenching, radio carbon dating, etc.
3. For evidence of modern anthropogenic (human) disturbances within and around the wetlands. The screen shot you left with me is strongly suggestive of modern gravel pits, drainage ditches, etc. Manipulating the raw data in Global Mapper may reveal finer details of human disturbance in the area.

Forrest- if the local government agrees to share their LiDAR data with us and FLNRORD continues to pursue this project we have another LiDAR/Global Mapper/AutoCAD/EXCEL project for you to work on.

Aniko Nelson

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: August 29, 2019 3:49 PM
To: Aniko Nelson
Subject: Mr Audet's Mayfly Creek file
Attachments: Scan_20190829.pdf

Aniko – a date to meet with Mr Audet is still to be confirmed – John B

From: JBALDWIN <John.Baldwin@gov.bc.ca>
Sent: August 29, 2019 2:51 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Scan From MPS0775

BRITISH COLUMBIA

File: 76800-30/22-100

August 29, 2019

VIA EMAIL: andre@audet.ws

Andre J Audet
2580 Crystal Drive,
Courtenay, British Columbia
V9N 9K1

Dear Andre Audet;

This is to follow up on my letter to you dated March 18, 2019, regarding your concerns with respect to Mayfly creek dam, drainage and your property (Lot 1, Section 26, Township 4, Comox District, Plan VIP87399) located south of Campbell River.

This office has reviewed your package. We would like to meet with you on a **without prejudice basis** to obtain a clearer understanding of your concerns and positions on possible approaches to resolving those concerns.

We anticipate that the involvement of other agencies will be necessary: Strathcona Regional District and the fisheries agencies, e.g., Fisheries and Oceans Canada (DFO) and BC Fish and Wildlife. Therefore, we intend to also invite them to send representatives to any meeting. This is intended to be an initial without prejudice meeting between us. However, please let us know if you plan to attend with a lawyer. In that case, the agencies may also need to involve their lawyers.

My office is located in Nanaimo with suitable meeting rooms and, therefore, I suggest Nanaimo as a meeting location. The week of September 16, 2019 is proposed. Please advise if you would be amenable to a without prejudice meeting and, if so, whether you would plan to attend with a lawyer. **Are there dates during the week of September 16, 2019 that would be workable for you?** If not, perhaps other dates during that month might be suggested. I suggest using e-mail to confirm a suitable date. My e-mail address is John.Baldwin@gov.bc.ca .

Yours truly,

John Baldwin
Dam Safety Officer

Ministry of Forests, Lands, Natural Resource Operations and Rural Development
West Coast Natural Resource Region
Water Protection
Mailing Address:
2080 Labieux Rd
Nanaimo, BC V9T 6J9
Tel: 250 751-7220
Fax: 250 751-7224
Website:www.gov.bc.ca/env/water

Andre J Audet

pc Stacey Larsen – Fisheries and Oceans Canada, Campbell River (Stacey.Larsen@dfo-mpo.gc.ca)

Mike Stalberg – FLNRORD Fish and Wildlife, Nanaimo (Mike.Stalberg@gov.bc.ca)

Aniko Nelson – Strathcona Regional District. Campbell River (anelson@srd.ca)

Aniko Nelson

From: Aniko Nelson
Sent: September 13, 2019 11:45 AM
To: Baldwin, John FLNR:EX
Subject: RE: Mr Audet's Mayfly Creek file

Hi John,

Thank you for the email. I do have availability the week of October 28.

Giving the covenant more thought, works within the covenant area may be permitted provided the SRD is confident that any work(s) are not in direct contravention of the covenant, as the SRD is responsible for the interpretation and enforcement of the covenant.

Thank you.

Strathcona Regional District
Aniko Nelson
Senior Manager, Community Services
301 – 990 Cedar Street, Campbell River, BC V9W 7Z8
e. anelson@srd.ca | t. 250.830.6708 | toll free: 1.877.830.2990

From: Baldwin, John FLNR:EX
Sent: September-11-19 1:48 PM
To: Aniko Nelson <ANelson@srd.ca>; Stalberg, Mike X FLNR:EX <Mike.Stalberg@gov.bc.ca>; Stacey Larsen (Stacey.Larsen@dfo-mpo.gc.ca) <Stacey.Larsen@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Barr, Larry FLNR:EX <Larry.Barr@gov.bc.ca>; Meret, Livia AG:EX <Livia.Meret@gov.bc.ca>
Subject: RE: Mr Audet's Mayfly Creek file

Please note that Mr Audet has **not responded to date** on agreeing to a without prejudice **meeting** during the week of September 16th 2019.

I will be away from Sept 19 to October 15th 2019. So unless Mr Audet responds in the next few days, I will send a second invitation for a meeting for late October 2019. Please confirm if the week of October 28th 2019 works for you to attend a meeting with Mr Audet to review his concerns with Mayfly Creek.

Thanks John B

From: Baldwin, John FLNR:EX
Sent: August 29, 2019 3:49 PM
To: Aniko Nelson (anelson@srd.ca) <anelson@srd.ca>
Subject: Mr Audet's Mayfly Creek file

Aniko – a date to meet with Mr Audet is still to be confirmed – John B

From: JBALDWIN <John.Baldwin@gov.bc.ca>
Sent: August 29, 2019 2:51 PM

To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Scan From MPS0775

Aniko Nelson

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: October 24, 2019 9:22 AM
To: Aniko Nelson
Cc: Lapcevic, Pat FLNR:EX
Subject: FW: proposed meeting regarding Mayfly Creek

Aniko – Mr Audet is requesting "a proposal" to address his concerns at Mayfly Creek. Are you available to meet with DFO and FLNRO to review next steps? Mr Audet's request for a proposal needs discussion.

I suggest mid November 2019 in Campbell River for meeting -could we use your office for the meeting?

John B

From: andre@audet.ws <andre@audet.ws>
Sent: September 17, 2019 3:53 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Re: proposed meeting regarding Mayfly Creek

Mr. Baldwin, All of the 'concerns' I might wish to raise are completely and fully expressed in the report submitted, please read it. Should you have a question, submit it in writing, and I'll respond without delay.

As to 'expected solution(s), pending your assessment of the situation, I have nothing to put forward, and consequently have no interest in attending the meeting proposed.

Andre Audet

2019-09-17 3:25 p.m., Baldwin, John FLNR:EX wrote:

> Andre – further to your letter and e-mail dated September 13th 2019 regarding Mayfly Creek , please note that this office does not have "a proposal" at this time as we still do not have a full understanding of your concerns and your expected solution(s). I still offer to meet without prejudice with you during the week of September 28th 2019 here in Nanaimo. As I will be away for the next four weeks, I ask that you contact Pat Lapcevic (FLNRORD West Coast Water Protection Section Head at 250 -751- 3149) to confirm a suitable day during that week to meet.
>
> John Baldwin
> Dam Safety Officer
>
> **From:** andre@audet.ws <andre@audet.ws>
> **Sent:** September 13, 2019 2:59 PM
> **To:** Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
> **Subject:** Re: proposed meeting
>
> Please see attached memo

On 2019-09-13 2:38 p.m., Baldwin, John FLNR:EX wrote:

> Andre – This office has not received a reply from you regarding a meeting during the week of Sept 16th 2019 to review your concerns with Mayfly Creek on your property located south of Campbell River.
>
> Please note that I will be away from the office until mid October 2019, and therefore offer the week of October 28th 2019 to meet with you to review your concerns. Please confirm a day during that week that most suits you to meet without prejudice to review your Mayfly Creek concerns.
>
> John Baldwin
> Dam Safety Officer
>
> **From:** Baldwin, John FLNR:EX
> **Sent:** August 29, 2019 3:47 PM
> **To:** Andre Audet (andre@audet.ws) <andre@audet.ws>
> **Subject:** FW: Scan From MPS0775
>
> Andre – hard copy of this letter is in the mail – John B
>
> **From:** JBALDWIN <John.Baldwin@gov.bc.ca>
> **Sent:** August 29, 2019 2:51 PM
> **To:** Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
> **Subject:** Scan From MPS0775

Aniko Nelson

From: Aniko Nelson
Sent: October 31, 2019 10:31 AM
To: Baldwin, John FLNR:EX
Subject: RE: proposed meeting regarding Mayfly Creek

Hi John,

I have confirmed my attendance for this meeting.

See you November 8th.

Best,

Strathcona Regional District
Aniko Nelson
Senior Manager, Community Services
301 – 990 Cedar Street, Campbell River, BC V9W 7Z8
e. anelson@srd.ca | t. 250.830.6708 | toll free: 1.877.830.2990

From: Baldwin, John FLNR:EX
Sent: October-30-19 8:48 AM
To: Aniko Nelson <ANelson@srd.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Subject: RE: proposed meeting regarding Mayfly Creek

Aniko – further to my voice mail today (Oct 30th 2019), can you make a meeting re Mr Audet on Friday morning Nov 8th 2019 in Campbell River (DFO Office)? – John B

From: Baldwin, John FLNR:EX
Sent: October 24, 2019 9:22 AM
To: Aniko Nelson (anelson@srd.ca) <anelson@srd.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Subject: FW: proposed meeting regarding Mayfly Creek

Aniko – Mr Audet is requesting "a proposal" to address his concerns at Mayfly Creek. Are you available to meet with DFO and FLNRO to review next steps? Mr Audet's request for a proposal needs discussion.

I suggest mid November 2019 in Campbell River for meeting -could we use your office for the meeting?

John B

From: andre@audet.ws <andre@audet.ws>
Sent: September 17, 2019 3:53 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Re: proposed meeting regarding Mayfly Creek

Mr. Baldwin, All of the 'concerns' I might wish to raise are completely and fully expressed in the report submitted, please read it. Should you have a question, submit it in writing, and I'll respond without delay.

As to 'expected solution(s), pending your assessment of the situation, I have nothing to put forward, and consequently have no interest in attending the meeting proposed.

Andre Audet

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>
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> Dam Safety Officer
>
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>
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> >
> > John Baldwin
> > Dam Safety Officer
> >
> > **From:** Baldwin, John FLNR:EX
> > **Sent:** August 29, 2019 3:47 PM
> > **To:** Andre Audet (andre@audet.ws) <andre@audet.ws>
> > **Subject:** FW: Scan From MPS0775
> >
> > Andre – hard copy of this letter is in the mail – John B
> >
> > **From:** JBALDWIN <John.Baldwin@gov.bc.ca>
> > **Sent:** August 29, 2019 2:51 PM

To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Scan From MPS0775

Aniko Nelson

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: November 5, 2019 9:24 AM
To: Stacey Larsen (Stacey.Larsen@dfo-mpo.gc.ca); Aniko Nelson; Stalberg, Mike X FLNR:EX
Cc: Lapcevic, Pat FLNR:EX
Subject: FW: Scan From MPS0775
Attachments: Scan_20191105.pdf

This is a heads up to report that Mr Audet has contacted the BC Association of Professional Engineers regarding his concerns. Copy of Mr Audet's letter is attached.

We can review this letter at our meeting on Friday Nov 8th 2019.

John Baldwin
Provincial Dam Safety Officer

From: JBALDWIN <John.Baldwin@gov.bc.ca>
Sent: November 5, 2019 8:42 AM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Scan From MPS0775

4 Nov 2019
Received
John B.

Andre J. Audet P.Eng.
2580 Crystal Drive
Courtenay, BC
Canada, V9N 9K1

Email: andre@audet.ws
Tel: 1 250 338 8809
October 28, 20019

Ms. K.V. Tarnai-Lokhorst, P.Eng.
President And Registrar; EGBC
200-4010 Regent Street,
Burnaby, BC, V5C 6N2

Dear Ms. Tarnai-Lokhorst
In compliance with the Code of Ethics Guidelines (Code); specifically;

Principle 1: hold paramount the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace, and
Principle 9: report to their association or other appropriate agencies any hazardous, illegal or unethical professional decisions or practices by engineers, geoscientists, or others,

the writer hereby submits the following concern regarding a potentially life-threatening situation, of which authorities, having been repeatedly advised, and have systematically ignored or dismissed.

Hazard
A provisionally constructed impoundment retaining the seasonal flow of Mayfly Creek, built in the distant past, and modified recently to serve objectives in support of the DFO and other interested parties, and which is described in the attached report (Report), is in an advanced state of deterioration, and will threaten life and property should it fail catastrophically.

Notifications
The writer formally notified authorities of concerns in 2012, at which time no response was received from the three levels of government advised. The attached Report, submitted in February of 2019 was similarly ignored.

Ownership Issues
The dam in question is entirely confined within boundaries on lands owned by the writer, and the waters/sediments retained therein are confined within it and a neighbouring property. Ownership of the dam complex, which extends over more than two hundred metres, falls to Provincial and Regional Governments by virtue of overriding covenants providing same with exclusive rights and obligations for the management thereof.

Water Sustainability Act
The recent Water Sustainability Act contains criteria that rank dams according to the hazards they present, and requires that those meeting certain standards be monitored. The dam system at issue exceeds minimal requirements for monitoring and would also appear to rank as an elevated hazard.

Government Ministry and Agency Responses
None of the Government Ministries responded to the writers February 2019 Report, though the covering letter requested a formal acknowledgement of reception. Repeated requests for same, some forcefully

(see attached letter to the Attorney General of BC) produced response only from the Attorney General and the DFO. There has been no response from 'Regional District' or the 'Ministry of Lands Forests etc.'

This not withstanding, the Dam Safety Division, which falls under the Ministry of Lands, Forests etc., responded casually in March of 2019 (attached Exibit A) in which Mr. Baldwin indicates his interest in examining the site. There was no further contact with that division until late August, at which time Mr. Baldwin invited the writer to an informal meeting to discuss unspecified concerns he and/or his associates may have been contemplating (Exibit B). To this, the writer has respectfully declined, predicated on having no additional technical information he might be qualified to offer, and on the wish to avoid the legal entanglements or perils that such a meeting might precipitate. Further, as there is no evidence that the site was examined during the intervening six months, and Mr. Baldwin clearly states that his offices have made no progress on the file (Exhibit C), any such meeting would seem to be without merit. Moreover, it is certain that at no time has the writer received a request for permission to enter the property from any of the intervening parties, thus further supporting the absence of progress in the investigation.

Current Status

Following a dry summer, seasonal flows in Mayfly Creek resumed in late September, and water levels within the impoundment are now sufficient to cause weeping and piping at several locations. On October 26th, discharge from piping, measured by a weir located at the south end of the system, recorded a flow rate of 120 gpm.

The writer believes this to be evidence of progressive failure, and that the now fully saturated impounding soils retaining the water saturated organic-rich sediment accumulation contained, present a risk of catastrophic failure if impacted by a significant seismic shock. Total load may exceed 1m tonnes, and would threaten homes, local roads and a highway down-gradient.

While my personal liability is largely limited by advisories made to appropriate authorities, it remains my responsibility under the Engineering Act (Code) that you be fully appraised of my concerns. Legal burdens not withstanding, it concerns me deeply that Government officials and their agencies failed to acknowledge reception of an advisory regarding a threat to life and property, and, even more concerning is their collective failure to engage in taking timely actions with respect to it. Accordingly, I ask that you intervene under provisions of the Engineering Act.

This letter-report is provided to your offices by email with supporting documents as digital attachments, and by Canada Post without the voluminous attachments.

Respectfully Submitted,

André J. Audet P.Eng.

cc J. Wilkinson; DFO
D. Donadson; FLNR
M. Babchuk; SRD
J. Baldwin; FLNR:EX
D. Eby; Attorney General

Aniko Nelson

From: Tom Yates
Sent: November 13, 2019 1:22 PM
To: David Leitch
Cc: Aniko Nelson
Subject: Mayfly Creek Dam
Attachments: 20191104 Audet to EGBC (cc Babhcuk) re Code of Ethics Guidelines.PDF

FYI

From: Edith Watson <EWatson@srd.ca>
Sent: November 13, 2019 12:04 PM
To: SRD Board Chair <schair@strathconard.ca>
Cc: Tom Yates <TYates@srd.ca>; Michele Babchuk <mbabchuk@srd.ca>
Subject: Chairs Mail

Good afternoon,

Attached is mail received for you.

Regards,

Strathcona Regional District
Edith Watson, CMC
Senior Executive Assistant
Deputy Corporate Officer
301-990 Cedar Street, Campbell River, BC V9W 7Z8
e. ewatson@srd.ca | t. 250.830.6712

Andre J. Audet P.Eng.
2580 Crystal Drive
Courtenay, BC
Canada, V9N 9K1

Email: andre@audet.ws
Tel: 1 250 338 8809
October 28, 20019

Ms. K.V. Tarnai-Lokhorst, P.Eng.
President And Registrar; EGBC
200-4010 Regent Street,
Burnaby, BC, V5C 6N2

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Respectfully Submitted,

André J. Audet P.Eng.

cc J. Wilkinson; DFO
D. Donadson; FLNR
M. Babchuk; SRD
J. Baldwin; FLNR:EX
D. Eby; Attorney General

Aniko Nelson

From: Aniko Nelson
Sent: November 19, 2019 9:37 PM
To: Desrochers, Dale; Baldwin, John FLNR:EX; Larsen, Stacey; Stalberg, Mike X FLNR:EX
Cc: Lapcevic, Pat FLNR:EX; Nottingham, Melissa; Meret, Livia AG:EX; Bartle, Hardy T FLNR:EX
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Hi John,

Thank you for preparing the correspondence for Mr. Audet. I have reviewed the letter and am in support of the content as presented.

Best,

Strathcona Regional District
Aniko Nelson
Senior Manager, Community Services
301 – 990 Cedar Street, Campbell River, BC V9W 7Z8
e. anelson@srd.ca | t. 250.830.6708 | toll free: 1.877.830.2990

From: Desrochers, Dale <Dale.Desrochers@dfo-mpo.gc.ca>
Sent: November 12, 2019 2:24 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>; Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>; Stalberg, Mike X FLNR:EX <Mike.Stalberg@gov.bc.ca>; Aniko Nelson <ANelson@srd.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Nottingham, Melissa <Melissa.Nottingham@dfo-mpo.gc.ca>; Meret, Livia AG:EX <Livia.Meret@gov.bc.ca>; Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Thanks for this John, attached are my comments on the letter. Thanks for pulling this together.

Dale

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Tuesday, November 12, 2019 1:02 PM
To: Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>; Stalberg, Mike X FLNR:EX <Mike.Stalberg@gov.bc.ca>; Aniko Nelson (anelson@srd.ca) <anelson@srd.ca>; Desrochers, Dale <Dale.Desrochers@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Meret, Livia AG:EX <Livia.Meret@gov.bc.ca>; Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

I have attached a DRAFT letter for your review. Any comments etc will be appreciated. I hope to have this letter out this week.

John B

From: Baldwin, John FLNR:EX
Sent: November 12, 2019 11:02 AM
To: 'Larsen, Stacey' <Stacey.Larsen@dfo-mpo.gc.ca>; Stalberg, Mike X FLNR:EX <Mike.Stalberg@gov.bc.ca>; Aniko

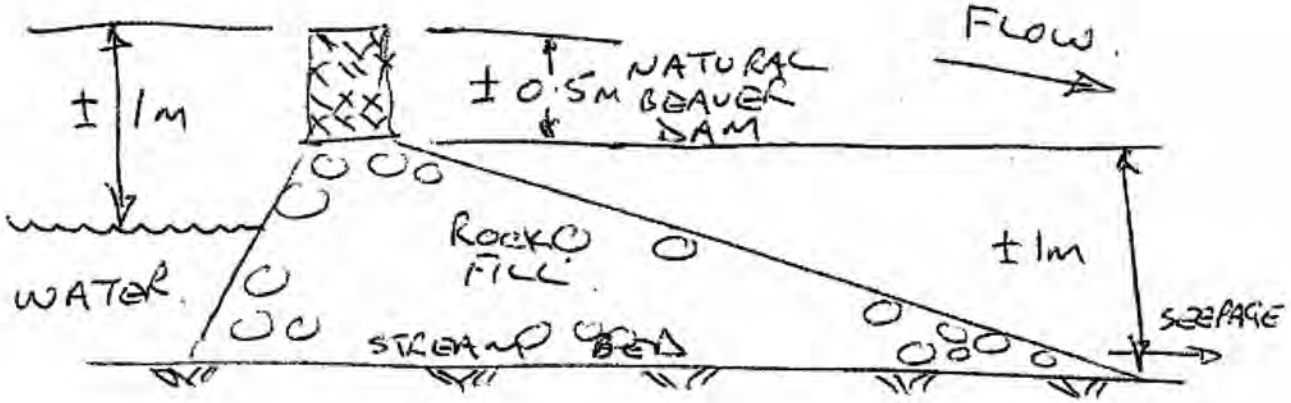
Nelson (anelson@srd.ca) <anelson@srd.ca>; Dale Desrochers (Dale.Desrochers@dfo-mpo.gc.ca) <Dale.Desrochers@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Meret, Livia AG:EX <Livia.Meret@gov.bc.ca>; Bartle, Hardy T FLNR:EX <Hardy.Bartle@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

This is a follow up to our meeting on Friday Nov 8th 2019 regarding Mr Audet's concerns related to Mayfly Creek on his property.

Mr Audet's Sept 13 2019 letter to FLNRORD and October 28 2019 letter to BC Association of Professional Engineers were reviewed. Any reply to the October 28 letter is the responsibility of the Association.

Mr Audet's Sept 13th letter requested a "proposal". There is no proposal at this time.

It was confirmed that under *BC Water Sustainability Act* Dam Safety Regulation the artificial beaver dam (constructed in 1999 without water licence under WSA with landowner permission, and fixed to the land) on Mr Audet's property (Mr Audet purchased in 2009) is a dam owned by Mr Audet. Mr Audet's ability to undertake any work on the dam is restricted by two covenants (artificial beaver dam is within covenant area held by FLNRORD Wildlife Manager and Strathcone Regional District) attached to Mr Audet's land title and *the BC Water Sustainability Act* (WSA – authorisation required to work in and about a stream).



X-SECTION - ARTIFICIAL BEAVER DAM NOV 8th 2019 MAYFLY CREEK.

FLNRORD has had two FLNRORD Engineers (R Mclean and H Bartle) review Mr Audet's February 27 2019 package in which Mr Audet expresses his concerns regarding "catastrophic" impacts in the surrounding area of failure of structures holding water in the wetland on his property . Copy of the Bartle Report dated 26 September 2019 is attached. Engineers Bartle has confirmed that **the lateral dam or berm indicated by Mr Audet is natural,** and **Mr Audet's spillway is an artificial beaver dam (placed rock fill) dam constructed in 1999**. The Report states that *it is unlikely that such time tested terrain will fail catastrophically unless it is disturbed by humans or a major natural disturbance such as an earthquake*. **The Report does recommend the lowering or removal of the artificial beaver dam** (the current approx. 1 metre high artificial rock filled dam has an approx. 0.5 m high natural beaver dam on top of the

rock fill), and monitoring of the artificial beaver dam over the winter period. No recent (last six months) beaver activity has been observed. Water level in the wetland on November 8th 2019 was approx. one metre below the current top of the artificial beaver dam and natural beaver dam (note attached sketch).

The artificial beaver dam in Mayfly Creek is not authorized under the WSA and needs to be licenced or removed. It was agreed that the lack of ability for the artificial beaver dam to hold water during the summer months has made this dam redundant for the original coho enhancement purpose (augment flows in lower Mayfly Creek during summer period). Mike S stated that It is expected that the long term impact of removal of the artificial beaver dam on the wetland will be minor if the wetland is returned to natural conditions. As the owner of the dam, Mr Audet will be offered the opportunity to apply for a water licence and keep the dam, or be instructed to remove the dam.

FLNRORD will prepare a letter to be sent to Mr Audet confirm findings and position regarding the artificial beaver dam. Offer will be made to meet with Mr Audet in December 2019 at DFO Comox Office to review findings and work with Mr Audet to address the artificial beaver dam situation. Permission/authorization will be required to work in the covenant area and stream.

Please let me know if these notes cover the essence of our meeting. If not, please forward additional notes.

John Baldwin
Dam Safety Officer.

From: Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>
Sent: October 31, 2019 9:52 AM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Hi John,

Yes, I've booked our meeting room. Dale and I will be there. Sorry I've been busy in the field with coho releases and chum broodstock in CR and Zeballos the last few days.

Stacey

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Wednesday, October 30, 2019 9:11 AM
To: Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Desrochers, Dale <Dale.Desrochers@dfo-mpo.gc.ca>; Stalberg, Mike X FLNR:EX <Mike.Stalberg@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Stacey – **Friday Nov 8th 2019 at 9:30 am at your office** works for FLNRORD. Still trying to get SRD's confirmation. Can you book your meeting room and confirm your office location? John B

From: Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>
Sent: October 28, 2019 9:47 AM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>; Desrochers, Dale <Dale.Desrochers@dfo-mpo.gc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Hello John,

Dale and I are able to meet with SRD and FLNRO to review next steps on either Nov. 8th or Nov. 29th.

DFO's position on the two points you've asked are:

1. We're not opposed to removing the artificial beaver dam or rock weir.
2. No, we don't have money or staff/time to contribute to the project if one is out coming from this.

I do have a meeting room at our office in Campbell River and so far those dates are open for booking it.

Stacey Larsen
Community Advisor
Campbell River & North Vancouver Island Areas
Offie: (250) 286-5883
Cell: (250) 902-9484

From: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Sent: Thursday, October 24, 2019 9:16 AM
To: Larsen, Stacey <Stacey.Larsen@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Subject: RE: Mr Audet and Mayfly Creek - proposed meeting

Stacey – further to my voice mail today – are you and Dale available to meet with SRD and FLNRO to review next steps? Mr Audet's request for a proposal needs discussion.

I suggest mid November 2019 in Campbell River for meeting -do you have space at your office for 6 people?

- John B

From: Baldwin, John FLNR:EX
Sent: September 16, 2019 12:11 PM
To: Stacey Larsen (Stacey.Larsen@dfo-mpo.gc.ca) <Stacey.Larsen@dfo-mpo.gc.ca>
Cc: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Subject: FW: proposed meeting

Stacey – Mr Audet has responded to the meeting invitation with the attached e-mail. Mr Audet is looking for a proposal to address his dam concerns. Have you managed to obtain DFO's position regarding the possible removal of the artificial beaver dam – mainly is there a biological concern with lowering the winter water level in the reservoir (the wetland is dry in the summer months) and any DFO funding to remove the dam? – John B

From: andre@audet.ws <andre@audet.ws>
Sent: September 13, 2019 2:59 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Re: proposed meeting

Please see attached memo

On 2019-09-13 2:38 p.m., Baldwin, John FLNR:EX wrote:

Andre – This office has not received a reply from you regarding a meeting during the week of Sept 16th 2019 to review your concerns with Mayfly Creek on your property located south of Campbell River.

Please note that I will be away from the office until mid October 2019, and therefore offer the week of October 28th 2019 to meet with you to review your concerns. Please confirm a day during that week that most suits you to meet without prejudice to review your Mayfly Creek concerns.

John Baldwin
Dam Safety Officer

From: Baldwin, John FLNR:EX
Sent: August 29, 2019 3:47 PM
To: Andre Audet (andre@audet.ws) <andre@audet.ws>
Subject: FW: Scan From MPS0775

Andre – hard copy of this letter is in the mail – John B

From: JBALDWIN <John.Baldwin@gov.bc.ca>
Sent: August 29, 2019 2:51 PM
To: Baldwin, John FLNR:EX <John.Baldwin@gov.bc.ca>
Subject: Scan From MPS0775

Aniko Nelson

From: Aniko Nelson
Sent: November 19, 2019 10:38 PM
To: Tom Yates; David Leitch
Subject: RE: Mayfly Creek Dam
Attachments: Desrochers comments on Mayfly Creek Mr Audet Nov 12th 2019 letter.docx

Good Evening,

Thank you for providing me a copy of the attached correspondence. I would like to advise that I have had a number of discussions with FLNRORD and two formal meetings that also included DFO to discuss this issue. The most recent meeting was held November 8, 2019, whereby the SRD, FLNRORD and DFO made good progress in a coordinated response to Mr. Audet's concerns. I should clarify that the SRD's involvement in the issue is limited to a number of restrictive covenants that are registered over the land. Further, notwithstanding Mr. Audet's position, the SRD does not have ownership over the dam located on Mr. Audet's property.

For your information, I have attached the most recent ***DRAFT*** letter that FLNRORD has prepared as a result of our last agency meeting, which is to be sent to Mr. Audet in hopes of assisting him in finding a solution to his issue.

I am happy to discuss further at your request.

Thank you.

A.

From: Tom Yates <TYates@srd.ca>
Sent: November 13, 2019 1:22 PM
To: David Leitch <DLeitch@srd.ca>
Cc: Aniko Nelson <ANelson@srd.ca>
Subject: Mayfly Creek Dam

FYI

From: Edith Watson <EWatson@srd.ca>
Sent: November 13, 2019 12:04 PM
To: SRD Board Chair <schair@strathconard.ca>
Cc: Tom Yates <TYates@srd.ca>; Michele Babchuk <mbabchuk@srd.ca>
Subject: Chairs Mail

Good afternoon,

Attached is mail received for you.

Regards,

Strathcona
REGIONAL DISTRICT

Edith Watson, CMC
Senior Executive Assistant
Deputy Corporate Officer
301-990 Cedar Street, Campbell River, BC V9W 7Z8
e. ewatson@srd.ca | t. 250.830.6712

BRITISH COLUMBIA

File: 76800-30/22-100

November ???? 2019

VIA EMAIL: andre@audet.ws

DRAFT

Andre J Audet

2580 Crystal Drive

Courtenay BC

V9N9K1

Dear Andre Audet:

Re: Mayfly Creek

This is a follow up to your February 27th 2019 letter to several agencies including the Minister of the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD), and the several offers by this office to meet without prejudice with you to review your concerns regarding the wetland on your property described as Lot 1, Section 26, Township 4, Comox District, Plan VIP87399 (Lot 1) .

This office has reviewed your February 27th 2019 package with the Federal Government Department of Fisheries and Oceans, the Strathcona Regional District and FLNRORD staff. As an Assistant Water Manager and Dam Safety Officer under *BC Water Sustainability Act* (WSA), I have entered on to Lot 1 under Section 89 of the WSA to confirm information you and others have supplied regarding the impoundment of water on Lot 1.

A FLNRORD Engineer (Hardy Bartle) has reviewed the related information and visited the site under my direction. His report titled Preliminary Mayfly Wetland Assessment signed August 26th 2019 is attached. Engineer Bartle has confirmed that "the lateral dam or berm" located on the east side of the wetland is natural but that "the spillway" at northern outlet of the wetland is a manmade rock filled dam built in 1999. This report states that *it is unlikely that such tested terrain will fail catastrophically unless it is disturbed by humans or a major natural disturbance such as an earthquake.*

This rock filled dam was constructed to replace a beaver dam that had failed, and was proposed to store winter flows to augment summer flows in the lower Mayfly Creek to enhance fisheries. The landowner (MacMillan Bloedel Ltd) at the time gave permission for

Ministry of Forests, Lands, Natural Resource Operations and Rural Development
West Coast Natural Resource Region
Water Protection
Mailing Address: 2080 Labieux Rd Nanaimo, BC V9T 6J9
Tel: 250 751-7220
Fax: 250 751-7224
Website: www.gov.bc.ca/env/wdtes

the construction of this "artificial beaver dam". No water licence has been issued for the storage of water under the BC Water Act at that time nor the new WSA. The Bartle Report does recommend that this artificial beaver dam be removed if not required. Both FLNRORD and DFO staff do not consider the artificial beaver dam to be necessary to support local fish values within Mayfly Creek.

Under the WSA Dam Safety Regulation the owner of Lot 1 is the owner of the artificial beaver dam located on Lot 1. As , ~~Y~~you and Karen Audet are the registered owners, your. ~~The~~ options are to obtain a water licence under the WSA or remove the dam. This office is available to assist in reviewing these options and the authorizations/permissions required, and suggests a meeting without prejudice in the month of December 2019 in Comox. Please confirm what date suits you and Karen.

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I can be contacted here in Nanaimo at 250-751-3179 or by e-mail at john.baldwin@gov.bc.ca

Yours truly,

John Baldwin
Assistant Water Manager

Attachments: Bartle Report

Cc Stacey Larsen, DFO Community Advisor

Dale Desrochers, DFO SEP Section Head

Mike Stalberg – FLNRORD Wildlife Manager

Aniko Nelson – Strathcona Regional District Senior Manager Community Services

File: 76800-30/22-100

November 26, 2019

VIA EMAIL: andre@audet.ws

Andre J Audet
2580 Crystal Drive
Courtenay, British Columbia
V9N 9K1

Dear Andre Audet:

Re: Mayfly Creek

This is a follow-up to your February 27, 2019 letter to several agencies as well as to Honourable Doug Donaldson, Minister of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD), and the several offers by this office to meet without prejudice with you to review your concerns regarding the wetland on your property described as Lot 1, Section 26, Township 4, Comox District, Plan VIP87399 (Lot 1).

This office has reviewed your February 27, 2019 package with the federal Department of Fisheries and Oceans (DFO) , the Strathcona Regional District (SRD) and FLNRORD staff. As an assistant water manager and dam safety officer under the *Water Sustainability Act* (WSA), I have entered on to Lot 1 under Section 89 of the WSA to confirm information you and others have supplied regarding the impoundment of water on Lot 1.

A professional engineer (Hardy Bartle) employed by FLNRORD, has reviewed the related information and visited the site under my direction. His report titled "Preliminary Mayfly Wetland Assessment", signed and sealed August 26, 2019, is attached. FLNRORD believes that "the lateral dam or berm" located on the east side of the wetland is a natural ground feature; the area of surface collapse and water influx at the south end of your property is an infilled gravel pit dating from the early 2000s and "the spillway" at northern outlet of the wetland is a manmade rock-filled dam built in 1999. Our professional engineer reports *it is unlikely that such time-tested terrain will fail catastrophically unless it is disturbed by humans or a major natural disturbance such as an earthquake.*

This rock-filled dam was constructed to replace a beaver dam that had failed and was proposed to store winter flows to augment summer flows in the lower Mayfly Creek to enhance fisheries. The landowner (MacMillan Bloedel Ltd) at the time gave permission for the construction of this "artificial beaver dam". No water licence has been issued for the

Ministry of Forests, Lands, Natural Resource Operations and Rural Development
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storage of water under the British Columbia *Water Act* at that time nor the new WSA. Both FLNRORD and DFO staff do not consider the artificial beaver dam to be necessary to support local fish values within Mayfly Creek.

Under the WSA Dam Safety Regulation, the owner of Lot 1 is the owner of the artificial beaver dam located on Lot 1. As you and Karen Audet are the registered owners, your options are to obtain a water licence under the WSA and manage the dam in accordance with the Dam Safety Regulation or remove the dam. This office is available to assist in reviewing these options and the authorizations/permissions required and suggests a meeting without prejudice in the month of December 2019 in Comox. Please confirm what date suits you.

I can be contacted here in Nanaimo by phone at 250 751-3179 or by email at John.Baldwin@gov.bc.ca.

Yours truly,

John Baldwin
Assistant Water Manager

Attachment: August 26 report by Hardy Bartle, "Preliminary Mayfly Wetland Assessment"

pc: Stacey Larsen, Department of Fisheries and Oceans, Community Advisor
Dale Desrochers, Department of Fisheries and Oceans, SEP, Section Head
Mike Stalberg, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Wildlife Manager
Aniko Nelson, Strathcona Regional District, Senior Manager, Community Services

Aniko Nelson

From: andre@audet.ws
Sent: November 27, 2019 11:40 AM
To: Hardy.Bartle@gov.bc.ca
Cc: Pearce, Raeanne FLNR:EX; Stacey.Larsen@dfo-mpo.gc.ca; Dale.Desrochers@dfo-mpo.gc.ca; Stalberg, Mike X FLNR:EX; Aniko Nelson; Baldwin, John FLNR:EX
Subject: Re: Mayfly Creek

Dear Mr. Bartle,

Thank you for a well reasoned report regarding the Mayfly Creak dam issue. My only criticism at this time is that the investigation was conducted during summer months when the system was dry and seepage points along the dam will not have been evident. Accordingly, given that the dam is currently at *near* peak levels, a revisit of the site may provide added insight from, but not limited to, an examination of points of water egress, thereby permitting a better appreciation of the potential hazard and an improved focus on recommended action going forward.

Best Regards,

André J. Audet P.Eng.

On 2019-11-27 9:01 a.m., Pearce, Raeanne FLNR:EX wrote:

> Dear Andre Audet,
>
> Please see the attached letter and report regarding Mayfly Creek sent on behalf of John Baldwin, Assistant Water Manager with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.
>
> Kind regards,

Raeanne Pearce
Program Assistant
West Coast Natural Resource Region
Phone (250) 751-7313 | Raeanne.Pearce@gov.bc.ca
Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD)

Aniko Nelson

From: Pearce, Raeanne FLNR:EX <Raeanne.Pearce@gov.bc.ca>
Sent: November 27, 2019 9:01 AM
To: andre@audet.ws
Cc: Stacey.Larsen@dfo-mpo.gc.ca; Dale.Desrochers@dfo-mpo.gc.ca; Stalberg, Mike X FLNR:EX; Aniko Nelson; Baldwin, John FLNR:EX
Subject: Mayfly Creek
Attachments: Mayfly wetland August 2019 report final.pdf; 2019-11-26 signed November 2019 letter from FLNRORD to Mr Audet.pdf

Dear Andre Audet,

Please see the attached letter and report regarding Mayfly Creek sent on behalf of John Baldwin, Assistant Water Manager with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

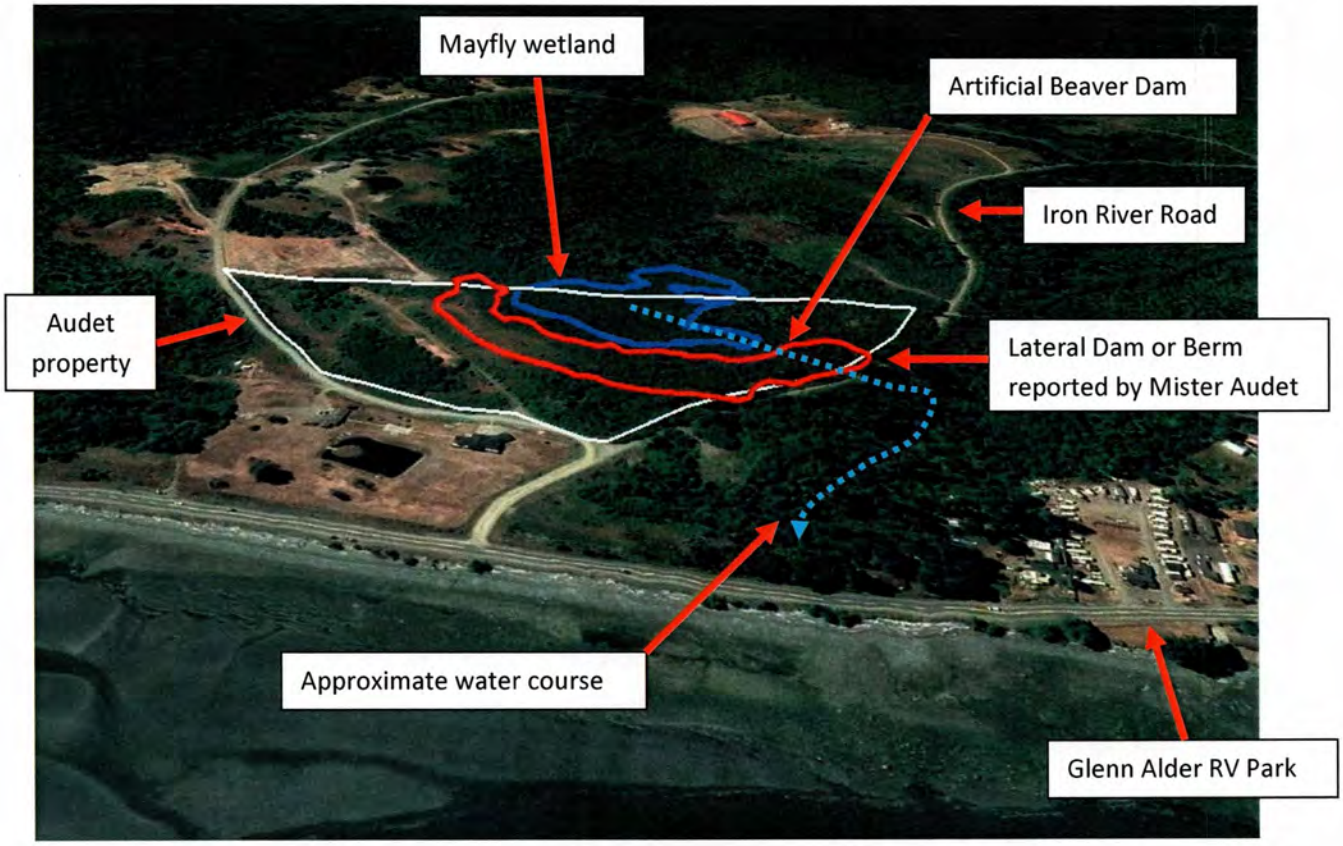
Kind regards,

Raeanne Pearce
Program Assistant
West Coast Natural Resource Region
Phone (250) 751-7313 | Raeanne.Pearce@gov.bc.ca
Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD)

Preliminary Mayfly wetland assessment

EDMRS File: 76915-20/22-100 Oyster River

Latitude: 49.898834°, Longitude: -125.166749°



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Summary

This report was prepared for the Ministry of Forests, Lands, Natural Resource Operations and Rural Development's (FLNRORD's) Dam Safety Program to:

1. Comment upon the origins of the feature labelled *Latteral Dam or Berm* within Figure 1 of Mister Audet's report of February 2019. Figure 1 of Mister Audet's report is reproduced as Figure 1 of this report.
2. Address Mister Audet's concerns that there is a man-made water impoundment upon his property that may pose an imminent threat to life and property.
3. Document a quality assurance review of the site investigation completed by Dam Safety program staff to date.

Mister Audet is a BC registered Professional Engineer; he suggests there could be a 400 metre long lateral dam or dyke like structure upon his property built by early 20th century railroad logging operations (see Figure 1). He suggests modifications of this long abandon forestry infrastructure in 2007 have increased water levels within the dam system to dangerous levels. He suggests the dam height could be in excess of four metres and a dam burst flood involving 1,000,000 tonnes of debris could occur. He points out that the area is prone to earthquakes and local soils could liquefy in response to ground shaking. He brings forward a variety of verbal reports, personal observations, google earth imagery, photographs of site conditions and technical reports to support his interpretation of site conditions.

The Dam Safety Program has investigated this matter since March of 2019. To date their investigation has yielded approximately a dozen technical and professional site assessments reports regarding the wetland's water management issues since 1998. Overall I concur with Dam Safety and historical site assessments; while the wetlands and the associated embankment could someday fail overall there is little immediate risk of catastrophic dam failure and the scale of the resulting dam burst flood would be far smaller than that envisioned by Mister Audet. Specifically:

1. Most of the berm on the east flank of the wetland that Mister Audet suggests is an improvised dam system is a natural ground feature. The berm is most likely an uplifted paleo beach front and intertidal zone system left over from relative sea level changes some 12,700 years ago. This is evidenced by the: geologically history of the site, old growth stumps and forest soil development at the north end of the feature, the sandy nature of the local soils and gravel mining operations at the south end of the feature.

2. There are three general scenarios in which dam failure is foreseeable. In order of likelihood the scenarios are:

The artificial, placed rock fill, beaver dam built within the wetlands in 1999[1] fails. The artificial beaver dam is approximately one metre high. Beaver have been infilling the spillway of the rock fill dam producing a composite structure approximately 1.5 metres high. There are professional reports[2] and field evidence that water levels within the wetlands have been increased above natural levels. Without maintenance eventually the man-made dam, and/or the beaver dam atop the man-made dam, will fail.

The gravel pit that encroached upon the south end of the wetland in the early 2000s could be a point of weakness within the wetland's water storage system. Seepage into the pit, from the wetlands, has been an issue since at least 2007[3]. Failure of the embankment at this location would be most credible when the reservoir is full or a seismic event affects the area.

The wetland's water retention system could be damaged during a major seismic event. There is evidence mega thrust, magnitude 9, earthquakes have occurred in the past (most recently January 26, 1700), and are forecast to recur every 200-850 years, within the region[4]. There were numerous reports of liquefaction issues, landslides, metres of ground deformation, cut and fill slope failures in the area associated with the June 23, 1946 magnitude 7.2 earthquake[5]. During a major seismic event damage to the Mayfly Creek wetlands is possible. A dam burst flood from the Mayfly wetland would likely be a small element of earthquake response and recover efforts in the region.

3. The magnitude and relative consequences of a dam burst flood associated with the wetlands are worthy of further investigation. The most probable, severe, dam burst flood scenario at the site is a composite (combined) beaver dam and artificial beaver dam failure. Preliminary analysis suggests this could produce a large (12 cubic metre per second), short duration (thirty minute to two hour long), flood of the lower creek channel. The resulting dam burst flood would likely involving some ten to thirty thousand cubic metres of water and wetland sediments. As suggested by Mister Audet more extreme outflows are plausible during a major earthquake. The Glenn Alder RV Park and the old Island Highway are downstream of the dam. What effects such floods would have upon the RV Park and Highway should be explored.

4. The Dam Safety program has conducted a diligent investigation of this matter. I am impressed by their: timely response, diligent field work, use of qualified professionals,

---

[1] See G Eriksen drawings, Fishery Renewal BC funding request and D Chamberlain, K Eakins, D Clough & W Wartigg reports of 1998 to 2001 for details.
[2] See FishFor reports of 2007 and 2009 for details.
[3] See Fishfor report of June 2007 for details.
[4] Structural Engineers of Association of BC, 2013
[5] Rogers G, 1979

impressive collection of historical documents and remote sensing imagery compiled since March of 2019.

I recommend a meeting with Mister Audet to clarify his view of site conditions; perhaps he is aware of field evidence that would prompt revisions of this report. The site should be monitored this fall as the reservoir fills; field observations this fall could also prompt revisions of this report. Ultimately someone should take responsibility for maintenance and operation of the artificial beaver dam or the artificial beaver dam should be removed from the stream channel. Beaver will likely be a chronic, costly, maintenance issue within the drainage.

The balance of this report is documentation to ensure this report's general compliance with FLNRORD Engineering Branch's Quality Management System[6]. This report is written with an awareness of professional practice guidelines for: expert witness reports[7], dam safety reviews[8], site characterization for dam foundations[9], landslide assessments for residential development in BC[10], the BC housing foundation and geotechnical guide[11], terrain stability assessments[12] and forestry roads[13]. This report does not fully comply with any of the referenced professional practice guidelines; this report, as recommended by Mister Audet and requested by the Dam Safety Program, is an overview rather than a detailed site assessment.

[6] FLNRORD, Engineering Branch. 2017. Quality Management System (QMS) Professional Practice Manual.
[7] Engineers and Geoscientists of BC (EGBC). 2016. Expert Witness Professional Practice Guidelines.
[8] EGBC. 2016. Guidelines for Legislated Dam Safety Reviews in BC.
[9] EGB, 2016. Site Characterization for Dam Foundations in BC.
[10] EGBC. 2010. Guidelines for Legislated Landslide assessments for proposed Residential Developments in BC.
[11] EGBC, 2015. Housing Foundations and Geotechnical Challenges guide for BC.
[12] EGBC and Association of BC Forest Professionals (ABCFP). 2010. Guidelines for Professional Services in the Forest Sector – Terrain Stability Assessments.
[13] EGBC and ABCFP. 2012. Guidelines for Professional Services in the Forest Sector – Forest Roads.

Figure 1

Source: Mister Audet's report of February 2019

1.0 Introduction

The site is approximately 15 kilometres south of Campbell River and 25 kilometres north of Courtenay BC on the east coast of Vancouver Island (see Figure 2). The study area is within a low lying coastal area some 15 metres above current sea level and 350 metres horizontal distance to the modern beach front.

Figure 2. Location map of the Mayfly Creek wetland

The quaternary geology of the site is relatively well defined. The latest glacial episode in the area, known as the Fraser Glaciation, began in the coastal mountains some 30,000 years ago. The ice expanded slowly at first before reaching its maximum some 16,000 years before present (BP). At the apex of the Fraser glaciation the site was likely buried beneath a kilometre of ice. Ensuing glacier melt was rapid; by 10,000 years BP there was no more ice than today (Pike et al., 2010).

The geology of the site during the retreat of the glaciers was complex. As suggested by Mister Audet there may well have been an outwash plain in the area. Recent research points towards several re-advances during the period of overall retreat and significant relative sea level changes (Fedje, 2018).

Marine shorelines dating to 14,300 years BP have been documented at 197m above present day sea level upon Quadra Island some 30 kilometres north of the site. The available evidence points to rapid marine regress (falling sea levels) until about 13,000 BP. By 13,000 BP relative sea level was perhaps 30m above current sea level. Paleo beach front berms and intertidal deposits 3-4m, 10-14m and 26-30m above modern sea level point towards slowing or pauses in marine regression at 11,000, 12,700 and 13,000 BP respectively (Fedje, 2018).

The paleo beach front berms and intertidal deposits reported at 10-14 m above modern sea level upon Quadra Island are of interest to this site investigation. The observation of loose sandy soil, nearby gravel pits, the near level nature of the wetland and LiDAR generated contour maps suggest the east flank of the wetlands could be some manner of paleo beach front with an elevation cresting at 15 m above current sea level. If the Quadra Island studies can be generalized to the Mayfly wetlands, there is a good chance the east flank of the wetland is a paleo beach front berm that dates to 12,700 BP. If the berm can be confirmed as a paleo beach front it has withstood 12,700 years of local geohazards including dozens of major seismic events.

1:50,000 scale soils mapping indicates Mister Audet's property is sited upon the Kye unit. Kye soils occur within the coastal BC Douglas fir subzone and developed in deep, sandy, fluvial, glaciofluvial or marine deposits that occur within 200m of modern sea level. Kye soils are rapidly drained[14]. Podzolized soil horizons, topsoil typical of coniferous forests, are usually less than 50 cm in thickness and relatively unweathered parent material (mineral soil) is encountered at depths between 80 and 120 cm. Soil texture is usually loamy sand (Jungen, 1985). This information is significant as it explains the leaky nature of the artificial beaver dam and is consistent with our field observations of the site.

The area is known to be seismically active (Structural Engineers of Association of BC, 2013). Liquefaction and earthquake induced slope failures are almost certain to occur when future, magnitude 7 to 9, earthquakes affect the region. There is no evidence the 1946 magnitude 7.2 earthquake damaged the wetland. The epicenter of the 1946 earthquake that induced slope failures and liquefaction along the east side of Vancouver Island, including Oyster Bay, is shown upon Figure 2.

[14] meaning they hold little moisture after rain- i.e. they are a coarse textured, free draining, soil.

Historically the elements at risk at the site have been modest including: riparian biota, down slope timber, the old Island Highway and a logging style bridge on Iron River Road. In recent years land use around the wetland has transitioned from privately managed forest to large lot residential development; what is now the Glenn Alder RV Park was built downstream of the wetland some decades ago. The elements at risk in the area have increased as the decades have passed; it is reasonable to infer the elements at risk will increase in the decades ahead.

Mister Audet purchase property to the east of the wetland in 2009. Mister Audet self identifies as a BC registered Professional Engineer that hold a degree in Geological Engineering granted by the University of British Columbia (UBC). He indicates he: is familiar with mine tailings ponds and the hazards they present, has nearly five decades of experience in the mining sector, and has experience with the design and construction of small water retention systems. Mister Audet has been concerned with water issues upon his property for at least seven years. He recommends that the Crown comply with its obligations under the Water Sustainability Act and a qualified geotechnical engineer investigate the site.

Essentially this report is the second part of what Mister Audet recommends. This report is a preliminary site investigation, by a professional engineer, of what Mister Audet indicates may be a sizeable, long abandoned, dam system upon his property.

2.0 Statement of qualifications

I am a BC registered geological engineer with 33 years of experience in the BC natural resource sector. I hold a bachelor's of applied science in Geological Engineering, geotechnical option (1986), and a diploma in Forest Engineering (2004) granted by the UBC. I have been employed by the province of British Columbia has a Professional Engineer since 1989. Prior to joining the provincial government I worked as a geotechnical engineer at a major open coal mine in north east BC. Since 1996 my practice has focused upon slope stability issues within or related to the coastal BC forestry sector. Since 2008, in accordance with mandate instructions issued by the provincial government, my scope of practise has come to include a wide range of forestry interface issues including: wildfires, floods, clean energy projects, natural hazard response to homes and recreational cabins at risk, relic forestry and mining infrastructure upon Crown land including a number of dams. Most of my experience is with old logging roads and timber harvesting operations upon Crown land; however, old railroad logging operations, logging camps, dams and private land projects periodically come to my attention.

I do not consider myself to be a dam safety specialist. My experience with dams has emphasized situations similar to the Mayfly wetland; evaluation of decades old forestry or mining infrastructure originally built in low consequence settings.

My expertise encompasses some of the issues raised by Mister Audet and the Dam Safety program. Specifically I have decades of experience examining historical imagery, reviewing historical documents, field reviewing site conditions, examining second growth forests and applying engineering judgement and experience to explain current, and forecast future probable, site conditions along coastal BC. My expertise focuses upon natural resource, typically forestry, extraction sites.

3.0 Scope and methods of assessment

John Baldwin, FLNRORD Dam Safety Specialist and I visited the site July 30, 2019. John Baldwin had previously assessed the site March 7, March 25 and April 16, 2019. We toured the site for approximately four hours between 10:00 AM and 3:00 PM including a short break for lunch. Weather was mixed. There was light rain upon our arrival with the weather clearing as the day progressed.

A schematic of key site features and our traverse route is presented in Figure 3. In all we traversed perhaps 2.2 kilometres of the site. We examined:

1. The ditch improvement work conducted along Iron River Road in 2012.
2. The bridge crossing of Mayfly Creek on Iron River Road.
3. The artificial beaver dam built upon the creek built in 1999.
4. The wetlands upstream of the artificial beaver dam.
5. The broad, open, drainage ditch (frequently referred to as a swale in historical records) excavated atop the lateral berm in August of 2008.
6. The drainage control berm, infilled gravel pit and drainage ditch at the south end of Mister Audet's property. These ground features were excavated and at least partially restored between 2005 and 2009. The old gravel pit appears to be the area of "thin soil crust, surface collapses and potential sub surface soil erosion" that Mister Audet indicates may forewarn imminent catastrophic dam failure.

The goal of our site visit was to examine the ground features that Mister Audet indicated may be suggestive of imminent, life threatening, dam failure.

Site observations were collected with an iPad using recreational grade GPS tracking. The iPad reported GPS coordinates should be viewed as approximate; recreational grade GPS readings, upon detailed investigation, frequently include location errors in the range of 5 to 10 metres. Horizontal reading collected July 30 appear to be sound; vertical readings appear to contain errors in the range of 10 metres compared to light detection and ranging (LiDAR) derived ground contours. GPS readings appear to be most accurate within clearings and least accurate when there is overhanging vegetation.

I also examined the dam safety program's file upon this matter compiled since March of 2019 and an abundance of related records including:

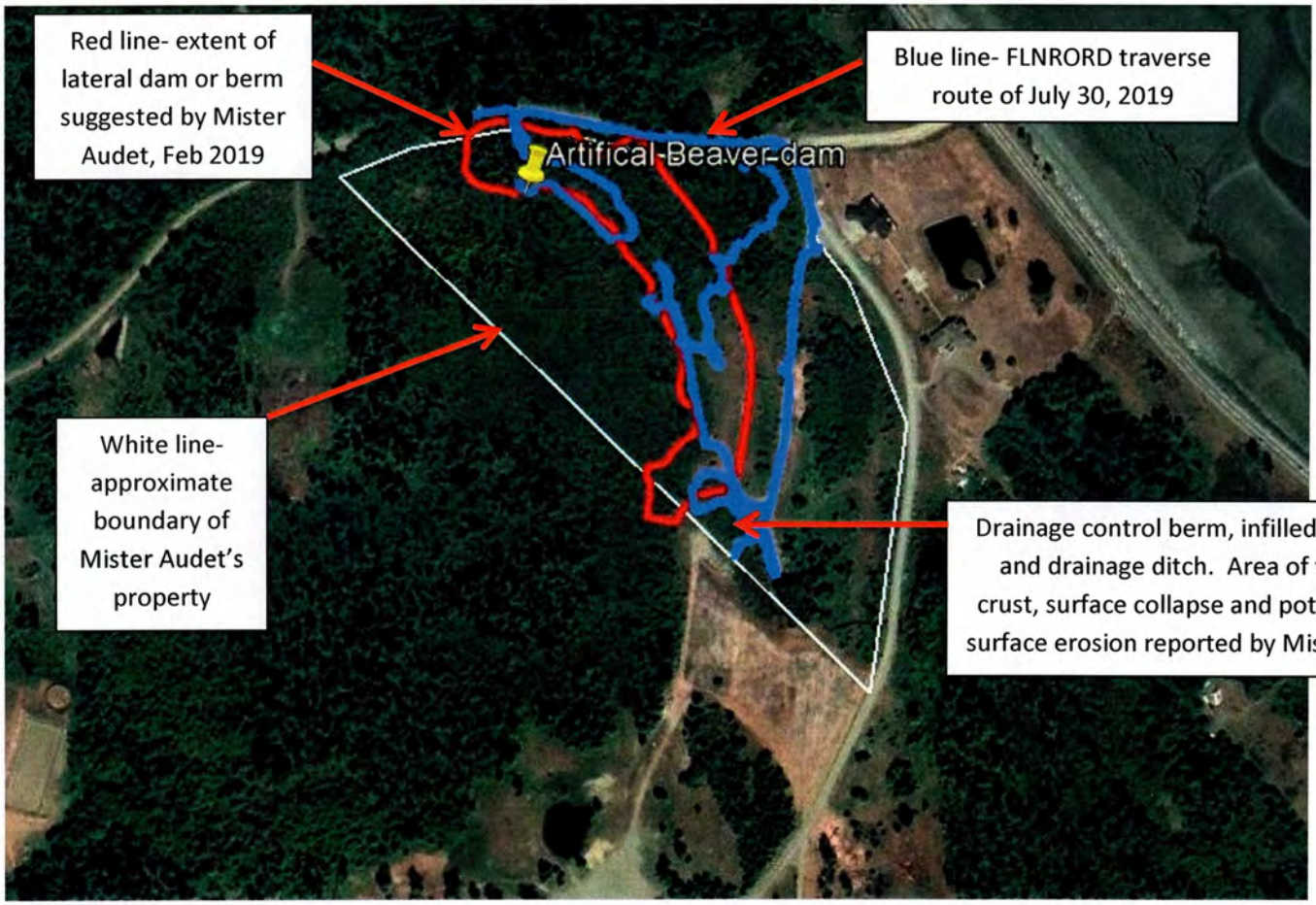
1. Some 20 sets of remote sensing data spanning 81 years of observation.
2. Approximately a dozen technical and professional reports regarding the site produced since 1998. Most of reports are authored by registered professional biologists but there a few reports by professional engineers including Mister Audet.

Hydrology estimates were produced using regional methods commonly applied to forestry road crossing of ungauged streams. Site measurements were enabled by overlays of remote sensing images and GPS readings into the professional edition of google earth. Dam burst flood estimates were produced by applying historical and current site data to preliminary dam burst flood estimation tables produced by the BC Dam Safety program.

A limiting factor of the site assessment was the prevailing water conditions during our site assessment. The east side of Vancouver Island has been dry for much of 2019[15].

[15] BC Drought Information Portal
https://governmentofbc.maps.arcgis.com/apps/MapSeries/index.html?appid=838d533d8062411c820eef50b08f7ebc

Figure 3- Field review of the Mayfly wetland



Source: google earth imagery dated June 14, 2019

4.0 Remote sensing products reviewed

The following air photographs were reviewed:

1.	BC77: 69 to 71	Dated: 1938
2.	BC253: 81 to 83	Dated: 1946
3.	BC2312: 8 and 9	Dated: 1957
4.	BC5097: 074 and 075	Dated: Jun 8 1964
5.	BC7077: 201 and 202	Dated: Jul 24, 1968
6.	BC7406: 148 and 147	Dated: Jul 1, 1972
7.	BC77072: 017 and 018	Dated: Aug 9, 1977
8.	BC77084: 125 to 126	Dated: Aug 9, 1977
9.	BC80002: 206 and 207	Dated: Apr 2, 1980
10.	BC84024: 131 and 132	Dated: Jul 15, 1984
11.	BCB91024: 84 and 86	Dated: Jul 4, 1991
12.	BCB96016: 1 and 2	Dated: Jul 14, 1996
13.	BCB96038: 107 and 108	Dated: Jul 14, 1996

In addition to the above photographs the following remote sensing data was reviewed:

1. Google Earth images dated: July 16, 2005, Jul 5, 2012, Mar 16, 2014, Jun 26, 2015 and Jun 14, 2019.
2. LiDAR products supplied by the Stratchona Regional District (SRD). The SRD supplied LiDAR derived ground contours and synthetic drainage paths[16] projected upon orthophotographs collected during the LiDAR flights. The precise date of the LiDAR flights is not available but details of the orthophotographs suggest the LiDAR was flown in late 2015.
3. Bing imagery. The Bing imagery was undated but clear and crisp. Comparison to google earth imagery suggests the Bing images were collected between Jun 26, 2015 and Jun 4, 2016.

In total there are 20 sets of remote sensing images spanning 81 years of observation.

[16] Estimated drainage paths derived from LiDAR data.

5.0 Findings from remote sensing

The 1938 air photographs are the earliest available site images. Highway 19 and the first 750 metres of Iron River Road were built by 1938. There are a handful of small buildings visible along Highway 19 some 400 metres east of the wetland. There is a very large (600+ ha) progressive clear cut some 850 metres to the west of the wetland. Timber from the progressive clear cut was hauled along contour to a load out far from the wetlands. There are skidder trails off of what is now Iron River Road that were used to extract timber from an 18 ha clear cut to the west of the wetland. A skidder trail departs from km 0.7 of Iron River Road to service selective harvesting along the southern edge of the wetland. A two hectare stand of deciduous forest, including a number of old growth veterans, is suggestive of some manner of anthropogenic ground disturbance to the north east of the wetlands. Judging from the size of the trees this patch of deciduous forest may have been selective logging some decades prior to 1938. There is an approximately 40 metre offset between the wetlands and anomalous forest cover. The wetlands, with boundaries similar to the current wetland, are readily apparent. There is no evidence of water ponding within the wetland; vegetation within the wetland is bushy or herbaceous and suggestive of hummocky terrain rather than a flat bottomed marsh or an excavated (man-made) dug out. Similar wetlands, at similar ground elevations, are about kilometre north and south of the site. There observations indicate it is unlikely the east flank of the wetland is a dam or dike like structure built by early 20th century railroad logging crews.

The 1946 air photographs reveal vegetation recovering from 1930's era logging around the wetlands. What appears to be a lineament upon the 1938 air photographs has been developed into a well-used bypass haul road that runs parallel to the foreshore and Highway 19. The bypass road runs behind a large logging camp to an active booming ground approximately one kilometre east of the wetland. There is no trace of the booming ground in the 1938 imagery. The logging camp contains a maintenance shop, an office and approximately 40 buildings for staff accommodations. Extensive skidder logging is visible to the southwest of the camp. Iron River Road appears to have been redeveloped into a main haul road to support large scale logging operations well into the interior of Vancouver Island. The booming grounds later evolves into the modern foreshore spit and intertidal lagoon along Oyster Bay. Two spur roads appear off of Iron River Road to the north west of the wetland. One of the spur roads was likely built within 50 metres of the artificial beaver dam. Why this spur was built towards the wetland is not clear; it may have been built to allow access to fresh water from the creek or enable extraction of the last of the large timber in the area.

The 1957 photographs reveal the booming ground to be inactive and most of the logging camp has been debuilt. A sizeable lineament emulates from remnants of the camp some 300 metres south of the wetland and runs directly up slope to perhaps 25 metres south of what is now

Mister Audet's property. There is an opening, possibly a water filled pit, at the top of the lineament. The lineament may be a ditch and well system built to supply water to the logging camp or a heavily scarred yarding corridor used to extract timber in the area. There is a new skid trail off of Iron River Road some 500 metres west of wetland. The spur roads to the north of the wetland are revegetating. The bottom of the wetland appears damp; there may be standing water within the wetland 40 metres south east of the 1999 artificial beaver dam. The wetland to the south of the decommissioned logging camp is water filled.

The Jun 8, 1964 photographs reveal an advancing regenerative forest surrounding the wetlands. The bypass road is brushing in. The maintenance shop has disappeared. A single building is left standing within the logging camp. The lineament emulating from the camp is brushing in. The spur roads near the wetland continue to brush in. The wetland appears water free but herbaceous vegetation suggests seasonal flooding.

The 1968 to 1991 photographs reveal the last of the camp buildings are gone; the camp, the bypass road and spur roads to the north of the wetland gradually brush in. Evidence of beaver dams and ponds appear within the wetland. Housing developments appear to the north and south of the site. There is no evidence of logging near the wetland. Iron River Road is clear. Later images reveal logging of second growth timber some 600 metres west of the wetland.

The Jul 14, 1996 air photographs are images are clear but small scale. Harvesting of the second growth to the west on the wetlands continues. The pools of standing water within the wetlands appear to have shrunk. Tendrils emulating from the southern pool have disappeared suggesting beaver have abandoned the southern beaver pond. Iron River Road is brushing in. Wetlands to the north and south are dry.

Collectively the 1946 to 1996 air photographs indicate the east flank of the wetlands are not a dam or dyke like structure built by mid to late 20th century logging crews. The mid-20th century logging camp have drawn water from the creek but there is no evidence logging crews built a 400 metre long lateral dam at the site.

The Jul 16, 2005 google earth images reveal logging in and around the wetlands. It appears an approximately 100 ha variable retention (VR) block was taken from the area in the early 2000s; perhaps 85% of stems were extracted within the VR block. A buffer of standing timber, approximately 60 metres wide, has been left along the north, west and south margins of the wetland. A buffer one or two tree stems wide (10 metres?) had been left along the east side of the wetland. A gravel pit was developed to the south east of the wetland. The gravel pit has a surface area of approximately 4,000 square metres and encroaches to within 30 metres of the wetland. Perhaps a third of the gravel pit is flooded. A loop road encircled the wetland.

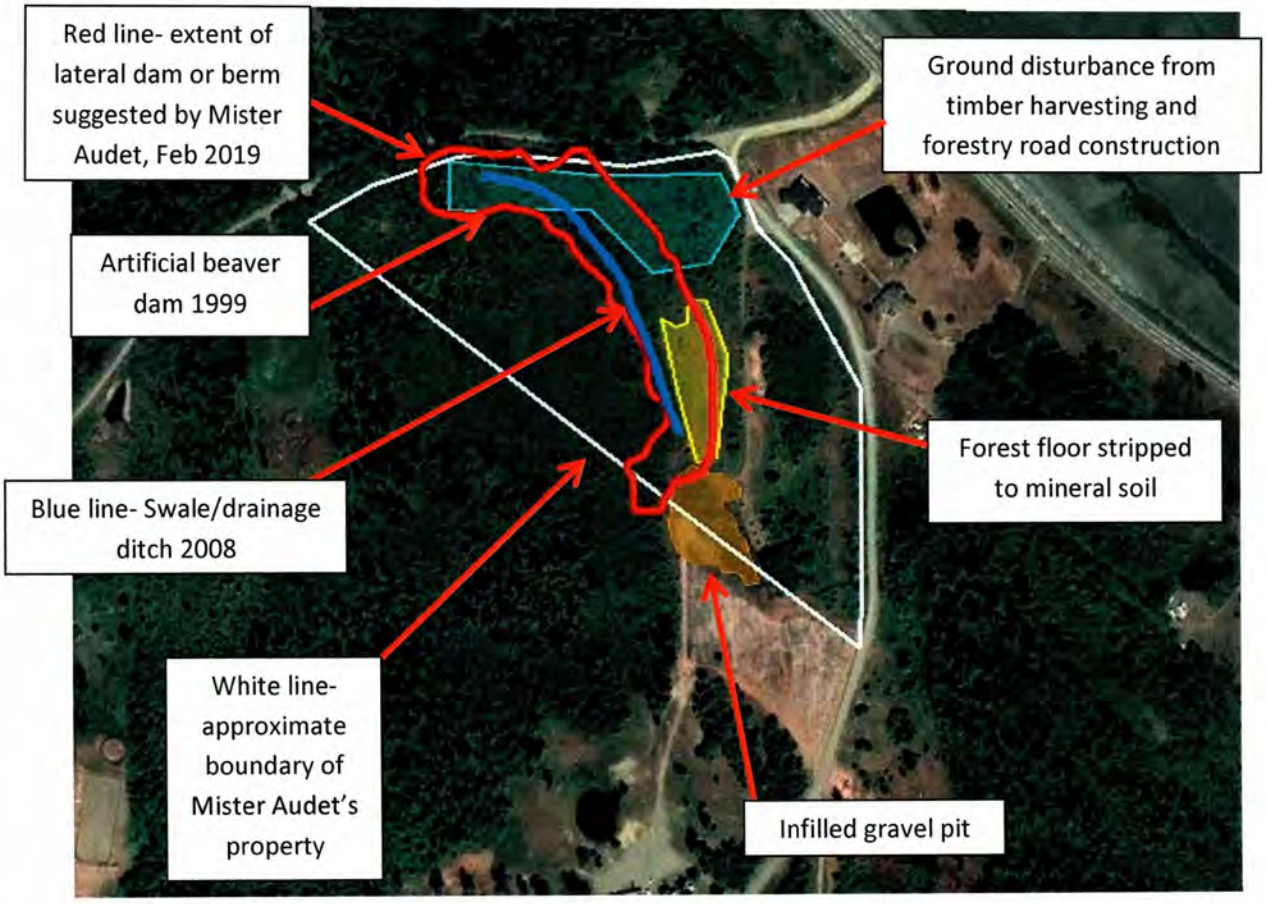
Perhaps 2.5 kilometres of new logging road and skid trails have been built around the wetland. Portions of the long abandon bypass haul road visible in the 1938, 1946 and 1957 imagery has been rebuilt.

The 2012, 2014 and 2015 google earth images reveal land development around the wetlands. Typical construction sequence is grubbing (topsoil, stumps and tree root clearing) and gravel pit development, followed by housing development. The images suggest grubbing of perhaps a hectare of ground immediately east of the wetland between 2005 and 2012. The road that once serviced the 2005 gravel pit has been abandoned in favour of a new alignment 90 metres to the east. A lineament between the first and second roads is suggestive of a third road developed and abandoned upon Mister Audet's property between 2005 and 2012. A lineament appears along the north east edge of the wetland; later images and historical records suggest this lineament is a ditch. A lineament also appears across the top of the 2005 gravel pit; later images and historical records suggest this feature is a clay filled trench, built to reduce seepage into adjacent the gravel pit. The trench is later filled with soil to create a berm.

The Jun 14, 2019 google earth images are sharp and clear; they reveal active mining of gravel within a new pit about 500 metres south of the wetlands and about one hectare of ground disturbance to the south of Mister Audet's property. The drainage ditch/swale running along the east side of the wetland is visible. Vegetation of the ground to the east of the wetland is suggestive of stripping of the forest floor to the underlying mineral soil some years earlier.

LiDAR derived ground contours indicate local topography is gentle; the ground to the east of the wetland averages 4% over horizontal distances in the range of 120 metres. Steeper, local, side slopes have been induced by road construction, gravel pit extraction, etc.

Figure 4- Summary of remote sensing observations



Remote sensing observations are summarized in Figure 4. Supporting commentary is:

It is possible, perhaps probable, Mayfly Creek and the wetlands were manipulated to suit the needs of early logging crews; however, the scale of ground disturbance appears to have been much smaller than that suggested by Mister Audet. Most of what Mister Audet suggests is a lateral dam built by early 20th century logging crews is, in my opinion, native ground repeatedly disturbed by historical logging operations and land development processes.

Beaver have been an issue within the wetlands for much of the historical record. However, there is no evidence of beaver activity in the earliest available air photographs. Beaver were likely were extricated (eliminated) from the area by early settlers and logging crews.

Human disturbances at the north end of the wetlands include: skidder and road based logging of the area between perhaps 1910 and 1960 and manipulation of the creek by forestry operations in the area. Early logging crews may have channeled the creek to a convenient crossing point along Iron River Road some 90 years ago; such stream channel modifications

were common along private forestry roads until the late 1990's. It is possible; perhaps probable, early logging crews took water from Mayfly Creek to supply to the logging camp visible in the 1946 air photographs. The artificial beaver dam is an example of modern forestry operations manipulating the stream to facilitate forestry operations. The land owners of the day earned public good will by allowing the construction of the dam upon their property.

Human disturbances to the mid-section of what Mister Audet suggests is an improvised lateral dam is likely limited to road construction and skidder based logging in the 1930 to 1960 and ground disturbance associated with land development in the early 2000s. The largest ground disturbance in the mid-section of the embankment appears to have been logging and stripping of the forest floor to the underlying sandy mineral soil in the early 2000s.

Human ground disturbance at the south end of the lateral dam is much closer to Mister Audet's site description. The excavation and subsequent backfilling of a gravel pit in the area is a good approximation of the site conditions he describes in his report of February 2019. However, the ground disturbance was made in the early 21st century, not the early 20th century, as suggested by Mister Audet.

6.0 Past reports reviewed

Many documents were made available to me during this investigation. Key documents and reported circumstances of the site are:

1. Mister Andre Audet's 212 page report, with a two page covering letter, regarding the site dated February 2019.
2. A letter dated November 16, 2012 addressed to Stacey Larson DFO outlining Mister Audet's understanding of site circumstances in late 2012.
3. A summary of key site circumstances developed by the FLNRORD Dam Safety program since March of 2019. Specifically:
    a. The Dam Safety program was unaware of the Mayfly Creek issues until March of 2019.
    b. An approximately one metre high artificial beaver (placed rock fill) dam was built by the Oyster Bay Stream Keepers (a now dyfunct community group) in 1999 using Fisheries Renewal BC funding at the site of the spillway reported by Mister Audet. MacMillan Bloedel Limited (M&B) owned the land in 1999.
    c. The artificial beaver dam was built to approximate the effects of natural beaver dams along the creek. The steam keepers proposed an artificial dam to restore "natural" beaver dam water storage and thereby maintain "natural" stream flow

along Mayfly Creek. Apparently beaver had abandoned the site some years prior to 1999 and unmaintained beaver dams were deteriorating at the time of the stream keepers' site assessments.

d. The artificial beaver dam is estimated by current (2019) FLNRORD sources to store somewhere between 14,555 and 32,000 cubic metres of water.
e. Residential development was proposed around the wetland and dam in the early 2000s. Land ownership changed hands; ultimately the land around the wetland was developed for large lot residential dwellings. Conservation covenants were placed upon the land around the wetland and artificial beaver dam as part of the land development process in 2005 and 2008.
f. The wetland and artificial beaver dam was found to be leaky and could not hold water into the summer months. Work was undertaken by Oyster Bay Development Limited (then current landowners) in 2008 to seal the dam. Sealing works included construction of an approximately 300m long drainage swale (ditch) on the east bank of the wetland to direct seepage northward towards Mayfly Creek and erection of an approximately 50 metre long berm across the top of a gravel pit excavated at the south end of Mister Audet's property.
g. Mister Audet purchased the property in 2009.
h. In 2012 downstream neighbours proposed removal of the artificial beaver dam to improve drainage upon their property. The neighbour's request to remove the dam was declined. The neighbours improved approximately 60 metre of ditch and installed a 600mm plastic pipe culvert along Iron River Road to improve drainage upon their property.
i. There is now a beaver dam within the spillway of the artificial beaver dam. The beaver dam increases the effective height of the dam to approximately 1.5 metres.
j. An email dated: 2019-03-13, 1:35PM from Andre J Audet to John Baldwin, FLNRORD Dam Safety Officer indicating "*there should be no verbal communication between myself (Mr Audet) and government personnel at any level*" and inviting questions regarding the Mayfly wetland to be submitted in writing to the return address on Mister Audet's cover letter of February 27, 2019.
k. Email correspondence within FLNRORD concluding that despite the seasonally dry nature of the wetland it appears the dam should be regulated in accordance with the Dam Safety Regulation. A consequence rating of low is likely not appropriate given that there are roads within the dam failure inundation area.
l. An email dated: April 11, 2019 4:01PM from Robert McLean FLNRORD Senior Dam Safety Engineer to John Baldwin FLNRORD Dam Safety Officer indicating he had conducted an office review of Mister Audet's cover letter and report, examined readily available remote sensing data such as google earth imagery and topography

and concluded *"failure of the dam would not result in a catastrophic event based on the information... reviewed."*.

m. The area of anomalous groundwater flow and surface collapse reported by Mister Audet at the south end of his property appears to correspond to the site of an early 2000s gravel pit. Local residents report the gravel pit was excavated and back filled during the development process. Reportedly the pit was back filled with an assortment of materials including stumps, logs, topsoil, surplus mineral soil and trucked in fill.

n. There is no evidence that the right abutment of the artificial beaver dam is founded upon a 400 metre long berm built by a small scale rail-road logging operation in the early 20th century. The berm appears to be some manner of uplifted ground feature from long past sea level variations.

4. A Habitat and Riparian Assessment report written by Don Chamberlain for the Oyster Bay Streamkeepers dated March 1998. A paragraph within the report proposed construction of a berm at the outlet of the beaver pond at the site. The report indicated: *"The water level in the pond had dropped an estimated 80 cm from when beaver were active in the pond. There does not appear to have been any beaver activity in the pond in the past two years and the dam has deteriorated."* This appears to be the origins of later proposals, site assessments and designs that resulted in the artificial beaver dam that currently occupies the site.
5. What appears to be a funding request for design and construction of a dam, two rock weirs and three log weirs along Mayfly Creek. The construction start date was projected to be June 15, 1999. The total cost of the project was projected to be $10,800, with most of the projected cost being $5,120 to build a small dam upon the creek. Quantity estimates are inexact but point towards 45.8 cubic metres of shot rock (5 truck loads?) and two truck loads (12 cubic metres?) of fill to build the dam.
6. Drawings prepared by G Eriksen of the Oyster Bay Streamkeepers dated Oct 27, 1998. The drawings are difficult to follow. The drawings appear to be a summary of design options to replace an existing beaver dam with a gravel cored, rock armoured, dam. Elements of the drawings indicate the proposed dam would flood an area of 9.61 ha at a dam height of 1.5m and retain 22,918 cubic metres of water at one metre of head. Other elements of the drawings refer to a dam height of 1.2 metres flooding an area that is comparable to the then current beaver pond. Other elements of the drawings refer to a design height of one metre above the "existing WL Oct 26/98". What survey data was available to support the reservoir estimates are unknown. The drawings suggest up to five weirs (six counting a low profile variant of the artificial beaver dam) along the stream were under consideration in 1998. Two rock weirs are proposed along

the creek immediately downstream of the dam with design heights of 50 centimetres. Log weirs are proposed well upstream of the dam with heights of 0.25 centimetres.

7. A second set of drawings by G Eriksen of the Oyster Bay Streamkeepers marked Revision 1 drawings A and B dated Oct 27, 1998 and Drawing C dated Jan 22, 1999. Drawings A and B include handwritten notations that report the water level behind the beaver dam Jan 22, 1999. Drawing A appears to indicate a weir 0.6m high at the dam site would flood an area of 9.61 ha and store 14,555 cubic metres of water. Other notations upon Drawing A suggest the Jan 22/99 water level (also referred to as "top of dam") was 0.93 metres above a local reference point. The drawings are difficult to interpret but appear to suggest an approximately one metre high, gravel cored, rock armoured dam was proposed for the site in late 1998 and early 1999.
8. A report entitled: Stream 5 Beaver Dam: Hydrological Assessment by Kelly Eakins, Forest Hydrologist, signed and sealed by Don Reksten, Professional Engineer, of the Eakins Hydrological Consulting (Eakins) dated January 1999. Attached to the report is an Addendum dated March 26, 1999 and handwritten notes by Grant Eriksen of the Oyster Bay Streamkeepers dated Jan 22, 1999. These documents are difficult to follow but appear to indicate:
    a. Three level and chain site surveys were conducted in late 1998 and early 1999 to determine the storage capacity of the proposed dam. Eakins reports the storage capacity of the dam at a design elevation of 1.1 metres above the existing lower (beaver) dam spillway to be 6,000 cubic metres. The Streamkeepers report the storage capacity of the dam as 14,555 cubic metres apparently assuming a design height of 0.99 metres at the lower beaver dam. There is no clear explanation for the differing reservoir capacity estimates for what appears to be similar dam heights and locations along Mayfly Creek.
    b. A drawing attached to the Eakins report suggests a streamlet was outflanking the upper beaver dam upon the right bank of the creek in 1999.
    c. There was discussion of the need for perimeter berms upon the upper and lower beaver ponds. Eakins concludes a perimeter berm is needed for the lower pond but not required for the upper pond.
    d. There is no indication the proposed dam would replace, or be built atop, a pre-existing, man-made, structure at the site.
9. A Mayfly Creek (Stream 5) report prepared by D.R. Clough and Warren Wartigg Registered Professional Biologists dated March 2001. Most of this report deals with proposed stream improvements for fish downstream of the dam. Key points relative to the wetlands are:
    a. The artificial beaver dam is reported to have been built in the 1999 fish window.
    b. Despite the dam there were still inadequate summer flows in the lower stream reaches.

c. The elevation of the dam is reported to be 13.1 metres above high tide. The as built elevation of the dam appears to be supported by a site survey tied in to sea level.
d. The reservoir of the dam is reported to be 9.61 ha with a storage capacity of 14,500 cubic metres. The capacity of the dam appears to be based upon G Eriksen's drawings of dated January 22, 1999; elements of G Eriksen's drawings are attached to the biologists' report.
e. There is no indication perimeter berms were built to improve the storage capacity of the dam.

10. A Mayfly Creek (stream 5) Restoration proposal prepared by Erika L Anderson, B. Sc., of FishFor Contracting Limited (FishFor) dated June 2007. Key points relevant to the study area:
    a. The area was impacted by past land use activities.
    b. An artificial beaver dam had been built some years earlier. Since construction of the artificial beaver dam, there has been use of the site by beaver. Despite the dam summer base flows were inadequate. Overflow during winter was escaping to the east. A swale and weir were recommended to redirect seasonal overflow back to Mayfly Creek.
    c. An excavated trench adjacent to the southeast end of the beaver pond, filled with clay some years earlier in an attempt to reduce seepage, had settled leaving a large trench. Water from the trench was flowing away from Mayfly Creek towards an old gravel pit filled with stumps. It was recommended the trench be infilled. The attached maps indicate the trench was at the south end of what is now Mister Audet's property.
    d. A clay berm at the outlet of the gravel pit is discussed. It was suggested by the Steamkeepers that a clay berm at the outlet of the gravel pit may help maintain local hydraulic pressure and hereby reduce groundwater seepage towards the gravel pit. The attached map indicates the clay berm and stump filled gravel pit are within the area Mister Audet reports unusual ground subsidence and seepage.
    e. Three drainage issues with roads around the wetlands are discussed. Roads had disturbed natural patterns of drainage. Corrective measures are recommended to produce more naturalistic patterns of water movement.
11. A Summary of the Mayfly Creek Restoration Project prepared by Cindy Hannah, Registered Professional Biologist, of FishFor dated March 11, 2009. This report appears to be a status report regarding the restoration work proposed prepared by FishFor in 2007. Key points:
    a. Ditches were reconfigured and a swale was constructed to redirect overflow from the east side of the beaver pond back to Mayfly Creek. The ditches and

swale were completed by August 2008. Revegetation of the swale was recommended.

b. The trench filled with a clay liner to reduced seepage had been filled with soil as planned. The infilled trench is above the stump filled gravel pit discussed in the 2007 FishFor report.
c. The clay berm at outlet of gravel pit proposed in 2007 had not been installed. In lieu of the clay berm it was decided to remove the stumps and backfill the gravel pit with soil. Gravel pit improvements had been started in April of 2008 but had not been completed. Gravel pit improvements were needed to meet the obligations of the restoration proposal.
d. Roads around the wetland had been treated to produce a better approximation of natural slope drainage.

12. A Riparian Areas Regulation: Assessment Report by Cindy Hannah, Registered Professional Biologist, dated 2009-10-07. Key elements of this report relative to the dam are:
    a. The 2007 restoration plan had been completed.
    b. Water stored behind the artificial beaver dam was overflowing in the winter and escaping the drainage.
    c. Beaver activity had enlarged the wetland. The wetland now extended past the covenant boundary.
13. Hard copy of eight site photographs. Date stamps and handwritten notes upon the photographs indicate they were collected by John Baldwin FLNRORD Dam Safety Officer March 7, March 25 or April 16, 2019. The photographs illustrate: the south end of the wetland near the old gravel pit, the drainage ditch near the old gravel pit at the south end of Mister Audet's property, a panoramic view of the wetlands and clearing around Mister Audet's trailer, vegetation within the wetland, water levels behind the dam and dam details.

In summary the study area has been examined by at least six interested parties (Mister Audet, MacMillan and Bloedel, the Oyster Bay Streamkeepers, Oyster Bay Development Limited, Fishfor and the BC Dam Safety program) since 1998. Most of the reviewers have commented upon the environmental value of the wetlands and recommended works to mitigate historical ground disturbances in the area. Most reviewers have seen the wetlands as a natural ground feature disturbed by: historical land use practices (logging), the artificial beaver dam, excavation of a gravel pit near the south end of the wetlands and efforts to redirect seepage from the wetlands back towards Mayfly Creek.

7.0 Findings from field review

All photographs within this section of this report were collected July 30, 2019. The wetland was dry during our site assessment.

The northern portion of Mister Audet's property that we traversed exhibited dense foliage characteristic of an undisturbed wetland or native ground disturbed by historical timber falling, yarding and road construction practices. Photograph 1 and 2 illustrates typical site conditions.

Photograph 1

Dense vegetation within the wetlands.

Typical wetland conditions.

Location: 49.89883, -125.16675
Elevation: 27.0 m
Time Created: 2019-07-30, 11:10:14 AM PDT

Photograph 2

Large, saw cut, stump. Notice the sizeable tree growing from the rotten stump.
Such ground conditions are characteristic of conventional old growth harvesting operations.

Location: 49.89840, -125.16455
Elevation: 19.1 m
Time Created: 2019-07-30, 12:45:07 PM PDT

Photograph 3

Tree cored to approximate the age of the surrounding forest and old growth stumps.

Location: 49.89901, -125.16668
Elevation: 19.0 m
Time Created: 2019-07-30, 11:40:34 AM PDT

:

We increment bored the Douglas fir illustrated in photograph 3. We measured the circumference of the tree to be 3.1 metres for a radius of 49 cm. Assuming the tree had a four centimetre thick layer of bark points towards a debarked radius of 45 cm. We sampled the tree with a short (40 centrimetre) and long (66 centrimetre) increment bore. Both cores missed the pith of tree. The:

1. Short increment bore yielded 31 cm of stem for a tree ring count of 83. Adjusting for the unsampled core of the tree suggests a probable age of 120 years (actual tree count of 83 divided by 31 cm length of recovered core multiplied by the estimated 45 cm true radius of the stem).
2. Long increment bore recovered 55 cm of stem but 17 cm of the recovered core where from the opposite side of the tree. The tree ring count upon the near side of the tree was 78. Adjusting for the missing core of the stem suggests an age of at least 92 years (raw count of 78 divided by 38 cm of targeted stem multiplied by estimated 45 cm true radius of the stem).

The short increment bore sampled closer to the pith than the long increment bore. As a consequence the short increment bore should yield a better estimate of the tree's age.

We documented approximately a dozen large rotten, saw cut, stumps at the site. The stumps lacked Humboldt undercuts[17] suggesting they were harvested prior to 1950. The stumps are likely relics of 1930 to 1960 old growth logging operations in the area. The stumps were too old and rotten to core. Stem diameters were similar to or larger (up to 170 cm) than the tree we cored. The larger of the rotten stumps was likely 170 to 225 old when harvested[18]. Assuming the largest saw cut stump was harvested in 1970 suggests it was a seedling in 1745 to 1800. Assuming the smaller of the stumps were 100 years old when harvested and the forest was harvested in 1950, when historical air photographs indicate old growth harvesting operations had ceased and Humboldt undercuts become common along coastal BC, suggests the stumps were seedlings in 1850. The distribution and probable age of the saw cut stumps suggests normal, rather than unusual severe, ground disturbance by early logging operations.

The mid-section of Mister Audet's property is characteristic of forested land stripped to mineral soil during the land development process. Photographs 4, 5 and 6 illustrate typical site conditions.

[17] A falling technique enabled by mid-20th century, light weight, chain saws.
[18] Age prorated from rate of growth for sampled tree.

Photograph 4

Island of original forest floor surrounded by a clearing.
The clearing is characteristic of forested lands stripped to mineral soil.

Location: 49.89789, -125.16463
Elevation: 15.5 m
Time Created: 2019-07-30, 12:42:17 PM PDT

Photograph 5

Shallow test pit near the site of photograph 4.
Notice the absence of tree roots and top soil.
Loose sand found to full (0.5 metre) depth of test pit.

Photograph 6

Typical sandy soil found along access road upon Mister Audet's property.

Location: 49.89792, -125.16392
Elevation: 16.3 m
Time Created: 2019-07-30, 12:05:34 PM PDT

The ground conditions at the south end of Mister Audet's property are consistent his and historical FishFor reports. The thin collapsing soil crust, abundance of groundwater seepage and evidence of buried wood are consistent with Mister Audet's and FishFor's site descriptions.

Photograph 7

Soil atop buried wood and abundant ground water seepage at the south end of Mister Audet's property.

Location: 49.89654, -125.16373
Elevation: 15.3 m
Time Created: 2019-07-30, 12:10:53 PM PDT

8.0 Geometrics

The surface area of the ground feature Mister Audet suggests may be an improvised dam or dyke like structure is approximately 19,000 square metres[19]. He suggests the structure may be composed of a random mixture of soil and wood to a depth in excess of four metres. Assuming an average depth of two metres yields an estimate of 38,000 cubic metres of earth work for early logging crews to build the dam like structure. It is unlikely early 20th century railroad logging crews would undertake such extensive earthworks to support the short term, small scale, harvesting operations visible within the earliest available (1938) air photographs.

Technical and professional site assessments during the design phase of the artificial beaver dam in 1999 point towards:

1. Dam heights in the range of one to 1.5 metres.
2. Flooded areas in the range of 10 ha (100,000 square metres).
3. Storage capacities in the range of 6,000 to 23,000 cubic metres of water.

There may be sediments within the wetland prone to liquefaction during a dam burst flood or ground shaking due to an earthquake; however, unless there are serious errors in the dam designer's estimates and our recent site assessment, it is unlikely the artificial beaver dam will produce the scale of mud and debris flow (1,000,000 metric tonnes) suggested by Mister Audet.

9.0 Creek hydrology and dam burst flood estimates

LiDAR derived synthetic drainage paths suggest Mayfly Creek has a drainage area of approximately 1.2 square kilometres. Applying the LiDAR derived drainage area, using the regional approach suggested by the CulvertBC website[20], with hydrological station 08HB075 (Dove Creek) as an index, suggests Q2 (two year return period) peak flows along the creek could be in the range of three cubic metres per second. Q100 (one hundred year return period) floods could be in the range of five cubic metres per second. The regional approach to flood estimation does not consider beaver dam failures. A large beaver dam failure within the wetlands would be expected to produce downstream floods greater than five cubic metres per second.

The designers and builders of the artificial beaver dam estimated it would have a reservoir with an area of approximately 10 ha with a dam height in the range of 1.2 metres. LiDAR derived

[19] As reported google earth, professional edition, site measurements.
[20] https://www.culvertbc.ca/s

ground contours suggest the reservoir may be closer to 6 ha. In any case dam breach discharge estimation tables suggest a 1.2 metre high dam with a reservoir >3 ha could produce peak discharges in the range of 12 cubic metres per second (FLNRORD, 2016).

Assuming the reservoir has a capacity of 10,000 cubic metres and the average rate of discharge is six cubic metres per second implies the reservoir would fully drain in about half an hour. If the reservoir holds 30,000 cubic metres of liquefiable soil and water that drain at six cubic metres per second the reservoir would fully drain in a little under two hours. The resulting downstream flood would be very large compared to natural run off events, excepting beaver dam burst floods, within the drainage.

The owner of the dam would be well advised to:

1. Verify the above reservoir estimates. It is unlikely the above reservoir and dam burst flood estimates are accurate.
2. Refine natural flood estimates for Mayfly Creek. The CulvertBC methodology is a good indicator of probable site conditions; however, more advanced analysis should yield more reliable estimates of long return period (100+ year) peak flows within the drainage. The frequency and magnitude of beaver dam burst floods would be a key issue to explore within the drainage.
3. Inspect the stream channel to the ocean below the artificial beaver dam. There is a good chance there are paleo stream channels along the lower reaches of Mayfly Creek that would accommodate peak flows from a dam burst flood within the wetlands. LiDAR suggests there is a 40 metre offset between the lower stream channel and the Glenn Alder RV Park. The stream crossing along Highway 19A should also be examined. Design data from design of the highway stream crossing and field evidence of peak flows at the highway could also be insightful.

10.0 Conclusions

1. The ground feature that Mister Audet refers to as a Latteral Dam or Berm within Figure 1 of his February 2019 report is predominately natural in origin. It is unlikely the feature is an improvised dam or dyke system built by early 20th century railroad logging crews. The feature is most likely some manner of uplifted paleo beach front berm and intertidal zone from sea level changes some 12,700 years ago.

2. While it is unlikely the ground feature Mister Audet refers to as a Lateral Dam or Berm is predominately a man-made feature it has definitely been modified by forestry operations,

stream restoration efforts and land development processes. The most obvious anthropogenic ground disturbances upon Mister Audet's property are:

a. Early (potentially 1910 to 1960) timber harvesting and forestry road construction operations around the wetlands. Iron River Road was built by 1938. Creeks were frequently realigned to the convenience of road crews of the era. In the 1940s and 1950s a major haul road crossed the north west section of his property. The haul road likely entailed 1,600 square metres of soil disturbance. An assortment of spur roads, skid trails and cable yarding corridors would have induced additional ground disturbance upon Mister Audet's property around the wetland between approximately 1930 and 2005.
b. Construction of the artificial beaver dam upon the creek in 1999.
c. Excavation of a gravel pit at the south end of the wetland in the early 2000s. Google earth imagery suggests the gravel pit involved 4,000 squares of ground disturbance. Perhaps 60% of the gravel pit is on Mister Audet's property. LiDAR data and field measurements suggest the gravel pit was relatively shallow; likely no more than five metres deep. The infilled gravel pit, at least partially underlain by woody debris, explains the seepage, thin soil crusts underlain by wood and ground collapse features reported by Mister Audet and confirmed by FLNRORD staff during our site visit.
d. Excavation of an approximately 300 metre long, shallow, drainage ditch along the east side of the wetland in 2008.
e. Stripping of the forest floor to mineral soil in the mid-section of the berm in the early 2000s. Google earth images and field observations suggest perhaps 5,500 square metres of his property was stripped to mineral soil during land development and gravel pit operations in the early 2000s.

3. The dam's failure potential is ambiguous. Most of the terrain the wetland is situated upon is gently sloping, native, ground that is thousands of years old. It is unlikely that such time tested terrain will fail catastrophically unless it is disturbed by humans or a major natural disturbance such as an earthquake. Points of weakness created by historical ground disturbances and foreseeable natural processes are:

a. The artificial beaver dam built in 1999. While this structure appears to have been well built there could be hidden defects within the dam. The seismic resistance of the dam is unclear; abrupt dam failure is possible when a major seismic event next occurs in the area. Abrupt dam failure is most likely to occur over the winter months when the dam reservoir is full.

b. Water diversions due to beaver. Beaver have returned to wetlands. Beavers' ability to plug dam spillways and induce overtopping or outflanking style dam failures is well established. Maintenance is usually prescribed to reduce the likelihood of beaver induced dam failures. Beaver are persistent creatures. Over time remediation of beaver damage can be costly.

c. Unnatural groundwater pressures created by the artificial beaver dam and beaver dams atop the man-made dam. There could be hidden points of weakness along the dam and native ground around the wetland; such points of weakness, coupled with unnatural water pressures and a seismic event could produce a dam failure.

d. The gravel pit at the south end of the wetland. Seepage into the pit from the wetlands appears to have been an issue for at least a decade. Sub surface erosion (piping) could be occurring during the wet season. Someday sub surface erosion could threaten the dam's reservoir.

4. The consequences of a dam burst flood are worthy of additional assessment. Preliminary analysis suggests a dam burst flood associated with the artificial beaver dam would produce peak flows in the range of 12 cubic metres per second. It is unclear if flood water would affect the Glenn Alder RV Park. It is also unclear what effects the flood waters would have upon the old Island Highway.

Overall I would judge the current, dry season, dam failure potential to be very low approaching nil. Failure potential will increase this fall as the reservoir fills. Without maintenance the dam's failure potential will increase. Given a reasonable program of dam inspection and maintenance, and the absence of a major seismic event, the artificial beaver dam's failure potential is low. Without maintenance, eventually, the artificial dam will fail.

11.0 Recommendations

1. The Dam Safety program request a meeting with Mister Audet. Data sharing should be to the benefit of all parties involved in the matter.

2. Trenching be considered as a means of exploring sub surface conditions. A few deep trenches on Mister Audet's property should confirm the nature of local ground conditions. As discussed above most of the berm appears to be a paleo beach front disturbed by historical logging operations and recent land development work. The infilled gravel pit at the south end of Mister Audet's property, stripping of top soil and the artificial beaver dam

on Mayfly Creek are the largest, readily apparent, man-made ground disturbances at the site. Test pits would be a relatively inexpensive means to improve our understanding of sub surface conditions.

3. The site be monitored during the upcoming winter. Observation of beaver activity, high-water marks, the maximum areal extent of the reservoir, overflow from the wetland and seepage from the infilled gravel pit would assist further site assessments.

4. If the artificial beaver dam is deemed to be a dam under the Water Sustainability Act a dam owner be identified. The dam owner should investigate the site, propose a dam failure consequence rating and comply with all applicable regulations and generally accepted standards of practice for such a dam.

5. All parties consider lowering or removal of the artificial beaver dam. It appears the dam was proposed in 1998 to approximate the effects of a deteriorating, natural, beaver dam within the wetlands. Historical records (FishFor 2007) and recent observations by Dam Safety program staff suggest beaver have returned to the site. It follows that need for the man-made dam is open to debate.

6. The conclusions and recommendations of this report be reconsidered after: meeting with Mister Audet, site observations this winter, clarification of the artificial beaver dam's status under the Water Sustainability Act and ownership.

12.0 Closure

My thanks to:

1. Mister Audet, Professional Engineer, for bring this matter to our attention; long abandoned natural resource infrastructure are a recurrent issue within British Columbia. Well-reasoned reports of potentially hazardous structures are appreciated.

2. John Baldwin, FLNRORD, Dam Safety Specialist. John's assistance with this matter is appreciated.

3. Greg Dohm, Professional Engineer, FLNRORD, Area Engineer. Greg's insights upon site hydrology and comments upon a draft edition of this report are appreciated.

Should you have any questions regarding this report please contact me at 250-751-7073 or via email at Hardy.Bartle@gov.bc.ca

Prepared by: 2019-08-26
Hardy Bartle, Professional Engineer

References

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Structural Engineers of Association of BC., 2013. British Columbia Earthquake Fact Sheet.

Edith Watson

From: Tom Yates
Sent: January 22, 2021 11:30 AM
To: Edith Watson
Subject: FW: Concern Regarding Mayfly Creek Dam
Attachments: Ltr Audit to EGBC 10.28.19.pdf; 2019-11-25 LT Strathcona.pdf

From: SRD Board Chair <schair@strathconard.ca>
Sent: December 2, 2019 7:40 PM
To: Tom Yates <TYates@srd.ca>; David Leitch <DLeitch@srd.ca>
Subject: Fwd: Concern Regarding Mayfly Creek Dam

Begin forwarded message:

From: President (Lianna Mah) <president@egbc.ca>
Date: Dec 2, 2019 at 10:14 AM
To: SRD Board Chair <schair@strathconard.ca>
Cc: Andre <andre@audet.ws>, Ann English <aenglish@egbc.ca>, Tony Chong <tchong@egbc.ca>, Peter Mitchell <mitchell@egbc.ca>, Efrem Swartz <eswartz@egbc.ca>
Subject: Concern Regarding Mayfly Creek Dam

Dear Ms. Babchuk,

I write on behalf of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (the "Association"), also operating as Engineers and Geoscientists BC, in relation to the letter of October 28, 2019 from Mr. Andre Audet, P.Eng., to the Association (copy attached).

Mr. Audet's letter concerned the risk of collapse of a dam on Mayfly Creek (the "Dam"), which is located on Mr. Audet's property, south of Campbell River, BC. In his letter, Mr. Audet stated that the collapse of the Dam could threaten life and property in the area and as a result Mr. Audet was reporting the issue with the Dam to the Association pursuant to his duty to report under Principle 9 of the Association's *Code of Ethics*.

In accordance with the Association's duty to uphold and protect the public interest pursuant to section 4.1(1)(a) of the *Engineers and Geoscientists Act,* R.S.B.C. 1996, c. 116, I am enclosing Mr. Audet's letter for your consideration. Please note that the Association does not require a response from the Strathcona Regional District with respect to this matter.

Kind regards,

Lianna Mah, P.Eng., FEC

Lianna Mah, P.Eng., FEC | President

Engineers and Geoscientists British Columbia
200 - 4010 Regent Street, Burnaby, BC, V5C 6N2
Tel: 604.430.8035 | **Toll-Free:** 1.888.430.8035 | **Web:** egbc.ca

Andre J. Audet P.Eng.
2580 Crystal Drive
Courtenay, BC
Canada, V9N 9K1

Email: andre@audet.ws
Tel: 1 250 338 8809
October 28, 20019

Ms. K.V. Tarnai-Lokhorst, P.Eng.
President And Registrar; EGBC
200-4010 Regent Street,
Burnaby, BC, V5C 6N2

Dear Ms. Tarnai-Lokhorst
In compliance with the Code of Ethics Guidelines (Code); specifically;

Principle 1: hold paramount the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace, and
Principle 9: report to their association or other appropriate agencies any hazardous, illegal or unethical professional decisions or practices by engineers, geoscientists, or others,

the writer hereby submits the following concern regarding a potentially life-threatening situation, of which authorities, having been repeatedly advised, and have systematically ignored or dismissed.

Hazard
A provisionally constructed impoundment retaining the seasonal flow of Mayfly Creek, built in the distant past, and modified recently to serve objectives in support of the DFO and other interested parties, and which is described in the attached report (Report), is in an advanced state of deterioration, and will threaten life and property should it fail catastrophically.

Notifications
The writer formally notified authorities of concerns in 2012, at which time no response was received from the three levels of government advised. The attached Report, submitted in February of 2019 was similarly ignored.

Ownership Issues
The dam in question is entirely confined within boundaries on lands owned by the writer, and the waters/sediments retained therein are confined within it and a neighbouring property. Ownership of the dam complex, which extends over more than two hundred metres, falls to Provincial and Regional Governments by virtue of overriding covenants providing same with exclusive rights and obligations for the management thereof.

Water Sustainability Act
The recent Water Sustainability Act contains criteria that rank dams according to the hazards they present, and requires that those meeting certain standards be monitored. The dam system at issue exceeds minimal requirements for monitoring and would also appear to rank as an elevated hazard.

Government Ministry and Agency Responses
None of the Government Ministries responded to the writers February 2019 Report, though the covering letter requested a formal acknowledgement of reception. Repeated requests for same, some forcefully

(see attached letter to the Attorney General of BC) produced response only from the Attorney General and the DFO. There has been no response from 'Regional District' or the 'Ministry of Lands Forests etc.'

This not withstanding, the Dam Safety Division, which falls under the Ministry of Lands, Forests etc., responded casually in March of 2019 (attached Exibit A) in which Mr. Baldwin indicates his interest in examining the site. There was no further contact with that division until late August, at which time Mr. Baldwin invited the writer to an informal meeting to discuss unspecified concerns he and/or his associates may have been contemplating (Exibit B). To this, the writer has respectfully declined, predicated on having no additional technical information he might be qualified to offer, and on the wish to avoid the legal entanglements or perils that such a meeting might precipitate. Further, as there is no evidence that the site was examined during the intervening six months, and Mr. Baldwin clearly states that his offices have made no progress on the file (Exhibit C), any such meeting would seem to be without merit. Moreover, it is certain that at no time has the writer received a request for permission to enter the property from any of the intervening parties, thus further supporting the absence of progress in the investigation.

Current Status

Following a dry summer, seasonal flows in Mayfly Creek resumed in late September, and water levels within the impoundment are now sufficient to cause weeping and piping at several locations. On October 26th, discharge from piping, measured by a weir located at the south end of the system, recorded a flow rate of 120 gpm.

The writer believes this to be evidence of progressive failure, and that the now fully saturated impounding soils retaining the water saturated organic-rich sediment accumulation contained, present a risk of catastrophic failure if impacted by a significant seismic shock. Total load may exceed 1m tonnes, and would threaten homes, local roads and a highway down-gradient.

While my personal liability is largely limited by advisories made to appropriate authorities, it remains my responsibility under the Engineering Act (Code) that you be fully appraised of my concerns. Legal burdens not withstanding, it concerns me deeply that Government officials and their agencies failed to acknowledge reception of an advisory regarding a threat to life and property, and, even more concerning is their collective failure to engage in taking timely actions with respect to it. Accordingly, I ask that you intervene under provisions of the Engineering Act.

This letter-report is provided to your offices by email with supporting documents as digital attachments, and by Canada Post without the voluminous attachments.

Respectfully Submitted,

André J. Audet P.Eng.

cc J. Wilkinson; DFO
D. Donadson; FLNR
M. Babchuk; SRD
J. Baldwin; FLNR:EX
D. Eby; Attorney General

Andre J. Audet P.Eng
2580 Crystal Drive
Courtenay, B.C.
V9N9K1

April 12th, 2019

The Honourable David Eby
Attorney General of B.C.
Room 232 Parliament Buildings
Victoria, B.C. V8V 1X4
Canada,

Sir,

I refer to the attached note, sent by e-mail, in which you dismiss concerns addressed to you in my letter and attached report of February 27, 2019, as being limited to the sole privy of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development. ***They are not!*** Concerns indicated in that reports are largely predicated on liability resulting from the dam referred to in your note. As the Province's ranking lawyer you will no doubt be reasonably aware that a potential for dam failure, where lives are at stake, carries significant liability. It is for that reason that I have advised you and now emphasis, that the stated hazards carry elevated liability where failure to act in a timely manner results in catastrophe. Clearly, my warnings with respect to these things have been ignored since first raised in 2012. You will appreciate that, while I maintain that no liability is incumbent on the land owner for reasons outlined in my report, it remains the land owner's responsibility to ensure that those risks be mitigated by reporting them to those responsible, and who may be unaware of the situation, or who may deliberately avoid knowing. My report to you, which partially satisfies those obligations, requires that there be formal *acknowledgment of awareness and reception* in order that my legal status be fully protected.

Note that I received no acknowledgment from any government official copied in my letter report dated November 16, 2012 other than an undated email from Ms. Larsen in which potential hazards and associated issues of liability are neither stated nor addressed. That not withstanding, since Larsen has no official capacity in government, any initiative she might have taken would have had little value. Moreover, it is significant that none of the Government officials addressed by me, and those who would have been copied in Ms. Larsen's correspondence, saw fit to respond.

The said report and covering letter, addressed to you, Mr. Donaldson, and several others, specifically requests an official response on government letterhead. However, I've not received that from you, or any of the others. Further, I consider the casual email received from you, on my second request for a response, to be a disrespectful snub. Therefore, I again request that you ***formally*** acknowledge reception of my report, which addresses concerns relating to stability, ownership and liability associated with the dam in question.

Aside from motivation due to personal integrity, and concerns due to liability as the registered land owner, I also owe a fiduciary responsibility as a professional engineer under the Code of Ethics

section of the Engineering Act with respect to public hazards wherever they may be recognized. In compliance with this, I need to know that you have received, and have *taken notice* of the concerns I've expressed by a formal acknowledgment thereof. A casual email drafted by a low-ranking filing clerk is not acceptable.

In anticipation that you (collectively) will again refuse such acknowledgment, this letter has been witnessed and the posting of it will have been attested to, and duly notarized by the time you receive it. None the less, be advised that obtaining official acknowledgement from your offices, and those of Mr. Donaldson, remains a priority to be pursued with whatever creative doggedness it may demand.

Yours truly

Andre J. Audet P.Eng

cc. The Honourable Doug Donaldson

Witnessed By:

Name	Signature	Date
C DAWSON		16/04/19
R CHRISTENSEN		16/04/19

BRITISH COLUMBIA

File: 76800-30/22-100

March 18, 2019

Andre Audet
2580 Crystal Drive
Courtenay, British Columbia
V9N 9K1

Dear Andre Audet:

(Re: Mayfly Creek Wetlands)

I refer to your letter of February 27, 2019 and your Report on Mayfly Creek Wetlands. I have been asked to acknowledge receipt of your letter on behalf of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

We are gathering information regarding the history of the restrictive covenants and works (rock spillway and berm) located on your property (Lot 1, Section 26, Township 4, Comox District, Plan VIP87399), which works are the subject of your report. The presence of the works appear to pre-date your acquisition of the property in 2009.

If we have any questions regarding that report, we may follow up with you in due course. Also, we hope you grant access to your property to an independent professional engineer with qualifications in dam safety analysis.

Yours truly,

John Baldwin
Dam Safety Officer

pc: John Neill – Strathcona Regional District, Campbell River
Stacey Larsen Fisheries and Oceans Canada, Community Advisor, Campbell River
Alycia Traas – BC Ministry of Transportation and Infrastructure, District Manager, Campbell River
Jenna Cragg - Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Regional Operations Division, Ecosystems Biologist, Nanaimo

Ministry of Forests, Lands, Natural Resource Operations and Rural Development
West Coast Region
Resource Stewardship
Water Protection
Mailing Address:
2080A Labieux Road
Nanaimo BC V9T 6J9
Telephone: 250 751-7220
Facsimile: 250 751-7224
Website: www.env.gov.bc.ca/wsd

BRITISH COLUMBIA

File: 76800-30/22-100

August 29, 2019

VIA EMAIL: andre@audet.ws

Andre J Audet
2580 Crystal Drive,
Courtenay, British Columbia
V9N 9K1

Dear Andre Audet:

This is to follow up on my letter to you dated March 18, 2019, regarding your concerns with respect to Mayfly creek dam, drainage and your property (Lot 1, Section 26, Township 4, Comox District, Plan VIP87399) located south of Campbell River.

This office has reviewed your package. We would like to meet with you on a **without prejudice basis** to obtain a clearer understanding of your concerns and positions on possible approaches to resolving those concerns.

We anticipate that the involvement of other agencies will be necessary: Strathcona Regional District and the fisheries agencies, e.g., Fisheries and Oceans Canada (DFO) and BC Fish and Wildlife. Therefore, we intend to also invite them to send representatives to any meeting. This is intended to be an initial without prejudice meeting between us. However, please let us know if you plan to attend with a lawyer. In that case, the agencies may also need to involve their lawyers.

My office is located in Nanaimo with suitable meeting rooms and, therefore, I suggest Nanaimo as a meeting location. The week of September 16, 2019 is proposed. Please advise if you would be amenable to a without prejudice meeting and, if so, whether you would plan to attend with a lawyer. **Are there dates during the week of September 16, 2019 that would be workable for you?** If not, perhaps other dates during that month might be suggested. I suggest using e-mail to confirm a suitable date. My e-mail address is John.Baldwin@gov.bc.ca .

Yours truly,

John Baldwin
Dam Safety Officer

Ministry of Forests, Lands, Natural Resource Operations and Rural Development
West Coast Natural Resource Region
Water Protection
Mailing Address:
2080 Labieux Rd
Nanaimo BC V9T 6J9
Tel: 250 751-7220
Fax: 250 751-7224
Website: www.gov.bc.ca/env/water

Andre J Audet

pc Stacey Larsen – Fisheries and Oceans Canada, Campbell River (Stacey.Larsen@dfo-mpo.gc.ca)

Mike Stalberg – FLNRORD Fish and Wildlife, Nanaimo (Mike.Stalberg@gov.bc.ca)

Aniko Nelson – Strathcona Regional District, Campbell River (anelson@srd.ca)

Subject:
RE: proposed meeting regarding Mayfly Creek
From:
"Baldwin, John FLNR:EX" <John.Baldwin@gov.bc.ca>
Date:
2019-09-17, 3:25 p.m.
To:
"andre@audet.ws" <andre@audet.ws>
CC:
"Lapcevic, Pat FLNR:EX" <Pat.Lapcevic@gov.bc.ca>

Andre – further to your letter and e-mail dated September 13th 2019 regarding Mayfly Creek , *please note that this office does not have "a proposal" at this time as we still do not have a full understanding of your concerns and your expected solution(s)*. I still offer to meet without prejudice with you during the week of September 28th 2019 here in Nanaimo. As I will be away for the next four weeks, I ask that you contact Pat Lapcevic (FLNRORD West Coast Water Protection Section Head at 250 -751- 3149) to confirm a suitable day during that week to meet.

John Baldwin

Dam Safety Officer